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City of Gainesville

Inter-Office Communication

Department of Community Development
Phone 334-5022, FAX 334-2282, Station 11

Item No. 2

To: City Plan Board **Date:** January 31, 2001

From: Planning Division Staff

Subject: **Petition 175CPA-00 PB. City Plan Board. Update the Conservation, Open Space and Groundwater Recharge Element of the City of Gainesville 1991-2001 Comprehensive Plan for the proposed 2000-2010 Comprehensive Plan.**

Recommendation

Planning Division staff recommends approval of the draft Conservation, Open Space and Groundwater Recharge Element.

Explanation

Attached is the current draft of the Conservation, Open Space and Groundwater Recharge Element and Data & Analysis of the updated 2000-2010 Gainesville Comprehensive Plan.

The Conservation, Open Space and Groundwater Recharge Element was the subject of City Plan Board workshops on September 28, 2000 and November 30, 2000. The current draft reflects input from the workshops and recommendations from the adopted Evaluation and Appraisal Report for the Comprehensive Plan. In the Goals, Objectives and Policies, strike-through's and underlines indicate changes to the adopted Goals, Objectives and Policies.

Revisions proposed for the Conservation, Open Space and Groundwater Recharge Element include one new and several amended objectives, deletion of several policies that have been met or are no longer pertinent, plus various new and amended policies. The new objective addresses coordination with Alachua County on the Alachua County Forever program, and has an associated policy. Proposed revisions to existing objectives are relatively minor. Other new policies address aquifer recharge area maps and protection of recharge areas, sedimentation problems in Hogtown Creek, and water quality in Tumblin Creek.

Proposed policy revisions include changes to standards and guidelines for protection of environmentally sensitive resources. Proposed changes include updating creek protection provisions to better reflect adopted land development regulations, revising wetlands protection provisions by striking the 'no net loss of on-site wetland acreage and function' requirement, and proposing provisions that address mitigation and generally reflect the wetlands protection language that was recently recommended to the City Commission by the Water Management Advisory Committee (WMAC). The WMAC text can be found in the attached Data and Analysis. Other policy changes include: use of the environmentally significant properties inventory/ranking report; changes to reflect current hazardous materials management and wellfield protection regulations; and updated text regarding trees.

Respectfully Submitted,

for

Ralph Hilliard
Planning Manager

RH:DM

Attachments

Conservation, Open Space and Groundwater Recharge Element

Goal 1

Establish and maintain an integrated and urban-defining open space network that protects and conserves key environmental features.

Objective 1.1

Upon adoption of this Plan, the City shall protect all significant environmental lands and resources identified ~~on Map 2~~ in the ~~(~~Environmentally Significant Land and Resources~~)~~ map series within the Future Land Use Map Series. The City shall continue to identify environmentally significant open space and recreation sites for acquisition.

Policies

1.1.1 At a minimum the following standards and guidelines shall be used to protect environmentally sensitive resources identified ~~on Map 2~~ in the ~~(~~Environmentally Significant Land and Resources~~)~~ map series within ~~of~~ the Future Land Use Map Series:

a. Creeks: ~~Developments must be consistent with the "Regulations of Development Near Creeks" Ordinance, which prohibits~~ Development is prohibited within 35 feet of the ~~centerline~~ break in slope at the top of the bank ~~centerline~~ of any regulated creek. Between 35 and 150 feet from the break in slope at the top of the bank, there is a presumption that development is detrimental to the regulated creek unless demonstrated otherwise.

b. Wetlands: Developments containing wetlands must ~~maintain the existing level of wetland acreage and function on the property~~ avoid loss of function or degradation of wetland habitat and/or wetland hydrology as the highest priority. Degradation or loss of function that is unavoidable shall be minimized, and the applicant must demonstrate that the cause of the degradation or loss of function is clearly in the public interest. The City shall develop and implement land development regulations that at a minimum:

1) Establish criteria for determining whether or not the proposed development or activity is clearly in the public interest;
2) Establish mitigation ratios for wetland preservation, restoration and creation;
3) Establish bonding, monitoring and maintenance requirements for wetland mitigation projects;
4) Establish means of assuring that the wetland mitigation project continues to exist and function as approved;

5) Require review and approval of wetland mitigation projects by qualified professionals.

c. Lakes: Developments containing a natural lake (or lakes) must not adversely impact the condition of the lake. Dredge and fill shall be prohibited. Development shall be prohibited within 35 feet of the landward extent of a lake.

d. Wellfields: Developments must be consistent with Policy 2.3.~~3~~2 of this Element.

e. Major Natural Groundwater Recharge Areas: Developments within this area must be consistent with Policy~~ies~~ 2.3.43 and 2.3.5 of this Element.

f. Upland Areas: Developments within an area identified as Upland must submit an ecological inventory of the parcel. Based on the inventory, development may be allowed on up to the maximum of 75 percent of the parcel.

1.1.2 The City shall ~~adopt criteria for~~ use the environmentally significant properties inventory/ranking report ~~the urban area, and use these criteria to develop and maintain an inventory of open space and natural reservations to be considered for acquisition. These criteria shall be designed~~ to ~~preserve~~ identify viable populations of native plant and animal species, environmentally significant areas, and unique geological or historic features that should be preserved, and show connectivity with other public lands and environmentally significant areas that should be maintained.

1.1.3 ~~By June 1992~~, The City shall ~~adopt~~ continue to have land development regulations that require new developments to dedicate land and easements, particularly for the creation of buffers along and around surface waters and natural reservations and to facilitate the development of greenways.

1.1.4 The City shall allocate a minimum of $300,000 ~~$150,000~~ per year toward the acquisition and preservation of environmentally significant open space and recreation sites.

Objective 1.2

The City shall coordinate with Alachua County on the Alachua County Forever program.

Policies

1.2.1 The City shall seek to maximize the protection of environmentally sensitive lands through the nomination of properties for acquisition with Alachua County Forever and other relevant funds.

Goal 2

Mitigate the effects of growth and development on environmental resources.

Objective 2.1

Upon adoption of this Plan, ~~existing~~ citywide levels of wetland acreage and functions within City limits shall be maintained to the extent feasible through the year ~~2001~~ 2010.

Policies

2.1.1 ~~By 1992~~, The City shall ~~develop and~~ continue to maintain an inventory of wetlands, and adopt land development regulations designed to ~~preserve~~ conserve ~~existing~~ wetland acreage~~s~~ and preserve natural functions on a citywide basis. When wetlands are unavoidably lost to development, mandatory mitigation shall be required to ensure no net loss of acreage and functions occurs. Mitigation will be performed within city limits except where special circumstances prohibit this option, in which case all mitigation must remain within Alachua County.

Objective 2.2

The City shall improve the quality of stormwater entering City lakes and creeks by requiring development and redevelopment to meet the adopted water quality standards of this Element and the Stormwater Management Element.

Policies

2.2.1 The City shall ~~adopt land development regulations that~~ continue to require stormwater quality treatment facilities for redevelopment of non-residential sites and the Central City District, particularly within stream-to-sink basins.

~~2.2.2 The City shall adopt land development regulations that reduce the amount of impervious parking surface allowed within any environmentally significant area, as compared to impervious allowances outside these areas. In these areas, reduction of impervious surface shall include reduction of required parking spaces, use of pervious surfaces, and/or use of multi-story parking structures to prevent damage to environmentally significant areas and transition zones.~~

2.2.~~3~~2 The City shall ~~adopt~~ continue to have land development regulations that require ~~state-of-the-art~~ best management practices for stormwater ~~quality and hazardous materials management designs to prevent damage to environmentally significant areas and transition zones~~.

2.2.~~4~~3 The City shall adopt land development regulations that require the handling of hazardous materials in such a way as to prevent degradation of the natural environment. At a minimum, this shall be achieved by complying with the Alachua County Hazardous Materials Management Code ~~(Ord. 91-6, 1991)~~ and the Alachua County Murphree Wellfield Protection Code, which:

a. Prohibit~~s~~ new~~, large-scale chemical businesses,~~ hazardous materials facilities~~,~~ and regulated underground storage tank systems from siting within the unconfined zone of the Floridan aquifer;

b. Prohibit new, large-scale hazardous materials facilities from siting within the primary and secondary wellfield protection zones of the Murphree wellfield.

c. Require~~s~~ new, large-scale ~~chemical businesses~~ hazardous materials facilities to maintain large setbacks from surface waters, wells, and floodplains; and

d. Requires stringent ~~chemical~~ hazardous materials storage and containment designs, periodic monitoring, inspections, a management plan, fees, and penalties for non-compliance.

2.2.~~5~~4 The City shall ~~adopt~~ continue to have land development regulations that supplement the standards of the applicable Water Management District to promote the natural cleansing of water in creeks. Such standards ~~shall~~ include:

a. Limiting creek dredging;

b. Prohibiting channelization;

c. Requiring sedimentation controls during and after construction;

d. Protecting creek banks and vegetation;

e. Requiring treatment of the first "one inch" of runoff;

f. Restoring previously channelized creeks identified for restoration by the City, provided that such restoration does not conflict with stormwater management objectives.

2.2.~~6~~5 The City shall maintain an inventory of altered creek segments suitable for restoration to a more natural condition.

Objective 2.3

~~By June 1992~~, The City shall only permit activities that maintain drinking water resources to meet the demands of population projected for the year ~~2001~~ 2010.

Policies

~~2.3.1 To protect drinking water resources, the City shall adopt criteria for the location of hazardous materials collection/transfer/treatment facilities.~~

2.3.~~2~~1 The City shall continue to cooperate with the Alachua County Environmental Protection ~~Office~~ Department, the Florida Department of Environmental ~~Regulation~~ Protection ~~(FDER)~~(FDEP), the Water Management Districts, and the Environmental Protection Agency (EPA) and shall support the appropriate agencies with efforts to accomplish the following:

a. Identify areas of pollution to surface waters and groundwater;

b. Establish a monitoring program that provides an annual report describing present environmental conditions and cleanup status;

c. Identify parties responsible for polluted areas, and require such parties to mitigate pollution problems.

2.3.~~3~~2 The City shall allow land uses and facility design ~~in that part of the City falling~~ within wellfield ~~management~~ protection zones (and other "community water system" cones of influence as defined by Rule 17-550.200 and 9J-5.003(21), F.A.C.) and identified ~~on Map 2~~ in the ~~(~~Environmentally Significant Land and Resources~~)~~ map series within ~~of~~ the Future Land Use Map Series, that are in compliance with the Murphree Wellfield ~~Management Code Ordinance 88-15~~, Protection Code. ~~adopted July 26, 1988 by the Alachua County Board of County Commissioners. New placement of septic tanks in the secondary zone for non-residential uses shall also be prohibited.~~

2.3.~~4~~3 The City shall only allow new development to place septic tanks in commercial, institutional, and industrial districts:

a. In compliance with ~~areas of major groundwater recharge, if the development is in compliance with the Alachua County Hazardous Material Code Ordinance 91-6 and does not include activities handling hazardous materials as listed in EPA's extremely hazardous substances list promulgated by SARA Title III; and~~ Division 3., Wellfield Protection

Special Use Permit of the City's Land Development Code, and if the development is in compliance with the Alachua County Hazardous Materials Management Code.

b. In areas not shown as regulated creek, lake, wetland, and upland areas identified ~~on Map 2 (~~in the Environmentally Significant Land and Resources map series~~)~~ of the Future Land Use Map Series.

2.3.~~5~~4 The City shall ~~adopt~~ continue to have a water conservation plan consistent with the Water Management Districts' plans (Sec. 373.175 & 373.246, F.S., and Chap. 40C-21, F.A.C.). The plan shall include strategies to deal with emergency conditions, implement public education campaigns regarding the nature of groundwater resources and the need to protect and conserve them, provide a public information program on water reuse systems, and develop potable water rate structures to encourage water conservation.

2.3.~~6~~5 Pursuant to Section 373.0395, F.S., Water Management Districts ~~will~~ are to map "prime" groundwater recharge areas within the County. Should such areas be identified within City limits, the areas will be mapped and included in the adopted comprehensive plan, and City land development regulations shall be amended to protect such areas if they are not already protected by existing regulations and programs.

2.3.6 Until such time as prime recharge areas are mapped, the City shall use the Floridan Aquifer recharge maps prepared by the St. Johns River Water Management District and the Suwannee River Water Management District (see Environmentally Significant Land and Resources map series within the Future Land Use Map Series). City land development regulations shall be amended to protect such areas if existing regulations and programs do not already protect them.

2.3.7 Final development orders shall require compliance with septic tank rules (Chapter ~~10D-6, F.A.C.~~ 64E-6, F.A.C. ~~and Section 381.272 (9)(a), F.S.)~~

Objective 2.4

The City shall ~~adopt~~ amend its land development regulations~~, based on performance standards keyed to the resources, that are~~ as necessary to conserve environmentally significant surface waters; major natural groundwater recharge areas; ~~development constraining soils~~; threatened or endangered or listed (or candidates for being listed) plants, animals and habitats; and prevent the spread of invasive vegetation. The adopted regulations shall be designed to maintain viable populations of these existing plant and animal species and allow development activities which are compatible with identified environmentally significant lands and resources. (See ~~Map 2 of~~ Environmentally Significant Land and Resources map series within the Future Land Use Map Series.).

Policies

2.4.1 ~~By 1993,~~ The City shall maintain an updated ~~its~~ inventory of identified environmentally significant resources identified ~~on Map 2~~ in the Environmentally Significant Land and Resources map series within ~~of~~ the Future Land Use Map Series. If additional resources are identified, these properties shall be subject to ~~performance based~~ regulations keyed to the resource present at the site. The Future Land Use Map Series shall be amended to include these properties.

2.4.2 The City shall adopt land development regulations that protect identified threatened or endangered or listed (or candidates for being listed) plants, animals or habitats. These regulations shall require developments of parcels within the environmentally significant areas to submit an ecological inventory of the parcel.

2.4.3 The City shall ~~develop~~ continue to have guidelines for the design of stormwater basins that require the use of native vegetation and basin slopes suitable for stormwater treatment that promote highly diverse plant and animal habitats, particularly within stream-to-sink basins, and that enhance the hydrological and ecological functions of related wetland areas.

2.4.4 ~~By 1994, the City shall identify road segments where large numbers of animals are killed ("road kills") and establish mitigation policies to be used in conjunction with future road improvements.~~ Future road alignments shall ~~avoid~~ minimize their impact on environmentally significant animal habitats.

2.4.5 The City shall ~~adopt land development regulations that~~ continue to require construction design consistent with existing terrain by discouraging contouring, cut and fill, or other practices where they might be shown to cause soil erosion.

2.4.6 The City shall ~~adopt~~ continue to have land development regulations for environmentally significant wetlands, lakes and regulated creeks that require:

a. Setbacks from regulated creeks, lakes and wetlands;

b. Prohibition of development ~~which~~ that would cause erosion and sediment pollution to regulated creeks, lakes and wetlands;

c. No net increase in the rate of runoff from development sites adjacent to regulated creeks, lakes and wetlands;

d. Retention or detention of the first inch of runoff of developments adjacent to regulated creeks, lakes and wetlands, through on-site filtration;

e. Retention of vegetation integral to the ecological value of regulated creeks, lakes and wetlands;

f. Compliance with the City's adopted criteria for controlling sediment and erosion;

g. Allowance of a transfer of development intensity and density from lower to higher elevations of a site; and

h. Prohibition on the installation of all septic tanks.

2.4.7 The City shall ~~annually~~ periodically conduct an inventory of environmentally significant plants, animals, and habitats within at least two city-owned parks or open space parcels; prepare a list of plants, animals, and habitats to protect; and prepare a plan for the maintenance of viable populations of these plants and animals.

2.4.8 ~~By 1992,~~ Chemical control efforts by the City to manage pest species shall only include use of chemicals ~~designated by the City to be~~ that are safe for wildlife and public health. Chemical control will be used only when non-chemical controls do not abate the pest problem.

2.4.9 The City shall coordinate with Alachua County, ~~FDNR~~ FDEP and the Water Management Districts to conserve environmentally significant ~~vegetative~~ plant communities ~~located within both the City and within the unincorporated area~~ by submitting relevant land development proposals for review to the Alachua County Environmental Protection ~~Office~~ Department, the applicable Water Management District, and ~~FDNR~~ FDEP for comment and recommendation.

~~2.4.10 By June 1992, the City shall adopt land development regulations that include (1) a definition of environmentally significant open space and other categories of open space; and (2) regulations to preserve such open space.~~

2.4.~~11~~10 The City shall protect floodplains through existing land development regulations ~~which~~ that at a minimum:

a. Prohibit development within the flood channel or floodplain without a City permit;

b. Prohibit filling in the flood channel by junk, trash, garbage, or offal;

c. Prohibit permanent structures in the flood channel, except for those necessary for flood control, streets, bridges, sanitary sewer lift stations, and utility lines;

d. Prohibit the storage of buoyant, flammable, explosive, toxic or otherwise potentially harmful materials in the flood channel;

e. Prohibit development within the floodplain ~~which~~ that would reduce the capacity of the floodplain;

f. Prohibit development ~~which~~ that would cause or create harmful soil erosion, stagnant water, and irreversible harmful impacts on existing flora and fauna;

g. Limit flood channel uses to agriculture, recreation, lawns, gardens, and parking areas; and

h. Limit floodplain uses to launching areas for boats and structures at least one foot above the 100-year flood elevation, in addition to those allowed in the flood channel.

2.4.~~12~~11 The City's ~~shall amend its current~~ land development regulations shall ~~to include performance based standards~~ ~~to~~ protect environmentally significant lands and resources ~~that will at minimum~~ by:

a. Controlling permissible uses through regulatory overlay districts;

b. Providing opportunities for alternative and innovative site development;

c. ~~Establish~~ Providing setback and parking standards;

d. Providing mandatory mitigation to ~~ensure no~~ minimize net loss of acreage and functions when wetlands are unavoidably lost;

e. Allowing for, or require, the clustering of development away from environmentally significant resources; and

f. Restricting on-site waste disposal systems.

2.4.~~13~~12 At a minimum, conservation strategies for significant ~~vegetative~~ natural communities shall include:

a. Required ~~preservation~~ conservation of native upland ~~vegetative~~ natural communities;

b. Installation of native vegetation landscaping and removal of invasive trees and shrubs; and

c. ~~Surface water~~ Setbacks.

Objective 2.5

The City shall continue existing programs and institute new programs as necessary to maintain air quality levels which comply with county, state and national ambient air quality standards through the year ~~2001~~ 2010.

Policies

2.5.1 Adopt citywide regulations restricting or prohibiting the burning of plastics, particularly with regard to local government, institutional, or commercial incineration. ~~(Refer to Solid Waste Element for additional incineration policies.)~~

~~2.5.2 By 1995 the City shall make available a general information brochure describing known radon hazards in the City.~~

2.5.~~3~~2 The City shall encourage ~~non-auto~~ transportation choice by adopting new programs and strategies as may be needed to encourage public ~~mass~~ transit use, bicycling, walking, and higher urban development densities near neighborhood centers ~~activity centers, satellite parking lots, and mixed land uses~~.

Objective 2.6

The City shall continue to promote and practice ~~energy~~ natural resource conservation and pollution prevention ~~to reduce energy consumption and demand~~ in order to reduce negative impacts on the environment. To accomplish this, the City shall continue to incorporate ~~energy-saving~~ natural resource-saving and pollution prevention policies in this Element and other elements of the Comprehensive Plan (such as Solid Waste, Future Land Use, and ~~Traffic Circulation~~ Transportation Mobility).

Policies

~~2.6.1 By 1992, after completion of the Local Energy Engineer Program (LEEP), the City shall amend the Comprehensive Plan to include an Energy Element unless it is deemed unnecessary~~.

2.6.~~2~~1 The City shall continue to provide customers with education and incentive programs to encourage ~~reduced energy consumption~~ natural resource conservation and pollution prevention.

Goal 3

Improve urban spaces through preservation and enhancement of the urban forest.

Objective 3.1

~~After January 1, 1992,~~ The total percentage of tree canopy coverage within the City shall not fall below the 199~~2~~4 percentage of tree canopy, as estimated by the City Manager or ~~his~~ designee, ~~using methods developed by the Florida Division of Forestry,~~ except in the event of natural catastrophe ~~(disease or insect epidemic, or storm)~~.

Policies

3.1.1 ~~By 1992, establish a tree planting program whereby~~ The City shall continue to plant~~s~~ at least 400 trees (or 650 inch-diameters at chest height) within City limits annually, and encourage developers and citizens to plant at least 600 trees annually. At least 75 percent of the trees should be native to north Florida.

3.1.2 The City shall adopt land development regulations for new development that require the following:

~~a. Use of native and drought-tolerant plants ("xeriscape") and a reduction in allowable turf area;~~

~~b. Energy conservation through a 5 percent increase in tree and shrub canopy over the 1990 Gainesville Landscape Ordinance canopy requirement to shade buildings and pavements;~~

~~c. Use of pervious paving materials adjacent to landscape strips and islands to provide greater rooting volume for trees and shrubs; and~~

~~d. Species diversity in new plantings (no more than 20 percent of any one genus citywide, or on any site plan except those within airport flight paths) to reduce the effect of loss of a tree species due to insect or disease outbreaks. (This policy excludes parking lots and road medians, that may have up to 50 percent of one tree genus.)~~

~~a.~~c. A plan for the removal of invasive trees and shrubs shall be submitted at the time of final development review.

~~3.1.3 By 1991, the City will have applied for a matching grant to conduct an inventory of city street trees to identify large trees and available planting locations. The information generated will be used as the basis for a comprehensive tree planting plan. If a grant is not awarded, then a study shall be conducted that will lead to the development of a comprehensive tree planting plan. By 1994, the City will conduct an independent study on the impact of trees on the infrastructure and shall submit a report, the information from which can be incorporated in the comprehensive tree planting plan so that appropriate trees can be planted in appropriate locations.~~

3.1.4~~3~~ ~~By 1992, all~~ The City shall continue to require that removal of regulated trees (as identified by the Gainesville Landscape Ordinance) shall be mitigated by on- or off-site tree planting (or an equivalent exaction of fees) ~~of at least 10 percent for regulated trees and 100 percent for Heritage trees (other than regulated water oak, laurel oak, camphor and pine and tallow, which shall require 10% mitigation) of the total diameter inches removed measured at breast height~~.

3.1.5~~4~~ By ~~1995~~ 2003, the City shall ~~adopt~~ prepare tree-lined streetscape guidelines which require the preservation and establishment of tree-lined streets and compatibility with existing infrastructure. In order to promote compatibility with infrastructure, strategies such as placing overhead utilities underground, using aerial (or tree) cabling, planting trees that are compatible with overhead utilities and reserving street right-of-way for trees shall be implemented, when economically feasible. All trimming within the public right-of-way shall use the National Arborist Association's approved tree-pruning practices to minimize the physical and aesthetic harm to trees that must be pruned.

~~3.1.6 In support of Policy 3.1.5, the City, shall, by June 1992, identify important street segments (to be known as "Gateway Streets") where a reduction in visual~~

~~obtrusiveness of infrastructure would be desirable. Consideration of financial and physical obstacles associated with all existing infrastructure along suggested gateways will be made before official designation.~~

~~3.1.7 By 1992, the City shall prepare a plan for the establishment and preservation of tree-lined streets. This plan shall give priority to high-visibility Gateway Streets and important activity center road segments, as well as segments included on the Metropolitan Transportation Planning Organization (MTPO) Transportation Improvement Plan.~~

3.1.~~8~~5 The City shall continue to remove invasive trees and shrubs from its rights-of-way and property and to inform private property owners of the benefits of removing invasive vegetation.

3.1.~~9~~6 The City shall continue ~~amend the Land Development Code~~ to exclude invasive vegetation from plant material permitted in landscape plans.

Goal 4

Provide ongoing monitoring of environmental resources and mitigate current pollution problems and potential point sources of pollution.

Objective 4.1

~~By June 1992,~~ The City shall ~~establish~~ participate in an environmental ~~quality~~ monitoring program designed to identify problems and trends in local air, surface water, groundwater, and plant and animal habitat quality. This program shall also be used to evaluate the effectiveness of protective regulations.

Policies

4.1.1 The City shall work with the Alachua County Environmental Protection ~~Office~~ Department and other appropriate ~~agencies~~ organizations to design and implement a comprehensive and ongoing monitoring program for Gainesville's environmental resources. This program should have at least an urban area scope and shall produce a "state of the environment" report ~~on~~ at least every five years ~~an annual basis~~.

Objective 4.2

~~By 1993,~~ The City shall identify pollution problems ~~by responsible parties~~ and ~~shall~~ establish strategies to mitigate, remediate, or assist in the mitigation or remediation of~~,~~ these problems. ~~One priority~~ Priority shall be given to improving the quality of water entering Sweetwater Branch, Tumblin Creek and Hogtown Creek. ~~which transmits water directly to the Floridan Aquifer through Alachua Sink.~~

Policies

4.2.1 By ~~December 1992~~ 2003, the City shall submit a National Pollutant Discharge Elimination System (NPDES) permit application to FDEP in order to improve surface water quality ~~work with FDNR, FDEP, St. Johns Water Management District and Alachua County to prepare a plan which at a minimum will be consistent with NPDES permitting to ensure that water discharged by Sweetwater Branch, into Paynes Prairie will be discharged in a manner that will support the management objectives of FDNR and City objectives regarding protection of the Floridan Aquifer System~~.

~~4.2.2 The City shall comply with State pollution control requirements at the former Gainesville Airport Landfill and Burn Site described in the Solid Waste Element.~~

~~4.2.3 By 1994, the City shall develop and implement a mitigation plan for identified point sources of air pollution from city-owned facilities.~~

4.2.2 The City shall continue to explore projects for improving water quality, including the study of sedimentation problems, in the Hogtown Creek watershed with the goal of reducing sediment accumulation in the vicinity of NW 34th Street by 2010.

4.2.3 The City shall continue to explore projects for improving water quality in Tumblin Creek that are identified in the City of Gainesville Master Stormwater Plan.

4.2.4 To enhance the quality of water entering Sweetwater Branch, the city will construct a master stormwater basin to treat flow from downtown Gainesville.

CONSERVATION, OPEN SPACE AND GROUNDWATER RECHARGE

DATA AND ANALYSIS REPORT

City of Gainesville
Comprehensive Plan

January 2001

Prepared by

The Department of Community Development

Comprehensive Planning Section

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CONSERVATION, OPEN SPACE, AND GROUNDWATER RECHARGE ELEMENT

DATA & ANALYSIS REPORT

EXECUTIVE SUMMARY

The Conservation, Open Space, and Groundwater Recharge Element of the City of Gainesville Comprehensive Plan identifies the environmental resources of the city and describes the functions of those resources. The Element also identifies the key community priorities for environmental conservation, and proposes strategies for the attainment of such conservation. The following is a summary of the Element:

THE VISION: A GREEN NETWORK

A plan for environmental conservation and open space should include a grand vision which illustrates what the community expects Gainesville to look like in the future. This Element proposes a "Green Network" vision, which includes tree-lined creeks, tree-lined streets, and interconnected open spaces for recreation and wildlife habitat with the goal of connecting with the state network of wildlife corridors.

Gainesville's plan for a citywide green network includes:

The Network Maps. Identifies "gateway" streets, linear creek and open space corridors, rail-trails, and important natural resource areas.

Restoring, Conserving and Preserving the Green Network. Several miles of city creeks and tree-lined streets offer visual beauty, wildlife habitat, and recreation for the community. Certain segments, however, have been damaged as a result of poor development practices in the past that are no longer permitted and also human activity. This section identifies some of the known segments in need of restoration and proposes preservation, conservation and restoration strategies.

Regulating Environmentally Significant Open Space. This section describes how environmentally significant areas of the city are identified. It also describes strategies to protect environmentally significant land owned by the public and private sectors. Furthermore, the section discusses areas where there are environmental overlay zones (zones which apply special development regulations to properties containing environmentally significant attributes). In addition, the section describes environmental management of public parks and open space.

Acquiring Land to Expand the Network. This section describes the ranking system used to identify properties that are most important for acquisition. The section also describes types of acquisition and acquisition issues.

A Healthy Tree Canopy. A healthy tree canopy that supports urban wildlife, provides shade, stabilizes soil, and ameliorates the environment by moderating the effects of temperature extremes and storm water run-off.

GAINESVILLE'S NATURAL ENVIRONMENT: THE COMPONENTS

There are five broad components of Gainesville's natural environment:

- Groundwater (includes wellfields, aquifer/groundwater recharge)
- Surface Waters
- Natural Communities (includes threatened and endangered species)
- Urban Forest/Tree Canopy
- Air
- Soils

The Element describes the importance of each of the 6 components by discussing the functions of these natural resources. Functions are presented in such a way as to illustrate the benefits they provide. Current and potential problems associated with the abuse of these resources are also presented, as are the strategies available to protect natural resources.

OTHER ISSUES

The Element contains sections describing (1) "point source" pollution problems; (2) a proposal to establish a comprehensive and ongoing environmental monitoring program; (3) hazardous waste issues; and (4) economic costs of damage to the environment.

INTRODUCTION

Despite its urban character, the Gainesville area contains relatively high-quality air, soil, water, tree canopy and urban wildlife. Gainesville's natural environment provides essential services for the community. In addition to providing beauty, the natural environment stores, transports, and cleans surface waters and drinking water. It assimilates and filters pollutants. It offers recreational opportunities, and supports various economic activities such as tourism, mining, and agriculture. It provides habitat for plants and animals. Most importantly, Gainesville's natural environment is self-managing. That is, when allowed to function naturally, it provides services without the need for large public expenditures. Trees and wetlands, for example, filter pollutants much more cheaply than smokestack scrubbers or sewage treatment plants.

The primary purpose of the Conservation, Open Space, and Groundwater Recharge Element is to identify Gainesville's natural environmental features, describe the functions and services they provide to the community, and describe the actions that should be taken to preserve, conserve, or restore the functions of the natural features found in the community. By protecting the natural environment, substantial protection is provided for Gainesville's long-term quality of life, and the cost of pollution and hazard control is minimized.

THE VISION

Gainesville's Green Network

The Gainesville urban area contains several outstanding natural features. These features, such as Paynes Prairie, Newnans Lake, Bivens Arm, and Hogtown Prairie, are islands of spectacular environmental quality interspersed throughout the urban landscape. The Recreation Element Data Collection & Analysis Section refers to these islands as "gems" of an "Emerald Necklace."

Tying the gems together are a series of connecting strands, or green corridors that connect the "urban" forest with the "real" forest. In the most densely populated areas, the corridors consist of tree-lined streets and gateway streets. These will connect to areas along creeks and trails, which will then connect with larger natural areas, such as Paynes Prairie, San Felasco Hammock, the Austin Carey Forest, Newnans Lake, or Gumroot Swamp, which in turn are connected to very large natural areas like the Ocala and Osceola National Forests. At a local level, then, our green corridors form the "Gainesville's Green Network," shown in the series of maps 2a, 2b and 2c. Protecting the network and restoring parts of it that have been degraded provide the following benefits:

* A maximum amount of visual and physical public access to the natural environment at minimum cost.

* Habitat corridors and islands for urban wildlife, so Gainesville continues to enjoy large and diverse populations of birds and small animals.

* Preservation of representative samples of the ecological communities of Alachua County.

* Conservation of the "forest" function of the urban forest.

Trees and Creeks

Trees and creeks are the most visible ingredients of the Green Network. Gainesville's trees and creeks are either directly or indirectly associated with almost all categories of environmental preservation, conservation, and restoration:

* Creeks receive large volumes of untreated stormwater runoff. Such runoff is probably the most significant source of urban pollution. Creeks are therefore essential to the cleansing of runoff before it reaches our aquifer system.

* Soil erosion and septic tank effluent may negatively affect creeks. Maintaining a buffer of trees and other vegetation along creeks helps to protect creek water quality.

* Creekside lands contain the largest and most important acreages of complete plant communities including trees and other forms of vegetation, and habitat for wildlife.

* A strong connection between conservation and passive recreation exists. Publicly accessible recreation along the greenways of the network provides environmental education and stimulates appreciation for the natural environment.

* Several lakes and wetlands are physically connected to creeks.

* Flow from creeks and lakes enters the Floridan Aquifer directly through sinkholes and wells.

* Gainesville is known as a "City in a Forest." The excellent quality of Gainesville's tree canopy is recognized nationally [1997 Florida Tree City

of the Year; first Florida recipient (1998) of the International Society of Arboriculture Gold Leaf Award]. Our many street trees offer Gainesville residents and out-of-town visitors a view of the natural beauty of the area. Trees are an important part of our image as a place where residents value the environment.

* Trees are important in reducing air pollution and ameliorating rising global temperatures through the sequestration of carbon. They curtail soil erosion and enhance stormwater management. Properly placed trees can abate noise pollution. Strategically planted, they help reduce energy consumption by providing shading and cooling due to transpiration.

* Trees and understory vegetation support the populations of songbirds, raptors and waterfowl in the city. They serve the same function for small amphibians (frogs and toads), reptiles (lizards, including anoles and skinks) and beneficial snakes (which aid in rodent control), and small mammals.

Restoration and Preservation of the Green Network

The quality of the Green Network can be improved dramatically through various restoration projects.

Several formerly natural creeks are now little more than drainage ditches. Since drainage ditches typically lack most of the features necessary to provide for environmental quality (such as habitat, pollution and flood control, and aesthetics), the City should investigate the feasibility of restoring certain ditches to their formerly natural condition. Restoration strategies would vary based on the opportunities and constraints of each, but would generally strive to promote the list of "Creek Protection and Restoration Objectives".

Examples of restoration techniques would include (but are not limited to) replacement of invasive exotic species with vegetation more suited to restoration objectives, reconfiguring the ditch from a straight-line channel to a more curvilinear pattern, establishing appropriate vegetation in areas with insufficient vegetation, and reducing the intensity of certain ditch maintenance efforts that tend to conflict with restoration objectives. Map 1 indicates creek segments that may be in need of restoration. 1967 acres are being restored in the Hogtown Creek basin.

The City of Gainesville is currently involved in a project to revitalize Sweetwater Branch Creek, which drains into Paynes Prairie Preserve, part of the State of Florida Park System. The Sweetwater Branch surface water basin contains approximately 1,710 acres and is located in the southeast central portion of the City of Gainesville. The majority of

surfacewater runoff from the Sweetwater Branch watershed is discharged directly to the creek without receiving treatment. The City's strategy is to construct a stormwater treatment facility to assist in reducing the nutrient and sediment load in the creek.

Trees and Tree-Lined Streets

More than any other factor, Gainesville's visual image is shaped by its trees. With a 60 percent canopy coverage, Gainesville compares very favorably with the national standard recommended by the American Forestry Association of 40%. The relative benefit of the national standard of 40% canopy is as follows:

> Increasing the tree cover in cities to the recommended level would improve the quality of air, water, and soil. In a metropolitan area with a population of around 2 million, planting more trees would mean a savings of more than $2 billion a year in stormwater management costs.
> (Moll, G. 1997. America's Urban Forests: Growing Concerns. *American Forests* 103:3.)

In 1993, Gainesville received a grant through the USDA Forest Services Urban and Community Forestry Program to conduct an urban tree assessment. The University of Florida School of Forest Resources and Conservation provided the City Arborist with a database of 21,380 records generated from a partial survey of trees on the public right-of-way. Of these records, 6,049 were a comprehensive assessment of the condition of street trees 12" in diameter or greater in the older parts of Gainesville; 11,286 records identified vacant planting spaces; 4,045 records were generated as a random sample that would enable statistical inference about the urban forest in general.

Study of the database reveal that although Gainesville has an apparently plentiful urban forest, it lacks diversity in tree age and structure. Furthermore, only about half of the available planting spaces for trees actually have trees.

The majority of large trees in Gainesville are oaks and pines. Laurel Oak and Water Oak, two species notorious for their inability to seal off internal decay, represent 32% of the large trees. The majority of emergency work orders requiring City tree crews to clear roads of fallen branches or uprooted trees are in response to tree failure by these two species. Live Oak, which is much more durable, comprises 16% of the urban forest. Loblolly Pine and Slash Pine represented 19% in 1993, but between 1994 and 1996, 3,450 pines were lost from the public right-of-way when Gainesville became the epicenter of an infestation of Southern Pine Beetle.

Gainesville's innovative program to remove the invasive exotic Tallow trees from public property was featured in an article in the Journal of Arboriculture 25(2) entitled "Controlling invasive exotics: A tallow tree replacement program campaign in Florida". The program has resulted in the removal of more than 300 Tallow trees from City streets. It coordinated the efforts of school children (through our Arbor Day celebrations), volunteers from the local chapter of the Florida Native Plant Society, University of Florida students, and local newspapers to locate the trees, which were then removed by government tree surgeons.

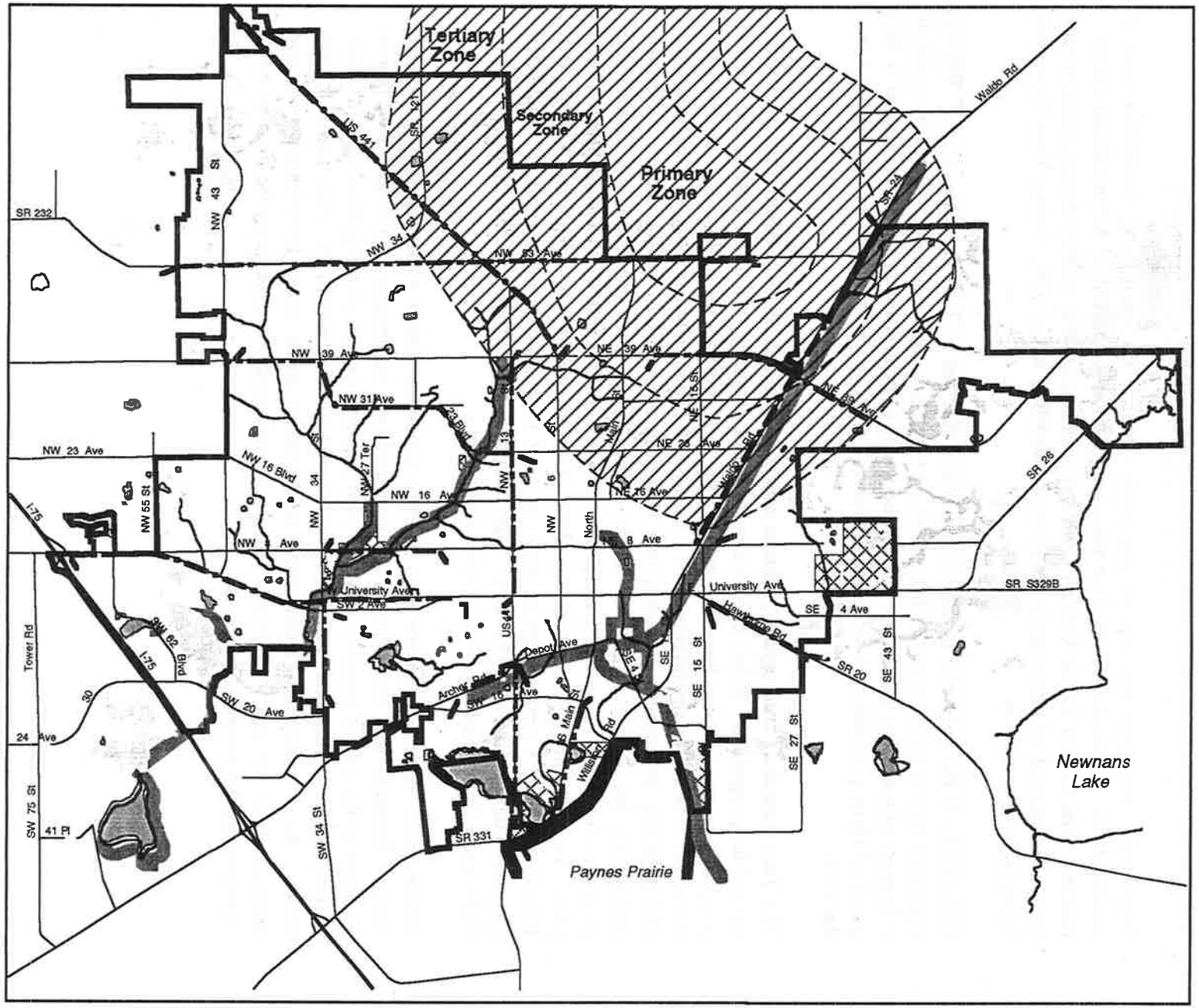
Gainesville was also the site of important research on identifying hazardous trees ("The predictability of tree decay based on visual assessment", Journal of Arboriculture 22(6)). This research was funded by the City of Gainesville in response to citizen disappointment resulting from the removal of many large laurel oaks identified in the 1993 Urban Tree Assessment as being in poor condition.

Gainesville is the only city in the United States that has a "Tree Appeals Board." Whenever a regulated tree is to be removed from public property, a sign is posted and nearby residents are informed of the proposed action. If anyone wants to protest the removal, an appeal is filed. A panel of three professionals with certification in the plant sciences hears the case and render a decision.

The ***Tree-mendous Gainesville*** program was established in 1995 to plant 1000 trees/year on public properties—street rights-of-way, parks, drainage retention basins, etc. This program assures Gainesville will meet its code requirements for replanting after trees are removed, whether the removals were a result of a construction project or a consequence of becoming structurally unsound and therefore a hazard to public safety. Besides addressing the quantity of trees in the urban forest, the Tree-mendous Gainesville program strengthens the quality of the urban forest. A diversity of species is planted each year. In 1998 and 1999, more than 75% of the plantings were White Ash, Pop Ash, Basswood, Bald Cypress, Florida Elm, Winged Elm, Southern Magnolia, Fringe Tree, Florida Maple, Red Maple, Live Oak, Bluff Oak, Bluejack Oak, Shumard Oak, Chickasaw Plum, Redbud, Tulip Poplar and Tupelo.

Along many streets, trees are in a healthy condition. Other streets, however, require various forms of tree restoration. New streets should be designed with dedicated places for trees to the extent feasible. Development projects require planting trees both to shade parking areas so that their canopy coverage will be 50% within 20 years and to buffer streets. At a minimum, stormwater management areas must be planted with the equivalent of one tree for every 35' of basin perimeter; the trees may be planted more closely to achieve aesthetic effects.

Map 2A



GREEN NETWORK

Adopted Environmental Overlay Districts

Wellfield District

- County Wellfield Protection Zones
- Zone Boundaries (Primary, Secondary, Tertiary)

*Surface Waters District**

- Regulated Creeks
- Lakes
- Wetlands

Other Districts

- Greenway District
- Gateway District
- Nature Park District
- *Gainesville City Limits*

* **Map does not include Flood Control District.**

Wetlands: Wetlands in the map are taken from the National Wetlands Inventory. Wetlands shown in other maps in this series are taken from SJWMD coverages. These wetlands are similar to NWI wetlands, but generally contain more wetland detail along creek systems.

Source: Environmental Overlay Maps adopted by Ord #s 0-94-52, 0-95-73 and 0-95-36. Petition #s 73TCH-95PB, 58TCH-94PB, and 58TCH-94PB(b), creating Sections 30-301 and 30-305 of the Land Development Code, City of Gainesville, Florida.

Warning: Wetlands depicted on this map are not to be used to determine the extent or existence of wetlands for specific sites within the City of Gainesville, nor will they be used as the basis for making such determinations in the future. The location and extent of all regulated wetlands are as defined or determined by the water management district with jurisdictional authority.

City of Gainesville
Gainesville, Florida

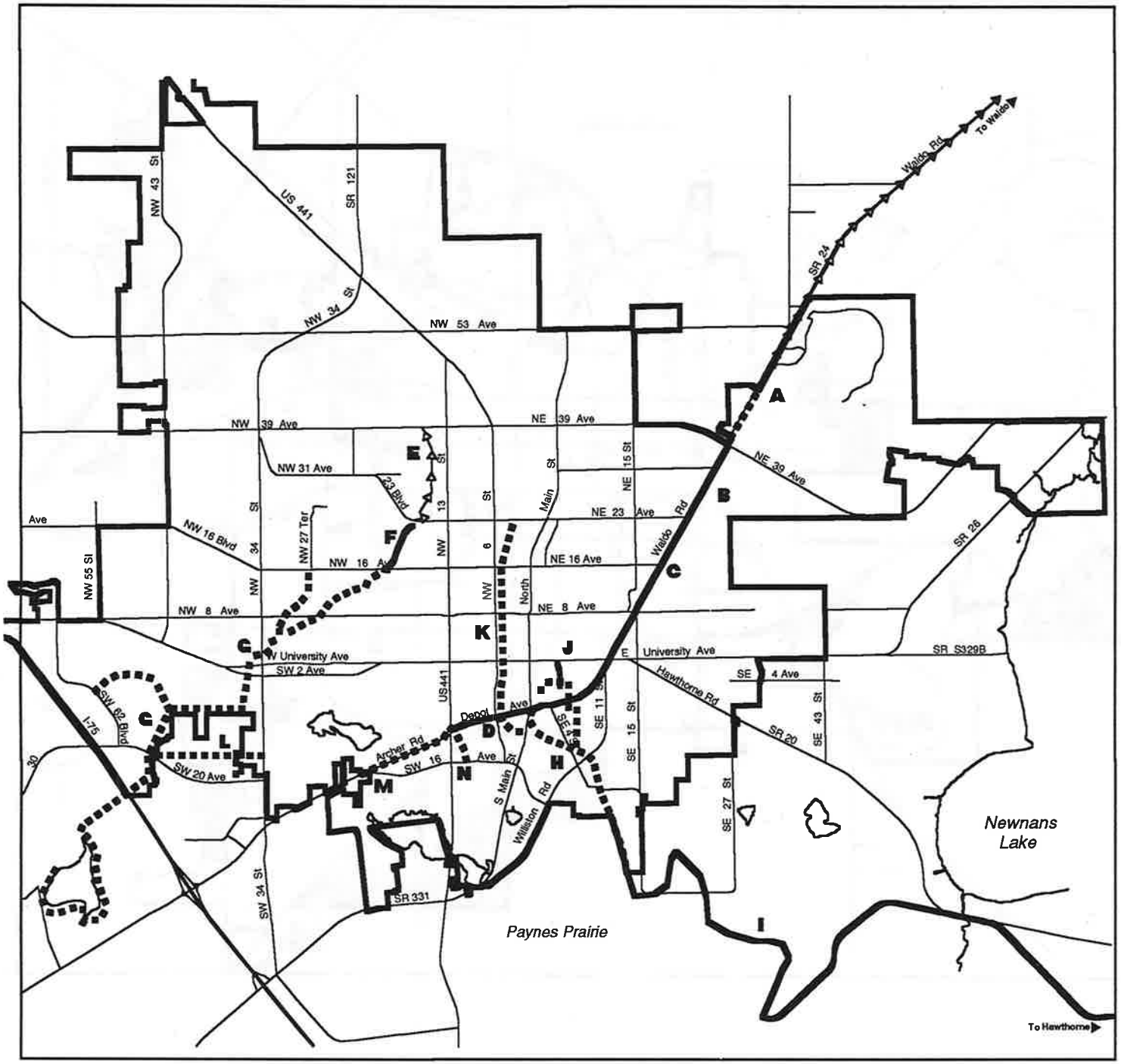
Prepared by the
Department of Community Development
November 2000

0 4000 8000 12000

1"= 8000'

N

Map 2B



GREEN NETWORK

Gainesville Trail Network

- Designated Network Trail - with Existing Trail
- Designated Network Trail - Trail not Installed
- Future Network Trails
- Gainesville City Limits

NETWORK TRAILS	Existing	Proposed	TOTAL
~~WALDO DEPOT RAIL TRAIL:~~			
A NE 39th Ave to NE 47 Ave	0	1.0	
B NE 39th Ave to NE 16th Ave	1.4	0	
C NE 16th Ave to Main St	2.2	0	
D Main St to Univ Center Hotel	1.1	0	
	~~4.7~~	~~1.0~~	~~5.7~~
HOGTOWN TRAIL:			
E NW 39th Ave to Ring North	0	1.0	
F Ring North to NW 16th Ave	0.5	0	
G NW 16th Ave to Kanapaha	0	5.5	
	~~0.5~~	~~6.5~~	7.0
HAWTHORNE RAIL TRAIL:			
H Main St to Boulware	0	1.9	
I Boulware to GUA	7.4	0	
	~~7.4~~	~~1.9~~	~~9.3~~
SWEETWATER TRAIL:			
J University Ave to 4th Ave	~~0.2~~	~~0~~	~~0.2~~
6TH STREET TRAIL			
K NW 23rd St to Main St	0	2.6	2.6
20TH AVE CHARETTE TRAILS:			
L Hull Road Extension Trail:			
SW 20 Ave to SW 34 St	0	1.2	
Park n Ride Lot 2 to SW 20 Ave	0	0.3	
	0	1.5	1.5
M Sigmon Memorial Trail: Univ. Center Hotel to SW 23 Terr	0	0.9	0.9
N PK Younge Trail: SW 10 Terr to Depot Ave	0	0.4	0.4
		Total Miles:	27.6

City of Gainesville
Gainesville, Florida

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0 4000 8000 12000

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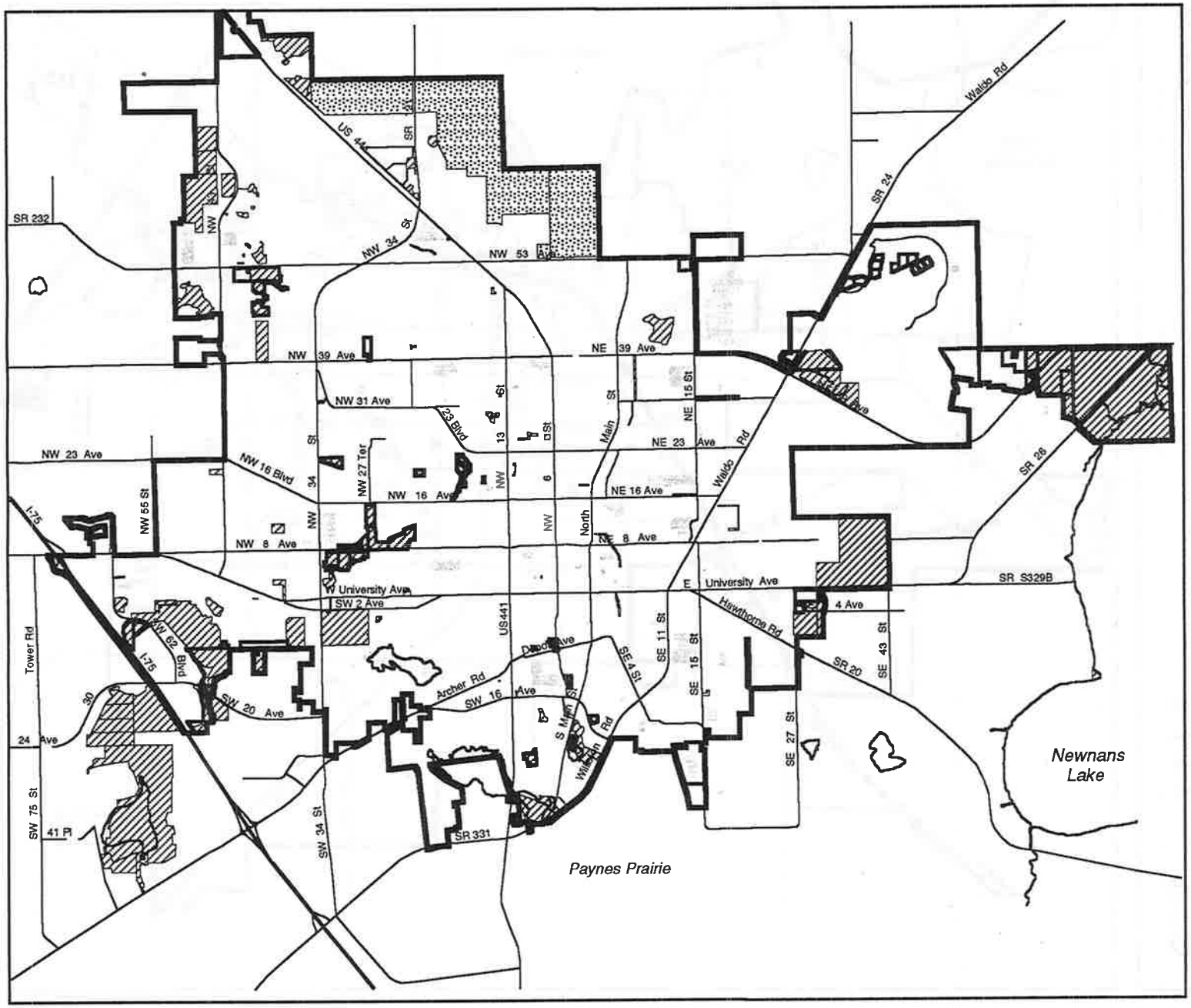
Map 2C



GREEN NETWORK

Existing Parks, Conservation Land Use, Agricultural Land Use & Vacant City-Owned Parcels

Legend

- Parks
- Conservation Land Use
- Agricultural Land Use
- Vacant City-Owned Parcel (>3 acres)
- Gainesville City Limits

City of Gainesville
Gainesville, Florida

Prepared by the
Department of Community Development
November 2000

0 4000 8000 12000

1"= 8000'

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URBAN FOREST PROTECTION AND RESTORATION OBJECTIVES

* Maximizing street tree canopy coverage.

* Ensuring that gateway streets convey the message that Gainesville is a Tree City.

* Promoting use of tree species native to north Florida (or otherwise appropriate for Gainesville streets) and representative of the diversity of trees that can be grown in this environment.

* Minimizing the conflict between trees, paved streets and sidewalks, and utility lines through innovative urban forest management techniques (the use of bio-barrier cloth, engineered soil, growth regulators, etc.).

* Promoting species diversity by striving to have no more than 20 percent of any one tree genus citywide. (According to the City's 1993 Urban Tree Assessment, the most common tree species in Gainesville are laurel oak, live oak, sweetgum, slash pine, loblolly pine, water oak, camphor, magnolia, sugarberry, and red maple. Rather than these species, the City encourages future plantings, when appropriate, to consist of less common species, especially native elms, ash, oaks, magnolias, and maples. Refer to the List of Approved Trees of Gainesville, available from the Gainesville Department of Community Development.)

* Continue to follow the pruning standards articulated in the American National Standard for Tree Care Operations "Tree, Shrub and Other Woody Plant Maintenance" so that as trees grow, they are structurally strong. This will reduce future pruning by guiding the trees to a natural "cathedral" structure. It will diminish the need for hazardous tree removals by eliminating included bark and codominant branching while trees are young.

* Continue the effort to remove all Chinese Tallow trees from public property. This invasive exotic poses a serious threat to the stability of natural ecosystems, particularly wetlands.

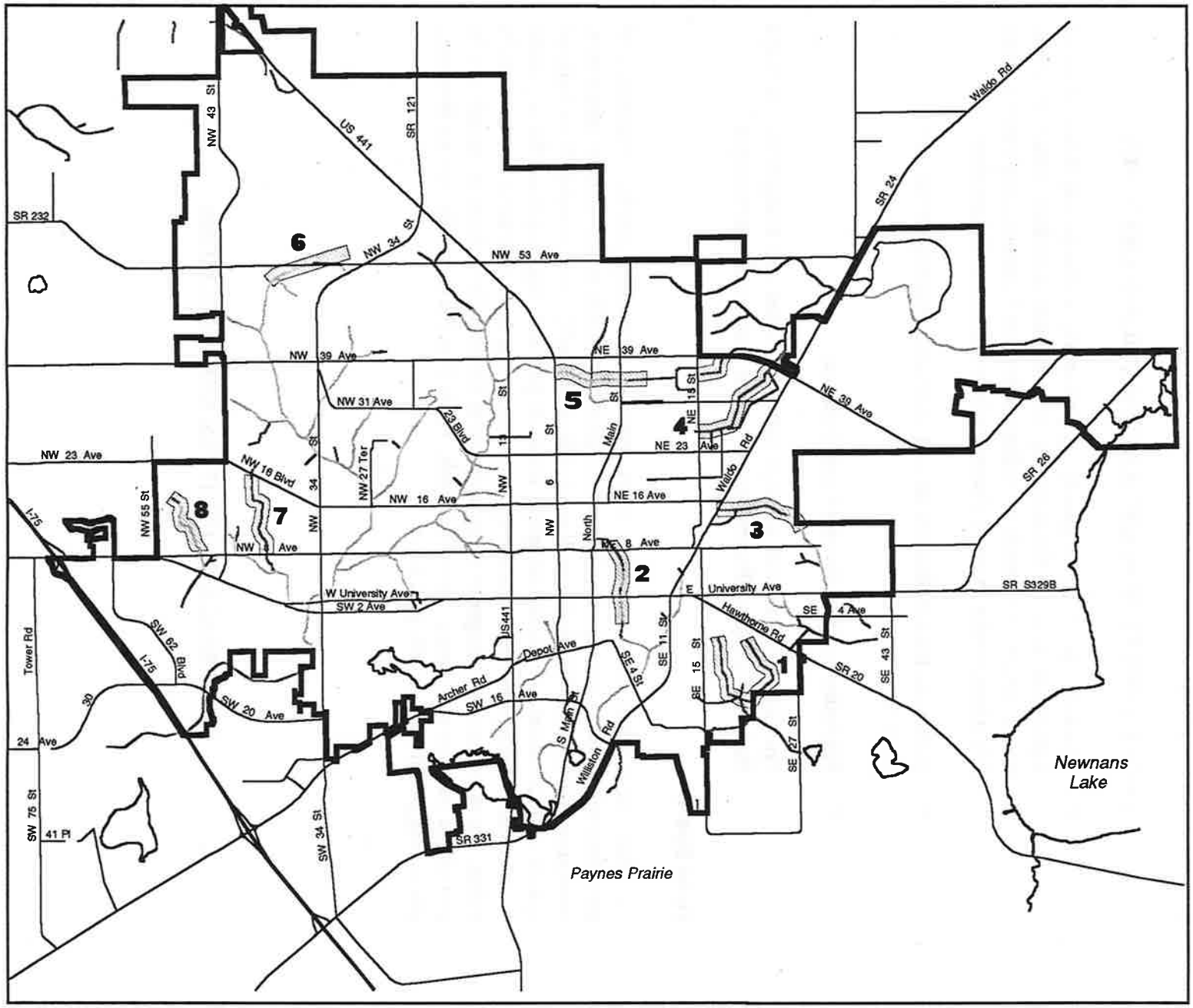
* Continue participation in the Tree City USA program. Gainesville has been a Tree City for 17 years and has received Growth Awards since the inception of that program. In 1997 Gainesville was selected "Florida Tree City of the Year by the Florida Urban Forestry Council.

* Continue to post signs explaining the reasons why trees must be removed and informing them that the Tree Appeals Board can be convened when citizens wish to present counter-arguments that might result in the preservation of such trees.

* Continue review of development proposals to assure they do not result in unnecessary tree removals, that trees to be preserved are adequately protected during construction, and that sufficient new trees are planted to maintain the citywide 60% tree canopy coverage.

* Make sure that an inspector with horticultural training approves the installation of landscaping on sites with approved landscape plans.

Map 1



CREEK SEGMENTS THAT MAY BE IN NEED OF RESTORATION

Legend

- Creeks
- Creek Segment that may be in need of restoration
  - 1 Calf Pond Creek
  - 2 Sweetwater Branch/ Duck Pond
  - 3 Lake Forest Creek
  - 4 Little Hatchet Creek
  - 5 Springstead Creek
  - 6 Possum Creek
  - 7 Royal Park Creek
  - 8 Beville Creek
- Gainesville City Limits

Note: Segments that may be in need of restoration include formerly natural creek channels that are now ditches currently being maintained by the City. This figure indicates expected and approximate locations of segments that may be in need of restoration. Actual locations are subject ot approval by the City Commisssion. Approved locations are available from the Department of Community Development.

City of Gainesville
Gainesville, Florida

Prepared by the
Department of Community Development
November 2000

0 4000 8000 12000

1"= 8000'

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Creeks

The approximate 56 miles of creeks within the city form another green network traversing the city. The creek networks are lined with a diverse array of vegetation, and form the most important wildlife habitat within the city. Because of their attractiveness, creek networks are identified as an important component in Gainesville's active and passive recreation plans.

CREEK PROTECTION AND RESTORATION OBJECTIVES

* Maximize creek water quality by protecting wetlands and headwaters of significant creeks, discouraging construction activities close to creek banks which will result in sedimentation, and encouraging citizens who live along creeks to avoid planting exotics and over-fertilization.

* Maximize the wildlife habitat and vegetative stability of the creek network.

* Minimize the need for creek maintenance.

* Provide public access, through publicly owned creek segments, in ways that will minimize disturbance to natural ecological communities.

Open Space

In urban areas such as Gainesville, open space is generally patchy, isolated, and disconnected. A key planning objective, which promotes public access and environmental awareness, wildlife habitat, and overall environmental quality, is to connect these isolated spaces with corridors. A connected green network provides opportunities for a greater diversity of wildlife, as well as creates the impression that there is more space than really exists. There are several categories of open space in Gainesville -- many of which can be part of the corridor-promoting Green Network. Table 7 in the appendix has an inventory of existing public and private park sites.

OPEN SPACE OBJECTIVES AND FUNCTIONS

* Urban definition, promotion of compact development, and control of urban sprawl

* Space for recreation, and linkages to recreation and nature sites
* Promoting public health and safety by controlling hazards and nuisances

* Improving aesthetics and the image of the community, promoting pleasant and quiet surroundings, and therefore increasing property values.

* Promoting environmental conservation, particularly through provision of natural habitat to support native wildlife diversity, habitat corridors, and preservation of important environmental features.

* Moderating extreme climate conditions by controlling wind, temperature, and water.

* Reducing air and water pollution.

The following sections describe identification, regulation, and acquisition of environmentally significant open space.

Identification of Environmentally Significant Open Space

Although much of the natural environment in the Gainesville urban area has been developed for urban uses, the city retains many environmentally significant features (in addition to areas that can be restored to a more natural condition). In the Gainesville area, environmentally significant features include:

Creeks Noted elsewhere in this Element for possessing a wide range of essential ecological and recreational functions. The City's "Regulation of Development Near Creeks" Ordinance in Gainesville's Land Development Code, Article VIII, Environmental Management recognizes the high value the community assigns to the creeks.

Lakes Possess a wide range of essential ecological and recreational functions.

Wetlands An important component of the ecology of the urban area.

Floodplain Floodplains are widely recognized for providing important species habitat and wildlife corridors, pollution mitigation, recreational and visual amenities, and storage of floodwaters.

Threatened and Endangered Species Habitat

Preservation of such species is critical to the maintenance of biological diversity. The ability of these species to survive is an indicator of the ecological health of an area. Diversity promotes ecosystem survival and preserves species that may be important to humans in the future.

Semiconfined Aquifer Zone, Stream-to-Sink Basins, and MunicipalWellfield

The semiconfined zone of the Floridan aquifer system, stream-to-sink basins, and the municipal wellfield area merit similar protection; namely, land uses in these areas must be regulated to prevent the spilling of hazardous materials or polluted stormwater that can contaminate important groundwater resources.

Significant Uplands Because they are so attractive for urban development, upland ecological communities are becoming threatened and endangered in the same way various species have become. As with threatened and endangered species, preservation of significant uplands is critical to the maintenance of biological diversity, particularly because many species are only able to survive in upland ecosystems. Particular consideration will be given to preserving uplands associated with wetlands and to uplands that have not been cultivated during the past 100 years.

Radon Unlike other significant environmental features, radon is a feature to be minimized. Radon areas are a threat to human health, and regulations will be needed to reduce human exposure to radon gas. Some of the highest radon levels in the southeastern U.S. have been recorded in the Gainesville area.

In order to improve the city's ability to protect environmentally significant features, lands containing such features have been identified and mapped. The following lands are areas where environmental overlay zones have been needed (zones that apply special development regulations to properties with environmentally significant attributes):

Creeks: Land within 150 feet of the break in slope at the top of the creek bank regulated by the "Regulation of Development Near Creeks" ordinance"

Lakes: Land within 150 feet of the recognized shoreline of lakes adversely impacted by human-built structures or modifications

Wetlands: Land within 35 feet of

Floodplain: Flood channel lands, and to a lesser extent, floodplain lands.

Significant Uplands: Land showing a level of biological rarity, diversity, or ecosystem importance which is significant on at least a county-wide basis, as identified by the Alachua County Conservation Element (adopted July 11, 1989). And as may be expanded by the City's 2000 Vacant Lands/Natural areas.

Creeks, lakes, and wetlands have been chosen to identify environmental significance because: (1) they can be well defined on maps; and (2) they embody almost all of the significant environmental features of the city. (It should be noted that much of the city's groundwater recharge areas, floodplains, radon areas, and threatened and endangered species habitat areas are associated with creeks, lakes, and wetlands.) For significant features not associated with creeks, lakes, wetlands, floodplains, or significant uplands, specific regulations tailored to each feature should be adopted.

Regulation of Environmentally Significant Open Space

Lands within the environmental conservation areas receive special consideration by the City. The lands have been evaluated to determine whether some form of public acquisition is appropriate. If not appropriate, land development is governed by a special set of environmental regulations.

Prescriptive regulations are the more traditional approach to land regulation. The developer is given no flexibility as to how to comply with the regulation. An example of such a regulation is: "there shall be no development within 200 feet of Lake Sunshine." Similarly, land use prohibitions will state which land uses are not permitted at particular locations.

Performance-based regulations, on the other hand, describe what level of environmental protection is sought, and require that development projects be designed to attain that level of protection. They therefore give the developer increased flexibility in designing a site to attain environmental conservation objectives. In addition, they are much more sensitive to the natural features of individual sites. Performance controls ask the developer and site planner: "what are the environmental constraints at the site, and how can/should you design the site to conserve such natural features?" An example of such a regulation is: "there shall be no net loss of wetland acreage or functions."

ENVIRONMENTAL CONSERVATION AREA OBJECTIVES

* Protecting or restoring surface water quality

* Protecting or restoring the wildlife habitat capability of urban ecological communities

* Protecting or restoring vegetation

* Protecting and enhancing Gainesville's tree canopy by replanting when and where trees are removed, fostering diversity of tree species, encouraging tree preservation and protection as construction activities are planned.

* Protecting the Floridan Aquifer System

* Minimizing exposure to radon gas

* Minimizing flood damage

* Protecting or providing scenic and passive recreational opportunities

* Minimizing soil erosion

* Removing invasive exotic plants and animals

Environmental Management of Public Parks & Open Space

Citizens of Gainesville and Alachua County have expressed great concern over development proposals in close proximity to environmentally significant areas. Citizen groups like the Women for Wise Growth, local chapters of the Audubon Society and the Sierra Club, Paynes Prairie Chapter of the Florida Native Plant Society often participate in the public comment portion of City Commission, Plan Board, and Development Review Board meetings. Many controversies exemplify the vulnerability of public parks and privately owned open spaces to the potentially harmful effects of human activity and development.

There are two general types of parks and recreational open spaces: (1) "active" parks and open space, which are generally designed for relatively intensive recreational activities such as tennis or baseball; and (2) "passive" parks and open space, which rely on the natural amenities of the site for their attractiveness and value. As a result, there are differences in how the two types of sites should be conserved.

For example, neighborhoods near active recreational sites may need to be protected from excessive noise and lighting. In addition, because persons using active sites are usually

engaged in more intensive recreational activity, they are generally more tolerant of distractions from nearby land uses. (Nevertheless, many active park users will desire some level of site protection from nearby land uses.) On the other hand, passive sites may contain sensitive wildlife that must be protected from human disturbance from nearby land uses. Also, persons using passive sites typically expect a more peaceful and undisturbed environment.

In summary, while both active and passive sites require some degree of protection from nearby land uses, passive sites will generally require a greater degree of protection than active sites. Conservation of both active and passive parks and open spaces can be accomplished by adopting some or all of the following strategies:

* Adopting criteria and conditions that must be adhered to in instances where consideration is being given to selling public properties or converting such properties to a new use.

- Establishing buffers, when appropriate, to protect public parks and open spaces from nearby development. Land uses within buffer zones should be subject to performance standards that conform to the conservation objectives of public parks and open spaces. These objectives include:

* Continue preparing an environmental inventory and management plan for existing and future public parks and open spaces, including an investigation of existing nuisance problems, environmental problems, and opportunities at these public sites.

* Protecting or restoring viable populations of important plants and animals currently or historically found at the site from on- or off-site factors which threaten the viability of such features. Examples of threats include pesticides, vegetative clearing, noise, household pets, roads and vehicles, and soil erosion.

* Protecting the site from on or off-site factors that would adversely impact on-site wetlands.

* Protecting the site from on or off-site factors which would significantly modify the hydroperiod of the site wetlands, or degrade the quality of groundwater or surface waters at the site.

A group of citizens have organized a Political Action Committee "Legacy Lands" and have succeeded in having a bond referendum, "Alachua County Forever" placed on the ballot for the November 2000 election.

Acquisition of Environmentally Significant Open Space

The Gainesville urban area contains large expanses of State-owned, publicly protected open spaces. Continued encroachment by human activities, however, may reduce the long-term viability of these natural open space systems. Many of these natural areas (which are all outside of city limits) are linked by the green network, which includes the Gainesville creek system, various trails, and tree-lined streets. While Gainesville's goal is for all streets to have trees, in 1993 the Urban Tree Assessment revealed that only ½ the spaces available for trees are actually filled. Some spaces are unsuitable for tree planting because of underground water, sanitary sewer or storm sewer pipes or urban design consideration. Priority is given to tree planting along corridors that connect significant open spaces.

Other State-owned areas can be linked to the green network through various acquisition and regulatory strategies.

Implementing Gainesville's green network plan will require efforts to acquire additional areas to strengthen and expand the network. Possible acquisition strategies include fee simple purchase of land, purchase of development rights (such as conservation, trail or scenic easements), acceptance of land or development rights, or provision for private common areas as sites are developed. The inclusion of an option for clustering in subdivision development was intended to preserve natural areas. To achieve this goal, the stormwater basins should be removed from qualification as a natural area to be preserved.

During the past decade, the City of Gainesville applied for several grants through the Florida Communities Trust (FCT) Florida Forever (formerly Preservation 2000) Program. A major grant was awarded in 1991 to fund the acquisition of lands for a proposed Hogtown Creek Greenway, a 6-mile, 1,786 acre multi-objective study corridor. The primary purpose of the Hogtown Creek Greenway is to protect, restore and preserve the remaining ecologically sensitive and important features within the Project Site, and secondarily, to provide structured and controlled access to these lands through a comprehensive network of trails and other public facilities. The matching funds for this grant were obtained from the City's greenspace allocation of $150,000/year. This funding was dedicated and bonded for 10 years. In 2001, this obligation will be completed. The City Commission may again consider allocation of a dedicated funding source for acquisition of parks and natural areas. These funds could be used as a match for acquisition grants aimed at properties not selected by the County Commission authorizing the disbursement of Alachua County Forever funds, if the bond referendum passes on November 7, 2000.

Most fee simple open space acquisition by the City is for the purpose of providing public parks. The Recreation Element Data Collection & Analysis Section calls for the acquisition of public conservation areas, community parks, neighborhood parks, and sports-complex parks. When parks are acquired, the City should survey the site for environmentally significant habitats, and establish a management plan for such areas.

Over the past 10 years, Gainesville's park acquisition program has added mostly passive park acreage to the existing stock of parks within the urban area. Because most of the recent acquisitions have not been developed for recreation, it is possible that the pace of future acquisitions may be slowed in order to provide funding for park development. However, continued population growth and development, along with the possibility of new funding sources for parks, may result in efforts to maintain or increase the pace of park acquisitions.

The Gainesville park and open space acquisition program uses a number of criteria to determine the value of properties being considered for acquisition. These criteria are designed to further the objectives of both the Recreation Element and the Conservation, Open Space, and Groundwater Recharge Element.

Whenever possible, public schools should provide an area within their open space acreage for native natural habitat. Recreation/Open Space impact fees should also be considered as a means of funding further acquisition of public lands.

GAINESVILLE'S NATURAL ENVIRONMENT:

THE COMPONENTS

There are six broad components of Gainesville's natural environment:

* Groundwater (includes wellfield, aquifer recharge)
* Surface Waters
* Natural Areas (including threatened and endangered species)
* Air
* Soils
* Urban Forest

GROUNDWATER

Physical Geography

Gainesville is located in an area of karst topography. This topography is associated with the presence of a fracture system in the limestone underlying Alachua County. Karstic activity and stream bank erosion are the primary forces currently modifying the topography of the urban area.

Four major physiographic regions are present in the Gainesville urban area: the Northern Highlands Plateau, the Northern Highlands Marginal Zone, the Western Valley and the Alachua Lake Cross Valley. The Northern Highlands Plateau is a relatively high flat area of low relief. From the surface down, it contains a layer of undifferentiated and unconsolidated Pleistocene to Holocene age sands and clayey sands, the Miocene Hawthorn Formation, a series of Eocene carbonate units (i.e., Ocala, Avon Park, Lake City and Oldsmar limestones) and the Paleocene Cedar Keys Formation. The Hawthorn Formation found in the Plateau is largely absent in the western and southern parts of the county due to erosion. Characteristic features of the Plateau include cypress hammocks, pine flatwoods and poorly drained swampy areas (e.g., Buck Bay, at the northern edge of the City).

There are substantial variations in the thickness of the Hawthorn Formation in the Marginal Zone because streams in it have cut and continue to cut headward into the

Northern Highlands Plateau. Abandoned as well as active stream valleys (e.g., Hogtown Creek valley) are present. Solution of the underlying limestone has produced numerous sinkholes and sinkhole ponds perforating the Hawthorn. Streams in the zone flow into sinkholes either before or just after they enter the limestone plain to the west or south (e.g., Hogtown Creek drains into Haile Sink). Karst features are particularly well developed along a linear cross-county fracture zone that runs in a northwest to southeast direction through the marginal zone. Both the Hawthorn and underlying limestone are extensively fractured in this zone.

Inventory of Groundwater

Gainesville relies exclusively on groundwater for its water supply. There are three groundwater zones underlying all or part of the Gainesville urban area. The aquifers within these zones are associated with the geologic formations discussed above. The zones include: (1) the surficial zone, (2) the intermediate zone, and (3) the Floridan zone. Map 4 provides an overview of the aquifer systems present. It is important to stress that the above zones and systems extend beyond the boundaries of the urban area. It also should be noted that water may flow between aquifer systems. A downward hydraulic gradient exists in Alachua County where multiple aquifer systems are present. The amount of water able to move from higher into lower aquifers, however, is limited by the thickness and permeability of the confining beds between the aquifers.

Surficial Zone

The surficial groundwater zone consists of a sequence of undifferentiated, relatively porous sands and clayey sands that are typically 10 to 30 feet thick in the Gainesville urban area. There is a surficial aquifer system within this zone in places where an underlying confining unit is present. In the urban area, the underlying confining unit is either the original Hawthorn Formation or a thick layer of reworked Hawthorn or other relatively impermeable sediments. The surficial aquifer operates under mainly unconfined, water table conditions.

The surficial aquifer system is recharged primarily by percolating rainwater. Land use patterns, vegetation, topography and the permeability of local soils affect recharge efficiency. Water is stored for comparatively short periods of time, and flows within the system typically follow the topography of the land surface. Water is discharged through evapotranspiration; seepage to lakes, streams and wetlands; leakage to underlying aquifers where a downward hydraulic gradient is present; or pumpage from wells. In the Gainesville urban area, water withdrawn from wells in the surficial system is used for domestic and landscape irrigation purposes.

Intermediate Zone

The Hawthorn Formation is the intermediate groundwater zone. It consists of widely varying mixtures of clay, quartz sand, carbonate and phosphate. Single component beds (e.g., pure clay) are uncommon. The most common lithologies found are dolomitic, clayey sands and/or sandy dolomites. The intermediate aquifer system is found in highly variable, noncontinuous dolomitic, limestone and sandy layers within the Hawthorn Formation. Water-bearing lenses 20 to 40 feet thick were found at two sites in the Gainesville urban area in connection with groundwater contamination remediation studies (i.e., the Fairbanks Department of Transportation sandpit disposal site and the Cabot Carbon/Koppers Superfund site). These findings, however, do not constitute a comprehensive description of the intermediate aquifer system in the urban area.

The intermediate aquifer system contains water under confined conditions. It is recharged by leakage from the surficial aquifer where a downward hydraulic gradient is present. Also, where the surficial aquifer is absent, it may be recharged directly by downward leakage of rainwater. Water is discharged from the system by vertical leakage through confining units, lateral leakage (e.g., along the erosional escarpment in the Northern Highlands Marginal Zone), or pumpage from wells. It is difficult to predict the location and extent of downward leakage into the Floridan because the sequence of sediments in the Hawthorn is so complex and variable, and the data available to make such determinations is limited. Water withdrawn from the intermediate aquifer system in the urban area is used for domestic and landscape irrigation purposes.

Floridan Zone

The Floridan aquifer system located in the Floridan zone is a prolific regional water-yielding unit which serves as the Gainesville urban area's primary source of water for drinking and other uses such as industrial processing and power generation. The Floridan is approximately 1500 feet thick in the urban area and composed of a sequence of hydraulically connected formations composed of limestone and dolomite. From top to bottom, these formations include: the Ocala Group, the Avon Park Limestone, the Lake City Limestone and the Oldsmar Limestone.[1]

The Floridan aquifer is over 100 feet below the surface in the northeastern part of the urban area where the Hawthorn Formation is continuous and operates a protective

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[1] Estimated maximum thicknesses for these formations in Alachua County are 250 feet for the Ocala Group, 700 feet for the combined Avon Park and Lake City limestones and 530 feet for the Oldsmar Limestone. Solution features such as caverns are more prevalent in the Ocala Group than in other parts of the Floridan. This is because: (1) a significant amount of solution activity occurred in the unit before it was covered by deposits from later geologic ages; (2) the unit is closer to surface sources of carbon dioxide which induces additional solution; and (3) faster water movements through the unit promote the expansion and development of solution features. Also, the Ocala Group and Hawthorn, where present, dip gently to the northeast in the county.

confining unit.[2] In the northwestern, central and southern parts of the urban area, the Hawthorn is variable in thickness and perforated by sinkholes, leaving the Floridan semiconfined. In the southwestern corner of the urban area, the Floridan is as little as 20 feet below the surface and unconfined because the Hawthorn is absent. It is particularly vulnerable to contamination in this area because of the lack of an overlying confining layer. Map 3 shows the generalized boundaries of the confined, semiconfined and unconfined zones in the urban area.[3]

According to well drilling records, the Floridan consists of three distinct zones and is not uniformly permeable from top to bottom at the Kanapaha Wastewater Treatment Plant, Murphree municipal wellfield and Lake Alice. Additional research is needed to determine whether the three-zone pattern exists throughout the urban area and the extent to which zone configurations vary from site to site.

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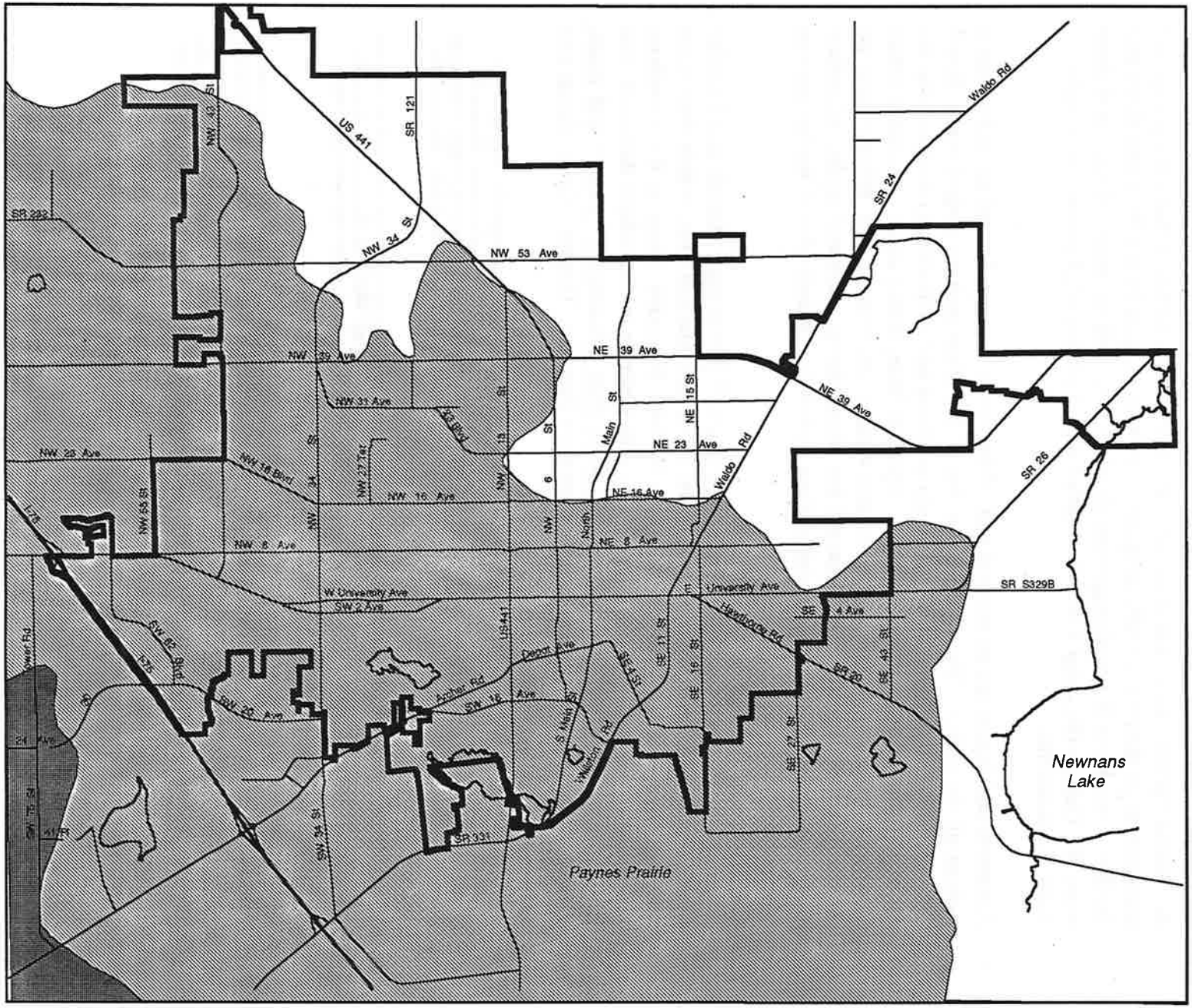
[2] It should be noted, however, that the Hawthorn Formation is not a completely impenetrable barrier even where it is continuous. It is more or less leaky depending on its components, thickness and structural integrity at a particular site.

[3] Map 5 was derived from a county-wide "degree of confinement map" prepared by the Florida Geological Survey (FGS). The degree of confinement in each of the map's three designated zones depends on the amount of clays and clayey sands present and whether the layer of clays and clayey sands is perforated by sinkholes. The clays and clayey sands may or may not be a part of the original Hawthorn Formation. As a consequence, the zone lines on the FGS's map do not exactly match physiographic region boundaries. Those boundaries are closely associated with the presence or absence of the Hawthorn.

Map 3



FLORIDAN AQUIFER SYSTEM

Degree of Confinement

Legend

- **Confined Zone**
  A region of higher elevation underlain by at least 10 feet of clays or clayey sand which form an aquiclude to the Floirdan Aquifer System.
- **Perforated Zone**
  A region primarily confined with numerous sinkholes allowing hydrologic access to the Floridan Aquifer System.
- **Unconfined Zone**
  A region of low and flat terrain where porous sands overlie the Floridan Aquifer System.
- Gainesville City Limits

Source: Alachua County Environmental Protection Department, 1995

City of Gainesville
Gainesville, Florida

Prepared by the
Department of Community Development
Nivember 2000

0 4000 8000 12000

1"= 8000'

N

Major Natural Groundwater Recharge Areas

It is important to identify and manage groundwater recharge areas to ensure the future availability of groundwater and protect water quality. In the Gainesville area, "major natural groundwater recharge areas" (which are surrogates for the "prime" recharge areas contemplated by the Florida Statutes). The water management districts have not designated "prime" areas, but areas of high groundwater recharge that are for regional planning rather than site specific purposes have been mapped by the St. Johns River and the Suwannee River Water Management Districts. City staff has prepared subsets of these maps for Gainesville. Map 4 is the resultant map depicting high groundwater recharge areas in Gainesville.

Stream-to-sink basins are an integral part of the karstic topography and natural drainage pattern of the region. Very little water leaves the urban area as surface water flow.[4] Instead, creeks, lakes and prairies drain into sinkholes and wells directly connected to the Floridan aquifer system. Creek and lake inflows include, among others, rainwater, urban stormwater and agricultural runoff, treated wastewater, power plant effluent, and air conditioner cooling water. Development has altered the quantity and quality of surface water flows, but the natural drainage system centered on stream-to-sink basins remains largely intact.

There are 6 stream-to-sink basins in the urban area.[5] Sweetwater Branch and Tumblin Creek (via several lakes and Paynes Prairie) drain into Alachua Sink, which discharges into the Ocala Group limestone and possibly into limestone zones in the Hawthorn Formation. Water from Lake Alice flows into drainage wells, which discharge into solution cavities in the Ocala Group and Avon Park Limestone.[6] Turkey and Blues Creeks enter the aquifer in San Felasco Hammock Preserve. Hogtown Creek drains into

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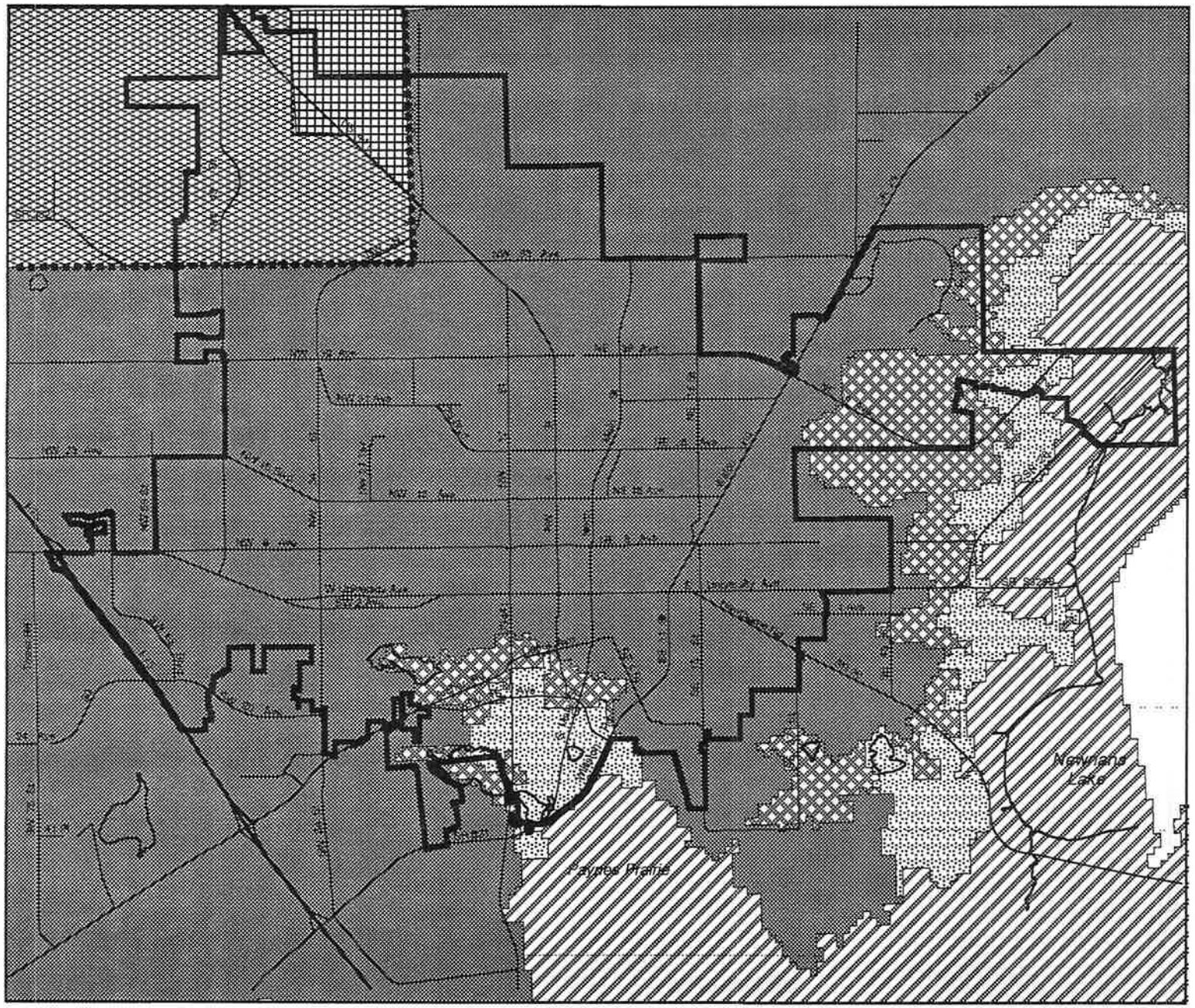
[4] Prairie Creek, which drains Newnans Lake, does flow out of the urban area and into Orange Lake. However, this creek would flow into Paynes Prairie and drain into Alachua Sink if the canal and control structures diverting it were removed. Some of the creek's flow has been rerouted to the prairie. According to a 1988 report, though, the amount of inflow rarely exceeds 15 percent of the creek's total volume and, in dry years, it is often insignificant due to the presence of a weir on the creek below Newnans Lake.

[5] It is possible to draw a hydrologic connection between waters in the Little Hatchet and Lake Forest creek basins and Alachua Sink since they all are related to Newnans Lake. Lake Forest Creek drains directly into the lake while Little Hatchet Creek drains into Gum Root Swamp which then discharges into the lake. Newnans Lake, as noted in footnote 6, drains into Prairie Creek, which provides some of the water entering Paynes Prairie and Alachua Sink.

[6] Before 1948, the area where Lake Alice is located was a low marshy area that drained during wet periods into a sinkhole near what is now the eastern end of the lake. Lake Alice was formed after dams were built to prevent outflow from the area and effluent from the University of Florida's Wastewater Treatment Plant and cooling water were added. The Lake Alice basin is treated as a natural stream-to-sink recharge area because lake overflows would drain into a sinkhole if they were not diverted into drainage wells. Also, the lake is very similar to Sweetwater Branch in terms of its inflows and it is hydrologically connected to Bivens Arm, Sweetwater Branch and Alachua Sink during some high water stages.

Haile Sink, which discharges into the lower part of the Ocala Group. The total drainage area of Alachua Sink, Lake Alice and Haile Sink is about 48 square miles. A United States Geological Survey (USGS) study conducted in the early 1980s estimated total recharge from the three sources was averaging 33 million gallons a day, including 7 million gallons of treated wastewater. It concluded these sources could account for 75 percent of the recharge occurring in the Gainesville area, assuming a recharge rate of 15 inches a year.

Map 4



ENVIRONMENTALLY SIGNIFICANT LAND & RESOURCES

Floridan Aquifer Recharge

St. Johns River Water Mangement District

- > 12 inches/year
- 8-12 inches/year
- 4-8 inches/year
- 0-4 inches/year
- Discharge

Suwannee River Water Mangement District

- Moderate to High Recharge Potential
- Moderate Recharge Potential

District Dividing Line

Gainesville City Limits

Notes: Methods for presenting recharge information varied betweenDistricts and is reflected in the legend.

Data from SRWMD was not available for translations. Areas are approximate only. Data from SJRWMD is a digital translation of the District's files.

City of Gainesville
Gainesville, Florida

Prepared by the
Department of Community Development
November 2000

0 4000 8000 12000
Feet

N

The semiconfined zone is extensive in the urban area. In addition to recharge through numerous sinkholes, some recharge may occur in this zone as a result of downward leakage through the Hawthorn Formation.

The Floridan is not unconfined anywhere within the Gainesville city limits, according to the latest Florida Geological Survey (FGS) confinement map available. As indicated above, however, the southwestern corner of the urban area lies within the unconfined zone. This zone is a major recharge area because: (1) rain is able to percolate directly into the Floridan through sandy soils; (2) the aquifer is a sufficient distance below the surface to create a downward hydraulic gradient and limit evapotranspiration; and (3) the Floridan in this area has the ability to accept water and move it away quickly. An FGS study estimated the unconfined zone in southwestern Alachua County has an average recharge rate of at least 10 inches a year. That rate is equivalent to almost one-half million gallons a day of recharge per square mile.

According to a 1988 USGS map of predevelopment recharge and discharge statewide, most of the Gainesville urban area (roughly the semiconfined and unconfined zones) has provided recharge of over 10 inches a year. The rest of the urban area (roughly the confined zone) is included in a zone that has provided 1 to 10 inches of recharge a year. To date, the St. Johns River (SJRWMD) and Suwannee River (SRWMD) water management districts have not identified or mapped "prime" recharge areas in Alachua County pursuant to the requirements of Sec. 373.0395, FS.

Artificial Recharge

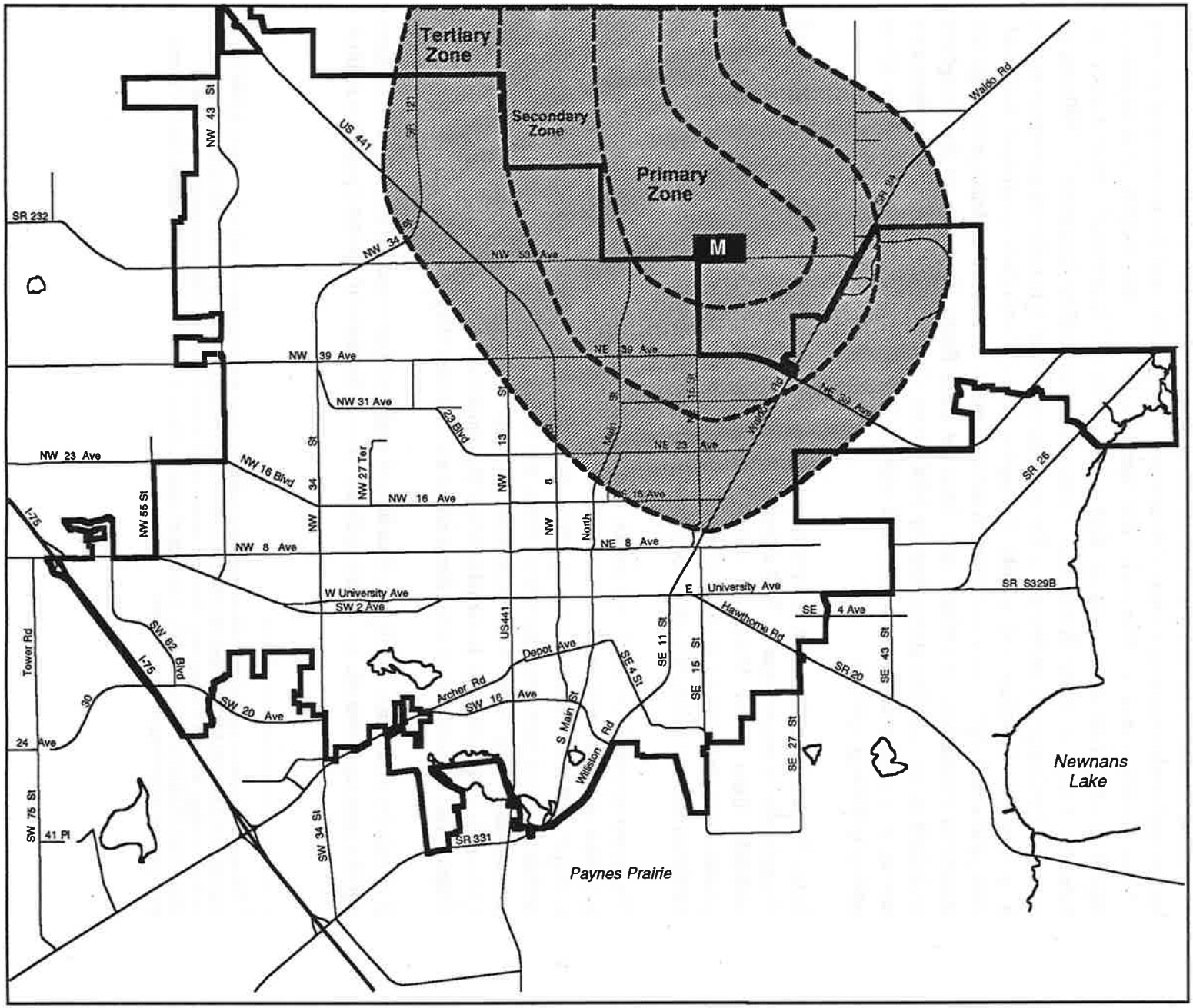
The Kanapaha Wastewater Treatment Plant is a tertiary treatment facility under permit by the Florida Department of Environmental Protection (DEP) which uses aquifer recharge wells to dispose of treated wastewater. The amount of recharge involved is substantial (i.e., average flow was 7.6 million gallons a day in 1999). This may increase up to the permitted maximum injection rate of 10 million gallons per day. The injection wells discharge to a deep zone of the Floridan, which extends from the lower part of the Avon Park Limestone into the Oldsmar Limestone (450 to 1020 feet below the surface at the plant site). The quantities of water injected have reversed the usual downward hydraulic gradient in the area surrounding the wells, and some upward "mounding" of water around wells has been observed. The potentiometric effects of injection have been nearly negligible at a regional scale, however, because the receiving zone is fractured and capable of transmitting large quantities of water away from the plant site. Increasing the amount of recharge will expand the localized area affected by the gradient reversal and raise the potentiometric head of the Floridan around the plant to some degree.

The University of Florida recently upgraded its wastewater treatment plant from a secondary into a tertiary treatment plant which produces effluent meeting drinking water

quality standards. The plant primarily uses aquifer recharge wells for effluent disposal. Reclaimed water is added to Lake Alice as needed to maintain lake water levels.

FDEP and the SJRWMD and SRWMD (within their district boundaries) evaluate and permit artificial injection facilities. See Chap. 17-28, 40B-5 and 40C-5, FAC. Both the Kanapaha and University of Florida plants lie within the SJRWMD. State requirements relating to underground injection control are based on standards set in the federal Safe Drinking Water Act. The stated purpose of DEP's rules in Chap. 17-28 is to protect the quality of the state's underground sources of drinking water and to prevent further degradation of the quality of other aquifers adjacent to the injection zone that may be used for other purposes.

Map 5



COMMUNITY WELLFIELD

Legend

- M — Murphree Treatment Plant
- Wellfield Protection Zones
- Zone Boundaries (Primary, Secondary, Tertiary)

Notes: Gainesville Regional Utilities is expanding the Murphree wellfield to meeet anticipated demand in the 1990's.

Community Water System is defined as a public water system which serves at least 15 service connections used by year-round residents or regularly services at least 25 year-round residents . (Rule 17-550.200(7), FAC).

The Protection zones are not an exact reflection of the wellfields cone of depression.

These capture zones were delinated by using the EPTRAC module of EPAs wellfiled Proection Area Mode prepared by SJRWMD.

Source: Alachua County Department of Environmental Protection May 2000

City of Gainesville
Gainesville, Florida

Prepared by the
Department of Community Development
November 2000

0 4000 8000 12000
Feet

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Movement of Groundwater in Floridan Aquifer System

The Floridan aquifer system is a vast reservoir of water which flows on a regional basis from areas of recharge to areas of discharge (e.g., along rivers and coasts). The potentiometric surface of the Floridan and topography tend to be high in recharge areas and low in discharge areas. Flow of the Floridan in Alachua County appears to be controlled primarily by the presence of an area of high potentiometric surface in the karstic highlands region in western Putnam and Clay counties and the presence of an area of low potentiometric surface along the Santa Fe River. The roughly oval highlands region is identified as an area of high recharge in the SJRWMD's 1990 Lower St. Johns/St. Marys Ground Water Basin Resource Availability Inventory.[7] Billions of gallons of recharge are attributed to this area annually and it is believed a portion moves in a westerly direction and eventually replenishes Gainesville's municipal wellfield. Also, some recharge occurs in eastern Alachua County as a result of leakage through the Hawthorn Formation. The travel time form the Lake Santa Fe region to the Murphree well field is estimated at approximately 1000 years. Groundwater leaving the urban area moves in a northwesterly direction and ultimately discharges into the Santa Fe River primarily through springs.

In the Gainesville urban area, the pattern of groundwater flow in the Floridan has changed dramatically in recent years. This change followed the 1975 relocation of the municipal wellfield from Main Street in south Gainesville to northeast Gainesville. The predominant direction of groundwater flow under the city now appears to be toward the northeast and the wellfield's expanding cone of depression.

There are currently at least five major features capable of influencing the direction of groundwater movement in the urban area. As indicated above, the municipal wellfield is a major influence since pumping pulls additional groundwater toward the point of withdrawal and increases the rate of flow, and the amount of water being withdrawn is substantial. The other four influences include Alachua Sink, Haile Sink, and the University of Florida and Kanapaha Water Reclamation Facility (KWRF) recharge wells. Water tends to move away from these influences because they are points of recharge.

It should be noted that, while the direction of regional flows can be estimated for a karst aquifer, precise flows are extremely difficult to trace because of a karst aquifer's complex

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[7] There are differences in opinion about whether the karstic highlands region is in fact a discrete high recharge area. A 1988 USGS map not cited in the 1990 SJRWMD groundwater basin inventory, for example, shows part of the region as a comparatively low recharge area (e.g., less than 1 inch a year). These differences may be resolved as the SJRWMD proceeds with its program for delineating recharge areas within its district. A recharge area(s) other than or in addition to the karstic highlands may be a primary source of water replenishing the city's wellfield.

three-dimensional pattern of fractures, fissures and solution channels. Also, it is important to note that flow rates tend to be highly variable in a karst aquifer. Groundwater typically moves slowly in porous rock (e.g., a few feet a day) but rapidly where solution features allowing conduit flow are present (e.g., hundreds of feet a day).

Supply and Conservation of Groundwater

Floridan groundwater resources tend to be plentiful in the Gainesville urban area. This is because, as indicated above, the urban area receives substantial amounts of recharge from adjacent largely undeveloped counties and it lies within a county that functions as a recharge area. Notably, the USGS in a 1988 study included Alachua County in an area designated as potentially "highly favorable" for large groundwater development. It also concluded pumpage from the Floridan has been and continues to be supplied primarily by the diversion of natural discharge and by induced recharge rather than by loss of water from aquifer storage. Another important consideration is that the urban area's water supply is not threatened by lateral saltwater intrusion due to Alachua County's inland location. The SJRWMD and SRWMD regulate the use of groundwater in the county through their issuance of consumptive or water use permits. See Chap. 40B-2 and 40C-2, FAC, which implement Part II of Chap. 373, FS (Florida Water Resources Act of 1972).

The supply issue, however, is complicated by a number of factors. First, although the Floridan aquifer system has the capacity to hold and transmit vast amounts of water, full utilization of that capacity depends on the availability of adequate amounts of rainfall. Extended rainfall deficits in recharge areas lead to declines in groundwater levels which, in turn, can leave shallower wells dry, create conflicts among water users with competing demands, cause harm to natural systems, lower water pressures in wellfields, and promote the formation of sinkholes.

The water management districts have the authority to declare water shortages and implement conservation measures when they determine insufficient water is available to meet the present and anticipated needs or when conditions dictate a temporary reduction in total use to protect water resources from serious harm. Emergencies may be declared under extraordinary circumstances. See Sec. 373.175 & 373.246, FS. Both the SJRWMD and SRWMD water management districts have adopted water shortage plans. Under both plans, the districts seek assistance in enforcing declared water shortages from local government and law enforcement officials.

On the local level, GRU promotes water conservation by providing ongoing public education programs, maintaining its water distribution system properly to minimize water losses, and recycling water at its two power plants. Water conservation is also promoted through the city's ongoing water loss reduction program and allowance of graywater recycling systems (Sec. 27-190 of city code). In addition, it is fostered through

implementation of the landscaping requirements in the city's zoning code which operate to protect the tree canopy, retard stormwater runoff, and encourage aquifer recharge and use of native vegetation (Chap. 29, Articles IV and XV). The City maintains a list of recommended landscape trees that includes many drought-resistant native species useful in conserving water.

Gainesville Regional Utilities has a water reuse program, which includes distribution of reclaimed water from the Kanapaha Water Reclamation Facility for use as irrigation and in aesthetic water recharge features. Irrigation uses include the Haile Plantation Golf Course, Kanapaha Park, Kanapaha Middle School and Kanapaha Botanical Gardens and irrigation of lawn and landscape areas in the southwest area. Aesthetic water features include features located at Kanapaha Botanical Gardens, Chapman Trails Park, Kanapaha Middle School and others.

Another consideration is that much of the water withdrawn from the Floridan for use in the urban area is reused indirectly because it is returned to its source through the wastewater disposal methods utilized by GRU and the University of Florida. In 1999, for example, 9.2 billion gallons of water were withdrawn from the Murphree wellfield and approximately 4.7 billion gallons of treated wastewater were returned to the Floridan via the Kanapaha plant's aquifer recharge wells and Sweetwater Branch/Paynes Prairie/Alachua Sink. The wastewater total does not include effluent from the University of Florida Wastewater Treatment plant, which enters the Floridan via aquifer recharge wells.

An additional factor complicating the groundwater supply issue is wellfield management. Careful management is needed to avoid adverse impacts on groundwater resources even where the supply is plentiful. In 1989, GRU installed a Supervisory Control and Data Acquisition (SCADA) System at the Murphree wellfield to enhance its ability to monitor and manage well performance and regulate the wellfield's cone of depression. At that time, well drawdowns varied from 15 to 50 feet due to the fracture system within the Floridan. The need for the SCADA system became apparent in June 1989 when extensive pumping of wells in a set combination reduced artesian pressure in the Floridan almost to the bottom of the Hawthorn Formation due to interference among the wells. GRU considered this an unacceptable practice because it could have encouraged migration of water from the intermediate aquifer system into the Floridan. Contamination is present in the intermediate system at the Fairbanks DOT sandpit disposal site and possibly at the Cabot Carbon/Koppers Superfund site, both of which are approximately two miles from the wellfield. In 1990, GRU initiated construction of three additional production wells to increase wellfield capacity and provide redundancy. It also proceeded with its development of a wellfield operational management program designed to minimize further decline in artesian pressure in the Floridan and provide adequate well spacing.

During the year 2000, significant well drawdowns occurred due to low aquifer levels due to a prolonged period of drought, combined with extremely high demands resulting from high irrigation demands.

This resulted in the need to institute water restrictions. GRU has moved forward with the addition of two additional supply wells that are expected to be completed by May 2001. These wells should significantly increase capacity. GRU also has an aggressive program of upgrading the water distribution system in order to eliminate low pressure problems.

FDEP regulates the construction, operation and maintenance of public water systems, including the Murphree wellfield, treatment plant and distribution system. (See Chap. 17-550, 17-555 and 17-602, FAC). The city's code (Chap. 27) and GRU's associated technical manual provide standards governing private sector construction of water facilities that will connect with the municipal public supply system. The SJRWMD and SRWMD issue well construction permits and license well contractors under Chap. 40B-3 and 40C-3, FAC. Alachua County issues permits relating to well construction in designated management zones under its Murphree Wellfield Protection Code. Also, the water management districts provide local governments with information on existing and planned wellfield sites, existing and anticipated "cones of influence" and highly productive groundwater areas to inform local comprehensive planning relating to the management of groundwater resources. (See Sec. 373.0391, FS).

In October of 1999 the City of Gainesville in cooperation with Gainesville Regional Utilities, the St. Johns River Water Management District, and the Suwannee River Water Management District purchased a conservation easement from The Timber Company for 7,102 acres of silvicultural land in the north-east corner of Gainesville's city limits. The primary purpose behind this purchase was to protect the City's wellfields from potential pollution by urbanizing land uses. Secondary benefits included protection of large natural areas, creation of an urban growth boundary to the north, habitat for listed species, and potential link in the Ocala to Osceola Conservation Greenway identified by DEP.

Under terms of the conservation easement, The Timber Company retains the right to sell, rent, mortgage, control public access, lease private hunting and conduct silvicultural operations in upland areas (with limited cutting in wetland areas). Rights purchased and retired by above cited governmental entities included prohibitions on residential, commercial, industrial and agricultural uses (other than silvicultural). Other prohibitions included use of fertilizers, herbicides and pesticides within five hundred feet of production wells, subdivision of parcels to less than a thousand acres, dumping and new road building.

Use of Floridan Groundwater

Historically, more than adequate resources have been available to meet demand for water in the Gainesville urban area. As noted above, the Floridan aquifer is the urban area's primary source of water for drinking and other uses such as industrial processing and power generation. Water withdrawals occur primarily at the Murphree wellfield which serves the city and a portion of the urbanized area around it. During calendar year 1999, an average of 25.2 million gallons of potable water was withdrawn at the wellfield each day. The annual total was approximately 9.2 billion gallons. There is one other community potable water system in the city at the Tacachale Community of Excellence. Although this system is currently not operating, according to the Alachua County Environmental Protection Department, there are plans to bring two of the three wells online in the near future. According to FDEP, average daily demand for this system was 250,000 gallons a day, in 1988. Map 5 shows the location of the two community wellfields. Currently Tacachale purchases its water from the City, although it still has its wellfield and has the capability of using its own wellfield in the future.

Adequate resources are expected to be available to meet demand for water through and beyond the 2010 planning horizon of the city's comprehensive plan. Table 1 shows projected demand for potable water from the Murphree wellfield for fiscal years 2000 to 2010. Annual totals based on projected water sales are included for residential, commercial/industrial, University of Florida and other water use categories. The current design capacity for the treatment plant is 40 million gallons a day. The plant capacity will be increased to 51 mgd by the end of fiscal year 2003. An additional expansion to 60 mgd is planned to be completed in approximately 2010. The totals in Table 1 indicate sufficient capacity will be available to meet projected average and peak daily potable water demand throughout the planning period.

Based on information provided by the St. Johns River Water Management District, the only current Commercial/Industrial consumptive use permit issued for inside the urban area is one for Clariant Life Science Molecules. The Kelly Generating Station has one on-site well and does not use potable water from the municipal wellfield for plant processing unless the well fails. The Kelly Plant is being repowered to incorporate a combined cycle generation unit. With the new unit, the plant is expected to use no more than 253 million gallons per year, and a maximum of 1.8 million gallons on any one day

Finally, it should be noted that substantial withdrawals from the Floridan are made from four on-site wells at GRU's Deerhaven Generating Station. The plant operates at full capacity during high demand periods, selling its excess power to other areas. At full capacity, it uses an average of 90 million gallons a month for cooling tower makeup and boiler fees and approximately 4 million gallons a month for feeders, coolers, bathroom, washdown hoses and other uses. These withdrawals are permitted under the plant's

Florida Electrical Power Plant Siting Act certification, not a separate water use permit from the SRWMD. Potable water from the Murphree wellfield is used only in the administration area of the plant. Deerhaven has a "zero-discharge wastewater system" which treats and recycles all of the plant's water on-site.

Table 1: Projected Potable Water Demands Murphree Wellfield

	Projected Demand	
Year	**Daily Flow (ADF)**	**Daily Flow (MDF)**
2000	25.2	36.8
2001	26.0	37.9
2002	26.7	39.0
2003	27.5	40.1
2004	28.2	41.2
2005	28.9	42.3
2006	29.5	43.1
2007	30.1	43.9
2008	30.6	44.7
2009	31.1	45.5
2010	31.7	46.2
2011	32.4	47.3
2012	33.0	48.2
2013	33.7	49.2
2014	34.4	50.2
2015	35.1	51.2
2016	35.7	52.2
2017	36.4	53.2
2018	37.1	54.1
2019	37.7	55.1
2020	38.5	56.1

Source: Gainesville Regional Utilities, 2000

Assessment of Groundwater Quality

In 1995, the Alachua County Environmental Protection Department prepared A Comprehensive Contaminant Source and Well Inventory Near Wellfields Areas of Alachua County which notes that areas where the Floridan aquifer system is unconfined or the confining unit is perforated have the greatest potential for groundwater contamination.

Contamination Potential Near Murphree Wellfield

The report identified 348 potential contaminant sources that use or store hazardous materials or petroleum facilities located within the one-foot drawdown contour of the Murphree Wellfield. The potential contamination sources included facilities regulated under the Alachua County Hazardous Materials Management Code (HMMC), underground/aboveground vehicular fuel tanks, wastewater treatment plants, and active/inactive landfills. Of the 251 regulated hazardous material sites within the one-foot drawdown, 195 were inspected of which 24% were found to be in compliance with the HMMC. Of the 139 tank sites, 58 sites contain active petroleum tanks and 6 sites have petroleum contamination. Two Superfund sites, Eleven small quantity generators, nine Class C facilities and two Class D facilities, two wastewater treatment plants and five landfills were among the potential contaminant sources within the Murphree Wellfield one foot drawdown contour.

Contamination is potentially a serious problem in the Northeast Gainesville Industrial Park which contains 72 (or 21%) of the regulated facilities within the drawdown contour. Most (68) of these sites are regulated by the Alachua County HMMC of which fifty-six are in violation, the majority (41) of which failing to provide adequate containment storage.

There are 66 documented cases of contamination of the surficial aquifer within the one foot drawdown, including two Superfund sites located at the Cabot/Koppers sites and Florida Department of Transportation site in Fairbanks, which are located within 1.5 miles of Murphree and are currently undergoing remediation. The remaining 64 sites have documented petroleum contamination of soil and/or groundwater.

Contamination Potential Near Tacachale Wellfield

In 1995, 89 facilities with a potential for contamination, 75 of which are regulated by the Alachua County HMMC within one-half mile of Tacachale. 52 of the hazardous materials facilities were found to be in violation of the Alachua County HMMC. 21 or 40% of the facilities inspected did not have proper disposal records. Forty-four (or 81%) of the facilities were found to have improper storage of waste and materials. 36 (or 69%) of the

inspected facilities were found not to meet secondary containment requirements set forth in the Alachua County HMMC. Six of 14 FDEP regulated storage tank facility sites were reported to be in one of the petroleum cleanup programs.

The groundwater supply of the Gainesville urban area is vulnerable to contamination in various ways. Pollutants allowed to enter the Floridan in upstream recharge areas could eventually make their way into the municipal wellfield, given the regional nature of groundwater flows. Surface waters in local stream-to-sink basins convey contaminants directly into the Floridan aquifer through sinkholes and drainage wells. In addition, pollutants from surface sources (e.g., spills and pesticide applications) and subsurface sources (e.g., leaking underground storage tanks and septic tanks) may move downward into one or more aquifers, depending on site characteristics. Also, wells can act as conduits for contaminants and allow mixing of water among aquifers.

After years of increasing concern about protecting the community's wellfield (Murphree Water Plant) and water supply from development and uses which may pose a hazard to soil and groundwater, the City of Gainesville, in conjunction with the Alachua County Environmental Protection Department and Gainesville Regional Utilities, created an amended and improved wellfield protection zone area. The result was a new special use permit that must be approved by the City Commission called a Wellfield Protection Special Use Permit.

This Wellfield Protection Special Use Permit allows for a more intensive review of non-residential projects in the wellfield zones and allows the City to revoke permits for non-compliance.

A substantial number of groundwater and soil contamination incidents have occurred in or near the urban area. Water quality problems in a number of wells in the Floridan at the old municipal wellfield on Main Street have been attributed to recharge from Alachua Sink located about two miles to the south. In 1986-87, the Alachua County Department of Environmental Services (ACDES) identified 952 actual and potential point sources of water pollution in the county in conjunction with its development of an ambient groundwater-monitoring network. The sources include underground storage tank facilities (432), hazardous waste generators (456), wastewater package plants (33), active or recently active landfills (5), abandoned dumps and landfills (18), industrial contamination sites (6), the Cabot Carbon/Koppers Superfund site and a borrow pit. They are concentrated in the urban area and generally follow transportation routes. Known and suspected soil and groundwater contamination sites in the urban area other than those relating to leaking underground petroleum storage tanks are listed in the "Hazardous Waste" section of the Solid Waste Element Data Collection and Analysis Report. They involve a variety of contaminants including heavy metals (e.g., arsenic, chromium, lead and mercury) and organic compounds (e.g., phenols, benzene, and trichloroethylene).

Also, 180 contamination sites involving leaking underground petroleum storage tanks were confirmed in Alachua County under FDEP's Early Detection Incentive Program that ended in December 1988. Approximately two-thirds of those sites are located in the urban area (over one-half within the city).

The City of Gainesville is spearheading a collaborative effort to cleanup and restore properties known as "brownfields" in the Depot Avenue and South Main Street area of downtown Gainesville. This brownfield pilot project, tentatively named "Depot Park", has received funding by the US EPA and the State of Florida. Its goals are to:

* Clean up a former manufactured gas plant site and create a stormwater park.
* Identify additional brownfields in the downtown area and facilitate their cleanup and redevelopment.
* Increase opportunities for business development, recreation and historic preservation.
* Help reduce urban sprawl by creating redevelopment opportunities downtown.

The stormwater park will consist of ponds that will be created by the excavation of soil contaminated by coal tar and other substances by nearby industrial operations. These ponds will naturally treat stormwater and reduce contaminants entering Paynes Prairie.

The stormwater park will tie together several projects planned for the Depot Avenue and South Main Street area. These projects involve environmental restoration, development of rail trails, historic preservation and infrastructure improvements. The site will be a park with walking paths, boardwalks, interpretive exhibits and native vegetation in a natural North Florida wetlands landscape.

Groundwater quality may also be affected, to a limited extent, by effluent discharges from the Kanapaha, Main Street and University of Florida wastewater treatment plants. The Kanapaha Water Reclamation Facility (KWRF) and the University of Florida wastewater treatment plant are required to produce effluent that meets drinking water standards. Reclaimed water from these facilities is discharged into the aquifer via recharge wells. The Main Street Wastewater Treatment Plant (MSWWTF) discharges to Sweetwater Branch, which eventually enters the Floridan Aquifer via Alachua Sink. The KWRF and MSWWTF employ advanced wastewater treatment and reliably meet their effluent criteria. Groundwater monitoring in the vicinity of the KWRF recharge wells is required as a permit condition. Monitoring in these wells has indicated no significant impact of the KWRF discharge on groundwater quality.

Groundwater quality, particularly in the surficial aquifer, has been and will continue to be affected to some degree by effluent from on-site sewage disposal systems. A 1985 study estimated there are some 8,500 such systems (mostly septic tanks with soil absorption

drainfields) in the urban area that treat and dispose of nearly 3 million gallons of wastewater per day. It found: (1) there was no clear evidence linking septic tanks to any health problems in Alachua County; (2) septic tanks are a significant source of recharge for the surficial aquifer, on the order of 10 percent for the urban area as a whole and 60 percent on a localized basis (a 0.4 acre lot with a septic tank); (3) other pollution sources (e.g., urban runoff) contribute more total loading than septic tanks on an urban area basis; and (4) septic tanks can be expected to degrade surficial groundwater quality on a localized basis (at densities of two or more units per acre). The study indicated any public health problems associated with on-site disposal systems would likely be site-specific (e.g., shallow private well contaminated by an upgradient source), rather than regional, since municipal potable water supplies are withdrawn from the Floridan. It did note, however, that it might be prudent to eliminate systems from areas where the potential exists for contaminating deep aquifers and surface waters.

There have been very few nuisance complaints relating to on-site sewage disposal systems in the city in recent years. Existing systems, however, will remain point sources of pollution and may pose an increasing risk as they age. Although information from the US Department of Agriculture Soil Conservation Service (USDA-SCS) confirmed that septic tanks do exist in areas with both moderate and severe limitations for septic tanks, the low number of septic tank complaints and an indication from the Health Department that corrections could easily be made with repairs, septic tanks do not appear to pose a major problem in the City of Gainesville. The Alachua County Health Department, which is authorized by HRS to implement Chap. 10D-6 in the county, could but currently does not require construction permits for system repairs. It is of note that the Alachua County Health Department is limited in its ability to enforce 10D-6's requirement that a system be upgraded if the use of a building is changed or if additions or alterations to a building are made which will increase sewage flow or change sewage characteristics.

It should also be noted that the use of septic tanks for new development is uncommon in the city. City Building Inspections Department personnel have indicated that over the last few years (1994-1999) very few new construction building permits have been issued for buildings using septic tanks (averaging about two per year). Most new construction hooks to existing wastewater lines or pays the cost of line extension from a proximate location.

Functions of Aquifer Systems

Aquifers perform the following functions:

* Water supply for drinking, irrigation and other uses.

* Water supply for creeks, lakes, rivers, wetlands and springs.

* Water storage.

* Purification of water and dilution of contaminants.

Strengths and Deficiencies of Existing Regulations and Programs in Maintaining the Natural Functions of the Floridan Aquifer

The Floridan Aquifer system, as it underlies Gainesville, is protected by several existing city, county, state, and federal regulations and programs. Remediation of contaminated groundwater at the Cabot Carbon/Koppers site and the Department of Transportation Fairbanks site are underway under the Superfund Program. At the federal level, the Superfund program is currently monitoring the Cabot Carbon/Koppers site and developing remediation strategies. However, lack of Superfund funding slowed the speed at which the site is being remediated. The National Pollutant Discharge Elimination System (NPDES) program required a water quality treatment upgrade of the Main Street Wastewater Plant, which discharges into Sweetwater Branch, and then into Alachua Sink. This upgrade, which was completed in 1992, now allows the plant to meet the current effluent limits.

At the state level, FDEP, SJRWMD, and SRWMD regulate artificial injection facilities such as the UF and Kanapaha wastewater plants. As a part of these regulations, the UF Plant has been upgraded from a secondary to tertiary treatment system. The monitoring systems for both plants have identified only minor water quality violations historically. Therefore the existing regulation of these facilities is adequate.

FDEP regulates the construction, operation, and maintenance of public water systems including the City's Murphree Plant. The WMDs issue well construction permits. Again, historical monitoring of wells and potable water quality indicate these programs are successfully ensuring the adequate delivery of quality potable water. FDEP also regulates the construction, operation, and maintenance of wastewater plants in the city. The historical performance of the plants within the city indicate such regulation is adequate.

FDEP implements the federal Water Quality Assurance Act, in part, by establishing a groundwater quality monitoring network. FDEP has recently combined their surface and groundwater monitoring programs. The Alachua County Environmental Protection Department currently participates in 2 sampling programs, the Trend (or temporal variability network) and the Status network. The Trend network is designed to evaluate water quality changes over time. The Status network is designed to look more comprehensively at surface water and groundwater quality statewide by basin every 3-5 years. This program continues to be implemented by Alachua County. FDEP's Early Detection Incentive Program, also implemented by the County, identified a large number of leaking underground storage tanks. All the sites contaminated as a result of leaking

underground storage tanks are assigned a priority ranking score by FDEP. Currently sites with a priority ranking score of 30 and above (a total of 93 sites) are being actively remediated in Alachua County.

At the county level, the County Health Department regulates on-site sewage disposal systems. In terms of public health, these regulations have effectively limited contamination from such systems to site-specific problems. The Alachua County Pubic Health Department continues to monitor all septic tank systems installed since 1989. The department also monitors septic tank systems installed before 1989, as any changes or modifications to an existing system, including changes in ownership, require involvement from the department. Nevertheless, the lack of personal responsibility in disposing of hazardous wastes (for instance pouring oil down the drain of a sink) and maintenance of a system will always present the potential for pollution problems to occur.

As explained previously, the City of Gainesville planning staff has worked with the Alachua County Environmental Protection Department and Gainesville Regional Utilities to create an amended and improved wellfield protection ordinance for the community. The new ordinance created a new special use permit process to regulate certain types of developments and uses within the wellfield protection zone area. This new process allows for a more intensive review of non-residential projects in the wellfield zones and allows the City to revoke permits for noncompliance. The City requires a wellfield protection special use permit for all new development (with limited exceptions) within the primary, secondary and tertiary wellfield protection zones. Most expansions of existing development or changes at a site requiring any level of development plan review also require a wellfield protection special use permit.

The Murphree Water Treatment Plant, owned by Gainesville Regional Utilities (GRU), is the primary facility providing potable water for the City and urban fringe. The St. Johns River Water Management District or other local agencies having qualified professional hydrologists for the Murphree wellfield have designated no "cones of influence".

Wellfield "management" zones were originally designated in conjunction with the county's adoption of the wellfield management code in 1988. The Murphree Wellfield Protection Code, including revised wellfield protection zones, was substantially revised and improved in 2000. The wellfield protection zones were a reasonable substitute for a "cone of influence" around the municipal wellfield. The protection zones are based on travel time and were established after substantial technical investigation, including hydrogeological modeling.

The primary wellfield protection zone is the land area immediately surrounding the Murphree Wellfield, and the land area defined as the 2-year Floridan aquifer system travel time at a 60-mgd pumping rate. Requirements for this zone are the most restrictive

of the three protection zones (the other two are the secondary and tertiary wellfield protection zones), and incorporate restrictions of both the tertiary and secondary zones.

In the primary zone, no new uses of land that involve the storage, use or manufacture of hazardous materials are allowed, and (with limited exceptions), no new septic tank systems are allowed. Transportation of hazardous materials is strictly limited to local traffic serving facilities within the zone. The provisions of the secondary and tertiary wellfield protection zones apply.

The secondary wellfield protection zone is the land area surrounding the primary wellfield protection zone, and the land area defined as the 10-year Floridan aquifer system travel time at a 60 mgd pumping rate. No new underground storage of hazardous materials is allowed, except vehicular fuel storage subject to Florida Statutes 376.317. Variance approval is required for the temporary storage (up to 180 days) of hazardous materials in containers or tanks beyond a certain volume for use in normal agricultural or silvicultural (forestry) operations and construction activities. A Hazardous Materials Storage License is required for all regulated storage facilities as set forth in section 355.11 of the County Code. The provisions of the tertiary wellfield protection zone apply to the secondary protection zone.

The tertiary wellfield protection zone is the land area surrounding the secondary wellfield protection zone, and the land area defined as the 25-year Floridan aquifer system travel time at a 60 mgd pumping rate. New landfills are prohibited, and new excavations and mining activities are generally prohibited. Filling of existing or newly developing sinkholes or other solution features requires approval from the Alachua County Environmental Protection Department. Agricultural and silvicultural operations must follow or exceed accepted best management practices. No new wells are allowed in any aquifer, except as set forth in s. 355.09(b), Alachua County Code. Existing wells posing a threat to groundwater quality shall be properly abandoned or repaired, and all new and existing wells shall be registered. A Hazardous Materials Storage License is required for regulated facilities (per section 355.11, Alachua County Code) with non-residential septic tanks or wells.

The County enforces the Underground Storage Tanks ordinance, which requires secondary containment for such tanks. One of the stronger provisions of the ordinance is a requirement that both new activities and existing activities (through retrofitting) install such containment. The ordinance is therefore extremely effective in reducing the threat of aquifer contamination due to leaking storage tanks. The County has recently revised the Hazardous Materials Management Code (HMMC). Primarily, the Code regulates hazardous materials discharges to soil, surface water and groundwater by providing uniform standards for the proper storage, handling and monitoring of hazardous materials. New and existing commercial facilities that store or utilize hazardous materials

are subject to the provisions of the Code and must register with the Alachua County Environmental Protection Department. Businesses handling hazardous materials are responsible for commercial hazardous waste management in accordance with state and federal regulations. Furthermore, such handlers must comply with the HMMC which, among other things, requires stringent monitoring, reporting and site design procedures. Household hazardous waste is currently collected by four rural collection centers and a temporary collection center located at the S.W. Landfill. These staffed facilities accept relatively low-hazard wastes such as used oil and paints. Relatively high-hazard wastes are collected by periodic special waste collection events. The program could be more effective through an increase in the frequency of collection and/or more convenient methods of collecting the materials from households.

At the city level, Gainesville Regional Utilities (GRU) promotes water conservation through public outreach and education, use of a conservation water rate structure, water reuse, water recycling its power plants, and its water distribution system water loss minimization and maintenance program. GRU's conservation services department provides advice and assistance to homeowners and businesses in energy and water conservation. This includes conducting of free energy and water conservation audits and advice on xeriscaping. GRU also provides public education and encourages water conservation as part of its overall public outreach program. GRU uses an inverted block water rate structure, which also encourages customers to conserve water. The City code allows for the use of graywater recycling systems, which can also be used to save water.

The city's landscaping ordinance helps protects the aquifer with stringent requirements for tree protection and replacement, and installation or retention of existing site vegetation. The ordinance is an important means of reducing stormwater pollution and promoting aquifer recharge. Aquifer (and surface water) protection has been improved through required landscaping and stormwater retention and detention areas. Like the landscaping ordinance, the city's flood control, creek setback, surface waters and wetlands overlay district and stormwater management requirements reduce stormwater pollution and promote recharge. For example, the flood and creek regulations restrict or prohibit development and vegetative removal near surface waters. Stormwater regulations require on-site retention or detention of the first inch of runoff. Additional information regarding regulations governing land use and development within natural recharge areas can be found in the Stormwater Management Element.

While existing city ordinances intend to provide a high level of aquifer protection, regulatory changes may be necessary for a higher level of protection of the aquifer from stormwater pollution or protection of recharge. Additional city regulations and programs to promote such objectives could include increasing setbacks and buffers for lakes and wetlands, further acquisition of lands associated with surface waters and restoring degraded creeks.

Potential for Conservation, Use or Protection

A dual approach emphasizing prevention and providing for remedial action is needed to conserve and protect groundwater and soil resources in the Gainesville urban area. A preventive component is needed to protect the public health, avoid adverse economic impacts, and prevent harm to the natural environment. A preventative approach also is important because it acknowledges the limitations of relying exclusively on monitoring strategies. Such strategies can be useful for identifying problems, diminishing potential impacts and promoting timely remedial action, but they do not prevent problems from occurring in the first place. To be effective, preventive measures must: (1) acknowledge the importance of groundwater resources to the community; (2) consider the complexity and vulnerability of groundwater resources in the urban area and recognize they have a limited capacity to absorb the cumulative spills, runoff and other contamination that tend to accompany land development and human activity; (3) recognize that proper land use management is critical to the protection of groundwater and soil resources; (4) address the City's well-established land use pattern (e.g., by addressing the need for retrofits as well as protective standards for new development as appropriate); and (5) balance the costs of prevention against the typically high costs of cleanups, assuming they are technically possible. A remedial component is needed to ensure that existing problems affecting soil and groundwater quality or quantity are identified and effectively monitored and managed.

Existing and Recommended Conservation Strategies

Existing aquifer conservation strategies include:

* "Regulation of Development Near Creeks" Ordinance
* City Flood Control Ordinance
* City Subdivision Ordinance
* City Landscape Ordinance
* City Site Plan Review Requirements
* City Planned Development District
* City Zoning Code General Performance Standards
* Alachua County Murphree Well Field Management Code
* Alachua County Storage Tank Systems Code
* SJRWMD and SRWMD Permitting and Research Programs Relating to Water Use and Management, and Permitting Programs Relating to Stormwater Management
* DEP Rules Governing Construction and Operation of Wastewater Treatment Plants and Water Treatment Plant

* HRS Rules Governing Siting, Construction, and Maintenance of On-Site Sewage Disposal Systems.
* Alachua County Hazardous Materials Management Code (HMMC)
* City Wellfield Protection Ordinance

Strategies to conserve Gainesville's aquifer systems include:

* Given the interrelationship among surface water, groundwater and soil resources, the City pursues a combination of strategies designed protect or restore surface water quality and natural drainage features as part of its efforts to protect groundwater and soils. These include, among others, requiring development setbacks from creeks, lakes and wetlands; acquiring land along and around surface waters; restoring previously channelized creeks; periodic street sweeping; requiring sedimentation controls during construction; requiring the use of vegetated stormwater basins and swales particularly when sites are redeveloped for non-residential uses; developing regional stormwater management facilities to address existing drainage deficiencies; ensuring proper construction, operation and maintenance of public and private drainage systems; upholding strict standards for water quality treatment in stream-to-sink basins; and minimizing the use of impervious surfaces.

* Continue to have a strong wetlands protection ordinance, and revise it to allow off-site mitigation in narrowly defined cases. Wetlands cleanse water before it enters surface waters and sinkholes.

* Restore previously channelized creeks.

* Continue to promote effective enforcement of the county's wellfield management ordinance through the City's Wellfield Special Use Permit requirements and other applicable regulatory programs

* Continue programs that promote proper disposal, recycling or reuse of hazardous materials and wastes by both businesses and households.

* All new and revised landscape plans should prohibit the use of invasive exotic plants.

* Discourage the use of landscaping which requires large amounts of fertilizers, pesticides and water (e.g., by minimizing turf area and using native and drought-tolerant trees and plants). Existing programs promoting conservation and water reuse (e.g., public education and city water loss reduction program).

* Continue GRU's programs providing for pretreatment of industrial wastewater and regular inspection, maintenance and replacement of sewer pipes.

* Continue to identify and require proper closing of abandoned wells.

* Continue to provide public education programs on the nature of groundwater resources and the need to protect and conserve them.

* Continue GRU's use of state-of-the-art techniques for wellfield management and hydrologeologic studies relating to City wellfields.

* Continue to coordinate with county staff in monitoring surface water and groundwater quality.

* Use best available data, maps and other tools promoting effective management of groundwater resources generated by the county, water management districts and other sources.

* Cooperate with any regional efforts to further common interests in protecting the quality and availability of groundwater resources.

* Any project using wetlands for drainage retention should provide documentation of water quality and quantity monitoring.

SURFACE WATERS AND WETLANDS

Inventory of Surface Waters and Wetlands

Gainesville's surface waters consist of creeks, lakes, and wetlands:

CREEKS: There are approximately 56 miles of creeks within the city. About 32 of these miles are regulated by the Gainesville "Regulation of Development Near Creeks" Ordinance.

LAKES: Within city limits, there are 16 lakes at least one acre in size. Lakes cover approximately 2,885 acres of city surface area. A majority of the lakes are unnamed.

WETLANDS: Within city limits, there are 289 wetlands at least one acre in size. Wetlands cover approximately 3,370 acres of city surface area.

Surface waters are shown on Map 6. Note that there are no bays, fisheries, or estuarine marshes within city limits.

Surface waters can be grouped into "drainage basins." Drainage basins are like large bowls -- collecting creek flow and stormwater flow at its low point, and ultimately discharging this surface water flow. (In Gainesville, almost all of this discharge is into sinkholes and drainage wells.) Because much of the surface water flow of each basin is contained within the basin, much of the movement of animals, plants, pollution, and stormwater is relatively contained within each basin. As a result, each basin can be considered to have a unique ecological, hydrological, and geological identity that should be evaluated separately from other basins.

The Gainesville urban area fully contains 7 basins:

* Hogtown Creek Basin
* Sweetwater Branch Basin
* Lake Forest Creek Basin
* Little Hatchet Creek Basin
* Lake Alice Basin
* Calf Pond Creek Basin
* Tumblin Creek Basin

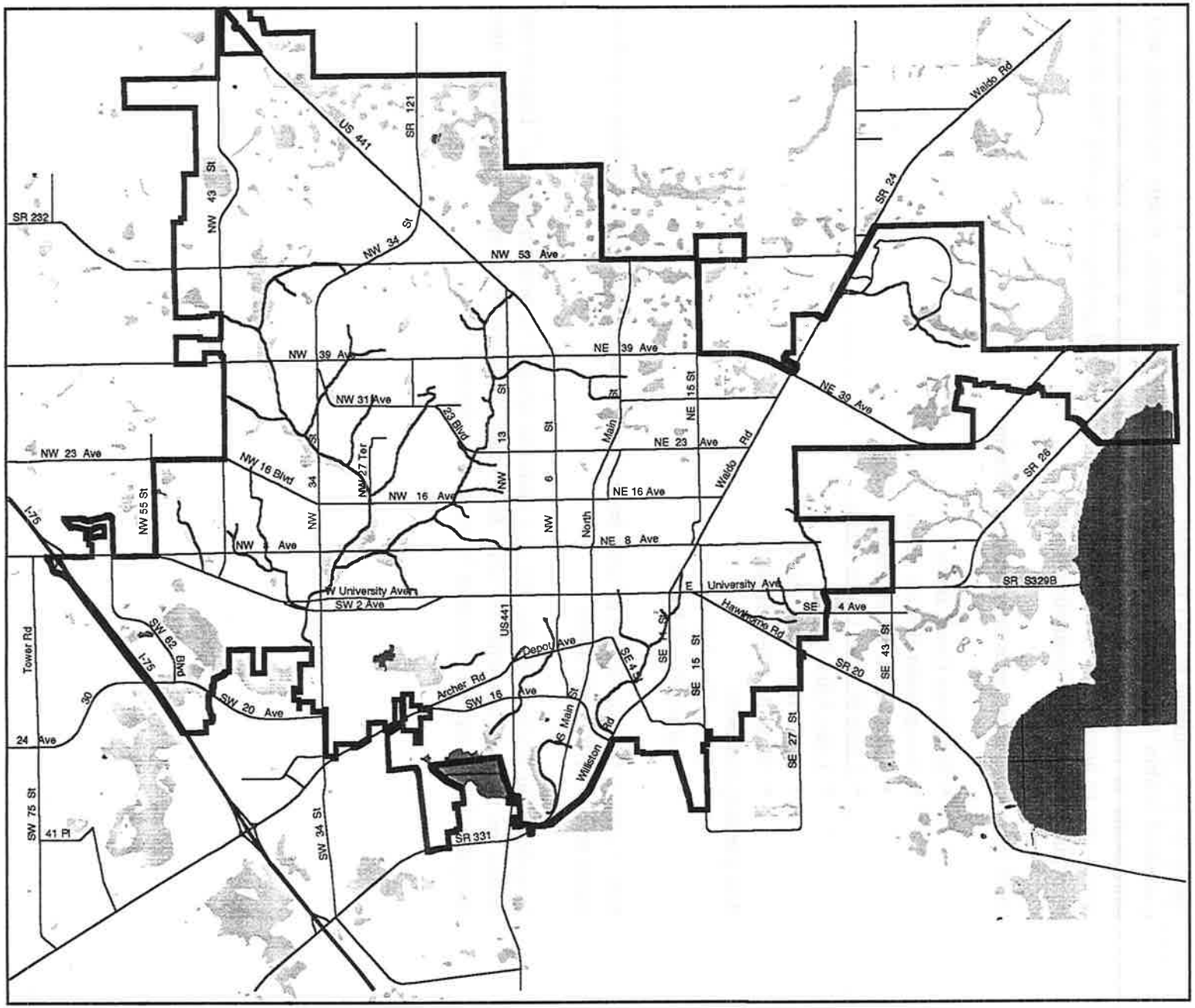
And partially contains:

* Blues Creek Basin
* Turkey Creek Basin

Map 7 shows the boundaries of each basin. Table 3 in the Appendix provides a surface water inventory for each basin.

In addition to drainage basins, the city contains several "depression basins." Depression basins are those basins with no outlet for surface water runoff except by percolation into the groundwater aquifer system or by evapotranspiration.

Map 6



ENVIRONMENTALLY SIGNIFICANT LAND & RESOURCES

Creeks, Lakes, and Wetlands

Legend

- Regulated Creeks
- Wetlands
- Lakes
- Gainesville City Limits

Sources: Wetlands and Lakes: SJRWMD digital files
Regulated Creeks: City of Gainesville, Land Development Regulations

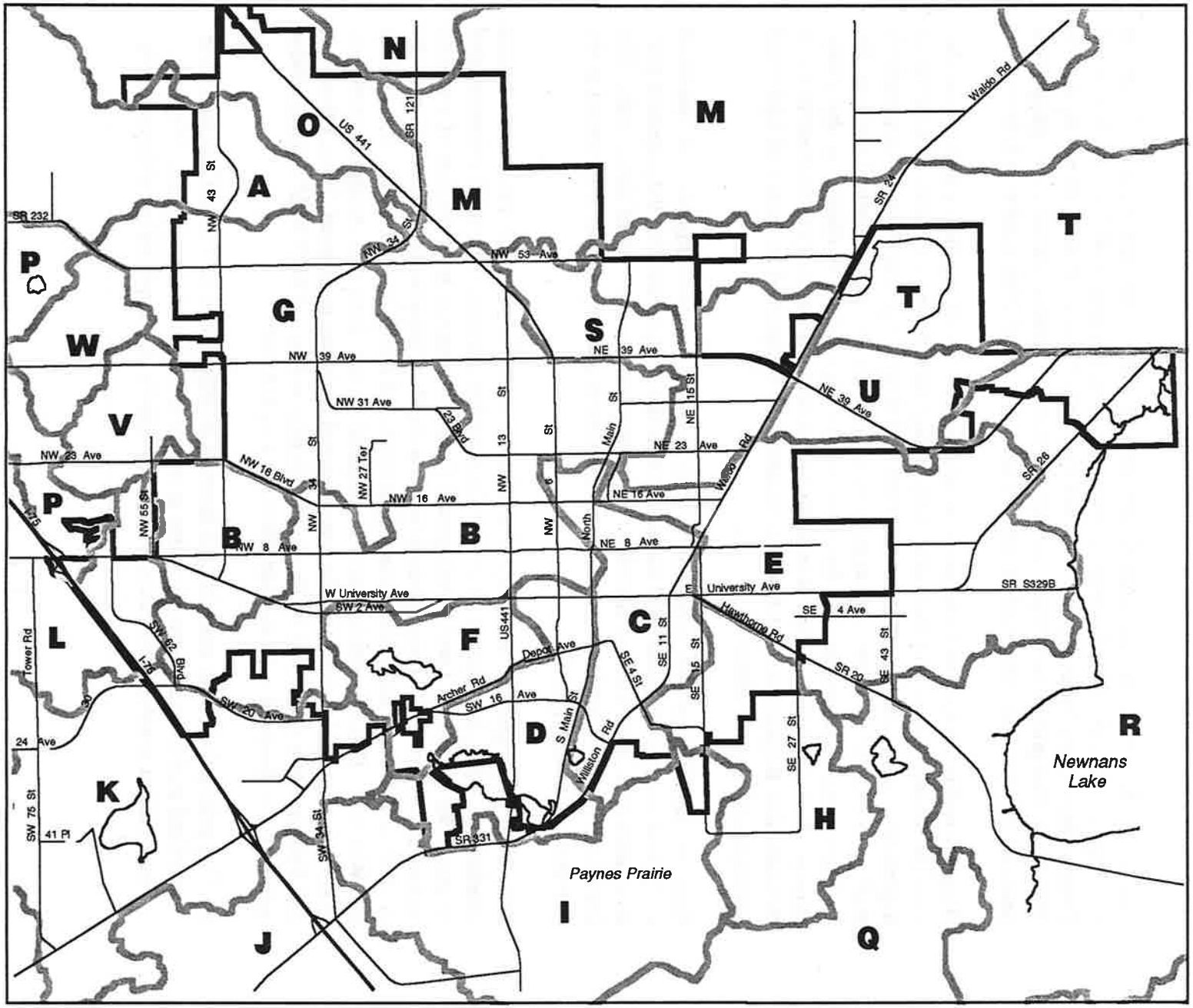
City of Gainesville
Gainesville, Florida

Prepared by the
Department of Community Development
November 2000

0 4000 8000 12000
Feet

N

Map 7



WATER BASINS

Legend

Water Basins

A. Blue Creek (Stream Basin)
B. Hogtown Creek (Stream Basin)
C. Sweetwater Branch (Stream Basin)
D. Bivans Arm Basin (Slough)
E. Sunland Basin (Drainage Basin)
F. Lake Alice Basin (Noncon)
G. Unnamed Stream Basin (Stream Basin)
H. Alachua Sink Basin (Noncon)
I. Extension Ditch (Ditch)
J. Paynes Prairie (NonCon)
K. Hogtown Pairie Basin (Reach)
L. Unamed Basin (Drainage Basin)
M. Hatchet Creek
N. Rocky Creek
O. Alachua Slough
P. Liberty Hill Drainage
Q. Paynes Prairie
R. Prairie Creek Reach
S. Unnamed
T. Gumroot Swamp
U. Airport Drainage
V. Rutledge Drainage
W. Unnamed Branch

Gainesville City Limits

City of Gainesville
Gainesville, Florida

Prepared by the
Department of Community Development
November 2000

0 4000 8000 12000
Feet

N

As noted above, there is very little surface water outflow from the Gainesville surface water system to areas outside of the urban area. Instead, creeks, urban stormwater runoff, agricultural runoff, and wetland runoff transport almost all surface water flow into aquifers through sinkholes and drainage wells. Refer to "Groundwater" section for more information.

Wetlands

The Water Management Advisory Committee (WMAC) over the course of various meetings in 2000, developed wetlands protection language proposed for inclusion in the Conservation, Open Space and Groundwater Recharge Element of the City of Gainesville 2000-2010 Comprehensive Plan. The recommended wetlands protection language was finalized in November 2000 (with minor revisions in January 2001) and is as follows:

"Projects within the City of Gainesville must comply with all regulatory protections that exist for surface waters and wetlands. City policy shall be to avoid loss of function or degradation of wetland habitat and/or wetland hydrology. Degradation that is unavoidable shall be minimized. Where degradation is anticipated due to a proposed activity, the applicant must demonstrate that the cause of the degradation is clearly in the public interest. Such degradation must be mitigated consistent with the City of Gainesville Land Development Regulations and must be reviewed and approved by qualified biological and engineering professionals.

Prior to initiation of the proposed activity causing wetland impacts, all approved mitigation must be completed and inspected to ensure compliance with the proposed plan, or an assurance bond must be submitted by the applicant to the City of Gainesville. The bond must be sufficient to cover the cost of mitigation and monitoring as proposed in the approved mitigation plan."

The Water Management Advisory Committee (WMAC) over the course of various meetings in 2000, in response to a City Commission referral, developed recommended language for the City's Land Development Code with respect to protection of wetlands and surface waters. This recommendation is a result of considerable deliberation of the WMAC and of input from professional biologists and engineers that are not members of the WMAC. This recommendation is included in the Data and Analysis section as relevant background information for any proposed revisions to adopted Goals, Objectives and Policies with respect to wetlands and surface waters. The WMAC-recommended language was finalized in November 2000 and is as follows:

1. City policy shall be to avoid loss of function or degradation of wetland habitat and/or wetland hydrology. Degradation that is unavoidable shall be minimized. Where degradation is anticipated due to a proposed activity, the applicant must demonstrate

that the cause of the degradation is clearly in the public interest as per Item 5. Such degradation must be mitigated consistent with the following provisions:

a. The following mitigation ratios shall be applied in determining the amount of area that must be mitigated in exchange for impacting wetlands:

Mitigation Type	**Mitigation Ratio**
Creation	
Forested Wetland (swamp)	50:1
Herbaceous Wetland (marsh)	20:1
Restoration	
Forested Wetland (swamp)	10:1
Herbaceous Wetland (marsh)	5:1
Preservation	
Wetland	20:1
Upland Associated with Wetlands	5:1

b. Wetlands creation is the least acceptable mitigation alternative, and shall be considered solely when the applicant can demonstrate that the proper hydrology and geology exists to make a created wetland sustainable. The applicant will further agree to enforceable monitoring to ensure that the created wetland continues to function.

c. Any mitigation shall include long term monitoring and maintenance. Appropriate and specific bonding shall be provided by the applicant to ensure performance.

d. Off-site mitigation shall be performed within the same sub-basin and basin in which the impact occurred, unless it is shown that mitigation outside the sub-basin is more appropriate. The order of preference for the location of the mitigated area(s) in relation to the impacted area(s) will be:

1) In the same basin and sub-basin;
2) In an adjacent sub-basin within the basin;
3) In an adjacent sub-basin outside the basin; and
4) In an adjacent basin.

e. Mitigation will be performed within the city limits of Gainesville. Where special circumstances prohibit this option, mitigation must remain within Alachua County.

2. Development shall not cause hydrological or wetland impacts off-site.

3. A minimum buffer distance of 50 ft shall be required between the landward extent of any wetland or surface water and the developed area. In some instances larger buffers may be warranted.

4. The above protection shall be extended to all water bodies and wetlands, regardless of whether they are currently mapped.

5. In determining whether or not a proposed activity is clearly in the public interest, the City must balance, and the applicant must address, the following criteria:

    a. Whether the activity is consistent with the City of Gainesville Comprehensive Plan;

    b. Whether adequate and reasonably proximate infrastructure is available to serve the project;

    c. Whether the activity will adversely affect the public health, safety, or welfare or the property of others;

    d. Whether the activity will adversely affect the conservation of fish and wildlife, including endangered or threatened species, or their habitats;

    e. Whether the activity will adversely affect the flow of water or cause harmful erosion or shoaling;

    f. Whether the activity will adversely affect fishing or recreational values in the vicinity of the activity;

    g. Whether the activity will be of a temporary or permanent nature;

    h. Whether the activity will adversely affect or will enhance significant historical and archaeological resources; and

Whether the current condition and relative value of functions being performed will be affected by the proposed activity.

Assessment of Surface Water Quality

Almost all surface waters in Gainesville, except for certain localized sites such as Hogtown Creek in the vicinity of the Cabot Carbon/Koppers Superfund site have been designated as "Class III" (suitable for recreation, propagation and management of fish and wildlife).

The Alachua County Environmental Protection Department currently monitors 15 surface water sites quarterly for selected inorganic parameters including nutrients and coliform bacteria. The current monitoring sites include 3 stations on Blues Creek, 3 stations on Hogtown Creek, 2 stations on Mill Creek, 1 station on Possum Creek, 3 stations on Sweetwater Branch, 2 stations on Tumbling Creek and 1 station on Turkey Creek.

One of the primary surface water features in Alachua County is the Orange Creek Basin (OCB). This basin contains those areas that drain into Newnans Lake, Lochloosa, and Orange Lakes and eventually into Orange Creek downstream to the Ocklawaha River (Rodman Reservoir). The OCB also encompasses Paynes Prairie (which drains into Alachua Sink) and the streams in Gainesville that flow either to Newnans Lake, Paynes Prairie or Hogtown Creek.

The St. Johns River Water Management District has identified several projects to upgrade water quality within the district. According to the May 2000 District Water Management Plan for the Orange Creek Basin, by FY 04-05, a complete diagnostic effort assessing the cause for the poor water quality and sediment accumulation in Newnans Lake shall be finalized.

Water quality in Newnans Lake is poor. The lake is presently hypereutrophic, with chlorophyll concentrations reaching levels seen on problem lakes such as Lake Apopka. The cause for the deterioration in Newnans Lake is unclear, but nutrient loading from the lake sediments to the water column is the likely cause. Newnans Lake is receiving increasing attention through implementation of the OCB surface water management plan. Goals of this plan include:

* Develop and begin implementation of a restoration plan for Newnans Lake to improve water quality and fisheries by FY 04-05.

* Submit reports to the OCB Partnership agencies on select stream restoration needs, the impact of stream water quality on Paynes Prairie wetlands, and the impact of discharge of Hogtown Creek and Sweetwater Branch to the Floridan aquifer.

* Submit status reports assessing water quality and stream discharge/lake level conditions to the OCB Partnership agencies.

The major sources of actual and potential surface water pollution in Gainesville are:

* Urban stormwater runoff from parking lots, service aprons, and roads.

* Leaks from underground hazardous materials storage tanks (particularly gas station tanks).

* Treated sewage from municipal and private wastewater systems.

* Leaks and spills from industrial, commercial, and residential hazardous materials storage and handling sites.

* Septic tanks (on-site sewage disposal systems).

* Sediment from soil erosion.

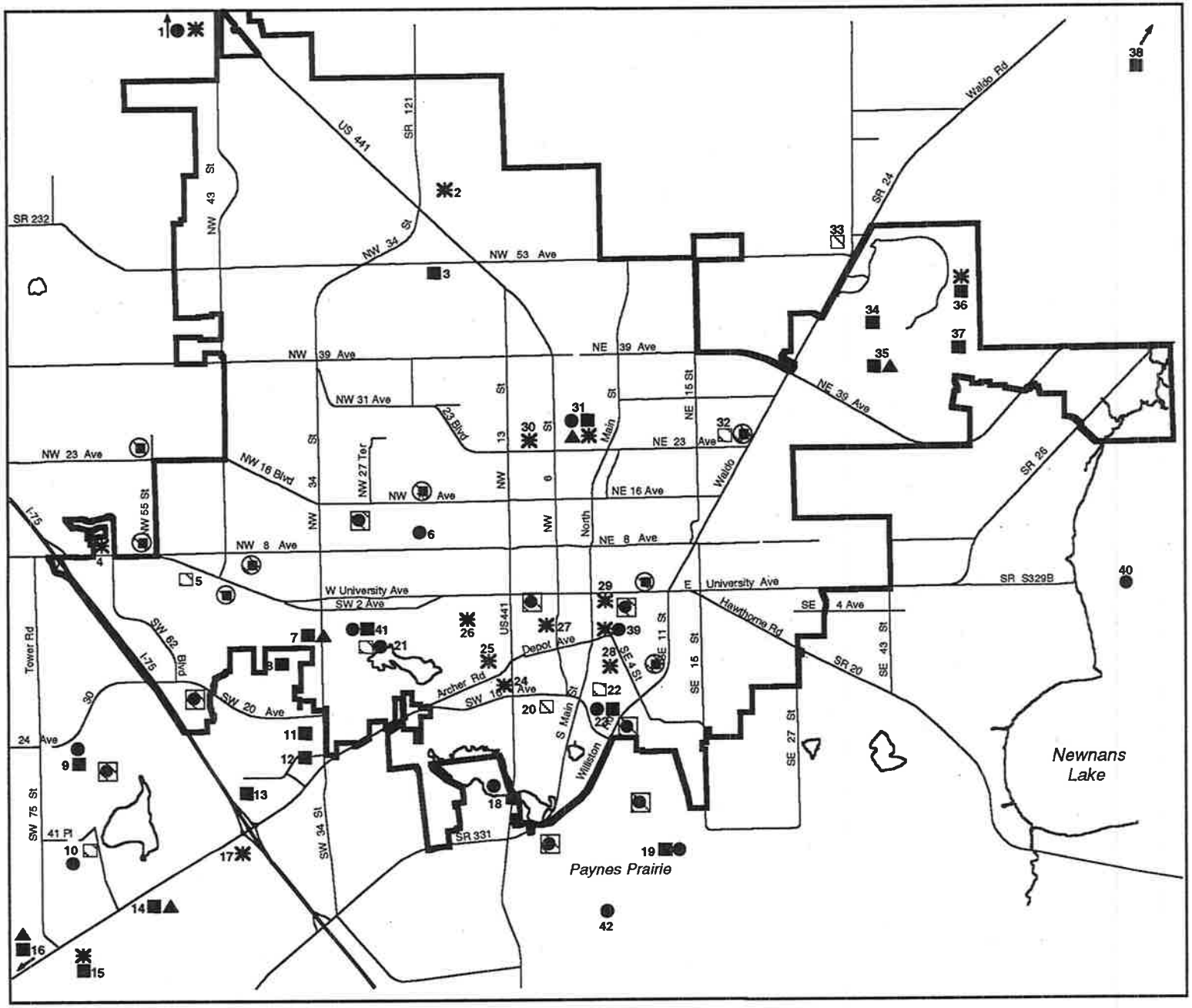
* Animal waste.

* Runoff from horticultural applications (particularly residential applications of fertilizers, pesticides, and herbicides).

Of these, municipal and septic sewage has traditionally been the primary source of surface water pollution. However, over the past several decades, due to local, state, and federal statutory and regulatory initiatives, Gainesville has mitigated much of the pollution from these sources. This mitigation has been attained through the construction of secondary and tertiary wastewater treatment plants, and subsequent utility system hook-up of several sewage sources that previously discharged directly to surface water or groundwater.

Currently, the most significant sources of surface water pollution in Gainesville are "non-point" sources, particularly urban stormwater runoff and sediment from soil erosion. See Map 8 for the location of identified "point" sources of pollution within the Gainesville urban area. To date, however, extensive sampling has failed to identify any significant human health-related contamination of surface water in Gainesville. Based on cursory studies, however, a pilot study to analyze water samples obtained from Tumblin Creek has resulted in the identification of E. Coli strains that are isolates from both human and non-human origin.

GRU is conducting tests of sewer lines to trace the source of pollution. Other partners in the project are community organizations, the Alachua County Health Department, and the Florida Department of Environmental Protection.



POTENTIAL & KNOWN POINT SOURCE POLLUTION PROBLEMS

1990 Comprehensive Plan

Affected Resource

- Surface Water
- Groundwater, Known
- Groundwater, Potential
- Soil
- Air

Alachua County Office of Environmental Protection Monitoring Points

- Surface Water Monitoring
- Groundwater Monitoring

Point Source Pollution Sites

1. Deerhaven Power Plant
2. Metal Container Corp
3. FMX Pesticide
4. N. Fla. Regional Hospital
5. Oaks Mall Retention Pond
6. Hogtown Creek
7. UF Nuclear Science Ctr.
8. UF Landfill
9. Haile Sink
10. Lake Kanapha Wastewater Plant
11. Voyle's Quadraplex
12. Gas Station
13. Stengle Air Field
14. Ameloroco Dump
15. Ziriech
16. Archer (SW) Landfill
17. Bear Archery
18. Bivens Arm
19. Alachua Sink
20. GNVL Scrap
21. Lake Alice/UF Wastewater Plant
22. GNVL Gas
23. Sweetwater Branch Waste Plant
24. VA Hospital Incinerator
25. Shands Incinerator
26. UF Incinerator
27. Alachua General Hospital Incinerator
28. Manon Concrete
29. Central Fla. Crematorium
30. Forest Meadows Funeral Home
31. Cabot Carbon/Koppers
32. Hope Electric
33. Vital Industries
34. Febco Air
35. Airport
36. PCR Chemical
37. Former Airport Landfill
38. NE Alachua Landfill
39. Kelly Power Plant
40. Newnans Lake
41. UF Fuel Tanks
42. Paynes Prairie

Gainesville City Limits

City of Gainesville
Gainesville, Florida

Prepared by the
Department of Community Development
November 2000

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Feet

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Based on standards set forth by DEP, all lakes within or near the City of Gainesville have poor water quality, while Hogtown Creek, Possum Creek and Gumroot Swamp are considered to have "good" water quality. Hatchet Creek has fair water quality while Sweetwater Branch has poor water quality. Water quality for lakes within or near the City is considered "poor" based on the trophic state index. The "trophic state index" is a method of classifying lakes based on their chlorophyll, Secci depth, nitrogen and phosphorous concentrations. For a more in-depth explanation of the index, refer to the Florida Department of Environmental Protection's *Central Florida District Water Quality Assessment: 305 (b) Technical Appendix (November 1996).*

Paynes Prairie State Preserve is being managed by the Florida Department of Environmental Protection (FDEP). The Prairie is potentially affected by surface waters from Sweetwater Branch and Tumblin Creek. The proliferation of woody vegetation in the northern part of the Prairie has been thought by DEP biologists to be caused by sediment and/or nutrient inputs from Sweetwater Branch and Tumblin Creek. Tumblin Creek passes through Bivens Arm before entering the Prairie, which likely reduces the sediment load to the Prairie.

There has been interest in determining the cause(s) for the woody plant proliferation on the northern part of the Prairie for more than a decade, and various causative hypotheses have been proposed. There has also been recent interest in assessing the potential for the sheet-flow of water from the Sweetwater Branch into the northern part of the Prairie, rather than continuing the channelization of this water into Alachua Sink. In both cases, the impact of this stormwater runoff to the Prairie vegetative communities needs to be assessed. During the early to mid-1990's, a concerted, multi-agency working group meet to discuss various approaches to address these issues.

Alachua County has secured a federal "Environmental Justice" grant to help find and clean up pollution in the Tumblin Creek Watershed. Twenty disadvantaged youths are helping to look for pollution sources and let the community know about ways to prevent it.

Functions of Surface Waters

Surface waters (creeks, lakes, and wetlands) provide the following functions:

* Moderation of air temperatures.

* Storage of water, control of flood waters during storms, and recharge of groundwater.

* Cycling of nutrients needed to support a diversity of natural communities.

* Provision of habitat and corridors for urban wildlife, and dispersal of seeds.

* Provision of important sites for education/research, recreation, scenic views, and open space.

* Provision of urban fire protection.

* Provision of buffering from noise, unattractive views, and other nuisances and hazards (by creeks and wetlands).

* Provision of oxygen, absorption of carbon dioxide, filtration of air pollutants and water pollutants (especially suspended solids, heavy metals, and biological oxygen demand), breakdown of harmful levels of organic matter, and reduction of erosion and sedimentation (by wetlands).

Existing and Potential Commercial and Recreational Uses

Commercial use of surface waters in Gainesville is limited to the diversion of stormwater runoff to surface waters from commercial operations, and the economic benefits accruing to commercial operations because of the aesthetic qualities of surface waters.

There is very little recreational use of surface waters within the city. Creeks and lakes are used to a limited extent by the local population for nature walks, fishing and wading. Portions of Bivens Arm and Lake Alice are incorporated into local nature parks that feature boardwalks, interpretive signage and observation platforms. Newnans Lake, most of which is outside of city limits, accommodates a large amount of boating and fishing, other than during drought events.

The City's acquisition of Gum Root Swamp Park and Gum Root Swamp Conservation Area, which opened in April of 1994, also provides for passive recreation on Newnans Lake, however access to the lake is limited due to the environmental sensitivity of the area. The park and conservation area together comprise 741 acres of protected vital floodplains and a sanctuary for wildlife and plants. The City also acquired Palm Point on Newnans Lake in the 1990s, which is outside of City limits, as well as a parcel of land on Clear Lake in southwest Gainesville that is presently undeveloped.

The St. Johns River Water Management District has identified parcels ringing Newnans Lake on the east, south and north side as potential acquisition sites through the Conservation and Recreation Lands program which would help link it with the District's 372-acre purchase of portions of Gum Root Swamp.

Surface waters in Gainesville represent a valuable future recreational resource for two primary reasons: (1) much of the remaining undeveloped land in Gainesville contains, or is in close proximity to surface waters; and (2) acquisition of surface waters and surrounding properties for recreation helps preserve the ecological integrity of surface waters and increases public access to such resources. For these reasons, the city should consider the acquisition (and when appropriate, the recreational development) of additional properties associated with surface water systems as part of its parks and recreation program.

Existing and Recommended Conservation Strategies

Existing local surface water conservation strategies include:

* Surface Water and Wetlands District
* City Wellfield Protection Ordinance
* City Flood Control Ordinance
* City Landscape Ordinance
* City Subdivision Ordinance
* City Site Plan Review Requirements
* City Planned Development District
* City Zoning Code General Performance Standards
* SJRWMD and SRWMD Permitting and Research Programs Relating to Water Use and Management
* DEP Rules Governing Construction & Operation of Wastewater Treatment Plants
* HRS Rules Governing Siting, Construction, & Maintenance of On-Site Sewage Disposal Systems

Recommended strategies to conserve Gainesville's surface waters and wetlands include:

* Continued coordination with the County in monitoring surface water quality in the urban area.

* Continue to require creek, lake and wetland setbacks designed to prevent erosion and drops in the level of the water table, trap sediment in stormwater runoff, and allow for periodic flooding without damage to structures.

* Develop additional land development regulations pertaining to wetlands mitigation.

PLANTS, ANIMALS, AND THEIR HABITATS

Inventory & Problems Regarding Plants, Animals

The Gainesville urban area contains an outstanding variety of plants, animals, and ecological communities. Some are remnants from pre-urban Gainesville, and others are adapted to survive in the urban landscape of Gainesville. As is true with most or all counties in Florida, Alachua County contains a relatively large number of threatened and endangered species.[8] Note that there are no fisheries, marine habitats, or intact forests within city limits.

The most important sanctuaries for plants, animals, and ecological communities in Gainesville are the creek, lake, and wetland areas. These habitat areas and corridors provide ample food, water, and cover that are typically lacking in areas where land has been developed. Note, however, that the effectiveness of urban wildlife corridors is only as effective as the relative space that the corridor provides to maintain a viable population of plants and animals.

The value of creeks, lakes, and wetlands is not necessarily a function of size. For example, temporary wetlands less than one-half acre in size may serve as habitat for a large and diverse population of species, especially if the wetland is remote from other wet areas. In addition, many species can only survive in smaller wetlands which exhibit characteristics that are not found in larger wetland systems (such as periodic dry periods, lower energy levels, etc.).

On the other hand, preservation and management of larger upland and wetland areas is critical to species that depend on such factors as continuous standing water, large feeding areas, and isolation from human activity. Larger habitat areas also help preserve and promote species diversity.

Upland communities are critical for a wide range of species adapted to a drier habitat. In addition, many uplands in the urban area are important groundwater recharge areas. Although most of the more significant upland communities within Gainesville city limits have been lost to urban development, there are numerous and significant uplands in the unincorporated urban area that merit protection. (See Maps 9 and 15)

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[8] For a complete inventory of "Special Protection Species" found in Alachua County, see Table 4 in the Appendix.

Ecological communities are defined as an integrated association of plants and animals adapted to and dependent on a particular environment. In the Gainesville urban area, there are roughly 12 major categories of ecological communities.

As defined by KBN (1996), the Soil Conservation Society of America, the Florida Natural Areas Inventory, and the University of Florida Center for Wetlands, they include:

Scrub (or Grassy Scrub)

A dry, old dune community. Dominant vegetative species include: sand live oak (shrub), saw palmetto, rosemary, wiregrass, and reindeer moss. Dominant animals include: scrub lizard, deer, and sand skink. Historically rare in Alachua County. Less than 1,000 acres remain in the county. Loss of scrub occurring rapidly throughout state, primarily due to desirable conditions for real estate development. Small patches observed near Hatchet Creek and in southwest urban area in early 1970s. Soils are often important for aquifer recharge. Requires a periodic fire to maintain identity. "Endangered, threatened, and special protection" species that may occur in community: scrub jay, blue-tailed mole skink, short-tailed snake, gopher tortoise.

Mesic Hammock

A moderately moist community with a sparse understory. Dominant vegetative species include: laurel oak, pignut hickory, magnolia, sweetgum, ironwood. Dominant animals include: turkey, squirrels, raccoons, possums, and several song birds such as bluebirds, cardinals, mockingbirds. Most widespread ecological community in Alachua County. Some communities are so exceptional in quality that they are of state and national significance. San Felasco Hammock contains the highest quality hammock in the county, as does Sugarfoot Hammock, Fred Bear Hammock and Buzzard's Roost. Large tracts in Paynes Prairie, and smaller communities at Kanapaha Prairie and Serenola. Must be protected from fire to maintain identity. "Endangered, threatened, and special protection" species that may occur in community: Florida panther, eastern indigo snake, black bear, auricled spleenwort, dwarf spleenwort, sinkhole fern.

Hydric Hammock

A wet, lowland community typically found in floodprone areas. Dominant vegetative species include: cabbage palm, water oak, red maple, red cedar, bays, blackgum, needle palm, ironwood, wax myrtle (shrub), sword and royal fern. Dominant animals include: squirrels, otter, turtle, and raccoons. Almost as widespread in Alachua County as mesic hammock. Excellent tracts in Paynes Prairie. Best county tract at Prairie Creek. Important for water quality and quantity control. "Endangered, threatened, and special protection"

species that may occur in community: Florida panther, black bear, auricled spleenwort, climbing dayflower.

Sandhill

A dry, upland community. Dominant vegetative species include: longleaf pine, turkey oak, bluejack oak, wiregrass, and reindeer moss. Dominant animals include: white-tailed deer, pocket gopher, fox squirrel, quail, fence lizard. In the past covered almost half of Alachua County, primarily in southwest. Community is now extremely rare, primarily due to desirable conditions for real estate development, fire suppression, and fragmentation. Occurrences in or near the urban area include Morningside Nature Center, Paynes Prairie, Austin Cary Forest, San Felasco Hammock, Kanapaha Prairie, Hatchet Creek-Gum Root Swamp-Little Hatchet Creek. Soils are often important for aquifer recharge. Requires a periodic fire to maintain identity. "Endangered, threatened, and special protection" species that may occur in community: Godfrey's blazing star, Florida panther, southeastern kestrel (sparrow hawk), red-cockaded woodpecker, blue-tailed mole skink, eastern indigo snake, short-tailed snake.

Dome Swamp (or cypress dome)

A wet, poorly drained depression community found along lakes, creek margins, prairies, and flatwoods. Dominant vegetative species include: bald cypress, blackgum, bays, pond cypress, red maple, cinnamon fern, Spanish moss. Dominant animals include: deer, mink, raccoon, and otter. Community is associated with pine (wet) flatwoods and hydric hammock. Occurrences in or near the urban area include Hatchet Creek and Buck Bay. Important for water quality and quantity control, wildlife habitat. Requires fluctuating water levels to maintain identity. "Endangered, threatened, and special protection" species that may occur in community: black bear, ivory-billed woodpecker, wood stork, bald eagle, bird's nest spleenwort, fuzzy-wuzzy air plant, giant water dropwort, hidden orchid, nodding catopsis, grass-of-parnassus, climbing dayflower.

Freshwater (or Floodplain) Marsh

An open expanse of grasses, sedges, and rushes in soils seasonally inundated. Dominant vegetative species include: beak rushes, common reed, flat sedge, sawgrass, cattail. Dominant animal species include: otter, raccoon, marsh rabbit, water rat, ibis, heron. Highly endangered both statewide and in the Gainesville urban area. Community is associated with pine (wet) flatwoods and hydric hammock. Occurrences throughout the urban area. Important for water quality and quantity control, wildlife habitat. Requires fluctuating water levels to maintain identity. "Endangered, threatened, and special protection" species that may occur in community: wood stork, sandhill crane, crested caracara, alligator.

Upland Pine Forest

A moderately dry, upland community characterized by flat terrain. Dominant vegetative species include: longleaf and loblolly pine, red oak, saw palmetto, wiregrass. Typical animal species include: deer, fox squirrel, cottontail rabbit, brown-headed nuthatch, cotton rat. In the past covered much of western Alachua County. Community is now rare, primarily due to fire suppression and fragmentation. Degraded or fragmented communities found throughout urban area. Relatively large patches in or near the urban area include Paynes Prairie, Hickory Sink, San Felasco Hammock. Requires a periodic fire to maintain identity. "Endangered, threatened, and special protection" species that may occur in community: Florida panther, southeastern kestrel (sparrow hawk), red-cockaded woodpecker, eastern indigo snake, bald eagle, black bear, sandhill crane.

Wet Flatwoods

A wet, flatland community seasonally inundated and associated with hydric hammock. Dominant vegetative species include: slash and pond pine, cabbage palm, loblolly bay, sweetbay, wax myrtle, saw palmetto, wiregrass. Typical animals include: rabbit, raccoon, opossum, skunk, fox squirrel, fox. Occurrences in or near the urban area include Hatchet Creek-Gum Root Swamp, Paynes Prairie, Prairie Creek. Important for water quality and quantity control, wildlife habitat. Requires fluctuating water levels to maintain identity.

Xeric Hammock

The driest of the hardwood hammock communities. Community is found throughout urban area. Xeric Hammock is typically a former sandhill or scrub that has become too fragmented to burn. Dominant vegetative species include: sand live oak, turkey oak, live oak, pignut hickory, saw palmetto, scrub rush. Typical animals include: gray squirrel, turkey, screech owl, bluejay, barking tree frog, fence lizard, hog-nose snake, gopher tortoise. Excellent example at Prairie Creek. Also at Hickory Sink.

Mesic Flatwoods

A moderately wet, flatland pine community. Dominant vegetative species include: longleaf, slash, and loblolly pine, saw palmetto, gallberry, wiregrass. Typical animals include: white-tailed deer, cotton rat, gray fox, raccoon, brown-headed nuthatch, southeastern kestrel. Formerly covered large areas of Alachua County, particularly north and east of Gainesville. Ecological communities found at Paynes Prairie, Austin Cary Forest, San Felasco Hammock, Hatchet Creek, Millhopper Flatwoods, Gum Root Swamp.

Scrubby Flatwoods

Represents the xeric (dry) version of the three flatwood types and is least abundant of the three. Dominant vegetative species include: longleaf, slash, and loblolly pine, saw palmetto, sand live oak (shrub), Chapman's oak (shrub), wiregrass. Typical animal species include: gray fox, raccoon, red rat snake, white-tailed deer, cotton rat, brown-headed nuthatch. Prairie Creek may have the county's best example. Other examples are found at Paynes Prairie, Austin Cary Forest, Hatchet Creek-Gum Root Swamp.

Baygall

Occur as small wetland patches at the base of slopes. Dominant vegetative species include: sweetbay, red maple, dahoon holly, white cedar, blackgum, cinnamon fern. Typical animals include: southern dusky salamander, marsh rabbit, southeastern shrew, raccoon, opossum, southern mink. Best example in county is at Hatchet Creek. Also found at Paynes Prairie, Millhopper Flatwoods.

See Table 5 in the Appendix for a catalog of these communities as they appear on several properties found in the urban area.

Inventory and Problems Regarding Plants, Animals and Habitats

Annexation has brought several thousand acres of environmentally significant areas into the City limits as well as moved it closer to other significant areas in the unincorporated areas. In 1996, Alachua County completed a habitat inventory, which supplements the KBN study from 1987, identifying significant habitat still in private ownership. The following habitats lie within or near the City limits and are identified on Map 9. Map 10 "Significant Ecological Communities" illustrates the distribution of communities found in Table 5 Catalog of Natural Ecological Communities located in the appendix.

HOGTOWN PRAIRIE-SUGARFOOT HAMMOCK. This 1782-acre site is the number three-rated site in the entire county based on the KBN/Golder priority ranking of 49 sites.

The habitat is located generally at the intersection of I-75 and SW 20th Avenue and straddles the City-County boundary. The study noted that Sugarfoot Hammock "is one of the most outstanding calcareous mesic hammocks in the county." The site is situated within the lower Hogtown Creek floodplain, where the Hogtown Creek empties into the Floridan aquifer. Sugarfoot Hammock contains mature hardwood forest, prairie, a lake, and "perhaps the finest…slough in north Florida."

GUM ROOT SWAMP. This 4,246-acre site was rated number 8 in priority by KBN/Golder and is located on the northern edge of Newnans Lake east of Gainesville

Regional Airport. The site includes the majority of Gum Root Swamp acquired by the City and St. Johns River Water Management District. The area includes large portions outside the City limits and is a large complex of wetlands and pinelands that provides key regional ecosystem linkages with Newnans Lake and Hatchet Creek. Although the bulk of Gum Root Swamp is a central wetlands basin, community types also include mesic flatwoods, wet flatwoods, scrubby flatwoods, and sandhill.

The KBN/Golder study identified several listed faunal species including alligator, wood stork, little blue heron, tri-colored heron and bald eagle. Fox squirrels and canebrake rattlesnakes have been reported in this vicinity. The Sandhill community provides habitat for gopher tortoise, and perhaps Florida mice and eastern indigo snakes. The Florida Game and Freshwater Fish Commission indicate "Gum Root Swamp and the lake shore swamp are among the highest rated areas in the County on the priority wetlands for listed species map for Alachua County".

MILLHOPPER FLATWOODS. This 1,600-acre site was ranked 23rd on KBN/Golder's study which is considered average in priority. It sits astride NW 43rd Street, north of NW 53rd Avenue and west of US 441 and provides much of the headwaters for Blues Creek.

The FGFWFC habitat distribution maps show habitat for alligator, wood stork, snowy egret, and little blue heron." The 1996 study also indicated a "pair of swallow-tailed kites is sometimes observed in the area and may be nesting here." Needle palms have been located in the hammock forest and three commercially exploited listed plant species—royal fern, cinnamon fern and greenfly orchid—are on the site.

Although the KBN study's rating places Millhopper Flatwoods as an "average" priority, the study noted that its connections with Fox Pond and San Felasco Hammock State Park were good, and those with the Devil's Millhopper State Park and Hague Flatwoods were fair. Furthermore, the study noted a good diversity of habitat, but a prescribed burning program is needed to support wildlife and plants. Suggested conservation strategies noted that "purchase does not seem to be the best option due to the modest resource value and the high price of land." Instead, the best strategy was to secure the most wetland protection, the widest possible setbacks along the creeks, clustering of development away from streams and wetlands, and a low density of development. However, its connections with Fox Pond, San Felasco Hammock, Buck Bay, and the Hague Flatwoods suggest portions of this site could serve as a wildlife corridor.

BUCK BAY FLATWOODS. Buck Bay is a diverse collection of pine flatwood forest and wetlands directly north of Gainesville. Comprising 18,018 acres, the flatwoods are a major headwaters area "rather like a miniature Green Swamp". Rare, threatened and endangered species for the flatwoods include the Florida gopher frog, gopher tortoises, wood stork, snowy egret, little blue heron and alligator. KBN indicates that the site is

large enough to be "potential habitat for the red-cockaded woodpecker, but is not close to being suitable in its present condition due to the young age of the trees." It is also potential habitat for a number of listed terrestrial orchids, butterworts and rare wildflowers.

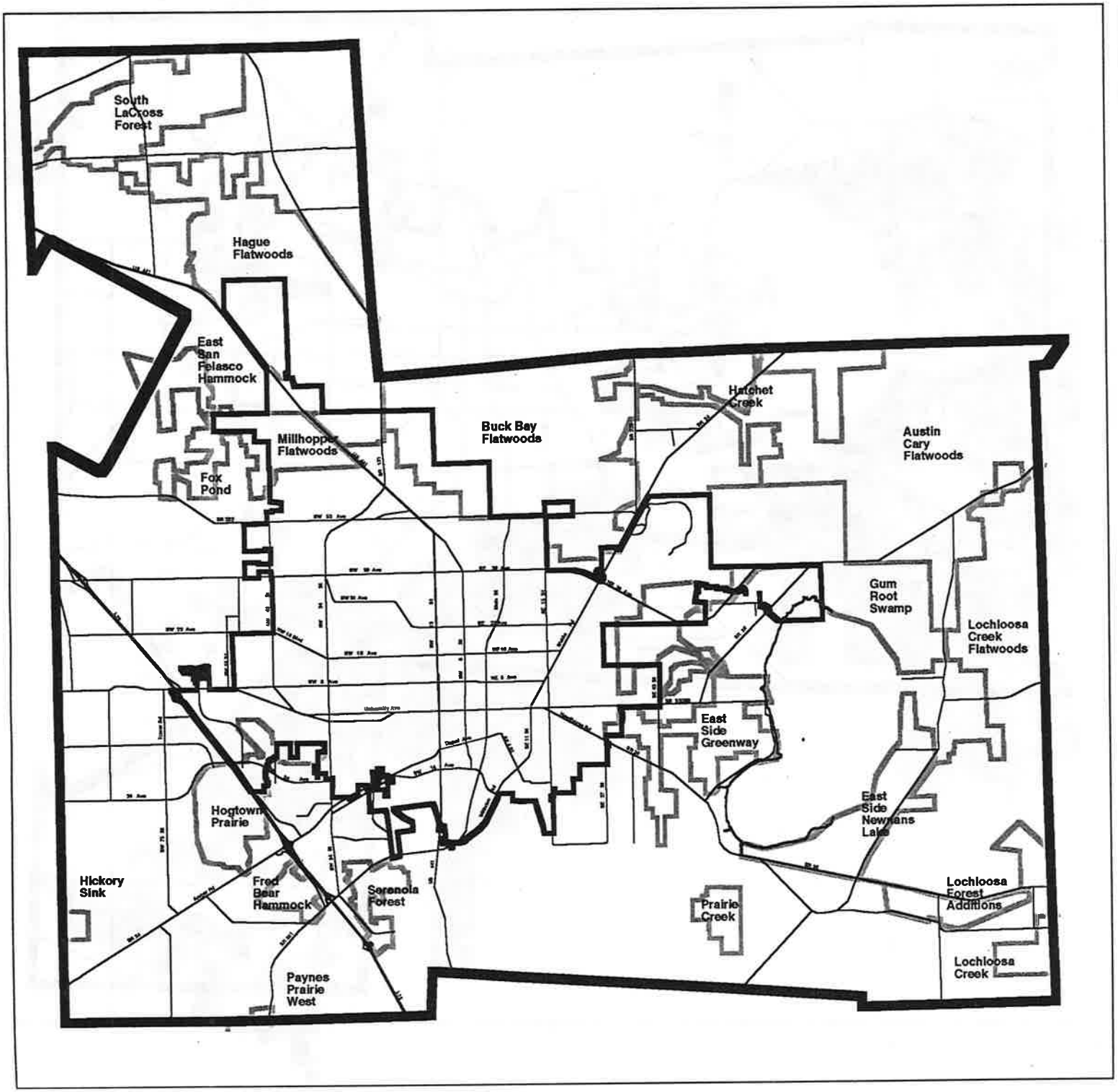
EASTSIDE GREENWAY (MORNINGSIDE GREENWAY). This 3,221-acre site lies east of Morningside Nature Center, west of Newnans Lake and south of Gum Root Swamp, substantial portions of which are located in the County. The "East Side Greenway", ranked fourteenth in priority by the KBN/Golder study, is designed to connect all three of these diverse and complex habitats. The study indicated that the "significance for Morningside Nature Center of remaining connected to the larger areas of wildlife habitat is also high".

Rare, threatened and endangered species within the East Greenway include alligators that travel throughout the greenway wetlands. Gopher tortoises, Florida gopher frogs and Florida pine snakes and a few Sherman fox squirrels and Eastern indigo snakes "probably need the greenway to survive". Two active bald eagle nests are on the site near Palm Point Hill. Florida Game and Freshwater Fish Commission habitat distribution maps show habitat in the East Side Greenway for wood storks, little blue herons, sandhill cranes, bald eagles, gopher frogs and alligators. Several plants are listed and include Catesby's lily, yellow-fringed orchid, rosebud orchid, royal fern, cinnamon fern and greenfly orchid.

Various invasive exotics have established themselves on the site and are a threat to the ecology including paper mulberry, Chinese tallow tree, camphor tree, mimosa, air-potato and elephant ear. Other non-threatening invasives include chinaberry, Spanish gold, wax begonia, centipede grass and bahia grass.

The KBN/Golder study noted that the land between Paynes Prairie and Morningside Nature Center is the "most valuable and important connector...and the best option is to purchase it and add it to the preserve". The lands by Newnans Lake would also be protected by purchase, probably by a cooperative effort involving the St. Johns River Water Management District, the Conservation and Recreation Lands Committee and perhaps the City and County. The lands owned by the prison system, Tacachale and other public agencies could be managed by cooperative agreement.

HAGUE FLATWOODS. This is a 6,344-acre site between, and north of, the Millhopper and Buck Bay Flatwoods, and contains the Deerhaven Power Station. Rated 23rd in priority by the KBN/Golder study, the site contains large areas of basin swamp, many cypress domes, and is part of the headwaters of both Rocky Creek and Turkey Creek.



ECOLOGICAL INVENTORY

Ecological Inventory Site Boundaries

Legend

- Ecological Inventory Site Boundaries
- Inventory Boundary
- City of Gainesville

Source: KBN, 1996. Figure 1-2. Alachua County Ecological Site Boundaries

City of Gainesville
Gainesville, Florida

Prepared by the
Department of Community Development
November 2000

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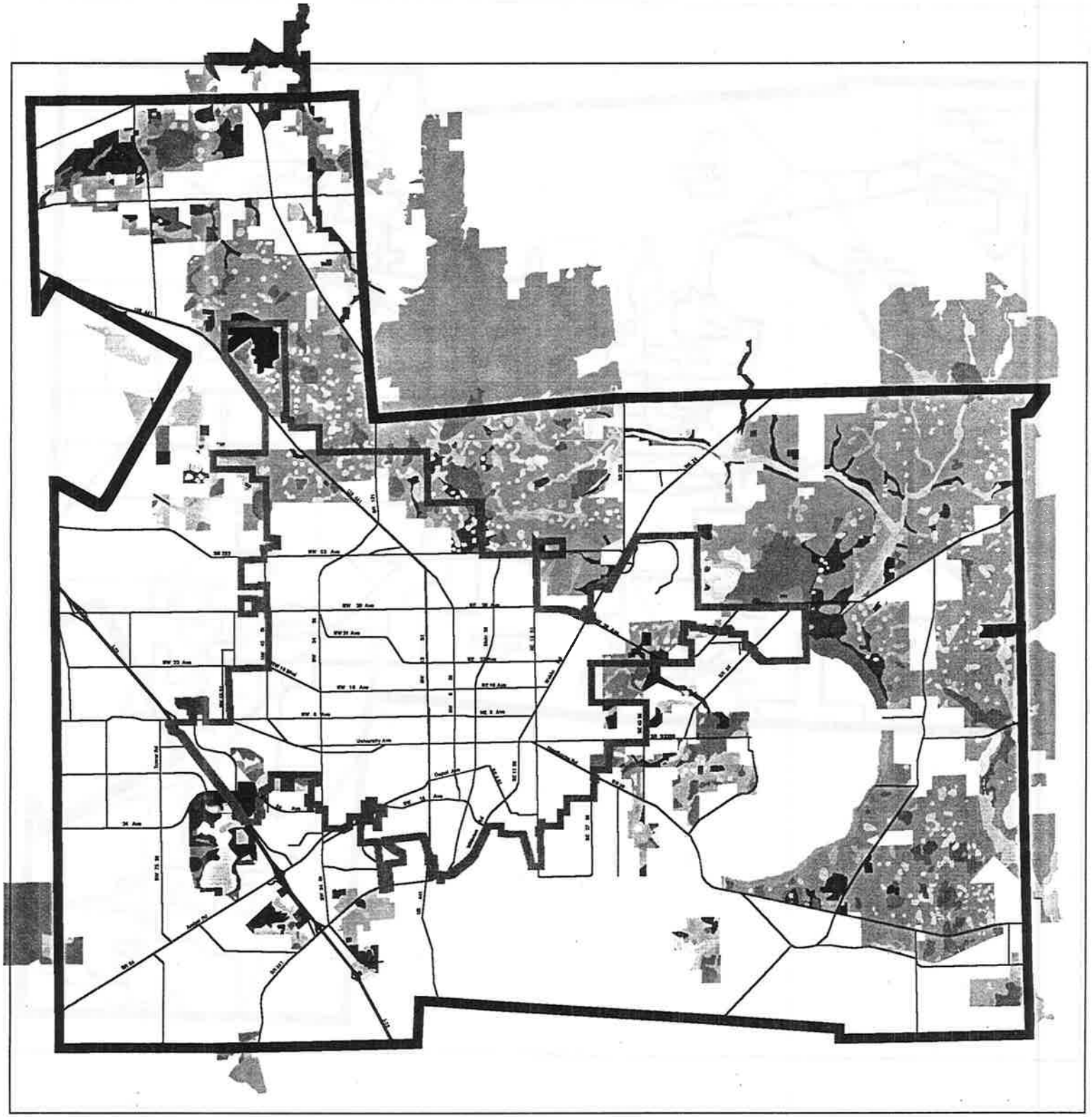

SIGNIFICANT ECOLOGICAL COMMUNITIES

Legend

Ecological Inventory

- Basin Marsh
- Basin Swamp
- Baygall
- Blackwater Stream
- Bog
- Bottomland Forest
- Calcareous Mesic Hammock
- Depression Marsh
- Dome Swamp
- Farm Pond
- Flatwoods/Prairie Lake
- Floodplain Forest
- Floodplain Swamp
- Formar Sandhill
- Hydric Hammock
- Improved Pasture
- Lakeshore Swamp
- Marsh lake
- Mesic Flatwoods
- Old Field Pine Planation
- Old Field Succession Pine
- Prairie Hammock
- Rough Pasture
- Row Crops
- Sandhill
- Scrub
- Scrubby Flatwoods
- Seepage Slope
- Seepage Slope Forest
- Seepage Stream
- Shrub Swamp
- Sinkhole
- Sinkhole Lake
- Site Conversion Pine Plantation
- Slope Forest
- Slough
- Swale
- Swamp Lake
- Upland Mixed Forest
- Upland Pine Forest
- Wet Flatwoods
- Wet Prairie
- Xeric Hammock
- Low Impact Development
- High Impact Development

- Project Boundary
- City of Gainesville

Source: Alachua County Department of Growth Management and Alachua County Environmental Protection Department, 12/97

Data Digitized from Linework on USGS 1:24,000 Quads by Golder Associates, Gainesville, Florida

City of Gainesville
Gainesville, Florida
Prepared by the
Department of Community Development
November 2000

0 8 16
Thousand Feet

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The FGFWFC habitat distribution maps indicate habitat for wood stork, snowy egret, little blue heron, Florida gopher frog and alligator. The presence of a gopher frog also indicates the likelihood of gopher tortoise. The only listed plant species are commercially exploited royal fern and cinnamon fern. KBN also indicates the likelihood of some listed terrestrial orchid species and two of the listed butterworts.

The main threats to the Hague Flatwoods include insufficient prescribed burning in fire adapted communities, timbering activities including the application of herbicides, and real estate development. Because the site is valuable for timber production, the study recommended continuing the use but in combination with other management strategies. These would include continuing the agricultural exemption, seeking conservation easements to protect resource values, and cooperative agreements with landowners to do prescribed burns. The study recommended protecting points of connection to adjacent ecological communities such as Millhopper Flatwoods, Buck Bay Flatwoods and Rocky Creek .

Environmental Resource Report

The City Commission directed staff to explore an environmental regulations overlay or other appropriate changes to environmental regulations in the Land Development Code, with particular emphasis on appropriate vacant lands in the city. Staff has prepared a full report on vacant parcels within the City, assessing the environmental features of those parcels, both by type and by an overall ranking of the most significant parcels. See the appendix for a copy of this report.

Functions of Plants and Animals

Plants and animals provide the following functions:

* Control of pest species, such as mosquitoes and rats, through plant and animal diversity.

* Nutrient/food cycling.

* Propagation/seed dispersal.

* Provision of important sites for education/research and recreation.

* Aesthetic and emotional satisfaction.

Plants and ecological communities protect the quality of life in Gainesville in the following ways, which are listed in addition to those cited above:

* Production of oxygen and absorption of carbon dioxide.
* Filtering out air pollutants and absorbing excessive solar radiation/heat, noise.
* Absorption or decomposition of soil pollutants.
* Reducing extremes of hot or cold temperatures and wind.
* Reducing flood damage and filtering out water pollutants.
* Reducing soil erosion.
* Providing habitat for urban wildlife.

Existing & Potential Commercial, Recreational Uses

From 1980 to 1995, the area of statewide commercial forest land declined by 6 percent. Nearly all of this decline was due to conversion to urban uses. 52 percent of the land area in Alachua County in 1995 was comprised of commercial forest. Approximately 40 percent of this forest was owned by forest industry and most of the remainder by other private interests. According to the U.S. Forest Service, commercial forests in the county can be broken down into the following broad types:

Planted Pine	44 percent
Upland Hardwood	26 percent
Natural Pine	10 percent
Lowland Hardwood	13 percent
Oak-Pine	7 percent

It is assumed that these percentages are reflective of existing commercial forest land within the urban area. Other than commercial forest activity, the only commercial use of vegetation in Gainesville is associated with the economic benefits that accrue to commercial operations because of the aesthetic qualities of vegetation (landscaped and natural vegetation). There is no significant commercial use of animals in the city. However, the collection and sale of reptiles and amphibians is permitted by the State and probably results in a limited amount of collection and sale within city limits.

Plants and animals currently provide recreational amenities at several public and private parks throughout the city. These amenities are also enjoyed in residential areas. Because of the ecological and aesthetic benefits of plants and animals, the City should encourage the acquisition and management of exemplary ecological communities as a part of its parks and recreational program. Such a program should, in part, strive to maintain (or in some instances restore) wildlife species diversity.

Potential for Conservation, Use, or Protection

In Gainesville, the three hammock types are increasing in abundance due to urban fire control. Scrub, sandhill, cypress, marsh, upland pine, and the three flatwood types are decreasing in abundance due to urban fire control, drainage of wet areas, fragmentation, and real estate development. For the purposes of promoting diversity, therefore, those communities that are declining in abundance are those most important to preserve or restore.

Urban wildlife dependent on these communities will change in abundance and diversity as the communities they depend on change in abundance, composition, and structure. In general, many historical populations of wildlife in the urban area (particularly larger mammals) will decline as a result of:

* Habitat fragmentation and loss
* Animals being killed on roads
* Domestic pesticide and herbicide use
* Soil erosion
* Diseases borne by humans or domestic plants and animals
* Predation by domestic animals
* Loss of woodland understory
* Introduction of exotic species
* Loss of dead trees
* Discontinuous noise from residences and parks
* Toxic degradation of water bodies

The natural integrity of Gainesville's ecological systems and bird diversity within these communities are in jeopardy. Breeding bird surveys by the local Audubon Society Chapter indicate the common nighthawk and brown-headed nuthatch are showing population declines. Colonial wading and water birds, such as herons, ibis, and wood storks, were once much more likely to nest at Lake Alice or Bivens Arm. The red-cockaded woodpecker, spotted at Morningside Nature Center as recently as the late 1970's, is no longer found in Gainesville. Similar surveys of other animals and plants have not been conducted in Gainesville. However, ecologists point out that when bird

populations decline, we can assume other forms of wildlife with similar habitat requirements are also declining.

Limited protection of endangered, threatened, or "special concern" species is primarily accomplished through landscaping, subdivision, planned development, and flood control regulations enforced by the city. Additional protection of such species is through the following special environmental districts within the City's Land Development Code: the Surface Waters and Wetland District, the Nature Park District, Greenway District and the Upland District. (See Map 11: Florida Natural Areas Inventory- Rare and Endangered Species Survey).

Compact urban development would have both positive and negative effects on the viability of wildlife in the future. On the positive side, such development will preserve larger "clumps" of connected open space outside of urbanized areas and therefore improve habitat for species requiring both a large range and protection from human activity. Compact development tends to minimize the amount of road mileage and reduce auto travel, thereby reducing the potential for road kills and further habitat fragmentation.

On the negative side, the "infilling" associated with compact development will remove many of the "pockets" of open space, particularly relatively dry, upland open space now providing urban habitat.

Existing and Recommended Conservation Strategies

Existing local plant, animal, and habitat conservation strategies include:

* City Surface Water and Wetland Overlay District
* City Nature Park District
* City Upland District
* Greenway District
* City Flood Control Ordinance
* City Landscape Ordinance
* City Subdivision Ordinance
* City Site Plan Review Requirements
* City Planned Development District
* SJRWMD and SRWMD Permitting and Research Programs Relating to Water Use and Management
* FDEP Rules Governing Construction & Operation of Wastewater Treatment Plants
* HRS Rules Governing Siting, Construction, & Maintenance of On-Site Sewage Disposal Systems

Recommended strategies to conserve Gainesville's plants, animals, and habitat include:

* Establish a city- or county-managed monitoring program for trends in plant and animal populations.

* Continue acquiring and maintaining exemplary ecological communities.

* Apply development regulations designed to protect and restore native plants and animals to properties associated with creeks, lakes, and wetlands.

* Work with Alachua County to adopt protection and restoration guidelines for significant uplands, farms, and forested areas in anticipation of future annexation of such areas into the city.

* Encourage the clustering of buildings, xeriscaping, establishment and protection of native vegetation, and tree protection for all land uses within the city. On cluster developments, discontinue accepting stormwater management areas to meet the requirement of "preserved open space", since the water quality in basins is often detrimental to wildlife.

* Ensure that future road alignments are minimizing disturbance of important upland and wetland habitats, and design roads to reduce the incidence of animals being killed on roads.

* Continue the "Tree-mendous Gainesville" tree planting program and require that through the annual re-certification of "Tree City USA" status, an accounting be made to prove that the City is meeting the Code requirements for replanting as trees are removed for safety reasons, to accommodate public works projects, and new construction.

* Encourage the use of "engineered soil" that meets the required Proctor densities for construction, yet also has large pore spaces that permit tree root growth under pavements. This will facilitate tree preservation and minimize the root disturbance to paved infrastructure.

* Ensure that drainage projects are designed and maintained to maximize the use of the natural environment as a tool to meet drainage objectives.

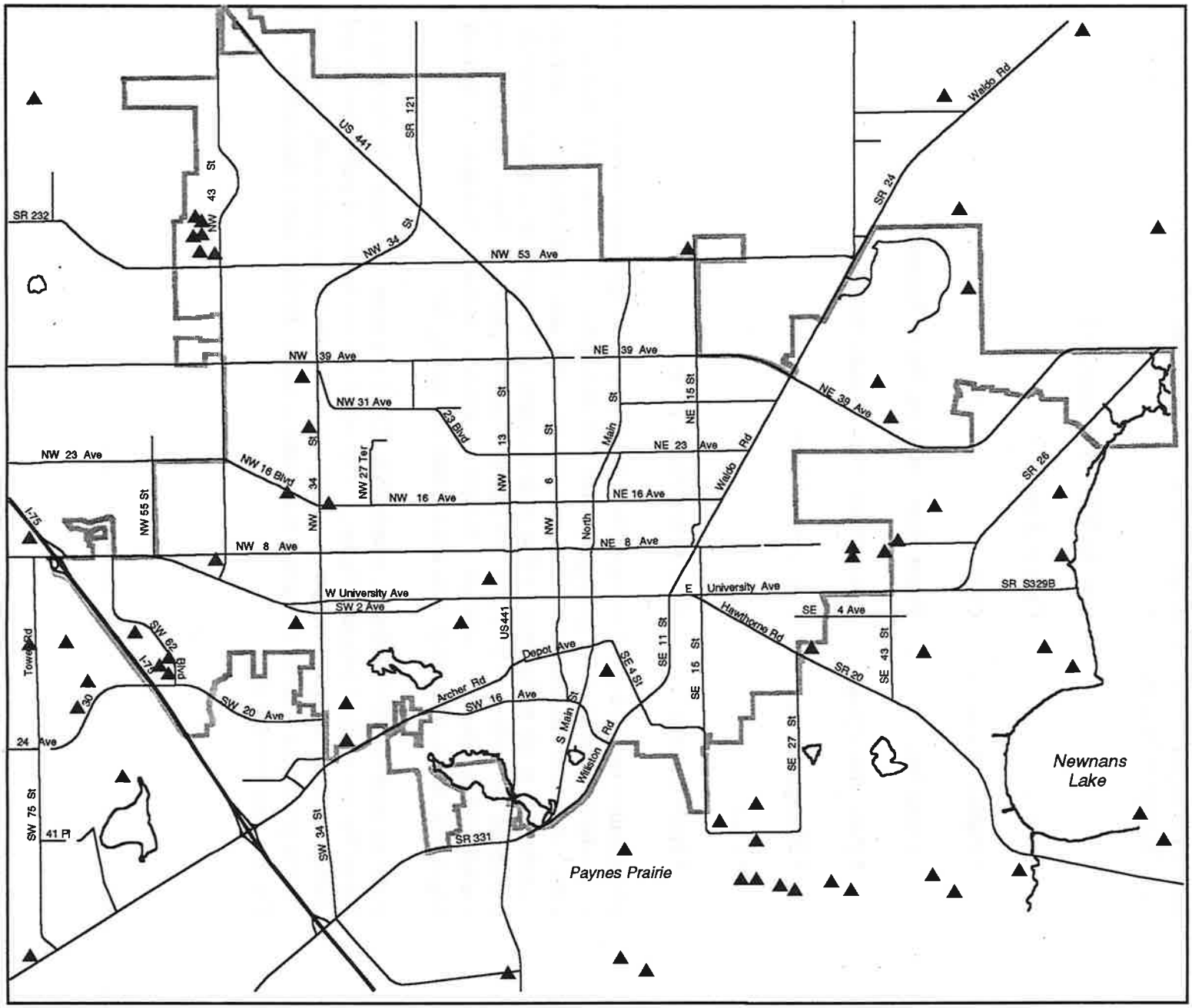
* Ensure compliance with the urban design standards for landscaping roadways and retention basins passed by the Metropolitan Transportation Planning Organization.

* Ensure that city mosquito control and utility corridor management activities are not detrimental to species diversity.

* Coordinate with Alachua County in development of regulations for the protection of significant upland communities, and threatened, endangered or otherwise important species.

* Adopt development standards for properties adjacent to nature parks that will include the requirement that only native or non-invasive exotics can be planted within 150' of nature parks.

Map 11



SIGNIFICANT FLORA & FAUNA

Rare & Endangered Species Survey

Legend

- ▲ General distribution of Rare & Endangered Species
- Gainesville City Limits

Source: Florida Natural Areas Inventory

City of Gainesville
Gainesville, Florida

Prepared by the
Department of Community Development
November 2000

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AIR

Inventory of Air Quality

Air quality in the Gainesville urban area is better than in most Florida cities when quality is measured by state air quality standards. According to GRU, Alachua County has the lowest per capita residential energy consumption in Florida. There are state standards for the following pollutants:

	Primary Sources in Gainesville
* Ozone	Cars, Industry
* Carbon Monoxide	Cars
* Sulfur Dioxide	Power Plants, Industry, Home Heating
* Particulates (dust)	Power Plants, Cars, Construction, Industry
* Nitrogen Oxides	Cars, Power Plants
* Lead	Cars
* Hydrocarbons	Cars, Power Plants, Industry

Air pollution can be defined as a condition in which any foreign and/or natural substance is discharged, released or propagated into the atmosphere at levels that produce a measurable and undesirable effect on humans, animals, vegetation or materials. Constituents of air pollution are either anthropogenic (man-made) or biogenic (naturally occurring) in nature. Man-made emissions emanate primarily from vehicular and manufacturing/industrial sources. Biogenic sources include volcanic eruptions, vegetation, microbial activity, seas and windstorms, among others.

National Ambient Air Quality Standards (NAAQS) have been established by the United States Environmental Protection Agency. These standards are to protect public health and welfare with an adequate margin of safety. The current list of pollutants, known as criteria pollutants, consists of: carbon monoxide, nitrogen dioxide, sulfur dioxide, PM10, PM 2.5, ozone and lead.

Table 2: Florida Ambient Air Quality Standards

Florida Ambient Air Quality Standards

Criteria Pollutant	ppm	**Ug/m3
Carbon Monoxide (CO)		
-8-hour Average	9	10,000
-1-hour Average	35	40,000
Ozone (O3)		
-8-hour Average	.08	157
-1-hour Average *	.12	235
Sulfur Dioxide (SO2)		
-Annual Average	.023	60
-24-hour Average	.1	260
-3-hour Average	.5	1,300
Nitrogen Dioxide (NO2)		
-Annual Arithmetic Mean	N/A	100
Particulate Matter (PM10)		
-Annual Average	N/A	50
-24-hour Average	N/A	150
Particulate Matter (PM2.5)		
-Annual Average	N/A	15
-24-hour Average	N/A	65
Lead (Pb)		
-Quarterly Average	N/A	1.5

*The ozone 1-hour standard applies only to areas that were designated nonattainment when the ozone 8-hour standard was adopted in July 1997.
** Ug/m3- microns per cubic meter of air.

Source: Alachua County Environmental Protection Department, 2000

In December of 1998, the Alachua County Commission unanimously adopted a resolution establishing the Alachua County Air Quality Commission (AQC). The AQC, an accomplished and diverse group of scientists, engineers and medical professionals accepted a charge to study and report on a number of air quality issues for the Commission. The AQC produced the Alachua County Air Quality Commission Report. The report is the first comprehensive scientific review of air quality issues in Alachua County, and contains key findings and recommendations from the AQC regarding these pertinent air quality issues.

The following provides general information on each of the criteria pollutants, as well as key findings regarding ambient air quality in Alachua County:

Carbon Monoxide (CO)
Carbon monoxide is a poisonous, odorless, and colorless gas that enters the bloodstream and impairs the transport of oxygen to vital organs and tissues, contributes to cardiovascular disease, harms mental functions, and endangers fetal development. Most carbon monoxide is generated by motor vehicle emissions. Currently, there is no FDEP or USEPA sponsored monitoring activity for carbon monoxide. The Alachua County Air Quality Commission (AQC), appointed by the Alachua County Board of County Commissioners, anticipates that county levels of this pollutant will most likely be equal to or lower than the heavily urbanized Florida counties where such monitoring is underway. The pollutant levels, for these counties, are well below the NAAQS across the state.

Nitrogen Dioxide (NO2)
Nitrogen Dioxide is formed in the ambient air through the oxidation of nitric oxide (NO). Nitrogen oxides (Nox) is the term used to describe the sum of NO and NO2, Nox principally enters the ambient air from high temperature combustion sources such as automobiles and fossil fuel fired combustion sources (e.g., electric utilities). Nitrogen dioxide aggravates respiratory and cardiovascular problems, impairs visibility, interferes with plant growth, and contributes to the formation of acid rain and urban smog. As with carbon monoxide, the AQC anticipates that county levels of this pollutant will most likely be equal to or lower than the heavily urbanized Florida counties where such monitoring is underway. Pollutant levels, across the state, even within the heavily urbanized counties, have been well below the NAAQS across the state.

Sulfur Dioxide (SO2)
Sulfur Dioxide, a major source of acid rain, is a gas created when fuel containing sulfur (primarily fossil fuels) is burned and during metal smelting and other industrial processes. High concentrations of SO2 can result in temporary breathing impairment for exposed people. The AQC anticipates that county levels of this pollutant will most likely be equal to or lower than the heavily urbanized Florida counties where such monitoring is underway. Pollutant levels, across the state, even within the heavily urbanized counties, are well below the NAAQS across the state.

Volatile Organic Compounds (VOCs)
Volatile Organic Compounds are emitted by a variety of sources, including motor vehicles, refineries, manufacturing plants producing fiberglass items, factories, consumer and commercial products, other industrial sources, and a wide variety of natural sources (primarily vegetation and microorganisms). Under the influence of heat and light, VOCs and Nox readily react to form ozone, the primary constituent of urban smog. Alachua

County does not measure speciated VOC levels to verify the results of the emission inventory. Measurement would allow better estimation of the relative contribution and reactivities of biogenic versus anthropogenic sources of VOC. This information would aid in choosing appropriate ozone control strategies.

Ozone (O3)

Ozone, the principle constituent of smog, is not emitted directly into the atmosphere. Rather, ozone is indirectly produced as the result of a complex photochemical reaction when nitrogen oxides and VOCs are exposed to heat and sunlight. Ozone gas is toxic to living organisms and causes respiratory and cardiovascular diseases. Ozone episodes are often regional in nature as a result of weather patterns producing conditions favorable to ozone formation over a large area and the effective intermixing of emissions from sources located throughout the nation. FDEP began monitoring for ozone in 1997. During the summer months, county ozone levels occasionally approach and exceed the new ozone National Ambient Air Quality Standard (NAAQS). Continued growth in the number of additional vehicles and industrial sources that emit Nox and VOC will most likely increase the number and severity of these ozone episodes. In 1997, 41 ozone exceedences of the NAAQS were recorded at 19 different monitors in 11 counties. Alachua County's eight hour 4th highest ozone reading (used for attainment purposes) was 93 parts per billion (ppb), which is above the NAAQS of 80 ppb. (See Table 10)

Particulate Matter (PM)

Particulate Matter consists of solid or liquid particles, such as soot, ash, dust and chemicals, which remain suspended in the air after being released by various industrial and natural processes, such as burning fuel and automobile emissions. Suspended particulates adversely affect the human respiratory system and cause or exacerbate asthma and other respiratory and cardiovascular illnesses. USEPA's PM10 standard focuses on smaller particles of 10 microns or less in diameter. Smaller particulates, which can be breathed into the lungs more easily, represent a greater health hazard than the larger particulates. These smaller, or finer particulates, known as PM 2.5, can penetrate to the deepest levels of the lung and are thought to be the most harmful component of PM10. In Alachua County, PM10 levels have been well below the annual arithmetic mean standard of 50 microns per cubic meter, however, the county's fine particulate matter (PM2.5) levels may be near the new NAAQS; but more monitoring is needed to confirm this.

Air emission inventories, of both anthropogenic and biogenic sources, are by their nature, incomplete and uneven in their accuracy. Nevertheless, they are an effective tool for managing air pollution when combined with data collected from ambient air monitors and air pollution modeling.

To summarize the emission inventory for Alachua County:

* The largest source of nitrogen oxides (Nox) in Alachua County is on-road vehicles, followed by stationary point sources. Gainesville Regional Utilities (GRU) Deerhaven is the largest permitted source. The Florida Rock Industries (FRI) kiln will be the second largest permitted source when it becomes operational.
* In Alachua County, natural or biogenic sources of volatile organic compounds (VOC) emissions are a significant portion of the overall VOC emission total, probably contributing at least 67 percent of the total VOC emissions. Vehicles, off-road engines, and directly related sources account for 25 percent of VOC emissions.
* The majority (55 percent) of PM10 (particulate matter less than 10 microns) emissions in Alachua County is attributed to paved and unpaved roads. The largest permitted source is now GRU Deerhaven, although the FRI kiln will become the second largest permitted source when operational. Permitted sources are about 1.5 percent of the total PM10 emissions.
* Primary industrial particulate emissions are estimated to be about 60 to 70 percent PM2.5 (particulate matter less than 2.5 microns).
* The forms of mercury emitted from industrial sources such as coal-fired utility boilers and cement kilns are not fully understood and remain controversial. The methods of measuring the forms of mercury have improved, and it is becoming increasingly clear that reactive gas mercury (RGM) releases from industrial sources are more important than previously believed. Existing US Environmental Protection Agency and Florida Department of Environmental Protection regulations are currently deficient in not requiring mercury species to be measured when mercury monitoring is required for compliance purposes.

Indoor Air Pollution

Indoor air contains a number of potentially hazardous pollutants. According to the USEPA, "studies of human exposure to air pollutants indicate that indoor air levels of many pollutants may be two to five times, and occasionally more than 100 times, higher than outdoor levels." Exposure to indoor pollutants is believed to have increased, and is due to a variety of factors, such as, the widespread use of air conditioning, the proliferation of chemicals in building materials and furnishings, construction of more tightly sealed buildings, reduced ventilation rates to save energy, and the use of personal care products, pesticides and household cleaners. A few select indoor pollutants are discussed below:

* Carbon Monoxide:

Carbon monoxide is produced from malfunctioning gas heaters or vehicles operating in enclosed spaces.

* Radon:

Radon comes from the natural breakdown of uranium. It can be found in high concentrations in soils and rocks containing uranium. Radon becomes a health hazard when it accumulates in high levels in buildings. The only known health effect from long-term exposure to high levels of radon is an increased risk of developing lung cancer.

*Asbestos:

Asbestos is a mineral fiber, and in the past, was used to strengthen products for insulation and for fire protection. Inhaling asbestos fibers increases the risk of lung cancer. According to the USEPA, the best thing to do with materials containing asbestos in good condition is to leave them intact. If the material is slightly damaged, or will be disturbed, it is best to have a professional remove it.

*Mold Spores:

Florida has high humidity, which often leads to mold growth in buildings and ventilation systems. Mold spores bloom sporadically outdoors, especially during wet times of the year. Indoor mold problems can be quite serious and difficult to detect and correct in buildings. Studies indicate that mold in buildings is an emerging air pollution problem that probably has serious, widespread and previously unrecognized consequences in Florida.

*Nitrogen Dioxide (NO2):

Much higher NO2 levels occur in homes than in the natural environment. Levels between 200 and 500 ppb over a few hours occur in homes during intensive gas stove use or during unvented space heating (Harlos, et. al. 1987). However, significant evidence of health impacts from these levels is scant.

Volatile Organic Compounds (VOCS):

VOCs are emitted by a variety of sources. Indoor pollutant sources include insulation, plywood, and home furnishings. Some VOCs are known to be toxic, although a clear relationship between the majority of VOCs and toxicity to human systems has not yet been determined

Because of reduced air circulation within buildings, these pollutants are often at much higher concentrations than are found in outdoor air. By reducing the amount of air leakage, energy conservation techniques for buildings have probably increased the concentrations of indoor pollutants in Gainesville. However, several air exchange techniques are now being used to reduce concentrations.

Radon is a naturally occurring, radioactive gas. It cannot be seen, smelled, or tasted. In Gainesville, radon is released from phosphate in the Hawthorn clays which predominate underlie large areas of the city. In outdoor air, radon is too diluted to pose a health hazard.

However, reduced air circulation within buildings sometimes allows radon concentrations to reach a level where it becomes a serious threat to public health. The health threat posed by radon increases as the time of exposure to the gas increases and as the concentration of radon in the air increases.

Generally, buildings located in areas where radon occurs will show higher radon levels as the "footprint" of the building increases. Buildings with a "slab" foundation show higher levels than buildings with an elevated (crawlspace) foundation. Cracks, joints, and pores in the floor can allow radon to seep into buildings.

Geographic location plays perhaps the most significant role in the level of radon found in buildings. Areas in Gainesville that show the highest levels of radon are those where the Hawthorn is either near or at the surface. Surface exposure to the Hawthorn clays is particularly likely in:

* Areas with considerable relief, such as steep slopes associated with creek channels. These areas typically expose the Hawthorn as a result of erosional processes that have cut into the clay layer. In some areas where this cutting extends below the elevation of the Hawthorn layer, clays from the Hawthorn have eroded and moved downward to be mixed with the sandy soils of creek lowlands to produce moderate radon levels.

* Areas that are between 105 feet and 145 feet above sea level. This elevation corresponds to the elevation of the Hawthorn in the Gainesville area.

Because the "semiconfined" zone in the city is characterized by such geologic features, high levels of radon have been measured in that area of Gainesville. (See Map 3 for the location of the semiconfined zone.) Some studies obtained by the Alachua County Office of Environmental Protection indicate that areas in western Gainesville and Marion County have some of the highest radon levels recorded in the southeastern United States. The "unconfined" zone shows lower levels of radon, although there are pockets of high levels indicating that patches of the Hawthorn exist in the zone. The lowest levels of radon are observed in the "confined" zone, where the Hawthorn is the farthest from the surface.

Levels of radon in several buildings west of NW 13th Street have in the past exceeded 20 picocuries per liter (pCi/l), with a few measurements exceeding 100 pCi/l. The U.S. EPA currently recommends that immediate remedial action be taken when levels exceed 20 pCi/l. EPA is currently of the opinion that levels at or below 4 pCi/l are reasonably safe.

Certain factors impede the migration of radon to the surface, and therefore reduce the health risk. Undifferentiated sands, which overlay much of Alachua County, can retard

radon movement. Groundwater also reduces radon movement to the surface. In addition, building design can reduce exposure to radon.

Functions of Healthy Air Quality

Clean air provides the following functions:

* Capacity to absorb and dilute air pollutants at concentrations that will not harm humans, animals, plants.

* Source of oxygen and carbon dioxide for humans, other animals, plants.

* Visual clarity, aesthetics.

Although currently none of the hospitals except for the VA Medical Center conduct medical waste incineration, hospital incineration tends to produce more dioxins and furans per gram incinerated than municipal incineration. The risks associated with biohazardous waste include illegal dumping, accidents during the handling of the waste, and emissions and ash from incinerators.

Air pollutants judged by the AQC to be of the greatest health concern for Gainesville and Alachua County are ozone, nitrogen dioxide, fine particulates (PM2.5) and mercury. It is important to note that County air pollution levels are currently approaching the new (and as yet not implemented) NAAQS for PM2.5 and ozone and that they could be exceeded as additional air pollution is generated in and around Alachua County by continued population and industrial growth.

In 1997, the Deerhaven plant contributed almost 77 percent or about 214 tons out of a total of 279 tons of carbon monoxide. The only other significant source in the county is the Florida Power Corporation Co-Generation Unit on the University of Florida campus, which contributed about 12 percent of the total CO emissions. The AQC report included the Florida Rock Industries (FRI) cement kiln. Although currently it is not yet operational, it will be the second largest permitted industrial source in the county once it becomes operational. Based on computer modeling required by the Florida Department of Environmental Protection, the cement kiln is not expected to increase ambient air concentrations above the NAAQS.

For a more in-depth discussion of air quality in Alachua County, see the County's Air Quality Commission Final Report.

Existing and Recommended Conservation Strategies

Existing local air quality conservation strategies include:

* City Landscape Ordinance
* City Subdivision Ordinance
* City Site Plan Review Requirements
* City Zoning Code General Performance Standards
* State and Federal Rules Under the Florida Air and Water Pollution Control Act and the (federal) Clean Air Act
* City Noise Control Ordinance
* City Clean Indoor Air Ordinance
* Regional Mass Transportation, Bicycle, and Pedestrian Programs
* GRU Energy Conservation Program

Recommended strategies to conserve Gainesville's air quality include:

* Continue the City's aggressive tree planting program.

* Continue to implement compact development strategies and other techniques to encourage non-auto travel.

* Continue to discourage the burning or incineration of toxic air pollutants, such as the combustion by-products of plastics.

* Continue to encourage energy conservation through, energy audits and the enforcement of the City's tree code.

* Provide radon information to homebuyers and homeowners.

* Continue efforts to increase the use of mass transit

* Encourage the use of alternative (non-fossil) fuels.

SOILS AND MINERALS

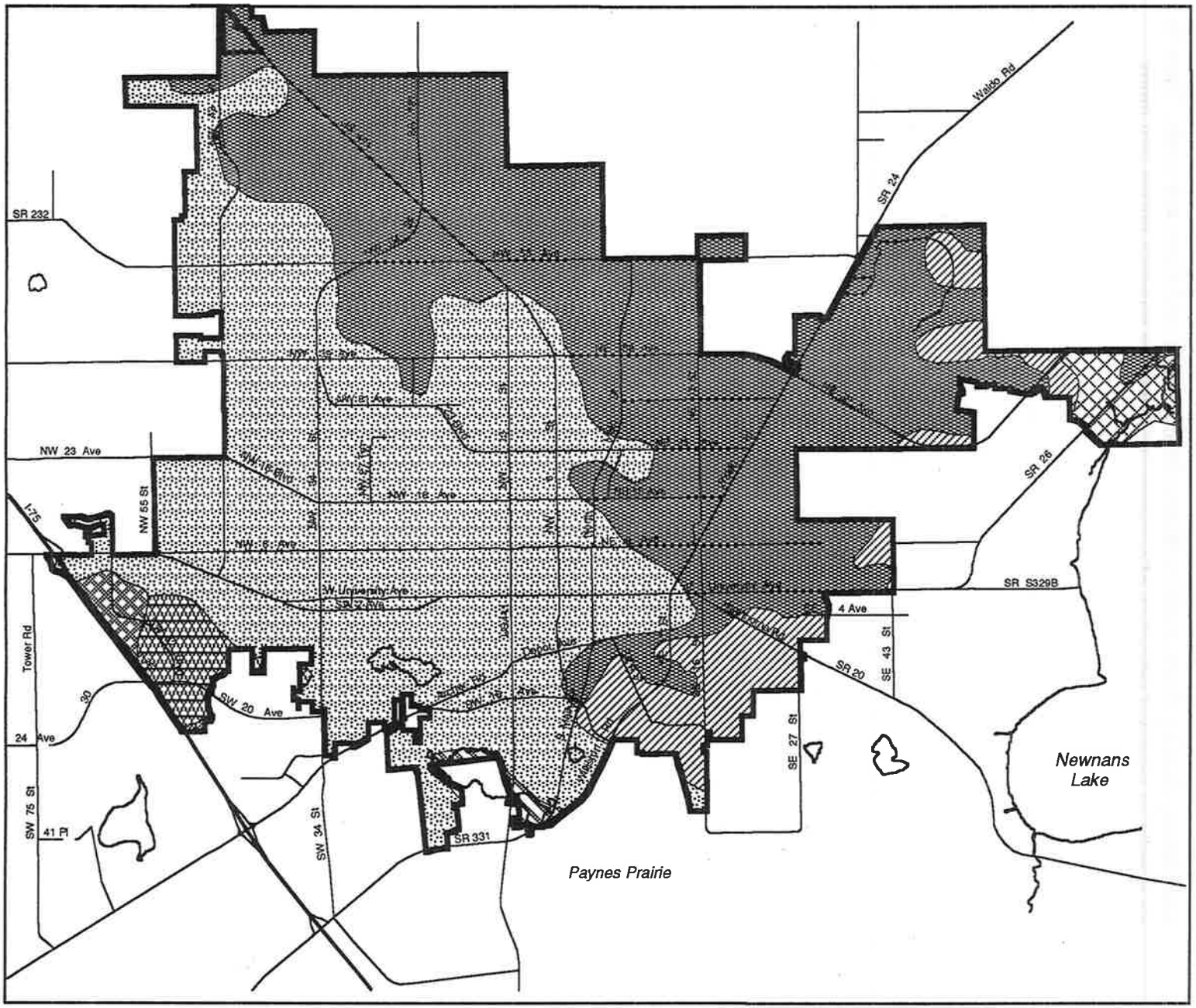
Inventory of Soils

Soils within the city are neutral to acidic sands underlain by sandy loams or clay subsoils. Much of the land area east of Main Street and in the northwestern portion of the city north of 53rd Avenue is level and poorly drained. (See Map 12.) These soils, known as

the Myakka-Wauchula-Placid association, retain high water tables several months of the year.

Most of the remaining city land has level to gently rolling, well-drained sandy or sandy loam soils well suited to development. Development problems are restricted to the floodplains of the Hogtown-Possum Creek system and to small ponds or marshes lacking drainage outlets. Clay subsoils are occasionally present in the Arrendondo-Zuber association, causing shrink-swell problems for building foundations and roads. There is no current or expected extraction of commercially valuable minerals within city limits.

Map 12



GENERAL SOIL ASSOCIATIONS

Legend

Areas Dominated by Sandy Droughty Soils Not Subject to Flooding

- Candler-Apopka association
- Jonesville-Chiefland-Archer association

Areas Dominated by Well Drained Soils Not Subject to Flooding

- Arredondo-Zuber association

Areas Dominated by Moderately Well to Poorly Drained Soils Not Subject to Flooding

- Blichton-Flemington-Kanapaha association
- Myakka-Wauchula-Placid association

Areas Dominated by Poorly and Very Poorly Drained Soils Subject to Flooding

- Martel-Placid association
- Fresh water swamp association

Source:

Alachua County 201 Wastewater Facility Plan
Vol. 2, Chapters 8-10,
CH2MHill Southeast , Inc., p. 8-12

Soil Survey of Alachua County, Florida
USDA-SCS, 1985

City of Gainesville
Gainesville, Florida

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November 2000

0 4000 8000 12000

1"= 8000'

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Functions of Soils

Soils provide the following functions:

* Foundation for buildings, roads, and other development.

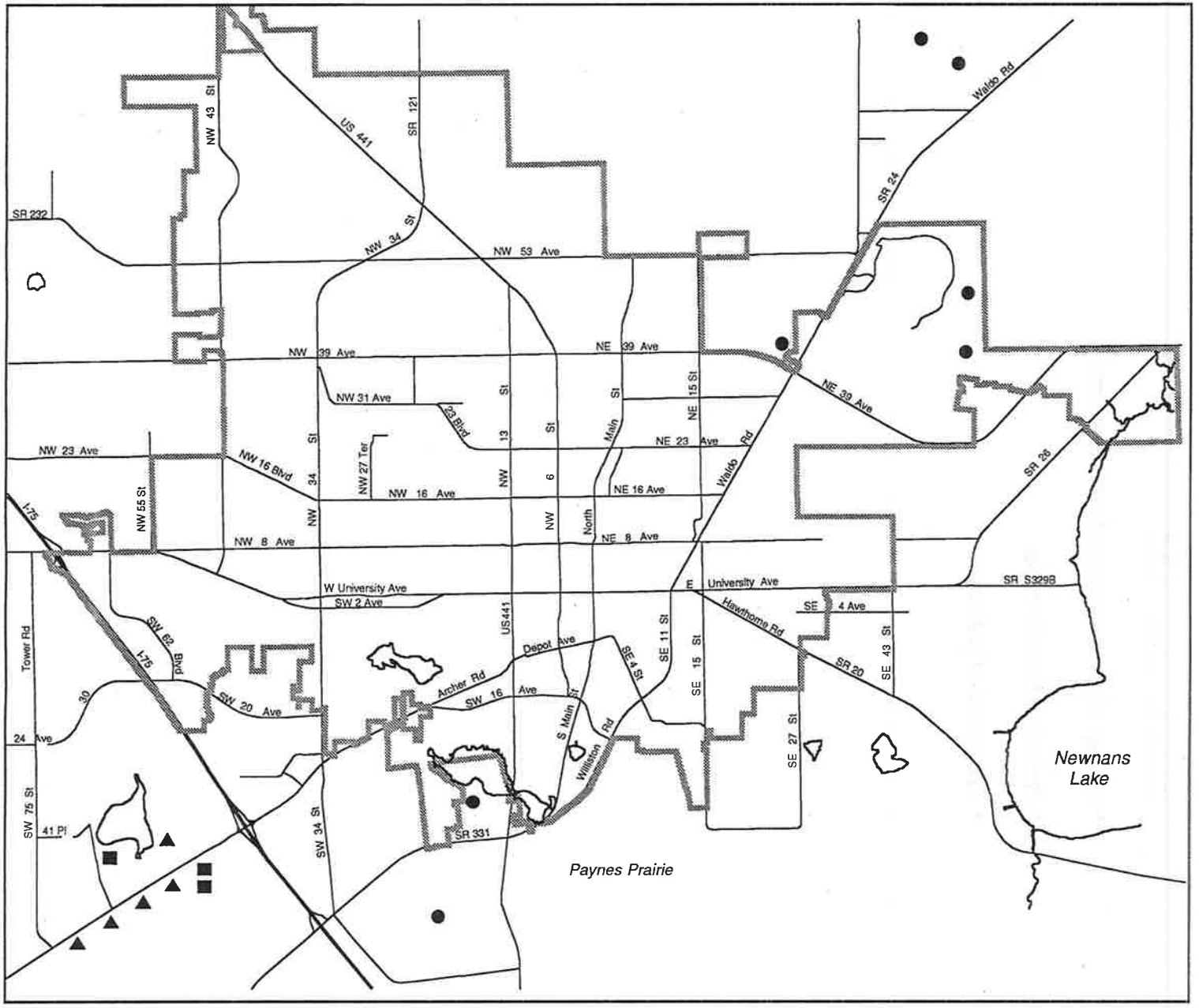
* Foundation and nutrient source for vegetation; including trees.

* Habitat for various wildlife.

* Storage of groundwater and surface waters.

* Protection from flooding.

* Adsorption of pollutants.



COMMERCIAL EXCAVATION SITES

Minerals

Legend

Natural Resource Excavation Sites

- Sand Pit
- Gravel Pit
- Quarries

Gainesville City Limits

Source: USGS Topographic Maps for Gainesville East and West Gainesville, Florida, 1966, Photorevised 1981

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Soil Limitations

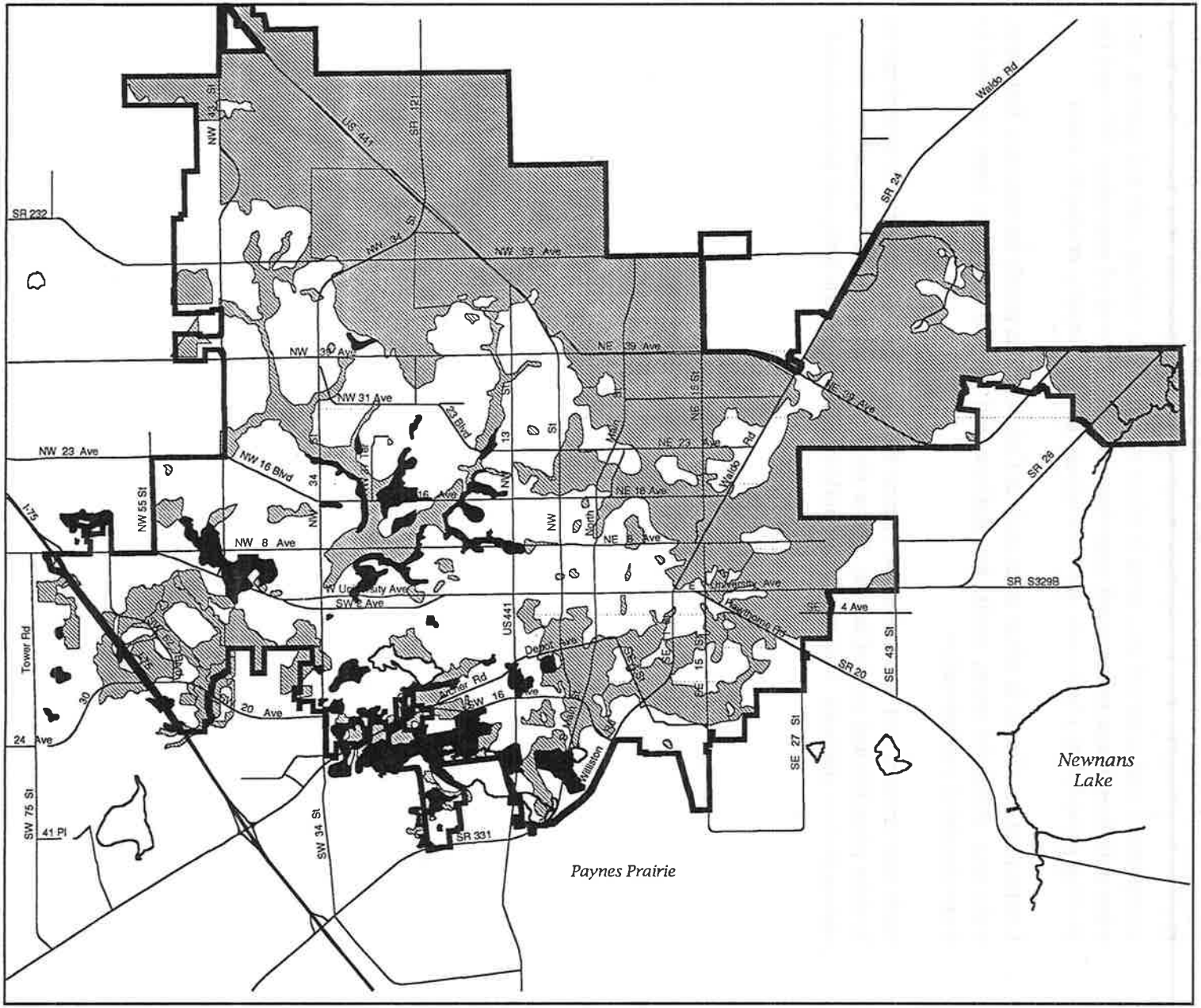
General development limitations include soil drainage potential, shrink-swell potential, bearing capability, erosion, and trafficability. Some of these limitations are referred to in the inventory section above. Refer to Map 14 for general soil limitations and erosion problem areas in Gainesville.

The soils of Gainesville are subject to erosion and to contamination from pollutants. Erosion is primarily due to previous development requirements that have since been strengthened and unpaved shoulders in older subdivisions lacking curb and gutters, and other activities where soils are left unprotected by the removal of vegetation. Without the binding provided by plant roots, soils in Gainesville are primarily eroded by water.

Contamination of soils in urban areas such as Gainesville is poorly inventoried. However, soils near industrial areas, roads, gas stations, and parking lots have been exposed to some degree of contamination.

Both soil erosion and contamination reduce the ability of urban soils to contribute to healthy plant life and animal habitat. Water storage capability is also reduced and stream sedimentation increases. The stability of buildings and other structures can be threatened.

Map 14



URBAN SOIL DEVELOPMENT LIMITATIONS

Legend

- Soil Limitations for Urban Development
- Soil Erosion Problems
- Gainesville City Limits

Source: Soil Survey of Alachua County
USDA, Soil Conservation Service
1980, 1985, 1990

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Inventory of minerals

The following minerals display actual or potential commercial value in the Gainesville urban area:

* Limestone
* Sand
* Phosphate

Despite extensive mining in the past, limestone deposits remain quite large and are expected to be mined in the future for such uses as roadfill or in construction as crushed rock. While active limestone mining is taking place in the county, there are presently no active mines within the city or urban area.

Sand deposits can be found throughout the urban area, and there is no foreseeable threat to the availability of this resource. Although the Florida Mining Atlas (DER, 1982) does not list any active sand mines in the county, USGS maps (1982) indicate the existence of 5 sand pits, 3 gravel pits, and 5 quarries within the urban area (Map 13). Presently, mined sand is used for general building and road construction purposes within the city.

Phosphate mining in the county has occurred in the past, but there are presently no active mining operations. Because of the relatively lower grade quality of local deposits, it is expected that resumption of phosphate mining will not occur until local deposits become comparable in quality to deposits being mined elsewhere in the state.

Existing & Potential Commercial, Recreational Use of Minerals

Existing mineral extraction companies with sites inside the city limits are Florida Rock industries and Rinker cement. Because of the urban character of the city, extraction of minerals elsewhere within city limits is unlikely.

There is no recreational use of minerals within the city. No future recreational use of minerals is expected.

Potential for Conservation, Use or Protection of Minerals

As described above, there are no existing or anticipated threats to the availability of minerals within the city or urban area.

For Potential for Conservation, Use or Protection of Soils, see Existing and Recommended Conservation Strategies.

Existing and Recommended Conservation Strategies

Existing local soil conservation strategies include:

* City Surface Water and Wetlands Overlay District
* City Wellfield Protection Permit
* City Upland District, Greenway District and Nature Park District
* City Flood Control Ordinance
* City Landscape Ordinance
* City Subdivision Ordinance
* City Site Plan Review Requirements
* City Zoning Code General Performance Standards
* Alachua County Murphree Well Field Management Code
* Alachua County Storage Tank Systems Code
* HRS Rules Governing Siting, Construction, & Maintenance of On-Site Sewage Disposal Systems

Recommended strategies to conserve Gainesville's soils include:

* Encourage construction design consistent with existing terrain by discouraging contouring or cut and fill.

* Continue to provide residents and small businesses with convenient programs for properly disposing of household hazardous waste.

* Maintain, and where necessary re-establish vegetative ground cover, particularly in areas near surface waters.

* Continue erosion control practices during development of individual residential lots.

* Continue to encourage the composting of yard and food waste for use as a soil conditioner.

OPEN SPACE

Inventory of Open Space

Open space can be defined as any vegetated or surface water area set aside for recreation, public gathering, aesthetics, buffering, urban definition, protection of public health and safety, and/or preservation of ecosystem functions. Using this definition, Gainesville open space can be placed in four broad (and in some cases, overlapping) categories:

Public Safety Open Space

* Floodplains and Steep Slopes
* Airport and Road Noise Contour Zones
* Wasteland (such as abandoned dumps and waste sites)
* Undeveloped rights-of-way.

Natural Resource Open Space

* Public Conservation Areas
* Significant Ecological Communities
* Wildlife Management Areas
* Wetlands
* Lakes
* Creeks and Creekbanks

Recreation Open Space

* Active Public Parks
* Passive Public Parks
* Public School Recreation Areas
* Golf Courses

Other Open Spaces

* Rights-of-Way and Easements
* Cemeteries
* Vacant Urban Land
* Farms/Agricultural

The 100-year floodplain areas (Map 15) and land in the Environmentally Significant Land Resources map series within the Future Land Use Map Series contain most of the open spaces found in the above categories.

Existing & Potential Commercial, Recreational Uses

Utility open space in Gainesville is used by commercial operations for expansion. Economic benefits accrue to commercial operations because of the aesthetic and social qualities of open space.

An inventory of existing public and private open space sites providing some form of public recreation can be found in Table 8 in the Appendix. This inventory identifies the

types of facilities found at each site and whether the site is resource-based or activity-based.

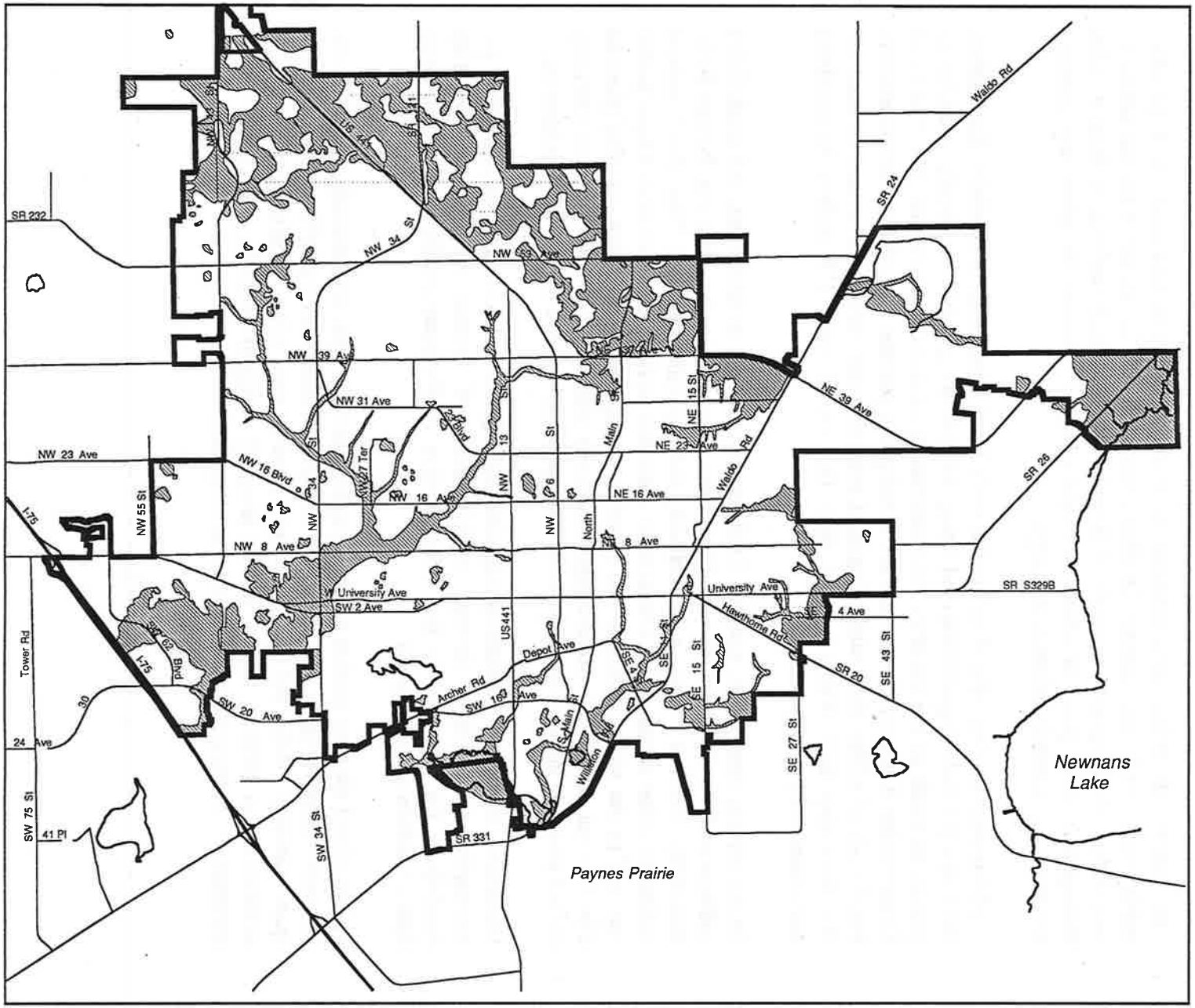
Potential for Conservation, Use or Protection

As described in the Recreation Element, the following active and passive park acreage level-of-service standards will be maintained:

Proposed Park Standards

Park Type	2000 LOS Standard	Current LOS
Nature Park	6 ac per 1000	17.02 acres
Sports Complex	0.5 ac per 1000	1.01 acres
Community Park	2 ac per 1000	2.27 acres
Neighborhood Pk	.8 ac per 1000	1.51 acres

Map 15



100-YEAR FLOODPLAIN

Legend

- 100-Year Floodplain
- Gainesville City Limits

Source:

1987 City Limits Area: CH2M Hill Flood Study Update
City of Gainesville, Public Works Department (1987)

1997 City Limits Area: Flood Insurance Rate Maps
Ferderal Emergency Management Agency (1984, 1993)

1999-2000 Annexations
Draft 1999 Flood Insurance Rate Maps/Digital Version
Ferderal Emergency Management Agency (1999)

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Over the past 10 years, Gainesville's park acquisition program has added mostly passive park acreage to the existing stock of parks within city limits. As the table shows, there are projected deficiencies for nature parks and neighborhood parks.

Continued population growth and development, along with the possibility of new funding sources for parks, may result in efforts to maintain or increase the pace of future park acquisitions.

The Gainesville urban area contains large expanses of State-owned (and therefore publicly protected) open spaces. Continued encroachment by human activities, however, may reduce the long-term viability of these habitat islands. In addition to these wildlife management areas (none of which are found within city limits), the urban area contains several linear corridors of creek floodplain.

A partnership that includes Alachua County's Land Conservation Advisory Committee, the Legacy Lands organization and many community groups is currently working to protect as much of the county's environmentally sensitive land as possible. The Land Conservation Advisory Committee has developed a process for ranking environmentally sensitive land within the county. Legacy Lands obtained enough signatures to place on the November 2000 ballot a bond issue that would raise $29 million to purchase environmentally significant land.

As for private open space, existing flood control, planned development, and subdivision ordinances limit the development of this open space, as do the additional Nature Park, Greenway, Surface Water and Wetland, and Uplands Districts. The flood control ordinance often requires that retention or detention basins be constructed. These basins can add to the stock of public and private open space. Furthermore, existing planned development and cluster subdivision ordinances increase the likelihood that privately owned common areas will be created as a supplement to future residential development.

Protection of privately-owned floodplains and significant ecological communities are accomplished primarily through establishment of special environmental overlay regulations (as described in the "Identification of Environmentally Significant Open Space" section of this Report).

Public school sites are another source of open space acreages. Additionally, older schools that may be converted to non-school (or special education) use typically retain their open space acreage. Both old and new schoolyards can offer excellent locations for maintaining or creating natural habitat areas. If designed properly, such areas reduce maintenance costs and provide outdoor ecology laboratories.

However, many local schools are reducing the availability of school open space. The primary reasons for this include: (1) add-ons to schools which encroach upon existing open space; and (2) increasing liability and maintenance concerns which are leading school administrators to adopt policies restricting public use of school open space. Add-ons are likely to continue, but will not result in a significant loss of school open space. Agreements between the School Board of Alachua County and the City may be necessary to preserve the current level of public access to open space being threatened by liability and maintenance problems.

Operation and maintenance costs can be minimized, however, through the use of landscaping practices which minimize the need for maintenance. For example, xeriscaping techniques can reduce the need for water, fertilizers, pesticides, pruning, and energy.

POINT SOURCES OF POLLUTION

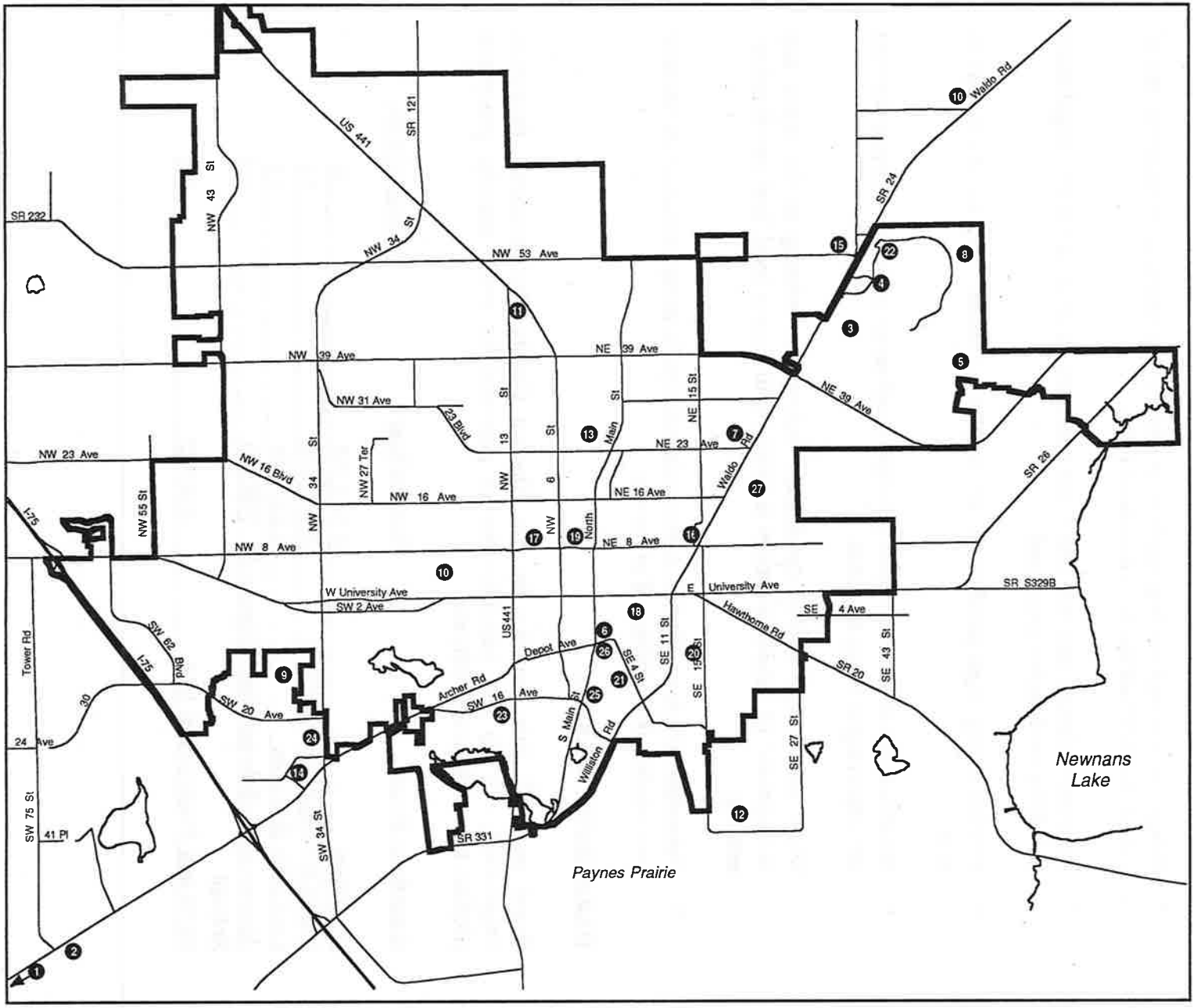
There are two general sources of pollution: "point" sources and "non-point" sources. "Non-point" sources of pollution were discussed in a previous section. "Point" sources will be discussed here.

Many sites in Gainesville have experienced significant pollution problems in the past. Several of these "point" sources of pollution are identified in Map 8. As the map demonstrates, the locations of these pollution sites generally correspond to areas in close proximity to the major arterials of the Gainesville urban area.

The Florida Legislature has established a state-funded program to cleanup properties that are contaminated as a result of the operations of a dry-cleaning facility or wholesale supply facility (Chapter 376, Florida Statues). The Dry-cleaning Solvent Cleanup Program is administered by Florida Department of Environmental Protection. Gainesville currently contains approximately 19 contaminated sites within city limits.

Alachua County, through the Alachua County Environmental Protection Department, is under contract with Florida Department of Environmental Protection Bureau of Petroleum Storage Systems (FDEP) to also manage the assessment and remediation of petroleum contaminated facilities through the County's Petroleum Cleanup Program. Currently, there are approximately 310 petroleum contaminated sites in Alachua County, the majority of which are located within Gainesville city limits. The number of petroleum contaminated facilities being cleaned up has been increasing steadily with time and the number is expected to continue to increase, according to the Alachua County Environmental Protection Department. For more information, refer to the "Hazardous Waste" section of the Solid Waste Element of the Data and Analysis section.

In general, Gainesville gives priority to the correction of point source pollution problems resulting from activities associated with some form of City ownership or management. Nevertheless, the City strongly encourages the immediate mitigation of private sector point source pollution problems.



ABANDONED DUMPS AND KNOWN AND POTENTIAL HAZARDOUS WASTE SITES

Legend

Site Locations

1 Southwest Landfill
2 Crom Corporation (Zirtech)
3 Fabco Air
4 Flying Colors
5 Former Gainesville Airport Landfill and Burn Site
6 Gainesville Gas/ Poole Roofing
7 Hope Electric
8 PCR, Inc. (formerly SCM)
9 University of Florida Landfill
10 Fairbanks Sandpit
11 Farmers Mutual
12 Feagles Fill Dirt
13 Cabot/ Koppers
14 Stengle Air Field
15 Vital Industries
16 Citizens Field (Old Dump)
17 A. Quinn Jones (Old School Site)
18 Old City Dump (NE of WWTP)
19 Original City Dump (Gainesville Shopping Center)
20 Williams Elementary/ Old Lincoln High (Old Dump)
21 City of Gainesville - RTS
22 Job Corps
23 Amoco
24 Rip's/ ABC Research
25 Synergetics
26 Gator Ice
27 Tacachale

Sources: Florida Department of Environmental Regulation, Jacksonville and Gainesville Offices, June 1990.

Alachua County Office of Environmental Protection, June 1997, February 1999.

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ENVIRONMENTAL QUALITY MONITORING PROGRAM

Environmental quality monitoring is an essential ingredient for environmental planning. The city currently does not have in place an environmental quality monitoring program, but it hopes to implement such a program in the future. By carrying out a detailed, comprehensive, and on-going monitoring program of natural areas and features, a community can:

* Determine whether existing regulations relating to protection or improvement of the environment are having a beneficial effect.

* Determine whether new regulations are necessary, or whether existing regulations should be modified or abandoned.

* Provide strong legal justification for regulations should they be challenged in court.

* Determine whether certain natural features (such as air quality or tree populations) are improving or being degraded.

* Make sure current and comprehensive information relating to the status and management of natural resources is available to inform local land use decision-making.

* Determine whether pollution at contaminated sites is being contained, or whether the pollution is migrating off of the site.

HAZARDOUS WASTES

Based on 1997 data provided by the Alachua County Environmental Protection Department, the top five hazardous wastes generated by small quantity generators (SQGs), by weight, are as follows:

Hazardous Waste	Pounds/Year	Percent of Total
Oil Filters	8,504,762	51
Used Oil and Other Lubricants	2,946,844	18
Lead Acid Batteries	2,447,905	15
Absorbents with listed Non halogenated Solvent	749,560	4.5
Spent anti-freeze w/low lead	614,282	3.7

The largest large quantity generators (LQGs) in Alachua County as reported in 1997 were Perma-Fix with 3,479 tons generated, Eveready Battery Company with 591 tons generated, Clariant Life Science Molecules (within City limits, formerly known as PCR) with 448 tons generated and Koppers Industries (located within City limits) with 194 tons of waste generated.

Facilities that produce or handle more than 200 pounds of hazardous waste in any one month are classified as Large Quantity Generators of Hazardous Waste and are required to file a report on their hazardous waste generation with the Florida Department of Environmental Protection every other year. Nine facilities located in Alachua County filed a report in 1995. The following Table 6 lists the facilities and tons of materials classified as either hazardous waste, exempted hazardous waste treated on site, or hazardous waste held at a transfer facility.

Table 6: Hazardous Waste from Large Quantity Generators:

Facility:	**Pounds of material reported in 1995**
Quadrex Environmental	6,850,309
Gates Energy Products, Inc.	2,689,472
Clariant Life Science Molecules.	857,812
Beaker East, Inc.	352,349
University of Florida	143,840
Hunter Marine	63,006
Metal Container Corp	38,981
Farchan Laboratories, Inc.	33,668
US Department of Agriculture	2,345

Source: *State of the Environment Report 1995-1996*, Alachua County Environmental Protection Department

The Alachua County Environmental Protection Department staff operates the permanent Household Hazardous Waste Collection Center at the Leveda Brown Environmental Park/Transfer Station. The center began operation in the fall of 1999.

There are 10 hazardous waste and contamination sites within city limits. There are also several abandoned dump sites (e.g., Citizens Field, Arredondo, A. Quinn Jones, Old City Dump northeast of the Main Street WWTP, the Original City Dump at Gainesville Shopping Center, Williams Elementary/Lincoln Middle School) which are not included because they were used primarily for household waste (Map 16).

There are 21 abandoned dumpsites (areas used for unmanaged solid waste disposal and considered to pose a threat to surface water and groundwaters) and known and potential hazardous waste sites relevant to the Gainesville urban area. 14 of these 21 sites are located within city limits.[9]

ECONOMIC COSTS OF DAMAGE TO GAINESVILLE'S NATURAL ENVIRONMENT

* If contamination in the Floridan Aquifer were to reach the municipal wellfield, the cost of drinking water would increase due to the need for special water treatment techniques, construction of a new municipal wellfield, or importation of water from outside of Alachua County.

* Significant loss of vegetation (particularly trees) would increase the cost of air conditioning, wind buffering, sun screening, and heating. Such loss would require the construction of flood control works needed as a result of increased flooding. Costs would also be incurred due to flood damage to public and private structures. In addition, the need for storm sewer networks and creek channel modifications would increase.

* Significant contamination of, or damage to any portion of Gainesville's natural environment could reduce property values immediately surrounding the affected area, resulting in declines in public revenues from ad valorem taxation. In addition, industries seeking a high quality of life for their employees might be less likely to locate in Gainesville.

* Uncontrolled soil erosion increases the need to remove sediment from creeks and undertake programs to improve surface water quality for fish and wildlife harmed by sedimentation. In addition, excessive sedimentation interferes with the ability of sinkholes to accept and move water. Erosion also increases the need for fertilization of soils, and soil leveling or stabilization.

* Loss of community attractiveness would result in a decline in tourism.

* Increases in air pollution would increase the need for air pollution abatement equipment and monitoring devices. Also, such pollution would result in increased public health costs.

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[9] See also the "Hazardous Waste" section of the Solid Waste Element Data Collection & Analysis Section.

APPENDIX

DEFINITIONS

AQUIFER: a geologic formation, group of formations, or part of a formation that contains sufficient saturated permeable material to yield significant quantities of water to wells and springs.

ASSIMILATIVE CAPACITY: the greatest amount of a pollutant loading that a water or wetland can receive without violating state water quality standards.

BUFFER: the use of naturally occurring vegetation or open space for the purposes of limiting the effects of development on natural areas, nearby land uses, or recreational resources.

CHANNELIZATION: cutting a ditch into, or otherwise modifying the channel of, a creek; usually for the purpose of increasing the storm water conveyance capacity of the creek and/or draining saturated areas.

CONE OF DEPRESSION: a roughly conical concavity (or dimple) in the potentiometric surface around a pumping well. It relates to the events that occur in an aquifer when withdrawal of well water exceeds recharge.

CONFINED AQUIFER: an aquifer bounded above and below by impermeable beds or by beds of distinctly lower permeability than that of the aquifer itself.

CONNECTED WETLAND: a vegetative community which is part of a flowing water system or a runoff system where waters flow through during times of heavy rainfall.
A-1.
CONSERVATION: the prudent use and protection or restoration of natural areas and features consistent with the continued functioning of the natural areas and features.

DEPRESSION BASIN: natural depression watershed areas which have no outlet for surface water outflow except by percolation or evapotranspiration.

DEVELOPMENT: any man-made change to property including, but not limited to, building or erecting a structure, locating a mobile home, mining, dredging, filling, grading, paving, excavating, or drilling operations.

ECOLOGICAL COMMUNITY: an integrated association of plants and animals adapted to and dependent on a particular environment.

ECOSYSTEM: an interacting system of living and non-living components of the environment.

ENVIRONMENTALLY SIGNIFICANT (or SENSITIVE): natural features prone to damage due to development and necessary for (1) the protection of public health, safety, and welfare; and (2) the conservation of the natural environment.

GEOLOGIC FEATURES: a prominent or conspicuous characteristic of naturally occurring earth materials in the landscape. Includes sinkholes, caves, stream bluffs, escarpments, outcroppings, and springs.

GROUNDWATER: water occurring beneath the surface of the ground in zones of saturation, whether or not flowing through known or definite channels.

HABITAT: the natural abode of a plant or animal. The kind of environment in which a plant or animal normally lives, as opposed to the range, or spatial distribution.

HABITAT CORRIDOR: a naturally vegetated transportation route for plants and animals that connects larger natural areas. Wild plants and animals typically require avenues for dispersal to different feeding and breeding sites in order to survive.

HAZARDOUS MATERIAL: materials, as defined in the Alachua County Hazardous Materials Management Code, which are potentially harmful to the natural environment and/or to the public health, safety, and welfare.

HYDROPERIOD: the annual period of inundation.

IMPERVIOUS: incapable of being penetrated, as by moisture.

INVASIVE EXOTIC PLANT SPECIES: A non-indigenous species, or one introduced to the state, either purposefully or accidentally, that is either invading and disrupting native plant communities in Florida, or has the potential to disrupt native plant communities.

ISOLATED (or EPHEMERAL) WETLAND: a wetland where no naturally occurring outfall exists. Examples are cypress domes, shallow marshes, and bayheads.

KARST TOPOGRAPHY: a type of topography characterized by closed depressions, sink holes, underground caverns and solution channels.

MAJOR NATURAL GROUNDWATER RECHARGE AREAS: those areas where stream-to-sink basins occur and the Floridan Aquifer system is unconfined or semiconfined.

MITIGATE: actions taken before, during or after development to preserve, replace, or restore various environmental functions or features of a natural area, or to buffer nearby land uses from adverse impacts of the development.

NATIVE (or NATIVE BIOTA): the natural occurrence of species of plants and animals in a specific region. Native biota does not include species that are exotic or introduced by humans and that have become "naturalized."

NATURAL COMMUNITY (or NATURAL AREA or NATURAL FEATURE or NATURAL RESOURCE): a distinct and reoccurring assemblage of populations of plants, animals, fungi and microorganisms naturally associated with each other an their physical environment. (Florida Department of Environmental Protection)

OPEN SPACE: any vegetated or surface water area set aside for recreation, public gathering, aesthetics, buffering, urban definition, protection of public health and safety, preservation of ecosystem functions, or a combination of these features.

OUTSTANDING FLORIDA WATERS (OFW): water designated, by the State, worthy of special protection because of its natural attributes. This special designation is applied to certain waters with the intent of maintaining existing good water quality.

POLLUTION: undesirable change in the physical, chemical, or biological characteristics of the air, water, or soil, that can harm humans, animals, vegetation, or structures.

POLLUTION, NON-POINT SOURCE: contamination arising from a relatively wide area such as a parking lot or construction site, rather than a specific point such as a pipe.

POLLUTION, POINT SOURCE: contamination arising from a specific point such as a pipe or smokestack, rather than from a relatively large area such as a parking lot or construction site.

POTENTIOMETRIC SURFACE: an expression of the pressure under which water is found or held, the level to which water from an aquifer will rise in tightly cased wells that penetrate an aquifer. The water table is a particular potentiometric surface.

PRESERVATION: the perpetual maintenance of areas in their natural state.

RECHARGE: the entry into the saturated zone of water made available at the water table surface, together with the associated flow away from the water table within the saturated zone.

RESTORATION: the revival or rehabilitation of a natural area or feature such as a wetland, plant or animal habitat, etc., to a condition in which the area or feature functions in a relatively self-maintaining, historically natural condition.

SEMICONFINED AQUIFER: according to the USGS, an aquifer with an overlying confining bed which is generally less than 100 feet thick, breached, or both.

SHEETFLOW: the pattern of water movement where large quantities of water move in broad-spread, shallow layers across the ground's surface. Typically seen in wetlands, marshes, grasslands, pine flatwoods, and prairies.

SINKHOLE: a natural depression in a land surface community with a subterranean passage, generally occurring in limestone regions and formed by solution or by collapse of a cavern roof (American Heritage Dictionary, 3rd edition)

STORMWATER (OR RUNOFF): flow of water which results from, and which occurs during and immediately following, a rainfall event.

TERTIARY TREATMENT: An enhancement of normal sewage treatment operations to provide water of potable quality using further chemical and physical treatment; the highest drinking water standard achieved in the U.S.

TREE CANOPY COVERAGE: the cover or leaves of branches formed by the tops or crowns of plants as viewed from above the cover; measured by the vertical projection downward of the extend of the cover and expressed as a percentage of the ground so covered. (Resource Conservation Glossary, 3rd edition).

UNCONFINED AQUIFER: an aquifer that has no impermeable layer between the zone of saturation and water table.

UPLAND COMMUNITY: non-wetland, non-aquatic areas not subject to regular flooding. Includes scrub, mesic hammock, sandhill, upland pine forest, xeric hammock, mesic flatwoods, and scrubby flatwoods.

URBAN FOREST: the woody vegetation within an urban area including trees along streets, in parks or undeveloped areas, and the understory vegetation. The urban forest provides wildlife habitat, provides food and shelter for bird and small animal populations. The value of the vegetative urban web of trees and

vegetation on public property is enhanced by undeveloped land, commercial forestry operations, and the upland buffers associated with wetlands and surface water areas.

WATERSHED: The area of land that catches precipitation and drains or seeps into a marsh, stream, river lake or groundwater.

WATER TABLE: the surface of an unconfined aquifer at which the pressure is atmospheric. It is defined by the level at which water stands in wells that penetrate the water body far enough to hold standing water.

WETLAND: those areas that are inundated (flooded) or saturated (soaked) by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence (majority) of vegetation typically adapted (adjusted) for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas. (US Army Corps)

WILDLIFE CORRIDOR: Travel path through open space used by animals. Keeping these functional is essential to maintaining the genetic diversity of animal populations and thus enabling species to buffer cataclysmic environmental or disease incidents and to respond to changing niche requirements.

XERISCAPE: a landscaping method that maximizes the conservation of water by the use of site-appropriate plants and an efficient watering system. The principles of Xeriscape include planning and design, appropriate choice of plants, soil analysis which may include the use of solid waste compost, efficient irrigation, practical use of turf, appropriate use of mulches, and proper maintenance.

Table 3. Basin-by-Basin Surface Water Inventory

*City of Gainesville, Florida**

Drainage Basins	Wetands (acres)	Lakes (acres)	Creeks (miles)**
Airport Drainage	84.70		
Alacua Sink	52.28		
Alachua Slough	269.92	0.43	0.53
Bivans Arm	116.70	31.36	2.60
Blue Creek	94.40		
Gumroot Swamp	227.99		1.88
Hatchet Creek	488.43	6.79	
Hogtown Creek	622.04	4.18	15.67
Hogtown Prairie Reach	77.00		
Lake Alice	95.72	24.17	0.14
Liberty Hill Drainage	2.75		
Prairie Creek Reach	355.99	112.44	1.43
Rocky Creek	5.49		
Sunland Drainage	166.31		2.28
Sweetwater Branch	75.78		3.07
Unnamed Drainage(s)	278.15	5.09	
Unnamed Stream(s)	357.31		11.52
Totals	**3370.98**	**184.46**	**39.12**

Notes:
Data compiled thru Arcview analysis. Source drainage basins and wetlands, St Johns River Water Management District. Source regulated creeks, City of Gainesville, Land Development Code.

**Data is for inside November 2000, Gainesville city limits.*
***Data for creeks is for regulated creeks only.*

Table 4: Endangered, Threatened and Species of Special Concern
FDEP, 2000

PREFACE

This document consolidates the state and federal official lists of endangered species, threatened species, and other species categorized in some way by the respective jurisdictional agencies as meriting special protection or consideration. The state lists of animals are maintained by the Florida Game and Fresh Water Fish Commission and categorized as endangered, threatened and of special concern, and constitute Rules 39-27.003, 39-27.004 and 39-27.005, respectively, Florida Administrative Code (F.A.C.). The state lists of plants are categorized into endangered, threatened and commercially exploited, and are administered and maintained by the Florida Department of Agriculture and Consumer Services via Chapter 5B-40, F.A.C. The federal lists of animals and plants are administered by the U.S. Fish and Wildlife Service and categorized into endangered and threatened, and are published in 50 CFR 17 (animals) and 50 CFR 23 (plants). The abbreviations used in part one are:

- GFC = Florida Fish and Wildlife Conservation Commission
- FDA = Florida Department of Agriculture and Consumer Services
- FWS = United States Fish and Wildlife Service
- E = Endangered
- T = Threatened
- T(S/A) = Threatened/Similarity of Appearance
- T(E/P) = Threatened/Experimental Population
- SSC = Species of Special Concern
- C = Commercially Exploited

NUMERICAL SUMMARY OF SPECIES LISTED BY STATE AND FEDERAL AGENCIES AS ENDANGERED, THREATENED OR OTHERWISE CATEGORIZED AS OF CONCERN

Status Designation	Fish	Amphibians	Reptiles	Birds	Mammals	Invertebrates	Plants	Total
GFC								
E	3	0	6	8	20	3	--	40
T	2	0	10	11	4	0	--	27
SSC	11	5	7	17	6	4	--	50
TOTAL	**16**	**5**	**23**	**36**	**30**	**7**	**--**	**117**
FDA								
E	--	--	--	--	--	--	337	337
T	--	--	--	--	--	--	66	66
C	--	--	--	--	--	--	10	10
TOTAL							**413**	**413**
FWS								
E	2	0	5	7	18	1	44	77

T	1	0	5	6	1	2	10	25
T(S/A)	0	0	1	0	0	0	0	1
T(E/P)	0	0	0	1	0	0	0	1
TOTAL	**3**	**0**	**11**	**14**	**19**	**3**	**54**	**104**

OFFICIAL LISTS

Scientific Name	Common Name(s)	Designated Status GFC	FWS
Fish			
Acipenser brevirostrum	Shortnose sturgeon	E	E
Acipenser oxyrhynchus	Atlantic sturgeon	SSC	T*
Ammocrypta asprella	Crystal darter	T	
Centropomus undecimalis	Common snook	SSC	
Cyprinodon variegatus hubbsi	Lake Eustis pupfish	SSC	
Etheostoma histrio	Harlequin darter	SSC	
Etheostoma okaloosae	Okaloosa darter	E	E
Etheostoma olmstedi maculaticeps	Southern tessellated darter; tesselated johnny darter	SSC	
Fundulus jenkinsi	Saltmarsh topminnow	SSC	
Menidia conchorum	Key silverside	T	
Micropterus notius	Suwannee bass	SSC	
Micropterus n. sp. cf *coosae*	Shoal bass; Chipola bass	SSC	
Notropis melanostomus	Blackmouth (=Pond Creek) shiner	E	
Pteronotropis welaka	Bluenose shiner	SSC	
Rivulus marmoratus	Mangrove rivulus; rivulus	SSC	
Starksia starcki	Key blenny	SSC	
Amphibians			
Haideotriton wallacei	Georgia blind salamander	SSC	
Hyla andersonii	Pine Barrens treefrog	SSC	
Rana capito	Gopher (=crawfish) frog	SSC	
Rana okaloosae	Bog frog	SSC	
Reptiles			
Alligator mississippiensis	American alligator	SSC	T(S/A)
Caretta caretta	Atlantic loggerhead turtle	T	T
Chelonia mydas mydas	Atlantic green turtle	E	E
Crocodylus acutus	American crocodile	E	E
Dermochelys coriacea	Leatherback (=leathery) turtle	E	E
Diadophis punctatus acricus	Big Pine Key ringneck snake	T	
Drymarchon corais couperi	Eastern indigo snake	T	T
Elaphe guttata guttata	Red rat snake; corn snake	SSC*	

* Applicable only to the subspecies *A.o. desotoi* (Gulf sturgeon)

Scientific Name	Common Name(s)	Designated Status GFC	FWS

Eretmochelys imbriccata imbratica	Atlantic hawksbill turtle	E	E
Eumeces egregius egregius	Florida Keys mole skink	SSC	
Eumeces egregius lividus	Bluetail mole skink	T	T
Gopherus polyphemus	Gopher turtle	SSC	
Graptemys barbouri	Barbour's map (=sawback) turtle	SSC	
Kinosternon bauri	Striped mud turtle	E*	
Lepidochelys kempi	Atlantic ridley turtle	E	E
Macroclemys temmincki	Alligator snapping turtle	SSC	
Neoseps reynoldsi	Sand skink	T	T
Nerodia fasciata taeniata	Atlantic salt marsh snake	T	T
Pituophis melanoleucus mugitus	Florida pine snake	SSC	
Pseudemys concinna suwanniensis	Suwannee cooter	SSC	
Stilosoma extenuatum	Short-tailed snake	T	
Storeria dekayi victa	Florida brown snake	T*	
Tantilla oolitica	Miami black-headed snake; rimrock crowned snake	T	
Thamnophis sauritus sackeni	Florida ribbon snake	T*	

*Applicable in lower Florida Keys only

Birds

Ajaia ajaja	Roseate spoonbill	SSC	
Ammodramus maritimus juncicolus	Wakulla seaside sparrow	SSC	
Ammodramus maritimus mirabilis	Cape Sable seaside sparrow	E	E
Ammodramus maritimus peninsulae	Scott's seaside sparrow	SSC	
Ammodramus savannarum floridanus	Florida grasshopper sparrow	E	
Aphelocoma coerulescens	Florida scrub-jay	T	T
Aramus guarauna	Limpkin	SSC	
Campephilus principalis	Ivory-billed woodpecker	E	E
Charadrius alexandrinus tenuirostris	Southeastern snowy plover	T	
Charadrius melodus	Piping plover	T	T
Cistothorus palustris griseus	Worthington's marsh wren	SSC	
Cistothorus palustris marianae	Marian's marsh wren	SSC	
Columba leucocephala	White-crowned pigeon	T	
Dendroica kirtlandii	Kirtland's warbler	E	E
Egretta caerulea	Little blue heron	SSC	
Egretta rufescens	Reddish egret	SSC	
Egretta thula	Snowy egret	SSC	
Egretta tricolor	Tricolored (=Louisiana) heron	SSC	
Eudocimus albus	White ibis	SSC	
Falco peregrinus tundrius	Arctic peregrine falcon	E	
Falco sparverius paulus	Southeastern American kestrel	T	

Scientific Name	Common Name(s)	Designated Status GFC	FWS
Grus americana	Whooping crane	SSC	T(E/P)
Grus canadensis pratensis	Florida sandhill crane	T	
Haematopus palliatus	American oystercatcher	SSC	
Haliaeetus leucocephalus	Bald eagle	T	T
Mycteria americana	Wood stork	E	E
Pandion haliaetus	Osprey	SSC*	
Pelecanus occidentalis	Brown pelican	SSC	
Picoides borealis	Red-cockaded woodpecker	T	E
Polyborus plancus audubonii	Audubon's crested caracara	T	T
Rostrhamus sociabilis	Snail kite	E	E
Rynchops niger	Black skimmer	SSC	
Speotyto cunicularia	Burrowing owl	SSC	
Sterna antillarum	Least tern	T	
Sterna dougallii	Roseate tern	T	T
Vermivora bachmanii	Bachman's warbler	E	E
*Applicable in Monroe County only			
Mammals			
Balaena glacialis	Right whale	E	E
Balaenoptera borealis	Sei whale	E	E
Balaenoptera physalus	Finback whale	E	E
Blarina carolinensis (=brevicauda) shermani	Sherman's short-tailed shrew	SSC	
Eumops glaucinus floridanus	Florida (=Wagner's) mastiff bat	E	
Felis concolor coryi	Florida panther	E	E
Megaptera novaeangliae	Humpback whale	E	E
Microtus pennsylvanicus dukecampbelli	Duke's (=Florida) saltmarsh vole	E	E
Mustela vison evergladensis	Everglades mink	T	
Myotis grisescens	Gray bat	E	E
Myotis sodalis	Indiana bat	E	E
Neotoma floridana smalli	Key Largo woodrat	E	E
Odocoileus virginianus clavium	Key deer; toy deer	E	E
Oryzomys argentatus	Silver rice rat	E	E
Oryzomys palustris sanibeli	Sanibel Island rice rat	SSC	
Peromyscus gossypinus allapaticola	Key Largo cotton mouse	E	E
Peromyscus polionotus allophrys	Choctawhatchee beach mouse	E	E
Peromyscus polionotus niveiventris	Southeastern beach mouse	T	T
Peromyscus polionotus peninsularis	St. Andrews beach mouse	E	
Peromyscus polionotus phasma	Anastasia Island beach mouse	E	E
Peromyscus polionotus trissyllepsis	Perdido Key beach mouse	E	E
Physeter catodon	Sperm whale; cachalot	E	E
Podomys floridanus	Florida mouse	SSC	
Sciurus niger avicennia	Big Cypress (=mangrove) fox squirrel	T	
Sciurus niger shermani	Sherman's fox squirrel	SSC	

Scientific Name	Common Name(s)	Designated Status GFC	FWS
Sorex longirostris eionis	Homosassa shrew	SSC	
Sylvilagus palustris hefneri	Lower Keys marsh rabbit	E	E
Tamias striatus	Eastern chipmunk	SSC	
Trichechus manatus	West Indian (=Florida) manatee	E	E
Ursus americanus floridanus	Florida black bear	T*	
*Not applicable in Baker and Columbia counties and Apalachicola National Forest			
Corals			
Dendrogyra cylindrus	Pillar coral	E	
Crustaceans			
Palaemonetes cummingi	Squirrel Chimney (=Florida) cave shrimp	T	
Procambarus econfinae	Econfina crayfish	SSC	
Procambarus erythrops	Sims Sink crayfish	SSC	
Procambarus pictus	Black Creek crayfish	SSC	
Insects			
Heraclides aristodemus ponceanus	Schaus' swallowtail butterfly	E	E
Molluscs			
Liguus fasciatus	Florida tree snail	SSC	
Orthalicus reses	Stock Island tree snail	E	T*
*Applies only to the subspeceis *O.r. reses*			

Scientific Name	Common Name(s)	Designated Status FDA	FWS
Plants			
Acacia choriophylla	Tamarindillo	E	
Acrostichum aureum	Golden leather fern	E	
Acrostichum danaeifolium	Giant leather fern	C	
Actaea pachypoda	Baneberry; doll's eyes	E	
Adiantum melanoleucum	Fragrant maidenhair fern	E	
Adiantum tenerum	Brittle maidenhair fern	E	
Alvaradoa amorphoides	Alvaradoa	E	
Amorpha crenulata	Crenulate (=Miami) lead plant	E	E
Anemia wrighti	Parsley fern	E	
Aquilegia canadensis	Wild (=Southern; =Canadian) columbine	E	
Arabis canadensis	Sicklepod	E	
Argythamnia blodgettii	Blodgett's wild-mercury	E	
Aristolochia tomentosa	Dutchman's pipe; pipevine	E	
Asclepias curtissii	Curtiss' (=sandhill) milkweed	E	
Asclepias viridula	Apalachicola (=green) milkweed	T	
Asimina tetramera	Four-petal (=opossum) pawpaw	E	E
Asplenium auritum	Auricled spleenwort	E	
Asplenium monanthes	San Felasco (=single sorus) spleenwort	E	
Asplenium pumilum	Dwarf (=chervil) spleenwort	E	
Asplenium serratum	Bird's nest spleenwort; wild birdnest fern	E	
Asplenium subtile	Slender spleenwort	E	
Asplenium trichomanes-dentatum	Slender spleenwort	E	
Asplenium verecundum	Delicate spleenwort	E	
Aster hemisphericus	Aster (unnamed)	E	
Aster spinulosus	Pinewoods aster	E	
Athyrium filix-femina	Southern lady fern	T	
Baptisia hirsuta (=B. calycosa var. *hirsuta)*	Pineland (=hairy) wild indigo	T	
Baptisia megacarpa	Apalachicola wild indigo	E	
Baptisia simplicifolia	Coastal Plain wild indigo; scare-weed	T	
Basiphyllaea corallicola	Carter's orchid	E	
Bigelowia nuttalli	Nuttal's rayless goldenrod	E	
Blechnum occidentale	Sinkhole fern	E	
Bletia purpurea	Pine pink orchid	T	
Bonamia grandiflora	Florida (=large-flowered) bonamia	E	T
Bourreria cassinifolia	Little strongback	E	
Brassia caudata	Long-tailed spider orchid	E	
Brickellia cordifolia	Flyr's brickell-bush	E	
Brickellia eupatorioides var. *floridana* *(=B. mosieri)*	Florida brickell-bush; Florida boneset	E	
Bulbophyllum pachyrrhachis	Rattail orchid	E	
Bumelia anomala	Clark's buckthorn	E	
Bumelia lycioides	Gopherwood buckthorn	E	

Scientific Name	Common Name(s)	Designated Status GFC	FWS
Bumelia thornei	Thorne's buckthorn	E	
Burmannia flava	Fakahatchee burmannia	E	
Byrsonima lucida	Locust berry	E	
Cacalia diversifolia	Variable-leaved Indian plantain	T	
Calamintha ashei	Ashe's savory; lavender basil	T	
Calamovilfa curtissii	Curtiss' reedgrass; Curtiss' sand grass	T	
Callirhoe papaver	Poppy mallow	E	
Calopogon barbatus	Bearded grass pink	T	
Calopogon multiflorus	Many-flowered grass pink	E	
Calycanthus floridus	Sweetshrub	E	
Calyptranthes zuzygium	Myrtle of the river	E	
Calystegia catesbaeiana	Catesby's bindweed	E	
Campanula robinsiae	Robins' (=Chinsegut) bellflower	E	E
Campylocentrum pachyrrhizum	Leafless orchid	E	
Campyloneurum angustifolium	Narrow strap fern	E	
Campyloneurum costatum	Tailed strap fern	E	
Campyloneurum phyllitidus	Long strap fern	E	
Canella winteriana	Wild cinnamon	E	
Carex baltzelli	Baltzell's sedge	T	
Cassia keyensis (=Chaemecrista lineata var. *keyensis)*	Big Pine partridge pea; Florida Keys senna; Key cassia	E	
Catesbaea parviflora	Small-flowered (=dune) lily-thorn	E	
Catopsis berteroniana	Powdery (=yellow) catopsis	E	
Catopsis floribunda	Many-flowered air plant	E	
Catopsis nutans	Nodding catopsis	E	
Celtis iguanaea	Iguana hackberry	E	
Celtis pallida	Spiny hackberry	E	
Cereus eriophorus	Indian River prickly apple	E	E
Cereus gracilis	West coast prickly apple	E	
Cereus pentagonus	Dildoe (=barbed wire) cactus	E	
Cereus robinii	Tree cactus	E	E
Chamaesyce cumulicola	Sand dune spurge	E	
Chamaesyce deltoidea ssp. *deltoidea*	Wedge (=deltoid; =rockland) spurge	E	E
Chamaesyce garberi	Garber's spurge	E	T
Chamaesyce porteriana	Porter's spurge	E	
Cheilanthes microphylla	Southern lip fern	E	
Chionanthus pygmaeus	Pygmy fringetree	E	E
Chrysophyllum oliviforme	Satinleaf	E	
Chrysopsis cruiseana (=C. gossypinus crioseana)	Cruise's golden aster	E	
Chrysopsis floridana	Florida golden aster	E	E
Cienfuegosia yucatanensis (=C. heterophylla)	Yellow hibiscus	E	
Cladonia perforata	Perforate reindeer lichen; deer moss	E	E
Cleistes divaricata	Rosebud orchid; spreading pogonia	T	
Clitoria fragrans	Pigeon-wing (=sandhill) butterfly-pea	E	T

Scientific Name	Common Name(s)	Designated Status GFC	FWS
Clusia rosea	Balsam apple	E	
Coccothrinax argentata	Silver palm	E	
Colubrina cubensis	Colubrina	E	
Conradina breviflora	Short-leaved rosemary	E	E
Conradina etonia	Etonia rosemary	E	E
Conradina glabra	Apalachicola (=panhandle) rosemary	E	E
Conradina grandiflora	Large-flowered rosemary	E	
Corallorhiza odontorhiza	Autumn coralroot	E	
Cordia sebestena	Geiger tree	E	
Cornus alternifolia	Pagoda dogwood	E	
Cranichis muscosa	Moss orchid	E	
Crataegus phaenopyrum	Washington thorn	E	
Croomia pauciflora	Few-flowered croomia	E	
Crossopetalum ilicifolium	Christmas berry	E	
Crossopetalum rhacoma	Rhacoma	E	
Crotolaria avonensis	Avon Park rattlebox; Avon Park harebells	E	E
Cryptotaenia canadensis	Honewort	E	
Ctenitis sloanei	Red-hair comb fern; Florida tree fern	E	
Ctenitis submarginalis	Brown-hair comb fern	E	
Cucurbita okeechobeensis	Okeechobee gourd; Indian pumpkin	E	E
Cupania glabra	Cupania	E	
Cyrtopodium punctatum	Cowhorn (=cigar) orchid	E	
Deeringothamnus pulchellus	White squirrel-banana; beautiful pawpaw	E	E
Deeringothamnus rugelii	Yellow squirrel-banana; Rugel's pawpaw	E	E
Delphinium carolinianum	Carolina larkspur	E	
Dennstaedtia bipinnata	Cuplet (=hay-scented) fern	E	
Dicerandra christmanii	Garrett's mint	E	E
Dicerandra cornutissima	Long-spurred balm; Robins' mint	E	E
Dicerandra frutescens	Scrub balm; Lloyd's mint	E	E
Dicerandra immaculata	Lakela's (=Olga's) mint	E	E
Digitaria pauciflora	Florida pineland crabgrass	E	
Dodecatheon meadia	Shooting star	E	
Drosera filifolia	Dew-thread	E	
Drosera intermedia	Water sundew	T	
Eltroplectris calcarata (=Centrogenium setaceum)	Spurred neottia	E	
Encyclia boothiana	Dollar (=dogtooth) orchid	E	
Encyclia cochleata	Shell (=clamshell) orchid	E	
Encyclia pygmaea	Dwarf epidendrum	E	
Encyclia tampensis	Butterfly orchid	C	
Epidendrum acunae	Acuna's epidendrum	E	
Epidendrum anceps	Dingy-flowered epidendrum	E	
Epidendrum conopseum	Greenfly orchid	C	
Eidendrum difforme	Unbelled epidendrum	E	

Scientific Name	Common Name(s)	Designated Status GFC	FWS
Epidendrum nocturnum	Night-scent orchid	E	
Epidendrum rigidum	Rigid epidendrum	E	
Epidendrum strobiliferum	Matted epidendrum	E	
Epigaea repens	Trailing arbutus	E	
Eragrostis tracyi	Sanibel Island lovegrass	E	
Eriogonum longifolium var. *gnaphalifolium* (=*E. floridanum*)	Scrub buckwheat	E	T
Ernodea cokeri	One-nerved ernodea	E	
Ernodea littoralis	Beach creeper	T	
Eryngium cuneifolium	Wedge-leaved button snake-root; scrub celery	E	E
Erythronium umbilicatum	Dogtooth lily; dimpled dogtooth violet	E	
Eugenia confusa	Redberry ironwood	E	
Eugenia rhombea	Red stopper	E	
Eulophia alta	Wild (=ground) coco	T	
Euphorbia telephioides	Telephus spurge	E	T
Forestiera godfreyi	Godfrey's swamp privet	E	
Galactia smallii	Small's milkpea	E	E
Galeandra beyrichii	Helmet orchid	E	
Garberia heterophylla	Garberia	T	
Gentiana pennelliana	Wiregrass gentian	E	
Goodyera pubescens	Downy rattlesnake orchid	E	
Gossypium hirsutum	Wild cotton	E	
Govenia utriculata	Gowen's orchid	E	
Guaiacum sanctum	Lignum-vitae tree	E	
Guzmania monostachia	Fuch's bromeliad	E	
Habenaria distans	Rein orchid (unnamed)	E	
Harperocallis flava	Harper's beauty	E	E
Harrisella filiformis	Threadroot orchid	T	
Hartwrightia floridana	Florida hartwrightia	T	
Hasteola robertiorum	Gulf Hammock Indian plantain	E	
Helianthus carnosus	Lakeside (=flatwoods) sunflower	E	
Hepatica nobilis (=H. americana)	Liverleaf	E	
Hexalectris spicata	Crested coralroot	E	
Hexastylis arifolia	Heartleaf	T	
Hippomane mancinella	Manchineel	E	
Hybanthus concolor	Green violet	E	
Hydrangea arborescens	Wild hydrangea	E	
Hymenocallis henryae	Henry's spiderlily	E	
Hypelate trifoliata	Inkwood; white ironwood	E	
Hypericum cumulicola	Highlands scrub St. John's-wort	E	E
Hypericum edsonianum	Edison's St. John's-wort	E	
Hypericum lissophloeus	Smooth-barked St. John's-wort	E	
Ilex krugiana	Krug's holly	E	
Illicium floridanum	Florida anise	T	

Scientific Name	Common Name(s)	Designated Status GFC	FWS
Illicium parviflorum	Yellow star anise	E	
Ionopsis utricularioides	Delicate ionopsis; violet orchid	E	
Ipomoea microdactyla	Wild potato morning glory	E	
Ipomoea tenuissima	Rocklands morning glory	E	
Isoetes engelmannii	Engelmann's quillwort	E	
Isotria verticillata	Whorled pogonia	E	
Jacquemontia curtissii	Pineland (=Curtiss') clustervine	E	
Jacquemontia reclinata	Beach (=reclined) clustervine	E	E
Jacquinia keyensis	Joewood	T	
Justicia cooleyi	Cooley's water willow	E	E
Justicia crassifolia	Thick-leaved (=large-flowered) water willow	E	
Kalmia latifolia	Mountain laurel	T	
Lantana depressa	Pineland lantana	E	
Lechea cernua	Nodding (=drooping; =scrub) pinweed	T	
Lechea divaricata	Pine (=spreading) pinweed	E	
Lechea lakelae	Lakela's pinweed	E	
Leitneria floridana	Florida corkwood	T	
Leochilus labiatus	Lipped orchid	E	
Lepanthopsis melanantha	Harris' tiny orchid	E	
Lepuropetalon spathulatum	Little people	E	
Liatris ohlingerae	Florida gayfeather; scrub blazing star	E	E
Liatris provincialis	Godfrey's gayfeather	E	
Licaria triandra	Gulf licaria	E	
Lilium catesbaei	Catesby's lily	T	
Lilium iridollae	Panhandle lily	E	
Lindera melissifolia	Swamp spicebush; Jove's fruit; pondberry	E	E
Lindera subcoriacea	Bog spicebush	E	
Linum arenicola	Sand flax	E	
Linum carteri	South Florida (=Everglades) flax	E	
Linum westii	West's flax	E	
Liparis nervosa	Tall twayblade	E	
Listera australis	Southern twayblade	T	
Litsea aestivalis	Pond spice; pond bush	E	
Lobelia cardinalis	Cardinal flower	T	
Lomariopsis kunzeana	Climbing holly fern	E	
Lupinus aridorum (=L. westianus var. *aridorum*)	McFarlin's (=scrub) lupine	E	E
Lupinus westianus	Gulfcoast (=panhandle) lupine	T	
Lycopodium cernuum	Nodding clubmoss	C	
Lycopodium dichotomum	Hanging (=coneless) clubmoss	E	
Lythrum curtissii	Curtiss' loosestrife	E	
Macbridea alba	White birds-in-a-nest	E	T
Macradenia lutescens	Trinidad macradenia	E	
Macranthera flammea	Hummingbird flower	E	
Magnolia acuminata	Cucumber tree	E	

Scientific Name	Common Name(s)	Designated Status GFC	FWS
Magnolia ashei	Ashe's magnolia	E	
Magnolia pyramidata	Pyramidal magnolia	E	
Malaxis unifolia	Green adder's mouth	E	
Malus angustifolia	Crabapple	T	
Marshallia obovata	Barbara's buttons (unnamed)	E	
Marshallia ramosa	Southern barbara's buttons	E	
Matela alabamensis	Alabama milkweed; Alabama anglepod	E	
Matela baldwyniana	Baldwin's milkweed; Baldwin's anglepod	E	
Matela flavidula	Yellow-flowered anglepod	E	
Matela floridana	Florida milkweed; panhandle anglepod	E	
Matela gonocarpos	Anglepod (unnamed)	T	
Maxillaria crassifolia	Hidden orchid	E	
Maxillaria parviflora	Minnie-max	E	
Medeola viginiana	Indian cucumber-root	E	
Melanthera parvifolia	Small-leaved melanthera	E	
Microgramma heterophylla	Climbing vine fern	E	
Monotropa hypopithys	Pinesap (unnamed)	E	
Monotropsis reynoldsiae	Pygmy-pipes; sweet pinesap	E	
Myrcianthes fragrans (=Eugenia simpsonii)	Simpson's ironwood; Simpson's stopper	T	
Najas filifolia	Slender naiad	T	
Nemastylis floridana	Fall-flowering pleat-leaf; celestial lily	E	
Nephrolepis biserrata	Giant sword fern	T	
Neurodium (=Paltonium) lanceolatum	Ribbon fern	E	
Nolina atopocarpa	Florida beargrass	T	
Nolina brittoniana	Scrub (=Britton's) beargrass	E	E
Okenia hypogaea	Burrowing four-o'clock	E	
Oncidium bahamensis	Dancing lady orchid	E	
Oncidium floridanum	Florida oncidium	E	
Oncidium luridum	Mule-ear (=dingy-flowered) orchid	E	
Ophioglossum palmatum	Hand adder's tongue fern	E	
Opuntia spinosissima	Semaphore cactus	E	
Opuntia stricta	Shell mound prickly pear cactus	T	
Opuntia triacantha	Keys joe-jumper	E	
Osmunda cinnamomea	Cinnamon fern	C	
Osmunda regalis	Royal fern	C	
Oxypolis greenmanii	Giant water dropwort	E	
Pachysandra procumbens	Allegheny spurge	E	
Panicum abscissum	Cutthroat grass	E	
Parnassia caroliniana	Coastal (=Carolina) grass-of-parnassus	E	
Parnassia grandifolia	Grass-of-parnassus	E	
Paronychia chartacea	Papery whitlow-wort	E	T
Pecluma dispersa	Polypoda fern (unnamed)	E	
Pecluma plumula	Plume polypoda fern	E	
Pecluma ptilodon	Swamp plume polypoda fern	E	

Scientific Name	Common Name(s)	Designated Status GFC	FWS
Pellaea atropurpurea	Cliff brake fern	E	
Peperomia glabella	Cypress peperomia	E	
Peperomia humilis	Pepper (unnamed)	E	
Peperomia magnoliifolia (=P. spathulifolia)	Spatulate peperonia	E	
Peperomia obtusifolia (=P. floridana)	Florida (=Everglades) peperomia	E	
Phoradendron rubrum	Mahogany mistletoe	E	
Phyllanthus liebmannianus	Pinewood dainties; Florida leaf flower	E	
Physocarpus opulifolius	Ninebark	E	
Pinckneya bracteata (=P. pubens)	Hairy fevertree	T	
Pinguicula caerulea	Blue flowered butterwort	T	
Pinguicula ionantha	Godfrey's (=panhandle) butterwort	E	T
Pinguicula lutea	Yellow flowered butterwort	T	
Pinguicula planifolia	Chapman's (=swamp) butterwort	T	
Pinguicula primuliflora	Primrose-flowered butterwort	E	
Pityopsis flexuosa	Panhandle (=Florida) golden aster	E	
Platanthera blephariglottis	Large white-fringed orchid	T	
Platanthera ciliaris	Yellow-fringed orchid	T	
Platanthera clavellata	Little club-spur orchid; green rein orchid	E	
Platanthera cristata	Golden (=crested) fringed orchid	T	
Platanthera flava	Southern tubercled orchid; gypsy-spikes	T	
Platanthera integra	Southern yellow fringeless orchid; orange rein orchid	E	
Platanthera nivea	Snowy orchid; bog torch	T	
Pleopeltis astrolepis	Star-scaled fern	E	
Pleurothallis gelida	Frosted orchid	E	
Pogonia ophioglossoides	Rose pogonia	T	
Poinsettia pinetorum	Everglades poinsettia	E	
Polygala lewtonii	Scrub milkwort; Lewton's polygala	E	E
Polygala smallii	Tiny (=Small's) milkwort	E	E
Polygonella ciliata var. *basiramia (=P. basiramia)*	Hairy (=tufted) jointweed	E	E
Polygonella macrophylla	Large-leaved jointweed	T	
Polygonella myriophylla	Small's jointweed; sandlace	E	E
Polygonum meisnerianum	Mexican tear-thumb	E	
Polyradicion (=Polyrrhiza) lindenii	Ghost orchid; palm polly	E	
Polystachya flavescens (=P. concreta; =P. extinctoria)	Pale-flowered polystachya	E	
Ponthieva brittoniae	Mrs. Britton's shadow witch	E	
Prescottia oligantha	Small-flowered orchid	E	
Prunus geniculata	Scrub plum	E	E
Pseudophoenix sargentii	Buccaneer (=Sargent's cherry) palm	E	
Pteris bahamensis	Cretan brake fern	E	
Pteroglossaspis (=Eulophia) ecristata	Non-crested coco; false coco	T	
Remirea maritima	Beach star	E	

Scientific Name	Common Name(s)	Designated Status GFC	FWS
Rhapidophyllum hystrix	Needle palm	C	
Rhexia parviflora	Apalachicola (=small-flowered) meadowbeauty	E	
Rhipsalis baccifera	Mistletoe cactus	E	
Rhododendron alabamense	Alabama azalea	E	
Rhododendron austrinum	Florida flame (=orange) azalea	E	
Rhododendron canescens	Pink azalea	C	
Rhododendron chapmanii	Chapman's rhododendron	E	E
Rhus michauxii	Michaux's sumac	E	
Ribes echinellum	Miccosukee (=Florida) gooseberry	E	T
Roystonea elata	Florida royal palm	E	
Rudbeckia nitida	St. John's-susan; yellow coneflower	E	
Ruellia noctiflora	Night-flowering wild petunia	E	
Sachsia bahamensis	Bahama sachsia	E	
Salix eriocephala	Heart-leaved willow	E	
Salix floridana	Florida willow	E	
Salvia urticifolia	Nettle-leaved sage	E	
Sarracenia leucophylla	White-top pitcherplant	E	
Sarracenia minor	Hooded pitcherplant	T	
Sarracenia psittacina	Parrot pitcherplant	T	
Sarracenia purpurea	Decumbant pitcherplant	T	
Sarracenia rubra	Red-flowered (=sweet) pitcherplant	T	
Scaevola plumieri	Inkberry	T	
Schisandra coccinea	Bay star vine	E	
Schizaea germanii	Ray (=tropical curly-grass) fern	E	
Schwalbaea americana	American chaffseed	E	E
Scutellaria floridana	Florida skullcap; helmet-flowers	E	T
Selaginella eatonii	Pygmy spikemoss	E	
Silene polypetala	Fringed campion; fringed catchfly	E	E
Sphenomeris clavata	Parsley (=wedgelet) fern	E	
Sphenostigma coelestina	Bartram's ixia	E	
Spigelia gentianoides	Gentian (=panhandle) pinkroot	E	E
Spigelia loganioides	Florida (=Levy) pinkroot	E	
Spiranthes adnata	Pelexia	E	
Spiranthes brevilabris	Florida ladies' tresses	E	
Spiranthes costaricensis	Costa Rican ladies' tresses	E	
Spiranthes elata	Tall neottia	E	
Spiranthes laciniata	Lace-lip ladies' tresses	T	
Spiranthes longilabris	Long-lip ladies' tresses	T	
Spiranthes ovalis	Oval ladies' tresses	E	
Spiranthes polyantha	Florida Keys (=green) ladies' tresses	E	
Spiranthes torta	Southern ladies' tresses	E	
Spiranthes tuberosa	Little ladies' tresses; little pearl twist	T	
Stachydeoma araveolens	Mock pennyroyal	E	
Stachys crenata	Shade betony	E	

Scientific Name	Common Name(s)	Designated Status GFC	FWS
Stachys tenuifolia	Narrow-leaved betony	E	
Staphylea trifolia	Bladdernut	E	
Stenorrhynchos lanceolata	Leafless beak orchid	T	
Stewartia malacodendron	Silky camellia	E	
Strumpfia maritima	Pride-of-big-pine	E	
Stylisma abdita	Hidden stylisma	E	
Suriana maritima	Bay cedar	E	
Swietenia mahogani	West Indian mahogany	E	
Taxus floridana	Florida yew	E	
Tectaria coriandrifolia	Hairy (=Hattie Bauer) halberd fern	E	
Tectaria heracleifolia	Broad halberd fern	T	
Tectaria fimbriata (=T. lobata)	Least halberd fern	E	
Tephrosia angustissima	Narrow-leaved (=coastal) hoary pea	E	
Tetrazygia bicolor	Tetrazygia	T	
Thalictrum cooleyi	Cooley's meadowrue	E	E
Thalictrum thalictroides	Rue anemone	E	
Thelypteris augescens	Abrupt-tipped maiden fern	T	
Thalypteris grandis	Collier County maiden fern	E	
Thelypteris patens	Grid-scale maiden fern	E	
Thelypteris reptans	Creeping star-hair fern	E	
Thelypteris reticulata	Lattice-vein (=cypress) fern	E	
Thelypteris sclerophylla	Stiff star-hair fern	E	
Thelypteris serrata	Dentate lattice vein fern	E	
Thrinax morrissi	Brittle thatch palm	E	
Thrinax radiata	Florida thatch palm	E	
Tillandsia balbisiana	Inflated (=reflexed) wild pine	T	
Tillandsia fasciculata	Common (=stiff-leaved) wild pine	E	
Tillandsia flexuosa	Twisted and banded air plant	E	
Tillandsia pruinosa	Fuzzy-wuzzy (=hoary) air plant	E	
Tillandsia utriculata	Giant wild pine; giant air plant	E	
Tillandsia valenzuelana	Soft-leaved wild pine	T	
Tipularia discolor	Crane-fly orchid	T	
Torreya taxifolia	Florida torreya	E	E
Tournefortia gnaphalodes	Sea lavender	E	
Tragia saxicola	Florida keys (=rocklands) noseburn	E	
Trichomanes holopterum	Entire winged bristle fern	E	
Trichomanes krausii	Krause's bristle fern	E	
Trichomanes lineolatum	Lined bristle fern	E	
Trichomanes punctatum	Florida bristle fern	E	
Trillium lancifolium	Lance-leaved wake-robin	E	
Triphora craigheadii	Craighead's nodding-caps	E	
Triphora latifolia	Broad-leaved nodding-caps	E	
Triphora trianthophora	Three-birds orchid	T	
Tripsacum floridanum	Florida tripsacum	E	

Scientific Name	Common Name(s)	Designated Status GFC	FWS
Tropidia polystachya	Young-palm orchid	E	
Vanilla barbellata	Worm-vine orchid; link vine	E	
Vanilla dilloniana	Leafless (=Dillon's) vanilla	E	
Vanilla mexicana	Unscented vanilla	E	
Vanilla phaeantha	Leafy (=oblong-leaved) vanilla	E	
Vanilla planifolia	Commercial vanilla	E	
Veratrum woodii	Woods' false hellebore	E	
Verbena maritima	Coastal vervain	E	
Verbena tampensis	Tampa vervain	E	
Verbesina chapmanii	Chapman's crownbeard	T	
Vicia ocalensis	Ocala vetch	E	
Viola tripartita	Yellow violet	E	
Warea amplexifolia	Clasping (=wide-leaf) warea	E	E
Warea carteri	Carter's mustard	E	E
Xanthorhiza simplicissima	Yellowroot	E	
Xyris longisepala	Kral's (=karst pond) yellow-eyed grass	E	
Xyris scabrifolia	Harper's (=harsh-leaf) yellow-eyed grass	T	
Zamia floridana	Florida coontie	C	
Zamia integrifolia	Florida arrowroot	C	
Zamia umbrosa	East coast coontie	C	
Zanthoxylum americanum	Prickly ash	E	
Zanthoxylum coriaceum	Leathery prickly ash	E	
Zanthoxylum flavum	Yellowheart	E	
Zephyranthes atamasco	Rain lily	T	
Zephyranthes simpsonii	Simpson's zephyr lily	T	
Zephyranthes treatiae	Treat's zephyr lily	T	
Zigadenus leimanthoides	Coastal death camas	E	
Ziziphus celata	Florida (=scrub) jujube	E	E

Table 5. CATALOG OF NATURAL ECOLOGICAL COMMUNITIES BY SITE LOCATION

In 1996, KBN, A Golder Associates Company, submitted a report to the Alachua County Department of Planning and Development entitled "Alachua County Ecological Inventory Project". This report identified, inventoried, map described and evaluated the most significant natural biological communities, both upland and wetland, that remain in private ownership in Alachua County and made recommendations for protecting these natural resources. The location of these sites is shown on the Ecological Inventory Map . The communities found at each site include:

Prairie Creek. Hydric, mesic, and xeric hammock, mesic and scrubby flatwoods, strand swamp, baygall, scrub, blackwater stream, swamp lake, basin marsh, cypress dome.

Hickory Sink. Upland pine forest, xeric hammock, terrestrial and aquatic cave, sinkhole, sinkhole lake.

Hague Flatwoods. Mesic flatwoods, basin swamp, dome swamp and baygall.

Austin Cary Flatwoods. Mesic flatwoods, dome swamp and basin swamp.

Fox Pond. Upland mixed forest.

Buck Bay Flatwoods. Mesic flatwoods, basin swamp, baygall, dome swamp and wet flatwoods.

East San Felasco Hammock. Mesic hammock.

Hogtown Prairie-Sugarfoot. Calcarious Mesic hammock, prairie hammock, wet prairie, and floodplain swamp.

Hatchet Creek. Mesic flatwoods, sandhill, blackwater stream, floodplain swamp, baygall, hydric and mesic hammock.

Kanapaha Prairie. Mesic hammock, sandhill, wet prairie, basin marsh, sinkhole, sinkhole lake, upland pine forest.

Gum Root Swamp. Mesic, wet, and scrubby flatwoods, sandhill, basin swamp.

East Side Greenway (Morningside Greenway). Mesic flatwoods, upland mixed forest, basin swamp.

East Side Newnans Lake. Mesic flatwoods, lake shore swamp and hydric hammock.

Millhopper Flatwoods. Mesic flatwoods, basin swamp, baygall.

Fred Bear Hammock. Mesic hammock, sinkhole, sinkhole lake, seepage stream.

Buzzard's Roost. Mesic hammock, seepage stream, sinkhole, floodplain forest.

North San Felasco Hammock. Mesic hammock, sinkhole lake, seepage stream.

Serenola Forest. Mesic hammock, sinkhole, sinkhole lake.

Paynes Prairie West. Mesic and hydric hammock, sandhill, upland pine forest, wet, scrubby, and mesic flatwoods, baygall.

Kincaid Flatwoods. Wet flatwoods.

Table 7. Gainesville Area Parks

Park	Address	Type of Park	Owner	Acres	Active	Passive	Land	Water	Basketball Hoops	Tennis	Racquetball	Hardball	Softball	Soccer	Pool	Gym	Playground	Picnic Tables	Trail Miles	Restrooms	Rec Center
Boulware Springs	3500 Blk. SE 15th St.	Community-U	City	103.3	67.30	36.00	103.30	0.00										4		●	
Citizen	1400 NE 8th Ave	Community	City	31.0	31.00	0.00	31.00	0.00	6					3	50M			3		●	●
Forest Park	SW 20th Ave&SW 43rd	Community-U	County	24.7	24.70	0.00	24.70	0.00						2							
Greentree	1900 NW 39th Ave.	Community-U	City	21.0	21.00	0.00	21.00	0.00	2			1	1				●	5		●	
Kanapaha Park	4000 blk SW 75th St	Community-U	County	23.0	23.00	0.00	23.00	0.00	1			1		2			●		0.75		
Northeast	501 NE 16th Ave.	Community	City	23.2	23.20	0.00	23.20	0.00		4	4	2	1	1			●	8	2.5	●	
Northside	NW 34th St. & US 441	Community-U	City	34.5	34.50	0.00	34.50	0.00		4	4						●	3		●	
Possum Creek	4000 blk NW 53 Ave	Community-U	City	80.0	40.00	40.00	80.00	0.00													
Squirrel Ridge	Williston Rd & SW 17th	Community-U	County	16.8	16.80	0.00	16.80	0.00						1			●				
T.B. McPherson	1717 SE 15th St.	Community	City	15.0	15.00	0.00	15.00	0.00	4	4	2		2		25 yd		●	15		●	●
Westside	1001 NW 34 St	Community	City	26.3	26.30	0.00	26.30	0.00	4	8	4	1	2		50M		●	16	1.5	●	●
Audubon Colclough	Williston Rd. Annex	Local Nature	Private	38.0	0.00	38.00	26.40	11.60											1		
Bivens Arm Nature	3650 S. Main St.	Local Nature	City	56.0	0.00	56.00	14.00	42.00										4	1	●	
Kanapaha Botanical	4625 SW 63rd Blvd.	Local Nature	County	62.0	0.00	62.00	62.00	0.00										4	3	●	
Lake Alice	Museum Rd. - U of F	Local Nature	State	120.0	0.00	120.00	10.00	110.00										3	0.5		
Loblolly Env Educ Fac	3300 blk NW 5th Ave	Local Nature	City	108.0	0.00	108.00	108.00	0.00										1		●	●
Morningside Nature	3540 E. University Ave.	Local Nature	City	277.6	0.00	277.59	277.59	0.00										23	7	●	
Ring Park	2000 NW 16 Ave	Local Nature	City	19.3	0.00	19.26	19.26	0.00										12	1	●	
San Felasco County Park	NW 43rd St, N. of 53rd	Local Nature	County	194.0	0.00	194.00	194.00	0.00									●				
Colclough Nature Park	2600 S. Main Street	Conservation	City	5.0	0.00	4.96	3.46	1.50													
Gum Root Swamp	6000 blk NE 39th Ave	Conservation	City	741.0	0.00	741.00	631.00	110.00											1		
HG #1	2400 NW 8th Ave	Conservation	City	113.7	0.00	113.69	113.69	0.00													
HG #2	2219 NW 34th St	Conservation	City	11.2	0.00	11.21	11.21	0.00													
HG #3	5200 NW 2nd Ave	Conservation	City	16.3	0.00	16.31	16.31	0.00													
HG #4 (Driggers)	N.W. 29th Rd (1500-blk)	Conservation	City	6.0	0.00	6.00	6.00	0.00													
Hatchet Creek	SR 24 S of NE 49th Rd.	Conservation	City	6.0	0.00	6.00	6.00	0.00													
Kanap. Addition (Davis et a	East of Kanap. Gardens	Conservation	City	20.5	0.00	20.50	20.50	0.00													
Lake Kanapaha	4625 SW 63 Blvd	Conservation	County	453.4	0.00	453.37	150.00	303.37													
Palm Point	Newnan's Lake	Conservation	City	16.1	0.00	4.59	4.59	11.51													
Sugarfoot Hammock	S.W. 20th Ave (6200-bl	Conservation	City	333.0	0.00	333.00	333.00	0.00													
Terwilliger Pond	400 SW 62nd St.	Conservation	City	24.0	0.00	24.00	20.00	4.00													
Sweetwater/Matheson G-w	NE Boulevard	Linear	City	1	1	0.00	1	0.00											1		
G-ville-Hawthorne RailTrail	Boulware Spgs/Paynes Pr	Linear	State	17	17	0.00	17	0.00											17		
Waldo Rail Trail	Waldo Road	Linear	State	8	8	0.00	8	0.00											8		
A.N.N.E.	6244 N.W. 28th Terr.	Mini	City	0.9	0.91	0.00	0.91	0.00	2								●	3			
Grandmother's	405 SW 5th Ave	Mini	City	0.3	0.30	0.00	0.30	0.00													
Kiwanis	NW 8th St & 8th Ave	Mini	City	2.3	2.30	0.00	2.30	0.00									●	12			

1/25/01

SOURCE: City of Gainesville [illegible]tment of Community Development

Table 7. Gainesville Area Parks

Park	Address	Type of Park	Owner	Acres	Active	Passive	Land	Water	Basketball Hoops	Tennis	Racquetball	Hardball	Softball	Soccer	Pool	Gym	Playground	Picnic Tables	Trail Miles	Restrooms	Rec Center
Lynch	450 S. Main St	Mini	City	1.4	1.40	0.00	1.40	0.00										3			
Mini Park #01	NE 15th St. & 4th Ave.	Mini	City	1.0	1.02	0.00	1.02	0.00	2								●	1			
Mini Park #02	SE 9th St. & 8th Ave.	Mini	City	0.5	0.50	0.00	0.50	0.00									●	3			
Mini Park #03	510 NW 2nd St.	Mini	City	1.0	1.00	0.00	1.00	0.00									●	3			
Mini Park #04	424 NW 6th Ave	Mini	City	0.2	0.18	0.00	0.18	0.00									●				
Mini Park #05	1352 SE 2nd St	Mini	City	0.6	0.60	0.00	0.60	0.00									●				
Mini Park #06	NW 31st Pl & 20th St.	Mini	City	0.4	0.40	0.00	0.40	0.00	2								●	1			
Mini Park #07	318 SW 7th Pl.	Mini	City	0.2	0.20	0.00	0.20	0.00									●				
Mini Park #08	NE 8th Ave. & 15th Terr.	Mini	Private	0.2	0.15	0.00	0.15	0.00									●				
Mini Park #09	820 NW 4th Ave	Mini	City	0.1	0.13	0.00	0.13	0.00									●				
~~Mini Park #10~~	~~1110 NE 25th St.~~	~~Mini~~	~~City~~	~~0.3~~	~~0.25~~	~~0.00~~	~~0.25~~	~~0.00~~	~~2~~												
Mini Park #11	~~1151 NE 21 St~~/ Cdr Gro	Mini	City	1.3	0.00	0.00	1.30	0.00													
Mini Park #12	2445 NE 12 Ave	Mini	City	0.5	0.50	0.00	0.50	0.00													
Oak Hill	NW 9th St. & NW 42nd	Mini	City	0.3	0.27	0.00	0.27	0.00													
Roper Park	NE 2nd St. & NE 4th Av	Mini	City	1.5	1.50	0.00	1.50	0.00									●	4			
S.Foster Mini Park	3336 NW 12th St	Mini	Private	1.4	1.41	0.00	1.41	0.00									●	3	0.21		
Cone	2601 E. University Ave.	Neigh'd	City	90.0	28.00	62.00	90.00	0.00	4			1					●	4		●	
Copeland Settlement	NE 27th Ave & 70th St	Neigh'd	County	5.0	5.00	0.00	5.00	0.00	1			1					●	14			
Green Acres	SW 6th Pl. & 40th St.	Neigh'd	City	37.0	20.03	17.00	37.03	0.00													
NE Liaison Center	1701 NE 8th Ave.	Neigh'd	City	0.5	0.53	0.00	0.53	0.00	2											●	●
NE 31st Avenue	NE 31st Ave. & 17th Ter	Neigh'd	City	1.4	1.40	0.00	1.40	0.00	4	2							●				
~~NW #1~~	~~2730 NW 39th Ave~~	~~Neigh'd~~	~~City~~	~~12.0~~	~~12.00~~	~~0.00~~	~~12.00~~	~~0.00~~													
Rosa Williams	524 NW 1st St. & 6th A	Neigh'd	City	0.9	0.90	0.00	0.90	0.00	4								●				●
Sharmie Ffar / W. Johnson	321 NW 10th Street	Neigh'd	City	0.7	0.73	0.00	0.73	0.00	1								●	4		●	●
Smokey Bear	2600 NE 15th St.	Neigh'd	City	4.5	4.50	0.00	4.50	0.00									●	6			
Springtree	2800 NW 39th Ave	Neigh'd	City	12.0	12.00	0.00	12.00	0.00										4		●	●
Thelma Boltin Center	516 NE 2nd Ave.	Neigh'd	City	1.0	1.02	0.00	1.02	0.00									●	8	1.5		
Tumblin Creek	SW 6th St. & Depot Ave	Neigh'd	City	4.2	4.18	0.00	4.18	0.00	4												
WA #1	900 blk SE 5th Ave	Neigh'd	City	3.8	3.00	0.80	3.80	0.00													
Woodland	1900 SE 4th St.	Neigh'd	City	5.3	5.31	0.00	5.31	0.00	4			1		1			●	4		●	
AQ Jones Center	1108 NW 7th Ave.	Neigh'd	SBAC	4.4	4.41	0.00	4.41	0.00	4			1		1			●				
Bishop Middle Sch	1901 NE 9th St.	Neigh'd	SBAC	8.0	8.00	0.00	8.00	0.00	4			1		1		●	●				
Buchholz High	5510 NW 27th Ave.	Neigh'd	SBAC	17.6	17.60	0.00	17.60	0.00				2		1		●					
Duval Elementary	2106 NE 8th Ave.	Neigh'd	SBAC	8.2	8.20	0.00	8.20	0.00	4			1					●				
East Side High	1201 SE 45th Terr.	Neigh'd	SBAC	29.0	29.00	0.00	29.00	0.00		2		2		1		●					
Finley Elementary	1912 NW 5th Ave.	Neigh'd	SBAC	17.0	17.00	0.00	17.00	0.00	4			1		1			●				
Ft. Clarke Middle Sch	9301 NW 23rd Ave.	Neigh'd	SBAC	14.1	14.11	0.00	14.11	0.00	2	2		1				●					
Gainesville High	1900 NW 13th St.	Neigh'd	SBAC	8.1	8.06	0.00	8.06	0.00				2		1		●					
Glen Springs Elementary	2826 NW 31st Ave	Neigh'd	SBAC	8.8	8.80	0.00	8.80	0.00	1			1					●				

1/25/01

SOURCE: City of Gainesville, Department of Community Development

Table 7. Gainesville Area Parks

Park	Address	Type of Park	Owner	Acres	Active	Passive	Land	Water	Basketball Hoops	Tennis	Racquetball	Hardball	Softball	Soccer	Pool	Gym	Playground	Picnic Tables	Trail Miles	Restrooms	Rec Center
Hidden Oak Elementary	9205 NW 23rd Ave	Neigh'd	SBAC	7.0	5.00	2.00	7.00	0.00	4								●	12			
Idylwild Elementary	4601 SW 20th Terr.	Neigh'd	SBAC	11.7	11.69	0.00	11.69	0.00	1	1							●				
Kanapaha Middle Sch	5005 SW 75th St.	Neigh'd	SBAC							1		1	1	2		●					
Kirby Smith	619 E. University Ave.	Neigh'd	SBAC	4.0	4.00	0.00	4.00	0.00	2								●				
Lake Forest Elementary	427 SE 43rd St.	Neigh'd	SBAC	11.8	11.80	0.00	11.80	0.00	1	?	?	1					●				
Lincoln/Williams	1001 SE 12th St.	Neigh'd	SBAC-P	28.7	28.70	0.00	28.70	0.00		1		1	1	8		●	●	3			
Littlewood Elementary	812 NW 34th St.	Neigh'd	SBAC	7.0	7.00	0.00	7.00	0.00	4					1			●				
Metcalfe Elementary	1905 NE 12th St.	Neigh'd	SBAC	9.7	9.70	0.00	9.70	0.00	2			1		1			●				
Norton Elementary	2200 NW 45th Ave	Neigh'd	SBAC	4.5	4.50	0.00	4.50	0.00	2								●				
Prairie View Elem.	1801 SE 32nd Place	Neigh'd	SBAC	11.0	11.00	0.00	11.00	0.00	1	1		1					●				
Rawlings Elementary	3500 NE 15th St.	Neigh'd	SBAC	18.0	18.00	0.00	18.00	0.00	2	1							●				
Sidney Lanier Center	312 NW 16th Ave.	Neigh'd	SBAC	7.3	7.30	0.00	7.30	0.00	2			1					●				
Stephen Foster Elementary	3800 NW 6th St.	Neigh'd	SBAC	9.8	9.80	0.00	9.80	0.00	2	1		1		1			●				
Talbot Elementary	5701 NW 43rd St.	Neigh'd	SBAC	6.6	6.57	0.00	6.57	0.00	2					1			●				
Terwilliger Elementary	301 NW 62nd St.	Neigh'd	SBAC	7.7	7.73	0.00	7.73	0.00	2								●				
Westwood Middle School	3215 NW 15th Ave.	Neigh'd	SBAC	8.0	8.00	0.00	8.00	0.00	4			2		1		●	●				
Wiles Elementary	4601 SW 75th St.	Neigh'd	SBAC	6.9	6.92	0.00	6.92	0.00	4					1			●				
Williams Elementary	1245 SE 7th Ave.	Neigh'd	SBAC	3.8	3.80	0.00	3.80	0.00	4			1					●				
Yonge (P.K.)	1080 SW 11th Ave.	Neigh'd	State	12.7	12.70	0.00	12.70	0.00	2	2		1		1		●	●				
Boys Club NW	2700 NW 51st St.	Neigh'd	Private	15.0	15.00	0.00	15.00	0.00	5	2		3		1		●	●	3	0.75	●	
Boys Club SE	1100 SE 17th Drive	Neigh'd	Private	6.2	6.26	0.00	6.26	0.00	6					1		●					
Girls Club	2101 NW 39th Ave.	Neigh'd	Private	5.2	5.20	0.00	5.20	0.00					1	1		●	●	8		●	●
Devil's Millhopper	4732 NW 53rd Ave.	Regional	State	259.0	0.00	259.00	259.00	0.00										6	0.5	●	
Paynes Prairie	US 441 & SR 121	Regional	State	######	0.00	######	######	374.56									●	23	15	●	
Prairie Creek Park	7200 SE Hawthorne Rd	Regional	WMD	202.5	0.00	202.50	202.50	0.00													
San Felasco Hammock	c/o Devil's Millhopper	Regional	State	6010.5	0.00	6010.46	6010.46	0.00											1.25		
Archery Range	Off State Rd. 24 - Airport	Special	City	100.0	100.00	0.00	100.00	0.00										1		●	
Community Plaza	101 E. University Ave.	Special	City	1.2	1.21	0.00	1.21	0.00												●	
Gainesville Golf	7300 SW 35th Way	Special	Private	140.0	140.00	0.00	140.00	0.00		2					21M					●	●
Ironwood Golf Club	2100 NE 39th Ave.	Special	City	122.0	122.00	0.00	122.00	0.00												●	●
Newnan's Lake	SR 20-Boat Launch	Special	County	6339.7	6339.68	0.00	11.68	6328.00									●	16		●	
Santa Fe C.C.	3000 NW 83rd St.	Special	State	20.0	20.00	0.00	20.00	0.00	1	8	8	1	~~2~~ 1	1		●			4	●	
Thomas Center Gardens	306 NE 6 th Ave	Special	City	6.2	6.20	0.00	6.20	0.00												●	
University of Florida	University of Florida	Special	State	238.0	238.00	0.00	238.00	0.00	5	~~40~~ 32	~~30~~ 15		~~14~~ 4	~~16~~ 8	46M	●		?	2.5	●	●

NOTE: SBAC schools are not officially considered public parks. Such schools provide only limited public access for recreation. This access is typically during evenings and weekends, and only when not in use for SBAC programs. They are inventoried solely for the purpose of determining neighborhood-level recreational levels-of-service.

SOURCE: City of Gainesville, Department of Community Development

Table 8: Invasive Exotic Plants
Florida Exotic Pest Plant Council's 1999 List of Invasive Species:

Florida Exotic Pest Plant Council's
1999
List of Florida's Most Invasive Species

Purpose: *To focus attention on:*

1. The impacts exotic pest plants have on native bio-diversity in Florida ecosystems.
2. The impact of exotic pest plants on the integrity of native plant community functions.
3. Habitat losses due to exotic plant infestations.
4. The impacts of exotic plants on endangered species via habitat loss and alteration (e.g., Cape Sable seaside sparrow).
5. The need to prevent such losses by comprehensive management for exotic pest plants.
6. The socioeconomic impacts of exotic pest plants (e.g., increased wildfires in *Melaleuca*).
7. Changes in the seriousness of different exotic pest plants over time.
8. The need to provide information that will help managers set priorities for management.

Definitions: *Exotic*–a non-indigenous species, or one introduced to this state, either purposefully or accidentally. A naturalized exotic, such as those listed here, has escaped into the wild where it reproduces on its own either sexually or asexually. *Native*–a species already occurring in Florida at the time of European contact (1500). *Invasive*– a variable condition defined by the category to which the species is assigned.

Abbreviations used: for "Government listed": P=Prohibited by Fla. Dept. of Environmental Protection, N=Noxious weed as listed by Fla. Dept. of Agriculture & Consumer Services and/or U.S. Department of Agriculture.

For information on distributions within Florida, see:
http://www.usf.edu/~isb/projects/atlas/mapindex.html

For other information:
Langeland, K. A. and K. Craddock Burks (editors). 1999. Identification & Biology of Non-native Plants in Florida's Natural Areas. Production is supported by 14 federal and private agencies, including Florida EPPC.

Category I–Species that are invading and disrupting native plant communities in Florida. *This definition does not rely on the economic severity or geographic range of the problem, but on the documented ecological damage caused.*

Scientific Name	***Common Name***	***FLEPPC Rank***	***Government Listed***
Abrus precatorius	*rosary pea*	*I*	
Acacia auriculiformis	*earleaf acacia*	*I*	
Albizia julibrissin	*mimosa, silk tree*	*I*	
Albizia lebbeck	*woman's tongue*	*I*	
Ardisia crenata (= A. crenulata)	*coral ardisia*	*I*	
Ardisia elliptica (=A. humilis)	*shoebutton ardisia*	*I*	
Asparagus densiflorus	*asparagus-fern*	*I*	
Bauhinia variegata	*orchid tree*	*I*	
Bischofia javanica	*bischofia*	*I*	

Calophyllum antillanum (=C. calaba; C. inophyllum, often misapplied in cultivation)	*santa maria (names "mast wood," "Alexandrian laurel" used in cultivation)*	*I*	
Casuarina equisetifolia	*Australian pine*	*I*	*P*
Casuarina glauca	*suckering Australian pine*	*I*	*P*
Cestrum diurnum	*day jessamine*	*I*	
Cinnamomum camphora	*camphor-tree*	*I*	
Colocasia esculenta	*wild taro*	*I*	
Colubrina asiatica	*lather leaf*	*I*	
Cupaniopsis anacardioides	*carrotwood*	*I*	*N*
Dioscorea alata	*winged yam*	*I*	*N*
Dioscorea bulbifera	*air-potato*	*I*	*N*
Eichhornia crassipes	*water-hyacinth*	*I*	*P*
Eugenia uniflora	*Surinam cherry*	*I*	
Ficus microcarpa (F. nitida andF. retusa var. nitida misapplied)	*laurel fig*	*I*	
Hydrilla verticillata	*hydrilla*	*I*	*P, N*
Hygrophila polysperma	*green hygro*	*I*	*P, N*
Hymenachne amplexicaulis	*West Indian marsh grass*	*I*	
Imperata cylindrica (Imperata brasiliensis misapplied)	*cogon grass*	*I*	*N*
Ipomoea aquatica	*waterspinach*	*I*	*P, N*
Jasminum dichotomum	*Gold Coast jasmine*	*I*	
Jasminum fluminense	*Brazilian jasmine*	*I*	
Lantana camara	*lantana, shrub verbena*	*I*	
Ligustrum sinense	*Chinese privet, hedge privet*	*I*	
Lonicera japonica	*Japanese honeysuckle*	*I*	
Lygodium japonicum	*Japanese climbing fern*	*I*	*N*
Lygodium microphyllum	*Old World climbing fern*	*I*	*N*
Macfadyena unguis-cati	*cat's claw vine*	*I*	
Melaleuca quinquenervia	*melaleuca, paper bark*	*I*	*P, N*
Melia azedarach	*Chinaberry*	*I*	
Mimosa pigra	*catclaw mimosa*	*I*	*P,N*
Nandina domestica	*nandina, heavenly bamboo*	*I*	
Nephrolepis cordifolia	*sword fern*	*I*	
Nephrolepis multiflora	*Asian sword fern*	*I*	
Neyraudia reynaudiana	*Burma reed; cane grass*	*I*	*N*
Paederia cruddasiana	*sewer vine, onion vine*	*I*	*N*
Paederia foetida	*skunk vine*	*I*	*N*
Panicum repens	*torpedo grass*	*I*	
Pennisetum purpureum	*Napier grass*	*I*	
Pistia stratiotes	*water lettuce*	*I*	*P*
Psidium cattleianum (=P. littorale)	*strawberry guava*	*I*	
Psidium guajava	*guava*	*I*	
Pueraria montana (=P.	*kudzu*	*I*	*N*

lobata)			
Rhodomyrtus tomentosa	*downy rose-myrtle*	*I*	*N*
Rhoeo spathacea (=R. discolor; Tradescantia spathacea)	*oyster plant*	*I*	
Sapium sebiferum	*popcorn tree, Chinese tallow tree*	*I*	*N*
Scaevola sericea (=Scaevola taccada var. sericea, S. frutescens)	*scaevola, half-flower, beach naupaka*	*I*	
Schefflera actinophylla (=Brassaia actinophylla)	*schefflera, Queensland umbrella tree*	*I*	
Schinus terebinthifolius	*Brazilian pepper*	*I*	*P, N*
Senna pendula (=Cassia coluteoides)	*climbing cassia, Christmas cassia, Christmas senna*	*I*	
Solanum tampicense (=S. houstonii)	*wetland night shade, aquatic soda apple*	*I*	*N*
Solanum torvum	*susumber, turkey berry*	*I*	*N*
Solanum viarum	*tropical soda apple*	*I*	*N*
Syzygium cumini	*jambolan, Java plum*	*I*	
Tectaria incisa	*incised halberd fern*	*I*	
Thespesia populnea	*seaside mahoe*	*I*	
Tradescantia fluminensis	*white-flowered wandering jew*	*I*	
Urochloa mutica (= Brachiaria mutica)	*Pará grass*	*I*	

Category II—*Species that have shown a potential to disrupt native plant communities. These species may become ranked as Category I, but have not yet demonstrated disruption of natural Florida communities.*

Scientific Name	***Common Name***	***FLEPPC Rank***	***Government Listed***
Adenanthera pavonina	*red sandalwood*	*II*	
Agave sisalana	*sisal hemp*	*II*	
Aleurites fordii	*tung oil tree*	*II*	
Alstonia macrophylla	*devil-tree*	*II*	
Alternanthera philoxeroides	*alligator weed*	*II*	*P*
Anredera leptostachya	*Madeira vine*	*II*	
Antigonon leptopus	*coral vine*	*II*	
Aristolochia littoralis	*calico flower*	*II*	
Asystasia gangetica	*Ganges primrose*	*II*	
Begonia cucullata	*begonia*	*II*	
Broussonetia papyrifera	*paper mulberry*	*II*	
Callisia fragrans	*inch plant, spironema*	*II*	
Casuarina cunninghamiana	*Australian pine*	*II*	*P*
Cereus undatus (=Hylocereus undatus)	*night-blooming cereus*	*II*	
Clerodendrum bungei	*strong-scented glorybower*	*II*	

Cryptostegia madagascariensis	*rubber vine*	*II*	
Cyperus alternifolius (=C. involucratus)	*umbrella plant*	*II*	
Cyperus prolifer	*dwarf papyrus*	*II*	
Dalbergia sissoo	*Indian rosewood, sissoo*	*II*	
Eleagnus pungens	*thorny eleagnus*	*II*	
Enterolobium contortisilquum	*ear-pod tree*	*II*	
Epipremnum pinnatum cv. Aureum	*pothos*	*II*	
Ficus altissima	*false banyan*	*II*	
Flacourtia indica	*governor's plum*	*II*	
Flueggea virosa	*Chinese waterberry*	*II*	
Hibiscus tiliaceus	*mahoe, sea hibiscus*	*II*	
Hiptage benghalensis	*hiptage*	*II*	
Jasminum sambac	*Arabian jasmine*	*II*	
Koelreuteria elegans	*golden rain tree*	*II*	
Leucaena leucocephala	*lead tree*	*II*	
Ligustrum lucidum	*glossy privet*	*II*	
Livistona chinensis	*Chinese fan palm*	*II*	
Melinis minutiflora	*molasses grass*	*II*	
Merremia tuberosa	*wood-rose*	*II*	
Murraya paniculata	*orange-jessamine*	*II*	
Myriophyllum spicatum	*Eurasian water-milfoil*	*II*	*P*
Ochrosia parviflora (=O. elliptica)	*kopsia*	*II*	
Oeceoclades maculata	*ground orchid*	*II*	
Passiflora biflora	*twin-flowered passion vine*	*II*	
Passiflora foetida	*stinking passion-flower*	*II*	
Phoenix reclinata	*Senegal date palm*	*II*	
Phyllostachys aurea	*golden bamboo*	*II*	
Pteris vittata	*Chinese brake*	*II*	
Ptychosperma elegans	*solitary palm*	*II*	
Rhynchelytrum repens	*Natal grass*	*II*	
Ricinus communis	*castor bean*	*II*	
Ruellia brittoniana (=R. tweediana)	*Mexican petunia*	*II*	
Sansevieria hyacinthoides (=S. trifasciata)	*bowstring hemp*	*II*	
Sesbania punicea	*purple sesban, rattlebox*	*II*	
Solanum diphyllum	*twinleaf nightshade*	*II*	
Solanum jamaicense	*Jamiaca nightshade*	*II*	
Syngonium podophyllum	*arrowhead vine*	*II*	
Syzygium jambos	*rose-apple*	*II*	
Terminalia catappa	*tropical almond*	*II*	
Tribulus cistoides	*puncture vine, burnut*	*II*	
Triphasia trifoliata	*lime berry*	*II*	
Urena lobata	*Caesar's weed*	*II*	
Wedelia trilobata	*wedelia*	*II*	

Wisteria sinensis	*Chinese wisteria*	*II*
Xanthosoma sagittifolium	*malanga, elephant ear*	*II*

Citation example:
Florida Exotic Pest Plant Council. FLEPPC 1999 List of Florida's Most Invasive Species. Internet: http://www.fleppc.org/99list.htm

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Conservation, Open Space and Groundwater Recharge Element
Data and Analysis
Petition 175CPA-00 PB
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A-32

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