APPENDIX E:

FNAI Letter Report
Randall Sleister
Volusia County Land Acquisition and Management Division
123 W. Indiana Avenue
Deland, FL 32720

Re: Doris Leeper Spruce Creek Preserve, Volusia County

Dear Mr. Sleister,

Thank you for your request for information on Doris Leeper Spruce Creek Preserve (hereafter the Preserve) from the Florida Natural Areas Inventory (FNAI). We have compiled the following information for the property.

This site is located within a significant region of natural areas and habitat for several rare species, and is within a significant area of scrub habitat, a natural community in decline that provides important habitat for several rare species. Special consideration should be taken to avoid and/or mitigate impacts to these natural resources and to design land uses that are compatible with these resources.

Documented Element Occurrences
Attached is a Managed Area Summary for this site, which lists the rare species we have documented within the boundaries of the Preserve.

We also include a map of all Element Occurrences on and in the vicinity of the preserve (see enclosed map and Element Occurrence table). Please be advised that a lack of Element Occurrences in the FNAI database is not a sufficient indication of the absence of rare or endangered species on a site.

The map also depicts observation points from a Florida scrub-jay survey that was conducted for the U.S. Fish and Wildlife Service by staff and associates of the Archbold Biological Station from 1992 to 1996 (Pranty and Stith, 1994).

The Element Occurrences data layer includes occurrences of rare species and natural communities. The map legend indicates that some Element Occurrences occur in the general vicinity of the label point. This may be due to lack of precision of the source data, or an element that occurs over an extended area (such as a wide ranging species or large natural community). For animals and plants, Element Occurrences generally refer to more than a casual sighting; they usually indicate a viable population of the species. Note that some Element Occurrences represent historically documented observations which may no longer be extant. Extirpated Element Occurrences will be marked with an 'X' following the occurrence label on the enclosed map.

Likely and Potential Rare Species
In addition to documented occurrences, we estimate there is over 600 acres of potential habitat for the federally threatened Florida scrub-jay (Aphelocoma coerulescens) on the Preserve. This estimate is based on FNAI statewide habitat models and a 2004 survey we conducted for Volusia County (NeSmith, et al. 2004). The recent land acquisition that is now included in the western portion of the Preserve supports a significant amount of good quality scrubby flatwoods, in addition to the 600 acres of scrub habitat identified in 2004. The preserve also supports about 600 acres of potential habitat buffer for the federally endangered manatee (Trichechus manatus); these acres are along the shores of Spruce Creek, Strickland Bay, Rose Bay, and Turnbull Bay.

FNAI habitat models indicate areas, which based on land cover type, offer suitable habitat for one or more rare species that is known to occur in the vicinity. Habitat models have been developed for approximately 300 of the rarest species tracked by the Inventory, including all federally listed species.


Land Acquisition Projects
This site is within the Spruce Creek Florida Forever BOT Project, which is part of the State of Florida’s Conservation and Recreation Lands land acquisition program. A description of this project is enclosed. For more information on this Florida Forever Project, contact the Florida Department of Environmental Protection, Division of State Lands.

Florida Forever Board of Trustees (BOT) projects are proposed and acquired through the Florida Department of Environmental Protection, Division of State Lands. The state has no specific land management authority over these lands until they are purchased.

We always recommends that professionals familiar with Florida’s flora and fauna should conduct a sitespecific survey to determine the current presence or absence of rare, threatened, or endangered species. Please visit www.fna.org/trackinglist.cfm for county or statewide Element Occurrence distributions and links to more element information.

The database maintained by FNAI is the single most comprehensive source of information available on the locations of rare species and other significant ecological resources. However, the data are not always based on comprehensive or site-specific field surveys. Therefore, this information should not be regarded as a final statement on the biological resources of the site being considered, nor should it be substituted for on-site surveys. Inventory data are designed for the purposes of conservation planning and scientific research, and are not intended for use as the primary criteria for regulatory decisions.

The information provided may not be published without prior written notification to the Florida Natural Areas Inventory, and the Inventory must be credited as an information source in these publications. You may include these materials in the upcoming Preserve management plan update. FNAI data may not be resold for profit.

This report is made available at no charge as a public service of the Florida Department of Environmental Protection and FNAI. Thank you for your request for FNAI information. If I can be of further assistance, please don’t hesitate to give me a call at (850) 224-8207 or email me at ckindell@fnai.org.

Sincerely,

Carolyn Kindell
Managed Areas Biologist
Encl
<table>
<thead>
<tr>
<th>SCIENTIFIC NAME</th>
<th>COMMON NAME</th>
<th>Global rank</th>
<th>State rank</th>
<th>Federal status</th>
<th>State status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plants and Lichens</td>
<td>Florida Beargrass</td>
<td>G3</td>
<td>S3</td>
<td>N</td>
<td>LT</td>
</tr>
<tr>
<td>Nolina atopocarpa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reptiles</td>
<td>Gopher Tortoise</td>
<td>G3</td>
<td>S3</td>
<td>N</td>
<td>ST</td>
</tr>
<tr>
<td>Gopherus polyphemus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Birds</td>
<td>Bald Eagle</td>
<td>G5</td>
<td>S3</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Haliaeetus leucocephalus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Summary includes all documented and likely species occurrence records currently in the FNAI database.
Using a ranking system developed by NatureServe and the Natural Heritage Program Network, the Florida Natural Areas Inventory assigns two ranks for each element. The global rank is based on an element's worldwide status; the state rank is based on the status of the element in Florida. Element ranks are based on many factors, the most important ones being estimated number of Element Occurrences (EOs), estimated abundance (number of individuals for species; area for natural communities), geographic range, estimated number of adequately protected EOs, relative threat of destruction, and ecological fragility.

### FNAI GLOBAL ELEMENT RANK

<table>
<thead>
<tr>
<th>Global rank</th>
<th>State rank</th>
<th>Federal status</th>
<th>State status</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1</td>
<td>Critically imperiled globally because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or man-made factor.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G2</td>
<td>Imperiled globally because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G3</td>
<td>Either very rare and local throughout its range (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction from other factors.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G4</td>
<td>Apparently secure globally (may be rare in parts of range).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G5</td>
<td>Demonstrably secure globally.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GH</td>
<td>Of historical occurrence throughout its range, may be rediscovered (e.g., ivory-billed woodpecker).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GX</td>
<td>Believed to be extinct throughout range.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GXC</td>
<td>Extirpated from the wild but still known from captivity or cultivation.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G#</td>
<td>Tentative rank (e.g., G2?).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G#G#</td>
<td>Range of rank; insufficient data to assign specific global rank (e.g., G2G3).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G#T#</td>
<td>Rank of a taxonomic subgroup such as a subspecies or variety; the G portion of the rank refers to the entire species and the T portion refers to the specific subgroup; numbers have same definition as above (e.g., G3T1).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G#Q</td>
<td>Rank of questionable species - ranked as species but questionable whether it is species or subspecies; numbers have same definition as above (e.g., G2Q).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G#T#Q</td>
<td>Same as above, but validity as subspecies or variety is questioned.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GU</td>
<td>Unrankable; due to a lack of information no rank or range can be assigned (e.g., GUT2).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GNA</td>
<td>Ranking is not applicable because the element is not a suitable target for conservation (e.g., a hybrid species).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GN</td>
<td>Element not yet ranked (temporary).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GNRTNR</td>
<td>Neither the element nor the taxonomic subgroup has yet been ranked.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### FNAI STATE ELEMENT RANK

<table>
<thead>
<tr>
<th>State rank</th>
<th>Federal status</th>
<th>State status</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>Critically imperiled in Florida because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or man-made factor.</td>
<td></td>
</tr>
<tr>
<td>S2</td>
<td>Imperiled in Florida because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor.</td>
<td></td>
</tr>
<tr>
<td>S3</td>
<td>Either very rare and local in Florida (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction from other factors.</td>
<td></td>
</tr>
<tr>
<td>S4</td>
<td>Apparently secure in Florida (may be rare in parts of range).</td>
<td></td>
</tr>
<tr>
<td>S5</td>
<td>Demonstrably secure in Florida.</td>
<td></td>
</tr>
<tr>
<td>SH</td>
<td>Of historical occurrence in Florida, possibly extirpated, but may be rediscovered (e.g., ivory-billed woodpecker).</td>
<td></td>
</tr>
<tr>
<td>SX</td>
<td>Believed to be extirpated throughout Florida.</td>
<td></td>
</tr>
<tr>
<td>SU</td>
<td>Unrankable; due to a lack of information no rank or range can be assigned.</td>
<td></td>
</tr>
<tr>
<td>SNA</td>
<td>State ranking is not applicable because the element is not a suitable target for conservation (e.g., a hybrid species).</td>
<td></td>
</tr>
<tr>
<td>SNR</td>
<td>Element not yet ranked (temporary).</td>
<td></td>
</tr>
</tbody>
</table>

### FEDERAL LEGAL STATUS

E - 5

**Note:** Summary includes all documented and likely species occurrence records currently in the FNAI database.
Legal status information provided by FNAI for information only. For official definitions and lists of protected species, consult the relevant federal agency.

Definitions derived from U.S. Endangered Species Act of 1973, Sec. 3. Note that the federal status given by FNAI refers only to Florida populations and that federal status may differ elsewhere.

C = Candidate species for which federal listing agencies have sufficient information on biological vulnerability and threats to support proposing to list the species as Endangered or Threatened.
LE = Endangered: species in danger of extinction throughout all or a significant portion of its range.
LE, LT = Species currently listed endangered in a portion of its range but only listed as threatened in other areas.
LE, PDL = Species currently listed endangered but has been proposed for delisting.
LE, PT = Species currently listed endangered but has been proposed for listing as threatened.
LE, XN = Species currently listed endangered but tracked population is a non-essential experimental population.
LT = Threatened: species likely to become Endangered within the foreseeable future throughout all or a significant portion of its range.
SAT = Treated as threatened due to similarity of appearance to a species which is federally listed such that enforcement personnel have difficulty in attempting to differentiate between the listed and unlisted species.
SC = Not currently listed, but considered a "species of concern" to USFWS.

STATE LEGAL STATUS

Provided by FNAI for information only. For official definitions and lists of protected species, consult the relevant state agency.

Animals: Definitions derived from "Florida’s Endangered Species and Species of Special Concern, Official Lists" published by Florida Fish and Wildlife Conservation Commission, 1 August 1997, and subsequent updates.

FE = Listed as Endangered Species at the Federal level by the U.S. Fish and Wildlife Service
FT = Listed as Threatened Species at the Federal level by the U.S. Fish and Wildlife Service
F(XN) = Federal listed as an experimental population in Florida
FT(S/A) = Federal Threatened due to similarity of appearance
ST = State population listed as Threatened by FFWCC. Defined as a species, subspecies, or isolated population which is acutely vulnerable to environmental alteration, declining in number at a rapid rate, or whose range or habitat is decreasing in area at a rapid rate and as a consequence is destined or very likely to become an endangered species within the foreseeable future. (ST* for Ursus americanus floridanus (Florida black bear) indicates that this status does not apply in Baker and Columbia counties and in the Apalachicola National Forest. ST* for Neovison vison pop.1 (Southern mink, South Florida population) indicates that this status applies to the Everglades population only.)
SSC = Listed as Species of Special Concern by the FFWCC. Defined as a population which warrants special protection, recognition, or consideration because it has an inherent significant vulnerability to habitat modification, environmental alteration, human disturbance, or substantial human exploitation which, in the foreseeable future, may result in its becoming a threatened species. (SSC* indicates that a species has SSC status only in selected portions of its range in Florida. SSC* for Pandion haliaetus (Osprey) indicates that this status applies in Monroe county only.)
N = Not currently listed, nor currently being considered for listing.

Plants: Definitions derived from Sections 581.011 and 581.185(2), Florida Statutes, and the Preservation of Native Flora of Florida Act, SB-40.001. FNAI does not track all state-regulated plant species; for a complete list of state-regulated plant species, call Florida Division of Plant Industry, 352-372-3505 or see: http://www.doacs.state.fl.us/pl/.

LE = Endangered: species of plants native to Florida 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; includes all species determined to be endangered or threatened pursuant to the U.S. Endangered Species Act.

LT = Threatened; 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 number as to cause them to be Endangered.

N = Not currently listed, nor currently being considered for listing.
<table>
<thead>
<tr>
<th>Map Label</th>
<th>Scientific Name</th>
<th>Common Name</th>
<th>Global Rank</th>
<th>State Rank</th>
<th>Status</th>
<th>State Listing</th>
<th>Observation Date</th>
<th>Description</th>
<th>EO Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGONMONT*7</td>
<td>Agonostomus monticolus</td>
<td>Mountain Mullet</td>
<td>G5</td>
<td>S3</td>
<td>N</td>
<td>N</td>
<td>1951-11-08</td>
<td>No general description given</td>
<td>2 SPECIMENS COLLECTED ON 29 APR. 1950 (UF-007790) AND 1 SPECIMEN COLLECTED ON 11 AUG. 1951 (UF-007791).</td>
</tr>
<tr>
<td>APHECOER*319</td>
<td>Aphelocoma coerulescens</td>
<td>Florida Scrub-jay</td>
<td>G2</td>
<td>S2</td>
<td>LT</td>
<td>FT</td>
<td>1981-05-17</td>
<td>&quot;OPEN SLASH PINE SCRUB, SOME HAS BEEN DEVELOPED&quot; SCRUBBY FLATWOODS</td>
<td>1981-05-17 2 SCRUB JAYS.</td>
</tr>
<tr>
<td>APHECOER*321</td>
<td>Aphelocoma coerulescens</td>
<td>Florida Scrub-jay</td>
<td>G2</td>
<td>S2</td>
<td>LT</td>
<td>FT</td>
<td>1981-05-17</td>
<td>&quot;DISTURBED SLASH PINE SCRUB, DEVELOPMENT TO SOUTH&quot;, SCRUBBY FLATWOODS</td>
<td>1981-05-17 2 SCRUB JAYS.</td>
</tr>
<tr>
<td>APHECOER*496</td>
<td>Aphelocoma coerulescens</td>
<td>Florida Scrub-jay</td>
<td>G2</td>
<td>S2</td>
<td>LT</td>
<td>FT</td>
<td>2005-02-10</td>
<td>2005-02-10: Rural residential with immature sand pine scrub to west and farm to east on road (PNDLY02FLUS).</td>
<td>2005-02-10: Five, maybe 6, birds observed; none banded. Birds using both sides of road (PNDLY02FLUS). 2003: found the area where jays were found in 1993 to be unsuitable, dense, 20-30’ planted sand pines (PNDNES03FLUS). 1993-05-17: Six jays in 3 group</td>
</tr>
<tr>
<td>CONRGRAN*23</td>
<td>Condorina grandiflora</td>
<td>Large-flowered Rosemary</td>
<td>G3</td>
<td>S3</td>
<td>N</td>
<td>LT</td>
<td>1987-10-26</td>
<td>SAND PINE SCRUB ON TRUCK PARKING SIDE OF REST AREA</td>
<td>10-40 PLANTS IN FULL FLOWER ON DISTURBED BANK (ALSO CONTINUING INTO THE UNDISTURBED SCRUB).</td>
</tr>
<tr>
<td>GOPHPOLY*1209</td>
<td>Gopherus polyphemus</td>
<td>Gopher Tortoise</td>
<td>G3</td>
<td>S3</td>
<td>N</td>
<td>ST</td>
<td>2003-08-28</td>
<td>2003-08-28: in powerline row in overgrown sand pine/oak scrub (U04SCH04FLUS).</td>
<td>2003-08-28: five burrows and 1 juvenile (approximately 5 inches in length) observed. Sizes of burrows: 3 juvenile, 2 adult (U04SCH04FLUS).</td>
</tr>
<tr>
<td>GOPHPOLY*1210</td>
<td>Gopherus polyphemus</td>
<td>Gopher Tortoise</td>
<td>G3</td>
<td>S3</td>
<td>N</td>
<td>ST</td>
<td>2003-08-28</td>
<td>2003-08-28: in xeric hammock, historically scrub (U04SCH04FLUS).</td>
<td>2003-08-28: two burrows approximately 70 meters apart. At northernmost burrow, 1 adult female observed(U04SCH04FLUS).</td>
</tr>
<tr>
<td>GOPHPOLY*1211</td>
<td>Gopherus polyphemus</td>
<td>Gopher Tortoise</td>
<td>G3</td>
<td>S3</td>
<td>N</td>
<td>ST</td>
<td>2004-07-06</td>
<td>2004-07-06: along ORV trail/sand road in overgrown scrub (U04SCH04FLUS).</td>
<td>2004-07-06: three active burrows at two locations along a 0.1 mile stretch of sand road, at least one of them is adult (12&quot; at burrow opening) (U04SCH04FLUS).</td>
</tr>
<tr>
<td>Map Label</td>
<td>Scientific Name</td>
<td>Common Name</td>
<td>Global Rank</td>
<td>State Rank</td>
<td>State Status</td>
<td>State Listing</td>
<td>Observation Date</td>
<td>Description</td>
<td>EO Comments</td>
</tr>
<tr>
<td>-----------</td>
<td>------------------------------</td>
<td>-------------------</td>
<td>-------------</td>
<td>------------</td>
<td>--------------</td>
<td>---------------</td>
<td>------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>GOPHPOLY*377</td>
<td>Gopherus polyphemus</td>
<td>Gopher Tortoise</td>
<td>G3</td>
<td>S3</td>
<td>N</td>
<td>N</td>
<td>1983-02-18</td>
<td>Sandhills and scrubby flatwoods variants; very old growth longleaf pine forest (understory mowed but not burned); sand pine-turkey oak and saw palmetto understories; Aristida stricta present.</td>
<td>Leonard observed gopher tortoise burrows here, presumably on both sides of Taylor Road (Rt. 41S).</td>
</tr>
<tr>
<td>GOPHPOLY*561</td>
<td>Gopherus polyphemus</td>
<td>Gopher Tortoise</td>
<td>G3</td>
<td>S3</td>
<td>N</td>
<td>N</td>
<td>1989-10-24</td>
<td>2007-02-20: small area of old pasture/bahia within overgrown oak scrub. (PNDKIN02FLUS). 1989-10-24: Ruderal, improved pasture-bahia grass (U90MAC05FLUS).</td>
<td>2007-02-07: 3 active burrows were discovered poached (dug up) in the northmost clearing. Manager stated they had been active (PNDKIN02FLUS, PNDSELE01FLUS), 1989-10-24: 3 active burrows, 1 individual (U90MAC05FLUS).</td>
</tr>
<tr>
<td>GOPHPOLY*745</td>
<td>Gopherus polyphemus</td>
<td>Gopher Tortoise</td>
<td>G3</td>
<td>S3</td>
<td>N</td>
<td>N</td>
<td>1991-07-03</td>
<td>SCRUB-SANDPINE, PRIMARILY OAKS AND PINES WITH SCATTERED PALMETTO AND ROSEMARY UNDERSTORY. SANDY SOIL.</td>
<td>TWO BURROWS OBSERVED APPEARED ACTIVE, FRESH DIGGING. NESTS ALSO OBSERVED.</td>
</tr>
<tr>
<td>MELAINDI*1</td>
<td>Melanoplus indicifer</td>
<td>East Coast Scrub Grasshopper</td>
<td>G1G2</td>
<td>S1S2</td>
<td>N</td>
<td>N</td>
<td>1938-08-31</td>
<td>No description given (U08ALM01FLUS).</td>
<td>1938-08-31: One specimen was collected by Hubbell and Friauf (U08ALM01FLUS).</td>
</tr>
<tr>
<td>Map Label</td>
<td>Scientific Name</td>
<td>Common Name</td>
<td>Global Rank</td>
<td>State Federal Status</td>
<td>State Listing</td>
<td>Observation Date</td>
<td>Description</td>
<td>EO Comments</td>
<td></td>
</tr>
<tr>
<td>-----------</td>
<td>----------------</td>
<td>-------------</td>
<td>-------------</td>
<td>---------------------</td>
<td>--------------</td>
<td>------------------</td>
<td>-------------</td>
<td>-------------</td>
<td></td>
</tr>
<tr>
<td>NEROTAEN*1</td>
<td>Nerodia clarkii taeniata</td>
<td>Atlantic Salt Marsh Snake</td>
<td>G4T1Q</td>
<td>S1</td>
<td>LT</td>
<td>FT</td>
<td>1987-05-20</td>
<td>No general description given</td>
<td>ONE DOR JUVENILE ON ROAD; ONE ADULT FEMALE COLLECTED IN MARSH. THE FEMALE GAVE BIRTH TO 3 YOUNG ON 15 OCT. 1987.</td>
</tr>
<tr>
<td>NEROTAEN*2</td>
<td>Nerodia clarkii taeniata</td>
<td>Atlantic Salt Marsh Snake</td>
<td>G4T1Q</td>
<td>S1</td>
<td>LT</td>
<td>FT</td>
<td>1979-10-04</td>
<td>No general description given</td>
<td>SNAKE(S) OBSERVED BY MOLER AND KOCHMAN.</td>
</tr>
<tr>
<td>NOLIATOP**182</td>
<td>Nolina atopocarpa</td>
<td>Florida Beargrass</td>
<td>G3</td>
<td>S3</td>
<td>N</td>
<td>LT</td>
<td>2004-07-06</td>
<td>2004-07-06: scrubby flatwoods, moderately fire-excluded, with some ORV trails (U04SCH04FLUS)</td>
<td>2004-07-06: 100-1000 plants scattered in a wide area, most in flower, few in fruit. Plants in clusters, to 3' tall (U04SCH04FLUS).</td>
</tr>
<tr>
<td>SCRUB***521</td>
<td>Scrub</td>
<td></td>
<td>G2</td>
<td>S2</td>
<td>N</td>
<td>N</td>
<td>1984-01-28</td>
<td>SCRUB SITE IS RELATIVELY LEVEL. LARGE AND NUMEROUS SERENO A REPENS. DOMINANT SHRUBS ARE CHAPMAN, MYRTLE AND LIVE OAK (U88CHR01). F84ST009 REPORTS ARISTIDIA STRICTA IN OCCASIONAL OPENINGS, BUT GENERALLY, THERE IS LITTLE GROUND VEGETATION.</td>
<td>SOME TREES ARE 40 CM D8H.</td>
</tr>
<tr>
<td>SCRUB***522</td>
<td>Scrub</td>
<td></td>
<td>G2</td>
<td>S2</td>
<td>N</td>
<td>N</td>
<td>2004</td>
<td>SAND PINE SCRUB LOCATED ON OLD DUNE LINE. SHRUB LAYER DENSITY AND HEIGHT VARIES FROM E TO W ACROSS DUNE. UNDERSTORY DOMINATED BY OAKS, LYONIA FERRUGINEA, XIMENIA AND SERENO A REPENS.</td>
<td>2004: Update to last obs date was based on interpretation of aerial photography (previous value was 1984-01-28) (U05FNA02FLUS). AN OLD STAND OF SAND PINE ON SITE. NUMEROUS SAND PINE SEEDLINGS PRESENT.</td>
</tr>
<tr>
<td>SCRUFAT*25</td>
<td>Scrubby flatwoods</td>
<td></td>
<td>G2</td>
<td>S2?</td>
<td>N</td>
<td>N</td>
<td>1981-05-17</td>
<td>&quot;OPEN SLASH PINE SCRUB, SOME HAS BEEN DEVELOPED&quot; SCRUBBY FLATWOODS</td>
<td>No EO data given</td>
</tr>
<tr>
<td>SCRUFAT*26</td>
<td>Scrubby flatwoods</td>
<td></td>
<td>G2</td>
<td>S2?</td>
<td>N</td>
<td>N</td>
<td>2004</td>
<td>&quot;DISTURBED SLASH PINE SCRUB, DEVELOPMENT TO SOUTH&quot; SCRUBBY FLATWOODS</td>
<td>2004: Update to last obs date was based on interpretation of aerial photography (previous value was 1981-05-17) (U05FNA02FLUS).</td>
</tr>
<tr>
<td>Map Label</td>
<td>Scientific Name</td>
<td>Common Name</td>
<td>Global Rank</td>
<td>State Federal Rank</td>
<td>State Status</td>
<td>Federal Status</td>
<td>Observation Date</td>
<td>Description</td>
<td>EO Comments</td>
</tr>
<tr>
<td>-----------</td>
<td>--------------------</td>
<td>------------------------</td>
<td>-------------</td>
<td>--------------------</td>
<td>--------------</td>
<td>----------------</td>
<td>------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>STERANT*187</td>
<td>Sternulla antillarum</td>
<td>Least Tern</td>
<td>G4</td>
<td>S3</td>
<td>N</td>
<td>S0</td>
<td>ST</td>
<td>1988: No general description given</td>
<td>1991/07/05: J.A. Hovis, GFC, no terns or nests observed (U97GFC02FLUS). 1990/05/24: J.A. Hovis, GFC, no nesting activity observed (U97GFC02FLUS). 1988: nesting began on 24 May and ended on 26 July; 40 nests observed (U97GFC02FLUS). 1987/05/08: T.E. O'Mea</td>
</tr>
<tr>
<td>UPLAFORE*125</td>
<td>Upland hardwood forest</td>
<td></td>
<td>G5</td>
<td>S3</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>2004: Transition from scrub uplands to cypress/red maple floodplain. Water seeps from base of slope at several points</td>
<td>2010: Prior to the 2010 natural community reclassification effort this EO had been known as Slope forest EO number 1 (see U10FLASO1FLUS for updated community descriptions). 2004: Update to last obs date was based on interpretation of aerial photography (p</td>
</tr>
</tbody>
</table>
Spruce Creek
Volusia County

Purpose for State Acquisition
Natural areas along the coast of Volusia County are becoming scarce as residential developments expand from Daytona Beach and New Smyrna Beach. The Spruce Creek project protects one of the largest tracts of undeveloped land left in this region along the estuary of Spruce Creek and helps to maintain the water quality of the creeks and bays here, thus protecting a fishery. Additionally, this project will conserve what may be the site of Andrew Turnbull’s 18th–century plantation and provide a recreational area where people can do anything from hiking and fishing to simply learning about the plants and animals of this scenic landscape.

Manager
Volusia County.

General Description
The original Spruce Creek project area, north and west of Strickland Bay, contains good estuarine tidal swamps, hammocks, scrub, and flatwoods. It protects habitat for such endangered or threatened species as bald eagles, wood storks and manatees. The addition, between U.S. 1 and Turnbull Bay, contains good Maritime or Xeric Hammock, with live oaks, cabbage palms, and several tropical shrubs near their northern limits. Flatwoods also cover a large part of the addition, and tidal marsh with remnants of black mangrove fringes it. Disturbed areas include an historic house at the north end and the remains of a fish camp and marina east of U.S. 1. No FNAI-listed plants are known from the addition; of FNAI-listed animals, gopher tortoises have been found. The area is adjacent to several Outstanding Florida Waters, and the aquatic resources are important to both recreational and commercial fisheries. There are two archaeological sites recorded within the project area: Spruce Creek Mound site, a prehistoric and historic burial mound; and J. D. site, a prehistoric and historic shell midden and burial site. The project may also contain historic archaeological sites related to the British Colonial Period occupation in this area of NE Florida (ca. 1763–1783 AD). The area is experiencing significant growth, so developable acreage is likely to be lost relatively soon.

Public Use
This project is designated as a recreation area with uses such as cultural and environmental education, hiking, fishing, camping and picnicking.

Acquisition Planning
On December 1, 1989, the Land Acquisition Advisory Council (LAAC) added the original Spruce Creek project to the CARL Priority list. This fee-simple acquisition, sponsored by Volusia County, consisted of approximately 1,718 acres, nine owners, and a 1989 taxable value of $2,675,000. On December 7, 1990, an owner sponsored 54-acre parcel was added to the boundary. The project was removed on December 10, 1992 due to unwilling sellers. At that time, it was less than 90% complete.

On December 6, 1994, LAAC added the current Spruce Creek project to the 1995 CARL Priority list. This

<table>
<thead>
<tr>
<th>Spruce Creek</th>
</tr>
</thead>
<tbody>
<tr>
<td>FNAI Elements</td>
</tr>
<tr>
<td>Florida Scrub-jay</td>
</tr>
<tr>
<td>Gopher Tortoise</td>
</tr>
<tr>
<td>Florida Beargrass</td>
</tr>
<tr>
<td>Bald Eagle</td>
</tr>
</tbody>
</table>

4 rare species are associated with the project

| Placed on List | 1990* |
| Project Area (Acres) | 2,831 |
| Acres Acquired | 2,289** |
| at a Cost of | $19,118,050** |
| Acres Remaining | 542 |

with Estimated (Tax Assessed) Value of $10,068,445

* Combined with Spruce Creek Addition in 1994
**Includes funds spent and acreage acquired by BOT, SJRWMD, Volusia County, and the City of Port Orange.
Note: 97 acres removed 10/26/09 due to residential/commercial/infrastructure development.
Spruce Creek

fee-simple acquisition, sponsored by Volusia County, consisted of a 208-acre portion of the original project and a 316-acre addition totaling 524 acres, multiple owners, and a 1993 taxable value of $2,124,141. The project boundary, however, included the portions of the project that had already been acquired. The resulting project acreage equaled 1,593 acres with a taxable value of $3,406,991.

On October 24, 2002, the Acquisition & Restoration Council (ARC) approved a fee-simple 648-acre addition to the project boundary. It was sponsored by Volusia County, consisted of five owners, and a 2002 taxable value of $1,297,592.

On October 10, 2006, the St. Johns River Water Management District (SJRWMD), in partnership with Volusia County, closed on a 40-acre parcel known as the Eubank/Rosier tract. The total purchase price was $915,535.

In August 2007, Volusia County acquired 7.08 acres from the Blanchette family.

In December 2007, the City of Port Orange acquired 225 acres on the western boundary from ICI.

On September 19, 2008, the SJRWMD acquired 58.02 acres from the Ford family.

On October 9, 2009, ARC voted to remove 6 sites with 54 individual parcels (97 acres) containing residential and commercial buildings or infrastructure. The total acreage has a just tax-assessed value of $9,166,381.

Coordination

Volusia County is a partner in the acquisition of this project as well as the manager. SJRWMD and City of Port Orange are acquisition partners also.

Management Policy Statement

The primary goals of management of the Spruce Creek project are to conserve, protect, manage, or restore important ecosystems, landscapes, and forests, in order to enhance or protect significant surface water, coastal, recreational, timber, fish or wildlife resources which local or state regulatory programs cannot adequately protect; to provide areas, including recreational trails, for natural-resource-based recreation; and to preserve significant archaeological or historical sites.

Management Prospectus

Qualifications for state designation The Spruce Creek Recreation Area has the size, natural, cultural, and recreational resources, and surrounding population density to qualify as a State Recreation Area.

Manager Volusia County in cooperation with the State of Florida.

Conditions affecting intensity of management The project includes moderate-need tracts requiring more than basic resource management and protection. These lands will contain more highly developed resource-related recreation facilities. Large portions of the property, however, would be considered low-need tracts requiring only basic resource management and protection. Recreation use will be incorporated but in a more dispersed and less intensive manner.

Timetable for implementing management and provisions for security and protection of infrastructure Within the first year after acquisition, management activities will concentrate on site security and resource inventory. Volusia County will provide appropriate access to the site to maintain existing and historic uses while protecting sensitive resources on the site. The site’s natural resources and listed plants and animals will be inventoried, recreational opportunities and uses identified, and a management plan formulated.

Long-range plans for Spruce Creek will be specified in the management plan and will generally be directed as follows: Development of recreational facilities, a comprehensive trail management program, a comprehensive educational and interpretive program, and a comprehensive historic resource management program; restoration of disturbed areas; maintenance of natural communities through a program of selected harvest and fire management; and habitat enhancement for listed species.

Revenue-generating potential will be determined by the concepts in the Management Plan. Some revenues will probably be generated by user and concession fees at recreation sites. Some revenues may be generated through sale of forest products, but any such revenues will be minimal. Use of small portions of the area as mitigation for development elsewhere would not only restore damaged areas on-site, but would yield revenue as well. It will be several years before potential revenue sources could be fully developed.

Cooperators in management activities Port Orange and New Smyrna Beach both will be involved in the planning of the project.
The Museum of Arts and Sciences and the Atlantic Center for the Arts may prove to be valuable partners in optimizing the educational and interpretive opportunities on this site. The Nature Conservancy still owns the 150 acres that is managed by the Museum of Arts and Sciences. The Environmental Council and Sierra Club have played important roles in the early protection of the creek including sponsoring OFW status in 1986. The Southeast Volusia Historical Society and Volusia Anthropological Society have had long-standing interest in protection and interpretation of the cultural, historical and archaeological resources located on the project site. Volunteers will be invaluable in developing, managing, and interpreting this site.

<table>
<thead>
<tr>
<th>Management Cost Summary</th>
<th>1996/97 Volusia County</th>
<th>1997/98 Volusia County</th>
<th>1998/99 Volusia County</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salary</td>
<td>$6,240</td>
<td>$6,240</td>
<td>$6,240</td>
</tr>
<tr>
<td>OPS</td>
<td>$0</td>
<td>$0</td>
<td>$7,712</td>
</tr>
<tr>
<td>Expense</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>OCO</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>FCO</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>$6,240</td>
<td>$6,240</td>
<td>$13,952</td>
</tr>
</tbody>
</table>
APPENDIX F:

List of Plant Species Observed by Local Florida Native Plant Society Chapter
<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>FAMILY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Acer rubrum</td>
<td>red maple</td>
<td>ACERACEAE</td>
</tr>
<tr>
<td>2 Ampelopsis arborea</td>
<td>pepper vine</td>
<td>VITACEAE</td>
</tr>
<tr>
<td>3 Andropogon glomeratus var. glaucopsis</td>
<td>Purple bluestem</td>
<td>POACEAE</td>
</tr>
<tr>
<td>4 Andropogon spp</td>
<td>Broomsedge</td>
<td>POACEAE</td>
</tr>
<tr>
<td>5 Aristida beyrichiana</td>
<td>wiregrass</td>
<td>POACEAE</td>
</tr>
<tr>
<td>6 Aristida spiciformis</td>
<td>bottlebrush threeawn</td>
<td>POACEAE</td>
</tr>
<tr>
<td>7 Armglossum floridanum</td>
<td>Indian Plantain</td>
<td>ASTERACEAE</td>
</tr>
<tr>
<td>8 Asimina incana</td>
<td>WOOLLY PAWPAW; POLECAT BUSH</td>
<td>ANNONACEAE</td>
</tr>
<tr>
<td>9 Asimina obovata</td>
<td>Flag Pawpaw</td>
<td>ANNONACEAE</td>
</tr>
<tr>
<td>10 Asimina parviflora</td>
<td>Small Fruited (Flowered) Pawpaw</td>
<td>ANNONACEAE</td>
</tr>
<tr>
<td>11 Asimina pygmea</td>
<td>DWARF PAWPAW</td>
<td>ANNONACEAE</td>
</tr>
<tr>
<td>12 Asimina spp.</td>
<td>pawpaw</td>
<td>ANNONACEAE</td>
</tr>
<tr>
<td>13 Asparagus aethiopicus</td>
<td>asparagus fern*</td>
<td>ASPARAGACEAE</td>
</tr>
<tr>
<td>14 Avicennia germinans</td>
<td>black mangrove</td>
<td>AVICENNIACEAE</td>
</tr>
<tr>
<td>15 Baccharis angustifolius</td>
<td>saltbrush</td>
<td>ASTERACEAE</td>
</tr>
<tr>
<td>16 Baccharis halimifolia</td>
<td>saltbush</td>
<td>ASTERACEAE</td>
</tr>
<tr>
<td>17 Bacopa monnieri</td>
<td>herb-of-grace</td>
<td>PLANTAGINACEAE</td>
</tr>
<tr>
<td>18 Batis maritima</td>
<td>saltwort</td>
<td>BATAEAE</td>
</tr>
<tr>
<td>19 Bejaria racemosa</td>
<td>tarflower</td>
<td>ERICACEAE</td>
</tr>
<tr>
<td>20 Blechnum serrulatum</td>
<td>swamp fern</td>
<td>BLECHNACEAE</td>
</tr>
<tr>
<td>21 Boehmeria cylindrica</td>
<td>false nettle</td>
<td>URTICACEAE</td>
</tr>
<tr>
<td>22 Borrichia frutescens</td>
<td>sea ox-eye</td>
<td>ASTERACEAE</td>
</tr>
<tr>
<td>23 Callicarpa americana</td>
<td>Beautyberry</td>
<td>LAMIACEAE</td>
</tr>
<tr>
<td>24 Carthamus corymbosus</td>
<td>COASTALPLAIN CHAFFHEAD; FLORIDA</td>
<td>ASTERACEAE</td>
</tr>
<tr>
<td>25 Carphophorus odoratissimus</td>
<td>PAINTBRUSH</td>
<td>ASTERACEAE</td>
</tr>
<tr>
<td>26 Carya floridana</td>
<td>Florida (Scrub) Hickory</td>
<td>JUGLANDACEAE</td>
</tr>
<tr>
<td>27 Carya glabra</td>
<td>Pignut Hickory</td>
<td>JUGLANDACEAE</td>
</tr>
<tr>
<td>28 Casuarina equisetifolia</td>
<td>Australian pine</td>
<td>CASUARINACEAE</td>
</tr>
<tr>
<td>29 Celtis laevigata</td>
<td>hackberry; sugarberry</td>
<td>CELTIDACEAE</td>
</tr>
<tr>
<td>30 Centella asiatica</td>
<td>coiwort</td>
<td>ARALIACEAE</td>
</tr>
<tr>
<td>31 Cinnamomum camphora</td>
<td>CAMPHORTREE</td>
<td>LAURACEAE</td>
</tr>
<tr>
<td>32 Cladonia</td>
<td>deer moss</td>
<td>FABACEAE</td>
</tr>
<tr>
<td>33 Clitoria mariana</td>
<td>Butterfly Pea</td>
<td>ASTERACEAE</td>
</tr>
<tr>
<td>34 Coreopsis laevenworthii</td>
<td>Leavenworth's tickseed</td>
<td>CORNACEAE</td>
</tr>
<tr>
<td>35 Cornus foemina</td>
<td>swamp dogwood</td>
<td>CYPERACEAE</td>
</tr>
<tr>
<td>36 Cyperus spp</td>
<td>flatsedge</td>
<td>POACEAE</td>
</tr>
<tr>
<td>37 Dichanthelium ensifolium</td>
<td>witchgrass</td>
<td>POACEAE</td>
</tr>
<tr>
<td>38 Dichanthelium spp.</td>
<td>witchgrass</td>
<td>POACEAE</td>
</tr>
<tr>
<td>39 Diospyros virginiana</td>
<td>POOR JOE; ROUGH BUTTONWEED</td>
<td>RUBIACEAE</td>
</tr>
<tr>
<td>40 Diospyros virginiana</td>
<td>persimmon</td>
<td>EBENACEAE</td>
</tr>
<tr>
<td>41 Distichlis spicata</td>
<td>seashore saltgrass</td>
<td>POACEAE</td>
</tr>
<tr>
<td>42 Eleocharis spp.</td>
<td>spike rush</td>
<td>CYPERACEAE</td>
</tr>
<tr>
<td>43 Epidendrum conopseum</td>
<td>Green Fly Orchid</td>
<td>Epidendrum</td>
</tr>
<tr>
<td>44 Erechtites hieracifolius</td>
<td>FIREWEED</td>
<td>ASTERACEAE</td>
</tr>
<tr>
<td>45 Erianthus giganteus</td>
<td>giant plume grass</td>
<td>POACEAE</td>
</tr>
<tr>
<td>46 Erigeron venus</td>
<td>daisy fleabane</td>
<td>ASTERACEAE</td>
</tr>
<tr>
<td>47 Erythrina herbacea</td>
<td>Coralbean</td>
<td>FABACEAE</td>
</tr>
<tr>
<td>48 Eupatorium capillifolium</td>
<td>dogfennel</td>
<td>ASTERACEAE</td>
</tr>
</tbody>
</table>

* Denotes exotic species
<table>
<thead>
<tr>
<th>Plant List</th>
</tr>
</thead>
<tbody>
<tr>
<td>49 Eupatorium rotundifolium</td>
</tr>
<tr>
<td>50 Eustachys glauca</td>
</tr>
<tr>
<td>51 Euthamia caroliniana</td>
</tr>
<tr>
<td>52 Fuirena scirpoida</td>
</tr>
<tr>
<td>53 Galactia elliotti</td>
</tr>
<tr>
<td>54 Gaylusaccia tomentosa</td>
</tr>
<tr>
<td>55 Gelsemium sempervirens</td>
</tr>
<tr>
<td>56 Gratiola hispida</td>
</tr>
<tr>
<td>57 Gratiola ramosa</td>
</tr>
<tr>
<td>58 Helianthemum corvibosum</td>
</tr>
<tr>
<td>59 Heliotropium curassavicum</td>
</tr>
<tr>
<td>60 Hypericum cistifolium</td>
</tr>
<tr>
<td>61 Hypericum fasciculatum</td>
</tr>
<tr>
<td>62 Hypericum hypericoides</td>
</tr>
<tr>
<td>63 Hypericum reductum</td>
</tr>
<tr>
<td>64 Hypericum tetrapteratum</td>
</tr>
<tr>
<td>65 ilex cassinis</td>
</tr>
<tr>
<td>66 ilex decidua</td>
</tr>
<tr>
<td>67 ilex glabra</td>
</tr>
<tr>
<td>68 ilex opaca</td>
</tr>
<tr>
<td>69 ilex vomitoria</td>
</tr>
<tr>
<td>70 Ipomoea spp.</td>
</tr>
<tr>
<td>71 Iva frutecens</td>
</tr>
<tr>
<td>72 Juncus effusus</td>
</tr>
<tr>
<td>73 Juncus marginatus</td>
</tr>
<tr>
<td>74 Juncus roemerianus</td>
</tr>
<tr>
<td>75 Juniperus virginiana</td>
</tr>
<tr>
<td>76 Lachnanthes carolina</td>
</tr>
<tr>
<td>77 Lechea cf. divaricata</td>
</tr>
<tr>
<td>78 Limonium carolinianum</td>
</tr>
<tr>
<td>79 Liquidambar styraciflua</td>
</tr>
<tr>
<td>80 Ludwigia peruviensis</td>
</tr>
<tr>
<td>81 Ludwigia repens</td>
</tr>
<tr>
<td>82 Lycium carolinianum</td>
</tr>
<tr>
<td>83 Lyonia ferruginea</td>
</tr>
<tr>
<td>84 Lyonia fruticosa</td>
</tr>
<tr>
<td>85 Lyonia lucida</td>
</tr>
<tr>
<td>86 Macroptilium lathyroides*</td>
</tr>
<tr>
<td>87 Magnolia grandiflora</td>
</tr>
<tr>
<td>88 Mikania scandens</td>
</tr>
<tr>
<td>89 Monanthochloe keyensis</td>
</tr>
<tr>
<td>90 Monotropa uniflora</td>
</tr>
<tr>
<td>91 Myrica cerifera</td>
</tr>
<tr>
<td>92 Osmanthus megacarpa</td>
</tr>
<tr>
<td>93 Panicum virgatum</td>
</tr>
<tr>
<td>94 Parthenocissus quinquefolia</td>
</tr>
<tr>
<td>95 Paspalum notatum</td>
</tr>
<tr>
<td>96 Paspalum urvillei*</td>
</tr>
<tr>
<td>97 Passiflora incarnata</td>
</tr>
<tr>
<td>98 Persea borbonia</td>
</tr>
<tr>
<td>99 Persea humilis</td>
</tr>
</tbody>
</table>

* Denotes exotic species

F - 3
## Doris Leeper Spruce Creek Preserve

### Plant List

<table>
<thead>
<tr>
<th>Plant Name</th>
<th>Common Name</th>
<th>Family</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Persea palustris</em></td>
<td>swamp bay</td>
<td>LAURACEAE</td>
</tr>
<tr>
<td><em>Phlebodium aureum</em></td>
<td>goldfoot fern</td>
<td>POLYPODIACEAE</td>
</tr>
<tr>
<td><em>Photinia pyrifolia</em></td>
<td>choke cherry</td>
<td>ROSACEAE</td>
</tr>
<tr>
<td><em>Phyla nodiflora</em></td>
<td>Frogfruit</td>
<td>VERBENACEAE</td>
</tr>
<tr>
<td><em>Physalis sp.</em></td>
<td>GROUNDCHERRY</td>
<td>SOLANACEAE</td>
</tr>
<tr>
<td><em>Pinguicula caerulea</em></td>
<td>BLUEFLOWER BUTTERWORT</td>
<td>LENTIBULARIACEAE</td>
</tr>
<tr>
<td><em>Pinus clausa</em></td>
<td>Sand Pine</td>
<td>PINACEAE</td>
</tr>
<tr>
<td><em>Pinus elliottii</em></td>
<td>slash pine</td>
<td>PINACEAE</td>
</tr>
<tr>
<td><em>Pinus serotina</em></td>
<td>pond pine</td>
<td>PINACEAE</td>
</tr>
<tr>
<td><em>Pinus taeda</em></td>
<td>loblolly pine</td>
<td>PINACEAE</td>
</tr>
<tr>
<td><em>Pleopelta polypodoides var. michauxiana</em></td>
<td>Resurrection Fern</td>
<td>POLYPODIACEAE</td>
</tr>
<tr>
<td><em>Pluchea spp.</em></td>
<td>camphorweed</td>
<td>ASTERACEAE</td>
</tr>
<tr>
<td><em>Polygala lutea</em></td>
<td>orange milkwort</td>
<td>POLYGALACEAE</td>
</tr>
<tr>
<td><em>Polygonum sp.</em></td>
<td>smartweed</td>
<td>POLYGONACEAE</td>
</tr>
<tr>
<td><em>Proserpinaca pectinata</em></td>
<td>mermaidweed</td>
<td>HALORAGACEAE</td>
</tr>
<tr>
<td><em>Prunus caroliniana</em></td>
<td>Carolina Cherrylaurie</td>
<td>ROSACEAE</td>
</tr>
<tr>
<td><em>Prunus serotina</em></td>
<td>Black Cherry</td>
<td>ROSACEAE</td>
</tr>
<tr>
<td><em>Pteridium aquilinum</em></td>
<td>Bracken</td>
<td>DENVSTAEDTIACEAE</td>
</tr>
<tr>
<td><em>Pteridium aquilinum var. latifolium</em></td>
<td>bracken fern</td>
<td>DENVSTAEDTIACEAE</td>
</tr>
<tr>
<td><em>Pterocaulum virgatum</em></td>
<td>blackroot, rabbit tobacco</td>
<td>ASTERACEAE</td>
</tr>
<tr>
<td><em>Ptilium capillaceum</em></td>
<td>mock bishop weed</td>
<td>APIACEAE</td>
</tr>
<tr>
<td><em>Quercus chapmanii</em></td>
<td>Chapman's Oak</td>
<td>FAGACEAE</td>
</tr>
<tr>
<td><em>Quercus geminata</em></td>
<td>sand live oak</td>
<td>FAGACEAE</td>
</tr>
<tr>
<td><em>Quercus laurifolia</em></td>
<td>Laurel Oak</td>
<td>FAGACEAE</td>
</tr>
<tr>
<td><em>Quercus minima</em></td>
<td>DWARF LIVE OAK</td>
<td>FAGACEAE</td>
</tr>
<tr>
<td><em>Quercus myrtifolia</em></td>
<td>Myrtle Oak</td>
<td>FAGACEAE</td>
</tr>
<tr>
<td><em>Quercus virginiana</em></td>
<td>live oak</td>
<td>FAGACEAE</td>
</tr>
<tr>
<td><em>Rhexia lutea</em></td>
<td>yellow meadowbeauty</td>
<td>MELASTOMATACEAE</td>
</tr>
<tr>
<td><em>Rhus copallina</em></td>
<td>Winged Sumac</td>
<td>ANACARDIACEAE</td>
</tr>
<tr>
<td><em>Rhychnospora latifolia</em></td>
<td>star rush</td>
<td>CYPERACEAE</td>
</tr>
<tr>
<td><em>Rhychnospora megalocarpa</em></td>
<td>Big Nut Sedge</td>
<td>CYPERACEAE</td>
</tr>
<tr>
<td><em>Rhychnospora spp.</em></td>
<td>beaksedge</td>
<td>CYPERACEAE</td>
</tr>
<tr>
<td><em>Rubus argutus</em></td>
<td>BLACKBERRY</td>
<td>ROSACEAE</td>
</tr>
<tr>
<td><em>Rubus trivialis</em></td>
<td>dewberry</td>
<td>ROSACEAE</td>
</tr>
<tr>
<td><em>Sabal etonia</em></td>
<td>Sabal Minor</td>
<td>ARECACEAE</td>
</tr>
<tr>
<td><em>Sabal palmetto</em></td>
<td>Sabal Palm</td>
<td>ARECACEAE</td>
</tr>
<tr>
<td><em>Sabatia grandiflora</em></td>
<td>rosegentian</td>
<td>GENTIANACEAE</td>
</tr>
<tr>
<td><em>Sagittaria lancifolia</em></td>
<td>arrowhead</td>
<td>ALISMATACEAE</td>
</tr>
<tr>
<td><em>Salicornia bigelovii</em></td>
<td>annual glasswort</td>
<td>AMARANTHACEAE</td>
</tr>
<tr>
<td><em>Salix caroliniana</em></td>
<td>Carolina willow</td>
<td>SALICACEAE</td>
</tr>
<tr>
<td><em>Sambucus canadensis</em></td>
<td>elderberry</td>
<td>ADOXACEAE</td>
</tr>
<tr>
<td><em>Samolus ebracteatus</em></td>
<td>water pimpernel - ebract</td>
<td>SAMOLACEAE</td>
</tr>
<tr>
<td><em>Sapindus marginatus</em></td>
<td>Florida Soapberry</td>
<td>SAPINDACEAE</td>
</tr>
<tr>
<td><em>Sapum sibereum</em></td>
<td>Chinese tallow*</td>
<td>EUPHORBIACEAE</td>
</tr>
<tr>
<td><em>Sarcocornia ambigua</em></td>
<td>swampfire (perrennial glasswort)</td>
<td>AMARANTHACEAE</td>
</tr>
<tr>
<td><em>Saururus cernuus</em></td>
<td>LIZARD'S TAIL</td>
<td>SAURURACEAE</td>
</tr>
<tr>
<td><em>Schinus terebinthifolius</em></td>
<td>Brazilian pepper</td>
<td>ANACARDIACEAE</td>
</tr>
<tr>
<td><em>Schinus terebinthifolius</em></td>
<td>Brazilian pepper*</td>
<td>ANACARDIACEAE</td>
</tr>
<tr>
<td><em>Scirpus sp.</em></td>
<td>bulrush</td>
<td>CYPERACEAE</td>
</tr>
<tr>
<td><em>Scleria spp.</em></td>
<td>white nut sedge</td>
<td>CYPERACEAE</td>
</tr>
</tbody>
</table>

* Denotes exotic species
<table>
<thead>
<tr>
<th>Plant Name</th>
<th>Common Name</th>
<th>Family</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scoparia dulcis</td>
<td>sweetbroom</td>
<td>PLANTAGINACEAE</td>
</tr>
<tr>
<td>Scutellaria integrifolia</td>
<td>skullcaps</td>
<td>LAMIACEAE</td>
</tr>
<tr>
<td>Seranoa repens</td>
<td>Saw Palmetto</td>
<td>ARECACEAE</td>
</tr>
<tr>
<td>Sesuvium portulacastrum</td>
<td>sea purslane</td>
<td>AIZOACEAE</td>
</tr>
<tr>
<td>Setaria parviflora</td>
<td>foxtail</td>
<td>POACEAE</td>
</tr>
<tr>
<td>Sisyrinchium angustifolium</td>
<td>NARROWLEAF BLUE-EYED GRASS</td>
<td>IRIDACEAE</td>
</tr>
<tr>
<td>Smilax auriculata</td>
<td>ear-leaved smilax</td>
<td>SMILACACEAE</td>
</tr>
<tr>
<td>Smilax glauca</td>
<td>greenbrier</td>
<td>SMILACACEAE</td>
</tr>
<tr>
<td>Smilax pumila</td>
<td>Sarsaparilla (vine)</td>
<td>SMILACACEAE</td>
</tr>
<tr>
<td>Smilax spp</td>
<td>Smilax (vine)</td>
<td>SMILACACEAE</td>
</tr>
<tr>
<td>Solidago sempervirens</td>
<td>seaside goldenrod</td>
<td>ASTERACEAE</td>
</tr>
<tr>
<td>Solidago spp</td>
<td>Goldenrod</td>
<td>ASTERACEAE</td>
</tr>
<tr>
<td>Solidago spp.</td>
<td>goldenrod</td>
<td>ASTERACEAE</td>
</tr>
<tr>
<td>Solidago spp.</td>
<td>goldenrod</td>
<td>ASTERACEAE</td>
</tr>
<tr>
<td>Spartina alterniflora</td>
<td>smooth cordgrass</td>
<td>POACEAE</td>
</tr>
<tr>
<td>Spartina bakeri</td>
<td>cordgrass</td>
<td>POACEAE</td>
</tr>
<tr>
<td>Sphagnum</td>
<td>sphagnum moss</td>
<td>POACEAE</td>
</tr>
<tr>
<td>Sporobolus virginicus</td>
<td>coastal dropseed</td>
<td>AMARANTHACEAE</td>
</tr>
<tr>
<td>Suadaea linearis</td>
<td>sea bine</td>
<td>ASTERACEAE</td>
</tr>
<tr>
<td>Symphyotrichum tenuifolium</td>
<td>perennial saltmarsh astor</td>
<td>ERIOCAULACEAE</td>
</tr>
<tr>
<td>Tanacetum flavidulum</td>
<td>YELLOW HATPINS</td>
<td>BROMELIACEAE</td>
</tr>
<tr>
<td>Tillandsia recurvata</td>
<td>ballmoss</td>
<td>BROMELIACEAE</td>
</tr>
<tr>
<td>Tillandsia usneoides</td>
<td>Spanish moss</td>
<td>BROMELIACEAE</td>
</tr>
<tr>
<td>Toxicodendron radicans</td>
<td>poison ivy</td>
<td>ANACARDIACEAE</td>
</tr>
<tr>
<td>Typha latifolia</td>
<td>cattail</td>
<td>TYPHACEAE</td>
</tr>
<tr>
<td>Ulmus americana</td>
<td>elm</td>
<td>ULMACEAE</td>
</tr>
<tr>
<td>Urena lobata</td>
<td>Caesar’s weed*</td>
<td>MALVACEAE</td>
</tr>
<tr>
<td>Utricularia sp.</td>
<td>bladderwort</td>
<td>LENTIBULARIACEAE</td>
</tr>
<tr>
<td>Vaccinium arboreum</td>
<td>Sparkleberry</td>
<td>ERICACEAE</td>
</tr>
<tr>
<td>Vaccinium myrsinites</td>
<td>shiny blueberry</td>
<td>ERICACEAE</td>
</tr>
<tr>
<td>Vaccinium myrsinites</td>
<td>shiny blueberry</td>
<td>ERICACEAE</td>
</tr>
<tr>
<td>Vaccinium stamineum</td>
<td>Shiny Blueberry</td>
<td>ERICACEAE</td>
</tr>
<tr>
<td>Vaccinium stamineum</td>
<td>Deerberry</td>
<td>ERICACEAE</td>
</tr>
<tr>
<td>Vaccinium stamineum</td>
<td>deerberry</td>
<td>ERICACEAE</td>
</tr>
<tr>
<td>Vicia acutifolia</td>
<td>narrowleaf</td>
<td>FABACEAE</td>
</tr>
<tr>
<td>Vigna luteola</td>
<td>cow pea</td>
<td>FABACEAE</td>
</tr>
<tr>
<td>Vitis rotundifolia</td>
<td>muscadine grape vine</td>
<td>VITACEAE</td>
</tr>
<tr>
<td>Vitis spp</td>
<td>Grape (vine)</td>
<td>VITACEAE</td>
</tr>
<tr>
<td>Vittaria lineata</td>
<td>shoestring fern</td>
<td>VITTARIACEAE</td>
</tr>
<tr>
<td>Woodwardia virginica</td>
<td>Virginia chain fern</td>
<td>BLECHNACEAE</td>
</tr>
<tr>
<td>Ximenia americana</td>
<td>Hog Plum (Deer Apple/Tallow Wood)</td>
<td>XIMENIACEAE</td>
</tr>
<tr>
<td>Xyris eliotii</td>
<td>yellow-eyed grass</td>
<td>XYRIDACEAE</td>
</tr>
<tr>
<td>Zamia pumila</td>
<td>Coontie</td>
<td>ZAMIACEAE</td>
</tr>
<tr>
<td>Deermoss</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Old Man’s Beard Lichen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Red Blanket Lichen</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Denotes exotic species
APPENDIX G:

Scrub-Jay Survey
Florida Scrub-Jay Survey Report

Doris Leeper Spruce Creek Preserve
Volusia County, Florida

ZC # 10041

October 25, 2010

Prepared By:
Zev Cohen & Associates
Attention: Jody N. Sisk
4475 US 1 South, Suite 601
St. Augustine, FL 32086

Prepared For:
Volusia County Growth and Resource Department
Division of Land Acquisition and Management
Attention: Randy Sleister
123 West Indiana Ave., Room 201
DeLand, FL 32720

Submitted To:
U.S. Fish and Wildlife Service
North Florida Field Office
Attn: Erin Gawera
7915 Baymeadows Way, Suite 200
Jacksonville, FL 32256-7517
# Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0 INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>2.0 BACKGROUND INFORMATION</td>
<td>1</td>
</tr>
<tr>
<td>3.0 METHODS</td>
<td>2</td>
</tr>
<tr>
<td>3.1 Background Research</td>
<td>2</td>
</tr>
<tr>
<td>3.2 Habitat Evaluation</td>
<td>2</td>
</tr>
<tr>
<td>3.3 Scrub-Jay Field Survey</td>
<td>2</td>
</tr>
<tr>
<td>4.0 RESULTS</td>
<td>3</td>
</tr>
<tr>
<td>4.1 Background Research</td>
<td>3</td>
</tr>
<tr>
<td>4.2 Habitat Descriptions</td>
<td>3</td>
</tr>
<tr>
<td>4.3 Field Survey</td>
<td>11</td>
</tr>
<tr>
<td>5.0 DISCUSSION</td>
<td>11</td>
</tr>
<tr>
<td>6.0 CONCLUSION</td>
<td>11</td>
</tr>
<tr>
<td>TECHNICAL LITERATURE REFERENCES</td>
<td>13</td>
</tr>
</tbody>
</table>
Appendices

Appendix A – Figures
- Aerial Map
- Quadrangle Map
- Soils Map
- Habitat Map
- Scrub-Jay Survey Location Map
- Florida Scrub-Jay Family Map

Appendix B – Species
- Wildlife Species Observed List
1.0 INTRODUCTION

Zev Cohen and Associates, Inc. (ZCA) was contracted by the Volusia County Growth and Resource Department, Land Acquisition and Management Division, to survey the Doris Leeper Spruce Creek Preserve property (hereafter referred to as the Preserve) for the presence of Florida scrub-jays (Aphelocoma coerulescens coerulescens). The Preserve is located along the Spruce Creek from US 1 to I-95 in Volusia County, Florida, within Sections 25, 26, 35, 36, Township 16S, Range 33E. The Preserve consists of approximately 2000 acres of a variety of natural communities (See attached Aerial Map and Quadrangle Map for details). The goal of this survey was to identify the presence/absence of the Florida scrub-jay within the Preserve. The results of this survey will provide Volusia County with a detailed description of the natural communities within the Preserve and provide recommendations for land management techniques which would enhance the communities to provide suitable habitat for the Florida scrub-jay.

2.0 BACKGROUND INFORMATION

The Florida scrub-jay is listed as Threatened by the U.S. Fish and Wildlife Service (USFWS) and the Florida Fish and Wildlife Conservation Commission (FWC), pursuant to the Federal Endangered Species Act (50 C.F.R. 17.11) and the Florida Administrative Code (Chapter 39-27.002, F.A.C.), respectively. The most significant difference between these regulations is that the ESA specifically protects the loss of habitat and not just the loss of the species. The ESA protects scrub-jays from being “killed, harassed, taken”, etc. either directly or indirectly. A direct taking would include destroying a nest with young in the nest or the killing of an adult. An indirect or incidental taking would involve the development of occupied habitat leading to habitat destruction, even if the birds were not directly harmed. The habitat loss prevents the birds from using the site for portions of their life cycle and eventually leads to their destruction. Generally, the Florida Administrative Code only protects the species from a direct taking.

Scrub-jays inhabit oak scrub communities with nearby open sandy areas. Scrub-jays typically nest in dense scrub oak pockets. Dense scrub oak sub-canopies provide protection from predatory raptors and domestic cats. This protection is critical to the survival of scrub-jays, which are brightly colored birds with poor evasive flying abilities. Typically, scrub-jays stay relatively close to or on the ground. Scrub-jays generally hop along the ground and between dense shrubby vegetation while foraging. The primary vegetative source of food for the Florida scrub-jay is acorns, however scrub-jays are known to eat certain insect larvae. The proximity of open sandy areas for acorn caching is critical to the species, as the individuals are vulnerable to predation for shorter periods of time when the caching areas are closer to dense protective vegetation. Areas of dense oak and pine canopy cover and areas of extensive saw palmetto are of limited suitability to scrub-jays.
Scrub-jays exemplify cooperative breeding, which means offspring from previous nesting cycles remain to help the parental adults raise future offspring. Scrub-jay families typically consist of an adult pair, plus 1-10 adult and juvenile helpers. The presence of 1 or 2 helpers per adult pair is typical, thus typical family size is three to four individuals.

3.0 METHODS

3.1 Background Research

A background literature search was conducted to determine if scrub-jays have been documented on the Preserve or in the vicinity. Where available, distribution and observation data were reviewed from the following sources: the Florida Natural Areas Inventory (FNAI), the Florida Committee on Rare and Endangered Plants and Animals (FCREPA) publications, the FWC, the USFWS, Florida Audubon Society and through consulting other published reference materials such as Cox (1987). In addition, ZCA’s Florida Scrub-Jay Database (a Zev Cohen proprietary database comprised of data acquired from several agencies, direct observations, and scientific journals) was reviewed to obtain location data recorded by others.

3.2 Habitat Evaluation

An inventory of the wildlife habitat found within the Preserve was made, and a Habitat Map was produced using the Florida Natural Areas Inventory Guide to the Natural Communities of Florida: 2010 Edition. Notes and observations for each habitat type were recorded by dominant species for each vegetative stratum. Additionally, the site was evaluated for the type of scrub-jay habitat (Type I, Type II, or Type III Habitat). Type I, II, and III habitats are varying degrees of suitable scrub-jay habitat as described in Fitzpatrick et. al., (1991):

- Type I Habitat – Any upland plant community in which percent cover of the substrate by scrub oak species is 15% or more.
- Type II Habitat – Any plant community not meeting the definition of Type I habitat, in which one or more scrub oak species is represented [the presence of any amount of scrub oak is the key indicator].
- Type III Habitat – Any upland or seasonally dry wetland within ¼ mile of any area designated as Type I or Type II habitat.

3.3 Scrub-jay Field Survey

ZCA, along with Volusia County Environmental staff, surveyed the Preserve in accordance with the techniques outlined in Fitzpatrick et. al., (1991). The survey consisted of the playback of recorded scrub-jay vocalizations at stations that were located...
to provide broadcast coverage of the entire site as well as broadcasts off-site without trespassing on private land (see attached Scrub-Jay Survey Map). The location of each station was located using a hand-held GPS unit (Garmin eTrex Venture personal navigator). The recorded locations are accurate to within 3 meters. A portable compact disc player (Sony Atrac3plus Model No. ZS-XN3O) was used to broadcast recordings of scrub-jay scolding and territory advertisement calls. The audio track was excerpted from Keller (1997). Typically, when these calls are played in an occupied scrub-jay territory, the resident jays will respond to the playback with calls of their own and visual displays in an attempt to locate and challenge the perceived intruder. The surveys were started in the morning hours and documented in daily field notes. The CD was not played during any precipitation, or in the presence of observed predators. The vocalizations played were unobstructed by other loud noises as the major roadways in the area are buffered by the trees found within the Preserve.

The survey protocol also followed guidelines provided by the USFWS North Florida Field Office, in their document, *Scrub-Jay Survey Guidelines*, which was adapted from Fitzpatrick et al., (1991). The survey also incorporated the guidelines provided by the USFWS North Florida Field Office, in their document, *Florida Scrub-Jay Urban Survey Protocol*.

4.0 RESULTS

4.1 Background Research

Background research in the vicinity of the subject property revealed the potential presence of five (5) Florida scrub-jay populations/families, within a two mile radius. The potential areas include four (4) known families within one mile south of the western parcel and one (1) family directly south of the eastern most parcel (see Florida Scrub-Jay Family Map, attached). No Florida scrub-jays have been documented on the subject property. Please note that the data used for this map includes data from the original statewide surveys conducted in 1992 and 1993 (Fitzpatrick et al.). Many of the scrub-jay families represented potentially no longer occur in the area due to development and predation.

4.2 Habitat Descriptions

The following is a description of the cover type listed by its designated FNAI community (see attached Habitat Map). Included in the descriptions are land management recommendations which could return the habitats which have a high potential to occupy Florida scrub-jay families back to historical conditions.
Natural Communities:

Hardwood Forested Uplands

Mesic Hammock – Mesic hammocks are well developed hardwood and/or palm forests on rarely inundated soils. The canopy is typically closed and dominated by live oak (*Quercus virginiana*), cabbage palm (*Sabal palmetto*), southern magnolia (*Magnolia grandiflora*), and pignut hickory (*Carya glabra*). The mesic hammocks found at the Preserve are dominated by the canopy trees mentioned above and the canopy is closed. The understory consists of saw palmetto (*Serenoa repens*), American beautyberry (*Callicarpa americana*), gallberry (*Ilex glabra*), sparkleberry (*Vaccinium arboreum*), yaupon holly (*Ilex vomitoria*) and wax myrtle (*Myrica cerifera*).

Mesic hammocks are not considered fire-adapted communities. With that in mind the mesic hammocks found at the Preserve, as like many throughout central and northeast Florida, are very healthy and functioning superbly. The most common disturbance is logging, understory clearing, cattle grazing, and introduction of feral hogs. The disturbances mentioned above have not occurred at the Preserve.

High Pine and Scrub

Scrub (Type I Habitat) – Scrub is a community composed of evergreen shrubs, with or without a canopy of pines, and is found on dry, infertile, sandy ridges. Scrub is dominated by myrtle oak (*Quercus myrtifolia*), sand live oak (*Quercus geminate*), Chapman’s oak (*Quercus chapmanii*), sand pine (*Pinus clausa*), Florida rosemary (*Ceratiola ericoides*), rusty lyonia (*Lyonia ferruginea*), and saw palmetto. The oaks form a dense cover interspersed with patchy openings that consist of bare sand with a sparse cover of herbs, particularly threeawns (*Aristida* spp.), hairsedges (*Bulbostylis* spp.), sandyfield beaksedge (*Rhynchospora megalocarpa*), pinweeds (*Lechea* spp.), jointweeds (*Polygonella* spp.), and ground lichens (*Ladonia leporine, Cladonia prostrate, Cladina subtenuis, and Cladina evansii*).

Florida scrub is home to a multitude of rare animals. This includes the Florida scrub-jay, scrub lizard (*Sceloporus woodi*), gopher tortoise (*Gopherus polyphemus*), Florida mouse (*Podomys floridanus*), short-tailed snake (*Stilosoma extenuatum*), gopher frog (*Rana capito*), and many other species.

While scrub is a fire-maintained community, it is not easily ignited. Scrub is thought to have burned less frequently than communities with a more easily ignited grassy groundcover, such as sandhill or mesic flatwoods. Scrub oak dominated scrub, as found within the Preserve, likely burned naturally at intervals between 5 and 20 years based on the habitat requirements of the Florida scrub-jay. Oak height is a critical limiting factor.
for Florida scrub-jays which have been documented to abandon territories where the oaks reached >3 meters. A minimum of five years is based on the time required for re-sprouting oak stems to reach acorn-bearing height.

Growth rates of scrub oaks are related to burn history and environmental conditions onsite. Long unburned oak scrub, which comprises the Preserve, may attain heights unsuitable for scrub-jays up to 50 percent faster after fire than regularly burned oak scrub and thus may at first require shorter burn intervals to maintain optimum heights following restoration of burning. In addition, small openings, needed by Florida scrub-jays for caching acorns, may need to be artificially restored in long unburned scrub by piling up fuel to create hotspots that kill the roots of the oaks.

**Pine Flatwoods and Dry Prairie**

*Wet Flatwoods* – Wet flatwoods are pine forests with a sparse or absent midstory and a dense groundcover of hydrophytic grasses, herbs, and low shrubs. The canopy of the wet flatwoods within the Preserve consists of planted slash pine (*Pinus elliottii*). The subcanopy consists of loblolly bay (*Gordonia lasianthus*), swamp bay (*Persea palustris*), dahoon holly (*Ilex cassine*), and wax myrtle. The shrub layer is dominated by gallberry, shiny lyonia, and saw palmetto. The herbaceous layer consists primarily of wiregrass (*Aristida stricta*), blue maidencane (*Amphicarpum muhlenbergianum*), Carolina redroot (*Lachnanthes carolina*), beaksedges (*Rhynchospora* spp.), and maidencane (*Panicum hemitomon*). Due to this site being fire suppressed the shrub layer is more abundant compared to the herbs.

Wet flatwoods tend to have a longer fire interval than upland pine flatwoods in the order of 5 to 7 years. If the interval is too long, 7 to 10 years, it can lead to an increase in woody species cover and a decline in grasses and forb cover. Many factors other than frequency of fire, such as season of fire, pre- and post-fire soil moistures, groundwater levels, weather, plant size or age at the time of fire, can greatly influence tree mortality and vegetation response to fire. Fire in the growing season can reduce the stature of woody vegetation, particularly hardwoods, prevent increases in shrub densities, and promote flowering of herbaceous groundcover.

*Mesic Flatwoods* (Type I Habitat) – Mesic flatwoods are generally characterized by an open canopy of tall pines and dense ground cover including shrubs, grasses, and forbs. Historically this community’s canopy was dominated by longleaf pine (*Pinus palustris*). Today the majority of mesic flatwoods found throughout central and northeastern Florida are dominated by dense stands of slash pine due to the pine silviculture industry and furthermore by prolonged periods of fire exclusion. The canopy found within the mesic flatwoods of the Preserve is comprised mostly of slash pine. The ground cover is dominated by a heavy cover of saw palmetto and gallberry. In natural state, mesic flatwood herbaceous cover is dominated by wiregrass, dropseeds (*Sporobolus* spp.),
panicgrasses (*Dichanthelium* spp.), and broomsedges (*Andropogon* spp.). Limited areas of wiregrass, or other herbaceous cover, are found within the mesic flatwoods of the Preserve due to fire exclusion.

Mesic flatwoods require frequent fire (2 to 4 year intervals). Longleaf pines have thick bark to protect them from fire and their seeds need the mineral soil and open sunlight that fire provides to germinate. Longleaf pine during the grass stage is fire resistant. All of the mesic flatwood constituent plant species recover rapidly from fire and several species require fire to reproduce. Wiregrass requires fire to flower, along with a number of other characteristic herbs. Red-cockaded woodpeckers (*Picoides borealis*), which nest in cavities in mature living pines, will abandon a nesting site if the midstory becomes too tall and dense.

The need for frequent fire to control hardwood and off-site pine invasion has been documented for many years. It is also well documented that fire stimulates flowering in many flatwood herbs and that frequent fire increases species richness and abundance. Controlled burns in mesic flatwoods also indirectly determine the fire frequency and season for all the adjacent natural communities.

Statistics from lightning caused fires suggest that most areas in Florida would naturally burn at the beginning of the lightning season. Growing season fires (April to mid-August) are known to be necessary for flowering and seed set in wiregrass.

**Scrubby Flatwoods (Type I Habitat)** – Scrubby flatwoods have an open canopy of widely spaced pine trees and a low, shrubby understory dominated by scrub oaks and saw palmetto. Scrubby flatwoods differ from the aforementioned scrub in the presence of wiregrass, a greater abundance of saw palmetto, and/or the presence of typical flatwoods shrubs such as gallberry and fetterbushes. Structurally it differs from scrub in its lack of a continuous cover of scrubby oaks.

The scrubby flatwoods at the Preserve have a canopy of longleaf pine, slash pine, and sand pine. The understory consists of a closed cover of sand live oak, myrtle oak, Chapman’s oak, saw palmetto, gallberry, and fetterbush. Some instances of grasses were found which include wiregrass, broomsedge bluestem (*Andropogon virginicus*), and shiny blueberry (*Vaccinium myrsinites*). The majority of the scrubby flatwoods found within the Preserve has a closed canopy of scrub oaks in the 3 to 4 meter range in height due to the lack of fire.

Scrubby flatwoods are often associated with scrub and/or mesic flatwoods. Therefore many of the rare species associated with the aforementioned scrub are also likely to inhabit scrubby flatwoods.

Scrubby flatwoods have a more continuous ground cover than scrub, therefore
historically have burned more readily than scrub. But due to less ground cover grasses scrubby flatwoods tend to burn less readily than mesic flatwoods. Therefore scrubby flatwoods historically have burned at a frequency intermediate of the two, most likely in the 5 to 15 year range. Light ground fires in the surrounding mesic flatwoods tend to enter scrubby flatwoods and extinguish, leading to a patchwork of recently burned and unburned portions, a situation which has been found to be favorable for scrub-jays. Therefore variability in season and frequency of prescribed fires to produce a mosaic of burned and unburned patches would be the most desirable for maintaining high biotic diversity within this community.

Coastal Uplands

*Maritime Hammock* – Maritime hammock is predominantly evergreen hardwood forest growing on stabilized coastal dunes lying at varying distances from the shore. The maritime hammocks found within the Preserve have a closed canopy dominated by live oak, cabbage palm, southern magnolia, and pignut hickory. The subcanopy is dominated by red cedar (*Juniperus virginiana*), yaupon holly (*Ilex vomitoria*), saw palmetto, Brazilian pepper, red bay (*Persea borbonia*), wild coffee (*Psychotria nervosa*), wax myrtle, and wild orange (*Citrus* spp.). The invasive exotic Australian pine (*Casuarina equisetifolia*) was also noted within the maritime hammock communities of the Preserve.

Fire is naturally rare in this community. Fire could weaken the canopy trees making them more susceptible to damage by other coastal stresses. Invasion by exotic species such as Brazilian pepper and Australian pine following storm and wind disturbance is an ongoing threat to the community. Also the composition of maritime hammock is in danger to be affected by the Laurel Wilt Disease, which is fatal to red bays over 1 inch in dbh. This disease is caused by an exotic wood-boring beetle (*Xyleborus glabratus*). The loss of red bays within the subcanopy could potentially lead to further invasion by Brazilian pepper.

Freshwater Non-Forested Wetlands

*Wet Prairie* – Wet prairie is an herbaceous community found on continuously wet, but not inundated, soils on somewhat flat or gentle slopes between lower lying depression marshes, shrub bogs, or dome swamps and slightly higher wet or mesic flatwoods, or dry prairie. The wet prairies found within the Preserve are small depressions adjacent to wet flatwoods and mesic flatwoods. The groundcover consists primarily of yellow eyed grass (*Xyris* spp.), St. John’s wort (*Hypericum fasciculatum*), maidencane, beaksedges, and Carolina redroot.

Natural fires likely entered wet prairies from surrounding pine flatwoods and burned through them when they were dry enough to carry fire. It is estimated that wet prairies found adjacent to pine flatwoods historically had a fire interval of 2 to 4 years. In
absence of fire, shrubs and trees invade wet prairie and shade out the light-loving herbaceous species. Further evidence of fire interval is the necessity of many of the dominant grasses that require fire to stimulate flowering. Wet prairies are sensitive to relatively slight physical alterations to the soil surface which can permanently alter the hydrology. Such disturbances include soil rutting by human disturbance or hog rooting. These disturbances can cause major changes in species composition that require expensive restoration to repair.

**Freshwater Forested Wetlands**

*Coastal Hydric Hammock* – Coastal hydric hammock is an evergreen hardwood and/or palm forest with a variable understory typically dominated by palms and ferns occurring on moist soils, often with limestone very near the surface. While species composition varies, the community generally has a closed canopy of oaks and palms, an open understory, and a sparse to a moderate groundcover of grasses and ferns. The coastal hydric hammock found within the Preserve has a canopy which is 100% cabbage palm. The subcanopy consists of swamp bay, wax myrtle, and saw palmetto. The herbaceous cover is dominated by Virginia chain fern (*Woodwardia virginica*), cinnamon fern (*Osmunda cinnamonea*), and royal fern (*Osmunda regalis* var. *spectabilis*).

Fire is not considered an important component of coastal hydric hammock dynamics; however they do burn occasionally. Due to this coastal hydric hammock being dominated by old growth cabbage palm fire most likely occurred historically. Cabbage palms are fire tolerant and intense fires favor the species. Feral hogs tend to be the most common cause of disturbance to this habitat. Hog rutting causes soil disturbance which can allow the spread of the exotic Brazilian pepper as it is found directly adjacent to this habitat.

*Bottomland Forest* – Bottomland forest is a deciduous, or mixed deciduous/evergreen closed-canopy forest within riverine floodplains and in shallow depressions. The dominate canopy species found within this community at the Preserve include laurel oak (*Quercus laurifolia*), sweetbay (*Magnolia virginiana*), cabbage palm, swamp tupelo (*Nyssa sylvatica* var. *biflora*), water oak (*Quercus nigra*), sugarberry (*Celtis laevigata*), American elm (*Ulmus americana*), water hickory (*Carya aquatica*), and red maple (*Acer rubrum*). The understory consists of swamp dogwood (*Cornus foemina*), dahoon holly (*Ilex cassine*), swamp bay, shiny lyonia (*Lyonia lucida*), and wax myrtle.

Bottomland forests are a preferred habitat for the Florida black bear (*Ursus americanus floridanus*) as they roam along the banks of streams and riverine systems.

Bottomland forests are not considered fire-adapted communities. The most common disturbance of bottomland forest is logging and introduction of feral hogs. The bottomland forests found within the Preserve do not appear to have been logged in the
past and hog presence was not found. Other disturbances such as man made dikes or
dams which do not allow for adequate drainage also cause considerable damage to
bottomland forests. No damming or diking has occurred within the Preserve.

**Marine and Estuarine Vegetated Wetlands**

*Salt Marsh* – Salt marsh is a largely herbaceous community that occurs in the portion of
the coastal zone affected by tides and seawater and protected from large waves, either by
the broad, gently sloping topography of the shore, by a barrier island, or by location along
a bay or estuary. In the case of the Preserve the salt marshes are protected from wave
activity by barrier islands. The dominate species is saltmarsh cordgrass (*Spartina
alterniflora*) and needle rush (*Juncus roemerianus*). The landward edge of the marsh
consists of sawgrass (*Cladium jamaicense*), saltmeadow cordgrass (*Spartina patens*),
marsh elder (*Iva frutescens*), sea oxeye daisy (*Borrichia frutescens*), and christmasberry
(*Lycium carolinianum*). The salt marshes within the Preserve also have sporadic black
mangroves (*Avicennia germinans*) found throughout.

Salt marshes, along with mangrove swamps, are some of the most biologically productive
natural communities in the world. The base of the food chain is supplied not only by the
rooted plant matter, but also by the algae and detritus found of the stems of plants, on the
sediment surface, and suspended in the water column of pools and tidal creeks.

Fire is known to occur in salt marshes, although sporadically, either by spreading from
adjacent uplands or from lightning strikes in the marsh itself.

Ditch/canal features are found in a portion of the salt marshes on the Preserve. The
ditching is consistent to what occurred in the area in the 1950’s and 1960’s which is
referred to as dragline ditching. The purpose of the ditches was to interrupt the life cycle
of saltmarsh mosquitoes (*Aedes taeniorhynchus, A. sollicitans*) by altering their breeding
sites. Saltmarsh mosquitoes lay their eggs on moist soils. These eggs hatch in huge
numbers when the marsh is flooded by tides or rain. Dragline ditching converts large
acreages to ditch and spoil piles while altering the hydrology of the remaining wetland
and providing access for mosquito-eating fish. The ditches are mostly open water due to
the depth. Along the edges nuisance species such as cattail (*Typha* spp.) and Carolina
willow (*Salix caroliniana*) dominate the plant composition. Backfilling of these historic
mosquito ditches has been a very successful form of salt marsh restoration throughout the
state.

*Mangrove Swamp* – Mangrove swamps are dense forests occurring along relatively flat,
low wave energy, marine and estuarine shorelines. Four species of mangroves occur in
Florida consisting of red mangrove (*Rhizophora mangle*), black mangrove, white
mangrove (*Laguncularia racemosa*), and buttonwood (*Conocarpus erectus*). The four
species can occur either in mixed stands or often in differentiated, monospecific zones
that reflect varying degrees of tidal influence, levels of salinity, and types of substrate. Red mangroves often dominate the lowest (deep water) zone, followed by black mangroves, then white, and finally buttonwoods which are normally found within the transition zone between the upland and wetland limits.

Mangrove swamps often exist with no understory, although in some open areas species such as sea-oxeye daisy, marsh elder, saltwort (*Batis maritima*), and giant leatherfern (*Acrostichum danaeifolium*) may be found.

The biological importance of mangrove swamps is well documented as numerous marine and estuarine organisms depend on the swamps for a portion of their life cycle. The continuous shedding of mangrove leaves and other plant components also produce as much as 80 percent of the total organic material available in the aquatic food web. Mangrove swamps are considered one of the most productive forest systems in the world. Mangrove swamps provide important habitat for many rare and endangered flora and fauna and also functions as nursery grounds for many of Florida’s commercially and recreationally important fish and shellfish.

Mangroves continue to face survival pressure resulting from oil spills, altered tidal flows, and changes in the quantity, quality, and timing of the fresh water input as a result of development of adjacent uplands. Mangrove swamps are sensitive to colonization by exotic species such as Brazilian pepper (*Schinus terebinthifolius*) and Australian pine (*Casuarina equisetifolia*). Both of the above species have been observed within the Preserve. Management of the mangrove swamps within the Preserve should include the hand removal of any of the above exotic species found within the existing mangrove swamps.

**Rivers and Streams (Riverine)**

*Blackwater Stream* - The open water areas within the Preserve include the tidal waters of the Spruce Creek and Murray Creek. These tidal creek systems, due to proximity to the Ponce Inlet, provide extremely valuable habitat for commercial marine species that spend all or part of their life cycle in tidal creeks which include mullet (*Mugil* spp.), spot (*Leiostomus xanthurus*), blue crabs (*Callinectes sapindus*), oysters (*Crassostrea virginica*), and shrimp (*Penaeus* spp.). The smaller minnows and juvenile fish in the tidal creeks provide food for many recreationally important, predatory fish, such as tarpon (*Megalops atlanticus*), snook (*Centropomus undecimalis*), red drum (*Sciaenops ocellatus*), and spotted seatrout (*Cynoscion nebulosus*).

**Altered Landcover Types**

*Clearing* – A portion of the pine mesic flatwoods in the northeast portion of the Preserve burned recently. The fire was extremely hot causing all the canopy trees along with the
understory to die. As a safety precaution all the trees were toppled and then removed. The area remains as cleared with sporadic vegetation.

Impoundment/Artificial Pond – Two impoundments occur within the Preserve. One is a large human made pond (approximately 35 acres) found on the eastern side of the Preserve. The pond is tidally influenced and appears to be shallow across. Ponds of this nature were created in the past as duck ponds for hunters to use during the duck migrations in the spring and fall.

A smaller freshwater borrow pond is located on the western side of the Preserve. This pond was used as a dirt mine in the past for use as fill. The side slopes drop dramatically and only a small littoral shelf is present.

Improved pasture – A small portion of improved pasture is included within the Preserve. This area consists of actively maintained bahiagrass (*Paspalum notatum*). It is currently used for parking equestrian trailers used by visitors of the Preserve. Gopher tortoises actively use this area for forage and a few burrows were also identified.

Successional Hardwood Forest – This habitat is found along a canal which was historically draglined through a wetland hardwood forest. The existing vegetation consists of a canopy of laurel oak, slash and longleaf pine, cabbage palm, sugarberry, and southern magnolia.

4.3 Field Survey

The scrub-jay survey was conducted over 5 consecutive days starting on 26 July 2010 and ending on 30 July 2010 (see attached list of species observed). Survey times generally began in the early morning hours (6:30 am) and generally ended around 10:00 a.m. Weather conditions were generally optimal with good visibility, no precipitation, calm winds, and temperatures within the acceptable range. Multiple teams of 2 biologists were used to cover the 88 survey stations within the appropriate times. One scrub-jay responded to the vocalization recording at station 1-27. The one scrub-jay observed flew from south of the property to the southern boundary to respond to the voice recording. It then flew back offsite and did not return. This sighting occurred on 28 July 2010, and the scrub-jay was not seen at any other locations or on other days. No scrub-jays were documented throughout the rest of the entire property demonstrating that the habitats need appropriate land management.

5.0 DISCUSSION

The Florida scrub-jay inhabits fire dominated, low-growing, oak scrub habitat found on well-drained sandy soils. They may persist in areas with sparser oaks or scrub areas that are overgrown, but at much lower densities and with reduced survivorship. Oak height is a critical limiting factor for Florida scrub-jays which have been documented to abandon
territories where the oaks reached >3 meters. The mesic flatwoods, scrubby flatwoods, and scrub found within the Preserve provide the potential for valuable acreage which could be utilized by local scrub-jay families and offspring. Prescribed fire within the above habitats is essential to re-establish these areas as optimum Florida scrub-jay habitats.

As stated previously, the continued existence of the Florida scrub-jay species will depend on preservation and long-term management of suitable scrub habitat. The three habitats above represent approximately 815.76 acres of the Doris Leeper Spruce Creek Preserve (mesic flatwoods – 281.59 acres, scrub – 280.04 acres, and scrubby flatwoods – 254.13 acres). With the presence of multiple Florida scrub-jay families within two miles of the Preserve the importance of managing the habitats to their appropriate historical state is of immeasurable value.

5.0 CONCLUSION

Zev Cohen and Associates has conducted a Florida scrub-jay (Aphelocoma c. coerulescens) survey for the subject property. Research data shows that potentially five (5) Florida scrub-jay populations/families, within a two mile radius. The potential areas include four (4) known families within one mile south of the western parcel and one (1) family directly south of the eastern most parcel. One scrub-jay responded to the vocalization recording at station 1-27. The one scrub-jay observed flew from south of the property to the southern boundary to respond to the voice recording. It then flew back offsite and did not return. No scrub-jays were documented throughout the rest of the entire property demonstrating that the habitats need appropriate land management.

Zev Cohen and Associates, Inc. is seeking concurrence from USFWS that the Florida scrub-jay does not occupy the Doris Leeper Spruce Creek Preserve in its present state due to the overgrown condition of the potential scrub-jay habitats onsite.
TECHNICAL LITERATURE REFERENCES


APPENDIX A

FIGURES
APPENDIX B

Wildlife Species Observed List
Fish and Wildlife

Wildlife observations, both direct and indirect (indirect observations of their presence include remnants, tracks, burrows, calls, scat, etc.), were made throughout the course of the site investigations. Pedestrian transects were traversed along existing field trails, as well as along vegetational community boundaries. Fish species identification was collected via 8 foot cast net throws and 50 foot seine net pulls. A list of species observed is provided in the following table:

Table 1: Wildlife species observed on the Doris Leeper Spruce Creek Preserve in Volusia County, Florida.

<table>
<thead>
<tr>
<th>Taxon</th>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Listed Species*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reptiles/Amphibians</td>
<td>Green anole</td>
<td>Anolis carolinensis</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Five-lined skink</td>
<td>Eumeces fasciatus</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Southern toad</td>
<td>Anaxyrus terrestris</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Green tree frog</td>
<td>Hyla cinerea</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Southern black racer</td>
<td>Coluber constrictor priapus</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Florida box turtle</td>
<td>Terrapene carolina bauri</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Gopher tortoise</td>
<td>Gopherus polyphemus</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Florida softshell turtle</td>
<td>Apalone ferox</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>American alligator</td>
<td>Alligator mississippiensis</td>
<td>Yes</td>
</tr>
<tr>
<td>Fish</td>
<td>Eastern mudminnow</td>
<td>Umbra pygmaea</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Mosquitofish</td>
<td>Gambusia spp.</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Bluegill</td>
<td>Lepomis macrochirus</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Warmouth</td>
<td>Lepomis gulosus</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Florida largemouth bass</td>
<td>Micropterus salmoides</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Largemouth bass</td>
<td>Micropterus salmoides</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Longnose gar</td>
<td>Lepisosteus osseus</td>
<td>No</td>
</tr>
<tr>
<td>Freshwater</td>
<td>Mud minnow</td>
<td>Fundulus grandis</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Yellowfin mojarra</td>
<td>Gerres cinereus</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Striped mojarra</td>
<td>Eugerres plumieri</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Bay anchovy</td>
<td>Anchoa mitchilli</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>White mullet</td>
<td>Mugil curema</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Striped mullet</td>
<td>Mugil cephalus</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Atlantic needlefish</td>
<td>Strongylura marina</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Atlantic menhaden</td>
<td>Brevoortia tyrannus</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Gulf pipefish</td>
<td>Syngnathus scovelli</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Sheepshead</td>
<td>Archosargus probatocephalus</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Grey (Mangrove) snapper</td>
<td>Lutjanus griseus</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Summer flounder</td>
<td>Paralichthys dentatus</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Common snook</td>
<td>Centropomus undecimalis</td>
<td>No</td>
</tr>
</tbody>
</table>
# Birds

<table>
<thead>
<tr>
<th>Species</th>
<th>Scientific Name</th>
<th>Endangered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anhinga</td>
<td><em>Anhinga anhinga</em></td>
<td>No</td>
</tr>
<tr>
<td>Wood stork</td>
<td><em>Mycteria americana</em></td>
<td>Yes</td>
</tr>
<tr>
<td>Brown pelican</td>
<td><em>Pelecanus occidentalis</em></td>
<td>Yes</td>
</tr>
<tr>
<td>Osprey</td>
<td><em>Pandion haliaetus</em></td>
<td>Yes</td>
</tr>
<tr>
<td>Tricolored heron</td>
<td><em>Egretta tricolor</em></td>
<td>Yes</td>
</tr>
<tr>
<td>White ibis</td>
<td><em>Eudocimus albus</em></td>
<td>Yes</td>
</tr>
<tr>
<td>Cattle egret</td>
<td><em>Bubulcus ibis</em></td>
<td>No</td>
</tr>
<tr>
<td>Great blue heron</td>
<td><em>Ardea herodias</em></td>
<td>No</td>
</tr>
<tr>
<td>Great egret</td>
<td><em>Ardea alba</em></td>
<td>No</td>
</tr>
<tr>
<td>Belted kingfisher</td>
<td><em>Ceryle alcyon</em></td>
<td>No</td>
</tr>
<tr>
<td>Ruby-throated hummingbird</td>
<td><em>Archilochus colubris</em></td>
<td>No</td>
</tr>
<tr>
<td>Carolina chickadee</td>
<td><em>Piceolus carolinensis</em></td>
<td>No</td>
</tr>
<tr>
<td>Carolina wren</td>
<td><em>Thryothorus ludovicianus</em></td>
<td>No</td>
</tr>
<tr>
<td>Grey catbird</td>
<td><em>Dumetella carolinensis</em></td>
<td>No</td>
</tr>
<tr>
<td>Downy woodpecker</td>
<td><em>Picoides pubescens</em></td>
<td>No</td>
</tr>
<tr>
<td>Pileated woodpecker</td>
<td><em>Dryocopus pileatus</em></td>
<td>No</td>
</tr>
<tr>
<td>Red-bellied woodpecker</td>
<td><em>Melanerpes carolinus</em></td>
<td>No</td>
</tr>
<tr>
<td>Blue jay</td>
<td><em>Cyanocitta cristata</em></td>
<td>No</td>
</tr>
<tr>
<td>Florida scrub-jay</td>
<td><em>Aphelocoma coerulescens</em></td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td><em>A. coerulescens</em></td>
<td></td>
</tr>
<tr>
<td>Mockingbird</td>
<td><em>Mimus polyglottos</em></td>
<td>No</td>
</tr>
<tr>
<td>Loggerhead shrike</td>
<td><em>Lanius ludovicianus</em></td>
<td>No</td>
</tr>
<tr>
<td>Red-winged blackbird</td>
<td><em>Agelaius phoeniceus</em></td>
<td>No</td>
</tr>
<tr>
<td>Eastern towhee</td>
<td><em>Pipilo erythrophthalmus</em></td>
<td>No</td>
</tr>
<tr>
<td>Tufted titmouse</td>
<td><em>Baeeolopus bicolor</em></td>
<td>No</td>
</tr>
<tr>
<td>White-eyed vireo</td>
<td><em>Vireo griseus</em></td>
<td>No</td>
</tr>
<tr>
<td>Brown thrasher</td>
<td><em>Toxostoma rufum</em></td>
<td>No</td>
</tr>
<tr>
<td>Northern cardinal</td>
<td><em>Cardinalis cardinalis</em></td>
<td>No</td>
</tr>
<tr>
<td>Common ground dove</td>
<td><em>Columbina passerine</em></td>
<td>No</td>
</tr>
<tr>
<td>Mourning dove</td>
<td><em>Zenaida macroura</em></td>
<td>No</td>
</tr>
<tr>
<td>Wild turkey</td>
<td><em>Meleagris gallopavo</em></td>
<td>No</td>
</tr>
<tr>
<td>American crow</td>
<td><em>Corvus brachyrhynchos</em></td>
<td>No</td>
</tr>
<tr>
<td>Boat-tailed grackle</td>
<td><em>Quiscalus major</em></td>
<td>No</td>
</tr>
<tr>
<td>Black vulture</td>
<td><em>Coragyps atratus</em></td>
<td>No</td>
</tr>
<tr>
<td>Red-shouldered hawk</td>
<td><em>Buteo jamaicensis</em></td>
<td>No</td>
</tr>
<tr>
<td>Bald Eagle</td>
<td><em>Haliaeetus leucocephalus</em></td>
<td>Yes</td>
</tr>
</tbody>
</table>

# Mammals

<table>
<thead>
<tr>
<th>Species</th>
<th>Scientific Name</th>
<th>Endangered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nine-banded armadillo</td>
<td><em>Dasypus novemcinctus</em></td>
<td>No</td>
</tr>
<tr>
<td>Southeastern pocket gopher</td>
<td><em>Geomys pinetis</em></td>
<td>No</td>
</tr>
<tr>
<td>Raccoon</td>
<td><em>Procyon lotor</em></td>
<td>No</td>
</tr>
<tr>
<td>Bobcat</td>
<td><em>Felis rufus</em></td>
<td>No</td>
</tr>
<tr>
<td>Grey squirrel</td>
<td><em>Sciurus carolinensis</em></td>
<td>No</td>
</tr>
<tr>
<td>White-tailed deer</td>
<td><em>Odocoileus virginianus</em></td>
<td>No</td>
</tr>
</tbody>
</table>
USFWS Concurrence Letter
United States Department of the Interior
U. S. FISH AND WILDLIFE SERVICE
7915 BAYMEADOWS WAY, SUITE 200
JACKSONVILLE, FLORIDA 32256-7517

IN REPLY REFER TO:

41910-2011-TA-0087

December 13, 2010

Jody Sisk
Zev Cohen and Associates, Inc.
4475 US 1 South, Suite 601
St. Augustine, Florida 32086

RE: 41910-2011-TA-0087

Dear Mr. Sisk,

Thank you for your letter dated December 1, 2010, to the U.S. Fish and Wildlife Service (Service) regarding the Doris Leeper Spruce Creek Preserve property located along Spruce Creek from US1 to I-95 (Sections 25, 26, 35, and 36, Township 16 South, Range 33 East) in Volusia County, Florida. Scrub-jay surveys of the site were conducted on July 26-30, 2010, and information in the report reveals that no scrub-jays were observed on the property. One scrub-jay was reported to approach the southern boundary of the property during the survey, but it did not come into the property and flew back off-site heading south.

Based on the above information, the U.S. Fish and Wildlife Service concludes that at this time the parcel is not occupied by the Florida scrub-jay. The Doris Leeper Spruce Creek Preserve intends to manage the scrub habitat on the property according to details within the report. Managing these areas may allow the development of more appropriate habitat for scrub-jays in the future.

Note that the Service’s determination in this letter is valid for a period of no more than two years from the date of this letter. If additional information in the future indicates that the property is being used by scrub-jays, please notify our office so that we can reassess our determination.

If you have any further questions please contact Erin Gawera at (904) 731-3121.

Sincerely,

[Signature]

David L. Hankla
Field Supervisor

G - 29