



L-2011-336  
10 CFR 52.3

September 1, 2011

U.S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, D.C. 20555-0001

Re: Florida Power & Light Company  
Proposed Turkey Point Units 6 and 7  
Docket Nos. 52-040 and 52-041  
Response to NRC Environmental Request for Additional Information Letter  
1104071 (RAI 5588) Environmental Standard Review Plan  
Section 9.3.1 – Alternative Site Selection Process

Reference:

1. NRC Letter to FPL dated April 6, 2011, Environmental Request for Additional Information Letter 1104071 Related to ESRP Section 9.3.1, Alternative Site Selection Process, for the Combined License Application Review for Turkey Point Units 6 and 7
2. FPL Letter to NRC L-2011-259 dated July 11, 2011, Revised Schedule for the Responses to NRC Environmental Request for Additional Information Letter 1104071 (RAI 5588) Environmental Standard Review Plan Section 9.3.1 – Alternative Site Selection Process

Florida Power & Light Company (FPL) provides, as an attachment to this letter, its response to the Nuclear Regulatory Commission's (NRC) Environmental Request for Additional Information (RAI) RAI 9.3.1-2, 9.3.1-6 through 9.3.1-9, 9.3.1-11, and 9.3.1-15 through 9.3.1-16 provided in Reference 1. FPL informed the NRC of the schedule for providing this response in Reference 2. The attachment identifies changes that will be made in a future revision of the Turkey Point Units 6 and 7 Combined License Application (if applicable).

If you have any questions, or need additional information, please contact me at 561-691-7490.

DO97  
NRC

I declare under penalty of perjury that the foregoing is true and correct.

Executed on September 1, 2011.

Sincerely,



William Maher  
Senior Licensing Director – New Nuclear Projects

WDM/RFO

- Attachment 1: FPL Response to NRC RAI No. 9.3.1-2 (RAI 5588)
- Attachment 2: FPL Response to NRC RAI No. 9.3.1-6 (RAI 5588)
- Attachment 3: FPL Response to NRC RAI No. 9.3.1-7 (RAI 5588)
- Attachment 4: FPL Response to NRC RAI No. 9.3.1-8 (RAI 5588)
- Attachment 5: FPL Response to NRC RAI No. 9.3.1-9 (RAI 5588)
- Attachment 6: FPL Response to NRC RAI No. 9.3.1-11 (RAI 5588)
- Attachment 7: FPL Response to NRC RAI No. 9.3.1-15 (RAI 5588)
- Attachment 8: FPL Response to NRC RAI No. 9.3.1-16 (RAI 5588)

Enclosure: Florida Power & Light Company, Turkey Point 6 & 7, New Nuclear Power  
Generation (Formerly Project Bluegrass) Augmented Site Selection Study  
Report, August 2011

cc:

PTN 6 & 7 Project Manager, AP1000 Projects Branch 1, USNRC DNRL/NRO  
Regional Administrator, Region II, USNRC  
Senior Resident Inspector, USNRC, Turkey Point Plant 3 & 4

**NRC RAI Letter No. 1104071 Dated April 6, 2011**

**SRP Section: EIS 9.3.1 – Alternative Site Selection Process**

Question from Environmental Technical Support Branch

**NRC RAI Number: EIS 9.3.1-2 (RAI 5588)**

Clarify how the scoring for County Population, Distance to Population Centers, and Proximity to Densely Populated Areas (Page C-36) within the October 2006 Site Selection Study Report (Siting Report) was derived and how the Proximity to Densely Populated Areas was scaled. The Siting Report does not explicitly and quantitatively define these terms nor clarify whether terminology within the report matches that used in the ER. For example, the ER (p9.3-5) defines that a population density of 300 people per square mile was an exclusionary criteria. The Siting Report on page C-33, suggests, but does not explicitly state, that the EPRI criteria of 500 PPSM was used.

**FPL RESPONSE:**

**NOTE TO ALL RESPONSES TRANSMITTED WITH THIS LETTER:**

FPL has augmented the 2006 Siting Report to:

- Address FPL's additional understanding of NRC guidance (NUREG-1555, Section 9.3) for the consideration of alternative sites subsequent to publication of the original 2006 Siting Report, and
- Provide a technical basis and rationale for response to Requests for Additional Information (RAI) issued by NRC in its review of the Turkey Point Units 6 & 7 COLA

This augmentation is documented in the *Florida Power & Light Company, Turkey Point 6 & 7, New Nuclear Power Generation (Formerly Project Bluegrass) Augmented Site Selection Study Report*, August 2011 (Augmentation Report). Specifically, the Augmentation Report adds:

- Explicit steps for regional screening and candidate area identification
- Canvassing candidate areas to identify additional greenfield potential sites
- Evaluation of additional potential sites in accordance with criteria and processes used in the Siting Report

The Augmentation Report is being submitted as an enclosure to these responses; results of site evaluation and screening, as documented in the Augmentation Report, will be reflected in future COLA revisions.

The overall rating for the population criterion, as presented on page C-36 of the 2006 Siting Report and Appendix D (page D-42) of the Augmentation Report is a composite rating of three sub-ratings:

- Population density for the host county
- Distance to the nearest population center – The definition of population center refers to the nearest “place” or “concentration of population” as defined by the U.S. Census Bureau, where a place is either legally incorporated under the laws of its respective state, or a statistical equivalent that the Census Bureau treats as a Census Designated Place (CDP). Population centers, as used in the regional screening Criterion P3 and GSC evaluations, are more encompassing than population centers, as defined in 10 CFR Part 100, in that they also include towns and cities with population less than 25,000 persons. Note that this clarification was provided in FPL’s response to RAI 5588 9.3.1-4; and
- Proximity to densely populated areas – Densely populated area, as used in the Augmentation Report is not tied to a specific population density (e.g., 300 or 500 persons per square mile), as used in the ER. Rather, the metric is based on proximity to highly populated areas, such as a Metropolitan Statistical Area (MSA).

Terminology relating to the population evaluation (e.g., population center) has been clarified in the Augmentation Report and also will be clarified in Revision 3 of the ER. The bases for sub-ratings assigned to each site are documented in the Augmentation Report, Appendices C (Criterion P3) and D (Section D.1.2.1).

This response is PLANT SPECIFIC.

#### **References:**

Florida Power & Light Company, Turkey Point 6 & 7, *New Nuclear Power Generation (Formerly Project Bluegrass) Augmented Site Selection Study Report*, August 2011.

#### **ASSOCIATED COLA REVISIONS:**

Results of site evaluation and screening, as documented in the Augmentation Report, will be reflected in future COLA revisions.

#### **ASSOCIATED ENCLOSURES:**

Florida Power & Light Company, Turkey Point 6 & 7, *New Nuclear Power Generation (Formerly Project Bluegrass) Augmented Site Selection Study Report*, August 2011.



**NRC RAI Letter No. 1104071 Dated April 6, 2011**

**SRP Section: EIS 9.3.1 – Alternative Site Selection Process**

Question from Environmental Technical Support Branch

**NRC RAI Number: EIS 9.3.1-6 (RAI 5588)**

Identify the extent to which the provisions of NRC Regulatory Guide 4.7 and 10 CFR Part 100 were incorporated into FPL's site screening methodology (ESRP 9.3). Provide a formal hard copy of the geographical information system (GIS) information submitted to the reading room by the applicant.

**FPL RESPONSE:**

The regional screening analysis of sites/areas independently identified by FPL's consultant is superseded by a regional screening/candidate area identification process documented in the Augmentation Report, Section 3.0. Section 3.1 provides a description of criteria used in regional screening. Results of regional screening are described in Section 3.2 and Appendix A, along with the rationale for deferring portions of the ROI and identifying candidate areas. Appendix A includes figures showing maps of results from individual screening criteria.

Specific criteria used in the regional screening (e.g., specific parameters that relate to site suitability guidance provided in Regulatory Guide 4.7 and 10 CFR Part 100) are described in the Augmentation Report, Table 3-1. Results of this analysis are presented in Appendix A of the Augmentation Report, which contains figures displaying the regional screening GIS information for the following criteria:

- Figure A-1, Dedicated Lands;
- Figure A-2, Critical Habitat;
- Figure A-3, Population;
- Figure A-4, Reclaimed Water Availability; and
- Figure A-5, Surface Water Availability.

The composite results of the regional screening process, resulting in the identification of 16 candidate areas, are shown in Figures A-6 and A-7.

This response is PLANT SPECIFIC.

**References:**

Florida Power & Light Company, Turkey Point 6 & 7, *New Nuclear Power Generation (Formerly Project Bluegrass) Augmented Site Selection Study Report*, August 2011.

Proposed Turkey Point Units 6 and 7  
Docket Nos. 52-040 and 52-041  
FPL Response to NRC RAI No. 9.3.1-6 (RAI 5588)  
L-2011-336 Attachment 2 Page 2 of 2

**ASSOCIATED COLA REVISIONS:**

Results of regional screening and candidate area identification, as documented in the Augmentation Report, will be reflected in future COLA revisions.

**ASSOCIATED ENCLOSURES:**

Florida Power & Light Company, Turkey Point 6 & 7, *New Nuclear Power Generation (Formerly Project Bluegrass) Augmented Site Selection Study Report*, August 2011.

**NRC RAI Letter No. 1104071 Dated April 6, 2011**

**SRP Section: EIS 9.3.1 – Alternative Site Selection Process**

Question from Environmental Technical Support Branch

**NRC RAI Number: EIS 9.3.1-7 (RAI 5588)**

ER Section 9.3.2 indicates that FPL's consultant performed an independent evaluation of the region to ensure that no reasonable candidate areas were excluded (ER Rev 2, p 9.3-5). First, provide a hard copy of the related GIS information that was made available by FPL in the reading room. Second, provide the details of the alternative site screening processes summarized in ER Rev 2 Section 9.3.2 used by FPL's consultant and provide documentation that characterizes this screening and provides the results in the form of statistical tables and/or the "graphical representations" referred to in the ER. Finally, explain how exclusionary criteria were used in the screening process to identify candidate areas and compare these results to the areas/sites that were identified by FPL in the Siting Report (e.g., did the Siting Report consider sites in areas that fell outside the candidate areas identified by the consultant?).

**FPL RESPONSE:**

The regional screening analysis of sites/areas independently identified by FPL's consultant is superseded by a regional screening/candidate area identification process documented in the Augmentation Report, Section 3.0. Section 3.1 provides a description of criteria used in regional screening. Results of regional screening are described in Section 3.2 and Appendix A, along with the rationale for deferring portions of the ROI and identifying candidate areas. Appendix A includes figures showing maps of results from individual screening criteria (i.e., the requested hard copy of the GIS-based regional screening results). The use of exclusionary criteria and how the resulting candidate areas related to potential sites is documented in Section 3.1 and 4.2 of the Augmentation Report.

This response is PLANT SPECIFIC.

**References:**

Florida Power & Light Company, Turkey Point 6 & 7, *New Nuclear Power Generation (Formerly Project Bluegrass) Augmented Site Selection Study Report*, August 2011.

**ASSOCIATED COLA REVISIONS:**

Results of regional screening and candidate area identification, as documented in the Augmentation Report, will be reflected in future COLA revisions.

Proposed Turkey Point Units 6 and 7  
Docket Nos. 52-040 and 52-041  
FPL Response to NRC RAI No. 9.3.1-7 (RAI 5588)  
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**ASSOCIATED ENCLOSURES:**

Florida Power & Light Company, Turkey Point 6 & 7, *New Nuclear Power Generation (Formerly Project Bluegrass) Augmented Site Selection Study Report*, August 2011.

**NRC RAI Letter No. 1104071 Dated April 6, 2011**

**SRP Section: EIS 9.3.1 – Alternative Site Selection Process**

Question from Environmental Technical Support Branch

**NRC RAI Number: EIS 9.3.1-8 (RAI 5588)**

Describe the process used to consider cultural resources in the alternative site analysis for both the Siting Report and the screening performed by FPL's consultant.

**FPL RESPONSE:**

Both the screening performed by FPL's consultant and the Siting Report have been updated and expanded in the analyses reported in the Augmentation Report. Processes used to consider cultural resources – as described in this Augmentation Report – are discussed below.

As reported in the Augmented Report, the first step in the site selection process was to screen the ROI to identify those areas that are more suitable than other potential siting areas. To the extent they were included within dedicated lands mapped in this stage of the siting process, existing cultural resources were mapped and screened out as areas unsuitable for siting a new nuclear power plant. This included American Indian Lands, National and State parks, and National Marine Sanctuaries (e.g., submerged cultural resources), as identified in Appendix A of the Augmentation Report.

An evaluation of primary sites against the general siting criteria (GSC, Section 6.1) included an evaluation of cultural resources as part of the land use criterion evaluation, as documented in Appendix D of the Augmentation Report (Section D.3.4.1). The land use evaluation was based on the compatibility of a new nuclear station with existing land uses, including existing and future land uses and zoning ordinances, as well as any significant historic resources. Historic resources included those currently listed on the National Register of Historic Places (NRHP), or known (active) archaeological sites or Native American lands. Special land use features, including proximity to National Register of Historic Places (NRHP) sites, were identified and compared across the set of primary sites; and this information was considered in the determination of site ratings for this criterion.

This response is PLANT SPECIFIC.

**References:**

Florida Power & Light Company, Turkey Point 6 & 7, *New Nuclear Power Generation (Formerly Project Bluegrass) Augmented Site Selection Study Report*, August 2011.

**ASSOCIATED COLA REVISIONS:**

Results of regional screening and candidate area identification, as documented in the Augmentation Report, will be reflected in future COLA revisions.



Proposed Turkey Point Units 6 and 7  
Docket Nos. 52-040 and 52-041  
FPL Response to NRC RAI No. 9.3.1-8 (RAI 5588)  
L-2011-336 Attachment 4 Page 2 of 2

**ASSOCIATED ENCLOSURES:**

Florida Power & Light Company, Turkey Point 6 & 7, *New Nuclear Power Generation (Formerly Project Bluegrass) Augmented Site Selection Study Report*, August 2011.

Proposed Turkey Point Units 6 and 7  
Docket Nos. 52-040 and 52-041  
FPL Response to NRC RAI No. 9.3.1-9 (RAI 5588)  
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**NRC RAI Letter No. 1104071 Dated April 6, 2011**

**SRP Section: EIS 9.3.1 – Alternative Site Selection Process**

Question from Environmental Technical Support Branch

**NRC RAI Number: EIS 9.3.1-9 (RAI 5588)**

Provide documentation of the basis for dismissing from further consideration the sites/areas independently identified by FPL's consultant (ER Rev 2. P 9.3-5).

**FPL RESPONSE:**

The regional screening analysis of sites/areas independently identified by FPL's consultant is superseded by a regional screening/candidate area identification process documented in the Augmentation Report, Section 3.0. Results of regional screening are described in Section 3.2 and Appendix A, along with the rationale for deferring portions of the ROI and identifying candidate areas.

This response is PLANT SPECIFIC.

**References:**

Florida Power & Light Company, Turkey Point 6 & 7, *New Nuclear Power Generation (Formerly Project Bluegrass) Augmented Site Selection Study Report*, August 2011.

**ASSOCIATED COLA REVISIONS:**

Results of regional screening and candidate area identification, as documented in the Augmentation Report, will be reflected in future COLA revisions.

**ASSOCIATED ENCLOSURES:**

Florida Power & Light Company, Turkey Point 6 & 7, *New Nuclear Power Generation (Formerly Project Bluegrass) Augmented Site Selection Study Report*, August 2011.

**NRC RAI Letter No. 1104071 Dated April 6, 2011**

**SRP Section: EIS 9.3.1 – Alternative Site Selection Process**

Question from Environmental Technical Support Branch

**NRC RAI Number: EIS 9.3.1-11 (RAI 5588)**

The ER's (Rev. 2) Purpose and Need, and Need for Power describe power need across FPL's Service Territory. However, the staff notes that a screening criterion was used that measures distance from the Miami load center. Provide the rationale for this criterion. ESRP 9.3 directs the staff to determine "... if the selected ROI will permit such siting and that potentially desirable candidate areas have not been excluded on the basis of an arbitrarily defined ROI." Explain how the Purpose and Need defined in Section 1.1.1 (ER p 1.1-2) supports a conclusion that the need for power is for the target load center in ER Section 9.3.2.1 (the region including Broward and Miami-Dade Counties) (ER p 9.3-6) exclusively. Additionally, ER Figure 9.3-2 clearly shows other load centers (ER p 9.3-141) outside this region. Explain how this is consistent with the Purpose and Need statement. Provide the rationale supporting the use of proximity to the "target load center". Explain whether the Need for Power case was presented to the FPSC for FPL's Service Territory or just the "target load center." The staff notes that the Need for Power of ER Section 8.0 asserts a need within FPL Service Territory, not the "target load center".

**FPL RESPONSE:**

Section 1.1.1 of the ER states that the purpose and need for the project includes objectives to "provide additional baseload generation to maintain system reliability, increase fuel diversity, and allow progress toward meaningful CO2 emissions reductions." This statement of need does not directly address the geographical locations of loads to be supplied or at which additional voltage support would be needed. As a result, and as noted in the Augmentation Report (Section 3.0), the ROI was defined to be the entire FPL service territory, and the search for potential sites (e.g., candidate area identification) was not constrained in any way based on the location of load centers within the ROI.

As noted in the Augmentation Report, criteria used in evaluating potential sites included a criterion (Transmission Access), in which sites were characterized by their distance to the load center in the greater Miami area (Palm Beach, Broward, and Miami-Dade Counties). The rationale for this criterion is that this distance provides a rough surrogate for the length of transmission right-of-way that would be required at each potential site if the new nuclear power plant was developed there. This measure of suitability reflects the fact that longer transmission distances would result in higher construction costs, electrical losses and environmental impacts.

In terms of the rationale for using the Miami load center as the basis for the distance measurement, it is FPL's expectation that much of the power generated at the new plant would be dispatched to serve demand in the greater Miami area. The Miami area is also the location of the greatest need for new capacity for transmission system voltage support to satisfy the "reliability objectives of the project. In its petition for determination of need for the power from

Turkey Point 6 & 7, identified a system-wide need for power, and also indicated that the project would:

“...improve the long-term stability and reliability of the electric grid, because the Project is a baseload resource located near FPL’s load center and hence will have a positive impact on the recurring imbalance between generation and load in the Southeast Florida region.”

Thus, although the plant output would be available to any of FPL’s customers, the bulk of power flows are expected to be towards the Miami area, and the location in southeast Florida is critical to achieving stated objectives of the project. Accordingly, the distance of a site to this area provides a reasonable metric on which to base the transmission access component of site screening.

This response is PLANT SPECIFIC.

**References:**

Florida Power & Light Company, *Petition to Determine Need for Turkey Point Nuclear Units 6 and 7 Electrical Power Plant*, by Florida Power & Light Company. Florida Public Service Commission Docket No. 070650-EI; October 16. Available at <http://www.psc.state.fl.us/library/filings/07/09443-07/09443-07.pdf>

Florida Power & Light Company, Turkey Point 6 & 7, *New Nuclear Power Generation (Formerly Project Bluegrass) Augmented Site Selection Study Report*, August 2011.

**ASSOCIATED COLA REVISIONS:**

No COLA changes have been identified as a result of this response.

**ASSOCIATED ENCLOSURES:**

None.

**NRC RAI Letter No. 1104071 Dated April 6, 2011**

**SRP Section: EIS 9.3.1 – Alternative Site Selection Process**

Question from Environmental Technical Support Branch

**NRC RAI Number: EIS 9.3.1-15 (RAI 5588)**

Clarify the basis for calculating the wetland acreages used for each site in screening since several sites (e.g. St. Lucie, Martin, and Turkey Point) do not appear to have the required 5,000 acres of land area around the site without counting surface water. ESRP 9.3 directs the staff to determine whether the screening methodology was applied consistently to all potential sites.

**FPL RESPONSE:**

As clarified in the response to NRC RAI Number 9.3.1-13 (submitted previously), each potential site was initially identified as a 5,000-acre area, nominally a circle centered on a site center-point. This provided a consistent basis for site evaluation and comparison of potential sites, while also providing flexibility for ultimately locating plant components within the area. This flexibility allowed for the refinement of detailed plant locations as more information (e.g., environmental and geotechnical considerations, land availability) was developed in subsequent steps in the siting process, while avoiding the need to re-evaluate the site area as refinements were made. Thus, the 5,000 acre evaluation area was not used as a mandatory requirement in determining land requirements or site feasibility, and wetlands evaluations for all sites were consistently based on this area.

The screening criteria evaluation for wetlands at the potential sites (with the exception of the Turkey Point, St. Lucie, and Martin sites) examined the wetlands present within a 5,000-acre area surrounding the site center point using USFWS National Wetlands Inventory data, and a rating was assigned based on the total wetlands area present with the 5,000-acre area. In the case of wetlands evaluations for Turkey Point, St. Lucie and Martin sites, the 5,000-acre area included a significant amount of marine deepwater (Turkey Point and St. Lucie) or existing reservoir (Martin) areas; these waters were not considered to be wetlands and were not included in the wetlands acreage totals for these sites. Accordingly, the ratings for these sites were assigned based on the total wetlands present as a percentage of land area available to allow a consistent comparison across sites. Full details of the wetlands evaluations for potential sites are provided in Table 5-1 and Appendix C, Criterion P6 of the Augmentation Report. Note that the metric used, as clarified in Table 5-1 and Appendix C, does take into account available land area to allow consistent comparison across all sites.

This response is PLANT SPECIFIC.



Proposed Turkey Point Units 6 and 7  
Docket Nos. 52-040 and 52-041  
FPL Response to NRC RAI No. 9.3.1-15 (RAI 5588)  
L-2011-336 Attachment 7 Page 2 of 2

**References:**

Florida Power & Light Company, Turkey Point 6 & 7, *New Nuclear Power Generation (Formerly Project Bluegrass) Augmented Site Selection Study Report*, August 2011.

**ASSOCIATED COLA REVISIONS:**

Results of the wetlands evaluation, as documented in the Augmentation Report, will be reflected in future COLA revisions.

**ASSOCIATED ENCLOSURES:**

None.

**NRC RAI Letter No. 1104071 Dated April 6, 2011**

**SRP Section: EIS 9.3.1 – Alternative Site Selection Process**

Question from Environmental Technical Support Branch

**NRC RAI Number: EIS 9.3.1-16 (RAI 5588)**

In its screening of potential sites, did FPL identify any sites other than Turkey Point that were close enough to Miami to allow the use of reuse water as a cooling water supply? More generally, explain whether using reuse water as a cooling water supply at a location other than Turkey Point was considered in the development of the Siting Report.

**FPL RESPONSE:**

In order to address this question, the regional screening process documented in the Augmentation Report considered reclaimed water as a potential cooling water source. Wastewater treatment plants in Florida with a flow of at least one-third of the total makeup requirement (~20 million gallons per day) were identified as potential sources of cooling water. Wastewater treatment plants unable to supply the total cooling water requirement would be supplemental sources of cooling water only. Wastewater treatment plants unable to supply at least one-third of the total cooling water requirement were assumed to be uneconomical as makeup water sources. The graphical representation of this information is included in Figure A-4 of the Augmentation Report, which shows that the potentially viable wastewater sources in the ROI are located along the Atlantic coast in southern Florida.

During the process of canvassing the candidate areas to identify potential sites, FPL examined candidate areas in southern Florida near these wastewater sources to attempt to identify potential sites that could potentially utilize reuse water. However, due to population and environmental constraints present in these candidate areas, FPL did not identify any potential sites other than Turkey Point that were located near viable sources of reclaimed water.

This response is PLANT SPECIFIC.

**References:**

Florida Power & Light Company, Turkey Point 6 & 7, *New Nuclear Power Generation (Formerly Project Bluegrass) Augmented Site Selection Study Report*, August 2011.

**ASSOCIATED COLA REVISIONS:**

Results of the consideration of sites that could utilize reclaimed water, as documented in the Augmentation Report, will be reflected in future COLA revisions.

Proposed Turkey Point Units 6 and 7  
Docket Nos. 52-040 and 52-041  
FPL Response to NRC RAI No. 9.3.1-16 (RAI 5588)  
L-2011-336 Attachment 8 Page 2 of 2

**ASSOCIATED ENCLOSURES:**

Florida Power & Light Company, Turkey Point 6 & 7, *New Nuclear Power Generation (Formerly Project Bluegrass) Augmented Site Selection Study Report*, August 2011.

Proposed Turkey Point Units 6 and 7  
Docket Nos. 52-040 and 52-041  
FPL Response to NRC RAI No. 9.3.1-2 (RAI 5588)  
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## ENCLOSURE

Florida Power & Light Company, Turkey Point 6 & 7, *New Nuclear Power  
Generation (Formerly Project Bluegrass) Augmented Site Selection Study Report*  
August 2011

**FLORIDA POWER & LIGHT COMPANY  
TURKEY POINT 6 & 7  
NEW NUCLEAR POWER GENERATION  
(Formerly PROJECT BLUEGRASS)**

**AUGMENTED  
SITE SELECTION STUDY REPORT**

**August 2011**



# **Florida Power & Light Company Turkey Point 6 & 7 New Nuclear Power Generation (Formerly Project Bluegrass) Augmented Site Selection Study Report**

August 2011

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Appendix A – Results of Regional Screening

Appendix B – Weight Factor Development

Appendix C – Technical Bases for Screening Criteria Evaluations

Appendix D – Technical Bases for General Site Criteria Evaluations

## **Acronyms and Abbreviations**

%g	percent of gravity
AAA	American Automobile Association
AA	Augmented Site Selection Study (Augmentation Analysis)
AFB	Air Force Base
bgs	below ground surface
CFR	Code of Federal Regulations
cfs	cubic feet per second
CH	Critical Habitat
COL	Combined Operating License
COLA	Combined Operating License Application
E	Endangered
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
EPRI	Electric Power Research Institute
F	Fahrenheit
FDEP	Florida Department of Environmental Protection
FEMA	Federal Emergency Management Agency

FIRM	Flood Insurance Rate Maps
FPL	Florida Power & Light Company
ft	feet
ft <sup>2</sup>	square feet
gpd	gallons per day
gpm	gallons per minute
in	inches
kV	kilovolts
MDWASD	Miami-Dade County Water and Sewer Department
mgd	million gallons per day
mi	miles
MSA	Metropolitan Statistical Area
MSL	Mean Sea Level
NAVD	North American Vertical Datum
NCDC	National Climate Data Center
NEI	Nuclear Energy Institute
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NP	Nuclear Plant
NRC	Nuclear Regulatory Commission
NRHP	National Register of Historic Places
NUREG	Nuclear Regulatory Commission Regulation
NWI	National Wetlands Inventory
NWR	National Wildlife Refuge
OFW	Outstanding Florida Waters
Okee	Okeechobee
PE	Probability of Exceedance
PGA	Peak Ground Acceleration
PPE	Plant Parameter Envelope
psm	persons per square mile
ROI	Region of Interest
ROW	Right of Way
RR	Railroad
RTE	Rare, Threatened, and Endangered
S/A	Similar in Appearance
sq. mi.	Square miles
T	Threatened
T&E	Threatened and Endangered
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WCA	Water Conservation Area
WMA	Wildlife Management Area
WWTP	Waste Water Treatment Plant
yr	year

## **1.0 Background and Introduction**

In 2006, Florida Power & Light Company (FPL) conducted a site selection study that led to selection of Turkey Point as the site for its Combined Operating License Application (COLA) for new nuclear units. Decision processes and results of the site selection study were reported in Florida Power & Light Company, *Project Bluegrass New Nuclear Power Generation Final Site Selection Study Report*, October 2006 (Siting Report). The overall objective of that process was to identify a nuclear power plant site that 1) meets FPL's business objectives for the COL project, 2) satisfies applicable Nuclear Regulatory Commission (NRC) site suitability requirements, and 3) is compliant with National Environmental Policy Act (NEPA) requirements regarding the consideration of alternative sites.

This augmentation analysis (AA) report was prepared to:

- Address FPL's additional understanding of NRC guidance (NUREG-1555, Section 9.3) for the consideration of alternative sites subsequent to publication of the original 2006 Siting Report.
- Provide additional technical basis and rationale for response to Requests for Additional Information (RAI) issued by the NRC in its review of the Turkey Point Units 6&7 COLA.

The AA features:

- Explicit steps for regional screening and candidate area identification.
- Canvassing candidate areas to identify additional greenfield potential sites.
- Evaluation of additional potential sites in accordance with criteria and processes used in the Siting Report.

The AA does not supersede or replace analyses in the original Siting Report. The original site selection methodologies are preserved, and augmented with the regional screening, candidate area identification, and additional potential site evaluations noted above. The augmented analysis relies primarily on information concurrent and consistent with the assumptions in the 2006 Siting Report. Where necessary and appropriate, the AA relies on more recent data sets for the evaluations conducted. Applicable data sources used in the AA are noted in the report.

Excerpts of the Background and Introduction section of the 2006 site selection report are reproduced below.

"Florida Power & Light Company (FPL) intends to prepare a Combined Operating License Application (COLA) for a new nuclear power plant. An early step in this process is selection of a site that will provide the geographic setting for the COLA. This *Siting Plan* provides a description of the bases, assumptions, and processes applied in selecting the FPL COL site."

"The purpose of the new Nuclear Power Plant Project is to provide needed generating capacity to FPL's customers that will enhance the fuel diversity and

fuel supply reliability of FPL's fleet, reduce emissions from the FPL system on a per-kilowatt basis, and help balance the generation and load in Southeast Florida.”

“The overall objective of the siting process was to identify a nuclear power plant site that 1) meets FPL’s business objectives for the COL project, 2) satisfies applicable Nuclear Regulatory Commission (NRC) site suitability requirements, and 3) is compliant with National Environmental Policy Act (NEPA) requirements regarding the consideration of alternative sites.”

“Sites were evaluated based on a bounding set of site-related plant characteristics that define the nuclear plant physical site suitability requirements. This set of parameters is analogous to the Plant Parameter Envelope defined in NEI-01-04, “Industry Guideline for an Early Site Permit License Application – 10 CFR Part 52, Subpart A.”

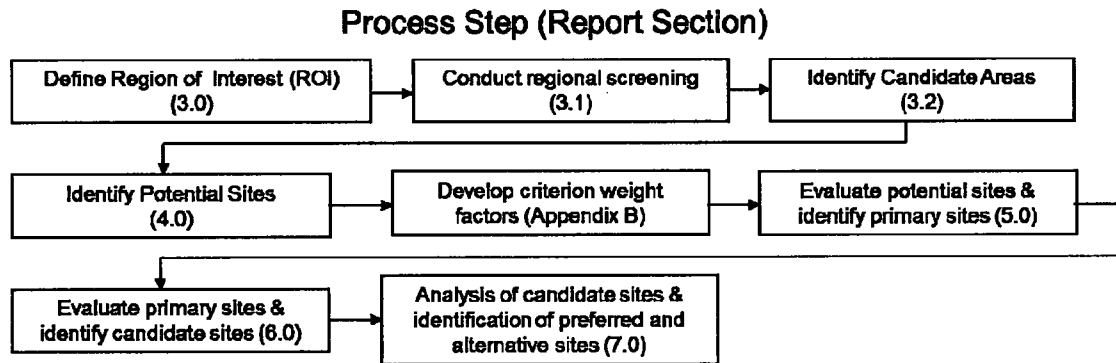
“Processes for site selection also take into account that existing sites have special status with NRC regarding consideration of alternative sites. For example, guidance provided to NRC staff on their review of alternative site analyses (NUREG-1555, Section 9.3, III [8]) states, in part [emphasis added]:”

*‘Recognize that there will be special cases in which the proposed site was not selected on the basis of a systematic site-selection process. Examples include facilities proposed to be constructed on the site of an existing nuclear power facility previously found acceptable on the basis of a NEPA review and/or demonstrated to be environmentally satisfactory on the basis of operating experience...’ ”*

An overall description of the siting process is provided in Section 2.0; additional detail on component steps in the site selection process is provided in succeeding sections.

## 2.0 Siting Process Overview

Site selection was conducted in accordance with the overall process outlined in the EPRI *Siting Guide: Site Selection and Evaluation Criteria for an Early Site Permit Application* (Siting Guide), March 2002. This process, as adapted for the augmented site selection study, is depicted in Figure 2-1.



**Figure 2-1 Site Selection Process Overview**

Definition of the Region of Interest (ROI) is described in Section 3.0. The process began with regional screening of the ROI by establishing and applying a set of mapping criteria and reducing the area under consideration to candidate areas (defined as sub-areas of the ROI that appear to contain suitable potential sites). Potential sites within the candidate areas were then identified and evaluated against a set of screening criteria, reducing the set of potential sites to a smaller set of primary sites. Then primary sites were evaluated against a set of general siting criteria, and a smaller set of candidate sites were identified. The candidate sites comprise the set of the proposed site and the alternate sites.

Site suitability criteria listed in the Siting Guide were used as the overall framework for these evaluations and were incorporated into the mapping criteria, screening criteria, and general siting criteria sets.

Finally, a recommended site for the new nuclear power plant was selected based on the composite ratings and a strategic issues and risk analysis related to FPL business plans and objectives.

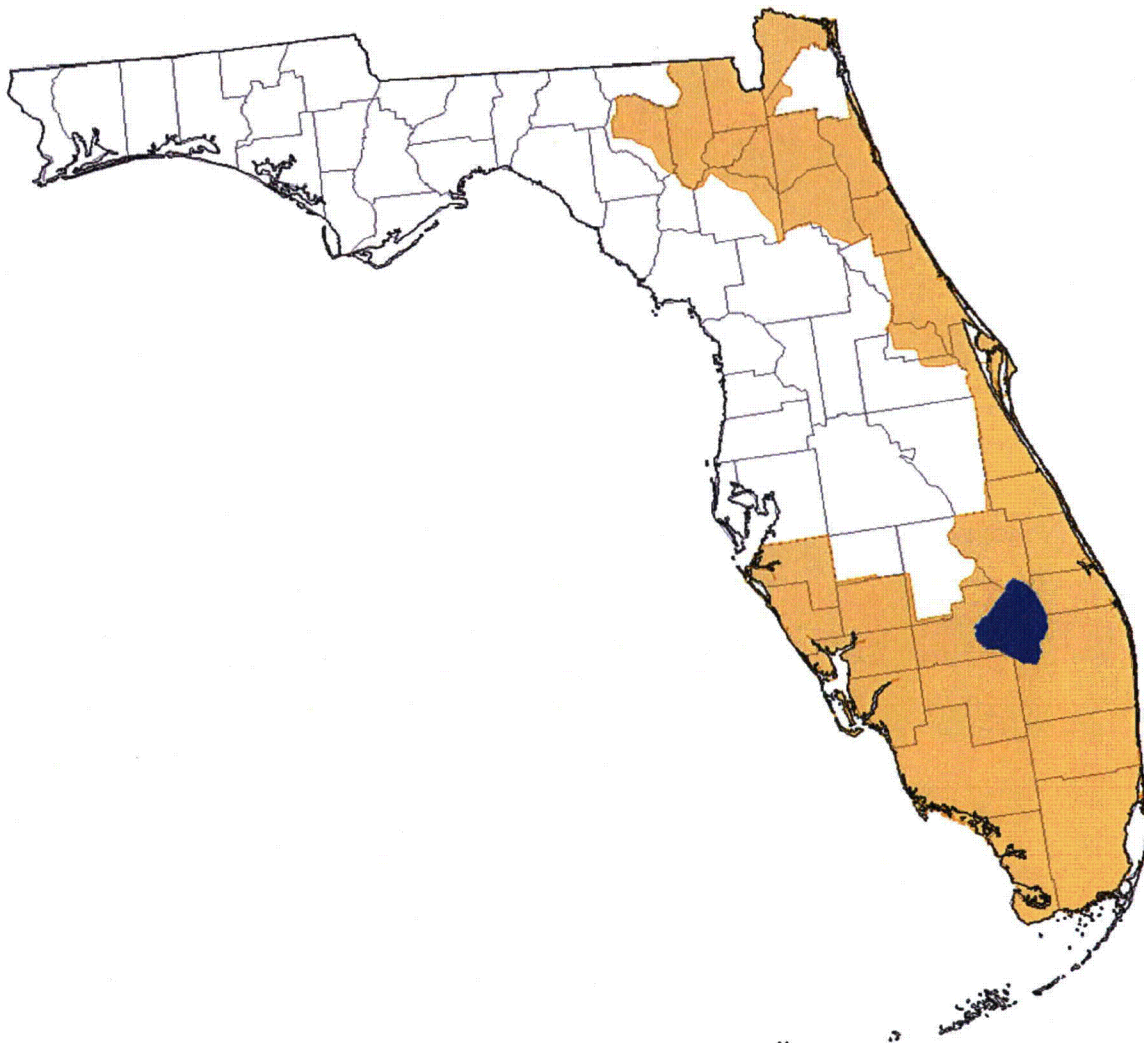


### **3.0 Regional Screening and Identification of Candidate Areas**

The ROI was defined as areas within or immediately adjacent to the FPL service territory (Figure 3-1).

Section 3.1 outlines the regional screening process. Section 3.2 describes the results of applying the exclusionary and avoidance criteria to the ROI and the identification of candidate areas for identification of potential sites (Section 4.0).

**Figure 3-1 Florida Power & Light Company Service Territory**



### 3.1 Regional Screening Process

The first step in the augmentation process was to screen the ROI to identify candidate areas of higher suitability within which additional potentially favorable sites (in addition to the sites identified in the Siting Report) may be found; this step was accomplished by eliminating from consideration those areas that are expected to be less suitable than other potential siting areas. Exclusionary and avoidance criteria identified in the Siting Guide were reviewed to identify those regional screening criteria and related physical features that provide insights into site suitability on an areal basis within the FPL ROI.

Regional screening criteria applied to the ROI are listed in Table 3-1. Additional information provided in Table 3-1 includes:

- Identification of data to be mapped.
- Mapping criteria that define how suitability was determined based on mapped data (e.g., buffer zones).
- Suitability impact (i.e., identification of areas excluded from further study).
- Data sources for identification and location of information to be mapped.
- Comments and rationale for the application of mapped data in determining suitability.

**Table 3-1 Regional Screening Criteria**

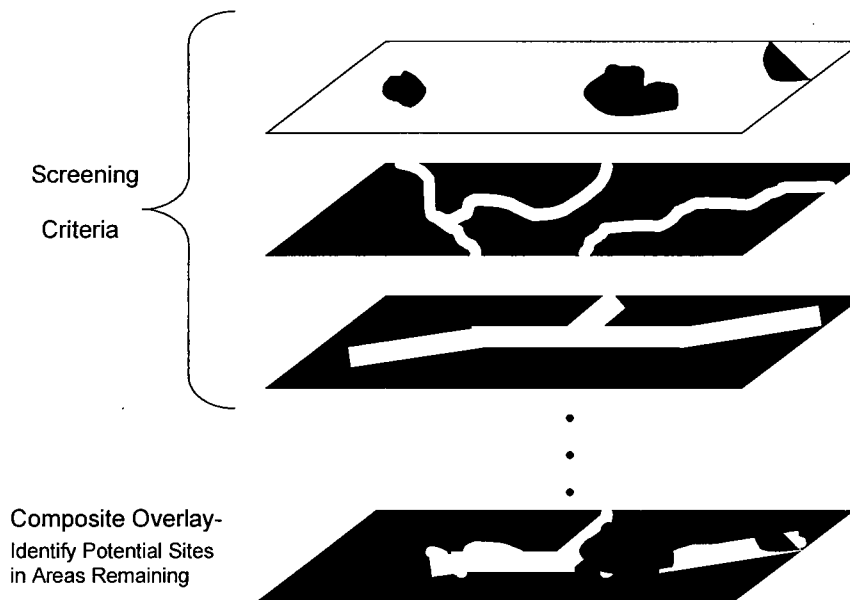
Criterion	Mapped Data	Mapping Criteria	Effect on Candidate Area Identification	Data Source(s)	Comments/Rationale
Cooling Water Availability (Surface Water)	Water sources (major rivers/canals, existing lakes/reservoirs, coastal areas)	Rivers/canals within the FPL ROI for which the annual mean flow > 500 cfs (approximately 5 times the new plant cooling water requirement <sup>1</sup> ) and the Atlantic Ocean and Gulf of Mexico	Excluded areas greater than 10 miles from qualifying rivers and 10 miles from the Atlantic Ocean and the Gulf of Mexico	USGS Water-Data Reports	Rivers for which more than 20% of the average flow will be required for makeup water may present permitting or operational water supply problems. The Atlantic Ocean and the Gulf of Mexico were assumed to be a viable source for cooling water makeup. Pumping makeup water more than 10 miles from rivers and the Atlantic Ocean/Gulf of Mexico may impose significant construction and operational costs and can result in operational risks.
Cooling Water Availability (Reclaimed Water)	Wastewater treatment plants	Wastewater treatment plants with an effluent flow rate of at least 20 Mgal/day (one-third the assumed makeup water requirement <sup>1</sup> )	Excluded areas greater than 10 miles from qualifying wastewater treatment plants	FDEP Reuse Inventory Database and Annual Report	Wastewater treatment plants with a flow of at least one-third of the total makeup requirement (~20 Mgal/day) were identified as potential cooling water sources. Wastewater treatment plants unable to supply the total cooling water requirement would be supplemental sources of cooling water only. Wastewater treatment plants unable to supply at least one-third of the total cooling water requirement were assumed to be uneconomical as makeup water sources.
Population	Population Density	Census block groups where population density > 300 persons/mi <sup>2</sup>	Excluded	2000 Census, updated as available	Areas with > 300 persons/mi <sup>2</sup> likely have multiple imbedded areas > 500 persons/mi <sup>2</sup> . Siting outside of these areas would more likely result in a population density less than the NRC guideline of 500 persons/mi <sup>2</sup> within a 20-mile radius of a site.
Dedicated Lands	Lands designated as National Parks, National Wildlife Refuges, National Marine Sanctuary Areas, military installations, Indian lands, and Florida state parks	Boundaries of dedicated lands identified	Excluded	Federal and state agency web sites (see Appendix A).	None.

Criterion	Mapped Data	Mapping Criteria	Effect on Candidate Area Identification	Data Source(s)	Comments/Rationale
Ecological Features mapped on a regional basis	Mapped critical habitat for identified species (see comments column at right)	Areal extent of identified features	Not considered as favorable areas for identification of additional potential sites	U.S. Fish and Wildlife Service (USFWS) Digitized Critical Habitat Data	Regional screening included critical habitat for species for which the USFWS website provided GIS shape files (digital data). This included critical habitat for the following species: American Crocodile, Cape Sable Seaside Sparrow, Choctawhatchee Beach Mouse, Everglade Snail Kite, Frosted Flatwoods Salamander, Gulf Sturgeon, Johnson's Seagrass, Perdido Key Beach Mouse, Piping Plover, Purple Bankclimber, Rice Rat, Right Whale, St. Andrew Beach Mouse.

1 – Assumed makeup water requirements (two units, closed cycle) = 42,000 gpm; ~ 100 cfs; ~ 60 Mgal/day).

Information defined for each of the ROI screening criteria listed in Table 3-1 was mapped and displayed on separate maps of the ROI. These maps were then combined using a simple overlaying technique to produce a composite screening map; Figure 3-2 provides a conceptual depiction of this process.

**Figure 3-2 Conceptual Depiction of ROI Screening Process**



### 3.2 Regional Screening Results

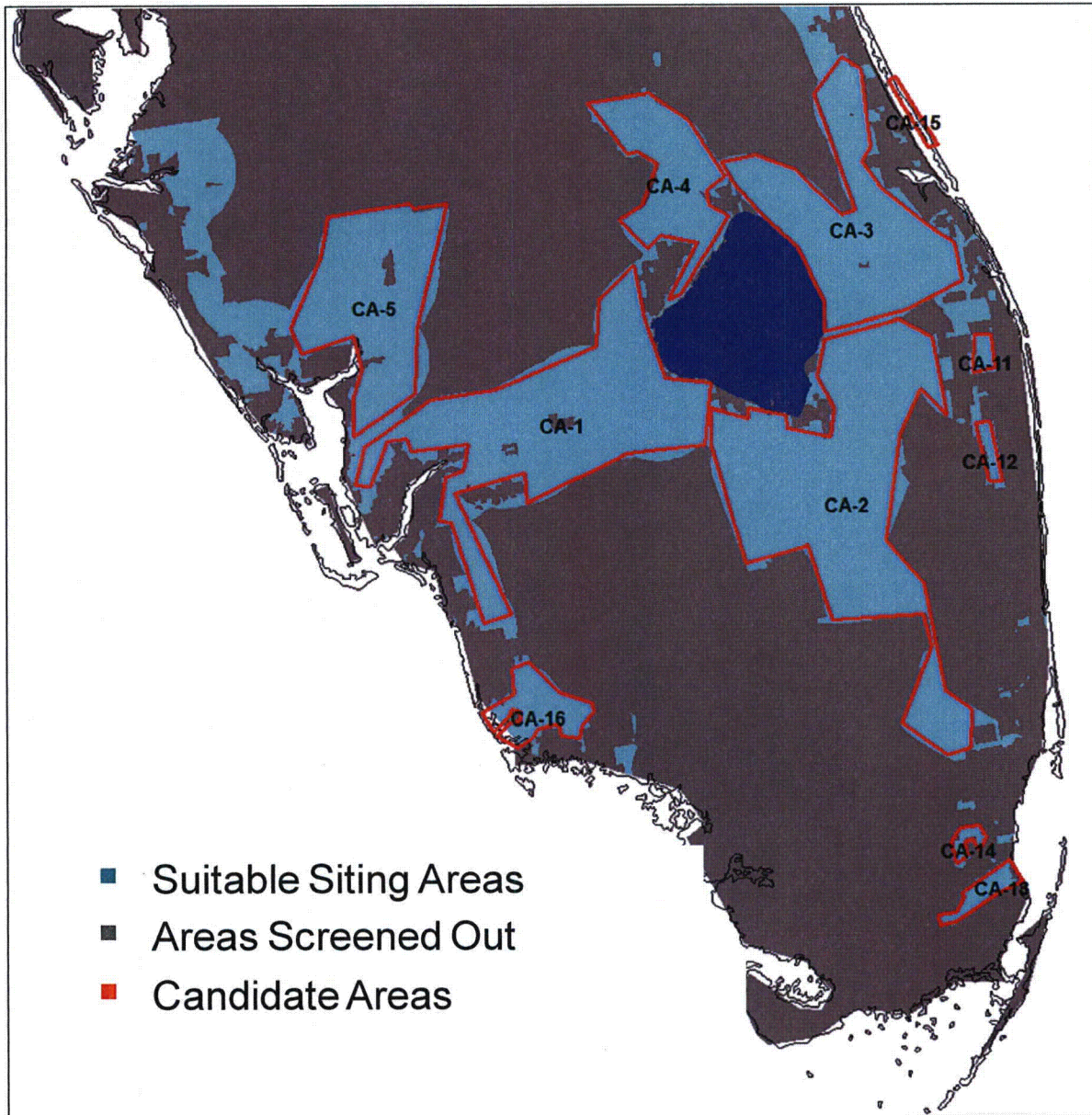
The individual and composite regional screening maps are included in Appendix A.

Figures 3-3 and 3-4 depict the results of the regional screening process, identifying areas of higher suitability for siting a new nuclear power plant. The following 16 candidate areas were identified:

- CA-1, Caloosahatchee River / West Lake Okeechobee
- CA-2, Various Canals / South Lake Okeechobee
- CA-3, St. Lucie Canal and River / East Lake Okeechobee
- CA-4, Kissimmee River / North Lake Okeechobee
- CA-5, Peace River
- CA-6, St. Johns River South
- CA-7, St. Johns River Central
- CA-8, St. Johns River North
- CA-9, St. Mary's River
- CA-10, St. Johns River / Reclaimed
- CA-11, West Palm Beach Canal / Reclaimed (North)
- CA-12, West Palm Beach Canal / Reclaimed (South)

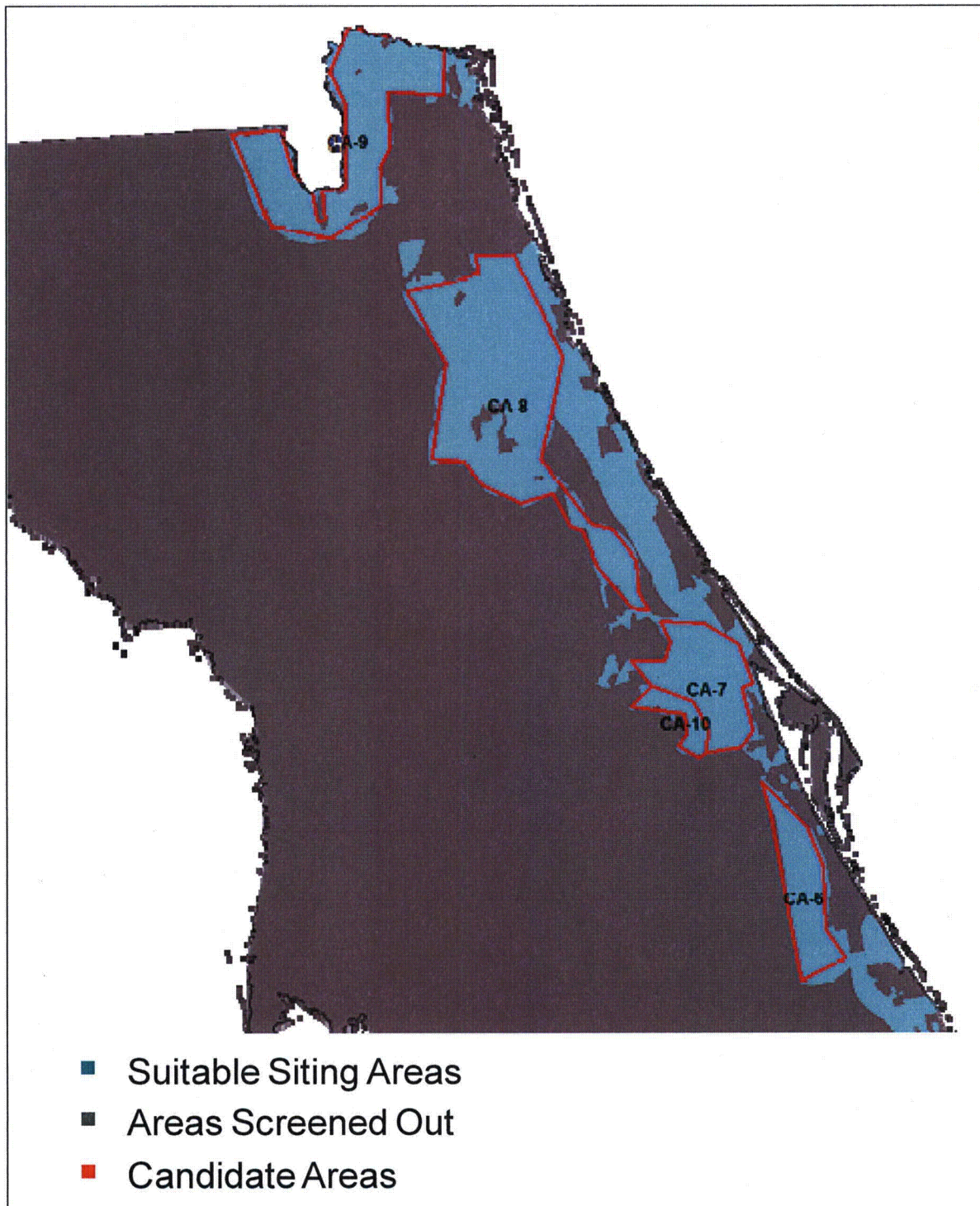
- CA-13, South Miami Reclaimed (South) (Turkey Point)
- CA-14, South Miami Reclaimed (North)
- CA-15, Coastal Existing Plant (St. Lucie)
- CA-16, South Gulf Coast

**Figure 3-3 ROI Regional Screening Results – Southern Service Territory**





**Figure 3-4 ROI Regional Screening Results – Northern Service Territory**



#### 4.0 Identification of Potential Sites

In order to obtain a set of potential sites that spans the nuclear power plant siting options within the region of interest, two independent processes for potential site identification were implemented. In the first, FPL convened a team of internal experts to identify the full spectrum of existing and available sites that could be initially considered; this process is described in Section 4.1. In addition, as described in Section 4.2, the candidate areas identified in Section 3.0 were canvassed to identify additional potential greenfield sites.

Cumulatively, a total of 21 potential sites were identified:

<b>Existing and Available Sites (Section 4.1)</b>	<b>Additional Greenfield Sites (Section 4.2)</b>
Charlotte	Collier A
Desoto	DeSoto A
Ft. Myers	Glades A
Glades	Hendry A
Hardee	Martin A
Hendry (2 locations)	Palm Beach A
Highlands	
Manatee	
Martin	
Okeechobee (2 locations)	
St. Lucie	
Turkey Point	
West County	

#### 4.1 Existing and Available Sites

FPL established a site selection team to identify potential sites for consideration in the site selection study. Internal FPL members of the team were identified such that they represented the full span of FPL business units and their associated specialized knowledge of existing and available sites that could be initially considered. Business units represented included:

- Resource Assessment and Planning
- Nuclear Division
- Environmental Services
- Transmission Planning
- External and Governmental Affairs
- Corporate Real Estate
- Legal
- Development



Thus, in representing their business units, the team collectively provided access to the full knowledge and capability of the Company with respect to sites in the FPL service territory and nearby regions.

Functionally, the canvassing was conducted at an August 2006 meeting during which each FPL business unit representative was asked to bring to the meeting all site-related knowledge available within their units. The committee was polled to identify the full spectrum of known existing and available sites (e.g., undeveloped land already owned by FPL or an interested seller) within or near the FPL service territory. Once all site alternatives available within the region of interest had been identified, the committee – again representing the knowledge and insights inherent in their business units – determined the feasibility of developing a new nuclear power plant at the identified sites.

Within the ROI, 23 sites were identified by FPL as locations that could be evaluated for the COL project and, potentially, a new nuclear power plant. These sites, which included existing power plant sites and greenfield sites previously identified by FPL, represented the full suite of siting tradeoffs available within the ROI and therefore provided an initial basis for evaluation of a reasonable set of alternative locations.

FPL and Enercon/McCallum-Turner team personnel reviewed this set of sites in a joint meeting on August 1, 2006, to identify the final set of potential sites for this study. The following groups of sites were reviewed.

#### FPL Existing Sites

Twelve existing FPL power-generating sites were considered. Two of the sites are existing nuclear power generating plants.

- Canaveral
- Cutler
- Ft. Myers
- Lauderdale
- Manatee
- Martin
- Port Everglades
- Putnam
- Riviera
- Sanford
- St. Lucie (existing nuclear)
- Turkey Point (existing nuclear)

Additionally, three FPL-owned greenfield sites were considered:

- Andytown
- DeSoto
- West County

Finally, eight non-FPL-owned greenfield sites were considered; these sites were identified by the FPL corporate real estate department as being potentially available and feasible sites for new power generation projects:

- Charlotte
- Glades
- Hardee
- Hendry (2 locations)
- Highlands
- Okeechobee (2 locations)

Each of the sites was evaluated qualitatively with respect to the following considerations:

- Sufficient land<sup>1</sup> currently exists for new nuclear power plant construction;
- Sufficient land can be obtained for new nuclear power plant construction;
- Adequate sources of water; and
- Transmission feasibility.

Using this process, the following 15 potential sites were identified for further consideration; these sites are depicted in Figure 4-1:

- Charlotte
- DeSoto
- Ft. Myers
- Glades
- Hardee
- Hendry (2 locations)
- Highlands
- Manatee
- Martin
- Okeechobee (2 locations)
- St. Lucie
- Turkey Point
- West County

Sites in the northern part of the ROI (Putnam, Sanford, Canaveral), as well as the Cutler site, were eliminated due to transmission feasibility; these sites are located far from the FPL load centers, and would not achieve the project objective of balancing loads in South Florida (Section 1.0). Additionally, right-of-way acquisition would be difficult, and/or transmission connections at these sites would have to be coordinated with other utilities. In addition, the Cutler, Sanford and Canaveral sites do not have adequate land area, and additional land could not feasibly be acquired.

The Andytown, Lauderdale, Port Everglades, and Riviera sites were eliminated from further consideration because these sites do not include enough land for a new nuclear power plant and additional land cannot be feasibly acquired in the time-frame required to support the FPL COLA schedule.

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<sup>1</sup> 3,000 acres was used as a general guideline in determining land sufficiency for sites other than existing nuclear power plant sites, based on the lower bound of the Desired Owner Buffer Area for two nuclear power units, as identified by FPL - where the Desired Owner Buffer Area includes the plant components/protected area and the owner controlled/buffer area. Land sufficiency at existing nuclear power plant sites (St. Lucie and Turkey Point) is known, based on detailed licensing and operational knowledge of these sites.

#### 4.2 Candidate Area Canvassing

Canvassing of the candidate areas was conducted to search for additional greenfield sites. The objective of this step was to identify a second set of potential sites – not necessarily associated with existing or known properties identified in Section 4.1 – that could be suitable for a nuclear power plant. These additional sites allowed for more comprehensive characterization of siting tradeoffs within the ROI, as well as provided further assurance that the process identified the best environmental sites that could reasonably be identified in the ROI. The process for conducting this canvassing is described in the balance of this section.

The sixteen candidate areas identified in the ROI screening were examined to identify additional potential greenfield sites that would be feasible for a new nuclear power plant, using the following process:

1. Satellite imagery of the areas was viewed using Google Earth<sup>®</sup> (<http://earth.google.com/>). Potential sites of approximately 5,000 acres<sup>2</sup> were identified by applying the considerations described below.
2. 1:100,000- and 1:24,000-scale topographic maps (USGS) were examined to identify areas for potential sites and to clarify and optimize locations identified from satellite photography. Information on identified sites was supplemented using state maps and atlases.
3. The latitude and longitude of the approximate center point of each potential site was noted.

Specific considerations applied in selecting these potential sites were:

- Avoidance of high-population areas.
- Avoidance of ecologically sensitive and special designation areas.
- Avoidance of special dedicated land uses (e.g., national parks).
- Proximity to transmission/load centers.

Siting suitability characteristics of the candidate areas, as identified during the canvassing process, are provided in Table 4-1.

For each of the potential sites identified, aerial photographs and other available geographic information were compiled and nominal site locations were identified. Potential sites were defined to be approximately 5,000 acres<sup>2</sup> in size. In addition to reflecting major siting trade-offs, the objective of this phase was to optimize potential sites within each area with respect to additional environmental considerations (e.g., wetlands) and engineering feasibility.

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<sup>2</sup> The nominal 5,000-acre area is consistent with the upper bound of the desired owner buffer area, as identified by FPL for the site selection study, and provided a consistent basis for comparison of potential sites while providing flexibility for ultimately locating plant components within the evaluated area. This flexibility allows for the refinement of detailed plant locations as more information (e.g., environmental and geotechnical considerations, land availability) is developed regarding the site in subsequent steps in the siting process, while avoiding the need to re-evaluate the site as locational refinements are made.

Additional factors taken into account in this process, as feasible, included:

- Flexibility to optimize site layout and design for cost minimization.
- Flexibility to optimize site layout and design for avoidance or mitigation of environmental impacts.
- Optimization of site engineering factors (e.g., topography, foundation conditions, grading requirements).

Using this additional process, the following 6 potential greenfield sites were identified for further consideration; these sites are also depicted in Figure 4-1:

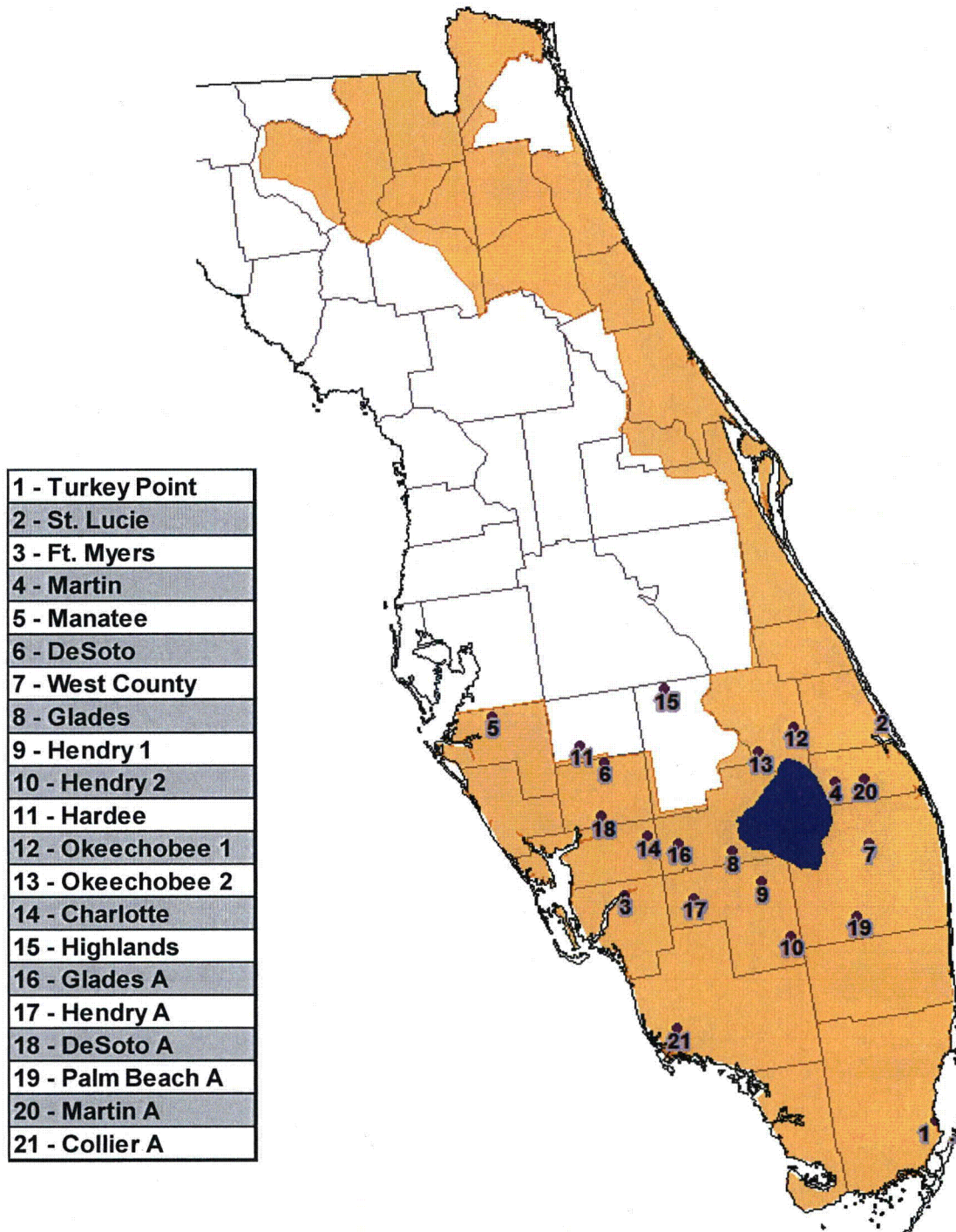
- Collier A
- DeSoto A
- Glades A
- Hendry A
- Martin A
- Palm Beach A

**Table 4-1 Candidate Area Siting Suitability Characteristics**

Candidate Area	Siting Suitability Characteristics
CA-1	A significant portion of the western half of the candidate area is covered in wetlands; these areas were avoided for potential site selection.
CA-2	A significant portion of the southern half of the candidate area is covered in wetlands; these areas were avoided for potential site selection. Potential sites in CA-2 were located in the central/southern portion of the candidate area to minimize the distance from the Miami load center and environmental impacts associated with construction of transmission and transportation infrastructure.
CA-3	The northeastern portion of the candidate area is located nearer areas of large population and does not offer any perceived advantages over other sites within the candidate area.
CA-4	The northern portion of the candidate area is located farther from the Miami load center than other sites in the candidate area and does not offer any perceived advantages over other sites within the candidate area.
CA-5	The southern and western portion of the candidate area is covered in wetlands; these areas were avoided for potential site selection.

Candidate Area	Siting Suitability Characteristics
CA-6 through CA-10	These candidate areas are located in the northern portion of FPL's service territory and are farther from the primary load center in the Miami area. Sites in these candidate areas will be disadvantaged due to the increased environmental impacts associated with construction of transmission infrastructure. These candidate areas do not offer any perceived advantages that would outweigh the increased environmental impacts associated with construction of transmission infrastructure. Additionally, significant portions of CA-6, CA-7, CA-9, and CA-10 are covered in wetlands.
CA-11	The majority of this candidate area is covered in wetlands; these areas were avoided for potential site selection. Additionally, the candidate area is surrounded by areas of large population.
CA-12	The candidate area contains pockets of larger population and is surrounded by areas of large population. Additionally, the wastewater treatment plant in the area can only supply a portion of the cooling water requirement, and access to other sources may be limited.
CA-13	The majority of this candidate area is covered in wetlands; these areas were avoided for potential site selection. The areas not covered in wetlands are developed and closer to areas of large population. During the process of canvassing the candidate areas to identify potential sites, FPL examined areas in southern Florida to attempt to identify potential sites that could potentially use the reuse water from the south Miami area. However, due to population and environmental constraints present in these candidate areas, FPL did not identify any potential sites other than Turkey Point that were located near viable sources of reclaimed water.
CA-14	The majority of the candidate area is populated and surrounded by areas of large population. The candidate area was examined closely to identify any potential sites that could take advantage of reclaimed water in the south Miami area, but no potential sites beyond Turkey Point were identified.
CA-15	The majority of the candidate area is covered in wetlands. Aside from the area surrounding the St. Lucie nuclear power plant, no viable siting areas were identified in the candidate area.
CA-16	With the exception of the central portion, the majority of the candidate area is covered in wetlands; these areas were avoided for potential site selection. Additionally, pipeline access to the Gulf of Mexico could be complicated by area development, large population, and environmental concerns (e.g., estuarine/marine habitat).

**Figure 4-1 Potential Site Locations**



## 5.0 Evaluation of Potential Sites and Identification of Primary Sites

### 5.1 Potential Site Evaluation

The overall process for screening-level evaluation of potential sites was composed of the following elements; each element is described in the following paragraphs.

- Develop criterion ratings for each site;
- Develop weight factors reflecting the relative importance of each criterion; and
- Develop composite site-suitability ratings.

Criterion Ratings – Each potential site was assigned a rating of 1 to 5 (1 = least suitable, 5 = most suitable) for each of the nine screening criteria identified below, using the rationale listed in Table 5-1. Information sources for these evaluations included publicly available data, data available from FPL files and personnel, and large-scale satellite photographs.

Weight Factors – Weight factors reflecting the relative importance of these criteria were developed by a multi-disciplinary committee in the areas of nuclear power plant site suitability that was convened at FPL offices on August 29, 2006; this committee was composed of subject matter experts in water use and availability, engineering, real estate, ecology, transmission, land use, health & safety, socioeconomics and public relations. The weight factors were derived using methodology consistent with the modified Delphi process specified in the Siting Guide (see Appendix B). Weight factors used (1 = least important, 10 = most important) are listed in the table below.

Criterion Number	Criterion	Weight Factor
P1	Cooling Water Supply	9.5
P2	Flooding	3.9
P3	Population	7.6
P4	Hazardous Land Uses	5.0
P5	Ecology	6.1
P6	Wetlands	6.4
P7	Railroad Access	5.6
P8	Transmission Access	8.5
P9	Land Acquisition	6.5

Composite Suitability Ratings – Ratings reflecting the overall suitability of each site were developed by multiplying criterion ratings by the criterion weight factors and summing over all criteria for each site.

Criteria presented in Table 5-1 were derived from the larger set of more detailed criteria listed in Chapter 3 of the EPRI *Siting Guide: Site Selection and Evaluation Criteria for an Early Site Permit Application* (Siting Guide), March 2002. They are intended to provide insights into the overall site suitability trade-offs between the potential sites and to take advantage of data available at this stage of the site selection process.

**Table 5-1 Screening Evaluation Criteria**

Criterion Number	Criterion	Measure of Suitability	
		Metric	Rating Rationale
P1	Cooling Water Supply	<p>Composite ratings were based on an average of ratings for the following four aspects:</p> <p><b>Flow –</b>  <u>Surface water</u>: Annual mean flow for the period of record as reported by USGS.  <a href="http://waterdata.usgs.gov/fl/nwis/current/?type=flow">[http://waterdata.usgs.gov/fl/nwis/current/?type=flow]</a>.  <u>Reclaimed water</u>: WWTP flow reported by FDEP.  <a href="http://www.dep.state.fl.us/water/reuse/inventory.htm">[http://www.dep.state.fl.us/water/reuse/inventory.htm]</a>.  <u>Groundwater</u>: Flow estimated based on FPL familiarity with Floridan aquifer, where feasible.  <u>Lake Okeechobee</u>: Conservatively estimated to be at least the lower of the low daily mean flow reported for the C44 and C43 canals (360 cfs).</p>	<p>Assumes only 20% of river/canal/lake flows are available for permit/withdrawal.  5 = No practical restriction  4 = Availability greater than 5 times the requirement  3 = Availability 3-5 times the requirement  2 = Availability less than 3 times the requirement  1 = Insufficient flow</p>
		<p><b>Flexibility –</b>  Number of source(s) of water present and capable of providing substantial portion of required flow.</p>	<p>Assumes groundwater only available as an augmentation source (data sources for groundwater availability on an areal basis throughout the ROI were not available).  5 = Multiple sources each capable of full flow required  4 = Additional sources capable of providing substantial portion of flow  3 = One source capable of providing full flow  2 = Multiple sources each capable of providing substantial portion of flow with no single source providing full flow requirements  1 = Insufficient flow regardless of number of sources</p>



Criterion Number	Criterion	Measure of Suitability	
		Metric	Rating Rationale
		<b>Risk –</b> Associated with flow variability, longer pumping distances and/or other reliability aspects of water supply.	5= All aspects favorable 4= Some favorable aspects 3= Neutral 2= Some risk 1= Substantial risk
		<b>Regulatory Challenge –</b> Known areas with elevated competition for water resources, a high number of water users, difficult supply conditions or challenging compliance situation are ranked lower than those without such challenges, based on knowledge and insights of the FPL siting team.	5= All aspects favorable 4= Some favorable aspects 3= Neutral 2= Some challenges 1= Substantial challenges
P2	Flooding	Flood potential considering difference between mean site elevation and surface water body elevation, proximity to swamp areas, and proximity to flood prone areas (100-year flood zone).	5 = Low flood potential, elevation difference greater than 20 feet, plant site can be located outside of swamp areas and outside of 100-year flood zone. 4 = Moderately low flood potential, elevation difference greater than 10 feet, plant site can be located outside of 100-year flood zone, swamp areas may be encountered. 3 = Moderate flood potential, elevation difference greater than 5 feet, plant site located on border of 100-year flood zone, swamp areas may be encountered. 2 = Moderately high flood potential, elevation difference less than 5 feet, plant site located within 500-year flood zone, swamp areas likely to be encountered. 1 = High flood potential, elevation difference less than 5 feet, plant site located within 100-year flood zone, base flood elevations above site elevation, swamp areas likely to be encountered.

Criterion Number	Criterion	Measure of Suitability	
		Metric	Rating Rationale
P3	Population	<p>Composite ratings were based on an average of ratings based on the following two conditions:</p> <p>(1) Distance to nearest population center (high density); and</p> <p>(2) Population density of host county (based on 2000 census).</p> <p>In addition, a rating point was deducted or added if the site is or is not in a particularly densely populated area.</p> <p>Population centers are defined as the nearest "place" or "concentration of population" as defined by the U.S. Census Bureau, where a place is either legally incorporated under the laws of its respective state, or a statistical equivalent that the Census Bureau treats as a Census Designated Place (CDP).</p>	<p>5 = No population centers within 20 miles  4 = Population centers between 20 and 15 miles  3 = Population centers between 15 and 10 miles  2 = Population centers between 10 and 5 miles  1 = Population centers within 5 miles</p> <p>County Population Density Ratings:</p> <p>5 = Less than 50 persons per square mile (psm)  4 = Between 250 psm and 50 psm  3 = Between 350 psm and 250 psm  2 = Between 500 psm and 350 psm  1 = Greater than 500 psm</p> <p>A point was added if no densely populated area is found within 40 miles of the site; a point deducted if a densely populated area is found within 15 miles of the site or if a large grouping of densely populated areas are located within 15-40 miles of the site.</p>
P4	Hazardous Land Uses	<p>Number of airports, pipelines, and other known hazardous industrial facilities (including Air Force Bases and Kennedy Space Center/Cape Canaveral), as determined from publicly available data.</p>	<p>5 = No major airport, city or county airport, military base, or rail within 10 miles [small air fields/landing strips are allowed if no more than 2 within 5 miles]  4 = No major airport (or Air Force Base) within 10 miles, no rail, pipeline small city or county airport within 5 miles [1-2 small air fields/landings strips are ok]  3 = Rail and small airports (multiple) &lt; 5 miles  2 = Major airport or Air Force Base &lt; 10 miles  1 = Major airport or Air Force Base &lt; 10 miles, rail and multiple small airports &lt; 5 miles, and existing plant location</p>
P5	Ecology	<p>Number of Federal Threatened, Endangered and Rare Species in County [aquatic and terrestrial]</p>	<p>5 = 0 species  4 = 1-10 species  3 = 11-20 species  2 = 21-30 species  1 = over 30 species</p>

Criterion Number	Criterion	Measure of Suitability	
		Metric	Rating Rationale
P6	Wetlands	Number of mapped wetland acres within a 5,000 acre nominal site area*, excluding riverine, existing reservoirs, and deepwater marine areas. Note: The use of the term "wetlands" is used solely as a descriptive term and is not used as a regulatory or jurisdictional term.	5 = 0 acres 4 = Between 0 acres and 250 acres, or $\leq 5\%$ of land area 3 = Between 250 acres and 500 acres, or $\leq 10\%$ of land area 2 = Between 500 acres and 1,500 acres, or $\leq 30\%$ of land area 1 = Greater than 1,500 acres, or $> 30\%$ of land area
P7	Railroad Access	Estimated cost of constructing a rail spur to the site, based on distance in miles to the nearest in-service rail line.	Ratings computed by scaling costs from lowest (rating = 5) to highest (rating = 1). 1 = More than 15 miles 2 = Between 15 miles and 10 miles 3 = Between 10 miles and 5 miles 4 = Between 5 miles and 2 miles 5 = Fewer than 2 miles Note: Ratings may be adjusted if barge access is located in the immediate vicinity in lieu of railroad access.
P8	Transmission Access	Transmission access is evaluated in the preliminary screening in terms of distance to the load center in the greater Miami area (Palm Beach, Broward, and Miami-Dade Counties) and amount of new right-of-way that would have to be acquired.	Ratings computed by measuring distances to greater Miami Area Load Center and considering high-level evaluation of transmission issues. 1 = More than 200 miles 2 = Between 200 miles and 100 miles 3 = Between 100 miles and 70 miles 4 = Between 70 miles and 50 miles 5 = Fewer than 50 miles Ratings points adjusted based on amount of new right-of-way that must be acquired and the relative difficulty of acquisition. The plant switchyard is assumed to be the same for all sites.

Criterion Number	Criterion	Measure of Suitability	
		Metric	Rating Rationale
P9	Land Acquisition	<p>Estimated cost of acquiring land (nominally 3,000 acres per site where FPL does not own**), based on the following cost/acre assumptions:</p> <ul style="list-style-type: none"> <li>– very remote areas - \$8,000 - \$12,000 [used \$10,000]</li> <li>– farm areas - \$15,000 - \$20,000 per acre [used \$17,500]</li> <li>– land near population centers - \$30,000 - \$40,000 per acre [used \$35,000]</li> </ul>	<p>Ratings computed by scaling costs from lowest to highest as follows:</p> <ul style="list-style-type: none"> <li>2 = FPL does not own; site near large population/highest cost</li> <li>3 = FPL does not own; site in farm area/moderate cost</li> <li>4 = FPL does not own; site in very remote area/lowest cost</li> <li>5 = FPL owns sufficient land</li> </ul> <p>In instances where FPL owns some land but would need to acquire additional land to accommodate nuclear development, rating based on total cost compared to other greenfield sites, (total acres to be acquired X estimated cost per acre based on metric).</p>
<p>* To provide a consistent basis for site evaluation and comparison across sites in the screening phase wetlands evaluation, each potential site was initially identified as a 5,000-acre area, nominally a circle centered on a site centerpoint. The 5,000-acre general area provided a general characterization of the presence of wetlands and flexibility in the eventual plant layout. It is also consistent with the upper bound of the Desired Owner Buffer Area as identified by FPL for the site selection study.</p> <p>** The lower bound of the Desired Owner Buffer Area (i.e., 3,000 acres), as identified by FPL for the site selection study, was used for the land acquisition criterion evaluation as the basis for comparing sites according to the need to acquire land and the associated land costs at sites FPL does not already own (or owns but has determined holdings are insufficient for development of two new nuclear units).</p>			

## 5.2 Identification of Primary Sites

Results of the screening evaluation are presented in Table 5-2 and Figure 5-1; the technical basis for the individual criterion ratings is detailed in Appendix C.

The top eight ranked sites were initially selected as primary sites. This set includes a variety of site characteristics and includes sites that were rated favorably (in the screening criteria evaluations) in comparison with lesser ranked sites from an environmental perspective.

In addition, the St. Lucie and Turkey Point sites were included as primary sites based on the fact that they are existing, operating nuclear power plant sites within the ROI. Inclusion of these sites in the set of primary sites allows detailed evaluation of their unique advantages, including confidence in site characteristics, existing infrastructure, and public acceptance.

The ten primary sites identified for further evaluation are:

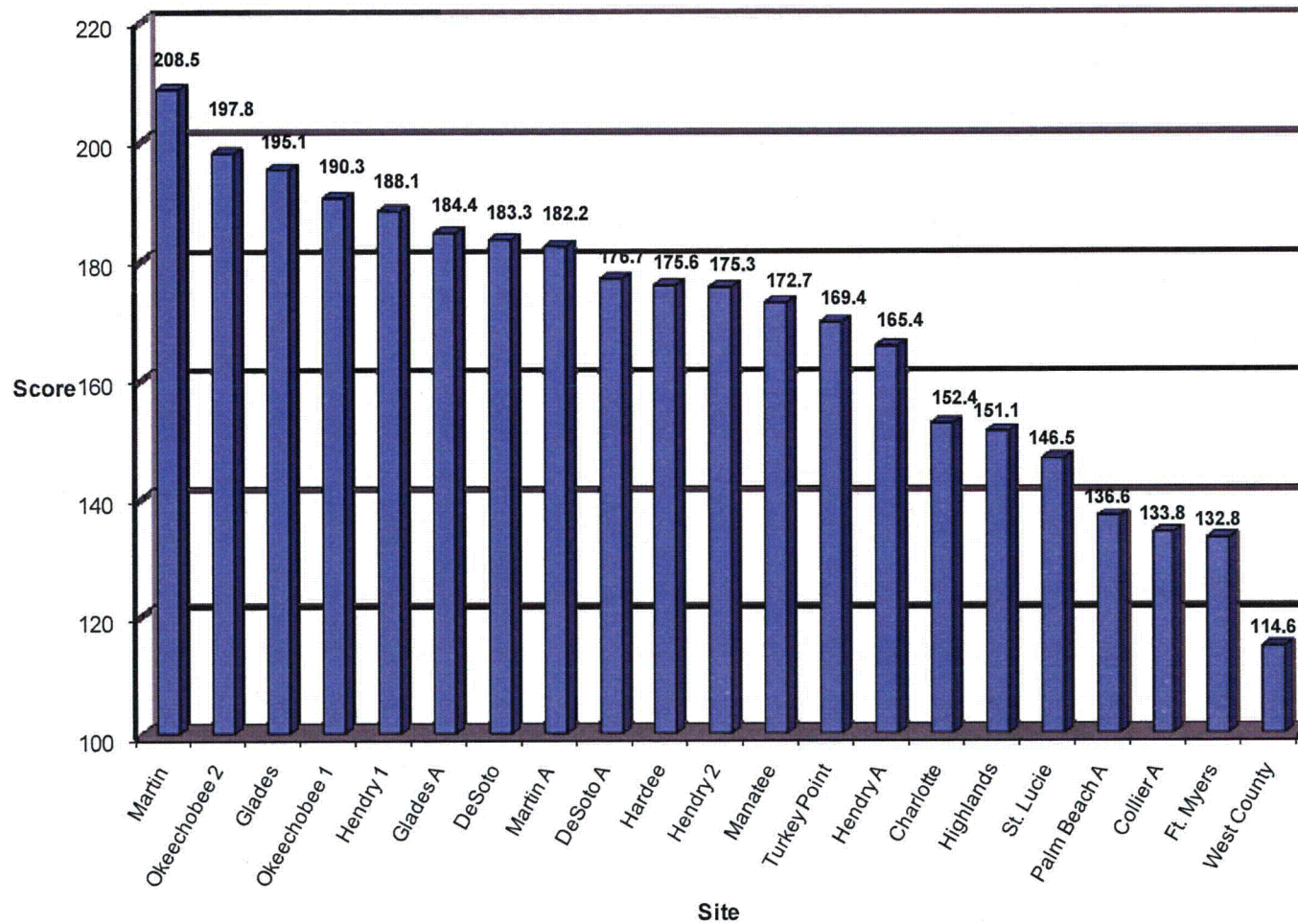
- DeSoto
- Glades
- Glades A
- Hendry 1
- Martin
- Martin A
- Okeechobee 1
- Okeechobee 2
- St. Lucie
- Turkey Point

**Table 5-2 Screening Criteria Site Ratings**

	Cooling Water Supply	Flooding	Popula- tion	Hazard- ous Land Uses	Ecology	Wetlands	Railroad Access	Transmis- sion Access	Land Acquisi- tion	
	Weight Factor									Site Rating
Potential Site Name	9.5	3.9	7.6	5.0	6.1	6.4	5.6	8.5	6.5	
Charlotte	3	2	4	5	2	1	1	2	3	152.4
Collier A	3	1	2	4	2	2	2	2	2	133.8
DeSoto	2	4	3	4	3	2	3	3	5	183.3
DeSoto A	2	4	3	4	3	3	3	3	3	176.7
Ft. Myers	3	2	1	1	2	2	4	2	3	132.8
Glades	3	2	4	3	3	3	4	4	3	195.1
Glades A	3	3	3	4	3	2	3	4	3	184.4
Hardee	2	4	4	3	3	2	5	2	3	175.6
Hendry 1	3	2	4	4	3	2	3	4	3	188.1
Hendry 2	2	1	5	5	3	1	2	4	3	175.3
Hendry A	3	1	3	4	3	2	1	4	3	165.4
Highlands	2	5	4	2	1	2	3	2	3	151.1
Manatee	3	5	2	3	3	2	4	1	5	172.7
Martin	3	2	3	3	2	3	5	5	5	208.5
Martin A	3	2	2	3	2	4	4	5	2	182.2
Okeechobee 1	2	5	4	4	3	2	3	4	3	190.3
Okeechobee 2	3	3	3	3	3	4	4	4	3	197.8
Palm Beach A	2	2	1	5	1	1	2	4	3	136.6
St. Lucie	4	1	1	3	2	1	4	1	5	146.5
Turkey Point	4	1	1	2	1	1	4	5	5	169.4
West County	2	2	1	4	1	1	2	2	3	114.6

Figure 5-1 Screening Criteria Ratings

FPL Screening Criteria Evaluation



## **6.0 Evaluation of Primary Sites and Identification of Candidate Sites**

The objective of this component of the site-selection process was to further evaluate the primary sites and select a smaller set of candidate sites for detailed evaluation and ultimate selection of the proposed site for the FPL COLA. Section 6.1 outlines the process for evaluating primary sites, while Section 6.2 describes process results and the selection of candidate sites.

### **6.1 Process for Evaluating Primary Sites**

General siting criteria used to evaluate the primary sites were derived from those presented in Chapter 3.0 of the *Siting Guide: Site Selection and Evaluation Criteria for an Early Site Permit Application*, EPRI, Palo Alto, CA: 2002 (Siting Guide); criteria from the siting guide were tailored to reflect issues applicable to – and data available for – the FPL primary sites. A list of the criteria appears in Table 6-1.

The overall process for applying the general site criteria was analogous to that described in Section 5.1 and was composed of the same three elements identified below. Results from applying the process are described in Section 6.2. Appendix D provides the detailed technical basis for the general site-criteria ratings.

Criterion Ratings – Each site was assigned a rating of 1 to 5 (1 = least suitable, 5 = most suitable) for each of the general siting criteria using the rationale described in Appendix D. Information sources for these evaluations included publicly available data, information available from FPL files and personnel, and USGS topographic maps.

Weight Factors – Weight factors reflecting the relative importance of these criteria were developed by a multi-disciplinary committee in the areas of nuclear power plant site suitability that was convened at FPL offices on August 29, 2006; this committee was composed of subject matter experts in water use and availability, engineering, real estate, ecology, transmission, land use, health & safety, socioeconomics and public relations. The weight factors were derived using methodology consistent with the modified Delphi process specified in the Siting Guide (see Appendix B). Weight factors used (1 = least important, 10 = most important) are included in Table 6-2 below.

Composite Suitability Ratings – Ratings reflecting the overall suitability of each site were developed by multiplying criterion ratings by the criterion weight factors and summing all criteria for each site, as summarized in Table 6-2.



**Table 6-1 General Siting Criteria**

<b>Siting Criteria</b>	<b>Siting Criteria</b>
<b>1.1 Health and Safety Criteria: Accident Cause-Related Criteria</b>	<b>Environmental Criteria: Operational-Related Effects on Aquatic Ecology, cont'd.</b>
1.1.1 Geology and Seismology	2.3.2 Entrainment/Impingement Effects
1.1.2.1 Cooling System Requirements: Cooling Water Supply	2.3.3 Dredging/Disposal Effects
1.1.2.2 Cooling Water System: Ambient Temperature Requirements	<b>2.4 Environmental Criteria: Operational-Related Effects on Terrestrial Ecology</b>
1.1.3 Flooding	2.4.1 Drift Effects on Surrounding Areas
1.1.4 Nearby Hazardous Land Uses	<b>3 Socioeconomic Criteria</b>
1.1.5 Extreme Weather Conditions	3.1 Socioeconomic – Construction Related Effects
<b>1.2 Health and Safety Criteria: Accident Effects-Related</b>	3.2 Socioeconomics – Operation (deleted from evaluation, see Appendix C)
1.2.1 Population	3.3 Environmental Justice
1.2.2 Emergency Planning	3.4 Land Use
1.2.3 Atmospheric Dispersion	<b>4.1 Engineering and Cost-Related Criteria: Health and Safety Related Criteria</b>
<b>1.3 Health and Safety Criteria: Operational Effects-Related</b>	4.1.1 Water Supply
1.3.1 Surface Water – Radionuclide Pathway	4.1.2 Pumping Distance
1.3.2 Groundwater Radionuclide Pathway	4.1.3 Flooding
1.3.3 Air Radionuclide Pathway	4.1.4 Vibratory Ground Motion (deleted from evaluation, see Appendix C)
1.3.4 Air – Food Ingestion Pathway	4.1.5 Civil Works
1.3.5 Surface Water – Food Radionuclide Pathway	<b>4.2 Engineering and Cost: Transportation or Transmission Related Criteria</b>
1.3.6 Transportation Safety	4.2.1 Railroad Access
<b>2.1 Environmental Criteria: Construction-Related Effects on Aquatic Ecology</b>	4.2.2 Highway Access
2.1.1 Disruption of Important Species/Habitats	4.2.3 Barge Access
2.1.2 Bottom Sediment Disruption Effects	4.2.4 Transmission Access
<b>2.2 Environmental Criteria: Construction-Related Effects on Terrestrial</b>	<b>4.3 Engineering and Cost-Related Criteria: Related to Socioeconomic &amp; Land Use</b>
2.2.1 Disruption of Important Species/Habitats and Wetlands	4.3.1 Topography
2.2.2 Dewatering Effects on Adjacent Wetlands	4.3.2 Land Rights
<b>2.3 Environmental Criteria: Operational-Related Effects on Aquatic Ecology</b>	4.3.3 Labor Rates
2.3.1 Thermal Discharge Effects	

## 6.2 Identification of Candidate Sites

Results of applying the evaluation process described in Section 6.1 to the primary sites are summarized in Table 6-2 and Figure 6-1. Detailed discussions of the basis for site ratings for each of the criteria are provided in Appendix D.

The Okeechobee 1, DeSoto, and Hendry 1 sites rated lowest in the general siting criteria evaluations, and were deferred from further analysis. The remaining seven top-ranked sites included:

- Glades/Glades A
- Martin/Martin A
- Okeechobee 2
- St. Lucie
- Turkey Point

Examination of evaluation results indicated that neither Glades A nor Martin A provided significant advantages over the sites previously identified in their respective counties (i.e. Glades and Martin). Glades A is farther from the proposed water source, leading to the expectation that it would encounter more cost and regulatory difficulties in water supply compared to Glades. The Martin A site is expected to be questionable with regard to the regulatory feasibility of developing a water supply from the C-44 Canal due to its close geographic proximity to the C-44 Reservoir and Stormwater Treatment Area component of the Indian River Lagoon-South Everglades restoration project. Accordingly, Glades A and Martin A were not carried forward for further consideration as they were capably represented by the existing Glades and Martin sites, respectively. The following five candidate sites were identified:

- Glades
- Martin
- Okeechobee 2
- St. Lucie
- Turkey Point

**Table 6-2 General Siting Criteria Ratings**

**Health and Safety Criteria**

Criteria		Weight Factor	DeSoto		Glades		Glades A		Hendry 1		Martin	
			Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score
D.1.1.1	Geology/Seismology	7.9	5	39.5	5	39.5	5	39.5	5	39.5	5	39.5
D.1.1.2	Cooling System Requirements	9.6	2.50	24.0	3.00	28.8	3.25	31.2	3.00	28.8	3.00	28.8
D.1.1.3	Flooding	3.9	5	19.5	1	3.9	3	11.7	2	7.8	3	11.7
D.1.1.4	Nearby Hazardous Land Uses	4.2	4	16.8	3	12.6	4	16.8	4	16.8	3	12.6
D.1.1.5	Extreme Weather Conditions	4.6	3	13.8	3	13.8	3	13.8	3	13.8	3	13.8
D.1.2	Accident Effect Related	8.1	4	32.4	4	32.4	4	32.4	4	32.4	3	24.3
D.1.3.1	Surface Water – Radionuclide Pathway	7.4	4	29.6	4	29.6	4	29.6	4	29.6	4	29.6
D.1.3.2	Groundwater Radionuclide Pathway	7.2	3	21.6	3	21.6	3	21.6	3	21.6	3	21.6
D.1.3.3	Air Radionuclide Pathway	7.4	4	29.6	4	29.6	4	29.6	4	29.6	4	29.6
D.1.3.4	Air-Food Ingestion Pathway	7.5	1	7.5	1	7.5	1	7.5	1	7.5	2	15.0
D.1.3.5	Surface Water-Food Radionuclide Pathway	7.4	1	7.4	2	14.8	2	14.8	1	7.4	1	7.4
D.1.3.6	Transportation Safety	5.4	3	16.2	3	16.2	3	16.2	3	16.2	3	16.2

**Environmental Criteria**

Criteria		Weight Factor	DeSoto		Glades		Glades A		Hendry 1		Martin	
			Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score
D.2.1.1	Disruption of Important Species/Habitats	6.4	4	25.6	4	25.6	4	25.6	4	25.6	4	25.6
D.2.1.2	Bottom Sediment Disruption Effects	5.1	3	15.3	3	15.3	3	15.3	3	15.3	3	15.3
D.2.2.1	Disruption of Important Species/Habitats and Wetlands	6.5	4.0	26.0	4.5	29.3	4.0	26.0	3.5	22.8	3.5	22.8
D.2.2.2	Dewatering Effects on Adjacent Wetlands	5.6	4	22.4	3	16.8	4	22.4	2	11.2	4	22.4
D.2.3.1	Thermal Discharge Effects	6.1	3	18.3	3	18.3	4	24.4	3	18.3	3	18.3
D.2.3.2	Entrainment/Impingement Effects	6.1	4	24.4	4	24.4	4	24.4	4	24.4	4	24.4
D.2.3.3	Dredging/Disposal Effects	4.9	5	24.5	5	24.5	5	24.5	5	24.5	5	24.5
D.2.4.1	Drift Effects on Surrounding Areas	5.9	3	17.7	4	23.6	4	23.6	4	23.6	3	17.7

**Table 6-2 General Siting Criteria Ratings**

**Health and Safety Criteria**

Criteria		Weight Factor	Martin A		Okeechobee 1		Okeechobee 2		St. Lucie		Turkey Point	
			Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score
D.1.1.1	Geology/Seismology	7.9	5	39.5	5	39.5	5	39.5	5	39.5	5	39.5
D.1.1.2	Cooling System Requirements	9.6	3.25	31.2	2.75	26.4	3.00	28.8	3.25	31.2	3.25	31.2
D.1.1.3	Flooding	3.9	3	11.7	5	19.5	3	11.7	1	3.9	1	3.9
D.1.1.4	Nearby Hazardous Land Uses	4.2	3	12.6	4	16.8	3	12.6	3	12.6	2	8.4
D.1.1.5	Extreme Weather Conditions	4.6	3	13.8	3	13.8	3	13.8	2	9.2	2	9.2
D.1.2	Accident Effect Related	8.1	4	32.4	4	32.4	4	32.4	3	24.3	3	24.3
D.1.3.1	Surface Water – Radionuclide Pathway	7.4	4	29.6	4	29.6	4	29.6	5	37.0	5	37.0
D.1.3.2	Groundwater Radionuclide Pathway	7.2	3	21.6	2	14.4	2	14.4	2	14.4	2	14.4
D.1.3.3	Air Radionuclide Pathway	7.4	4	29.6	4	29.6	4	29.6	5	37.0	5	37.0
D.1.3.4	Air-Food Ingestion Pathway	7.5	2	15.0	1	7.5	1	7.5	5	37.5	5	37.5
D.1.3.5	Surface Water-Food Radionuclide Pathway	7.4	1	7.4	2	14.8	2	14.8	5	37.0	5	37.0
D.1.3.6	Transportation Safety	5.4	3	16.2	3	16.2	3	16.2	3	16.2	3	16.2

**Environmental Criteria**

Criteria		Weight Factor	Martin A		Okeechobee 1		Okeechobee 2		St. Lucie		Turkey Point	
			Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score
D.2.1.1	Disruption of Important Species/Habitats	6.4	4	25.6	4	25.6	4	25.6	3	19.2	3	19.2
D.2.1.2	Bottom Sediment Disruption Effects	5.1	3	15.3	3	15.3	3	15.3	4	20.4	4	20.4
D.2.2.1	Disruption of Important Species/Habitats and Wetlands	6.5	4.0	26.0	4.0	26.0	4.5	29.3	3.0	19.5	2.5	16.3
D.2.2.2	Dewatering Effects on Adjacent Wetlands	5.6	4	22.4	3	16.8	4	22.4	3	16.8	3	16.8
D.2.3.1	Thermal Discharge Effects	6.1	4	24.4	3	18.3	3	18.3	4	24.4	4	24.4
D.2.3.2	Entrainment/Impingement Effects	6.1	4	24.4	4	24.4	4	24.4	3	18.3	3	18.3
D.2.3.3	Dredging/Disposal Effects	4.9	5	24.5	5	24.5	5	24.5	4	19.6	5	24.5
D.2.4.1	Drift Effects on Surrounding Areas	5.9	3	17.7	4	23.6	4	23.6	2	11.8	3	17.7

**Table 6-2 General Siting Criteria Ratings**

**Socioeconomic Criteria**

Criteria		Weight Factor	DeSoto		Glades		Glades A		Hendry 1		Martin	
			Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score
D.3.1	Socioeconomics – Construction – Related Effects	5.2	3	15.6	2	10.4	2	10.4	3	15.6	5	26.0
D.3.3	Environmental Justice	4.3	5	21.5	5	21.5	5	21.5	5	21.5	5	21.5
D.3.4	Land Use	5.4	3	16.2	3	16.2	3	16.2	3	16.2	3	16.2

**Engineering and Cost Related Criteria**

Criteria		Weight Factor	DeSoto		Glades		Glades A		Hendry 1		Martin	
			Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score
D.4.1.1	Water Supply	8.5	1	8.5	3	25.5	3	25.5	3	25.5	3	25.5
D.4.1.2	Pumping Distance	5.6	3	16.8	4	22.4	3	16.8	3	16.8	4	22.4
D.4.1.3	Flooding	4.1	5	20.5	3	12.3	4	16.4	4	16.4	5	20.5
D.4.1.5	Civil Works	4.8	3.0	14.4	2.0	9.6	3.0	14.4	2.0	9.6	2.5	12.0
D.4.2.1	Railroad Access	6.7	3	20.1	4	26.8	3	20.1	3	20.1	5	33.5
D.4.2.2	Highway Access	6.6	5	33.0	5	33.0	4	26.4	4	26.4	5	33.0
D.4.2.3	Barge Access	6.7	1	6.7	3	20.1	3	20.1	3	20.1	4	26.8
D.4.2.4	Transmission Access	8.6	3	25.8	4	34.4	4	34.4	4	34.4	5	43.0
D.4.3.1	Topography	3.4	5	17.0	5	17.0	5	17.0	5	17.0	5	17.0
D.4.3.2	Land Rights	5.6	5	28.0	3	16.8	3	16.8	3	16.8	5	28.0
D.4.3.3	Labor Rates	5.4	5	27.0	5	27.0	5	27.0	5	27.0	3	16.2

Composite Site Rating	DeSoto	Glades	Glades A	Hendry 1	Martin
	703.2	721.1	733.9	700.1	762.7

**Table 6-2 General Siting Criteria Ratings**

**Socioeconomic Criteria**

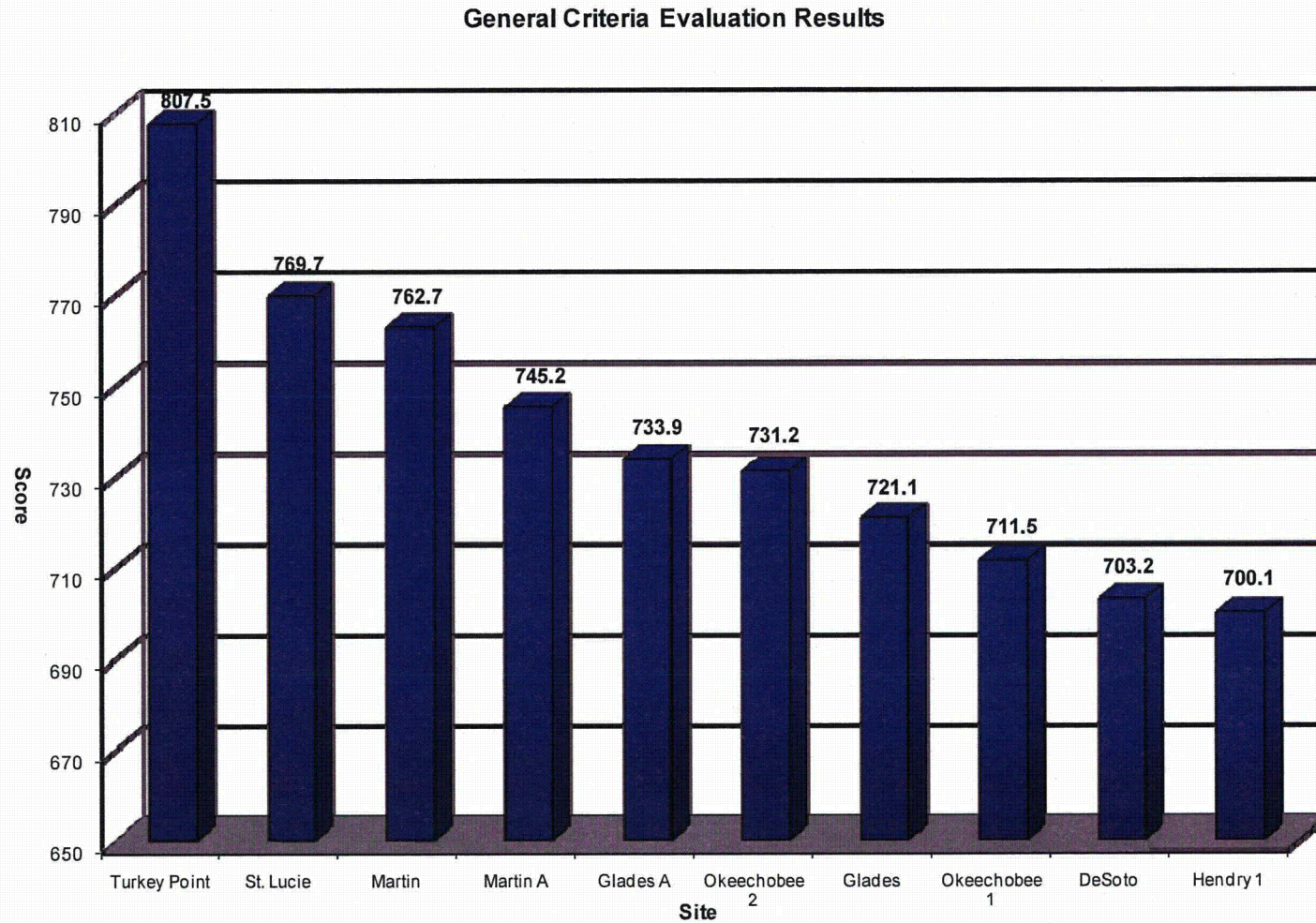
Criteria		Weight Factor	Martin A		Okeechobee 1		Okeechobee 2		St. Lucie		Turkey Point	
			Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score
D.3.1	Socioeconomics – Construction – Related Effects	5.2	5	26.0	3	15.6	3	15.6	5	26.0	5	26.0
D.3.3	Environmental Justice	4.3	5	21.5	5	21.5	5	21.5	5	21.5	5	21.5
D.3.4	Land Use	5.4	2	10.8	3	16.2	3	16.2	3	16.2	4	21.6

**Engineering and Cost Related Criteria**

Criteria		Weight Factor	Martin A		Okeechobee 1		Okeechobee 2		St. Lucie		Turkey Point	
			Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score
D.4.1.1	Water Supply	8.5	3	25.5	1	8.5	3	25.5	5	42.5	5	42.5
D.4.1.2	Pumping Distance	5.6	4	22.4	3	16.8	4	22.4	5	28.0	5	28.0
D.4.1.3	Flooding	4.1	4	16.4	5	20.5	4	16.4	2	8.2	2	8.2
D.4.1.5	Civil Works	4.8	3.0	14.4	3.0	14.4	2.0	9.6	3.0	14.4	3.0	14.4
D.4.2.1	Railroad Access	6.7	4	26.8	3	20.1	4	26.8	4	26.8	4	26.8
D.4.2.2	Highway Access	6.6	5	33.0	5	33.0	5	33.0	5	33.0	5	33.0
D.4.2.3	Barge Access	6.7	3	20.1	3	20.1	3	20.1	5	33.5	5	33.5
D.4.2.4	Transmission Access	8.6	5	43.0	4	34.4	4	34.4	1	8.6	5	43.0
D.4.3.1	Topography	3.4	5	17.0	5	17.0	5	17.0	5	17.0	5	17.0
D.4.3.2	Land Rights	5.6	2	11.2	3	16.8	3	16.8	5	28.0	5	28.0
D.4.3.3	Labor Rates	5.4	3	16.2	4	21.6	4	21.6	3	16.2	2	10.8

Composite Site Rating	Martin A	Okeechobee 1	Okeechobee 2	St. Lucie	Turkey Point
	745.2	711.5	731.2	769.7	807.5

Figure 6-1 General Siting Criteria Ratings



## **7.0     Selection of Proposed Site**

As discussed in Section 6.2, the Glades, Martin, Okeechobee 2, St. Lucie, and Turkey Point sites were selected as candidate sites for the FPL COLA. Based on the comprehensive evaluations conducted to this point, all of these sites appear to be feasible locations for a new nuclear power plant.

To select a proposed site for the COLA from this set of candidate sites, additional considerations were evaluated in 2006 to provide further insight on their relative suitability to support FPL's objectives for the COL project and a future nuclear plant. Scope and results of these studies are described in Section 7.1. The rationale for selecting a proposed site from the candidate sites considered is provided in Section 7.2.

### **7.1     Analysis of Candidate Sites**

The objective of these additional considerations for the five candidate site studies was to provide further insight into site conditions and/or to provide further confidence on specific issues that were viewed as important to the COLA site decision. Specific factors considered in this evaluation were as follows:

- Environmental impact – Existence of ecological or environmental permitting issues;
- Transmission – Availability of existing right-of-way and cost of upgrades;
- Land acquisition – Existing land ownership and expected difficulty of acquiring site (if applicable);
- Reliability (transmission) – Analysis of reliability from a power-transmission perspective;
- Reliability (generation) – Qualitative analysis of risk factors for reliable power production and supply;
- Public acceptance – Ability to obtain public acceptance to support siting activities;
- Political (local) – Governmental/organizational support at the local level;
- Political (state) – Governmental and regulatory support at the state and Federal level;
- Transmission takeaway – Feasibility of constructing the necessary upgrades to deliver power to the system;
- Schedule compatibility – Level of confidence that site will support commencement of COLA activities in January 2007; and
- Site layout feasibility – Ability of site to accommodate plant layout.

Evaluation of these factors was conducted in 2006 by a multi-disciplinary team of FPL professionals with specific expertise, experience, and ongoing involvement in the areas being evaluated; for example, personnel involved in environmental permitting throughout the FPL service territory provided input on environmental matters, and public relations staff provided judgments on public acceptance and political factors.

Results of these evaluations were reported by assigning ratings for each candidate site that ranged from 1 to 3 (1 = more favorable, 3 = less favorable), based on experience and best professional judgment. Each of the ratings was discussed in 2006 by personnel from FPL,



Enercon Services, and McCallum-Turner. The resulting ratings are summarized in Table 7-1; information on the basis for these ratings, along with results of the General Siting Criteria evaluations (Section 6.0), are provided in the following paragraphs.

### Environmental Impact

The St. Lucie site was rated least favorable because much of the land proposed for development contains red and black mangrove habitat and would incur significant environmental impact. Turkey Point was rated average with respect to environmental impact. Some of the land proposed for development at the Turkey Point site is designated as critical crocodile habitat. Some mitigation may be implemented because the entire cooling canal system is designated as critical habitat and the proposed area of development is small in relation to the whole canal system. The Glades, Martin, and Okeechobee 2 sites were rated as more favorable because environmental impacts can be mitigated more effectively than at the St. Lucie or Turkey Point sites.<sup>3</sup>

### Transmission

Transmission access was originally evaluated in terms of distance to the load center in the greater Miami area and the amount of new right-of-way that would have to be acquired; these factors are described in the screening criteria rating description in Section 5.0. Based on those evaluations the following ratings were applied to the candidate sites:

Glades – 2  
Martin – 1  
Okeechobee 2 – 2  
St. Lucie – 3  
Turkey Point – 1

### Land Acquisition

The Turkey Point, St. Lucie, and Martin sites are all rated more favorable as these sites are FPL owned properties. The Glades site is rated average because while the property is not owned by FPL, options to purchase exist. The Okeechobee 2 site is rated less favorable because the property is not owned by FPL and purchasing options have not been developed.

### Reliability (Transmission)

The Turkey Point and Martin sites are rated more favorable with respect to transmission reliability. Power generation from a new power plant at Turkey Point could be routed on a geographically diverse corridor, thereby minimizing reliability risks. Transmission from all other sites would be co-located with existing transmission lines with varying degrees of

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<sup>3</sup> The assumptions regarding the relative environmental impacts of the sites evaluated included the assumption that there is the potential for crocodile habitat to be impacted at Turkey Point, requiring species-specific mitigation, and that the other candidate sites had more common aquatic resources to be mitigated.

congestion and crossings. Transmission from the St. Lucie site is less favorable as co-location within one heavily used right-of-way would be required.

#### Reliability (Generation)

The Glades site is rated more favorable due to a lower hurricane frequency and resulting site evacuation and shut-down requirements. The Turkey Point site is rated less favorable due to the slightly higher frequency of hurricanes.

#### Public Acceptance

The Turkey Point site is rated more favorable because the existing nuclear plant's license renewal received strong local community support. The Glades site also is rated favorable due to demonstrated local government support. The Okeechobee 2 site is rated average because local political leaders have indicated they would support a nuclear power generation project. The Martin and St. Lucie sites do not appear to have a similarly strong supportive base and are rated less favorable.

#### Political Acceptance (Local)

The Glades and Okeechobee 2 sites are rated more favorable because no rezoning or comprehensive plan amendments would be required for a new nuclear power plant. The Turkey Point site was rated average because no comprehensive plan amendments would be necessary, but some level of rezoning or land use definition appears to be required. The Martin and St. Lucie sites are rated less favorable because both sites would require significant effort with local planning issues.

#### Political Acceptance (State/Federal)

With respect to regulatory requirements, there is no significant distinction between the candidate sites. The Florida State government has shown strong support for new nuclear power generation. The Martin site could present some resistance due to previously observed political perception surrounding water use issues and Lake Okeechobee water levels. As such, all sites have been rated more favorable, with the exception of the Martin site, which has been rated less favorable.

#### Transmission Takeaway Feasibility

The Turkey Point and St. Lucie sites are rated more favorable because neither site would require significant acquisition of new transmission right-of-way. The Glades site would require a significant acquisition of new right-of-way, but was rated average because a coal-fired power plant is proposed in the vicinity of the Glades location, and a nuclear plant at the site would benefit from earlier work to obtain some portion of the necessary right-of-way. The Martin site also was rated average because existing right-of-way could be utilized, although they are congested in areas. The Okeechobee 2 site is rated less favorable because significant amounts of right-of-way acquisition and new line construction would be required.

### Schedule Compatibility

The ability to meet schedule requirements at a site closely parallels the land-acquisition evaluation above. The Turkey Point, St. Lucie, and Martin sites were rated more favorable because they are located on FPL-owned property. The Glades site was rated average as the property is not owned by FPL, but options to purchase exist. The Okeechobee 2 site was rated less favorable because the property is not owned by FPL and purchasing options have not been developed.

### Site Layout

The Glades and Okeechobee 2 sites were rated more favorable. Both sites are greenfield sites and would allow the greatest flexibility in developing layouts for a new nuclear power plant. The Martin site was also rated more favorable because a considerable amount of FPL-owned property exists that would provide a similar amount of flexibility. Both existing nuclear power plant sites were rated lower than the greenfield sites because layout flexibility is reduced at each site due to the existing facilities. The Turkey Point site was rated average because there are several potential locations that can be developed. St. Lucie was rated less favorable because the restrictions to available land and surrounding natural features would significantly limit the ability to site new nuclear facilities.

**Table 7-1 FPL Site Selection Study – Candidate Site Ratings\***

	Technical Analysis Composite Rating/Score	Environ- mental Impact	Trans- mission	Land Acquisition	Reliability (Trans- mission)	Reliability (Generation)	Public Acceptance	Political (Local)	Political (State)	Transmission Takeaway Feasibility	Schedule Compati- bility	Site Layout
Glades	721.1 3	1	2	2	2	1	1	1	1	2	2	1
Martin	762.7 2	1	1	1	1	2	3	3	3	2	1	1
Okeechobee 2	731.2 3	1	2	3	2	2	2	1	1	3	3	1
St. Lucie	769.7 2	3	3	1	3	2	3	3	1	1	1	3
Turkey Point	807.5 1	2	1	1	1	3	1	2	1	1	1	2

\* Note: A scale of 1 (more favorable) to 3 (less favorable) is used in this Table.

## 7.2 Selection of Proposed Site

The results of the 11 additional site selection considerations (section 6.1), combined with the results of the general criteria evaluations (section 5.2), were used to identify a recommended site as described below.

Results of the evaluations as described in Section 6.1 confirm that all of the five candidate sites are viable locations for a nuclear power plant. However, these evaluations do serve to further distinguish among the five candidate sites and identify the most favorable site. The Turkey Point site rates more favorable in 8 of the 12 considerations. With respect to the criteria described in Section 7.1, Turkey Point ranked least favorable in only one (Generation Reliability), whereas Martin, Okeechobee and St. Lucie each ranked least favorable in at least three. Glades ranked least favorable in none of these considerations, but its composite score (from the technical analysis reported in Chapter 6) was lowest of all the candidate sites.

Based on these results, the overall ranking of the five candidate sites is as follows:

1. Turkey Point
2. Glades
3. Martin
4. Okeechobee 2
5. St. Lucie

Thus, taking into consideration the results of each evaluation conducted (including satisfying the overall business objectives for the FPL COL project), the **Turkey Point** site was selected as the recommended site for the COL project.

## **8.0     References**

EPRI 2002, Siting Guide: Site Selection and Evaluation Criteria for an Early Site Permit Application, Electric Power Research Institute, March 2002.

Florida Power & Light Company, *Project Bluegrass New Nuclear Power Generation Final Site Selection Study Report*, October 2006.

## **Appendix A – Results of Regional Screening**

Figures provided in this Appendix provide results of the screening of the FPL Region of Interest in accordance with the screening criteria described in Section 3.0. The following information related to identification of candidate areas is contained in subsections of this Appendix:

- Section A-1, Dedicated Lands
- Section A-2, Critical Habitat
- Section A-3, Population
- Section A-4, Cooling Water Availability, Reclaimed Water
- Section A-5, Cooling Water Availability, Surface Water
- Section A-6, Composite Screening Map

## A.1 Dedicated Lands

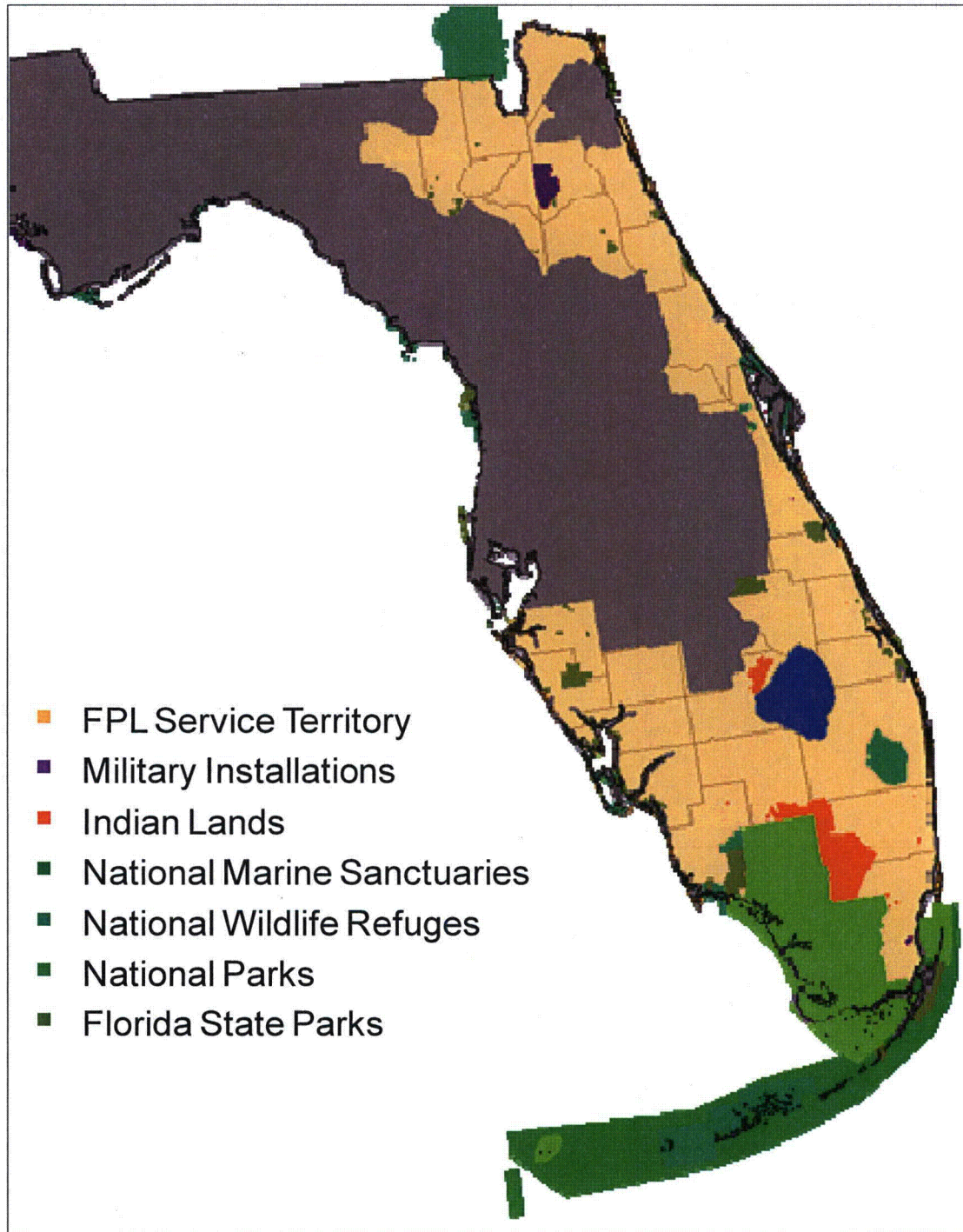
The following dedicated lands were mapped and screened out as areas unsuitable for siting a new nuclear power plant.

- Department of Defense Military Installations
  - University of Florida GeoPlan Center, U.S. Military Installations in Florida, March 2010. <http://www.fgdl.org/metadataexplorer/explorer.jsp>.
- American Indian Lands and Native Entities
  - University of Florida GeoPlan Center, American Indian Lands and Native Entities in Florida. June 2008. <http://www.fgdl.org/metadataexplorer/explorer.jsp>.
- National Marine Sanctuary Areas
  - National Oceanic and Atmospheric Administration, National Marine Sanctuaries Program, National Marine Sanctuary Areas, December 2004.  
<http://www.fgdl.org/metadataexplorer/explorer.jsp>.  
[http://sanctuaries.noaa.gov/library/imast\\_gis.html](http://sanctuaries.noaa.gov/library/imast_gis.html).
- National Parks
  - National Park Service, Administrative Boundaries of National Park System Units in Florida, May 2010. <http://www.fgdl.org/metadataexplorer/explorer.jsp>.
- National Wildlife Refuges
  - U.S. Fish and Wildlife Service, National Wildlife Refuge Boundaries in Florida, June 2010. <http://www.fgdl.org/metadataexplorer/explorer.jsp>.  
<http://www.fws.gov/GIS/data/CadastralDB/index.htm>.
- Florida State Parks
  - Florida Department of Environmental Protection, Florida State Parks, January 2011. <http://www.fgdl.org/metadataexplorer/explorer.jsp>.  
<http://www.dep.state.fl.us/mainpage/programs/parks.htm>.

Figure A-1 depicts the results of screening the FPL service territory region of interest for dedicated lands.



**Figure A-1, Dedicated Lands Screening Map**



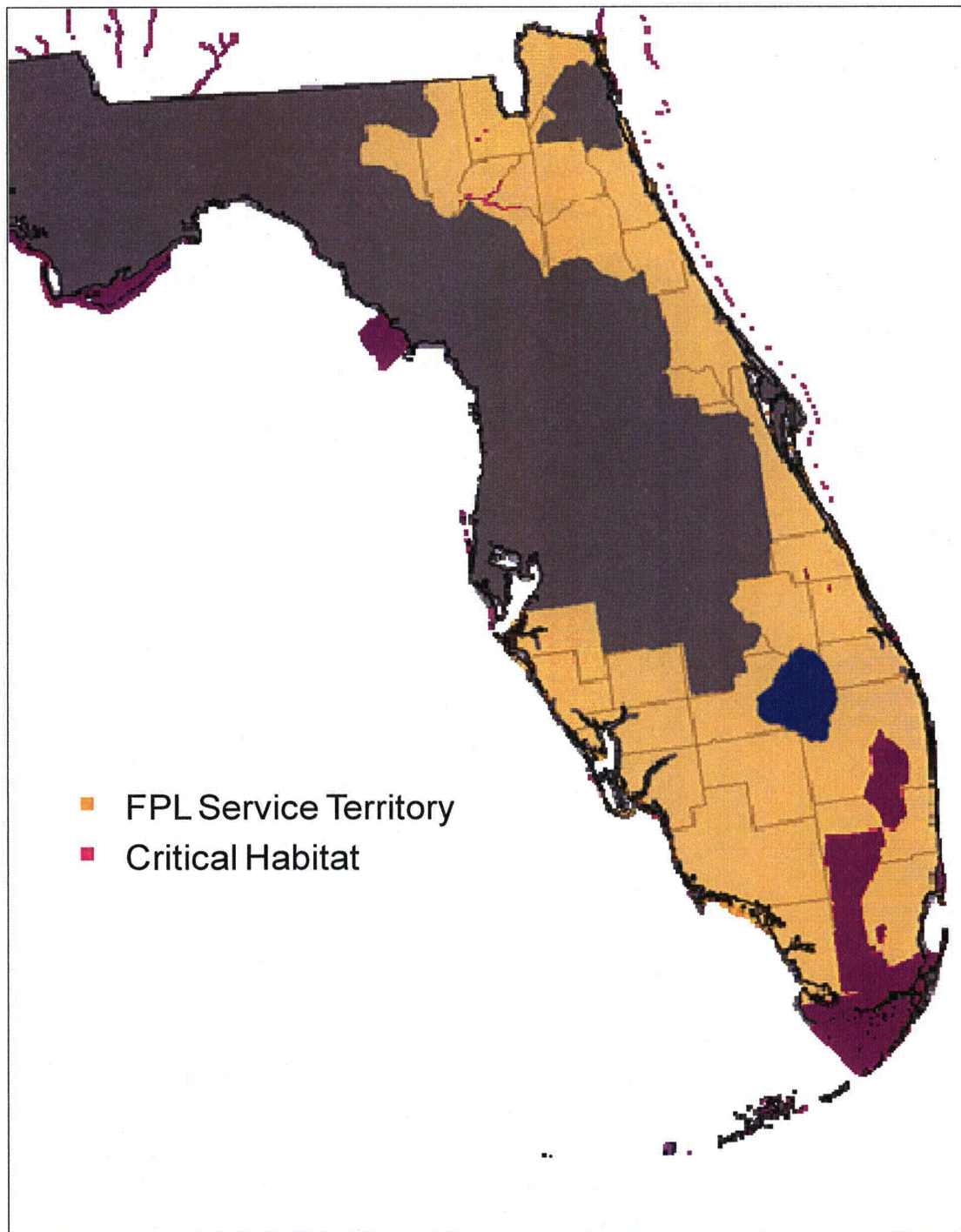
## A.2 Critical Habitat

Areas of critical habitat for the following species were mapped and screened out as areas unsuitable for siting a new nuclear power plant.

- American Crocodile
  - Cape Sable Seaside Sparrow
  - Choctawhatchee Beach Mouse
  - Everglade Snail Kite
  - Frosted Flatwoods Salamander
  - Gulf Sturgeon
  - Johnson's Seagrass
  - Perdido Key Beach Mouse
  - Piping Plover
  - Purple Bankclimber
  - Rice Rat
  - Right Whale
  - St. Andrew Beach Mouse
- U.S. Fish and Wildlife Service, Critical Habitat for Species in Florida, <http://criticalhabitat.fws.gov/>. Includes digitized critical habitat submitted into the USFWS system as of March 21, 2011.

Figure A-2 depicts the results of screening the FPL service territory region of interest for critical habitat.

**Figure A-2, Critical Habitat Screening Map**



### A-3 Population

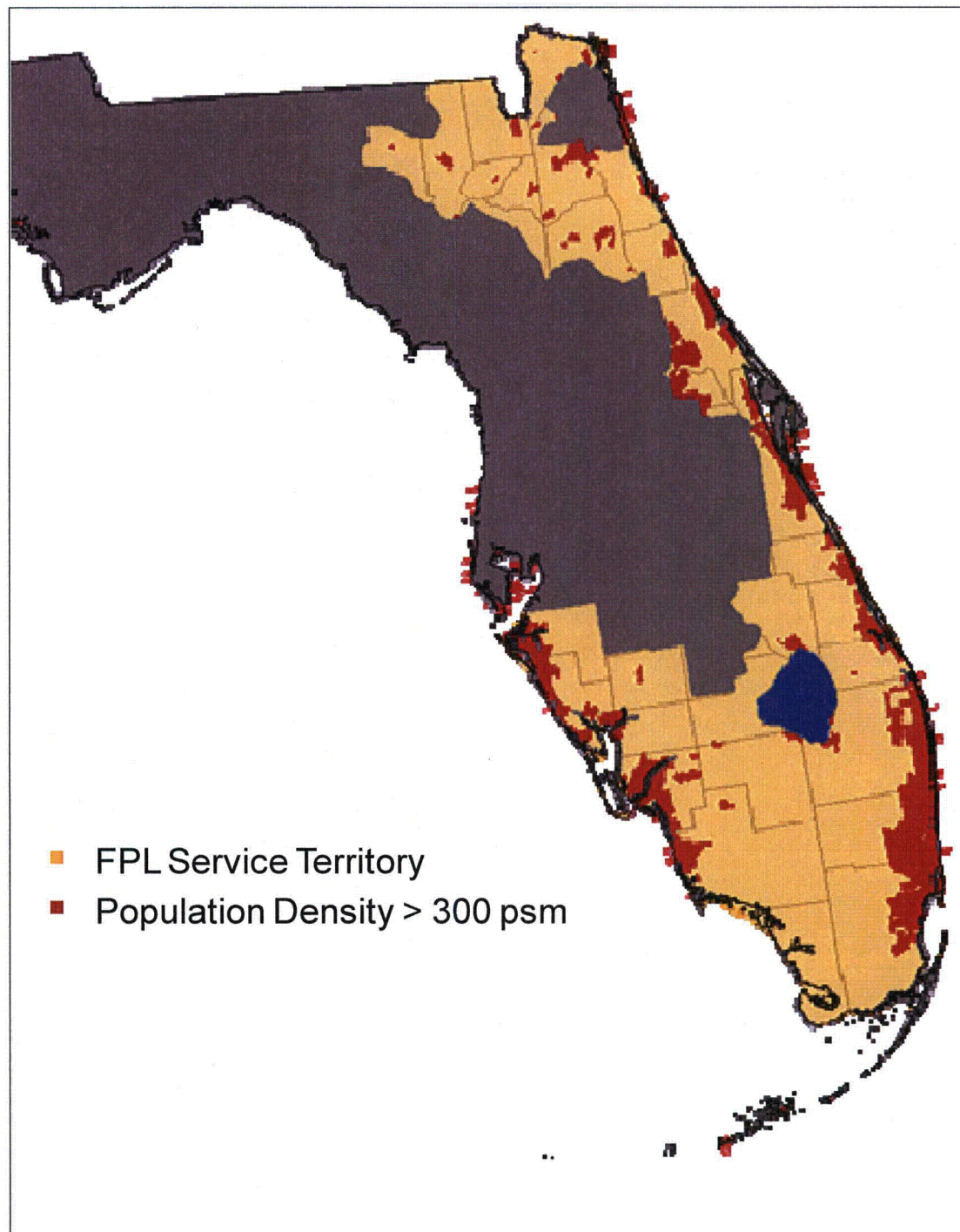
Areas of higher population were mapped and screened out as areas less suitable for siting a new nuclear power plant. Using 2000 U.S. Census data, census block groups with a population density greater than 300 persons per square mile (psm) were identified as less suitable siting areas; siting outside of these areas would more likely result in a population density less than the NRC guideline of 500 psm within a 20-mile radius of a site.

- U.S. Census Bureau, U.S. Census Block Groups in Florida, 2000 (2009 Spatial Update). <http://www.fgdl.org/metadataexplorer/explorer.jsp>.  
<http://www.census.gov/geo/www/tiger/>.

Figure A-3 depicts the results of screening the FPL service territory region of interest for areas of higher population.



**Figure A-3, Population Screening Map**



#### **A-4 Cooling Water Availability, Reclaimed Water**

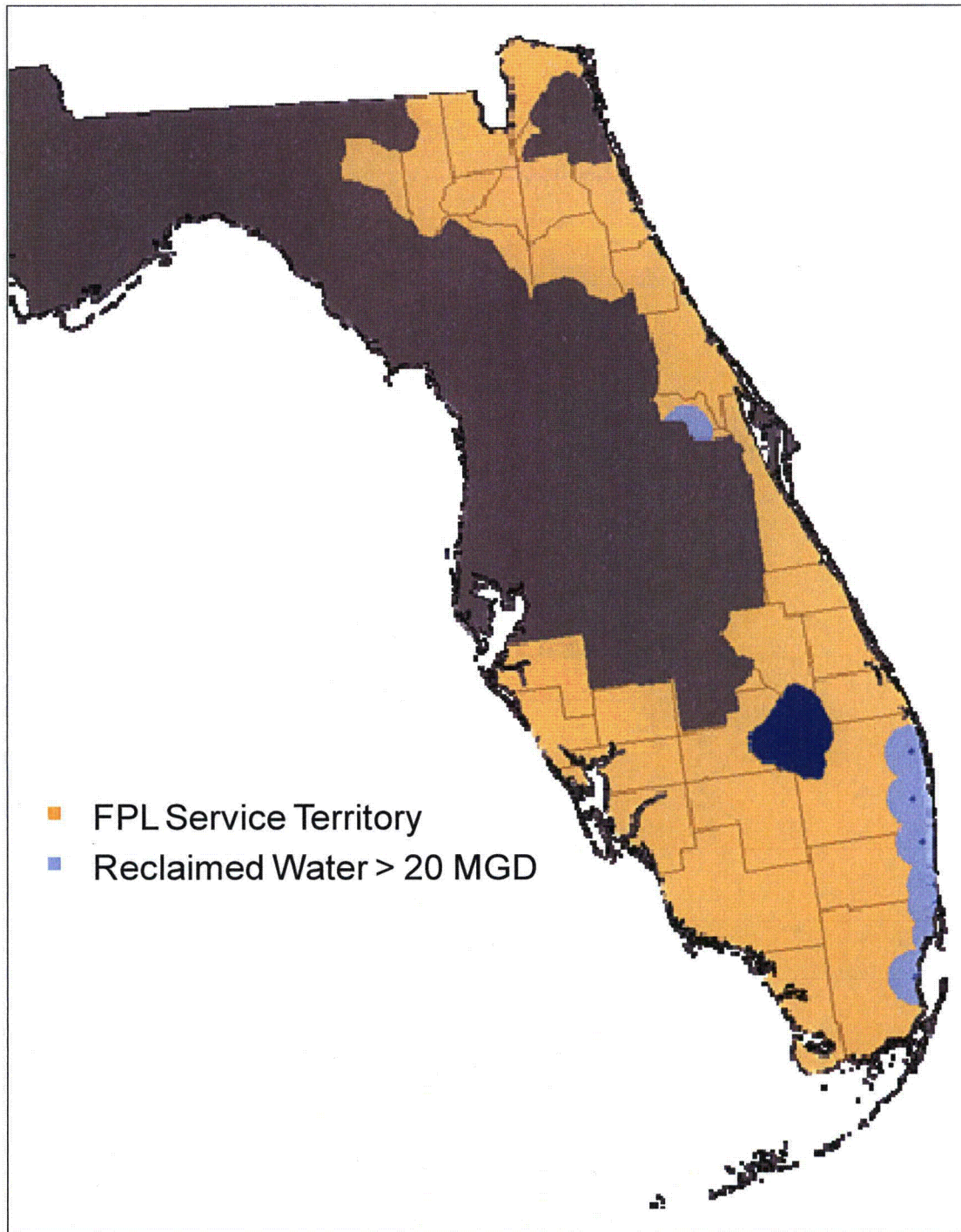
Wastewater treatment plants in Florida with a flow of at least one-third of the total makeup requirement (~20 million gallons per day [MGD]) were identified as potential sources of cooling water. The cooling water requirement of the new facility is estimated at 25,000 to 40,000 gallons per minute (gpm), or 36.0 to 57.6 MGD per 1,000 MWe, as identified by FPL for the site selection study. The estimated maximum cooling water requirement of a new facility at the Turkey Point site using reclaimed water is 50,481 gpm (72.7 MGD). Wastewater treatment plants unable to supply the entire cooling water requirement would be supplemental sources of cooling water only. Wastewater treatment plants unable to supply at least one-third of the total cooling water requirement were assumed to be uneconomical as makeup water sources. A 10-mile radius (assumed maximum pumping distance) from the following 11 wastewater treatment plants having a flow greater than 20 MGD was mapped and screened in as areas more suitable for siting a new nuclear power plant.

- MDWASD Central District – 116.50 MGD
- MDWASD South District – 88.36 MGD
- MDWASD North District – 87.63 MGD
- Broward Co. North Regional – 72.30 MGD
- Howard F. Curren – 54.33 MGD
- Hollywood Southern Regional – 44.50 MGD
- East Central Regional – 38.80 MGD
- JEA-Buckman Street – 29.98 MGD
- Palm Beach Co. Southern Regional – 21.92 MGD
- Pinellas Co.-South Cross Bayou, 21.78 MGD
- Orlando-Iron Bridge, 20.77 MGD

- Florida Department of Environmental Protection, Reuse Inventory Database and Annual Report, 2009. <http://www.dep.state.fl.us/water/reuse/inventory.htm>.

Figure A-4 depicts the results of screening the FPL service territory region of interest for areas of reclaimed water availability.

**Figure A-4, Reclaimed Water Screening Map**



## A-5 Cooling Water Availability, Surface Water

Surface waters within the FPL service territory with an annual mean flow of at least 500 cubic feet per second (cfs), or 323 MGD were identified as potential sources of cooling water. This represented approximately 5 times the new plant cooling water requirement, estimated by FPL for the site selection study at 25,000 to 40,000 gallons per minute (gpm), or 36.0 to 57.6 MGD per 1,000 MWe. The estimated maximum cooling water requirement of a new facility at the Turkey Point site using fresh water (reclaimed water) is 50,481 gpm (72.7 MGD). Surface waters with an annual mean flow of at least 500 cfs were deemed to have the physical availability of water to supply the new facility and a reasonable potential to acquire the necessary cooling water supplies; permitability of the source water for the new facility was not considered at this point. A 10-mile radius (assumed maximum pumping distance) from the following 12 surface water features was mapped and screened in as areas more suitable for siting a new nuclear power plant.

- Caloosahatchee River
- Hillsboro Canal (flow less than 500 cfs, but potential to transport greater flows from Lake Okeechobee)
- Kissimmee River
- Lake Okeechobee
- Miami Canal (flow less than 500 cfs, but potential to transport greater flows from Lake Okeechobee)
- North New River Canal (flow less than 500 cfs, but potential to transport greater flows from Lake Okeechobee)
- Peace River
- St. Johns River
- St. Lucie Canal
- St. Lucie River
- St. Mary's River
- West Palm Beach Canal (flow less than 500 cfs, but potential to transport greater flows from Lake Okeechobee)

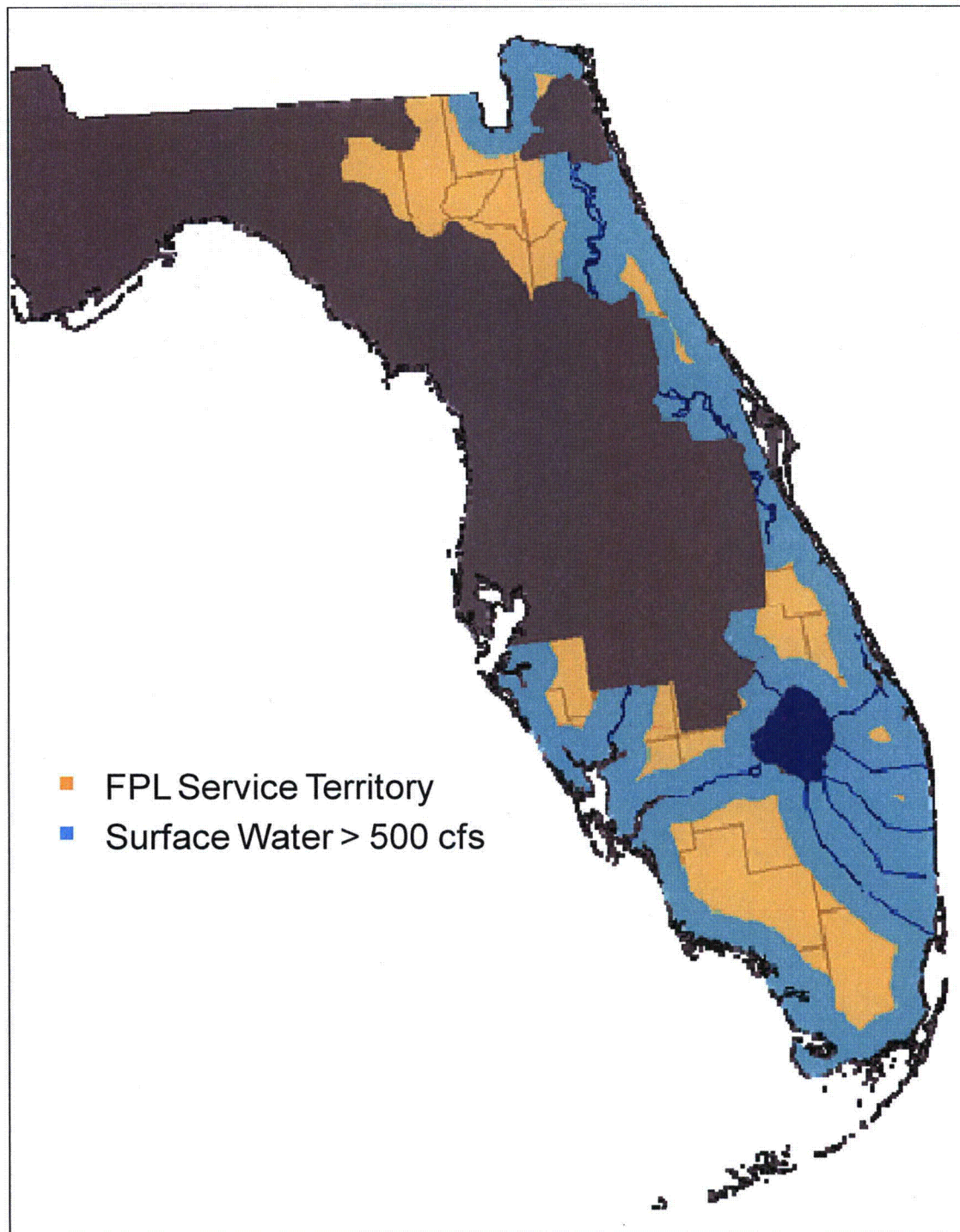
Additionally, the Gulf of Mexico and the Atlantic Ocean were identified as potential sources of cooling water. A 10-mile inland distance (assumed maximum pumping distance) was mapped and screened in as areas more suitable for a new nuclear power plant.

- U.S Geological Survey, Surface-Water Data for Florida, Water-Data Reports, <http://waterdata.usgs.gov/fl/nwis/sw/>.

Figure A-5 depicts the results of screening the FPL service territory region of interest for areas of surface water availability.



**Figure A-5, Surface Water Screening Map**

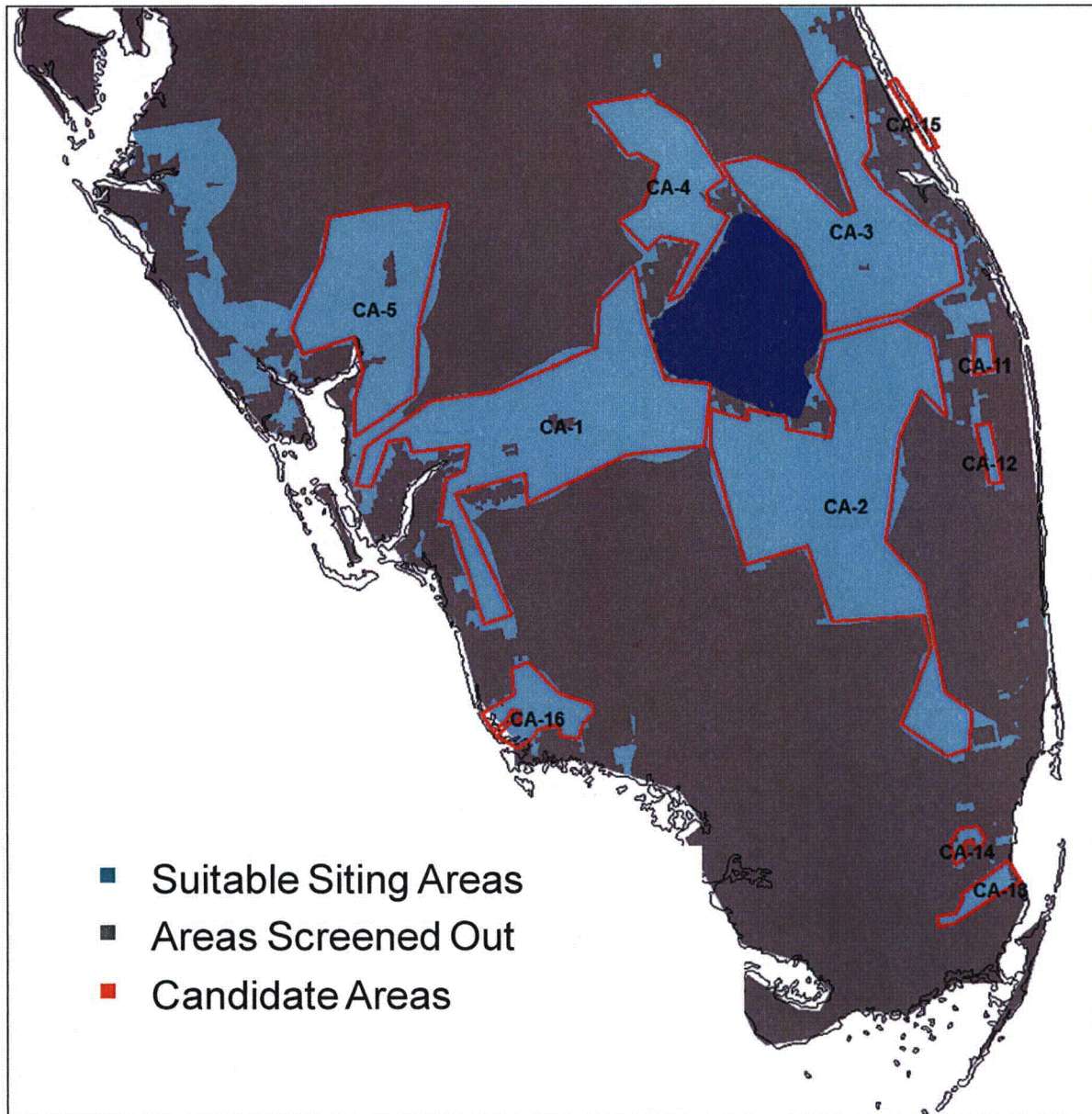


## **A-6 Composite Screening Map**

Figures A-6 and A-7 depict the results of the regional screening process, identifying areas of higher suitability for siting a new nuclear power plant. The following 16 candidate areas were identified:

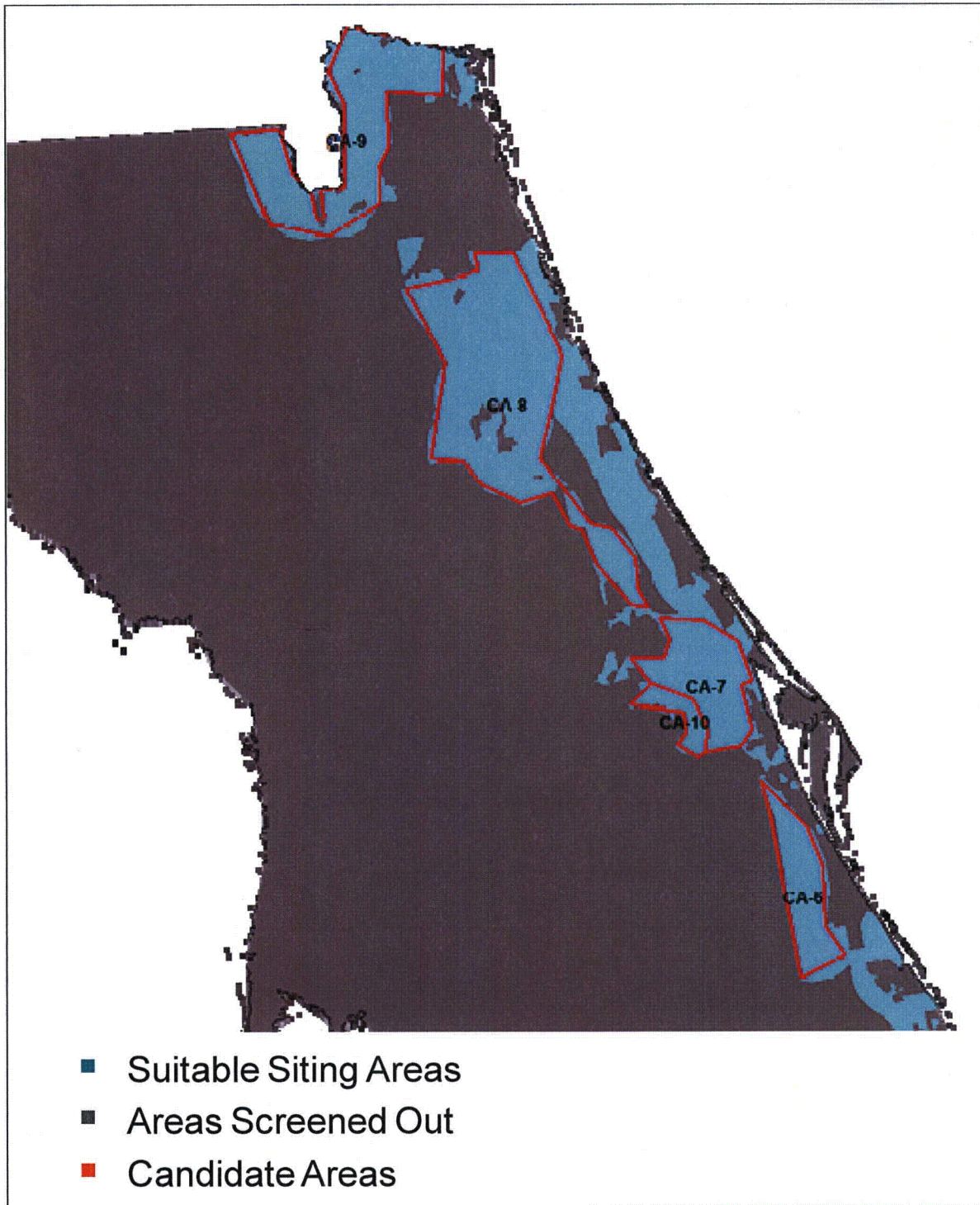
- CA-1, Caloosahatchee River / West Lake Okeechobee
- CA-2, Various Canals / South Lake Okeechobee
- CA-3, St. Lucie Canal and River / East Lake Okeechobee
- CA-4, Kissimmee River / North Lake Okeechobee
- CA-5, Peace River
- CA-6, St. Johns River South
- CA-7, St. Johns River Central
- CA-8, St. Johns River North
- CA-9, St. Mary's River
- CA-10, St. Johns River / Reclaimed
- CA-11, West Palm Beach Canal / Reclaimed (North)
- CA-12, West Palm Beach Canal / Reclaimed (South)
- CA-13, South Miami Reclaimed (South)
- CA-14, South Miami Reclaimed (North)
- CA-15, Coastal Existing Plant
- CA-16, South Gulf Coast

**Figure A-6, Composite Regional Screening Map – Southern Service Territory**





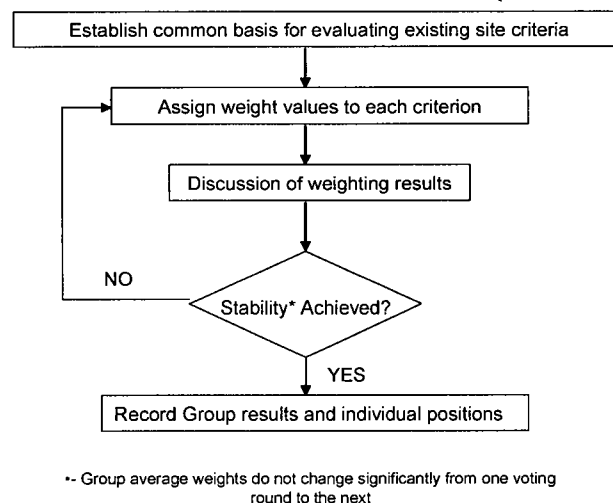
**Figure A-7, Composite Regional Screening Map – Northern Service Territory**



## Appendix B – Weight Factor Development

For the potential and candidate site evaluation phases of the site selection process (Sections 5.0 and 6.0, respectively), weight factors were developed that reflect the relative importance of individual criteria in judging the overall suitability of nuclear power plant sites. As described below, weight factors were used in developing overall composite suitability ratings for sites under consideration.

Weight factors reflecting the relative importance of the screening criteria used to evaluate potential sites were developed consistent with the modified Delphi method suggested in the EPRI Siting Guide. The process used for weight-factor development is summarized in the diagram below.



Weight factors reflecting the relative importance of these criteria were developed by a multi-disciplinary committee in the areas of nuclear power plant site suitability that was convened at FPL offices on August 29, 2006; this committee was composed of subject matter experts in water use and availability, engineering, real estate, ecology, transmission, land use, health & safety, socioeconomics and public relations.

A brief description of the screening site criteria, data inputs, and rating methodologies was provided. Weights were assigned on a 1 to 10 scale, with 10 being most important and 1 being least. Individual weight scores were averaged to arrive at group composite criterion weighting factors.

After the first round of voting, a group discussion was held in which each committee member provided the rationale for his or her weight-factor assignments. Following this discussion, another polling of the group was conducted and committee members modified their weights, as they deemed appropriate, based on the discussions and arguments presented after the first round.

A second discussion was held after the second round of voting. When polled, no members of the committee indicated that they had been persuaded to change their weight assignments, and the Delphi session was terminated. The resulting weight factors are provided in Section 5.1.

The same process (described above) was applied to develop weight factors for the general site criteria. Again, after two rounds of voting, no members of the committee indicated that they had been persuaded to change their weight assignments, and the Delphi session was terminated. The resulting weight factors are provided in Table 6-2.

## Appendix C – Technical Bases for Screening Criterion Ratings

Descriptions of the methodology, rationale, and data used in evaluating potential sites are provided in Table 5-1. Results of the evaluations are provided in the following tables. All ratings are assigned on a scale of 1 to 5, with 5 representing a more suitable site from the perspective of each criterion and 1 representing a less suitable site.

Criterion P1 – Cooling Water Supply							
Site	Water Source <sup>1</sup>	Estimated Flow <sup>1</sup>	Rating <sup>2</sup>				
			Flow	Flexibility	Risk	Regulatory Challenge	Composite Rating
Charlotte	Caloosahatchee River/Canal Peace River Reclaimed Water Groundwater (Floridan)	592 cfs (>10 miles) 652 cfs (>10 miles) Not Available 155 cfs <sup>3</sup>	3	4 (reduced from rating of 5 due to pumping distance > 10 miles)	2	2	3
Collier A	Gulf of Mexico Reclaimed Water	Unlimited Not Available	5	3	2	1	3
De Soto	Peace River Reclaimed Water Groundwater (Floridan)	652 cfs Not Available Limited <sup>4</sup>	2 (Gulf of Mexico is > 10 miles from site)	3	2	2	2
DeSoto A	Peace River Reclaimed Water Groundwater (Floridan)	652 cfs Not Available Limited <sup>4</sup>	2 (Gulf of Mexico [Charlotte Harbor] is > 10 miles from site)	3	2	2	2
Ft. Myers	Caloosahatchee River/Canal Reclaimed Water Groundwater (Floridan)	944 cfs Not Available 155 cfs <sup>3</sup>	3 (Gulf of Mexico is > 10 miles from site)	4	3	2	3

Criterion P1 – Cooling Water Supply							
Site	Water Source <sup>1</sup>	Estimated Flow <sup>1</sup>	Rating <sup>2</sup>				
			Flow	Flexibility	Risk	Regulatory Challenge	Composite Rating
Glades	Caloosahatchee River/Canal Reclaimed Water Groundwater (Floridan) Lake Okeechobee (via Caloosahatchee River/Canal)	592 cfs Not Available 155 cfs <sup>3</sup> 360 cfs	3	4	2	2	3
Glades A	Caloosahatchee River/Canal Reclaimed Water Groundwater (Floridan) Lake Okeechobee (via Caloosahatchee River/Canal)	592 cfs Not Available 155 cfs <sup>3</sup> 360 cfs	3	4	2	2	3
Hardee	Peace River Reclaimed Water Groundwater (Floridan)	611 cfs Not Available Limited <sup>4</sup>	2	3	1	2	2
Hendry 1	Caloosahatchee River/Canal Reclaimed Water Groundwater (Floridan) Lake Okeechobee (via Caloosahatchee River/Canal)	592 cfs Not Available 155 cfs <sup>3</sup> 360 cfs	3	4	2	2	3



Criterion P1 – Cooling Water Supply							
Site	Water Source <sup>1</sup>	Estimated Flow <sup>1</sup>	Rating <sup>2</sup>				
			Flow	Flexibility	Risk	Regulatory Challenge	Composite Rating
Hendry 2	Reclaimed Water Groundwater (Floridan) Lake Okeechobee (via Miami Canal)	Not Available 155 cfs <sup>3</sup>  360 cfs	2	2	2	2	2
Hendry A	Caloosahatchee River/Canal Reclaimed Water Groundwater (Floridan) Lake Okeechobee (via Caloosahatchee River/Canal)	592 cfs Not Available 155 cfs <sup>3</sup>  360 cfs	3	4	2	2	3
Highlands	Kissimmee River Reclaimed Water Groundwater (Floridan)	919 cfs Not Available Limited <sup>4</sup>	2	3	1	2	2
Manatee	Tampa Bay Reclaimed Water  Groundwater (Floridan)	Unlimited Not Available (>10 miles) Limited <sup>4</sup>	5	3	3	2	3
Martin	St. Lucie River/Canal Lake Okeechobee (via St. Lucie River/Canal) Reclaimed Water Groundwater (Floridan)	842 cfs 360 cfs   Not Available 155 cfs <sup>3</sup>	3	4	3	3	3

Criterion P1 – Cooling Water Supply							
Site	Water Source <sup>1</sup>	Estimated Flow <sup>1</sup>	Rating <sup>2</sup>				
			Flow	Flexibility	Risk	Regulatory Challenge	Composite Rating
Martin A	St. Lucie River/Canal	842 cfs	3	4	3	3	3
	Lake Okeechobee (via St. Lucie River/Canal)	360 cfs					
	Reclaimed Water Groundwater (Floridan)	Not Available 155 cfs <sup>3</sup>					
Okeechobee 1	Lake Okeechobee Groundwater (Floridan)	360 cfs 155 cfs <sup>3</sup>	2	2	2	2	2
	Reclaimed Water	Not Available					
Okeechobee 2	Kissimmee River	919 cfs	3	4	2	2	3
	Lake Okeechobee (via Kissimmee River)	360 cfs					
	Groundwater (Floridan)	155 cfs <sup>3</sup>					
Palm Beach A	Reclaimed Water Groundwater (Floridan)	Not Available 155 cfs <sup>3</sup>	2	2	2	2	2
	Lake Okeechobee (via North New River Canal)	360+ cfs					
St. Lucie	Atlantic Ocean Reclaimed Water	Unlimited Not Available	5	3	4	4	4
Turkey Point	Atlantic Ocean Reclaimed Water (MDWASD South District)	Unlimited 137 cfs	5	5	4	4	4
	Canals (Ltd)	Limited					

Criterion P1 – Cooling Water Supply							
Site	Water Source <sup>1</sup>	Estimated Flow <sup>1</sup>	Rating <sup>2</sup>				
			Flow	Flexibility	Risk	Regulatory Challenge	Composite Rating
West County	Hydrostorage Pits	~176 cfs <sup>5</sup>	3	4	2	1	2
	Lake Okeechobee (via West Palm Beach Canal)	360 cfs					
	Groundwater (Floridan)	155 cfs <sup>3</sup>					
	Reclaimed Water	Not Available					
<p>Notes:</p> <ol style="list-style-type: none"> <li>1. 89 cfs required. Water sources identified by water supply subcommittee.</li> <li>2. See Table 5-1 for description.</li> <li>3. Groundwater flow assumed to be 100 MGD (155 cfs) based on FPL familiarity with Floridan aquifer.</li> <li>4. Site located within Southern Water Use Caution Area; use of groundwater may be challenged/limited.</li> <li>5. Flow potentially available from L8 (low daily mean flow for last 10 years) used as representation of possible flow available from new hydrostorage pit.</li> </ol> <p>Note: This evaluation was performed in the absence of agency contact using publicly available flow data. Flow in some of the source water systems is complex and requires further investigation. A permitability assessment of the probability of obtaining water permits at the primary sites was beyond the reconnaissance-level evaluations required for site selection analysis; such analyses must be based on statutory and regulatory criteria requiring site-specific analysis of reasonable beneficial use, existing legal users, and public interest factors. Additional data, including regulatory agency consultation, is needed before approval of water use can be assured.</p>							

Criterion P2 – Flooding		
Site	Rating	Comments and Discussion
Charlotte	2	Charlotte elevation = 57 feet. Fisheating Creek elevation = 29 feet, flood stage = 34 feet. Difference = 23 feet above flood stage. Site is located in/near swamp lands. Site is located at border of Zone A and Zone X. Site is at border of 100-year flood zone.
Collier A	1	Collier A elevation = 6 feet. Gulf of Mexico elevation = 0 feet. Difference = 6 feet. Site is located in Zone AE with base flood elevations of ~ 6 feet. Site is located in 100-year flood zone.
DeSoto	4	DeSoto elevation = 81 feet. Peace River current elevation (at Arcadia, FL) ~ 10 feet. River flood stage = 17 feet. Difference = 64 feet above flood stage. Site is located in Zone X (outside 500-year flood zone). Swamp areas exist in the vicinity of the proposed site. Site is not located in 100-year flood zone.
DeSoto A	4	DeSoto A elevation = 42 feet. Peace River current elevation (at Arcadia, FL) ~ 10 feet. River flood stage = 17 feet. Difference = 25 feet above flood stage. Site is located in Zone X (outside 500-year flood zone). Swamp areas exist in the vicinity of the proposed site. Site is not located in 100-year flood zone.
Ft. Myers	2	Ft. Myers elevation = 9 feet. Site is located in Zone AE with base flood elevations of 8 feet (~1 foot below site elevation). Site is located in 100-year flood zone.

Criterion P2 – Flooding		
Site	Rating	Comments and Discussion
Glades	2*	Glades elevation = 15 feet. Caloosahatchee Canal (Okeechobee Waterway) and Lake Hicpochee elevation = 11 feet. Difference = 4 feet. Site is in Zone A (located in 100-year flood zone).
Glades A	3	Glades 2 elevation = 59 feet. Site is located ~ 8.5 miles west of USGS gaging station 02256500 on Fisheating Creek near Palmdale, FL. Recent river level at gaging station = 29 ft. Difference = 30 feet above Fisheating Creek level. Site is located on border of Zone C and Zone A (border of 100-year flood zone). Plant area would include areas of Zone A (within 100-year flood zone). Therefore, rating reduced to 3.
Hardee	4	Highlands elevation = 63 feet. Peace River current elevation (at Zolfo Springs, FL) ~ 39 feet. River flood stage = 46 feet. Difference = 17 feet above flood stage. Site is in Zone X (not located in 100-year flood zone).
Hendry 1	2	Hendry 1 elevation = 19 feet. Lake Okeechobee elevation = 14 feet. Difference = 5 feet. Site is located near swamp areas. Site is located in Zone A3 (located in 100-year flood zone).
Hendry 2	1	Hendry 2 elevation = 14 feet. Site is located in swamp areas (east of canal and Levee 3). Site is in Zone A (located in 100-year flood zone). In the event of canal flooding, areas immediately northeast of the canal are primarily impacted as levees protect areas southwest of canals. Flexibility in locating the proposed site within the Hendry 2 parcel could result in improved flood conditions. Moving the site to the southwest of the canal and Levee 3 would increase elevation 2-3 feet, move the site out of swamp areas, and improve flood protection by utilizing Levee 3. The proposed site could be located in Zone C (not located in 100-year flood zone), and the site rating could be increased to a rating of 2 (or possibly 3).

Criterion P2 – Flooding		
Site	Rating	Comments and Discussion
Hendry A	1	<p>Hendry 3 elevation = 29 feet.</p> <p>Site is not located within 10 miles of USGS gaging stations.</p> <p>Site is located ~ 8.7 miles southeast of the Caloosahatchee River.</p> <p>Site is located in Zone A (within 100-year flood zone). Swamp areas exist in the vicinity of the potential site.</p>
Highlands	5	<p>Highlands elevation = 74 feet.</p> <p>River stage data not available for Palmetto Creek or Arbuckle Creek. Topographic maps show approximate river elevation at 50 feet.</p> <p>Difference = 24 feet.</p> <p>Site coordinates are located near swamp lands, but ample areas outside of swamp lands exist in the immediate vicinity of the proposed site.</p> <p>Site is located on border of Zone A (100-year flood zone) and Zone C (outside of 100-year flood zone). However, the exact proposed site location can be located in Zone C areas (not located in 100-year flood zone).</p>
Manatee	5	<p>Manatee elevation = 46 feet</p> <p>Little Manatee River current elevation ~ 3 feet. River flood stage = 11 feet.</p> <p>Difference = 35 feet above flood stage.</p> <p>Site is located in Zone X (outside 500-year flood zone).</p> <p>Site is not located in 100-year flood zone.</p> <p>Flood Insurance Rate Map is old (circa 1971) and does not reflect current conditions. However, area flooding is not expected to differ significantly from prior surveys (i.e., reservoir is not expected to impact area flood potential).</p>

Criterion P2 – Flooding		
Site	Rating	Comments and Discussion
Martin	2	<p>Martin site elevation = 28 feet.</p> <p>Lake Okeechobee elevation = 14 feet.</p> <p>Difference = 14 feet.</p> <p>Site is located near swamp lands.</p> <p>Site is in Zone X (area of 500-year flood, area of 100-year flood with average depths of &lt; 1 foot or with drainage area &lt; 1 sq. mi., or area protected by levees from 100-year flood).</p> <p>Site is located east of boundary limit of flooding from Lake Okeechobee caused by breaching of Herbert Hoover Dike.</p> <p>Site is not located in 100-year flood zone.</p>
Martin A	2	<p>Martin A elevation = 27 feet.</p> <p>Lake Okeechobee elevation = 14 feet.</p> <p>Difference = 13 feet.</p> <p>Site is in Zone X (area of 500-year flood, area of 100-year flood with average depths of &lt; 1 foot or with drainage area &lt; 1 sq. mi., or area protected by levees from 100-year flood).</p> <p>Site is located east of boundary limit of flooding from Lake Okeechobee caused by breaching of Herbert Hoover Dike.</p> <p>Site is not located in 100-year flood zone.</p>
Okeechobee 1	5	<p>Okeechobee 1 elevation = 59 feet.</p> <p>Lake Okeechobee elevation = 14 feet.</p> <p>Difference = 45 feet.</p> <p>Swamp areas exist in the vicinity of the proposed site, but specific location could be moved to avoid these areas.</p> <p>Site is located in Zone C.</p> <p>Site is not located in 100-year flood zone.</p>

<b>Criterion P2 – Flooding</b>		
<b>Site</b>	<b>Rating</b>	<b>Comments and Discussion</b>
Okeechobee 2	3	Okeechobee 2 elevation = 28 feet. Kissimmee River ~ 20 feet. Difference = 8 feet. Swamp areas exist in the vicinity of the proposed site. Site is at border of Zone A and Zone C. Site is at border of 100-year flood zone.
Palm Beach A	2	Palm Beach A elevation = 9 feet. Lake Okeechobee elevation = 14 feet. Difference = -5 feet. North New River Canal gage height near Lake Okeechobee ~ 10 feet. Difference = -1 feet. Site is in Zone B (area between limit of 100-year flood and 500-year flood, area of 100-year flood with average depths of < 1 foot or with drainage area < 1 sq. mi., or area protected by levees from 100-year flood). Site is not located in 100-year flood zone.
St. Lucie	1	St. Lucie elevation = 0-5 feet. Atlantic Ocean elevation = 0 feet. Difference = 0-5 feet. Site is located in Zone AE with base flood elevations of 7-8 feet. Site is located in 100-year flood zone.
Turkey Point	1	Turkey Point elevation = 1-2 feet. Site is located in Zone AE with base flood elevations of 12 feet. Site is located in 100-year flood zone.



Criterion P2 – Flooding		
Site	Rating	Comments and Discussion
West County	2	<p>West County elevation = 14 feet.  Lake Okeechobee elevation = 14 feet.  Difference = 0 feet.  Site is located in/near swamp lands.  Site is in Zone B (area between limit of 100-year flood and 500-year flood, area of 100-year flood with average depths of &lt; 1 foot or with drainage area &lt; 1 sq. mi., or area protected by levees from 100-year flood).  In the event of canal flooding, areas immediately northeast of the canal are primarily impacted as levees protect areas southwest of canals. Flooding of West Palm Beach Canal could impact proposed site.  Site is not located in 100-year flood zone.</p>
<p>* Glades site is located within the 100-year floodplain, based on FEMA Flood Insurance Rate Maps and consistent with FPL information that the 1-in-100-year event is based on lake elevation at 21' NAVD. Screening level evaluation does not consider a dike breach of Lake Okeechobee, such site-specific factors are addressed in a subsequent phase of the evaluation.</p> <p>References: FEMA Digital Flood Insurance Rate Maps, <a href="http://www.msc.fema.gov">http://www.msc.fema.gov</a>  Google Earth, <a href="http://earth.google.com">http://earth.google.com</a>; NOAA Stream and Flood Data, <a href="http://water.weather.gov/ahps/forecasts.php">http://water.weather.gov/ahps/forecasts.php</a>.  USGS Topographic Maps (1 x 100,000 metric); U.S. Flood Hazard Areas, <a href="http://www.esri.com/hazards/makemap.html">http://www.esri.com/hazards/makemap.html</a>.</p>		

Criterion P3 – Population <sup>1</sup>					
Site and County Population	Rating				Comments and Discussion
	County Density	Closest Pop Center	Average Rating*	Adjusted Rating**	
Charlotte (Charlotte) 141,627 (2000) 157,536 (2005) (11% growth rate) 204.2 psm	4	5	4	4	No large population centers within 10 miles Population centers within 25 miles: Fort Myers Shores (5,733) – 16 miles SW La Belle (4,210) – 16.3 miles SE Ft. Myers (48,208) – 21 miles SW Arcadia (6,604) – 23 miles NW Port Charlotte (46,451) – 23 miles WNW

Criterion P3 – Population <sup>1</sup>					
Site and County Population	Rating				Comments and Discussion
	County Density	Closest Pop Center	Average Rating*	Adjusted Rating**	
Collier A (Collier) 251,377 (2000) 318,357 (2009) 26.7% growth rate; 124.1 psm	4	2	3	2	Population centers within 10 miles: Lely Resort (1,426) - 5.7 miles Naples Manor (5,186) - 7.2 miles Lely (3,857) - 8 miles Goodland (320) - 8.8 miles Marco Island (14,879) - 9 miles Golden Gate (20,951) - 10 miles Naples MSA 351,377 (2000), East Naples Naples City -20,976; Bonita Springs - 32,797 (40,877 in 2000/24.6% growth; Population centers within 15 miles: Naples (20,976) - 11 miles Vineyards (2,232) - 13.7 miles Population centers within 25 miles: Bonita Spring (40,877 in 2006 - 24.6% growth rate since 2000) Orangetree (950) - 16 miles; Everglades (479) - 19 miles; Belle Meade (5.3 miles) and Ave Maria (21.6 miles) - both unincorporated areas with no population data from USCB. Note: Naples MSA population (2000) is 331,377; Proximity of this large populated area to the site resulted in additional 1 point deduction in rating.
DeSoto (De Soto) 32,309 (2000) 35,406 (2005) (9.9% growth rate) 50.5 psm	5	2	3	3	Population centers within 10 miles: Arcadia (6,604) – 8.5 miles SW  Population Centers within 20 miles: Zollo Springs (no pop data) - 12.1 miles N Wauchula (4,368) – 15.4 miles N Sebring (3667)/Lake Placid area(1668) – 20 miles ENE Port Charlotte (46,451) – 30 miles SW

Criterion P3 – Population <sup>1</sup>					
Site and County Population	Rating				Comments and Discussion
	County Density	Closest Pop Center	Average Rating*	Adjusted Rating**	
DeSoto A (De Soto) 32,309 (2000) 35,406 (2005) (9.9% growth rate) 50.5 psm	5	2	3	3	Population centers within 10 miles: Arcadia (6,604) – 9.4 miles  Unincorporated places (no population data available from USCB) within 10 miles: Nocatee, 6.8 miles; Fort Ogden, 7.3 miles; Peace River Shores, 8.1 miles Within 20 miles: Harbor Heights (11.5 miles)  Population Centers within 20 miles: Charlotte Park (2,182), 16.3 miles Port Charlotte (46,451), 16.3 miles Ft. Myers (60,531) is about 25 miles (to outskirts) 2006 Ft. Myers/Cape Coral MSA (2000): 440,888
Ft. Myers (Lee County) 440,888 (2000) 544,758 (2005) (23.6% growth rate); 548.6 psm	1	1	1	1	Population Centers within 5 miles: Tice (4,538) - 1.6 miles W Ft. Myers Shores (5,733) - 1.6 miles E  Population Centers within 10 miles: Fort Myers (48,208) - 6.4 miles SW [North Ft. Myers]- Lehigh Acres (33,430) - 8 miles SE Cape Coral (102,286) - 11.2 miles SW

Criterion P3 – Population <sup>1</sup>					
Site and County Population	Rating				Comments and Discussion
	County Density	Closest Pop Center	Average Rating*	Adjusted Rating**	
Glades (Glades) 10,576 (2000) 11,252 (2005) (6.4% growth rate) 13.7 psm	5	1	3	4	Population centers within 5 miles: Moore Haven (1,635) – 2 miles E  Population centers within 20 miles: Clewiston (6460) – 12 miles ESE Belle Glade (14, 906) – 12 miles E La Belle ( 4,210) – 18.4 miles W  Population Centers within 50 miles Okeechobee (5,376) – 35 miles NE Fort Myers (western fringe, Lehigh Acres, 33,430) – 45 miles W
Glades A (Glades) 10,576 (2000) 11,252 (2005) (6.4% growth rate) 13.7 psm	5	2	3	3	No population centers within 5 miles. Population Centers within 10 miles: La Belle (4,210), 8.7 miles Unincorporated Areas; Muce (5.7 miles); Palmdale (8.6 miles) Population centers within 20 miles: Alva (2,182) 15.8 miles Population centers within 30 miles: Moore Haven (1,635), 21.5 miles Buckingham (3,742), 22.7 miles Fort Myers - 25-30 miles: Ft. Myers (60,531) is 25-30 miles (25 to outskirts) Ft. Myers/Cape Coral MSA (2000): 440,888
Hardee (Hardee Co) 26,938 (2000) 28,286 (2005) (5.0% growth rate) 42.3 psm	5	3	4	4	Population centers within 20 miles: Zollo Springs (no pop data) – 12 miles NE Wauchula (4,368) – 13.5 miles NE Arcadia (6,604) – 14 miles SE Population Centers within 30 miles: Sarasota (52,715) – 35 miles W Port Charlotte (46,461) – 26 miles SW

Criterion P3 – Population <sup>1</sup>					
Site and County Population	Rating				Comments and Discussion
	County Density	Closest Pop Center	Average Rating*	Adjusted Rating**	
Hendry 1 (Hendry) 36,210 (2000) 39,561 (2005) (9.3% growth rate) 31.4 psm	5	2	3	4	Population centers within 10 miles Clewiston (6460) – 7.3 miles  Population Centers within 25 miles: Belle Glade (14,906) 19.9 miles E La Belle (4,210) – 25 miles W
Hendry 2 (Hendry) 36,210 (2000) 39,561 (2005) (9.3% growth rate) 31.4 psm	5	5	5	5	Population centers within 30 miles: Clewiston (6460) – 28 miles NW Belle Glade (14,906) – 28 miles NE Immokalee (13,763) – 27.6 miles W  Population Centers within 50 miles Boca Raton/Atlantic coast (western fringe) 42 miles to Coral Springs
Hendry A (Hendry) 36,210 (2000) 39,561 (2005) 9.3% growth rate 31.4 psm	5	2	3	3	No cities within 5 miles. Cities within 10 miles: La Belle (4,210), 8.2 miles Cities within 15 miles: Lehigh Acres (33,430), 12 miles Alva (2,182), 12 miles Immokalee (19,763), 14 miles Population Centers within 25 miles: Moore Haven (1,635), 23.4 miles Closest Densely Populated Area Ft. Myers (60,531) [2006] is 25-30 miles (25 to outskirts) Ft. Myers/Cape Coral Metropolitan Statistical Area (MSA) (2000): 440,888 Bonita Springs (40,877) 2006; 30 miles

Criterion P3 – Population <sup>1</sup>					
Site and County Population	Rating				Comments and Discussion
	County Density	Closest Pop Center	Average Rating*	Adjusted Rating**	
Highlands (Highlands) 87,366 (2000) 95,496 (2005) (9.3% growth rate) 85 psm	4	2	3	4	Population centers within 10 miles: Avon Park, (8,542), 4.6 miles W Sebring, (9667), 7 miles SW Population Centers within 20 miles Lake Wales (10,194), 20.7 miles NW Closest densely populated area: Vero Beach/ (17,705 – city; 20,362 – Vero beach South, CDP)/coastal development – 50 miles
Manatee (Manatee; site close to Hillsborough county border) 264,002 (2000) 306,779 (2005) (16.2% growth rate) 356.3 psm	2	2	2	2	Population centers within 10 miles: Parrish (no pop data ) – 4.8 miles W Wimauma (4,246) – 7.2 miles N Ruskin (8,321) – 8 miles NW  Population Centers within 20 miles Palmetto (12,571) – 13 miles SW Bradenton (49,504) – 14 miles SW Sarasota (52,715) – 19 miles SW St. Petersburg (248,232) – 20 miles NW Tampa (303,447) – 22 miles NW

Criterion P3 – Population <sup>1</sup>					
Site and County Population	Rating				Comments and Discussion
	County Density	Closest Pop Center	Average Rating*	Adjusted Rating**	
Martin (Martin) 126,731(2000) 139,728 (2005) (10.3% growth rate) 228.1 psm	4	2	3	3	Population centers within 10 miles: Indiantown (5,588) 7 miles SE  Population Center within 25 miles: Port St. Lucie (88,769) – 20 miles E Stuart (14,633) – 25 miles NE Okeechobee (5,376) - 20 miles NW  Site is 40 miles NW of West Palm Beach and 25 miles from Atlantic Coast development Port St. Lucie-Ft. Pierce MSA - 319,426
Martin A (Martin) 126,731(2000) 139,728 (2005) 10.3% growth rate 228.1 psm	4	1	2	2	Cities within 5 miles: Indiantown (5,588), 4.7 miles Cities within 15 miles: Stuart (14,633), 13 miles Port Salerno (10,141), 13 miles Cities within 20 miles Jupiter (48,847) [2006], 19 miles Port St. Lucie (143,860 - 2006; up from 88,769 in 2000 - 61.9% growth since 2000), 20 miles Palm Beach Gardens (48,914) (2006), 21 miles Cities within 30 miles Ft. Pierce (39,365) (2006), 25 miles Wellington (54,993) (2006) 28 miles West Palm Beach (98,774) (2006)- around 30 miles Note: West Palm Beach-Boca Raton MSA is 1,131,184 persons; Port St. Lucie-Ft. Pierce MSA - 319,426 (2000)



Criterion P3 – Population <sup>1</sup>					
Site and County Population	Rating				Comments and Discussion
	County Density	Closest Pop Center	Average Rating*	Adjusted Rating**	
Okeechobee 1 (Okeechobee) 35,910 (2000) 39,836 (2005) (10.9% growth rate) 46.4 psm	5	2	3	4	Population centers within 10 miles: Cypress Quarters (1,150) – 8 miles to SW Okeechobee (5,376) – 9 miles to SW  Population Centers within 25 miles: Port St. Lucie (88,769) - 19 miles E (although western edge of development is at around 17 miles) Ft. Pierce (37,516) – 22 miles NE
Okeechobee 2 (Okeechobee) 35,910 (2000) 39,836 (2005) (10.9% growth rate) 46.4 psm	5	2	3	3	Population centers within 10 miles: Okeechobee (5,376) – 8 miles  Population Centers within 20 miles: Lake Placid outskirts (1668) – 19.2 miles W  Closest densely populated areas: Port St. Lucie (western edge) (88,769) – 30 miles E
Palm Beach A (Palm Beach) 1,131,190 (2000) 1,279,950 (2009) 13.2% growth rate 573 ppm	1	4	2	1	No population centers within 15 miles Population centers within 20 miles: Belle Glade (14,906), 18.4 miles Coral Springs (129,805), 20 miles (18 miles to population outskirts) [2006] Population centers within 25 miles [all population data from 2006] Wellington (54,993), 23.8 miles Population centers within 30 miles: Boca Raton (86,396) , 29 miles Pompano (104,402), 29 miles 22 miles to coastal population, closest is 18 miles at Coral Springs Note: West Palm Beach-Boca Raton MSA is 1,131,184 persons (2000)

Criterion P3 – Population <sup>1</sup>					
Site and County Population	Rating				Comments and Discussion
	County Density	Closest Pop Center	Average Rating*	Adjusted Rating**	
St. Lucie (St Lucie County) 192,695 (2000) 241,305 (2005) (25.2% growth rate) 336.3 psm	3	1	2	1	Population center within 5 miles: Port St. Lucie (88,769) – 4.5 miles W  Population Centers within 10 miles: Ft Pierce (37,516) – 7 miles NW Stuart (14,633) – 8 miles S
Turkey Point (Miami Dade County) 2,253,362 (2000) 2,376,014 (2005) (5.4% growth rate) 1,157.9 (persons per square mile, psm)	1	2	1	1	No population centers within 5 miles Population Centers within 10 miles: Leisure City (22,152)- 7.2 miles N Homestead (31,909)– 9 miles NW Florida City (7,843) – 8 miles W Key Largo (11,806)– 10 miles S  Major population center within 50 miles Miami (450,403 for Miami and Miami Beach)– 20-25 miles N, although S. Miami development within 10 miles N (9.6 miles Goulds and Cutler Ridge)
West County (Palm Beach Co) 1,131,184 (2000) 1,268,548 (2005) (12.1% growth rate) 573 psm	1	1	1	1	Population centers within 5 miles: Wellington (38,216) – 4 miles E  Population Centers within 20 miles Belle Glade (14,506) – 17 miles W West Palm Beach (82,103) – 18 miles E (but 3-5 miles to residential/development); and coastal development extends below West Palm down to Miami.

Criterion P3 – Population <sup>1</sup>					
Site and County Population	Rating				Comments and Discussion
	County Density	Closest Pop Center	Average Rating*	Adjusted Rating**	
<sup>1</sup> Population data are for 2000 unless otherwise noted; all population density data (by county) are for 2000. * Average of ratings based on host county population density and rating based on distance to nearest population center (identified using screening map and USGS 100,000 scale topographic map). ** Point added if no densely populated area is found within 40 miles of the site; point deducted if a densely populated area is found within 15 miles of the site or if a large grouping of densely populated areas are located within 15-40 miles of the site.  References: U.S. Census Bureau (2000 Census data for population density; 2000 Census data for population totals unless otherwise noted, such as for most recent addition of greenfield sites), available at: <a href="http://quickfacts.census.gov/qfd/states/12000.html">http://quickfacts.census.gov/qfd/states/12000.html</a> ; USGS 100,000 scale topographic maps; AAA Florida State Map.					

Criterion P4 – Hazardous Land Uses		
Site	Rating	Comments and Discussion
Charlotte	5	Airports: Closest major airport is Regional Southwest Airport in Ft. Myers, 28.4 miles away; Charlotte County airport is 24 miles W and Arcadia airport is 24 miles NW; Smaller airports located 3.2, 7.4, 8.7, 12.9, 15.8, 16.3 and 18.1 miles away Rail: Closest is 18 miles E
Collier A	4	Airports: no major airport within 10 miles. Closest major airport is Southwest Regional Airport (Ft. Myers) at 33.8 miles. Small airports at 5.4 and 7.1; Marco Island at 8.9 miles and Naples Municipal at 12.2 miles. Rail: 12.8 miles NW (operated by Seminole Gulf RR). Interstate 75: 6.9 miles to south.
DeSoto	4	Airports: No major airports; smaller airports at Arcadia (9.6 miles SW) and Sebring (24.8 miles to NW) Other small airport/landing strips at 2.5, 7.4, 8.2, 8.4, 12.7, 13.5, and 15.4 miles Rail: 7.1 miles W
DeSoto A	4	Airports: No major airports within 10 miles. Smaller airports at Arcadia (8.2 miles) and Charlotte County (13.5 miles). Other small airport/landing strips at 3.3, 4.0, 7.8, 7.9, 8.3, 9.8, 9.9, 12.5 [airfields identified on Google Earth although in most instances, airfields appear to be in middle of farmland (no landing strip visible)]. Rail: ~ 6.2 miles NW (operated by Seminole Gulf RR). Interstate 75: 13 miles to west (shipments of hazardous materials by truck).
Ft. Myers	1	Airport: Regional Southwest (Ft. Myers) – 10 miles S Other smaller airports: 2.1 miles, 4.8 miles (Lehigh Acres SE); 9.6 miles (Page Field SW), 9 and 10 miles Rail: 2.4 miles SW Natural gas pipeline service to site 1.5 miles from I-75 Existing power plant on site with natural gas pipeline service to site
Glades	3	Airports: Clewiston is 12.4 miles SE of site; other smaller airports at 2 and 3 miles from site (landing strips) Rail: 3.1 miles NE; 11 miles W

Criterion P4 – Hazardous Land Uses		
Site	Rating	Comments and Discussion
Glades A	4	<p>Airports: No major airports within 10 miles. Numerous small airports throughout the area, at 6.7, 8.0, 8.2, 8.5, 10.0 (LaBelle Municipal), 10.4, 11.2, 13.6, 14.2, 14.8, 15.7, and 16.5 miles from potential site.</p> <p>Rail: Potential site is located ~ 8.4 miles southwest of existing rail (near Palmdale, FL). This rail line is operated by South Central Florida Express and does not support passenger service.</p> <p>A rail line running south from Palmdale, FL to Sunniland, FL (~ 7.7. miles east of the potential site) formerly operated by Seaboard System RR has since been abandoned.</p>
Hardee	3	<p>Airports: No major airports; airport at Arcadia (9 miles) and smaller airstrips located 9.5 and 12.5 miles away</p> <p>Rail: Located 0.4 miles W [more like 4 miles from my site location]</p>
Hendry 1	4	<p>Airports: Clewiston Airport (7.3 miles); smaller airports at 4.5, 9.8, 10.5, 10.9, 16.6 miles</p> <p>Rail: 8.7 miles NE</p>
Hendry 2	5	<p>Airports: Small airports nearby at 2.2, 4.4 and 6.7 miles</p> <p>Rail: 12.8 miles N</p>
Hendry A	4	<p>Airports: No major airports within 10 miles. Small airports/landing strips found at 2.3, 4.3, 5.5, 5.7, 6.4, 7.6, 7.7, 7.8 (La Belle Municipal), 9.3, 9.4, and 12.1 miles from potential site.</p> <p>Rail: Potential site is located ~ 21.2 miles southwest of existing rail (near Palmdale, FL). This rail line is operated by South Central Florida Express and does not support passenger service.</p> <p>A rail line running south from Palmdale, FL to Sunniland, FL (~ 2.2 miles east of the potential site) formerly operated by Seaboard System RR has since been abandoned.</p>
Highlands	2	<p>Airports: Sebring Regional Airport 10.3 miles SE; MacDill AFB auxiliary/Avon Park AFB 3.7 miles NE; [also appears to be abandoned airfield on Avon Park Bombing Range, just NE of AFB airfield]; Avon Park Municipal 8 miles W; another smaller landing strip (for ranch) also further to the west.</p> <p>The Avon Park Airport fixed base operator is Avon Park Jet Center. The maximum runway length for the Avon Park Airport is 5,364 feet.</p> <p>Rail: 5.75 miles SE [railroad freight service provided by CSX includes side-track service to several industrial areas. Passenger service is provided by Amtrak which has scheduled arrivals and departures from Sebring.]</p> <p>Pipeline: None identified within 5 miles.</p> <p>Military Installations: Avon Park AFB/Avon Park Bombing Range – 4 miles NE</p>

<b>Criterion P4 – Hazardous Land Uses</b>		
<b>Site</b>	<b>Rating</b>	<b>Comments and Discussion</b>
Manatee	3	Major Airports: 30 miles St Pete airport (NW); 18 miles MacDill AFB (NW); 27 miles Tampa airport (N); 18 miles Sarasota Bradenton airport (SW) Rail: 2.6 miles N Existing power plant with natural gas pipeline service to site
Martin	3	Airports: No major airports; Stuart Airport 25 miles E; smaller airports at 2.5, 6.4, 6.8, and 11 miles away Rail: 1.5 miles NE and 2.8 miles W Existing power plant with natural gas pipeline service to site
Martin A	3	Airports: No major airports within 10 miles (West Palm at 31 miles). Smaller airports at 2.5 (Indiantown), 7.3, 10.5, 11.9, 14 (Stuart Airport/Whitham Field), 14.9 and 19 (Briant Air Strip). Majority of small airports are landing strips in farm fields (with no visible landing strip). Rail: 4.4 miles SW (operated by CSX Transportation). Existing power plant at Martin is 9.7 miles to west. Interstate 95: 6.3 miles Existing nuclear plant: St. Lucie at 22.7 miles
Okeechobee 1	4	Airports: Okeechobee County airport 9.6 miles SW; Sebring Airport over 25 miles NW; smaller airports located 3.5, 6.4, 6.6, 10, 12 and 13 miles away. Rail: 8.3 miles SW and 13.1 miles SE No pipelines identified
Okeechobee 2	3	Airports: Okeechobee County airport 7.3 miles E; smaller airports located 1.3, 4.3, 8.1 and 10 miles away Avon Bombing Range – 27 miles NW Rail: 2.2 miles NW
Palm Beach A	5	Airports: No major airports within 10 miles (West Palm Beach and Fort Lauderdale International at 33 and 35 miles respectively). Belle Glade Municipal at 19 miles, Loxahatchee at 20 miles and Palm Beach County Airport at 30 miles. Smaller airports/landing strips/fields at 11.4, 15.7 and 24.2 miles. Rail: ~ 10.7 miles NW (operated by South Central Florida Express). Interstate 75: 19 miles (to south/Alligator Alley); Interstate 95: 27 miles

Criterion P4 – Hazardous Land Uses		
Site	Rating	Comments and Discussion
St. Lucie	3	<p>Airports: Major airport 12.4 miles NW (St. Lucie County International); smaller airport (Witham field in Stuart) 10.4 miles SW</p> <p>Pipeline: Did not see on topographic maps, but other reports show line extending down Atlantic Coast</p> <p>Rail located 2.1 miles W</p> <p>Site located on navigable waterway</p> <p>Existing nuclear plant</p>
Turkey Point	2	<p>Airport/Military Base: Homestead Air Reserve Base – 5.2 miles NW (more limited operations as part of air base realignment but still contains aircraft and supports flight ops which are assumed to present potential hazards)</p> <p>Other Airports: Homestead general aviation airport – 14+ miles NW</p> <p>Pipelines: major pipeline routes not identified on topographic maps, but natural gas pipeline service to site exists.</p> <p>Rail: 10 miles W</p> <p>Site located on navigable waterway</p> <p>U.S. Naval Reservation with heliport and radio facility, located 7 miles SW</p> <p>Existing power plants [2 nuclear units, 2 conventional boiler fossil units plus building new combined cycle unit]</p> <p>Note: Lower rating at Turkey Point, compared to St. Lucie, is based on proximity to Air Reserve Base (assumed to be potentially greater hazard than proximity to rail at St. Lucie) and fact that TP has more existing generating units (including fossil units) than St. Lucie.</p>
West County	4	<p>Airports: West Palm Beach airport 18.3 miles E; other smaller airports 12.7 and 13.4 miles away</p> <p>Rail: 13.6 miles NE; 14.1 miles NW</p> <p>Pipeline: 13.5 miles W</p> <p>Property is adjacent to existing Corbett Substation and soon to be used for new greenfield combined cycle natural gas power plant; surrounding land use is predominantly sugar cane and limestone mining (site previously used for mining operations). [Site could qualify as 5 based on criteria but the fact that a new power plant is going in and mining occurs in area drops its rating to a 4.]</p>
<p>References:</p> <p>Google Earth, <a href="http://earth.google.com">http://earth.google.com</a>.</p> <p>USGS Topographic Maps (1 x 100,000 metric).</p>		

<b>Criterion P5 – Ecology/Federal Rare, Threatened, and Endangered (RTE) Species (by Host County)</b>		
<b>Site</b>	<b>Rating</b>	<b>Comments and Discussion</b>
Charlotte	2	22 T&E species: 3 mammals, 8 birds (although documentation for 2 is very old), 5 reptiles, 2 fish, 1 plant, and 3 candidate species (bald eagle delisted since 2006).
Collier A	2	25 species: 4 mammals (including 1 candidate species), 11 birds (including 1 candidate species), 5 reptiles, 2 fish; 2 candidate invertebrate and 1 candidate plant species. County includes critical habitat for manatee and piping plover. Site is located west of the Fakahatchee Strand Preserve State Park and the Big Cypress National Preserve.
DeSoto	3	13 T&E species: 3 mammals (including manatee), 7 birds, 2 reptiles and 1 plant (bald eagle delisted since 2006). County also includes critical habitat for the Florida manatee, including Charlotte Harbor (Charlotte County) and several miles north on the Peace River into DeSoto County (potentially near site).
DeSoto A	3	13 T&E species: 3 mammals (including manatee), 7 birds, 2 reptiles and 1 plant (bald eagle delisted since 2006). County also includes critical habitat for the Florida manatee, including Charlotte Harbor (Charlotte County) and several miles north on the Peace River into DeSoto County (potentially near site).
Ft. Myers (Lee County)	2	22 T&E species: 4 mammals, 8 birds (including 1 candidate species), 6 reptiles, 2 fish, 2 plants (including 1 candidate species); (bald eagle delisted since 2006).
Glades	3	15 T&E species: 3 mammals, 8 birds, 2 reptiles, 2 plants (bald eagle delisted since 2006). County includes critical habitat for Everglade snail kite (includes the western portion of Lake Okeechobee, a potential cooling water supply source for the site).
Glades A	3	15 T&E species: 3 mammals, 8 birds, 2 reptiles, 2 plants (bald eagle delisted since 2006). County includes critical habitat for Everglade snail kite (includes the western portion of Lake Okeechobee, a potential cooling water supply source for the site).
Hardee County	3	11 T&E species: 2 mammals, 5 birds, 2 reptiles, 2 plants (bald eagle delisted since 2006).
Hendry 1	3	13 T&E species: 3 mammals, 8 birds, 2 reptiles (bald eagle delisted since 2006).
Hendry 2	3	13 T&E species: 3 mammals, 8 birds, 2 reptiles (bald eagle delisted since 2006). [just north of Big Cypress National Preserve/WMA and just to west of Rotenberger and Holey Land WMAs]
Hendry A	3	13 T&E species: 3 mammals, 8 birds, 2 reptiles (bald eagle delisted since 2006). County includes critical habitat for Everglade snail kite. Critical habitat for the snail kite includes the western portion of Lake Okeechobee, a potential cooling water supply source for the site.



<b>Criterion P5 – Ecology/Federal Rare, Threatened, and Endangered (RTE) Species (by Host County)</b>		
Site	Rating	Comments and Discussion
Highlands	1	36 T&E species: 3 mammals, 8 birds (documentation for one is 40 years old), 4 reptiles, 1 invertebrate (candidate) and 20 plants (bald eagle delisted since 2006). Area includes unique ecological habitat along Lake Wales Ridge and State Forest and Avon Park Air Force Range. This habitat includes numerous protected species (federal and state).
Manatee	3	13 T&E species: 1 mammal, 5 birds, 1 fish, 5 reptiles, 1 plant (bald eagle delisted since 2006). County includes critical habitat for manatee.
Martin	2	29 T&E species: 4 mammals, 10 birds (including one candidate species, red knot), 7 reptiles (including 4 species of sea turtles), 1 fish, 1 invertebrate (candidate species), and 6 plants. County includes critical habitat for West Indian manatee, piping plover, and Johnson's seagrass. Historic date for American crocodile is unknown; and presence of threatened southeastern beach mouse is inferred. Critical habitat for the manatee includes the Atlantic coastline of Martin County. Critical habitat for Johnson's seagrass is also found along the Atlantic coastline, at Hobe Sound and Jupiter Inlet (south side). Critical habitat for the piping plover (282 acres) is found at the St. Lucie Inlet (majority on public land in Saint Lucie Inlet State Preserve).
Martin A	2	29 T&E species: 4 mammals, 10 birds (including one candidate species, red knot), 7 reptiles (including 4 species of sea turtles), 1 fish, 1 invertebrate (candidate species), and 6 plants. County includes critical habitat for West Indian manatee, piping plover, and Johnson's seagrass. Historic date for American crocodile is unknown; and presence of threatened southeastern beach mouse is inferred. Critical habitat for the manatee includes the Atlantic coastline of Martin County. Critical habitat for Johnson's seagrass is also found along the Atlantic coastline, at Hobe Sound and Jupiter Inlet (south side). Critical habitat for the piping plover (282 acres) is found at the St. Lucie Inlet (majority on public land in Saint Lucie Inlet State Preserve).
Okeechobee 1	3	14 T&E species: 4 mammals, 8 birds, 2 reptiles (bald eagle delisted since 2006). County includes critical habitat for Everglade snail kite.
Okeechobee 2	3	14 T&E species: 4 mammals, 8 birds, 2 reptiles (bald eagle delisted since 2006). County includes critical habitat for Everglade snail kite.
Palm Beach A	1	32 T&E species: 4 mammals, 10 birds (including 1 candidate species), 7 reptiles, 1 fish, 3 invertebrate (proposed threatened staghorn coral and 2 candidate species), 7 plants; county includes critical habitat for manatee, Everglade snail kite and Johnson's seagrass. Site located adjacent to the Loxahatchee National Wildlife Refuge (to the east), Everglades Wildlife Management (to the south), Holey Land Wildlife Management Area (to the west) - all wetland areas; and is immediately adjacent to the Browns Farm Wildlife Management Area.

Criterion P5 – Ecology/Federal Rare, Threatened, and Endangered (RTE) Species (by Host County)		
Site	Rating	Comments and Discussion
St. Lucie	2	26 T&E species: 4 mammals, 10 birds, 7 reptiles, 1 fish, 4 plants; (bald eagle delisted since 2006. County includes critical habitat for manatee, Everglade snail kite and Johnson's sea grass.
Turkey Point (Miami-Dade County)	1	50 T&E species: 4 mammals ( including 1 candidate species), 12 birds (including 1 candidate species; note that 4 species last documented in 1960s or earlier; 1 last documented in 1987-1991 and 2 are possible migrants – 1901 and 1958; bald eagle delisted since 2006), 7 reptiles, 2 fish, 6 invertebrates (including 2 candidate species and 1 proposed species), 19 plants (including 10 candidate species; note that 2 species last documented over 50 years ago); site located between Biscayne National Park and Everglades National Park.  FPL maintains natural wildlife area; wetlands set aside as Everglades Mitigation Bank; entire site is crocodile habitat. County includes critical habitat for manatee, Everglade snail kite, Cape Sable seaside sparrow, American crocodile and Johnson's seagrass.
West County (Palm Beach)	1	32 T&E species: 4 mammals, 10 birds (including 1 candidate species), 7 reptiles, 1 fish, 3 invertebrate (proposed threatened staghorn coral and 2 candidate species), 7 plants (bald eagle delisted since 2006) [in between Loxahatchee NWR and JW Corbett WMA]. County includes critical habitat for manatee, Everglade snail kite and Johnson's seagrass.
<p>Note: All six species of sea turtles occurring in the U.S. are protected under the Endangered Species Act of 1973. NOAA Fisheries and the <u>U.S. Fish and Wildlife Service (USFWS)</u> share jurisdiction for sea turtles, with NOAA Fisheries having lead responsibility for the conservation and recovery of sea turtles in the marine environment and USFWS on turtles on nesting beaches. NOAA Fisheries (also known as the National Marine Fisheries Service) also has responsibility for Johnson's seagrass.</p> <p>References:  US Fish and Wildlife Service, South Florida Field Office [<a href="http://www.fws.gov/southflorida/CountyList">www.fws.gov/southflorida/CountyList</a> – data provided by county; supposed to be current through September or December 2005.  US Fish and Wildlife Service, Vero Beach/South Florida [<a href="http://www.fws.gov/verobeach/species_lists/countyfr.html">www.fws.gov/verobeach/species_lists/countyfr.html</a>] June 2000.  <a href="http://www.fws.gov/verobeach/">http://www.fws.gov/verobeach/</a>; or website to link to species list by county identified below:  <a href="http://www.fws.gov/verobeach/index.cfm?Method=programs&amp;NavProgramCategoryID=3&amp;programID=37&amp;ProgramCategoryID=3">http://www.fws.gov/verobeach/index.cfm?Method=programs&amp;NavProgramCategoryID=3&amp;programID=37&amp;ProgramCategoryID=3</a>  For Manatee: <a href="http://www.fws.gov/northflorida/CountyList/Manatee.htm">http://www.fws.gov/northflorida/CountyList/Manatee.htm</a>  For Lee: <a href="http://ecos.fws.gov/tess_public/countySearch!speciesByCountyReport.action?fips=12071">http://ecos.fws.gov/tess_public/countySearch!speciesByCountyReport.action?fips=12071\</a>  For Collier: <a href="http://www.fws.gov/verobeach/images/pdflibrary/Collier%20County3.pdf">http://www.fws.gov/verobeach/images/pdflibrary/Collier%20County3.pdf</a>  Note: T&amp;E species lists updated by FWS June 2010</p>		

<b>Criterion P6 – Wetlands</b>		
<b>Site</b>	<b>Wetland Acres (within 5,000-acre site area)</b>	<b>Rating</b>
Charlotte	1,970	1
Collier A	1,234	2
DeSoto	688	2
DeSoto A	395	3
Ft. Myers	972	2
Glades	482	3
Glades A	877	2
Hardee	626	2
Hendry 1	831	2
Hendry 2	2,571	1
Hendry A	933	2
Highlands	810	2
Manatee	1,000	2
Martin	326 <sup>1</sup>	3 <sup>2</sup>
Martin A	150	4
Okeechobee 1	958	2
Okeechobee 2	248	4
Palm Beach A	1,680	1
St. Lucie	1,173 <sup>3</sup>	1 <sup>4</sup>
Turkey Point	1,273 <sup>3</sup>	1 <sup>5</sup>

Criterion P6 – Wetlands		
Site	Wetland Acres (within 5,000-acre site area)	Rating
West County	3,433	1
<p>Note: The use of the term “wetlands” is used solely as a descriptive term and is not used as a regulatory or jurisdictional term.</p> <p><sup>1</sup> Does not include 1,767 acres of a portion of the existing reservoir at the Martin Site. Because (1) it was assumed (during the original Siting Study) that the reservoir, which was constructed to support the existing Martin plant, could also potentially be used to support two new units, and (2) the reservoir would not be disturbed by any new development, its acreage is not included in the wetlands total.</p> <p><sup>2</sup> Rating based on percentage of remaining land area (3,233 acres, after deducting 1,767 acres of reservoir) comprised of wetlands – approximately 10 percent.</p> <p><sup>3</sup> Total wetland acreage at these two existing nuclear plant coastal sites does not include “estuarine and marine deepwater” category.</p> <p><sup>4</sup> Rating at St. Lucie is based on the percentage of remaining land area (1,538 acres, after deducting 3,462 acres of deepwater) comprised of wetlands – approximately 76%.</p> <p><sup>5</sup> Rating at Turkey Point is based on the percentage of remaining land area (1,730 acres, after deducting 3,270 acres of deepwater) comprised of wetlands – approximately 73%.</p> <p>Reference: From NWI Wetlands Mapper, found at: <a href="http://www.fws.gov/wetlands/Data/Mapper.html">http://www.fws.gov/wetlands/Data/Mapper.html</a>.</p> <p>Data Limitations and Uses of NWI Wetlands Mapper (found at <a href="http://www.fws.gov/wetlands/Data/Limitations.html">http://www.fws.gov/wetlands/Data/Limitations.html</a>): Maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery. Thus, on the ground inspection of any site may result in revision of the wetland boundaries or classification established through image analysis. Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than used in this inventory. There is no attempt to define the limits of proprietary jurisdiction of any Federal, state or local government or to establish the geographical scope of the regulatory programs of government agencies.</p>		

Criterion P7 – Railroad Access		
Site	Rating	Comments and Discussion
Charlotte	1	Rail is ~ 18.1 miles E (operated by South Central Florida Express, CSX Transportation has trackage rights). Rail is ~ 22.7 miles W (operated by Seminole Gulf RR, CSX Transportation has trackage rights).
Collier A	2	Rail is ~ 12.8 miles NW (operated by Seminole Gulf RR).
DeSoto	3	Rail is ~ 7.1 miles W (operated by CSX Transportation). A rail line between Arcadia, FL and Bowling Green, FL (~ 2.3 miles W of the proposed site) formerly operated by Seaboard System RR has since been abandoned.
DeSoto A	3	Rail is ~ 6.2 miles NW (operated by Seminole Gulf RR).
Ft. Myers	4	Rail is ~ 2.4 miles SW (operated by Seminole Gulf RR, CSX Transportation has trackage rights). Connection to rail could be complicated by development in Tice, FL and location near the Caloosahatchee River.
Glades	4	Rail is ~ 3.1 miles NE (operated by South Central Florida Express, CSX Transportation has trackage rights).
Glades A	3	Potential site is located ~ 8.4 miles southwest of existing rail (near Palmdale, FL). This rail line is operated by South Central Florida Express and does not support passenger service. A rail line running south from Palmdale, FL to Sunniland, FL (~ 7.7 miles east of the potential site) formerly operated by Seaboard System RR has since been abandoned.
Hardee	5	Rail is ~ 0.4 miles W (operated by CSX Transportation). A rail line between Arcadia, FL and Bowling Green, FL (~ 6.4 miles E of the proposed site) formerly operated by Seaboard System RR has since been abandoned.
Hendry 1	3	Rail is ~ 8.7 miles NE (operated by South Central Florida Express, CSX Transportation and Florida East Coast Railway have trackage rights).
Hendry 2	2	Rail is ~ 12.8 miles N (operated by South Central Florida Express, CSX Transportation and Florida East Coast Railway have trackage rights).
Hendry A	1	Potential site is located ~ 21.2 miles southwest of existing rail (near Palmdale, FL). This rail line is operated by South Central Florida Express and does not support passenger service. A rail line running south from Palmdale, FL to Sunniland, FL (~ 2.2 miles east of the potential site) formerly operated by Seaboard System RR has since been abandoned.

Criterion P7 – Railroad Access		
Site	Rating	Comments and Discussion
Highlands	3	Rail is ~ 7.1 miles W (operated by CSX Transportation).
Manatee	4	Rail is ~ 2.2 miles N (owned by FPL, operated by CSX Transportation). This rail line formerly ran between Palmetto, FL and Durant, FL but now terminates in Willow, FL (~ 2.6 miles N of proposed site). A spur from this rail line accesses the existing Manatee plant.  In 1989, FPL purchased 15.1 miles of the railroad from Willow, FL to Ellenton, FL, where it connects to the CSX Transportation rail network.
Martin	5	Rail is accessible at the Martin site via a siding from the main rail line to the existing plant. The rail siding is owned by Florida East Coast Railway and is operated by South Central Florida Express under a long term lease agreement.  Rail is ~ 1.5 miles NE (operated by CSX Transportation). Rail is ~ 2.8 miles W (operated by Florida East Coast Railway).
Martin A	4	Rail is ~ 4.4 miles SW (operated by CSX Transportation).
Okeechobee 1	3	Rail is ~ 8.3 miles SW (operated by CSX Transportation). Rail is ~ 13.1 miles SE (operated by Florida East Coast Railway).
Okeechobee 2	4	Rail is ~ 2.2 miles NE (operated by CSX Transportation).
Palm Beach A	2	Rail is ~ 10.7 miles NW (operated by South Central Florida Express).
St. Lucie	4	Rail is ~ 2.1 miles W (operated by Florida East Coast Railway). However, Intercoastal Waterway is located between the St. Lucie site and this rail line.  Due to the coastal location of the St. Lucie site, barge access is accessible in the immediate vicinity for delivery of heavy/large items. However, since rail access is not immediately accessible, a rating of 5 was not assigned.
Turkey Point	4	Rail is ~ 10.3 miles W (operated by CSX Transportation). Homestead, FL marks the southernmost point of Florida served by rail.  A rail line to Homestead, FL formerly operated by Florida East Coast Railway has since been abandoned.  Due to the coastal location of the Turkey Point site, barge access is immediately accessible for delivery of heavy/large items. A barge channel has been constructed in Biscayne Bay providing direct access to the site. As barge access provides an alternative to rail access, the rating has been increased to 4 (however, since rail access is not immediately accessible, a rating of 5 was not assigned).

Criterion P7 – Railroad Access		
Site	Rating	Comments and Discussion
West County	2	Rail is ~ 13.6 miles NE (operated by CSX Transportation). Rail is ~ 14.1 miles NW (operated by Florida East Coast Railway).
References: North American Railroad Map, version 3.0, <a href="http://www.RailroadMap.com">http://www.RailroadMap.com</a> . USGS Topographic Maps (1 x 100,000 metric).		

Criterion P8 – Transmission Access		
Transmission access is evaluated in the preliminary screening in terms of distance to the load center in the greater Miami area, and amount of new right of way (ROW) that needs to be acquired. The highest ranked sites already own the ROW, and the lowest-ranked sites require significant ROW acquisition which will be difficult to obtain. In addition the plant switchyard is assumed the same for all sites.		
Site	Rating	Comments and Discussion
Charlotte	2	~ 100 miles to Miami Load Center. 140 miles of new 500 kV ROW acquisition, 1 autotransformer, 7- 500 kV line terminals.
Collier A	2	~ 90 miles to Miami Load Center. 95 miles of new 500 kV ROW acquisition, 2 autotransformers, 6- 500 kV line terminals. 8-230 kV terminals ROW near Ft Myers substation will be difficult to obtain. [Assumed similar ROW scenario as Ft. Myers.]
DeSoto	3	~ 125 miles to Miami Load Center. 135 miles of new 500 kV ROW acquisition, 2 autotransformers, 8- 500 kV line terminals. ROW near Orange River substation will be difficult to obtain.
DeSoto A	3	~ 120 miles to Miami Load Center. 135 miles of new 500 kV ROW acquisition, 2 autotransformers, 8- 500 kV line terminals. ROW near Orange River substation will be difficult to obtain. [Assumed similar ROW scenario as DeSoto.]
Ft. Myers	2	~ 100 miles to Miami Load Center. 95 miles of new 500 kV ROW acquisition, 2 autotransformers, 6- 500 kV line terminals. 8-230 kV terminals ROW near Ft Myers substation will be difficult to obtain.
Glades	4	~ 75 miles to Miami Load Center. 146 miles of new 500 kV of which approximately 60 miles of new ROW acquisition, 1 autotransformer, 6- 500 kV line terminals; rebuild 120 miles of 230 kV lines.
Glades A	4	~ 90 miles to Miami Load Center. 146 miles of new 500 kV of which approximately 60 miles of new ROW acquisition, 1 autotransformer, 6- 500 kV line terminals; rebuild 120 miles of 230 kV lines. [Assumed similar ROW scenario as Glades.]
Hardee	2	~ 135 miles to Miami Load Center. 165 miles of new 500 kV ROW acquisition, 2 autotransformers, 6- 500 kV line terminals.



Criterion P8 – Transmission Access		
Transmission access is evaluated in the preliminary screening in terms of distance to the load center in the greater Miami area, and amount of new right of way (ROW) that needs to be acquired. The highest ranked sites already own the ROW, and the lowest-ranked sites require significant ROW acquisition which will be difficult to obtain. In addition the plant switchyard is assumed the same for all sites.		
Site	Rating	Comments and Discussion
Hendry 1	4	~ 60 miles to Miami Load Center. 72 miles of new 500 kV of which approximately 40 miles of new ROW acquisition, 1 autotransformer, 6- 500 kV line terminals; rebuild 120 miles of 230 kV lines.
Hendry 2	4	~ 45 miles to Miami Load Center. 72 miles of new 500 kV of which approximately 40 miles of new ROW acquisition, 1 autotransformer, 6- 500 kV line terminals; rebuild 120 miles of 230 kV lines.
Hendry A	4	~ 80 miles to Miami Load Center. 72 miles of new 500 kV of which approximately 40 miles of new ROW acquisition, 1 autotransformer, 6- 500 kV line terminals; rebuild 120 miles of 230 kV lines. [Assumed similar ROW scenario as Hendry 1.]
Highlands	2	~ 125 miles to Miami Load Center. 165 miles of new 500 kV ROW acquisition, 2 autotransformers, 6- 500 kV line terminals.
Manatee	1	~ 165 miles to Miami Load Center. 250 miles of new 500 kV ROW acquisition, 2 autotransformers, 8- 500 kV line terminals. ROW will be difficult to obtain.
Martin	5	~ 65 miles to Miami Load Center. 35 miles of new 500 kV in existing ROW, 6- 500 kV line terminals.
Martin A	5	~ 65 miles to Miami Load Center. 35 miles of new 500 kV in existing ROW, 6- 500 kV line terminals. [Assumed similar ROW scenario as Martin.]
Okeechobee 1	4	~ 90 miles to Miami Load Center. 75 miles of new 500 kV of which approximately 20 miles of new ROW acquisition, 2 autotransformers, 8- 500 kV line terminals.
Okeechobee 2	4	~ 90 miles to Miami Load Center. 95 miles of new 500 kV of which approximately 40 miles of new ROW acquisition, 2 autotransformers, 8- 500 kV line terminals.

Criterion P8 – Transmission Access		
Transmission access is evaluated in the preliminary screening in terms of distance to the load center in the greater Miami area, and amount of new right of way (ROW) that needs to be acquired. The highest ranked sites already own the ROW, and the lowest-ranked sites require significant ROW acquisition which will be difficult to obtain. In addition the plant switchyard is assumed the same for all sites.		
Site	Rating	Comments and Discussion
Palm Beach A	4	~ 30 miles to Miami Load Center. 72 miles of new 500 kV of which approximately 40 miles of new ROW acquisition, 1 autotransformer, 6- 500 kV line terminals; rebuild 120 miles of 230 kV lines. [Assumed similar ROW scenario as Hendry 2.]
St. Lucie	1	~ 85 miles to Miami Load Center. 80 miles of new 500 kV ROW acquisition, 2 autotransformers, 8- 500 kV line terminals. ROW will be difficult to obtain.
Turkey Point	5	~ 50 miles to Miami Load Center. 64 miles of existing 500 kV, 1 autotransformer, 8-500 kV line terminals.
West County	2	~ 45 miles to Miami Load Center. 50 miles of new 500 kV ROW acquisition, 50 miles of new 230 kV will need to be rebuilt, 1 autotransformer, 6- 500 kV line terminals . ROW to the south will be difficult to obtain.
References: Google Earth, <a href="http://earth.google.com">http://earth.google.com</a> .		

Criterion P9 – Land Acquisition		
Site	Rating	Comments and Discussion <sup>1</sup>
Charlotte	3	FPL does not own – farmland/rural [\$45 M] [there is less farming here than in other counties (50% farming: cattle watermelons; fish)] [Note: assumed 1,000 acres at \$10,000 per acre and 2,000 acres at \$17,500 per acre]
Collier A	2	FPL does not own – farmland near development along Gulf Coast, but undeveloped to west and south. Assume mid level pricing (\$26,000 per acre or \$78 M).
DeSoto	5	FPL owns sufficient land
DeSoto A	3	Does not own – farmland (63.8% of county in farms in 2007, down from 95.2% in 2002) [\$52.5 M]. For comparison: U.S. Census of Agriculture: \$5,557 per acre in 2007; \$2,415 in 2002.
Ft. Myers <sup>2</sup>	3	FPL owns some land but would have to buy more land; \$35,000 per acre [near Ft. Myers] – [\$52.5 M]
Glades	3	Does not own – mostly farmland/agriculture [\$52.5 M] County is second largest sugarcane producer in the state
Glades A	3	Does not own – mostly farmland/agriculture [\$52.5 M] County is second largest sugarcane producer in the state (81.2% of county in farms in 2007; 82.5% in 2002) For comparison: U.S. Census of Agriculture: \$5,252 per acre in 2007; \$1,849 in 2002.
Hardee	3	Does not own – mostly farmland/agriculture [\$52.5 M]; County is leading citrus and cattle producer in state
Hendry 1	3	Does not own – mostly farmland/agriculture [\$52.5 M] County is largest producer of sugarcane in the state; crops; cattle and citrus around Lake Okeechobee
Hendry 2	3	Does not own – mostly farmland/agriculture [\$52.5 M] County is largest producer of sugarcane in the state; crops; cattle and citrus around Lake Okeechobee

<b>Criterion P9 – Land Acquisition</b>		
Site	Rating	Comments and Discussion <sup>1</sup>
Hendry A	3	Does not own – mostly farmland/agriculture [\$52.5 M] County is largest producer of sugarcane in the state; crops; cattle and citrus around Lake Okeechobee (63.1% of county in farms in 2007, down from 74.9% in 2002) For comparison: U.S. Census of Agriculture, \$3,396 per acre (2007); \$3,846 (2002).
Highlands	3	Does not own – mostly farmland/agriculture [\$52.5 M]; County is big in citrus/crop and livestock (milk and beef). Avon park area (near site) is one of heaviest citrus producing areas in state
Manatee	5	FPL owns sufficient land
Martin	5	FPL owns sufficient land
Martin A	2	Does not own – mostly farmland/agriculture around site although close to I-95 and Port St. Lucie/associated coastal population compared to other sites. Assume mid level pricing (between farmland and developed areas - \$26,000 per acre) [\$78.2 M]; note that Martin County had one of the higher prices per acre of farmland in 2007 according to U.S. Census of Agriculture (which would also support slightly higher costs); 37.2% of county in farms in 2007, down from 58% in 2002) [\$78 M]. For comparison: U.S. Census of Agriculture, \$6,064 (2007); \$2,604 (2002) per acre.
Okeechobee 1	3	Does not own – mostly farmland/agriculture [\$52.5 M] [County big in cattle, dairy, citrus]
Okeechobee 2	3	Does not own – mostly farmland/agriculture [\$52.5 M] [County big in cattle, dairy, citrus]

Criterion P9 – Land Acquisition		
Site	Rating	Comments and Discussion <sup>1</sup>
Palm Beach A	3	Does not own; mostly farmed right at site area but close to coastal population/development (18 miles to closest population in Coral Springs area); also surrounded on three sides (east, south, west) by extensive wetland areas/national wildlife refuge/wildlife management areas. These provide a natural barrier from nearby coastal population/development so land price at site assumed to be equivalent to farm prices (\$17,000 per acre; \$52.5 M). 41.6% of County in farmland in 2007; 42.4% in 2002.  For comparison: U.S. Census of Agriculture, \$4,114 per acre (2007); \$3,348 (2002). [one could argue site is in rural area because no development on 3 sides, but proximity to protected ecological lands could also help raise price - farmland price offers fair mid-level amount]
St. Lucie	5	FPL owns sufficient land
Turkey Point	5	FPL owns sufficient land
West County <sup>2</sup>	3	FPL owns but would have to buy more land; \$35,000 per acre [near West Palm Beach] - \$52.5 M
<p><sup>1</sup> For cost comparison purposes, land requirements were assumed to be 3,000 acres per site where FPL does not already own the land (e.g., greenfield sites), or owns insufficient acreage for development of two new nuclear units. The 3,000-acre area did not apply to existing nuclear power plant sites (St. Lucie and Turkey Point), which are known to have sufficient land based on detailed licensing and operational knowledge of these sites.</p> <p><sup>2</sup> Need to purchase 1,500 acres more at Ft. Myers and West County where FPL holdings are not sufficient for new nuclear plant.</p> <p>Note: Costs per acre are assumed to be \$10,000 in rural areas; \$17,500 for farmland; \$35,000 for sites near urban/developed areas. Two of the most recently added sites during the Augmentation Analysis were in farm areas but closer to population than other greenfield sites; a revised estimate of \$26,000 per acre was used for these sites (mid-way between farm and populated area pricing).</p> <p>References: FPL real estate; county profile data.</p> <p>U.S. Census of Agriculture (county land values): State and County Reports. All counties by state in table. Table 8: Farms, Land in Farms, Value of Land and Buildings, and Land Use (2002 and 2007), available at: <a href="http://www.agcensus.usda.gov/">http://www.agcensus.usda.gov/</a></p>		

## **Appendix D – Technical Bases for General Site Criterion Ratings**

General siting criteria used in the FPL nuclear power plant siting study were derived from those presented in Chapter 3.0 of the *Siting Guide: Site Selection and Evaluation Criteria for an Early Site Permit Application*, EPRI, Palo Alto, CA: 2002 (Siting Guide).

The following information is provided in this appendix for each criterion:

- Objective – what aspect of site suitability is being measured;
- Evaluation approach – technical basis/methodology used to develop site ratings from available data;
- Discussion – data and information available for the primary sites under consideration; and
- Results – ratings results and rationale.

The following primary sites were evaluated for the FPL Combined Operating License Application in Florida: DeSoto, Glades, Glades A, Hendry 1, Martin, Martin A, Okeechobee 1, Okeechobee 2, St. Lucie, and Turkey Point (Miami-Dade County).

Note that the sites were evaluated with respect to the following screening criteria (Appendix C): cooling water supply, flooding, population, hazardous land uses, ecology, wetlands, railroad access, transmission access, and land acquisition. For several of these criteria (e.g., transmission access), the screening criteria evaluations are used in the general site criteria evaluations reported in this appendix. For these criteria, a brief summary and the final ratings are presented in this appendix for completeness. For other screening criteria (e.g., flooding, population and ecology), additional data were evaluated or additional detail are provided in this appendix, as appropriate, to provide a more comprehensive analysis of the full suite of EPRI siting general site criteria and sub-criteria.

Technical bases for site ratings developed for each general site criterion are provided in the following sections. Criterion/section numbering is designed to reflect section numbers in Chapter 3 of the EPRI Siting Guide where the criteria is discussed, e.g., Criterion D.1.1.1 – Geology/ Seismology appears in Section 3.1.1.1 of the Siting Guide.

## **D.1 HEALTH AND SAFETY CRITERIA**

### **D.1.1 ACCIDENT CAUSE-RELATED**

#### **D.1.1.1 Geology/Seismology**

Objective – The objective of this criterion is to rank the suitability of the primary sites with respect to the geologic and seismic setting.

Evaluation approach – The geology/seismology criterion encompasses several sub-criteria, including vibratory ground motion, capable tectonic sources, surface faulting and deformation, geologic hazards, and soil stability. The primary sites were evaluated against each geologic/seismic sub-criterion (Sections D.1.1.1.1 through D.1.1.1.5). A numerical system of weights and ratings based upon suitability or avoidance measures specific to each sub-criterion, were used to compute an index number (i.e., rating times weight) for each sub-criterion. To enable the comparative evaluation of sites, the weights and rating schemes adopted herein are the same for all primary sites. The index numbers for each sub-criterion were then summed for each site to compute a site composite GEOL Index as presented in Section D.1.1.1.6 (Tables D.1.1-1 through D.1.1-10). The range of GEOL indexes was then used to develop an overall Geology/Seismology rating scale of 1 to 5 for the primary sites (Section D.1.1.1.6), based on the GEOL scale, with the most suitable sites receiving an overall rating of 5. Weights and the bases for deriving site ratings from the GEOL scale are discussed with respect to each sub-criterion in the sections below. NOTE: Within the GEOL index, an inverse rating basis is used for each sub-criterion, with lower numbers indicating most suitable and higher numbers the least suitable.

##### **D.1.1.1.1 Vibratory Ground Motion**

Objective – The purpose of this sub-criterion is to rate sites according to the expected magnitude of ground motion that can be expected.

Evaluation approach – As long as expected peak ground accelerations do not exceed that for the certified designs under consideration, there are no exclusionary or avoidance components to this sub-criterion. Peak Ground Acceleration (PGA) is a measure of the maximum force experienced by a small mass located at the surface of the ground during an earthquake and is an index of hazard for some structures. The units for PGA are in percent of gravity (%g); i.e. an acceleration of 0.30g is expressed as 30%g. PGA provided herein, as for other sites, is for a probability of exceedance (PE) of 2% in 50 years (once in 2,500 years). PGA data for the sites were obtained from the USGS National Seismic Hazards Mapping Project, 2002 (<http://earthquake.usgs.gov/research/hazmaps/design/>).

Discussion/Results – The PGA values for each of the primary site locations evaluated are shown in the table below.

**Probabilistic ground motion values in %g**

<b>Site</b>	<b>PGA (%g) with 2% PE in 50 years</b>
DeSoto	3.58
Glades	3.57
Glades A	3.54
Hendry 1	3.52
Martin	3.33
Martin A	3.15
Okeechobee 1	3.45
Okeechobee 2	3.55
St. Lucie	3.00
Turkey Point	2.11

The following table shows the assigned weight and rating scheme for vibratory ground motion.

<b>Weight</b>	<b>Range</b>	<b>Rating</b>	<b>GEOL Index Range (weight x rating)</b>
<b>5</b>	<b>PGA (%g)</b>		
	0 – 3	1	5 - 50
	3 – 6	2	
	6 – 9	3	
	9 – 12	4	
	12 – 15	5	
	15 – 18	6	
	18 – 21	7	
	21 – 24	8	
	24 – 27	9	
	27 – 30	10	

Based upon the information provided in Tables D.1.1-1 through D.1.1-10, each primary site received the following rating and resulting index number for vibratory ground motion.



Site	Rating	GEOL Index No.
DeSoto	2	10
Glades	2	10
Glades A	2	10
Hendry 1	2	10
Martin	2	10
Martin A	2	10
Okeechobee 1	2	10
Okeechobee 2	2	10
St. Lucie	1-2	5-10
Turkey Point	1	5

#### D.1.1.1.2 Capable Tectonic Structure or Source

**Objective** – The objective of this sub-criterion is to identify the existence of capable or potentially capable tectonic structures within 200 miles of each site. Primary sites that are farthest from capable or potentially capable tectonic structures are considered more suitable.

**Evaluation Approach** – No absolute exclusionary conditions have been identified. Capable tectonic structures are addressed as avoidance conditions. A database compiled by USGS (Quaternary Fault and Fold Database, <http://earthquake.usgs.gov/regional/qfaults/>) and Crone and Wheeler (2000) was utilized to identify capable and potentially capable tectonic sources within 200 miles of each of the primary sites. It was assumed that capable and potential capable tectonic sources, which are Quaternary features that may generate strong ground motion, fall into two categories as defined by Crone and Wheeler (2000, p5):

Class A features have good geologic evidence of tectonic origin and are potentially seismogenic; and

Class B features have geologic evidence that supports the existence of a seismogenic fault or suggests Quaternary deformation, but the currently available geologic evidence for Quaternary tectonic activity is less compelling than for a Class A feature.

**Discussion/Results** – There are no Class A or B features within 200 miles of the primary sites. The following table shows the assigned weight and the rating scheme for capable tectonic sources.

Weight	Range (miles)	Rating	GEOL Index Range (weight x rating)
Class A 2	None within 200 mile radius	0	0 – 10
	Between 100 and 200 miles	2	
	Between 50 and 100 miles	3	
	Between 25 and 50 miles	4	
	Within 25 miles	5	
Class B 1	None within 200 mile radius	0	0 – 5
	Between 100 and 200 miles	2	
	Between 50 and 100 miles	3	
	Between 25 and 50 miles	4	
	Within 25 miles	5	

Based on the information provided in Tables D.1.1-1 through D.1.1-10, each primary site receives the following ratings and computed index numbers.

Class A		
Site	Rating	GEOL Index No.
DeSoto	0	0
Glades	0	0
Glades A	0	0
Hendry 1	0	0
Martin	0	0
Martin A	0	0
Okeechobee 1	0	0
Okeechobee 2	0	0
St. Lucie	0	0
Turkey Point	0	0

<b>Class B</b>		
<b>Site</b>	<b>Rating</b>	<b>GEOL Index No.</b>
DeSoto	0	0
Glades	0	0
Glades A	0	0
Hendry 1	0	0
Martin	0	0
Martin A	0	0
Okeechobee 1	0	0
Okeechobee 2	0	0
St. Lucie	0	0
Turkey Point	0	0

Crone and Wheeler (2000) and the USGS Fault Database (2003) also identify Class C and D features. Class C features are defined by Crone and Wheeler (2000) as features where:

Geologic evidence is insufficient to demonstrate (1) the existence of a tectonic fault, or (2) Quaternary slip or deformation associated with the feature.

No Class C features are known to occur within 200 miles of any of the primary sites.

Class D features are defined by Crone and Wheeler (2000) as features where:

Geologic evidence demonstrates that the feature is not a tectonic fault or feature; this category includes features such as demonstrated joints or joint zones, landslides, erosional or fluvial scarps, or landforms resembling fault scarps, but of demonstrable non-tectonic origin.

One Class D feature is known to occur within 200 miles of all primary sites.

#### Class D Feature

The following Class D feature occurs within 200 miles of the primary sites, and is considered non-capable.

Grossman's Hammock Rock Reef. The Grossman's Hammock rock reef is located approximately 120 miles south of the DeSoto site; 98 miles south-southeast of the Glades site; 113 miles south-southeast of Glades A; 88 miles south-southeast of the Hendry 1 site; 110 miles south of the Martin site; 110 miles south of the Martin A site; 130 miles south of the Okeechobee 1 site; 120 miles south of the Okeechobee 2 site, 130 miles south of the St. Lucie site, and 25 miles west of the Turkey Point site. Following a tentative inference of Quaternary displacement at Grossman's Hammock, investigation

by drilling and ground penetrating radar showed no evidence of Quaternary faulting. (USGS Fault Database, 2003; Crone and Wheeler, 2000).

#### D.1.1.1.3 Surface Faulting and Deformation

Objective – The objective of this sub-criterion is to develop site ratings for site suitability relative to surface faulting and deformation in the site vicinity.

Evaluation approach – No absolute exclusionary criteria have been identified with regard to surface faulting and deformation. Suitability measures have been established based on the occurrence of surface faulting and tectonic and non-tectonic structures within a 25-mi and 5-mi radius of the primary sites, as follows (EPRI 2000, p.3-7):

##### Within 25 miles

- No such structures altogether (Most Suitable)
- Potential non-capable structures
- Potential capable structures (Least Suitable)

##### Within 5 miles

- No such structures altogether (Most Suitable)
- Potential non-capable structures
- Potential capable structures
- Fault exceeding 1,000 feet in length (Least Suitable)

The potential for surface faulting or deformation primarily concerns plant design; therefore, features identified within 5 miles of a primary site receive a higher weight. Following are the assigned weights and ratings for surface faulting and deformation.

Weight	Range	Rating	GEOL Index Range (weight x rating)
Between 5 and 25 miles – 1	No structures	0	0–5
	Potential non-capable structures	1	
	Potential capable structures	5	
Within 5 miles – 2	No structures	0	0–10
	Potential non-capable structures	2	
	Potential capable structures	3	
	Fault exceeding 1,000 feet in length	4	
	Capable fault exceeding 1,000 feet in length	5	

Discussion/Results – Over several decades, various faults have been proposed across Florida. Communications with the Florida Geologic Survey confirm that many of these have since been

discounted, and conclusive proof is lacking for others. The current Geologic Map of Florida does not show faulting, and various structural maps of the State show deep-seated basins, platforms, and other structures, but no faulting. Therefore, it is not apparent that significant faulting occurs within 25 miles of any of the primary sites. Based upon this information, the primary sites received the following ratings and computed index numbers for surface faulting and deformation.

**Within 25 miles**

Site	Rating	GEOL Index No.
DeSoto	0	0
Glades	0	0
Glades A	0	0
Hendry 1	0	0
Martin	0	0
Martin A	0	0
Okeechobee 1	0	0
Okeechobee 2	0	0
St. Lucie	0	0
Turkey Point	0	0

**Within 5 miles**

Site	Rating	GEOL Index No.
DeSoto	0	0
Glades	0	0
Glades A	0	0
Hendry 1	0	0
Martin	0	0
Martin A	0	0
Okeechobee 1	0	0
Okeechobee 2	0	0
St. Lucie	0	0
Turkey Point	0	0

#### D.1.1.1.4 Geologic Hazards

Objective – Based on EPRI guidance (2000, p. 3-7), sites having the following geologic and man-made conditions should be avoided:

- Areas of active (and dormant) volcanic activity,
- Subsidence areas caused by withdrawal of subsurface fluids such as oil or groundwater, including areas which may be affected by future withdrawals,
- Potential unstable slope areas, including areas demonstrating paleolandslide characteristics,
- Areas of potential collapse (e.g. karst areas, salt, or other soluble formations),
- Mined areas, such as near-surface coal mined-out areas, as well as areas where resources are present and may be exploited in the future, and
- Areas subject to seismic and other induced water waves and floods.

Evaluation approach – Sites farthest away from these features would be considered the most suitable sites; primary sites were rated in accordance with the presence of – and distance from – these features. Following are the assigned weight and rating used for the geologic hazards sub-criterion:

Weight	Range	Rating	GEOL Index Range (weight x rating)
1	Geologic hazard(s) present	0–1	0–1

Discussion/Results – The following geologic hazards apply to eight of the primary sites (DeSoto, Glades, Glades A, Hendry 1, Martin, Martin A, Okeechobee 1, and Okeechobee 2):

The Geologic Map of Florida, other maps, and site vicinity reports indicate that each site area is underlain by several tens of feet of sand and shelly material, which in turn overlies at least 350 feet of Hawthorn Group sediments (300 feet of Hawthorn Group sediments for the DeSoto site) consisting primarily of phosphatic sands and clays. Discontinuous lenses of limestone or dolostone may occur. Topographic maps of the general site vicinity exhibit some evidence of sinkhole formation.

The following geologic hazards apply to the two coastal primary sites (St. Lucie and Turkey Point):

The site is located adjacent to the Atlantic Ocean, and is subject to seismic and other induced water waves and floods. Design specifications for a new nuclear facility at this site must address the possibility of large water waves and floods.

Design specifications for a new nuclear facility must address the possibility of solutioning and sinkhole formation, and of large water waves and floods. The primary sites received the following ratings and computed index numbers for geologic hazards:

Site	Rating	GEOL Index No.
DeSoto	1	1
Glades	1	1
Glades A	1	1
Hendry 1	1	1
Martin	1	1
Martin A	1	1
Okeechobee 1	1	1
Okeechobee 2	1	1
St. Lucie	1	1
Turkey Point	1	1

#### D.1.1.1.5 Soil Stability

Objective – The objective of this sub-criterion is to evaluate the sites with respect to the difficulty of expected soil conditions.

Evaluation approach – No absolute exclusionary criteria have been identified with respect to soil stability. Soil stability is addressed as an avoidance criterion. Certain soil properties have unfavorable characteristics in association with vibratory ground motion. These soil properties include poor mineralogy, low density soil (lack of compaction), and high water content (or high water table). Sites with the highest values of PGA in combination with deleterious site soils would receive a relatively lower rating. Sites having rock foundations or more suitable soil conditions are considered to be better sites.

Following are the assigned weights and ratings for soil stability:

Weight	Range	Rating	GEOL Index Range (weight x rating)
2	Rock site	0	0 – 4
	Deep soil site, no known deleterious soil conditions	1	
	Deep soil site with potential stability issues, or insufficient information available to assign a rating of 1	2	

Discussion/Results – According to the Geologic Map of Florida, and other maps and reports, nine of the ten sites (DeSoto, Glades, Glades A, Hendry 1, Martin, Martin A, Okeechobee 1, Okeechobee 2, and St. Lucie) are underlain by hundreds of feet of predominately unconsolidated sediments (sands and clays) with some possible limestone or dolostone. Accordingly, each of these sites is a deep soil site. Deep soil sites will require specific site investigations to determine if deleterious soil conditions exist.

According to extensive investigations for nuclear and other facilities near the Turkey Point site, the site is underlain by a few feet of sandy material followed by approximately 70 feet of limestone. This limestone is reported to be competent and capable of supporting heavy loads. The limestone is underlain by many hundreds of feet of competent sand, clay, and rock. The Turkey Point site is assumed to be a rock site.

Based upon this information the primary sites receive the following rating and computed index number for soil stability:

Site	Rating	Index No.
DeSoto	1	2
Glades	1	2
Glades A	1	2
Hendry 1	1	2
Martin	1	2
Martin A	1	2
Okeechobee 1	1	2
Okeechobee 2	1	2
St. Lucie	1	2
Turkey Point	0	0

**D.1.1.1.6      Overall Rating for Geology/Seismology**

The range of GEOL index numbers, which extended from 5 to 85, was used to develop an overall rating for the Geology/Seismology criterion as follows:



<b>GEOL Index Range</b>	<b>Overall Rating</b>
5 – 21	5
22 – 37	4
38 – 53	3
54 – 69	2
70 – 85	1

The GEOL index numbers for each sub-criterion were summed, by site, resulting in a composite GEOL index for each site (Tables D.1.1.1 through D.1.1.10). Accordingly, the composite GEOL index was compared to the index ranges in the above table to determine the overall Geology/Seismology rating for each site. Based upon this methodology, the primary sites are rated as follows:

<b>Site</b>	<b>Composite GEOL Index Number</b>	<b>Overall Rating</b>
DeSoto	13	5
Glades	13	5
Glades A	13	5
Hendry 1	13	5
Martin	13	5
Martin A	13	5
Okeechobee 1	13	5
Okeechobee 2	13	5
St. Lucie	8-13	5
Turkey Point	6	5

**Table D.1.1-1 Ratings for DeSoto Site**

<b>Feature</b>	<b>Source</b>	<b>Weight</b>	<b>Rating</b>	<b>Index No.</b>
Vibratory Ground Motion	PGA 3.58 %g with 2% PE in 50 years (USGS National Seismic Hazards Mapping Project, 2002).	5	2	10
Capable Tectonic Source (Class A)	No Class A features occur within 200 miles of the DeSoto site (USGS Fault and Fold Database, 2003. Crone & Wheeler, 2000).	2	0	0
Capable Tectonic Source (Class B)	No Class B features occur within 200 miles of the DeSoto site (USGS Fault and Fold Database, 2003. Crone & Wheeler, 2000).	1	0	0
Surface Faulting & Deformation within 25 miles	No surface faulting or deformation is known to occur near the site.	1	0	0
Surface Faulting & Deformation within 5 miles	No surface faulting or deformation is known to occur at the site.	2	0	0
Geologic Hazards	The site is located in an area of potential solutioning and sinkhole formation.	1	1	1
Soil Stability	The DeSoto site is presumed to be a deep-soil site.	2	1	2
			<b>Composite GEOL Index</b>	<b>13</b>

**Table D.1.1-2 Ratings for Glades Site**

<b>Feature</b>	<b>Source</b>	<b>Weight</b>	<b>Rating</b>	<b>Index No.</b>
Vibratory Ground Motion	PGA 3.57 %g with 2% PE in 50 years (USGS National Seismic Hazards Mapping Project, 2002).	5	2	10
Capable Tectonic Source (Class A)	No Class A features occur within 200 miles of the Glades site (USGS Fault and Fold Database, 2003. Crone & Wheeler, 2000).	2	0	0
Capable Tectonic Source (Class B)	No Class B features occur within 200 miles of the Glades site (USGS Fault and Fold Database, 2003. Crone & Wheeler, 2000).	1	0	0
Surface Faulting & Deformation within 25 miles	No surface faulting or deformation is known to occur near the site.	1	0	0
Surface Faulting & Deformation within 5 miles	No surface faulting or deformation is known to occur near the site.	2	0	0
Geologic Hazards	The site is located in an area of potential solutioning and sinkhole formation.	1	1	1
Soil Stability	The Glades site is presumed to be a deep-soil site.	2	1	2
			<b>Composite GEOL Index</b>	<b>13</b>

**Table D.1.1-3 Ratings for Glades A Site**

<b>Feature</b>	<b>Source</b>	<b>Weight</b>	<b>Rating</b>	<b>Index No.</b>
Vibratory Ground Motion	PGA 3.54 %g with 2% PE in 50 years (USGS National Seismic Hazards Mapping Project, 2002).	5	2	10
Capable Tectonic Source (Class A)	No Class A features occur within 200 miles of the Glades A site (USGS Fault and Fold Database, 2003. Crone & Wheeler, 2000).	2	0	0
Capable Tectonic Source (Class B)	No Class B features occur within 200 miles of the Glades A site (USGS Fault and Fold Database, 2003. Crone & Wheeler, 2000).	1	0	0
Surface Faulting & Deformation within 25 miles	No surface faulting or deformation is known to occur near the site.	1	0	0
Surface Faulting & Deformation within 5 miles	No surface faulting or deformation is known to occur near the site.	2	0	0
Geologic Hazards	The site is located in an area of potential solutioning and sinkhole formation.	1	1	1
Soil Stability	The Glades A site is presumed to be a deep-soil site.	2	1	2
			<b>Composite GEOL Index</b>	<b>13</b>

**Table D.1.1-4 Ratings for Hendry 1 Site**

<b>Feature</b>	<b>Source</b>	<b>Weight</b>	<b>Rating</b>	<b>Index No.</b>
Vibratory Ground Motion	PGA 3.52 %g with 2% PE in 50 years (USGS National Seismic Hazards Mapping Project, 2002).	5	2	10
Capable Tectonic Source (Class A)	No Class A features occur within 200 miles of the Hendry 1 site (USGS Fault and Fold Database, 2003. Crone & Wheeler, 2000).	2	0	0
Capable Tectonic Source (Class B)	No Class B features occur within 200 miles of the Hendry 1 site (USGS Fault and Fold Database, 2003. Crone & Wheeler, 2000).	1	0	0
Surface Faulting & Deformation within 25 miles	No surface faulting or deformation is known to occur near the site.	1	0	0
Surface Faulting & Deformation within 5 miles	No surface faulting or deformation is known to occur at the site.	2	0	0
Geologic Hazards	The site is located in an area of potential solutioning and sinkhole formation.	1	1	1
Soil Stability	The Hendry 1 site is presumed to be a deep-soil site.	2	1	2
			<b>Composite GEOL Index</b>	<b>13</b>

**Table D.1.1-5 Ratings for Martin Site**

<b>Feature</b>	<b>Source</b>	<b>Weight</b>	<b>Rating</b>	<b>Index No.</b>
Vibratory Ground Motion	PGA 3.33 %g with 2% PE in 50 years (USGS National Seismic Hazards Mapping Project, 2002).	5	2	10
Capable Tectonic Source (Class A)	No Class A features occur within 200 miles of the Martin site (USGS Fault and Fold Database, 2003. Crone & Wheeler, 2000).	2	0	0
Capable Tectonic Source (Class B)	No Class B features occur within 200 miles of the Martin site (USGS Fault and Fold Database, 2003. Crone & Wheeler, 2000).	1	0	0
Surface Faulting & Deformation within 25 miles	No surface faulting or deformation is known to occur near the site.	1	0	0
Surface Faulting & Deformation within 5 miles	No surface faulting or deformation is known to occur at the site.	2	0	0
Geologic Hazards	The site is located in an area of potential solutioning and sinkhole formation.	1	1	1
Soil Stability	The Martin site is presumed to be a deep-soil site.	2	1	2
			<b>Composite GEOL Index</b>	<b>13</b>

**Table D.1.1-6 Ratings for Martin A Site**

<b>Feature</b>	<b>Source</b>	<b>Weight</b>	<b>Rating</b>	<b>Index No.</b>
Vibratory Ground Motion	PGA 3.15 %g with 2% PE in 50 years (USGS National Seismic Hazards Mapping Project, 2002).	5	2	10
Capable Tectonic Source (Class A)	No Class A features occur within 200 miles of the Martin A site (USGS Fault and Fold Database, 2003. Crone & Wheeler, 2000).	2	0	0
Capable Tectonic Source (Class B)	No Class B features occur within 200 miles of the Martin A site (USGS Fault and Fold Database, 2003. Crone & Wheeler, 2000).	1	0	0
Surface Faulting & Deformation within 25 miles	No surface faulting or deformation is known to occur near the site.	1	0	0
Surface Faulting & Deformation within 5 miles	No surface faulting or deformation is known to occur at the site.	2	0	0
Geologic Hazards	The site is located in an area of potential solutioning and sinkhole formation.	1	1	1
Soil Stability	The Martin A site is presumed to be a deep-soil site.	2	1	2
			<b>Composite GEOL Index</b>	<b>13</b>

**Table D.1.1-7 Ratings for Okeechobee 1 Site**

<b>Feature</b>	<b>Source</b>	<b>Weight</b>	<b>Rating</b>	<b>Index No.</b>
Vibratory Ground Motion	PGA 3.45 %g with 2% PE in 50 years (USGS National Seismic Hazards Mapping Project, 2002).	5	2	10
Capable Tectonic Source (Class A)	No Class A features occur within 200 miles of the Okeechobee 1 site (USGS Fault and Fold Database, 2003. Crone & Wheeler, 2000).	2	0	0
Capable Tectonic Source (Class B)	No Class B features occur within 200 miles of the Okeechobee 1 site (USGS Fault and Fold Database, 2003. Crone & Wheeler, 2000).	1	0	0
Surface Faulting & Deformation within 25 miles	No surface faulting or deformation is known to occur near the site.	1	0	0
Surface Faulting & Deformation within 5 miles	No surface faulting or deformation is known to occur at the site.	2	0	0
Geologic Hazards	The site is located in an area of potential solutioning and sinkhole formation.	1	1	1
Soil Stability	The Okeechobee 1 site is presumed to be a deep-soil site.	2	1	2
			<b>Composite GEOL Index</b>	<b>13</b>



**Table D.1.1-8 Ratings for Okeechobee 2 Site**

<b>Feature</b>	<b>Source</b>	<b>Weight</b>	<b>Rating</b>	<b>Index No.</b>
Vibratory Ground Motion	PGA 3.55 %g with 2% PE in 50 years (USGS National Seismic Hazards Mapping Project, 2002).	5	2	10
Capable Tectonic Source (Class A)	No Class A features occur within 200 miles of the Okeechobee 2 site (USGS Fault and Fold Database, 2003. Crone & Wheeler, 2000).	2	0	0
Capable Tectonic Source (Class B)	No Class B features occur within 200 miles of the Okeechobee 2 site (USGS Fault and Fold Database, 2003. Crone & Wheeler, 2000).	1	0	0
Surface Faulting & Deformation within 25 miles	No surface faulting or deformation is known to occur near the site.	1	0	0
Surface Faulting & Deformation within 5 miles	No surface faulting or deformation is known to occur at the site.	2	0	0
Geologic Hazards	The site is located in an area of potential solutioning and sinkhole formation.	1	1	1
Soil Stability	The Okeechobee 2 site is presumed to be a deep-soil site.	2	1	2
			<b>Composite GEOL Index</b>	<b>13</b>

**Table D.1.1-9 Ratings for St. Lucie Site**

<b>Feature</b>	<b>Source</b>	<b>Weight</b>	<b>Rating</b>	<b>Index No.</b>
Vibratory Ground Motion	PGA 3.00 %g with 2% PE in 50 years (USGS National Seismic Hazards Mapping Project, 2002).	5	1 - 2	5 - 10
Capable Tectonic Source (Class A)	No Class A features occur within 200 miles of the St. Lucie site (USGS Fault and Fold Database, 2003. Crone & Wheeler, 2000).	2	0	0
Capable Tectonic Source (Class B)	No Class B features occur within 200 miles of the St. Lucie site (USGS Fault and Fold Database, 2003. Crone & Wheeler, 2000).	1	0	0
Surface Faulting & Deformation within 25 miles	No surface faulting or deformation are known to occur near the site.	1	0	0
Surface Faulting & Deformation within 5 miles	No surface faulting or deformation are known to occur at the site.	2	0	0
Geologic Hazards	The site is located in an area susceptible to seismic and other induced water waves and floods.	1	1	1
Soil Stability	The St. Lucie site is presumed to be a deep-soil site.	2	1	2
			<b>Composite GEOL Index</b>	<b>8-13</b>

**Table D.1.1-10 Ratings for Turkey Point Site**

<b>Feature</b>	<b>Source</b>	<b>Weight</b>	<b>Rating</b>	<b>Index No.</b>
Vibratory Ground Motion	PGA 2.11 %g with 2% PE in 50 years (USGS National Seismic Hazards Mapping Project, 2002).	5	1	5
Capable Tectonic Source (Class A)	No Class A features occur within 200 miles of the Turkey Point site (USGS Fault and Fold Database, 2003. Crone & Wheeler, 2000).	2	0	0
Capable Tectonic Source (Class B)	No Class B features occur within 200 miles of the Turkey Point site (USGS Fault and Fold Database, 2003. Crone & Wheeler, 2000).	1	0	0
Surface Faulting & Deformation within 25 miles	No surface faulting or deformation are known to occur near the site.	1	0	0
Surface Faulting & Deformation within 5 miles	No surface faulting or deformation are known to occur at the site.	2	0	0
Geologic Hazards	The site is located in an area susceptible to seismic and other induced water waves and floods.	1	1	1
Soil Stability	The Turkey Point site is presumed to be a rock site.	2	0	0
			<b>Composite GEOL Index</b>	<b>6</b>

## References

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#### **D.1.1.2 Cooling System Requirements**

Objective – Cooling system requirements are important siting considerations for new power generating facilities. The objective of this criterion is to rate the primary sites with respect to specific cooling system requirements.

Evaluation approach – The principal requirements of interest are the quantity of cooling water available and the ambient air temperature (EPRI, 2001, Section 3.1.1.2.1). Exclusionary and avoidance conditions apply to the evaluation of primary sites with respect to these cooling system requirements.

Cooling System Type	Cooling System Requirement
Closed-cycle	Make-up flow rate: 25,000 to 40,000 gpm (55.7 to 89.1 cfs, 36.0 to 57.6 Mgal/day) per 1,000 MWe Assumes no more than 20% of surface water flow is available for new withdrawal

Ambient air temperature characteristics of a potential site affect the design of heat removal systems. The primary sites are all located within a region of similar ambient air characteristics; this aspect is evaluated in section D.1.1.2.2.

Discussion/Results – Site data and results are presented for each sub-criterion in Sections D.1.1.2.1 and D.1.1.2.2, below. Overall ratings for the Cooling System Requirements criterion are provided in Section D.1.1.2.3.

#### D.1.1.2.1 Cooling Water

The primary sites were evaluated with respect to the cooling water criterion during the initial screening phase (Criterion P1), and all were found to have an adequate flow or some potential to develop reservoir capacity to support the requirements of a closed-cycle cooling water system. The rating approach used in this evaluation, as well as the site data and screening results, were described previously in the screening criteria report (Criterion P1).

For the screening phase, the metrics of flow, flexibility, general risk and regulatory challenge were considered in developing the ratings. These metrics were combined to form the cooling water supply ratings reported in the screening criteria report and are incorporated into the evaluation of the general site criteria. Site attributes associated with pipeline routing or pumping are reflected in section D.4.1.2.

#### Screening Phase Ratings for Cooling Water Supply

Site	Rating
DeSoto	2
Glades	3
Glades A	3
Hendry 1	3
Martin	3
Martin A	3
Okeechobee 1	2
Okeechobee 2	3
St. Lucie	4
Turkey Point	4

For the evaluation of the general siting criteria, an additional aspect of developing a cooling water supply was evaluated to promote further differentiation of the primary sites. The additional aspect included the proximity of the site to sensitive areas from either an environmental or water-supply basis, providing additional insight into the potential to acquire the required cooling water supplies. Sensitive areas, for the purpose of evaluating this general siting criterion, consisted of water supplies in or near to 303(d), Water Conservation Areas or Outstanding Florida Waters designations (<http://www.fgdl.org/metadataexplorer/explorer.jsp>).

Sub-ratings for proximity to sensitive areas were assigned based on the following:

- 4 = No sensitive areas nearby (within 5 km);
- 3 = One designated area nearby; and
- 2 = More than one designated area nearby.

The sub-ratings were averaged to compile a composite rating for each site.

This evaluation was performed in the absence of agency contact using publicly available flow data. Flow in some of the source water systems is complex and requires further investigation. A permissibility assessment of the probability of obtaining water permits at the primary sites was beyond the reconnaissance-level evaluations required for site selection analysis; such analyses must be based on statutory and regulatory criteria requiring site-specific analysis of reasonable beneficial use, existing legal users, and public interest factors. Additional data, including regulatory agency consultation, is needed before approval of water use can be assured.

Site	Cooling Water Supply <sup>1</sup>	Sensitive Areas	Composite Rating
DeSoto	2	2	2
Glades	3	3	3
Glades A	3	4	3.5
Hendry 1	3	3	3
Martin	3	3	3
Martin A	3	4	3.5
Okeechobee 1	2	3	2.5
Okeechobee 2	3	3	3
St. Lucie	4	3	3.5
Turkey Point	4	3	3.5

<sup>1</sup> Cooling water supply rating carried forward from screening criteria evaluation.

#### D.1.1.2.2 Ambient Temperature Requirements

Temperature data were obtained from local weather stations as compiled by the Southeast Regional Climate Center – historical climate summaries – which is part of the National Oceanic and Atmospheric Administration’s National Climate Data Center (NOAA NCDC). Closest daily weather stations with a reasonable period of record (e.g., more than 20 years) were selected for each site. Data indicate that each site meets the ambient temperature exclusionary and avoidance

criteria addressed in EPRI 2001 (Section 3.1.1.2.2). Maximum and minimum annual temperature values, as well as the highest and lowest average monthly temperatures values, and the annual average monthly mean values, were compared between sites. Actual meteorological conditions at the primary sites, however, may vary from the data collected and evaluated for the closest reporting (representative) weather stations: Arcadia for DeSoto; Moore Haven for Glades; LaBelle for Glades A, Clewiston for Hendry 1, Canal Point USDA for Martin and Martin A; Okeechobee for Okeechobee 1 and Okeechobee 2; Fort Pierce for St. Lucie; and Miami for Turkey Point. The periods of record for all sites include a minimum of 30 years varying between 1931 and 2005.

Ambient Temperature (degrees F)	Highest temperature of record	Highest monthly average	Lowest temperature of record	Lowest monthly average	Annual Monthly Average Mean	Rating
<b>DeSoto</b>	104 (6/5/85) Arcadia	91.8 (July/ August)	18 (1/13/81)	49.2 (January)	72.5	<b>3</b>
<b>Glades</b>	103 (7/8/32) Moore Haven	91.2 (July)	23 (1/28/40)	51.8 (January)	73.2	<b>3</b>
<b>Glades A</b>	104 (5/29/73) La Belle	93 (July)	19 (1/20/97)	50 (January)	73.5	<b>3</b>
<b>Hendry 1</b>	101 (8/7/95) Clewiston	91.4 (July)	26 (1/12/82)	54.3 (January)	74	<b>3</b>
<b>Martin and Martin A</b>	100 (7/17/81) Canal Point USDA	91.2 (August)	25 (1/12/82)	52.7 (January)	73.3	<b>3</b>
<b>Okeechobee 1 and Okeechobee 2</b>	99 (8/7/72) Okeechobee	93 (August)	31 (12/28/72)	47.7 (Feb)	72.7	<b>3</b>
<b>St. Lucie</b>	101 (7/23/89) Ft. Pierce	90.1 (July)	10 (1/23/52)	53.1 (January)	73.3	<b>3</b>
<b>Turkey Point</b>	98 (5/25/05) Miami Beach	87.9 (August)	32 (12/24/89)	62.7 (January)	81.1	<b>3</b>

Source: [www.sercc.net/climateinfo/historical/historical.html](http://www.sercc.net/climateinfo/historical/historical.html) [for Florida]  
NOAA National Climatic Data Center, Ashville, NC: 2005 Local Climatological Data, Annual Summary with Comparative Data for the following Florida locations: Arcadia, Moore Haven, Clewiston, Canal Point/USDA, Okeechobee, Ft. Pierce, and Miami Beach.  
<http://hurricane.ncdc.noaa.gov/climatenormals/clim20/state-pdf/fl.pdf>.

Discussion/Results – The primary sites were compared to one another to assess their relative suitability with respect to selected temperature extremes and frequency values.

With the exception of extreme low temperature values, sites with the lowest dry bulb temperatures are considered to be the most suitable. Based on a comparison of highest and



lowest temperature (daily extremes), average high and low temperature records, annual average monthly mean temperatures, and consideration of general climate conditions at the sites, the variation in temperatures between sites was very small. This is not surprising given that they are located in the same geographic area of south Florida. The differences were small enough that identical ratings were assigned to each site. In addition, because the temperatures in Florida are, in general, higher than other parts of the country, and the maximum temperatures exceeded 100 in all cases except Okeechobee 1, Okeechobee 2, and Turkey Point (which were in the high 90s), a conservative rating of 3 was given to all sites.

#### D.1.1.2.3 Cooling System Requirements Rating

The composite ratings for the primary sites are based on the average of the ratings for the cooling water supply composite and ambient air temperature ratings.

Site	Cooling Water Supply	Ambient Temperature	Composite Rating
DeSoto	2	3	2.5
Glades	3	3	3.0
Glades A	3.5	3	3.25
Hendry 1	3	3	3.0
Martin	3	3	3.0
Martin A	3.5	3	3.25
Okeechobee 1	2.5	3	2.75
Okeechobee 2	3	3	3.0
St. Lucie	3.5	3	3.25
Turkey Point	3.5	3	3.25

#### References

U.S. Nuclear Regulatory Commission Office of Nuclear Reactor Regulation. NUREG-1038 Supplement No. 4.

USGS: The National Streamflow Information Program, Florida Active Streamgages, [http://water.usgs.gov/nsip/nsipmaps/fl\\_base.html](http://water.usgs.gov/nsip/nsipmaps/fl_base.html).

FDEP: The Watershed Management Basin Rotation Project, IMS Website, <http://wrmims2.dep.state.fl.us/basinmap/open.htm?BasinList=21&Submit1=Go%21>.

#### D.1.1.3 Flooding

Objective – The objective of this criterion is to evaluate the suitability of the primary sites with respect to potential flooding.



**Evaluation Approach** – Some potential sites are located within the 100-year floodplain and may not meet the exclusionary and avoidance criteria outlined in EPRI 2001 (Section 3.1.1.3). These criteria exclude potential sites within major wetlands and areas less than one foot above the maximum flood elevation. The relative suitability of the primary sites was evaluated with respect to flooding during the initial screening phase (Criterion P2), but was limited to a comparison of existing surface water elevations and anticipated (and approximate) plant elevations. A further comparison was conducted in this evaluation, between site grade elevation and the 100-year flood elevation for the major river or lake on which the plant is located. The 100-year flood elevations were based on Flood Insurance Rate Maps (FIRM) from FEMA for the respective counties in which the sites are located. Primary emphasis was on flood elevations for the main water bodies (rivers and reservoirs) and their major tributaries where flood elevations were identified. Finally, other potential flooding sources (e.g., upstream dam failure concerns) were also considered.

Because of the more accurate floodplain data and consideration of upstream dam failure concerns, the rating scale was modified from that used in the initial screening phase. The revised scale is as follows:

- 5 = Site is not located within 100-year floodplain, and no potential upstream flooding concerns exist (e.g., dam failure).
- 4 = Site is not located within 100-year floodplain, but potential upstream flooding concerns exist.
- 3 = Site is on border of 100-year floodplain.
- 2 = Site is located within 100-year floodplain, but no potential upstream flooding concerns exist.
- 1 = Site is located within 100-year floodplain, and potential upstream flooding concerns exist.

**Discussion/Results** – Additional pertinent flood-related information for the primary sites is shown in the following table, followed by the site ratings.

Site	Evaluation
DeSoto	<p>DeSoto elevation = 81 feet.</p> <p>Peace River current elevation (at Arcadia, FL) ~ 10 feet. River flood stage = 17 feet.</p> <p>Difference = 64 feet above flood stage.</p> <p>Site is located in Zone X (outside 500-year flood zone). Swamp areas exist in the vicinity of the proposed site; however ample areas exist for precise site location to avoid swamp areas and areas within the 100-year flood zone.</p> <p>Site is not located in 100-year flood zone.</p> <p>No dams or other flooding concerns are located on the Peace River within 40 miles upstream of the proposed site. The Sand Gully (west of the proposed site) has been known to flood up to 2 miles west of the proposed site.</p>

Site	Evaluation
Glades	<p>Glades elevation = 15 feet.</p> <p>Caloosahatchee Canal (Okeechobee Waterway) and Lake Hicpochee elevation = 11 feet.</p> <p>Difference = 4 feet.</p> <p>Site is in Zone A (located in 100-year flood zone).</p> <p>The proposed site is located ~ 5.0 miles southwest of Lake Okeechobee. Lake Okeechobee is reinforced from flooding by the Herbert Hoover Dike. The failure of this dike has been examined, and resulting flood predictions in the event of dike failure have been prepared. Two failure scenarios could potentially impact the proposed site.</p> <p>Scenario #1: If the lake level is at 26 feet and a break in Reach 2 occurs (southeast of Moore Haven, FL), flood waters could reach the proposed site in 5-18 days, and flood depths of 6 feet are predicted.</p> <p>Scenario #2: If the lake level is at 26 feet and a break in Reach 4 occurs (north of Moore Haven, FL), flood waters could reach the proposed site in 1-3 days, and flood depths of 6 feet are predicted.</p> <p>Additionally, the Moore Haven Lock and Spillway (dam) is located at the entry of the Caloosahatchee Canal into Lake Okeechobee. Should this structure fail, flooding at the proposed site is predicted to be observed within 24 hours and could reach depths of 2 feet.</p>
Glades A	<p>Glades 2 elevation = 59 feet.</p> <p>Site is located ~ 8.5 miles west of USGS gaging station 02256500 on Fisheating Creek near Palmdale, FL. Recent river level at gaging station = 29 ft.</p> <p>Difference = 30 feet above Fisheating Creek level.</p> <p>Site is located on border of Zone C and Zone A (border of 100-year flood zone). Plant area would include areas of Zone A (within 100-year flood zone).</p>
Hendry 1	<p>Hendry 1 elevation = 19 feet.</p> <p>Lake Okeechobee elevation = 14 feet.</p> <p>Difference = 5 feet.</p> <p>Site is located near swamp areas.</p> <p>Site is located in Zone A3 (located in 100-year flood zone).</p> <p>The proposed site is located ~ 10.9 miles south of Lake Okeechobee. Lake Okeechobee is reinforced from flooding by the Herbert Hoover Dike. The failure of this dike has been examined, and resulting flood predictions in the event of dike failure have been prepared. The proposed site is located south of the L-1 canal/levee, and this structure is predicted to protect the proposed site location in the event of a break in either Reach 2 (southeast of Moore Haven, FL) or Reach 4 (north of Moore Haven, FL) with a lake level of 26 feet. No other potential failures resulting in flooding are located in the proposed site area.</p>

Site	Evaluation
Martin	<p>Martin site elevation = 28 feet.  Lake Okeechobee elevation = 14 feet.  Difference = 14 feet.</p> <p>Site is not located in 100-year flood zone, but is located near swamp lands.</p> <p>Site is in Zone X (area of 500-year flood, area of 100-year flood with average depths of &lt; 1 foot or with drainage area &lt; 1 sq. mi., or area protected by levees from 100-year flood).</p> <p>Lake Okeechobee is located ~ 5.1 miles west of the proposed site. The proposed site is located east of the boundary limit of flooding from Lake Okeechobee caused by breaching of Herbert Hoover Dike (as shown on FIRM).</p> <p>No other potential failures resulting in flooding are located in the proposed site area.</p>
Martin A	<p>Martin A elevation = 27 feet.  Lake Okeechobee elevation = 14 feet.  Difference = 13 feet.</p> <p>Site is not located in 100-year flood zone.</p> <p>Site is in Zone X (area of 500-year flood, area of 100-year flood with average depths of &lt; 1 foot or with drainage area &lt; 1 sq. mi., or area protected by levees from 100-year flood).</p> <p>Lake Okeechobee is located ~ 14 miles west of the proposed site. The proposed site is located east of the boundary limit of flooding from Lake Okeechobee caused by breaching of Herbert Hoover Dike (as shown on FIRM).</p> <p>No other potential failures resulting in flooding are located in the proposed site area.</p>
Okeechobee 1	<p>Okeechobee 1 elevation = 59 feet.  Lake Okeechobee elevation = 14 feet.  Difference = 45 feet.</p> <p>Swamp areas exist in the vicinity of the proposed site, but specific location could be moved to avoid these areas.</p> <p>Site is located in Zone C.</p> <p>Site is not located in 100-year flood zone.</p> <p>No dams or other flooding concerns are located in the proposed site area.</p>

Site	Evaluation
Okeechobee 2	<p>Okeechobee 2 elevation = 28 feet.  Kissimmee River ~ 20 feet.  Difference = 8 feet.  Swamp areas exist in the vicinity of the proposed site.  Site is at border of Zone A and Zone D.  Site is at border of 100-year flood zone.  Lake Okeechobee is located ~ 7.6 miles southeast of the proposed site.  Lake Okeechobee is reinforced from flooding by the Herbert Hoover Dike. The failure of this dike has been examined, and resulting flood predictions in the event of dike failure have been prepared. The proposed site is located east of the Kissimmee River, and this feature is predicted to protect the proposed site location in the event of a break in either Reach 6 or Reach 8 (both on the northwest side of Lake Okeechobee) with a lake level of 26 feet.  A lock structure is located on the south side of Lake Kissimmee, ~ 41 miles north of the site. The Kissimmee River has been canalized between Lake Kissimmee and Lake Okeechobee for flood control purposes.</p>
St. Lucie	<p>St. Lucie elevation = 0-5 feet.  Atlantic Ocean elevation = 0 feet.  Difference = 0-5 feet.  Site is located in Zone AE with base flood elevations of 7-8 feet.  Site is located in 100-year flood zone.  With the exception of flooding caused by adverse climatic events, no other potential failures resulting in flooding are located in the proposed site area.</p>
Turkey Point	<p>Turkey Point elevation = 1-2 feet.  Site is located in Zone AE with base flood elevations of 12 feet.  Site is located in 100-year flood zone.  With the exception of flooding caused by adverse climatic events, no other potential failures resulting in flooding are located in the proposed site area.</p>

Site	Rating
DeSoto	5
Glades	1
Glades A	3
Hendry 1	2
Martin	3
Martin A	3
Okeechobee 1	5
Okeechobee 2	3

Site	Rating
St. Lucie	1
Turkey Point	1

## References

FEMA Digital Flood Insurance Rate Maps, <http://www.msc.fema.gov>.

Google Earth, <http://earth.google.com>.

Herbert Hoover Dike Major Rehabilitation Study.

NOAA Stream and Flood Data, <http://www.weather.gov/ahps/>.

Site Drainage and Interim Land Use Study, Brown & Root, Inc., March 1976.

USGS Topographic Maps (1:100,000 and 1:24,000 scale).

U.S. Flood Hazard Areas, <http://www.esri.com/hazards/makemap.html>.

### D.1.1.4 Nearby Hazardous Land Uses

#### D.1.1.4.1 Existing Facilities

#### D.1.1.4.2 Projected Facilities

**Objective** – The objective of this criterion is to include NRC guidance on considerations regarding the nature and proximity of man-related hazards (dams, airports, transportation routes, and military and chemical manufacturing and storage facilities).

**Evaluation approach** – For the purpose of this evaluation, it was assumed that all primary sites can be developed to meet the exclusionary criteria outlined in 10 CFR 100. The suitability of the primary sites was, therefore, evaluated based on the relative number and distance of the following off-site man-made hazards that could be identified on USGS topographic maps, supplemented by information found in existing environmental reports for each site. The evaluation was limited to only existing hazards within a 5- to 10-mile radius of each site, to the extent such information was available. This included primarily airports, pipelines, and rail. Note that information relating to projected man-made hazards was not readily available and could not be evaluated during this phase of the siting process.

The relative suitability of the primary sites with respect to nearby hazardous land uses was evaluated in the initial screening phase (Criterion P4), although the rating approach was revised slightly to better reflect a comparison of the primary sites (as compared to the 15 sites evaluated previously). The following revised scale was used:

5 = No major or minor hazardous land uses within 10 miles

4 = No major hazardous land uses within 10 miles, but minor hazardous land uses within 10 miles (single or multiple, e.g., landing strips or small airports)

- 3 = No major hazardous land use within 10 miles but minor hazardous land use within 5 miles (one rail and/or between 2 and 4 small airports/landing strips)
- 2 = Major hazardous land use within 10 miles or multiple minor hazardous land use within 5 miles (more than 4)
- 1 = Major hazardous land use within 5 miles

Discussion – To summarize from the screening evaluation, identified hazards at each of the sites are as follows:

*DeSoto*

Airports: No major airports; smaller airports at Arcadia (9.6 miles SW) and Sebring (24.8 miles NW); other small airport/landing strips at 2.5, 7.4, 8.2, 8.4, 12.7, 13.5, and 15.4 miles [closest general aviation airports include DeSoto County in Arcadia and Port Charlotte/Punta Gorda].  
Freight Rail: Rail: 7.1 miles to W [rail in county includes CSX and Seminole Gulf rail line].  
Other Potential Hazards: local deepwater ports – Manatee Port Authority – 49 miles.

*Glades*

Airports: Clewiston Municipal Airport is 12.4 miles SE of site; other smaller airports at 2 and 3 miles from site (landing strips) [county profile website mentions Airglades airport at unknown distance].  
Freight Rail: 3.1 miles to NE [South Central Florida Express]; 11 miles W.  
Other Potential Hazards: local deep water port – Port of Ft. Pierce – 64 miles.  
Also in Glades County: includes mining industry; Florida Rock, Witherspoon sand mine [location/distance to site is unknown].

*Glades A*

Airports: No major airports within 10 miles. Numerous small airports throughout the area, at 6.7, 8.0, 8.2, 8.5, 10.0 (LaBelle Municipal), 10.4, 11.2, 13.6, 14.2, 14.8, 15.7, and 16.5 miles from potential site.  
Rail: Potential site is located ~ 8.4 miles southwest of existing rail (near Palmdale, FL). This rail line is operated by South Central Florida Express and does not support passenger service. A rail line running south from Palmdale, FL to Sunniland, FL (~ 7.7 miles east of the potential site) formerly operated by Seaboard System RR has since been abandoned.

*Hendry 1*

Airports: general aviation: Clewiston Airport (7.3 miles); smaller airports at 4.5, 9.8, 10.5, 10.9, 16.6 miles [airport in LaBelle].  
Freight Rail: 8.7 miles to NE.  
Other Potential Hazards: closest deep water port – Ft. Pierce – 84 miles.

*Martin*

Airports: No major airports; Stuart Airport 25 miles to E; smaller airports at 2.5, 6.4, 6.8, and 11 miles away. General aviation – Witham Field.  
Freight Rail: 1.5 miles NE and 2.8 miles W.  
Other Potential Hazards: Existing power plant with natural gas pipeline service to site [3,700 MW – 2 steam units, 3 combined cycle units, 6,800 acre cooling pond]; 40 miles from Port of

Palm Beach; existing plant bounded on west by Florida East Coast Railway and adjacent SFWMD L-65 Canal, and on the south by the St. Lucie Canal (C-44 or Okeechobee Waterway) and northeast by SR 710 and the adjacent CSX Railroad [from 10 year plan].

#### *Martin A*

Airports: No major airports within 10 miles (West Palm at 31 miles). Smaller airports at 2.5 (Indiantown), 7.3, 10.5, 11.9, 14 (Stuart Airport/Whitham Field), 14.9 and 19 miles (Briant Air Strip). Majority of small airports are landing strips in farm fields (with no visible landing strip).  
Rail: 4.4 miles SW (operated by CSX Transportation).  
Existing power plant at Martin is 9.7 miles to west.  
Interstate 95: 6.3 miles

#### *Okeechobee 1*

Airports: Okeechobee County airport 9.6 miles SW; Sebring Airport over 25 miles NW; smaller airports located 3.5, 6.4, 6.6, 10, 12 and 13 miles away.  
Rail: 8.3 miles SW and 13.1 miles SE.  
No pipelines identified.

#### *Okeechobee 2*

Airports: Okeechobee County airport 7.3 miles E; smaller airports located 1.3, 4.3, 8.1 and 10 miles away [Palm beach International – closest with scheduled commercial airline service].  
Freight Rail: 2.2 miles NW.  
Military Installation: Avon Bombing Range – 27 miles to NW.  
Other Potential Hazards: Port of Ft. Pierce and Port of Palm Beach – 35 miles.

#### *St. Lucie*

Airports: Major airport 12.4 miles to NW (St. Lucie County International); smaller airport (Whitham field in Stuart) 10.4 miles to SW.  
Freight Rail: 2.1 miles W.  
Pipeline: None identified on topographic maps, but other reports show nearby line extending down Atlantic coast.  
Other Potential Hazards: Site located on navigable waterway; Port of Ft. Pierce is 1 mile away; and site would be adjacent to the existing St. Lucie nuclear power plant.

#### *Turkey Point*

Airports: Homestead general aviation airport and Kendall-Tamiami Executive Airport, both 14+ miles NW of site.  
Freight Rail: 10 miles W.  
Pipeline: No major pipeline routes identified on topographic maps, but natural gas pipeline service to site exists.  
Military Installation: Homestead Air Reserve Base – 5.2 miles NW of site (limited operations but still supports some flight operations). U.S. Naval Reservation with heliport and radio facility, located 7 miles SW.  
Other Potential Hazards: Site located on navigable waterway, and a barge canal has been constructed from the northeast that provides direct barge access to the proposed site. The Port of Miami is approximately 25 miles away. Existing power plants located at the site (2 nuclear

units, 2 conventional boiler fossil units, and a new combined cycle unit being constructed in 2006).

**Results** – Most sites had numerous smaller airports or landing strips and possibly a rail line within 5 or 10 miles and received ratings of 3 or 4 accordingly. Turkey Point received the lowest rating due to its close proximity to a U.S. Air Force Base (Reserve), as well as being on a navigable waterway. Its co-location with two other existing nuclear and multiple fossil (oil/gas) operating units also was considered.

Site	Rating
DeSoto	4
Glades	3
Glades A	4
Hendry 1	4
Martin	3
Martin A	3
Okeechobee 1	4
Okeechobee 2	3
St. Lucie	3
Turkey Point	2

## References

Google Earth, <http://earth.google.com>.

USGS Topographic Maps.

FPL 10 Year Plan.

County profile data.

### D.1.1.5 Extreme Weather Conditions

#### D.1.1.5.1 Winds

#### D.1.1.5.2 Precipitation

**Objective** – The objective of this criterion is to rate the suitability of the primary sites with respect to extreme weather conditions. Extreme weather conditions of interest are related to specific plant parameter envelope (PPE) criteria regarding tornado design, wind and precipitation (EPRI Siting Guide, Section 3.1.1.5).

**Evaluation approach** – During the review of available meteorological information on the sites, no information was found that indicated the primary sites could not meet the exclusionary and avoidance criteria specified for the PPE values. Extreme weather readily available for the



primary sites included fastest mile speed (available for selected cities – although not necessarily the most representative of site conditions); number of tornadoes and violent tornadoes per 10,000 square miles (state average); and maximum 24-hour precipitation values. The number of hurricanes making landfall in Florida was also considered. Available extreme weather data were obtained from government sources (National Climate Data Center and Southeast Regional Climate Center), including NCDC Climatic Wind Data for US [ncdc.noaa.gov/documentlibrary.pdf/wind1996.pdf].

Rating of the sites was performed based on a comparison of fastest mile (wind) speeds, maximum 24-hour precipitation and severe storm records, although greater emphasis was placed on the most distinguishing site feature – site location in relation to the coast – as an indicator of greater probability of hurricane threat – and the number of hurricanes to hit Florida (broken up into four geographic quadrants) as follows:

**Hurricane direct hits on the mainland U.S. coastline and for individual states 1851-2004 by Saffir/Simpson category.**

Area	Category Number					All (1-5)	Major (3-5)
	1	2	3	4	5		
<b>U.S. (Texas to Maine)</b>	109	72	71	18	3	273	92
<b>Florida</b>	43	32	27	6	2	110	35
(Northwest)*	27	16	12	0	0	55	12
(Northeast)*	13	8	1	0	0	22	1
(Southwest)*	16	8	7	4	1	36	12
(Southeast)*	13	13	11	3	1	41	15

- Assume Southeast area includes Glades, Hendry, Martin, Okeechobee, St. Lucie and Turkey Point, and DeSoto is in southwest Florida, with inland sites being preferred over coastal sites.
- Hurricane that may strike more than one region in Florida would be counted separately for each region (i.e., individual regional totals may exceed state totals)

Source: National Hurricane Center at <http://www.nhc.noaa.gov/paststate.shtml>

Site	Fastest Mile (1970-2001)	Tornado Frequency: Strong violent/ strong violent per 10,000 sq mi [state annual average, 1953- 2004]	Proximity to Coast/ Hurricane Threat	Hurricane direct hits on Florida region (1851-2004)	Maximum 24-hr precip. [in]
DeSoto	92 (Ft. Myers) Or 79 (Orlando for inland counties)	7/1.2	Inland	36 (12 major)	7.38 (Arcadia)
Glades	86 (W. Palm)	7/1.2	Inland	41 (15 major)	8.4 (Moore Haven)
Glades A	86 (W. Palm)	7/1.2	Inland	41 (15 major)	6.3 (La Belle)
Hendry 1	86 (W. Palm) 92 (Ft. Myers)	7/1.2	Inland	41 (15 major)	9.6 (Clewiston)
Martin and Martin A	86 ( W. Palm)	7/1.2	Inland	41 (15 major)	9.68 (USDA Canal)
Okeechobee 1 and Okeechobee 2	86 ( W. Palm)	7/1.2	Inland	41 (15 major)	8.08 (Okeechobee)
St. Lucie	86 (W. Palm)	7/1.2	Coast	41 (15 major)	10.00 (Ft. Pierce)
Turkey Point	86 ( Miami)	7/1.2	Coast	41 (15 major)	10.06 (Miami)

**Discussion/Results** – In general, the sites were fairly similar and were assigned equally conservative ratings of 3, with the exception of the two coastal sites: St. Lucie and Turkey Point. Given their proximity to the coast and higher potential for extreme storm events (precipitation, winds, and number of hurricanes), they were given slightly lower ratings of 2.

Site	Rating
DeSoto	3
Glades	3
Glades A	3
Hendry 1	3
Martin	3
Martin A	3
Okeechobee 1	3
Okeechobee 2	3
St. Lucie	2
Turkey Point	2

## **D.1.2      ACCIDENT EFFECTS-RELATED**

**Objective** – The overall objective of this criterion is to evaluate sites with respect to design-related accident evaluations and potential effects of accidents.

**Evaluation approach** – Site ratings for this criterion were developed as a composite of three sub-criteria that address site characteristics relevant to consideration of accidents: Population, Emergency Planning, and Atmospheric Dispersion.

**Discussion/Results** – A discussion of each sub-criterion appears in the following sections D.1.2.1, D.1.2.2, and D.1.2.3. A discussion of the roll-up of the sub-criterion ratings into an overall rating for the Accident Effects-Related criterion appears in Section D.1.2.4.

### **D.1.2.1      Population**

**Objective** – The objective of this sub-criterion is to evaluate the relative suitability of the primary sites with respect to the population density in the vicinity of the sites. For the purposes of this evaluation, it was assumed the existing licensed units at two of the primary sites (Turkey Point and St. Lucie) meet the population density conditions codified in 10 CFR 100.21. These conditions are:

- The sites have exclusion area authority,
- A low population zone exists beyond the exclusion area, and
- Sufficient distance exists to high-population centers.

**Evaluation approach** – As outlined in NRC Regulatory Guide 4.7 – General Site Suitability Criteria for Nuclear Power Stations, low-population areas are preferred and low-population zones should have densities less than 500 people per square mile (EPRI 2001) (equivalent to less than 25,000 persons within 4 miles).

All sites meet population density exclusion criteria since population density was a criterion in the regional screening process. Available census data regarding the nearest population centers (defined in Table 5-1 as the nearest “place” or “concentration of population” as defined by the U.S. Census Bureau) and area population densities were reviewed for the primary sites in the initial screening phase (Criterion P3), and confirmed that each met the exclusionary criteria. An additional component, proximity to densely populated areas, was considered at this phase which was based on distance to the nearest metropolitan statistical area (MSA), or more specifically as measured to the largest city(ies) found within the MSA. While not tied to a specific population density, the MSAs were assumed to have sufficiently high population levels that could exceed a population density of 500 psm. Online data were obtained from the U.S. Census Bureau.

**Discussion/Results** – The population data and distance to population centers that drive the ratings are presented for each site in the following table.

Nearest Population Center (2000 Population)	Population and Population Density (By County)	Notes
<b>DeSoto (DeSoto County)</b>		
Nearest population center: Arcadia, 8.5 miles County Seat: Arcadia Largest City: Arcadia	32,309 (2000); 35,406 (2005); 9.9% growth  Population Projections (County): 40,400 (2015) 48,500 (2030)  Pop. Density: 50.5 psm (2000)	Population Center within 10 miles: Arcadia (6,604) Population Centers within 20 miles: Zollo Springs (no data), Wauchula (4,368), Sebring (3,667)/Lake Placid (1,668)  Nearest MSA – Port Charlotte/Punta Gorda (30 miles) [Punta Gorda MSA is 141,627 persons, 2000] Port Charlotte (46,451) Tampa/Gulf Coast – 65 miles
<b>Glades (Glades County)</b>		
Nearest population center: Moore Haven, 2 miles County Seat: Moore Haven Largest City: Moore Haven	10,576 (2000); 11,252 (2005); 6.4% growth  Population Projections (County): 12,200 (2015) 13,700 (2030)  Pop. Density: 13.7 psm	Population Center within 10 miles: Moore Haven (1,635) Population Centers within 20 miles: Clewiston (6,460), Belle Glade (14,906), LaBelle (4,210)  Nearest MSA - Ft. Myers/Cape Coral (38 miles) [MSA is 440,888 persons, 2000]  Miami/East Coast – 95 miles
<b>Glades A (Glades County)</b>		
Nearest incorporated area: La Belle, 8.7 miles County Seat: Moore Haven Largest City: Moore Haven	10,576 (2000); 11,252 (2005); 6.4% growth  Population Projections (County): 12,200 (2015) 13,700 (2030)  Pop. Density: 13.7 psm  [Note: population was 10,950 (2009); 3.5% growth; updated population projections (based on lower growth rate) now: 11,599 for County for 2015 and 12,541 for 2030]	No population centers within 5 miles. Population Centers within 10 miles: La Belle (4,210), 8.7 miles Population centers within 20 miles: Alva (2,182) 15.8 miles Population centers within 30 miles: Moore Haven (1,635), 21.5 miles Buckingham (3,742), 22.7 miles Fort Myers (eastern fringe/Lehigh Acres, 33,430), 20 miles [Cape Coral – Fort Myers MSA is 440,888 persons, 2000] Cape Coral and Fort Myers 2006 population was 151,389 and 60,531, respectively. Closest densely populated areas: Cape Coral-Fort Myers, the concentration of which is 35-45 miles away Fort Myers - 25-30 miles

Nearest Population Center (2000 Population)	Population and Population Density (By County)	Notes
<b>Hendry 1 (Hendry County)</b>		
Nearest population center: Clewiston (7.3 miles) County Seat: LaBelle Largest Cities: La Belle, Clewiston	36,210 ( 2000); 39,561 (2005); 9.3% growth  Population Projections (County): 46,500 (2015) 56,000 (2030)  Pop. Density: 31.4 psm	Population Centers within 10 miles: Clewiston (6,460) Population Centers within 20 miles: Belle Glade (14,906)  Nearest MSA – Ft. Myers/Cape Coral (45 miles) and West Palm Beach (50 miles) [West Palm Beach-Boca Raton MSA is 1,131,184 persons, 2000]  Miami/East Coast – 103 miles Tampa/Gulf Coast – 106 miles
<b>Martin (Martin County)</b>		
Nearest population center: Indiantown (7 miles) County Seat: Stuart Largest Cities: Stuart, Sewalls Point, Jupiter Island	126,731 (2000); 139,728 (2005); 10.3% growth  Population Projections (County): 170,300 (2015); 205,100 (2030)  Pop. Density: 228.1 psm	Population Centers within 10 miles: Indiantown (5,588) Population Centers within 20 miles: Port St. Lucie (88,769), Okeechobee (5,376)  Nearest MSA – Ft. Pierce/Port St. Lucie (23 miles) and West Palm Beach (40 miles) [Ft. Pierce/St. Lucie MSA is 319,426 persons, 2000] Miami/East Coast – 96 miles
<b>Martin A (Martin County)</b>		
Nearest population center: Indiantown (4.7 miles) County Seat: Stuart Largest Cities: Stuart, Sewalls Point, Jupiter Island	126,731 (2000); 139,728 (2005); 10.3% growth  Population Projections (County): 170,300 (2015); 205,100 (2030)  Pop. Density: 228.1 psm  [Note: population was 139,794 (2009); 10.3% growth; updated population projections (based on lower growth rate) now: 150,055 for County for 2015 and 172,676 for 2030]	Cities within 5 miles: Indiantown (5,588), 4.7 miles Cities within 15 miles: Stuart (14,633), 13 miles Port Salerno (10,141), 13 miles Cities within 20 miles: Jupiter (48,847) [2006], 19 miles Port St. Lucie (143,860 - 2006; up from 88,769 in 2005 - 61.9% growth since 2000), 20 miles Palm Beach Gardens (48,914) (2006), 21 miles Cities within 30 miles: Ft. Pierce (39,365) (2006), 25 miles Wellington (54,993) (2006) 28 miles West Palm Beach (98,774) (2006)- around 30 miles Note: West Palm Beach-Boca Raton MSA is 1,131,184 persons; Port St. Lucie-Ft. Pierce

Nearest Population Center (2000 Population)	Population and Population Density (By County)	Notes
		MSA - 319,426 (2000)
<b>Okeechobee 1 (Okeechobee County)</b>		
Nearest population center: Cypress Quarters (8 miles) County Seat: Okeechobee Largest Cities: Okeechobee	35,910 (2000); 39,836 (2005); 10.9% growth  Population Projections (County): 41,200 (2015) 45,700 (2030)  Pop Density: 46.4 psm  [Note: population was 40,241 (2009); 12.1% growth; updated population projections (based on higher growth rate) now: 41,631 for County for 2015 and 46,931 for 2030]	Population centers within 10 miles: Cypress Quarters (1,150) – 8 miles to SW Okeechobee (5,376) – 9 miles to SW  Population Centers within 25 miles: Port St. Lucie (88,769) - 19 miles E (although western edge of development is at around 17 miles) Ft. Pierce (37,516) – 22 miles NE  [Port St. Lucie-Ft. Pierce MSA is 319,426 persons, 2000]
<b>Okeechobee 2 (Okeechobee County)</b>		
Nearest population center: Okeechobee (8 miles) County Seat: Okeechobee Largest Cities: Okeechobee	35,910 (2000); 39,836 (2005); 10.9% growth  Population Projections (County): 41,200 (2015) 45,700 (2030)  Pop Density: 46.4 psm	Population Center within 10 miles Okeechobee (5,376) Population Centers within 20 miles: Lake Placid ( 1,668)  Nearest MSA – Ft. Pierce/Port St. Lucie (35 miles) [Port St. Lucie-Ft. Pierce MSA is 319,426 persons, 2000]  Miami/East Coast – 111 miles Orlando – 93 miles
<b>St. Lucie (St. Lucie County)</b>		
Nearest population center: Port St. Lucie (4.5 miles) County Seat: Ft. Pierce-Port St. Lucie Largest Cities: Port St. Lucie, Ft. Pierce, St. Lucie Village	192,695 (2000); 241,305 (2005); 25.2% growth  Population Projections (County): 320,500 (2015); 419,200 (2030)  Pop. Density: 336.3 psm	Population Center within 5 miles Port St. Lucie (88,769) Population Centers within 10 miles Stuart (14,633), Ft. Pierce (37,516)  Nearest MSA – Ft. Pierce/Port St. Lucie (within 5 miles) [Port St. Lucie-Ft. Pierce MSA is 319,426 persons, 2000]  Miami/East Coast – 115 miles to Fort Lauderdale/Miami MSA Orlando – 100 miles

Nearest Population Center (2000 Population)	Population and Population Density (By County)	Notes
<b>Turkey Point (Miami-Dade County)</b>		
Nearest population center: Leisure City (7.2 miles) County Seat: Miami Largest Cities: Miami, Hialeah, Miami Beach	2,253,362 (2000); 2,376,914 (2005); 5.4% growth  Population Projections (County): 2,771,500 (2015); 3,196,800 (2030)  Pop. Density 1,157.9 psm)	Population Centers within 10 miles Homestead (31,909), Florida City (7,843) Key Largo (11,806) Population Centers within 20 miles Miami  Nearest MSA – Miami (within 20 miles) Miami, FL PMSA (2,253,362)

Based on the above information, the following site ratings were assigned. In the case of proximity to nearest population center, sites within 5 miles of the nearest population center were given a rating of 1, within 10 miles were given a rating of 2, within 15 miles were given a rating of 3, and within 20 miles were given a rating of 4. Specific rationale for the densely populated area sub-rating is as follows: DeSoto, Glades, Hendry 1, and Okeechobee 2 each received the highest rating of 4 given their greater distances (30-40 miles) from the closest MSA compared to the other sites. While Hendry 1 was slightly over 40 miles from the nearest MSA (Fort Myers), it still received a conservative rating of 4 given the large population found in the Fort Myers-Cape Coral MSA (over 400,000 persons in 2000). In addition, the Hendry 1 site is within 40-50 miles of heavily populated areas on both coasts (Fort Myers on Gulf and West Palm Beach on the Atlantic). Glades A, Martin/Martin A and Okeechobee 1 received a slightly lower rating of 3 given their closer proximity to the Ft. Pierce-Port St. Lucie MSA (Martin/Martin A and Okeechobee 1) compared to Okeechobee 2 (35 miles from Ft. Pierce); and proximity to Ft. Myers MSA (Glades A). St. Lucie and Turkey Point received the lowest ratings of 2 and 1 respectively. While St. Lucie is actually closer to an MSA (5 miles from Port St. Lucie) than Turkey Point (10 miles between Turkey Point and south Miami area), the Miami MSA (over 2 million) is considered significantly larger than the population of Port St. Lucie (and Fort Pierce MSA), to support the lowest rating of 1 for Turkey Point.

Site	County Population	Distance to Population Center	Proximity to Densely Populated Area	Composite Rating
DeSoto	5	2	4	4
Glades	5	1	4	3
Glades A	5	2	3	3
Hendry 1	5	2	4	4
Martin	4	2	3	3
Martin A	4	1	3	3
Okeechobee 1	5	2	3	3

Site	County Population	Distance to Population Center	Proximity to Densely Populated Area	Composite Rating
Okeechobee 2	5	2	4	4
St. Lucie	3	1	2	2
Turkey Point	1	2	1	1

## References

US Census Bureau, 2000 population data; available at:  
<http://quickfacts.census.gov/qfd/states/12000.html>.

[http://edr.state.fl.us/Content/population-demographics/data/Pop\\_0401\\_c.pdf](http://edr.state.fl.us/Content/population-demographics/data/Pop_0401_c.pdf).

Florida Atlas and Gazetteer 2003; detailed topographic maps.

### D.1.2.2 Emergency Planning

**Objective** – The objective of this criterion is to evaluate the relative suitability of the primary sites with respect to emergency planning characteristics of the general area around each site.

**Evaluation approach** – No exclusionary or avoidance criteria apply to this issue. In particular, this evaluation relied on information pertaining to general population in surrounding area, road conditions near site, access to major traffic networks, terrain features, and climatic conditions. Sites with the least constrained evacuation planning issues (low population, good access from site to major traffic networks, and no terrain or climate limitations) were considered the most suitable and were assigned a score of 5. Ratings are based on review of county websites (transportation information), USGS topographic maps, and best professional judgment. Ratings relate to extent of development in the general area, the number of roads providing egress from the site area, and proximity to major U.S. highway systems.

**Discussion/Results** – A summary of information for each site is shown in the table below. In general, the sites with lower populations were found in the more rural areas with less developed traffic networks, so the two factors generally offset each other. In general, given Florida's flat topography, no limiting terrain features were identified. Limiting climate conditions identified for the coastal sites included the potential for hurricanes.

Site	Evaluation
DeSoto	Proposed site is located ~ 2.5 miles east of U.S. Highway 17 and ~ 7.3 miles north of State Highway 70. Brownville, FL is located ~ 3.2 miles southwest of the proposed site, and Arcadia, FL is located ~ 8.6 miles southwest of the proposed site. Area evacuation is possible in all directions. Florida is prone to impact by hurricanes, and site evacuations coinciding with such climatic conditions would be hampered.



Site	Evaluation
Glades	Proposed site is located ~ 1.0 miles south of U.S. Highway 27 and State Highway 78. Moore Haven, FL is located ~ 4.8 miles east of the proposed site, and Clewiston, FL is located ~ 15.2 miles southeast of the proposed site. Area evacuation is possible in all directions, but immediate area evacuation is limited to the south due to minimal crossings of the Caloosahatchee Canal. Florida is prone to impact by hurricanes, and site evacuations coinciding with such climatic conditions would be hampered.
Glades A	Proposed site is located ~ 8.5 miles west of U.S. Highway 27 (near Palmdale, FL) and ~ 5.3 miles northwest of State Highway 29. Area evacuation is possible in all directions but could be limited to the south due to minimal crossings of the Caloosahatchee Canal. Florida is prone to impact by hurricanes, and site evacuations coinciding with such climatic conditions would be hampered.
Hendry 1	Proposed site is located ~ 5.4 miles east of State Highway 833 and ~ 6.4 miles south of U.S. Highway 27. Clewiston, FL is located ~ 9.2 miles northeast of the proposed site. Area evacuation is possible in all directions, although northerly evacuation routes go around Lake Okeechobee and southerly evacuation routes go through swampy areas. Florida is prone to impact by hurricanes, and site evacuations coinciding with such climatic conditions would be hampered.
Martin	Proposed site is located ~ 1.1 miles southwest of State Highway 710 and ~ 5.6 miles east of U.S. Highway 98/441. Indiantown, FL is located ~ 6.3 miles southeast of the proposed site, and Port St. Lucie, FL is located ~ 20.4 miles northeast of the proposed site. Area evacuation is possible in three directions, being limited to the west by Lake Okeechobee. Florida is prone to impact by hurricanes, and site evacuations coinciding with such climatic conditions would be hampered.
Martin A	Proposed site is located ~ 4.2 miles northeast of State Highway 710 and ~ 6.5 miles southwest of I-95. Indiantown, FL is located ~ 5.1 miles southwest of the proposed site. Area evacuation is possible in all directions but could be limited to the south due to minimal crossings of the St. Lucie Canal. Florida is prone to impact by hurricanes, and site evacuations coinciding with such climatic conditions would be hampered.
Okeechobee 1	Proposed site is located ~ 5.7 miles east of U.S. Highway 441 and ~ 3.9 miles northwest of State Highway 70. Okeechobee, FL is located ~ 9.0 miles southwest of the proposed site. Area evacuation is possible in all directions, although southerly evacuation routes go around Lake Okeechobee. Florida is prone to impact by hurricanes, and site evacuations coinciding with such climatic conditions would be hampered.
Okeechobee 2	Proposed site is located ~ 0.4 miles north of State Highway 70 and ~ 4.3 miles southwest of U.S. Highway 98. Okeechobee, FL is located ~ 6.8 miles east of the proposed site. Area evacuation is possible in all directions, although southerly evacuation routes go around Lake Okeechobee. Florida is prone to impact by hurricanes, and site evacuations coinciding with such climatic conditions would be hampered.

Site	Evaluation
St. Lucie	<p>Proposed site is located on Hutchinson Island adjacent to Highway A1A and ~ 9.8 miles from access to U.S. Highway 1. Port St. Lucie, FL is located ~ 7.2 miles southwest of the proposed site, and Fort Pierce, FL is located ~ 8.7 miles northwest of the proposed site. Area evacuation is possible in two directions, being limited to the east by the Atlantic Ocean and to the west by the Intercoastal Waterway. Florida is prone to impact by hurricanes, and site evacuations coinciding with such climatic conditions would be hampered and more prevalent at the proposed site due to its coastal location.</p> <p>The site is adjacent to the existing St. Lucie nuclear power plant and brings the advantage of already having an Emergency Plan that could easily be adapted to include the new site. However, both sites would require evacuation under emergency conditions.</p>
Turkey Point	<p>Proposed site is located ~ 9.1 miles east of U.S. Highway 1 and the Florida Turnpike. Homestead, FL is located ~ 9.8 miles west of the proposed site. Area evacuation is possible in three directions, being limited to the east by the Atlantic Ocean/Biscayne Bay. Westerly evacuation routes are available, but are limited by the Everglades. Florida is prone to impact by hurricanes, and site evacuations coinciding with such climatic conditions would be hampered and more prevalent at the proposed site due to its coastal location.</p> <p>The site is adjacent to the existing Turkey Point nuclear power plant and brings the advantage of already having an Emergency Plan that could easily be adapted to include the new site. However, both sites would require evacuation under emergency conditions.</p>

Based on the above information, the following site ratings were assigned.

Site	Rating
DeSoto	5
Glades	4
Glades A	4
Hendry 1	5
Martin	3
Martin A	4
Okeechobee 1	5
Okeechobee 2	5
St. Lucie	3
Turkey Point	4

## References

Rand McNally Road Atlas.

USGS Topographic Maps.

### D.1.2.3 Atmospheric Dispersion

**Objective** – The objective of this criterion is to evaluate the suitability of the primary sites with respect to short-term atmospheric dispersion characteristics, as a measure of the relative level of concentrations that could occur during accident conditions at the sites.

**Evaluation Approach** – The efficiency of atmospheric diffusion is primarily dependent on wind speed, wind direction, and the change in air temperature with height which affects atmospheric stability. These factors are used to calculate an atmospheric dispersion function referred to X/Q.

**Discussion/Results** – The best way to calculate atmospheric dispersion (X/Q) is using on-site meteorological data; however, no such data were readily available for all primary sites. Sites near the coast would generally experience windier conditions, and were given a rating of 5. Inland locations would generally experience less wind, and were given a rating of 4. Should atmospheric dispersion become a sensitive criterion for site selection, site-specific meteorological data should be obtained to calculate an atmospheric dispersion function (X/Q) for more accurate site comparison.

Site	Evaluation
DeSoto	Site is located ~ 50 miles inland from the Gulf of Mexico.
Glades	Site is located ~ 70 miles inland from the Gulf of Mexico. Site is located ~ 70 miles inland from the Atlantic Ocean.
Glades A	Site is located ~ 55 miles inland from the Gulf of Mexico. Site is located ~ 85 miles inland from the Atlantic Ocean.
Hendry 1	Site is located ~ 65 miles inland from the Atlantic Ocean. Site is located ~ 75 miles inland from the Gulf of Mexico.
Martin	Site is located ~ 25 miles inland from the Atlantic Ocean. During the daytime with strong solar heating, the atmosphere is unstable and disperses pollutants quickly for short periods of time. The majority condition is neutral and disperses pollutants at moderate rates. During nighttime, the atmosphere becomes stable and minimally disperses pollutants.
Martin A	Site is ~ 20 miles inland from the Atlantic Ocean. During the daytime with strong solar heating, the atmosphere is unstable and disperses pollutants quickly for short periods of time. The majority condition is neutral and disperses pollutants at moderate rates. During nighttime, the atmosphere becomes stable and minimally disperses pollutants.
Okeechobee 1	Site is located ~ 30 miles inland from the Atlantic Ocean.
Okeechobee 2	Site is located ~ 45 miles inland from the Atlantic Ocean.
St. Lucie	Site is located in the Atlantic Ocean coastal region.

Site	Evaluation
Turkey Point	Site is located in the Atlantic Ocean coastal region.

Site	Rating
DeSoto	4
Glades	4
Glades A	4
Hendry 1	4
Martin	4
Martin A	4
Okeechobee 1	4
Okeechobee 2	4
St. Lucie	5
Turkey Point	5

## References

Site Certification Application, Martin Expansion Project. January 2002.

USGS Topographic Maps (1:100,000 and 1:24,000 scale).

### D.1.2.4 Accident-Effect Related Overall Rating

Overall ratings for this criterion (Accident Effects-Related) are a composite of the sub-criterion ratings (D.1.2.1, D.1.2.2, and D.1.2.3). The ratings for each sub-criterion, along with the overall rating for this criterion, are provided in the following table.

Site	Population	Emergency Planning	Atmospheric Dispersion	Overall Rating
DeSoto	4	5	4	4
Glades	3	4	4	4
Glades A	3	4	4	4
Hendry 1	4	5	4	4
Martin	3	3	4	3
Martin A	3	4	4	4
Okeechobee 1	3	5	4	4
Okeechobee 2	4	5	4	4
St. Lucie	2	3	5	3
Turkey Point	1	4	5	3

### D.1.3 OPERATIONAL EFFECTS-RELATED

#### **D.1.3.1 Surface Water – Radionuclide Pathway**

##### D.1.3.1.1 Dilution Capacity

##### D.1.3.1.2 Baseline Loadings

##### D.1.3.1.3 Proximity to Consumptive Users

**Objective** – The purpose of this criterion is to evaluate primary sites with respect to potential liquid pathway dose consequences. (No site exclusionary or avoidance criteria apply to this issue.) Besides potential source terms, dilution in the receiving surface water body is of primary importance. In order to evaluate the most environmentally impacting scenario, disposal of cooling tower blowdown to surface waters has been assumed at all sites. Three factors considered in evaluating the potential dilution for a receiving water body are dilution capacity, baseline loadings, and proximity to consumptive users.

**Evaluation Approach** – Site ratings for this criterion are developed as a composite of three sub-criteria that address site characteristics relevant to consideration of operation: Dilution Capacity, Baseline Loadings, and Proximity to Consumptive Users.

- **Dilution Capacity** – The purpose of this sub-criterion is to rate sites based on the overall capacity of the receiving water body to dilute effluents from a nuclear power plant. Information on the radioactive source term dilution at a new power plant will be site specific. For siting consideration where such information is not available, however, surrogate parameters, representing the dilution capacity of a stream, can be used. The greater the dilution capacity of the receiving water body, the shorter will be the mixing length downstream defined as the zone within which complete mixing of a discharge contaminant occurs. Sites with higher dilution capacity are rated higher.
- **Baseline Loadings** – The capacity of a stream to impact health and safety of downstream consumers is related to the existing, or baseline loadings of, radionuclides that are present in the system or can be anticipated in the future. The purpose of this sub-criterion is to characterize sites in accordance with existing levels of radioactive contamination in the receiving water body. Sites are given a rating of 5 for no baseline loadings; proportionally lower ratings are assigned as higher existing levels of radionuclide contamination are identified.
- **Proximity to Consumptive Users** – The purpose of this sub-criterion is to rate sites in accordance with the proximity of plant effluent release point to the location(s) of public water supply withdrawal(s). More proximal withdrawals present higher potential for dose impacts from the surface water ingestion pathway and can require additional design and licensing efforts. Downstream locations of public water supply withdrawals and recreational contact were identified for each site. Sites with greater pathway lengths to users were more suitable and were assigned a score of 5.

**Discussion/Results** – An evaluation of each site and a summary of the sub-criterion and overall ratings for the surface water-radionuclide pathway criterion are presented in the following tables.

Site	Evaluation
DeSoto	<p><b>Dilution Capacity:</b> The Peace River is the nearest receiving body of water from the site (~ 4 miles west of the proposed site). The Peace River annual mean flow near the site is 652 cfs. Under these conditions, the receiving body of water is likely capable of diluting potential liquid pathway dose.</p> <p><b>Baseline Loading:</b> No sources of existing radionuclide loadings were identified for the site.</p> <p><b>Proximity to Consumptive Users:</b> The majority of DeSoto County, including Arcadia, FL, relies on groundwater as the primary source of public water use. The Peace River is not widely used for consumptive uses.</p>
Glades	<p><b>Dilution Capacity:</b> Lake Okeechobee is a receiving body of water near the site (~ 5 miles east of the proposed site). The receiving body of water is likely capable of diluting effluents from a nuclear power plant. The C-43 canal (Okeechobee Waterway / Caloosahatchee Canal) is another potential receiving body of water from the site. The annual mean flow of the C-43 canal near the site is 592 cfs. The C-43 canal flows west to the Gulf of Mexico (~ 60 miles).</p> <p><b>Baseline Loading:</b> No sources of baseline radionuclide loadings were identified for the site.</p> <p><b>Proximity to Consumptive Users:</b> Lake Okeechobee is classified as a drinking water source. Moore Haven, FL is located ~ 5 miles east of the proposed site.</p>
Glades A	<p><b>Dilution Capacity:</b> The C-43 canal (Okeechobee Waterway / Caloosahatchee Canal) is a potential receiving body of water from the site (~9 miles south of the site). The annual mean flow of the C-43 canal near the site is 592 cfs. The C-43 canal flows west to the Gulf of Mexico (~ 60 miles). The receiving body of water is likely capable of diluting effluents from a nuclear power plant.</p> <p><b>Baseline Loading:</b> No sources of baseline radionuclide loadings were identified for the site.</p> <p><b>Proximity to Consumptive Users:</b> The C-43 canal is not widely used for consumptive uses.</p>
Hendry 1	<p><b>Dilution Capacity:</b> Lake Okeechobee is the nearest receiving body of water from the site (~ 11 miles north of the proposed site). The receiving body of water is likely capable of diluting effluents from a nuclear power plant.</p> <p><b>Baseline Loading:</b> No sources of baseline radionuclide loadings were identified for the site.</p> <p><b>Proximity to Consumptive Users:</b> Lake Okeechobee is classified as a drinking water source. Clewiston, FL is located ~ 9 miles northeast of the proposed site.</p>
Martin	<p><b>Dilution Capacity:</b> Lake Okeechobee is a receiving body of water near the site (~ 5 miles west of the proposed site). The receiving body of water is likely capable of diluting effluents from a nuclear power plant. The C-44 canal (Okeechobee Waterway / St. Lucie Canal) is another potential receiving body of water from the site. The annual mean flow of the C-44 canal near the site is 842 cfs. The C-44 canal flows east to the Atlantic Ocean (~ 25 miles).</p> <p><b>Baseline Loading:</b> No sources of baseline radionuclide loadings were identified for the site.</p> <p><b>Proximity to Consumptive Users:</b> The Okeechobee Utility Authority is permitted to withdraw water from the northern bank of Lake Okeechobee for a public potable water source. This plant is located ~ 18 miles northwest of the site.</p>

Site	Evaluation
Martin A	<p>Dilution Capacity: The C-44 canal (Okeechobee Waterway / St. Lucie Canal) is a potential receiving body of water from the site (~1 mile south of the site). The annual mean flow of the C-44 canal near the site is 842 cfs. The C-44 canal flows east to the Atlantic Ocean (~ 25 miles). The receiving body of water is likely capable of diluting effluents from a nuclear power plant.</p> <p>Baseline Loading: No sources of baseline radionuclide loadings were identified for the site.</p> <p>Proximity to Consumptive Users: The C-44 canal is not widely used for consumptive uses.</p>
Okeechobee 1	<p>Dilution Capacity: Lake Okeechobee is the nearest receiving body of water from the site (~ 10 miles south of the proposed site). The receiving body of water is likely capable of diluting effluents from a nuclear power plant.</p> <p>Baseline Loading: No sources of baseline radionuclide loadings were identified for the site.</p> <p>Proximity to Consumptive Users: The Okeechobee Utility Authority is permitted to withdraw water from the northern bank of Lake Okeechobee for a public potable water source.</p>
Okeechobee 2	<p>Dilution Capacity: The Kissimmee River is the nearest receiving body of water from the site (~ 2 miles southwest of the proposed site). The annual mean flow of the Kissimmee River near the site is 919 cfs. The receiving body of water is likely capable of diluting effluents from a nuclear power plant.</p> <p>Baseline Loading: No sources of baseline radionuclide loadings were identified for the site.</p> <p>Proximity to Consumptive Users: The Okeechobee Utility Authority is permitted to withdraw water from the northern bank of Lake Okeechobee for a public potable water source. This plant is located ~ 9 miles southeast of the site.</p>
St. Lucie	<p>Dilution Capacity: The Atlantic Ocean is the receiving body of water from the site and is sufficiently large to easily dilute effluents from a nuclear power plant.</p> <p>Baseline Loading: While an existing nuclear power plant is located near the proposed site, the receiving body of water is sufficiently large to render any baseline radionuclide loadings negligible.</p> <p>Proximity to Consumptive Users: No downstream locations of public water supply withdrawals were identified for the site.</p>
Turkey Point	<p>Dilution Capacity: The Atlantic Ocean/Biscayne Bay and groundwater (via the cooling canals) are the receiving bodies of water from the site and are sufficiently large to easily dilute effluents from a nuclear power plant.</p> <p>Baseline Loading: While an existing nuclear power plant is located near the proposed site, the receiving body of water is sufficiently large to render any baseline radionuclide loadings negligible.</p> <p>Proximity to Consumptive Users: No downstream locations of public water supply withdrawals were identified for the site.</p>

Site	Dilution Capacity	Baseline Loadings	Proximity to Downstream public water supply	Composite Rating
DeSoto	3	5	5	4
Glades	4	5	3	4
Glades A	3	5	5	4
Hendry 1	4	5	3	4
Martin	4	5	4	4
Martin A	3	5	5	4
Okeechobee 1	4	5	3	4
Okeechobee 2	3	5	3	4
St. Lucie	5	4	5	5
Turkey Point	5	4	5	5

## References

Estimated Water Use 2002, Southwest Florida Water Management District.

USGS Topographic Maps.

### D.1.3.2 Groundwater Radionuclide Pathway

**Objective** – The purpose of this section is to evaluate the primary sites with respect to the relative vulnerability of shallow groundwater resources to potential contamination.

**Evaluation Approach** – All primary sites overlie aquifers that have not been designated by EPA's (1986) classification scheme. EPA guidelines were, however, used to assign a designation to primary site aquifers. In addition, the relative vulnerability of these aquifers to groundwater pollution was evaluated using a standard numerical ranking system called DRASTIC (Aller et al. 1987). Sites considered most suitable are those that are least vulnerable to groundwater contamination within a 2-mile radius of a site.

**Discussion/Results** – Class I groundwater is addressed as an avoidance criteria (EPRI 2000). This classification includes groundwater resources of unusually high value. They are highly vulnerable to contamination and are irreplaceable sources of drinking water and or ecologically vital. Groundwater underlying the primary sites are either currently used or are potential sources of drinking water, hence, they would be considered Class II aquifers according to the EPA classification guidelines. The Biscayne Aquifer in South Florida has been designated a Sole Source Aquifer by EPA. One site, Turkey Point, is located above the Biscayne Aquifer. Projects that receive Federal financial assistance and have the potential to contaminate a sole source aquifer are subject to EPA review. The Okeechobee 1 and Okeechobee 2 sites are located in the recharge zone for the Biscayne Aquifer, and the Martin, Glades, and Glades A sites are located



either within or along the border of the recharge zone. These sites, while not located above the Biscayne Aquifer, would have a potential for contamination since they are located within or very near the aquifer's recharge zone.

The DRASTIC evaluation was completed using site-specific data, where available, or data from published sources. The most important variables that control the groundwater pollution potential are:

- D—Depth to water,
- R—Recharge (net),
- A—Aquifer media,
- S—Soil media,
- T—Topography (slope),
- I—Impact of the vadose zone,
- C—Conductivity (hydraulic) of the groundwater flow system.

DRASTIC assigns a weighted numeric value to each characteristic, depending on its relative contribution to risk of groundwater contamination. This results in a numeric ranking for each site, allowing the sites to then be ranked in order of suitability. The higher an area scores on the DRASTIC index, the more susceptible a site is to groundwater contamination. Following is a summary of the DRASTIC evaluations.

<b>DeSoto</b>				
<b>DRASTIC Variable</b>	<b>Range and Source of Information</b>	<b>Weight</b>	<b>Rating</b>	<b>Number</b>
Depth to Water	5-15 ft bgs (USGS topographic maps)	5	9	45
Net Recharge	10 <sup>+</sup> in/yr	4	9	36
Aquifer Media	Sands with silt and clay (Florida geologic maps and text)	3	6	18
Soil Media	Sandy Loam (Florida geologic map and text)	2	6	12
Topography	Less than 1% (USGS site topographic maps)	1	10	10
Impact Vadose Zone	Sand (Florida geologic map and text)	5	6	30
Hydraulic Conductivity	300 - 700 gpd/ft <sup>2</sup> (Driscoll, 1986; DRASTIC, 1987)	3	4	12
			<b>INDEX</b>	<b>163</b>

<b>Glades</b>				
<b>DRASTIC Variable</b>	<b>Range and Source of Information</b>	<b>Weight</b>	<b>Rating</b>	<b>Number</b>
Depth to Water	5-15 ft bgs (USGS topographic maps)	5	9	45
Net Recharge	10 <sup>+</sup> in/yr	4	9	36
Aquifer Media	Sands with silt and clay (Florida geologic maps and text)	3	6	18
Soil Media	Sandy Loam (Florida geologic map and text)	2	6	12
Topography	Less than 1% (USGS site topographic maps)	1	10	10
Impact Vadose Zone	Sand (Florida geologic map and text)	5	6	30
Hydraulic Conductivity	300 - 700 gpd/ft <sup>2</sup> (Driscoll, 1986; DRASTIC, 1987)	3	4	12
			<b>INDEX</b>	<b>163</b>

<b>Glades A</b>				
<b>DRASTIC Variable</b>	<b>Range and Source of Information</b>	<b>Weight</b>	<b>Rating</b>	<b>Number</b>
Depth to Water	30-50 ft bgs (SFWMD DBHYDRO Query)	5	5	25
Net Recharge	10 <sup>+</sup> in/yr	4	9	36
Aquifer Media	Sands with silt and clay (Florida geologic maps and text)	3	6	18
Soil Media	Sand (USGS Web Soil Survey)	2	9	18
Topography	Less than 1% (USGS site topographic maps)	1	10	10
Impact Vadose Zone	Sand and Gravel (DRASTIC)	5	8	40
Hydraulic Conductivity	700-1000 gpd/ft <sup>2</sup> (DRASTIC)	3	6	18
			<b>INDEX</b>	<b>165</b>

<b>Hendry 1</b>				
<b>DRASTIC Variable</b>	<b>Range and Source of Information</b>	<b>Weight</b>	<b>Rating</b>	<b>Number</b>
Depth to Water	5-15 ft bgs (USGS topographic maps)	5	9	45
Net Recharge	10 <sup>+</sup> in/yr	4	9	36
Aquifer Media	Sands with silt and clay (Florida geologic maps and text)	3	6	18
Soil Media	Sandy Loam (Florida geologic map and text)	2	6	12
Topography	Less than 1% (USGS site topographic maps)	1	10	10
Impact Vadose Zone	Sand (Florida geologic map and text)	5	6	30
Hydraulic Conductivity	300 - 700 gpd/ft <sup>2</sup> (Driscoll, 1986; DRASTIC, 1987)	3	4	12
			<b>INDEX</b>	<b>163</b>

<b>Martin</b>				
<b>DRASTIC Variable</b>	<b>Range and Source of Information</b>	<b>Weight</b>	<b>Rating</b>	<b>Number</b>
Depth to Water	5-15 ft bgs (USGS topographic maps)	5	9	45
Net Recharge	10 <sup>+</sup> in/yr	4	9	36
Aquifer Media	Sands with silt and clay (Florida geologic maps and text)	3	6	18
Soil Media	Sandy Loam (Florida geologic map and text)	2	6	12
Topography	Less than 1% (USGS site topographic maps)	1	10	10
Impact Vadose Zone	Sand (Florida geologic map and text)	5	6	30
Hydraulic Conductivity	300 - 700 gpd/ft <sup>2</sup> (Driscoll, 1986; DRASTIC, 1987)	3	4	12
			<b>INDEX</b>	<b>163</b>

<b>Martin A</b>				
<b>DRASTIC Variable</b>	<b>Range and Source of Information</b>	<b>Weight</b>	<b>Rating</b>	<b>Number</b>
Depth to Water	5-15 ft bgs (USGS topographic maps)	5	9	45
Net Recharge	10 <sup>+</sup> in/yr	4	9	36
Aquifer Media	Sands with silt and clay (Florida geologic maps and text)	3	6	18
Soil Media	Sandy Loam (Florida geologic map and text)	2	6	12
Topography	Less than 1% (USGS site topographic maps)	1	10	10
Impact Vadose Zone	Sand (Florida geologic map and text)	5	6	30
Hydraulic Conductivity	300 - 700 gpd/ft <sup>2</sup> (Driscoll, 1986; DRASTIC, 1987)	3	4	12
			<b>INDEX</b>	<b>163</b>

<b>Okeechobee 1</b>				
<b>DRASTIC Variable</b>	<b>Range and Source of Information</b>	<b>Weight</b>	<b>Rating</b>	<b>Number</b>
Depth to Water	15-30 ft bgs (SFWMD DBHYDRO Query)	5	7	35
Net Recharge	10 <sup>+</sup> in/yr	4	9	36
Aquifer Media	Sands with silt and clay (Florida geologic maps and text)	3	6	18
Soil Media	Fine Sand (USGS Web Soil Survey)	2	9	18
Topography	Less than 1% (USGS site topographic maps)	1	10	10
Impact Vadose Zone	Sand and Gravel (DRASTIC)	5	8	40
Hydraulic Conductivity	700-1000 gpd/ft <sup>2</sup> (DRASTIC)	3	6	18
			<b>INDEX</b>	<b>175</b>

<b>Okeechobee 2</b>				
<b>DRASTIC Variable</b>	<b>Range and Source of Information</b>	<b>Weight</b>	<b>Rating</b>	<b>Number</b>
Depth to Water	0-5 ft bgs (USGS topographic maps)	5	10	50
Net Recharge	10 <sup>+</sup> in/yr	4	9	36
Aquifer Media	Sands with silt and clay (Florida geologic maps and text)	3	6	18
Soil Media	Sandy Loam (Florida geologic map and text)	2	6	12
Topography	Less than 1% (USGS site topographic maps)	1	10	10
Impact Vadose Zone	Thin sand (Florida geologic map and text)	5	8	40
Hydraulic Conductivity	300 - 700 gpd/ft <sup>2</sup> (Driscoll, 1986; DRASTIC, 1987)	3	4	12
			<b>INDEX</b>	<b>178</b>



<b>St. Lucie</b>				
<b>DRASTIC Variable</b>	<b>Range and Source of Information</b>	<b>Weight</b>	<b>Rating</b>	<b>Number</b>
Depth to Water	5-15 ft bgs (USGS topographic maps)	5	9	45
Net Recharge	10 <sup>+</sup> in/yr	4	9	36
Aquifer Media	Sands with silt and clay (Florida geologic maps and text)	3	6	18
Soil Media	Sand (Florida geologic map and text)	2	7	14
Topography	Less than 1% (USGS site topographic maps)	1	10	10
Impact Vadose Zone	Sand (Florida geologic map and text)	5	7	35
Hydraulic Conductivity	300 - 700 gpd/ft <sup>2</sup> (Driscoll, 1986; DRASTIC, 1987)	3	4	12
			<b>INDEX</b>	<b>170</b>

<b>Turkey Point</b>				
<b>DRASTIC Variable</b>	<b>Range and Source of Information</b>	<b>Weight</b>	<b>Rating</b>	<b>Number</b>
Depth to Water	0-5 ft bgs (USGS topographic maps)	5	10	50
Net Recharge	10 <sup>+</sup> in/yr	4	9	36
Aquifer Media	Bedded limestone (Florida geologic maps and text)	3	7	21
Soil Media	Thin (Florida geologic map and text)	2	10	20
Topography	Less than 1% (USGS site topographic maps)	1	10	10
Impact Vadose Zone	Thin sand and limestone (Florida geologic map and text)	5	7	35
Hydraulic Conductivity	700 - 1000 gpd/ft <sup>2</sup> (Driscoll, 1986; DRASTIC, 1987)	3	6	18
			<b>INDEX</b>	<b>190</b>

DRASTIC indexes for all typical hydrogeologic settings range from 65 to 223 (Aller et al. 1987, p. 82). This range of indexes was used to develop a ranking system to compare vulnerability of primary sites, as follows:

<b>DRASTIC Index Range</b>	<b>Relative Vulnerability</b>	<b>Rating</b>
65–98	Low	5
98–132	Low to Moderate	4
132–166	Moderate	3
166–199	High	2
199–233	Very High	1

Based on these DRASTIC Index Ranges for qualitative vulnerability, primary sites were ranked as follows:

Primary Site	DRASTIC Index	Rating
DeSoto	163	3
Glades	163	3
Glades A	165	3
Hendry 1	163	3
Martin	163	3
Martin A	163	3
Okeechobee 1	175	2
Okeechobee 2	178	2
St. Lucie	170	2
Turkey Point	190	2

## References

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**D.1.3.3 Air Radionuclide Pathway**

**D.1.3.3.1 Topographic Effects**

**D.1.3.3.2 Atmospheric Dispersion**

**Objective** – The purpose of this criterion is to address the relative suitability of sites with respect to the potential for exposure to the public from routine airborne releases from a nuclear power plant.

**Evaluation approach** – The criterion is composed of two suitability characteristics:

Topographic Effects – Site ratings are based on whether there are any significant topographic features that would materially affect dispersion of the plume from plant releases (e.g., channeling of releases from a site located low in a high-banked river valley).

Atmospheric Dispersion – Measured in terms of long term (e.g., annual average X/Q) dispersion characteristics. Sites with lower X/Q values are rated higher than those with less favorable dispersion conditions.

**Discussion/Results** – None of the sites are believed to have significant potential for negative topographic effects on long-term dispersion; however, final site locations have not been identified for several of the sites. Annual average X/Q values were unavailable for primary sites. Sites near the coast would generally experience windier conditions, and were given a rating of 5. Inland locations would generally experience less wind, and were given a rating of 4. Should atmospheric dispersion become a sensitive criterion for site selection, site-specific meteorological data should be obtained to calculate an atmospheric dispersion function (X/Q) for more accurate site comparison.

Site	Evaluation	Rating
DeSoto	Site is located ~ 50 miles inland from the Gulf of Mexico.	4
Glades	Site is located ~ 70 miles inland from the Gulf of Mexico. Site is located ~ 70 miles inland from the Atlantic Ocean.	4
Glades A	Site is located ~ 55 miles inland from the Gulf of Mexico. Site is located ~ 85 miles inland from the Atlantic Ocean.	4
Hendry 1	Site is located ~ 65 miles inland from the Atlantic Ocean. Site is located ~ 75 miles inland from the Gulf of Mexico.	4
Martin	Site is located ~ 25 miles inland from the Atlantic Ocean.	4

Site	Evaluation	Rating
Martin A	Site is ~ 20 miles inland from the Atlantic Ocean.	4
Okeechobee 1	Site is located ~ 30 miles inland from the Atlantic Ocean.	4
Okeechobee 2	Site is located ~ 45 miles inland from the Atlantic Ocean.	4
St. Lucie	Site is located in the Atlantic Ocean coastal region.	5
Turkey Point	Site is located in the Atlantic Ocean coastal region.	5

The proposed site ratings with respect to radionuclide exposure via airborne releases are as follows:

Site	Rating
DeSoto	4
Glades	4
Glades A	4
Hendry 1	4
Martin	4
Martin A	4
Okeechobee 1	4
Okeechobee 2	4
St. Lucie	5
Turkey Point	5

## References

USGS Topographic Maps.

### D.1.3.4 Air-Food Ingestion Pathway

**Objective** – The objective of this criterion is to rate primary sites in terms of the relative potential for exposure of humans to radioactive emissions through deposition of radioactive materials on food crops with subsequent consumption of exposed foodstuffs by individuals.

**Evaluation approach** – A potential exposure pathway for nuclear power plants is the emission of radionuclides into the food chain on local crops and pastures. Radiological doses and dose commitments resulting from a nuclear plant are well-known and documented. While the operational impacts on the public through food pathway exposures are negligible, sites with lower amounts of crop and pasture land uses are considered to be more suitable. No exclusionary or avoidance criteria apply to this issue. Sites with less crop production nearby are rated higher than those with larger agricultural industries.

Discussion/Results – General information regarding crop lands and pastures near the sites is summarized in the table below.

Site	Evaluation	Ranking
Florida (entire state)	Agriculture (farmland) represents 10,414,877 acres out of 34,513,280 acres in Florida (30%). Out of total farmland, <b>3,715,257</b> acres are planted in crop (36%).	N/A
DeSoto	Agriculture (farmland) represents 388,177 acres out of 407,680 acres in DeSoto County (95%). Out of the total farmland, <b>115,356</b> acres are planted in crop (30%). Other farmland is used for cattle (81,628 head), and lower numbers of hogs and pigs (33 head), sheep (38 head) and poultry (251 layers).  Aerial imagery indicates that the proposed site is in the general vicinity of agricultural operations, and the actual impact to local crops, pastures, and livestock from radionuclide emission exposure would be greater than the county-wide percentages.	1
Glades	Agriculture (farmland) represents 407,950 acres out of 495,360 acres in Glades County (82%). Out of the total farmland, <b>73,043</b> acres are planted in crop (18%). Other farmland is used for cattle (66,423 head), and lower numbers of hogs and pigs (48 head) and poultry (210 layers).  Aerial imagery indicates that the proposed site is in the general vicinity of agricultural operations, and the actual impact to local crops, pastures, and livestock from radionuclide emission exposure would be greater than the county-wide percentages.	1
Glades A	Agriculture (farmland) represents 407,950 acres out of 495,360 acres in Glades County (82%). Out of the total farmland, <b>73,043</b> acres are planted in crop (18%). Other farmland is used for cattle (66,423 head), and lower numbers of hogs and pigs (48 head) and poultry (210 layers).  Aerial imagery indicates that the proposed site is in the general vicinity of agricultural operations, and the actual impact to local crops, pastures, and livestock from radionuclide emission exposure would be greater than the county-wide percentages.	1
Hendry 1	Agriculture (farmland) represents 552,352 acres out of 737,920 acres in Hendry County (75%). Out of the total farmland, <b>296,006</b> acres are planted in crop (54%). Other farmland is used for cattle (73,207 head), and lower numbers of hogs and pigs (125 head) and poultry (286 layers).  Aerial imagery indicates that the proposed site is in the general vicinity of agricultural operations, and the actual impact to local crops, pastures, and livestock from radionuclide emission exposure would be greater than the county-wide percentages.	1

Site	Evaluation	Ranking
Martin	<p>Agriculture (farmland) represents 206,198 acres out of 355,840 acres in Martin County (58%). Out of the total farmland, <b>97,840</b> acres are planted in crop (47%). Other farmland is used for cattle (27,279 head), and lower numbers of hogs and pigs (439 head) and poultry (81 broilers).</p> <p>Aerial imagery indicates that the proposed site is in the general vicinity of agricultural operations, and the actual impact to local crops, pastures, and livestock from radionuclide emission exposure would be greater than the county-wide percentages. Additionally, while power plants are currently located near the proposed site, the potential for radionuclide emissions would be a newly introduced area hazard.</p>	2
Martin A	<p>Agriculture (farmland) represents 206,198 acres out of 355,840 acres in Martin County (58%). Out of the total farmland, <b>97,840</b> acres are planted in crop (47%). Other farmland is used for cattle (27,279 head), and lower numbers of hogs and pigs (439 head) and poultry (81 broilers).</p> <p>Aerial imagery indicates that the proposed site is in the general vicinity of agricultural operations, and the actual impact to local crops, pastures, and livestock from radionuclide emission exposure would be greater than the county-wide percentages.</p>	2
Okeechobee 1	<p>Agriculture (farmland) represents 392,495 acres out of 495,360 acres in Okeechobee County (79%). Out of the total farmland, <b>115,292</b> acres are planted in crop (29%). Other farmland is used for cattle (142,656 head), and lower numbers of hogs and pigs (82 head), sheep (1,737), and poultry (171 layers).</p> <p>Aerial imagery indicates that the proposed site is in the general vicinity of agricultural operations, and the actual impact to local crops, pastures, and livestock from radionuclide emission exposure would be greater than the county-wide percentages.</p>	1
Okeechobee 2	<p>Agriculture (farmland) represents 392,495 acres out of 495,360 acres in Okeechobee County (79%). Out of the total farmland, <b>115,292</b> acres are planted in crop (29%). Other farmland is used for cattle (142,656 head), and lower numbers of hogs and pigs (82 head), sheep (1,737), and poultry (171 layers).</p> <p>Aerial imagery indicates that the proposed site is in the general vicinity of agricultural operations, and the actual impact to local crops, pastures, and livestock from radionuclide emission exposure would be greater than the county-wide percentages.</p>	1

Site	Evaluation	Ranking
St. Lucie	<p>Agriculture (farmland) represents 221,537 acres out of 366,080 acres in St. Lucie County (61%). Out of the total farmland, <b>118,847</b> acres are planted in crop (54%). Other farmland is used for cattle (31,944 head), and lower numbers of hogs and pigs (394 head) and poultry (317 layers).</p> <p>Aerial imagery indicates that the proposed site is not in the general vicinity of agricultural operations, and the actual impact to local crops, pastures, and livestock from radionuclide emission exposure would be significantly lower than the county-wide percentages.</p>	5
Turkey Point	<p>Agriculture (farmland) represents 90,373 acres out of 1,245,440 acres in Miami-Dade County (7%). Out of the total farmland, <b>66,564</b> acres are planted in crop (74%). Other farmland is used for cattle (3,880 head), hogs and pigs (144 head), sheep (272 head), and poultry (2,052 layers and 240 broilers).</p> <p>Aerial imagery indicates that the proposed site is in the general vicinity of some agricultural operations (although not as agriculturally dominated as potential greenfield sites). However, existing nuclear power plants are located at the Turkey Point location, and agricultural operations in the general vicinity are already exposed to potential radionuclide emissions. As such, the site has been given a rating of 5 as potential radionuclide emissions are not a new hazard to the area.</p>	5

Site	Rating
DeSoto	1
Glades	1
Glades A	1
Hendry 1	1
Martin	2
Martin A	2
Okeechobee 1	1
Okeechobee 2	1
St. Lucie	5
Turkey Point	5

## References

Florida MapStats, <http://www.fedstats.gov/qf/states/12000.html>.

Google Earth, <http://earth.google.com>.



National Agriculture Statistics Service (2002 Census of Agriculture) for Florida,  
[http://151.121.3.33:8080/Census/Create\\_Census\\_US\\_CNTY.jsp](http://151.121.3.33:8080/Census/Create_Census_US_CNTY.jsp).

### **D.1.3.5 Surface Water – Food Radionuclide Pathway**

**Objective** – The purpose of this criterion is to evaluate the relative suitability of sites in terms of the specific use of irrigation water by downstream locations as a potential pathway for potential exposure.

**Evaluation approach** – Sites with the fewest number of downstream irrigation uses are more suitable and are rated higher than sites with a large number of downstream irrigation withdrawals. No exclusionary or avoidance criteria apply to this issue (EPRI 2001).

**Discussion/Results** – General information regarding irrigated lands near the sites is summarized in the table below.

<b>Site</b>	<b>Evaluation</b>	<b>Ranking</b>
Florida (entire state)	Total irrigated land represents 1,815,174 acres out of 10,414,877 acres of farmland in Florida (17%).	N/A
DeSoto	Total irrigated land represents 79,147 acres out of 388,177 acres of farmland in DeSoto County (20%). Withdrawals of water for irrigation from the Peace River downstream of the site are probable.	1
Glades	Total irrigated land represents 49,147 acres out of 407,950 acres of farmland in Glades County (12%). Withdrawals of water for irrigation from area canals downstream of the site are probable.	2
Glades A	Total irrigated land represents 49,147 acres out of 407,950 acres of farmland in Glades County (12%). Withdrawals of water for irrigation from area canals downstream of the site are probable.	2
Hendry 1	Total irrigated land represents 206,043 acres out of 552,352 acres of farmland in Hendry County (37%). Withdrawals of water for irrigation from area canals downstream of the site are probable.	1
Martin	Total irrigated land represents 55,805 acres out of 206,198 acres of farmland in Martin County (27%). Withdrawals of water for irrigation from area canals downstream of the site are probable.	1
Martin A	Total irrigated land represents 55,805 acres out of 206,198 acres of farmland in Martin County (27%). Withdrawals of water for irrigation from area canals downstream of the site are probable.	1
Okeechobee 1	Total irrigated land represents 22,085 acres out of 392,495 acres of farmland in Okeechobee County (6%). Withdrawals of water for irrigation from the Kissimmee River and area canals downstream of the site are probable.	2

Site	Evaluation	Ranking
Okeechobee 2	Total irrigated land represents 22,085 acres out of 392,495 acres of farmland in Okeechobee County (6%). Withdrawals of water for irrigation from the Kissimmee River and area canals downstream of the site are probable.	2
St. Lucie	Total irrigated land represents 102,629 acres out of 221,537 acres of farmland in St. Lucie County (46%). Withdrawals of water for irrigation downstream of the site are not expected as the site is located very near the Atlantic Ocean, and agricultural operations are not located in the vicinity of the site.	5
Turkey Point	Total irrigated land represents 43,615 acres out of 90,373 acres of farmland in Miami-Dade County (48%). Withdrawals of water for irrigation downstream of the site are not expected as the site is located very near the Atlantic Ocean (Biscayne Bay). Additionally, existing nuclear power plants are located at the Turkey Point location, and agricultural operations in the general vicinity are already exposed to potential radionuclide emissions. As such, the site has been given a rating of 5 as potential radionuclide emissions are not a new hazard to the area.	5

Site	Rating
DeSoto	1
Glades	2
Glades A	2
Hendry 1	1
Martin	1
Martin A	1
Okeechobee 1	2
Okeechobee 2	2
St. Lucie	5
Turkey Point	5

## References

National Agriculture Statistics Service (2002 Census of Agriculture) for Florida,  
[http://151.121.3.33:8080/Census/Create\\_Census\\_US\\_CNTY.jsp](http://151.121.3.33:8080/Census/Create_Census_US_CNTY.jsp).

### D.1.3.6 Transportation Safety

**Objective** – The objective of this criterion is to evaluate the suitability of the primary sites with respect to potential to create fog and ice hazards to local transportation. No exclusionary or avoidance criteria apply to this issue.

Evaluation approach – Potential impacts from plant operations on transportation safety could occur as a result of increased hazards from cooling towers. Both natural draft and mechanical cooling towers can increase area fogging conditions and ice formation on local roads and highways. Sites with high frequencies of naturally-occurring fog and ice events will likely be more adversely affected by cooling tower operations.

Discussion/Results – Relative information regarding existing fog and ice conditions was not readily available for primary sites; however, cooling tower fogging or icing is not expected to be a major issue at any of the sites, given their general weather patterns, nor is it expected to be a major site discriminator. Accordingly, and in the absence of site specific data, all sites are given a conservative rating of 3 with respect to this criterion.

Site	Rating
DeSoto	3
Glades	3
Glades A	3
Hendry 1	3
Martin	3
Martin A	3
Okeechobee 1	3
Okeechobee 2	3
St. Lucie	3
Turkey Point	3

## **D.2 ENVIRONMENTAL CRITERIA**

### **D.2.1 CONSTRUCTION-RELATED EFFECTS ON AQUATIC ECOLOGY**

#### **D.2.1.1 Disruption of Important Species/Habitats**

Objective – The objective of this criterion is to evaluate the primary sites with respect to potential construction-related impacts on aquatic or marine ecology. Regulatory Guide 4.7 defines important plant and animal species if one or more of the following conditions apply.

1. the species is commercially or recreationally valuable,
2. the species is officially listed as endangered or threatened,
3. the species affects the well being of another species within (1) or (2) above,
4. the species is a critical component of the structure and function of a valuable ecosystem,  
or,
5. the species is a biological indicator of radionuclides in the environment.

Of particular concern are potential impacts to habitat areas used by important species. These areas include those used for:

- breeding and nursery,
- nesting and spawning,
- wintering, and
- feeding.

Evaluation approach – The following siting criteria were used to evaluate the primary sites.

- Exclusionary – Designated critical habitat of endangered species
- Avoidance – Areas where threatened and endangered species are known to occur
- Suitability – Areas where limited potential impact is expected

No information was obtained which would indicate that any of the sites under consideration would exceed the exclusionary or avoidance criteria relative to ecology. Therefore, the evaluation focused on the relative suitability of the site based on the number of areas where limited potential impact is expected. The number of potential impact areas was directly correlated to the number of rare, threatened, and endangered (RTE) aquatic species that may occur in the host county, their habitat (based on existing reports and professional judgment of the amount and quality of habitat available for species), and flexibility (professional judgment of the amount of space within the site circle to avoid known locations of protected species during construction of the facility). Note that the evaluation was limited to the plant site and not existing or potential (future) transmission corridors.

The suitability of the primary sites with respect to ecology (rare, threatened and endangered aquatic and terrestrial species, and critical habitat) was initially evaluated in the screening criteria report (Criterion P5, which included Federally protected aquatic and terrestrial species combined). Additional site ecological information specific to aquatic resources at each site is included in the full discussion below. In the context of this discussion, vicinity refers to the county in which the primary site is located.

**Discussion** – There is one Federally listed protected aquatic species the manatee, found in DeSoto, Glades, Hendry and Okeechobee counties.

Martin and St. Lucie Counties also have the manatee and one fish species that could be in the vicinity of the Martin or St. Lucie sites: the smalltooth sawfish, as well as four sea turtles and an aquatic plant (Johnson's seagrass). Both counties also contain critical habitat for the manatee and for Johnson's seagrass, although it is found along the coast. Because the two Martin sites are both inland sites far from the county's eastern coastline or intercoastal waterway where the coastal species and critical habitat are found, only the manatee and fish species were included in the species count.

Miami-Dade County, location of the Turkey Point site, has the manatee, two fish species (smalltooth sawfish and gulf sturgeon), four sea turtles (same as St. Lucie County), two invertebrate coral species (proposed threatened), and one aquatic plant on the federally protected species list. Miami-Dade County also includes critical habitat for the manatee and Johnson's seagrass.

The species common and scientific names and listing status are included in the table below. The National Marine Fisheries Service (NMFS) has lead for the fish, invertebrate, and plant species, as well as for the turtle species in the water.

Scientific Name	Common Name	Federal Status
<b>Fish</b>		
Gulf sturgeon	<i>Acipenser oxyrhynchus desotoi</i>	Threatened
Smalltooth sawfish	<i>Pristis pectinata</i>	Endangered
<b>Mammals</b>		
West Indian manatee	<i>Trichechus manatus</i>	E, CH
<b>Reptiles</b>		
Green sea turtle	<i>Chelonia mydas</i>	E
Leatherback sea turtle	<i>Dermochelys coriacea</i>	E
Loggerhead sea turtle	<i>Caretta caretta</i>	T
Hawksbill sea turtle	<i>Eretmochelys imbricata</i>	E
<b>Invertebrates</b>		
Elkhorn coral	<i>Acropora palmate</i>	PT
Staghorn coral	<i>Acropora cervicornis</i>	PT
<b>Plants</b>		
Johnson's seagrass	<i>Halophila johnsonii</i>	T, CH

**Results** – Site ratings are based on the number of Federally protected species found in a given county. Turkey Point and St. Lucie are given the lowest ratings of 3 with 5-10 species. In general, ratings related to habitat are based on professional judgment of the amount and quality of habitat available for species, typically based on poor quality satellite imagery (Google Earth). In the case of aquatic species, where habitat is limited to existing surface water bodies in a given site area or county, habitat ratings are assumed to be the same as those identified for species abundance. In general, ratings related to flexibility are based on professional judgment of the

amount of space within the site area to avoid known locations of protected species (while trying to maximize access to cooling water supply) during construction of the facility – also typically based on poor quality aerial photographs. All sites were given favorable ratings with slightly lower siting flexibility ratings given to Turkey Point and St. Lucie based on their higher level of development currently existing on site (and presumed reduced opportunity to avoid any remaining undeveloped areas/habitat areas with new construction). Martin, Martin A, and Okeechobee 2 sites fall in the middle given existing development at Martin and presumed preference to locate sites near existing surface water resources (e.g., lake/canal for Martin and Martin A and Kissimmee River for Okeechobee 2).

Site	T&E Species (aquatic)	Habitat	Flexibility	Overall Rating
DeSoto	4	4	5	4
Glades	4	4	5	4
Glades A	4	4	5	4
Hendry 1	4	4	5	4
Martin	4	4	4	4
Martin A	4	4	5	4
Okeechobee 1	4	4	5	4
Okeechobee 2	4	4	4	4
St. Lucie	3	3	2	3
Turkey Point	3	3	2	3

## References

US Fish and Wildlife Service, Vero Beach/South Florida [<http://www.fws.gov/verobeach/> and then link to endangered species and then species list by county, or access through <http://www.fws.gov/verobeach/index.cfm?Method=programs&NavProgramCategoryID=3&programID=37&ProgramCategoryID=3> (and click on specific county) – for DeSoto, Glades, Hendry, Martin, Miami-Dade, Okeechobee, and St. Lucie Counties].

Note: T&E species lists updated by FWS June 2010.

### D.2.1.2 Bottom Sediment Disruption Effects

#### D.2.1.2.1 Contamination

#### D.2.1.2.2 Grain Size

**Objective** – The objective of the criterion is to evaluate the potential short-term impacts to aquatic/marine resources resulting from construction related dredging activities at the primary sites.

**Evaluation approach** – The evaluation sought available data on the amount of contaminated sediments near the primary sites and the grain size of sediments in the area. In general, sites with

the lowest concentration of heavy metals and toxic organic compounds and the highest sediment grain size are considered to be the most suitable.

Little information exists regarding the site-specific level of sediment contamination that exists in water bodies near the primary sites. The majority of the available information was obtained from the EPA's National Sediment Quality Survey (2001 and 2004). Information in the EPA report addresses sediment contamination levels as Tier I (adverse impacts to aquatic life are probable) and Tier II (adverse impacts to aquatic life are possible but infrequent). Using best professional judgment, the following evaluation considered the results of the EPA's Tier I/Tier II study results to determine the relative contamination potential for the primary sites.

No information regarding sediment grain size was obtained for this evaluation. Because sediment grain size is highly variable, even within a small area of coastline or river reach, the following evaluation of potential bottom sediment disruption effects was limited to available information regarding sediment contamination levels in principal water bodies at the primary sites.

Discussion/Results – An updated EPA study (EPA 2004) evaluated 2,874 sampling stations in the Southeast, and identified 12 water bodies as having the most significant sediment contamination in EPA Region 4. No water bodies on which the FPL primary sites are located were identified in the EPA study.

Because dredging is not one of the parameters considered for this particular evaluation, and information on grain size was not readily available for most of the sites, the estimated potential for contaminated sediments to affect the cost and schedule of any construction-related dredging operations was based on the limited information available and professional judgment. Based on the EPA study and information provided by the Water Management Districts in Florida, and because the presence of contaminated sediments in the immediate vicinity of the primary sites including any onsite streams cannot be confirmed, the following conservative ratings are given to the primary sites. The coastal sites are given a slightly higher rating because their receiving body of water is so expansive (Atlantic Ocean).

Site	Rating
DeSoto	3
Glades	3
Glades A	3
Hendry 1	3
Martin	3
Martin A	3
Okeechobee 1	3
Okeechobee 2	3
St. Lucie	4
Turkey Point	4



## References

The Incidence and Severity of Sediment Contamination in Surface Waters of the United States. National Sediment Quality Survey. Office of Science and Technology. EPA 823-R-04-007. November. Available at: <http://www.clu-in.org/download/contaminantfocus/pcb/incidence-and-severity-2004nsqs2ed-complete.pdf>.

### D.2.2 CONSTRUCTION-RELATED EFFECTS ON TERRESTRIAL ECOLOGY

#### D.2.2.1 **Disruption of Important Species/Habitats and Wetlands**

##### D.2.2.1.1 Important Species/Habitats

##### D.2.2.1.2 Groundcover/Habitat

##### D.2.2.1.3 Wetlands

**Objective** – The objective of this criterion is to evaluate the primary sites with respect to potential construction related impacts on important species and terrestrial ecology. Regulatory Guide 4.7 defines important plant and animal species if one or more of the following conditions apply.

1. The species is commercially or recreationally valuable,
2. The species is officially listed as endangered or threatened,
3. The species affects the well-being of another species within (1) or (2) above,
4. The species is a critical component of the structure and function of a valuable ecosystem,  
or
5. The species is a biological indicator of radionuclides in the environment.

Of particular concern are potential impacts to habitat areas used by important species. These areas include those used for:

- breeding and nursery,
- nesting and spawning,
- wintering, and
- feeding.

**Evaluation approach** – The following siting criteria were used to evaluate the primary sites.

- Exclusionary – Designated critical habitat of endangered species
- Avoidance – Areas where threatened and endangered species are known to occur
- Suitability – Areas where limited potential impact is expected

No information was obtained which would indicate that any of the sites under consideration would exceed the exclusionary or avoidance criteria relative to ecology. Therefore, the evaluation focused on the relative suitability of the site based on the number of areas where limited potential impact is expected. The number of potential impact areas was directly correlated to the number of rare, threatened, and endangered terrestrial species that may occur in the host county, their habitat (based on existing reports and professional judgment of the amount and quality of habitat available for species), and flexibility (professional judgment of the amount of space within the site circle to avoid known locations of protected species during construction



of the facility). Note that the evaluation was limited to the plant site and not existing or potential (future) transmission corridors. The data source for protected Federal species is the U.S. Fish and Wildlife Service listings for Florida, by county. Observations relating to existing land uses (habitat) are based on satellite imagery (Google Earth), although resolution may vary by site, and the images are not necessarily current.

Another sub-criteria evaluated was the total acreage of wetland within the 5,000 acres, not including the lake or reservoir that would be the primary source of cooling water, or the marine deepwater off coastal sites. This was also broken out into three components: total wetlands (acres), total acreage of higher-quality wetlands, and flexibility, or the ability to avoid wetlands during construction.

The relative suitability of the primary sites with respect to ecology (rare, threatened, and endangered aquatic and terrestrial species and critical habitat by host county of each site) and wetlands was evaluated in the screening criteria report (Criterion P5, aquatic and terrestrial species combined; P6). Additional site ecological information specific to terrestrial resources is included in the full discussion below.

#### Discussion/Results

##### *DeSoto*

Twelve Federally listed terrestrial species: 2 mammals, 7 birds (one experimental and second historic data unknown), 2 reptiles, and one plant have the potential to occur in DeSoto County (see table below). One of the birds is an experimental population (whooping crane) and the historic data for the ivory-billed woodpecker is unknown.

Scientific Name	Common Name	Federal Status
<i>Puma (=Felis) concolor</i>	Puma (=Mountain lion)	Threatened (S/A)
<i>Puma (=Felis) concolor coryi</i>	Florida panther	Endangered
<i>Rostrhamus sociabilis plumbeus</i>	Everglade snail kite	Endangered (last documented in 1967)
<i>Aphelocoma coerulescens</i>	Florida scrub-jay	Threatened
<i>Mycteria americana</i>	Wood stork	Endangered
<i>Ammodramus savannarum floridanus</i>	Florida grasshopper sparrow	Endangered
<i>Polyborus plancus audubonii</i>	Audubon's crested caracara	Threatened
<i>Campephilus principalis</i>	Ivory-billed woodpecker	E (historic data unknown)
<i>Grus Americana</i>	Whooping crane	Experimental population
<i>Dymarchon corais couperi</i>	Eastern Indigo Snake	Threatened
<i>Alligator mississippiensis</i>	American alligator	Threatened (S/A)
<i>Chionanthus pygmaeus</i>	Pygmy fringe tree	Endangered

### Glades/Glades A

Fourteen Federally listed terrestrial species: 2 mammals, 8 birds, 2 reptiles, 2 plants, and critical habitat have the potential to occur in Glades County (see Table below). One of the birds is an experimental population (whooping crane) and the ivory-billed woodpecker was last documented in 1904.

Scientific Name	Common Name	Federal Status
<i>Puma (=Felis) concolor</i>	Puma (=Mountain lion)	Threatened (S/A)
<i>Puma (=Felis) concolor coryi</i>	Florida panther	Endangered
<i>Rostrhamus sociabilis plumbeus</i>	Everglade snail kite	Endangered/CH
<i>Aphelocoma coerulescens</i>	Florida scrub-jay	Threatened
<i>Mycteria americana</i>	Wood stork	Endangered
<i>Ammodramus savannarum floridanus</i>	Florida grasshopper sparrow	Endangered
<i>Polyborus plancus audubonii</i>	Audubon's crested caracara	Threatened
<i>Picoides borealis</i>	Red-cockaded woodpecker	Endangered
<i>Campephilus principalis</i>	Ivory-billed woodpecker	E (last documented in 1904)
<i>Grus americana</i>	Whooping crane	Experimental population
<i>Dymarchon corais couperi</i>	Eastern indigo snake	Threatened
<i>Alligator mississippiensis</i>	American alligator	Threatened (S/A)
<i>Warea carteri</i>	Carter's mustard	Endangered
<i>Cucurbita okeechobeensis</i> ssp. <i>Okeechobeensis</i>	Okeechobee gourd	Endangered

### Hendry I

Twelve Federally listed terrestrial species: 2 mammals, 8 birds, 2 reptiles and critical habitat have the potential to occur in Hendry County (see Table below). One of the birds is an experimental population (whooping crane) and the ivory-billed woodpecker was last documented in 1904.

Scientific Name	Common Name	Federal Status
<i>Puma (=Felis) concolor</i>	Puma (=Mountain lion)	Threatened (S/A)
<i>Puma (=Felis) concolor coryi</i>	Florida panther	Endangered
<i>Rostrhamus sociabilis plumbeus</i>	Everglade snail kite	Endangered/CH
<i>Aphelocoma coerulescens</i>	Florida scrub-jay	Threatened (last documented in 1980)
<i>Mycteria americana</i>	Wood stork	Endangered
<i>Ammodramus savannarum floridanus</i>	Florida grasshopper sparrow	Endangered (last documented in 1927)
<i>Polyborus plancus audubonii</i>	Audubon's crested caracara	Threatened

Scientific Name	Common Name	Federal Status
<i>Picoides borealis</i>	Red-cockaded woodpecker	Endangered
<i>Campephilus principalis</i>	Ivory-billed woodpecker	Endangered (historic date unknown)
<i>Grus americana</i>	Whooping crane	Experimental population
<i>Dymarchon corais couperi</i>	Eastern indigo snake	Threatened
<i>Alligator mississippiensis</i>	American alligator	Threatened (S/A)

*Martin/Martin A*

Twenty -two Federally listed terrestrial species: 3 mammals, 10 birds (including 1 candidate species), 3 reptiles, 5 plants, one candidate invertebrate species, and critical habitat have the potential to occur in Martin County (see Table below). Documentation for several of the species is very dated (1970s or earlier) or historic data are unknown (piping plover critical habitat), one is an experimental population (whooping crane), one is a migrant (Kirtland's warbler, 1978), and one plant species is only found at the Hobe NWR.

Scientific Name	Common Name	Federal Status
<i>Puma (=Felis) concolor</i>	Puma (=Mountain lion)	Threatened (S/A)
<i>Puma (=Felis) concolor coryi</i>	Florida panther	Endangered
<i>Peromyscus polionotus neveiventris</i>	Southeastern beach mouse	Threatened (inferred)
<i>Rostrhamus sociabilis plumbeus</i>	Everglade snail kite	Endangered/CH
<i>Aphelocoma coerulescens</i>	Florida scrub-jay	Threatened
<i>Mycteria americana</i>	Wood stork	Endangered
<i>Polyborus plancus audubonii</i>	Audubon's crested caracara	Threatened
<i>Picoides borealis</i>	Red-cockaded woodpecker	Endangered, last documented 1970-1978
<i>Dendroica kirtlandii</i>	Kirtland's warbler	E Migrant 1978
<i>Charadrius melodus</i>	Piping plover	T, CH, historic date unknown
<i>Campephilus principalis</i>	Ivory-billed woodpecker	E (last documented in 1985?)
<i>Grus americana</i>	Whooping crane	Experimental population, inferred
<i>Calidris canutus rufa</i>	Red knot	Candidate
<i>Anaea troglodyta floridalis</i>	Florida leafwing butterfly	Candidate
<i>Dymarchon corais couperi</i>	Eastern indigo snake	Threatened
<i>Alligator mississippiensis</i>	American alligator	Threatened (S/A)
<i>Crocodylus acutus</i>	American crocodile	E, historic data unknown
<i>Jacquemontia reclinata</i>	Beach jacquemontia	E, last documented in 1921

Scientific Name	Common Name	Federal Status
<i>Asimina tetramera</i>	Four-petal pawpaw	E
<i>Cladonia perforate</i>	Florida perforate cladonia	E
<i>Dicerandra immaculata</i>	Lakela's mint	E, Hobe Sound NWR only
<i>Polygala smallii</i>	Tiny polygala	Endangered

#### Okeechobee 1/Okeechobee 2

Thirteen Federally listed terrestrial species: 3 mammals, 8 birds, 2 reptiles and critical habitat have the potential to occur in Okeechobee County (see Table below). One bird species is part of experimental population and documentation for two other bird species is very dated (prior to 1970 and in 1924).

Scientific Name	Common Name	Federal Status
<i>Puma (=Felis) concolor</i>	Puma (=Mountain lion)	Threatened (S/A)
<i>Puma (=Felis) concolor coryi</i>	Florida panther	Endangered
<i>Eumops floridanus</i>	Florida bonneted bat	Candidate
<i>Ammodramus savannarum floridanus</i>	Florida grasshopper sparrow	Endangered
<i>Rostrhamus sociabilis plumbeus</i>	Everglade snail kite	Endangered/CH
<i>Aphelocoma coerulescens</i>	Florida scrub-jay	Threatened
<i>Mycteria americana</i>	Wood stork	Endangered
<i>Polyborus plancus audubonii</i>	Audubon's crested caracara	Threatened
<i>Picoides borealis</i>	Red-cockaded woodpecker	Endangered, last documented prior to 1970
<i>Campephilus principalis</i>	Ivory-billed woodpecker	E (last documented in 1924)
<i>Grus americana</i>	Whooping crane	Experimental population, inferred
<i>Dymarchon corais couperi</i>	Eastern indigo snake	Threatened
<i>Alligator mississippiensis</i>	American alligator	Threatened (S/A)

#### St. Lucie

Nineteen Federally listed terrestrial species: 3 mammals, 10 birds, 3 reptiles, 3 plants, and critical habitat have the potential to occur in St. Lucie County (see Table below). Documentation for several of the bird species is very dated (1970s or earlier) or historic data are unknown; one is an experimental population (whooping crane), and two are migrant (also dated documentation).

Scientific Name	Common Name	Federal Status
<i>Puma (=Felis) concolor</i>	Puma (=Mountain lion)	Threatened (S/A)
<i>Puma (=Felis) concolor coryi</i>	Florida panther	Endangered

Scientific Name	Common Name	Federal Status
<i>Peromyscus polionotus neveiventrus</i>	Southeastern beach mouse	T (inferred)
<i>Rostrhamus sociabilis plumbeus</i>	Everglade snail kite	Endangered/CH
<i>Aphelocoma coerulascens</i>	Florida scrub-jay	Threatened
<i>Mycteria americana</i>	Wood stork	Endangered
<i>Polyborus plancus audubonii</i>	Audubon's crested caracara	Threatened
<i>Picoides borealis</i>	Red-cockaded woodpecker	Endangered, last documented 1970-1978
<i>Dendroica kirtlandii</i>	Kirtland's warbler	E Migrant 1918
<i>Charadrius melodus</i>	Piping plover	Threatened,
<i>Campephilus principalis</i>	Ivory-billed woodpecker	E (historic date unknown)
<i>Grus americana</i>	Whooping crane	Experimental population, inferred
<i>Calidris canutus rufa</i>	Red knot	Candidate
<i>Dymarchon corais couperi</i>	Eastern indigo snake	Threatened
<i>Alligator mississippiensis</i>	American alligator	Threatened (S/A)
<i>Crocodylus acutus</i>	American crocodile	E, historic date unknown
<i>Cereus eriophorus</i> var. <i>fragrans</i>	Fragrant prickly-apple	Endangered
<i>Dicerandra immaculate</i>	Lakela's mint	Endangered
<i>Polygala smallii</i>	Tiny polygala	Endangered

#### Turkey Point

Forty Federally listed terrestrial species, including 3 mammal (including 1 candidate species), 12 birds, 3 reptiles, 18 plants (including 10 candidate plant species), 4 invertebrate (including 2 candidate species) and critical habitat have the potential to occur in Miami Dade County (see Table below). The bird species include two migrant species and several with dated documentation or with unknown historic data.

Scientific Name	Common Name	Federal Status
<i>Puma</i> (=Felis) <i>concolor</i>	Puma (=Mountain lion)	Threatened (S/A)
<i>Puma</i> (=Felis) <i>concolor coryi</i>	Florida panther	Endangered
<i>Eumops floridanus</i>	Florida bonneted bat	Candidate
<i>Rostrhamus sociabilis plumbeus</i>	Everglade snail kite	Endangered/CH
<i>Aphelocoma coerulascens</i>	Florida scrub-jay	Threatened, last documented 1960s
<i>Mycteria americana</i>	Wood stork	Endangered
<i>Polyborus plancus audubonii</i>	Audubon's crested caracara	Threatened, last documented 1987-1991
<i>Picoides borealis</i>	Red-cockaded woodpecker	Endangered, last documented prior to 1960

Scientific Name	Common Name	Federal Status
<i>Ammodramus savannarum floridanus</i>	Florida grasshopper sparrow	Endangered, last documented 1968
<i>Dendroica kirtlandii</i>	Kirtland's warbler	E Migrant 1958
<i>Charadrius melodus</i>	Piping plover	T, historic date unknown
<i>Campephilus principalis</i>	Ivory-billed woodpecker	E (last documented in 1889)
<i>Vermivora bachmanii</i>	Bachman's warbler	E, migrant 1901?
<i>Ammodramus maritimus mirabilis</i>	Cape sable seaside sparrow	E.CH
<i>Calidris canutus rufa</i>	Red knot	Candidate
<i>Dymarchon corais couperi</i>	Eastern indigo snake	Threatened
<i>Alligator mississippiensis</i>	American alligator	Threatened (S/A)
<i>Crocodylus acutus</i>	American crocodile	E, CH, historic data unknown
<i>Orthalicus reses (not incl. nesodryas)</i>	Stock island tree snail	T
<i>Heraclides aristodemus ponceanus</i>	Schaus swallowtail butterfly	E
<i>Strymon acis bartrami</i>	Bartram's hairstreak butterfly	C
<i>Anaea troglodyta floridalis</i>	Florida leafwing butterfly	C
<i>Jacquemontia reclinata</i>	Beach jacquemontia	E
<i>Warea carteri</i>	Carter's mustard	E (last documented 1942)
<i>Amorpha crenulata</i>	Crenulate lead-plant	E
<i>Chaemaesyce deltoidea deltoidea</i>	Deltoid spurge	E
<i>Chamaesyce garberi</i>	Gaber's spurge	T
<i>Cucurbita okeechobeensis</i> ssp. <i>Okeechobeensis</i>	Okeechobee gourd	E
<i>Galactia smallii</i>	Small's milkpea	E
<i>Polygala smallii</i>	Tiny polygala	E
<i>Chamaecrista lineate keyensis</i>	Big Pine partridge pea	C
<i>Argythamnia blodgettii</i>	Blodgett's silverbush	C
<i>Linum carteri carteri</i>	Carter's small-flowered flax	C
<i>Brickellia mosieri</i>	Florida brickell-bush	C
<i>Trichomanes punctatum</i> ssp. <i>floridanum</i>	Florida bristle fern	C
<i>Digitaria pauciflora</i>	Florida pineland crabgrass	C
<i>Dalea carthagenensis floridana</i>	Florida prairie clover	C
<i>Consolea corallicola</i>	Florida semaphore cactus	C
<i>Chamaesyce deltoidea pinetorum</i>	Pineland sandmat	C
<i>Linum arenicola</i>	Sand flax	C

### Site ratings based on Important Terrestrial Species/Habitat

Site	T&E Species (terrestrial)	Habitat	Flexibility	Overall Rating
DeSoto	3	5	4	4
Glades	3	4	4	4
Glades A	3	4	4	4
Hendry 1	3	4	4	4
Martin	2	4	3	3
Martin A	2	4	4	3
Okeechobee 1	3	4	4	4
Okeechobee 2	3	4	4	4
St. Lucie	2	3	2	2
Turkey Point	1	2	2	2

Ratings for T&E species based on total number of species found in the host county. Habitat and flexibility ratings are based on professional judgment and other factors as discussed in Section D.2.1.1. Presence of critical habitat and number of protected species is also a consideration in habitat ratings.

### Wetlands

The flexibility associated with the final location of the plant area and the presence of higher quality wetlands such as forested wetlands were considered in addition to the overall acreage of mapped wetlands indicated by NWI; the area of interest for each site is the same area (5,000 acres centered around a site centerpoint) as assumed for the previous screening provided in Appendix C.

Note: The use of the term “wetlands” is used solely as a descriptive term and is not used as a regulatory or jurisdictional term.

Sub-Criterion	DeSoto	Glades	Glades A	Hendry 1	Martin
% of wetland polygons mapped over 5,000 acre area	688	482	877	831	326 <sup>1</sup>
Number of acres of high quality wetlands* within site area	60	0	0	296	50

Sub-Criterion	Martin A	Okee 1	Okee 2	St. Lucie	Turkey Point
% of wetland polygons mapped over 5,000 acre area	150	958	248	1,173 <sup>1</sup> (out of 1,538 total land area)	1,273 <sup>1</sup> (out of 1,730 total land area)
Number of acres of high quality wetlands* within site area	18	137	1	0	6

\* = Number of acres forested/scrub-shrub wetland polygons mapped.

<sup>1</sup> Does not include existing reservoir at Martin and deepwater at St. Lucie and Turkey Point sites.

Taking into account the above wetlands identified, the sites were given the following composite ratings:

#### Site ratings based on Wetlands

Site	Total Acres <sup>1</sup>	Acres of High Quality Wetlands <sup>2</sup>	Flexibility <sup>3</sup>	Overall Rating
DeSoto	3	4	4	4
Glades	4	5	5	5
Glades A	3	5	3	4
Hendry 1	3	3	4	3
Martin	4	5	4 <sup>4</sup>	4
Martin A	4	5	5	5
Okeechobee 1	3	4	4	4
Okeechobee 2	4	5	5	5
St. Lucie	3	5	3 <sup>4</sup>	4
Turkey Point	3	5	2 <sup>4</sup>	3

<sup>1</sup> scale reflects characteristics of nominal 5,000 acre circular area with ultimate site requirement of 2,000 acre proposed site area (at greenfield sites). Note that land requirements at existing nuclear power plant sites would be expected to be significantly less than this, based on the detailed licensing and operational knowledge of these sites (including the multiple advantages their existing infrastructure bring), and the ratings for St. Lucie and Turkey Point have been adjusted upward (from regional screening) to reflect the reduced land requirement.

→ 5=<100 acres, 4=<500 acres, 3=<1,500 acres, 2=<3,000 acres, 1=>3,000 acres

<sup>2</sup> 5= <50 acres, 4= <250, 3=<500, 2=<1,000, 1=>1,000 (forested/scrub-shrub)

<sup>3</sup> 5=<10%, 4=<25% 3=<50%, 2=<90%, 1=>90%

<sup>4</sup> Martin, St. Lucie, and Turkey Point sites were reduced by 1 rating point due to constraints associated with on-site ponds/reservoir and/or deep water marine areas.



## Composite Site Ratings

Composite site ratings include an average of the overall site rating for the terrestrial species component and the overall site rating for the wetlands component of this criterion.

Site	Species	Wetlands	Overall Rating
DeSoto	4	4	4
Glades	4	5	4.5
Glades A	4	4	4
Hendry 1	4	3	3.5
Martin	3	4	3.5
Martin A	3	5	4
Okeechobee 1	4	4	4
Okeechobee 2	4	5	4.5
St. Lucie	2	4	3
Turkey Point	2	3	2.5

## References

NWI website: <http://wetlandsfws.er.usgs.gov/>.

US Fish and Wildlife Service, Vero Beach/South Florida [<http://www.fws.gov/verobeach/> and then link to endangered species and then species list by county, or access through <http://www.fws.gov/verobeach/index.cfm?Method=programs&NavProgramCategoryID=3&programID=37&ProgramCategoryID=3> (and click on specific county) – for DeSoto, Glades, Hendry, Martin, Miami-Dade, Okeechobee, and St. Lucie Counties].

Note: T&E species lists updated by FWS June 2010.

### D.2.2.2 Dewatering Effects on Adjacent Wetlands

#### D.2.2.2.1 Depth to Water Table

#### D.2.2.2.2 Proximal Wetlands

**Objective** – The objective of this criterion is to evaluate the sites with respect to potential impacts from construction-related dewatering activities on area wetlands.

**Evaluation approach** – The evaluation included a review of information related to the depth of the water table and the distance to nearby wetlands. A determination of the extent of wetland acreage within the study area was limited. National Wetland Inventory maps were used for some sites as the basis for determining wetland acreage. Those maps can include numerous areas that do not represent jurisdictional wetlands under Section 404 of the Clean Water Act, which contributed to the difficulty in making an estimate of wetland acreage. Moreover, those maps were based primarily on interpretation of aerial photography, and the amount of field validation

that was performed varies according to region of the country and local terrain. Overall site elevation is being used as an indicator of depth to groundwater.

Discussion/Results – Wetlands have been evaluated previously (Section D.2.2.1 of this appendix); depth to groundwater for each site is being evaluated by proxy using site elevation as an indicator. Potential hydraulic connections among wetlands via groundwater are not known.

In light of the previous ratings and groundwater information, the site ratings are as follows:

Site	Total Wetland Acreage <sup>1</sup>	Acres of High Quality Wetlands <sup>2</sup>	Depth to Groundwater <sup>3</sup>	Overall Rating
DeSoto	3	4	5	4
Glades	4	5	1	3
Glades A	3	5	3	4
Hendry 1	3	3	1	2
Martin	4	5	2	4
Martin A	4	5	2	4
Okeechobee 1	3	4	3	3
Okeechobee 2	4	5	2	4
St. Lucie	3	5	1	3
Turkey Point	3	5	1	3

<sup>1</sup> scale reflects characteristics of nominal 5,000 acre circular area with ultimate site requirement of 2,000 acre proposed site area → 5=<100 acres, 4=<500 acres, 3=<1,500 acres, 2=<3,000 acres, 1=>3,000 acres

<sup>2</sup> 5= <50 acres, 4= <250, 3=<500, 2=<1,000, 1=>1,000 (forested/scrub-shrub)

<sup>3</sup> (avg. site elev. as surrogate) 5=80'+, 4=60'+, 3=40'+, 2=20'+, 1= <20'

## D.2.3 OPERATIONAL-RELATED EFFECTS ON AQUATIC ECOLOGY

### D.2.3.1 Thermal Discharge Effects

#### D.2.3.1.1 Migratory Species Effects

#### D.2.3.1.2 Disruption of Important Species/Habitats

#### D.2.3.1.3 Water Quality

Objective – No exclusionary or avoidance criteria apply to condenser cooling water system thermal discharges on receiving water bodies (EPRI 2001, Section 3.2.3.1). The objective of this criterion is to address the relative suitability of the primary sites with respect to potential thermal impacts. Two specific thermal impact issues were considered:

- disruption of important species and habitats, and
- impact on water quality of the receiving water body.

Information on migratory species (also identified in EPRI criteria) was not collected at each site and therefore is not evaluated as part of this criterion.

**Evaluation approach** – In December 2001, the EPA published a final regulation, which affects the location, design, construction, and capacity of intake structures for new power plants (EPA 2001). The EPA rule will strongly encourage the use of closed-cycle designs to reduce adverse cooling water system impacts, and it is assumed that new nuclear reactors at the primary sites would include closed-cycle cooling water systems.

**Discussion/Results** – No additional site-specific data are available for the sites except for the existing plants at St. Lucie and Turkey Point. Ratings are therefore based on surface water flow characteristics (as brought forward from Criterion P1 of Appendix C - flow component only), where the size of the receiving water body [heat sink] was the primary factor in assigning ratings [highest rating given to the largest heat sink]; proximity to sensitive waters (defined as water supplies in or near to 303(d) Water Conservation Areas (WCA) or Outstanding Florida Waters (OFW), as brought forward from Section D.1.1.2.1 of this appendix); and on site ratings for disruption of aquatic species/habitat (as brought forward from Section D.2.1.1 of this appendix). In addition, ratings were based on the use of the source water body as the receiving water for this evaluation. The presence of an existing nuclear plant in the immediate site area (St. Lucie and Turkey Point) also was taken into account, although these locations are not expected to be a problem for locating a second plant. The sub-ratings were averaged to provide a consolidated rating for each site below.

Site	Flow	Presence of Important Aquatic Species <sup>1</sup>	OFW-303(d)-WCA <sup>2</sup>	Overall Rating
DeSoto	2	4	2	3
Glades	3	4	3	3
Glades A	3	4	4	4
Hendry 1	3	4	3	3
Martin	3	4	3	3
Martin A	3	4	4	4
Okeechobee 1	2	4	3	3
Okeechobee 2	3	4	3	3
St. Lucie	5	3	3	4
Turkey Point	5	3	3	4

<sup>1</sup> zero = 5, <2 = 4, <10 = 3, <20 = 2, 20+ = 1 (fish + sea turtles)

<sup>2</sup> No sensitive areas nearby (within 5 km) = 4, one designated area nearby = 3, more than one designated area nearby = 2

### **D.2.3.2      Entrainment/Impingement Effects**

#### **D.2.3.2.1      Entrainable Organisms**

#### **D.2.3.2.2      Impingable Organisms**

**Objective** – No exclusionary or avoidance criteria apply to entrainment and impingement impacts from the operation of condenser cooling water systems (EPRI 2001, Section 3.2.3.1). The objective of this criterion is to address the relative suitability of the primary sites with respect to potential entrainment and impingement impacts.

When cooling water is pumped from water bodies, several environmental impacts can occur. Entrainment refers to the removal of small, drifting organisms with the cooling water. Small fish, fish eggs, phytoplankton, zooplankton, and other aquatic/marine organisms experience high mortality rates as they pass through cooling water pumps and heat exchangers. Impingement refers to larger organisms that are screened out of the cooling water at the intake structure. Impinged organisms can include large fish, crustaceans, turtles, and other aquatic/marine organisms that can not avoid high intake velocities near the intake structure and are trapped on the intake screens.

**Evaluation approach** – Concerns about entrainment and impingement losses are resource dependent and vary on a site-to-site basis. Typically, power plants with once-through cooling water systems have higher entrainment and impingement impacts than power plants with closed-cycle cooling water systems. The EPA issued a final rule in December 2001 affecting the design of intake structures for new power plants (EPA 2001). These rules encourage the use of closed-cycle systems, which is the type of system assumed to be used by FPL at these sites. Developers of new power plants who choose certainty and faster permitting over greater design flexibility will be encouraged to limit intake water capacities and velocities and incorporate specific intake screen designs to reduce entrainment and impingement losses.

**Discussion/Results** – The primary sites were evaluated with respect to relative potential for entrainment and impingement impacts for the closed-cycle cooling water system. Proposed facilities at each site will include cooling towers that will reduce the amount of cooling water withdrawal required for plant operation. In addition, proper design of the water intake structure would minimize the potential adverse impacts. In NUREG 1437, NRC concludes that, with cooling towers and appropriate intake design, potential adverse impacts due to entrainment or impingement of aquatic organism are minor and do not significantly disrupt existing populations. Assuming a two-unit closed-cycle plant at the site, and 100 percent of the local plankton passing through the plant, it appears that there would be no discernible effect on the plankton population in existing rivers and reservoirs at each site. This is due to the very small volume of water used by the plant relative to the total volume in the river or reservoir at the site. Because of the low flow velocities of a closed cycle plant at the site, impingement of adult fish would be expected to be minimal. Use of a deep water intake would have a minimal effect on entrainment of larval fish.

Another component of this criterion was the presence of important aquatic species.

Given the above information, all sites received consistent ratings in terms of intake design (conservative rating of 3), with slightly higher preference given to those sites with fewer protected aquatic species present. Because entrainment/impingement impacts are not as big an issue with closed cooling water systems, average ratings ending in 0.5 were rounded up to the nearest whole number.

Site	Presence of Important Aquatic Species	Regulatory/ Engineering Design (conservative)	Overall Rating
DeSoto	4	3	4
Glades	4	3	4
Glades A	4	3	4
Hendry 1	4	3	4
Martin	4	3	4
Martin A	4	3	4
Okeechobee 1	4	3	4
Okeechobee 2	4	3	4
St. Lucie	3	3	3
Turkey Point	3	3	3

**D.2.3.3 Dredging/Disposal Effects**  
**D.2.3.3.1 Upstream Contamination Sources**  
**D.2.3.3.2 Sedimentation Rates**

**Objective** – The purpose of the section is to evaluate the sites for potential environmental impacts related to maintenance dredging at the intake structure. No specific exclusionary or avoidance criteria apply to this issue. The following evaluation, therefore, is a summary of available information related to the relative suitability of the sites.

**Evaluation approach** – Sites with high levels of contaminated sediment deposition at the intake structure will experience higher maintenance costs for the removal and disposal of the dredged material. Two factors were considered in performing the evaluation:

- The level of upstream contamination, and
- The rate of sedimentation at the site.

All sites are assumed to have relatively low fine-sediment-deposition rates (which are preferred), so the ratings were based on potential for contamination.

As addressed in Section D.2.1.2 (Contaminated Sediments), no site-specific information about the level of sediment contamination at the sites was identified. Results in Section D.2.1.2 were based on EPA data, which addressed general trends in levels of contamination in the water bodies at the primary sites, and general water-quality information for the major water bodies on

which the primary sites are located. The evaluation was further expanded to consider existing background radioactive contamination at the sites. The greenfield sites were considered to be optimum because there is no known source of existing background radioactive contamination present. Turkey Point was also rated high under the assumption that the effluent is contained in the canals which presumably would not be disturbed as part of development of the new plant (hence it was assumed that there would not be contaminated sediments to disturb). St. Lucie also received a favorable, but slightly lower rating, because its effluent is discharged directly into the environment and there are other water-quality issues given the high levels of development along the coast in the site vicinity.

Discussion/Results – Based on available information, the sites were rated according to the expected levels of contamination. The results are summarized in the table below.

Site	Rating
DeSoto	5
Glades	5
Glades A	5
Hendry 1	5
Martin	5
Martin A	5
Okeechobee 1	5
Okeechobee 2	5
St. Lucie	4
Turkey Point	5

#### D.2.4 OPERATIONAL-RELATED EFFECTS ON TERRESTRIAL ECOLOGY

##### D.2.4.1 **Drift Effects on Surrounding Areas**

###### D.2.4.1.1 Important Species/Habitat Areas

###### D.2.4.1.2 Source Water Suitability

Objective – The objective of this criterion is to evaluate the relative suitability of the primary sites with respect to potential concerns with cooling tower drift effects. This evaluation considered the potential effects on surrounding areas and the suitability of the cooling water source (EPRI 2001). This issue does not apply to sites for which once-through cooling water systems are selected.

#### **Cooling Tower Drift**

In every cooling tower, there is a loss of water to the environment in the form of pure water, which results from the evaporative cooling process. This evaporated water leaves the tower in a pure vapor state, and thus presents no threat to the environment. Drift, however, is the undesirable loss of liquid water to the environment, via small unevaporated droplets that become

entrained in the exhaust air stream of a cooling tower. These water droplets carry with them minerals, debris and microorganisms and water treatment chemicals from the circulating water, thus potentially impacting the environment. High drift losses are typically caused by fouled, inefficient or damaged drift eliminators, excessive exit velocities or imbalances in water chemistry.

Minimizing drift losses in a cooling tower reduces the risk of impacting the environment. The principal environmental concern with cooling tower drift impacts are related to the emission and downwind deposition of cooling water salts (EPA 1987). Salt deposition can adversely affect sensitive plant and animal communities through changes in water and soil chemistry.

Evaluation approach – Sites considered with the most sensitive environments were assigned lower rating values. Sites with highest concentrations of dissolved solids and other potential contaminants in cooling tower makeup were also assigned lower rating values.

Discussion/Results – Information regarding important terrestrial and aquatic plant and animal communities, habitats, and wetlands in the vicinity of the primary sites were previously addressed in Section D.2.1.1 (Disruption of Important Species/Habitats) and Section D.2.2.1 (Disruption of Important Species/Habitats and Wetlands). Cooling water makeup water quality was also taken into account. The following primary cooling water sources were assumed for each site:

DeSoto – Peace River (assumed higher salinity than other rivers based on FPL input)  
Glades/Glades A/Hendry 1 – Caloosahatchee River/Canal  
Martin/Martin A – St. Lucie Canal  
Okeechobee 1 – Kissimmee River  
Okeechobee 2 – Lake Okeechobee  
St. Lucie – Atlantic Ocean  
Turkey Point – Municipal Effluent

Given all the above information, the following ratings were assigned:

Site	Important Species Habitat Areas – Aquatic	Important Species Habitat Areas – Terrestrial	Source Water <sup>1</sup>	Overall Rating
DeSoto	4	3	3	3
Glades	4	3	4	4
Glades A	4	3	4	4
Hendry 1	4	3	4	4
Martin	4	2	4	3
Martin A	4	2	4	3
Okeechobee 1	4	3	4	4
Okeechobee 2	4	3	4	4

<b>Site</b>	<b>Important Species Habitat Areas – Aquatic</b>	<b>Important Species Habitat Areas – Terrestrial</b>	<b>Source Water<sup>1</sup></b>	<b>Overall Rating</b>
St. Lucie	3	2	1	2
Turkey Point	3	1	4	3

<sup>1</sup> Fresh = 5, Primarily fresh + possible brackish = 4, Primarily brackish + possible fresh = 3,  
Brackish = 2, Ocean = 1



### **D.3 SOCIOECONOMICS CRITERIA**

#### **D.3.1 SOCIOECONOMICS - CONSTRUCTION RELATED EFFECTS**

**Objective** – The objective of this criterion is to evaluate the relative suitability of the site with respect to the number of construction workers who will move into the plant site vicinity with their families; and the capacity of the communities surrounding the plant site to absorb this new temporary (in-migrant) population.

**Evaluation approach** – The number of in-migrant workers is dependent on labor availability within commuting distance of the plant site. If an adequate supply of workers is available within reasonable commuting distance, few (if any) workers will choose to relocate to the site vicinity. The capacity of communities to absorb an increase in population depends on the availability of sufficient resources, such as adequate housing and community services to support the influx.

Steps 1 and 2 (Exclusionary and Avoidance criteria) are not applicable to this criterion. The plant construction workforce is likely to be available at any of the sites under consideration. The issue in siting, therefore, is the potential socioeconomic impact associated with any temporary influx of construction workers who live too far away to commute daily from their residence. With respect to suitability of the sites under consideration by FPL, socioeconomic impacts of nuclear power plant construction are directly related to two factors:

- number of construction workers who will move into the plant site vicinity with their families; and
- capacity of the communities surrounding the plant site to absorb this new temporary (in-migrant) population.

The number of in-migrant workers is dependent on labor availability within commuting distance of the plant site. If an adequate supply of workers is available within reasonable commuting distance, few (if any) workers would choose to relocate to the site vicinity. The capacity of communities to absorb an increase in population depends on the availability of sufficient resources, such as adequate housing and community services (e.g., schools, hospitals, police, transportation systems, and fire protection) to support the influx without straining existing services. Impacts to a small community located along the commuter route(s) (e.g., food, lodging, gas, and congestion) can also be significant and should be considered. The information that should be considered in rating sites from the perspective of construction impacts includes labor requirements, location of labor pool, number of immigrants, and the economic structure of affected communities.

Before the data could be compared between sites and the sites rated, certain assumptions were made regarding the construction labor requirements and construction schedule, labor pool, and affected area. Many of these assumptions were made without the benefit of site-specific information and may warrant future revision when site-specific data become available (i.e., full NEPA documentation for original plant construction and operation can be reviewed, and/or site-specific plant personnel can be interviewed regarding actual impacts from original plant construction). For purposes of this report, assumptions are based on professional judgment, the AP1000 Siting Guide, and information contained in the U.S. Nuclear Regulatory Commission's

*Generic Environmental Impact Statement for License Renewal for Nuclear Plants* (NUREG 1437) (May 1996).

### **Assumptions**

According to the AP1000 Siting Guide, the plant workforce (construction) includes a monthly maximum construction workforce requirement of 1,000 persons per unit. Construction of a nuclear power plant is very labor-intensive, and for the AP1000 skilled and unskilled construction workers would likely be needed over a 4- to 5-year period. The following assumptions were used in this analysis.

- Ratings are based on the assumption that two units would be constructed at a given site.
- Construction would require a peak construction work force of 2,000 workers (1,000 per unit); this estimate is not necessarily the "worst-case," but assumed to be a realistic estimate for purposes of site comparison.
- Analysis assumes that no other major construction project would occur in the site vicinity concurrently with the plant construction and operation. Thus, sites were rated without consideration of potential cumulative impacts of other potential demands for labor.

Available population and economic data were obtained from the US Census Bureau for each site. The data were collected by county to determine availability of an adequate labor force within commuting distance (based on an assumed location of the labor pool). Data relating to population and labor force (primarily construction industry) were compared with the construction labor requirement to determine availability of labor.

The study of economic structure examines employment because of its pre-eminent role in determining economic well-being of an area. Specifically, impacts are determined by comparing the number of direct and indirect jobs created by plant's construction with total employment of the local study area at the time of construction. Sites were rated according to economic impacts based on the following criteria: economic effects were considered small if peak construction related employment accounted for less than 5 percent of total study area employment; moderate if it accounted for 5 to 10 percent of total study area employment; and large if it accounted for more than 10 percent of total study area employment.

Note that the study area for evaluating socioeconomic impacts from construction included the host county, adjacent counties and any other nearby counties with a major population center within a reasonable commuting distance from the site.

Discussion – The available population and work force data are presented in the following tables. Projected growth rates from 2000-2010 is assumed to be the same as growth rates found between 1990 and 2000, based on U.S. Census data.

#### DeSoto Site Population and Work Force

County	Total Pop (2000)	Total Pop (2010)*	Total Employed Workforce (2000)	Total Construction Workforce (2000)
DeSoto	32,209	43,482 (35%)	12,742	976
Sarasota	325,957	382,348 (17.3%)	133,419	12,246
Manatee	264,002	329,210 (24.7%)	111,793	13,098
Charlotte	141,627	180,716 (27.6%)	50,690	5,374
Glades	10,576	14,732 (39.3%)	3,677	368
Hardee	26,938	37,228 (38.2%)	9,901	794
Highlands	87,366	111,566 (27.7%)	30,051	2,139
<b>Total</b>		<b>1,099,282</b>	<b>352,273</b>	<b>34,995</b>

\* Based on growth rate for 1990-2000 (%)

Source: U.S. Census Bureau, <http://quickfacts.census.gov/qfd/> for Florida

#### Glades/Glades A Site Population and Work Force

County	Total Pop (2000)	Total Pop (2010)*	Total Employed Workforce (2000)	Total Construction Workforce (2000)
Glades	10,576	14,732 (39.3%)	3,677	368
Lee	440,888	580,208 (31.6%)	186,417	23,087
Highlands	87,366	111,566 (27.7%)	30,051	2,139
Hendry	36,210	50,875 (40.5%)	14,579	1,164
<b>Total</b>		<b>757,381</b>	<b>231,253</b>	<b>26,758</b>

\* Based on growth rate for 1990-2000 (%)

Source: U.S. Census Bureau, <http://quickfacts.census.gov/qfd/> for Florida

### Hendry 1 Site Population and Work Force

County	Total Pop (2000)	Total Pop (2010)*	Total Employed Workforce (2000)	Total Construction Workforce (2000)
Hendry	36,210	50,875 (40.5%)	14,579	1,164
Glades	10,576	14,732 (39.3%)	3,677	368
Palm Beach	1,131,184	1,481,851 (31%)	484,760	40,152
<b>Total</b>		<b>1,547,458</b>	<b>503,016</b>	<b>41,684</b>

\* Based on growth rate for 1990-2000 (%)

Source: U.S. Census Bureau, <http://quickfacts.census.gov/qfd/> for Florida

### Martin/Martin A Site Population and Work Force

County	Total Pop (2000)	Total Pop (2010)*	Total Employed Workforce (2000)	Total Construction Workforce (2000)
Martin	126,731	159,174 (25.6%)	51,054	5,357
St. Lucie	192,695	247,228 (28.3%)	77,842	8,476
Palm Beach	1,131,184	1,481,851 (31%)	484,760	40,152
Okeechobee	35,910	43,523 (21.2%)	14,169	1,352
<b>Total</b>		<b>1,931,776</b>	<b>627,465</b>	<b>55,337</b>

\* Based on growth rate for 1990-2000 (%)

Source: U.S. Census Bureau, <http://quickfacts.census.gov/qfd/> for Florida

**Okeechobee 1/Okeechobee 2 Site Population and Work Force**

<b>County</b>	<b>Total Pop (2000)</b>	<b>Total Pop (2010)*</b>	<b>Total Employed Workforce (2000)</b>	<b>Total Construction Workforce (2000)</b>
Okeechobee	35,910	43,523 (21.2%)	14,169	1,352
St. Lucie	192,695	247,228 (28.3%)	77,842	8,476
Highlands	87,366	111,566 (27.7%)	30,051	2,139
Martin	126,731	159,174 (25.6%)	51,054	5,357
Glades	10,576	14,732 (39.3%)	3,677	368
Indian River	112,947	141,410 (25.2%)	45,494	3,878
Osceola	172,493	276,161 (60.1%)	79,859	7,030
<b>Total</b>		<b>993,794</b>	<b>302,146</b>	<b>28,600</b>

\* Based on growth rate for 1990-2000 (%)

Source: U.S. Census Bureau, <http://quickfacts.census.gov/qfd/> for Florida

**St. Lucie Site Population and Work Force**

<b>County</b>	<b>Total Pop (2000)</b>	<b>Total Pop (2010)*</b>	<b>Total Employed Workforce (2000)</b>	<b>Total Construction Workforce (2000)</b>
St. Lucie	192,695	247,228 (28.3%)	77,842	8,476
Indian River	112,947	141,410 (25.2%)	45,494	3,878
Martin	126,731	159,174 (25.6%)	51,054	5,357
Palm Beach	1,131,184	1,481,851 (31%)	484,760	40,152
Okeechobee	35,910	43,523 (21.2%)	14,169	1,352
<b>Total</b>		<b>2,073,186</b>	<b>673,319</b>	<b>59,215</b>

\* Based on growth rate for 1990-2000 (%)

Source: U.S. Census Bureau, <http://quickfacts.census.gov/qfd/> for Florida

### Turkey Point Site Population and Work Force

County	Total Pop (2000)	Total Pop (2010)*	Total Employed Workforce (2000)	Total Construction Workforce (2000)
Miami-Dade	2,253,362	2,620,660 (16.3%)	921,208	63,135
Broward	1,623,081	2,098,644 (29.3%)	758,939	56,496
<b>Total</b>		<b>4,102,241</b>	<b>1,405,968</b>	<b>119,631</b>

\* Based on growth rate for 1990-2000 (%)

Source: U.S. Census Bureau, <http://quickfacts.census.gov/qfd/> for Florida

**Results** – Although the results show higher population and workforce numbers available at Martin, Martin A, St. Lucie and Turkey Point, the overall population levels for all primary sites are sufficiently large that the impact on study area employment from construction of two new units would be low at each site. This is based on conservative workforce levels using 2000 Census Bureau data (without expected increases in 2010); although such increases might be used to support other large (non-nuclear) construction projects at that time). All sites show a percentage increase less than 5% when compared to total study area construction workforce, and a percentage increase less than 1% for total employed work force.

Because of the large population within the host county (Miami Dade) for Turkey Point, and the close proximity and easy access to the heavily populated Atlantic coastal development for the St. Lucie, Martin, and Martin A sites (in addition to these sites already including large power plant facilities), it was assumed that the majority of construction workers workforce would commute from within the area to these sites. There would be no in-migrant workforce population (and families), with no demands on housing or communities services. Therefore, these four sites were given a rating of 5.

Given the rural nature, the lower general population estimates – particularly in their respective host counties – and the lower (existing) construction workforce to draw from at the remaining six sites, an additional analysis was conducted for these six sites to consider the impacts of workers in-migrating to the areas. We have identified the following assumptions to help address potential impacts on local community services and housing:

- 50% of workers will in-migrate (1,000 workers)
- 50% of these workers bring their families (2.5 additional persons per family) (1,250 family members)
- Influx of direct workers also brings in influx of indirect workers (0.4 ratio of direct to indirect workers – in absence of site-specific information) pertaining to the Regional Industrial Multiplier System direct/indirect ratios calculated for each plant (as found in NUREG/CR-2749) (400 indirect workers)

- 50% of these indirect workers bring their families (2.5 additional persons per family) (500 family members)

Thus an influx of 1,000 workers is predicted to result in a total population influx of 3,150 persons.

When this population influx is compared to the total population projections in 2010 for the five areas (multiple county), the increase is less than 1%. Therefore, the impact on housing and community services would be expected to be negligible. However, when considering the population of the host county alone, Glades County has a significantly lower population compared to the other sites.

When the workforce influx is compared to the total construction workforce for the six sites, the increase ranges from 2% to 4%; when the workforce influx is compared to the total workforce for the six sites, the increase is less than 1% in every instance (see summary table below). In general, the remaining six sites are within reasonable commuting distance from at least one large city or metropolitan area, as summarized in the table below.

Site	Major population centers within commuting distance of site	Percent increase in total workforce	Percent increase in total construction workforce
DeSoto	Port Charlotte (within 25 miles)	0.3	2.8
Glades/Glades A	Ft. Myers (30-40 miles)	0.4	3.7
Hendry 1	Ft. Myers and West Palm (each at approximately 50 miles)	0.2	2.4
Okeechobee 1/ Okeechobee 2	Ft. Pierce and Port St. Lucie area (20-40 miles)	0.3	3.4

Each study area appears to have sufficient population centers within commuting distance and/or has experienced tremendous growth since 1990 such that its public services sector would be able to absorb the population in-migration associated with plant construction with minimal impact. However, Glades/Glades A comes in slightly lower in comparison to the other four sites, three of which (Hendry 1, Okeechobee 1, and Okeechobee 2) are within 50 miles of more than one large MSA.

Finally, this evaluation also incorporates more recent findings from a study conducted by Dominion Energy Inc., Bechtel Power Corporation, TLG, Inc., and MPR Associates for the US Department of Energy (2004) titled: *Study of Construction Technologies and Schedules, O&M Staffing and Cost, Decommissioning Costs and Funding Requirements for Advanced Reactor Designs*. This report includes a more accurate and up-to-date assessment of labor availability that takes into account a U.S. labor pool that is aging and diminishing in number and skill level (with retirement of the baby boom generation that constructed the first set of nuclear power plants). It recognizes that attracting craft with the high skill levels and regulatory employment

criteria for new nuclear plant construction is expected to be difficult given that the group of craft currently doing nuclear work is significantly smaller than the total construction craft population, and is in higher demand because of the higher skill levels and greater capability to meet strict employment standards (e.g., scrutiny of NRC background check). However, in an effort to reduce or minimize the labor supply concerns associated with new nuclear plant construction projects, a new strategy has been identified that would shift portions of the work force to areas of the country where skills and craft are available in sufficient quantity (national workforce). This would most effectively be done through modularizing portions of the plants to be built, and providing aggressive training of craftsmen before and during the construction phase of the project. Modularization is anticipated to become an important aspect of new nuclear construction. Such a workforce would presumably be in-migrant for the duration of the construction period and have the potential to adversely affect housing and community services at those sites located in rural, low populated areas/host counties.

Based on the results above, this latest information and using best professional judgment, a comparison of socioeconomic conditions between the remaining sites reveals similar conditions at each of them with perhaps a slight disadvantage to the Glades and Glades A sites given their lower population and workforce numbers, particularly within the host county. Because of the general rural nature of all sites and the slightly lower results for the Glades and Glades A sites, the following conservative ratings are assigned. Martin/Martin A, St. Lucie, and Turkey Point sites rate the highest as noted previously.

Site	Rating
DeSoto	3
Glades	2
Glades A	2
Hendry I	3
Martin	5
Martin A	5
Okeechobee 1	3
Okeechobee 2	3
St. Lucie	5
Turkey Point	5

#### D.3.2 SOCIOECONOMICS – OPERATION

Socioeconomic impacts of operation relate primarily to the benefits afforded to local communities as a result of the plant's presence (e.g., tax plans, local emergency planning support, educational program support). These benefits tend to be a function of negotiations between the plant owner and local government; they are not indicative of inherent site conditions that affect relative suitability between sites. In addition, three of the primary sites have previously demonstrated that their local economies can support existing plant operations, and an additional unit will not adversely affect an area that has already shown its ability to support existing units.



This criterion is not applicable to a comparison of the primary sites, and in accordance with guidance in the Siting Guide, suitability scores were not developed.

### D.3.3 ENVIRONMENTAL JUSTICE

Objective – The objective of this criterion is to ensure that the effects of proposed actions do not result in disproportionate adverse impacts to minority and low-income communities. In comparing sites, this principle is evaluated on the basis of whether any disproportionate impacts to these communities are significantly different when comparing one site to another.

Evaluation approach – The first step in this evaluation is to collect and compare population data for minorities and low-income populations across sites.

However, two additional questions comprising this evaluation also are relevant:

1. Does the proposed action result in significant adverse impacts?
2. Are impacts to minority or low-income populations significantly different between sites?

If the answer to the first question is “no” for all sites (i.e., no significant health and safety impacts are identified), then there would be no environmental justice concerns, regardless of the percentage of minority or low-income populations found within the surrounding communities of a site(s). If the answer to the first question is “yes” (i.e., significant health and safety impacts are expected), environmental justice concerns are relevant to site selection only if the answer to the second question is also “yes” (i.e., disproportionate adverse impacts on minority or low-income populations are identified at one or more sites, thereby resulting in significant differences between sites).

Note that the study area for evaluating environmental justice concerns included the host county and immediately surrounding counties.

Discussion – With regard to the sites under consideration, related environmental justice information is summarized for each primary site below. Data for white population is for one race alone.

**DeSoto Site Minority and Low Income Population/Percentages**

<b>County</b>	<b>Population (2000)</b>	<b>White</b>	<b>Minority</b>	<b>Low Income (% / pop)</b>
DeSoto	32,209	23,619	8,590	18.3 / 5,894
Sarasota	325,957	301,985	23,972	8.4 / 27,380
Manatee	264,002	227,981	36,021	10.8 / 28,512
Charlotte	141,627	131,125	10,502	9.3 / 13,171
Glades	10,576	8,142	2,434	13.1 / 1,385
Hardee	26,938	19,035	7,903	20.6 / 5,549
Highlands	87,366	72,926	14,440	13.9 / 12,185
<b>Total</b>	<b>888,675</b>	<b>784,813</b>	<b>103,862</b>	<b>94076</b>

Source: U.S. Census Bureau, <http://quickfacts.census.gov/qfd/> for Florida

**Glades/Glades A Site Minority and Low Income Population/Percentages**

<b>County</b>	<b>Population (2000)</b>	<b>White</b>	<b>Minority</b>	<b>Low Income (% / pop)</b>
Glades	10,576	8,142	2,434	13.1 / 1,385
Lee	440,888	386,598	54,290	10.2 / 44,970
Highlands	87,366	72,926	14,440	13.9 / 12,185
Hendry	36,210	23,926	12,284	18 / 6,518
<b>Total</b>	<b>575,037</b>	<b>491,592</b>	<b>83,448</b>	<b>65,058</b>

Source: U.S. Census Bureau, <http://quickfacts.census.gov/qfd/> for Florida

**Hendry 1 Site Minority and Low Income Population/Percentages**

<b>County</b>	<b>Population (2000)</b>	<b>White</b>	<b>Minority</b>	<b>Low Income (% / pop)</b>
Hendry	36,210	23,926	12,284	18 / 6,518
Glades	10,576	8,142	2,434	13.1 / 1,385
Palm Beach	1,131,184	894,207	236,977	10.9 / 123,299
<b>Total</b>	<b>1,177,970</b>	<b>926,275</b>	<b>251,695</b>	<b>131,202</b>

Source: U.S. Census Bureau, <http://quickfacts.census.gov/qfd/> for Florida

**Martin/Martin A Site Minority and Low Income Population/Percentages**

<b>County</b>	<b>Population (2000)</b>	<b>White</b>	<b>Minority</b>	<b>Low Income (population)</b>
Martin	126,731	113,912	12,819	9.2 / 11,659
St. Lucie	192,695	152,504	40,191	12.9 / 24,857
Palm Beach	1,131,184	894,207	236,977	10.9 / 123,299
Okeechobee	35,910	28,468	7,442	15 / 5,386
<b>Total</b>	<b>1,486,520</b>	<b>1,189,091</b>	<b>297,429</b>	<b>165,201</b>

Source: U.S. Census Bureau, <http://quickfacts.census.gov/qfd/> for Florida

**Okeechobee 1/Okeechobee 2 Site Minority and Low Income Population/Percentages**

<b>County</b>	<b>Population (2000)</b>	<b>White</b>	<b>Minority</b>	<b>Low Income (% / pop)</b>
Okeechobee	35,910	28,468	7,442	15 / 5,386
St. Lucie	192,695	152,504	40,191	12.9 / 24,857
Highlands	87,366	72,926	14,440	13.9 / 12,185
Martin	126,731	113,912	12,819	9.2 / 11,659
Glades	10,576	8,142	2,434	13.1 / 1,385
Indian River	112,947	98,754	14,193	10 / 11,295
Osceola	172,493	133,169	39,324	13.1 / 22,596
<b>Total</b>	<b>738,718</b>	<b>607,875</b>	<b>130,843</b>	<b>90,361</b>

Source: U.S. Census Bureau, <http://quickfacts.census.gov/qfd/> for Florida

**St. Lucie Site Minority and Low Income Population/Percentages**

<b>County</b>	<b>Population (2000)</b>	<b>White</b>	<b>Minority</b>	<b>Low Income (% / pop)</b>
St. Lucie	192,695	152,504	40,191	12.9 / 24,857
Indian River	112,947	98,754	14,193	10 / 11,295
Martin	126,731	113,912	12,819	9.2 / 11,659
Palm Beach	1,131,184	894,207	236,977	10.9 / 123,299
Okeechobee	35,910	28,468	7,442	15 / 5,386
<b>Total</b>	<b>1,599,467</b>	<b>1,287,845</b>	<b>311,622</b>	<b>176,496</b>

Source: U.S. Census Bureau, <http://quickfacts.census.gov/qfd/> for Florida

### Turkey Point Site Minority and Low Income Population/Percentages

County	Population (2000)	White	Minority	Low Income (% / pop)
Miami-Dade	2,253,362	1,570,558	682,804	18.9 / 425,885
Broward	1,623,081	1,145,287	477,794	12.5 / 202,885
<b>Total</b>	<b>3,876,443</b>	<b>2,715,845</b>	<b>1,160,598</b>	<b>628,770</b>

Source: U.S. Census Bureau, <http://quickfacts.census.gov/qfd/> for Florida

**Results** – Environmental justice data for the primary sites are summarized below.

Site	Population (2000)	White (%)	Minority (%)	Low Income (%)
DeSoto	888,675	88	12	10.6
Glades/ Glades A	575,037	85.5	14.5	11.3
Hendry 1	1,177,970	78.6	21.4	11.1
Martin/ Martin A	1,486,520	80	20	11.1
Okeechobee 1/ Okeechobee 2	738,718	82.3	17.7	12.2
St. Lucie	1,599,467	80.5	19.5	11
Turkey Point	3,876,443	70	30	16.2

\*State average for Florida is 78% white (22% minority) and 13% below poverty line (low income).

All sites had minority populations greater than 10%; minority populations of 20% or higher are found at four sites (Hendry 1, Martin, Martin A, and Turkey Point), with 19.5% found at St. Lucie; although note that the state average minority population for Florida is 22%.

Low-income populations higher than the state average is found only at Turkey Point; however, when evaluating income below poverty line for the individual counties, host counties DeSoto, Hendry and Miami-Dade have 18% or higher populations living below the poverty line.

Low-income populations in other counties in the South that currently host existing nuclear power plants have directly benefited from economic impacts of the existing plant. Similar beneficial economic impacts are expected to occur for additional units at existing Turkey Point site, as well as at the other sites with large minority populations as well.

Based on professional judgment in factoring in the above percentages alone, the initial site ratings are as follows:

Site	Rating
DeSoto	4
Glades	4
Glades A	4
Hendry 1	3
Martin	3
Martin A	3
Okeechobee 1	4
Okeechobee 2	4
St. Lucie	4
Turkey Point	2

However, given that no significant impacts to any human populations are expected to occur at any of the sites under consideration, there cannot be significant disproportionate impacts to minority or low-income populations; and based on actual employment experience, positive economic benefits have been shown to be available to all members of the population, without regard to income or ethnicity.

While disproportionate adverse impacts could be expected to occur to minority or low-income populations at the Turkey Point site (and perhaps the DeSoto and Hendry sites given higher low income populations in their host counties), if significant health and safety impacts were expected from a new nuclear reactor, no significant health and safety impacts are expected to human populations from reactor operations. Therefore, if no significant health and safety impacts are identified from reactor construction and operation, then there would be no environmental justice concerns, regardless of the percentage of minority or low-income populations found within the surrounding communities. Therefore, no significant differences in environmental justice impacts are expected between the primary sites and all should receive a final comparative rating of 5.

Based on this analysis, there is no basis for differentiation between sites from an environmental justice perspective, despite differences in the percentages of minority and low-income populations found within the surrounding communities of each site. All sites are found to be equally and highly suitable. Therefore, the site ratings are as follows:

Site	Rating
DeSoto	5
Glades	5
Glades A	5
Hendry 1	5
Martin	5

Site	Rating
Martin A	5
Okeechobee 1	5
Okeechobee 2	5
St. Lucie	5
Turkey Point	5

#### D.3.4 LAND USE

##### D.3.4.1 **Construction- and Operation-Related Effects**

**Objective** – The objective of this criterion is to evaluate the suitability of the primary sites with respect to potential conflicts in existing land uses at each site. No exclusionary or avoidance criteria apply to this issue.

**Evaluation Approach** – The evaluation is based on the compatibility of a new nuclear station with existing land uses, including existing and future land uses and zoning ordinances, as well as any significant historic resources. Historic resources include those currently listed on the National Register of Historic Places (NRHP), or known (active) archaeological sites or Native American lands.

**Discussion/Results** – Special land use features, including proximity to National Register of Historic Places (NRHP) sites and dedicated lands/special ecological areas are summarized for each site in the table below. No major issues were identified at any of the sites; however, the potential difficulty in changing existing land use or zoning plans is unclear for the rural, heavy agricultural sites, so they were given a conservative rating of 3. There is also a similar concern at the existing St. Lucie site given the surrounding protected uses, site location on an island between the Atlantic and Indian River Lagoon, and resulting space limitations for construction of two new units. Turkey Point is rated most favorable given the suitable acreage and existing and consistent industrial (i.e. other FPL power plants) surrounding the site.

Site	Special Land Use Features in Vicinity of Site
DeSoto	Greenfield site: Undeveloped on 13,500 acre property in unincorporated DeSoto County. Adjacent to portions of the Peace River. Land on site is currently dedicated to agricultural use (sod farming, cattle grazing and truck crops). Developed portions of the adjacent properties are primarily agricultural (sod farms, citrus groves, and cattle grazing). Undeveloped portions include mixed scrub with some hardwoods and a few isolated wetlands. Agricultural land use would not appear to be consistent for nuclear power plant. Potential difficulty in changing existing land use or zoning is unclear. Historic Sites (NRHP): None in vicinity – two sites located in Arcadia.

Site	Special Land Use Features in Vicinity of Site
Glades	<p>Remote and rural agrarian; mostly agricultural; County is the second largest producer of sugarcane in the state.</p> <p>Agricultural land use would not appear to be consistent for nuclear power plant. Potential difficulty in changing existing land use or zoning is unclear.</p> <p>Two management areas within 5 miles (north) of site: Nicodemus Slough and Fisheating Green Wildlife Management area.</p> <p>Located near shore of Lake Okeechobee; Brighton Indian Reservation located several miles to the north.</p> <p>NRHP Sites: Moore Haven (Downtown Historic District and Residential Historic District).</p>
Glades A	<p>Remote and rural agrarian; mostly agricultural; immediate site area is cleared pasture/agricultural land. Glades County is the second largest producer of sugarcane in the state.</p> <p>Agricultural land use would not appear to be consistent for nuclear power plant. Potential difficulty in changing existing land use or zoning is unclear.</p> <p>Fisheating Creek Wildlife Management Area within 5 miles (NE) of site: Located near shore of Lake Okeechobee.</p> <p>Closest NRHP Sites: LaBelle Downtown Historic District (30 acres and 9 buildings), and 4 other historic structures in LaBelle - to south of site in Hendry County (approximately 9 miles from site).</p>
Hendry 1	<p>Remote and rural; mostly agricultural/farmland.</p> <p>Largest producer of sugarcane in state; crops; cattle and citrus around Lake Okeechobee.</p> <p>Located near shores of Lake Okeechobee.</p> <p>Agricultural land use would not appear to be consistent for nuclear power plant. Potential difficulty in changing existing land use or zoning is unclear.</p> <p>NRHP Sites: None in vicinity; all located in La Belle and Clewiston.</p>
Martin	<p>Industrial site with existing power plant (3,700 MW), including 6,800-acre cooling reservoir; existing power plant located on 3,000 acres. To east is area of mixed pine flat wood with scattering of small wetlands.</p> <p>North is 1,200 acre cooling pond set aside as mitigation.</p> <p>Peninsula of wetland forest on west side of reservoir that is named the Barley Barber Swamp. The Barley Barber Swamp encompasses 400 acres and is preserved as a natural area. There is a 10 kW photovoltaic energy facility at the south end of the site. There is also a solar thermal energy facility at the south end of the site (not yet under construction in 2006, completed in 2010).</p> <p>Located on Lake Okeechobee and near J.W. Corbett Wildlife Management Area and Loxahatchee National Wildlife Refuge.</p> <p>NRHP Sites: None in vicinity.</p>



Site	Special Land Use Features in Vicinity of Site
Martin A	<p>Site is located in the middle of Martin County, northeast of Indiantown and north of the St. Lucie Canal. Area surrounding site is agricultural or open/wetland areas (to south of the canal). Lake Okeechobee lies to the west and the J.W. Corbett Wildlife Management Area is located to the south in West Palm County.</p> <p>The immediate site area is cleared/planted in crop. Industrial facilities are located several miles to the west (including the FPL's Martin Plant and recently constructed solar thermal plant). However, zoning for nuclear is expected to be a challenge given the presence of significant agriculture in immediate site vicinity and fact that Martin County favors renewable energy. Given Martin A is a greenfield site and would require a zoning change, it receives a lower rating than the existing Martin power plant site; it is given a rating of "2".</p> <p>NRHP Sites: The Seminole Inn in Indiantown was added to the NRHP in May 2006.</p>
Okeechobee 1	<p>Remote and rural; lightly populated; agrarian. County has high levels of cattle, dairy, and citrus farms. Agricultural land use would not appear to be consistent for nuclear power plant. Potential difficulty in changing existing land use or zoning is unclear.</p> <p>NRHP Sites: None in vicinity; located in Okeechobee (2 sites).</p>
Okeechobee 2	<p>Remote and rural; lightly populated; agrarian. County has high levels of cattle, dairy, and citrus farms. Agricultural land use would not appear to be consistent for nuclear power plant. Potential difficulty in changing existing land use or zoning is unclear.</p> <p>NRHP Sites: None in vicinity; located in Okeechobee (2 sites).</p>
St. Lucie	<p>Existing power plant (nuclear) site. Located on Hutchinson Island. Two county parks (Blind Creek Pass and Walton Rocks Park) lie within site boundary.</p> <p>Indian River Lagoon located west of facility; stretch of lagoon adjacent to site is designated as the Jensen Beach to Jupiter Inlet Aquatic Preserve.</p> <p>Fort Pierce Inlet State Recreation Area 9 miles north of site.</p> <p>Savannas State Preserve freshwater wetland is located 2 miles west.</p> <p>Other prominent features within 50 miles of site include Lake Okeechobee, Blue Cypress Lake, Jonathan Dickinson State Park, Dupuis Reserve State Forest, JW Corbett Wildlife Management Area, portion of Brighton Seminole Indian Reservation, and Hobe Sound, Pelican Island, and Loxahatchee National Wildlife Refuges. Sand pine community containing several rare and endangered plants and animals.</p> <p>Hobe Sound NWR located south of the site on Jupiter Island. Includes one of the most productive sea turtle nesting areas in the US (listed leatherback, green and loggerhead sea turtles lay their eggs there).</p> <p>NRHP sites in Ft. Pierce (many including in Stuart, Jupiter island, Jensen Beach and Hobe Sound); also a shipwreck:</p> <p>URCA DE LIMA (shipwreck) (added 2001 - Site - #01000529). Also known as URCA DE LUCA State Underwater Archeological Preserve 200 yds offshore Jack Island Park, N of Ft. Pierce Inlet, Ft. Pierce.</p>

Site	Special Land Use Features in Vicinity of Site
Turkey Point	Existing industrial site on shore of part of Biscayne Bay with ecologically sensitive areas nearby including two National Parks: Biscayne National Park (3.2 miles from park headquarters); Everglades National Park (15 miles west of the site). Small portions of Miccosukee Indian Reservation and Big Cypress National Preserve are within 50 miles. Bill Baggs Cape Florida State Recreation Area and Key Large Hammocks State Botanical Site also found near the site. Ecologically sensitive estuarine environment along the coast. NRHP Sites: Numerous, including many in Homestead and Biscayne National Park but presumably would not be affected by the plant since land is owned by FPL and existing power plants/nuclear units located there now.

Site	Rating
DeSoto	3
Glades	3
Glades A	3
Hendry 1	3
Martin	3
Martin A	2
Okeechobee 1	3
Okeechobee 2	3
St. Lucie	3
Turkey Point	4

## References

Glades Environmental Site Assessment.

St. Lucie and Turkey Point Relicensing Environmental Reports and Supplemental NRC EISs (License Renewal Generic EIS, NUREG 1427, Supplements 5 (Turkey Point Units 3 & 4, January 2002) and 11 (St. Lucie Units 1 and 2, May 2003).

Florida Wildlife Viewing Guide, 1998.

Google Earth and Florida Atlas & Gazetteer for general land use information for new sites.

National Register of Historic Places (NRHP) database, found at:  
<http://www.nationalregisterofhistoricplaces.com/> [link to state and county] or through the National Park Service website: <http://www.nps.gov/nr/research/> [link to NRHP database at <http://nrhp.focus.nps.gov/natreghome.do?searchtype=natreghome> and then specify state and county (for list by county)].

## **D.4 ENGINEERING AND COST-RELATED CRITERIA**

### **D.4.1 HEALTH AND SAFETY RELATED CRITERIA**

#### **D.4.1.1 Water Supply**

**Objective** – The purpose of this criterion is to evaluate relative differences in the design and construction cost of developing water supply facilities.

**Evaluation approach** – Sites with local conditions that would require additional engineering costs to develop water supply capability (e.g., reservoirs to address water supply limitations or reliability issues such as low flow constraints) are rated lower than sites with no such requirements. Because topography in the vicinity of the primary sites does not provide natural drainages that can easily be developed for reservoirs, actual construction of reservoirs would likely be very expensive, if feasible at all. Sites are characterized below in terms of the relative difficulty and expense of dealing with low-flow conditions at the sites, regardless of whether a reservoir or some other means of addressing drought conditions is adopted.

**Discussion/Results** – Because water flows vary among the sites, particularly during periods of low flow, reservoir requirements also will differ. Site ratings are based on professional judgment – taking into account major river body flows (average annual and low flow/drought conditions) (see section D.1.1.2), as well as the size and extent of on-site tributaries (conceptual engineering and cost studies were not undertaken as part of the site selection screening). Sites with no anticipated low-flow constraints received a 5; other ratings relate to the likelihood that a reservoir or other means to address low-flow conditions would be required.

<b>Site</b>	<b>Evaluation</b>	<b>Ranking</b>
DeSoto	The water supply for the proposed site is the Peace River; groundwater sources may augment this supply. Reservoir construction is likely to overcome low flow periods or withdrawal restrictions and the associated costs to engineer the water supply are anticipated to be relatively high.	1
Glades	Potential water supplies for the proposed site include the Caloosahatchee Canal and Lake Okeechobee (via the Caloosahatchee Canal); groundwater sources may augment this supply. Reservoir construction is likely to overcome low flow periods or withdrawal restrictions and the associated construction costs to deliver the water supply are anticipated to be moderate.	3
Glades A	Potential water supplies for the proposed site include the Caloosahatchee Canal and Lake Okeechobee (via the Caloosahatchee Canal); groundwater sources may augment this supply. Reservoir construction is likely to overcome low flow periods or withdrawal restrictions and the associated construction costs to deliver the water supply are anticipated to be moderate.	3

Site	Evaluation	Ranking
Hendry 1	Potential water supplies for the proposed site include the Caloosahatchee Canal and Lake Okeechobee (via the Caloosahatchee Canal); groundwater sources may augment this supply. Reservoir construction is likely to overcome low flow periods or withdrawal restrictions and the associated construction costs to deliver the water supply are anticipated to be moderate.	3
Martin	Potential water supplies for the proposed site include the St. Lucie Canal and Lake Okeechobee (via the St. Lucie Canal); groundwater sources may augment this supply. Reservoir construction is likely to overcome low flow periods or withdrawal restrictions and the associated construction costs to deliver the water supply are anticipated to be moderate.	3
Martin A	Potential water supplies for the proposed site include the St. Lucie Canal and Lake Okeechobee (via the St. Lucie Canal); groundwater sources may augment this supply. Reservoir construction is likely to overcome low flow periods or withdrawal restrictions and the associated construction costs to deliver the water supply are anticipated to be moderate.	3
Okeechobee 1	Potential water supplies for the proposed site include a combination of Lake Okeechobee and groundwater sources. Reservoir construction is likely to overcome low flow periods or withdrawal restrictions and the associated costs to engineer the combined water supply are anticipated to be relatively high.	1
Okeechobee 2	Potential water supplies for the proposed site include the Kissimmee River and Lake Okeechobee; groundwater sources may augment this supply. Reservoir construction is likely to overcome low flow periods or withdrawal restrictions and the associated construction costs to deliver the water supply are anticipated to be moderate.	3
St. Lucie	Potential water supplies for the proposed site include Ocean Intake. Due to the proximity of water supplies (site is coastal), construction costs to deliver the water supply are anticipated to be relatively low.	5
Turkey Point	Potential water supplies for the proposed site include reclaimed water and Ocean Intake (via radial collection wells). Due to the proximity and expected availability of water supplies, construction costs to deliver the water supply are anticipated to be relatively low.	5

Site	Rating
DeSoto	1
Glades	3
Glades A	3
Hendry 1	3
Martin	3
Martin A	3

Site	Rating
Okeechobee 1	1
Okeechobee 2	3
St. Lucie	5
Turkey Point	5

## References

USGS Topographic Maps.

### D.4.1.2 Pumping Distance

**Objective** – The purpose of this criterion is to evaluate relative differences in the operational costs associated with pumping makeup water from the source water body to the plant.

**Evaluation approach** – Sites located large distances from their makeup water supply source are rated lower than those located adjacent to the source. In general, the cost differential is expected to be a linear function of distance from the water source.

**Discussion/Results** – Precise intake and discharge locations have not yet been determined for primary sites as final plant locations and reservoir requirements/locations have yet to be determined. It is assumed that cooling facilities will be located as close to the water supply as possible.

Site	Evaluation	Ranking
DeSoto	The water supply for the proposed site is the Peace River; groundwater sources may augment this supply. The Peace River is located ~ 4 miles west of the proposed site. Pumping costs required to deliver the water supply are anticipated to be moderate.	3
Glades	Potential water supplies for the proposed site include the Caloosahatchee Canal and Lake Okeechobee (via the Caloosahatchee Canal); groundwater sources may augment this supply. The Caloosahatchee Canal is located ~ 2.5 miles south of the proposed site. Pumping costs required to deliver the water supply are anticipated to be moderately low.	4
Glades A	Potential water supplies for the proposed site include the Caloosahatchee Canal and Lake Okeechobee (via the Caloosahatchee Canal); groundwater sources may augment this supply. The Caloosahatchee Canal is located ~ 9 miles south of the proposed site. Pumping costs required to deliver the water supply are anticipated to be moderate.	3

Site	Evaluation	Ranking
Hendry 1	Potential water supplies for the proposed site include the Caloosahatchee Canal and Lake Okeechobee (via the Caloosahatchee Canal); groundwater sources may augment this supply. The Caloosahatchee Canal is located ~ 11 miles north of the proposed site. Pumping costs required to deliver the water supply are anticipated to be moderate.	3
Martin	Potential water supplies for the proposed site include the St. Lucie Canal and Lake Okeechobee (via the St. Lucie Canal); groundwater sources may augment this supply. The St. Lucie Canal is located ~ 3.5 miles south of the proposed site. Pumping costs required to deliver the water supply are anticipated to be moderately low.	4
Martin A	Potential water supplies for the proposed site include the St. Lucie Canal and Lake Okeechobee (via the St. Lucie Canal); groundwater sources may augment this supply. The St. Lucie Canal is located ~ 1 mile south of the proposed site. Pumping costs required to deliver the water supply are anticipated to be moderately low.	4
Okeechobee 1	Potential water supplies for the proposed site include a combination of Lake Okeechobee and groundwater sources. Lake Okeechobee is located ~ 10 miles south of the proposed site. Pumping costs required to deliver the water supply are anticipated to be moderate.	3
Okeechobee 2	Potential water supplies for the proposed site include the Kissimmee River and Lake Okeechobee; groundwater sources may augment this supply. The Kissimmee River is located ~ 2 miles southwest of the proposed site, and Lake Okeechobee is located ~ 8 miles southeast of the proposed site. Pumping costs required to deliver the water supply are anticipated to be moderately low.	4
St. Lucie	Potential water supplies for the proposed site include Ocean Intake. Due to the proximity of water supplies (site is coastal), pumping costs required to deliver the water supply are anticipated to be relatively low.	5
Turkey Point	Potential water supplies for the proposed site include reclaimed water and Ocean Intake (via radial collection wells). Due to the proximity of water supplies (site is coastal), pumping costs required to deliver the water supply are anticipated to be relatively low. The source of reclaimed water is ~ 7 miles north of the site.	5

Site	Rating
DeSoto	3
Glades	4
Glades A	3
Hendry 1	3
Martin	4

Site	Rating
Martin A	4
Okeechobee 1	3
Okeechobee 2	4
St. Lucie	5
Turkey Point	5

## References

USGS Topographic Maps (1:100,000 and 1:24,000 scale).

### D.4.1.3 Flooding

**Objective** – The purpose of this criterion is to rate sites with respect to differential costs associated with construction of flood protection structures necessary to address probable maximum floods at the sites under consideration.

**Evaluation approach** – Sites with the largest differences between site-grade elevation and likely flood elevations are rated highest; sites with plant grade at or near flood level are rated lowest.

**Discussion/Results** – Although final plant layout locations have not been set for primary sites, an initial comparison of potential site locations with floodplain information indicate that some proposed plant facilities may require protection from flooding.

Site	Evaluation	Ranking
DeSoto	The proposed site is not located in the 100-year flood zone. While swamp areas exist in the vicinity of the proposed site, ample areas exist for precise site location to avoid swamp areas and areas within the 100-year flood zone. No other neighboring flooding concerns exist. If required, construction of flood protection structures would be minimal.	5
Glades	The proposed site is located within the 100-year flood zone (located in the vicinity of the Caloosahatchee Canal and Lake Okeechobee). Failure of the Herbert Hoover Dike on Lake Okeechobee would present flooding concerns to the proposed site and could result in flood depths of 6 feet. Therefore, construction of flood protection structures or fill to elevate the proposed site is likely to be necessary.	3
Glades A	The proposed site is located on the border of the 100-year flood zone. While some swamp areas exist in the vicinity of the proposed site, ample areas exist for precise site location to avoid swamp areas. No other neighboring flooding concerns exist. Construction of flood protection structures maybe necessary, but would be minimal.	4

Site	Evaluation	Ranking
Hendry 1	The proposed site is located in the 100-year flood zone and is near swamp areas. Existing secondary levees protect the proposed site from flooding due to failure of the Herbert Hoover Dike on Lake Okeechobee. No other neighboring flooding concerns exist. Construction of flood protection structures or fill to elevate the proposed site is likely to be necessary, but would be minimal.	4
Martin	The proposed site is not located in the 100-year flood zone. While swamp areas exist in the vicinity of the proposed site, ample areas exist for precise site location to avoid swamp areas and areas within the 100-year flood zone. Existing secondary levees protect the proposed site from flooding due to failure of the Herbert Hoover Dike on Lake Okeechobee. No other neighboring flooding concerns exist. If required, construction of flood protection structures would be minimal.	5
Martin A	The proposed site is not located in the 100-year flood zone. While some swamp areas exist in the vicinity of the proposed site, ample areas exist for precise site location to avoid swamp areas and areas within the 100-year flood zone. Existing berms protect the proposed site from flooding of the St. Lucie canal. No other neighboring flooding concerns exist. Due to the proximity of the St. Lucie canal, construction of flood protection structures may be required, but would be minimal.	4
Okeechobee 1	The proposed site is not located in the 100-year flood zone. While swamp areas exist in the vicinity of the proposed site, ample areas exist for precise site location to avoid swamp areas and areas within the 100-year flood zone. No other neighboring flooding concerns exist. If required, construction of flood protection structures would be minimal.	5
Okeechobee 2	The proposed site is located on the border of the 100-year flood zone. While swamp areas exist in the vicinity of the proposed site, ample areas exist for precise site location to avoid swamp areas. The location of the Kissimmee River protects the proposed site from flooding due to failure of the Herbert Hoover Dike on Lake Okeechobee. No other neighboring flooding concerns exist. Construction of flood protection structures or fill to elevate the proposed site is likely to be necessary, but would be minimal.	4
St. Lucie	The proposed site is located in the 100-year flood zone with base flood elevations of 7-8 feet. Adverse climatic events (e.g., area hurricanes) would likely result in flooding of the proposed site. Construction of flood protection structures or fill to elevate the proposed site will be required and would likely be more robust than other proposed sites.	2



Site	Evaluation	Ranking
Turkey Point	The proposed site is located in the 100-year flood zone with base flood elevations of 12 feet. Adverse climatic events (e.g., area hurricanes) would likely result in flooding of the proposed site. Construction of flood protection structures or fill to elevate the proposed site will be required and would likely be more robust than other proposed sites.	2

Site	Rating
DeSoto	5
Glades	3
Glades A	4
Hendry 1	4
Martin	5
Martin A	4
Okeechobee 1	5
Okeechobee 2	4
St. Lucie	2
Turkey Point	2

## References

FEMA Digital Flood Insurance Rate Maps, <http://www.fema.gov/fhm/>.

USGS Topographic Maps.

### D.4.1.4 Vibratory Ground Motion – *Deleted from evaluation*

The objective of this criterion is to provide a relative measure of cost associated with designing to different seismic requirements at different sites. Because all of the sites under consideration are expected to meet the site parameters for seismic design of the standardized designs under consideration, this criterion is not applicable to the FPL Florida service territory site selection process.

### D.4.1.5 Civil Works

**Objective** – The objective of this criterion (formerly titled “soil stability”) is to rate sites according to differences in the cost of civil works (e.g., non-flood related berms, stabilizing of graded slopes and banks) necessary to prepare the site for nuclear plant development.

**Evaluation approach** – Sites are rated highest to lowest according to the estimated level of cost of civil works required at each site.

**Discussion/Results** – The existing primary sites (St. Lucie and Turkey Point) are located at operating plants that have been previously developed and have been shown to be capable of supporting conventional foundation designs. Accordingly, the existing sites are assigned a median rating of 3.

Given the general lack of site specific geotechnical information on the remaining sites, consideration was allotted to the overall elevation above sea level as a potential indicator of dewatering needs and overall site relief as an indicator of potential grading and excavation.

Site	Avg. elev. <sup>1</sup>	Relief <sup>2</sup>	Overall Rating
DeSoto	4	2	3
Glades	1	3	2
Glades A	3	3	3
Hendry 1	1	3	2
Martin	2	3	2.5
Martin A	2	4	3
Okeechobee 1	3	3	3
Okeechobee 2	2	2	2
St. Lucie	1	5	3
Turkey Point	1	5	3

<sup>1</sup> 80'+ = 5, 60'+ = 4, 40'+ = 3, 20'+ = 2, 0'+ = 1

<sup>2</sup> 0' = 5, <5' = 4, <10' = 3, <20' = 2, 20'+ = 1

#### D.4.2 TRANSPORTATION OR TRANSMISSION-RELATED CRITERIA

##### D.4.2.1 **Railroad Access**

**Objective** – The purpose of this criterion is to rate sites according to the relative costs associated with providing rail access.

**Evaluation approach** – Sites are rated from highest to lowest in accordance with the length of additional or new rail spur construction required to provide rail access, scaled from those discussed in the screening criteria report, Criterion P7. Sites having rail access within 2 miles or less receive a rating of 5; sites with rail access between 2 and 5 miles away receive a rating of 4, and sites with rail access greater than 5 miles away receive a rating of 3.

Some sites are located near abandoned rail lines. The site-specific condition of abandoned rail lines is unknown and could range from removed/revegetated to present and operable with minimal upgrade. Therefore, distances used in this analysis are to the nearest rail line in service and assume abandoned rail lines have been removed/revegetated. Should rail access become a sensitive criterion for site selection, site-specific conditions of abandoned rail lines should be more fully evaluated.

Discussion/Results – Distances to rail service at each of the sites were measured in the Preliminary Screening Evaluation (based on USGS topographic maps and summarized in Appendix C). Assuming that (1) passenger lines may be used for a one-time delivery of plant equipment to the site, (2) abandoned lines have been removed/revegetated, and (3) costs are based on a straight linear scale of costs for construction of rail spurs to the sites from these lines, ratings for the sites are assigned in the table below.

Site	Evaluation	Ranking
DeSoto	Rail is ~ 7.1 miles W (operated by CSX Transportation). A rail line between Arcadia, FL and Bowling Green, FL (~ 2.3 miles west of the proposed site) formerly operated by Seaboard System RR has since been abandoned.	3
Glades	Rail is ~ 3.1 miles NE (operated by South Central Florida Express, CSX Transportation has trackage rights).	4
Glades A	Potential site is located ~ 8.4 miles southwest of existing rail (near Palmdale, FL). This rail line is operated by South Central Florida Express and does not support passenger service.  A rail line running south from Palmdale, FL to Sunniland, FL (~ 7.7 miles east of the potential site) formerly operated by Seaboard System RR has since been abandoned.	3
Hendry 1	Rail is ~ 8.7 miles NE (operated by South Central Florida Express, CSX Transportation and Florida East Coast Railway have trackage rights).	3
Martin	Rail is accessible at the Martin site via a siding from the main rail line to the existing plant. The rail siding is owned by Florida East Coast Railway and is operated by South Central Florida Express under a long term lease agreement. Rail is ~ 1.5 miles NE (operated by CSX Transportation). Rail is ~ 2.8 miles W (operated by Florida East Coast Railway).	5
Martin A	Rail is ~ 4.4 miles SW (operated by CSX Transportation).	4
Okeechobee 1	Rail is ~ 8.3 miles SW (operated by CSX Transportation). Rail is ~ 13.1 miles SE (operated by Florida East Coast Railway).	3
Okeechobee 2	Rail is ~ 2.2 miles NE (operated by CSX Transportation).	4
St. Lucie	Rail is ~ 2.1 miles W (operated by Florida East Coast Railway). However, the Intercoastal Waterway is located between the St. Lucie site and this rail line.  Due to the coastal location of the St. Lucie site, barge access is accessible in the immediate vicinity for delivery of heavy/large items. However, since rail access is not immediately accessible, a rating of 5 was not assigned.	4

Site	Evaluation	Ranking
Turkey Point	<p>Rail is ~ 10.3 miles W (operated by CSX Transportation). Homestead, FL marks the southernmost point of Florida served by rail.</p> <p>A rail line to Homestead, FL formerly operated by Florida East Coast Railway has since been abandoned.</p> <p>Due to the coastal location of the Turkey Point site, barge access is immediately accessible for delivery of heavy/large items. A barge channel has been constructed in Biscayne Bay providing direct access to the site. As barge access provides an alternative to rail access, the rating has been increased to 4 (however, since rail access is not immediately accessible, a rating of 5 was not assigned).</p>	4

Site	Rating
DeSoto	3
Glades	4
Glades A	3
Hendry 1	3
Martin	5
Martin A	4
Okeechobee 1	3
Okeechobee 2	4
St. Lucie	4
Turkey Point	4

## References

North American Railroad Map, version 3.0, <http://www.RailroadMap.com>.

USGS Topographic Maps (1:100,000 and 1:24,000 scale).

### D.4.2.2 Highway Access

**Objective** – The purpose of this criterion is to rate sites according to the relative costs associated with providing highway access.

**Evaluation approach** – Sites are rated from highest to lowest in accordance with the length of additional or new highway construction required to provide car and truck access.

**Discussion/Results** – The following table evaluates the existing roads serving the site areas. All sites are located near existing roads, and construction of site access is predicted to be minimal. Therefore, each site has been assigned a rating of 5, with the exception of Glades A and Hendry 1 which would likely require more construction than other sites.

Site	Evaluation	Ranking
DeSoto	Proposed site is located ~ 2.5 miles east of U.S. Highway 17 and ~ 7.3 miles north of State Highway 70. These roads provide main access to the area. U.S Highway 27 is also located ~ 23 miles east of the proposed site at Lake Placid, FL. Construction of local access would be required but should be minimal.	5
Glades	Proposed site is located ~ 1.0 miles south of U.S. Highway 27 and State Highway 78. These roads provide main access to the area. Construction of local access would be required but should be minimal.	5
Glades A	Proposed site is located ~ 8.5 miles west of U.S. Highway 27 (near Palmdale, FL) and ~ 5.3 miles northwest of State Highway 29. These roads provide main access to the area. Construction of local access would be required but should be minimal, although greater than other sites.	4
Hendry 1	Proposed site is located ~ 5.4 miles east of State Highway 833 and ~ 6.4 miles south of U.S. Highway 27. These roads provide main access to the area. Construction of local access would be required but should be minimal, although greater than other sites.	4
Martin	Proposed site is located ~ 1.1 miles southwest of State Highway 710 and ~ 5.6 miles east of U.S. Highway 98/441. Area access exists due to co-location with the existing Martin power plant. Construction of local access would be required but should be minimal.	5
Martin A	Proposed site is located ~ 1.1 miles southwest of State Highway 710 and ~ 5.6 miles east of U.S. Highway 98/441. These roads provide main access to the area. Construction of local access would be required but should be minimal.	5
Okeechobee 1	Proposed site is located ~ 5.7 miles east of U.S. Highway 441 and ~ 3.9 miles northwest of State Highway 70. These roads provide main access to the area. Construction of local access would be required but should be minimal.	5
Okeechobee 2	Proposed site is located ~ 0.4 miles north of State Highway 70 and ~ 4.3 miles southwest of U.S. Highway 98. These roads provide main access to the area. Construction of local access would be required but should be minimal.	5
St. Lucie	Proposed site is located on Hutchinson Island adjacent to Highway A1A and ~ 9.8 miles from access to U.S. Highway 1 and Interstate 95. Area access exists due to co-location with the existing St. Lucie nuclear power plant. Construction of local access would be required but should be minimal.	5
Turkey Point	Proposed site is located ~ 9.1 miles east of U.S. Highway 1 and the Florida Turnpike. Privately owned access exists to the existing Turkey Point nuclear power plant. Additional local access construction would be required but should be minimal.	5

Site	Rating
DeSoto	5
Glades	5
Glades A	4
Hendry 1	4
Martin	5
Martin A	5
Okeechobee 1	5
Okeechobee 2	5
St. Lucie	5
Turkey Point	5

## References

Rand McNally Road Atlas.

USGS Topographic Maps (1:100,000 and 1:24,000 scale).

### D.4.2.3 Barge Access

**Objective** – The purpose of this criterion is to rate sites according to the relative costs associated with providing barge access.

**Evaluation approach** – Sites are rated from highest to lowest in accordance with estimated cost of facilities construction required to provide barge access.

**Discussion/Results** – The following table evaluates the area geography permitting barge access to the primary sites.

Site	Evaluation	Ranking
DeSoto	The proposed site is located ~ 55 miles southeast of the Tampa Cargo Seaport. Intermodal transport of heavy/large items would be required.	1
Glades	The proposed site is located ~ 5 miles west of Lake Okeechobee, which is accessible by barge (Okeechobee Waterway) from either the Atlantic Ocean (Stuart, FL via 2 locks) or the Gulf of Mexico (Ft. Myers, FL via 3 locks). The barge channel is 8 feet deep with an 80 foot bottom width.	3

Site	Evaluation	Ranking
Glades A	The proposed site is located ~ 9 miles north of the Okeechobee Waterway, which is accessible by barge from the Gulf of Mexico (Ft. Myers, FL via 3 locks). The barge channel is 8 feet deep with an 80 foot bottom width.	3
Hendry 1	The proposed site is located ~ 11 miles south of Lake Okeechobee, which is accessible by barge (Okeechobee Waterway) from either the Atlantic Ocean (Stuart, FL via 2 locks) or the Gulf of Mexico (Ft. Myers, FL via 3 locks). The barge channel is 8 feet deep with an 80 foot bottom width.	3
Martin	The proposed site is located ~ 5 miles east of Lake Okeechobee, which is accessible by barge (Okeechobee Waterway) from either the Atlantic Ocean (Stuart, FL via 2 locks) or the Gulf of Mexico (Ft. Myers, FL via 3 locks). The barge channel is 8 feet deep with an 80 foot bottom width.  As rail access is available immediately adjacent to the proposed site and provides an alternative to barge transport, the rating has been increased to 4 (however, since barge access is not immediately accessible, a rating of 5 was not assigned).	4
Martin A	The proposed site is located ~ 1 mile north of the Okeechobee Waterway, which is accessible by barge from the Atlantic Ocean (Stuart, FL via 2 locks). The barge channel is 8 feet deep with an 80 foot bottom width.	3
Okeechobee 1	The proposed site is located ~ 10 miles north of Lake Okeechobee, which is accessible by barge (Okeechobee Waterway) from either the Atlantic Ocean (Stuart, FL via 2 locks) or the Gulf of Mexico (Ft. Myers, FL via 3 locks). The barge channel is 8 feet deep with an 80 foot bottom width.	3
Okeechobee 2	The proposed site is located ~ 8 miles north of Lake Okeechobee, which is accessible by barge (Okeechobee Waterway) from either the Atlantic Ocean (Stuart, FL via 2 locks) or the Gulf of Mexico (Ft. Myers, FL via 3 locks). The barge channel is 8 feet deep with an 80 foot bottom width.	3
St. Lucie	The proposed site is located on the coast of the Atlantic Ocean. Barge access is available at the proposed site.	5
Turkey Point	The proposed site is located on the coast of the Atlantic Ocean/Biscayne Bay. A barge canal has been constructed from the northeast and provides direct barge access to the proposed site.	5

Site	Rating
DeSoto	1
Glades	3

Site	Rating
Glades A	3
Hendry 1	3
Martin	4
Martin A	3
Okeechobee 1	3
Okeechobee 2	3
St. Lucie	5
Turkey Point	5

## References

Florida Intracoastal and Inland Waterway Study, Final Report, May 2003.

USGS Topographic Maps (1:100,000 and 1:24,000 scale).

### D.4.2.4 Transmission Cost and Market Price Differentials

**Objective** – The purpose of this criterion is to rate sites according to the relative costs associated with construction of power transmission systems and issues related to market price differentials.

**Evaluation approach** – Sites are rated from highest to lowest in accordance with estimated transmission system construction costs and consideration of other identified issues related to power transmission. Because all primary sites are located within the FPL Florida service area, no electricity market price differentials are expected between the sites, and this sub-criterion was not evaluated.

**Discussion/Results** – Transmission access is evaluated in terms of distance to the load center in the greater Miami area, and amount of new right of way (ROW) that needs to be acquired. The highest ranked sites already have the ROW, and the lowest-ranked sites require significant ROW acquisition, which will be difficult to obtain. In addition the plant switchyard is assumed the same for all sites.

Site	Evaluation	Ranking
DeSoto	~ 125 miles to Miami Load Center. 135 miles of new 500 kV ROW acquisition, 2 autotransformers, 8 – 500 kV line terminals. ROW near Orange River substation will be difficult to obtain.	3
Glades	~ 75 miles to Miami Load Center. 146 miles of new 500 kV ROW, of which approximately 60 miles of new ROW acquisition, 1 autotransformer, 6 – 500 kV line terminals; rebuild 120 miles of 230 kV lines.	4



Site	Evaluation	Ranking
Glades A	~ 90 miles to Miami Load Center. 146 miles of new 500 kV of which approximately 60 miles of new ROW acquisition, 1 autotransformer, 6- 500 kV line terminals; rebuild 120 miles of 230 kV lines. [Assumed similar ROW scenario as Glades.]	4
Hendry 1	~ 60 miles to Miami Load Center. 72 miles of new 500 kV ROW, of which approximately 40 miles of new ROW acquisition, 1 autotransformer, 6 – 500 kV line terminals; rebuild 120 miles of 230 kV lines.	4
Martin	~ 65 miles to Miami Load Center. 35 miles of new 500 kV in existing ROW, 6 – 500 kV line terminals.	5
Martin A	~ 65 miles to Miami Load Center. 35 miles of new 500 kV in existing ROW, 6- 500 kV line terminals. [Assumed similar ROW scenario as Martin.]	5
Okeechobee 1	~ 90 miles to Miami Load Center. 75 miles of new 500 kV of which approximately 20 miles of new ROW acquisition, 2 autotransformers, 8- 500 kV line terminals.	4
Okeechobee 2	~ 90 miles to Miami Load Center. 95 miles of new 500 kV ROW, of which approximately 40 miles of new ROW acquisition, 2 autotransformers, 8 – 500 kV line terminals.	4
St. Lucie	~ 85 miles to Miami Load Center. 80 miles of new 500 kV ROW acquisition, 2 autotransformers, 8 – 500 kV line terminals. ROW will be difficult to obtain.	1
Turkey Point	~ 50 miles to Miami Load Center. 64 miles of existing 500 kV ROW, 1 autotransformer, 8 – 500 kV line terminals.	5

Site	Rating
DeSoto	3
Glades	4
Glades A	4
Hendry 1	4
Martin	5
Martin A	5
Okeechobee 1	4
Okeechobee 2	4
St. Lucie	1
Turkey Point	5

#### D.4.3 CRITERIA RELATED TO LAND USE AND SITE PREPARATION

##### D.4.3.1 **Topography**

**Objective** – The purpose of this criterion is to rate sites according to the relative costs associated with site grading and earth-moving necessary to prepare the site for construction of a nuclear power plant.

**Evaluation approach** – Ratings are based on the amount of topographic relief currently found at the site, with the most severe relief resulting in the highest estimated grading costs and therefore the poorest rating. Sites are rated from highest to lowest in accordance with estimated grading costs.

**Discussion/Results** – Given the general flat topography found in central Florida, ratings were favorable across all sites.

<b>Site</b>	<b>Evaluation</b>	<b>Ranking</b>
DeSoto	The proposed site is located in a relatively flat area, with minor relief (+/- ~ 4 feet). At ~ 2 miles west of the proposed site, the area begins to slope downward to the Peace River. Costs associated with site grading are expected to be relatively low.	5
Glades	Topographic relief across the area is relatively flat (+/- 1 foot) with a system of ditches and water retention areas for irrigation and drainage purposes. Areas north and west of the proposed site begin to slope upward. Costs associated with site grading are expected to be relatively low.	5
Glades A	The proposed site is located in a relatively flat area, with minor relief (+/- 5-10 feet). The area has some small drainages and generally slopes from west to east. Costs associated with site grading are expected to be relatively low.	5
Hendry 1	The proposed site is located in a relatively flat area, with minor relief (+/- 1 foot). Costs associated with site grading are expected to be relatively low.	5
Martin	The proposed site is located in a relatively flat area, with minor relief (+/- 4 feet). The area generally slopes from east to west (toward Lake Okeechobee). Costs associated with site grading are expected to be relatively low.	5
Martin A	The proposed site is located in a relatively flat area, with minor relief (+/- 3 feet) with a system of ditches for irrigation and drainage purposes. Costs associated with site grading are expected to be relatively low.	5

Site	Evaluation	Ranking
Okeechobee 1	The proposed site is located in a relatively flat area, with minor relief (+/- 5-10 feet) with a system of ditches for irrigation and drainage purposes. Costs associated with site grading are expected to be relatively low.	5
Okeechobee 2	Topographic relief across the area is relatively flat (+/- 2 feet) with a system of ditches and water retention areas for irrigation and drainage purposes. The area generally slopes down to the southwest (toward the Kissimmee River). Costs associated with site grading are expected to be relatively low.	5
St. Lucie	The proposed site is located in a relatively flat area, with minor relief (+/- 1 foot). Costs associated with site grading are expected to be relatively low.	5
Turkey Point	The proposed site is located in a relatively flat area, with minor relief (+/- 1 foot). Costs associated with site grading are expected to be relatively low.	5

Site	Rating
DeSoto	5
Glades	5
Glades A	5
Hendry 1	5
Martin	5
Martin A	5
Okeechobee 1	5
Okeechobee 2	5
St. Lucie	5
Turkey Point	5

## References

Draft Phase I Environmental Site Assessment, A. Duda & Sons Inc. URS Corporation. July 2006.

Phase I Environmental Site Assessment, Pelaez & Sons Inc. Ranch. URS Corporation. May 2006.

Site Drainage and Interim Land Use Study. Brown & Root, Inc. March 1976.

USGS Topographic Maps (1:100,000 and 1:24,000 scale).

#### D.4.3.2 Land Rights

**Objective** – The purpose of this criterion is to rate sites according to the relative costs associated with purchasing land required to construct and operate a nuclear station on the site.

**Evaluation approach** – Sites are rated from highest to lowest in accordance with estimated land costs based on information provided by FPL real estate and County profile data.

**Discussion/Results** – This criterion was evaluated previously in the screening criteria report (Criterion P9), although for a larger land size area. Results are provided below.

Site	Comments and Discussion	Rating
DeSoto	FPL owns sufficient land Undeveloped site in 13,500-acre property	5
Glades	Does not own – Farmland; [\$35 M] [actually now appears FPL has bought for a coal fired power plant site, but not assumed for purposes of siting evaluation]	3
Glades A	Does not own – Farmland; [\$35 M]	3
Hendry 1	Does not own – Farmland; [\$35 M]	3
Martin	FPL owns sufficient land – 11,300 acres Existing industrial site	5
Martin A	Does not own – mostly farmland/agriculture around site although close to I-95 and Port St. Lucie/associated coastal population compared to other sites. Assume mid level pricing (between farmland and developed areas - \$26,000 per acre) [\$52 M]	2
Okeechobee 1	Does not own – Farmland [\$35 M]	3
Okeechobee 2	Does not own – Farmland [\$35 M]	3
St. Lucie	FPL owns sufficient land	5
Turkey Point	FPL owns sufficient land	5

Note: Land requirements of 2,000 acres per site where FPL does not own. Costs per acre are assumed to be \$10,000 in rural areas; \$17,500 for farmland; \$35,000 for sites near urban/developed areas.

Site	Rating
DeSoto	5
Glades	3
Glades A	3
Hendry 1	3
Martin	5
Martin A	2

Site	Rating
Okeechobee 1	3
Okeechobee 2	3
St. Lucie	5
Turkey Point	5

#### **D.4.3.3 Labor Rates**

Objective – The purpose of this criterion is to rate sites according to the relative costs associated with local labor costs that would be incurred during plant construction.

Evaluation approach – Sites are rated from highest to lowest in accordance with estimated local labor costs, with the lower cost resulting in higher ratings.

Discussion/Results – Economic data are typically available by county, but were found to be provided in a variety of forms (e.g., by hour, by week, by year; by job type) that were not necessarily consistent between counties. For purposes of consistency, this evaluation relied on Economic data based on County Data for Florida (eFlorida profile data for 2004), average annual wage for construction worker, 2004 data, as follows:

DeSoto: Average annual construction wage – \$24,276

Glades/Glades A: No data [assumed to be low wage given rural nature and emphasis on agriculture]

Hendry 1: \$24,306

Martin/Martin A: \$33,667

Okeechobee 1/Okeechobee 2: \$26,147

St. Lucie: \$31,894

Turkey Point: \$40,149

Comparisons of the above construction labor wages reveals that the highest rates are in Miami Dade County (Turkey Point), the lowest rates in DeSoto, Hendry and presumably Glades counties, with the remaining sites falling somewhere in between. The slight differences are noted in the rankings. Finally, it should be noted that a significant portion of the construction workforce is expected to come from a national workforce of journeymen, whose rates will be set based on supply and demand within the overall nuclear industry, rather than by local workforce rates or skill sets. While the ratings below are based solely on current and local wage differentials, this additional factor could mitigate differences in labor costs between the sites.

Site	Rating
DeSoto	5
Glades	5
Glades A	5
Hendry 1	5

Site	Rating
Martin	3
Martin A	3
Okeechobee 1	4
Okeechobee 2	4
St. Lucie	3
Turkey Point	2

## References

<http://www.eflorida.com/floridasregionsSubpage.aspx?id=284>