
Environmental Data & Analysis
Plum Creek Envision Alachua Sector Plan
June 2015
Prepared by
Breedlove, Dennis & Associates, Inc.

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1.0 SECTOR PLAN REQUIREMENTS: F.S. § 163.3245

Pursuant to Florida Statutes (F.S.) § 163.3245, a sector plan must include the adoption of a Long-Term Master Plan (LTMP) with the following components addressing natural resource issues:

1. F.S. 163.3245(3)(a)(1) *"a framework map that, at a minimum, generally depicts areas of urban, agricultural, rural and conservation land use"*;
2. F.S. 163.3245(3)(a)(5) *"a general identification of regionally significant natural resources within the planning area based on the best available data and policies setting forth the procedures for protection or conservation of specific resources consistent with the overall conservation and development strategy for the planning area"*; and
3. F.S. 163.3245(3)(a)(6) *"general principles and guidelines addressing…the protection and, as appropriate, restoration and management of lands identified for permanent preservation through recordation of conservation easements…which shall be phased or staged in coordination with detailed specific area plans to reflect phased or staged development with the planning area…[and] general principles and guidelines addressing [the protection of] wildlife and natural areas."*

2.0 PLUM CREEK ENVIRONMENTAL PLAN

2.1 Environmental Plan for the Long-Term Master Plan Framework Map

F.S. 163.3245(3)(a)(1) requires *"a framework map that, at a minimum, generally depicts areas of urban, agricultural, rural and conservation land use."* Consistent with this requirement, the proposed LTMP Environmental Plan is presented in Figure 2.1-1. This LTMP Environmental Plan depicts lands within Alachua County for which Plum Creek has proposed long-term protection through the LTMP and subsequent plan implementation pursuant to Section 163.3245, F.S. These natural resource lands will comprise the primary green infrastructure around the actual development on the Plum Creek Property.

The Plum Creek Envision Alachua Sector Plan (EASP) represents a rare chance to design for ecological sustainability at a regional scale, thereby reducing landscape fragmentation, conserving ecosystem integrity, and providing a framework around which to design a compact urban footprint and incorporate infrastructure efficiently. This approach is consistent with the Alachua County Environmental Protection Department's mission "To protect the natural and historic resources of Alachua County and reduce environmental impacts of land development through environmental planning…." The EASP is also consistent with the Alachua County Comprehensive Plan.

2.1.1 Vision for the Environmental Plan

The overarching environmental vision for the Plum Creek LTMP on its 52,745-acre land holding in Alachua County, Florida has evolved from recognition of the long-standing silvicultural nature and use of the lands for timber production, and identification of lands appropriate for additional conservation uses. The vision for the LTMP Environmental Plan considers the broader regional landscape setting within

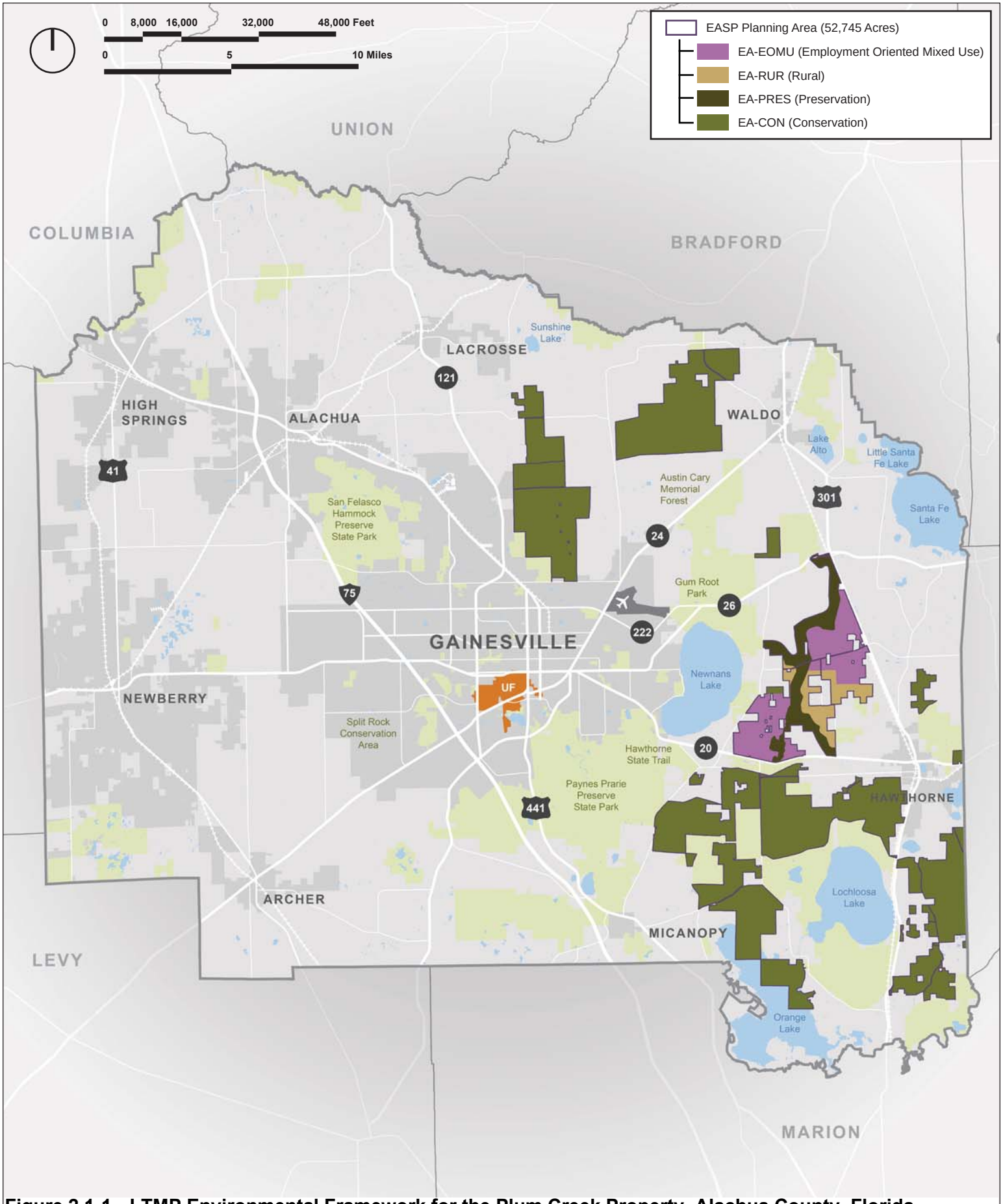


Figure 2.1-1 LTMP Environmental Framework for the Plum Creek Property, Alachua County, Florida

Data Sources: Alachua County GIS, Plum Creek | Updated: 06-2015

which the lands occur; identification of key environmental linkages in the regional landscape; identification of lands appropriate to accommodate future needs of Alachua County for jobs creation centers and expanding population; identification of lands targeted for agricultural uses; and identification of significant environmental resources within lands targeted for urban uses for resource protection and management. All of these elements were identified and studied through the comprehensive *Envision Alachua* experience, which brought together the land owner, stakeholders, concerned citizens, policy makers, governmental regulators, environmental groups, and scientists from numerous disciplines.

2.2 Building the Long-Term Master Plan Environmental Plan

2.2.1 Using Envision Alachua Planning Process as the Foundation

The LTMP Environmental Plan is based on the results of a community-based planning process, which engaged local experts, community groups, and agencies to help guide a vision for future growth and conservation in Alachua County.

Through this collaborative process, the best available data on the historical background of the lands; details of the current existing conditions and land uses; regional environmental and wildlife linkages; and key environmental features such as Lochloosa Creek were identified and brought together into a comprehensive Geographic Information System (GIS) database.

With this technical GIS database upon which to plan, and the informed analysis through the *Envision Alachua* process, appropriate lands for conservation, agricultural, and future urban land uses were identified. Additional key elements of the environmental vision of the LTMP include the recognition of the imperative to seamlessly address the juxtaposition of the various land uses to achieve an overall enhanced and sustainable quality of life for the citizens of Alachua County and the region while

protecting the integrity of each component use. It is also recognized that educational opportunities, both formal and of a continuing nature, are another key element of the environmental vision of the LTMP. Nature is an amenity and will be treated as such, providing environmental protection of key natural resources and wildlife; and recreational and educational opportunities for enjoyment and incorporation into daily life.

The *Envision Alachua* Community Task Force identified compact development as preferential to rural ranchette sprawl in order to preserve open space, maintain the largest contiguous wetland areas practicable, and minimize water and energy use. Concentrating the development area decreases habitat frgamentation, degradation, and isolation of the remaining natural areas. Compact development and open space preservation can also help protect water quality by reducing the amount of paved surfaces and by allowing natural lands to filter runoff before reaching wetlands and surface waters. Additionally, compact communities optimize pedestrian, bicycle, and public transit usages which can reduce air pollution by reducing automobile mileage and traffic. Therefore, the numerous public benefits of compact development may necessitate the federal, state, and local permitting of wetland impacts required during implementation of the LTMP over the next 50 years.

The EASP considers the broader, regional landscape setting within which the totality of the lands occur; identification of key environmental linkages in the regional landscape; identification of lands appropriate to accommodate future needs of Alachua County for jobs creation centers and expanding population; identification of lands targeted for agricultural uses; and identification of significant environmental resources within lands targeted for urban uses for resource protection and management. All wetland and wetland buffer impacts outside of the compact urban development footprint will be avoided and minimized to the greatest extent practicable. Appropriate mitigation will be assessed and provided during

the federal, state, and local permitting process. The economic benefit of 30,000 new jobs, and diversifying and expanding Alachua County's tax base to improve funding for public services establishes the overriding public interest for wetland impacts within the EASP Employment Oriented Mixed Use (EOMU) land use development footprint.

Pursuant to the Federal Clean Water Act Section 404(b)(1) Guidelines Alternatives Requirements for consideration of alternatives as required by 40 Code of Federal Regulations 230.10(a), an alternatives analysis was conducted by the multi-agency *Envision Alachua* public scoping process. Section 404(b)(1) Guidelines provide that "no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences". The location of the EOMU, rural, preservation, and conservation land use categories depicted in the framwork map were carefully selected as the preferred alternative for optimal suitability while providing minimal impact to the surrounding green infrastructure.

The following vision, goal, and principles were developed based on feedback received through the multi-year *Envision Alachua* planning process activities, including Task Force meetings, Technical Advisory Group meetings, and Community Workshops:

> *Environmental Vision:* Support the development of communities that have a balanced and compatible mix of land uses and environmentally sustainable development practices while conserving lands to protect ecosystems, wildlife corridors, and working landscapes.

Environmental Conservation Goal: Protect and retain lands for conservation, habitat protection, and wildlife connectivity.

Planning Principles:

- Develop an ecologically-based plan for Plum Creek lands to connect people to nature
- Support local and state conservation activities that enhance wildlife connectivity
- Retain lands strategically to maximize conservation and recreation opportunities
- Protect habitat for sensitive species, wetlands, and wildlife corridors
- Ensure long-term watershed protection
- Use cluster development techniques and buffers to separate conservation and residential areas
- Help complete the "emerald necklace" around Gainesville
- Develop projects that demonstrate the compatibility of conservation and economic development
- Use a science-based approach to define sensitive areas, habitat, water resources, and other environmental factors
- Use conservation easements to protect ecologically significant portions of proposed project areas

2.3 Attaining the Vision of the Long-Term Master Plan Environmental Plan

Key to attaining this vision is careful planning and development, recognizing that the human-use areas will be embedded within selected portions of the natural environment, the conservation of which is crucial to the character and quality of life of Alachua County. The LTMP Environmental Plan was designed using science-based environmental planning principles to create a green infrastructure for planning

natural linkages, transportation corridors, and other human uses. Plum Creek has helped build upon the *Envision Alachua* concepts, expanded conservation areas throughout the Property to ultimately create a robust and comprehensive LTMP Environmental Plan that protects the long-term viability of key ecosystems, sustains resident wildlife populations, and protects water supplies for the future. The LTMP Environmental Plan is based squarely on the foundations of sustainability, conservation, wise and efficient planning of human uses and recognition of the integral role that agriculture plays in the economy, and cultural heritage of the region. The following is a description of the key components of the LTMP Environmental Plan.

2.3.1 Lochloosa Creek

Lochloosa Creek flows into Lake Lochloosa and is the largest tributary to the lake. From Lake Lochloosa water primarily flows into Orange Creek to the Ocklawaha River. The portion of Lochloosa Creek south of the Property extending from County Road (CR) 20A to Lochloosa Lake was designated an Outstanding Florida Water on December 15, 1987.

The portion of Lochloosa Creek within the Property is bordered by floodplain swamp and has been identified within the Florida Ecological Greenways Network Priority 3 project area known as "Ocala NF-Lochloosa-Paynes Prairie-Newnans Lake". Lochloosa Creek, which generally is oriented north-south through the Property east of Newnans Lake, is perhaps the most significant environmental feature of the Property that is not under conservation easement. The wetlands of Lochloosa Creek have the highest priority ranking in the Critical Lands and Water Identification Project (CLIP) version 3.0 statewide wetlands data layer, and a buffer along the creek received a Priority 2 ranking for protection of surface waters by CLIP.

Approximately 3,538 acres of land extending north-south over 9.4 miles of the Property is proposed for preservation, including a western branch connecting this area to the Newnans Lake Conservation Area. This area includes approximately 1,805 acres of uplands, 1,732 acres of wetlands, and 1 acre of surface water. This area will provide an additional element of protection to this regionally significant ecological corridor. By protecting the creek and key uplands and wetlands that border this important resource, the LTMP Environmental Plan connects to and augments existing public lands and helps to protect the long-term health and integrity of this system.

The Lochloosa Creek corridor has been designated as Preservation Land Use on the Framework map and will be placed placed under a Preservation Management Plan (Figure 2.1-1). This land use designation requires silvicultural activities within the proposed Lochloosa Creek corridor to be excluded as adjacent development is permitted. If determined as appropriate mitigation by state and federal agencies, large areas of suitable upland soils currently in silviculture could be restored to upland hardwood hammocks (pine [*Pinus* spp.] removal, leave hardwood subcanopy, remove bedding). Hydric pine flatwoods and upland pine flatwoods could also be restored (removal of bedding and thinning of pine).

2.3.2 Large Wetland Systems

The LTMP Environmental Plan will also protect large wetland strands and major tributary systems. Protecting large, forested wetland strands provides core habitat that supports numerous native game and non-game species. These large systems have fewer "edge effects" from adjacent development and provide greater resilience due to their size. Large wetland systems buffer creeks on the Property and provide vital connections to off-site ecological areas including numerous public conservation lands.

2.3.3 Landscape Linkages

The LTMP Environmental Plan recognizes the importance of planning for regional-scale spatial and temporal patterns when preserving local natural resources.

The following describes the relationship of the Property to lands in public ownership:

- Balu Forest – the portion of the Property north of State Road (SR) 26 proposed for conservation is bordered to the east by this parcel while the Lochloosa Creek corridor borders the southeast boundary of this parcel which is owned and managed by Alachua County
- Little Orange Creek Nature Park – the portion of the Property in the northeast quadrant of the intersection of SR 20 and US Highway 301 (US 301) proposed for conservation is adjacent to this parcel owned and managed by the City of Hawthorne
- Lochloosa Wildlife Conservation Area – much of the Lochloosa Conservation Easement is contiguous with this parcel of public land owned and managed by St. Johns River Water Management District (SJRWMD)
- Longleaf Flatwoods Reserve – much of the Lochloosa Conservation Easement surrounds and is contiguous with this parcel of public land owned and managed by SJRWMD
- Newnans Lake Conservation Area – portions of the Property north of SR 26 and east of CR 234 are contiguous with this parcel of public land in three places
- Orange Creek Restoration Area – the southeastern-most portion of the Property in the southeast corner of Alachua County is contiguous with this parcel of public land owned and managed by SJRWMD
- Paynes Prairie Preserve State Park – the western-most portion of the Property south of SR 20 is contiguous along its western boundary with this state park, which is owned by the State of Florida

and managed by the Florida Department of Environmental Protection (FDEP), Division of Recreation and Parks

- Phifer Flatwoods – this parcel of public land is immediately south of SR 20 and it is contiguous with the Property north and south of SR 20
- Santa Fe River-AP&E – the portion of the Property north of SR 24 and west of US 301 is bordered to the north by this parcel owned and managed by Alachua County

Landscape linkages contribute to the maintenance of wildlife populations and their viability by providing habitat and serving as conduits for dispersal and gene flow among populations, thus ensuring the long-term persistence of resident species. The LTMP Environmental Plan will protect vital landscape linkages within the Property and connections to regionally-significant ecological areas within Alachua County (Figure 2.3.3-1) and Northern Florida (Figure 2.3.3-2). The LTMP Environmental Plan will also protect large areas including Lochloosa Creek, and the other large-buffered wetlands and tributaries that connect to other priority areas offsite. The LTMP Environmental Plan will protect these large, interconnected wetland and stream systems to accommodate the movement of wildlife populations and help to ensure the long-term persistence of resident wildlife within the "Emerald Necklace" and North Central Florida region.

2.3.4 Silvicultural Lands

Plum Creek plans to continue their sustainable forestry practices, incorporating the perpetual growing and harvesting of trees with the protection of wildlife, plants, soil, and water quality for future generations. Plum Creek's silvicultural operations are recognized as a model for responsible and sustainable environmental management, certified under the Sustainable Forestry Initiative. Silvicultural conservation

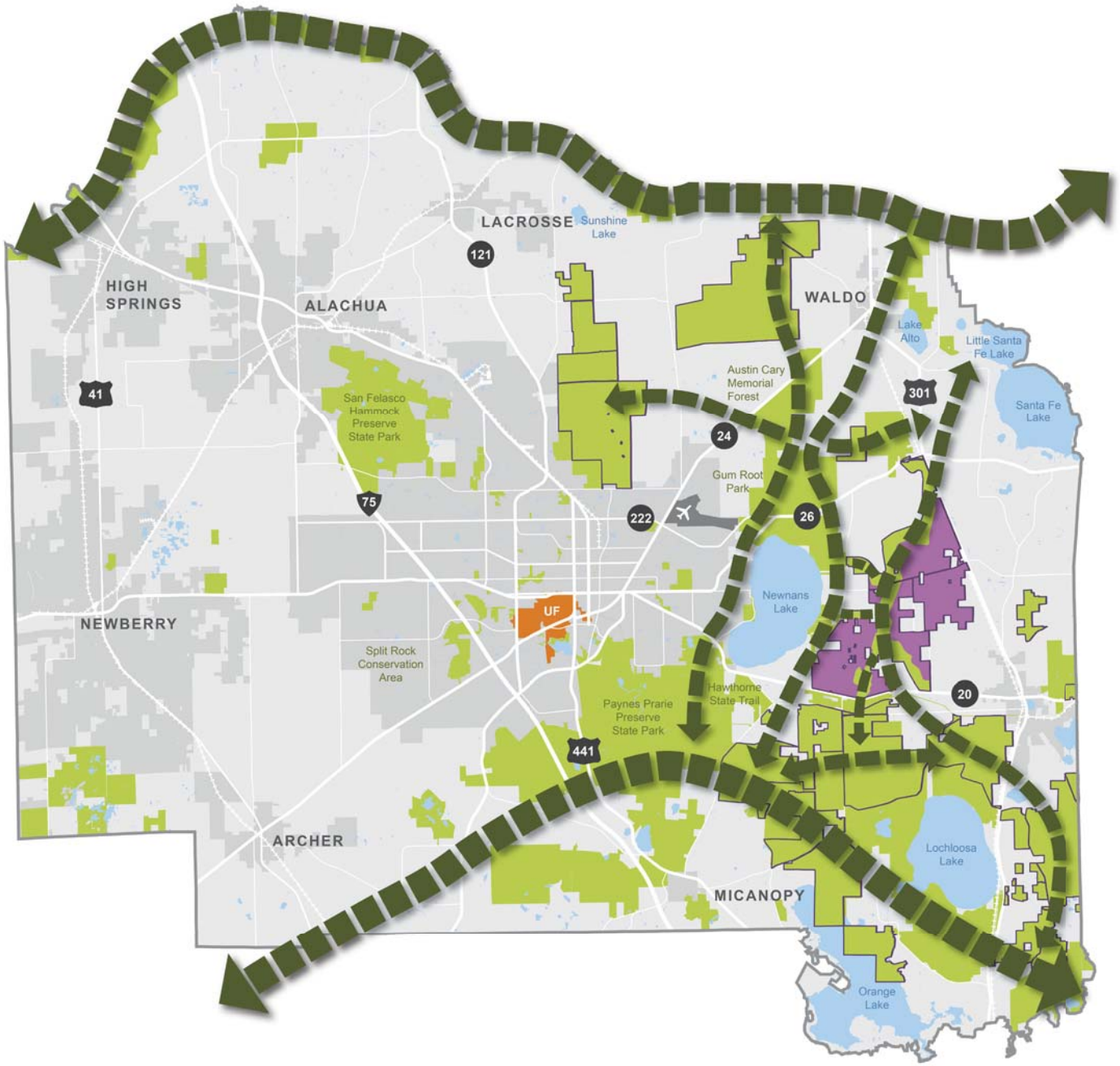


Figure 2.3.3-1 Local Landscape Linkages to the LTMP Environmental Plan

CONSERVATION & PRESERVATION
LANDSCAPE LINKAGES
ENVISION ALACHUA SECTOR PLAN

0 8,000 16,000 32,000 48,000 feet
0 5 10 miles

Data Source: Alachua County GIS, Plum Creek
June 2015

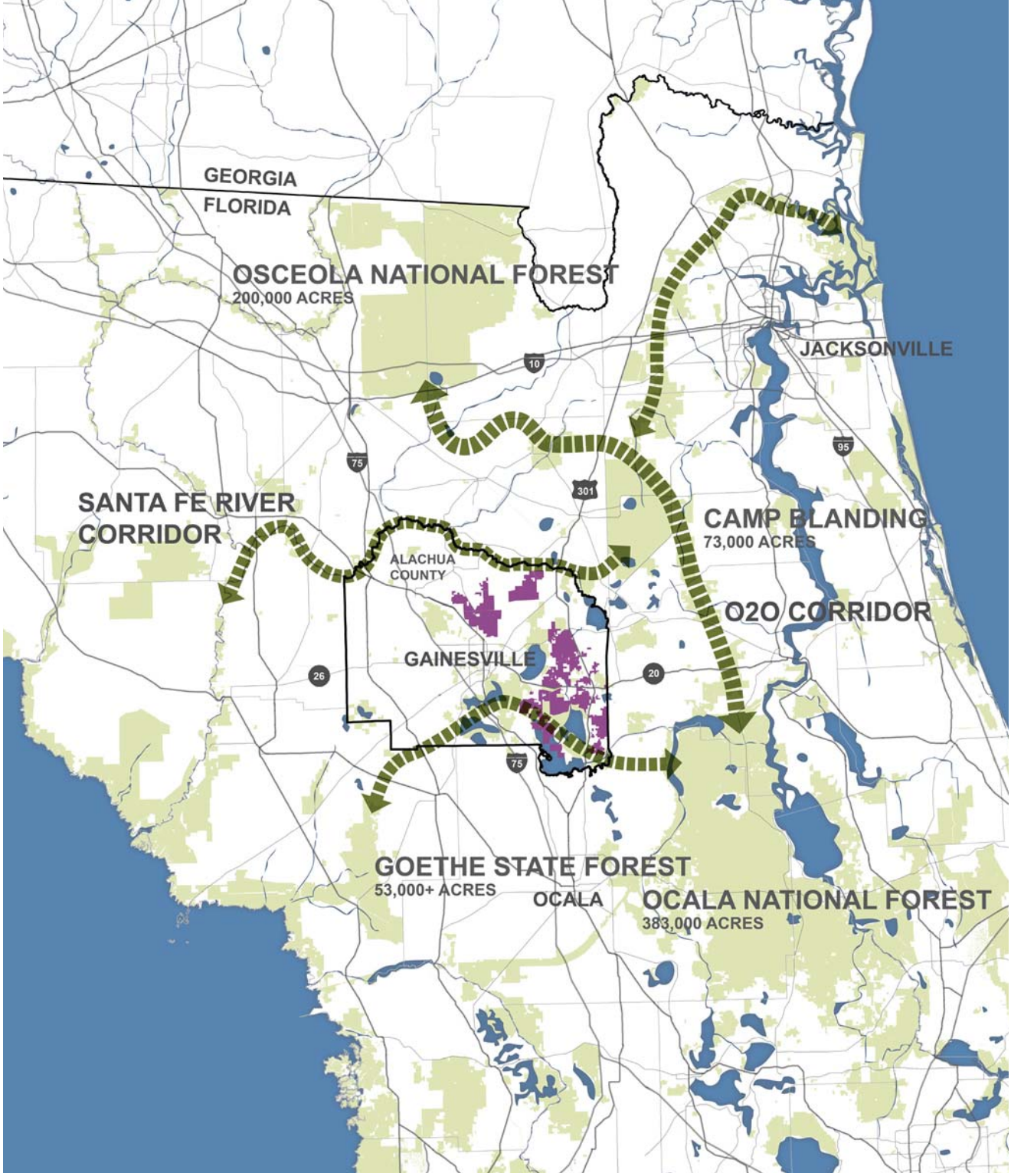


Figure 2.3.3-2 Regional Landscape Linkages to the LTMP Environmental Plan

PUBLIC/PRIVATE CONSERVATION
LANDSCAPE LINKAGES
PLUM CREEK PROPERTY IN ALACHUA COUNTY

0 10 mi 20 mi 50 mi
0 50,000 ft 100,000 ft 200,000 ft

Data Source: Alachua County GIS, Plum Creek
June 2015

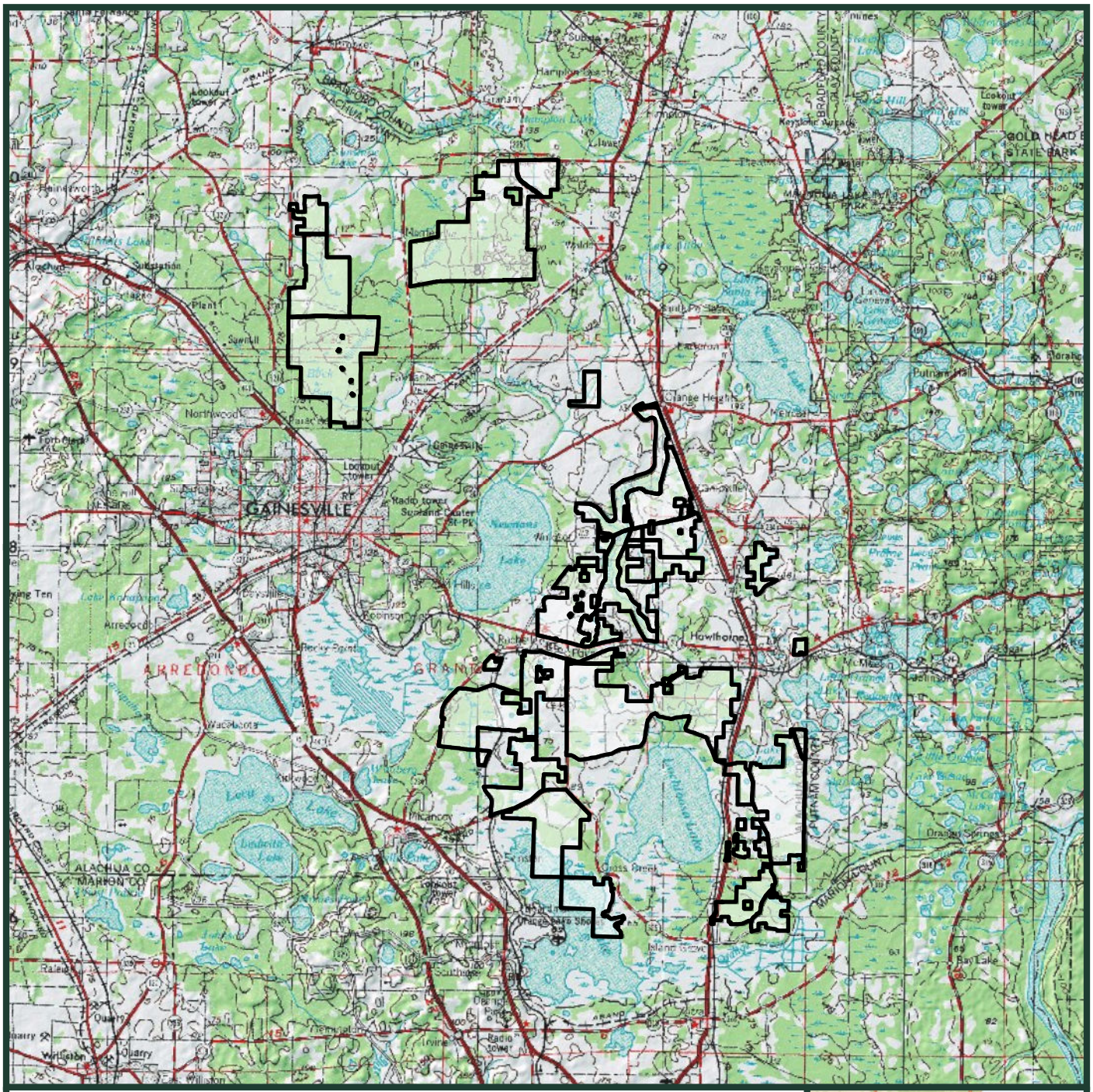
lands are a valuable component of the LTMP Environmental Plan, because they provide additional areas of upland wildlife habitat within the large mosaic of wetlands proposed for preservation and buffering important ecological resources from areas planned for development. As part of the LTMP Environmental Plan, lands identified for continued silviculture will also enhance aesthetic values as undeveloped parts of the landscape provide additional green infrastructure. The LTMP Environmental Plan reflects Plum Creek's commitment to remaining a viable silvicultural operation into the future.

3.0 GENERAL IDENTIFICATION OF ENVIRONMENTAL RESOURCES

F.S. 163.3245(3)(a)(5) requires "a general identification of regionally significant natural resources within the planning area based on the best available data…" The EASP application also serves as a proposed amendment to the Alachua County Comprehensive Plan. Pursuant to the Alachua County Comprehensive Plan 2011-2030 Conservation Open Space Policy 3.4.1, "All applications for land use change, zoning change and development approval shall be required to submit an inventory of natural resource information." Consistent with both of these requirements, the following description of the ecological setting of the Plum Creek EASP Property is provided, including physiography, geology, topography, soils, vegetative communities, wildlife, and regionally significant natural resources. The associated data for out parcels adjacent to the Property have been included on the various maps to provide an environmental context of the local landscape. The completed Alachua County Environmental Resources Assessment Checklist is included as Appendix A.

3.1 Ecological Setting

The Property consists of approximately 52,745 acres located primarily within the Orange Creek Basin of the Ocklawaha River watershed, with a small portion of the northern Property located within the Santa Fe River watershed (Figure 3.1-1). The Property is located within the Eastern Florida Flatwoods ecological region of the Southern Coastal Plain (Figure 3.1-2). This ecoregion is a warm, heterogeneous area of low relief and wet soils consisting of flat plains, coastal lagoons, marshes, and swampy lowlands along the Gulf and Atlantic coasts. Historically this region was covered by a variety of forest communities that included trees of longleaf pine (*Pinus palustris*), slash pine (*Pinus elliottii*), pond pine (*Pinus serotina*), sweetgum (*Liquidambar styraciflua*), southern magnolia (*Magnolia grandiflora*), laurel oak (*Quercus laurifolia*) with forested wetlands of blackgum (*Nyssa sylvatica* var. *sylvatica*) and cypress (*Taxodium*



Legend

Plum Creek Property in the Envision Alachua Sector Plan

0 2.5 5 Miles

1 inch = 5 miles

Source: Property boundary provided by Sasaki Associates, Inc. May 2015. World Street Map base map obtained online from ESRI.

Service Layer Credits: Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community. Copyright:© 2013 National Geographic Society, i-cubed

FIGURE 3.1-1
LOCATION OF PLUM CREEK PROPERTY,
ALACHUA COUNTY, FLORIDA

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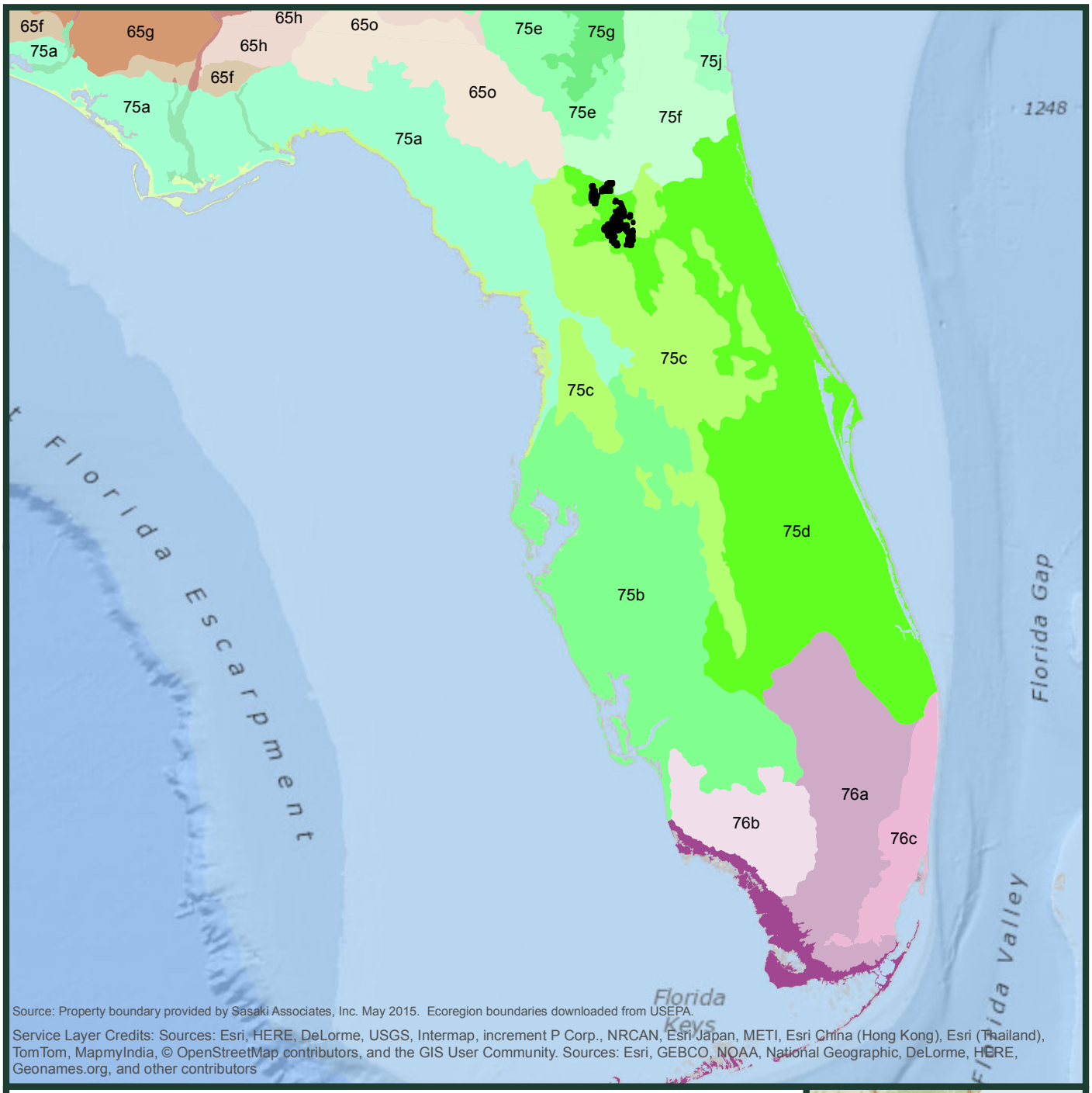

- Plum Creek Property
- 65f Southern Pine Plains and Hills
- 65g Dougherty Plain
- 65h Tifton Upland
- 65o Tallahassee Hills/Valdosta Limesink
- 65p Southeastern Floodplains and Low Terraces
- 75a Gulf Coast Flatwoods
- 75b Southwestern Florida Flatwoods
- 75c Central Florida Ridges and Uplands
- 75d Eastern Florida Flatwoods
- 75e Okefenokee Plains
- 75f Sea Island Flatwoods
- 75g Okefenokee Swamp
- 75h Bacon Terraces
- 75i Floodplains and Low Terraces
- 75j Sea Islands/Coastal Marsh
- 75k Gulf Barrier Islands and Coastal Marshes
- 75l Big Bend Coastal Marsh
- 76a Everglades
- 76b Big Cypress
- 76c Miami Ridge/Atlantic Coastal Strip
- 76d Southern Coast and Islands

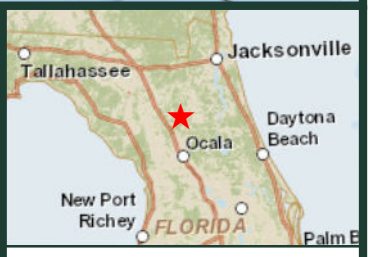

FIGURE 3.1-2
LEVEL IV ECOREGIONS AND THE PLUM CREEK PROPERTY, ALACHUA COUNTY, FLORIDA

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sp.). Current land cover in this region is primarily slash pine and loblolly pine (*Pinus taeda*) with oak-gum-cypress forest in low lying areas, row and field crops, pasture land for beef cattle and horses, and urban.

3.2 Physiography

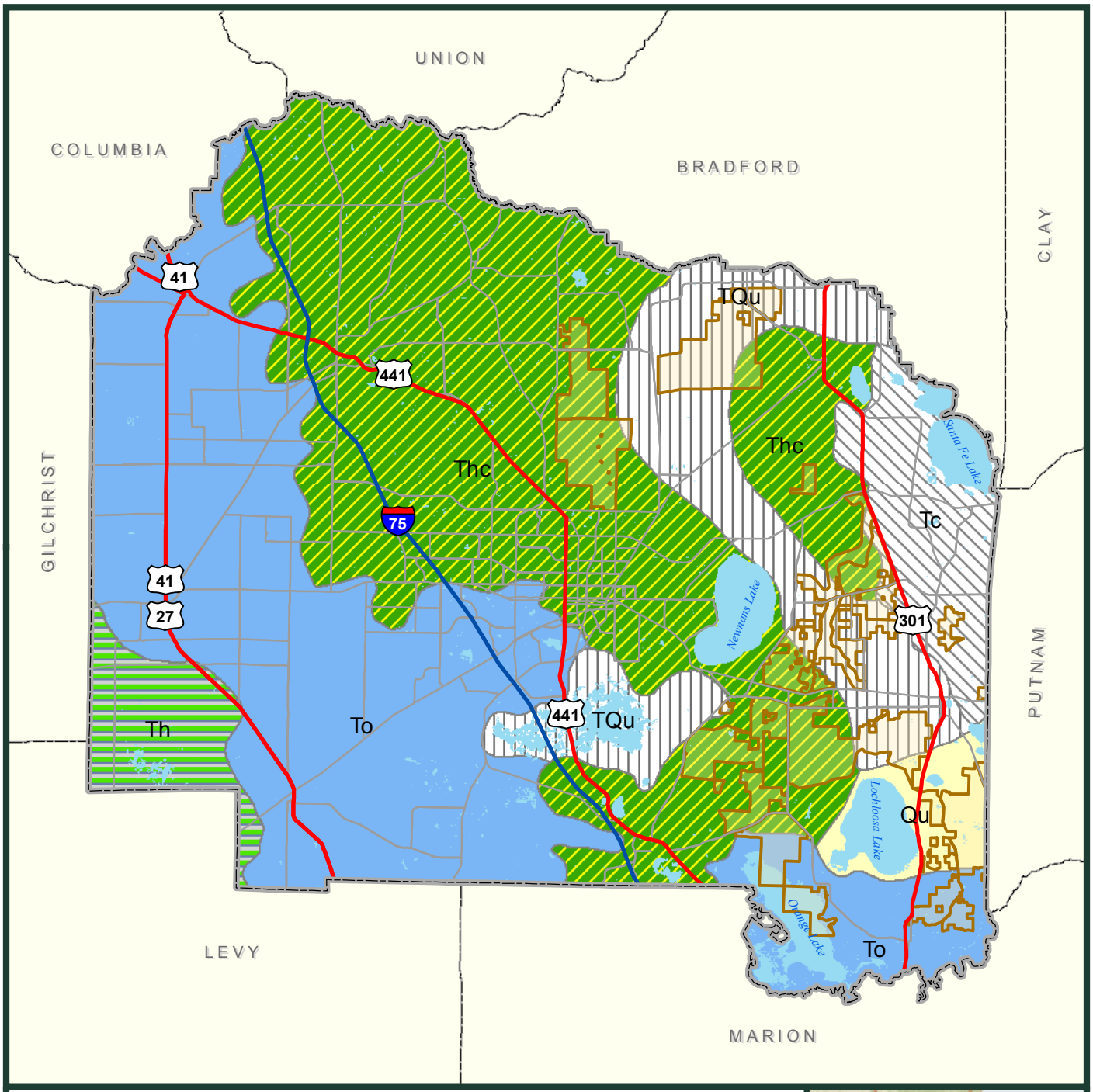
The term physiography refers to the characterization of an area in terms of geologic origin, topography, and natural features. Brooks (1981) devised a hierarchical classification system that divides the state into broad regional physiographic districts, which are subdivided into provinces, which are further subdivided into subprovinces. The Property is within three major physiographic districts mapped by Brooks (1981). The portion of the Property northwest of SR 24 is within the High Flatwoods subprovince of the Okefenokee Upland province, Sea Island District. This area is characterized as undissected upland terraces and separating ridges with sluggish to poorly organized surface water drainage systems and vegetation dominated by flatwoods, swamps, and marsh types. The portion of the Property east of Newnans Lake, west of US 301, and north and northwest of Lochloosa Lake are within the Newnans Lake Basin subprovince of the Northern Peninsula Slopes province, Ocala Uplift district. This area is characterized as a broad basin with very gentle slopes within a district where early Tertiary limestones are at or near the surface in most places. Smaller areas of the Property southwest of Lochloosa Lake along a line between Orange Lake and Paynes Prairie are within the Alachua Prairies subprovince of the Northern Peninsula Plains province, Ocala Uplift district. This area is a karst plain dominated by lakes and prairie marshes. The portion of the Property east of US 301 and north of SR 20 is within the Perched Lakes and Prairies province of the Central Lake physiographic district. This area is characterized by flatwoods and river swamp vegetation in low areas and sandhill vegetation occurring on low hills in a region underlain by the uplifted limestone of the Floridan Aquifer. Approximately 3,500 acres of the Property east of US 301 and south of SR 20 are within the St. Johns Offset province of the Central Lake district. This is an

ancient portion of the St. Johns River Valley with limestone near the surface. Flatwoods occur on the Pleistocene terraces of this area, and a river swamp forest occurs on the floodplain.

3.3 Geology

A description of the geology of the Property is a characterization of the origins and types of parent materials lying beneath the soil. According to Scott (2001a) most of the Plum Creek parcels occur on sites underlain by limestone of the Coosawhatchee Formation or are in areas of undifferentiated Tertiary-Quaternary sediments (Figure 3.3-1). However, small portions of the southern portion of the Property are underlain by the Ocala Limestone or are in areas of undifferentiated Quaternary sediments deposited within the last 1.8 million years. Scott (2001b) describes these geologic features as follows:

> Coosawhatchee Formation (Thc): The Coosawhatchee Formation is exposed or lies beneath a thin overburden on the eastern flank of the Ocala Platform and formed in the Miocene (24 million to 5 million years ago). Within the outcrop region, the Formation is poorly to moderately consolidated and consists of variably clayey and phosphatic sands or is slightly sandy with silty clay. Few or no fossils are present. Permeability is generally low, and thus the Coosawhatchee Formation forms part of the intermediate confining unit for the aquifer system.
>
> Undifferentiated Quaternary Sediments (Qu): These sediments were deposited in the Quaternary period (1.8 million years ago to present). Much of Florida's surface is covered by a varying thickness of undifferentiated sediments consisting of siliciclastics, organics, and freshwater carbonates. These sediments are mapped as distinct units when they exceed 20 feet in thickness. Areas mapped as Qu are distinct from areas mapped as



- Plum Creek Property
- Qu - Undifferentiated Sediments
- TQu - Undifferentiated Sediments
- Tc - Cypresshead Formation
- Th - Hawthorn Group
- Thc - Coosawhatchee Formation
- To - Ocala Limestone
- Water

0 3 6 Miles

1 inch = 6 miles

Source: Property boundary provided by Sasaki Associates, Inc. May 2015. Geology data obtained from FDEP. Alachua County boundary downloaded from Alachua County. Roads downloaded from FDOT. County boundaries downloaded from FGDL.

FIGURE 3.3-1
STRATIGRAPHIC GEOLOGY WITHIN THE PLUM CREEK PROPERTY, ALACHUA COUNTY, FLORIDA

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Qal (alluvial and floodplain deposits), Qbd (sediments of beach ridges and dunes), and Qtr (sediments of Trail Ridge). Undifferentiated Quaternary sediments are clean to clayey, silty, unfossiliferous, variably organic-bearing sands, and poorly to moderately consolidated. Organics occur as plant debris, roots, disseminated organic matrix, and beds of peat.

Undifferentiated Tertiary/Quaternary Sediments (TQu): These sediments are siliciclastics that are separated from undifferentiated Quaternary sediments solely on the basis of elevation. Sediments above 100 feet MSL are generally older than Pleisocene (1.8 million years to 11,000 years ago). This unit may include fluvial and aeolian deposits. These sediments are unconsolidated to poorly consolidated, fine to coarse grained, clean to clayey, unfossiliferous sands, sandy clays, and clays. Organic debris and disseminated organics are present in these sediments, which are part of the surficial aquifer system.

Ocala Limestone (To): The Ocala Limestone consists of nearly pure limestones and occasional dolostones that formed in the upper Eocene (38 million years ago). Fossils present in the Ocala Limestone include abundant large and smaller foraminifers, echinoids, bryozoans, and mollusks. The permeable, highly transmissive carbonates of the Ocala Limestone form an important part of the Floridan Aquifer System.

3.4 Topography

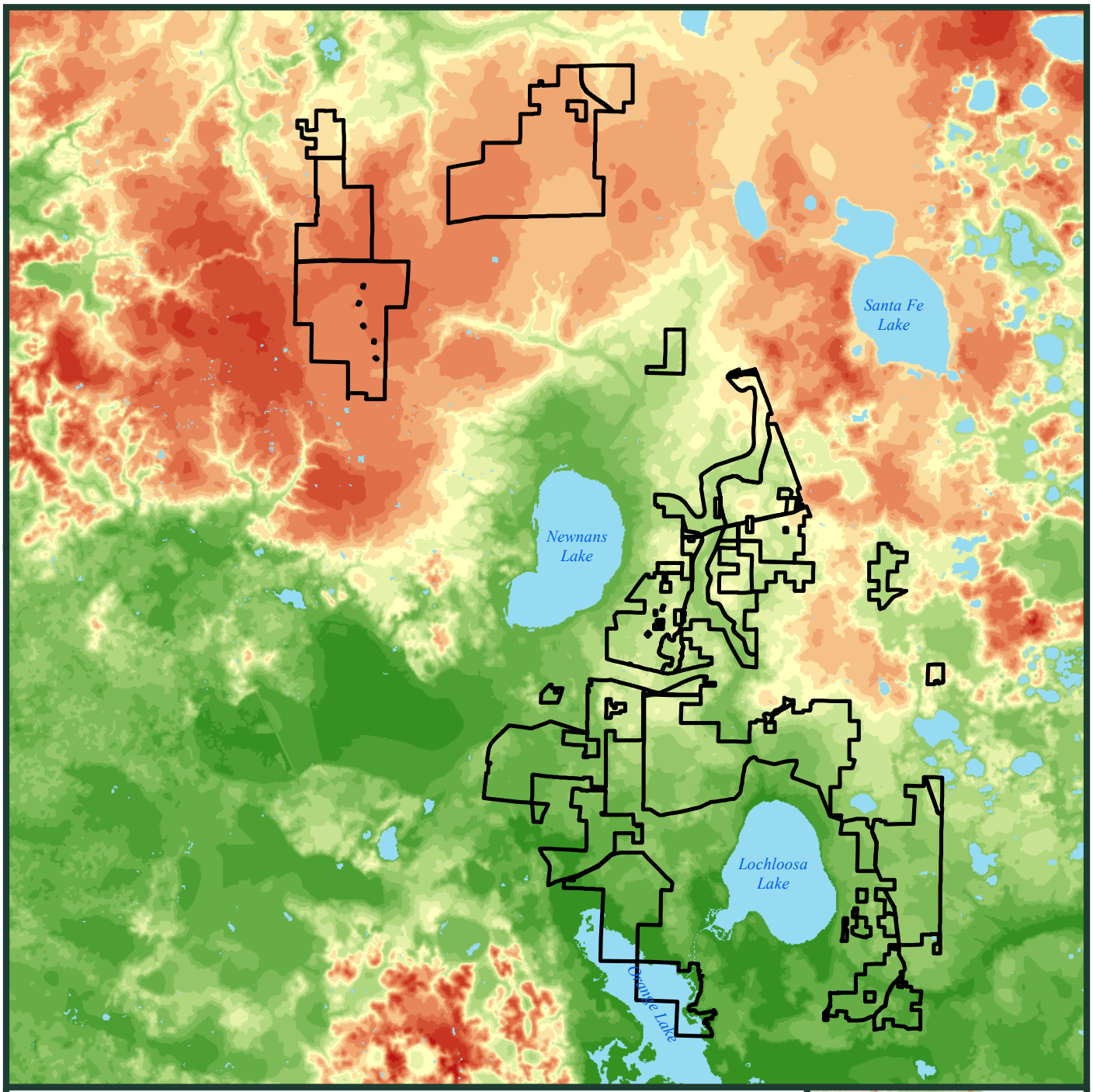
Topography within the Property was determined from a statewide digital elevation model (DEM) constructed from a mosaic of four Laser Rangefinder- and contour-based DEM models and published by

the GeoPlan Center, University of Florida (Figure 3.4-1). The statewide DEM has contour intervals of one foot and a resolution of five meter grid cells. Elevations within the Property range from 42 to 181 feet above mean sea level. The lowest elevations are along the shoreline of Orange Lake. The highest elevations occur along the south boundary of the westernmost portion of the Property.

3.5 Soils

Soils on the Property are depicted in Figure 3.5-1. The Soil Survey Geographic database created by the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) for Alachua County, Florida, identifies 46 soil map units representing seven soil orders as occurring within the Property. The majority of the property is comprised of Spodosols (62%) and Ultisols (22%) with dominant soil map units including Pomona sand (14), Monteocha loamy sand (19), Newnan sand (21), and Sparr fine sand (50).

Soils are classified by the NRCS into four Hydrologic Soils Groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D) according to the rate of water infiltration or runoff potential from long-duration storms (NRCS, 1993). Group A soils have a high infiltration rate (low runoff potential) when thoroughly wet; consisting primarily of deep, well to excessively drained sands or gravelly sands. Approximately 25% of the Property is comprised of Group A soils. Group D soils have a very low infiltration rate (high runoff potential) when thoroughly wet; consisting primarily of clays, soils with a permanent high water table, soils with a restrictive layer at or near the surface, and/or shallow soils over nearly impervious material. Certain soils are placed in group D based solely on the presence of a water table within 24 inches of the surface even though the saturated hydraulic conductivity may be favorable for water transmission. When a soil is assigned to a dual hydrologic group the first letter applies to the drained condition and the second to the undrained condition. If these soils can, or have been adequately



Plum Creek **Topography (ft)**

40 - 50	90 - 100	150 - 160
50 - 60	100 - 110	160 - 170
60 - 70	110 - 120	170 - 180
70 - 80	120 - 130	180 - 190
80 - 90	130 - 140	190 - 200
	140 - 150	200 - 210

0 2 4 Miles

1 inch = 4 miles

Source: Property boundary provided by Sasaki Associates, Inc. May 2015. Florida Digital Elevation Model (DEM) derived from LIDAR imagery downloaded from FGDL.

FIGURE 3.4-1
TOPOGRAPHY WITHIN THE PLUM CREEK PROPERTY,
ALACHUA COUNTY, FLORIDA

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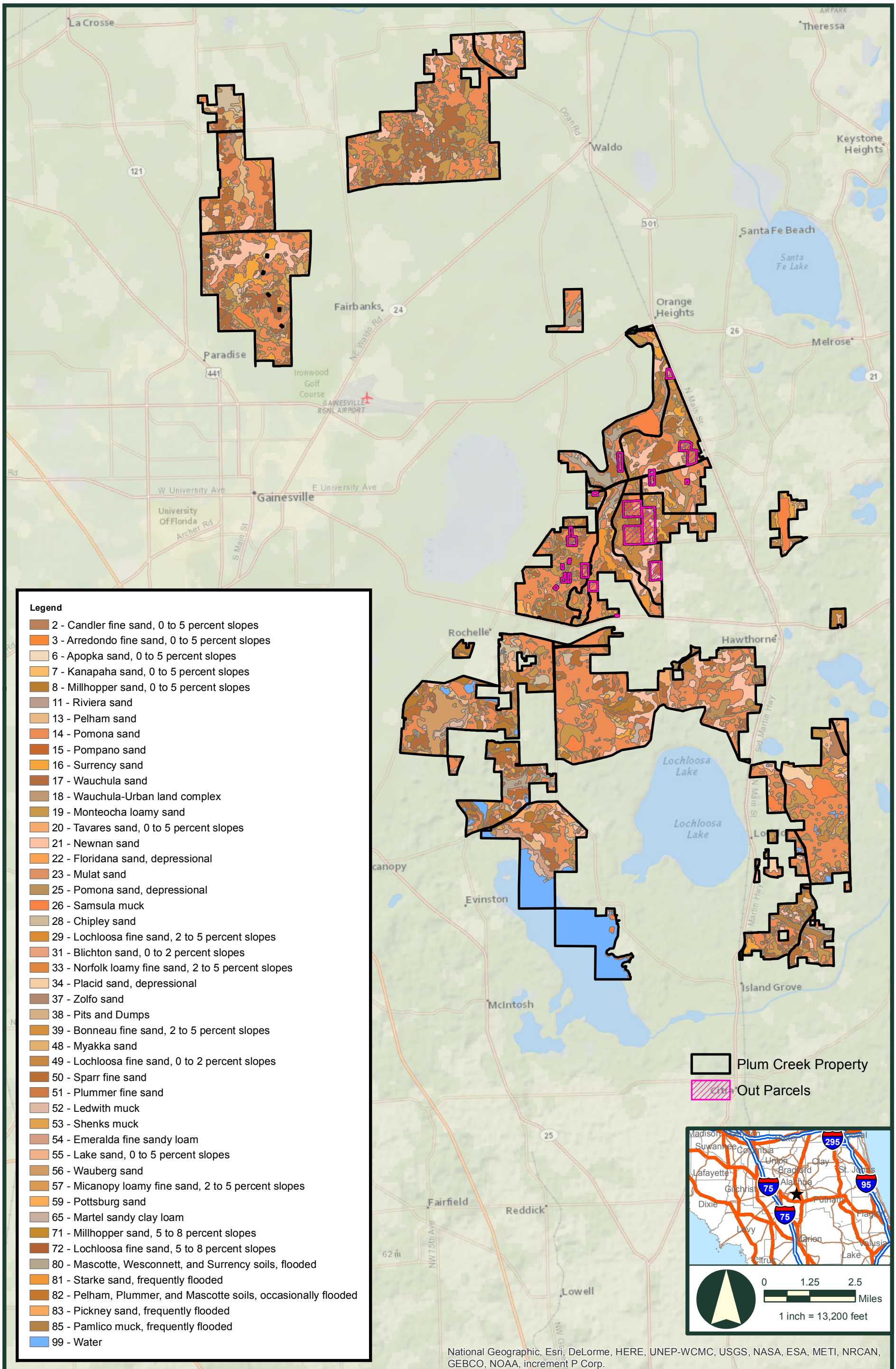

FIGURE 3.5-1.
NATURAL RESOURCE CONSERVATION SERVICE SOILS MAP OF PLUM CREEK PROPERTY, ALACHUA COUNTY, FLORIDA.

Source: Property boundary provided by Sasaki Associates, Inc. May 2015. Soils from USDA, NRCS, SSURGO database for Alachua County, FL. December, 2013.

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drained, they are assigned to dual hydrologic soil groups. The majority of the Property (56%) is classified as A/D soils.

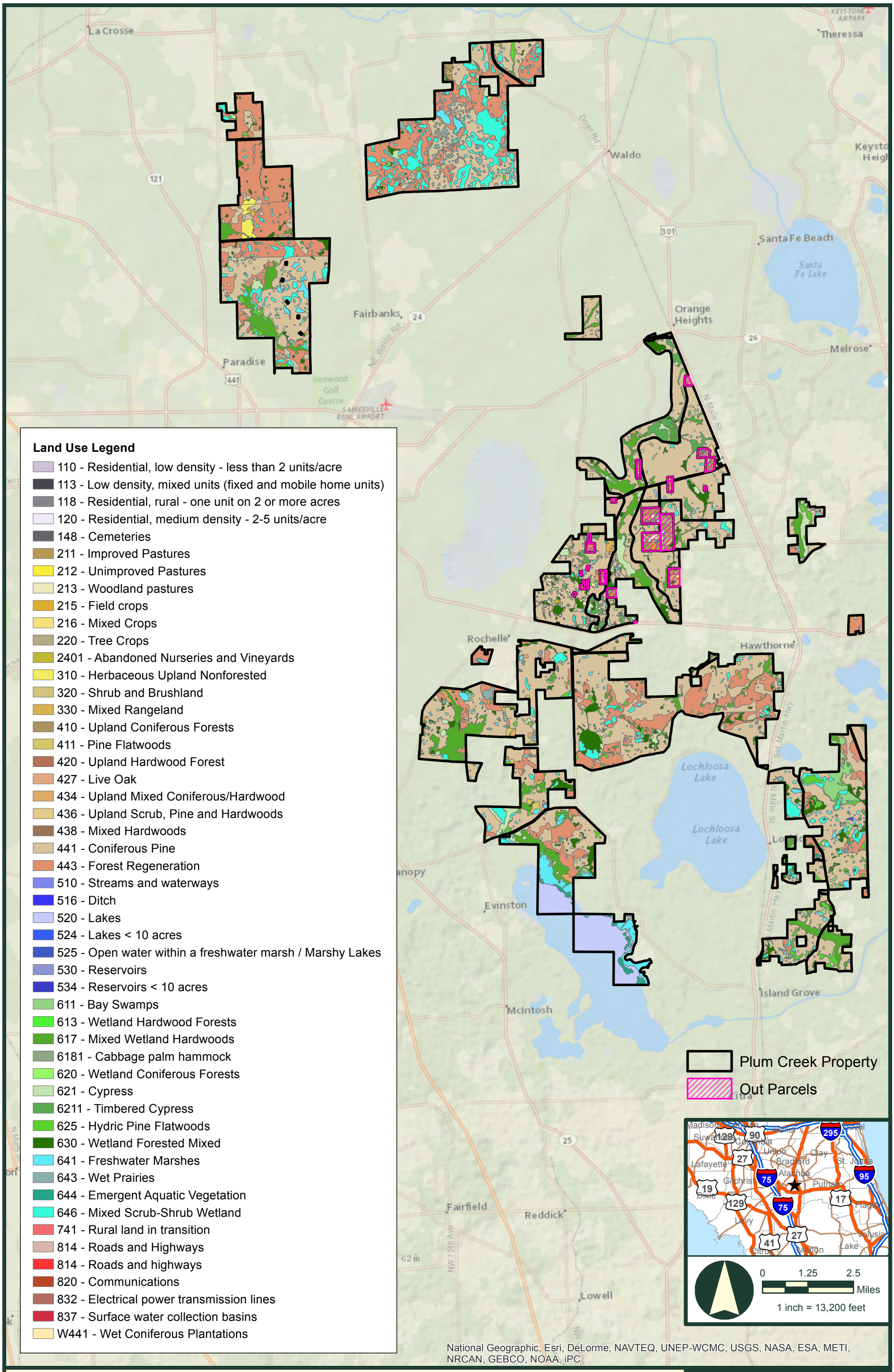
Soils within portions of Alachua County have been identified as containing high concentrations of geologic phosphorus due to the presence of the Hawthorne Group. Ramnarine (2003) researched the distribution of phosphatic soil within Alachua County, determining the majority of east Alachua County had a low probability of containing phosphatic soil. Further research by FDEP (2008), Cohen et al (2008), Long (2009), and Di et al. (2012) have looked at the contribution of geologic phosphorus to the nutrient loading of Newnans, Lochloosa, and Orange Lakes, located within close proximity to the Property.

3.6 Vegetative Communities

Land use and vegetative associations identified throughout the Property were classified using the Florida Land Use, Cover and Forms Classification System (FLUCFCS; Florida Department of Transportation [FDOT], January 1999) data included in the Suwannee River Water Management District (SRWMD) and SJRWMD GIS database (Table 3.6-1, Figure 3.6-1). Approximately 19% of the northern extent of the Property is located within the SRWMD. The 2010-2011 SRWMD land use/land cover (released in 2012) was based on 2010 or 2011 true color aerial photography. The 2009 SJRWMD land use/land cover dataset (released in 2011 based on 2009 color infrared aerial photography) was updated to reflect the existing on-site land use cover types and approximate wetland boundaries based on selective groundtruthing and aerial photo-interpretation conducted in December 2011 for a portion of the Property located east of Newnans Lake. Additionally, approximately 2,900 acres southeast of Newnans Lake were reviewed for wetlands considered jurisdictional by the SJRWMD pursuant to Chapter 62-340 of the

Table 3.6-1 Vegetative Communities for the Plum Creek Property, based on the Florida Land Use Cover and Forms Classification System.

FLUCFCS Code	Vegetative Community	Percent Coverage (%)
1100	Res.idential, low density	0.05
1180	Residential, rural	0.01
2110	Improved pastures	0.07
2120	Unimproved pastures	0.01
2130	Woodland pastures	0.02
2401	Abandoned nurseries and vineyards	0.02
3100	Herbaceous upland nonforested	0.37
3200	Shrub and brushland	0.05
3300	Mixed rangeland	0.15
4100	Upland coniferous forests	0.13
4110	Pine flatwoods	0.49
4340	Upland mixed coniferous/hardwood	0.85
4360	Upland scrub, pine and hardwoods	0.05
4380	Mixed hardwoods	0.04
4410	Coniferous plantations	46.05
W441	Wet coniferous plantations	0.70
4430	Forest regeneration	18.88
5100	Streams and waterways	0.01
5200	Lakes	2.96
5250	Marshy lakes	0.02
5340	Reservoirs < 10 acres	0.01
6110	Bay swamps	0.97
6130	Gum swamps	0.04
6170	Mixed wetland hardwoods	6.63
6181	Cabbage palm hammock	0.03
6200	Wetland coniferous forests	0.08
6210	Cypress	2.86
6211	Timbered cypress	0.94
6250	Hydric pine flatwoods	2.42
6300	Wetland forested mixed	4.31
6410	Freshwater marshes	2.57
6430	Wet prairies	1.41
6440	Emergent aquatic vegetation	0.32
6460	Mixed scrub-shrub wetland	6.46
7410	Rural land in transition	0.01
8320	Electrical transmission lines	0.01
	Grand Total	**100.00**



Land Use Legend

- 110 - Residential, low density - less than 2 units/acre
- 113 - Low density, mixed units (fixed and mobile home units)
- 118 - Residential, rural - one unit on 2 or more acres
- 120 - Residential, medium density - 2-5 units/acre
- 148 - Cemeteries
- 211 - Improved Pastures
- 212 - Unimproved Pastures
- 213 - Woodland pastures
- 215 - Field crops
- 216 - Mixed Crops
- 220 - Tree Crops
- 2401 - Abandoned Nurseries and Vineyards
- 310 - Herbaceous Upland Nonforested
- 320 - Shrub and Brushland
- 330 - Mixed Rangeland
- 410 - Upland Coniferous Forests
- 411 - Pine Flatwoods
- 420 - Upland Hardwood Forest
- 427 - Live Oak
- 434 - Upland Mixed Coniferous/Hardwood
- 436 - Upland Scrub, Pine and Hardwoods
- 438 - Mixed Hardwoods
- 441 - Coniferous Pine
- 443 - Forest Regeneration
- 510 - Streams and waterways
- 516 - Ditch
- 520 - Lakes
- 524 - Lakes < 10 acres
- 525 - Open water within a freshwater marsh / Marshy Lakes
- 530 - Reservoirs
- 534 - Reservoirs < 10 acres
- 611 - Bay Swamps
- 613 - Wetland Hardwood Forests
- 617 - Mixed Wetland Hardwoods
- 6181 - Cabbage palm hammock
- 620 - Wetland Coniferous Forests
- 621 - Cypress
- 6211 - Timbered Cypress
- 625 - Hydric Pine Flatwoods
- 630 - Wetland Forested Mixed
- 641 - Freshwater Marshes
- 643 - Wet Prairies
- 644 - Emergent Aquatic Vegetation
- 646 - Mixed Scrub-Shrub Wetland
- 741 - Rural land in transition
- 814 - Roads and Highways
- 814 - Roads and highways
- 820 - Communications
- 832 - Electrical power transmission lines
- 837 - Surface water collection basins
- W441 - Wet Coniferous Plantations

FIGURE 3.6.1. FLORIDA LAND USE, COVER AND FORMS CLASSIFICATION SYSTEM MAP OF PLUM CREEK PROPERTY, ALACHUA COUNTY, FLORIDA.

Source: Parcels provided by Sasaki Associates, Inc. 2015-04-09. Vegetative delineation based on SJRWMD Land Use and Land Cover, 2009; SRWMD Land Use and Land Cover 2010-2011; and selective groundtruthing by BDA, Dec. 2011, May 2015.

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Florida Administrative Code (F.A.C.) and delineated April - May 2015. The wetland delineation results have been incorporated into Table 3.6-1 and Figure 3.6-1.

FLUCFCS data indicates the Property is comprised of a diverse mixture of upland and wetland community types, including silvicultural lands, upland forest, wetlands, surface waters, and various types of human infrastructure. While the dominant land use on the Property is silviculture (~66%), there are also many other vegetative communities that combine to create a diverse and abundant mosaic of uplands, wetlands, and water. The majority of the Property is characterized as uplands (~68%), with the remaining consisting of wetland (~29%) and surface water (~3%) cover types. Upland forested communities, excluding silvicultural lands, cover ~2% of the Property and consist of pine flatwoods, upland coniferous forests, upland mixed coniferous and hardwood forest, upland scrub pine and hardwoods, and mixed hardwoods. Additional upland land uses on the Property include residential areas (0.06%), pastures (0.10%), herbaceous upland nonforested (0.37%), shrub and brushland (0.05%), mixed rangeland (0.15%), rural land in transition (0.01%), and electrical power transmission lines (0.01%).

Forested freshwater wetlands cover ~19% of the Property and are characterized by areas of cypress swamp, bay swamp, mixed wetland hardwoods, timbered cypress, gum swamps, wetland coniferous forests, hydric pine flatwoods, cabbage palm hammock, and mixed forested wetlands. Herbaceous freshwater wetlands comprise ~4% of the Property including marshes, wet prairies, and emergent aquatic vegetation. In addition, approximately 6% of the Property is characterized as mixed scrub-shrub wetland. Surface waters comprise ~3% of the Property and consist of lakes, streams and waterways, marshy lakes, and reservoirs.

3.7 Significant Wetlands and Surface Waters

Approximately 43% (22,865 acres) of the Property subject to this Sector Plan is presently preserved under existing conservation easements (Table 3.7-1, Figure 3.7-1). This includes the Murphree Wellfield Conservation Easement (6,228 acres) and Lochloosa Conservation Easement (16,637 acres) included in the "Emerald Necklace", an Alachua County land conservation initiative to establish a network of greenways managed to support the protection, enhancement, and restoration of functional and connected natural systems while providing unique opportunities for resource-based recreation. Incorporated into the Lochloosa Conservation Easement is the Grove Park Wildlife Management Area containing public trails that may be accessed year-round for hiking, biking, wildlife viewing, and horseback riding.

Additionally, much of the Property is contiguous with parcels of land in public ownership or under conservation easements including Balu Forest and Phifer Flatwoods (owned and managed by Alachua County), and the Newnans Lake Conservation Area and Lochloosa Wildlife Conservation Area (owned and managed by the SJRWMD).

Orange Lake, Lochloosa Creek, Little Monteocha Creek, and tributaries of Hatchet Creek border or are located on the Property. Plum Creek is committed to the protection of these water resources and their ecological linkages within the regional landscape. Therefore, Plum Creek is proposing to protect an additional 42% (22,363 acres) of the Property including many large interconnected wetland strands and large tributaries flowing through the Property. Plum Creek is committed to the conservation of these key ecosystems, their functionality, and their role in protecting larger regionally significant lake and river systems.

Table 3.7-1 Existing Conservation Easements on Plum Creek Property, Alachua County, Florida

Instrument No.	Date Recorded	Acres	Grantor/Grantee	General Location	Restrictions/Prohibited Uses	Affirmative and Reserved Rights/Allowed Uses
Murphree Wellfield Conservation Easement						
1651188	12-15-1999	±7,102	Nekoosa Packaging Corporation in favor of SJRWMD, SRWMD, and City of Gainesville	Vicinity of Buck Bay, east of State Hwy 121 in north-central Alachua County	Use of the Property that will cause or result in a sustained degradation of the present environmental and water resource value of the Property	Use, occupy, manage, and regulate the Property in keeping with the policies declared in Chapter 373, Florida Statutes and enforce compliance with this Easement
					Water well locations will be subject to a Public Utilities Easement of not less than 30 ft in width over and across the Property to the well site; all activities associated with water wells are subject to the relevant government regulations	Locate, construct and maintain production wells, monitoring wells, exploratory wells, pumps, water conveyance pipelines, electrical distribution lines and electrical transmission lines as required for the proposed City water wells
					Dredging, construction of new ponds, dikes, or canals; any manipulation of natural water courses; any activities or uses detrimental to water quantity or quality	Maintenance, repair and replacement of existing improvements, ditches, canals, roads, and structures which service silvicultural operations
					Commercial, agricultural or industrial activity (including any right of passage in conjunction with such activities)	Development, construction and maintenance of building facilities, infrastructure or utilities to implement and carry out Grantee's rights and policies in regard to the Property as described in this Easement
					Development of the Property to accommodate or facilitate the construction of temporary or permanent residences, buildings, facilities, utilities, or infrastructure	Placement of ownership notification signage
					Construction of temporary or permanent residences, building, facilities, utilities or infrastructure (to include mobile homes, advertising signs, billboards and other advertising materials; as well as docks, bridges, piers or other structures)	Construct temporary logging roads as reasonably required for silvicultural and related management operations permitted under this Easement
					Building of new permanent roads or widening of existing roads (except as necessary for ingress/egress and construction, operation and maintenance of water wells)	Maintenance of existing roads shall be limited to: (a) Removal of dead vegetation; (b) Necessary pruning or removal of hazardous trees and plants; (c) Application of permeable materials necessary to correct or impede erosion; (d) Grading; (e) Replacement of culverts, water control structures and bridges; and (f) Maintenance of roadside ditches
					Filling, excavating, dredging, mining or drilling; removal of substrates, minerals or other materials; changes to topography of the land (except for those normal silvicultural activities performed in compliance with Best Management Practices (BMPs)	
					Dumping or placing of soil, trash, solid or liquid waste, or unsightly, offensive or hazardous materials, wastes or substances, toxic wastes or substances, pollutants or contaminants	
					Subdividing or conveyance of the Property that would result in creation of tracts less than 1,000 acres without written consent of Grantee(water well sites are the exception)	
					Planting of nuisance exotic or non-native plants as listed by the Exotic Pest Plant Council	Manage and control any occurrence of nuisance exotic or non-native plants to the degree practicable
					Application of pesticides, herbicides, and fertilizers within 500 ft of any production well (both on the Property and on adjoining City property)	Application of pesticides, herbicides and fertilizers in accordance with BMPs or label instructions; monitoring wells and instruments may be installed to monitor the quality of the surface and ground water
					Intentional destruction or damage to any sites of archaeological, cultural or historic significance unless authorized or approved by the appropriate regulating agency	Afford protection to threatened or endangered species and species of special concern in accordance with federal and/or state regulations
					Any use of the Property and any activity thereon which is or may become inconsistent with the conservation of the Property predominately in its present condition and the protection of environmental systems	Sell, rent or mortgage the Property (subject to 1,000-acre minimum parcel size, excepting well sites)

Table 3.7-1 Continued

Instrument No.	Date Recorded	Acres	Grantor/Grantee	General Location	Restrictions/Prohibited Uses	Affirmative and Reserved Rights/Allowed Uses
					No more than 15% of the aggregate acres may be clear cut within any calendar year; if Property is subdivided, no more than 15% of the aggregate acres within each subdivided parcel may be clear cut within any calendar year	Conduct commercial forestry operations (silvicultural) in accordance with the Silvicultural BMPs Manual (1993 edition or later), the "Forestry Plan" prepared for the Property, and the conditions and restrictions of this Easement; Grantor will provide Grantee with a report and update to the Forestry Plan on an annual basis
					Oldest and youngest stands of planted trees must be separated by at least 10 years	
					Upland harvesting clear cuts shall be limited to areas no larger than 200 acres; 3 years of regrowth is required prior to harvesting adjacent timber unless: (a) No more than 10% of the perimeters of both harvest areas are immediately adjacent; and (b) Buffer strips of at least 500 ft are preserved between adjacent harvest areas	
					Windrowing, bedding or harrowing in site preparation and replanting operations outside of the existing Upland pine plantations or said adjacent isolated or fringe areas	Isolated or fringe areas of upland vegetation smaller than 20 acres that are immediately adjacent to designated Upland pine plantations may be added to or included within the harvesting and management operations
					Wetland harvesting clear cuts shall be limited to areas of 50 acres or less; 5 years of regrowth are required prior to harvesting adjacent timber unless: (a) The perimeter of such harvest areas are not adjacent; and (b) Buffer strips of at least 500 ft are preserved between the perimeters of the harvest areas	
					Harvesting in wetlands that lie in a primary Special Management Zone (SMZ)	Wetlands of Buck Bay that do not qualify as SMZ may be subject to one harvest of the area; thereafter, such area shall be considered a primary SMZ
					Commencement and maintenance of new pine plantations in wetlands	Remove damaged timber in the event of a natural disaster, fire, disease, insect infestation or the like to protect remaining timber
					±1,777 acres of land known as the "2 Year Travel Time Zone" are subject to the terms and conditions of a Cooperative Agreement between Commodity Credit Corporation and the City of Gainesville for the Farmland Protection Program	Control and restrict public access for hunting, fishing, and other recreational purposes; continue lease-hunting privileges as expressly subject to this Easement
First Amendment to Murphree Wellfield Conservation Easement						
1784465	9-26-2001	±7,102	NPC Timber, Inc. in favor of SJRWMD, SRWMD and City of Gainesville	Vicinity of Buck Bay, east of State Hwy 121 in north-central Alachua County	Same as Original CE except: Modified and amended property legal description to separate SJRWMD and SRWMD tracts	
Public Utilities Easement						
1929242	4-23-2003	±9.373	Plum Creek Timberlands, LP in favor of City of Gainesville (Gainesville Regional Utilities)	Approximately 30-ft wide access easement interior to the Murphree Wellfield CE	Subject to the terms and conditions of the Murphree Wellfield CE	Construct, locate, operate, inspect, patrol, alter, improve, repair, rebuild, relocate, and remove said facilities
					Utilize or permit utilization of Easement in any way which will interfere with the safe operation and maintenance of the said facilities	Ingress and egress at all times
						Upgrade the quantity and type of facilities
						Clear the Easement area and keep it clear of trees, limbs, undergrowth and other obstructions which endanger or interfere with the safe and efficient installation, operation or maintenance of said facilities
						Trim and cut and keep trimmed and cut any trees and undergrowth on Grantor's land adjacent to but outside of Easement area which endanger or interfere with the safe and efficient installation, operation or maintenance of said facilities

Table 3.7-1 Continued

Instrument No.	Date Recorded	Acres	Grantor/Grantee	General Location	Restrictions/Prohibited Uses	Affirmative and Reserved Rights/Allowed Uses
						Use of the Easement area for purposes which are not inconsistent with the granted Easement privileges
Lochloosa Conservation Easement						
1373813	12-29-1995	±16,610	Nekoosa Packaging Corporation in favor of SJRWMD	Vicinity of Lochloosa Lake, south of SR 20 in southeast Alachua County	Use of the Property that will cause or result in a sustained degradation of the present environmental quality of the Property	Use, occupy, manage, and regulate the Property in keeping with the policies declared in Chapter 373, Florida Statutes and enforce compliance with this Easement
					Commercial, agricultural or industrial activity (including any right of passage in conjunction with such activities)	Maintenance, repair, and replacement of improvements and structures servicing the existing silvicultural operation
					Continue any existing cattle leases through that date which is 3 years from the date of this Easement; on or before such date cattle leases shall be terminated and thereafter Grantor will not enter into or renew any cattle or livestock leases for the Property	
					Development of the Property to accommodate or facilitate the construction of temporary or permanent residences, building, facilities, infrastructure or utilities	Development, construction and maintenance of building facilities, infrastructure or utilities to implement and carry out Grantee's rights and policies in regard to the Property as described in this Easement
					Construction of temporary or permanent residences, building, facilities, utilities or infrastructure (to include mobile homes, advertising signs, billboards and other advertising materials; as well as docks, bridges, piers or other structures)	Placement of ownership notification signage, signage used in conjunction with the Wildlife Management Area, and signage in conjunction with the public access plan
					Building of new permanent roads or widening of existing roads	Construct temporary logging roads as reasonably required for silvicultural and related management operations permitted under this Easement
					Dredging, construction of new ponds, dikes, or canals; any manipulation of natural water courses; any activities or uses detrimental to water quantity or quality	Maintenance of roads shall be limited to: (a) Removal of dead vegetation; (b) Necessary pruning or removal of hazardous trees and plants; (c) Application of permeable materials necessary to correct or impede erosion; (d) Grading; (e) Replacement of culverts, water control structures and bridges; and (f) Maintenance of roadside ditches
					Filling, excavating, dredging, mining or drilling; removal of substrates, minerals or other materials; dumping of ashes, trash, garbage or other foreign material; changes to topography of the land	
					Continued borrow pit operation in or relocation to a Conservation Area as defined in this Easement	Continue removal of soil and rock material from existing operational borrow pits for purpose of existing road maintenance; relocation or substantial enlargements of such borrow pits will require prior written approval of Grantee
					Subdivision or conveyance of the Property that would result in creation of tracts less than 2,000 acres in size without written consent of Grantee	Sell, rent or mortgage the Property (subject to 2,000-acre minimum parcel size)
					Upland harvesting clear cuts shall be limited to areas no larger than 200 acres; 3 years of regrowth are required prior to harvesting adjacent timber unless: (a) No more than 10% of the perimeters of both harvest areas are immediately adjacent (b) Buffer strips of at least 500 ft are preserved between adjacent harvest areas	Conduct commercial forestry operations (silvicultural) in accordance with the Silvicultural BMPs Manual (1993 edition or later), the "Forestry Plan" prepared for the Property, and the conditions and restrictions of this Easement; Grantor will provide Grantee with a report and update to the Forestry Plan on an annual basis
					Windrowing, bedding or harrowing in site preparation and replanting operations outside of the existing Upland pine plantations or said adjacent isolated or fringe areas	Isolated or fringe areas of upland vegetation smaller than 20 acres that are immediately adjacent to designated Upland pine plantations may be added to or included within the harvesting and management operations

Table 3.7-1 Continued

Instrument No.	Date Recorded	Acres	Grantor/Grantee	General Location	Restrictions/Prohibited Uses	Affirmative and Reserved Rights/Allowed Uses
					Wetland harvesting clear cuts shall be limited to areas of 50 acres or less; 5 years of regrowth are required prior to harvesting adjacent timber unless: (a) The perimeter of such harvest areas are not adjacent; and (b) Buffer strips of at least 500 ft are preserved between the perimeters of the harvest areas	Within a Conservation Area, forest areas designated as "Stand Three" may be subject to a one-time clear cut harvest followed by timely regeneration of the area according to BMPs
					Harvesting in Wetlands that lie in a primary or secondary Special Management Zone (SMZ)	Selective harvesting from below is permitted within Conservation Area Uplands; following harvest, remaining stand shall be approximately 50 ft^2 of basal area and the leave trees shall be chosen from the population of the dominant and co-dominant
					Commencement and maintenance of new pine plantations in Wetlands	Fifth row thinning of timber stands within Conservation Area Uplands which have received no prior harvesting
					No more than 2,000 aggregate acres may be clear cut within any calendar year	Salvage harvesting following a natural disaster is permitted in both Conservation Area Uplands and Wetlands according to agreed plan
					Any use of the Property and any activity thereon which is or may become inconsistent with the conservation of the Property predominately in its present condition and the protection of environmental systems	Prescribed burning of Conservation Area Uplands according to BMPs
						Control and restrict public access for hunting, fishing, and other recreational purposes through use of designated access points as provided in the "Public Access Plan"
						Public hunting on the Property for a period of 20 years subsequent to the date of this Easement shall be managed by a wildlife management plan or wildlife management agreement with the State of Florida; Grantor is entitled to any revenue generated by such public hunting; at such time as public hunting privileges expire, Grantor may lease hunting privileges at its own discretion
First Amendment to Lochloosa Conservation Easement						
1635194	9-20-1999	±16,610	Nekoosa Packaging Corporation in favor of SJRWMD	Vicinity of Lochloosa Lake, south of SR 20 in southeast Alachua County	Same as original CE except: (a) Clarified boundaries of the Uplands and Conservation Areas; (b) Substitution of legal description for the Conservation Easement Property (Exhibit A); (c) Addition of Conservation Area parcel legal descriptions (Exhibit B) and amended drawings delineating the Conservation Area boundaries (Exhibit D); amended drawings shall supersede Exhibit B of original Easement; (d) Addition of Land Cover Map (Exhibit E) delineating the boundaries of the Uplands	

Table 3.7-1 Continued

Instrument No.	Date Recorded	Acres	Grantor/Grantee	General Location	Restrictions/Prohibited Uses	Affirmative and Reserved Rights/Allowed Uses
Second Amendment to Lochloosa Conservation Easement						
2449438	8-18-2008	±16,610	Plum Creek Timberlands, LP in favor of SJRWMD	Vicinity of Lochloosa Lake, south of SR 20 in southeast Alachua County	Same as original CE and first amendment except: (a) Exclusion of ±40.58-ac parcel from the Conservation Easement Property (Exhibit B) (b) Replace Section II.6. of Easement in its entirety and substitute with 1,750-ac minimum parcel size restriction of Property to be sold, rented, or mortgaged	Same as original CE and first amendment except: (a) Inclusion of ±40.58-ac parcel to the Conservation Easement Property (Exhibit A) (b) Addition of new paragraph III.4 to Section III of Easement: Engage in activities (including prescribed burning, herbicide use, and mechanical treatments) intended to improve or maintain native wildlife habitat (including gopher tortoise restocking) provided such activities are properly permitted by the appropriate authority and subject to Grantee approval (c) Addition of new paragraph III.5. to Section III of Easement: Engage in activities (including modifications to topography) designed to create, enhance or restore the quantity or quality of wetlands or waters on the Property, provided such activities are properly permitted by the appropriate authority or otherwise approved by the Grantee
Conservation Easement for Habitat Management						
2485826	2-23-2009	±680.70	Plum Creek Timberlands, LP in favor of FWC	Interior to Lochloosa CE, south of CR 346 and west of CR 325	Subject to the SJRWMD Conservation Easement (aka Lochloosa CE), including all Prohibited Uses and restrictions to Reserved Rights	Implement the habitat management plan for gopher tortoise restocking site ("Plan") as incorporated by reference; management objectives include: (a) Maintain preferred habitat for the gopher tortoise on preferred soils (b) Sustainable production of timber (c) Continuation of dispersed recreation
					Any activity or use of the Property in violation of the "Plan"	Preserve and protect the habitat management values of the Property through implementation of habitat management activities such as harvesting, burning, herbicide use, mechanical treatments and reforestation, as well as monitoring of habitat conditions and tortoise density surveys
					Right of access by the general public to any portion of the Property is not conveyed by this Easement	Grantee may enter Property to engage in activities consistent with this Easement (to include compliance monitoring and enforcement)
						Grantor may engage in all uses of the Property that are not expressly prohibited herein and are not inconsistent with the purpose of this Easement
					Initial stocking of gopher tortoises (regardless of number) will invoke habitat management obligations on a minimum of 200 acres; thereafter, obligations will initiate on an acre-by-acre basis as tortoises are stocked	Obligations to perform habitat management will commence with actual stocking of gopher tortoises; Grantor may quit accepting tortoises at its sole discretion, but habitat management obligations will be carried out in perpetuity

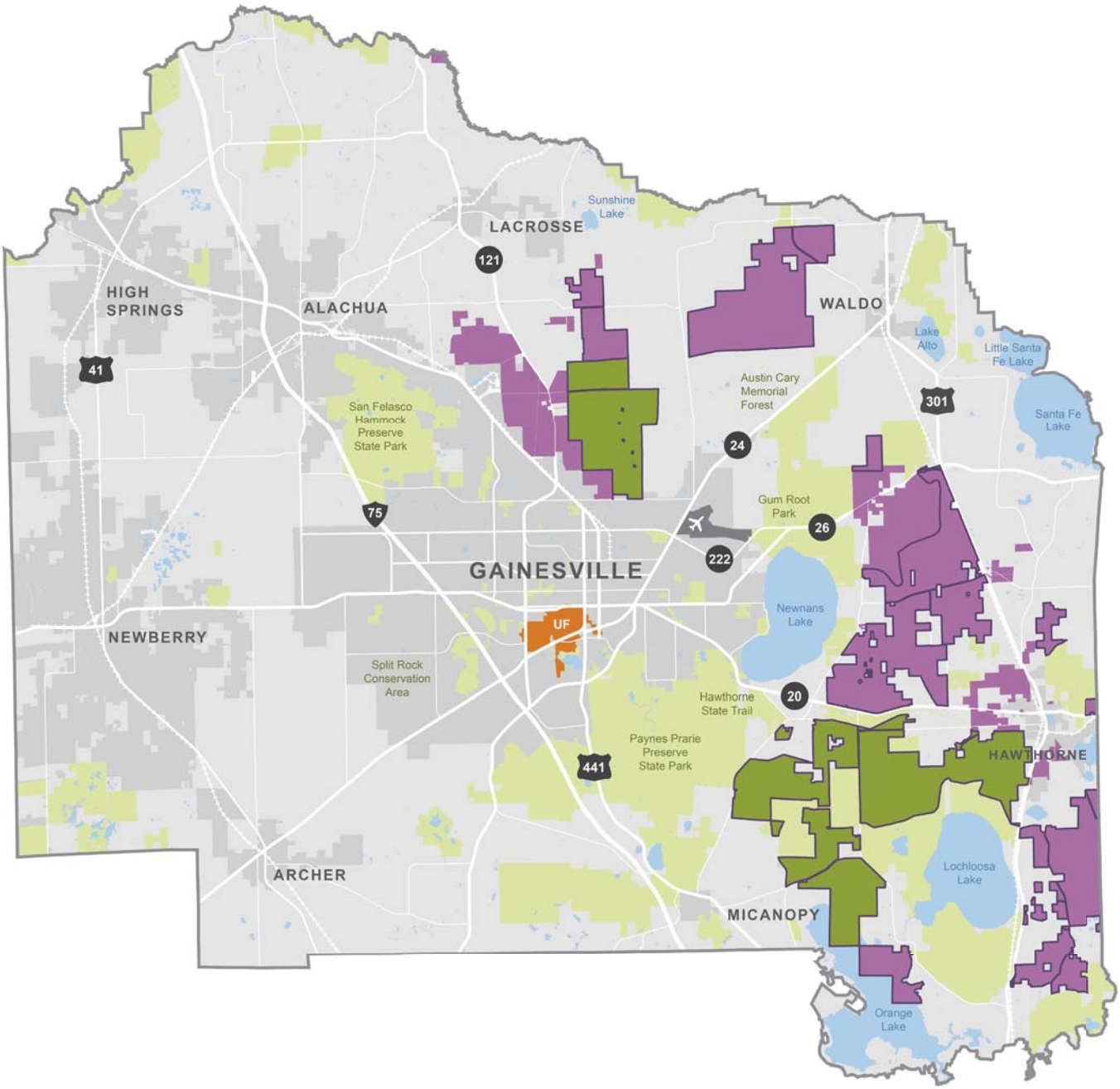


Figure 3.7-1 Existing Conservation Easements on the Plum Creek Property, Alachua County, Florida

- PLUM CREEK EASP PROPERTY
- PLUM CREEK PROPERTY
- PLUM CREEK PROPERTY - EXISTING CONSERVATION EASEMENT
- ALACHUA COUNTY EXISTING CONSERVATION
- MUNICIPALITIES & URBAN CLUSTER

0 8,000 16,000 32,000 48,000 feet

0 5 10 miles

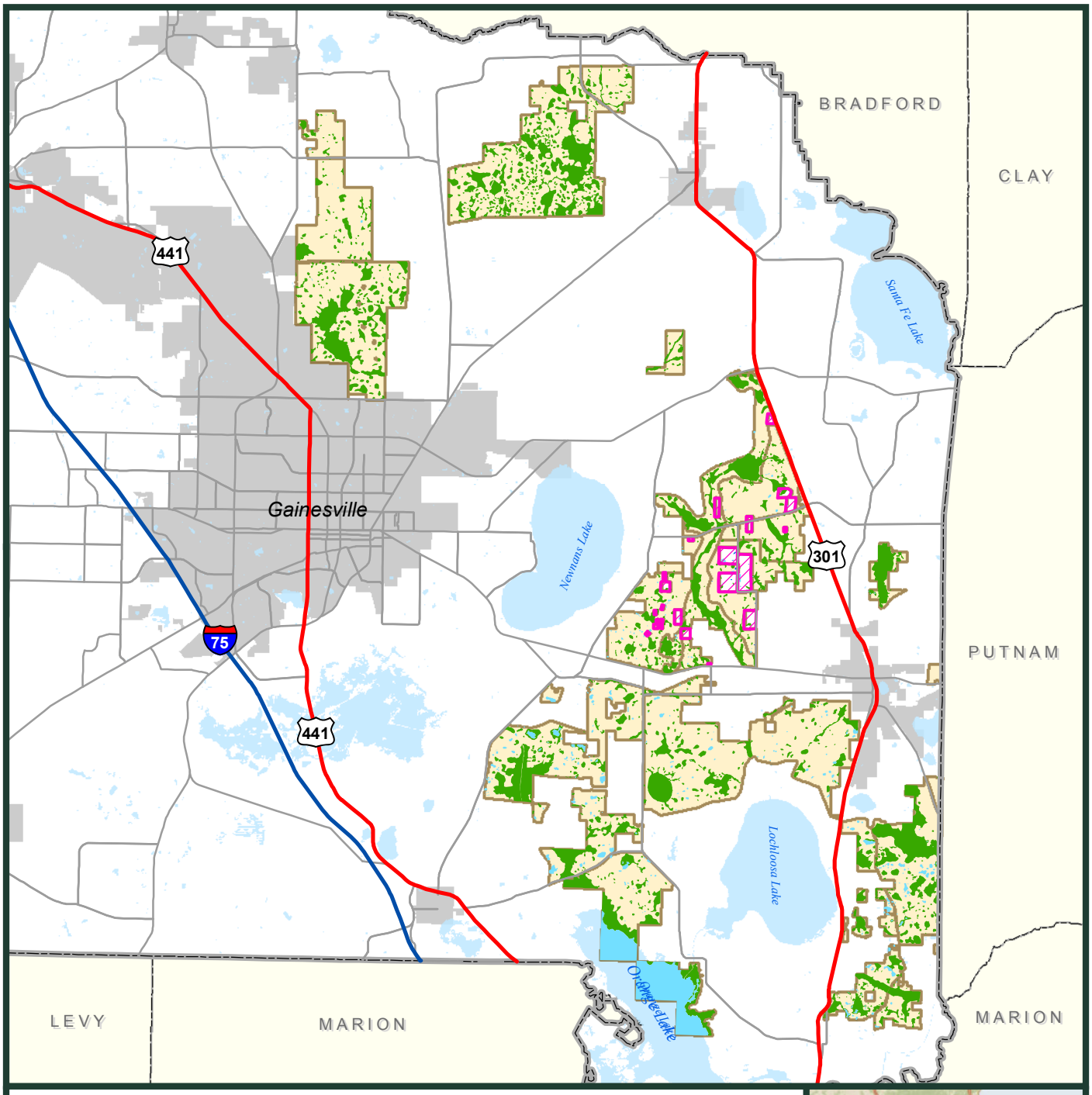
Data Source: Alachua County GIS, Plum Creek
June 2015

3.7.1 Wetland Acreage Analysis

The combined 2010-2011 SJRWMD land use/land cover and modified 2009 SJRWMD land use/land cover data presented previously in section 3.6 indicates there are approximately 15,692 acres of wetlands and 1,580 acres of surface water within the Property (17,272 acres total).

The U.S. Geological Survey (USGS) National Hydrography Dataset (NHD) for Alachua County was last revised in 2003. The NHD was creating by combining USGS hydrologic digital line graphs with U.S. Environmental Protection Agency reach files. The dataset is designed to be used in general mapping and hydrologic feature modeling. USGS NHD mapped wetland features within the Property include 13,140 acres of wetlands and 2,372 acres of surface water (15,512 acres of wetlands and surface water total) (Figure 3.7.1-1).

The U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) map for Alachua County is based on 1984 color infrared aerial photography. Tiner (1999) discusses several problems in utilizing NWI maps including the fact that NWI wetland boundaries are approximately 50 feet wide, but when converted to a line feature in GIS, this boundary dimension is lost. Additionally, several studies suggest NWI maps often underestimate the extent of wetlands, especially in forested areas. The NWI *Notes to Users North Central Florida* state "There is no attempt, in either the design or products of this inventory, to define limits of proprietary jurisdiction of any federal, state, or local government or to establish the geographical scope of regulatory programs of government agencies." The NWI mapped palustrine and lacustrine systems within the Property include 1,078 acres of freshwater emergent wetlands, 11,959 acres of freshwater forested/shrub wetlands, 606 acres of freshwater pond, and 1,936 acres of lake (15,579 acres of wetlands and surface water total) (Figure 3.7.1-2).



Source: Property boundary provided by Sasaki Associates, Inc. May 2015. Alachua County boundary downloaded from Alachua County. Roads downloaded from FDOT. National Hydrography Dataset (NHD) downloaded from FDEP. County boundaries downloaded from FGDL.

FIGURE 3.7.1-1
NATIONAL HYDROGRAPHY DATASET WITHIN THE PLUM CREEK PROPERTY, ALACHUA COUNTY, FLORIDA

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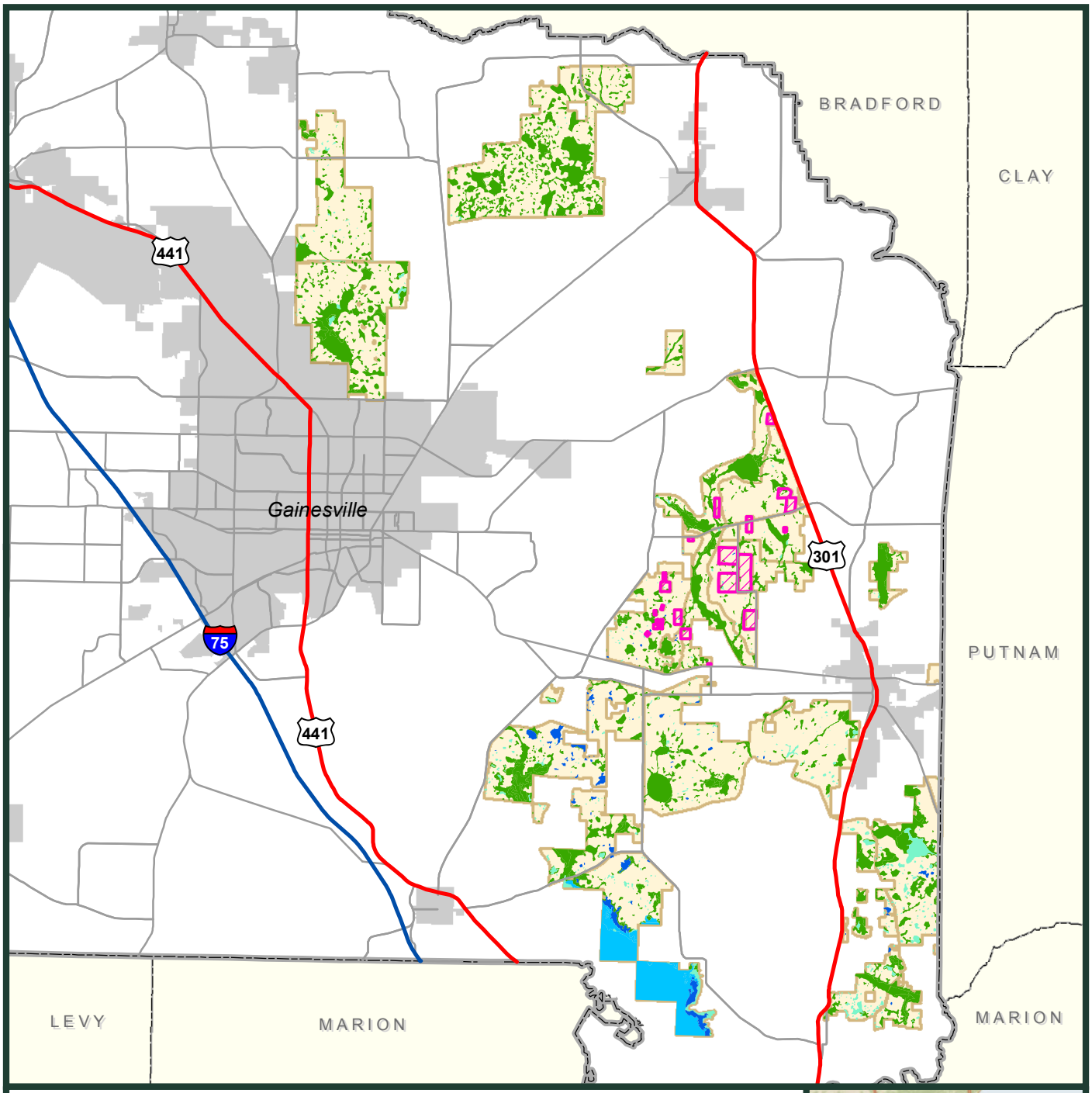
BN, CBT 5/22/2015 P:\ATG\2011029\2013037\Permit_Use\SectorPlan_201504\ARCGIS\NHD_Wetlands.mxd



Plum Creek Property
Out Parcels
Municipalities
Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetland
Freshwater Pond
Lake

0 2 4 Miles
1 inch = 4 miles

Source: Property boundary provided by Sasaki Associates, Inc. May 2015. Alachua County boundary downloaded from Alachua County. Roads downloaded from FDOT. USFWS National Wetlands Inventory (NWI) data and county boundaries downloaded from FGDL.

FIGURE 3.7.1-2
USFWS NATIONAL WETLANDS INVENTORY WITHIN THE PLUM CREEK PROPERTY, ALACHUA COUNTY, FLORIDA

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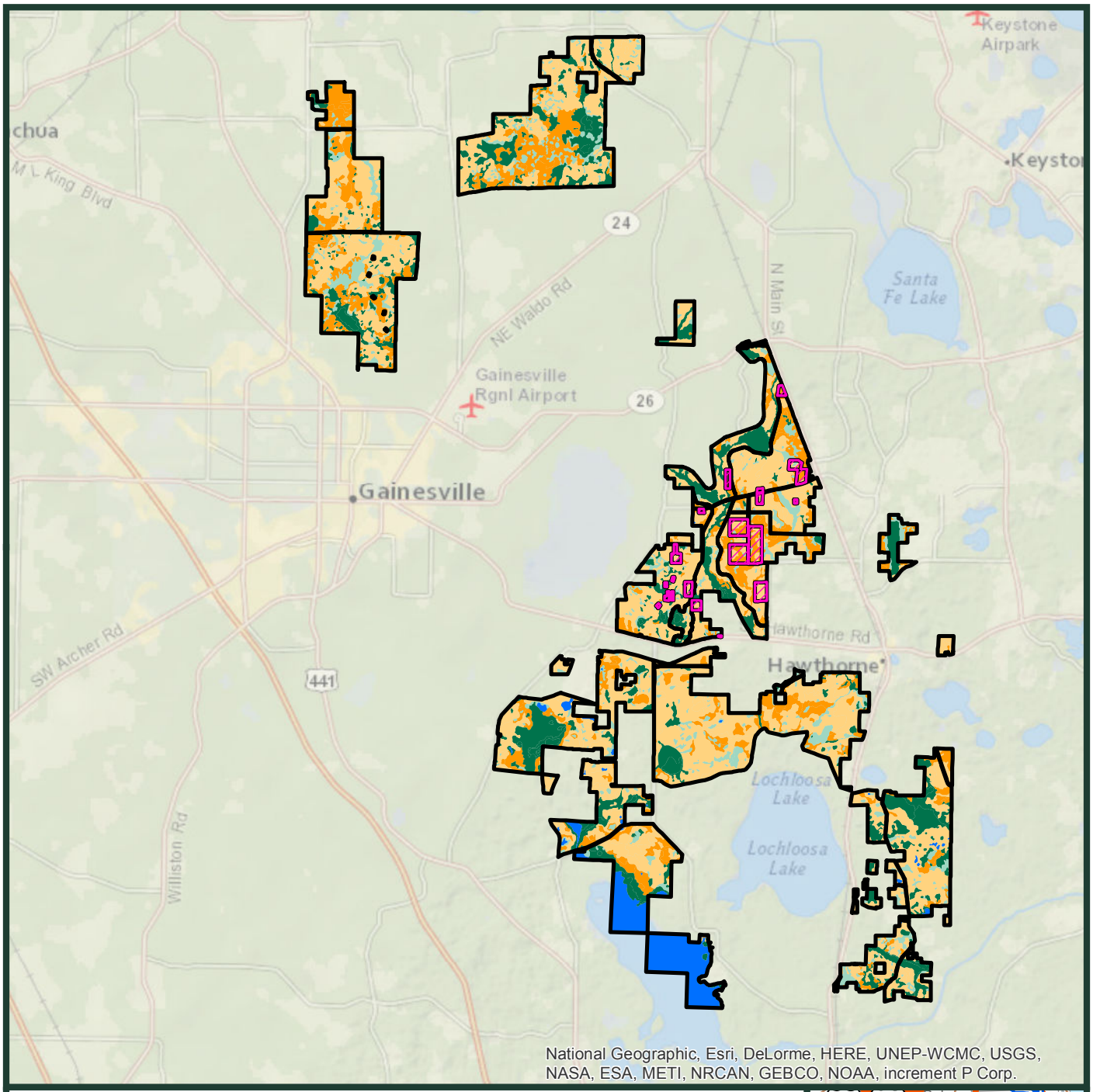
The Soil Conservation Service Alachua County Soil Survey was published in 1985, based on 1974 aerial photography and 1982 field work. The National Technical Committee for Hydric Soils was originally charged with finalizing a definition of hydric soils and creating a list of hydric soils; this was not accomplished until the early 1980s. The soil survey itself does not provide wetland data, but rather focuses on soil properties for land management. The presence of a hydric soil is one of three factors utilized to meet the definition of a jurisdictional wetland; therefore, hydric soil lists were compiled for each county. Any map unit with a hydric soil component, even if the component makes up as little as 1% of the map unit in the county, appears on the hydric soil list. The NRCS Web Soil Survey provides hydric ratings by soil map units according to the percent of hydric components that comprise the map unit. According to the NRCS hydric ratings, 9,767 acres within the Property are rated as Hydric (100%) and 4,674 acres are Predominantly Hydric (66-99%) likely to occur within wetlands, while 2,491 acres of the Property are mapped as surface water (16,932 acres of wetlands and surface water total) (Figure 3.7.1-3).

3.8 100-Year Floodplain

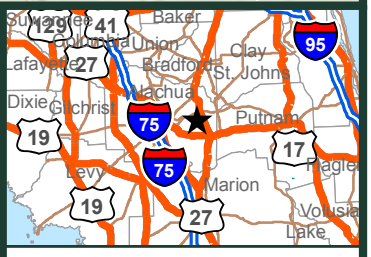
The Digital Flood Insurance Rate Map (DFIRM) (March 2014) for the state of Florida was downloaded from the Florida Geographic Data Library web site hosted by the University of Florida GeoPlan Center. This database contains information about flood hazard areas within many Florida counties, including Alachua County. These zones are used by the Federal Emergency Management Agency (FEMA) to designate Special Flood Hazard Areas for insurance rating purposes, and they are depicted on Flood Insurance Rate Maps. The DFIRM database shows that over half (27,740 acres) of the Property is located within the 100-year floodplain, including the majority of the northeast portion of the Property proposed for conservation (Figure 3.8-1). Areas within the 100-year floodplain generally include surface waters, streams, wetlands, and adjacent uplands.



Legend

- Nonhydric (0%) – Upland
- Predominantly Nonhydric (1-32%) – Upland
- Predominantly Hydric (66-99%) – Wetland
- Hydric (100%) – Wetland
- Surface Water
- Out Parcels
- Plum Creek Property

Source: Property boundary provided by Sasaki Associates, Inc. May 2015. Soils from USDA, NRCS, SSURGO database for Alachua County, FL. December, 2013.



0 2 4 Miles

1 inch = 4 miles

FIGURE 3.7.1-3.
NATURAL RESOURCE CONSERVATION SERVICE HYDRIC RATING MAP OF PLUM CREEK PROPERTY, ALACHUA COUNTY, FLORIDA.

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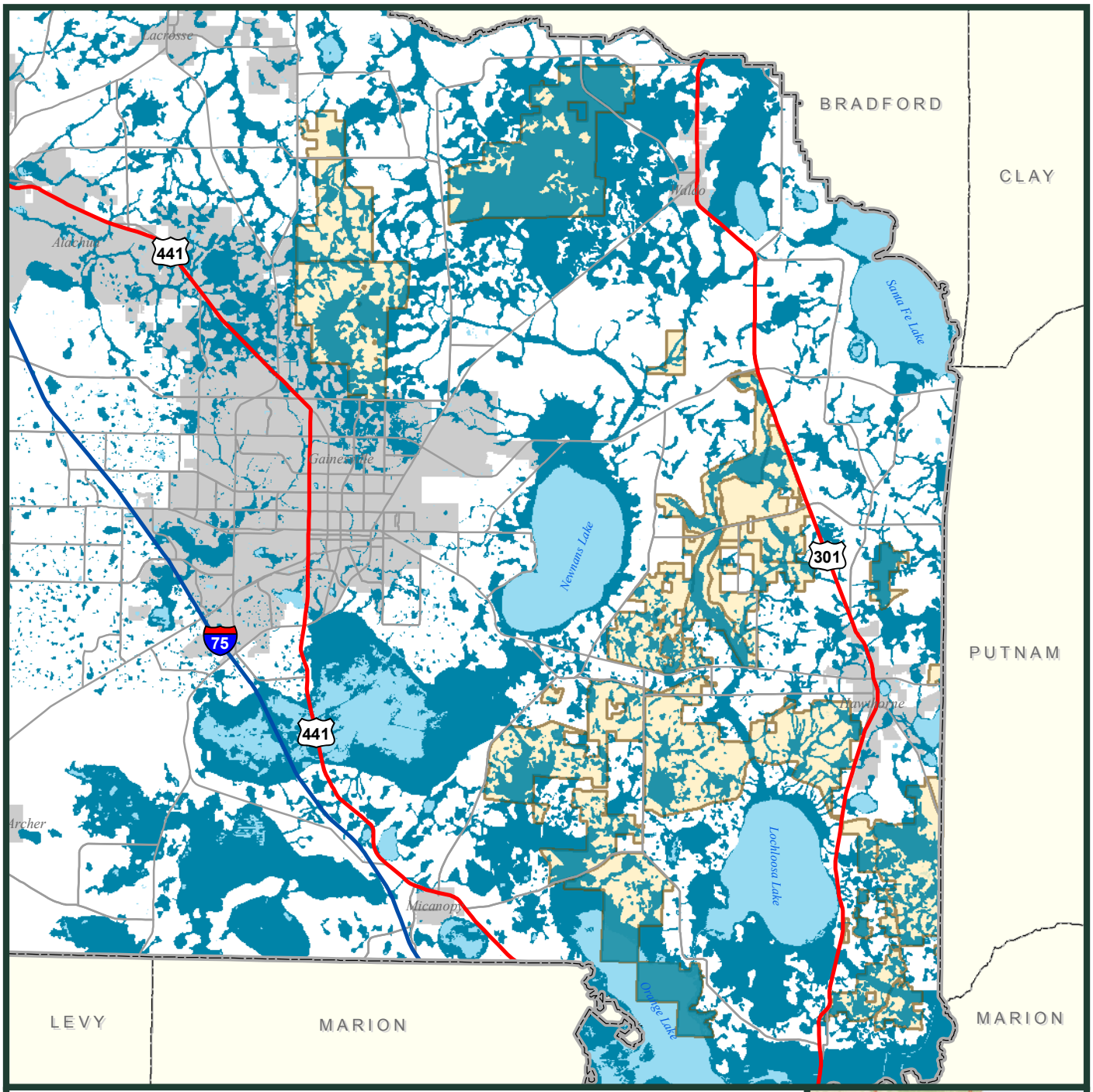
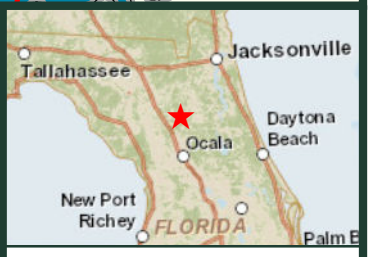


Plum Creek Property
Municipalities
100-Year Floodplains
Water



0 2 4 Miles

1 inch = 4 miles

Source: Property boundary provided by Sasaki Associates, Inc. May 2015. Alachua County boundary downloaded from Alachua County. Roads downloaded from FDOT. FEMA floodplain data(dfirm_fldhaz_jun13) and county boundaries downloaded from FGDL.

FIGURE 3.8-1
100-YEAR FLOODPLAINS WITHIN THE PLUM CREEK PROPERTY, ALACHUA COUNTY, FLORIDA

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BN, CBT 5/21/2015 P:\ATG\2011029\2013037\Permit_Use\SectorPlan_201504\ARCGIS\Floodplains.mxd

There are many recognized benefits of naturally functioning floodplains, including the storage and conveyance of flood waters, recharging of groundwater, maintenance of surface water quality, provision of habitats for fish and wildlife, as well as providing diverse recreational opportunities, and aesthetic value to local communities (FEMA, 1996). The emphasis of the publication *Protecting Floodplain Resources* (FEMA, 1996), cited by Alachua County staff, is on the floodplains of rivers and streams including the adjacent wetlands. One large creek system is located within the Property, Lochloosa Creek and its associated floodplain, which have been proposed for preservation within the Lochloosa Creek corridor. The multiple benefits and values of floodplains, as described in *Protectiong Floodplain Resouces*, that apply to Lochloosa Creek have been addressed in the Plan, which affords protection to Lochloosa Creek, its adjacent wetlands, and broader floodplain. The FEMA publication does not address smaller, isolated mapped depressional floodplains that are not associated with larger flowing water systems. The physical storage and conveyance benefits of these areas are typically addressed during FEMA's review of the Conditional Letter of Map Amendment Revision and Letter of Map Amendment Revision while potential natural resource benefits are reviewed and evaluated in conjunction with the associated wetland and associated upland buffer analysis.

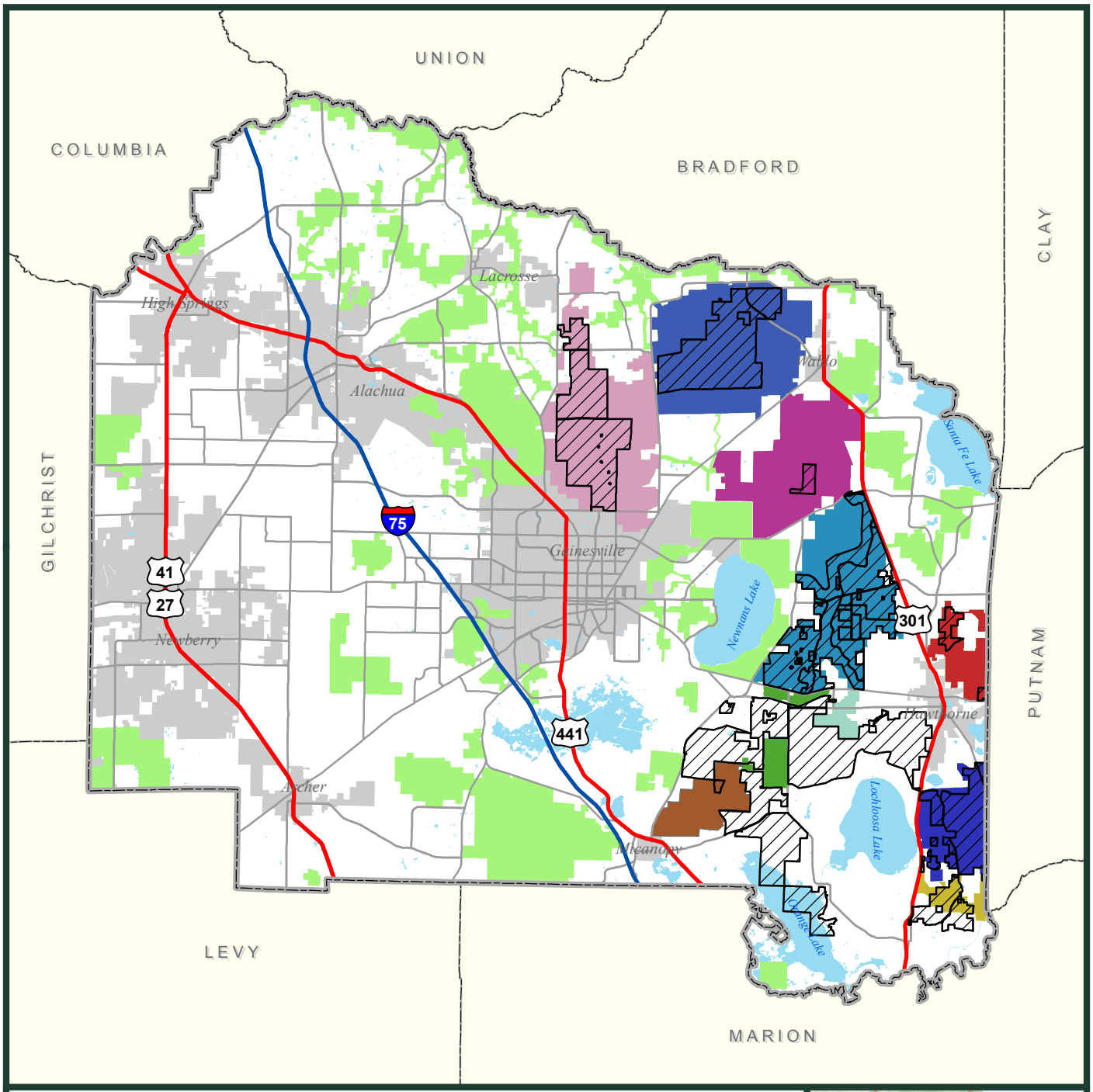
The physical attributes and values of floodplains including the storage and conveyance of flood waters, groundwater recharge, and maintenance of surface water quality are all addressed in the engineering analysis of floodplains, including any compensating storage analysis and the stormwater management plan design. Floodplain values related to fish and wildlife habitat, recreational opportunities, and aesthetic values are primarily addressed in the Lochloosa Creek corridor conservation plan of the floodplain associated with Lochloosa Creek. Any additional floodplain values associated with natural systems on the property will be addressed with specific plans in each Detailed Specific Area Plan.

3.9 Strategic Ecosystems

The Property includes 10 areas mapped as strategic ecosystems according to the Alachua County Ecological Inventory studies of 1987 and 1996 (Figure 3.9-1). These include portions of the Austin Cary Flatwoods, Buck Bay Flatwoods, East Lochloosa Forest, Little Orange Creek, Lochloosa Creek, Lochloosa Creek Flatwoods, Lochloosa Forest Additions, Lochloosa Forest West, Lochloosa Slough, and Northeast Flatwoods. Approximately 33,467 acres (63%) of the total EASP are mapped as straegic ecosystems. The ecosystems were ranked according to six ecological, hydrological, and management parameters to determine their relative importance. Amongst those strategic ecosystems mapped within the Property, Lochloosa Forest West received the highest ranking while the remainder of the strategic ecosystems on the Property received average to low rankings. The Lochloosa Forest West ecosystem located within the Property is proposed for conservation, as are the Austin Carrie Flatwoods, Buck Bay Flatwoods, East Lochloosa Forest, Lochloosa Slough, Lochloosa Forest Additions, Little Orange Creek, and Northeast Flatwoods ecosystems located within the Property. Additionally, portions of the Lochloosa Creek Flatwoods located within the Property are proposed for preservation. Below is a brief summary of each of these communities, utilizing information included in the 1996 report titled *Alachua County Ecological Inventory Project* by KBN, A Golder Associates Company.

<u>Austin Cary Flatwoods</u>

- Located north of SR 26 and west of US 301 in northeast portion of Alachua County.
- Primarily mesic pine flatwoods used for commercial forestry. Includes a significant part of Hatchet Creek and its watershed.
- Priority ranking: 15 (slightly above average)
- Total Size: 12,477.25 acres
- Total EASP Property included within ecosystem: 433 acres (3% of total)



Plum Creek Property

Strategic Ecosystems:

- Austin Cary Flatwoods
- Buck Bay Flatwoods
- East Lochloosa Forest
- Little Orange Creek
- Lochloosa Creek
- Lochloosa Creek Flatwoods
- Lochloosa Forest Additions
- Lochloosa Forest West
- Lochloosa Slough
- Northeast Flatwoods
- Other Strategic Ecosystems

0 3 6 Miles

1 inch = 6 miles

Source: Property boundary provided by Sasaki Associates, Inc. May 2015. Strategic ecosystems, Alachua County boundary, and municipalities boundaries downloaded from Alachua County. Roads downloaded from FDOT. County boundaries downloaded from FGDL.

FIGURE 3.9-1
STRATEGIC ECOSYSTEMS MAPPED WITHIN THE PLUM CREEK PROPERTY, ALACHUA COUNTY, FLORIDA

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- 425 acres (98%) = proposed Conservation
- 8 acres (2%) = proposed Preservation

Buck Bay Flatwoods

- Located north of CR 232, east of SR 121, and west of CR 225 in north-central portion of Alachua County.
- Primarily mesic pine flatwoods used for commercial forestry. Major headwaters area supporting several creek systems.
- Priority ranking: 20 (average)
- Total Size: 18,018.34 acres
- Total EASP Property included within ecosystem: 8,193 acres (45% of total)
  - 1,969 acres (24%) = proposed Conservation
  - 6,224 acres (76%) = existing Conservation

East Lochloosa Forest

- Located east of US 301 in southeast portion of Alachua County.
- Primarily mesic pine flatwoods used for commercial forestry. Important connector between Lochloosa Wildlife Management Area and the Orange Creek and Ocklawaha River basins.
- Priority ranking: 26 (average)
- Total Size: 6,340.29 acres
- Total EASP Property included within ecosystem: 4,496 acres (71%)
  - 100% proposed Conservation

Little Orange Creek

- Located east of US 301, north of SR 20, and south of CR 1474 in east portion of Alachua County.
- Primarily sandhill used for commercial forestry and basin swamp.
- Priority ranking: 39 (below average)
- Total Size: 3,579.10 acres
- Total EASP Property included within ecosystem: 689 acres (19% of total)
    - 100% proposed Conservation

Lochloosa Creek

- Located west of US 301 and south of SR 20 in southeast portion of Alachua County.
- Primarily mesic pine flatwoods and floodplain swamp. Connection between SJRWMD lands north of Lake Lochloosa and wildlife habitat to the north in eastern Alachua County.
- Priority ranking: 20 (average)
- Total Size: 1,251.57 acres
- Total EASP Property included within ecosystem: 25 acres (2% of total)
    - 100% existing Conservation

Lochloosa Creek Flatwoods

- Located east of CR 234, north of SR 20, south of SR 26, and west of US 301 in east portion of Alachua County.
- Primarily mesic pine flatwoods used for commercial forestry. Main headwaters area for Lochloosa Creek.
- Priority ranking: 9 (above average)
- Total Size: 15,759.93 acres

- Total EASP Property included within ecosystem: 10,931 acres (69% of total)
    - 3,519 acres (32%) = proposed Preservation
    - 99 acres (1%) = proposed Conservation
    - 1,953 acres (18%) = Rural
    - 5,360 acres (49%) = Employment Oriented Mixed Use

Lochloosa Forest Additions

- Located south of SR 20, west of US 301, and east of CR 234 in southeast portion of Alachua County.
- Primarily mesic pine flatwoods connected to the Lochloosa Wildlife Management area.
- Priority ranking: 9 (above average)
- Total Size: 2,023.54 acres
- Total EASP Property included within ecosystem: 43 acres (2% of total)
    - 100% existing Conservation

Lochloosa Forest West

- Located east of US 301, north of SR 20, and south of CR 1474 in east portion of Alachua County.
- Primarily mesic pine flatwoods. Single most valuable endangered species location in Alachua County.
- Priority ranking: 4 (high)
- Total Size: 4,274.79 acres
- Total EASP Property included within ecosystem: 133 acres (3% of total)
    - 100% existing Conservation

Lochloosa Slough

- Located east of US 301 and north of CR 318 in southeast portion of Alachua County.
- Primarily mesic pine flatwoods. Provides one of the highest quality and most important wetland connections in Alachua County (Lochloosa Lake to Orange Creek).
- Priority ranking: 15 (slightly above average)
- Total Size: 1,714.98 acres
- Total EASP Property included within ecosystem: 923 acres (54% of total)
    - 100% proposed Conservation

Northeast Flatwoods

- Located west of US 301, north of SR 24, and east of CR 225 in northeast portion of Alachua County.
- Primarily mesic pine flatwoods used for commercial forestry. Forested wetlands are headwaters for streams that flow to Santa Fe River.
- Priority ranking: 15 (slightly above average)
- Total Size: 18,291.95 acres
- Total EASP Property included within ecosystem: 7,601 acres (42% of total)
    - 100% proposed Conservation

In 2007, Creative Environmental Solutions, Inc. and Environmental Consulting & Design, Inc. developed a Strategic Ecosystem Area Method (SEAM) in consultation with the Alachua County Department of Growth Management and Environmental Protection Department, to identify the communities of highest ecological value within the areas mapped as strategic ecosystems, designated Ecologically Significant Areas (ESAs). SEAM consisted of a GIS Suitability Model, literature review, personnel interviews with

land managers, field verification and refinement of model results, and final identification of the ESAs. SEAM incorporated the site summary information from the 1996 KBN report, Alachua County Forever Rapid Ecological Project Assessments, as well as geology, topography, soils, groundwater recharge, Florida Element Occurrences, Focal Species Hotspots, Strategic Habitat Conservation Areas, Florida Fish and Wildlife Conservation Commission (FWC) vegetation and land cover, and SJRWMD FLUCFCS data. The results of their analysis are depicted in Figure 3.9-2. These results were presented to the Alachua County Environmental Protection Department in 2007.

According to Policy 4.10.1 of the Alachua County Comprehensive Plan 2011-2030, the landowner must "conserve strategic ecosystems that are determined through ground-truthing using the KBN/Golder report as a guide to maintain or enhance biodiversity based on an overall assessment". As indicated in Section 406.33 of the Alachua County Unified Land Development Code (as Adopted December 8, 2005 [Ord. 05-10] last amended: August 27, 2013, [Ord. 13-13, 13-14]), areas determined not to contain strategic ecosystems "shall be eligible for consideration for development as part of a development plan or Special Area Plan provided the ecological integrity of the strategic ecosystem as a whole will be sufficiently protected". The 2007 ESAs have been added to the Strategic Ecosystem map depicting the current EASP boundary (Figure 3.9-3). All of the development is proposed within the Lochloosa Creek Flatwoods. Of the 10,931 acres of EASP Property included within the Lochloosa Creek Flatwoods, 2,128 acres were determined to be ESAs, primarily within the Lochloosa Creek corridor proposed for preservation (69%) and rural area where no land use change is proposed (19%).

According to Policy 4.10.5 of the Comp Plan, "Each strategic ecosystem shall be preserved as undeveloped area, not to exceed 50% of the upland portion of the property without landowner consent". The EASP proposes to protect 100% of the uplands in 9 of the 10 County-mapped strategic ecosystems

FIGURE 3.9-2 EAST ALACHUA COUNTY PLUM CREEK ECOLOGICALLY SIGNIFICANT AREAS AND POTENTIAL CONSERVATION ACQUISITION LANDS STRATEGIC ECOSYSTEM AREA METHOD (SEAM)

STATEGIC ECOSYSTEM	TOTAL ACREAGE	ESA ACREAGE
AUSTIN CARY FLATWOODS	1,265	210
BUCK BAY FLATWOODS	9,771	3,870
EAST LOCHLOOSA FOREST	4,358	2,118
HAGUE FLATWOODS	4,469	NIL
LITTLE ORANGE CREEK	2,455	1,590
LOCHLOOSA CREEK FLATWOODS	13,598	2,149
LOCHLOOSA SLOUGH	1,608	958
MORANS PRAIRIE	393	257
NORTHEAST FLATWOODS	7,512	1,459
TOTALS	45,429	12,611

LEGEND

- CITY AND TOWNS
- INTERSTATE
- US HIGHWAY
- STATE ROAD
- COUNTY ROAD
- RIVERS
- PLUM CREEK SEAM PROJECT AREAS
- ECOLOGICALLY SIGNIFICANT AREA (ESA)
- PLUM CREEK FEE TRACTS (ALACHUA COUNTY)
- ALACHUA COUNTY MUNICIPALITIES
- ALACHUA COUNTY
- SURROUNDING COUNTIES
- LAKES
- EXISTING CONSERVATION LANDS
- ALACHUA COUNTY STRATEGIC ECOSYSTEMS

IDENTIFIED CONSERVATION ACQUISITION LANDS

- ALACHUA COUNTY FOREVER
- SJRWMD
- FLORIDA FOREVER BOARD OF TRUSTEE'S

EC&D
environmental consulting & design, inc.
www.ECDFlorida.com
1425 NW 6TH Street
Gainesville, FL 32601
o: 352.371.4333
f: 352.371.0020

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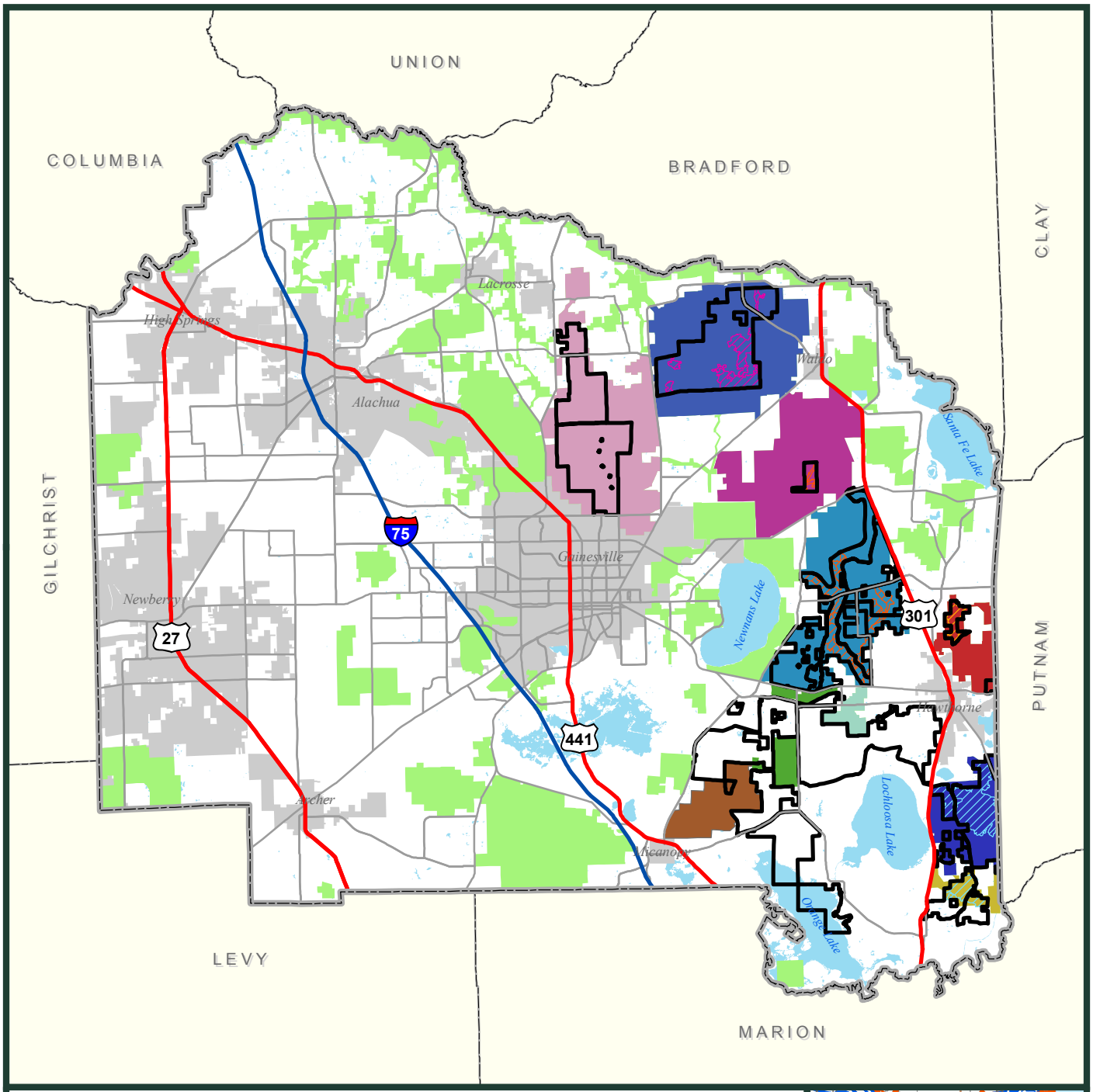


Legend

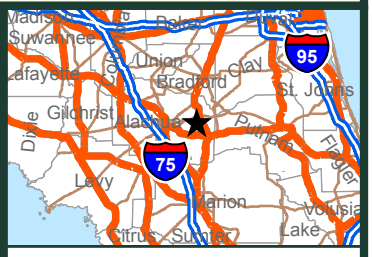
Plum Creek Property

ESA

- ESA Austin Lochloosa Flatwoods
- ESA East Lochloosa SA
- ESA Little Orange Creek
- ESA NE Flatwoods

Strategic Ecosystems:

- Austin Cary Flatwoods
- Buck Bay Flatwoods
- East Lochloosa Forest
- Little Orange Creek
- Lochloosa Creek
- Lochloosa Creek Flatwoods
- Lochloosa Forest Additions
- Lochloosa Forest West
- Lochloosa Slough
- Northeast Flatwoods
- Other Strategic Ecosystems



0 3 6 Miles

1 inch = 6 miles

Source: Property boundary provided by Sasaki Associates, Inc. May 2015. Alachua County. Environmental Consulting & Design, Inc.

FIGURE 3.9-3
ECOLOGICALLY SIGNIFICANT AREAS MAPPED BY ENVIRONMENTAL CONSULTING & DESIGN, INC. WITHIN THE PLUM CREEK PROPERTY, ALACHUA COUNTY, FLORIDA

BDA BREEDLOVE, DENNIS & ASSOCIATES, INC.
Environmental Consultants
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overlapping the Property, exceeding the requirement of Policy 4.10.5. Additionally, approximately 47% of the uplands within the County-mapped Lochloosa Creek Flatwoods strategic ecosystem (excluding rural land use) will be protected from development. Excluding areas of existing conservation and areas remaining in rural land use, the EASP proposes to protect approximately 80% of the uplands mapped as strategic ecosystems.

3.10 Significant Geologic Feature

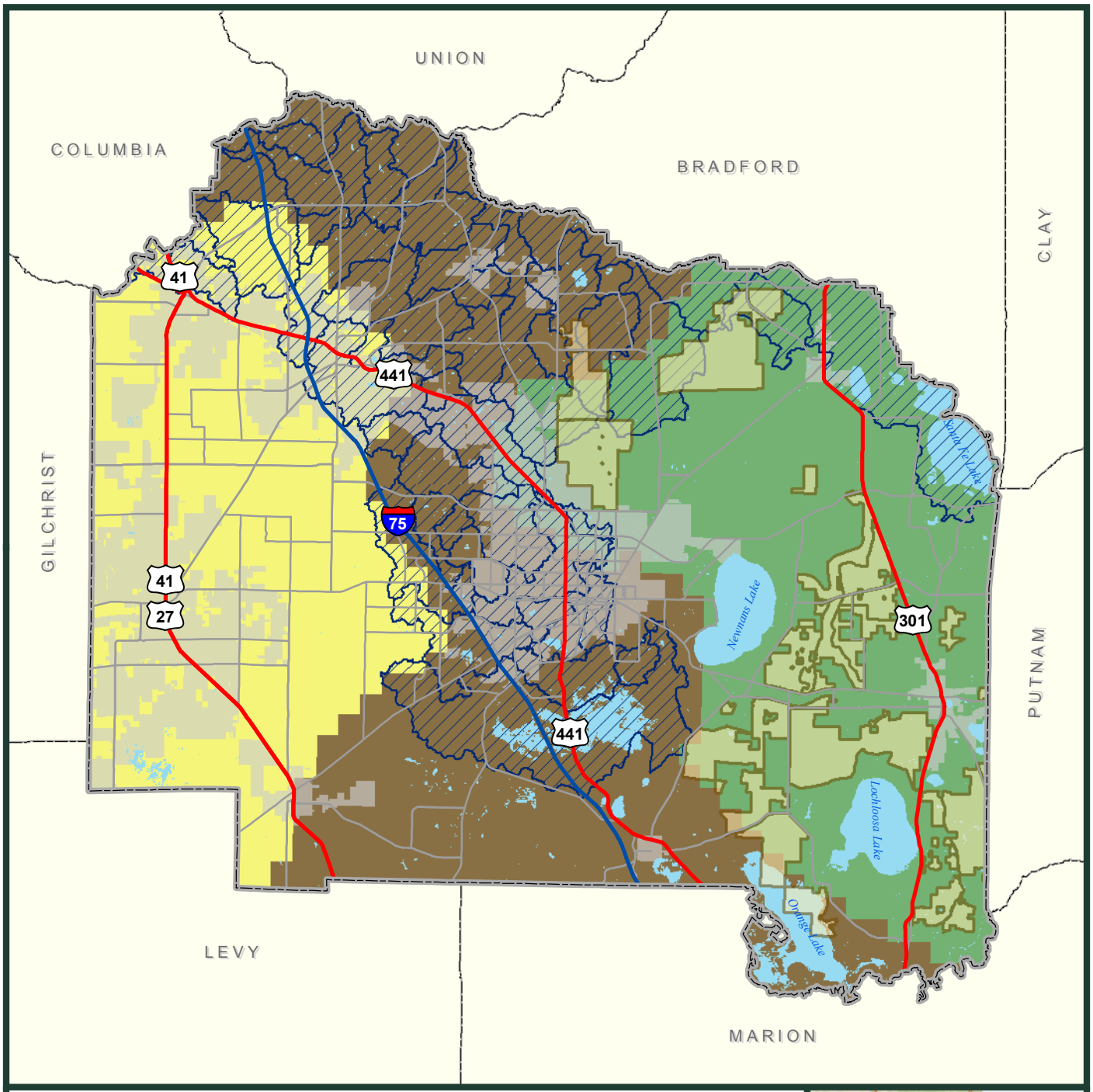
There are no significant geologic features within the Property.

3.11 High Aquifer Recharge Areas

The majority of the Property is located within east Alachua County where the Floridan aquifer system has been determined to have a low vulnerability according to the *Alachua County Aquifer Vulnerability Assessment* (FGS, 2005) and the Alachua County Floridan Aquifer High Recharge Area Map (2008) (Figure 3.11-1). A small area of the Property located north and northeast of the Murphree Wellfield Conservation Easement is within a stream-to-sink surface water basin where the Floridan aquifer system has been determined to be vulnerable. Plum Creek is committed to the protection of Alachua County's water resources and is proposing to conserve this portion of the Property.

3.12 Wellfield Protection Areas and Proposed Wells

The Murphree Wellfield Conservation Easment is included within the northwest portion of the Property. This area includes portions of the primary, secondary, and tertiary Wellfield Protection Areas and includes the proposed location for four future wells (Figure 3.12-1). This area is critical to the public drinking water supply for the Gainesville area and will continue to be protected indefinitely.



Source: Property boundary provided by Sasaki Associates, Inc. May 2015. Floridan Aquifer High Recharge Area and Stream-to-Sink Basins data layers digitized by Breedlove, Dennis & Associates, Inc., from a map published by the Alachua County Environmental Protection Department. Alachua County and municipalities boundaries downloaded from Alachua County. Roads downloaded from FDOT. County boundaries downloaded from FGDL.

FIGURE 3.11-1
LOCATION OF PLUM CREEK PROPERTY WITHIN ALACHUA COUNTY
FLORIDAN AQUIFER HIGH RECHARGE AREA

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Environmental Consultants
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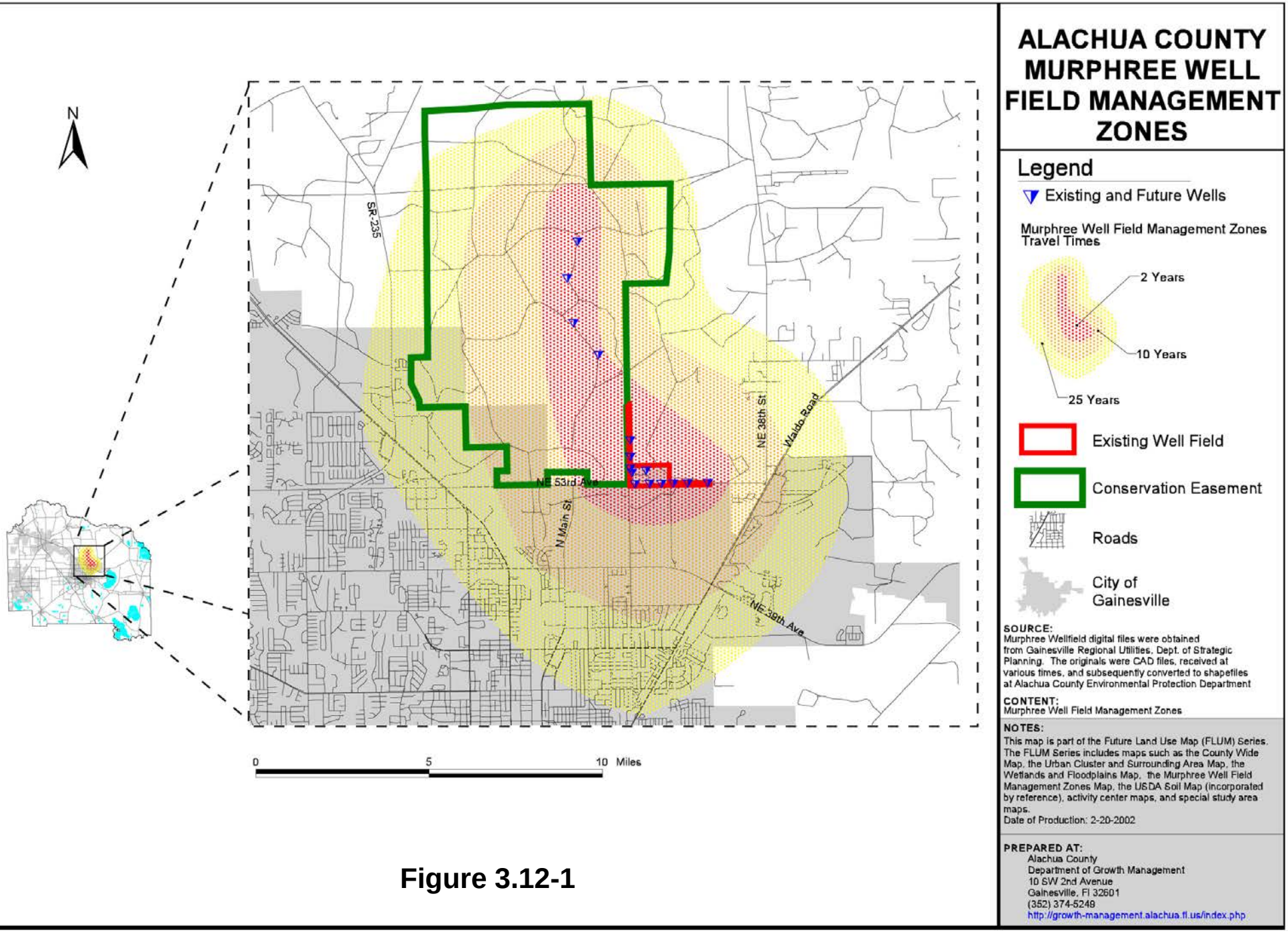

ALACHUA COUNTY
MURPHREE WELL
FIELD MANAGEMENT
ZONES
Legend
Existing and Future Wells
Murphree Well Field Management Zones
Travel Times
2 Years
10 Years
25 Years
Existing Well Field
Conservation Easement
Roads
City of
Gainesville
SOURCE:
Murphree Wellfield digital files were obtained from Gainesville Regional Utilities, Dept. of Strategic Planning. The originals were CAD files, received at various times, and subsequently converted to shapefiles at Alachua County Environmental Protection Department
CONTENT:
Murphree Well Field Management Zones
NOTES:
This map is part of the Future Land Use Map (FLUM) Series. The FLUM Series includes maps such as the County Wide Map, the Urban Cluster and Surrounding Area Map, the Wetlands and Floodplains Map, the Murphree Well Field Management Zones Map, the USDA Soil Map (incorporated by reference), activity center maps, and special study area maps.
Date of Production: 2-20-2002
PREPARED AT:
Alachua County
Department of Growth Management
10 SW 2nd Avenue
Gainesville, Fl 32601
(352) 374-5249
http://growth-management.alachua.fl.us/index.php
N
SR-235
NE 53rd Ave
N Main St
NE 38th St
Waldo Road
NE 39th Ave
0
5
10 Miles

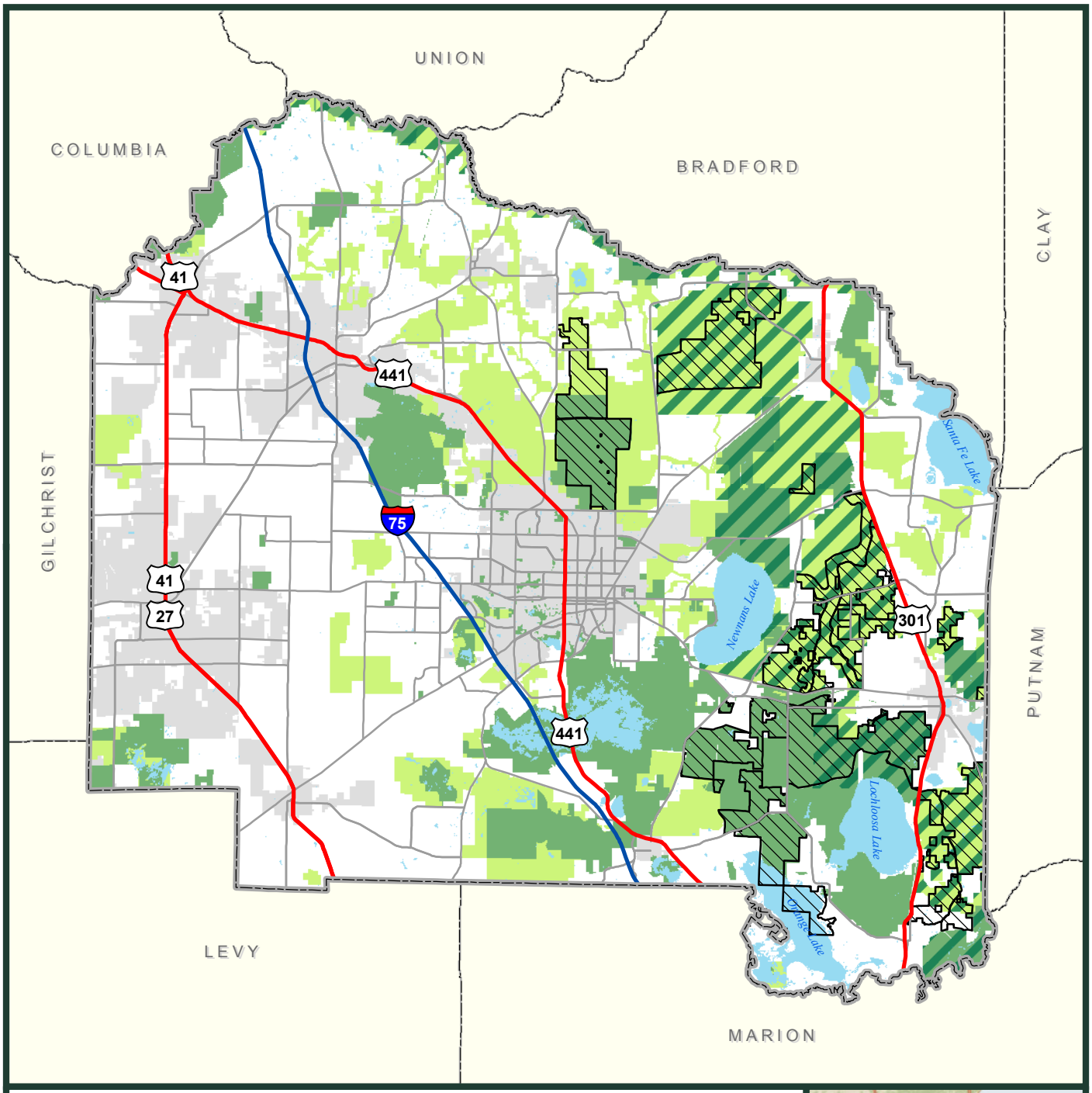
Figure 3.12-1

3.13 Critical Ecological Corridors

The majority of the Property is located within the critical ecological corridor mapped within eastern Alachua County (Figure 3.13-1). Through the extensive Envision Alachua planning process, the importance of maintaining both local and regional environmental and wildlife linkages was emphasized, resulting in the proposed environmental framework map (Figure 2.3.3-1 and Figure 2.3.3-2). The proposed 3,538-acre Lochloosa Creek corridor preserves connectivity between public lands in the eastern portion of Alachua County, maintaining the depicted Critical Ecological Corridor. Additionally, the portions of the Property north of SR 24 and east of US 301 within the mapped Critical Ecological Corridor are also proposed for conservation.

3.14 Critical Lands and Waters Identification Project (CLIP)

The CLIP version 3.0 database and technical report were downloaded from the Florida Natural Areas Inventory (FNAI) web site. CLIP is a GIS database that identifies and ranks areas of Florida important to the long-term conservation of biodiversity, landscapes, water resources, and other natural resource features, but the database is not a conservation plan and no specific conservation actions are recommended. The CLIP database consists of 20 core data layers divided into five resource categories: biodiversity, landscape, water resources, groundwater, and marine. However, only nine core data layers representing priorities for biodiversity, landscapes, and surface water resources are used to produce the CLIP model of Aggregated Priorities that provides an overall prioritization of the Florida landscape for conservation. The Aggregated Priorities layer for CLIP 3.0 showed that Priority 1 areas (i.e., highest ranking areas for conservation) in the region surrounding the Property were associated with Payne's Prairie and lands southeast of Orange Lake (Figure 3.14-1). Priority 1 lands mapped within the Property are associated with Orange and Lochloosa lakes, within the Lochloosa Conservation Easement. Areas of the Property mapped as Priority 2 in the CLIP 3.0 Aggregated Priorities data layer are primarily located



Plum Creek Property

Critical Ecological Corridor

Public Lands

Strategic Ecosystems

0 3 6 Miles

1 inch = 6 miles

Source: Property boundary provided by Sasaki Associates, Inc. May 2015. Strategic ecosystems, Alachua County boundary, and municipalities boundaries downloaded from Alachua County. Public lands downloaded from FNAI. Critical ecological corridors digitized by BDA from a map produced by Alachua County Department of Growth Management. Roads downloaded from FDOT. County boundaries downloaded from FGDL.

FIGURE 3.13-1
CRITICAL ECOLOGICAL CORRIDORS MAPPED WITHIN THE PLUM CREEK PROPERTY, ALACHUA COUNTY, FLORIDA

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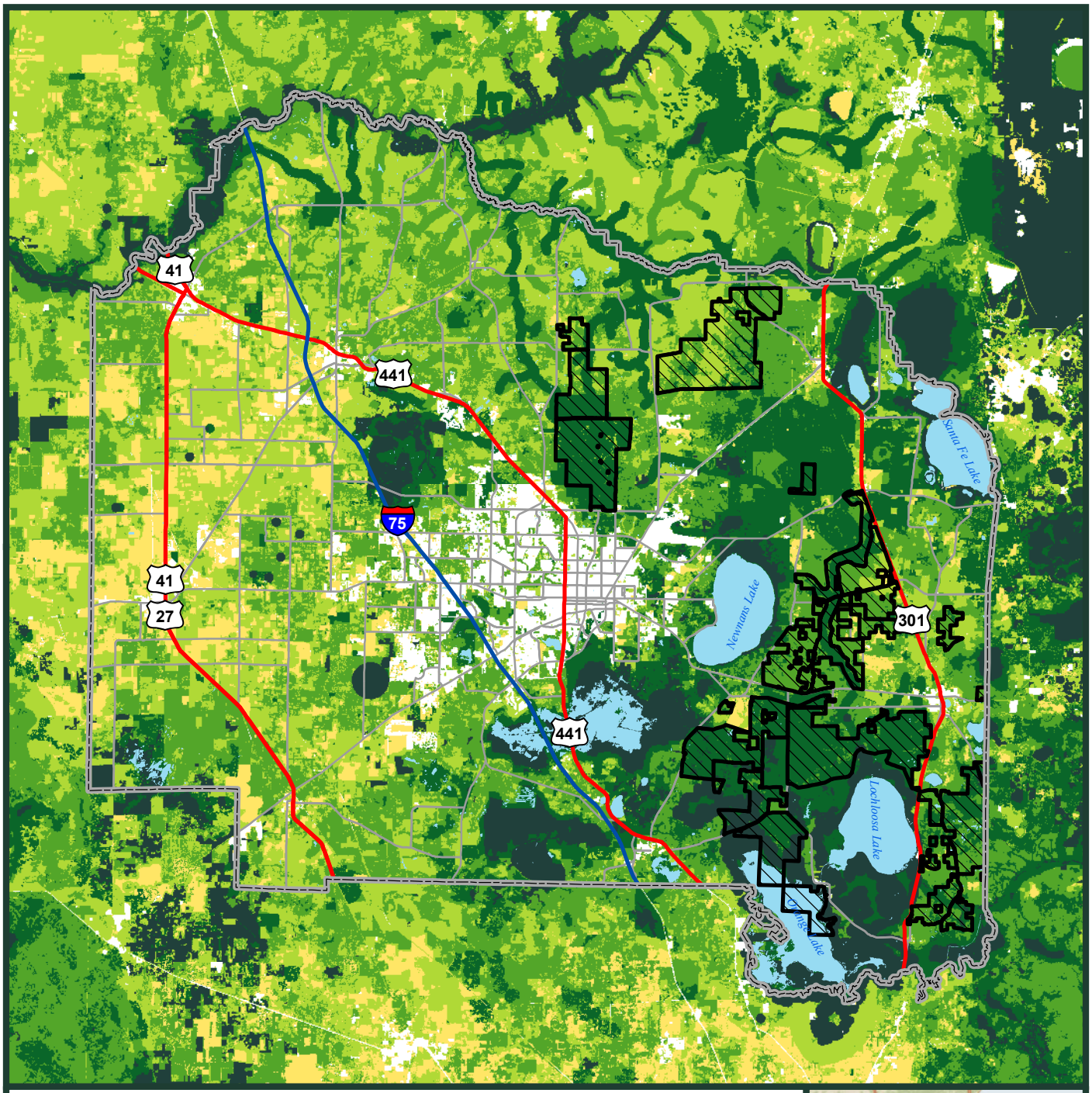

Plum Creek Property

Water

CLIP 3.0 Aggregated Priorities

0 (No Priority)

Priority 5

Priority 4

Priority 3

Priority 2

Priority 1 (Highest)

0 3 6 Miles

1 inch = 6 miles

Source: Property boundary provided by Sasaki Associates, Inc. May 2015. Critical Lands and Waters Project (CLIP) 3.0 data downloaded from FNAI. Alachua County boundary downloaded from Alachua County. Roads downloaded from FDOT. County boundaries downloaded from FGDL.

FIGURE 3.14-1
CLIP 3.0 AGGREGATED PRIORITIES AND THE PLUM CREEK PROPERTY, ALACHUA COUNTY, FLORIDA

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within the Murphree Wellfield Conservation Easement and within the proposed Lochloosa Creek corridor.

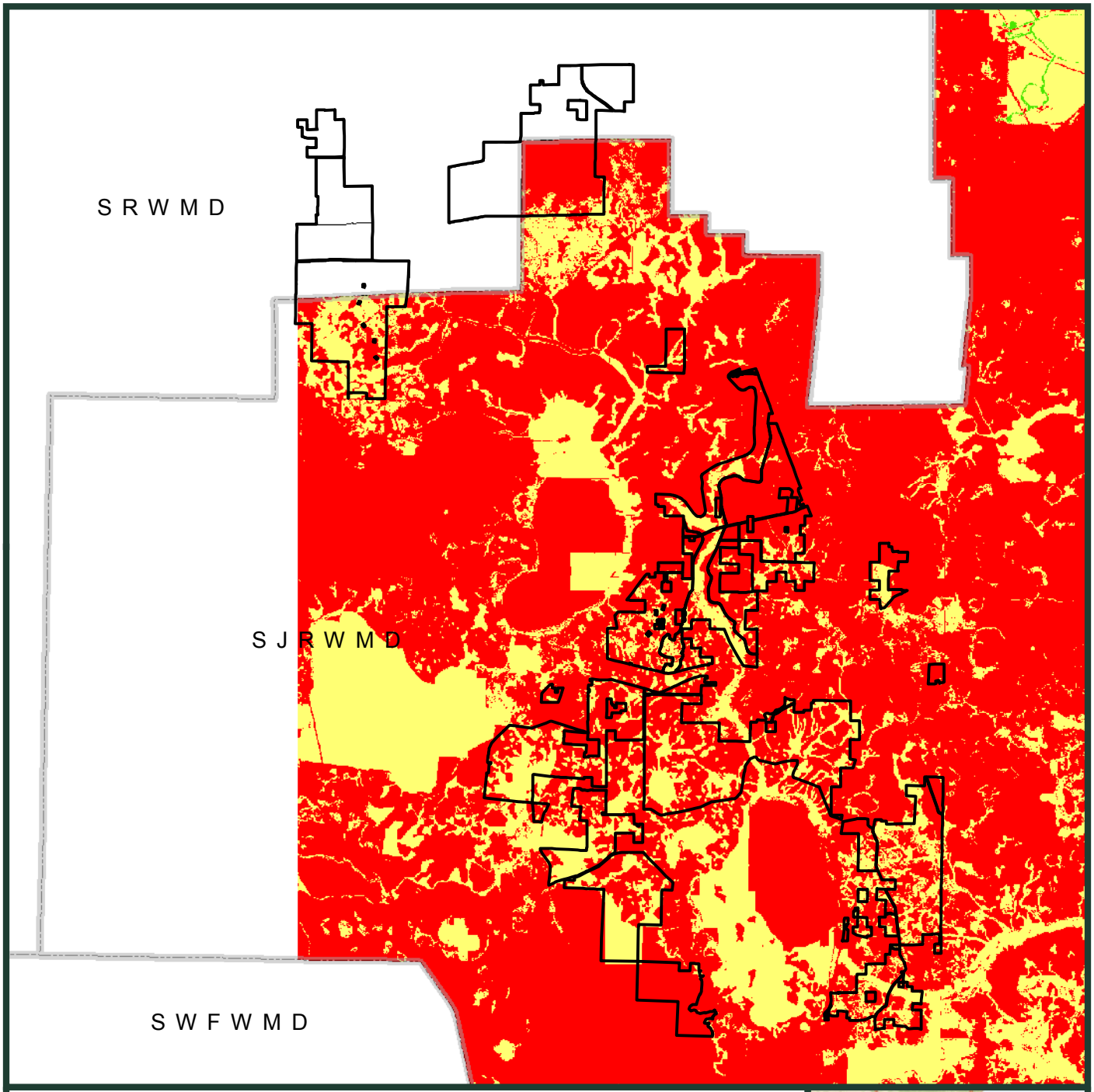
3.15 St. Johns River Water Management District Land Assessment

The 2012, SJRWMD (in coordination with the FNAI, FWC, and University of Florida GeoPlan Center) created a composite natural resource GIS dataset ranking the Overall Conservation Value of land within the SJRWMD boundary. The composite layer sums rankings from four natural resource datasets: natural community, floodplain, Florida Ecological Greenways Network, and Strategic Habitat Conservation Area. There were no areas of highest conservation value (score 10-12) identified within the SJRWMD portion of the Property (Figure 3.15-1). Those areas of medium conservation value (score 7-9) within the Property include much of the Murphree Wellfield Conservation Easement, Lochloosa Conservation Easement, proposed Lochloosa Creek corridor, and proposed conservation east of US 301.

3.16 Federal and State Listed Species

State and federal databases were reviewed to determine the likelihood of occurrence for protected species of plants and animals that occur or are likely to occur within the Property and within Alachua County. Statewide GIS databases of known locations and potential habitat models for rare and imperiled species were researched. Upland and wetland communities were also evaluated during field studies to determine the occurrence or likelihood of occurrence for protected wildlife and plant species within the Property.

Species of wildlife and plants protected under provisions of the Endangered Species Act (ESA) of 1973, 16 United States Code 1531-1544, December 28, 1973, as amended 1976 – 1982, 1984, and 1988 ESA and Florida rule (68A-27.0001-27.007, F.A.C.) known to occur within Alachua County are represented in Table 3.16-1. The likelihood of occurrence, listed within this table, is based on a comparison of known



Legend

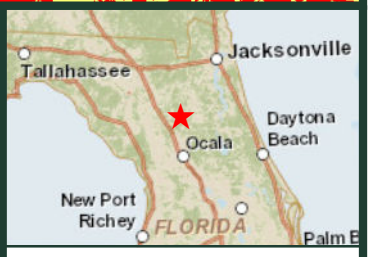
Plum Creek Property

Water Management Districts

Overall Conservation Values

Highest

Lowest



0 2 4 Miles

1 inch = 4 miles

Source: Property boundary provided by Sasaki Associates, Inc. May 2015. Conservation Values from St. Johns River Water Management District Lands Assessment Project Documentation Report; 2011-2012.

FIGURE 3.15-1
SJRWMD OVERALL CONSERVATION VALUE DATASET WITHIN THE PLUM CREEK PROPERTY, ALACHUA COUNTY, FLORIDA.

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Table 3.16-1 Federal and State Protected Plants and Animals with Potential for Occurrence on Plum Creek Property, Alachua County, Florida.

Species	Habitat of Occurrence	Likelihood of Occurrence	Designated Status[1]	
			USFWS[2]	FWC[34]
INVERTEBRATES				
Palamonetes cummingi Squirrel Chimney cave shrimp	Flooded sinkhole.	Not Applicable	T	FT
FISH				
Micropterus notius Suwannee bass	Rivers.	Not Applicable	—	SSC
AMPHIBIANS				
Ambystoma cingulatum flatwoods salamander	Pine flatwoods, cypress swamp.	Low	T	FT
Lithobates capito gopher frog	Xeric oak scrub, sand pine scrub, sandhill, upland hardwoods, pine flatwoods, freshwater marsh.	Moderate	—	SSC
REPTILES				
Alligator mississippiensis American alligator	Freshwater marsh, cypress swamp, mixed hardwood swamp, shrub swamp, bottomland hardwoods, lakes, ponds, rivers, streams.	High	T (S/A)	FT (S/A)
Drymarchon corais couperi eastern indigo snake	Xeric oak scrub, sand pine scrub, sandhill, pine flatwoods, pine rocklands, tropical hardwood hammock, hydric hammock, wet prairie, mangrove swamp.	Moderate to High	T	FT

Table 3.16-1 Continued.

Species	Habitat of Occurrence	Likelihood of Occurrence	Designated Status[1]	
			USFWS[2]	FWC[34]
Gopherus polyphemus gopher tortoise	Sandhill, sand pine scrub, xeric oak scrub, coastal strand, xeric hammock, dry prairie, pine flatwoods, mixed hardwood–pine forests, ruderal.	High (observed)	—	ST
Macroclemys temminckii alligator snapping turtle	Rivers.	Not Applicable	—	SSC
Pituophis melanoleucus mugitus Florida pine snake	Xeric oak scrub, sand pine scrub, sandhill, scrubby pine flatwoods, old fields on former sandhill and scrub sites.	High	—	SSC
Pseudemys concinna suwanniensis Suwannee cooter	Rivers, large streams, spring runs, and associated backwaters and impoundments.	Unlikely	—	SSC
Stilosoma extenuatum short-tailed snake	Sandhill, xeric hammock, sand pine scrub, xeric oak scrub.	Unlikely	—	ST
BIRDS				
Aramus guarauna limpkin	Freshwater marsh, mixed hardwood swamp, rivers, streams, spring runs, lake margins, ruderal.	Low	—	SSC
Athene cunicularia burrowing owl	Sandhill, dry prairie, pastures, ruderal.	Unlikely	—	SSC
Egretta caerulea little blue heron	Freshwater marsh, various types of forested wetlands, lakes, streams, salt marsh, mangrove swamp, tidal mud flats.	High	—	SSC

Table 3.16-1 Continued.

Species	Habitat of Occurrence	Likelihood of Occurrence	Designated Status[1]	
			USFWS[2]	FWC[34]
Egretta thula snowy egret	Freshwater marsh, various types of forested wetlands, streams, lakes, salt marsh, mangrove swamp, tidal mud flats, impoundments, ditches.	High	—	SSC
Egretta tricolor tricolored heron	Salt marsh, mangrove swamp, tidal mud flats, tidal creeks, tidal ditches, freshwater marsh, various types of forested wetlands, lakes and ponds.	High	—	SSC
Eudocimus albus white ibis	Freshwater marsh, various types of forested wetlands, salt marsh, mangrove swamp, tidal mud flats, ruderal.	High	—	SSC
Falco sparverius paulus southeastern American kestrel	Sandhill, pine flatwoods, dry prairie, pasture, old field.	Low	—	ST
Grus canadensis pratensis Florida sandhill crane	Dry prairie, freshwater marsh, pasture.	Low	—	ST
Mycteria americana wood stork	Freshwater marsh, various types of forested wetlands, ponds, salt marsh, mangrove swamp, tidal mud flats, lagoons, flooded pastures.	Low	T	FT
Picoides borealis red-cockaded woodpecker	Sandhill, pine flatwoods.	Unlikely	E	FE

Table 3.16-1 Continued.

Species	Habitat of Occurrence	Likelihood of Occurrence	Designated Status[1]	
			USFWS[2]	FWC[34]
MAMMALS				
Podomys floridanus Florida mouse	Xeric oak scrub, sand pine scrub, sandhill.	Low	—	SSC
Sciurus niger shermani Sherman's fox squirrel	Sandhill, pine flatwoods, pastures.	High (observed)	—	SSC

[1] Federal Designations: E = Endangered; T = Threatened; T(S/A) = Threatened Due to Similarity of Appearance; State Designations: ST = State-designated Threatened; SSC = State Species of Special Concern; ST(S/A) = State-designated Threatened Due to Similarity of Appearance; FE = Federally-designated Endangered; FT = Federally-designated Threatened; FT(S/A) = Federally-designated Threatened Due to Similarity of Appearance.

[2] U.S. Fish and Wildlife Service.

[3] Florida Fish and Wildlife Conservation Commission.

[4] Species are listed as "Federally-designated endangered or threatened species" on the Florida Endangered and Threatened Species list but regulatory authorizations for take are only provided by the federal agency administering the species under the Endangered Species Act of 1973, as amended. These state classifications are pending reclassification in accordance with revisions to Rules 68A-27.003, 68A-27.005, 68A-27.0012 and 68A-27.0021, Florida Administrative Code, for managing imperiled species as adopted by the Florida Fish and Wildlife Conservation Commission on September 1, 2010, effective November 15, 2010.

general habitat requirements by these species with the habitats found on or near the Property, the quantity, quality, and adjacency of these habitats, as well as any observations of these species during preliminary field investigations. The likelihood of occurrence for protected species was rated as observed (i.e., species presence documented), high, moderate, low, unlikely, or not applicable based on knowledge of a species' habitat preference and site conditions. A likelihood of occurrence given as "unlikely" indicates that no, or very limited, suitable habitat for this species exists on the Property, but the Property is within the documented range of the species; "not applicable" indicates that the habitat for this species does not exist on or adjacent to the Property and/or the Property is not within the documented range of the species.

3.16.1 Amphibians and Reptiles

3.16.1.1 Gopher Tortoise (*Gopherus polyphemus*)

The gopher tortoise is listed as Threatened (T) by the FWC but is not listed as T or Endangered (E) by the USFWS. However, USFWS determined in a 12-month finding published on July 27, 2011, that listing of the gopher tortoise as T in the eastern portion of its range is warranted under the ESA. Gopher tortoises were added to the candidate species list with the publication of the 12-month finding, but the USFWS has taken no further action. Gopher tortoises occur in a variety of natural and disturbed habitats characterized by well-drained loose soils in which to burrow, low-growing herbaceous vegetation used for food, and open sunlit areas for nesting (Diemer 1992, Mushinsky et al. 2006). Gopher tortoises typically inhabit sites with soils that support sandhill, scrub, and pine flatwoods habitats (Enge et al. 2006), and sandhill and mesic flatwoods soils cover approximately 21,356 acres (40%) of the site.

Reported annual average home range sizes vary from 1.2 to 4.7 acres for males and from 0.2 to 1.6 acres for females (Enge et al. 2006). Cox et al. (1987) indicate that patches of habitat must be at least 25-50 acres in size to support a minimally viable population of gopher tortoises, but Eubanks et al. (2002) found

that 47-101 acres were needed to support populations of this size. Mushinsky et al. (2006) considered 250 acres to be the minimum area necessary to maintain a population of tortoises, and a buffer zone surrounding the 250-acre parcel would provide additional security. FWC habitat models (Cox et al. 1994, McCoy et al. 2002, Endries et al. 2009) indicate the Property contains potentially suitable gopher tortoise habitat. Most of the areas mapped as potentially suitable gopher tortoise habitat are within the Lochloosa Conservation Easement. Plum Creek currently operates a FWC gopher tortoise recipient site within a portion of the Lochloosa Conservation Easement. FWC Gopher Tortoise Permitting Guidelines provide that sites that are Acceptable as recipient sites for the long-term relocation of gopher tortoises should be >40 acres in size and have a minimum annual depth to water table of >18 inches. The Property contains approximately 14,485 acres of appropriate soil types, most of which support pine plantations of various ages that meet the criterion for Acceptable relocation sites. This information and field observations indicate that gopher tortoises have a high likelihood of occurring on the Property.

3.16.1.2 Eastern Indigo Snake (*Drymarchon couperi*)

The eastern indigo snake is listed as T by USFWS. The primary reasons for this listing status are over-collection and habitat loss (Moler 1992). Eastern indigo snakes are found in a variety of habitats throughout Florida, including pine flatwoods, scrubby flatwoods, sandhill, dry prairie, tropical hardwood hammocks, edges of freshwater marshes, agricultural fields, coastal dunes, and human-altered habitats (USFWS 2008). Eastern indigo snakes often winter in the burrows of gopher tortoises in northern portions of the range, but they also may take shelter in hollowed root channels, hollow logs, stump holes, trash piles, or the burrows of rodents, armadillos (*Dasypus novemcinctus*), or land crabs (*Cardisoma guanhumi*) in wetter habitats (USFWS 2008, USFWS 2011). Eastern indigo snakes are capable of moving considerable distances in a short period of time as demonstrated by records of movements of 2.2 miles in 42 days and 2.4 miles in 176 days (USFWS 2008). One individual was observed to have moved

13.8 miles over a two-year period in a mark-recapture study in southeastern Georgia (Stevenson and Hyslop 2010). Reported home range sizes of eastern indigo snakes in peninsular Florida range from 4 to 818 acres (USFWS 2011), and mean home range size reported from one Florida study was 292 acres (Dodd and Barichivich 2007). Radio-telemetry studies of indigo snakes in Georgia have revealed home ranges sizes of 87.5 to 8,885 acres for females and 350 to 3,825 acres for males (Hyslop 2007). Indigo snakes apparently need a mosaic of habitats to complete their life cycle, often feeding along wetland edges (Moler 1992). Population viability modeling suggests that indigo snake populations are susceptible to habitat fragmentation resulting from construction of roads and intensive human developments in occupied habitats, and that large areas protected from roads and human developments are needed to maintain viable snake populations (Breininger et al. 2004). USFWS (2011) requires surveys to determine the presence of indigo snakes on sites in north and central Florida when impacts are projected for more than 25 acres of xeric habitat or for more than 25 active and inactive gopher tortoise burrows. Occurrence databases available from the FWC and FNAI contain two records of eastern indigo snakes approximately 1.0 mile north of Orange Lake within the Lochloosa Conservation Easement. There are additional scattered records to the west and east of the Property. Older FWC habitat models (Cox et al. 1994) indicate that most areas of all parcels were mapped as potentially suitable indigo snake habitat. However, more recent FWC models (Endries and Enge, unpublished data) indicate a more scattered distribution in the landscape surrounding the Plum Creek Property, with most areas mapped as habitat potentially suitable for indigo snakes occurring within the Lochloosa Conservation Easement. Indigo snakes have a moderate to high potential to occur onsite based on previous occurrence records and the large area and mix of vegetation types present.

3.16.1.3 Florida Pine Snake (*Pituophis melanoleucus mugitus*)

The Florida pine snake is listed as a Species of Special Concern (SSC) by the FWC but is not listed as T or E by the USFWS. The Property is within the range of the Florida pine snake as mapped by Franz (1992). Florida pine snakes occur in open xeric habitats, including longleaf pine – turkey oak (*Quercus laevis*) sandhills, sand pine (*Pinus clausa*) scrub, scrubby pine flatwoods, and old fields on former sandhill sites (Franz 1992). Florida pine snakes are extremely fossorial, seeking out the tunnel systems of pocket gophers (*Geomys pinetis*), and, to a lesser extent, gopher tortoise burrows. Two radio-tracked females exhibited home ranges of 27.5 and 30 acres, and three males used areas two to eight times larger in size (Franz 1992). Available occurrence databases contain no records of Florida pine snakes on or near the site. FWC habitat models (Cox et al. 1994, Endries et al. 2008) indicate areas of potentially suitable habitat occur on the northwest and eastern portion of the Property, as well as within the Lochloosa Conservation Easement. The Property also contains approximately 1,254 acres of soil types that typically support the xeric habitats preferred by this species, of which most areas are east of US 301 or within the Lochloosa Conservation Easement. Florida pine snakes have a high likelihood of occurring on the Property based on the presence of xeric vegetation and soil types preferred by this species.

3.16.1.4 Short-tailed Snake (*Stilosoma extenuatum*)

The short-tailed snake is listed as T by the FWC but is not listed as T or E by the USFWS. Approximately one-third of the parcels are within the range of the short-tailed snake as mapped by Campbell and Moler (1992). Short-tailed snakes are restricted primarily to longleaf pine – turkey oak sandhills, but they may occasionally be found in upland hammocks and sand pine scrub communities, especially when these communities are adjacent to longleaf pines and turkey oaks. Campbell and Moler (1992) report that short-tailed snakes select Norfolk, Blanton, and St. Lucie soils over a variety of other types for burrowing. Short-tailed snakes are secretive burrowers seldom seen above ground except in

April and October. Harvest of longleaf pine and subsequent timber management or conversion of native sandhill habitats to stands of turkey oak appears to severely affect this species (Campbell and Moler 1992). Occurrence databases contain no records of short-tailed snakes on the Property, but there are several records of short-tailed snakes approximately 0.5-2.0 miles west of the Newnans Lake with dates of 1934, 1957, and 1992. The only areas of the site mapped as potential short-tailed snake habitat by the FWC are on the Murphree Wellfield and Lochloosa Conservation Easements and a small area in the northeast corner of the portion of the Property south of SR 20 and east of US 301 (Cox and Kautz 2000, Endries et al. 2008). It is unlikely that short-tailed snakes occur on portions of the Property not under conservation easement due to the disturbed nature of the areas with the potential to support the species.

3.16.1.5 American Alligator (*Alligator mississippiensis*)

The American alligator is listed as T due to similarity of appearance (to other crocodilians) by the USFWS. American alligators are found throughout Florida in permanent water bodies of freshwater including marshes, swamps, lakes, reservoirs, and rivers. There is a high likelihood of occurrence of alligators on the Property.

3.16.1.6 Gopher Frog (*Rana capito*)

The gopher frog is listed as SSC by the FWC but is not listed as T or E species by the USFWS. The Property is within the range of the gopher frog as mapped by Godley (1992). The distribution of gopher frogs seems to be restricted to that of gopher tortoises (Godley 1992). Gopher frogs typically occur in native, xeric, upland habitats, particularly longleaf pine – turkey oak sandhills which often support the densest populations of gopher tortoises. However, gopher frogs are also known from pine flatwoods, sand pine scrub, xeric hammocks, and the early successional stages of these communities. Preferred breeding habitats include seasonally flooded, grassy ponds, and cypress heads that lack fish populations

(Godley 1992). Gopher frogs will disperse up to 1.0 mile from breeding ponds to occupy gopher tortoise burrows, but they may also occupy a variety of other retreats including the burrows of rodents and crayfish (*Procambarus* sp.), stump holes, and other crevices (Godley 1992). There is one database record of gopher frogs from 1992 within the Lochloosa Conservation Easement. FWC habitat models (Cox et al. 1994, Endries et al. 2008) indicate that the primary areas of the site mapped as potentially suitable habitat for gopher frogs are on lands within the Lochloosa Conservation Easement. There is a moderate likelihood that gopher frogs occur on the Property based the presence of flatwoods habitats, small areas of xeric soil types, and the confirmed presence of gopher tortoises.

3.16.1.7 Flatwoods Salamander (*Ambystoma cingulatum*)

The flatwoods salamander is listed as T by the USFWS. The Property is at the western edge of the range of the flatwoods salamander as mapped by Ashton (1992). The flatwoods salamander inhabits fire-maintained, open-canopied longleaf pine and slash pine savannas and flatwoods on the southeastern coastal plain (Ashton 1992, Means et al. 1996, Palis 1997). Breeding sites include pine flatwoods depressions such as pond-cypress or blackgum-dominated swamps, graminoid-dominated depressions, roadside ditches, and borrow pits that are generally devoid of large predatory fishes. Adults migrate to breeding sites between October and December and lay eggs on various substrates prior to wetlands filling with water in response to winter rains (Palis 1997). Breeding ponds range in size from 0.05-23.5 acres and generally are <1.6 feet deep (Palis 1996). Post-larval flatwoods salamanders are fossorial, often occupying crayfish (*Procambarus* spp.) burrows, and inhabit mesic pine-wiregrass flatwoods and savannas with little to no midstory and an open overstory in the uplands surrounding breeding ponds. Movements of 1.1 miles have been recorded away from breeding ponds and into surrounding pine flatwoods (Ashton 1992), and movements of 985-1,640 feet away from breeding ponds have also been reported (Means et al. 1996). Home range sizes of 0.37 acre have been reported (Ashton 1992), and

approximately 2,500 acres of terrestrial habitat surrounding a breeding site is probably needed to sustain a breeding population (Palis 1997). Available databases contain one record of flatwoods salamanders occurring on the Property on the Murphree Wellfield Conservation Easement (1947). There are also two records of occurrence within the vicinity of the Proeprty, north (1974) and south (pre-1980) of SR 26 near Newnans Lake Conservation Area. Most of the areas of the site that were mapped as potentially suitable flatwoods salamander habitat by the FWC (Endries et al. 2009) are on lands of the Lochloosa Conservation Easement and the Murphree Wellfield Conservation Easement. Although flatwoods salamanders have been documented on the site, these records are old and it is likely that this species is no longer present based on the absence of recent documented occurrences, FWC models that indicate that very little of the site contains habitats that are potentially suitable for this species, and because intensive silvicultural operations have likely eliminated preferred habitats for flatwoods salamanders.

3.16.1.8 Striped Newt (*Notophthalmus perstriatus*)

The striped newt is not listed as T or E or as SSC by either the FWC or USFWS. However, the USFWS determined in a 12-month finding published on June 7, 2011, that listing of the striped newt as endangered or threatened is warranted under the U.S. ESA of 1973, as amended (USFWS 2011). Striped newts were added to the candidate species list with the publication of the 12-month finding, but for the time being, the USFWS is precluded from taking further action due to limited resources. The Property is within the range of the striped newt as mapped by Christman and Means (1992). The preferred habitat of striped newts is longleaf pine – turkey oak sandhills with an intact ground cover containing wiregrass (*Aristida stricta*), but this species is also found in scrub and scrubby flatwoods habitats (Christman and Means 1992, USFWS 2011). Striped newts have long life spans (approximately 12-15 years) and a complex life history. They breed exclusively in small (typically less than 12.4 acres), isolated, ephemeral ponds that lack predaceous fish and are interspersed in and surrounded by xeric upland habitats (USFWS

2011). Maidencane (*Panicum hemitomon*) has been found at ephemeral ponds where striped newts have been found and seems to be a good indicator of previous extent of flooding in ponds (LaClaire and Franz 1990, LaClaire 1995). This species occupies terrestrial habitats at considerable distances from breeding ponds. Striped newts have been observed to have moved up to 2,330 feet from ponds into surrounding uplands (Dodd and Cade 1998), and Dodd (1996) found that only 28 percent of amphibians were captured >1,300 feet from wetlands. Johnson (2003) recommended a protected area extending 3,280 feet from breeding sites as upland "core habitat" surrounding breeding ponds. Striped newts form metapopulations that persist in isolated fragments of longleaf pine-wiregrass ecosystems, with ponds functioning as focal points for local breeding populations (Johnson 2001, Johnson 2005). Maintaining connectivity between uplands and breeding ponds of diverse hydroperiods is essential for striped newts to recolonize local breeding ponds and maintain metapopulation viability (Johnson 2005, Dodd and Johnson 2007).

Available databases contain three records of striped newts on the Lochloosa Conservation Easement, one of which was undated and the other two with dates of 1973 and 1985. FWC habitat models (Endries et al. 2009) mapped a very small area of the Lochloosa Conservation Easement and a small area of the southeastern-most portion of the Property as potentially suitable habitat for striped newts. The Property contains approximately 1,254 acres of soil types that typically support the sandhill habitats preferred by this species. Striped newts may occur on the Property in areas where sandhill soils are present, but the likelihood of their occurrence appears to be low because intensive silvicultural operations have likely eliminated preferred habitats for this species.

3.16.2 Birds

3.16.2.1 Bald Eagle (*Haliaeetus leucocephalus*)

The bald eagle is protected by the USFWS under provisions of the Bald and Golden Eagle Protection Act

(BGEPA) and the Migratory Bird Treaty Act. Recovery goals have been achieved for this species; therefore, the bald eagle is no longer listed or protected as a "Threatened" species under the ESA. The USFWS has implemented National Bald Eagle Management Guidelines (National Guidelines) to assist private landowners and others plan land-use activities in proximity to active bald eagle nests. The National Guidelines include measures intended to minimize the likelihood of causing "disturbance" to nesting bald eagles, as defined under the BGEPA. The FWC also removed the bald eagle from classification and protection as a "Threatened" species under Florida Rule and implemented a Florida Bald Eagle Management Plan (Florida Plan). The Florida Plan includes Florida Bald Eagle Management Guidelines (Florida Guidelines) and permit provisions. We recommend taking the National Guidelines and Florida Guidelines into account during preparation of the LTMP and coordinating with both the USFWS and FWC for guidance prior to undertaking any development activity that may result in "disturbance" of nesting bald eagles. The FWC Bald Eagle Nest Database was reviewed to determine the locations of all nests that occur on or in close proximity to the Property. The FWC database contains records of nine bald eagle nests on the Property. Five of the nests are located within the Lochloosa Conservation Easement, one is located north of SR 20, and three are located east of US 301 and south of SR 20. The status of these nests through the 2012 nesting season is as follows:

- AL037 – Last known active 2011, last surveyed 2011
- AL005 – Last known active 2011, last surveyed 2011
- AL099 – Last known active 2011, last surveyed 2011
- AL053 – Last known active 1995, last surveyed 2011
- AL058 – Last known active 1995, last surveyed 2011
- AL088 – Last known active 2011, last surveyed 2011
- AL073 – Last known active 2006, last surveyed 2011
- AL090 – Last known active 2011, last surveyed 2011

- AL052 – Last known active 2003, last surveyed 2011

Additionally, one new eagle nest was identified on the Property during the wetland delineation effort. This nest is located approximately 0.7 mile southeast of nest AL037 and may potentially be an alternate nest for the same pair of eagles at AL037, last surveyed in 2011.

3.16.2.2 Wood Stork (*Mycteria americana*)

The wood stork is listed as T by the USFWS. There are no records of a wood stork rookery on the Property based on data available from USFWS for the 2001-2012 nesting seasons. However, available databases contain a record of one wood stork rookery that has occurred within 18.6 miles of the site in recent years. This was the River Styx rookery (number 605011) approximately 6.2 miles southwest of the site in Alachua County. This rookery was last active in 1995 when 250 nesting pairs were recorded. Approximately 75% of the Property, including those areas south of SR 222, are within the Core Foraging Area of the River Styx wood stork rookery.

Wood storks typically return to the same rookery sites each year to nest (Ogden 1996). Wood storks will travel up to 18.6 miles from south Florida rookeries to forage in wetlands and return food to incubating adults and nestlings during the nesting season (Cox et al. 1994). Wetlands within 13 miles of known rookeries are considered by the USFWS to comprise Core Foraging Areas for nesting wood storks in this area. It appears that wetlands on the Property have the potential to contribute to the breeding success of a known wood stork rookery because portions of the site are within the Core Foraging Area. However, consultation with the USFWS is not likely to be required for potential effects on wood storks or their habitats because the only nesting colony within 13 miles of the site has been inactive for more than 10

years. Wood storks, nevertheless, have the potential to forage in wetlands on the site outside of the breeding season if hydrologic conditions are suitable.

3.16.2.3 Wading Bird Rookeries (1999)

The FWC wading bird rookery database from the 1999 statewide survey contains no records of rookeries used by other protected species of wading birds on the Property. However, the FWC database also contains records of 24 wading bird rookeries within 9.3 miles, the maximum distance most listed species of wading birds will fly to forage in wetlands and return food to incubating adults and nestlings (Cox et al. 1994). Wetlands within 9.3 miles of the rookeries of listed species of wading birds are considered important to wading bird nesting success. These off-site rookeries contained nests of snowy egrets (*Egretta thula*), little blue herons (*Egretta caerulea*), tricolored heron (*Egretta tricolor*), and white ibis (*Eudocimus albus*), all of which are listed as SSC by FWC. The wetlands on the Property appear to have the potential to contribute to the nesting success of listed species of wading birds due to the presence of at least one known rookery within normal foraging distances of the site. In addition, listed species of wading birds may be expected to forage in on-site wetlands during other times of the year if hydrologic conditions are suitable.

3.16.2.4 Limpkin (*Aramus guarauna*)

The limpkin is listed as SSC by the FWC but is not listed as T or E by the USFWS. The Property is within the range of limpkins as mapped by Bryan (1996). Limpkins are found along the wide and well-vegetated shallows of rivers and streams statewide; around lakes in peninsular Florida; and in marshes, broad swales, strand swamps, sloughs, and impoundments in south Florida. The range of the limpkin is almost identical with that of the Florida apple snail (*Pomacea paludosa*), the primary food item in the diet of limpkins (Bryan 1996). Nests are constructed in a wide variety of situations, including slowly-sinking

aquatic vegetation, among tall marsh grasses, between the knees of bald-cypress (*Taxodium distichum*), in vine-covered shrubs, in the tops of cabbage palms (*Sabal palmetto*), and on high cypress branches. During the nesting season, riparian habitats are divided into abutting exclusive territories arranged linearly along rivers and lake edges (Bryan 1996). Territories average 1.93 acres in size during high population years and 9.39 acres in more normal years (Bryan 1996). There are no occurrence records of limpkins on or near the Property. However, three Breeding Bird Atlas (BBA) blocks (Kale et al. 1992) with confirmed nesting records of limpkins overlap portions of the Lochloosa Conservation Easement, and another BBA block with confirmed nesting overlaps a small area of the Property north of SR 20. The only areas of the Property mapped as having habitat potentially suitable for limpkins by the FWC were on the Lochloosa Conservation Easement and on the area east of US 301 and north and south of SR 20 (Cox et al. 1994, Endries et al. 2009). There is a low likelihood that limpkins occur on the Property outside of the Lochloosa Conservation Easement.

3.16.2.5 Red-cockaded Woodpecker (*Picoides borealis*)

The red-cockaded woodpecker is listed as E by the USFWS. The Property is within the range of the species as mapped by Wood (2001), and most areas east of the Murphree Wellfield Conservation Easement are within the USFWS consultation area for red-cockaded woodpeckers. Nesting habitat for this species consists of open old-growth pine forests >60-80 years old (USFWS 2003). Stands of pines >50 years of age comprise preferred foraging habitat, and red-cockaded woodpeckers usually forage within 0.5 mile of cavity trees (USFWS 2003). Average home range size of red-cockaded woodpeckers in central Florida has been reported as 319 acres (DeLotelle et al. 1995). Female red-cockaded woodpeckers usually disperse no further than two miles to establish territories of their own in areas where populations are dense, but in areas where populations are sparsely distributed females may disperse up to 15 miles (USFWS 2003). FWC databases contain no records of red-cockaded woodpecker groups on the

Property. The nearest records of red-cockaded cavity trees are on the Austin Cary Memorial Forest approximately two miles northwest of the Property north of SR 222, but it is unlikely these cavity trees are still active based on data recently updated by the FNAI (Knight et al. 2011). FWC habitat models indicate that less than 2% of the site was mapped as small scattered patches of potentially suitable habitat for this species (Endries et al. 2009). The Property has been cleared of old-growth timber and is managed for short-rotation pine production; therefore, habitat conditions on the site are unsuitable for red-cockaded woodpeckers. The Property is beyond normal foraging and dispersal distances from known red-cockaded woodpecker cavity trees. It is unlikely that red-cockaded woodpeckers utilize the Property based on the lack of suitable habitat conditions and low likelihood that active red-cockaded woodpecker cavity trees are near the Property.

3.16.2.6 Burrowing Owl (*Athene cunicularia*)

The burrowing owl is listed as SSC by the FWC but is not listed as T or E by the USFWS. Although burrowing owls occur in Alachua County, only those parcels that are part of the Lochloosa Conservation Easement and approximately 1,900 acres in the southwest corner of the Property immediately north of SR 20 are within the range of the burrowing owl as depicted by Wood (2001). Burrowing owls typically occur in open, well-drained treeless areas where herbaceous groundcover is low and sparse. Historically, burrowing owls occurred primarily in the dry prairies of central Florida, but land clearing and wetlands drainage have greatly expanded the range and habitats used by burrowing owls (Millsap 1996). Currently, burrowing owls are found in a variety of open well-drained habitats including improved pastures, golf courses, school campuses, athletic fields, airports, cemeteries, and industrial/residential complexes (Wood 2001). Burrowing owls construct burrows in well-drained soils, but will also adopt abandoned gopher tortoise burrows or will nest in polyvinyl chloride pipes, culverts, and under the eaves of buildings (Wood 2001). Available databases, including occurrence records and the Florida BBA (Kale

et al. 1992), contain no records of burrowing owls on the Property. The nearest records of burrowing owls are in BBA blocks located approximately 16.8 miles west of the Murphree Wellfield Conservation Easement and 6.9 miles south of Orange Lake. FWC models (Cox et al. 1994, Endries et al. 2008) indicate the site was not mapped as potentially suitable habitat for this species. It is unlikely that Florida burrowing owls occur on the Property based on the lack of evidence of nesting burrowing owls on the Property or in the surrounding landscape, and the location of most of the site outside of the known range of the species.

3.16.2.7 Southeastern American Kestrel (*Falco sparverius paulus*)

The southeastern American kestrel is listed as T by the FWC but is not listed as T or E by the USFWS. Two subspecies of American kestrels occur in Florida, the eastern American kestrel (*Falco sparverius sparverius*) and the southeastern American kestrel. The eastern American kestrel winters in Florida, arriving in September and leaving in the early spring months of March-April (Stys 1993). Southeastern and eastern American kestrels co-occur in Florida during the winter, during which time they are virtually indistinguishable in the field. Surveys intended to determine the presence of resident kestrels should be conducted between April and August, and surveys for nesting kestrels ideally would be conducted in April or May (Stys 1993, Wood 2001). Southeastern American kestrels are secondary cavity nesters, typically using cavities excavated by other species in trees or snags. Occasionally southeastern American kestrels will nest in human structures such as utility poles (Wood 2001). Kestrels feed in open areas, such as croplands, pasture, and open pine woods that are adjacent to nest sites. Home ranges around nest sites range 125-800 acres (Stys 1993, Wood 2001). Available occurrence databases contain no records of southeastern American kestrels on the site, but there are several records of kestrels on public lands within five miles of the Property to the east and west. FWC habitat models (Cox et al. 1994, Endries et al. 2009) indicate that potentially suitable habitat for southeastern American kestrels generally does not exist on the

Property. A Florida BBA (Kale et al. 1992) block with records of nesting kestrels overlaps a portion of the Lochloosa Conservation Easement, and other blocks with confirmed nesting are very near to the Murphree Wellfield Conservation Easement and the portion of the Property east of US 301 and north of SR 20. There is a low likelihood that southeastern American kestrels are present on the Property based on the apparent presence of open clearcut areas adjacent to forested wetlands that may contain snags for nesting and several records of breeding kestrels in areas around the site.

3.16.2.8 Florida Sandhill Crane (*Grus canadensis pratensis*)

The Florida sandhill crane is a resident, breeding, non-migratory subspecies of sandhill cranes that is listed as T by the FWC but is not listed as T or E by the USFWS. The greater sandhill crane (*Grus canadensis tabida*) also occurs in Florida as a wintering migrant, arriving in Florida during October and November and beginning spring migration to northern breeding grounds in late February (Stys 1997). Florida sandhill cranes nest in shallow, emergent palustrine wetlands, particularly those dominated by pickerelweed (*Pontederia cordata*) and maidencane. They feed in a variety of open, upland habitats, mostly prairies but also human-manipulated habitats such as sod farms, ranchlands, pastures, golf courses, airports, and suburban subdivisions (Nesbitt 1996, Wood 2001). Home ranges of individual pairs overlap with those of adjacent pairs and average approximately 1,100 acres. Core nesting territories within home ranges vary from approximately 300 acres to 625 acres and are aggressively defended from other cranes (Wood 2001). There are no nest records on the Property. However, portions of the Lochloosa Conservation Easement are within a BBA (Kale et al. 1992) block in which Florida sandhill cranes have been observed nesting, and BBA blocks with records of nesting sandhill cranes overlap most areas of Paynes Prairie immediately west of the Lochloosa Conservation Easement. FWC habitat models (Cox et al. 1994, Endries et al. 2009) mapped small areas of the Lochloosa Conservation Easement as potentially suitable habitat for Florida sandhill cranes. There is a low likelihood that Florida sandhill cranes nest on

the Property due to the absence of large areas of herbaceous wetlands, although it is likely that sandhill cranes would forage onsite outside of the nesting season based on the presence of small areas that are in improved pasture or vegetated by herbaceous wetlands.

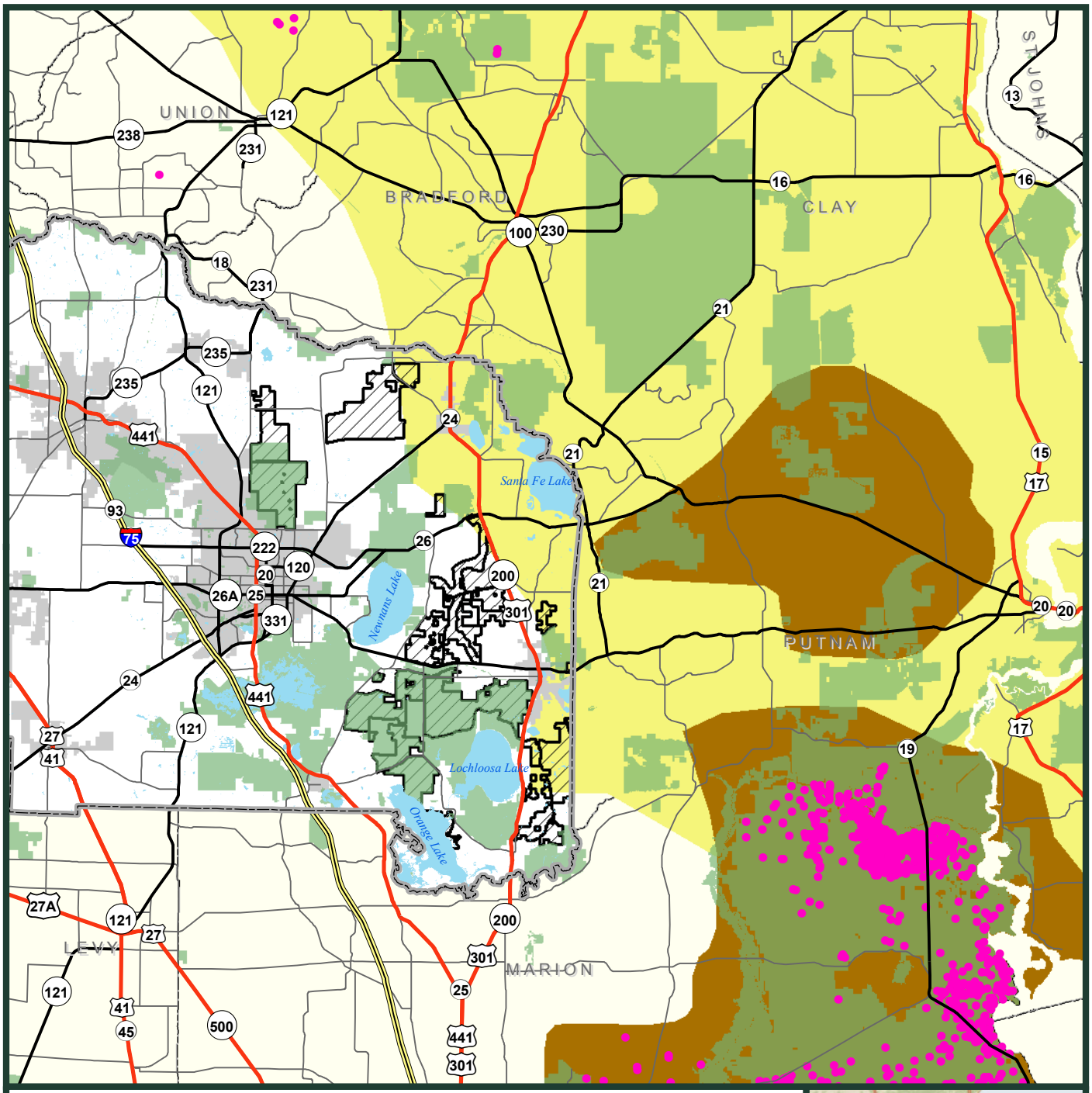
3.16.3 Mammals

3.16.3.1 Florida Black Bear (*Ursus americanus floridanus*)

The Florida black bear is a wide-ranging omnivore that is not listed as T or E by the FWC or USFWS. However, the black bear is protected under the Florida Black Bear Conservation Rule (68A-4.009, F.A.C.). This rule provides that it is unlawful to injure or kill bears, and it states that FWC will work with landowners and regulatory agencies to guide future land use to be in line with FWC's Florida Black Bear Management Plan. Florida black bears are dependent on forest vegetation, but are not limited to specific forest types (Eason 2003). Forested wetlands provide optimal habitat, but any forested areas of large size with diverse foods and dispersed cover can support bears. Home range sizes vary but average approximately 9,200 acres for females and 39,700 acres for males (Eason 2003). Male Florida black bears have been reported moving distances of 13.67 – 87.0 miles and females have been reported moving 8.7 – 47.9 miles (Maehr et al.1988, Wooding and Hardiskey 1988, Wooding et al. 1992, Maehr 1997). Individuals tend to be solitary, except for females with young and groups at abundant food sites, but Florida black bears tolerate considerable range overlap (Eason 2003). Reserves ranging in size from 494,200 – 998,400 acres have been recommended as necessary to support viable populations of black bears (Cox et al. 1994, Kautz and Cox 2001). Although black bears historically ranged throughout Florida, the current range generally consists of the natural and semi-natural landscapes surrounding large parcels of public land throughout the state. Black bear habitat has been mapped as Primary Range and Secondary Range (Simek et al. 2005). Primary Range was defined as areas with evidence of females and reproduction, and factors such as habitat, general bear use, and roadkill records were used to refine range

boundaries. Secondary Range was defined as areas outside of Primary Range where general bear use has been documented by nuisance calls, sightings, and roadkill records, but evidence of females or reproduction has not been confirmed.

FWC databases show there are no Florida black bear telemetry records on the Property (Figure 3.16.3.1-1). However, there are records of several roadkilled bears on paved roads that pass through or adjacent to the site: (1) 1979 record of a juvenile male on US 301 approximately 1.0 mile south of SR 26; (2) 1997 record of an adult male on SR 26 approximately 0.95 mile west of US 301; (3) 1997 record of a juvenile female; (4) a 2000 record of an adult male on CR 325 approximately 2.9 miles south of SR 20; (5) 1997 record of a juvenile female; (6) 2000 record of a juvenile male; (7) 2003 record of an adult female, all on US 301 within 2.5 – 4.1 miles south of SR 20; and (8) 2003 record of an adult male of CR 234 approximately 0.4 mile south of SR 26. There are also three records of nuisance bears between 1993 and 1996 in the town of Hawthorne near the intersection of US 301 and SR 20, and several records of other nuisance bears east of US 301 and north and south of SR 20. Most of the Property east of US 301 is in the Secondary Range of the Ocala black bear population as mapped by the FWC (Simek et al. 2005) (Figure 3.16.3.1-1). FWC habitat models (Endries et al. 2009) indicate that most of the Property and the surrounding landscape were mapped as potentially suitable bear habitat. Although the Property is in an area that has habitat conditions similar to areas of the state where bears are known to occur, it is likely that only those parcels east of US 301 that are within the Secondary Range of the Ocala bear population provide habitat that support a sustainable bear population. There is limited evidence that bears use other areas of the Property at the present time. However, the possibility exists that Florida black bears could occasionally move through the Property as they venture beyond the Secondary Range of the Ocala population.



Source: Property boundary provided by Sasaki Associates, Inc. May 2015. Florida black bear telemetry data and range map downloaded from FWC. Conservation lands downloaded from FNAI. Roads downloaded from FDOT. County boundaries downloaded from FGDL.

FIGURE 3.16.3.1-1
FLORIDA BLACK BEAR RANGE MAP AND TELEMETRY RECORDS NEAR THE PLUM CREEK PROPERTY, ALACHUA COUNTY, FLORIDA

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CBT, bn 5/20/2015 P:\ATG\2011029\2013037\Permit_Use\SectorPlan_201504\ARCGIS\FloridaBlackBear.mxd

3.16.3.2 Sherman's Fox Squirrel (*Sciurus niger shermani*)

Sherman's fox squirrel is listed as SSC by the FWC but is not listed as T or E by the USFWS. The Property is within the range of Sherman's fox squirrels as mapped by Kantola (1992) and Wood (2001). Optimal Sherman's fox squirrel habitat has been characterized as mature, fire-maintained longleaf pine – turkey oak sandhills and flatwoods by Kantola (1992). Preferred habitat has also been described as mature and open pine and pine-hardwood associations by Edwards and Guynn (2003). Sherman's fox squirrels are diurnal, solitary animals whose home ranges may overlap, but separate core home range areas are maintained (Kantola 1992). Male and female home ranges average 196 acres and 82 acres, respectively (Wooding 1997). Available databases contain no occurrence records from the site. FWC habitat models (Cox et al. 1994, Endries et al. 2009) indicate that most areas of the Lochloosa Conservation Easement and Murphree Wellfield Conservation Easement contain habitats suitable for Sherman's fox squirrels, but less than 1% of other areas of the Property were mapped as small and isolated patches of potentially suitable habitat for Sherman's fox squirrels. Sherman's fox squirrels were observed on the Property during preliminary field reconnaissance efforts in 2011.

3.16.3.3 Florida Mouse (*Podomys floridanus*)

The Florida mouse is listed as SSC by the FWC but is not listed as T or E by the USFWS. The Property is within the range of Florida mice as mapped by Layne (1992). The Florida mouse is narrowly restricted to fire-maintained, xeric, upland vegetation occurring on deep, well-drained sandy soils (Layne 1992). Sand pine scrub is the primary habitat occupied by Florida mice, and longleaf pine – turkey oak sandhills comprise secondary habitats. The Florida mouse is a burrow-dwelling species, often using the burrows of gopher tortoises (Layne 1992), but Brown (1997) suggests that Florida mice also may use burrows made by the ubiquitous nine-banded armadillo (*Dasypus novemcintus*). Population densities are highest in early successional stages of scrub and sandhill vegetation following a fire, and they decline as the habitat

becomes denser and shadier. Population densities have been reported ranging from 0.65 – 11.33 per acre, and mean population densities range from 2.02 – 3.80 per acre (Layne 1992). Cox et al. (1994) used population viability modeling to develop a general recommendation that populations comprising 200 individuals would have a 90% chance of persistence for 200 years. Assuming this recommendation applies to Florida mice, data on population density suggests that preserve sizes would have to be in the range of 50 – 300 acres to protect viable populations. Occurrence databases contain no records of Florida mice on the Property, and FWC habitat models (Cox and Kautz 2000, Endries et al. 2009) indicate the site was not mapped as potentially suitable habitat. Although the site contains approximately 1,254 acres of soils that typically support sandhill vegetation, there is a low likelihood that Florida mice occur on the Property based on the absence of occurrence records and the management of the site for silviculture.

3.16.4 Plants

The FNAI Element Occurrence database for Alachua County dated October 15, 2012, and the University of Florida GeoPlan Center Species Observation database dated August 2013 were reviewed. These databases contained no records of state or federally listed plants on the Plum Creek Property in Alachua County. The FNAI tracking list web site, last updated in May 2015, was searched to identify listed species of plants known to occur in Alachua County. That database search revealed that no federally listed species of plants are known to occur in Alachua County. However, 15 species of plants listed by the Florida Department of Agriculture and Consumer Services (FDACS) as E and 4 plants listed as T are known to occur in Alachua County. The potential exists that some of these species could occur on the Plum Creek Property. State regulations pertaining to endangered, T, and commercially exploited plants are contained in Chapter 5B-40 F.A.C., Preservation of Native Flora of Florida. Chapter 5B-40 contains no restrictions on private landowners regarding the disposition of State-listed E or E plants that occur on their properties. The rule provides that persons who willfully harvest, collect, pick, injure, destroy,

transport for sale, sell, or offer to sell plants listed as T or E must obtain written permission from the landowner, and if endangered, must apply for a permit from FDACS to engage in these activities.

3.17 Florida Natural Areas Inventory Species (S1, S2, S3)

The FNAI 2015 Tracking Lists of vertebrates, invertebrates, and plants in Alachua County are included as Appendix B. Those species with a state ranking of S1, S2, or S3 that were not previously discussed in section 3.16 or listed in Table 3.16-1 have been highlighted.

The following are brief descriptions of the habitat requirements and likelihood of occurrence on the Property. The status of each species is given in parentheses following the scientific name in the order of Federal Status, State Status, FNAI State Ranking. E=endangered; T=threatened; N=not listed; S1, S2, or S3=FNAI state rank. Literature reviewed for this assessment included Ward (1979), Ashton and Ashton (1988), Gilbert (1992), Humphrey (1992), Moler (1992), Stevenson and Anderson (1994), Rodgers et al. (1996), Brown (1997), FNAI (1997), Hoehn (1998), Chafin (2000), Hipes et al. (2001), Wunderlin and Hansen (2003), Weaver and Anderson (2010), and NatureServe (2014).

3.17.1 Plants

Brittle maidenhair fern (*Adiantum tenerum*) (N, E, S3): Habitat is described as sinkhole, rockland hammock, and upland hardwood forest. Found on limestone, limestone ledges, or soil over limestone, and on upland hardwood forest stream banks. This species is unlikely to occur on the Property due to the apparent absence of preferred habitat.

Incised groove-bur (*Agrimonia incisa*) (N, E, S2): Habitat is described as sandhill, upland pine forest, upland hardwood forest, and thickets. Found on upland hardwood forest edges. This species has the

potential to occur on the site based on the presence of potentially suitable soils.

Wagner's spleenwort (*Asplenium heteroresiliens*) (N, N, S1): This species is apparently a hybrid between *Asplenium heterochromum x Asplenium resiliens* and is referred to as Morzenti's spleenwort (Chafin 2000, Wunderlin and Hansen 2003). Habitat is described as an occasional plant in hammocks, on limestone outcrops, and around sinkholes. This species is unlikely to occur on the Property due to the absence of limestone outcrops and sinkholes.

Ruffled spleenwort (*Asplenium plenum*) (N, N, S1): This rare species is a hybrid backcross between *Asplenium abscissum* and *Asplenium x curtissii* (Chafin 2000, Wunderlin and Hansen 2003). Habitat of this species is in hammocks and on limestone outcrops. This species is unlikely to occur on the Property due to the absence of limestone outcrops.

Dwarf spleenwort (*Asplenium pumilum*) (N, E, S1): Habitat is described as shaded limestone boulders and ledges. This species is unlikely to occur on the Property due to the absence of limestone boulders and ledges.

Modest spleenwort (*Asplenium verecundum*) (N, E, S1): Habitat is described as rockland hammocks, limestone outcrops, grottoes, and sinkholes. This species is unlikely to occur on the Property due to the lack of preferred habitat.

Curtiss' spleenwort (*Asplenium x curtissii*) (N, N, S1): Found in Citrus, Alachua, Marion, and Sumter counties, the modest spleenwort hybridizes with a common species, cutleaf spleenwort (*Asplenium abscissum*), to produce the rare hybrid Curtiss' spleenwort. Habitat is described as limestone rocks and

sinkholes. This species is unlikely to occur on the Property due to the absence of limestone rocks and sinkholes.

Sinkhole fern (*Blechnum occidentale*) (N, E, S1): This fern is common in Central and South America but is found in Florida only in Citrus, Hernando, Pasco, and Collier counties and two locations in western Alachua County. This fern is found in deep-shaded ravines or elsewhere in moist and dense hammocks. Occasionally it occurs on the sheer rock walls of deep sinkholes, as near Newberry. There are no known occurrence records of sinkhole fern on the Property.

Flyr's brickell-bush (*Brickellia cordifolia*) (N, E, S2): Habitat is described as dry, upland pine-oak (*Quercus* spp.) woods, often with southern red oak (*Quercus falcata*) and loblolly pine, and ravine slopes with spruce pine (*Pinus glabra*), white oak (*Quercus alba*), and southern magnolia. This species usually occurs in sunny openings or along edges of trails, but may persist in shady, overgrown woods. The range of Flyr's brickell-bush in Alachua County is depicted as a small area in the northwest quadrant of the County (Ward 1979). The range map appears to indicate this species occurs in San Felasco Hammock Preserve State Park. It is not likely that this species occurs on this parcel because most of the uplands have been converted to silvicultural operations, a land use detrimental to this species.

Poppy mallow (*Callirhoe papaver*) (N, E, S2): This plant is known from only two areas of Florida, on the east side of Tallahassee in Leon County, and at several stations northwest and southwest of Gainesville. Poppy mallow is a plant of dry woodlands, upland areas with oak and usually pine. The range of poppy mallow is known to include portions of San Felasco Hammock Preserve State Park. The range map for poppy mallow depicted in Ward (1979) appears to indicate that, if this species occurs on the Property, it would most likely be found northwest of the Murphree Wellfield. However, most of the

uplands in this area have been converted to silvicultural operations, and it is not known whether this species can tolerate that level of disturbance. It seems unlikely that poppy mallow occurs on the Property.

Southern lip fern (*Cheilanthes microphylla*) (N, E, S3): This plant grows widely in the Caribbean and eastern Mexico, but it occurs only sporadically in Florida, including a small area in the center of Alachua County coinciding with the City of Gainesville (Ward 1979). At the scale of the map depicted by Ward (1979), it is difficult to discern whether the range of this species overlaps any portions of the Property. Southern lip fern is always found on limestone or other calcareous formations in habitats that are usually dry and shaded. It is unlikely that southern lip fern occurs on the Property.

Piedmont jointgrass (*Coelorachis tuberculosa*) (N, T, S3): Piedmont jointgrass is a plant of occasional occurrence in the central and northern peninsula and panhandle. Habitat is described as margins of depression marshes, wet prairies, ponds, marsh lakes, and sandhill upland lakes. Piedmont jointgrass is likely to occur on the Property on the wet edges of marshes, ponds, and lakes.

Godfrey's swampprivet (*Forestiera godfreyi*) (N, E, S2): Habitat is described as upland hardwood forests with limestone at or near the surface, often on slopes above lakes and rivers. It is unlikely that Godfrey's swampprivet occurs on the Property due to the very few acres of upland hardwood forest present on the Property and the management of most uplands for silviculture.

Chapman's skeletongrass (*Gymnopogon chapmanianus*) (N, N, S3): Chapman's skeletongrass is an occasional plant of the Florida peninsula. Habitat is described as sandhills, scrub, and flatwoods. There is a moderate to high likelihood this species occurs on the Property due to the presence of soils that typically support sandhill and flatwoods vegetation types under natural conditions.

Pondspice (*Litsea aestivalis*) (N, E, S2): Habitat is described as edges of baygalls, flatwoods ponds, and pond-cypress (*Taxodium ascendens*) domes. This species may form thickets around edges of ponds. Clearing and draining of wetlands, especially for silviculture, have greatly reduced this species' habitat. There is a moderate likelihood this species occurs on the Property around the margins of flatwoods ponds and cypress domes in areas without silvicultural management.

Green adder's-mouth orchid (*Malaxis unifolia*) (N, E, S3): This species is a rare plant of moist hammocks and ravines in Alachua, Marion, and Hernando counties and the central and western Florida panhandle. The species description and range map of Ward (1979) indicate there are two locations known for green adder's-mouth orchid in west-central Alachua County. At the scale of the range map, it is difficult to discern whether the range of this species overlaps any areas of the Property. The range of the species in Alachua County appears to coincide with San Felasco Hammock Preserve State Park. If this species were to occur on the Property, it would be in the northwestern-most portion of the Property. However, this area of the Property has been subject to silvicultural activities for years, thus it seems unlikely this species would occur on the site.

Florida spiny-pod (*Matelea floridana*) (N, E, S2): This species is an occasional plant of the northern and central Florida peninsula, and Miami-Dade, Madison, and Liberty counties. Habitat is described as upland mixed forest and upland hardwood forest. There is a low likelihood this species occurs on the Property due to the small acreage of upland hardwood or upland mixed forests.

Pinesap (*Monotropa hypopithys*) (N, E, S1): This species is a rare plant with occurrence records recorded in Marion, Lake, Okaloosa, and Walton counties. Habitat is described as mesic hammocks with

well-drained soils. There is a low likelihood this species occurs on the Property due to the limited occurrence of mesic hammocks on the Property.

Narrowleaf naiad (*Najas filifolia*) (N, T, S1): This species is an occasional plant of the central and northern peninsula and Leon and Santa Rosa counties in the panhandle. Habitat is described as freshwater ponds. There is a moderate likelihood this species occurs in the ponds on the Property.

Plume polypody (*Pecluma plumula*) (N, E, S2): Habitat is described as tree branches or limestone in hammocks, wet woods, and limesinks. Habitat has been greatly reduced by drainage, logging, and development. It is unlikely that plume polyploidy occurs on the Property due to years of silvicultural activities over most of the site and the small acreage of upland hardwood forests on the Property.

Giant orchid (*Pteroglossaspis ecristata*) (N, T, S2): Habitat is described as sandhill, scrub, pine flatwoods, and rocklands. Although reported from most counties of the peninsula and some panhandle counties, plants have not been seen in many of the mapped Florida counties in several decades and have been seen only in a few parcels of public conservation lands in recent years. Despite the association of this plant with sandhill and pine flatwoods habitats and the presence of the habitats on the Property, there appears to be a low likelihood this species occurs on the Property due to forest management of most parcels and the declining population.

Florida mountain-mint (*Pycnanthemum floridanum*) (N, T, S3): Florida mountain-mint is an occasional plant of the northern and central peninsula west to the central panhandle. Habitat is described as sandhill, upland mixed forest, wet flatwoods, and floodplain forest. It is found in roadside ditches and

sandhill communities in moist areas. There is a moderate likelihood that Florida mountain-mint occurs on the Property, particularly in areas with sandhill soils.

Nettle-leaved sage (*Salvia urticifolia*) (N, E, S1): Nettle-leaved sage is a rare plant known from Alachua, Gadsden, and Jackson counties. Habitat is described as calcareous hammocks and upland glade. It is unlikely that this species occurs on the Property due to its rarity, the disturbed nature of much of the site as a result of intensive silviculture, and the apparent absence of preferred habitats.

Silver buckthorn (*Sideroxylon alachuense*) (N, E, S2): Silver buckthorn is a rare species endemic to north-central Florida and an adjacent area in southeast Georgia. Only four populations are known in the wild in Florida, with fewer than 30 plants, most in conservation areas. Habitat is described as upland hardwood forests around limesinks and on shell mounds. It seems unlikely that silver buckthorn would occur on the Property due to its rarity, management of the site for silviculture, and absence of limesinks.

Scrub stylisma (*Stylisma abdita*) (N, E, S3): This species is a rare plant found throughout peninsular Florida. Habitat is described as scrub. It is unlikely this species occurs on the Property due to its rarity, and limited occurrence of the preferred scrub habitat on the Property.

Variable-leaf crownbeard (*Verbesina heterophylla*) (N, N, S2): This species is an occasional plant that is endemic to northeast Florida, including Alachua County. Habitat is described as mesic flatwoods, dry woods, and sandhill. There is a moderate likelihood this species occurs on the Property, but its distribution on the site is probably restricted to flatwoods and sandhill sites least affected by silvicultural operations.

3.17.2 Fishes

Mud sunfish (*Acantharchus pomotis*) (N, N, S3): Habitats are described as flatwoods/prairie lake, marsh lake, river floodplain, lake, swamp lake, and blackwater stream. The FNAI Element Occurrence database contains one record of a mud sunfish along CR 346 approximately 3.0 miles east of US 441 and 1.0 mile north of Orange Lake within the Lochloosa Conservation Easement. This species is likely to occur on the Property in the blackwater streams, ponds, or lakes on the site.

Gulf sturgeon (*Acipenser oxyrinchus desotoi*) (T, FT, S2): The Gulf sturgeon is an anadramous species that migrates up coastal rivers connected to the Gulf of Mexico to spawn. The Suwannee River basin is included in the range of this species. Spawning occurs in non-vegetated flowing waters with a rocky, gravel, or hard substrate where the eggs are broadcast and adhere to hard bottom features. Although the Gulf sturgeon could occur in the Santa Fe River along the north boundary of Alachua County, it seems unlikely this species would occur on the Property to due to the small size of the tributary streams that drain to the Santa Fe River. Moreover, Alachua County is not included in the range of the Gulf sturgeon as mapped by Hipes et al. (2001).

Spotted bullhead (*Ameiurus serracanthus*) (N, N, S3): Habitat is described as alluvial and blackwater stream. This species is likely to occur on the Property in any of the blackwater streams draining the site.

Blackbanded sunfish (*Enneacanthus chaetodon*) (N, N, S3): The blackbanded sunfish is an omnivorous species that is usually found near dense, rooted vegetation in the shallow margins of sluggish acidic streams, ponds, and lakes (Hoehn 1998). FNAI (1997) describes the habitat of this species as basin swamp, floodplain swamp, and blackwater stream. This species is likely to occur on the Property in any of the blackwater streams, ponds, or lakes on the site.

Suwannee bass (*Micropterus notius*) (N, N, S3): The Suwannee bass are endemic to the lower Suwannee and Ochlockonee River systems in Florida and southern Georgia and were introduced in the St. Marks and Wacissa Rivers (Page and Burr 2011). Habitat is described as rocky riffles, runs, and pools of small to medium rivers, and large springs and well-vegetated spring runs. Only the northern-most portion of the Property is within the Santa Fe River watershed; therefore, this is the only area of the Property where this species may occur. This species is not likely to occur on the Property to due to the absence of rivers and springs.

Eastern mudminnow (*Umbra pygmaea*) (N, N, S3): Habitat is described as floodplain swamp and blackwater stream. The FNAI Element Occurrence database contains one record of an eastern mudminnow along CR 346 approximately 3.0 miles east of US 441 and 1.0 mile north of Orange Lake within the Lochloosa Conservation Easement. This species is likely to occur on the Property in any of the blackwater streams and floodplain swamps on the site.

3.17.3 Amphibians

Tiger salamander (*Ambystoma tigrinum*) (N, N, S3): Habitat is described as upland mixed forest, upland pine forest, mesic flatwoods, and depression marsh. Tiger salamanders usually breed in ponds that lack predatory fishes. Isolated wetlands with emergent herbaceous vegetation are preferred. This species may occur on the Property in any of a variety of locations, including upland forest and isolated herbaceous wetlands.

3.17.4 Reptiles

Spotted turtle (*Clemmys quttata*) (N, N, S2S3): The spotted turtle is an omnivorous species found in the central peninsula and eastern panhandle. Habitat is described as swamps, bogs, marshes, small streams, wet meadows, and wet forests. This species has a moderate likelihood of occurring on the Property.

Eastern diamondback rattlesnake (*Crotalus adamanteus*) (N, N, S3): Eastern diamondback rattlesnakes occur in a broad range of habitats, but most commonly are associated with pines, especially longleaf, in sandhills, flatwoods, upland pine forests, and rarely scrub. This species is also found in old fields, floodplains, hardwood hammocks, dry prairie, and coastal strand habitats. Eastern diamondback rattlesnakes commonly use gopher tortoise burrows and root holes for refuge; they are often associated with saw palmettos (*Serenoa repens*). There is a high likelihood that eastern diamondback rattlesnakes occur in a variety of habitats on the Property.

Timber rattlesnake (*Crotalus horridus*) (N, N, S3): The timber rattlesnake has a limited range in Florida which includes northern peninsular counties, mostly within the Suwannee River drainage. Alachua County is the southern extent of the range of the species in Florida. Habitat is described as wet lowland forests, including pine flatwoods, floodplain hammocks, and swamps. This species has a moderate likelihood of occurring on the Property.

Southern hognose snake (*Heterodon simus*) (N, N, S2): The principal habitat of southern hognose snakes is xeric sandy uplands, especially sandhill, scrub, xeric hammock, and old fields on associated soil types. The species is rare in more mesic hammocks and dry river floodplains. Southern hognose snakes are often associated with ephemeral wetlands interspersed within xeric uplands, as these habitats may serve as breeding areas for the toads upon which this snake feeds. This species would most likely occur

in the sandhill soils found in areas of the Lochloosa Conservation Easement and in the portion of the Property south of SR 20 and east of US 301.

Short-tailed snake (*Lampropeltis extenuata*) (N, ST, S3): The short-tailed snake primarily inhabits areas with well-drained sandy soils, particularly sandhill, scrub, and xeric hammock habitats (FWC, 2011). Since 2008, the species has been documented in Alachua, Citrus, Hernando, Levy, Marion, and Pasco counties. This species would most likely occur in the sandhill soils found in areas of the Lochloosa Conservation Easement and in the portion of the Property south of SR 20 and east of US 301.

Common kingsnake (*Lampropeltis getula*) (N, N, S2S3): The common kingsnake is considered common in mesic hammocks, temporary ponds, and roadside ditches; uncommon in pine flatwoods, hydric hammocks, cypress swamps, and agricultural areas; and rare in gum and river swamps (Ashton and Ashton 1988). The preferred habitats of this species appear to be limited on the Property, thus there is a low to moderate likelihood this species occurs on the site.

Suwannee alligator snapping turtle (*Macrochelys suwanniensis*) (N, N, S1S2): The Suwannee alligator snapping turtle is an omnivore that inhabits the Suwannee River basin in Florida and Georgia. Habitat is described as rivers and springs. This species is not likely to occur on the Property to due to the absence of preferred habitat.

Alligator snapping turtle (*Macrochelys temminickii*) (N, SSC, S2): This omnivorous species occurs in rivers draining to the Gulf of Mexico. In Florida its range extends from the panhandle east to the Suwannee River. Habitat includes rivers, lakes, backwater swamps, and periodically brackish water systems. Only the northern-most portion of the Property is within the Santa Fe River watershed;

therefore, this is the only area of the Property where this species may occur. There is a low likelihood this species occurs within the northern swamps on the Property due to the absence of preferred habitat.

3.17.5 Birds

Florida scrub-jay (*Aphelocoma coerulescens*) (T, FT, S2): Florida scrub-jays require low-growing scrub oaks (*Quercus* spp.) interspersed with small open patches of bare sand. This type of habitat does not occur on the Property, nor does the site contain soils that typically support scrub vegetation under natural conditions. Alachua County is not in the range of the Florida scrub-jay as mapped by Woolfenden and Fitzpatrick (1996) and Hipes et al. (2001).

Swallow-tailed kite (*Elanoides forficatus*) (N, N, S2): Nesting and foraging habitats include pine forests and savannas, cypress and cypress-hardwood swamps, narrow riparian forests, prairies, and freshwater and brackish marshes. Nests are normally in tall pine or cypress trees that emerge from the canopy of fairly open stands. Swallow-tailed kites require a mosaic of communities with tall accessible trees for nesting and open areas for foraging. There is a high likelihood that swallow-tailed kites nest or forage on the Property.

Merlin (*Falco columbarius*) (N, N, S2): The merlin is a migratory raptor that breeds in northern North America. The winter range of the species extends to northern areas of South America and includes all of Florida. Merlins wintering in Florida forage in a wide range of habitats, including shorelines, mudflats, marshes, open pineland, pastures, and scrubby flatwoods. In forested habitats, merlins usually hunt along forest edges or where the woodland is discontinuous and patchy. Preference for open areas is related to its method of prey capture. There is a high likelihood that merlins occur on the Property in the winter, especially along the edges of clear-cut areas.

Peregrine falcon (*Falco peregrinus*) (N, N, S2): Peregrine falcons occur in Florida only in the winter. Although this species may occur anywhere in Florida during the winter, they rely mainly on open terrain that permits detection and capture of avian prey. Typical habitats include coastal and barrier island shorelines, lake and river margins, prairies, coastal ponds, sloughs, and marshes, and urban areas with adequate prey. Waterfowl and shorebirds comprise primary prey species. There is a low likelihood that peregrine falcons occur on the Plum Creek property due to the general absence of open shoreline habitats preferred by wintering shorebirds. However, they may be expected on occasion feeding on waterfowl of larger lakes such as Newnans Lake, Lochloosa Lake, and Orange Lake.

Black rail (*Laterallus jamaicensis*) (N, N, S2): The black rail is a very secretive bird that typically inhabits the upper reaches of tidal marshes where the dominant vegetation is black rush (*Juncus roemarianus*), frequently mixed with cordgrass (*Spartina bakeri, Spartina spartinea*) and salt myrtle (*Baccharis halimifolia*). In the St. Johns River valley, black rails are found in freshwater marshes dominated by cordgrass (*Spartina* sp.). These regions of the marsh are typically saturated to the surface by groundwater but are rarely inundated. One breeding record of black rails is known from Alachua County. It is unlikely that black rails occur on the Property due the general absence of the expansive marsh habitats preferred by this species.

Yellow-crowned night-heron (*Nyctanassa violacea*) (N, N, S3): Yellow-crowned night-herons feed primarily on crustaceans in a variety of wetland habitats from coastal mudflats, marshes, and mangrove swamps to inland riverine forests. They nest in trees, often over water. There is a low likelihood this species is present on the Property due to a general preference for coastal wetlands.

Black-crowned night-heron (*Nycticorax nycticorax*) (N, N, S3): This species occurs in a variety of estuarine and freshwater wetlands habitats, including blackwater systems. There is a high likelihood that black-crowned night-herons utilize the blackwater wetlands habitats on the Property.

Louisiana waterthrush (*Parkesia motacilla*) (N, N, S2): The Louisiana waterthrush is a ground-nesting warbler that breeds in the eastern United States. Alachua County is at the southern extent of the breeding range of this species. The winter range of Louisiana waterthrushes includes central Florida, and migrants occur in Florida during the fall and spring. The Louisiana waterthrush, a bird that is shy and difficult to observe, inhabits woodlands along rivers and streams, with a preference for rapidly moving water. Some researchers have classified the Louisiana waterthrush as a forest interior species susceptible to habitat fragmentation. Louisiana waterthrushes tend to abandon breeding sites following the clearing of streamside forests. There is a low likelihood that Louisiana waterthrushes nest on the Property due to the long history of the site in silvicultural use, the general lack of forested streamsides adjacent to flowing waters, and the location of the site at the extreme southern extent of the breeding range of the species.

Brown pelican (*Pelecanus occidentalis*) (N, SSC, S3): The brown pelican is a bird of coastal estuarine and marine habitats. Although there are confirmed records of pelicans having been observed in Alachua County (Stevenson and Anderson 1994), the map of Hipes et al. (2001) does not include Alachua County in the range of the species. There is no likelihood the Property provides suitable habitat for this bird of coastal areas of Florida.

Bachman's sparrow (*Peucaea aestivalis*) (N, N, S3): Bachman's sparrow inhabits open, pine flatwoods and drier upland areas with various grasses, shrubs, and scrub oaks (*Quercus* spp.); it does not require pines if saw palmettos (*Serenoa repens*) are present in adequate numbers. Nests are built on the ground,

often under a saw palmetto frond. Most foraging is on the ground or just above it. Habitat alteration, such as occurs with intensive silviculture operations, is the greatest threat to the species. There is a high likelihood that Bachman's sparrows occur on the Property due to the presence of pine habitats. However, their numbers may be limited by the extensive silvicultural activities that have taken place on the site for several decades.

Hairy woodpecker (*Picoides villosus*) (N, N, S3): The hairy woodpecker is considered a rare species in Florida. It is found in most areas of the state except for extreme south Florida. This species occurs in a variety of forested habitats, including pinelands, sand pine scrub, cypress stands, deciduous swamp forests, and high hammocks. However, it inhabits mainly wooded bottomlands and pine flatwoods. There is a moderate likelihood that hairy woodpeckers occur on the Property due to the presence of forested wetlands and flatwoods, but its numbers are likely to be low as elsewhere in Florida.

Glossy ibis (*Plegadis falcinellus*) (N, N, S3): The glossy ibis is essentially a bird of freshwater wetlands, although they often nest at coastal sites if favorable foraging habitat is located within flight range. Seasonally flooded grasslands, prairies, roadside ditches, and shallow, flooded marshes and lake shorelines are the most important feeding habitats. Glossy ibises nest in a wide variety of woody shrubs and low trees occurring in dense thickets on islands or in standing water. There is a high likelihood that glossy ibises forage on the Property, especially along the shoreline of Orange Lake.

3.17.6 Mammals

Rafinesque's big-eared bat (*Corynorhinus rafinesquii*) (N, N, S2): Habitat is described as forested communities, particularly those associated with floodplains, supporting large, hollow trees used for roosting. Also occurs in mature, open pine flatwoods and mixed oak-pine forests, and often roosts in old

buildings, under bark, and in culverts. There is a high likelihood that Rafinesque's big-eared bat occurs on the Property based on the presence of forested upland and wetland habitats.

Big brown bat (*Eptesicus fuscus*) (N, N, S3): The big brown bat is widespread and abundant over much of the United States, but Florida is at the southeastern extent of the range and the species is conspicuously uncommon in this part of the country. Big brown bats forage over a variety of open habitats. Habitats include upland hardwood forest, upland mixed forest, hydric hammock, wet flatwoods, wet prairie, bottomland forest, floodplain forest, floodplain swamp, and dome swamp. Individuals sometimes roost alone, but small colonies of fewer than 100 are more common. Roost sites include buildings, trees, rock crevices, mines, caves, storm sewers, and bridges. Given the variety of forested habitats and extensive holdings, there is a moderate to high likelihood that big brown bats occur on the Property.

Southeastern weasel (*Mustela frenata olivacea*) (N, N, S3?): The southeastern weasel is found from North Carolina to north Florida and the panhandle, extending south to Marion County. Habitats include old fields, hardwood hammocks, natural pinelands, pine plantations, bottomland forests, and cypress swamps. There is a high likelihood that southeastern weasels occur on the Property.

Southeastern bat (*Myotis austroriparius*) (N, N, S3): This species range includes much of the southeastern United States and the northern half of the Florida peninsula. The southeastern bat is primarily a cave bat, but it is also found in buildings and presumably trees. Caves are considered essential to the survival of the species. Southeastern bats appear to prefer to forage over open water. In dry areas, bats having access to longleaf pine and live oak (*Quercus virginianus*) habitats feed around the live oaks. There is a low likelihood that southeastern bats occur on or forage on the Property due to the absence of caves that provide suitable roost and nursery habitat.

Round-tailed muskrat (*Neofiber alleni*) (N, N, S3): The habitat of the round-tailed muskrat is described as shallow emergent freshwater marshes of variable size and species composition. Dense stands of maidencane and pickerelweed provide preferred habitat. This species will also use sugar cane, rice, and other agricultural crops grown in moist or submerged soils. The species is patchily distributed and occurs on Paynes Prairie. There is a high likelihood that round-tailed muskrats occur on the Property in areas where shallow freshwater marshes are found.

3.17.7 Invertebrates

Suwannee moccasinshell (*Medionidus walkeri*) (N, N, S1): This species is restricted to the Suwannee River system in Florida with sites listed from the Withlacoochee, Suwannee, and Santa Fe drainages. This species is endemic to the Florida portion of the Suwannee River system, and known from 11 historical occurrences. It occurs in the lower Withlacoochee, from its confluence with the main stem downstream to about Levy County, and in the upper Santa Fe river system including both main stem and New River sites. It has been reported from mud and sand in slight to moderate current, and in medium-sized creeks and rivers in muddy sand, sand, and gravel, in slow to moderate current. This species is most often found in mid-channel habitats in coarser sediments. Only the northern-most portion of the Property is within the Santa Fe River watershed; therefore, this is the only area of the Property where this species may occur. There is a low likelihood this species occurs on the Property due its rarity and apparent preference for medium-sized creeks and rivers.

Peninsular floater (*Utterbackia peninsularis*) (N, N, S2S3): This species is restricted to northern Peninsular Florida from the lower Suwannee and Santa Fe Rivers south to the Hillsborough River and is presumed to be stable throughout its range. It is found in benthic habitats of canals, creeks, and rivers

with sand or muddy substrates with slight to moderate current. Only the northern-most portion of the Property is within the Santa Fe River watershed; therefore, this is the only area of the Property where this species may occur. There is a low to moderate likelihood this species occurs on the Property in creeks draining to the Santa Fe River.

Florida rainbow (*Villosa amygdala*) (N, N, S3): This species is a peninsular Florida endemic restricted to the St. Johns and Withlacoochee (west central Florida) River systems south to the Everglades. Most records are from the St. Johns River system, and none are from the Suwannee or Santa Fe drainages. This species generally inhabits mud or soft sand in large creeks to medium-sized rivers, lakes, and Everglade marshes, as well as some artificial waters (e.g., canals, boat basins, possibly some impoundments). There is a low to moderate likelihood this species occurs on the Property in streams and lakes within the watershed of the St. Johns River.

Freemouth hydrobe snail (*Aphaostracon chalarogyrus*) (N, N, S1): This snail is known from one locality: at the pool and overflow of Magnesia Springs, which is located approximately 3.9 miles west of Hawthorne on private property not within the ownership of Plum Creek. It is unlikely this species occurs on the Property.

Workman's jumping spider (*Phidippus workmani*) (N, N, S2S3): This species is known from the upper two-thirds of the Florida peninsula and two localities in extreme southern Georgia. It is known only from 11 sites and about 40 specimens. It is restricted to early successional sandhill and scrub habitats. There is a low to moderate likelihood this species occurs in areas of the Property where sandhill soils are found.

Florida cave amphipod (*Crangonyx grandimanus*) (N, N, S2S3): This species is known from 12 counties in Florida, most of which are in the northern part of the peninsula and the nearby eastern panhandle, with approximately half of the occurrences lying within the Suwannee River drainage. This species is a subterranean obligate found in caves, wells, and karst springs. This species is not likely to occur on the Property to due to the absence of preferred habitat.

Hobbs' cave amphipod (*Crangonyx hobbsi*) (N, N, S2S3): This species is restricted to Florida, where it occurs mostly in the northern peninsula and adjacent eastern panhandle. Approximately half of known sites occur in the Suwannee River drainage. This species is a subterranean obligate found in freshwater caves and wells in limestone bedrock, usually near entrances where detritus enters the system. This species is not likely to occur on the Property to due to the absence of preferred habitat.

Florida cave isopod (*Caecidotea hobbsi*) (N, N, S2): Reported from aquatic caves in Alachua and Marion counties in the northern peninsula, and from caves along the Chipola and Choctawhatchee River systems in the Florida panhandle. This species lives in fresh water that is held in interstitial spaces between particles of soil or rock. Most records are from subterranean waters, either cave pools or wells that intersect caves. At one location, this species occurred in shallow water on decaying wood near a sinkhole entrance. This species is not likely to occur on the Property to due to the absence of sinkholes.

Swimming little Florida cave isopod (*Remasellus parvus*) (N, N, S1S2): This species is known from a small number of caves in the Ochlockonee, Aucilla, and Suwannee River drainages of Florida. This species is not likely to occur on the Property to due to the lack of caves.

Light-fleeing cave crayfish (*Procambarus lucifugus*) (N, N, S2S3): This species is restricted to Florida in an arc approximately 80 miles long from Citrus and Hernando counties, northward to Marion County, and into Alachua, Gilchrist, and Levy counties. This species is found in subterranean karstic fresh waters near surface openings of sinks, solution chimneys, and caves, usually associated with bat roosts and debris. This species is not likely to occur on the Property to due to the absence of preferred habitat.

Pallid cave crayfish (*Procambarus pallidus*) (N, N, S2S3): This species has been found in more than 80 caves across its range, which is restricted to northern peninsular Florida along the upper Suwannee River and some tributaries (lower Withlacoochee and lower Santa Fe Rivers), as well as in some sinkholes that probably connect to them. Habitat is described as cave systems with fresh water, reportedly associated with caves that have high flow in newly emerging karst areas. Pallid cave crayfish may venture out into the lighted portions of some "blue hole" sinks. This species is only weakly attracted to sinks and other energy input areas. This species is not likely to occur on the Property to due to the absence of caves.

North Florida spider cave crayfish (*Troglocambarus maclanei*) (N, N, S2): This species is endemic to but not uncommon within a narrow range in Florida, with most occurrences lying along a single arc about 80 miles long and extending from Suwannee County to Hernando County. This species inhabits caves with subterranean/karstic waters near sites of detrital input, particularly large sinkholes and areas under bat roosts in caves. This species is not likely to occur on the Property to due to the absence of caves and sinkholes.

Banded spiketail (*Cordulegaster oblique fasciata*) (N, N, S3): The range of this dragonfly is unknown, and NatureServe (2014) contains no information on the habitat requirements of this species. It is not

possible to assess the likelihood of occurrence of this species on the Property due to the lack of information on its range and habitat requirements.

Say's spiketail (*Cordulegaster sayi*) (N, N, S2): This dragonfly has a spotty distribution across northern Florida, including Clay, Alachua, Columbia, Liberty, and Santa Rosa counties. Habitat is described as silt-bottom seepage streams in hardwood forests. The species forages in open woodlands and clearings. It is unlikely this species occurs on the Property due to low acreage of hardwood forests occurring on the site.

Southeastern spinyleg (*Dromogomphus armatus*) (N, N, S3): This species occurs in several Southeastern states including the Florida panhandle and the northern third of the Florida peninsula. NatureServe (2014) provides no information regarding the habitat requirements of the species. Although the Property apparently is within the range of the species, it is difficult to assess likelihood of occurrence due to a lack of information on habitat requirements.

Elegant spreadwing (*Lestes inaequalis*) (N, N, S2): NatureServe (2014) indicates this pond-breeding odonate is distributed throughout the eastern United States and eastern Canada. Although FNAI (2013) indicates this species occurs in Alachua and Columbia counties, NatureServe (2014) indicates the only counties of occurrence are Santa Rosa and Walton. NatureServe (2014) contains no information on this species' habitat requirements. It seems unlikely the elegant spreadwing could occur on the Property given the apparent limited range of the species in Florida.

Smoky shadowfly (*Neurocordulia molesta*) (N, N, S1): The range of this brown dragonfly is throughout the eastern half of the United States, but the range is limited to panhandle and northern portions of the

peninsula in Florida. This species inhabits large rivers, sometimes large streams, all with rocks or logs to which the larvae cling. It seems unlikely the smoky shadowfly occurs on the Property due to its preference for large rivers and streams.

Umber shadowfly (*Neurocordulia obsoleta*) (N, N, S2): The range of the umber shadowfly is the eastern third of the United States, but the range is limited to the panhandle and north Florida. NatureServe (2014) describes this species as a river-breeding dragonfly, but gives no information on specific habitat requirements. It is difficult to assess the likelihood of occurrence on the Property without additional information.

Tawny sanddragon (*Progomphus alachuensis*) (N, N, S3): This species is endemic to the Florida peninsula from Baker and Union counties south to Highlands and Glades counties. The required habitat of this species is clear sand-bottomed lakes. This species is only likely to occur on the Property in lakes or small bodies of water within areas where sandhill soils predominate.

Larger sandhill grasshopper (*Melanoplus querneus*) (N, N, S2S3): Although this species apparently occurs throughout Alabama and Georgia, its range in Florida is limited to Alachua, Columbia, and Gilchrist counties. Older records were from sandhill habitats, but more recent records have come from hardwood hammocks. Habitat requirements are listed as the undergrowth of pine, hardwood, and mixed pine-hardwood forests and clumps of scrub oaks in pine-oak woodlands. There is a low to moderate likelihood this species occurs on the Property due to the presence of sandhill, pine, and hardwood hammock habitats.

Blind pocket gopher cave cricket (*Typhloceuthophilus floridanus*) (N, N, S2): This blind and flightless cricket is totally dependent on pocket gophers), which typically inhabit sites with sandhill soils. It is likely that pocket gophers occur in the sandhill soils on the Property, and thus there is a moderate likelihood this cricket species is also present in locations where pocket gophers occur.

Small pocket gopher aphodius beetle (*Aphodius aergrotus*) (N, N, S3): This dung feeder beetle is active year-round with peak of activity in early fall (August to November) (Skelley and Woodruff, 1991). It is one of the most common and widespread species of *Aphodius*, inhabiting pocket gopher burrows in the southeast (Skelley and Gordon, 2001). The pocket gopher typically inhabits sites with xeric soils such as sandhill and scrub, but this beetle has not been found everywhere that its host has. It is likely that pocket gophers occur in the sandhill soils on the Property, thus there is a moderate likelihood this beetle is also present in locations where pocket gophers occur.

Surprising pocket gopher aphodius beetle (*Aphodius dyspistus*) (N, N, S3): This dung feeder species occurs in the panhandle and northern peninsula. It is dependent on the pocket gopher, which typically inhabits sites with xeric soils such as sandhill and scrub, but this beetle has not been found everywhere that its host has. It is likely that pocket gophers occur in the sandhill soils on the Property, thus there is a moderate likelihood this beetle is also present in locations where pocket gophers occur.

Hubbell's pocket gopher aphodius beetle (*Aphodius hubbelli*) (N, N, S3): This dung feeder beetle is active in the southeast during winter months (Skelley and Gordon, 2001). It is dependent on the pocket gopher, which typically inhabits sites with xeric soils such as sandhill and scrub, but this beetle has not been found everywhere that its host has. It is likely that pocket gophers occur in the sandhill soils on the

Property, thus there is a moderate likelihood this beetle is also present in locations where pocket gophers occur.

Large pocket gopher aphodius beetle (*Aphodius laevigatus*) (N, N, S3): This dung feeder species is active year-round in many parts of Florida (Skelley and Gordon, 2001). It is one of the most common and widespread species of *Aphodius*, inhabiting pocket gopher burrows in the southeast (Skelley and Gordon, 2001). The pocket gopher, which typically inhabits sites with xeric soils such as sandhill and scrub, but this beetle has not been found everywhere that its host has. It is likely that pocket gophers occur in the sandhill soils on the Property, thus there is a moderate likelihood this beetle is also present in locations where pocket gophers occur.

Long-clawed pocket gopher aphodius beetle (*Aphodius tanytarsus*) (N, N., S2S3): This dung feeder species occurs in northern Florida, southeastern Alabama, and southwestern Georgia. It is dependent on the pocket gopher, which typically inhabits sites with xeric soils such as sandhill and scrub, but this beetle has not been found everywhere that its host has. It is likely that pocket gophers occur in the sandhill soils on the Property, thus there is a moderate likelihood this beetle is also present in locations where pocket gophers occur.

Gopher tortoise aphodius beetle (*Aphodius troglodytes*) (N, N, S2): This dung feeder species is completely dependent on the gopher tortoise. Although its total range is probably concurrent with the gopher tortoise, its known distribution is very spotty. This species does not occur everywhere its host does and very little is known about its life history. There is a low to moderate likelihood this species occurs on the Property wherever gopher tortoises are found.

An Ataenius beetle (*Ataenius brevicollis*) (N, N, S1S2): This species is known only from Alachua, Dade, and Monroe counties with the vast majority (420 out of 422) of Florida specimens being from Key Largo in Monroe County associated with Key Largo woodrat (*Neotoma floridana smalli*) nests. The Key Largo woodrat is listed as endangered. It is possible this beetle may occur with the peninsular subspecies of woodrat, but this has not been investigated. NatureServe (2014) provides no information on the habitat requirements of this beetle and indicates this species either has been extirpated or possibly extirpated from all counties within its range. The lack of information on this species makes it difficult to assess its likelihood of occurrence, but it seems unlikely this species occurs on the Property.

Bicolored burrowing scarab beetle (*Bolbocerosoma hamatum*) (N, N, S3): NatureServe (2014) indicates that, "Although this species ranges from extreme southern Alabama and Georgia throughout nearly all of Florida and is attracted to ultraviolet light, relatively few specimens have been collected from relatively few localities. More information is needed before giving this species a more definitive rank." No information is provided regarding the habitat requirements of this species. Therefore, it is difficult to assess the likelihood the bicolored burrowing scarab beetle occurs on the Property.

Shining ball scarab beetle (*Ceratocanthus aeneus*) (N, N, S2): This species is known from North Carolina, South Carolina, Tennessee, Alabama, and five counties in Florida, including Alachua County. This is a rarely collected species. NatureServe (2014) provides no information regarding the habitat requirements of this species. Therefore, it is difficult to assess the likelihood the bicolored burrowing scarab beetle occurs on the Property.

Gopher tortoise hister beetle (*Chelyoxenus xerobatis*) (N, N, S2): NatureServe (2014) indicates this species is "Apparently totally dependent on the gopher tortoise but does not occur everywhere that the

tortoise does. Nearly nothing is known about its life history, including habitat requirements and especially dispersal. More information is needed before assigning this species a more definite rank." There is some likelihood this species occurs on the Property where gopher tortoises are found.

Gopher tortoise copris beetle (*Copris gopheri*) (N, N, S2): This species is found only in gopher tortoise burrows and is known only from 10 counties in Florida, including Alachua County. There is some likelihood this species occurs on the Property where gopher tortoises are found.

Mat red globe scarab beetle (*Eucanthus alutaceus*) (N, N, S1S2): The only information provided for this species by NatureServe (2014) is that, "This species is known from a few localities in (mostly) northern Florida and also Alabama, southern Mississippi, and Georgia, USA. More information is needed before giving this species a definitive rank." NatureServe (2014) provides no information regarding the habitat requirements of this species. Therefore, it is difficult to assess the likelihood the bicolored burrowing scarab beetle occurs on the Property.

Three spotted pleasing fungus beetle (*Ischyrus dunedinensis*) (N, N, S2S3): This species is nearly endemic to the Florida peninsula and appears to be restricted to scrub habitat. It appears to be spottily distributed with less than 20 occurrences known, but encompasses most of the peninsula it its range. It is unlikely this species occurs on the Property due to the absence of scrub habitat.

North peninsular mycotrupes beetle (*Mycotrupes gaigei*) (N, N, S2S3): This species is restricted to xeric sandhill and scrub habitat in a relatively small geographic area in north-central Florida, including Alachua County. It is a flightless species with presumably low rates of dispersal and recolonization.

Very little is known about its life history. There is a low to moderate likelihood this species occurs on the Property in areas where sandhill soils are present.

Punctate gopher tortoise onthophagus beetle (*Onthophagus polyphemi polyphemi*) (N, N, S2): This beetle is apparently completely dependent upon the gopher tortoise. Nearly nothing is known about its life history, including details of dispersal and exact habitat and other requirements. Even within its restricted known range, less than that of its host, it does not appear to occur in all places that its host does. NatureServe (2014) indicates this species has been extirpated or possibly has been extirpated from Alachua County. There is a low likelihood this species occurs on the Property.

Florida deepdigger scarab beetle (*Peltotrupes profundus*) (N, N, S3): This species appears to have low fecundity and only occurs in scrub and sandhill habitats with deep, well-drained sand in the northern two-thirds of peninsular Florida. Although it has a relatively large range, it has a spotty distribution, with approximately 20 known populations, and the species is absent from some areas with suitable-appearing habitat. NatureServe (2014) indicates this species has been extirpated or possibly has been extirpated from Alachua County. There is a low likelihood this species occurs on the Property in areas of the site with sandhill soils.

Clemens' June beetle (*Phyllophaga clemens*) (N, N, S1): This species is known from Alachua and Leon counties in Florida, Thomasville in Georgia, and Allendale and Fairfax in South Carolina, although some of these occurrences have not been confirmed in over 40 years. The specific habitat requirements of this species are unknown, but the species appears to be quite rare. The lack of information makes it difficult to assess the likelihood of this species occurring on the Property.

Elongate June beetle (*Phyllophaga elongata*) (N, N, S3): Although this species is wide ranging, having a spotty distribution through much of peninsular Florida, it is rarely collected and most records are at least 20 years old. When it is found, it is usually in very low numbers. It is dependent on scrub habitat. Almost nothing is known about the life history of this species. The lack of information makes it difficult to assess the likelihood this species occurs on the Property, but it seems unlikely the species would occur on the Property due to the absence of scrub habitats.

Skelley's June beetle (*Phyllophaga skelleyi*) (N, N, S2): This species is only known from a relatively small geographic area in Florida, including Alachua County, and it is restricted to sandhill habitat with turkey oaks. There is a low likelihood this species could occur on the Property in areas where sandhill soil types are dominant.

Schwarz' pocket gopher ptomaphagus beetle (*Ptomaphagus schwarzi*) (N, N, S3): Although this species has a relatively wide range in parts of Alabama, Georgia, and northern Florida, including Alachua County, it is dependent upon the pocket gopher, which is typically found in sandhill habitats. There is a low to moderate likelihood this species could occur on the Property in areas where sandhill soil types are dominant and pocket gophers may be present.

Pygmy silky june beetle (*Serica pusilla*) (N, N, S2S3): There are records for about 20 occurrences of this species, but approximately half of these records are from more than 40 years ago, even though this species is known to be attracted to lights. It is possible this species is in decline, but also possible that recent records are just not available. The females are flightless and so the species probably has poor dispersal and recolonization abilities. Habitat requirements for this species are unknown. The lack of

information on this species' habitat requirements makes it difficult to assess the likelihood of this species occurring on the Property.

Scrub palmetto flower scarab beetle (*Trigonopeltastes floridana*) (N, N, S2S3): This species is known only from scrub habitat in few counties in central peninsular Florida. Although FNAI indicates the range of this species includes Alachua County, NatureServe (2014) does not include Alachua County within the range. This species is apparently dependent upon the flowers of scrub palmetto (*Sabal etonia*). It is unlikely this species occurs on the Property due to the absence of scrub habitats.

Florida scorpionfly (*Panorpa floridana*) (N, N, S1): This species is known from only five specimens from three localities in Florida, but NatureServe (2014) contains no information about these specific sites or the habitat requirements of the species. The lack of information on this species' habitat requirements makes it difficult to assess the likelihood of this species occurring on the Property.

Spring-loving psiloneuran caddisfly (*Agarodes libalis*) (N, N, S3): This species is known as fairly common from Alabama, South Carolina, Louisiana, and Florida, but the range also extends to Delaware, Mississippi, Texas, and Virginia. The habitats of this species are described as small, sandy, cool, spring-fed artesian streams. In Florida, it occurs in many undisturbed seepage/steephead streams and spring-fed softwater (blackwater) streams across the northern tier of counties. It is unlikely this species occurs on the Property due to the absence of spring-fed streams.

Florida cernotinan caddisfly (*Cernotina truncona*) (N, N, S3): The range of this species includes Virginia, North Carolina, South Carolina, Alabama, and Florida, including Alachua County. Habitat is

described as coastal plain ponds, lakes, and streams. There is a moderate likelihood this species occurs on the Property in the ponds, lakes, and streams.

Berner's microcaddisfly (*Hydroptila berneri*) (N, N, S3): Although this species is known in a number of states in the United States and Quebec Province in Canada, it is rare in northern Florida; known only from the Santa Fe River at High Springs in Alachua County. NatureServe (2014) contains no information regarding the habitat requirements of this species. It is unlikely this species occurs on the Property since the Property is outside of the only known location for this species in Florida.

Wakulla Springs vari-colored microcaddisfly (*Hydroptila wakulla*) (N, N, S2): This species range covers most of northern peninsular Florida and the eastern edge of the panhandle, but only approximately 10 occurrences are known. NatureServe (2014) indicates this species has been extirpated or possibly has been extirpated from Alachua County. NatureServe (2014) provides no information regarding habitat requirements, but the species is named after a large spring in Wakulla County suggesting that clear, cool, spring-fed streams may be the habitat of this species. It is unlikely the species occurs on the Property due to the absence of spring-fed streams and possibility the species no longer occurs in Alachua County.

Daytona long-horned caddisfly (*Oecetis daytona*) (N, N, S2S3): This species is endemic to the southeastern Coastal Plain, specifically Florida, Alabama, Mississippi, North Carolina, and South Carolina. However, it is distributed sporadically and local populations are typically low in numbers. Although FNAI indicates this species occurs in Alachua County, NatureServe (2014) does not include Alachua County within the range. Habitats of this species presumably are small coastal plain streams. The Property includes potential habitat for this species, but it is difficult to assess the likelihood of

occurrence on the Property due to the apparent rarity of the species and possibility the species no longer occurs in Alachua County.

Little oecetis long-horned caddisfly (*Oecetis parva*) (N, N, S2): This southeastern endemic has been collected only from Alabama (one male from Wright's Creek near Florida border) and throughout most areas of central and northern Florida, including near Gainesville in Alachua County. Populations of *Oecetis parva* are especially abundant in some of the lakes and ponds within the Ocala National Forest. The habitat of this benthic species is described as natural ponds and lakes. There is a moderate likelihood this species occurs in the natural ponds and lakes on the Property.

Porter's long-horn caddisfly (*Oecetis porteri*) (N, N, S2S3): This species exists in several counties in Florida; a few counties in Alabama, North Carolina, and South Carolina; and there is a disjunct population in southern Nova Scotia. This species has been reported as particularly common in central Florida lakes, and its range includes Alachua County. There is a moderate likelihood this species occurs in the lakes on the Property.

Pescador's bottle-cased caddisfly (*Oxyethira pescadori*) (N, N, S3): This species is described as endemic to, but widespread in, Alabama and Florida. Although NatureServe (2014) provides no information regarding habitat requirements, the species apparently occurs in rivers, streams, and springs based on vouchered locations. There is a moderate likelihood this species occurs on the Property in the streams and creeks draining the site.

Floridian triaenode caddisfly (*Triaenodes florida*) (N, N, S2): This species is somewhat rare and known only from a few populations in northern and central Florida, where it is stable and at times

common, and adjacent Alabama (Covington County). This caddisfly is described as being particularly abundant in natural lakes in the Florida panhandle. There is a low to moderate likelihood this species occurs in the natural lakes on the Property.

Hoary edge (*Achalarus lyciades*) (N, N, S2): This species is widely distributed in the eastern half of the United States, including Alachua County. Habitats are described as a variety of brushy, dry, usually more or less wooded situations with host plants often of the species ticktrefoil (*Desmodium* sp.). These sites are found in grasslands, herbaceous rangelands, old fields, savannas, pine forests, hardwood forests, and mixed pine-hardwood forests. There is a moderate to high likelihood this species occurs on the Property in clear-cut areas and early stages of forest regeneration.

Loammi skipper (*Atrytonopsis loammi*) (N, N, S1): This species is known from only one site in Mississippi and six sites in Florida. Although FNAI indicates that Alachua County is included in the range of this species, NatureServe (2014) does not include Alachua County in the range. The habitat is most often pine flatwoods in Florida, but it also can occur in more xeric pine savanna. The grass mix of the site is important and the food plant lopsided indiangrass (*Sorghastrum secundum*) must be more or less dominant. It is unlikely this species occurs on the Property.

Golden-banded skipper (*Autochton cellus*) (N, N, S1): The range of this species extends eastward from Arizona and New Mexico through the southern tier of states, south, and the Great Lakes in the eastern United States. Although FNAI indicates Alachua County is included in the range of this species, NatureServe (2014) does not include Alachua County in the range. The habitats of this species are described as forested wetlands, hardwood forests, mixed pine-hardwood forests, and pine woodlands, usually near streams in rich forests in eastern portions of the range. Although the Property contains

vegetation types that may comprise potentially suitable habitats, it is unlikely this species occurs on the Property.

Eastern pine elfin (*Callophrys niphon*) (N, N, S2): The range of this species includes most of Canada and the eastern United States. Although common in northern portions of the range, the species become increasingly rare and localized southward. Although FNAI indicates Alachua County is included in the range of this species, NatureServe (2014) does not include Alachua County in the range. Habitat is generally described as pine-dominated forests or mixed pine-hardwood forests, but habitat requirements in the south are poorly understood. There is a low likelihood this species occurs on the Property based on the abundance of pine forests.

Grisatra underwing moth (*Catocala grisatra*) (N, N, S1): This species formerly was known only from Georgia and northern Florida, but was recently found on a sandhill in North Carolina. What little is known about this species comes from a few amateur collectors active in northern Florida in or after the 1980s. As far as is known, the habitat is xeric, usually sandhill, pine-oak woodland, or savanna with a substantial number of hawthorns (*Crataegus* spp.) in the understory. Populations might well occur in other dry situations with a lot of hawthorn. This species might be much more likely on "idle land" than on excessively managed preserves. There is a low to moderate likelihood this species occurs in areas of the Property where sandhill soils are found.

Eastern tailed blue (*Cupido comyntas*) (N, N, S2): This species is widespread in the United States and Canada, reaching the southern extent of its range in Florida. Although FNAI indicates Alachua County is included in the range of this species, NatureServe (2014) does not include Alachua County in the range. This species occurs in a wide variety of open, brushy to lightly wooded, generally dry, habitats with any

of the many native and exotic legumes used by the larvae. This species has adapted easily to human activity and thrives in disturbed environments. There is a moderate to high likelihood this species occurs on the Property based on the extent of its range and apparently adaptability to disturbed environments.

Dion skipper (*Euphyes dion*) (N, N, S2S3): The range of this species covers the eastern half of the United States and Canada. Although FNAI indicates Alachua County is included in the range of this species, NatureServe (2014) does not include Alachua County in the range. Habitat is described as bog, herbaceous wetlands, forested wetlands, shrub swamp, and roadside ditches. There is a low to moderate likelihood this species occurs in suitable wetlands habitats on the Property.

Calhoun's skipper (*Euphyes dukesi calhouni*) (N, N, S1): This distinctive subspecies is confined to the Florida peninsula, north to Duval County. Although FNAI indicates Alachua County is included in the range of this species, NatureServe (2014) does not include Alachua County in the range. Habitat is described as sedge patches within swamps, which may be cypress (*Taxodium* spp.), gum (*Nyssa* spp.), red maple (*Acer rubrum*), or mixed canopy forested wetlands. There is a low to moderate likelihood this species occurs in the forested wetlands on the Property.

Seminole skipper (*Hesperia attalus slossonae*) (N, N, S3): The range of this species covers several southeastern states, including Florida, where the species is considered fairly common. The species is considered a habitat specialist that is often very sparsely distributed. The Seminole skipper, although somewhat versatile, is restricted to xeric habitats such as sandhill and scrub. Sparse, stunted grasses and patches of xeric bare white sand appear to be constant habitat features, at least north of Florida. There is a moderate likelihood this species occurs in areas of the Property where sandhill soils are dominant.

Eastern meske's skipper (*Hesperia meskei straton*) (N, N, S2S3): The range of this species includes all of Florida except the southern tip. This species occupies xeric upland habitats, such as sandhill and scrub, and is considered to be uncommon, local, and declining. There is a low to moderate likelihood this species occurs in areas of the Property where sandhill soils are dominant.

Gopher tortoise noctuid moth (*Idia gopheri*) (N, N, S2S3): This species is known only in Florida from Lake Worth north to Escambia and Liberty counties, but it may also be found in southeast Alabama and southern Georgia. This moth is a commensal of gopher tortoises, but like most commensal insects, this species is apparently not as widespread as the gopher tortoise. There is a moderate likelihood this moth occurs on the Property in locations where gopher tortoises occur.

Neamathla skipper (*Nastra neamathla*) (N, N, S2S3): This species is known only from Arizona and Texas, where it is not ranked, and Florida, where it is considered imperiled. Habitats of this species are described as herbaceous wetlands, grasslands, herbaceous rangelands, pine savannas, and woodlands. There is a moderate likelihood this species could occur on the Property in areas of herbaceous wetlands and pine forest.

Mourning cloak (*Nymphalis antiopa*) (N, N, S2): The mourning cloak is widespread from Alaska south to Venezuela. Adult mourning cloaks have been observed infrequently in northcentral Florida and the Florida panhandle. The first documented instance of mourning cloak caterpillars in Florida occurred in March 2011 in Alachua County. Preferred plant hosts for larvae are willows (*Salix* sp.), elms (*Ulmus* sp.), and hackberry (*Celtis occidentalis*). Where common, the mourning cloak caterpillar is considered a pest due to tree defoliation. There is a low to moderate likelihood this species occurs on the Property in shrub wetlands containing host plants.

Broad-winged skipper (*Poanes viator zizaniae*) (N, N, S2): The range of this species includes many states in the eastern half of the United States. Although FNAI indicates Alachua County is included in the range of this species, NatureServe (2014) does not include Alachua County in the range. Habitats used by this species are described as herbaceous wetlands, forested wetlands, shrub swamps, suburban areas, and orchards. In southern portions of the range, it is usually found in coastal marshes. It is unlikely this species occurs on the Property due to the species' preference for salt marsh habitats.

Yehl skipper (*Poanes yehl*) (N, N, S2S3): The range of this species includes the Southeastern United States east of Texas and south of Kentucky and Virginia. Although FNAI indicates Alachua County is included in the range of this species, NatureServe (2014) does not include Alachua County in the range. Habitats described for this species include forested wetlands, pine forests, hardwood forests, and mixed pine-hardwood forests, especially in clearings or along paths and streams in more or less wooded habitats. There is a low to moderate likelihood this species occurs on the Property in forested wetlands along streams or upland pine and hardwood forests.

King's hairstreak (*Satyrium kingi*) (N, N, S2): The range of this species includes the southeastern states east of Texas in areas with coastal plain and piedmont ecoregions. The species is known from only five counties in Florida, including Alachua County. Habitats are described as forested wetlands, upland hardwood forests, upland mixed pine-hardwood forests, and pine woodlands, especially in areas of mesic ravines or mesic to swampy woodlands. There is a low to moderate likelihood this species occurs in forested wetlands on the Property.

Scalloped sooty wing (*Staphylus hayhurstii*) (N, N, S2): The range of this species includes most areas of the eastern United States south of the Great Lakes. In Florida, the species has been reported only from Alachua, Levy, and Okeechobee counties. Habitats are described as cropland and hedgerow, grasslands, herbaceous rangelands, savannas, suburban areas, orchards, hardwood forests, and mixed pine-hardwood forests. Seldom does this species occur in natural habitats except along their edges near disturbances. It is often found in shaded weedy spots in towns or backyards. There is a moderate to high likelihood this species occurs on the Property due to its apparent tolerance of, or preference for, disturbed habitats.

Sugarfoot moth fly (*Nemopalpus nearcticus*) (N, N, S1S2): This species is known only from Sugarfoot Hammock south of the Oaks Mall in Alachua County and from Gulf Hammock in Levy County. NatureServe (2014) provides no information regarding the habitat preferences of this species, but it can be assumed the species requires mesic or hydric hammocks based on the vegetation types that are present where this species has been found. It is unlikely this species occurs on the Property unless it were to occur in the small area of hardwood forest.

A cellophane bee (*Colletes longifacies*) (N, N, S1S2): This species is known only from Alachua and Walton counties in Florida. NatureServe (2014) provides no information about the habitat requirements or specific locations known for this species in Alachua County. Therefore, it is difficult to assess the likelihood this species occurs on the Property.

Lake Wales Ridge velvet ant (*Dasymutilla archboldi*) (N, N, S2S3): This species is known only from the Lake Wales Ridge in Highlands, Polk, Osceola, and Orange counties, and Alachua County. The Lake Wales Ridge velvet ant is known from only 20 populations. This species is considered a habitat specialist

that requires open scrub habitat. It is unlikely this species occurs on the Property due to the absence of scrub habitats on the site.

Blatchley's perdita bee (*Perdita blatchleyi*) (N, N, S2): This species is known only from Alachua, Orange, Pinellas, and Wakulla counties in northern Florida. NatureServe (2014) provides no information about the habitat requirements or specific locations known for this species in Alachua County. Therefore, it is difficult to assess the likelihood this species occurs on the Property.

Shining Amazon ant (*Polyergus lucidus*) (N, N, S1S2): FNAI indicates this species is known only from Alachua, Columbia, Leon, and Santa Rosa counties in northern Florida. NatureServe (2014) provides no information about the habitat requirements or specific locations known for this species in Alachua County. Therefore, it is difficult to assess the likelihood this species occurs on the Property.

3.18 Wildlife Habitat and Biodiversity Models

3.18.1 Florida Natural Areas Inventory Potential Habitats (October 2001, May 2007)

The FNAI database of habitats potentially used by rare and imperiled species of plants and animals shows that portions of the EASP Property were mapped as potentially suitable habitat for some species:

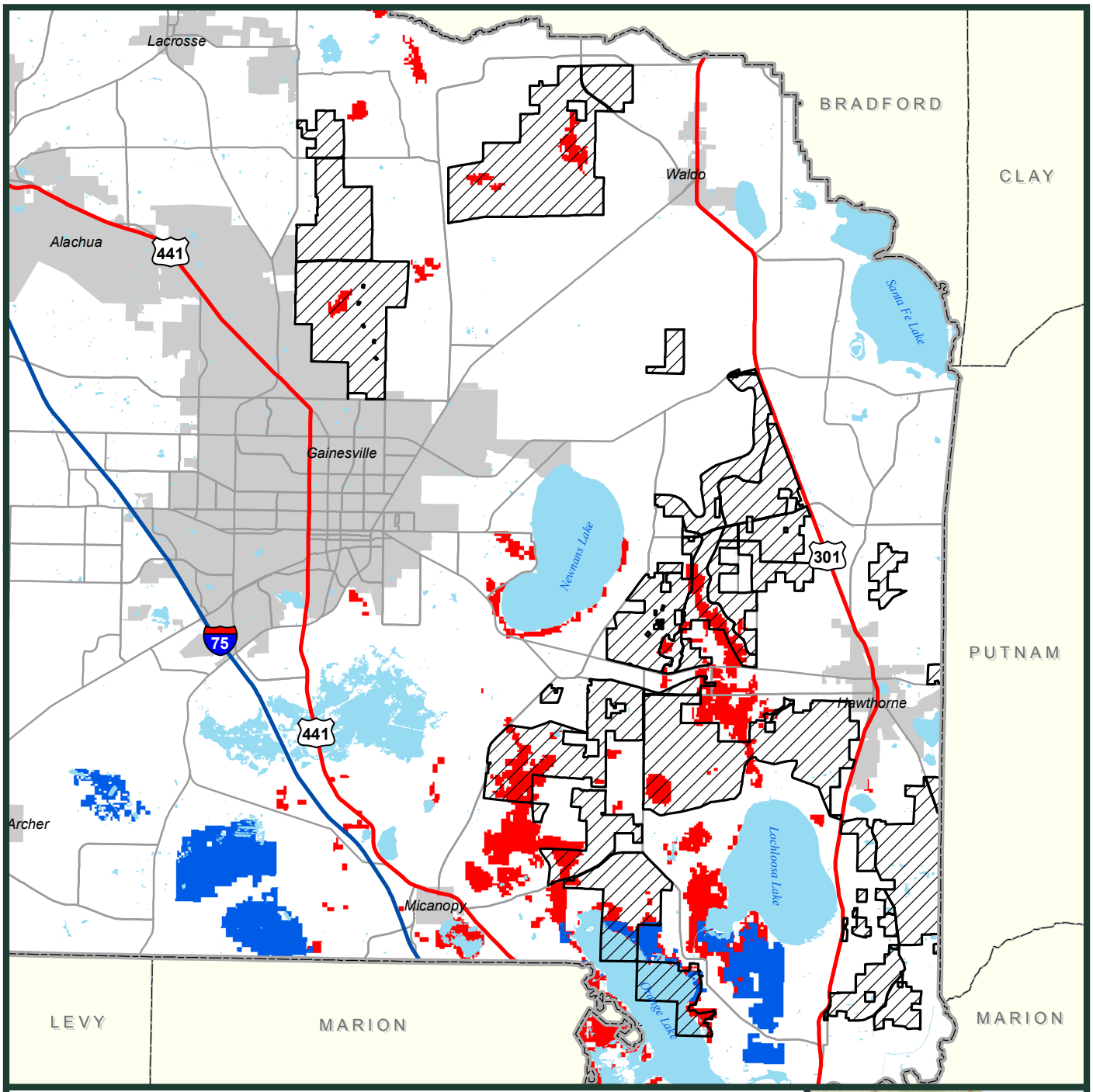
- A portion of the Lochloosa Conservation Easement was mapped as potentially suitable habitat for the eastern indigo snake.
- The southeastern quadrant of the Property within the Murphree Wellfield Conservation Easement and the northern third of the Property east of Newnans Lake were mapped as potentially suitable habitat for the flatwoods salamander.
- Portions of the Property near Newnans, Lochloosa, and Orange Lakes and Paynes Prairie were mapped as potentially suitable habitat for the bald eagle.

3.18.2 Strategic Habitat Conservation Areas (1994, 2009)

The FWC Closing the Gaps database (Cox et al. 1994) indicates that the larger wetlands systems on the Property were mapped as a Strategic Habitat Conservation Area (SHCA) for listed species of wading birds, and small areas of herbaceous wetlands along the shoreline of Orange Lake within the Lochloosa Conservation Easement were mapped as an SHCA for Florida sandhill cranes (Figure 3.18.2-1). However, in the 2009 update report on FWC recommendations for SHCAs, Endries et al. (2009) concluded that SHCAs were no longer needed for wading birds and Florida sandhill cranes because population viability modeling revealed that these species have a low probability of decline over the next 100 years. The majority of the areas mapped as SHCA in 1994, within the Property, were located either within the existing conservation easements on the Property or areas proposed for conservation within the LTMP. Endries et al. (2009) mapped approximately half of the Property as an SHCA for the American swallow-tailed kite (*Elanoides forficatus*), and small areas of the Property east of Newnans Lake were mapped as an SHCA for Cooper's hawk (*Accipiter cooperii*). Neither of these raptors are listed as endangered, T, or SSC by either the USFWS or FWC. A very small area of the Property south of SR 20 and east of US 301 was mapped as an SHCA for the striped newt, a species that is a candidate for listing as threatened by the USFWS but is not listed by the FWC.

3.18.3 Biodiversity Hot Spots (1994)

The FWC Closing the Gaps database (Cox et al. 1994) indicates that approximately 75% of the area within the Property was mapped as a hot spot for 3-7+ species of wildlife that are indicators of Florida's biodiversity.



Plum Creek Property

Florida Sandhill Crane SHCA (1994)

Wading Bird SHCA (1994)

0 2 4 Miles

1 inch = 4 miles

Source: Property boundary provided by Sasaki Associates, Inc. May 2015. Alachua County boundary downloaded from Alachua County. Roads downloaded from FDOT. County boundaries downloaded from FGDL. Strategic Habitat Conservation Area grid files obtained from FWC.

FIGURE 3.18.2-1
STRATEGIC HABITAT CONSERVATION AREAS WITHIN THE PLUM CREEK PROPERTY, ALACHUA COUNTY, FLORIDA

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Environmental Consultants
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3.18.4 Integrated Wildlife Habitat Ranking System (2003, 2009)

The Integrated Wildlife Habitat Ranking System database was created by the FWC in 2003 to score the Florida landscape from 1 to 10 for wildlife and biodiversity, with 10 being areas of highest value, and the most recent update to the database was completed in 2009 (Endries et al. 2003, Endries et al. 2009). The database was created at the request of the FDOT as a means of rapidly determining whether planned road projects were likely to have adverse impacts on listed species of wildlife.

The ranking was based on 10 variables that are indicators of importance to wildlife and biodiversity. Generally speaking, scores higher than 6 indicate that further review for impacts to wildlife may be warranted. The Property within the Murphree Wellfield Conservation Easement has scores that range from one to seven, indicating that some areas have moderate importance for conservation of Florida's biodiversity on a statewide scale. The parcels north of SR 24 and west of US 301 have scores ranging primarily from one to four, indicating relatively low value to biodiversity conservation. The western half of the Property east of Newnans Lake and north of SR 20 has scores of five to six, indicating a moderate value in terms of biodiversity conservation, but the eastern areas of these parcels have scores mostly in the range of two to four, indicating low conservation value. The Property south of SR 20, primarily within the Lochloosa Conservation Easement, has scores generally in the range of seven to nine, indicating that this area is the most important portion of the Property for conservation of Florida's biodiversity.

3.19 Wildlife Crossings

Wildlife corridors are viewed as continuous linear landscape features that connect core patches of habitat which are often on protected conservation lands. Roads that cross wildlife corridors may have a variety of potential ecological effects on wildlife populations including loss of habitat, isolation and reduction in

size of remaining habitat, decreased population sizes in remaining fragmented habitat, and increased mortality. These problems will be avoided in the Lochloosa Creek corridor through the installation of wildlife crossing structures in new or existing roads that cross the Lochloosa Creek corridor. The types and locations of crossing structures will be determined by assessing the species of wildlife likely to use the crossings, movement patterns of those species, road capacity, and necessary road design standards.

3.19.1 Species of Wildlife Known to Use Wildlife Crossings

Species of wildlife generally fall into one of three categories for purposes of evaluating proposed projects for the potential need for wildlife crossings. The categories are based primarily on body size, home range size, and movement and dispersal patterns of terrestrial species. The size and type of wildlife crossing that may be needed at a given site will be a function of which category of focal species are to be served by the crossing. The three categories of wildlife are: (1) large mammals, (2) mid-sized mammals, and (3) amphibians, reptiles, and small mammals.

Large Mammals: Large mammals whose movements may need to be accommodated as new highways are planned or existing roads are upgraded include the Florida black bear and white-tailed deer (*Odocoileus virginianus*). The Florida black bear is of particular concern because of the need for large connected landscapes. However, as previously discussed in Section 3.14.3.1, the entire Plum Creek Property is outside the Primary Range of sustainable bear populations; therefore, the natural areas and/or corridors that exist within the Property are not used by this species, other than the occasional occurrence of nuisance black bears.

Mid-Sized Mammals: Mid-sized mammals in Alachua County include bobcat (*Lynx rufus*), river otter (*Lontra canadensis*), gray fox (*Urocyon cinereoargenteus*), red fox (*Vulpes vulpes*), coyote (*Canis*

latrans), opossum (*Didelphis marsupialis*), raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), and nine-banded armadillo. Most of the species listed above are likely to use habitats and wildlife crossings on the Property.

Amphibians, Reptiles, and Small Mammals: Examples of amphibians, reptiles, and small mammals that use wildlife crossings include the southern leopard frog (*Rana utricularia*), green tree frog (*Hyla cinerea*), cottonmouth (*Agkistrodon piscivorus*), southern black racer (*Coluber constrictor*), snapping turtle (*Chelydra serpentina*), striped mud turtle (*Kinosternon baurii*), Florida cooter (*Pseudemys floridana*), American alligator, eastern cottontail (*Sylvilagus floridana*), eastern mole (*Scalopus aquaticus*), cotton rat (*Sigmodon hispidus*), rice rat (*Oryzomys palustris*), cotton mouse (*Peromyscus gossypinus*), and gray squirrel (*Sciurus carolinensis*). Most of the species listed above are likely to use habitats and wildlife crossings on the Property.

3.19.2 Types of Wildlife Crossing Structures

Researchers from Florida and various locations around the world have investigated wildlife use of wildlife crossings of various types, sizes, and configurations. Types of crossings typically considered successful at maintaining connectivity across highway corridors fall into six general types: (1) wide maintained highway shoulders, (2) bridges, (3) large or small rectangular box culverts, (4) multi-plate arches, (5) small circular culverts that function as wildlife pipes or amphibian tunnels, and (6) ecopassages which combine various sizes of crossings with barrier walls. Modifications may be made to these basic types to accommodate site-specific features. Provision and maintenance of wide road shoulders to maximize visibility of both wildlife and motorists can be a very effective type of crossing where many species of wildlife may be expected to cross a transportation corridor at non-specific locations. Large wildlife crossings may be designed as an overpass or underpass, depending on local

topography, or structures that are installed in wet areas may need to incorporate some form of dry passage that allows wildlife to move through the crossing during periods of high water. Fencing or other type of low-profile barrier wall may be needed to prevent animals from entering the road corridor and to guide animals to the wildlife crossing.

4.0 CONTINUING THE TRADITION OF ENVIRONMENTAL STEWARDSHIP

The LTMP Environmental Plan represents an opportunity to conserve a large part of the region's "green infrastructure" while responsibly planning for projected regional growth. The LTMP Environmental Plan proposes to protect important natural resources on the Property consistent with environmental protection plans prepared through regional public processes including the *Envision Alachua* planning initiative. The green infrastructure proposed for protection is composed of some of the region's most significant natural resources and will establish the fundamental framework within which to plan future human uses. This environmental framework will guide smart planning and development, ensuring the achievement of long-term conservation and sustainability goals.

5.0 REFERENCES

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APPENDIX A

ALACHUA COUNTY ENVIRONMENTAL RESOURCES ASSESSMENT CHECKLIST

Alachua County, Board of County Commissioners
Department of Growth Management
10 SW 2nd Ave., Gainesville, Fl 32601
Tel. 352.374.5249, Fax. 352.338.3224
http://growth-management.alachua.fl.us

Submit to:
Development Services Division

ENVIRONMENTAL RESOURCES ASSESSMENT CHECKLIST

Pursuant to Alachua County Comprehensive Plan 2002, as amended, Conservation Open Space Element Policy 3.4.1, applications for land use change, zoning change, and development approval shall be required to submit an inventory of natural resource information. The inventory shall include site specific identification, analysis and mapping of each resource present on or adjacent to the site. The identification and analysis shall indicate information sources consulted.

Natural Resources Checklist:

Check "Yes" for each resource or resource characteristic identified and discuss and provide supporting material.
Check "N/A" for each resource or resource characteristic not present or otherwise relevant to the application.

Yes	☑	N/A	☐	Surface Waters (ponds, lakes, streams, springs, etc.)
Yes	☑	N/A	☐	Wetlands
Yes	☑	N/A	☐	Surface Water or Wetland Buffers
Yes	☑	N/A	☐	Floodplains (100-year)
Yes	☐	N/A	☑	Special Area Study Resource Protection Areas (Cross Creek, Idylwild/Serenola, etc)
Yes	☑	N/A	☐	Strategic Ecosystems (within or adjacent to mapped areas)
Yes	☑	N/A	☐	Significant Habitat (biologically diverse natural areas)
Yes	☑	N/A	☐	Listed Species/Listed Species Habitats (FNAI S1, S2, & S3; State or Federally E, T, SSC)
Yes	☑	N/A	☐	Recreation/Conservation/Preservation Lands
Yes	☑	N/A	☐	Significant Geological Features (caves, springs, sinkholes, etc.)
Yes	☑	N/A	☐	High Aquifer Recharge Areas
Yes	☑	N/A	☐	Wellfield Protection Areas
Yes	☐	N/A	☑	Wells
Yes	☑	N/A	☐	Soils
Yes	☐	N/A	☑	Mineral Resource Areas
Yes	☑	N/A	☐	Topography/Steep Slopes
Yes	☐	N/A	☐	Historical and Paleontological Resources *{Provided under separate cover by Southeastern Archaeological Research, Inc.}*
Yes	☐	N/A	☑	Hazardous Materials Storage Facilities
Yes	☐	N/A	☑	Contamination (soil, surface water, ground water)

SIGNED:_____ PROJECT #_____ DATE:_____

For assistance please visit the Alachua County Environmental Protection Department (ACEPD) website at http://www.alachuacounty.us/government/depts/epd/natural/devchecklist.aspx or contact ACEPD at (352) 264-6800.
(version 5/20/05)

APPENDIX B

FLORIDA NATURAL AREAS INVENTORY 2015 TRACKING LIST FOR ALACHUA COUNTY

FLORIDA Natural Areas INVENTORY

ABOUT FNAI STAFF PARTNERSHIPS CONTACT US

FNAI tracking list

ALACHUA COUNTY

195 Total Elements Found
Last Updated: May 2015

Key

Scientific Name is linked to the FNAI Online Field Guides when available.

- links to **NatureServe Explorer**, an online encyclopedia of more than 55,000 plants, animals, and natural communities in North America, compiled by the **NatureServe** network of natural heritage programs, of which the Florida Natural Areas Inventory is a member.

- links to a species distribution map (**Adobe SVG viewer** required). If your browser does not support Adobe SVG, try this **link**

New Search

SEARCH RESULTS

NOTE: This is not a comprehensive list of all species and natural communities occurring in the location searched. Only elements documented in the FNAI database are included.

Plants and Lichens

EXPLANATION

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
Adiantum tenerum	Brittle Maidenhair Fern	G5	S3	N	E
Agrimonia incisa	Incised Groove-bur	G3	S2	N	E
Asplenium heteroresiliens	Wagner's Spleenwort	GNA	S1	N	N
Asplenium plenum	Ruffled Spleenwort	G1Q	S1	N	N
Asplenium pumilum	Dwarf Spleenwort	G5	S1	N	E
Asplenium verecundum	Modest Spleenwort	G1	S1	N	E
Asplenium x curtissii	Curtiss' Spleenwort	GNA	S1	N	N
Blechnum occidentale	Sinkhole Fern	G5	S1	N	E
Brickellia cordifolia	Flyr's Brickell-bush	G2G3	S2	N	E
	Poppy Mallow	G5	S2	N	E

Callirhoe papaver						
Cheilanthes microphylla	Southern Lip Fern	G5	S3	N	E	
Coelorachis tuberculosa	Piedmont Jointgrass	G3	S3	N	T	
Forestiera godfreyi	Godfrey's Swampprivet	G2	S2	N	E	
Gymnopogon chapmanianus	Chapman's Skeletongrass	G3	S3	N	N	
Litsea aestivalis	Pondspice	G3?	S2	N	E	
Malaxis unifolia	Green Adder's-mouth Orchid	G5	S3	N	E	
Matelea floridana	Florida Spiny-pod	G2	S2	N	E	
Monotropa hypopithys	Pinesap	G5	S1	N	E	
Najas filifolia	Narrowleaf Naiad	G1	S1	N	T	
Pecluma plumula	Plume Polypody	G5	S2	N	E	
Pteroglossaspis ecristata	Giant Orchid	G2G3	S2	N	T	
Pycnanthemum floridanum	Florida Mountain-mint	G3	S3	N	T	
Salvia urticifolia	Nettle-leaved Sage	G5	S1	N	E	
Sideroxylon alachuense	Silver Buckthorn	G1	S1	N	E	
Stylisma abdita	Scrub Stylisma	G3	S3	N	E	
Verbesina heterophylla	Variable-leaf Crownbeard	G2	S2	N	N	

Clams and Mussels

EXPLANATION

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
Medionidus walkeri	Suwannee Moccasinshell	G1	S1	N	N
Utterbackia peninsularis	Peninsular Floater	G2G3	S2S3	N	N
Villosa amygdala	Florida Rainbow	G3	S3	N	N

Snails and Allies

EXPLANATION

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
Aphaostracon chalarogyrus	Freemouth Hydrobe Snail	G1	S1	N	N

Spiders

EXPLANATION

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
Phidippus workmani	Workman's Jumping Spider	G2G3	S2S3	N	N
Sphodros abboti	Blue Purse-web Spider	G4G5	S4	N	N

Amphipods

EXPLANATION

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
Crangonyx grandimanus	Florida Cave Amphipod	G2G3	S2S3	N	N
Crangonyx hobbsi	Hobbs' Cave Amphipod	G2G3	S2S3	N	N

Isopods

EXPLANATION

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
Caecidotea hobbsi	Florida Cave Isopod	G2G3	S2	N	N
Remasellus parvus	Swimming Little Florida Cave Isopod	G1G2	S1S2	N	N

Crabs, Crayfishes, and Shrimps

EXPLANATION

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
Palaemonetes cummingi	Squirrel Chimney Cave Shrimp	GH	SH	LT	FT
Procambarus lucifugus	Light-fleeing Cave Crayfish	G2G3	S2S3	N	N
Procambarus pallidus	Pallid Cave Crayfish	G2G3	S2S3	N	N
Troglocambarus maclanei	North Florida Spider Cave Crayfish	G2	S2	N	N

Dragonflies and Damselflies

EXPLANATION

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
Cordulegaster obliqua fasciata	Banded Spiketail	G4T3Q	S3	N	N
Cordulegaster sayi	Say's Spiketail	G2	S2	N	N
Didymops floridensis	Maidencane Cruiser	G4	S4	N	N

Dromogomphus armatus	Southeastern Spinyleg	G4	S3	N	N
Gomphaeschna antilope	Taper-tailed Darner	G4	S4	N	N
Gomphus cavillaris	Sandhill Clubtail	G4	S4	N	N
Lestes inaequalis	Elegant Spreadwing	G5	S2	N	N
Neurocordulia molesta	Smoky Shadowfly	G4	S1	N	N
Neurocordulia obsoleta	Umber Shadowfly	G5	S2	N	N
Progomphus alachuensis	Tawny Sanddragon	G3	S3	N	N
Tachopteryx thoreyi	Gray Petaltail	G4	S4	N	N

Grasshoppers and Allies

EXPLANATION

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
Melanoplus querneus	Larger Sandhill Grasshopper	G2G3	S2S3	N	N
Typhloceuthophilus floridanus	Blind Pocket Gopher Cave Cricket	G2	S2	N	N

Beetles

EXPLANATION

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
Aphodius aegrotus	Small Pocket Gopher Aphodius Beetle	G3G4	S3?	N	N
Aphodius dyspistus	Surprising Pocket Gopher Aphodius Beetle	G3G4	S3?	N	N
Aphodius hubbelli	Hubbell's Pocket Gopher Aphodius Beetle	GNR	S3?	N	N
Aphodius laevigatus	Large Pocket Gopher Aphodius Beetle	G3G4	S3?	N	N
Aphodius tanytarsus	Long-Clawed Pocket Gopher Aphodius Beetle	G2G3	S2S3	N	N
Aphodius troglodytes	Gopher Tortoise Aphodius Beetle	G2G3	S2	N	N
Ataenius brevicollis	An Ataenius Beetle	G3G5	S1S2	N	N
Auperia denominata	An Aphodiine Beetle	G5	S3S5	N	N
Bolbocerosoma hamatum	Bicolored Burrowing Scarab Beetle	G3G4	S3	N	N
Ceratocanthus aeneus	Shining Ball Scarab Beetle	G2G3	S2	N	N

Chelyoxenus xerobatis		Gopher Tortoise Hister Beetle	G2G3	S2	N	N
Copris gopheri		Gopher Tortoise Copris Beetle	G2	S2	N	N
Eucanthus alutaceus		Mat Red Globe Scarab Beetle	G2G3	S1S2	N	N
Hypotrichia spissipes		Florida Hypotrichia Scarab Beetle	G3G4	S3S4	N	N
Ischyrus dunedinensis		Three Spotted Pleasing Fungus Beetle	G2G3	S2S3	N	N
Mycotrupes gaigei		North Peninsular Mycotrupes Beetle	G2G3	S2S3	N	N
Onthophagus polyphemi polyphemi		Punctate Gopher Tortoise Onthophagus Beetle	G2G3T2T3	S2	N	N
Peltotrupes profundus		Florida Deepdigger Scarab Beetle	G3	S3	N	N
Phyllophaga clemens		Clemens' June Beetle	G2	S1	N	N
Phyllophaga elongata		Elongate June Beetle	G3	S3	N	N
Phyllophaga skelleyi		Skelley's June Beetle	G2	S2	N	N
Ptomaphagus schwarzi		Schwarz' Pocket Gopher Ptomaphagus Beetle	G3	S3	N	N
Selonodon floridensis		Florida Cebrionid Beetle	G2G4	S2S4	N	N
Selonodon mandibularis		Large-Jawed Cebrionid Beetle	G2G4	S2S4	N	N
Serica pusilla		Pygmy Silky June Beetle	G2G3	S2S3	N	N
Trigonopeltastes floridana		Scrub Palmetto Flower Scarab Beetle	G2G3	S2S3	N	N
Triplax alachuae		Alachua Pleasing Fungus Beetle	G2G4	S2S4	N	N

Scorpionflies

EXPLANATION

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
Panorpa floridana	Florida Scorpionfly	G1	S1	N	N

Caddisflies

EXPLANATION

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
Agarodes libalis	Spring-loving Psiloneuran Caddisfly	G3	S3	N	N
Cernotina truncona		G4	S3	N	N

		Florida Cernotinan Caddisfly				
Chimarra florida		Floridian Finger-net Caddisfly	G4	S3S4	N	N
Hydroptila berneri		Berner's Microcaddisfly	G4G5	S3	N	N
Hydroptila wakulla		Wakulla Springs Vari-colored Microcaddisfly	G2	S2	N	N
Oecetis daytona		Daytona Long-horned Caddisfly	G3	S2S3	N	N
Oecetis parva		Little Oecetis Longhorned Caddisfly	G2	S2	N	N
Oecetis porteri		Porter's Long-horn Caddisfly	G3G4	S2S3	N	N
Oxyethira janella		Little-entrance Oxyethiran Microcaddisfly	G5	S4S5	N	N
Oxyethira pescadori		Pescador's Bottle-Cased Caddisfly	G3G4	S3	N	N
Triaenodes florida		Floridian Triaenode Caddisfly	G2	S2	N	N

Butterflies and Moths

EXPLANATION

Scientific Name		Common Name	Global Rank	State Rank	Federal Status	State Status
Achalarus lyciades		Hoary Edge	G4G5	S2	N	N
Amblyscirtes aesculapius		Lace-winged Roadside Skipper	G3G4	S3S4	N	N
Atrytonopsis loammi		Loammi Skipper	G1	S1	N	N
Autochton cellus		Golden-banded Skipper	G4	S1	N	N
Callophrys niphon		Eastern Pine Elfin	G5	S2	N	N
Catocala grisatra		Grisatra Underwing Moth	G1G3	S1	N	N
Celastrina ladon		Spring Azure	G4G5	SU	N	N
Cupido comyntas		Eastern Tailed Blue	G5	S2	N	N
Euphyes dion		Dion Skipper	G4	S2S3	N	N
Euphyes dukesi calhouni		Calhoun's Skipper	G3T1T2	S1	N	N
Hesperia attalus slossonae		Seminole Skipper	G3G4T3	S3	N	N
Hesperia meskei straton		Eastern Meske's Skipper	G3G4T3	S2S3	N	N
Idia gopheri		Gopher Tortoise Noctuid Moth	G2G3	S2S3	N	N
Megathymus yuccae		Yucca Skipper	G5	S3S4	N	N

Nastra neamathla	Neamathla Skipper	G5	S2S3	N	N
Nymphalis antiopa	Mourning Cloak	G5	S2	N	N
Pholisora catullus	Common Sootywing	G5	SH	N	N
Poanes viator zizaniae	Broad-winged Skipper	G5T5	S2	N	N
Poanes yehl	Yehl Skipper	G4	S2S3	N	N
Poanes zabulon	Zabulon Skipper	G5	S4	N	N
Polites origenes	Crossline Skipper	G4G5	S3S4	N	N
Pompeius verna	Little Glassywing	G5	S4	N	N
Satyrium kingi	King's Hairstreak	G3G4	S2	N	N
Staphylus hayhurstii	Scalloped Sooty Wing	G5	S2	N	N

Flies

EXPLANATION

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
Nemopalpus nearcticus	Sugarfoot Moth Fly	G1G2	S1S2	N	N

Ants, Bees, and Wasps

EXPLANATION

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
Colletes longifacies	A Cellophane Bee	G1G2	S1S2	N	N
Dasymutilla archboldi	Lake Wales Ridge Velvet Ant	G2G3	S2S3	N	N
Perdita blatchleyi	Blatchley's Perdita bee	G2	S2	N	N
Polyergus lucidus	Shining Amazon Ant	GNR	S1S2	N	N

Fishes

EXPLANATION

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
Acantharchus pomotis	Mud Sunfish	G4G5	S3	N	N
Acipenser oxyrinchus desotoi	Gulf Sturgeon	G3T2	S2	LT	FT
Ameiurus serracanthus	Spotted Bullhead	G3	S3	N	N

Enneacanthus chaetodon	Blackbanded Sunfish	G3G4	S3	N	N
Micropterus notius	Suwannee Bass	G3	S3	N	N
Umbra pygmaea	Eastern Mudminnow	G5	S3	N	N

Amphibians

EXPLANATION

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
Ambystoma cingulatum	Frosted Flatwoods Salamander	G2	S2	LT	FT
Ambystoma tigrinum	Tiger Salamander	G5	S3	N	N
Lithobates capito	Gopher Frog	G3	S3	N	SSC
Notophthalmus perstriatus	Striped Newt	G2G3	S2	C	N

Reptiles

EXPLANATION

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
Alligator mississippiensis	American Alligator	G5	S4	SAT	FT (S/A)
Clemmys guttata	Spotted Turtle	G5	S2S3	N	N
Crotalus adamanteus	Eastern Diamondback Rattlesnake	G4	S3	N	N
Crotalus horridus	Timber Rattlesnake	G4	S3	N	N
Drymarchon couperi	Eastern Indigo Snake	G3	S3	LT	FT
Gopherus polyphemus	Gopher Tortoise	G3	S3	C	ST
Heterodon simus	Southern Hognose Snake	G2	S2	N	N
Lampropeltis extenuata	Short-tailed Snake	G3	S3	N	ST
Lampropeltis getula	Common Kingsnake	G5	S2S3	N	N
Macrochelys suwanniensis	Suwannee Alligator Snapping Turtle	G1G2	S1S2	N	N
Macrochelys temminckii	Alligator Snapping Turtle	G3G4	S2	N	SSC
Pituophis melanoleucus mugitus	Florida Pine Snake	G4T3	S3	N	SSC
Pseudemys concinna suwanniensis	Suwannee Cooter	G5T3	S3	N	SSC

EXPLANATION

Birds

Scientific Name		Common Name	Global Rank	State Rank	Federal Status	State Status
Aphelocoma coerulescens		Florida Scrub-Jay	G2	S2	LT	FT
Aramus guarauna		Limpkin	G5	S3	N	SSC
Ardea alba		Great Egret	G5	S4	N	N
Athene cunicularia floridana		Florida Burrowing Owl	G4T3	S3	N	SSC
Egretta caerulea		Little Blue Heron	G5	S4	N	SSC
Egretta thula		Snowy Egret	G5	S3	N	SSC
Egretta tricolor		Tricolored Heron	G5	S4	N	SSC
Elanoides forficatus		Swallow-tailed Kite	G5	S2	N	N
Eudocimus albus		White Ibis	G5	S4	N	SSC
Falco columbarius		Merlin	G5	S2	N	N
Falco peregrinus		Peregrine Falcon	G4	S2	N	N
Falco sparverius paulus		Southeastern American Kestrel	G5T4	S3	N	ST
Grus canadensis pratensis		Florida Sandhill Crane	G5T2T3	S2S3	N	ST
Haliaeetus leucocephalus		Bald Eagle	G5	S3	N	N
Ixobrychus exilis		Least Bittern	G5	S4	N	N
Laterallus jamaicensis		Black Rail	G3G4	S2	N	N
Mycteria americana		Wood Stork	G4	S2	LT	FT
Nyctanassa violacea		Yellow-crowned Night-heron	G5	S3	N	N
Nycticorax nycticorax		Black-crowned Night-heron	G5	S3	N	N
Pandion haliaetus		Osprey	G5	S3S4	N	SSC*
Parkesia motacilla		Louisiana Waterthrush	G5	S2	N	N
Pelecanus occidentalis		Brown Pelican	G4	S3	N	SSC
Peucaea aestivalis		Bachman's Sparrow	G3	S3	N	N
Picoides borealis		Red-cockaded Woodpecker	G3	S2	LE	FE
Picoides villosus		Hairy Woodpecker	G5	S3	N	N

Plegadis falcinellus	Glossy Ibis	G5	S3	N	N

Mammals

EXPLANATION

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	G3G4	S2	N	N
Eptesicus fuscus	Big Brown Bat	G5	S3	N	N
Lasiurus cinereus	Hoary Bat	G5	SU	N	N
Mustela frenata olivacea	Southeastern Weasel	G5T4	S3?	N	N
Myotis austroriparius	Southeastern Bat	G3G4	S3	N	N
Neofiber alleni	Round-tailed Muskrat	G3	S3	N	N
Podomys floridanus	Florida Mouse	G3	S3	N	SSC
Sciurus niger shermani	Sherman's Fox Squirrel	G5T3	S3	N	SSC
Ursus americanus floridanus	Florida Black Bear	G5T2	S2	N	N

Natural Communities

DESCRIPTION EXPLANATION

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
Aquatic cave		G3	S3	N	N
Basin marsh		G4	S3	N	N
Basin swamp		G4	S3	N	N
Blackwater stream		G4	S3	N	N
Bottomland forest		G4	S3	N	N
Depression marsh		G4	S4	N	N
Sandhill		G3	S2	N	N
Scrubby flatwoods		G2	S2?	N	N
Sinkhole		G2	S2	N	N
Spring-run stream		G2	S2	N	N
Terrestrial cave		G3	S2	N	N

Upland hardwood forest		G5	S3	N	N
Upland mixed woodland		G2	S2	N	N
Wet flatwoods		G4	S4	N	N

Other Elements

EXPLANATION

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
Bird Rookery		G5	SNR	N	N
Geological feature		GNR	SNR	N	N

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