Gordon River Greenway Preserve
Land Management Plan

Managed by: Conservation Collier Program

Collier County, Florida

June 2011 – June 2021 (10-yr plan)

Prepared by:

Conservation Collier Staff;

Collier County Facilities Management Department

Gordon River Greenway Preserve

Land Management Plan Executive Summary

Lead Agency: Collier County Board of County Commissioners, Conservation Collier Program

Property included in this Plan: "Gordon River Greenway Preserve" 43.54-acres. Preserve consists of one parcel in Section 34, Township 49, and Range 25 of Collier County, Florida.

Folio Number	Legal Description
00268160009	Appendix 1

Management Responsibilities:

Agency: Collier County - Conservation Collier Program

Designated Land Use: Conservation and natural resource based recreation

Unique Features: Mature mangrove forests; adjacent to Gordon River

Management Goals:

Goal 1: Remove or control populations of invasive, exotic or problematic flora and fauna

Goal 2: Develop a baseline monitoring report

Goal 3: Restore and maintain native habitats

Goal 4: Develop and implement a plan for public use

Goal 5: Facilitate uses of the site for educational purposes

Goal 6: Determine if prescribed fire and/or mechanical treatments are feasible to decrease woody invasion resulting from past fire exclusion; if so proceed

Goal 7: Provide a plan for security and disaster preparedness

Public Involvement: The Gordon River Greenway Preserve is one part of the larger Gordon River Greenway Project. Stakeholders from the City of Naples, The Naples Zoo, SW FL Land Preservation Trust, Naples Airport Authority, Conservancy of Southwest Florida, and Naples' Pathways Coalition, as well as other members of the general public, have been involved with the planning of the Greenway Project.

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1.0 Introduction

The Gordon River Greenway Preserve is a 43.54-acre natural area within the boundary of an unincorporated area of Collier County, Florida, within is directly adjacent to the City of Naples. Native plant communities within the preserve include mangrove swamp, scrubby flatwoods, hardwood/coniferous/palm mixed, and mixed wetland hardwoods. The preserve is one part of the larger "Gordon River Greenway Project", which, when complete, will be a 2-mile ecological and trail corridor centrally located within the Naples-Collier urban area. The Gordon River Greenway Preserve and the Gordon River Greenway Park, directly to the north, are being designed, permitted, and constructed together as one County project. Public amenity features along the boardwalk will be consistent throughout the entire project. Certain aspects of the trail system, such as trail width, security lighting, and hours of operation will be determined by County officials, with input from the Conservation Collier Program, to ensure public safety and consistency throughout the project area.

A site assessment to determine compliance with Conservation Collier's initial screening criteria was conducted in May 2004 and the Conservation Collier Program purchased the property on April 7, 2006. The County holds a fee simple title to the Gordon River Greenway Preserve. The Conservation Collier program manages these lands under authority granted by Conservation Collier Ordinance 2002-63 as amended (2007-65; available from www.municode.com). Initial acquisition activities are summarized in Table 1.

Table 1: Acquisition History and Status of Gordon River Greenway Preserve

Year	Benchmark
2004	Property nominated to the Conservation Collier Program
2004	Initial Criteria Screening Report accepted by the Conservation Collier Land Acquisition Advisory Committee (CCLAAC)
2006	Purchase approved by the Board of County Commissioners (BCC) and lands purchased
2006	Interim Management Plan completed and approved by CCLAAC and BCC
2010	Final Management Plan completed. The Final Management Plan was delayed because the preserve was originally to be incorporated into the Gordon River Greenway Park Final Management Plan. However, complications related to the Greenway Park's Management Plan FCT grant requirements prompted Conservation Collier staff to draft a separate, stand-alone Final Management Plan for the Greenway Preserve.
2011	Final Management Plan approved by CCLAAC and BCC

Conservation, restoration and natural resource-based recreation are the designated uses of this preserve. Management activities allowed include those necessary to preserve, restore, secure and maintain this environmentally sensitive land for the benefit of present and future generations. Public use of the site must be consistent with these management goals.

This is the Final Management Plan for the Gordon River Greenway Preserve. This 10-year management plan will be submitted to the Collier County Board of County Commissioners (BCC) for its approval. When approved, this plan will replace the Interim Management Plan.

1.1 Conservation Collier: Land Acquisition Program and Management Authority

The Conservation Collier program was originally approved by voters in November 2002 and subsequently confirmed in the November 2006 ballot referendum. Both voter-approved referendums enable the program to acquire, preserve, restore, and maintain vital and significant threatened natural lands, forest, upland and wetland communities located in Collier County, Florida (Ordinance 2002-63, as amended). Properties must support at least two of the following qualities to qualify for consideration: rare habitat, aquifer recharge, flood control, water quality

protection, and listed species habitat. The BCC appointed a Land Acquisition Advisory Committee to consider any selected or nominated properties that an owner has indicated a willingness to sell. The Committee recommends property purchases for final approval by the BCC.

Lands acquired with Conservation Collier funds are titled to "COLLIER COUNTY, a political subdivision of the State of Florida, by and through its Conservation Collier program." The BCC established the Conservation Collier Program to a lands. As such, Conservation Collier holds management authority for the Gordon River Greenway Preserve.

1.2 Purpose and Scope of Plan

The purpose of the plan is to provide management direction for Gordon River Greenway Preserve by identifying the goals and objectives necessary to eliminate or minimize any threats to the resources and integrity of the preserve. This text is a working document that establishes the foundation of the ten-year plan by identifying the appropriate management techniques necessary to restore and preserve the resource.

This plan will balance resource restoration and protection with natural resource-based recreational and educational use while looking at restoration needs, listed species protection and maintenance of the site free of invasive, exotic plant and animal species. This plan is divided into sections that incorporate an introduction, descriptions of the natural and cultural resources, projected uses of the property, management issues, and goals and objectives.

1.3 Location of the Gordon River Greenway Preserve

Gordon River Greenway Preserve is located on the east and west side of the Gordon River, approximately ½ mile south of Golden Gate Parkway and just northwest of the Naples Airport, with the northern access to the Preserve being from Bembury Drive. (Figures 1 and 2). The Gordon River Greenway Preserve is in southwest Collier County in Section 34, Township 49, and Range 25.

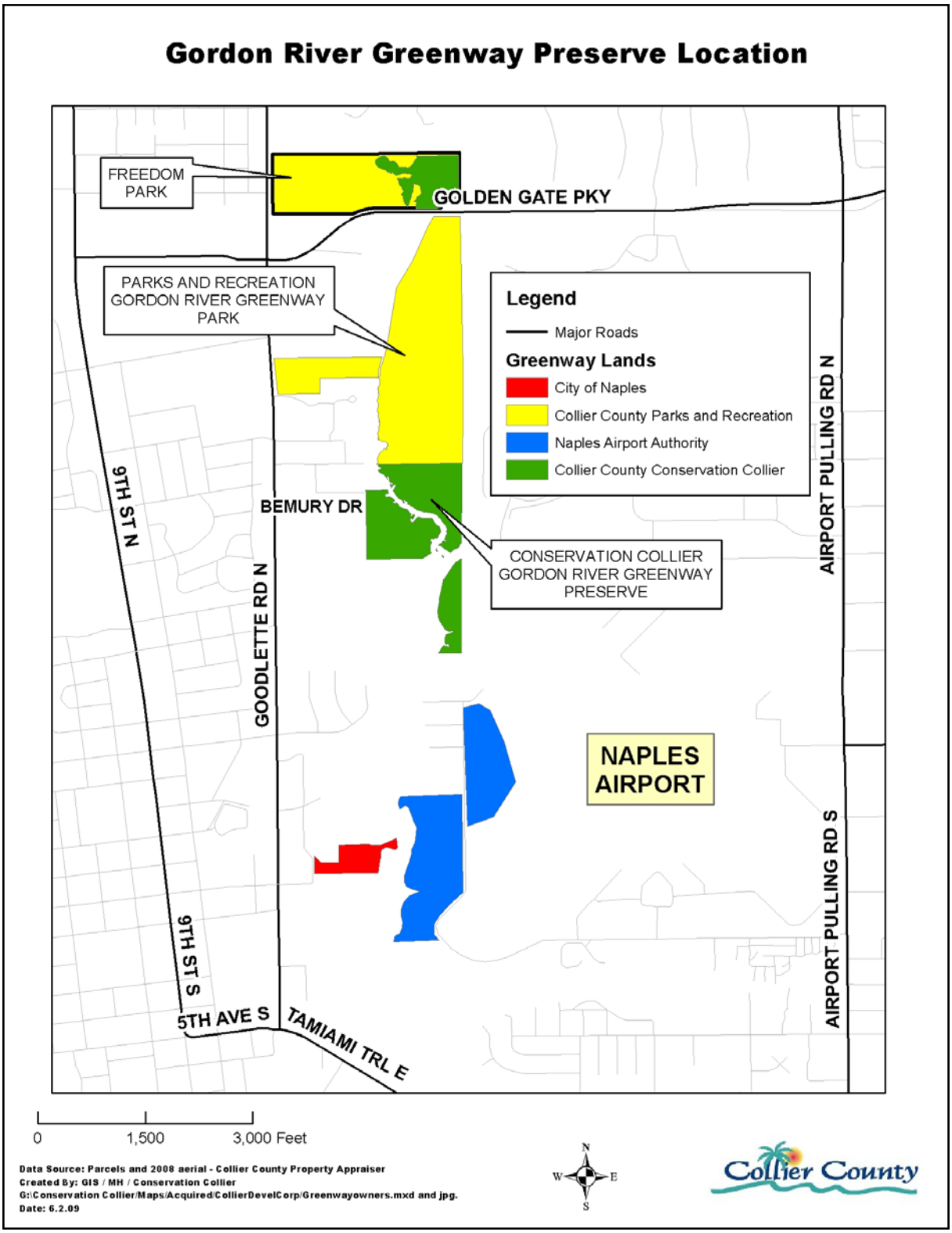

Figure 1: General Location of Gordon River Greenway Preserve.

Figure 2: Aerial View of the Gordon River Greenway Preserve

1.4 Regional Significance of the Gordon River Greenway Preserve

Ecosystem services such as the protection of water resources, flood control, maintenance of nutrient cycles, preservation of biological diversity, carbon sequestration, and the availability of recreational lands are imperative for the well-being of the citizens of Collier County and may be achieved through the preservation of natural areas. As of April 2008, approximately 66% (over 860,000 acres) of all lands in Collier County were protected in conservation areas (Figure 3) and managed by private, local, state and federal agencies (FNAI 2008). Collier County's Conservation Collier Program manages the 43.54-acre Gordon River Greenway Preserve; it contains mangrove swamp, scrubby flatwoods, hardwood/coniferous/palm mixed, and mixed wetland hardwoods communities. Specific information on the plant communities found on the Gordon River Greenway Preserve may be found in section 2.3 (Natural Plant Communities) of this document.

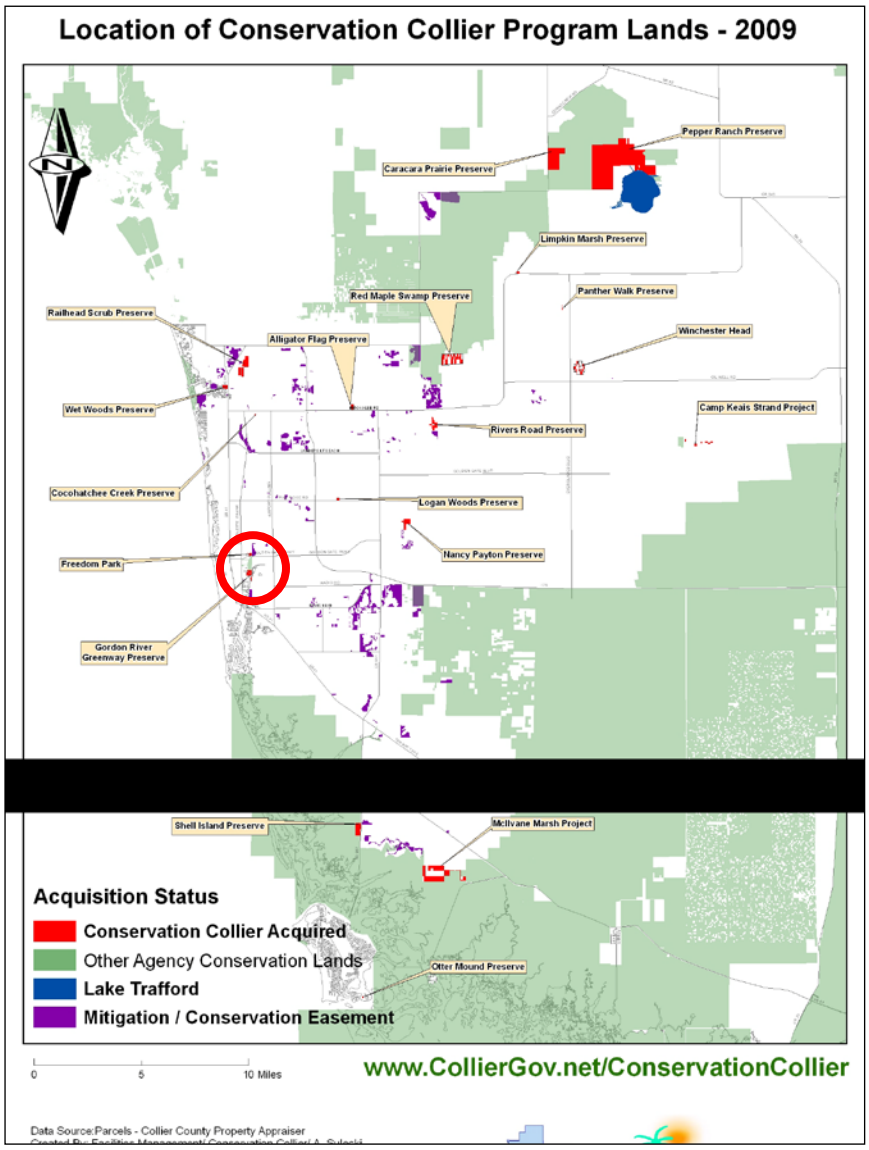

Figure 3: Conserved Lands in Collier County, Florida

1.5 Nearby Public Lands and Designated Water Resources

Currently, the closest preserved, natural area to the Gordon River Greenway Preserve is the adjoining Gordon River Greenway Park to the north managed by Collier County Parks and Recreation (Parks and Rec.). Other preserves, in order of increasing distance, are provided in Table 2. Figure 4 shows the locations of these preserves.

Table 2: Public Lands Located near the Gordon River Greenway Preserve

Name	Approximate Distance (miles)	Direction	Type
Gordon River Greenway Park	0.00 (adjoining)	N	County
Riverside Circle Wetland Area	0.47	SW	City of Naples
Naples Preserve	0.64	NW	City of Naples
Freedom Park	0.67	S	Conservation Collier
Rookery Bay National Estuarine Research Reserve	4.3	S	State
Logan Woods Preserve	5.1	NE	Conservation Collier
Picayune Strand State Forest	7.2	W	State
Cocohatchee Creek Preserve	7.2	N	Conservation Collier
Nancy Payton Preserve	7.3	NE	Conservation Collier
Delnor-Wiggins Pass State Park	7.8	W	State
Wet Woods Preserve	8.5	NW	Conservation Collier

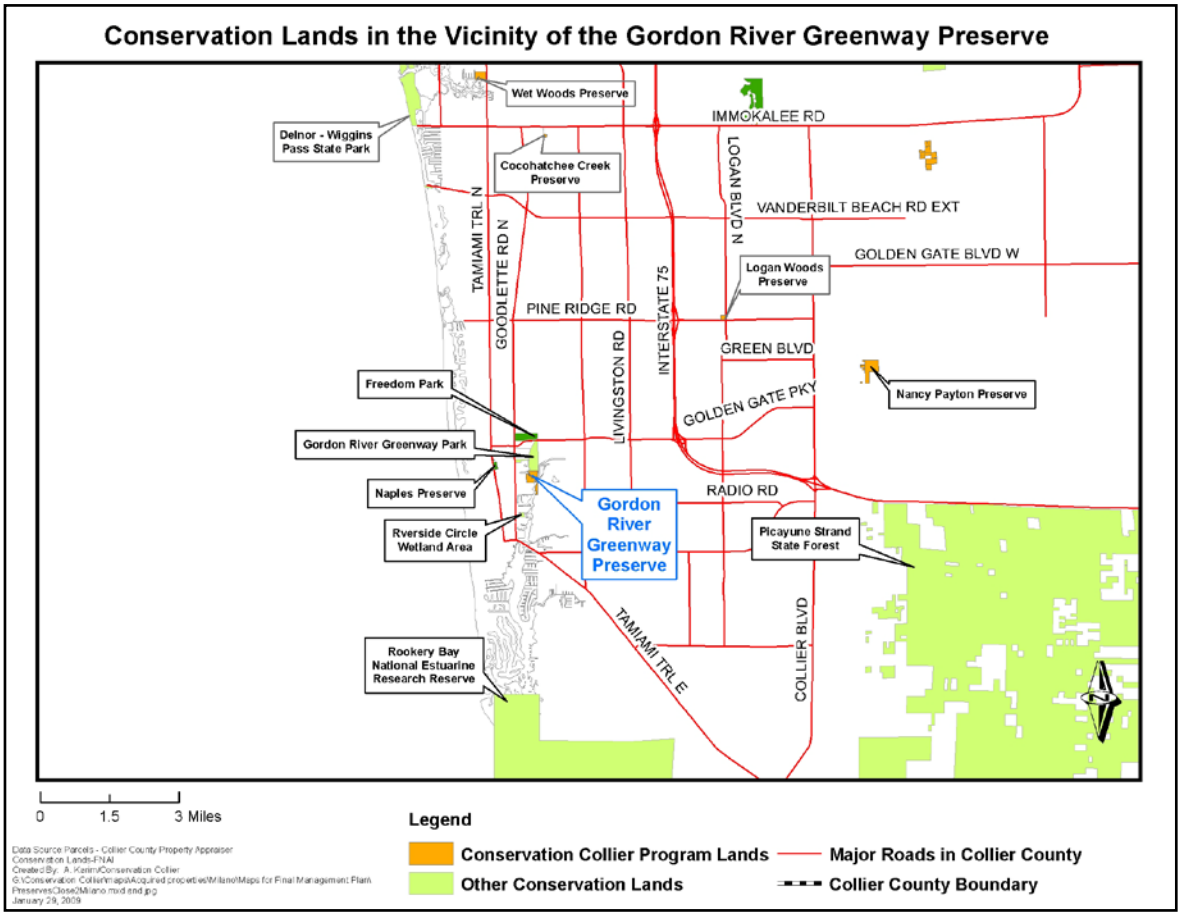

Figure 4: Preserves and Protected Lands in the Vicinity of Gordon River Greenway Preserve

1.6 Public Involvement

Neighborhood involvement will be sought through public meetings associated with the rezone and development process of the County's portion of the Gordon River Greenway, which includes the Gordon River Greenway Preserve and the Gordon River Greenway Park adjacent to the Preserve on the northern boundary. Staff will seek to coordinate management actions, such as exotic removal with owners of adjoining lands that are also part of the larger Gordon River Greenway Project.

Staff will continue to work together with Collier County Parks and Rec., Southwest Florida Land Preservation Trust, the Naples Airport Authority, and the City of Naples to ensure that sufficient public input is gathered regarding the Greenway and to ensure that Greenway development is consistent across agency boundaries.

2.0 Natural Resources

2.1 Physiography

Gordon River Greenway Preserve lies within the Floridian section of the Coastal Plain. The Coastal Plain extends from New Jersey to Texas and was formed mainly from sedimentary rocks deposited in marine environments (USGS 2004).

2.1.1 Soils

Soils data is based on the Soil Survey of Collier County Area, Florida (USDA/NRCS, 1990). The majority of the mapped soils on this parcel are Durbin and Wulfert Mucks, which are frequently flooded hydric, tidal soils. Non-hydric, Immokalee Fine Sand is found in a very small section at the northern edge of the property. (Figure 5).

Durbin and Wulfert Mucks, frequently flooded, covers approximately 91.3% of the preserve. These level, very poorly drained soils are in tidal mangrove swamps. Mapped areas can consist entirely of the Durbin soil, entirely of the Wulfert soil, or any combination of the two soils. The permeability of both soil types is rapid. The available water capacity in the Durbin soil is high and in the Wulfert soil it is moderate. The water table fluctuates with the tide, and it is within a depth of 12 inches for most of the year. The soil is subject to tidal flooding. The natural vegetation consists of red mangrove *(Rhizophora mangle*), black mangrove (*Avicennia germinans*), and white mangrove (*Laguncularia racemosa*) (Liudahl et al. 1990).

Immokalee Fine Sand (7.6% of the preserve) is a nearly level, poorly drained, non-hydric soil found on flatwoods. The permeability of this soil is moderate. The available water capacity is low. The seasonal high water table is normally at a depth of 6 to 18 inches for 1-6 monthes during most years; during the other months, the water table is below a depth of 18 inches, and it recedes to a depth of more than 40 inches during extended dry periods. Natural vegetation within this soil consists of Florida slash pine (*Pinus elliottii*), saw palmetto (*Serenoa repens*), waxmyrtle (*Myrica cerifera*), chalky bluestem (*Andropogon virginicus*), little bluestem (*Schizachyrium scoparium*), and wiregrass (*Aristida stricta*) (Liudahl et al. 1990).

Hallandale Fine Sand and Urban Land – Immokalee – Oldsmar, Limestone Substratum Complex soils cover 0.9% and 0.2% of the preserve respectively.

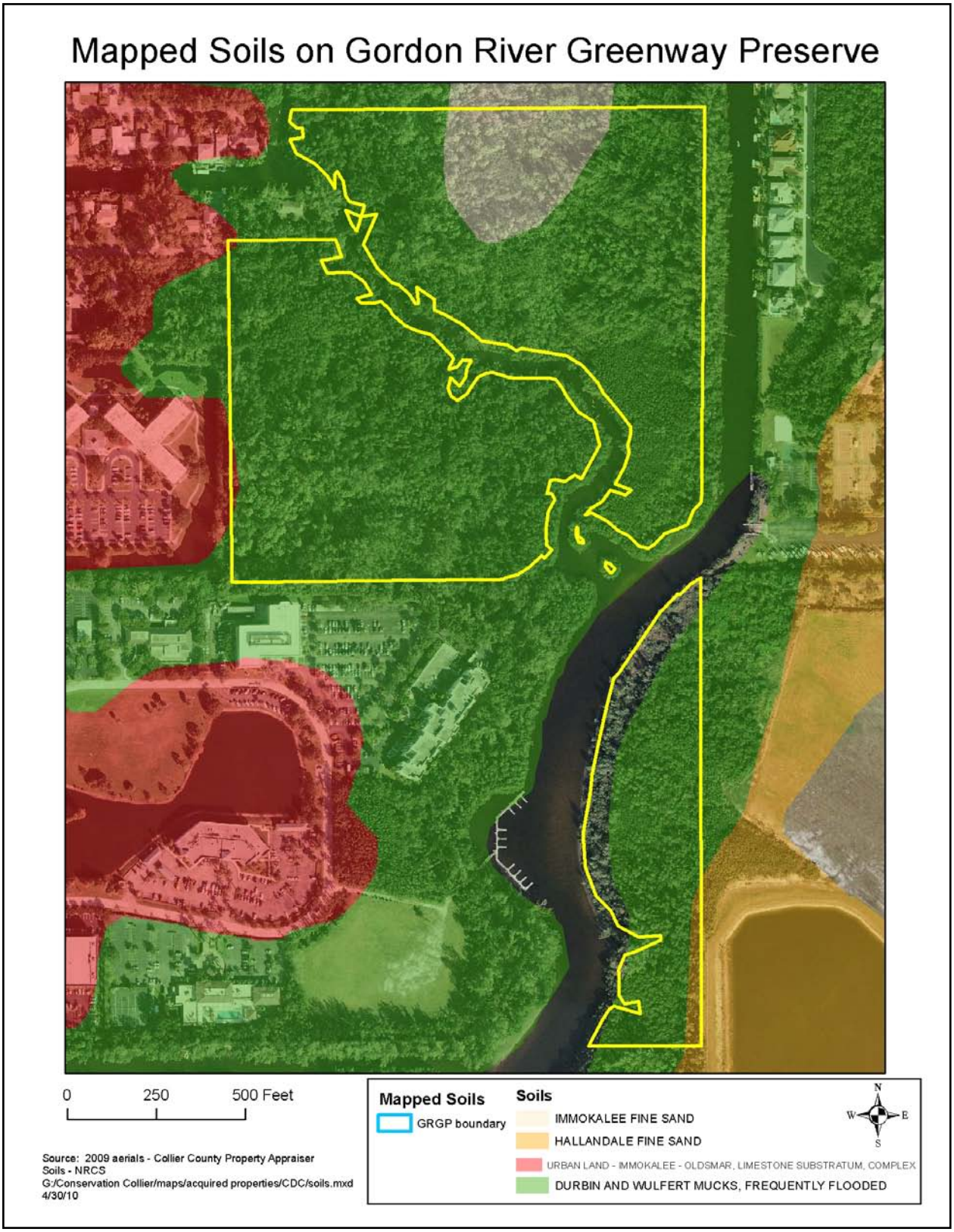

Figure 5: Soil Units on the Gordon River Greenway Preserve

2.1.2 Hydrology/Water Management

Near the surface, the aquifer is highly permeable and the groundwater flows toward the west. However, permeability decreases downward from a porous limestone into poorly indurated sandstone cemented by micrite. The aquifer grades from freshwater downward into brackish water due to the proximity of the Gulf of Mexico to the west and the brackish water in the intermediate aquifer made primarily of Miocene aged sediments. Below that, the Hawthorne formation typically marks the upper boundary of the Floridian aquifer, which is contained within the underlying Oligocene age Suwannee Limestone (Lodge 2005).

A large majority of the preserve contains tidally influenced brackish water wetlands that hold water year round.

The Surficial Aquifer is an aquifer close to the surface and unconfined, typically associated with the groundwater table. This aquifer is generally limited to smaller uses such as household or small agricultural uses. The Lower Tamiami aquifer is below this aquifer and is recognized as being useful for long-term water needs. According to the South Florida Water Management District's (SFWMD) technical publication 95-02 (Fairbank & Hohner 1995), the Surficial Aquifer recharge capacity on the Gordon River Greenway Preserve is moderate at 43 to 56 inches annually. The Lower Tamiami Aquifer recharge capacity on the preserve is relatively low at 7 to 14 inches annually.

2.2 Climate

The Gordon River Greenway Preserve is located in an area of Florida where humid subtropical and tropical savanna climatic patterns overlap, with temperatures moderated by winds from the Gulf of Mexico and the Atlantic Ocean. Sharply delineated wet and dry seasons and average monthly temperatures greater than 64º Fahrenheit characterize a tropical savanna climate. Monthly rainfalls may exceed ten inches during the wet season. On the other hand, humid subtropical climates typically show less extreme rainfall fluctuations between wet and dry seasons and average monthly temperatures is less than 64º Fahrenheit in some months.

The average annual temperature for the coastal portion of Collier County is approximately 75º Fahrenheit. The warmest months are usually July and August. The humidity is high during these months but frequent afternoon thunderstorms prevent excessively high temperatures.

Two-thirds of the annual rainfall occurs in the wet season from May to October. Thunderstorms are frequent during the wet season, occurring every two out of three days between June and September. Rainfall records for the area indicate that there is not significant variation in the annual rainfall throughout much of the county; however, large variations often occur during a single year. The Atlantic hurricane season extends from June through November with peak activity occurring in September and October when ocean temperatures are highest.

2.3 Natural Plant Communities

A plant community refers to the suite of floristic species that form the natural vegetation of any place. In addition to anthropogenic influences, the combination of factors such as geology, topography, hydrology, underlying soils and climate determine the types of plants found in an area. These plants, in turn determine the animal species that may be found there. The

description or classifications of these floral communities differ by agency and are based on an agency's goals and objectives for identifying plant communities. As some categorizations are broad (e.g., forest) while others are specific (e.g., mesic pine flatwoods), determining how each organization classifies a community may be difficult. The South Florida Vegetation Classification Scheme Crosswalks (Gilbert 2005) provides a way to decipher the classifications of plant communities across agencies. Appendix 2 provides the categorization of the plant communities observed on the Gordon River Greenway Preserve based on the South Florida Vegetation Classification Scheme Crosswalks; classifications from the Florida Natural Areas Inventory (FNAI) are also included in this appendix. Specific information on the invasive, exotic species present on the preserve is provided in section 2.6.1 of this document.

The Florida Department of Transportation and Water Management Districts' Land Use, Land Cover Classification System (FLUCCS) codes for plant communities observed on the Gordon River Greenway Preserve are presented in Table 3. The following subsections (2.3.1, 2.3.2, 2.3.3 and 2.3.4) provide information about the plant communities observed on the preserve.

Table 3: Extent of Florida Land Use, Land Cover Classification System Designations on the Gordon River Greenway Preserve

FLUCCS CODE	Mapped Plant Community	2009
6129	Mangrove Swamp – Disturbed	77%
3279	Other Shrubs and Brush (Scrubby Flatwoods – Disturbed)	9%
4349	Harwood/Coniferous/Palm Mixed	8%
7430	Spoil Area	5%
6179	Mixed Wetland Hardwoods – Disturbed	1%

Figure 6: Distribution of Natural Communities on the Gordon River Greenway Preserve

2.3.1 Wetlands: Mangrove Swamp – Disturbed

This land cover occupies 77% of the Greenway Preserve. Vegetation present in the wetland canopy includes Australian pine (*Casuarina* sp.), red mangrove, black mangrove, white mangrove, buttonwood (*Conocarpus erectus*), and cabbage palm (*Sabal palmetto*). A sub-canopy is present along the edges of this wetland and is comprised of Brazilian pepper (*Schinus terebinthifolia*), seagrape (*Coccoloba uvifera*), and wild lime (*Zanthoxylum fagara*). Species found in the herbaceous stratum include crinum lily (*Crinum americanum*), swamp fern *(Blechnum serrulatum*), giant leather fern (*Acrostichum danaeifolium*), golden leather fern (*Acrostichum aureum*), oyster plant (*Tradescantia spathacea*), scorpion's tail (*Heliotropium angiospermum*), seashore paspalum (*Paspalum vaginatum*), pineland heliotrope (*Heliotropium polyphyllum*) and grapevine (*Vitis rotundifolia*).

2.3.2 Wetlands: Mixed Wetland Hardwoods – Disturbed

The canopy along the edge of this community is comprised of laurel oak (*Quercus laurifolia*), slash pine, Australian pine, cabbage palm, and melaleuca (*Melaleuca quinquenervia*). Red mangrove, black mangrove, buttonwood, and white mangrove comprise the other canopy species in the mid-zone of this wetland. The sub-canopy consists of Brazilian pepper, gumbo limbo (*Bursera simaruba*), wax myrtle (*Myrica cerifera*), downy rose myrtle (*Rhodomyrtus tomentosa*), white indigoberry (*Randia aculeate*), Spanish stopper (*Eugenia foetida*), shoe button ardisia (*Ardisia elliptica*), and lyonia (*Lyonia ligustrina*). The herbaceous stratum contains sawgrass (*Cladium jamaicense*), black needlerush (*Juncus romerianus*), swamp fern, golden leather fern, and giant leather fern.

2.3.3 Uplands: Other Shrubs and Brush (Scrubby Flatwoods – Disturbed)

This area, labeled 3279 on Figure 6, is located on the north-central portion of the property, west of the Golden Gate Canal and Bear's Paw Golf Club. This upland area has become infested with dense downy rose myrtle. The dominant vegetation is saw palmetto, slash pine, wire grass and downy rose myrtle.

2.3.4 Uplands: Hardwood/Coniferous/Palm Mix

This native area is located at the southwestern corner of the property and consists of cabbage palm, slash pine, swamp fern, carrotwood (*Cupaniopsis anacardioides*), Brazilian pepper, and Australian pine.

2.3.5 Uplands: Spoil Area

A spoil berm exists on the southeastern parcel and it is most likely a result of the dredging of the Golden Gate Canal. This spoil area supports bahia grasses (*Paspalum notatum*), cabbage palm, Brazilian pepper, and several other upland species that have exploited the high ground within the mangrove swamps. The soil is classified as Urban Land-Immokalee-Oldsmar-Limestone substratum which is an upland soil according to the Soil Survey of Collier County, Florida (1998).

2.4 Native Plant and Animal Species

This section discusses the flora and fauna found within the plant communities described above. The next section (2.5) discusses all listed species in greater detail.

2.4.1 Plant Species

To date, 168 plant species have been recorded on the preserve (Appendix 3). Mike Kirby, Entrix staff member, conducted a floristic inventory in 2009. Of these 168 species, 111 (66%) are native - of which, 10 are listed by the State of Florida (3 are listed as endangered; 7 are listed as threatened). A qualified botanist will conduct another floristic inventory after initial removal of thick invasive, exotic vegetation.

2.4.2 Animal Species

Due to the dearth of specific surveys for the occurrence of animal species (in contrast to plants) and the lack of on-site staffing, little is recorded for actual occurrences of animals at the Gordon River Greenway Preserve. Occurrences of fauna at the preserve are based on direct visual and aural observations or observed evidence of activity such as spoor, scat, or burrows by County staff and environmental consultants during site visits. Occurrences are also based on site information available in documents such as the site's initial criteria screening report, the property's interim management plan and anecdotal information from persons with knowledge of the site. Table 4 provides a comprehensive list of animals, both native and non-native, recorded on the Gordon River Greenway Preserve thus far.

Table 4: Faunal Species Recorded on the Gordon River Greenway Preserve

Common Name	Scientific Name
Red imported fire ant [a]	*Solenopsis invicta*
Brown anole [a]	*Anolis sagrei*
Gopher tortoise	*Gopherus polyphemus*
Bald eagle	*Haliaeetus leucocephalus*
Belted kingfisher	*Ceryle alcyon*
Boat-tailed grackle	*Quiscalus major*
Brown pelican	*Pelecanus occidentalis*
Great crested flycatcher	*Myiarchus crinitus*
Great egret	*Ardea alba*
Little blue heron	*Egretta caerulea*
Northern cardinal	*Cardinalis cardinalis*
Osprey	*Pandion haliaetus*
Snowy egret	*Egretta thula*
Solitary sandpiper	*Tringa solitaria*
Swallow-tailed kite	*Elanoides forficatus*
Tri-colored heron	*Egretta tricolor*
Yellow crowned night heron	*Nyctanassa violacea*
Squirrel monkey [a]	*Saimiri sp.*
Nine-banded armadillo	*Dasypus novemcinctus*

a = non-native species

The Florida Breeding Bird Atlas (FWC 2003) lists 50 avian species that have been recorded as confirmed, probable, or possible breeding in the vicinity of the site (Table 5). The Breeding Bird Atlas documents breeding distributions of all bird species in Florida between 1986 and 1991. Some of these species may breed at the Gordon River Greenway Preserve.

Other wildlife species that have not yet been recorded undoubtedly occur at the Gordon River Greenway Preserve. During migration periods, transient bird species would be expected to utilize this area for short periods of time. The developed character of the adjacent areas may inhibit transient use by many mammal, reptile, and amphibian species, thus limiting the utilization of the preserve to resident individuals or inhibiting the dispersal of many species to and from the preserve.

Table 5: Breeding Bird Species Recorded in the Naples South Quadrangle Encompassing the Gordon River Greenway Preserve

Common Name	Scientific Name	Common Name	Scientific Name
American Swallow-tailed Kite	*Elanoides forficatus*	Mangrove Cuckoo	*Coccyzus minor*
Bald Eagle	*Haliaeetus leucocephalus*	Mourning Dove	*Zenaida macroura*
Black Vulture	*Coragyps atratus*	Muscovy Duck	*Cairina moschata*
Blue Jay	*Cyanocitta cristata*	Northern Bobwhite	*Colinus virginianus*
Blue-gray Gnatcatcher	*Polioptilia caerulea*	Northern Cardinal	*Cardinalis cardinalis*
Boat-tailed Grackle	*Quiscalus major*	Northern Flicker	*Colaptes auratus*
Brown Thrasher	*Toxostoma rufum*	Northern Mockingbird	*Mimus polyglottos*
Brown-headed Cowbird	*Molothrus ater*	Osprey	*Pandion haliaetus*
Carolina Wren	*Thryothorus ludovicianus*	Pied-billed Grebe	*Podilymbus podiceps*
Cattle Egret	*Bubulcus ibis*	Pileated Woodpecker	*Dryocopus pileatus*
Chimney Swift	*Chaetura pelagica*	Pine Warbler	*Dendroica pinus*
Common Grackle	*Quiscalus quiscula*	Prairie Warbler	*Dendroica discolor*
Common Ground-Dove	*Columbina passerina*	Purple Martin	*Progne subis*
Common Moorhen	*Gallinula chloropus*	Red-bellied Woodpecker	*Melanerpes carolinus*
Downy Woodpecker	*Picoides pubescens*	Red-shouldered Hawk	*Buteo lineatus*
Eastern Screech-Owl	*Megascops asio*	Red-winged Blackbird	*Agelaius phoeniceus*
European Starling	*Sturnus vulgaris*	Rose-ringed Parakeet	*Psittacula krameri*
Gray Kingbird	*Tyrannus dominicensis*	Ruby-throated Hummingbird	*Archilochus colubris*
Great Crested Flycatcher	*Myiarchus crinitus*	Snowy Egret	*Egretta thula*
Great Egret	*Ardea alba*	Tricolored Heron	*Egretta tricolor*
Great Horned Owl	*Bubo virginianus*	White-eyed Vireo	*Vireo griseus*
Green Heron	*Butorides virescens*	White-winged Dove	*Zenaida asiatica*
House Sparrow	*Passer domesticus*	Wild Turkey	*Meleagris gallopavo*
Least Tern	*Sterna antillarum*	Wilson's Plover	*Charadrius wilsonia*
Little Blue Heron	*Egretta caerulea*	Yellow-crowned Night-Heron	*Nyctanassa violacea*

**** = non-native species***

2.5 Listed Species

Official lists of rare and endangered species are produced at the federal level by the United States Fish and Wildlife Service and the National Marine Fisheries Service and at the State level by the Florida Fish and Wildlife Conservation Commission (FWC) and the Florida Department of Agriculture and Consumer Services. FNAI produces a list of rare and endangered species, and maintains a database of occurrences of these species in Florida. The Institute for Regional Conservation (IRC) also ranks native plant species by conservation status in the 10-county area of South Florida. The following subsections (2.5.1 and 2.5.2) discuss the listed, rare and protected plant and animal species found within and close to the Gordon River Greenway Preserve in detail.

2.5.1 Listed Plant Species

The Florida State Statute titled "Preservation of native flora of Florida" (Statute 581.185) provides the following definitions:

- Endangered plants means species of plants native to the state that are in imminent danger of extinction within the state, the survival of which is unlikely if the causes of a decline in the number of plants continue, and includes all species determined to be endangered or threatened pursuant to the federal Endangered Species Act of 1973, as amended, Pub. L. No. 93-205 (87 Stat. 884).
- Threatened plants means species native to the state that are in rapid decline in the number of plants within the state, but which have not so decreased in such number as to cause them to be endangered.
- Commercially exploited plants means species native to the state, which are subject to being removed in significant numbers from native habitats in the state and sold or transported for sale.

There are ten (10) plant species at Gordon River Greenway Preserve that are listed by the Florida Department of Agriculture and Consumer Services (FDACS), three (3) as endangered and seven (7) as threatened (Table 6). A brief description of these species and their status is included in the following paragraphs.

Table 6: Listed Plant Species Detected at the Gordon River Greenway Preserve

Common Name(s)	Scientific Name	State
Whitewood	*Drypetes diversifolia*	E
Florida Royal Palm	*Roystonea regia*	E
Stiff-leaved wild-pine, Cardinal airplant	*Tillandsia fasciculata*	E
Golden leather fern	*Acrostichum aureum*	T
Satinleaf	*Chrysophyllum oliviforme*	T
Pricklypear	*Opuntia stricta*	T
Mullein nightshade	*Solanum donianum*	T
West Indian mahogany	*Swietenia mahagoni*	T
Reflexed wild-pine, Northern needleleaf	*Tillandsia balbisiana*	T
Twisted airplant	*Tillandsia flexuosa*	T

T: Threatened; E: Endangered; C: Commercially Exploited

Three of the ten listed plant species found on the Gordon River Greenway Preserve are classified as bromeliads. Bromeliads are members of the pineapple family (Bromeliaceae). While some of

these species may be found growing terrestrially, most native bromeliads found in Florida are found growing attached to tree trunks and branches and may therefore be referred to as epiphytes (a plant that lives upon other plants; from Greek "epi" = upon "phyte" = plant). The leaves and/or roots of these airplants (depending on the species) absorb the water and nutrients they need from the air and from the rain that falls through the canopy of the tree on which they are found. Since epiphytes use their roots only to anchor themselves to another plant, they are considered non-parasitic. Even though the three listed bromeliad species found on the Gordon River Greenway Preserve are fairly common in the state, they are listed due to illegal collecting and the destruction of the habitats in which they are found. Additionally, infestation by the introduced Mexican bromeliad weevil (*Metamasius callizona*) has been implicated in the decline of many airplant populations around the state. Currently, there are no control measures in place however, close research and monitoring is taking place.

Stiff-leaved Wild Pine (*Tillandsia fasciculata*), is also known as cardinal airplant and common wild pine. *T. fasciculata* is listed as an endangered plant by the State of Florida and has been in 24 counties throughout Florida (Wunderlin & Hansen 2008). This epiphyte was frequently found in South Florida before the introduction of the Mexican bromeliad weevil. Today, it may be found in hammocks, cypress swamps and pinelands.

Tillandsia fasciculata;
Photo by Annisa Karim

View of *T. fasciculata* with water in the "tank".
Photo by Annisa Karim

Like most of the other bromeliads in Florida, this species is often referred to as a "tank" bromeliad because the leaf axils and central stems form a "tank" or reservoir at the base of the plant. These reservoirs capture and hold water, dead and decaying plant matter (leaves, seeds twigs, etc.), and dead and drowning non-aquatic insects; these trapped items provide nutrients for the plant (Larson et al. 2006).

Twisted airplant (*Tillandsia flexuosa*) is a slow growing epiphyte found in moist forests and swamps. *T. flexuosa*, also known as banded wild pine is listed as a threatened plant by the State of Florida.

Tillandsia flexuosa;
Photo by T. Ann Williams

Swietenia mahagoni;
Photo by Patricia Howell

West Indian mahogany (*Swietenia mahagoni*)

West Indian mahogany occurs in the West Indies, Bahamas and South Florida. The leaves of the mahogany are unique among North American native trees. They are even-pinnate compound, with three or four pairs of asymmetric leaflets and no leaflet at the tip. *S mahagoni* has been reported from the 5 southernmost counties in Florida (Wunderlin & Hansen 2008).

Mullein nightshade (*Solanum donianum*)

This threatened plant is found growing near the upland spoil within the southern portion of the property. It has been found in 3 South Florida counties (Wunderlin & Hansen 2008).

Solanum donianum;
Photo by T. Ann Williams

Opuntia stricta;
Photo by Keith Bradley

Pricklypear (*Opuntia stricta*)

O. stricta is predominantly found within pinelands and coastal uplands throughout Florida where it has been documented in 25 counties (Wunderlin & Hansen 2008).

Satinleaf (*Chrysophyllum oliviforme*)

This medium to large sized tree is endemic to peninsular Florida where it has been reported from 10 counties (Wunderlin & Hansen 2008).

Chrysophyllum oliviforme;
Photo by Shirley Denton

Drypetes diversifolia;
Photo by T. Ann Williams

Whitewood (*Drypetes diversifolia*)

This tree has only been documented in 2 counties and its range appears to be limited only to the Florida keys (Wunderlin & Hansen 2008). Once initial invasive exotic plant removal has occurred within the preserve, a follow-up floristic survey will need to be completed to confirm the presence of this species.

Reflexed wild pine (*Tillandsia balbisiana*) is an epiphytic, "tank" bromeliad and is listed as a threatened plant by the State of Florida. Wunderlin and Hansen reported this species in 22 counties throughout Florida as of 2008 (Wunderlin & Hansen 2008). Reflexed wild pine is an occasional species in South Florida and is usually found in scrub, pinelands, strand swamps, hammocks, mangrove swamps and on shell ridges/mounds.

Tillandsia balbisiana
Photo by Annisa Karim

Roystonea regia;
Photo by Shirley Denton

Florida royal palm (*Roystonea regia*)

Although seemingly common, this majestic tree is considered endangered by the State of Florida. Native to the cypress swamps of South Florida and found growing naturally in only 4 counties within the state (Wunderlin & Hansen 2008), this tree is a favorite landscape tree throughout Florida.

Golden leather fern (*Acrostichum aureum*)

Native to tidal swamps and marshes, this large fern is found in 9 coastal Florida counties as far north as Hillsborough County (Wunderlin & Hansen 2008).

Acrostichum aureum;
Photo by Shirley Denton

FNAI maintains a database of occurrences of rare, threatened, and endangered species in Florida. An element is any exemplary or rare component of the natural environment, such as a species, natural community, bird rookery, spring, sinkhole, cave, or other ecological feature. An element occurrence is a single, extant habitat that sustains or otherwise contributes to the survival of a population or a distinct, self-sustaining example of a particular element.

These element occurrence data are built into biodiversity matrices. Each matrix encompasses one square mile and includes all species and natural communities tracked by FNAI, including all federal listed species. The FNAI report for the matrix in which the Gordon River Greenway Preserve is located identifies one likely element and eleven potential elements. Of these twelve likely and potential elements, one has been observed on the preserve, namely Florida royal palm (described above). Appendix 4 provides the FNAI Element Occurrence Summary as well as the

Biodiversity Matrix Report. Global and state rankings are provided for each species as well as their federal and state status.

2.5.2 Listed Animal Species

Within FNAI's Biodiversity Matrix for the Gordon River Greenway Preserve, two rare wildlife species were documented, two wildlife species were reported as likely to occur (rare species likely to occur on the site based on suitable habitat and/or known occurrences in the vicinity), and twenty species were reported as potential occurrences (site lies within the known or predicted range of species). Global and state rankings are provided for each species as well as their federal and state status.

Table 7 below contains listed species that have been observed in or are likely to occur in the ecosystems of Gordon River Greenway Preserve.

Table 7: Listed Animal Species Observed and Likely to Occur at the Gordon River Greenway Preserve

Common Name(s)	Scientific Name	State	Federal
Eastern Indigo Snake	*Drymarchon corais couperi*	T	T
Gopher Tortoise - observed	*Gopherus polyphemus*	T	
Brown Pelican - observed	*Pelecanus occidentalis*	SSC	
Wood Stork	*Mycteria americana*	E	E
Little Blue Heron - observed	*Egretta caerulea*	SSC	
Reddish Egret	*Egretta rufescens*	SSC	
Snowy Egret - observed	*Egretta thula*	SSC	
Tricolored Heron - observed	*Egretta tricolor*	SSC	
White Ibis	*Eudocimus albus*	SSC	
Roseate Spoonbill	*Platalea ajaja*	SSC	
Big Cypress Fox Squirrel – observed on adjacent Parks and Rec. property	*Sciurus niger avicennia*	T	
West Indian Manatee	*Trichechus manatus latirostris*	E	E

Eastern Indigo Snake (*Drymarchon corais couperi*)

The Eastern indigo snake, a State and federally listed Threatened species, uses a wide variety of habitats in peninsular Florida and may be expected to occupy almost any tract that contains potentially suitable habitat. Typically, within this area of South Florida, the Eastern indigo snake is found in scrubby and pine flatwoods areas with groundcover consisting of palmetto near water, or tropical hammocks, and frequently uses gopher tortoise burrows as refuges. Based on current site characteristics, the amount of suitable habitat, and the population of gopher tortoises present on and adjacent to the site, the probability of Eastern indigo snake occurring on the preserve is high. Increasingly, the United States Fish and Wildlife Service (USFWS) requests implementation of *Standard Protection Measures for the Eastern Indigo Snake* to minimize potential impacts to the snakes during site clearing and construction. Typically, these measures include education of heavy equipment operators to identify and avoid Eastern indigo snakes, requirements that all work stop if an eastern indigo snake is observed, and having an on-call biologist to oversee the construction in potentially suitable habitat.

Gopher Tortoise (*Gopherus polyphemus*)
The gopher tortoise is a state-listed Threatened species that occupies a variety of open, upland habitat characterized by well-drained, sandy soils, some of which are found within the northern upland area of the Gordon River Greenway Preserve. At the request of Collier County and in preparation of planning the park's future layout, ENTRIX ecologists conducted a 100-percent survey (March-April 2008) of the project area to determine the presence of this species. Evidence of gopher tortoises was observed in the scrubby flatwoods w/ >50% downy rose myrtle (FLUCFCS 3272). A total of 1 active burrow, 3 inactive burrows, and 9 abandoned burrows were documented by ENTRIX ecologists within the Gordon River Greenway Preserve. Fewer than 5 gopher tortoises may need to be relocated from the parking area near the Naples Zoo within the Gordon River Greenway Park. If possible, these gopher tortoises will be re-located to the 3.9 acres of disturbed Scrubby Flatwoods plant community within the Greenway Preserve, once this area is restored. Staff will coordinate relocation with FWC and Parks and Recreation staff.

Brown Pelican (*Pelecanus occidentalis*)
The Brown Pelican is a state-listed Species of Special Concern that requires coastal, mangrove islands for breeding and open saltwater areas for foraging. Limited suitable nesting habitat was observed within the Gordon River Greenway Preserve within a small mangrove island currently used as a rookery site by yellow-crowned night herons (*Nyctanassa violacea*). Extensive foraging opportunities exist within the Gordon River and the Golden Gate Canal.

Listed Wading and Water Birds
Wood Stork (*Mycteria americana*)
Roseate Spoonbill (*Platalea ajaja*)
Little Blue Heron (*Egretta caerulea*)
Snowy Egret (*Egretta thula*)
Tricolored Heron (*Egretta tricolor*)
White Ibis (*Eudocimus albus*)
Reddish Egret (*Egretta rufescens*)

With the exception of the state and federally endangered wood stork, all of the birds listed above are Florida Species of Special Concern. During the extensive fieldwork conducted by ENTRIX ecologists as part of this project, several listed and non-listed wading birds were observed foraging within the exposed and mangrove-dominated shorelines along the Gordon River and Golden Gate Canal. No nesting by listed wading birds were observed, but a small rookery of non-listed yellow-crowned night herons was observed. A review of the FWC online waterbird nesting database, revealed that only one wading bird colony was located within five (5) miles of the project boundary, and this colony has been inactive during the past decade. It is unlikely that nesting by any listed wading bird might occur elsewhere on the project site within the mangrove-dominated wetlands along Gordon River. The project boundary, however, is within the 18.6-mile core foraging area (CFA) of some of the most significant Wood Stork nesting colonies in southwest Florida; especially those at Corkscrew Swamp Sanctuary (Mazziotti 2002). As such, the UFWS will seek to minimize adverse impacts to wood stork foraging habitat by requiring compensation based on replacing any lost function provided by each wetland type impacted within the boundary of the project area. Wetland impacts must be compensated by offering

compensation of the same hydroperiod, or through purchase of wetland credits within a "Service Approved" mitigation bank. The proposed project produces impacts to wood stork core foraging habitat by construction of a pedestrian boardwalk through wetlands adjacent to the Gordon River and construction of a pedestrian bridge over the river. Compensation for these proposed impacts will consist primarily of extensive wetland habitat improvement, resulting from the eradication of nuisance non-native vegetation project-area wide and its long-term management. Currently, wetlands located throughout the project area are virtually unavailable to wood stork foraging because of the dense cover caused by the invasion of these systems by nuisance non-natives. Based on direction provided by the UFWS in their South Florida Programmatic Concurrence for the Wood Stork (November 9, 2007), the extensive habitat improvement proposed should be considered adequate mitigation for the minor impacts resulting from the proposed construction. Similarly, the project is not likely to negatively impact the foraging habitat of state-listed wading birds and is likely to improve foraging opportunities project-area wide.

The Big Cypress fox squirrel (*Sciurus niger avicennia*)

Also known as the mangrove fox squirrel, the FWC lists this species as threatened in Florida. While the species is widespread in eastern and central North America, the subspecies is endemic to southwestern Florida – specifically in the Immokalee Rise, Big Cypress Swamp, and Devil's Garden area in Collier County. Some areas of this range have become vacated, while many other suitable areas are being altered or becoming isolated through development. The subspecies uses most types of forest occurring in its range. However, dense interiors of mixed cypress-hardwood strands seem to be avoided by Big Cypress fox squirrels due to dense populations of gray squirrels (*Sciurus carolinensis*) occupying these areas. Big Cypress fox squirrels have been reported in cypress swamp, pine flatwood, tropical hammock, hardwood hammock, mangrove swamp, and suburban habitats including golf courses, and residential areas in native vegetation. Big Cypress fox squirrel densities appear to be quite low, and on this basis the subspecies can be considered inherently rare (Humphrey & Jodice 1992).

West Indian Manatee (*Trichechus manatus latirostris*)

The West Indian manatee, is a State and federally listed Endangered species commonly found in coastal, estuarine, and in riverine habitats near coastal areas. Manatees require access to freshwater sources, vascular aquatic plants for foraging, channels of minimum 6-foot depth for movement, and access to natural springs, coves, and warm-water refugia for foraging, mating, and wintering. All of these conditions are found within the Gordon River and Golden Gate Canal areas. The extensive Golden Gate Canal system, dredged in late 1960's, allows boating access to the Gulf of Mexico for several single- and multi-family developments. This canal system flows into Naples Bay. The West Indian manatee is drawn to and capable of accessing the inland canal system, rivers, and bays near the project site to feed, calve, and mate. According to the *Collier County Manatee Protection Plan* (May, 1995), the Golden Gate Canal/Gordon River area is not a significant area for manatee population concentrations or mortality within the County. As such, this region has been designated as a "Slow Speed" zone year round, including the channel (68C-22.023(1)(c)2. Naples Bay south of Gordon River is designated as an "Idle Speed" zone all year round including the channel (68C-22.023(1)(b)1). According to the FWC Research Institute's 2007 Manatee Mortality Report, three (3) manatee deaths occurred within a one (1) mile radius of the preserve boundary. None of these mortalities were attributed to boating collisions or other

human-related causes, but were natural or prenatal causes. Based on these results, the impact to manatees and their habitat should be minimal. Impacts are largely confined to those associated with the construction of an elevated boardwalk through a portion of the coastal mangrove forest and a pedestrian bridge across the Gordon River. Installation of these structures and selection of materials will use Best Management techniques to minimize impacts to the surrounding habitat. Footers for the pedestrian bridge will be installed in the adjoining mangroves to avoid any construction or obstruction within Gordon River that might impact manatees or their movements. Collier County will implement the FWC's *Standard Manatee Conditions for In-Water Work* (July 2005) for all bridge and boardwalk work conducted within Gordon River to ensure the safety of manatees.

2.6 Invasive, Non-native and Problem Species

In an ecological context, an invasive species is one that is aggressive in growth and expansion of range and tends to dominate others; its establishment and dominance can cause widespread harm to an ecological system by altering the species composition, susceptibility to fire and hydrology of an area. Non-indigenous species (i.e., non-native or exotic species) are those that have been introduced purposefully or accidentally to an area outside their normal range. The characteristics of some of these species (high rate of growth/reproduction, no natural predators, easily dispersed, able to out-compete native species) make them invasive. Some indigenous species (a species whose natural range included Florida at the time of European contact circa 1500 AD or a species that has naturally expanded or changed its range to include Florida) may also become invasive. Invasions by native and non-native species often follow an alteration to ecosystem function, disruption of the food web, large-scale fragmentation of an ecosystem and/or disturbance (e.g., clearing, fire, drought, etc) of an area. While some native species may become invasive, the establishment and dominance of non-native species is of particular concern. The exotic plant and animal species documented within the preserve and those that have a potential to occur within the preserve are discussed in the following sections.

2.6.1 Invasive and Problem Plant Species

The Florida Exotic Pest Plant Council (FLEPPC) maintains a list of exotic plants that have been documented to (1) have adverse effects on Florida's biodiversity and plant communities, (2) cause habitat loss due to infestations and (3) impact endangered species via habitat loss and alteration. To date, 57 non-indigenous plant species have been detected within Gordon River Greenway Preserve, accounting for 34% of the plant species recorded there. Of these 57 exotic species, 46 can be considered invasive (Table 8), and 38 are listed by FLEPPC (21 Category I and 17 Category II). FLEPPC defines Category I plants as those that alter native plant communities by displacing native species, change community structures or ecological functions, or hybridize with natives. Category II plants have increased in abundance or frequency but have not yet altered Florida plant communities to the extent shown by Category I species. These definitions do not rely on the economic severity or geographic range of the problem, but rather on the documented ecological damage caused by these plants (FLEPPC 2007). Preserve lands will be maintained free of both Category I and II exotic plants.

Table 8: Invasive Plant Species at Gordon River Greenway Preserve		
Common Name	**Scientific Name**	**FLEPPC Category**
Air potato	*Dioscorea bulbifera*	I
American evergreen	*Syngonium podophyllum*	I
Australian umbrella tree	*Schefflera actinophylla*	I
Australian pine	*Casuarina* sp.	I
Balsam apple	*Momordica charantia*	
Bamboo	*Bambusa* sp.	
Beauty leaf	*Calophyllum antillanum*	
Bishopwood	*Bischofia javanica*	I
Brazilian pepper	*Schinus terebinthifolius*	I
Caesarweed	*Urena lobata*	II
Carrotwood	*Cupaniopsis anacardioides*	I
Castorbean	*Ricinus communis*	II
Chinaberry tree	*Melia azedarach*	II
Coral vine	*Antigonon leptopus*	II
Downy rosemyrtle	*Rhodomyrtus tomentosa*	I
Earleaf acacia	*Acacia auriculiformis*	I
Florida tassleflower	*Emilia fosbergii*	
Guineagrass	*Panicum maximum*	II
Indian laurel	*Ficus microcarpa*	I
Java Plum	*Syzygium cumini*	I
Lantana	*Lantana camara*	I
Latherleaf	*Colubrina asiatica*	I
Leadtree	*Leucaena leucocephala*	II
Life plant	*Kalanchoe* sp.	II
Limpo grass	*Hemarthria altissima*	II
Mahoe	*Talipariti tiliaceum*	II
Malabar plum	*Syzygium jambos*	
Melaleuca	*Melaleuca quinquenervia*	I
Mother-in-law's tongue	*Sansevieria hyacinthoides*	II
Napiergrass	*Pennisetum purpureum*	I
Oyster-plant	*Tradescantia spathacea*	II
Paper mulberry	*Broussonetia papyrifera*	II
Rosary pea	*Abrus precatorius*	I
Royal Poinciana	*Delonix regia*	
Senegal date palm	*Phoenix reclinata*	II
Septicweed	*Senna occidentalis*	
Shoebutton ardisia	*Ardisia elliptica*	I
Shrubby false buttonweed	*Spermacoce verticillata*	
Simpleleaf chastetree	*Vitex trifolia*	II
Small-leaf climbing fern	*Lygodium microphyllum*	I

Torpedograss	*Panicum repens*	I
Tropical almond	*Terminalia catappa*	II
Turkeyberry	*Solanum torvum*	II
Valamuerto	*Senna pendula var. glabrata*	I
Wedelia	*Sphagneticola trilobata*	II
Woman's Tongue	*Albizia lebbeck*	I

The following paragraph outlines the methods that will be used to treat exotics dependent on the species type and location of treatment.

Most woody invasive species, with the exception of Australian pine and downy rosemyrtle, will be killed in place with a dye-laced herbicide. Melaleuca and other exotic plants within the Mixed Wetland Hardwoods Disturbed community may be hand cut and removed from the site or mechanically cleared, depending upon density of the exotic vegetation and soil moisture conditions. Downy rosemyrtle will be mowed in place and re-sprouts treated if density of plants and soil moisture conditions allow. Where machinery cannot be used, downy rosemyrtle will be hand cut at base, left on-site, and stumps sprayed with an appropriate herbicide. If hand cut downy rosemyrtle density is high, the preserve manager may opt to remove plant debris. All Australian pines growing adjacent to the Gordon River and canal, and all Australian pines growing over 20 feet in height will be cut and removed from site. A barge will be necessary to mobilize equipment and tree debris. A suitable staging area for the barge and tree debris will need to be identified. All Australian pines growing under 20 feet in height and growing at least 20 feet inward from the shoreline and 20 feet away from the boardwalk/trail will be killed in place. All herbaceous invasive exotic vegetation will be treated via foliar application. Invasive vines may be treated via foliar application or cut-stem application.

2.6.2 Invasive and Problem Animal Species

Although Florida does not have an official exotic, invasive animal species list, at least 400 exotic fish and wildlife animal species have been reported in Florida, and approximately 125 species are established.

Three non-indigenous, animal species have been documented on the preserve: squirrel monkeys red imported fire ants (*Solenopsis invicta*) and brown anoles (*Anolis sagrei*). Brief descriptions of documented and undocumented but potentially problematic species are provided in the following paragraphs.

Squirrel Monkey troops have been observed within the Gordon River Greenway Preserve. Photo courtesy of

Squirrel Monkey (*Saimiri* sp.): documented within the Gordon River Greenway Preserve

Squirrel monkeys are native to the tropical forest canopy layers of Central and South America. They are omnivores, eating primarily fruits and insects, but occasionally eating nuts, buds, eggs and small vertebrates (Groves 2005). Groups of free- roaming squirrel monkeys have existed within the vegetated areas surrounding The Naples Zoo

for many years. The monkeys have been observed within the Gordon River Greenway Preserve.

Red imported fire ant (*Solenopsis invicta*): documented within the Gordon River Greenway Preserve

Solenopsis invicta, an invasive, non-indigenous arthropod documented within the Gordon River Greenway Preserve. Photo courtesy of the USDA.

These social insects were introduced into the U.S. from Brazil into either Mobile, Alabama or Pensacola, Florida between 1933 and 1945 (Collins & Scheffrahn 2005) and have been detected in the Gordon River Greenway Preserve. Red imported fire ants (RIFA) have been documented to cause harm to humans and wildlife as well as economic harm (Stimac & Alves 1994; Collins & Scheffrahn 2005; Willcox & Giuliano, 2006). RIFAs are omnivorous, but they prefer insects as their primary food source (Willcox & Giuliano 2006). RIFAs have a number of impacts on wildlife; in many areas, they have eliminated native ant populations through competition and predation and have eradicated food sources utilized by some wildlife species. Ground-nesting wildlife is especially susceptible to RIFAs. Within the Gordon River Greenway Preserve, RIFAs have the potential to affect ground-nesting birds; small mammals; reptiles, native lizard and snake species, and native invertebrates (Willcox & Giuliano 2006). Additionally, members of the public that come into contact with RIFAs may be harmed if stung. Many people have anaphylactic reactions to the toxins released from RIFA stings.

Brown Anole (*Anolis sagrei*): documented within the Gordon River Greenway Preserve

Anolis sagrei, an invasive, exotic reptile documented in the Gordon River Greenway Preserve. Photo courtesy of the USGS.

Also known as the Cuban anole, the brown anole is native to Cuba, the Bahamas, and neighboring islands (Schwartz & Henderson 1991). Like other anoles from the islands, this species is a small, tropical, diurnal, arboreal, territorial, and insectivorous lizard (Campbell 2001). The brown anole was first documented in the Florida Keys in the late 1800s (Lee 1985) and has since spread throughout Florida, into Georgia and into two other southeastern states (Campbell 1996). The brown anole is a habitat generalist and generally prefers the fairly open areas of disturbed sites. It feeds on a wide variety of insects, amphipods, and isopods. Brown anoles also prey on other small vertebrates including the hatchlings of the native green anole (*A. carolinensiis;* Campbell 2000).

Anolis carolinensiis, an ***indigenous*** reptile documented in the Gordon River Greenway Preserve. Photo courtesy of the USGS.

Campbell (2000) showed that, in the absence of the exotic brown anoles, native green anoles occupy perches from ground to the canopy of vegetation. However, in the presence of the exotic anole, native anoles move higher in trees, occupying only the trunk and crown of trees. Dietary overlap is high between both species, but the overall affects of the brown anole on the green anole are still undetermined.

Cuban tree frog (*Osteopilus septentrionalis*): undocumented within the Gordon River Greenway Preserve

Osteopilus septentrionalis, an invasive, exotic amphibian that has the potential to occur at the Gordon River Greenway Preserve. Photo courtesy of the USGS.

Like the Cuban anole, the Cuban tree frog is native to Cuba, the Bahamas, and neighboring islands. The first Cuban tree frogs probably arrived in the Florida Keys as stowaways in shipping crates originating from the Caribbean in the 1920's. Today, they have established breeding populations as far north as Cedar Key on Florida's Gulf Coast, Jacksonville on the Atlantic Coast, and Gainesville in north-central Florida. These hylids are the largest tree frog found in Florida and because of their ability to invade natural areas and prey on native invertebrates and small vertebrates (including native tree frogs) they are considered an invasive species. Additionally, the tadpoles of this species inhibit the growth and development of the tadpoles of the native southern toad (*Bufo terrestris*) and green tree frog (*Hyla cinerea*). Cuban tree frogs thrive in residential and natural areas such as pine forests, hardwood hammocks, and swamps. In residential settings, they are most commonly found on and around homes and buildings, and in gardens and landscape plants. They are known to get into transformer boxes and electrical switches causing power outages (Johnson 2007). Due to the natural communities that are found within the Gordon River Greenway Preserve and its proximity to residential areas, this species has the potential of occurring in the preserve.

Giant Marine Toad or Cane Toad (*Bufo marinus*): undocumented within the Preserve

Bufo marinus, an invasive, exotic amphibian that has the potential to occur at the Gordon River Greenway Preserve. Photo courtesy of the USGS.

Bufo terrestris, a native toad that looks similar to the exotic, invasive cane toad. Photo courtesy of the USGS.

The cane toad is a tropical species native to the Amazon basin in South America, and its range extends through Central America to extreme southern Texas along the Rio Grande River. They are used as a control agent for insects that damage sugarcane and consequently, are one of the most introduced amphibian species in the world. In 1936, an attempt was made to introduce this species into Palm Beach County, FL. This attempt failed as did two subsequent efforts. Ironically, in 1955, an accidental release by an importer at the Miami International Airport in Miami-Dade County, FL proved

successful. They have since been deemed an invasive species in Florida and are currently found in urban areas of south and central Florida, and are rapidly expanding northward (Brandt & Mazziotti 2005). Many of this species' characteristics enable it to do well in south Florida. Beetles, bees, ants, winged termites, crickets and bugs are a large part of the diet of the adult marine toad. Additionally, they consume arthropods, mollusks, small vertebrates, plant matter, pet food, carrion, household scraps, marine snails, smaller toads and native frogs, small snakes, and even small mammals. Marine toads are prolific breeders and females can lay tens of thousands of eggs in a single breeding season. They prefer forested areas with semi permanent water nearby (Churchill 2003). The cane toad looks very similar to the native, southern toad, but there are some distinct differences. The most obvious difference is adult body size (length of body not counting the legs). Adult marine toads can reach lengths of 6 -9 inches while the native southern toads only reach a length of 3.6 inches. Like other true toads, both possess poisonous, parotid glands. The ***parotid glands*** of the cane toad are angled downward behind their head to their shoulders. The southern toad has a kidney-shaped parotid gland behind each eye positioned close to the spine. The southern toad also possesses ***cranial crests*** that start between the eyes and often end in big knobs. While the parotid glands of all toads contain bufotoxins (poisonous, milky fluids exuded as a defense mechanism), the chemicals released by the exotic, cane toad are much more harmful to wildlife, pets and people (Brandt & Mazziotti 2005). Due to the natural communities that are found within the Gordon River Greenway Preserve and its proximity to residential areas, this species has the potential of occurring within the preserve. Adjoining residents of the preserve should be encouraged to keep pet food and water containers indoors or empty at night.

Feral domestic cat *(Felis catus):* undocumented within the Gordon River Greenway Preserve

Domestic cats originated from an ancestral wild species, the European and African wildcat (*Felis silvestris*). Humans facilitated the global distribution of cats due to their highly efficient predatory skills. Egyptians took cats with them on shipping vessels to keep rodent populations down, and they likely introduced domestic cats to Europe. Subsequently the expansion of the Roman Empire and European missionary missions facilitated the spread of domestic cats into Asia and beyond (Masterson 2007). Today, the impact of feral cats on wildlife is difficult to quantify; however, literature (FWC 2001; Karim 2007; Masterson 2007) strongly indicates that they are a significant factor in the mortality of small mammals, birds (including migratory birds), reptiles, and amphibians in Florida. Because free-ranging cats often receive food from humans, they may reach abnormally high numbers. An increase in the population of feral cats may lead to increased predation rates on native wildlife. While no cats have yet been observed on the Gordon River Greenway Preserve, there exists a high probability of their future presence on the preserve due to the proximity of the Greenway to human residential areas. Adjoining residents of the preserve should be encouraged to keep their cats indoors and staff should monitor the preserve for the presence of feral cats.

3.0 Previous and Current Use of the Preserve; Adjacent Land Uses

3.1 Previous Use of the Preserve and Adjoining Lands

Historical aerial photographs taken in 1952 (Figure 7) and in 1980 (Figure 8), accompanied by more recent visits to the site, show that development has never occurred on the site; however,

portions of the property adjacent to the northwestern end of the Naples Airport runway appear to have been cleared prior to 1980. Digital images were downloaded from the Florida Department of Transportation's Aerial Photo Look Up System (2008) and georeferenced in ArcMap 9.2 by Conservation Collier Staff.

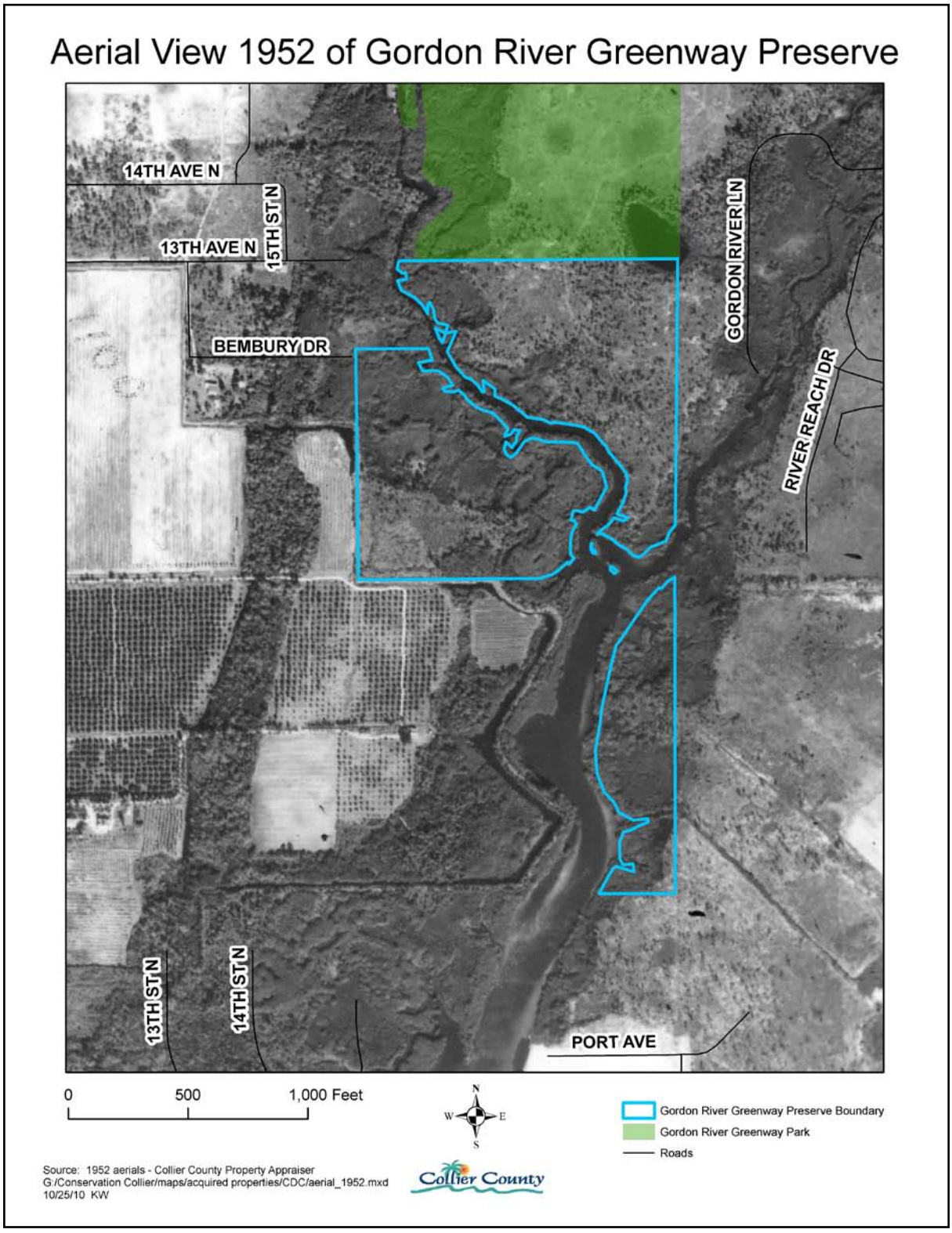

Figure 7: Historical Aerial Photograph from 1952 of the Gordon River Greenway Preserve and Adjoining Lands

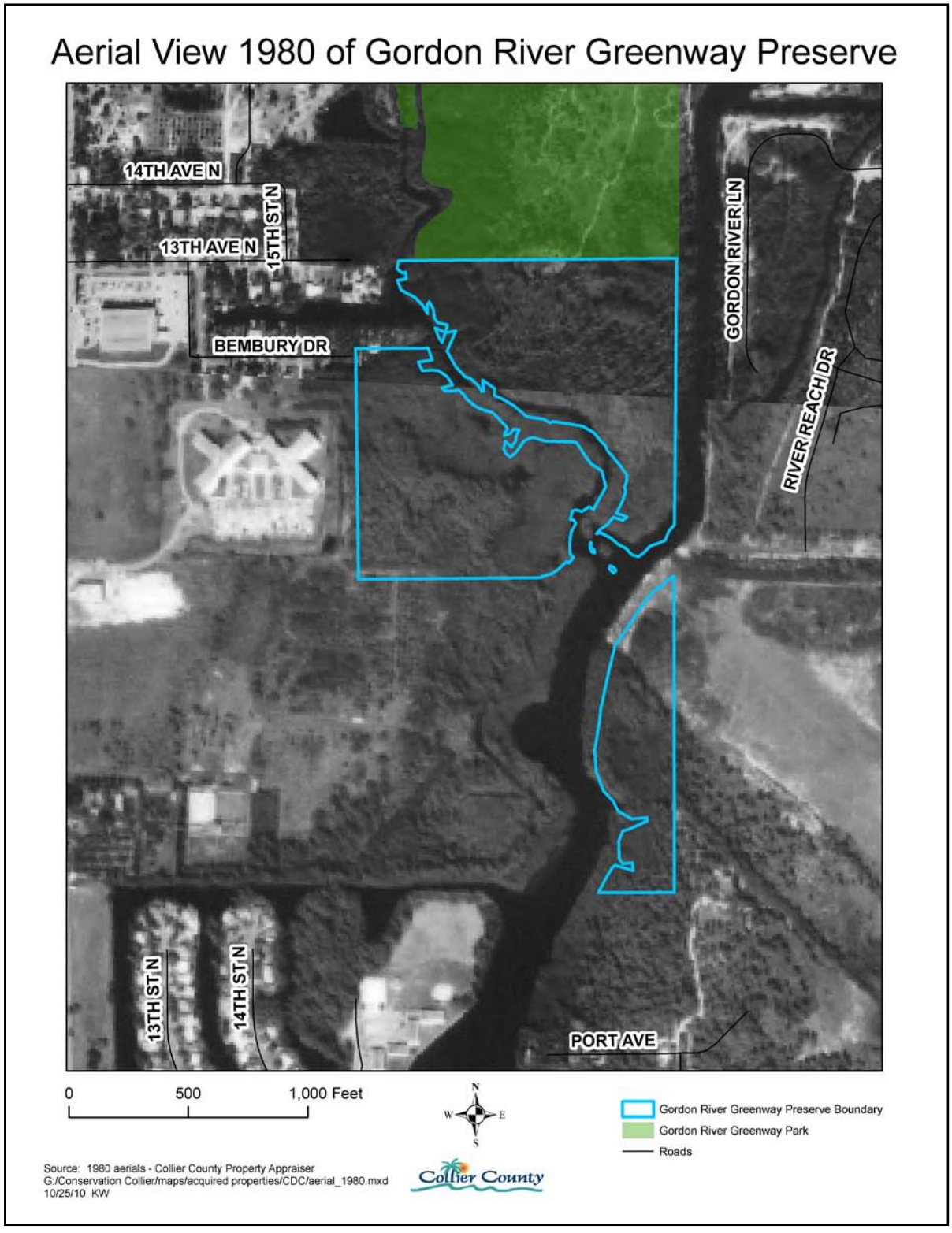

Figure 8: Historical Aerial Photograph from 1980 of the Gordon River Greenway Preserve and Adjoining Lands

3.2 Current Land Uses

Currently, there is no sanctioned public use of the Gordon River Greenway Preserve. Conservation, restoration and natural resource-based recreation are the designated uses of this preserve. Management activities allowed include those necessary to preserve, restore, secure and maintain this environmentally sensitive land for the benefit of present and future generations. Public use of the site must be consistent with these management goals and will be discussed in section 4.4 of this document.

The Collier County Parks and Rec. owned Gordon River Greenway Park property abuts the northern property line of the preserve. The preserve is surrounded on both the east and west by planned unit developments consisting of both residential and commercial properties. The City of Naples municipal boundary borders the project on the west. The Naples Airport is adjacent to the southeastern boundary of the preserve, and an undeveloped property, zoned R-1-7.5, is adjacent to the south boundary of the preserve. The Gordon River bisects the northern portion of the property and forms the western boundary of the southern portion of the property. The Golden Gate Canal forms the eastern boundary of the northern portion of the property (Figure 9).

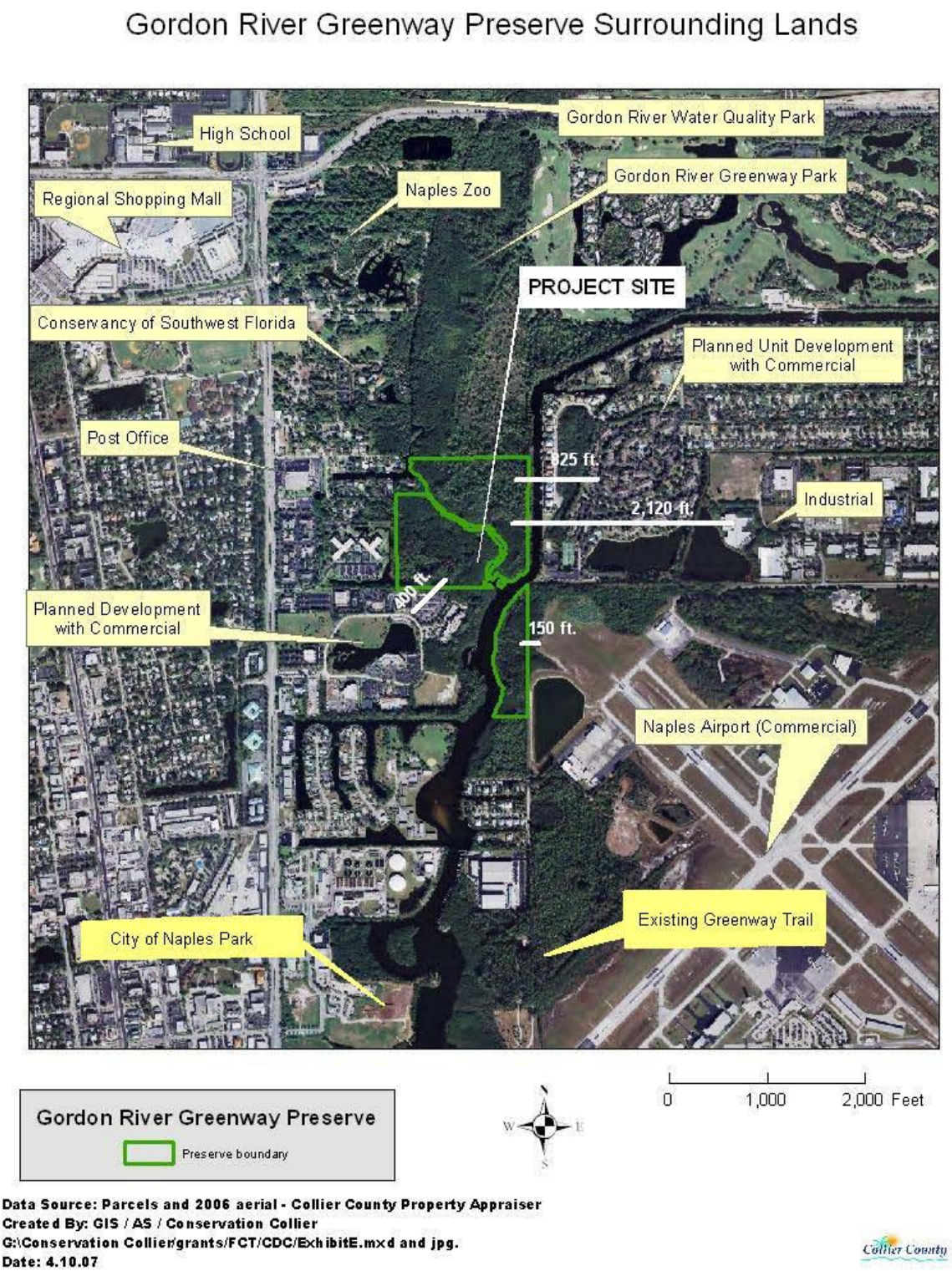

Figure 9: Areas Adjacent to the Gordon River Greenway Preserve

3.3 Cultural, Historical and Archeological Resource Protection

The Gordon River Greenway Preserve is within an area of historical and archaeological probability. A phase one cultural resource assessment completed by the Archaeological and Historical Conservancy, Inc. (AHC) in August 2007 indicates that one archaeological site (8CR978) is present on the property. AHC determined that Site 8CR978 is a prehistoric shell refuse site, consisting of redeposited remains; the total loss of integrity renders the site ineligible for listing on the National Register of Historic Places. The Florida Department of State Division of Historical Resources does not require further investigation of Site 8CR978 prior to development of a trail system through Gordon River Greenway Preserve; however, site plans will avoid disturbance in this area.

The County will notify the Division of Historical Resources immediately if evidence is found to suggest any other archaeological or historic resources are discovered. If such resources are identified on-site, staff shall cordon off the area, and a professional survey and assessment shall be instituted. The archaeologist shall prepare a report outlining results of the assessments and issue recommendations to County staff about management of any sites discovered, per provisions of the Land Development Code Section 2.2.25. This report shall be sent to the Division of Historical Resources. The County shall cooperate fully with direction from the Division of Historical Resources on the protection and management of archaeological and historical resources. The management of these resources will comply with the provisions of Chapter 267, Florida Statutes, specifically Sections 267.061 2 (a) and (b).

3.4 Major Accomplishments during Previous Years

Since the acquisition of the Gordon River Greenway Preserve, Kimley-Horn and Associates, Inc. has been hired to plan, design, and permit the preserve in conjunction with planning, designing, and permitting the Parks and Rec. property adjacent to the north. A 30% design was near completion at the time this management plan was drafted. Conservation Collier staff has also continues to explore options of funding exotic removal and boardwalk construction through grants from the Department of Environmental Protection.

4.0 Future Use of the Gordon River Greenway Preserve including Management Issues, Goals and Objectives

This section describes the main management issues, goals, and objectives for the Gordon River Greenway Preserve as well as the overall management framework. Central to the management of the Preserve is the mission of the Conservation Collier Program, and the goals and objectives set forth in this management plan.

4.1 Management Plan Framework

Each property purchased by Conservation Collier shall have its own management plan. At the time the Gordon River Greenway Preserve as purchased, the Conservation Collier Ordinance required that an "Interim" Management Plan be developed within 60 days of closing. Interim

plans include basic items such as removal of invasive exotics and trash, establishing site security, developing management partnerships and planning for public access. The interim plan for this site was officially approved in July 2006. The ordinance then requires a "Final" ten-year management plan be developed within two years; the first draft of this management plan was submitted to the Lands Evaluation and Management Subcommittee in November 2010. Because it was anticipated that the Gordon River Greenway Preserve would be incorporated into the Gordon River Greenway Park management plan, staff received BCC approval to extend the deadline for submission of the final management plan until October 2010. Once approved, this final management plan must be reviewed every five years. Final management plans, however, are considered living documents and can be updated at any time. Review of all management plans start in the Lands Evaluation and Management subcommittee and must be approved by both the CCLAAC and BCC.

4.1.1 Preserve Manager: Contact Information

The site manager for Gordon River Greenway Preserve will be a designated Collier County Environmental Specialist who may be contacted through electronic mail: ConservationCollier@Colliergov.net.

4.2 Planned Uses and Assessment of their Impacts

Future planned use will be consistent with the primary goals of conservation, preservation, restoration and maintenance of the resource. Official public use of the site will not be possible until a safe public access boardwalk and trail can be created. However, citizens that desire to visit the site prior to opening may do so by signing a waiver that will allow them access at their own risk and releases the liability of the County until safe access is established. Details of planned uses for the Gordon River Greenway Preserve and an assessment of their potential impacts are provided in the following sections.

4.2.1 Identification of Public Uses Consistent with Preservation, Enhancement, Restoration, Conservation and Maintenance of the Resources

The Conservation Collier Ordinance 2002-63 constrains the use of this property to "primary objectives of managing and preserving natural resource values and providing appropriate natural resource-based recreational & educational opportunities." Natural resource-based recreation shall mean all forms of uses, which are consistent with the goals of this program, and are compatible with the specific parcel. Such uses may include, but are not limited to hiking, nature photography, bird watching, kayaking, canoeing, swimming, hunting and fishing (Ord. No. 02-63, as amended§ 5, 12-3-02). Additionally, no dumping, use of unauthorized vehicles, or removal or destruction of natural or historical/archaeological resources will be permitted within the preserve. The goal is to allow limited, non-destructive public access to native plant communities and animal species. Currently, the preserve rules are those identified in Collier County Ordinance 76-48 (available from www.municode.com), as amended.

The following are ***consistent*** uses for this particular site: hiking, nature photography, kayaking, canoeing, fishing and bird watching. ***Inconsistent*** uses include hunting and off road vehicle use

(ORV) in addition to development of structures other than those required for limited public access and environmental education.

There are no existing easements, concessions, or leases at the Gordon River Greenway Preserve. In accordance with the management goals of the preserve, no future easements, concessions, or leases are appropriate in association with this site, other than conservation related easements. Although not an easement, it is prudent to note that the property boundary of Nature Pointe of Naples, Inc. extends across the Golden Gate Canal and encompasses all lands approximately 30 feet west of the western canal edge. These lands, which line the Golden Gate Canal and are directly adjacent to the Gordon River Greenway, are currently infested with mature Australian pine trees.

4.3 Desired Future Conditions

This section includes a description of the proposed future conditions for the site's natural areas. Management techniques to achieve these conditions are outlined in section 4.4.

After managers complete recommended management actions, Gordon River Greenway Preserve will consist of Mangrove Swamp, Scrubby Flatwoods, Harwood/Coniferous/Palm Mixed, and Mixed Wetland Hardwoods; these communities will have a similar structure and composition to those that existed before non-indigenous people settled the region and before the exclusion of fire. With the exception of a boardwalk and trail, the site will be vegetated with appropriate native flora that will provide suitable cover for a variety of wildlife species.

4.4 Goals for the 10 year period 2010-2020

A set of goals and objectives for Gordon River Greenway Preserve were developed in conjunction with the drafting of this Management Plan. The goals and objectives in this plan are tailored specifically for Gordon River Greenway Preserve based on the purposes for which the lands were acquired, the condition of the resources present, and the management issues for the property. On-site managers should be familiar with this entire Management Plan. Goals and objectives from the Interim Management Plan for the Gordon River Greenway Preserve were reviewed to determine whether they should be included in this plan. The goals and objectives presented here reflect programmatic goals and ideas of Conservation Collier personnel in charge of managing and protecting the area. These goals shall not be modified, but specific application of management techniques may take into consideration input by user groups and other stakeholders from outside the program, accommodating user needs and desires where practicable and where overarching management goals are not violated.

Management issues are discussed below in separate sections. Within each section, approaches for dealing with these issues are described. The ability to implement the specific goals and objectives identified in this plan is dependent upon the availability of funding sources. The following goals have been identified for Gordon River Greenway Preserve:

Goal 1: Remove or control populations of invasive, exotic or problematic flora and fauna

Goal 2: Develop a baseline monitoring report

Goal 3: Restore and maintain native habitats

Goal 4: Develop and implement a plan for public use consistent with environmental protection

Goal 5: Facilitate uses of the site for educational purposes

Goal 6: Determine if prescribed fire and/or mechanical treatments are feasible to decrease woody invasion resulting from past fire exclusion; if so proceed

Goal 7: Provide a plan for security and disaster preparedness

GOAL 1: *REMOVE OR CONTROL POPULATIONS OF INVASIVE, EXOTIC OR PROBLEMATIC FLORA AND FAUNA*

Action Item 1.1 Coordinate with the Naples Airport Authority prior to removal of large Australian pines

Some of the Australian pines within the Greenway Preserve are within the flight path of the City of Naples' Airport runway. The Naples Airport Authority may have funding to assist with removal of large Australian pines from the preserve.

Action Item 1.2 Coordinate with Parks and Rec. prior to exotic plant removal in order to reduce equipment mobilization costs

Action Item 1.3 Acquire services of licensed and qualified contractor(s) for the removal of invasive, exotic or problematic plant species.

The following (Table 9) describes recommended controls (Langeland & Stocker 2001) of the Category I, invasive, exotic plant species recorded to date on the Gordon River Greenway Preserve. These recommended control methods may be altered by site managers dependent on new information and products available on the control of these species.

Table 9: Invasive, Exotic Plant Species Control Plan for the Gordon River Greenway Preserve FLEPPC Category I species [a]		
Common Name	**Scientific Name**	**Recommended Control(s)[b]**
Air potato	*Dioscorea bulbifera*	Manual: cut vines that are high in trees; cut bulbils and remove from site. Dig up underground tubers if possible. Foliar: 1%-2% Roundup or Touchdown Pro. Cut stem: 10% Garlon 4.
American evergreen	*Syngonium podophyllum*	Manual: hand pull vegetation and remove from site or destroy (place in plastic bags until decomposed). Foliar: 3% Garlon 4. Basal stem: 10% Garlon 4. Multiple treatments are required.
Australian umbrella tree	*Schefflera actinophylla*	Large individuals (>10 inches diameter) have proven extremely difficult to eradicate. Cut stump (recommended): 50% Garlon 3A or 10% Garlon. Basal bark (if a cut-stump treatment is not possible): wide band of 10% Garlon 4 on smaller individuals and 20% Garlon 4 on larger individuals. It may take up to 9 months to kill large trees.
Australian pine	*Casuarina* sp.	Basal bark treatment with 10% Garlon 4 is very effective, as is a cut-stump treatment with 50% Garlon 3A or 10% Garlon 4. When basal bark treatment is used on trees greater than 1 foot in diameter it may be necessary to slough off loose bark in the application area to prevent the bark from trapping the herbicide. Broadcut or 4-6 lb Velpar ULW may be used when appropriate.
Bishopwood	*Bischofia javanica*	Basal bark: 10%-20% Garlon 4. Frill/girdle (larger trees): 20% Garlon 4. Manual: hand pull seedlings.
Brazilian pepper	*Schinus terebinthifolius*	Hand pull seedlings or cut-stump treatment with 50% Garlon 3A, 10% Garlon 4 or a basal bark application of 10% Garlon 4. Foliar application of Garlon 4, Garlon 3A, Roundup Pro, Roundup Super Concentrate, or Rodeo, according label directions may be used where appropriate. Glyphosate products are less effective when used alone in spring and early summer. Use Rodeo where plants are growing in aquatic sites.
Carrotwood	*Cupaniopsis anacardioides*	Hand pull seedlings or basal bark application of 100% Pathfinder II, or 10%-20% Garlon 4 diluted with oil; or cut stump application of 10% Garlon 3A, 100% Brush-B-Gon, 100% Roundup Pro, 100% Rodeo, or equivalent glyphosate containing product, or 100% Pathfinder II.
Downy rosemyrtle	*Rhodomyrtus tomentosa*	Basal bark or cut stump (individual plants): 10%-20% Garlon 4. Re-treatmentmay be necessary. Foliar: 1% Arsenal + 2% Roundup or 2 quarts Vanquish/acre in 50 gallons spray volume.
Indian laurel	*Ficus microcarpa*	Basal bark: 10% Garlon 4.
Java Plum	*Syzygium cumini*	Cut stump: 50% Garlon 3A or 10% Garlon 4. Basal bark: 10%-20% Garlon 4 or Pathfinder II.
Lantana	*Lantana camara*	Basal bark: 10% Garlon 4. Cut stump: 50% Garlon 3A or 10% Garlon 4.
Latherleaf	*Colubrina asiatica*	Basal bark: 10%-20% Garlon 4 or undiluted Pathfinder II. Cut-stump: 50% Garlon 3A. Foliar: 3% Garlon 3A or Garlon 4. Follow up for 3 to 4 weeks. Manual: hand pull seedlings.
Melaleuca	*Melaleuca quinquenervia*	For seedlings and saplings: (1) hand pull, being sure not to break plant off of root system and remove or place in piles to help reduce the chance that they will re-root or; (2) Treat with foliar, low volume spot application of 5% Rodeo. For mature trees: (1) Fell large trees with chain saw leaving a level surface, or fell small trees with machete and treat with triclopyr or glyphosate products according to frill and girdle directions on SLN. Use aquatic versions where standing water is present. Monitor for resprouting and retreat as necessary. (3) Mature trees are very difficult to control with foliar applications.

Napiergrass	*Pennisetum purpureum*	Foliar: 1%-3% Roundup. If nontarget damage is a concern, cut stems to ground level and allow sprouts to reach 8-12 inches and treat the same as Neyraudia. Broadcast 3-5 quart/acre Roundup Pro, 2 quart/acre Arsenal, or 1 quart Arsenal and 2 quart Roundup Pro.
Rosary pea	*Abrus precatorius*	Basal stem: 10% Garlon 4. Foliar: 5% Roundup (low volume). Remove seed pods if possible. Site must be revisited several times to pull seedlings.
Shoebutton ardisia	*Ardisia elliptica*	Basal bark: 10% Garlon. Cut stump: 50% Garlon 3A. Manual: hand pull seedlings.
Small-leaf climbing fern	*Lygodium microphyllum*	Foliar: For ground applications, cut plants that grow high into trees; thoroughly spray foliage to wet with 1%-2% Roundup or Rodeo, 2% Garlon 3A, 1% Plateau, or equivalent of 1-2 ounces Escort XP/100 gallon diluent; light infestations use 2%-4% Roundup or Rodeo (low volume). For aerial application, 7.5 pints Rodeo or 2 ounces Escort XP in sufficient volume and using spray pattern to maximize coverage.
Torpedograss	*Panicum repens*	Foliar: 0.75% - 1.5% Rodeo and/or 0.5% Habitat, 4 pints Habitat per acre, or 5%Rodeo low volume spot treatment.
Valamuerto	*Senna pendula var. glabrata*	The following foliar applications on a spray-to-wet basis have been found effective: 1.0% Roundup Pro, 0.5% Garlon 3A + 0.375% Induce, 0.50 oz/gal Escort + 0.375% Induce, 3.13% Brush-B-Gon. Basal bark application of 10% Garlon 4 in oil is used by the Southwest Florida Water Management District (Mack Sweat, 2003 personal communication).
Woman's Tongue	*Albizia lebbeck*	Basal bark: 20% Garlon 4 or undiluted Pathfinder II. Cut stump: 50% Garlon 3A or 10% Garlon 4, follow-up treatments necessary for root sprouts with 10% Garlon 4.

[a] **FLEPPC 2007: Category I plants** are those that alter native plant communities by displacing native species, change community structures or ecological functions, or hybridize with natives.
[b] Langeland & Stocker 2001

<u>Action Item 1.4</u> Enact regular maintenance events a maximum of 3 months after initial exotic removal

A qualified, licensed contractor will be hired to do follow-up maintenance immediately following initial maintenance. Growth of vines and category II exotic species may be intense following initial removal of monocultures of category I species within the preserve. Treatment may be necessary within one month of initial removal, but should be completed no later than three months after initial removal. If necessary, the preserve should be swept monthly for the first year after initial treatment. Monitoring of re-growth and new invasions should be done monthly, and follow-up treatments should be done based upon findings during monitoring.

<u>Action Item 1.5</u> Avoid non-target damage to native plants and animals, especially rare species, during invasive, exotic plant treatments.

Decisions on the types of herbicides utilized will be made on the best information available at the time of exotic removal. Staff has prohibited the use of herbicides containing Imazapyr (e.g., Arsenal) due to reports that these herbicides have potentially caused a great deal of non-target damage throughout the state. Licensed County or State contractors have been (and will be) monitored closely to ensure the proper herbicide applications are being utilized while treating the site. In addition, close attention will be paid to identify listed epiphytes (Table 7) that may be

attached to invasive trees being cut down or removed. Plants of these species will be relocated prior to removal. Special attention will be given to avoid damage to native species in the vicinity of exotic removal activities. Hand pulling of exotic seedlings will be done when possible.

Action Item 1.6 Monitor non-native fauna

To date, three (3) introduced animal species have been documented on the Gordon River Greenway Preserve, the squirrel monkey, the RIFA and the brown anole.

It is doubtful that the total eradication of the RIFA can be achieved. However, staff and/or contractors should take measures to remove RIFA populations close to or on public access trails.

Although they do not appear to be a detriment to the preserve, public interaction with the squirrel monkeys within the preserve should be discouraged. If the squirrel monkey population within the preserve appears to be increasing, monitoring of the population should be implemented.

If feral cat colonies are found near the preserve, the elements that sustain the undesirable population(s) should be identified and efforts made to ask property owners to eliminate them (i.e., refuse bins, dumpsters, and supplementary feeding by humans). If any feral cats remain, they will be trapped and taken to Collier County Domestic Animal Services.

GOAL 2: *DEVELOP A BASELINE MONITORING REPORT*

Action Item 2.1 Establish a long-term biological monitoring program and conduct additional wildlife surveys.

Long-term management of the preserve should be based on biological data. Changes following baseline conditions should be assessed as negative or positive, and management strategies changed appropriately. This section discusses information needs and long-term monitoring needs.

ENTRIX staff conducted a floristic inventory of the Gordon River Greenway Preserve in 2009; these findings comprise the baseline floristic data on which future actions will be based. The site should be inspected by Conservation Collier Staff at least twice a year and thoroughly inventoried at regular intervals (ca. 5-10 years) to detect new invasions (by natives or exotics) and extinctions. Areas undergoing extreme restoration should be assessed more frequently. While some wildlife data has been collected, additional baseline data should be collected, especially on invertebrates, small mammals, reptiles, and amphibians. The site manager may contract this work out or enlist the assistance of local educators to coordinate student research projects. Wildlife sampling, like plant sampling, on non-listed species only, should take place at regular intervals (ca. 5-10 years) to detect long-term trends.

Prior to restoration, photo point stations will be established within the different plant communities throughout the preserve. Locations of photo points will be recorded with a GPS and all photographs will be taken at a standard height and angle of view. During photo documentations, one photo will be taken in each of the cardinal directions (north, east, south and west). These photos will help to monitor exotic removal and native plant recruitment over time. If necessary, more photo points will be established to aid in management decision activities.

GOAL 3: *RESTORE AND MAINTAIN NATIVE HABITATS*

Action Item 3.1 Identify locations of rare and listed native plant species.

The location of these species will be identified using a global positioning system (GPS) device and mapped to allow staff to monitor them. Public trails will be constructed to avoid areas where rare and listed species exist.

Action Item 3.2 Enforce regulations prohibiting trash in or near the preserve.

Staff will monitor the trails on a regular basis and if excessive dumping or littering start to occur, enforcement actions will be sought through the County Sheriff's Department.

Action Item 3.3 Maintain a revised GIS map and description of FNAI natural communities and disturbed areas on the property.

Maintaining updated maps will help to guide restoration efforts

Action Item 3.4 Plant native plant species in their appropriate habitats

Periods following exotic removal and prescribed fire (or mechanical treatment) are essential to the recruitment of native plants. If native plant recruitment is not sufficient from the surrounding, intact seed source, efforts will be made to plant indigenous flora in appropriate habitats. Natural area restoration of Gordon River Greenway Preserve should include only site-specific native plant material that has been determined to be non-problematic at the site and whenever possible, site-specific seed sources should be utilized.

Action Item 3.5 Install signs encouraging people to stay on any future public access trails situated on the preserve.

Action Item 3.6 Note and research all site development occurring adjacent to Gordon River Greenway Preserve to determine that the proper site development permits have been obtained and that the site development complies with the permits.

Activities on adjacent lands may have an impact on the indigenous plant and animal life on the Gordon River Greenway Preserve. As such, all existing local, state, and federal regulations should be strictly followed and enforced during any site development adjacent to the preserve. It shall be the responsibility of the developer to establish erosion control measures and vegetation protection measures (i.e., protective fencing or barriers). If any site developer working in areas adjacent to the preserve does not take the necessary control measures, construction shall be immediately halted until control measures are put into place and mitigation and/or remediation will be the sole responsibility of the developer.

GOAL 4: *DEVELOPAND IMPLEMENT A PLAN FOR PUBLIC USE*

Action Item 4.1 Continue to coordinate design and permitting plans with Parks and Rec. through Kimley-Horn and Associates, Inc. (Kimley-Horn)

Kimley-Horn was selected to plan, permit and design (PPD) the Gordon River Greenway Park by Parks and Rec. via the Collier County Request for Proposal process. Prior to executing a contract with Kimley-Horn, Conservation Collier coordinated with Parks and Rec. to include the Gordon River Greenway Preserve in the Gordon River Greenway Park PPD process. This allows Collier County to PPD one single project instead of two separate projects. Kimley-Horn is responsible for designing and permitting the boardwalks, trails, shade structures/rest pavilions,

observation overlook, fishing platform, educational signage and pedestrian bridge within the Gordon River Greenway Preserve.

Action Item 4.2 Maintain visitor amenities a minimum of 100 feet from known yellow-crowned night heron rookery island

The yellow-crowned night heron is a colonial nester in swamps and marshes. A yellow-crowned night heron rookery exists on a small mangrove island at the southern extent of the project, located at the intersection of Gordon River and the Golden Gate Canal. Efforts will be made to locate the bridge as far away from this rookery as possible. Signs placed around the island to keep kayakers/ canoers and boaters away from the island may be installed if necessary.

Action Item 4.3 Identify actual and potential locations of other resident animal life and take steps such as locating visitor amenities away from animal nesting sites.

Action Item 4.4 Develop access and required facilities for intended public uses

Kimley-Horn site plans for the project, dated January 25, 2011, are currently at 30% design. See Figure 10. To be consistent with the overall project, preserve boardwalk widths will be 10 feet; trail widths will be 12 feet. Trail system will follow the approximate alignment as shown in Figure 11; however, installation of all boardwalks and trails will be field located to ensure the least impact to native vegetation. ADA trails are anticipated to occur within the upland portions of the preserve. If funding allows, a raised boardwalk trail will replace the at grade ADA trail through the scrubby flatwoods section of the preserve.

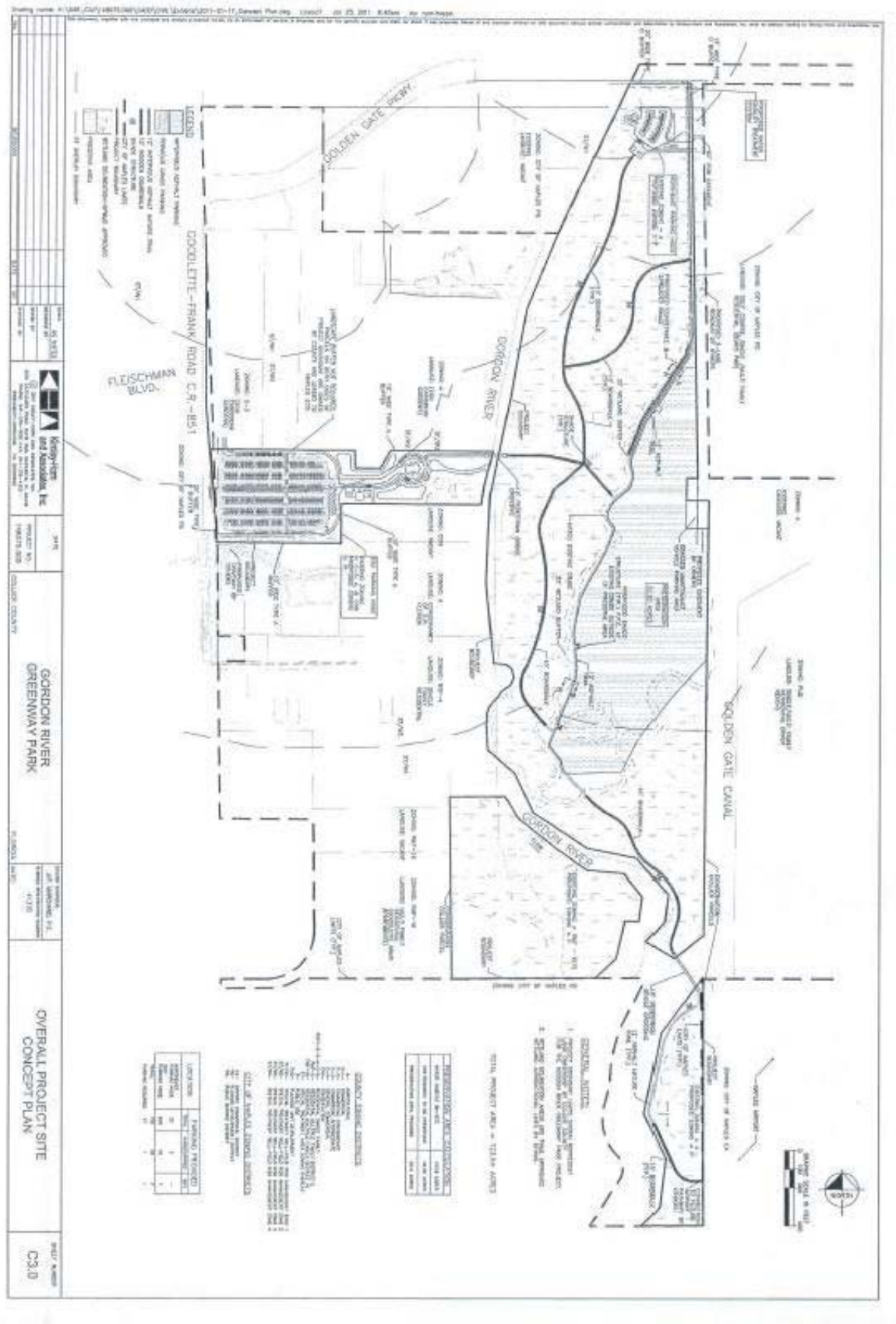

Figure 10: Gordon River Greenway Park 30% Site Construction Plan - Kimley-Horn, 1/25/11

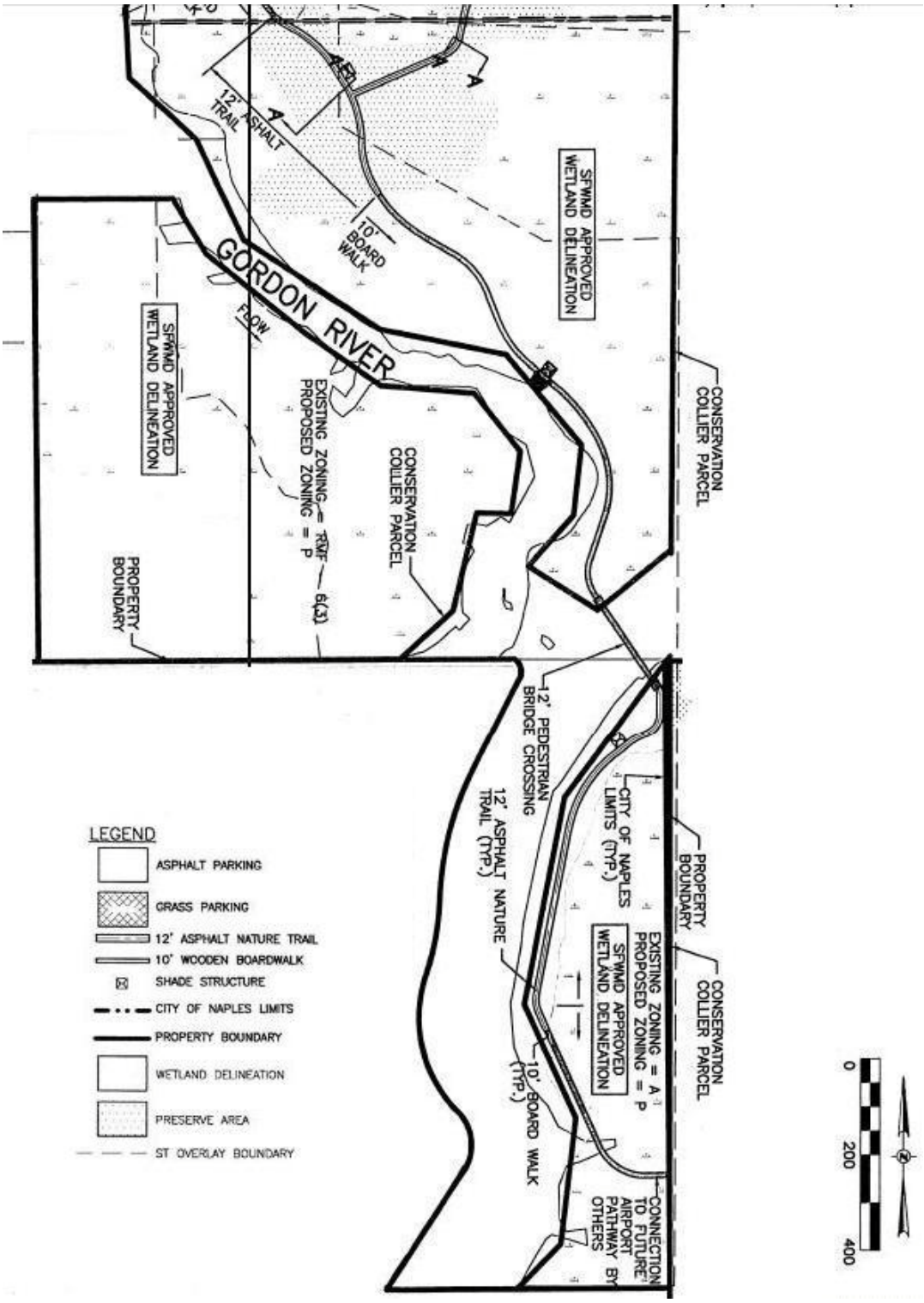

Figure 11: Gordon River Greenway Preserve 30% Site Construction Plan – Kimley-Horn, 1/25/11

GOAL 5: *FACILITATE USES OF THE SITE FOR EDUCATIONAL PURPOSES*

Actions Item 5.1 Provide preserve brochures in rainproof box on site.

A brochure outlining the native plant communities and wildlife present at the preserve will be created by County staff and kept in rainproof boxes near the preserve entrance. The preserve manager will inspect these boxes monthly and refill as necessary.

Action Item 5.2 Facilitate Parks and Rec. educational programs

Once the boardwalk, trails and bridge are complete, Parks and Rec. staff will begin educational programs along the Gordon River Greenway extending into the preserve. Conservation Collier program staff will cooperate with Parks and Rec. and assist whenever possible. Appropriate signage will be utilized for public education regarding resource conservaton.

GOAL 6: *DETERMINE IF PRESCRIBED FIRE AND/OR MECHANICAL TREATMENTS ARE FEASIBLE TO DECREASE WOODY INVASION RESULTING FROM PAST FIRE EXCLUSION; IF SO, PROCEED*

Action Item 6.1 Coordinate with Parks and Rec. to see if the adjacent Gordon River Greenway Park should be included within the burn management zones of the Gordon River Greenway Preserve.

Action Item 6.2 Develop a prescribed fire or mechanical treatment plan to mimic natural fires within the scrubby flatwoods plant community.

Unless absolutely necessary, fire breaks should not be created along ecotones. Firebreaks along ecotones prevent fires from burning across the landscape between different habitat types, and the trails themselves destroy habitat for species that require specific ecotonal habitats.

The scrubby flatwoods community within the preserve should be burned at an interval of 8-25 years. Summer headfires will probably be needed to ensure that most vegetation ignites and that the fire moves across the habitat. For best results, prescribed fire management should begin after permanent firebreaks have been established. Prior to any prescribed fires, burn teams should assess fuel loads and conduct fuel reduction where necessary, conduct risk assessment for the planned burn, obtain appropriate permits, and coordinate with local fire officials. Exotic plant species in particular should be removed prior to fires. Additionally, a plan of action for the Preserve Manager to notify surrounding residents should be established.

If the application of prescribed fire is absolutely impossible there are several alternatives that are available, although much less desirable. These options include herbicide application, mechanical treatment, and grazing. Both herbicide application and mechanical treatments have the disadvantage of requiring that dead woody material be removed from the site following treatment, limiting the amount of decomposing vegetation that would create organic soils. Even with physical removal after treatment, organic matter from all plants on the sites will eventually accumulate, leaving an organic soil, and thereby reducing diversity of native herbs. Grazing, such as by goats, has the disadvantage in introducing trampling effects, nutrients from feces, and possible spread of exotic pest plant seeds. Staff will coordinate with the Florida Division of

Forestry's Urban Fire Mitigation Team to create a burn plan for the site, conduct pre-fire fuel reduction and firebreak creation, and to conduct prescribed burns.

Action Item 6.3 If fire is deemed appropriate, delineate fire management and rescue access routes, and provide this information to the police department and emergency services.

***GOAL 7**: PROVIDE A PLAN FOR SECURITY AND DISASTER PREPAREDNESS*

Action Item 7.1 Discourage any visitation to the park after hours.

Electronic, timed gates will be installed at all entrances of the County's Greenway project. These gates will open and close automatically when the preserve is open and closed respectively. While the preserve is closed, visitors will be able to open the gates to leave the preserve, but not to enter. A sign designating the Greenway hours of operation will be installed at the 2 entrances to the preserve.

Action Item 7.2 Determine whether security lighting is appropriate along the trail system within the preserve.

Security within the preserve is inherently connected to security throughout the entire Greenway system. If lighting for security purposes is determined to be necessary, lighting within the preserve should be the minimum required and should be focused down toward the trail, so as to minimize light pollution.

Action Item 7.2 Enforce regulations prohibiting trash and landscape debris dumping in or near the preserve.

Currently, there is no vehicular access and dumping is not a problem. Monthly inspections will determine if dumping becomes a problem. Staff will work with the Collier County Sheriff's Office to address dumping if it becomes a problem.

Action Item 7.3 Survey trees along the trail and the perimeter of the property annually for damage

Staff will utilize the services of a certified arborist to determine diseased, weak, or damaged trees/limbs surrounding the trails and kiosks that should be removed for safety reasons and prior to hurricane season. This activity is intended to reduce the risk of visitor injury.

Action Item 7.4 Visit preserve within 48 hours after a storm event to assess damage.

Staff will take photos of damage and fill out appropriate Collier County Risk Management Department forms. If damage is extensive, the preserve will be closed until public safety hazards are cleared.

Action Item 7.5 Promptly clear storm debris from preserve.

If necessary, a Collier County emergency debris removal contractor will be contracted as soon as possible after the storm to schedule clean-up. Removal of debris and damaged or downed trees along the trail system may be needed. Downed trees and limbs that do not appear to be a public safety hazard will be cleared at the discretion of the Preserve Manager. As much hurricane debris as possible will be chipped and retained on-site – to be used as mulch for the trail.

4.5 Establish an Operational Plan for the Gordon River Greenway Preserve

This section provides management recommendations for operation of the Gordon River Greenway Preserve. It discusses maintenance and budgeting needs, coordination, and other management issues.

4.5.1 Maintenance

The primary maintenance activities for the preserve will include control of dumping and littering within and around the preserve and trail. Particularly important are the security measures to keep vandals out and the signage and gates in good conditions. The boardwalk and pedestrian bridge should be inspected annually for structural integrity.

4.5.2 Estimated Annual Costs and Funding Sources

Preliminary budget estimates for Gordon River Greenway Preserve include cost breakdowns associated with resource restoration and management and public access site development. The funding source identified for these activities is the Conservation Collier Program Management Trust Fund. Grants will be sought to supplement existing management funds and specifically for the costs associated with the construction of the boardwalk and pedestrian bridge.

The budget in Table 10 represents the actual and unmet budgetary needs for managing the lands and resources of the preserve for the next ten years. The table shows the activities planned and the initial and annual cost estimate of each activity. This budget was developed using data from Conservation Collier and other cooperating entities, and is based on actual costs for land management activities, equipment purchase and maintenance, and for development of fixed capital facilities. The budget considers available funding and is consistent with the direction necessary to achieve the goals and objectives for Gordon River Greenway Preserve.

Table 10: Estimated Annual Land Management Budget

Table 10: Estimated Annual Land Management Budget (Amounts in $; see assumptions for cost estimates on next page)													
Item	**QTY**	**Cost ($)**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**Total**
Facilities Development													
Boardwalk [1]	1,500 - 2,255 LF	$590 / LF		$885,000 or $1,330,450									**$885,000** or **$1,330,450**
Trails [2]	1015 - 1770 LF	$26.66 / LF		$27,060 or $47,200									**$27,060** or **$47,200**
Pedestrian Bridge	1			$384,000									**$384,000**
Shade Structures	3	$10,000 ea		$30,000									**$30,000**
Entry Gate [3]	1	$5,000 ea		$5,000									**$5,000**
Security Lighting				$285,300	$1,700	$1,700	$1,700	$1,700	$1,700	$1,700	$1,700	$1,700	**$285,300**
Interior interpretive signs [4]	3	$2,000 ea		$6,000									**$6,000**
Plant signs	30	$10			$300								**$300**
Restoration/Monitoring		t.b.d.											**t.b.d.**
Establish photo points	recurring	n/a											**$0**
Remove exotics [5]	43.54 acres			$996,000	$35,000	$35,000	$17,700	$17,700	$9,200	$9,200	$9,200	$9,200	**$1,138,200**
Regular Maintenance													
Reduce Fuel Loads [6]	2	$2,000		$2,000					$2,000				**$4,000**
General Facilities Maintenance	8	$720			$720	$720	$720	$720	$720	$720	$720	$720	**$5,760**
Brochures					$300	$100	$100	$100	$100	$100	$100	$100	**$1,000**
Grand Total				**$2,640,500 or $3,065, 810**	**$38,020**	**$37,520**	**$20,220**	**$20,220**	**$13,720**	**$11,720**	**$11,720**	**$11,720**	**$2,791,760 or $3,217,070**

Assumptions for Cost Estimates

1. Boardwalk: The length of the ADA compliant, sustainably harvested hardwood, raised boardwalk will be between 1,500 LF at $590/LF = $885,000 if the boardwalk does not extend into scrubby flatwoods, and 2,255 LF at $590/LF = $1,330,450 if the boardwalk extends into scrubby flatwoods. Unit price includes required materials, labor and equipment – comparable to Freedom Park

2. Trails: The length of an impervious trail will be between 1,015 LF at $26.66/LF = $27,060 if the boardwalk does not extend into the scrubby flatwoods, and 1,770 LF at $26.66/LF = $47,200 if the boardwalk extends into scrubby flatwoods

3. Entry Gates: 1 electronic security gate at $5,000.00 each (if deemed necessary)

4. Interpretive Signs: 3 interpretative signs (4'x6') at $2,000 each - comparable to Freedom Park

5. Remove Exotics: Exotic removal estimate from County contractor

6. Reduce Fuel Loads: Reduction of dense fuels in scrubby flatwoods - $2000 every 5 years

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Appendix 1. Legal Description of Gordon River Greenway Preserve

PROPERTY TAX IDENTIFICATION NUMBER: 00268160009

THE SOUTHEAST (SE¼) QUARTER OF NORTHEAST (NE¼) QUARTER AND THAT PART OF THE NORTHEAST (NE¼) QUARTER OF THE SOUTHEAST (SE¼) QUARTER OF SECTION 34, TOWNSHIP SOUTH, RANGE 25 EAST, COLLIER COUNTY, FLORIDA, LYING EAST OF THE CREEK, LESS AND EXCEPT THE FOLLOWING TWO PARCELS:

ALL THAT TRACT OF PARCEL OF LAND LYING AND BEING IN THE NORTHEAST (NE1/4) QUARTER OF SECTION 34, TOWNSHIP SOUTH, RANGE 25 EAST, COLLIER COUNTY, FLORIDA, AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE POINT OF INTERSECTION OF THE EAST BOUNDARY OF STORTER SUBDIVISION WITH THE NORTH RIGHT-OF-WAY LINE OF A CANAL, RECORDED IN PLAT BOOK 5, PAGE 106; RUN IN A NORTHERLY DIRECTION 149.00 FEET, MORE OR LESS, TO THE SOUTH BOUNDARY OF GORDON RIVER HOMES SUBDIVISION, RECORDED IN PLAT BOOK 2, PAGE 84; THENCE IN AN EASTERLY DIRECTION ALONG WITH THE SOUTH BOUNDARY OF GORDON RIVER HOMES A DISTANCE OF 133.00 FEET, MORE OR LESS, TO THE MEAN HIGH WATER LINE OF GORDON RIVER; THENCE IN A SOUTHEASTERLY DIRECTION FOLLOWING THE MEANDERINGS OF THE M.H.W. LINE OF GORDON RIVER TO THE EASTERLY EXTENSION OF THE NORTH RIGHT-OF-WAY LINE OF THE CANAL IN STORTER SUBDIVISION AS RECORDED PLAT BOOK 5, PAGE 106; THENCE IN A WESTERLY DIRECTION ALONG THE EASTERLY EXTENSION OF THE NORTH RIGHT-OF-WAY LINE OF SAID CANAL TO THE POINT OF BEGINNING.

AND

A PORTION OF THE SOUTHEAST (SE ¼) QUARTER OF THE NORTHEAST (NE ¼) QUARTER, SECTION 34, TOWNSHIP 49 SOUTH, RANGE 25 EAST, COLLIER COUNTY, FLORIDA DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT KNOWN AS "POINT OF ENDING OF BULKHEAD LINE NUMBER 3" AS SHOWN AND DESCRIBED ON THE BULKHEAD LINE PLAT, RECORDED IN BULKHEAD LINE PLAT BOOK 1 AT PAGE 24, PUBLIC RECORDS OF COLLIER COUNTY, FLORIDA; RUN SOUTH 89° 42' 36" EAST, ALONG SAID BULKHEAD LINE NUMBER 3, FOR 217.80 FEET; THENCE RUN SOUTH 29° 16' 45" EAST, STILL ALONG SAID BULKHEAD LINE, FOR 144.56 FEET; THENCE RUN NORTH 89° 42' 36" WEST, FOR 289.14 FEET, TO THE WEST LINE OF THE SOUTHEAST (SE ¼) QUARTER OF THE NORTHEAST (NE ¼) QUARTER OF SECTION 34, TOWNSHIP 49 SOUTH, RANGE 25 EAST, COLLIER COUNTY, FLORIDA, SAID POINT BEING ON THE NORTHERLY RIGHT-OF-WAY LINE OF BEMBURY DRIVE BY POSSESSION AS MONUMENTED ON THE GROUND, SAID POINT BEING 362.32 FEET SOUTH OF THE NORTHWEST CORNER OF SAID SOUTHEAST (SE ¼) QUARTER OF THE NORTHEAST (NE ¼) QUARTER AS SHOWN ON SAID BULKHEAD PLAT (SURVEYOR'S NOTE: THE NORTHERLY RIGHT-OF-WAY LINE OF BEMBURY DRIVE IS SHOWN AS BEING 360 FEET SOUTH OF SAID NORTHWEST CORNER ON PLAT OF STORTER SUBDIVISION AS RECORDED IN PLAT BOOK 5, PAGE 106, PUBLIC RECORDS OF COLLIER COUNTY, FLORIDA); THENCE RUN NORTH 0° 17' 24" EAST, ALONG THE AFOREMENTIONED WEST LINE FOR 125.73 FEET TO THE POINT OF BEGINNING; CONTAINING 0.732 ACRES; TOGETHER WITH ALL RIPARIAN RIGHTS, INCLUDING ANY LAND CONTIGUOUS TO, AND WATERWARD OF, THE HEREIN DESCRIBED PORTION OF BULKHEAD LINE NUMBER 3.

CONSISTING OF 43.54 ACRES, MORE OR LESS.

Appendix 2. Vegetation Scheme Crosswalks/ Florida Natural Areas Inventory Plant Community Classifications

South Florida Vegetation Classification Scheme Crosswalks for Plant Communities Observed on the Gordon River Greenway Preserve

EVSC^		FFWCC^	FLGAP^		FLUCCS^		MSRP^	FNAI*
ID	*Name*	*Name*	*I*	*Name*	*ID*	*Name*	*Name*	*Name*
FM	Mangrove forest	Mangrove Swamp	9	Mixed Mangrove Forest Formation	612	Mangrove swamps	Mangroves	Mangrove Swamp
FMa	Black mangrove forest		10	Black Mangrove Forest				
FM1	White mangrove forest		11	Red Mangrove Forest				
FM1b	White mangrove or buttonwood forest		20	Buttonwood Woodland				
FMr	Red mangrove forest		21	Mixed Mangrove Woodland				
FMx	Mixed mangrove forest		22	Black Mangrove Woodland				
FB	Buttonwood forest		23	Red Mangrove Woodland				
SM	Mangrove scrub		32	Dwarf Mangrove Ecological Complex				
SMr	Red mangrove scrub							
Sma	Black mangrove scrub							
SM1	White mangrove scrub							
SM1b	White mangrove or buttonwood scrub							
SMx	Mixed mangrove scrub							
EO	Lather leaf							
FS	Swamp forest	Xeric Oak Scrub	27	Broad-leaved Evergreen /Mixed Evergreen Shrubland	329	Other shrubs and brush	Florida Scrub	Scrubby Flatwoods
S	Scrub	Shrub Swamp	30	Gallberry/ Saw Palmetto/Titi Compositional Group			Scrubby Flatwoods	
SC	Buttonwood scrub	Shrub and Brush	35	Xeric Scrubland			Scrubby High Pine	
SP	Saw palmetto scrub		36	St. Johns Wort Shrubland Compositional Group				
SH	Hardwood scrub							
PE	Non-graminoid emergent marsh							
SB	Shrublands							
SBm	Wax myrtle							
SVPIh	Slash pines with hardwoods	Mixed Hardwood-Pine	14	Mesic-Xeric Mixed Pine/Oak/Hickory Forest Ecological Complex	434	Hardwood conifer mixed	Mesic Temperate Hammock	Upland Hardwood Forest
								Mesic Hammock
ORV	ORV trails	Barren and Urban	60	Bare soil/Clearcut	743	Spoil areas	N/A	N/A
SA	Spoil areas							
SAd	Artificial deer islands							
FS	Swamp forest	Hardwood Swamp	3	Semi-decidous/Evergreen Tropical/Subtropical Swamp Forest	617	Mixed wetland hardwoods	Flowing Water Swamps	Wet Flatwoods
FSh	Mixed hardwood swamp forest	Bottomland Hardwood Forest	17	Swamp Forest Ecological Complex			Pond Swamps	Bottomland Forest
FSx	Cypress-mixed hardwoods						Seepage Swamps	
FSa	Mixed hardwoods, cypress and pine							
FSb	Bayhead							

^ Crosswalks for 5 vegetation classification schemes used in south Florida: 1. Everglades Vegetation Classification System (EVSC, South Florida National Parks), 2. Florida Fish and Wildlife Conservation Commission (FFWCC), 3. Florida Gap Analysis Project (FLGAP, US Geological Survey), 4. Florida Land Use and Cover Classification System (FLUCCS, Florida Department of Transportation and Water Management Districts), 5. Multi-Species Recovery Project (MSRP, US Fish and Wildlife Service). Source: Gilbert 2005

* Classification of plant communities based on the Natural Communities Guide developed by Florida Natural Areas Inventory (FNAI)

Appendix 3. Preliminary Floristic Inventory of the Gordon River Greenway Preserve.

Plant list of Gordon River		
Common names	**Scientific names**	**Status**
AIR-POTATO	*Dioscorea bulbifera*	Not native N/E I
AMERICAN BEAUTYBERRY	*Callicarpa americana*	Native UPL
AMERICAN EVERGREEN	*Syngonium podophyllum*	Not native N/E I
ARECA PALM	*Dypsis lutescens*	Not Native
AUSTRALIAN UMBRELLA TREE	*Schefflera actinophylla*	N/E I
AUSTRALIAN-PINE	*Casuarina equisetifolia*	FAC N/E I
BALSAMPEAR	*Momordica charantia*	Not native
BAMBOO	*Bambusa* sp.	FACU Not Native
BANYAN TREE	*Ficus benghalensis*	Not native
BEAUTY LEAF	*Calophyllum* sp.	N/E I
BEGGARTICKS, SPANISH NEEDLES	*Bidens alba*	Native FAC
BISHOPWOOD	*Bischofia javanica*	N/E I
BLACK MANGROVE	*Avicennia germinans*	OBL
BLACKROOT	*Pterocaulon pycnostachyum*	Native
BOTTLEBRUSH THREEAWN	*Aristida spiciformis*	FAC
BRACKEN FERN	*Pteridium aquilinum*	FACU
BRAZILIAN PEPPER	*Schinus terebinthifolius*	FAC N/E I
BUSHY BLUESTEM	*Andropogon glomeratus*	Native FACW
BUTTONWOOD	*Conocarpus erectus*	FACW
CABBAGE PALM	*Sabal palmetto*	FAC
CAESARWEED	*Urena lobata*	FACU N/E II
CALLOOSE GRAPE	*Vitis shuttleworthii*	FAC
CANDYROOT	*Polygala nana*	FACW
CARDINAL AIRPLANT	*Tillandsia fasciculata*	(E) FL
CARROTWOOD	*Cupaniopsis anacardioides*	FAC N/E I
CASTORBEAN	*Ricinus communis*	N/E II
CHAPMAN'S OAK	*Quercus chapmanii*	Native
CHINABERRYTREE	*Melia azedarach*	N/E II
COASTALPLAIN STAGGERBUSH	*Lyonia fruticosa*	FAC
COCO PLUM	*Chrysobalanus icaco*	FACW
COCONUT PALM	*Cocos nucifera*	FACU not native
COINVINE	*Dalbergia ecastaphyllum*	FACW
COMMON DAYFLOWER	*Commelina diffusa*	NoT Nativ FACW
COMMON RAGWEED	*Ambrosia artemisiifolia*	Native UPL
CORAL VINE	*Antigonon leptopus*	N/E II
CREEPING OXEYE, WEDELIA	*Sphagneticola trilobata*	FAC N/E II
CURE-FOR-ALL, PUCHEA	*Pluchea carolinensis*	FACW
CUT-LEAF PHILODENDRON	*Monstera deliciosa*	Not native
DAHOON holly	*Ilex cassine*	OBL
DOGFENNEL	*Eupatorium capillifolium*	Native FAC
DOWNY ROSE MYRTLE	*Rhodomyrtus tomentosa*	FAC N/E I
DROPSEED, PINEYWOODS	*Sporobolus junceus*	Native
DWARF LIVE OAK	*Quercus minima*	Native
EARLEAF ACACIA	*Acacia auriculiformis*	FAC N/E I
FLORIDA PAINTBRUSH	*Carphephorus corymbosus*	FACU
FLORIDA ROYAL PALM	*Roystonea regia*	FACW Endagere
FLORIDA SWAMPPRIVET	*Forestiera segregata*	FAC
FLORIDA TASSELFLOWER	*Emilia fosbergii*	Not native

FOGFRUIT, MATCHWEED	*Phyla nodiflora*	FAC
FORKED BLUECURLS	*Trichostema dichotomum*	Native
GALLBERRY	*Ilex glabra*	FACW
GIANT LEATHER FERN	*Acrostichum danaeifolium*	OBL
GOLDEN LEATHER FERN	*Acrostichum aureum*	OBL (T)
GOLDEN POLYPODY	*Phlebodium aureum*	Native
GOLDENROD	*Solidago* spp.	Native FACU
GOPHER APPLE	*Licania michauxii*	Native
GREENBRIER	*Smilax auriculata*	FACU
GREENBRIER	*Smilax* sp.	Native FACU
GROUNDCHERRY	*Physalis angulata*	FAC
GROUNDSEL TREE	*Baccharis halimifolia*	FAC Native
GUINEAGRASS	*Panicum maximum*	FAC N/E II.
GUMBO-LIMBO	*Bursera simaruba*	Native
Hamelia patens	FIREBUSH	Native
HURRICANEGRASS	*Fimbristylis cymosa*	Native FAC
INDIAN LAUREL	*Ficus microcarpa*	N/E I
INFLATED & REFLEXED WILD PINE	*Tillandsia balbisiana*	(T) FL
JAVA PLUM	*Syzygium cumini*	FAC, N/E I
LANTANA	*Lantana camara*	FACU N/E I
LATHERLEAF; ASIAN NAKEDWOOD	*Colubrina asiatica*	FAC N/E I
LEADTREE	*Leucaena leucocephala*	N/E II
LIFE PLANT	*Kalanchoe* spp.	N/E II
LIMPOGRASS	*Hemarthria altissima*	N/E II
LIVE OAK	*Quercus virginiana*	UPL
LONGAN	*Dimocarpus longan*	Not native
LOPSIDED INDIANGRASS	*Sorghastrum secundum*	FACU
LOVE VINE	*Cassytha filiformis*	FAC Native
MAHOE	*Taliparititi liliaceum*	N/E II, FAC
MAHOGANY, WEST INDIAN	*Swietenia mahagoni*	Threatened, FL
MALABAR PLUM; ROSE APPLE	*Syzygium jambos*	FAC, N/E II
MARYLAND GOLDENASTER	*Chrysopsis mariana*	UPL
MASTIC, FALSE	*Sideroxylon foetidissimum*	Native
MELALEUCA, PUNKTREE	*Melaleuca quinquenervia*	N/E I, FAC
MOTHER-IN-LAW'S TONGUE	*Sansevieria hyacinthoides*	Not native N/E II
MULLEIN NIGHTSHADE	*Solanum donianum*	Threatened, FL
MUSCADINE GRAPE	*Vitis rotundifolia*	FAC
MYRSINE	*Rapanea punctata*	FAC
NAPIERGRASS	*Pennisetum purpureum*	FAC N/E I.
NARROWLEAF SILKGRASS	*Pityopsis graminifolia*	Native
NEEDLE RUSH, BLACK RUSH	*Juncus roemerianus*	OBL Native
NETTED PAWPAW	*Asimina reticulata*	Native Endemic
OYSTER-PLANT	*Tradescantia spathacea*	N/E II
PAPAYA	*Carica papaya*	Not native
PAPER MULBERRY	*Broussonetia papyrifera*	N/E II
PARTRIDGE PEA	*Chamaecrista fasciculata*	FACU Native
PASSIONFLOWER, CORKYSTEM	*Passiflora suberosa*	Native
PENNYROYAL, WILD FALSE	*Piloblephis rigida*	Native
PINELAND ACACIA	*Acacia pinetorum*	Native
PINELAND HELIOTROPE	*Heliotropium polyphyllum*	FAC
PINGUIN	*Bromelia pinguin*	Not native
PIPEWORT, HATPINS	*Eriocaulon* spp.	OBL

PLUCHEA, SWEETSCENT	*Pluchea odorata*	FACW
POISON IVY	*Toxicodendron radicans*	FAC
POKEWEED	*Phytolacca americana*	UPL
POND APPLE	*Annona glabra*	OBL
PRICKLYPEAR	*Opuntia stricta*	FACU Threat.FL
RECLINATA, SENEGAL DATE PALM	*Phoenix reclinata*	N/E II.
RED BAY	*Persea borbonia*	FACW
RED CEDAR	*Juniperus virginiana*	FACU
RED MANGROVE	*Rhizophora mangle*	OBL
RESURRECTION FERN	*Pleopeltis polypodioides*	Native
ROSARY PEA	*Abrus precatorius*	N/E I
ROSE-RUSH	*Lygodesmia aphylla*	Native
ROYAL POINCIANA	*Delonix regia*	Not native
RUSTY STAGGERBUSH	*Lyonia ferruginea*	FAC
SAFFRON PLUM, BUMELIA	*Sideroxylon celastrinum*	FAC
SALTGRASS	*Distichlis spicata*	OBL Native
SALTWATER FALSEWILLOW	*Baccharis angustifolia*	OBL Native
SAND LIVE OAK	*Quercus geminata*	Native
SATINLEAF	*Chrysophyllum oliviforme*	Threatened, FL
SAW PALMETTO	*Serenoa repens*	FACU
SCORPIONSTAIL	*Heliotropium angiospermum*	FACU
SCRUB OAK	*Quercus inopina*	Native Endemic
SEAGRAPE	*Coccoloba uvifera*	FAC
SEASHORE PASPALUM	*Paspalum vaginatum*	OBL
SENSITIVE PEA	*Chamaecrista nictitans*	FACU Native
SEPTICWEED	*Senna occidentalis*	Not native
SHINY BLUEBERRY	*Vaccinium myrsinites*	UPL
SHOEBUTTON	*Ardisia elliptica*	FAC N/E I
SHORTLEAF GAYFEATHER	*Liatris tenuifolia*	Native
SHORTLEAF ROSEGENTIAN	*Sabatia brevifolia*	Native FACW
SHRUBBY FALSE BUTTONWEED	*Spermacoce verticillata*	Not native
SIDA, LLIMA	*Sida cordifolia*	Not native
SIMPLELEAF CHASTETREE	*Vitex trifolia*	N/E II
SLASH PINE	*Pinus elliottii*	FACW
SMALL-LEAF CLIMBING FERN	*Lygodium microphyllum*	N/E I
SNOWBERRY	*Chiococca alba*	FAC
SOUTHERN NEEDLELEAF	*Tillandsia setacea*	Native
SOUTHERN SANDBUR	*Cenchrus echinatus*	Native
SPANISH STOPPER	*Eugenia foetida*	Native
SPINY BLACK OLIVE	*Bucida molinetii*	Native
ST.JOHN'S-WORT, ATLANTIC	*Hypericum tenuifolium*	Native FACU
STRANGLER FIG; GOLDEN FIG	*Ficus aurea*	Native FAC
SUGARCANE	*Saccharum officinarum*	FACU not native
SWAMP BAY	*Persea palustris*	OBL Native
SWAMP FERN	*Blechnum serrulatum*	FACW
TICKTREFOIL	*Desmodium* sp.	Native
TORPEDOGRASS	*Panicum repens*	FACW N/E I
TREAD-SOFTLY; FINGER-ROT	*Cnidoscolus stimulosus*	Native
TREMMA, NETTLETREE	*Trema micranthum*	Native FAC
TROPICAL ALMOND, WEST INDIAN	*Terminalia catappa*	N/E II.
TURKEYBERRY	*Solanum torvum*	N/E II
TWISTED AIRPLANT	*Tillandsia flexuosa*	(T) FL

VALAMUERTO, Christmas cassia	*Senna pendula* var. *glabrata*	N/E I
VIRGINIA CREEPER	*Parthenocissus quinquefolia*	FAC
WAX MYRTLE	*Myrica cerifera*	FAC
WHITE INDIGOBERRY	*Randia aculeata*	FAC
WHITE MANGROVE	*Laguncularia racemosa*	OBL
WHITE STOPPER	*Eugenia axillaris*	Native
WHITEJACKET	*Aniseia martinicensis*	Not native
WHITEMOUTH DAYFLOWER	*Commelina erecta*	Native
WHITEWOOD	*Drypetes diversifolia*	Endangered
WILD BANYAN TREE	*Ficus citrifolia*	Native FAC
WILD COFFEE	*Psychotria nervosa*	FAC
WILD LIME	*Zanthoxylum fagara*	Native
WIREGRASS	*Aristida stricta*	FAC
WOMAN'S TONGUE	*Albizia lebbeck*	N/E I
YELLOW STARGRASS	*Hypoxis* spp.	FACW
YELLOWEYED GRASS	*Xyris* spp.	FACW

Appendix 4. Florida Natural Areas Inventory Report for the Gordon River Greenway Preserve

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Suite 200-C
Tallahassee, FL 32303
(850) 224-8207
(850) 681-9364 Fax
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FLORIDA Natural Areas INVENTORY

Florida Natural Areas Inventory

ELEMENT OCCURRENCES DOCUMENTED ON OR NEAR PROJECT SITE

Map Label	Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Listing	Observation Date	Description	EO Comments
STYLABDI*16	Stylisma abdita	Scrub Stylisma	G3	S3	N	LE	1990-09-22	No general description given	BURCH (NO #) COLLECTED SPECIMEN.
STYLABDI*9	Stylisma abdita	Scrub Stylisma	G3	S3	N	LE	1966	No general description given	PRESENT ON SITE. SMITH AND MYINT (627) COLLECTED SPECIMEN; NUMBER NOT GIVEN.
STYLABDI*13	Stylisma abdita	Scrub Stylisma	G3	S3	N	LE	1990-09-25	No general description given	BURCH (NO #) COLLECTED SPECIMEN.
GOPHPOLY*197	Gopherus polyphemus	Gopher Tortoise	G3	S3	N	LS	ZZ	No general description given	No EO data given
SCIUAVIC*1	Sciurus niger avicennia	Mangrove Fox Squirrel	G5T2	S2	N	LT	1985-03-09	No general description given	DOR SPECIMEN COLL. 9 MARCH 1985 BY DOUG GONZALES.
GOPHPOLY*1059	Gopherus polyphemus	Gopher Tortoise	G3	S3	N	LS	1986-02-20	Scrub	1986-02-20: S.P. Christman, MNH, observation.
CARECARE*19	Caretta caretta	Loggerhead	G3	S3	LT	LT	1992	6.4 KM STRETCH OF GULF COASTAL BEACH.	NESTING BEACH. DATA (FROM CARETTA RESEARCH, INC., UNPUB.) PRESENTED AS YEAR: # NESTS OBSERVED (#/KM). 1979: 55 (8.9), 1978: 40 (6.3), 1977: 38 (5.9), 1976: 35 (5.5), 1975: 30 (4.7).
SCRUB****355	Scrub		G2	S2	N	N	1983-02-13	FAIRLY OPEN SAND PINE SCRUB.	No EO data given
SCRUB****356	Scrub		G2	S2	N	N	1983-02-13	FAIRLY DENSE STAND OF SANDPINE.	No EO data given
RANACAPI*45	Rana capito	Gopher Frog	G3	S3	N	LS	ZZ	No general description given	SPEC. (LA-60564). COLLECTOR N/A, DATE N/A.
HALILEUC*1063	Haliaeetus leucocephalus	Bald Eagle	G5	S3	LT,PDL	LT	2003	2005-07-12: Source does not provide a description.	Nest status: Active, 2003, 2002, 2001, 2000, 1999;(U03FWC01FLUS)
HALILEUC*1067	Haliaeetus leucocephalus	Bald Eagle	G5	S3	LT,PDL	LT	2003	2005-07-12: Source does not provide a description.	Nest status: Active, 2003; Unknown status or not assessed, 2002, 2001, 2000, 1999;(U03FWC01FLUS)
SCRUB****354	Scrub		G2	S2	N	N	1983-02-13	"SAND PINE SCRUB".	No EO data given
SCRUB****351	Scrub		G2	S2	N	N	1987	"OAK SCRUB" IN RAPIDLY URBANIZING AREA BETWEEN H. S. & SHOPPING MALL.	No EO data given
SCRUB****353	Scrub		G2	S2	N	N	ZZ	"SAND PINE SCRUB".	No EO data given

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ELEMENT OCCURRENCES DOCUMENTED ON OR NEAR *PROJECT SITE*

Map Label	Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Listing	Observation Date	Description	EO Comments
SCRUB****352	Scrub		G2	S2	N	N	1987-04-07	SAND PINE SCRUB IN RAPIDLY URBANIZING AREA BEHIND MAJOR SHOPPING MALL.	LOW, BROKEN CANOPY OF SAND LIVE OAKS, MYRTLE OAKS WITH TALLER SCATTERED SLASH PINES. TREES HARBOR VARIOUS BROMELIADS. UNDERSTORY OF SHINY LYONIA, SAW PALMETTO, ROSEMARY, GOPHER APPLE. GOPHER TORTOISES INHABIT THE SITE. 1 ACTIVE, 2 INACTIVE BURROWS SEEN.
HALILEUC*357	Haliaeetus leucocephalus	Bald Eagle	G5	S3	LT,PDL	LT	2003	No general description given	Nest status 1999-2003: Active - 2003, 2000, 1999; Inactive - 2002; Unknown/not assessed - 2001;Status 1995-98: Continuously active. (U03FWC01FLUS). Previous data (note different format) NEST: 1982-1988 ACTIVE. FLEDGED YOUNG 1983-1987.
HALILEUC*248	Haliaeetus leucocephalus	Bald Eagle	G5	S3	LT,PDL	LT	1981	No general description given	Nest status 1999-2003: Unknown/not assessed - 2003, 2002, 2001, 2000, 1999; Status 1995-98: Unknown/not assessed - 1998, 1997, 1996, 1995; (U03FWC01FLUS). Previous data (note different format) ACTIVE NEST; 0 YOUNG IN 1981,1980,1979,1978.

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FLORIDA Natural Areas INVENTORY

Florida Natural Areas Inventory

Biodiversity Matrix Report

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Listing
Matrix Unit ID: 39066					
Documented					
Haliaeetus leucocephalus	Bald Eagle	G5	S3	LT,PDL	LT
Documented-Historic					
Gopherus polyphemus	Gopher Tortoise	G3	S3	N	LS
Likely					
Mycteria americana	Wood Stork	G4	S2	LE	LE
Matrix Unit ID: 39067					
Documented-Historic					
Gopherus polyphemus	Gopher Tortoise	G3	S3	N	LS
Likely					
Haliaeetus leucocephalus	Bald Eagle	G5	S3	LT,PDL	LT
Mycteria americana	Wood Stork	G4	S2	LE	LE
Stylisma abdita	Scrub Stylisma	G3	S3	N	LE
Potential from any/all selected units					
Acipenser oxyrinchus desotoi	Gulf Sturgeon	G3T2	S2	LT	LS
Ardea herodias occidentalis	Great White Heron	G5T2	S2	N	N
Athene cunicularia floridana	Florida Burrowing Owl	G4T3	S3	N	LS
Crocodylus acutus	American Crocodile	G2	S1	LE,PT	LE
Dendroica discolor paludicola	Florida Prairie Warbler	G5T3	S3	N	N
Drymarchon couperi	Eastern Indigo Snake	G3	S3	LT	LT
Elytraria caroliniensis var. angustifolia	Narrow-leaved Carolina Scalystem	G4T2	S2	N	N
Eragrostis pectinacea var. tracyi	Sanibel Lovegrass	G5T1	S1	N	LE
Eretmochelys imbricata	Hawksbill	G3	S1	LE	LE
Eumops floridanus	Florida bonneted bat	G1	S1	N	LE
Forestiera segregata var. pinetorum	Florida Pinewood Privet	G4T2	S2	N	N
Gymnopogon chapmanianus	Chapman's Skeletongrass	G3	S3	N	N
Heterodon simus	Southern Hognose Snake	G2	S2	N	N
Lechea cernua	Nodding Pinweed	G3	S3	N	LT
Linum carteri var. smallii	Carter's Large-flowered Flax	G2T2	S2	N	LE
Mesic flatwoods		G4	S4	N	N
Nemastylis floridana	Celestial Lily	G2	S2	N	LE
Nolina atopocarpa	Florida Beargrass	G3	S3	N	LT
Patagioenas leucocephala	White-crowned Pigeon	G3	S3	N	LT
Picoides borealis	Red-cockaded Woodpecker	G3	S2	LE	LS
Polyrrhiza lindenii	Ghost Orchid	G2G4	S2	N	LE
Pteroglossaspis ecristata	Giant Orchid	G2G3	S2	N	LT
Puma concolor coryi	Florida Panther	G5T1	S1	LE	LE
Rallus longirostris scottii	Florida Clapper Rail	G5T3?	S3?	N	N
Rana capito	Gopher Frog	G3	S3	N	LS
Rivulus marmoratus	Mangrove Rivulus	G3	S3	C	LS
Rostrhamus sociabilis plumbeus	Snail Kite	34G5T3C	S2	LE	LE

Definitions: *Documented - Rare species and natural communities documented on or near this site.*
Documented-Historic - Rare species and natural communities documented, but not observed/reported within the last twenty years.
Likely - Rare species and natural communities likely to occur on this site based on suitable habitat and/or known occurrences in the vicinity.
Potential - This site lies within the known or predicted range of the species listed.

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Biodiversity Matrix Report

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Listing
Roystonea elata	Florida Royal Palm	G2G3	S2	N	LE
Sceloporus woodi	Florida Scrub Lizard	G3	S3	N	N
Sciurus niger avicennia	Mangrove Fox Squirrel	G5T2	S2	N	LT
Trichechus manatus	Manatee	G2	S2	LE	LE
Ursus americanus floridanus	Florida Black Bear	G5T2	S2	N	LT*

Definitions: *Documented - Rare species and natural communities documented on or near this site.*
Documented-Historic - Rare species and natural communities documented, but not observed/reported within the last twenty years.
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