FLORIDA
Natural Areas
INVENTORY

1018 Thomasville Road
Suite 200-C
Tallahassee, FL 32303
850-224-8207
fax 850-681-9364
www.fnai.org

April 13, 2010

Tim Telfer
Flagler County Administration
1769 East Moody Blvd., Suite 309
Bunnell, FL 32110

Dear Mr. Telfer,

Thank you for your request for information from the Florida Natural Areas Inventory (FNAI). We have compiled the following information for your project area.

Project:	Townsend Longshape Prairie Tract
Date Received:	April 7, 2010
Location:	Township 13S, Range 29E, Sections 7, 8 & 17-20 Flagler County

Locally Significant Natural Area Status

We have determined that this site **does** meet the criteria for a Locally Significant Natural Area (LNA) for purposes for Florida Communities Trust proposal evaluations. The attached table details how the site matches the FNAI criteria for LNA status.

Element Occurrences

A search of our maps and database indicates that currently we have several Element Occurrences mapped within the vicinity of the study area (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.

Federally Listed Species

Our data indicate no federally listed species are present on or very near your site (see enclosed map and element occurrence table for details). This statement should not be interpreted as a legal determination of presence or absence of federally listed species on a property.

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, other rare species and natural communities may be identified on or near the site based on habitat models and species range models (see enclosed Biodiversity

Florida Resources
and Environmental
Analysis Center

Institute of Science
and Public Affairs

The Florida State University

Matrix Report). These species should be taken into consideration in field surveys, land management, and impact avoidance and mitigation.

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.

FNAI species range models indicate areas that are within the known or predicted range of a species, based on climate variables, soils, vegetation, and/or slope. Species range models have been developed for approximately 340 species, including all federally listed species.

The FNAI Biodiversity Matrix Geodatabase compiles Documented, Likely, and Potential species and natural communities for each square mile Matrix Unit statewide.

The Inventory always recommends that professionals familiar with Florida's flora and fauna should conduct a site-specific survey to determine the current presence or absence of rare, threatened, or endangered species.

Please visit www.fnai.org/trackinglist.cfm for county or statewide element occurrence distributions and links to more element information.

The database maintained by the Florida Natural Areas Inventory 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.

Information provided by this database 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. FNAI data may not be resold for profit.

This report is made available at no charge due to funding from the Florida Department of Environmental Protection, Division of State Lands.

Thank you for your use of FNAI services. If I can be of further assistance, please give me a call at (850) 224-8207.

Sincerely,

Alicia C. Newberry

Alicia C. Newberry
GIS/Data Services Analyst

Encl

Locally Significant Natural Area Criteria

Date: 13-Apr-10
Site Name: Townsend Longshape Prairie Tract
County: Flagler
Requested by: Tim Telfer
Total Site Acres: 652

Site must meet any 1 of the 4 Criteria below to qualify as an LNA:

	Minimum Acres Needed to Qualify	Acres on Site	Criterion Met	Notes
1. FNAIHAB Priorities 1-3				
plants	5	0	No	
invertebrates	5	0	No	
birds	10	6	No	
reptiles	10	0	No	
amphibians	10	0	No	
fish	10	0	No	
mammals	20	6	No	
2. Natural Communities				
upland glade	1	0	No	
pine rockland	1	0	No	
scrub	5	0	No	
rockland hammock	5	0	No	
seepage slope	1	0	No	
coastal uplands	1	0	No	
sandhill upland lake	1	0	No	
sandhill	20	0	No	
dry prairie	20	0	No	
upland hardwood	50	0	No	
pine flatwoods	50	0	No	
3. Potential Natural Areas				
Priorities 1-4	20	652	Yes	Continues onto adjacent Managed Area. No minimum acreage required.

4. FNAI Element Occurrences

EO must be Srank S1-S3, AND EITHER (EO Rank A, B, C OR Grank G1-G3); AND Last Obs < 20 years

Sname	State Rank	EO Rank	Global Rank	Last Obs Date
None	n/a	n/a	n/a	n/a

NOTE: ***All acreages for Criteria 1-3 are calculated from FNAI GIS data layers. These data are primarily based on remotely sensed information such as satellite imagery and aerial photography. FNAI makes every effort to maintain the most accurate statewide data available, but no statewide data will be 100% accurate for every site.***

Documentation for LNA criteria and all data is attached to this report.

This document revised 9 September 2008.

Townsend Longshape Prairie Tract

Site boundaries are approximate.

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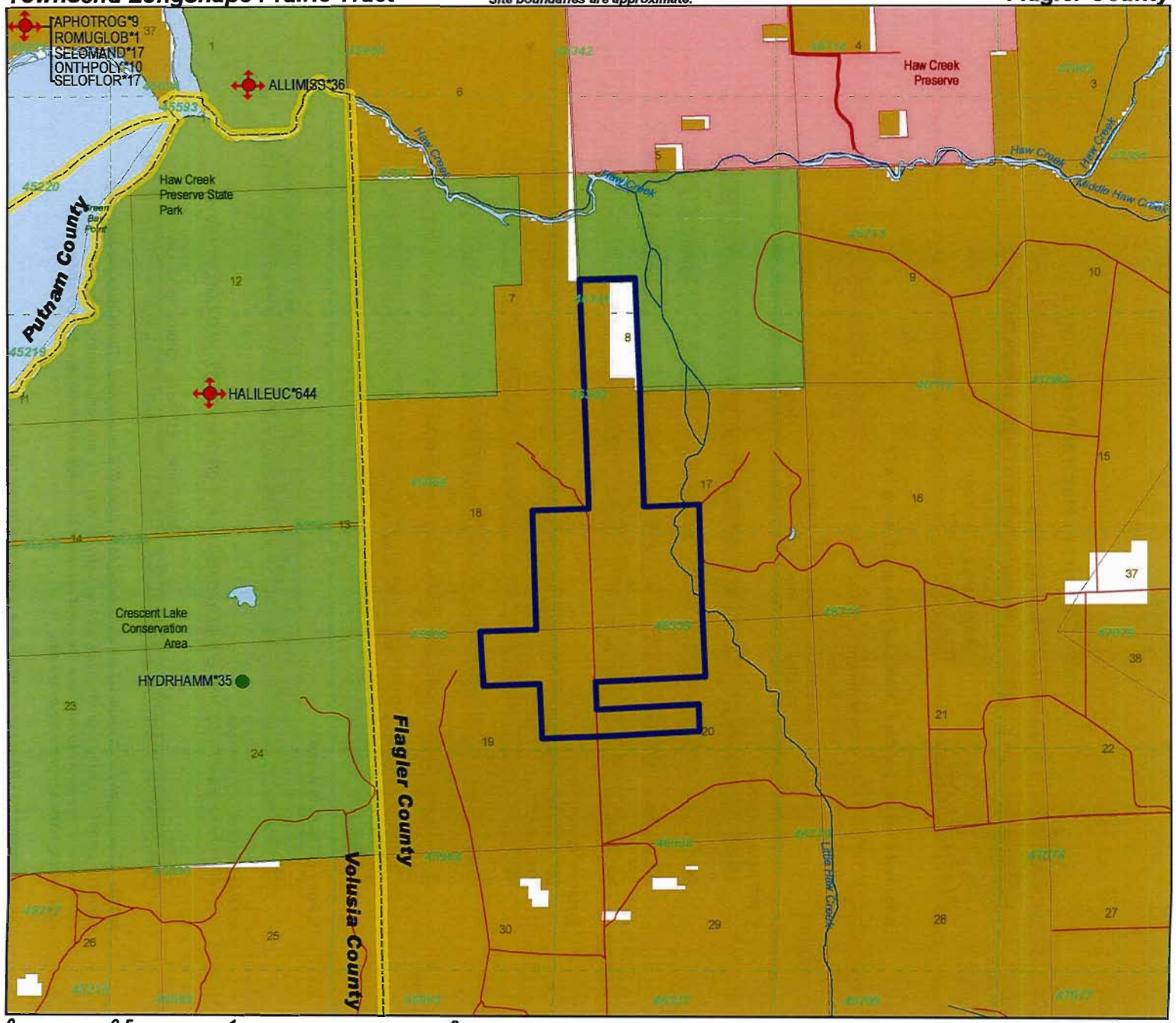

Element Occurrences

- Animals
- Plants
- Communities
- Other
- Data Sensitive
- Point Indicates General Vicinity of Element
- U.S. Fish & Wildlife Service Scrub Jay Survey 1992-96

Conservation Lands

- Federal
- State
- Local
- Private
- State Aquatic Preserves

Land Acquisition Projects

- Florida Forever Board of Trustees Projects

- FNAI Rare Species Habitat
- FNAI Biodiversity Matrix Square Mile Units

- County Boundary
- Interstate
- Turnpike
- Major Highway
- Local Road
- Railroad [Inactive railroads shown in Gray]
- Water

N W E S

NOTE
Map should not be interpreted without accompanying documents.

Map produced by ACN
Map Date: 13 APR 2010

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Florida Natural Areas Inventory

ELEMENT OCCURRENCES DOCUMENTED ON OR NEAR
Townsend Longshape Prairie Tract

Map Label	Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Listing	Observation Date	Description	EO Comments
HYDRHAMM*35	Hydric hammock		G4	S4	N	N	2004	The hydric hammock continued S for 2 miles and appeared to be up to 0.4 mile wide (E-W) in some places. It graded into basin swamp and basin marsh which covered the one mi N to Crescent Lake. Most of area appeared to have been logged in the past as an oc	2004: Update to last obs date was based on interpretation of aerial photography (previous value was 1994-10-14) (U05FNA02FLUS). In Section 24 NW1/4, hydric hammock extended ca. 0.3 mi across. Old logging road ca. 8' wide ran through hammock with occasion
ALLIMISS*36	Alligator mississippiensis	American Alligator	G5	S4	SAT	LS	1983	THROUGHOUT AREA.	REGULARLY OBSERVED, BUT NO POP. ESTIMATE.
HALILEUC*644	Haliaeetus leucocephalus	Bald Eagle	G5	S3	N	N	2005	2006. Located in floodplain swamp/hydric hammock southeast of Cresent Lake, just north of a large basin marsh in Haw Creek Preserve. The forested wetlands in the preserve are in excellent condition, few exotics and minimal hydrologic disturbances (PNDK	2006: Continuously active 2002-2005. 2006 activity was undetermined (W06FWC01FLUS). 1999-2003: Continuously active; Status 1995-98: Active - 1998, 1997, 1995; Inactive - 1996; (U03FWC01FLUS). Previous data (note different format) NEST; 1995: PRODUCED 2
SELOFLOR*17	Selonodon floridensis	Florida Cebrionid Beetle	G2G3	S2S3	N	N	1999-Pre	1999-Pre: No description given (B99GAL01FLUS).	1999-Pre: One specimen was collected (B99GAL01FLUS).
ROMUGLOB*1	Romulus globosus	Round-Necked Romulus Long-Horned Beetle	G1G2	S1S2	N	N	1994-Pre	1994-Pre: No description given (B94DEY01FLUS).	1994-Pre: A species was collected at this site (B94DEY01FLUS).
ONTHPOLY*10	Onthophagus polyphemi polyphemi	Punctate Gopher Tortoise Onthophagus Beetle	GNRTNR	S2S3	N	N	1973-Pre	1973-Pre: No description given (B73WOO01FLUS).	1973-Pre: Two specimens were collected by Hubbard (paratypes) (B73WOO01FLUS).
SELOMAND*17	Selonodon mandibularis	Large-Jawed Cebrionid Beetle	G2G3	S2S3	N	N	1938-06	1938-06: No description given (B99GAL01FLUS).	1938-06: 8 specimens were collected and deposited at MCZ and USNM (B99GAL01FLUS).
APHOTROG*9	Aphodius troglodytes	Gopher Tortoise Aphodius Beetle	GNR	S2S3	N	N	1973-Pre	1973-Pre: No description given (B73WOO01FLUS).	1973-Pre: Four specimens were collected by H.W. Wenzel (B73WOO01FLUS).

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Florida Natural Areas Inventory

Biodiversity Matrix Report

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Listing
Matrix Unit ID: 45965					
Likely					
Grus canadensis pratensis	Florida Sandhill Crane	G5T2T3	S2S3	N	LT
Ursus americanus floridanus	Florida Black Bear	G5T2	S2	N	LT*
Potential					
Arnoglossum diversifolium	Variable-leaved Indian-plantain	G2	S2	N	LT
Asplenium heteroresiliens	Wagner's Spleenwort	GNA	S1	N	N
Calamintha ashei	Ashe's Savory	G3	S3	N	LT
Carex chapmanii	Chapman's Sedge	G3	S3	N	LE
Centrosema arenicola	Sand Butterfly Pea	G2Q	S2	N	LE
Coelorachis tuberculosa	Piedmont Jointgrass	G3	S3	N	LT
Conradina grandiflora	Large-flowered Rosemary	G3	S3	N	LT
Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	G3G4	S2	N	N
Deeringothamnus rugelii	Rugel's Pawpaw	G1	S1	LE	LE
Drymarchon couperi	Eastern Indigo Snake	G3	S3	LT	LT
Gopherus polyphemus	Gopher Tortoise	G3	S3	N	LT
Gymnopogon chapmanianus	Chapman's Skeletongrass	G3	S3	N	N
Hartwrightia floridana	Hartwrightia	G2	S2	N	LT
Illicium parviflorum	Star Anise	G2	S2	N	LE
Lechea cernua	Nodding Pinweed	G3	S3	N	LT
Litsea aestivalis	Pondspice	G3	S2	N	LE
Matelea floridana	Florida Spiny-pod	G2	S2	N	LE
Mustela frenata peninsulae	Florida Long-tailed Weasel	G5T3	S3	N	N
Nemastylis floridana	Celestial Lily	G2	S2	N	LE
Neofiber alleni	Round-tailed Muskrat	G3	S3	N	N
Picoides borealis	Red-cockaded Woodpecker	G3	S2	LE	LS
Pteroglossaspis ecristata	Giant Orchid	G2G3	S2	N	LT
Pycnanthemum floridanum	Florida Mountain-mint	G3	S3	N	LT
Rana capito	Gopher Frog	G3	S3	N	LS
Rhynchospora thornei	Thorne's Beaksedge	G3	S1S2	N	N
Rudbeckia nitida	St. John's Blackeyed Susan	G3	S2	N	LE
Salix floridana	Florida Willow	G2	S2	N	LE
Matrix Unit ID: 45966					
Likely					
Grus canadensis pratensis	Florida Sandhill Crane	G5T2T3	S2S3	N	LT
Ursus americanus floridanus	Florida Black Bear	G5T2	S2	N	LT*
Potential					
Arnoglossum diversifolium	Variable-leaved Indian-plantain	G2	S2	N	LT
Calamintha ashei	Ashe's Savory	G3	S3	N	LT
Carex chapmanii	Chapman's Sedge	G3	S3	N	LE
Centrosema arenicola	Sand Butterfly Pea	G2Q	S2	N	LE
Coelorachis tuberculosa	Piedmont Jointgrass	G3	S3	N	LT
Conradina grandiflora	Large-flowered Rosemary	G3	S3	N	LT
Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	G3G4	S2	N	N
Deeringothamnus rugelii	Rugel's Pawpaw	G1	S1	LE	LE

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

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Listing
Drymarchon couperi	Eastern Indigo Snake	G3	S3	LT	LT
Gopherus polyphemus	Gopher Tortoise	G3	S3	N	LT
Gymnopogon chapmanianus	Chapman's Skeletongrass	G3	S3	N	N
Hartwrightia floridana	Hartwrightia	G2	S2	N	LT
Illicium parviflorum	Star Anise	G2	S2	N	LE
Lechea cernua	Nodding Pinweed	G3	S3	N	LT
Litsea aestivalis	Pondspice	G3	S2	N	LE
Matelea floridana	Florida Spiny-pod	G2	S2	N	LE
Mustela frenata peninsulae	Florida Long-tailed Weasel	G5T3	S3	N	N
Nemastylis floridana	Celestial Lily	G2	S2	N	LE
Neofiber alleni	Round-tailed Muskrat	G3	S3	N	N
Picoides borealis	Red-cockaded Woodpecker	G3	S2	LE	LS
Pteroglossaspis ecristata	Giant Orchid	G2G3	S2	N	LT
Pycnanthemum floridanum	Florida Mountain-mint	G3	S3	N	LT
Rana capito	Gopher Frog	G3	S3	N	LS
Rhynchospora thornei	Thorne's Beaksedge	G3	S1S2	N	N
Rudbeckia nitida	St. John's Blackeyed Susan	G3	S2	N	LE
Salix floridana	Florida Willow	G2	S2	N	LE

Matrix Unit ID: 46339

Likely

Grus canadensis pratensis	Florida Sandhill Crane	G5T2T3	S2S3	N	LT
Mesic flatwoods		G4	S4	N	N
Ursus americanus floridanus	Florida Black Bear	G5T2	S2	N	LT*

Potential

Arnoglossum diversifolium	Variable-leaved Indian-plantain	G2	S2	N	LT
Asplenium heteroresiliens	Wagner's Spleenwort	GNA	S1	N	N
Calamintha ashei	Ashe's Savory	G3	S3	N	LT
Centrosema arenicola	Sand Butterfly Pea	G2Q	S2	N	LE
Coelorachis tuberculosa	Piedmont Jointgrass	G3	S3	N	LT
Conradina grandiflora	Large-flowered Rosemary	G3	S3	N	LT
Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	G3G4	S2	N	N
Deeringothamnus rugelii	Rugel's Pawpaw	G1	S1	LE	LE
Drymarchon couperi	Eastern Indigo Snake	G3	S3	LT	LT
Gopherus polyphemus	Gopher Tortoise	G3	S3	N	LT
Gymnopogon chapmanianus	Chapman's Skeletongrass	G3	S3	N	N
Hartwrightia floridana	Hartwrightia	G2	S2	N	LT
Illicium parviflorum	Star Anise	G2	S2	N	LE
Lechea cernua	Nodding Pinweed	G3	S3	N	LT
Litsea aestivalis	Pondspice	G3	S2	N	LE
Matelea floridana	Florida Spiny-pod	G2	S2	N	LE
Mustela frenata peninsulae	Florida Long-tailed Weasel	G5T3	S3	N	N
Nemastylis floridana	Celestial Lily	G2	S2	N	LE
Neofiber alleni	Round-tailed Muskrat	G3	S3	N	N
Picoides borealis	Red-cockaded Woodpecker	G3	S2	LE	LS
Pteronotropis welaka	Bluenose Shiner	G3G4	S3S4	N	LS
Pycnanthemum floridanum	Florida Mountain-mint	G3	S3	N	LT
Rana capito	Gopher Frog	G3	S3	N	LS

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Biodiversity Matrix Report

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Listing
Rudbeckia nitida	St. John's Blackeyed Susan	G3	S2	N	LE
Salix floridana	Florida Willow	G2	S2	N	LE
Vicia ocalensis	Ocala Vetch	G1	S1	N	LE
Matrix Unit ID: 46340					
Likely					
Grus canadensis pratensis	Florida Sandhill Crane	G5T2T3	S2S3	N	LT
Mesic flatwoods		G4	S4	N	N
Ursus americanus floridanus	Florida Black Bear	G5T2	S2	N	LT*
Potential					
Aimophila aestivalis	Bachman's Sparrow	G3	S3	N	N
Arnoglossum diversifolium	Variable-leaved Indian-plantain	G2	S2	N	LT
Asplenium heteroresiliens	Wagner's Spleenwort	GNA	S1	N	N
Calamintha ashei	Ashe's Savory	G3	S3	N	LT
Centrosema arenicola	Sand Butterfly Pea	G2Q	S2	N	LE
Coelorachis tuberculosa	Piedmont Jointgrass	G3	S3	N	LT
Conradina grandiflora	Large-flowered Rosemary	G3	S3	N	LT
Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	G3G4	S2	N	N
Deeringothamnus rugelii	Rugel's Pawpaw	G1	S1	LE	LE
Drymarchon couperi	Eastern Indigo Snake	G3	S3	LT	LT
Gopherus polyphemus	Gopher Tortoise	G3	S3	N	LT
Gymnopogon chapmanianus	Chapman's Skeletongrass	G3	S3	N	N
Hartwrightia floridana	Hartwrightia	G2	S2	N	LT
Illicium parviflorum	Star Anise	G2	S2	N	LE
Lechea cernua	Nodding Pinweed	G3	S3	N	LT
Litsea aestivalis	Pondspice	G3	S2	N	LE
Matelea floridana	Florida Spiny-pod	G2	S2	N	LE
Mustela frenata peninsulae	Florida Long-tailed Weasel	G5T3	S3	N	N
Nemastylis floridana	Celestial Lily	G2	S2	N	LE
Neofiber alleni	Round-tailed Muskrat	G3	S3	N	N
Picoides borealis	Red-cockaded Woodpecker	G3	S2	LE	LS
Pteronotropis welaka	Bluenose Shiner	G3G4	S3S4	N	LS
Rana capito	Gopher Frog	G3	S3	N	LS
Rudbeckia nitida	St. John's Blackeyed Susan	G3	S2	N	LE
Salix floridana	Florida Willow	G2	S2	N	LE
Vicia ocalensis	Ocala Vetch	G1	S1	N	LE
Matrix Unit ID: 46341					
Likely					
Mesic flatwoods		G4	S4	N	N
Ursus americanus floridanus	Florida Black Bear	G5T2	S2	N	LT*
Potential					
Aimophila aestivalis	Bachman's Sparrow	G3	S3	N	N
Alligator mississippiensis	American Alligator	G5	S4	SAT	LS
Arnoglossum diversifolium	Variable-leaved Indian-plantain	G2	S2	N	LT
Asplenium heteroresiliens	Wagner's Spleenwort	GNA	S1	N	N

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Calamintha ashei	Ashe's Savory	G3	S3	N	LT
Carex chapmanii	Chapman's Sedge	G3	S3	N	LE
Centrosema arenicola	Sand Butterfly Pea	G2Q	S2	N	LE
Coelorachis tuberculosa	Piedmont Jointgrass	G3	S3	N	LT
Conradina grandiflora	Large-flowered Rosemary	G3	S3	N	LT
Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	G3G4	S2	N	N
Drymarchon couperi	Eastern Indigo Snake	G3	S3	LT	LT
Gopherus polyphemus	Gopher Tortoise	G3	S3	N	LT
Grus canadensis pratensis	Florida Sandhill Crane	G5T2T3	S2S3	N	LT
Gymnopogon chapmanianus	Chapman's Skeletongrass	G3	S3	N	N
Hartwrightia floridana	Hartwrightia	G2	S2	N	LT
Illicium parviflorum	Star Anise	G2	S2	N	LE
Lechea cernua	Nodding Pinweed	G3	S3	N	LT
Litsea aestivalis	Pondspice	G3	S2	N	LE
Matelea floridana	Florida Spiny-pod	G2	S2	N	LE
Monotropsis reynoldsiae	Pygmy Pipes	G1Q	S1	N	LE
Mustela frenata peninsulae	Florida Long-tailed Weasel	G5T3	S3	N	N
Nemastylis floridana	Celestial Lily	G2	S2	N	LE
Neofiber alleni	Round-tailed Muskrat	G3	S3	N	N
Picoides borealis	Red-cockaded Woodpecker	G3	S2	LE	LS
Pteronotropis welaka	Bluenose Shiner	G3G4	S3S4	N	LS
Pycnanthemum floridanum	Florida Mountain-mint	G3	S3	N	LT
Rana capito	Gopher Frog	G3	S3	N	LS
Rhynchospora thornei	Thorne's Beaksedge	G3	S1S2	N	N
Rudbeckia nitida	St. John's Blackeyed Susan	G3	S2	N	LE
Salix floridana	Florida Willow	G2	S2	N	LE
Trichechus manatus	Manatee	G2	S2	LE	LE
Vicia ocalensis	Ocala Vetch	G1	S1	N	LE

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

GLOBAL AND STATE RANKS

Florida Natural Areas Inventory (FNAI) defines an **element** as any rare or exemplary component of the natural environment, such as a species, natural community, bird rookery, spring, sinkhole, cave, or other ecological feature. FNAI assigns two ranks to each element found in Florida: the **global rank**, which is based on an element's worldwide status, and the **state rank**, which is based on the status of the element within Florida. Element ranks are based on many factors, including estimated number of occurrences, estimated abundance (for species and populations) or area (for natural communities), estimated number of adequately protected occurrences, range, threats, and ecological fragility.

GLOBAL RANK DEFINITIONS

G1	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.
G2	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.
G3	Either very rare and local throughout its range (21-100 occurrences or less than 10,0000 individuals) or found locally in a restricted range or vulnerable to extinction from other factors.
G4	Apparently secure globally (may be rare in parts of range).
G5	Demonstrably secure globally.
G#?	Tentative rank (e.g., G2?)
G#G#	Range of rank; insufficient data to assign specific global rank (e.g., G2G3)
G#T#	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)
G#Q	Rank of questionable species - ranked as species but questionable whether it is species or subspecies; numbers have same definition as above (e.g., G2Q)
G#T#Q	Same as above, but validity as subspecies or variety is questioned.
GH	Of historical occurrence throughout its range, may be rediscovered (e.g., ivory-billed woodpecker)
GNA	Ranking is not applicable because element is not a suitable target for conservation (e.g. as for hybrid species)
GNR	Not yet ranked (temporary)
GNRTNR	Neither the full species nor the taxonomic subgroup has yet been ranked (temporary)
GX	Believed to be extinct throughout range
GXC	Extirpated from the wild but still known from captivity/cultivation
GU	Unrankable. Due to lack of information, no rank or range can be assigned (e.g., GUT2).

STATE RANK DEFINITIONS

Definition parallels global element rank: substitute "S" for "G" in above global ranks, and "in Florida" for "globally" in above global rank definitions.

FEDERAL AND STATE LEGAL STATUSES (U.S. Fish and Wildlife Service – USFWS) PROVIDED BY FNAI FOR INFORMATION ONLY.

For official definitions and lists of protected species, consult the relevant state or federal agency.

FEDERAL LEGAL STATUS

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.

LE	Listed as Endangered Species in the List of Endangered and Threatened Wildlife and Plants under the provisions of the Endangered Species Act. Defined as any species which is in danger of extinction throughout all or a significant portion of its range.
LE,XN	A non essential experimental population of a species otherwise Listed as an Endangered Species in the List of Endangered and Threatened Wildlife and Plants. LE,XN for Grus americana (Whooping crane), Federally listed as XN (Non essential experimental population) refers to the Florida experimental population only. Federal listing elsewhere for Grus americana is LE.
PE	Proposed for addition to the List of Endangered and Threatened Wildlife and Plants as Endangered Species.
LT	Listed as Threatened Species, defined as any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.
LT,PDL	Species currently listed Threatened but has been proposed for delisting.
PT	Proposed for listing as Threatened Species.
C	Candidate Species for addition to the list of Endangered and Threatened Wildlife and Plants, Category 1. Federal listing agencies have sufficient information on biological vulnerability and threats to support proposing to list the species as Endangered or Threatened.
SAT	Threatened due to similarity of appearance to a threatened species.
SC	Species of Concern, species is not currently listed but is of management concern to USFWS.
N	Not currently listed, nor currently being considered for addition to the List of Endangered and Threatened Wildlife and Plants.

FLORIDA LEGAL STATUSES (Florida Fish and Wildlife Conservation Commission – FFWCC/ Florida Department of Agriculture and Consumer Services – FDACS)

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

LE	Listed as Endangered Species by the FFWCC. Defined as a species, subspecies, or isolated population which is so rare or depleted in number or so restricted in range of habitat due to any man-made or natural factors that it is in immediate danger of extinction or extirpation from the state, or which may attain such a status within the immediate future.
LT	Listed as Threatened Species by the 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.
LT*	Indicates that a species has LT status only in selected portions of its range in Florida. LT* for Ursus americanus floridanus (Florida black bear) indicates that LT status does not apply in Baker and Columbia counties and in the Apalachicola National Forest. LT* for Neovison vison pop. 1 (Southern mink, South Florida population) state listed as Threatened refers to the Everglades population only (Note: species formerly listed as Mustela vison mink pop. 1. Also, priorly listed as Mustela evergladensis).
LS	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.

LS* Indicates that a species has LS status only in selected portions of its range in Florida. LS* for Pandion haliaetus (Osprey) state listed as LS (Species of Special Concern) in Monroe County only.

PE Proposed for listing as Endangered.

PT Proposed for listing as Threatened.

PS Proposed for listing as a Species of Special Concern.

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, 5B-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 please visit: http://DOACS.State.FL.US/PI/Images/Rule05b.pdf

LE Listed as Endangered Plants in the Preservation of Native Flora of Florida Act. Defined as species of plants native to the state that are in imminent danger of extinction within the state, the survival of which is unlikely if the causes of a decline in the number of plants continue, and includes all species determined to be endangered or threatened pursuant to the Federal Endangered Species Act of 1973, as amended.

PE Proposed by the FDACS for listing as Endangered Plants.

LT Listed as Threatened Plants in the Preservation of Native Flora of Florida Act. Defined as species native to the state that are in rapid decline in the number of plants within the state, but which have not so decreased in such number as to cause them to be endangered. LT* indicates that a species has LT status only in selected portions of its range in Florida.

PT Proposed by the FDACS for listing as Threatened Plants.

N Not currently listed, nor currently being considered for listing.

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FLORIDA
Natural Areas
INVENTORY

Tracking Florida's Biodiversity

Florida Natural Areas Inventory
Criteria for
"Locally Significant Natural Area" Status
for FCT Applications
rev. 9 September 2008

FCT and FNAI have determined that in order for a site to receive 5 points for the "FNAI question" on the FCT proposal, it must be considered a "Locally Significant Natural Area" (LNA) by FNAI. FNAI will evaluate each site and consider the site a LNA if it meets any one of the following four criteria:

NOTE: for criteria 1-3, minimum acreages need not apply if the site is adjacent to an existing Managed Area (federal, state, local, or private conservation land in the FNAI Managed Areas database, or a state aquatic preserve) and the resource in question continues onto the adjacent Managed Area.

1. Site contains FNAI Rare Species Habitat Conservation Priorities (FNAIHAB) priorities 1, 2, or 3. In order to qualify, the site must contain a minimum acreage based on the species habitat included: plants or invertebrates, minimum 5 acres; birds, reptiles, amphibians, fish, minimum 10 acres; mammals, minimum 20 acres. Meeting the minimum acreage for any one species type is sufficient.

2. Site contains one of the following natural communities at or above the respective minimum acreage: upland glade, 1 acre; pine rockland, 1 acre; scrub, 5 acres; rockland hammock, 5 acres; seepage slope, 1 acre; coastal uplands, 1 acre; sandhill, 20 acres; sandhill upland lake, 1 acre; dry prairie, 20 acres; upland hardwood forest, 50 acres; mesic pine flatwoods, 50 acres. Determination will be based on natural community GIS models.

3. Site contains a minimum of 20 acres of a FNAI Potential Natural Area (PNA), priority 1, 2, 3, or 4.

4. Site contains a FNAI Element Occurrence (EO) with a State rarity rank of S1, S2, or S3, and an EO Rank of A, B, or C. If the EO lacks an EO Rank, it must have a Global rank of G1, G2, or G3. The LastObs date of the EO must be less than 20 years old. An EO will be counted as occurring on a site if:

    a. Locational Uncertainty is Negligible; or
    b. Representation Accuracy is High or Very High; or
    c. Entire EO polygon lies within the site boundary.

FNAI will provide a site map and letter to the applicant explaining clearly whether the site meets the criteria for a Locally Significant Natural Area, and if so which criteria are met by the site.

Due to frequent updates of FNAI data and analyses, the LNA criteria may be adjusted slightly from year to year by FNAI. However, FNAI will make no substantial changes to the process without conferring with FCT.

FNAI Rare Species Habitat Conservation Priorities

Measure definition

The FNAI Habitat Conservation Priorities data layer prioritizes places on the landscape that would protect both the greatest number of rare species and those species with the greatest conservation need. We developed the data layer by first selecting species with the greatest conservation need in Florida and developing habitat maps around known occurrences of those species. The Inventory currently has more than 23,000 occurrence records for Florida's rare and endangered species in the form of point locations. For this data layer we wanted to identify habitat areas, based on these point locations that represent the geographic extent of the species occurrence on the landscape. We created habitat polygons only around known occurrences, rather than creating polygons of potential habitat where no occurrence records exist. In using this method, we are able to definitively say that acquisition of a habitat area serves to protect a particular species because we have documentation of the species at that site. The habitats were then ranked based on quality/suitability for the species and the species were weighted based on conservation need. The weighted habitat maps for 248 species were then overlaid to determine overall conservation priorities for Florida's rarest species. The process of selecting species, creating habitat maps, weighting species by conservation need, and building the overlay model is discussed below.

Selection of Species

The Inventory tracks approximately 1,100 rare species in Florida. In order to determine which species to include in this analysis, we considered each species' Global Rank, and the percentage of each species' element occurrences that are protected on conservation lands.

Global Rank

NatureServe and the Natural Heritage Program Network, of which FNAI is a part, assign a Global Rank (GRANK) to each species. This rank reflects the worldwide status of a species, from critically imperiled globally (rank = G1) to demonstrably secure globally (rank = G5). This rank is determined by many factors, including the estimated number of element occurrences, abundance, range, number of adequately protected element occurrences, relative threat of destruction, and ecological fragility. We initially included all species ranked G1 through G3 and all federally listed species regardless of GRANK as potential candidates for habitat modeling.

Percentage of protected element occurrences

The percentage of protected element occurrence records indicates how well a species is represented on conservation lands relative to other species. For example, if species A has only 10% of its occurrences protected vs. 50% for species B, then species A is considered to have greater conservation need. If 100% of the known occurrences are protected on conservation lands, the species was not included on the target list.

Based on these two factors, the following rules were applied to determine the final list of species to be included in the analysis:

Table 2-1. Criteria for Selecting Target Species

G1 species	
Included	ALL
Excluded	IF 100% protected at baseline (Oct 2001) AND 100% protected in Apr 2005
G2 species	
Included	IF less than 10 EOs are protected on managed areas at baseline or in Apr 2005 OR less than 67% of EOs are protected on managed areas at baseline or in Apr 2005
Excluded	IF >20 populations* are protected on managed areas at baseline
G3 species	
Included	IF less than 33% EOs are protected on managed areas at baseline or in Apr 2005
Excluded	IF >20 populations* are protected on managed areas at baseline
Federally Listed	
Included	ALL
Excluded	IF 100% protected at baseline (Oct 2001) AND 100% protected in Apr 2005 OR excluded as recommended by scientists on case by case basis

* populations defined by overlapping buffers.

FNAI scientists reviewed the entire target list and recommended deletions if habitat acquisition in Florida was not a conservation need for the species. Several species were removed from the target list based on this review. Species for which all known occurrences are found on conservation lands also were excluded from the analysis. Federally listed species were automatically included on the target list unless all occurrences are on conservation lands.

Updates to Selected Species

The FNAI Habitat Conservation Priorities are updated every 1 to 2 years based on the most recent element occurrence information. Species may be added or removed from the previous version based on whether they currently meet the selection criteria. Database changes that can influence selection criteria are: 1) GRANK changes- scientists may change the global rank of a species based on new status information; 2) tracking changes- based on new information, FNAI scientists may determine that species not previously tracked should be tracked or vice versa; 3) additional documented occurrences on private lands that may result in species having a greater conservation need; 4) additional documented occurrences on conservation lands that were in existence in October 2001, resulting in a decreased conservation need at baseline.

The current target list contains 248 species, comprised of 142 plants, 64 vertebrates, and 42 invertebrates. All target species included in the analysis are listed in Appendix D.

Creation of Habitat Maps

Each element occurrence record is a point on the landscape that represents a known location of a particular species. In order to delineate the actual habitat area that an element occurrence represents, it is necessary to combine point information with information about the natural communities or landcover type in the vicinity of the occurrence. The most detailed and current landcover information available is the 1995 - 2000 WMD landcover data. For our standard mapping method, we chose to use this data for the basic habitat polygons and cross-check it with other landcover information such as the FWC satellite imagery. We estimated the extent of habitat likely to be occupied based on the biology the species. For

some species, including aquatic species, wide-ranging species, and well-studied species for which information outside our point occurrences is more useful, modifications or alternatives to our standard mapping method were used. The standard mapping method and alternative methods are described in more detail below.

Standard method

In the standard method for developing habitat maps we used ArcView to select suitable landcover polygons within an appropriate distance of a known element occurrence. Buffers to element occurrence points were created based on the biology of each species. For example, Sherman's fox squirrel requires large tracts of land and areas of at least 25,000 km^2 ha are recommended for habitat protection (Kantola 1992). No such information existed for mangrove fox squirrel but we assumed that the two subspecies have similar habitat requirements and thus used a 5000 m radius buffer around occurrence points for mangrove fox squirrel. We relied on published information as well as the scientific expertise of FNAI staff to determine appropriate buffers. These biological buffers were designed for seconds precision occurrence records (for explanation of precision see FNAI Element Occurrences under Basemap Data Layers section); for minutes precision records, for which there is greater locational uncertainty, the original buffer was expanded by one mile. General precision records were not included in the analysis. The seconds precision buffers are listed in Appendix E.

For some species, the known extent of the population, rather than a distance radius, was used to delineate habitat. For example, for most island or keys species all appropriate habitat on the island where the species occurs was selected. FNAI has also mapped boundaries in addition to points for some occurrences. Where these boundaries existed, we used them as the habitat extent. These variations are noted in Appendix E in the radius descriptions.

WMD landcover polygons were intersected with the buffers for each species so that all landcover polygons within the buffer, or any contiguous polygons intersecting the buffer were selected. The selected landcover polygons became the draft habitat map for each species. An example of the standard mapping method is shown in Fig. 2-1. FNAI scientists reviewed these draft habitat maps and identified the appropriate landcover types and habitat extent for each species. The habitat associated with each occurrence was ranked as high, medium, or low based on quality/suitability for the species. For example, a large intact block of "longleaf-xeric oak" might receive a high rank for a sandhill species, whereas a pine plantation or sandhill highly fragmented by agriculture might receive a medium or low rank. These ranks were given numeric scores in the overlay process.
Examples of the final habitat map for *Silene polypetala* showing the habitat categories selected and the habitat rankings are shown in Figs. 2-2 and 2-3.

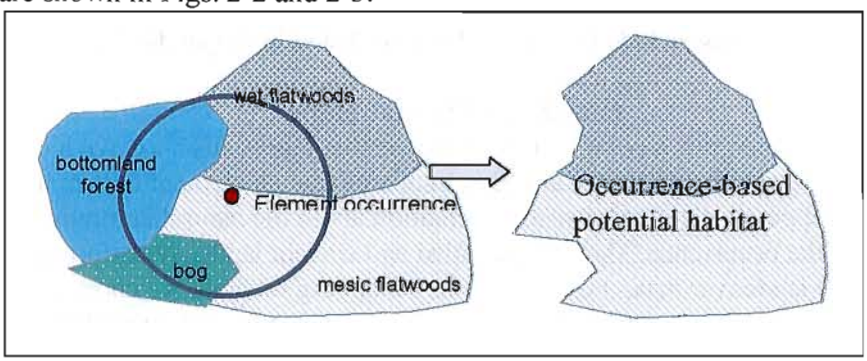


Figure 2-1. Example of the standard mapping method applied to a species that is restricted to flatwoods habitat.

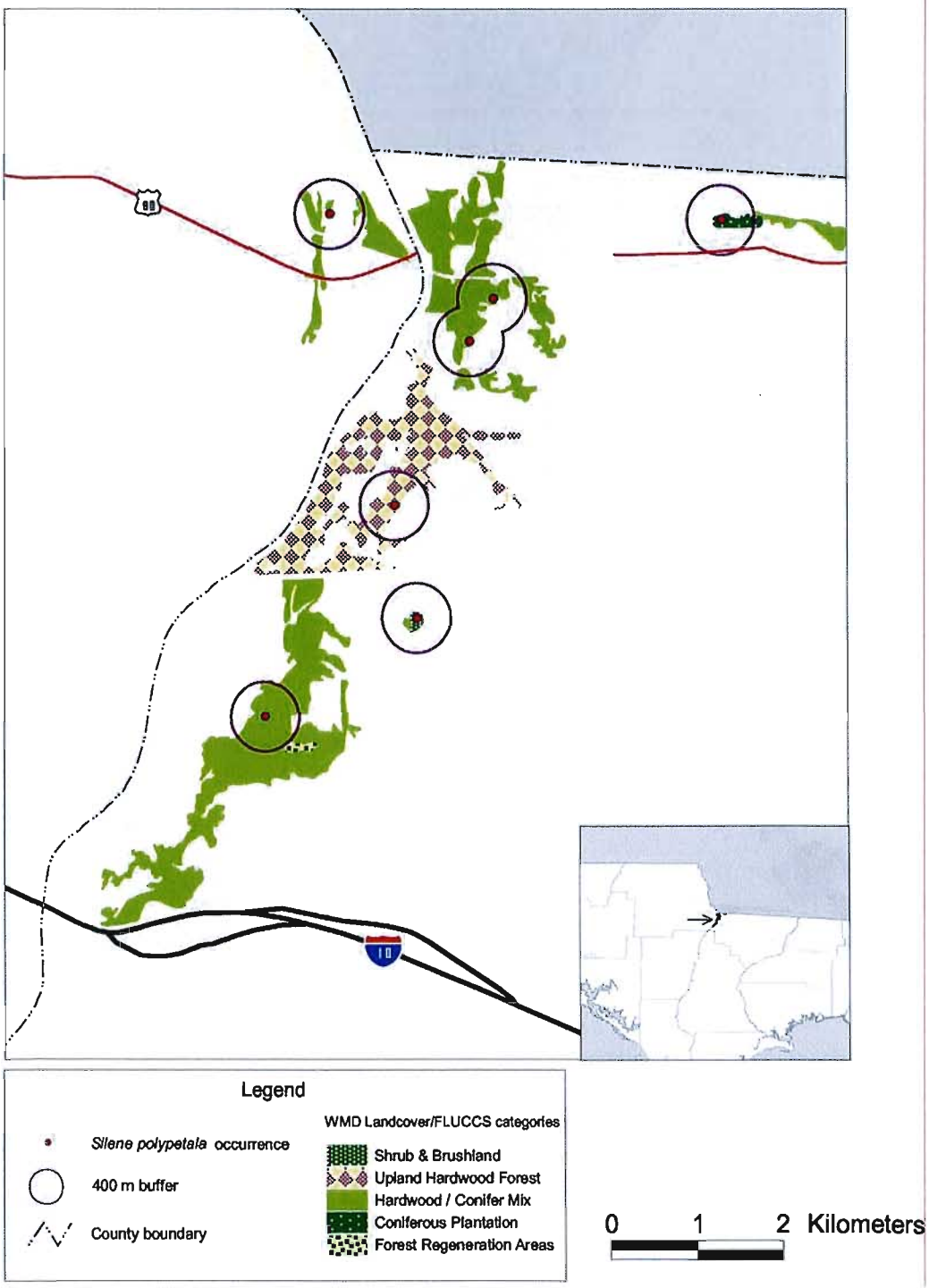


Figure 2-2. Final habitat map using standard mapping method for *Silene polypetala* showing habitat categories selected from WMD landcover.

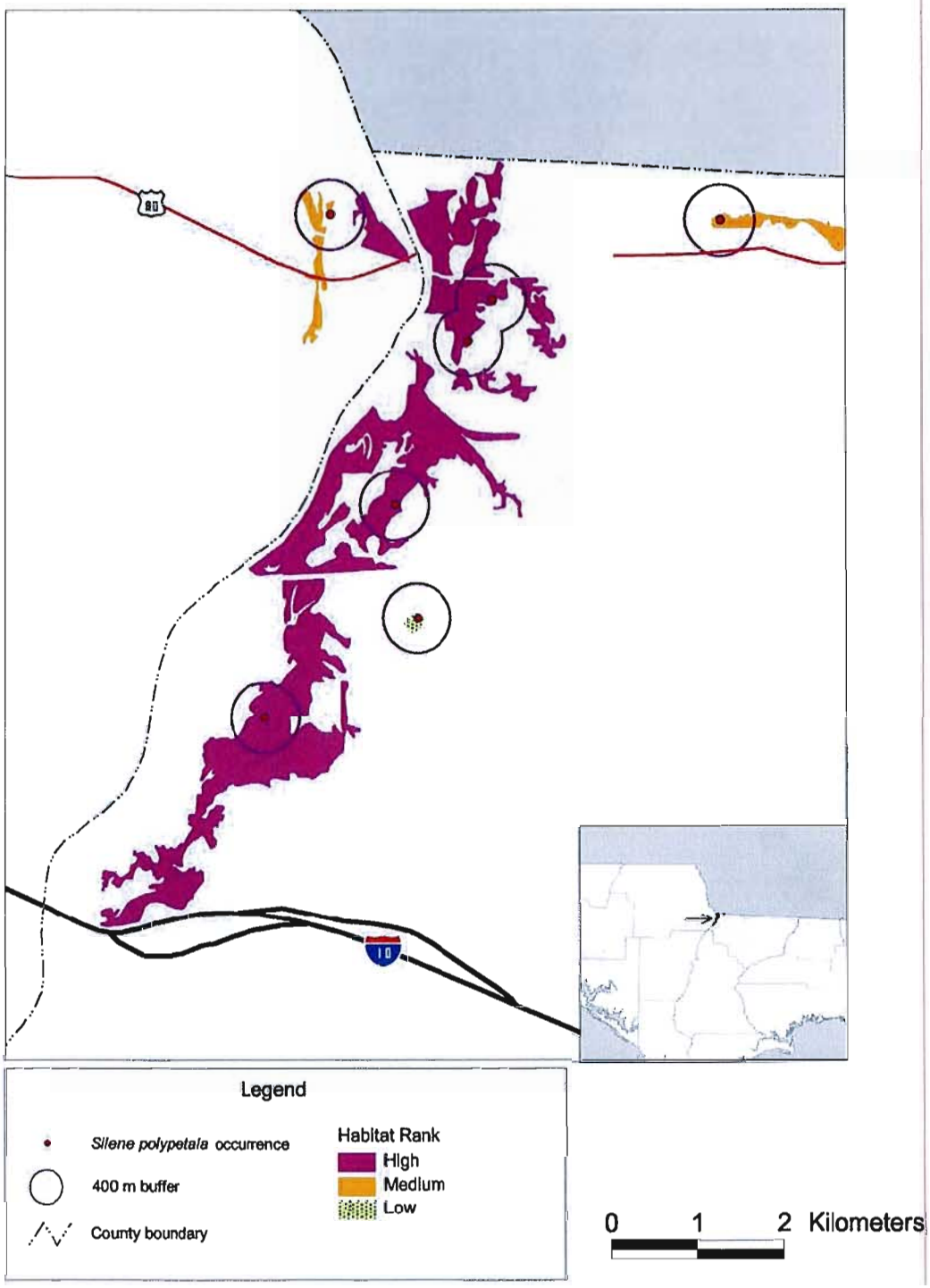


Figure 2-3. Final habitat map using standard mapping method for *Silene polypetala* showing habitat ranked according to quality/suitability for the species.

Alternative Methods

An alternative to the standard mapping method was used for aquatic species, wide-ranging species for which we identified a prioritized subset of the total habitat, and well-studied species (e.g. scrub jay, sea turtles, etc.) for which much information on habitat distribution exists outside the FNAI occurrence data. The following section describes these exceptions to the standard mapping method.

Aquatic, spring, and cave species

Most of Florida's water bodies are state-owned sovereign lands and thus not candidates for a land acquisition program. Conservation needs for many aquatic species, however, extend to the terrestrial habitats buffering these waters; therefore, for fish, freshwater mussels, and other aquatic invertebrates, we identified upland areas that, if acquired, would serve to protect the aquatic habitats in which these species occur. For stream-dwelling species, the linear extent of the stream or river in which each species occurs was delineated. If the extent was unknown, we cut off the extent 1 mile downstream of the most downstream occurrence. The same method applied to upstream occurrences when the upstream extent was unknown. For species inhabiting lakes or ponds the habitat extent included the entire water body. The aquatic habitat was then buffered by 100 m. This buffer was chosen based on research, which determined that a buffer up to 92 m is necessary on either side of a stream to provide required wildlife habitat elements (Leedy et al. 1978). All "natural" uplands (see Appendix C) within 100 m were selected as areas necessary for habitat protection and included as habitat in the model. All wetlands within or contiguous to the 100 m buffer were also selected because of the important role of wetlands in improving or maintaining water quality in adjacent natural waterways (Department of Environmental Protection 1997).

For aquatic cave species, all habitat within 250 m of the element occurrence, excluding water bodies and intensive urban land use (FLUCCS categories not categorized as "natural" or "semi-natural"; see Appendix C), was included in the model. A buffer of 250 m was deemed a reasonable protection zone for aquatic caves and springs. For spring-dwelling species, the spring, or spring run was buffered by 250 m. For gray bat, *Myotis grisescens*, the only terrestrial cave species on the target list, natural landcover
within 400 m of known maternity caves was included as habitat in the model because this buffer helps ensure a forested corridor to the water bodies over which these bats forage.

Grasshopper sparrow

We did not use the standard mapping method for grasshopper sparrow habitat because ongoing survey work provided more up-to-date information on the status of the birds and their habitat than that currently in the FNAI database. In order to delineate habitat for grasshopper sparrow we first identified large polygons (i.e., managed areas boundaries, potential natural areas, or hand-digitized polygons based on the known or estimated extent of sparrow populations) that contained dry prairie habitat. These polygons correspond in large part to the polygons of remaining grasshopper sparrow habitat surveyed by Shriver and Vickery (1999), although we included 3 additional areas of known habitat. Within these polygons we used a combination of FWC satellite imagery ("dry prairie" category) and WMD landcover data ("shrub and brushland" FLUCCS code for SWFWMD; "palmetto prairie" FLUCCS code for SFWMD) to specifically capture dry prairie. We excluded the habitat that Shriver and Vickery (1999) considered unoccupied and poor quality and the unoccupied habitat in Hendry County that was considered to be marginal. We did include some areas of unoccupied habitat if birds were known from the site historically or if large intact areas of dry prairie remained. Shriver and Vickery (1999) recommend that acquisition of all remaining dry prairie habitat should be a conservation priority for

grasshopper sparrow. Quality/suitability ranks for the habitat were assigned based on occurrences of grasshopper sparrows in combination with the habitat classification of Shriver and Vickery (1999). Occupied habitat received a high rank in our analysis. Unoccupied habitat classified as high quality by Shriver and Vickery received a medium rank in our analysis, and unoccupied habitat classified as marginal by Shriver and Vickery received a low rank.

Florida scrub-jay
The scrub-jay habitat is based on polygons from the 1992-93 Statewide Mapping Project (SMP) delineating scrub patches and occupied scrub-jay territories (Fitzpatrick et. al. 1994). We used only those patches that were occupied according to the SMP and subsequent update by Mr. Bill Pranty* of Archbold Biological Station (*currently with Audubon of Florida). For territories that existed outside scrub patches ("suburban jays" as defined by Stith 1999) we used territory polygons delineated by Stith (1999) in his acquisition map models. The habitat patches were ranked by considering the disturbance classification of each patch as determined by the 1992- 93 SMP, the number of scrub-jay territories present, and the metapopulation vulnerability rankings and acquisition target recommendations of Stith (1999).

Sea turtles and plovers
The five sea turtles known from Florida are loggerhead, green turtle, leatherback, hawksbill, and Kemp's ridley. We included the beach polygons from WMD landcover data that corresponded to the extent of nesting beaches for each species as delineated by Florida Fish and Wildlife Conservation Commission, Florida Marine Research Institute (2000). The habitat was ranked based on relative density of nests (Florida Fish and Wildlife Conservation Commission, 2000), hence suitability/importance, for each species.

Two plovers are included in this analysis: snowy plover, which nests on the Gulf coast of Florida; and piping plover, which winters along the Atlantic and Gulf coasts. We included the beach polygons from WMD landcover data that corresponded to the extent of nesting (for snowy plover) or wintering (for piping plover) beaches as determined by FNAI element occurrence records.

Bald eagle
We buffered bald eagle nest points (Florida Fish and Wildlife Conservation Commission, 1999 – 04 Bald Eagle survey data) by 2 km, the USFWS recommended buffer zone (1987; primary zone = approx. 400 m, plus secondary protection zone = 1600 m). All urban land use polygons (FLUCCS categories not categorized as "natural" or "semi-natural"; see Appendix C) were removed from the resulting map. We chose to focus only on habitat associated with nesting because nests are more of a limiting factor for bald eagles than foraging areas. The habitat was ranked primarily according to density of nests in an area. The habitat was buffered by 1000 m and where these buffers were contiguous for at least 30 nests, the habitat was ranked high. This included areas known to be important for bald eagles such as the lakes in southeastern Alachua County, Lake George, the lakes of Seminole and southern Volusia Counties, the chain of lakes on the Osceola-Polk county border, and coastal Citrus and northern Hernando Counties. We also gave a high rank to the habitat around Charlotte Harbor, although there were fewer than 30 contiguous sites. All other sites with 3 – 30 contiguous sites received a medium rank and the more isolated sites received a low rank.

Red-cockaded woodpecker
We delineated habitat for red-cockaded woodpeckers (RCW) by first identifying large polygons (i.e., managed areas boundary or hand-digitized polygons based on known or estimated extent of population) around RCW colonies. The colonies were represented by FNAI element occurrence data and data provided by Jim Cox et. al. (1995). The polygons around colony sites represented areas needed to protect cavity trees, not necessarily foraging areas. We then selected pine landcover types, using a combination of FWC satellite imagery and WMD landcover data, that were within or contiguous to the larger polygon boundaries.

Black Creek crayfish
Black Creek crayfish are known from the North and South Forks of Black Creek and their tributaries (Franz and Franz 1979). As habitat, we used the "wetland forested mixed" WMD landcover polygons, which followed the Black Creek drainage very closely.

Snail kite
We used our standard habitat mapping method in combination with areas designated as critical habitat for snail kite (USFWS, 1981). With the standard method we captured freshwater marshes and the shallow vegetated edges of lakes using WMD landcover with a 10 km radius of the element occurrence. We also captured the same habitat types within the "critical habitat" boundaries.

Wood stork
For wood storks we applied the standard habitat mapping method, capturing all wetlands within a 30 km radius of rookery sites. This differs from most other habitat maps in two respects: (1) the large size of the buffer, and (2) the broad criteria for selecting appropriate habitat polygons. The large buffer was chosen because wood storks feed far from the nesting colony (mostly between 5 and 40 miles) and feeding habitat is the primary limiting factor (Ogden 1990). Wood stork decline is attributed to loss and degradation of feeding habitat. The 30 km buffer was used to capture core foraging areas based on Cox et al. (1994). Habitat was then ranked based on proximity to the nesting colony. Wetlands within 15 km of a rookery were ranked as high and those at a distance of 15–30 km were ranked as medium. All wetland habitat polygons within these buffers were selected. Wood storks will feed in almost any shallow wetland depression where fish tend to be concentrated (Ogden 1990). Ogden (1990) also emphasizes the importance of protecting many different wetlands, with both long and short annual hydroperiods, in order to maintain the wide range of feeding site options required by wood storks.

Sandhill crane
We used multiple sources of information to map sandhill crane habitat. First, we buffered FNAI element occurrences by 1,200 meters (2,800 meters for minute precision; general precision were excluded). This buffer distance was based on the published homerange size of 447 hectares for sandhill cranes (Rodgers et al. 1996). For a starting basemap, we used all WMD landcover natural and semi-natural polygons. In this case we also included FLUCCS type 2150, Field Crops, as cranes are known to forage in these areas. The above WMD polygons were selected if they intersected a) EO buffers; b) EO boundary polygons; or C) FWC breeding bird atlas blocks (Kale et. al 1992) with probable or confirmed sandhill cranes. From this selection, the following landcover types were removed: low density residential (FLUCCS 1000 – 1200), forested uplands and wetlands (4000 – 4999; 6100 – 6399), and spoil, borrow, and fill areas (7420 – 7440). Finally, scrub was removed using the scrub community data layer developed by FNAI for this assessment (see Under-represented Natural Communities section in this report).

Further review of sandhill crane habitat in the Everglades and Loxahatchee National Wildlife Refuge areas led to further refinements. In this region, several WMD landcover wetlands polygons were initially included because they intersected FWC breeding bird atlas blocks. However, these polygons are quite extensive, and continue into areas where sandhill cranes were not reported in the breeding bird atlas project. We therefore included only portions of those polygons within the actual breeding bird atlas blocks where cranes are probable or confirmed.

Eastern indigo snake
Moler (1992) reported homeranges of 215 – 250 acres for eastern indigo snakes. Assuming a population of 50 snakes at 250 acres, an area of 12,500 acres would be needed to sustain the population. We buffered FNAI element occurrences of indigo snake by 4.4 km to achieve an area of 15,000 acres, knowing that not all of the acreage would be suitable habitat. Within the buffers, we selected all "natural" and "semi-natural" landcover types, except the following: saltmarsh (6420), aquatic vegetation (6440-6450), non-vegetated wetlands (6500-6890), beaches (7100), and spoil (7430 – 7440). We did not include isolated populations if the amount of available habitat selected by the buffer was less than 10,000 acres for inland populations, or less than 1,000 acres for coastal populations.

Many landcover polygons selected by the buffers were exceedingly large and stretched for a large area beyond the buffer. We therefore selected all polygons where less than 20% of the polygon area was within the buffer. These polygons were clipped by the buffer so that they did not extend beyond it.

Species experts
For species that receive much conservation attention and for which better information than FNAI occurrence data may exist, we consulted with species experts. We conducted workshops for Florida black bear and manatee, in which experts identified lands that should be acquisition priorities. A similar process was used to identify priority habitat for Florida panther. Randy Kautz, FWC, coordinated with experts familiar with panther habitat in southwest Florida to create this habitat data layer and provide it for use in the model. For these wide-ranging species, we included this prioritized subset of lands in the model, rather than all habitat used by these species. The workshops are described in more detail below. We also consulted experts on habitat priorities for fish, freshwater mussels, scrub-jay, sea turtles, and red-cockaded woodpeckers. In addition, we used information from published sources. All sources are identified in Appendix E.

<u>Wide-ranging species</u>
Identification of land acquisition priorities for wide-ranging species such as Florida black bear, Florida panther, and manatee is problematic because of the large areas needed and the limited amount of land acquisition funding. Cox et al. (1994) identified 1.04 and 1.65 million acres of SHCAs as being necessary to support viable populations of panther and black bear, respectively. Given that it is unlikely that Florida Forever can purchase all the land needed for even one of these wide-ranging species and also meet other biodiversity conservation needs, it was necessary to identify and rank those lands most important to conserve these species.

Florida black bear workshop
The Florida black bear workshop was held on May 11, 2000 at Florida Natural Areas Inventory. The workshop was attended by the following: John Kasbohm (U.S. Fish and Wildlife Service [USFWS]), Harold Morrow (USFWS), Tom Hoctor (University of Florida), Dale Jackson (FNAI), Amy Knight (FNAI), Jon Oetting (FNAI), Christine Small (Defenders of Wildlife), Thomas Eason (FWC), Terry

Gilbert (FWC), Walter McCown (FWC), Jayde Roof (FWC), Robert Kawula (FWC), Dan Sullivan (FWC), Cory Morea (FWC), and Randy Kautz (FWC). In addition, written input was received from David Maehr (University of Kentucky) and John Wooding (private consultant). The meeting was in part facilitated by Randy Kautz, FWC, who provided base maps and agreed to compile the results of the workshop. He also summarized the workshop results in an informal report (Kautz, 2000). That report, as excerpted here, will serve as official documentation for the workshop.

From Kautz (2000):

> Workshop attendees agreed to use the black bear potential habitats and SHCAs mapped by Cox et al. (1994) as the basis for ranking. The attendees reached consensus that the population of black bears on and around the Ocala National Forest (NF) is the population in greatest jeopardy of loss of habitat to development and, therefore, is highest priority for protection. The attendees also acknowledged that the Apalachicola NF population of black bears is expanding to the east, and that habitat in the vicinity of the Aucilla River (Jefferson County) and south through the Big Bend region is important to this expanding population. Over the long-term, protection of habitats in the Big Bend region has the potential to provide a landscape linkage to the small and isolated Chassahowitzka population in Citrus and Hernando counties. General consensus was reached on the following points: (1) the black bear population centered around Eglin Air Force Base (AFB) appears to be small, but development pressure in this area is not too great at the present time; (2) although protection of the landscape connection between Osceola NF and Okefenokee Swamp National Wildlife Refuge (NWR) is important, habitats in this area are under less development pressure than other areas; and (3) black bear habitat in the vicinity of Big Cypress National Preserve (NP) is under intensive development pressure, but these habitats would be conserved by land acquisition efforts aimed at the endangered Florida panther. Finally, workshop attendees reached consensus that black bear habitat in Glades County and a landscape linkage between Ocala and Osceola national forests are important but lower priority habitat conservation needs.
>
> After reviewing a map of black bear SHCAs and discussing black bear habitat conservation needs, workshop attendees reached consensus on the following priorities (Figure 1), ranked and scored in order: (1) the black bear SHCA south of Ocala NF in the Wekiva River area; (2) the black bear SHCA south and east of Ocala NF in southern Flagler and northern Volusia counties; (3) the black bear SHCA in the vicinity of the Aucilla River; (4) the black bear SHCA northeast, north, and northwest of Ocala NF, and black bear potential habitat between US 98 and the coast through the Big Bend region; (5) the black bear SHCA north of Big Cypress NP; (6) the black bear SHCAs around Eglin AFB, Apalachicola NF, and Osceola NF; and (10) black bear potential habitat in Glades County, and potential habitat forming a landscape linkage between Ocala and Osceola national forests. Note that workshop attendees purposely did not assign ranks of 7-9 to any areas of potential black bear habitat, choosing instead to assign a ranking of 10 to both the Glades County potential habitat and the landscape linkage between Ocala and Osceola national forests. These latter areas were deemed important habitats for black bear conservation, but the ranking of 10 was intended to indicate that they are of lower priority. In addition, workshop attendees indicated that those areas of potential black bear habitat in Taylor, Dixie, Levy, and Citrus counties between US 98 and the coast would be ideal candidates for conservation easements designed to maintain the existing land use (i.e., pine plantations).

Florida panther
The habitat model for Florida panther is based on the Landscape Conservation Strategy for Florida Panther in South Florida (Florida Panther Subteam of the Multi-speices/Ecosystem Recovery Implementation Team for South Florida, 2002) and includes a primary zone, secondary zone, and dispersal zone. The habitat zones were prioritized based on the recommendations of this report: Primary zone is Priority 1; dispersal zone is Priority 2; secondary zone is Priority 3. In order to be consistent with the occurrence-based habitat modeling approach for used for other species, we further modified the habitat model so that land use polygons not considered natural or semi-natural (such as citrus grove) that did not intersect any panther radio-tracking points (or element occurrences) were removed.

Manatee workshop
The manatee workshop was held on May 12, 2000 at the Alachua County Public Library in Gainesville, Florida. The workshop was attended by the following: Bob Bonde (U.S. Geological Survey, Caribbean Science Center [USGS]), Lynn Lefebvre (USGS), Jim Reid (USGS), Cam Shaw (U.S. Fish and Wildlife Service [USFWS]), Jim Valade (USFWS), Kent Smith (FWC), Leslie Ward (Florida Marine Research Institute [FMRI]), Tom Pitchford (FMRI), and Amy Knight (FNAI). The participants represented expertise from around the state.

The manatee group proposed that there be three categories of protection for manatees: 1) watersheds; 2) recharge areas for springs; and 3) buffers to important surface waters. The members conceded, however, that full watershed protection for manatees was outside the scope of a ten-year land acquisition program. The group, therefore, focused on important manatee sites that are currently unprotected.

The group first identified waterways and springs that are important habitat for manatees. Members of the group nominated sites and categorized them as sites where it is important to establish upland buffers, or to protect recharge, or both. Forty-two "buffer" sites and 7 "recharge" sites were identified. The group then prioritized the sites into six groups based on relative importance to manatees and potential threats.

In order to map recharge areas, FNAI agreed to consult with groundwater experts to obtain paper or digital maps of recharge areas critical to the seven spring systems identified by the group. Subsequent discussions with experts from the water management districts, U. S. Geological Survey, and Department of Environmental Protection, including members of the Springs Task Force, revealed that this information was not readily available. Although some recharge information for some springs does exist, it is not consistent statewide. In addition, some of the recharge areas that have been mapped are large and do not fit the goal of habitat mapping that we were trying to achieve with this process. Several weeks after the workshop we informed the participants of these difficulties and reached consensus among the members that we would only map the buffers for these waters.

At the workshop the group agreed that the buffer should capture floodplain wetlands and at least 1000 feet of uplands around the water body. The rationale for the 1000' buffer was a Pollutant Loading Assessment of Sarasota Bay that reports that a 900-foot setback from surface waters for septic systems would protect the Bay from additional nutrient loading (Sarasota Bay National Estuary Program, 1992). This was the buffer used in the Version 1.1 of the Conservation Needs Assessment. This mapping method, however, is not consistent the method we used for other aquatic species. In order to make the manatee habitat more consistent with that mapped for other rare aquatic species we we used 1995 Water

Management District Land Cover data to identify natural uplands within 100m of target water bodies. We then selected wetlands using the WMD land cover that were within and/or contiguous with the 100m buffer. Because in some cases a single wetland polygon could cover many thousands of acres, we only included wetlands that were within 300m of the water body. We also removed "non-natural" landcover polygons (Appendix C) from the final habitat. The 49 final prioritized sites are listed in Table 2-2.

Table 2-2. Manatee habitat areas identified and prioritized for acquisition by manatee workshop participants.

Site Name	Priority	**Site Name**	Priority
Blue Spring	1	Little Manatee River	3
Caloosahatchee River	1	Loxahatchee River	3
Chassahowitzka Complex	1	Rookery Bay	3
Crystal River/Kings Bay	1	St. Lucie River	3
Estero Bay	1	Terra Ceia	3
Homosassa Springs	1	Tiger Island to Amelia River	3
Matlacha Pass	1	Lower Suwannee River	3
St. Johns River	1	Nassau River	4
Turtle Bay/Bull Bay	1	St. Mary's River	4
Warm Mineral Springs	1	Weekiwachee	4
Merritt Island, esp. west side	1	Biscayne Bay	5
Jupiter Sound	2	Eau Gallie Creek	5
Lake Worth	2	Spring Creek	5
Little River & Southeast Canals	2	Spruce Creek	5
Manatee River	2	Turkey Creek	5
Myakka River	2	Turnbull Bay	5
Peace River	2	Wakulla/St. Marks	5
Sarasota Bay to Lemon Bay	2	Anclote River	6
Sebastian Creek	2	Apalachicola River	6
St. Lucie Inlet to N. Jensen Beach	2	Pithlachascotee	6
Tomoka River	2	Steinhatchee River	6
Tomoka to Merritt Island	2	Sulphur Spring	6
Vero to Ft. Pierce Inlet	2	Wacasassa River	6
Alafia River	3	Withlacoochee River	6
East side of Old Tampa Bay	3		

Habitat Overlay Process

The goal of the overlay process is to prioritize places on the landscape that would protect both the greatest number of rare species and those species with the greatest conservation need. In order to achieve this, habitat for each species was weighted based on the species' conservation need. The conservation needs weight and overlay methods are described below.

Conservation Needs Ranking

Prior to weighting habitat, the 248 species were assigned a conservation needs ranking based on rarity and current protection status on public lands. This method differs from the original scoring method for selecting target species in that we were able to use the habitat acreages, which are more informative than point occurrences, and we did not consider the federal listing status in ranking species according to conservation need. The ranking method considered a species' GRANK, acres of total habitat, and percentage of habitat on conservation lands. The points assigned for each of these criteria are shown Table 2-3. The conservation needs rank was calculated by summing the points for each criteria.

Table 2-3. Criteria and points used to score species by conservation need.

GRANK	
G1	10
G2	8
G3	6
G4-G5	3
Percent protected	
0-10%	10
11-25%	8
26-40%	6
41-60%	4
61-90%	2
>90%	0
Total habitat acres	
0-100	10
100-1,000	9
1,000-10,000	8
10,000-100,000	7
100,000-1,000,000	6
>1,000,000	5

In order to ensure that the special status of true G1 species (not sub-species with G1 rank) was reflected in the conservation needs ranking, an additional point was given to those species. Another adjustment was made to the scoring for species with large area requirements. Because the point system assigns diminishing points as total habitat acres increase, it is biased against those species that require large areas for survival. Therefore, those species received an additional 3 points. Species that received additional points for having the large-area requirements are so noted in Appendix D.

The species were then grouped into 5 groups, A through E, based on their conservation needs ranking. Species in group A represented those species with the highest conservation need, primarily G1 species whose habitat is currently unprotected. Species in Group B are primarily G1 and G2 species with some

degree of habitat protection (generally <30%). Species in Group C are a mix of G1 – G3 species with a moderate degree of habitat protection (generally 30 – 60%). Species in Group D are a mix of G1- G3 species whose habitat is >50% protected. Species in Group E are primarily G2 and G3 species whose habitat is fairly well protected (generally >65%). All scores and final conservation needs groups are given in Appendix D.

Weighting of Habitat

The habitat for all species within a group received the same weight factor in the overlay process. The weight factor was assigned on a scale of 1 – 10 with Group A species receiving a weight of 10. We determined the weight factors by considering the conservation need of species in each group relative to those in the other groups. For example, we decided that the protection need for species in group A (weight = 10) was more than twice that of species in group C (weight = 4). Thus, a patch of habitat that supports a single species in Group A would still rank higher than a patch that supports two overlapping species in Group C. Weight factors for all groups are shown in Table 2-4.

Table 2-4. Weight factors for species grouped according to conservation need.

Group	Ranking Points	Weight factor
A	27 - 30	10
B	24 - 26	7
C	21 - 23	4
D	18 - 20	2
E	0 - 17	1

Habitat quality/suitability score

As discussed in the map creation section, all habitat polygons associated with a specific occurrence were assigned a quality/suitability rank of high, medium, or low. These ranks were translated into numeric scores of 10, 6, and 3, respectively.

Overlay method

The habitat maps for each species were originally created as individual ArcView shapefiles. In order to do the mathematical overlay, these data first had to be converted to grid files. This conversion resulted in 248 separate grid files, one for each species, with a cell size of 30 m^2. Each cell retained a value of 10, 6, or 3 based on its habitat quality/suitability score.

The habitat grids within each conservation need category were added and the resulting grid was multiplied by the conservation need weight factor for that category. The resulting 5 weighted grids were then added together. This resulted in a habitat model with cell values ranging from 2 to 584. The model values were then grouped into 6 priority classes. The Priority 1 class captures all of the highest ranked habitat for the species with the greatest conservation need (group A); priority 2 class captures the entire highest ranked habitat for group B species; priority 3 captures the highest ranked habitat for group C species; priority 4 captures the highest ranked habitat for group D species; priority 5 captures the highest ranked habitat for group E species; priority 6 includes all remaining habitat. The value range and acres for each class are given in Table 2-5. A map of this data layer is shown in Fig. 2-4.

Table 2-5. Acres and value range for 30 m grid cells within each priority class of the FNAI Rare Species Habitat Conservation Priorities.

B2: FNAI Habitat Conservation Priorities	Value Range	Total Acres	Baseline Acres Protected July 2001
Priority 1	100 - 584	480,900	184,000
Priority 2	70 - 99	1,444,200	933,000
Priority 3	40 – 69	4,405,500	1,667,100
Priority 4	20 - 39	5,004,100	1,867,800
Priority 5	10 - 19	5,100,300	1,782,200
Priority 6	2 - 9	2,222,800	457,100
TOTAL		**18,657,800**	**6,891,100**

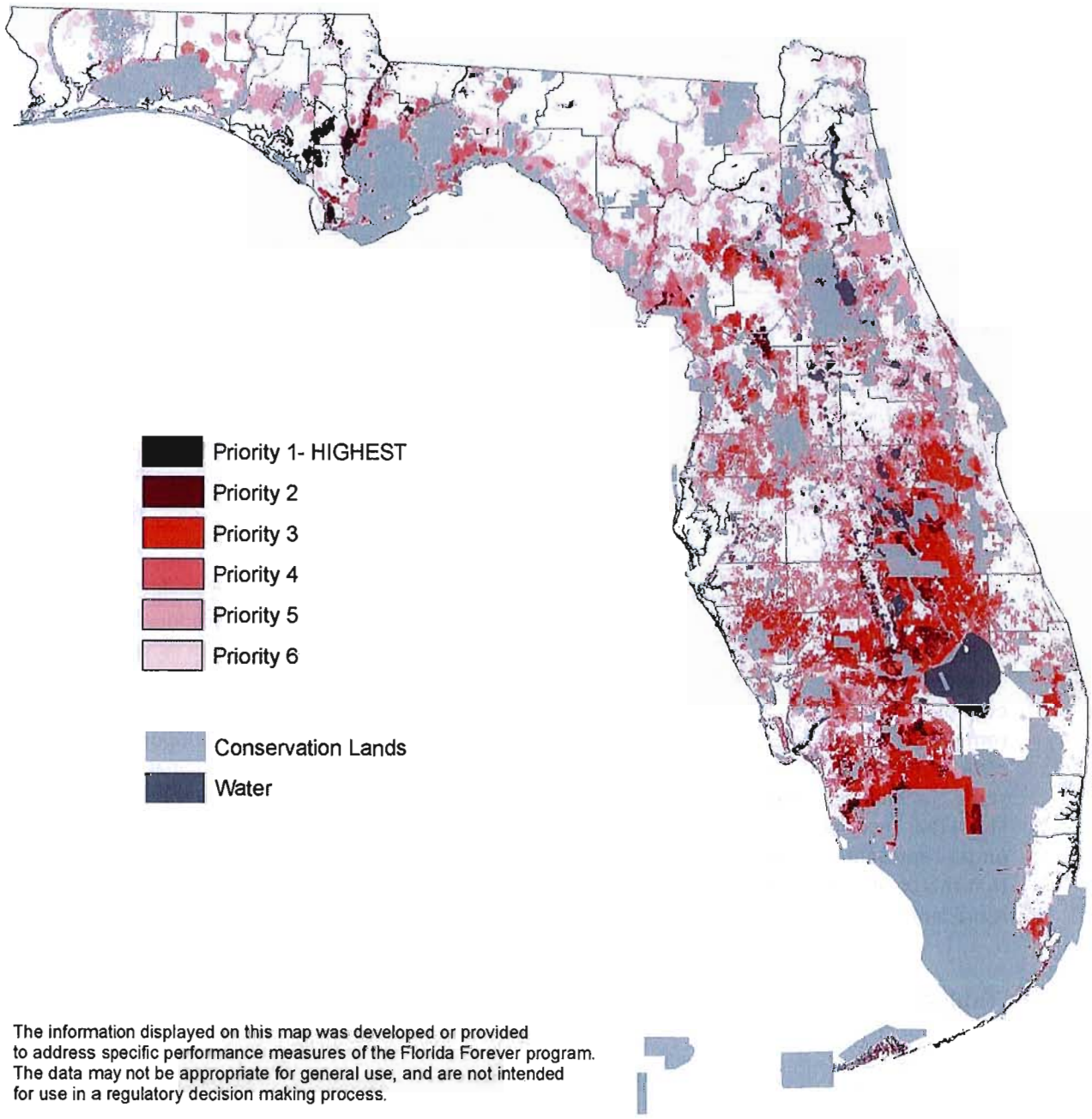


Figure 2-4. FNAI Rare Species Habitat Conservation Priorities
Source: Florida Natural Areas Inventory

Under-represented Natural Communities

Measure B4: The number of acres acquired of under-represented native ecosystems.
Source: Florida Natural Areas Inventory

Measure Definition

Depending on the classification system followed, Florida features as many as 81 different natural community types (FNAI 1990). Many of these community types, particularly wetland communities, are relatively well-represented on existing conservation lands, and therefore are less of a priority for land acquisition than some of Florida's rarest communities that are currently not well-protected.

Methods

The 1997 *Florida Preservation 2000 Program Remaining Needs and Priorities Report* (Brock 1997) identified natural community types that were inadequately represented on conservation lands in Florida. Since that time, the Office of Environmental Services (OES), Florida Department of Environmental Protection, has regularly reported progress toward protecting additional acres of natural communities through land acquisition. Based on the OES criteria, a natural community is considered to be inadequately represented on conservation lands if less than 15% of the original extent of that community is currently found on existing conservation lands.

Table 4-1 lists those communities that were included in the data layer for measure B4, based on the OES criteria. The original acreages were calculated from a map of historic vegetation produced by Davis (1967). Remaining acreages were calculated based on the individual natural community data layers developed for this measure, as described below. Seepage slopes and upland glades were not identified as distinct communities on the original Davis map, so we are unable to report the percent of original acreage remaining. However, seepage slopes are known to be a rare community type that supports a large number of rare endemic plant species. Recent estimates suggest that less than 1% of the original extent of seepage slope communities remain (FNAI 1990). Upland Glade is also a very rare community (ranked G1/S1 by FNAI) that supports endemic plant species. In 2007, we added sandhill upland lake and dry prairie as under-represented types. Although we do not have a historic map of sandhill upland lake, we can assume that this community is under-represented because the associated sandhill community is under-represented.

Table 4-1. Natural community types considered to be under-represented.

	ORIGINAL	REMAINING	PERCENT REMAINING	PROTECTED	PERCENT OF ORIGINAL PROTECTED
Pine Rocklands	224,000	24,840	11	20,600	9
Upland Glades	n/a	1,600	-	220	-
Tropical Hardwood Hammock	296,000	19,100	6	11,600	4
Scrub	979,000	375,490	38	286,800	29
Dry Prairie	1,205,000	983,700	82	221,300	18
Seepage Slope	n/a	4,700	-	3,800	-
Sandhill	6,943,000	768,100	11	317,900	5
Sandhill Upland Lake	n/a	95,000	-	15,000	-
Upland Hardwood Forest	1,635,000	230,300	14	18,800	1
Pine Flatwoods	12,558,000	2,928,200	23	1,066,300	8

Taken as a whole, the scrub community type appears to be fairly well protected based on Table 4-1. However, much of the scrub on conservation lands is located in the Ocala National Forest. If scrub other

than that in the Ocala region is considered, 84% of the original scrub extent is unprotected. Scrub is also a community that supports a large number of endemic species, particularly in the Lake Wales Ridge region.

Dry prairie also exceeds the 15% threshold. However, this community type is rare and experts agree it should be considered under-represented. It is critical habitat for the endemic Florida grasshopper sparrow.

For each community type, we developed a preliminary data layer showing community extent. Where overlap existed among the preliminary layers, a set of rules was developed to assign overlap areas to a single community. The process is explained below.

Seepage Slope

No existing land cover data includes seepage slope/bog as a distinct community type. Therefore, several plant species were chosen as indicators of the occurrence of seepage slope communities. These same plant assemblages are characteristic of coastal wet prairie in the panhandle, which is also included as part of the seepage slope/bog layer. The following species, along with seepage slope occurrence records, were included as indicators of seepage slope/bog communities in this analysis:

Sarracenia leucophylla	white-top pitcherplant
Sarracenia rubra	sweet pitcherplant
Lachnocaulon digynum	bog button
Plantanthera integra	yellow fringeless orchid
Pinguicula ionantha	violet-flowered butterwort
Parnassia caroliniana	Carolina grass-of-parnassus
Asclepias viridula	southern milkweed
Justicia crassifolia	thick-leaved water-willow
Ruellia noctiflora	white-flowered wild petunia
Xyris drummondii	Drummond's yellow-eyed grass
Xyris scabrifolia	Harper's yellow-eyed grass

Element occurrences for these species were selected from the FNAI database. Occurrences were excluded if their descriptions indicated that habitat was significantly disturbed. Minute and general precision occurrences were also excluded, since point occurrences at these levels of precision cannot be associated with a specific location on the landscape. A 100 m buffer was created around the remaining occurrences. Within this buffer, polygons of landcover types from the 1995 WMD landcover data that were included in the "natural" and "semi-natural" land cover subsets (see Tables 1 and 2) were selected to form the preliminary Seepage Slope community boundary for each occurrence. In addition, we included extensive wet prairie polygons in southern Escambia county (based on DEP/Division of Recreation and Parks natural community map and 2004 aerial photography) and Garcon Point area of southern Santa Rosa county (based on 2004 aerial photography).

Upland Hardwood Forest

Comparing current with historic distributions of upland hardwood communities can be misleading, because pine-dominant communities are known to succeed to hardwood-dominant communities in the absence of fire (Platt and Schwartz 1990). With widespread fire-suppression across much of Florida in recent decades, the distribution of hardwood communities has likely spread into historic pine forests. We therefore considered only the historic distribution of hardwoods, based on Davis (1967), in developing our remaining upland hardwood natural community data layer. In calculating historic acreage of upland hardwood forests, we divided the historic distribution from Davis into temperate and tropical hardwoods, based on

Figure 7.1 of Platt and Schwartz (1990). Only the temperate hardwoods were considered in the present Upland Hardwood Forest category.

Within Davis' Hardwood Forest and Mixed Hardwood and Pine categories, polygons from the 1995 WMD landcover data that corresponded to FLUCCS categories 420 – 439 (except 422, 424, and 426) were selected. Next, areas identified as wetlands in the National Wetlands Inventory, and areas identified as pine forest categories (Pinelands, Sand Pine, Sandhill) in the FWC satellite imagery, were removed.

Finally, FNAI PNAs (see page 4) were overlaid onto the remaining areas, and only those areas within PNAs were selected as the preliminary Upland Hardwoods data layer. This layer represents areas of relatively intact undisturbed upland hardwoods within the historic temperate upland hardwood forest distribution.

Pine Rocklands

For the purposes of this analysis, the distribution of pine rocklands was determined to be pinelands within the Miami Rock Ridge Pinelands and Long Pine Key in Miami-Dade County, and the Florida Keys in Monroe County. An area of limestone outcropping also occurs in the Big Cypress Swamp in Monroe County (Snyder et al. 1990) but was not included in this analysis. That area does not include the suite of endemic plant species found in the rocklands of Miami-Dade County and the Keys.

Several landcover and/or habitat data layers have been developed or updated since the original pine rocklands mapping work in 2000. Pine rocklands were therefore revised based on the following criteria:

1. Miami-Dade County developed a GIS file of ownership parcels in the county that contained pine rocklands. Each of these parcels was inspected using 2004 DOQQ aerial photography, and pine rockland polygons were digitized. These polygons were considered sufficient to be designated pine rocklands, without confirmation from other data sources.

2. Pine rocklands on Long Pine Key in the Everglades were inspected using 1999 WMD landcover (FLUCCS 410-411) and 2004 DOQQ aerial photography. The FLUCCS pine polygons were found to correspond closely to pine rocklands on Long Pine Key, so these polygons were considered sufficient to be designated pine rocklands, without confirmation from additional data sources. Note that WMD landcover elsewhere in the range of pine rocklands was not considered sufficient to be designated pine rocklands (see section 4b below).

3. The following two data layers were considered sufficient to identify pine rocklands *only if* they were confirmed by one additional data source:

   a. Monroe County recently developed a ground-truthed landcover data set for the Monroe County Keys. This landcover included a category of polygons labelled "pinelands".

   b. Element Occurrence polygons for Pine rockland or pine rockland-dependent species from the FNAI Element Occurrence database.

4. The following three data layers were also used to confirm pine rocklands identified by the data listed in section 3 above. These layers were not considered sufficient to identify pine rocklands even if overlapping with the other layers in this section:

   a. "Pinelands" category from the 2003 FWC landsat landcover.

b. 1999 WMD landcover FLUCCS categories 410-411 (see exception in section 2 above).

c. Monroe County landcover data, "freshwater pine" category.

Tropical Hardwood Hammock

In Florida, temperate hardwood forests grade into tropical hardwood hammocks over a broad area that, generally speaking, extends along the Gulf coast from Pinellas County south to Lee County, across the peninsula south of Lake Okeechobee, and along the Atlantic Coast from Martin County north to Volusia County (Platt and Schwartz 1990). Originally, all hardwood forests identified from this region southward were classified as Tropical Hardwood Hammocks. However, in December 2005, this category was revised to specifically refer to "rockland hammocks" – those tropical hardwood hammocks occurring within the Miami Rock Ridge and Long Pine Key in Miami-Dade County, the Florida Keys, and a small additional area of tropical hammock identified from a limestone outcrop area in the Big Cypress Swamp. Other "tropical hardwood hammocks" along the southwest and southeast coasts of Florida will now be included in the Coastal Uplands data layer. Consequently, Tropical Hardwood Hammock is now classified as a G2 community (rockland hammock), rather than G3 (maritime and other hammock types).

Like pine rocklands, several landcover and/or habitat data layers have been developed or updated since the original tropical hardwood hammock mapping work in 2000. Tropical Hardwood Hammock was therefore revised in December 2005 based on the following criteria:

1. Miami-Dade County developed a GIS file of ownership parcels in the county that contained tropical hardwood (rockland) hammocks. Each of these parcels was inspected using 2004 DOQQ aerial photography, and hammock polygons were digitized. These polygons were considered sufficient to be designated tropical hardwood hammock, without confirmation from other data sources.

2. FNAI scientists conducted field surveys and mapped natural communities on the Florida Keys Wildlife and Environmental Area (managed by FWC) in 2005. Polygons mapped as "rockland hammock" were also considered sufficient to be designated tropical hardwood hammock, without confirmation from other data sources.

3. The following three data layers were considered sufficient to identify tropical hardwood hammock *only if* they were confirmed by one additional data source:

a. Monroe County recently developed a ground-truthed landcover data set for the Monroe County Keys. This landcover included a category of polygons labelled "hammocks". Additional categories from this dataset were used as outlined in section 4b below.

b. "Tropical Hardwood Hammock" category from the 2003 FWC landsat landcover.

c. Rockland hammock Element Occurrence polygons from the FNAI Element Occurrence database.

4. The following three data layers were also used to confirm tropical hardwood hammock identified by the data listed in section 3 above. These layers were not considered sufficient to identify hammock even if overlapping with the other layers in this section:

a. "Hardwood Hammocks & Forests" category from the 2003 FWC landsat landcover.

b. "Hammock (CRB) [presumably refers to coastal rock barren]", "ridge hammock", and "buttonwood" categories from Monroe County landcover dataset.

c. 1999 WMD landcover FLUCCS category 420 (upland hardwood).

Sandhill

We first selected sandhill from the 2003 FWC Landsat vegetation cover and longleaf pine – xeric oak from the WMD land cover and combined these into a preliminary sandhill polygon shapefile. Because the FWC satellite imagery does not distinguish between natural (undisturbed) pinelands and pine plantations, only the polygons within FNAI PNAs were included. We then did a visual inspection of sandhill land cover that fell outside of PNAs and added several sites based on that review. Within the Ocala National Forest we also inspected the 2003 FWC Landsat shrub and brushland and bare soil/clearcut categories using 2004 DOQQs. Where appropriate these were reclassified as sandhill. Finally, we removed isolated fragments that were less than 5 acres.

Sandhill Upland Lake

Distinguishing sandhill upland lakes from other lake types is difficult. No differentiation of lake types exists in available land cover data. We attempted to identify relatively pristine sandhill upland lakes by applying criteria to the lakes category of WMD land cover. First, we selected lakes that were within historic sandhill or scrub based on the Davis (1967) map or within 60 m of current sandhill or scrub based on the under-represented natural community maps. Because sandhill lakes are typically lentic water bodies without significant surface inflows and outflows, we eliminated lakes that were associated with 1st or 2nd order streams based on the National Hydrography Dataset. Next we established a size range of 1 – 1000 acres that should fit the majority of sandhill lakes. The lower limit attempts to separate permanent lakes from more temporary depression ponds. The upper limit approaches the maximum size of sandill lakes on current protected areas but also attempts to limit the sandhill lakes to those that can be acquired by the state and that are not sovereign submerged lands. Finally, we eliminated lakes for which >33% of the perimeter was not a 'natural' land cover type. Although we believe this data layer captures the majority of sandhill upland lakes, we acknowledge that it likely contains other lake types and excludes some high quality sandhill lakes.

Scrub

Several potential data sources for scrub community distribution exist; however none of these is comprehensive. The FWC satellite imagery includes categories for Xeric Oak Scrub and Sand Pine Scrub, but known scrub communities exist in other FWC categories, such as Shrub and Brushland. The Archbold Biological Station produced a GIS polygon layer of scrub communities, but that work concentrated on habitat for scrub-jays in central Florida, so many coastal scrubs, especially those in northern Florida, are not included. This data layer also includes communities that are disturbed by agricultural or suburban development. We have also found that some of these polygons are sometimes generously drawn and include many other community types. Thus, we have elected not to use the Archbold layer. FNAI tracks high quality Scrub element occurrences as point locations. Some of these occurrences have polygon boundaries, but this data layer is not complete statewide. In addition, there is good local ground-truthed information for many scrub sites. Used in combination these data layers can result in a statewide scrub distribution. The following data sets were combined to produce the final scrub layer:

1) Xeric Oak Scrub and Sand Pine Scrub from 2003 FWC Landsat vegetation.
2) Mixed Pine Hardwood from 2003 FWC Landsat vegetation that intersect FNAI scrub element occurrences; each polygon was inspected using 1999 DOQQs.

3) Coastal Scrub, Sand Pine, and Xeric Oak categories of WMD Land Cover that contain FNAI scrub element occurrence points.
4) FNAI scrub natural community occurrence boundaries that contain FNAI scrub element occurrence points.
5) WMD Land Cover categories excluding open water and non-natural categories clipped by FNAI scrub polygons from the element occurrence database.
6) Coastal Scrub, Sand Pine, and Xeric Oak categories of WMD Land Cover that contain approximate scrub types from the 2003 FWC Landsat vegetation (shrub and brushland, bare soil/clearcut, hardwood hammocks, mixed pine hardwood).
7) Approximate scrub types from the 2003 FWC Landsat vegetation (shrub and brushland, bare soil/clearcut, hardwood hammocks, mixed pine hardwood) that occur within Archbold Scrub polygons and within scrub-jay habitat polygons provided by Charlotte County.
8) Scrub polygons delineated during FNAI field projects (mostly ground-truthed with some aerial photo interpretation)
9) Scrub sites provided by Broward County and Division of Forestry.
10) Within the Lake Wales Ridge and Ocala National Forest we inspected the 2003 FWC Landsat shrub and brushland and bare soil/clearcut categories using 2004 DOQQs. Where appropriate these were reclassified as scrub.

Isolated single and paired pixels were excluded from the final layer.

Dry Prairie

Existing FWC and WMD land cover overestimate the extent of dry prairie by including open pine flatwoods in the dry prairie classification. To overcome this limitation we used a combination of data sources along with review of aerial photography. The following data sets and methods were used to produce the final dry prairie layer:

1) Dry prairie polygons from the FNAI element occurrence database.
2) Dry prairie polygons delineated during FNAI field surveys (mostly ground-truthed with some aerial photo interpretation).
3) Dry prairie polygons delineated by DEP/Division of Recreation Parks in natural community maps for the lands they manage.
4) Grasshopper sparrow areas delineated on Avon Park Air Force Range Navy Air-to-Ground Training EIS.
5) The WMD Land Cover categories that have high potential for dry prairie (2120- unimproved pasture, 3100- herbaceous/dry prairie, 3200- upland shrub and brushland, 3210- palmetto prairies) where they intersect with dry prairie from the 2003 FWC Landsat vegetation. These areas were only included if they fell within the pre-settlement dry prairie boundary developed by Bridges (2006).
6) Most areas identified in the previous step were reviewed by ecologists who have field surveyed dry prairie and are familiar with the aerial photograph signatures for dry prairie. Additional areas within the Bridges (2006) boundary that were not identified in the previous step were also reviewed with 2004 aerial photography. We removed and added areas of dry prairie based on this review.

Upland Glades

Existing upland glades were mapped as part of a 2005 survey effort. These polygons were buffered by 100m to capture transitional areas around the glades. The original polygons plus buffers comprise the final data layer.

Pine Flatwoods

We identified pine flatwoods by selecting Pinelands and Dry Prairie from the 2003 FWC Landsat vegetation that fell within WMD land cover classes 410 (upland coniferous forest, primarily in NWFWMD) and 411 (mesic flatwoods). The dry prairie was selected because the 2003 FWC Landsat vegetation classifies many open pinelands as dry prairie. True dry prairie was excluded based on the dry prairie data layer described above. We also added mesic and scrubby flatwoods delineated during FNAI field projects. Using 2004 aerial photographs, we also reviewed the FWC mixed pine-hardwood category where it intersected WMD flatwoods but concluded that it was not consistently flatwoods. Finally, we removed any areas identified as flatwoods north of the Cody Scarp. The exclusion areas were identified primarily from the Physiographic Map of Florida (White 1970; Puri and Vernon 1964) and include Western Highlands, Marianna Lowlands, Grand Ridge, Tallahassee Hills and New Hope Ridge. These areas are more likely to be upland pine forest. The Cody Scarp was estimated from Isolated single and paired pixels were excluded from the final layer.

Overlap

Once the preliminary data layer was complete for each individual natural community type, some areas of overlap were found among the layers. Areas of overlap were assigned to a single community type based on the following rules. These rules were determined based on our confidence with the precision obtained with each individual community layer, and the narrowness of the community definition. In general, data layers with higher precision and narrower definition took precedence over those with lower precision and broader definition. For example, Upland Glades is a more narrowly defined community than Upland Hardwoods, and the Upland Glades data layer was based on location-specific (higher precision) occurrence records, whereas Upland Hardwoods were developed based on broader (lower precision) patterns of distribution.

1. Upland Glades, Seepage Slope, Tropical Hardwood Hammock, Pine Rocklands, Dry Prairie, and Sandhill Upland Lake were assigned over all other types (there is no overlap among these communities).
2. Sandhill was assigned over Scrub, Upland Hardwood, and Pine Flatwoods.
3. Scrub was assigned over Upland Hardwood and Pine Flatwoods.
4. Overlap between Upland Hardwood and Pine Flatwoods was removed from both categories (the small amount of overlap was spot-checked on DOQQs and appears to actually be mixed hardwood-conifer forest).

The number of acres for each community type is given in Table 4-2. A map of this data layer is shown in Fig. 4-1.

Table 4-2. Total acres and baseline acres protected in July 2001 at the onset of the Florida Forever program.

B4: Under-represented Natural Communities	Total Acres	Baseline Acres Protected July 2001
Upland Glade	310	50
Pine Rockland	10,230	8,580
Scrub	394,570	292,090
Tropical Hardwood Hammock	11,330	7,470
Dry Prairie	187,620	94,700
Seepage Slope/Bog	12,140	7,540
Sandhill	544,870	316,930
Sandhill Lake	110,530	13,680
Upland Hardwood	440,280	37,750
Pine Flatwoods (G4)	1,039,040	525,810
Total	***2,750,920***	***1,304,600***

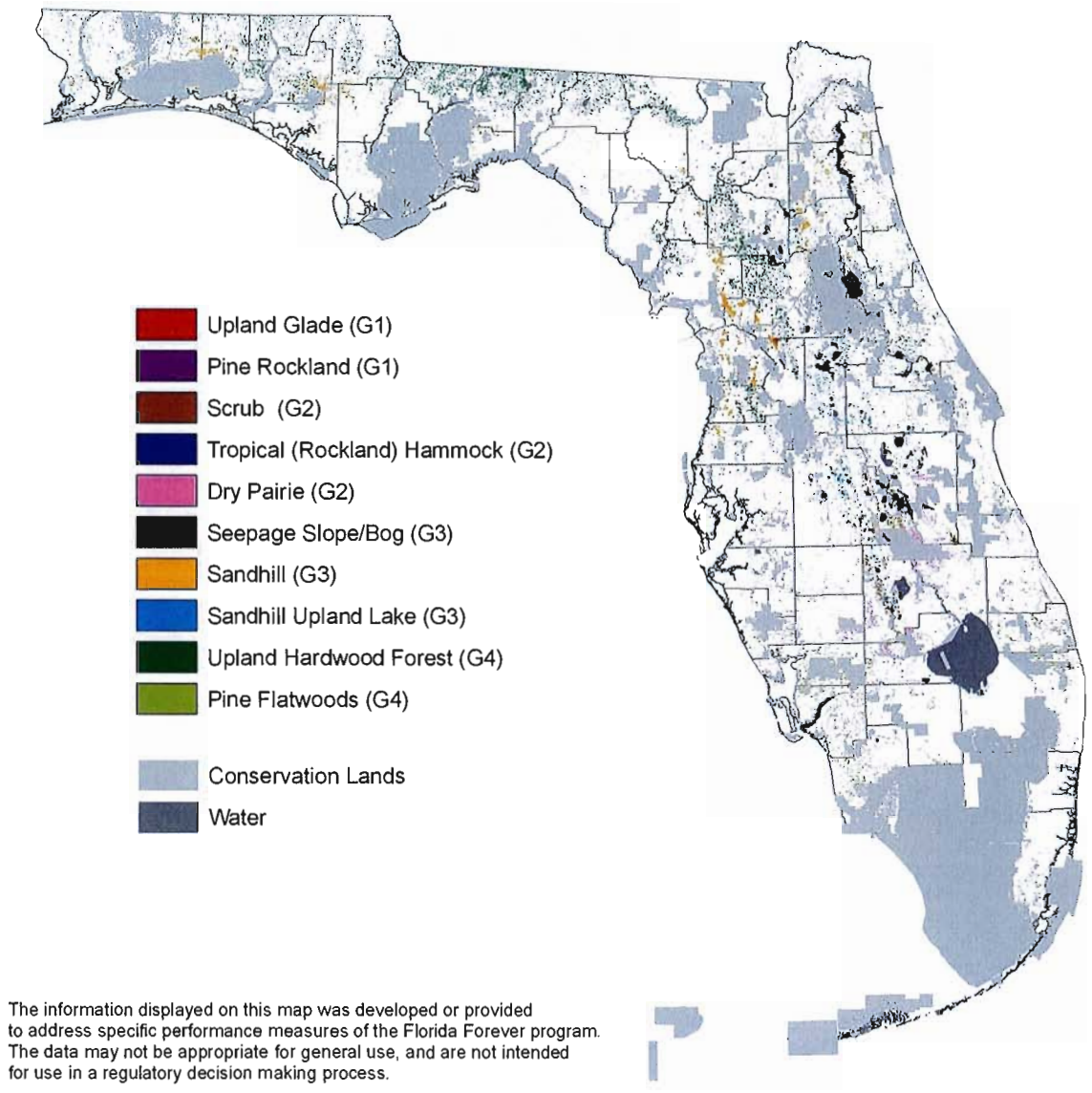


Figure 4-1. Under-represented Natural Communities

Source: Florida Natural Areas Inventory

Fragile Coastal Resources

Measure C8: The number of acres acquired that protect fragile coastal resources
Source: Florida Natural Areas Inventory

Measure Definition

We defined fragile coastal resources as those natural communities most vulnerable to disturbance or development. Upland coastal communities face a variety of threats, especially invasion by non-native species and real estate development (Johnson and Barbour 1990). The high percentage of Florida's upland barrier coast already developed (>50%) and the continued rapid rate of development prompted an assessment of remaining coastal uplands in Florida (Johnson and Muller 1993; Johnson and Gulledge 2005). The major upland communities surveyed by Johnson and Muller were included in the fragile coastal resources data layer: beach dune, coastal grassland, coastal strand, coastal scrub, and maritime hammock (Table 8-1). Coastal wetland communities are also threatened by development and other human activities. Florida Marine Research Institute has documented significant losses to salt marsh and mangrove communities, which were also included in this data layer (Table 8-1).

We restricted coastal natural communities to those that occur within one km of the shoreline of marine or estuarine waters, or those that were identified and mapped for the assessment of Florida's remaining coastal upland communities (Johnson and Gulledge 2005).

We recognize that some important coastal resources, such as seagrass beds and shellfish harvesting areas are not explicitly represented in this data layer. These resources, however, were identified by DEP/Coastal and Aquatic Managed Areas as important surface waters and, therefore, are captured in the surface water protection data layer. In future revisions, we may reconsider the most appropriate representation of data that overlaps different resource categories.

Methods

For coastal uplands the primary data set used was natural coastal upland sites confirmed by Johnson and Gulledge (2005). This is a polygon shapefile of coastal upland communities greater than 20 acres in extent on Florida's barrier island and ocean/gulf-front shores. These sites were originally identified in 1989-92 and exclude natural lands that were protected on existing conservation lands at that time. In the 2005 update the authors revisited and/or reviewed the original sites using 2004 aerial photography.

We also initially selected upland coastal communities that were identified in 3 other data layers: FNAI element occurrences (FNAI EOs), DEP/Division of Recreation and Parks natural community maps (DRP NCs), and polygons mapped by FNAI as part of several natural community mapping projects for FWC and DOF (FNAI NC maps). These data layers plus the Johnson and Gulledge (2005) coastal upland sites are hereafter referred to as the base coastal uplands.

To fill in gaps and select polygons that correspond to FNAI EO points, we used portions of the WMD land cover and FWC 2003 Landsat vegetation. The method of selection depended on the community type as follows:

1. Beach dune: Based on an intersection of the WMD land cover with FNAI EO polygons and DRP coastal upland polygons we determined WMD land cover codes 7100, 7200 and, in some districts, 1800, 1810, and 1850 corresponded to beach dune. We selelcted polygons with these codes and deleted those that were not on barrier islands or adjacent to ocean/gulf front. Remaining polygons

that were outside the base coastal uplands were inspected with 2004 aerial photography and deleted if they were not natural beach. Finally, we inspected FNAI EOs that did not intersect the base coastal uplands or WMD land cover beach dune. In some cases, these had been developed since they were first observed and thus were deleted; in other cases, we mapped polygons based on aerial photography or included the existing FNAI EO polygon in the beach dune data layer.

2. Coastal strand/coastal grassland: Coastal communities just inland of beach dune such as coastal strand, coastal grassland and to some extent coastal scrub can be difficult to distinguish from one another with WMD land cover data. Therefore, these types were selected as a set referred to here as coastal strand/grassland. Based on an intersection of the WMD land cover with FNAI EO polygons and DRP coastal upland polygons we determined WMD land cover codes 3200 and 3220 corresponded to coastal strand/grassland. We selected polygons with these codes and deleted those that were not on barrier islands or within the coastal upland zone as determined by the extent of base coastal uplands. Finally, we inspected FNAI EOs that did not intersect the base coastal uplands or WMD land cover for coastal strand/grassland and edited them as described above for beach dune.

3. Coastal scrub: We consulted with Ann Johnson, FNAI ecologist, to identify a subset of the statewide scrub layer (see Under-represented Natural Communities described in Section 4 of this report). True coastal scrub, which differs from other scrub based on soils and ecological processes, occurs only on barrier islands, especially along Gulf Coast, and right along the shoreline on the Atlantic Coast (except in the vicinity of Guana River where it occurs slightly further inland). We selected coastal scrub from the statewide scrub layer that met these criteria.

4. Maritime hammock: Maritime hammock is difficult to distinguish solely from remotely-sensed land cover. Therefore, we used a hybrid method that required corroboration of WMD land cover polygons and 2003 FWC Landsat vegetation. First we selected WMD land cover polygons with codes 4200, 4260 or 4340 within 1 km of the shoreline. From this set we selected polygons for which at least 15% of the area overlapped the 2003 FWC Landsat vegetation types of hardwood hammocks or mixed pine-hardwood. These polygons were inspected and edited using 2004 aerial photography. Maritime hammock can occur farther inland than the other coastal upland types. In consultation with Ann Johnson and other FNAI scientists, we deleted any polygons that did not occur within the known extent of maritime hammock. Finally, we inspected FNAI EOs that did not intersect the base coastal uplands or WMD land cover for maritime hammock and edited them as described above for beach dune.

5. Tropical hammock: As with coastal scrub, we identified a subset of the statewide tropical hardwood hammock layer (see Under-represented Natural Communities described in Section 4 of this report). Any tropical hammock within 1km of the shoreline was included in the coastal data layer.

6. Coastal rock barren/coastal berm: We examined FNAI EOs for these communities if they did not intersect any other coastal upland type from above. We then edited/included them as described for beach dune.

The base coastal uplands (with EOs edited as described in 1 – 6) and additional polygons from the WMD land cover (as described in 1 – 6) were merged to create the coastal uplands portion of the fragile coastal resources data layer.

For coastal wetlands, we primarily relied on the WMD categories of mangrove and salt marsh. In some cases, however, our element occurrence data identified a WMD polygon or portion of a polygon as scrub or tropical hardwood hammock, where the WMD identified it as mangrove. We corrected the data to reflect the FNAI descriptions.

Community-specific acreages could not be calculated for most community types because of the ambiguity of the WMD land cover categories and because the sites from Johnson and Gulledge (2005) do not delineate separate natural community polygons. We can, however, provide an acreage count for the total coastal uplands or wetlands identified (Table 8-1).

The number of acres is given in Table 8-2. A map of this data layer is shown in Fig. 8-1.

Table 8-1. Community types included in the fragile coastal resources data layer.

Coastal Uplands	**Coastal Wetlands**
Beach dune	Salt marsh
Coastal scrub	Mangrove
Coastal grassland	
Coastal strand	
Maritime hammock	

Table 8-2. Total acres of fragile coastal resources and baseline acres protected in July 2001 at the onset of the Florida Forever program.

C7: Fragile Coastal Resources	Total Acres	Baseline Acres Protected July 2001
Coastal uplands	145,300	86,800
Coastal wetlands	769,700	566,800
Total	***915,000***	***653,700***

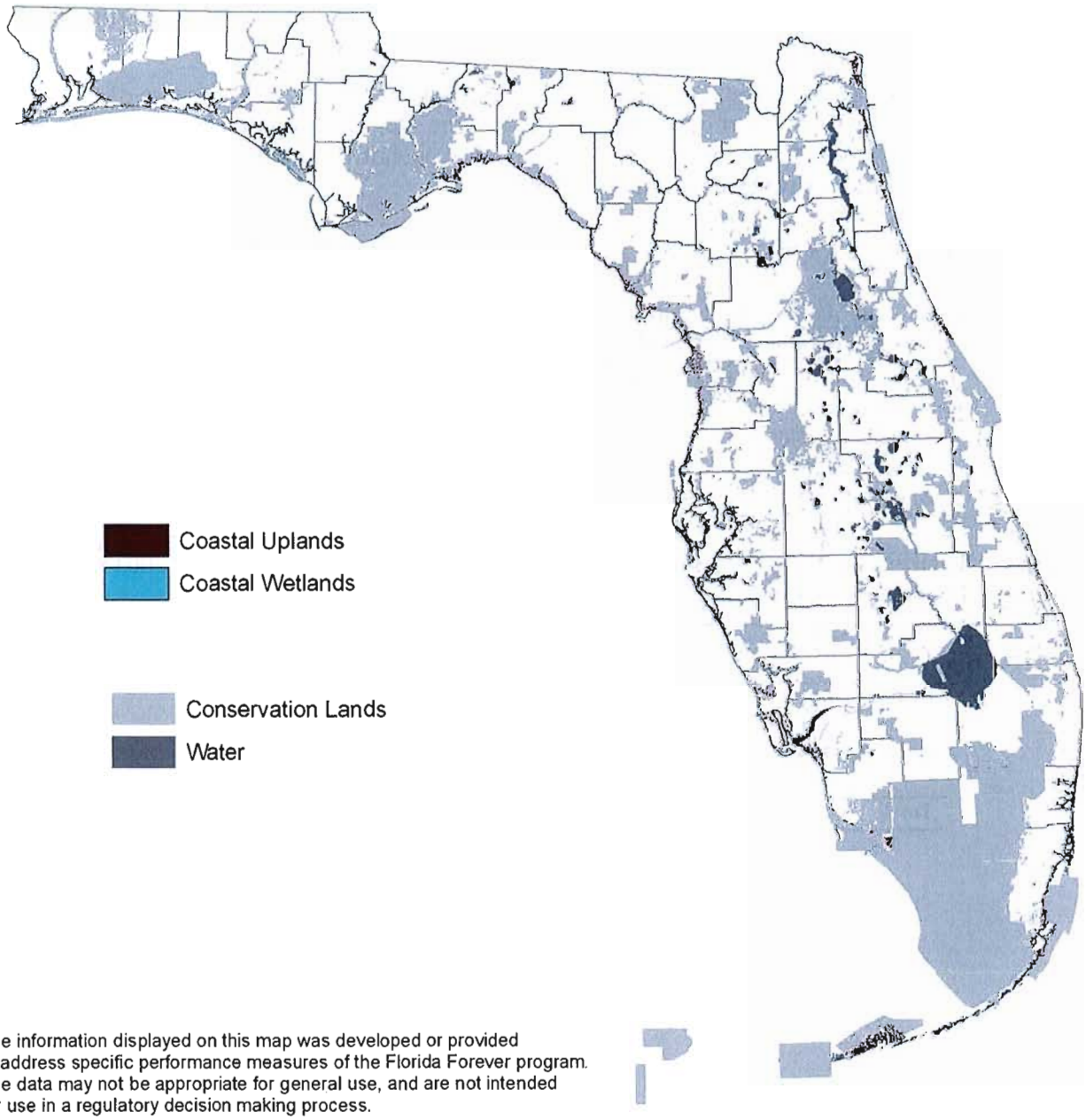


Figure 8-1. Fragile Coastal Resources
Source: Florida Natural Areas Inventory

FNAI Potential Natural Areas

The Potential Natural Areas (PNA) data layer identifies, throughout the State of Florida, privately owned lands that are not managed or listed for conservation purposes, which may contain good quality natural communities. These areas were delineated by FNAI scientific staff through interpretation of natural vegetation from 1988-1993 FDOT aerial photographs and from input received during Regional Ecological Workshops held for each regional planning council. These workshops were attended by experts familiar with natural areas in the region. All PNA classifications and rankings were made based on the combined judgment of at least two scientists making independent determinations. Element occurrences in the FNAI database may or may not be present on these sites.

In order to be classified as a Potential Natural Area the natural communities identified through aerial photographs had to meet the following criteria:

1. Must be a minimum of 500 acres. *Exceptions*: sandhill, min. 320 acres; scrub, min. 80 acres; pine rockland, min. 20 acres; dry prairie, min. 320 acres; *or* any example of coastal rock barren, upland glade, coastal dune lake, spring-run stream or terrestrial cave.

2. Must contain at least one of the following:
   a. One or more high quality examples of FNAI state-ranked S3 or above natural communities.
   b. An outstanding example of any FNAI tracked natural community.

Potential Natural Areas were assigned ranks of Priority 1 through Priority 5 based on size, perceived quality, and type of natural community present. The areas included in Priority 5 are exceptions to the above criteria. These areas were identified through the same process of aerial photographic interpretation and regional workshops as the PNA 1 through 4 ranked sites, but do not meet the standard criteria. These PNA 5 areas are considered lower priority for conservation than areas ranked PNA 1- 4, but nonetheless are believed to be ecologically viable tracts of land representative of Florida's natural ecosystems.

Revised PNA Boundaries

The original PNAs were digitized based on 1:100,000 scale county maps and lacked the geographic precision desirable for the type of geographic overlay analyses undertaken in the *Conservation Needs Assessment*. We therefore revised the PNA boundaries by overlaying the original PNA polygons onto the Land Use Land Cover polygon coverage produced by the water management districts (WMD; see below). The WMD land cover boundaries were found to conform more closely to land cover patterns than the original PNA boundaries, based on comparison with digital ortho quarter quad (DOQQ) aerial photography.

To revise the PNA boundaries, all WMD polygons classified as "natural" (see Table 1) that intersected the original PNAs were included in their entirety. All WMD polygons classified as "semi-natural" (see Table 2) that intersected PNAs were "clipped" by the original PNA boundary (i.e. that portion of the original PNA was retained in the revised boundary). All other WMD polygons ("non-natural") were removed from the PNA boundaries.

In addition, the original PNAs did not take into consideration existing managed areas or Conservation and Recreation Lands (CARL) acquisition projects. We added these by selecting all WMD "natural" or "semi-natural" polygons within managed area or CARL project boundaries (all of these polygons were "clipped" by the boundaries of the managed area or CARL project).

FNAI Element Occurrences

The Florida Natural Areas Inventory (FNAI or the Inventory) maintains a database of occurrences of approximately 1,000 rare plant and animal species and 70 natural community types known to occur in Florida. Currently this FNAI database includes over 27,000 occurrences of plants, animals, and communities. These records are compiled from a variety of sources, including FNAI science staff surveys, scientific literature, museum collections, federal, state, and local government agencies, and academic experts. The data are managed in a relational database and in GIS coverages in the form of point and/or polygon locations for individual Element Occurrences (EOs).

For each element occurrence data are maintained on observation dates, habitat description and quality, number and status of individuals, management considerations, locational certainty and best sources for the occurrence information. For animals and plants, EOs generally refer to more than a casual sighting; they usually indicate a viable population of the species. Natural community EOs represent high quality examples of natural communities, and thus are not a comprehensive coverage of all occurrences of a given community type.

For each element (species or community) the Inventory assigns both a Global Rank (GRANK) and a State Rank (SRANK) to indicate the overall rarity of the species or community on a global and statewide basis. A complete listing and explanation of global and state ranks is available in Appendix B, along with an explanation of state and federal listing status for listed species.

For many EOs, the Inventory has developed polygon boundaries representing the true geographic extent of the occurrence. However, these boundaries are still in development and are not available in a comprehensive format for all elements.

A list of the plants, animals, and communities tracked by the Inventory, along with their global and state ranks and federal and state listing status, is updated quarterly and is available from the Inventory website at www.fnai.org.

FLORIDA
Natural Areas
INVENTORY

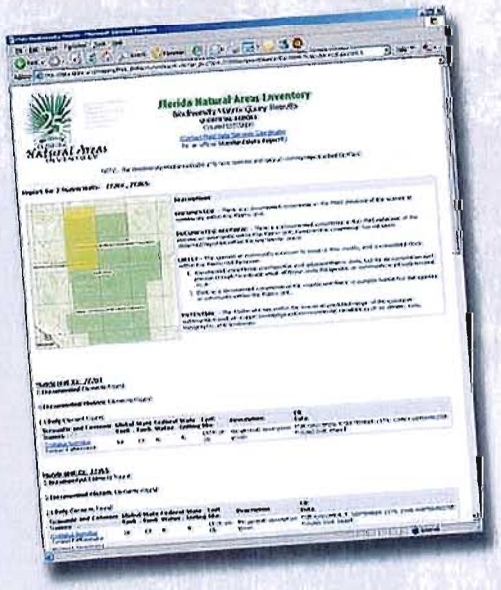
Technical Assistance Provided by:

FREAC
FLORIDA RESOURCES & ENVIRONMENTAL ANALYSIS CENTER
AT THE FLORIDA STATE UNIVERSITY

FOR IMMEDIATE RELEASE

FNAI's Biodiversity Matrix Online

The Biodiversity Matrix Map Server is a new **screening tool** from FNAI that provides **immediate, free access** to rare species occurrence information statewide. This tool allows you to zoom to your site of interest and create a report listing documented, likely, and potential occurrences of rare species and natural communities.



The FNAI Biodiversity Matrix offers **built-in interpretation** of the likelihood of species occurrence for each 1-square-mile Matrix Unit across the state. The report includes a site map and list of species and natural communities by occurrence status: Documented, Documented-Historic, Likely, and Potential.

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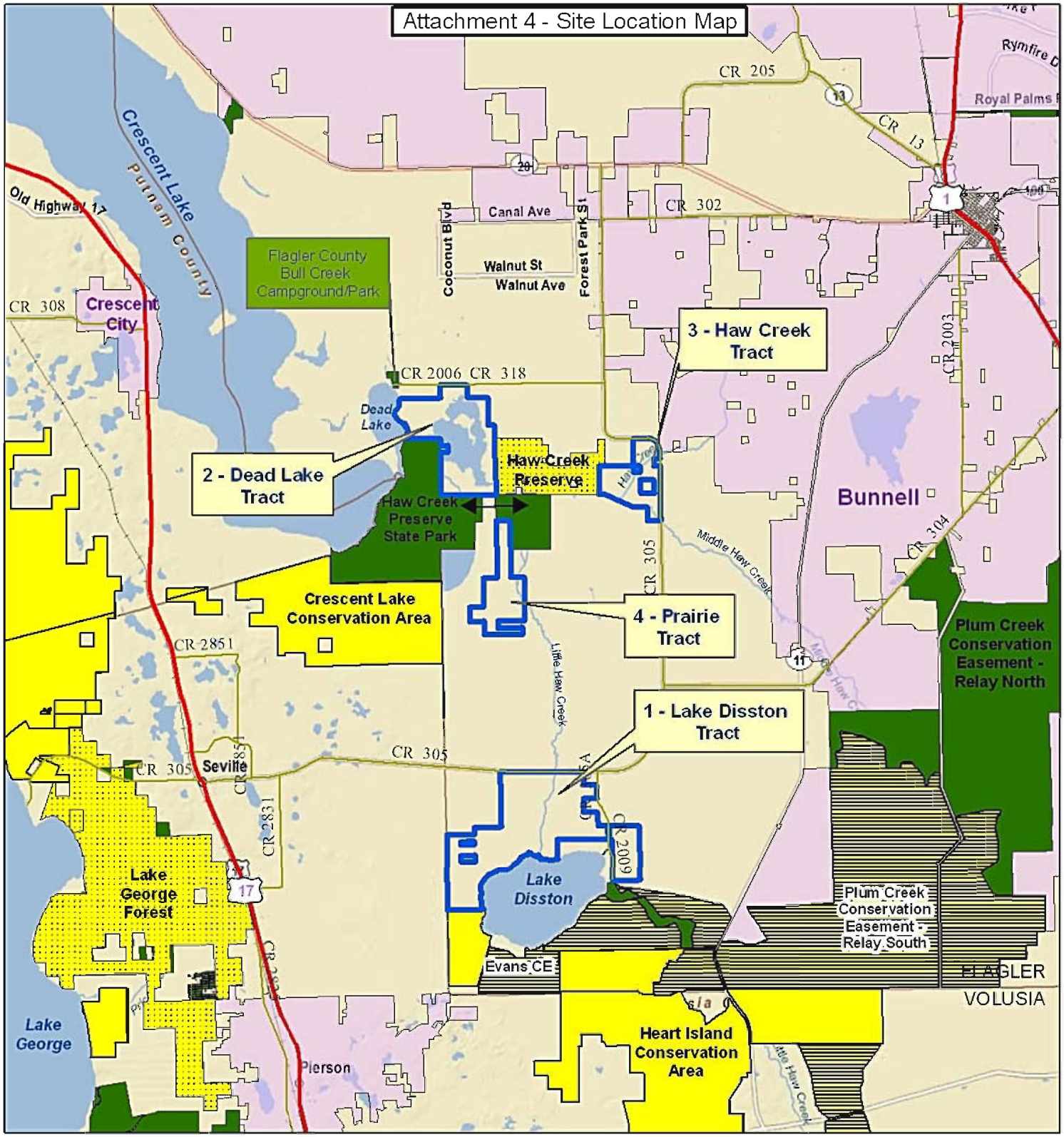
Please note: FNAI will continue to offer our Standard Data Report service as always. The Standard Data Report offers the most comprehensive information available on rare species, natural communities, conservation lands, and other natural resources.


Attachment 4 - Site Location Map
Crescent Lake
Putnam County
Old Highway 17
CR 205
CR 13
Royal Palms
Canal Ave
CR 302
Coconut Blvd
Forest Park St
Walnut St
Walnut Ave
Flagler County
Bull Creek
Campground/Park
CR 308
Crescent City
CR 2006 CR 318
Dead Lake
3 - Haw Creek Tract
2 - Dead Lake Tract
Haw Creek Preserve
Haw Creek Preserve State Park
Bunnell
CR 2003
CR 304
Middle Haw Creek
CR 305
Crescent Lake Conservation Area
4 - Prairie Tract
Plum Creek Conservation Easement - Relay North
CR 2851
Little Haw Creek
1 - Lake Disston Tract
CR 305
Seville
CR 2831
CR 2009
Lake George Forest
Lake Disston
Plum Creek Conservation Easement - Relay South
Evans CE
FLAGLER
VOLUSIA
Lake George
Pierson
Heart Island Conservation Area
Townsend Properties
Flagler County
Townsend Properties
SJRWMD Full Fee
SJRWMD Joint Fee
SJRWMD Conservation Easements
Other Public Lands
Cities 2008
0
2
4
Miles
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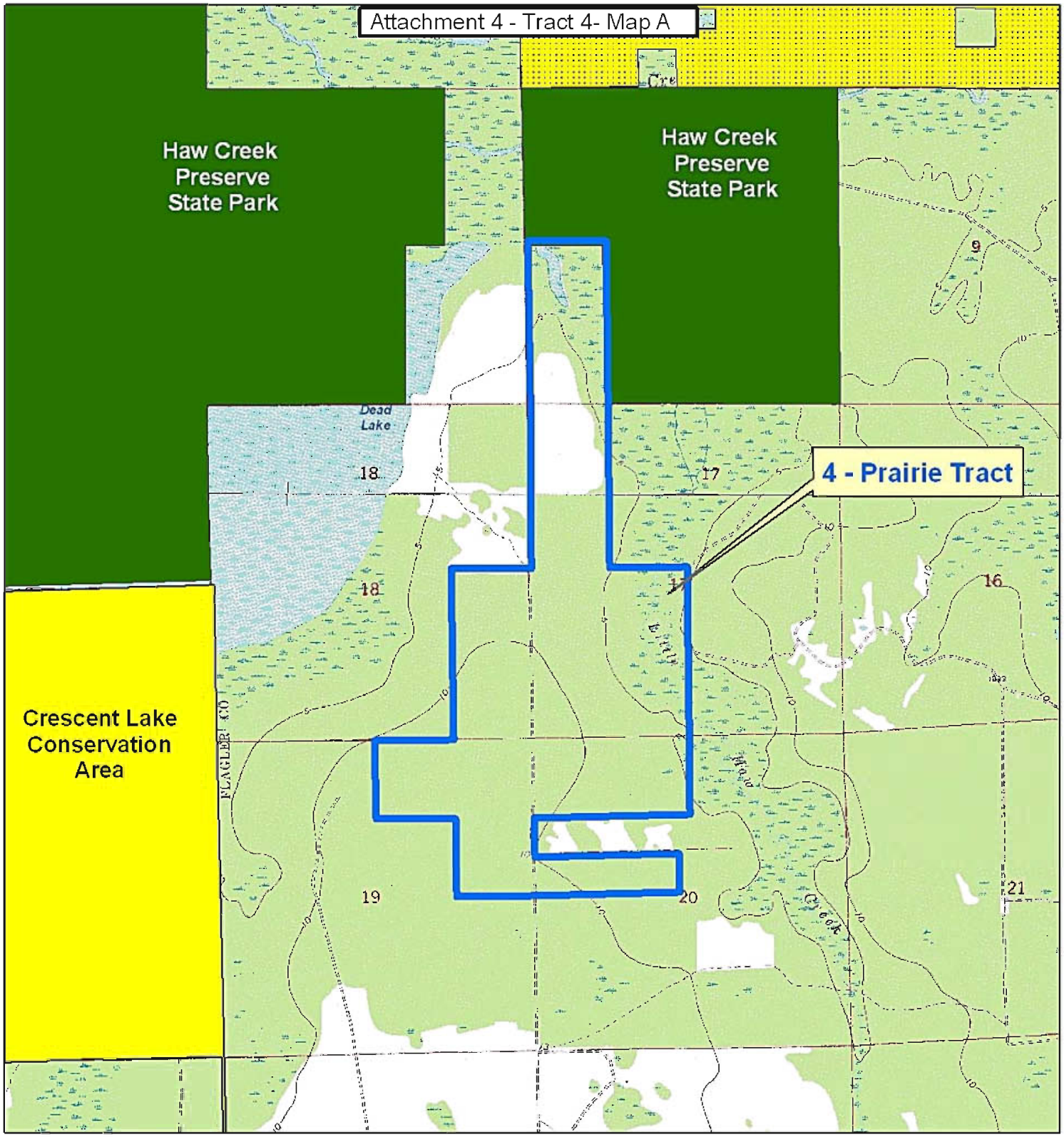

Prairie Tract
Flagler County
USGS Quad Map

0 1,500 3,000 Feet

- Prairie Tract
- SJRWMD Full Fee
- SJRWMD Joint Fee
- SJRWMD Conservation Easements
- Other Public Lands
- Cities 2008

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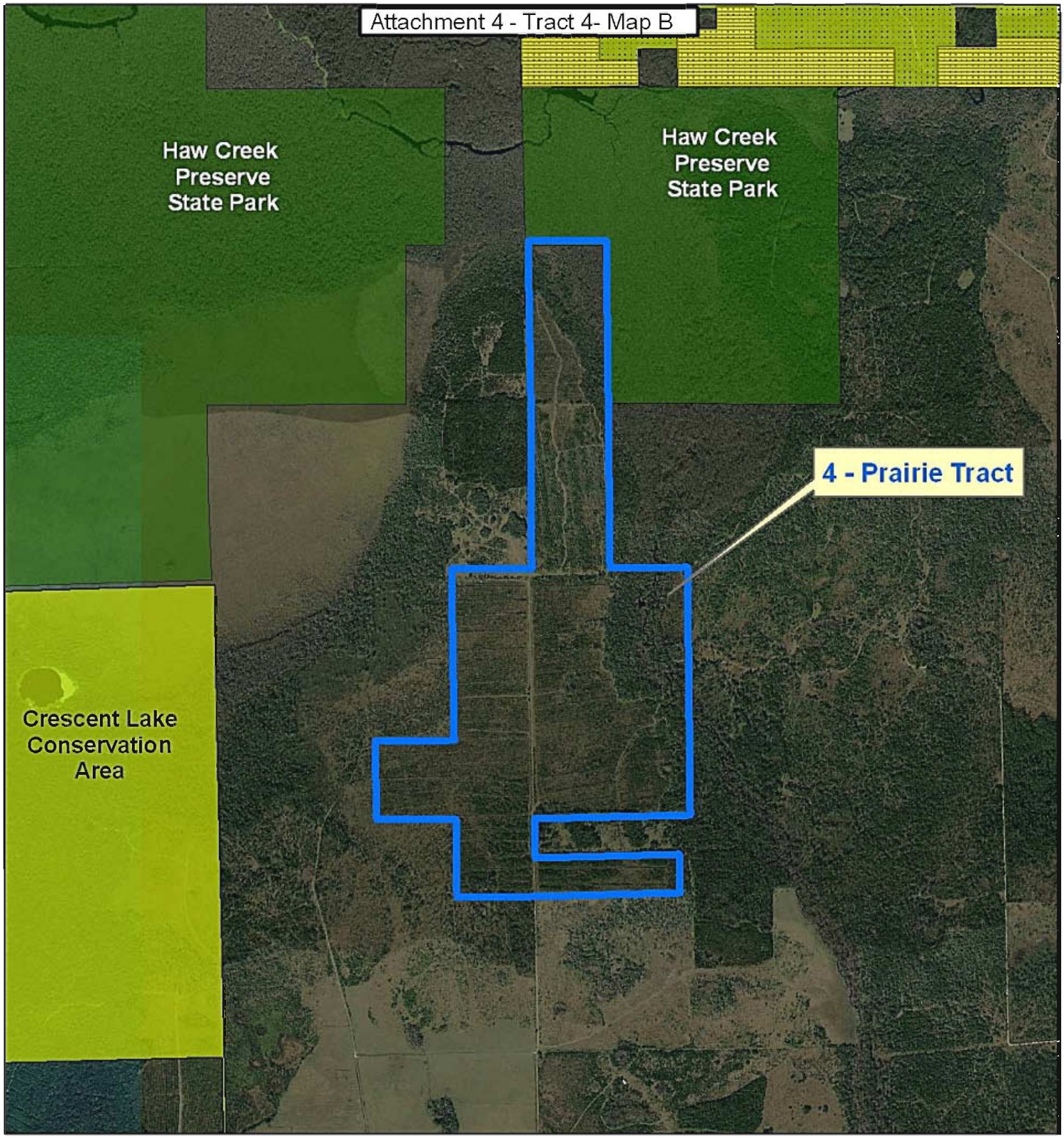
Attachment 4 - Tract 4- Map B



Prairie Tract
Flagler County
2009 Digital Imagery

0 1,500 3,000 Feet

- Prairie Tract
- SJRWMD Full Fee
- SJRWMD Joint Fee
- SJRWMD Conservation Easements
- Other Public Lands
- Cities 2008

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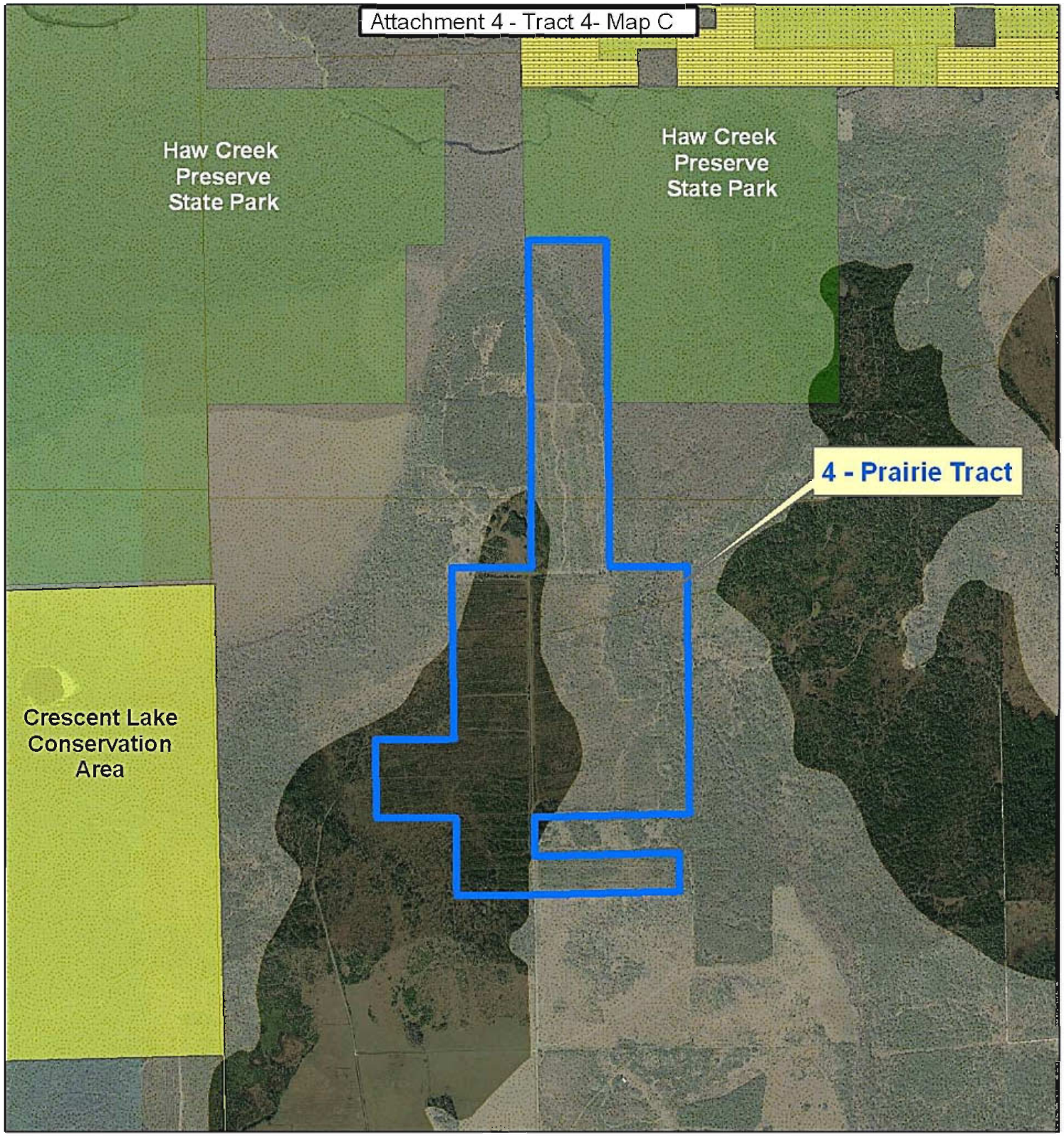

Prairie Tract
Flagler County
FEMA Flood Zones

0 1,500 3,000 Feet

- Prairie Tract
- 100 year (1% chance)
- SJRWMD Full Fee
- SJRWMD Joint Fee
- SJRWMD Conservation Easements
- Other Public Lands
- Cities 2008

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