SWFRPC ADA SUPPLEMENTAL QUESTIONS AND CLARIFICATIONS

In reviewing Developments of Regional Impact it has been found that certain information requested in the standard questionnaire is not always useful. Additionally, it has been found that data necessary in order to accomplish a complete review is generally not provided without requesting further information. Therefore, the purpose of this document is in part intended to overcome these problems.

Also in order to streamline the ADA preparation and review process the following questions as well as clarifications are being provided. The intent is to hopefully abbreviate the review process by reducing the number of sufficiency questions that are raised during review of a submitted application. If the information requested in the standard questionnaire as modified by this document is responded to in a complete and concise manner, it is the commitment of the Council and its staff to expedite review. It must be stressed that completeness is a must. By working in concert, the process should be less burdensome to all involved.

22. Environment and Natural Resources: Air

Except for projects that are proposed industrial developments, a commitment that any proposed DRI will comply with all FDEP permit requirements will suffice as a sufficient response for this question.

13. Environment and Natural Resources: Wetlands

In addition to the standard questions, please respond to the following:

B.1. If wetlands are to be eliminated by filling and excavation, please describe, in detail, any mitigation proposed.

23. Hurricane Evacuation

The following information must be provided to answer Questions 23.B. 1 & 2 of the state questionnaire:

1. Elevation of the first floor living units;
2. Number of first floor living units;
3. Number of anticipated residents that will need to be evacuated in a worst case category three storm;
4. Routes proposed to be utilized for evacuation purposes; and
5. Impact that additional (project) traffic will have on evacuation time.

If on-site shelters are proposed to be utilized, then provide the following information:

1. The buildings that are proposed to be utilized;
2. The building area in square feet;
3. Proposed elevations of the on-site shelters; and,

4. What emergency facilities (water supply, power generation, waste storage, etc.) will be available.

In addition, indicate what efforts will be made to advise and educate residents concerning hurricane preparation, evacuation routes and shelter space both on and off site.

Staff will supply the applicant, upon request, specific information regarding THE 1991 SLOSH or the Lake Okeechobee SLOSH model results, as appropriate, relevant to your site as well as the SWFRPC "Hurricane Plan Update 1995".

29. Public Facilities: Energy

As an option to responding to this question in its entirety, please respond to question D. Provide a response in the following or a similar format, with those items appropriate (residential vs. nonresidential) to that as follows:

The Development of Regional Impact (name of project) will (or will not) incorporate the following energy conservation features:

a. Provision of a bicycle/pedestrian system connecting all land uses, to be placed along arterial and collector roads within the project. This system is to be consistent with local government requirements.

b. Provision of bicycle racks or storage facilities in recreational, commercial, and multi-family residential areas.

c. Cooperation in the locating of bus stops, shelters, and other passenger and system accommodations for a transit system to service the project area.

d. Use of energy-efficient features in window design.

e. Use of operable windows and ceiling fans.

f. Installation of energy-efficient appliances and equipment.

g. Prohibition of deed restrictions or covenants that would prevent or unnecessarily hamper energy conservation efforts (e.g., building orientation, clotheslines, and solar water heating systems).

h. Reduced coverage by asphalt, concrete, rock, and similar substances in streets, parking lots, and other areas to reduce local air temperatures and reflecting light and heat.

i. Installation of energy-efficient lighting for streets, parking areas, recreation areas, and other interior and exterior public areas. (The phrase "recreation areas" will be omitted for DRIs that do no have a recreation component.)

j. Use of water closets with a maximum flush of 3.5 gallons and shower heads and faucets with a maximum flow rate of 3.0 gallons per minute (at 60 pounds of water pressure per square inch).

k. Selection of native plants, trees, and other vegetation and landscape design features that reduce requirements for water, fertilizer, maintenance, and other needs.

l. Planting of native shade trees to provide reasonable shade for all recreation areas, streets, and parking areas. (The phrase "recreation areas" will be omitted from DRIs that do not have a recreation component.)

m. Placement of trees to provide needed shade in the warmer months while not overly reducing the benefits of sunlight in the cooler months.

n. Planting of native shade trees for each residential unit. (To be included only in DRIs with residential units.)

o. Orientation of structures, as possible, to reduce solar heat gain by walls and to utilize the natural cooling effects of the wind.

p. Provision for structural shading wherever practical when natural shading cannot be used effectively.

q. Inclusion of porch/patio areas in residential units. (To be included only in DRIs with residential units.)

r. Consideration by the project architectural review committee(s) of energy conservation measures (both those noted here and others) to assist builders and residents in their efforts to achieve greater energy efficiency in the development.

The incorporation of those energy conservation measures in this Development of Regional Impact does not preclude the provision of additional energy conservation measures by the applicant. It also does not prevent the local government of jurisdiction or any state, regional, or other agency under whose jurisdiction this project falls from requiring additional energy measures or measures that may be more stringent.

21. Transportation

Prior to answering DRI Question 21, a meeting with review agencies should be held to discuss the applicant's assumptions and proposed methodology. A letter summarizing these assumptions and the proposed methodology for answering Question 21 must be provided to review agencies at least one week prior to this meeting. All parts of Question 21 should be answered consistent with the attached SWFRPC "Transportation Methodology Procedures", adopted September 19, 1996.

General Comments

The most frequently asked question in the SWFRPC staff sufficiency review is "Please cite the source for...". In order to save time for yourself and the Council staff, please cite all data sources, assumptions, and standards. Clearly explain all methodologies.

AFFORDABLE HOUSING RECOMMENDATIONS

Any DRI Development Order issued by _____ County/City shall contain the following provisions:

a. The applicant shall provide a site within the boundaries of the project for development of affordable housing as defined in the _____ County/City Comprehensive Plan. This site shall be 5% of the total acreage of the subject site or at least _____ acres in size, with a number of residential units consistent with the land development approval granted by _____ County/City. The affordable housing units shall be divided between rental and equity ownership to the satisfaction of _____County/City. The applicant may reduce the size of the affordable housing parcel, if an appropriate number of multi-family units as identified by the County/City are provided in a mixed-use portion of the development and that an appropriate number of single-family equity owned units are provided in other areas of site.

b. In the alternative to the above on-site affordable housing development requirements, the applicant may provide an equal size parcel of developable land off-site. The off-site parcel must be located within the identified DRI housing assessment area. The applicant shall be responsible to provide the same number and mix of residential units and meet the same rental and equity ownership parameters that were approved by _____County/City.

c. In lieu of the above requirements, the applicant may provide a financial contribution to meet the affordable housing demand created by the development. The amount of the contribution shall be negotiated with _____ County/City staff and must be approved by the _____ County Board of County Commissioners/City Council.

MEMORANDUM

TO: Principal Planner Dan Trescott

FROM: Senior Planner John Gibbons

SUBJECT: Standard DRI Solid Waste Conditions

DATE: February 12, 2002

Per your request, please find standard DRI Solid Waste conditions recommended for inclusion in a DRI Development Order issued by a local jurisdiction. The recommended conditions cover planning and mitigation initiatives related to waste disposal and waste storage management.

- The applicant will provide the projected solid waste quantities for all residential, commercial, industrial, and institutional developments.

- The applicant will provide official letters of commitments from the local government jurisdiction, and the applicable franchise haulers showing ability to serve the project's solid waste and hazardous waste needs.

- The applicant will incorporate the solid waste demands of the project into the county solid waste management program and explore possibilities of extending the life of the landfill by reducing the solid waste volume by incorporating practices such as conservation, recycling, trash compaction, and mechanical shredding.

- Any business found within the development boundary that generates hazardous waste will be responsible for the temporary storage, siting and proper disposal of the hazardous waste generated by such business. However, there will be no siting of hazardous waste storage facilities contrary to the county zoning regulations.

- The project will be bound by all applicable recycling requirements in effect in the County at the time of the development.

- Any Buildings where hazardous material/waste is to be used, displayed, handled, generated or stored will be constructed with impervious floors with adequate floor drains leading to separate impervious holding facilities that are adequate to contain and safely facilitate cleanups of any spill, leakage, or contaminated water.

- Discharge of hazardous waste effluent into the sewage system will be prohibited unless approved by permit issued by the Florida Department of Environmental Protection.

Please advise this writer of any questions or concerns regarding any of the above recommended development order conditions.

JLG/

Southwest Florida Regional Planning Council
1926 Victoria Ave.
Fort Myers, Florida 33901
(239) 338-2550 x212
http://www.swfrpc.org

8/18/05

Tim Walker
GIS Coordinator
email: twalker@swfrpc.org

Submittal standards for DRI GIS Data

The following is a brief description of what a DRI applicant needs to submitt in regards to GIS data.

Type- Data should be submitted in shapefile format only and compatable with the latest version of ESRI ArcView. Feature class should always be polygon.

Projection- All data should be in State Plane West, NAD 83, feet. A proction file (.prj) should be included as part of the shapefile.

Metadata- All shapefiles need to have an accompaning metadata file. This can be in the form of the standard ESRI metadata file or a simple text file. At a minimum the metadata needs to contain:

- shapefile name
- Projection
- source
- feature class (should always be polygon)
- accuracy/scale of source map
- date created
- contact person
- attribute data description

Shapefile features- The shapefile should have the boundary of the DRI at a minimum.

Attribute data- Each attribute record needs to be clearly described.

This submittal standard is a work in progress so exeptions or inclusions are possible. Please contact Tim Walker for more information.

SOUTHWEST FLORIDA REGIONAL PLANNING COUNCIL

Transportation Methodology Procedures

The following is a description of the current preferred methodology procedures used in determining the transportation impacts of a DRI in Southwest Florida. Listed first are the questions from the currently adopted DCA Questionnaire (RPM-BSP-ADA-1) in bold type and numbered according to the questionnaire (i.e., 21.A. through 21.I). The preferred methodology is then outlined using bullets (*).

All methodologies and procedures are subject to negotiation and should be agreed upon at the Transportation Methodology Meeting. Prior to answering DRI Question 21, a meeting with review agencies should be held to discuss the applicant's assumptions and proposed methodology. A letter summarizing these assumptions and the proposed methodology for answering Question 21 should be provided to review agencies at least one week prior to this meeting.

The DRI traffic study will be prepared in accordance with applicable governing agency rules and guidelines. For technical guidance, the DRI traffic study will rely on the following documents: ITE Trip Generation (Latest Edition); the ITE Trip Generation Handbook; the FDOT Quality Level of Service Handbook; the FDOT Site Impact Handbook; the Highway Capacity Manual (Latest Edition) and HCS- Software; "Applicable Local Plans", and the SWFRPC Standard Methodology.

Most DRIs are relatively large by definition and have long term buildouts. For those types of projects, the preferred method for analyzing their impacts is to use a computerized traffic simulation model. As a general rule, the only time a computer model does not have to be used is for projects that have a buildout of less than 5 years, or where no computer model exists for the area. In those instances, appropriate growth rates approved by the review agencies should be used to project background traffic, and the traffic from the other large developments (including DRIs) should be added in. The trip generation for the project would then be added in to determine total traffic.

All analyses are to be performed for each phase of the project. If the project is not expected to be phased, yet has a buildout of more than 5 years, analyses will be performed for 5 year increments. These 5 year increments are to be used if a project's phases are expected to be greater than 5 years.

It should be noted that some of the questions outlined in bold type below do not reflect what is requested in the review of a project. However, it is the intent of this process to

update these questions and to determine as fair and accurate a method as possible to determine the impacts of these large developments.

21.A. Using Map J or a table as a base, indicate existing conditions on the highway network within the study area (as previously defined by Map J), including AADT, peak-hour directional trips, traffic split, levels of service and maximum service volumes for the adopted level of service (LOS). Identify the assumptions used in this analysis, including "K" factor, directional "D" factor, facility type, number of lanes and existing signal locations. (If levels of service are based on some methodology other than the most recent procedures of the Transportation Research Board and FDOT, this should be agreed upon at the preapplication conference stage.) Identify the adopted LOS standards of the FDOT, appropriate regional planning council, and local government for roadways within the identified study area. Identify what improvements or new facilities within this study area are planned, programmed, or committed for improvement. Attach appropriate excerpts from published capital improvements plans, budgets and programs showing schedules and types of work and letters from the appropriate agencies stating the current status of the planned, programmed and committed improvements.

- The transportation analysis will be prepared following the requirements of Chapter 380.06, F.S. providing a review of regional impacts associated with the project and will be performed consistent with current local government concurrency policies.
- The analysis period for the Application shall be at least one of the following:
- Peak season, P.M. peak hour, peak direction (i.e., K100 for roadway links and p.m. peak hour for intersections);
- Peak season, P.M. peak hour, two way;
- Peak season, A.M. peak hour, peak direction (i.e., K100 for roadway links and p.m. peak hour for intersections);
- Peak season, A.M. peak hour, two way;
- Peak season average daily; and/or
- Annual average daily traffic.

The type of project and the concurrency management program of the local jurisdiction(s) affected will determine which of these analyses will be required. The specific requirements will be determined at the Transportation Methodology Meeting.

- The study area (Map J) is defined as including all roads on which the DRI traffic comprises 5% or more of the adopted LOS capacity for the appropriate analysis period(s) as determined above and those intersections at either end of or within the link (if major intersections are within the link). It should be noted that some unsignalized intersection analyses may be required. In addition, the local

jurisdiction may require a lower significance test percentage. The number of intersections to be analyzed may be reduced at the Transportation Methodology Meeting, if all review agencies agree.

- The adopted levels of service as identified in the local jurisdiction's Comprehensive Plan will be used for those roadways within that jurisdiction. For roads on the Florida Intrastate Highway System (FIHS), the Florida Department of Transportation (FDOT) LOS standards will apply. At the Transportation Methodology Meeting, it may be determined that other state standards, local ordinances or codes may be required for the determination of levels of service.
- The service volumes for adopted LOS will be those approved by each local jurisdiction or by FDOT for those roadways on the FIHS.
- The applicant is to use the latest available FDOT, County or City traffic counts to identify existing conditions. If two counts exist for the same location in the same year, adjusted counts (to AADT) may be averaged for these locations at the discretion of the local jurisdiction, to be determined at the Transportation Methodology Meeting. If a link has two separate count stations along it, the link should be redefined into two different links or the higher of the two counts should be used. If the applicant does its own counts, it should confirm with reviewing agencies ahead of time the locations to be counted, and should describe the methodology and conditions for taking the counts. The traffic count collection methods and actual counts should be signed and sealed by a professional engineer. All raw count collection data sheets should be provided in the appendices to the ADA. Adopted local jurisdiction or FDOT seasonal adjustment factors for each county are preferable for use; the use of any other seasonal factors should be agreed upon at the Transportation Methodology Meeting.
- Counts used for the analysis will not be older than one year, unless otherwise agreed upon during the Transportation Methodology Meeting (e.g., if construction along a major corridor in the study area will have an impact on the way people drive in the area).
- According to the DCA DRI Transportation Rule, only those improvements that are
  - scheduled for construction in the first three years of the adopted FDOT Work Program;
  - the first three years of the TIP/CIP for Counties/Cities with in-compliance Comprehensive Plans; or
  - the first year of the TIP/CIP for Counties/Cities with not in-compliance Comprehensive Plans can be considered committed.
- Only those private roadway commitments that are part of an adopted and approved Development Agreement can be included, and the applicant should note which developments are responsible for those commitments and when they are to be accomplished.

21.B. Provide a projection of vehicle trips expected to be generated by this development. State all standards and assumptions used, including trip end generation rates by land use types, sources of data, modal split, persons per vehicle, etc., as appropriate. The acceptable methodology to be used for projecting trip generation (including the Florida Standard Urban Model Structure or Institute of Transportation Engineers trip generation rates) shall be determined at the pre-application conference stage.

- The preferred source of trip generation rates is the Institute of Transportation Engineers'(ITE) Trip Generation Manual, latest version (as of this printing, Seventh Edition) and the ITE Trip Generation Handbook. All land use codes should be agreed upon at the Transportation Methodology Meeting. The following information and documentation should be provided for review for each phase end year and analysis period of the project:

  - Land use code used;
  - Units of each land use (i.e., square feet, gross leasable or gross floor area, dwelling units, rooms, beds, etc.);
  - Total trip ends; and
  - Total inbound and outbound trip ends.
  - If the proposed land use does not have a LUC in ITE or if ITE has minimal data, other sources of trip generation rates may be used provided documentation is provided and they are agreed upon at the Transportation Methodology Meeting.
  - The applicant's analysis should assume 100 percent occupancy of all DRI land uses.

21.C. Estimate the internal/external split for the generated trips at the end of each phase of development as identified in (B) above. Use the format below and include a discussion of what aspects of the development (i.e., provision of on-site shopping and recreation facilities, on-site employment opportunities, etc.) will account for this internal/external split. Provide supporting documentation showing how splits were estimated, such as the results of the Florida Standard Urban Transportation Model Structure (FSUTMS) model application and the ITE Multi-Use Development Internal Capture Summary Worksheets. Describe the extent to which the proposed design and land use mix will foster a more cohesive, internally supported project.

(Proposed new table format follows)

TRIP GENERATION AND INTERNAL CAPTURE SUMMARY

Land Use	ITE Code	Unit Number	Unit Type	Trip Type	Percent Adjusted	P.M Enter	PEAK Exit	Total	Daily

		or Size							
				Total					
				Internal					
				External					
				Pass-By					
				Net New					
		Total							

- The internal capture for projects may be estimated using the FSUTMS model. If this method is used, the percentage of trips captured would be applied to the ITE trips generated. Review of the model produced internal capture for reasonableness will be required.

- Manual calculations of internal capture must be based on the reasonable likelihood of trips being captured internally. The percentage of trips captured between each land use on the site must be documented within the application (or its appendices) Internal capture of project traffic shall be estimated based on the review and application of the FSUTMS model; ITE Trip Generation (Latest Edition); ITE Trip Generation Handbook (Section 7.5); and/or locally approved internal capture rates. The use of traffic monitoring studies and professional judgement may influence the acceptable amount of internal capture. Supporting documentation should include the ITE Trip Generation Handbook Multi-Use Development Internal Capture Summary Worksheets and documentation of applied assumptions.

- Pass-by capture may be applied to commercial uses only. If out-parcels are projected for the project, the aggregated commercial land uses square footage should be used to calculate the pass-by rate of capture. These pass-by capture rates may be determined using the equations outlined in the ITE Trip Generation, latest version. However, if a local jurisdiction has adopted, as part of its impact fee or other ordinance, pass-by capture rates (or their equivalent) for individual uses, they may be used in the analysis, if approved at the Transportation Methodology Meeting. Documentation of said adoption should be included in the application.

21.D. Provide a projection of total peak hour directional traffic, with the DRI, on the highway network within the study area at the end of each phase of development. If these projections are based on a validated FSUTMS model, state the source, date and network of the model and of the TAZ projections. If no standard model is available or some other model procedure is used, describe it in detail and include documentation showing its validity. Describe the procedure used to estimate and distribute traffic with full DRI development in subzones at buildout and at interim

phase-end years. These assignments may reflect the effects of any new road or improvements which are programmed in adopted capital improvements programs and/or comprehensive plans to be constructed during DRI construction; however, the inclusion of such roads should be clearly identified. Show these link projections on maps or tables of the study area network, one map or table for each phase-end year. Describe how these conclusions were reached.

- The use of computer models generally yields Peak Season Weekday Daily Traffic (PSWDT). The ITE based trip generation for daily volumes is based on average weekday trips. The PSWDT for the project must be converted to peak hour directional project traffic in order to evaluate results for the P.M. peak hour adopted level of service standard. Depending upon which analyses are required under 21.A. above, this should be adjusted to AADT using agreed upon peak season factors. This AADT would then be adjusted to peak season, peak hour, peak direction using agreed upon K100 and D factors (generally, adopted FDOT factors except where specific local jurisdiction data is available).
- The latest adopted FSUTMS model E+C network and ZDATA files should be used for the analysis when performing computer model runs. For project phases or build-out years that do not coincide with interim years for which adopted ZDATA may be available, interpolation of the files will be necessary. This should be accomplished using a straight-line interpolation of the data or some other approach acceptable to the local jurisdiction. Review of the data will be necessary to account for large developments, including DRIs, which have received approvals but which might not otherwise be accounted for in the interpolated data. Adjustments to account for these approvals will be necessary, to the satisfaction of the local jurisdiction and the RPC. The inclusion of certain developments that have not received final approval may also be required and will be discussed at the Transportation Methodology Meeting.
- The initial applicant analysis for each phase should be based on the existing plus committed network. Any improvements required in addition to the E+C network should be addressed in answer to DRI Question 21.F.
- The DRI land uses will be in a TAZ (s) by themselves. The TAZ(s) that contains the development will be reviewed to determine if a new TAZ needs to be created to represent the DRI. If land uses are present within the TAZ which are not associated with the DRI, these uses will remain in the existing TAZ and be adjusted to account for the acreage used by the DRI.
- A preferred method for multi-use projects to estimate trip distribution and assignment is by "Select Zone" analysis. A select zone analysis estimates the daily traffic percentage on each roadway segment that enters and exits the project. The preferred methodology is to be consistent with the FDOT, Site Impact Handbook.
- The Project ITE trip generation (net new external trips) shall be used in the model special generator ZDATA3 file. ITE vehicle trips shall initially be converted to person trips for use in the ZDATA3 files based on auto occupancy factor found in

the PROFILE.MAS file and trip purposes (by percent) derived from the GEN.OUT file. The model trips in the zdata3 file should be adjusted through model iterations until the model external vehicle trips match the net new external trips based on ITE.

- Another method for trip distribution and assignment is based on conventional ZDATA1 and ZDATA2. Distribution is based on the gravity model with a minimum of three trip purposes performed using the FSUTMS. Separate link distribution percentage should be made for each phase of the development. This method may be appropriate for projects that have a smaller mix of uses and /or a limited roadway network.
- Future traffic volume estimates shall use the latest validated county FSUTMS model in conjunction with the most current socio-economic data, existing and committed (E+C) road network. The network, socio-economic data, and TAZ structure may require modification prior to being found suitable for the project. Therefore, the applicant shall submit to the review agencies any proposed or required modifications to the data sets. FSUTMS input and output files must be submitted to the review agencies for verification.
- Other manual methods of distributing traffic may be used if approved by the review agencies during development of the formal methodology.

21.E. Assign the trips generated by this development as shown in (B) and (C) above and show, on separate maps or tables for each phase-end year, the DRI traffic on each link of the then-existing network within the study area. Include peak-hour directional trips. If local data is available, compare average trip lengths by purpose for the project and local jurisdiction. For the year of buildout and at the end of each phase estimate the percent of impact, in terms of peak hour directional DRI trips/total peak hour directional trips and in terms of peak hour directional DRI trips/existing peak hour service volume for desired LOS, on each regionally significant roadway in the study area. Identify facility type, number of lanes and projected signal locations for the regionally significant roads.

- The assignment should be capacity restrained on the E+C network, to determine travel demand. Background traffic can be defined as equaling the total traffic assignment minus the project traffic.
- When using the FSUTMS computer model, the assignment of project traffic will be determined using the "select zone" or select link module available from FDOT. When using the ITE trip generation, the percentages of the traffic will be used.
- HCM analyses should be performed for all intersections impacted by the project. An operational analysis is required for all phase-end years. Roadway levels of service will initially be based on the generalized capacities outlined above. Additional analyses may be performed using the arterial analysis procedures outlined in the latest version of the HCM. Definitions of segments of roadway to be analyzed in this manner should be approved prior to the analysis. Summary

results of the intersection capacity analysis with the Project shall be presented. In addition, the HCM worksheets shall be included as an appendix. Further, HC software intersection capacity analysis files with the Project shall be submitted to the review agencies.

21.F. Based on the assignment of trips as shown in (D) and (E) above, what modifications in the highway network (including intersections) will be necessary at the end of each phase of development, to attain and maintain local and regional level of service standards? Identify which of the above improvements are required by traffic not associated with the DRI at the end of each phase. For those improvements which will be needed earlier as a result of the DRI, indicate how much earlier. Where applicable, identify Transportation System Management (TSM) alternatives (e.g., signalization, one-way pairs, ridesharing, etc.) that will be used and any other measures necessary to mitigate other impacts such as increased maintenance due to a large number of truck movements.

- In concordance with the intent of Chapter 380, Florida Statutes, the analysis is intended to provide information to local governments to assist them in making decisions concerning developments having a greater than local impact. Further, the information submitted by the applicant "will consider whether, and the extent to which: (d) The development will efficiently use or unduly burden public transportation facilities.
- Pursuant to 9J-2.045(2)(a), the source for roadway specific service volumes and concurrency requirements shall be based on the requirements of the locally impacted jurisdiction and "applicable local plan". LOS analysis shall address link specific impacts by jurisdiction. Multi jurisdictional impacts shall be addressed individually or by worst case.
- Significance test all facilities in the project study area and adversity test all significant facilities. A significantly impacted roadway segment is defined in Florida Administrative Code 9J-2.045(6) as one where the project traffic utilizes five percent of the adopted peak hour maximum level of service volume. An adversely impacted segment is one that will operate below the adopted level of service volume.
- Weaving, ramp, and merge analysis shall be performed, where applicable, consistent with the FDOT Site Impact Handbook; the Highway Capacity Manual (Latest Edition) and HCS- Software (or latest version).
- Improvements will be consistent with the Long Range Plans of the local Metropolitan Planning Organization and the Comprehensive Plans of the local jurisdiction.
- The projected level of service with the improvements required to achieve the adopted LOS should be provided in table format.

21.G. Identify the anticipated number and general location of access points for driveways, median openings and roadways necessary to accommodate the proposed

development. Describe how the applicant's access plan will minimize the impacts of the proposed development and preserve or enhance traffic flow on the existing and proposed transportation system. This information will assist the applicant and governmental agencies in reaching conceptual agreement regarding the anticipated access points. While the ADA may constitute a conceptual review for access points, it is not a permit application and, therefore, the applicant is not required to include specific design requirements (geometry) until the time of permit application.

Generally, the FSUTMS model does not adequately represent access to the site. In those cases, the traffic generated by the project will need to be separately assigned to the planned access points for the project. The links affected by the access points will need to be split to represent the proposed access points as well and adjustments will need to be made to the link volumes to reflect these changes (i.e., if only one centroid connector is assumed in the model, yet three access points are anticipated, the analysis should include four links, not two).

LOS analyses at the access points will be performed to determine the impacts these might have on the roadway network. Proposed signals at the access points will need to be accounted for when determining the roadway link LOS.

21.H. If applicable, describe how the project will complement the protection of existing, or development of proposed, transportation corridors designated by local governments in their comprehensive plans. In addition, identify what commitments will be made to protect the designated corridors such as interlocal agreements, right-of-way dedication, building set-backs, etc.

- Discussion of the commitments is required.

21.I. What provisions, including but not limited to sidewalks, bicycle paths, internal shuttles,
ridesharing and public transit, will be made for the movement of people by means other than
Private automobile? Refer to internal design, site planning, parking provisions, location, etc.

Discussion of the commitments and a map of proposed routes are required.

For more information contact the Southwest Florida Regional Planning Council, 1926 Victoria Avenue, Ft. Myers, Florida 33901.

Phone: (239) 338-2550 FAX: (239) 338-2561 E-mail: SWFRPC@SWFRPC.ORG

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PLANNING COUNCIL

GUIDLEINES AND METHODOLOGY FOR COMPLETING QUESTIONS ~~16~~ 13, ~~18~~ 12, AND ~~22~~ 19 OF THE APPLICATION FOR DEVELOPMENT APPROVAL

by

Office of Environmental Services
Florida Game and Fresh Water Fish Commission
Vero Beach, Florida

March 1987

GUIDELINES FOR COMPLETING QUESTION 16

1. List the acreage and community type of all wetlands found on the project site according to the Florida Land Use and Cover Classification System, Level III.

2. For each wetland type, include a discussion of plant species dominance and composition of the overstory, midstory, and groundcover strata.

3. Discuss the importance of these wetland communities to regional drainage patterns including location and functional role within the drainage system (i.e. headwaters; 1st, 2nd, or 3rd order tributary; bay; estuary; etc.)

4. For each wetland type, discuss hydroperiod characteristics including depth and duration of flooding, and seasonality of fluctuation.

5. Provide acreage figures and a map showing the location of all wetlands to be preserved or altered, by plant community type.

6. Describe mechanisms to be utilized to insure the continued viability of wetlands to be preserved onsite including building setbacks and buffers, water control structures, and water management plans.

7. Discuss types of proposed wetland alteration (ie. dredging, filling, hydroperiod alteration, etc.)

8. Provide wetlands mitigation and restoration details including location, size, plant species composition, hydroperiod, and functional replacement value.

WILDLIFE METHODOLOGY GUIDELINES FOR COMPLETING QUESTION 18

State and Federally Protected Species

A. General

1. A valid collector's permit from the Florida Game and Fresh Water Fish Commission is required for individuals engaged in the handling and collection of birds, mammals, and all listed species. Please provide the permit number, expiration date, and name(s) of the individual(s) involved with sampling activities which require a permit.

2. List all species classified as endangered, threatened, or of special concern that are known, or have the potential, to utilize the project site.

3. Cite the reference and date of publication of the list being used.

4. For those protected species specifically sampled for, include the sampling methodology, sampling dates, and amount of effort expended.

5. Identify on a map the locations of pedestrian transects, trap grids, herp arrays, or other field sampling plots used to determine the onsite status of protected species.

6. Present the results of all sampling efforts in terms of number of individuals, and map (scale 1" = 200'') the location of observed individuals.

7. Discuss what measures will be taken to minimize the project's impacts on protected fish and wildlife and their habitats.

SPECIFIC SAMPLING METHODOLOGIES

The following protected species have potential for inhabiting sites proposed for development. Appropriate sampling methodologies are provided as follows:

GOPHER TORTOISE

1. Burrows should be surveyed while walking transects through areas of suitable habitat. Transects should be approximately 150m x 7m as described by Auffenberg and Franz (1982). Total transect area should encompass at least 20 percent of the suitable habitat on a site.

2. Burrows should be recorded as active, inactive, or abandoned based on the following criteria:

- active: soil at mouth recently disturbed;
- inactive: soil undisturbed but burrow appears maintained;
- abandoned: washed in or covered with debris.

3. Population estimates should be based on the following equation:

$(A+I)K$ = population estimate; where
A = no. of active burrows,
I = no. of inactive burrows, and
K = a correction factor of 0.681 to account for interburrow movements, dispersal, and natural mortality. Populations are to be determined by density (individuals/hectare) based on population estimate and area surveyed by transects.

4. Sampling dates, average daily temperature, and a description of ground cover should accompany results of the survey.

FLORIDA MOUSE, SANIBEL ISLAND RICE RAT, SILVER RICE RAT, KEY LARGO COTTON MOUSE

Number of transects and location should be based on the distribution of available habitat across the site (i.e. one transect per 50 acres of suitable habitat). Each transect should consist of 25 stations placed at 50-foot intervals. Two Sherman live traps should be placed at each station anywhere within a 10-foot radius of the station marker in a manner that maximizes capture (i.e. near burrows, stumps, and fallen logs). Each transect should be sampled for 4 consecutive 24-hour periods to obtain the necessary 200 trap-nights per transect. Captured animals should be identified to species, toe-clipped and released. Final survey reports should include all habitat/transect data.

GOPHER FROG, EASTERN INDIGO SNAKE, FLORIDA PINE SNAKE, SHORT-TAILED SNAKE, BLUE-TAILED MOLE SKINK, SAND SKINK

A two-stage sampling approach should be used to determine the on-site presence of these species. It involves drift fence arrays as described by Campbell and Christman (1982) in conjunction with funnel trapping of individual gopher tortoise burrows. A minimum of two arrays (situated at least 100m apart) is recommended for each 100 acres of suitable habitat. Arrays should be checked morning and evening for at least four consecutive days.

One-way funnel traps should be located at burrow entrances with the mouth of the trap facing into the burrow. Both active and inactive burrows should be sampled. Traps should be set one hour before dark and picked up one hour after sunup for at least a four day period. They should be removed from the burrow during daylight hours so as not to impede daily tortoise movements. The number and distribution of traps across the site should be determined on the basis of maximizing capture of the greatest number of species. (As a general guideline, 25 percent of all burrows should be sampled). Burrows within one-half mile of freshwater wetlands tend to serve as staging areas for gopher frogs and thus should be sampled more intensively than other areas.

SHERMAN'S FOX SQUIRREL, MANGROVE FOX SQUIRREL, FLORIDA BLACK BEAR, FLORIDA PANTHER, FLORIDA SCRUB JAY, BURROWING OWL, FLORIDA GRASSHOPPER SPARROW, SOUTHEASTERN AMERICAN KESTREL, RED-COCKADED WOODPECKER

The presence of these species should be determined by using morning and

evening pedestrian surveys (500 meters of transect per 100 acres) for a minimum of 4 days. Transects should be meandered through areas of suitable habitat and changed after each survey to maximize site coverage. Map visual observations of all protected species as well as any physical features which may indicate species presence such as tree markings, tracks, nests, scats, scrapes, kill remains, and cavity trees. Report all other species observed during transect runs.

WOOD STORK, BALD EAGLE, FLORIDA SANDHILL CRANE, ROSEATE SPOONBILL, LIMPKIN, LITTLE BLUE HERON, SNOWY EGRET, TRICOLORED HERON, REDDISH EGRET, LEAST TERN, ROSEATE TERN, SNAIL KITE, CAPE SABLE SEASIDE SPARROW, SCOTT'S SEASIDE SPARROW

All wetlands should be surveyed for at least 4 days during season of probable occurrence. Surveys should be conducted using either pedestrian transects or aerial flights. Estimates of individuals by species should be reported for each survey. Map all known or observed nesting and roosting sites.

ALL LISTED SPECIES

Enclosed is the Official List of Endangered and Potentially Endangered Fauna and Flora in Florida. While the previously described sampling methodology may be appropriate to detect the presence of species which were specifically discussed, many species, due to seasonality of occurrence or low population levels, are extremely difficult to detect. Therefore, for those species, the applicant should consult the literature and determine the probability of occurence within the project area based on the known range of the species and the presence of suitable habitat onsite.

NATURAL PLANT COMMUNITIES

General

1. Use Level III of the Florida Land Use and Cover Classification System to identify and map all land uses on the site.

2. Indicate the occurrence of any of the following rare natural upland plant communities: sand pine scrub, xeric oak scrub, longleaf pine/xeric oak sandhill, xeric oak hammock, tropical hardwood hammock, coastal hammock, longleaf pine-wiregrass, and old growth stands of longleaf pine and slash pine flatwoods.

3. Discuss the condition (successional state, species diversity and composition) and past land uses of any of the above plant communities found on site.

4. Discuss what measures will be taken to retain viable amounts of these communities within the proposed development.

WILDLIFE REFERENCES

Auffenberg, W. and R. Franz. 1982. The status and distribution of the gopher

tortoise (Gopherus polyphemus). Pages 95-126 In North American Tortoises: Conservation and Ecology. R. Bary, ed. U.S. Dept. of Interior. Fish and Wildlife Service Research Report 12.

Campbell, H.W. and S.P. Christman. 1982. Field techniques for herpetofaunal community analysis. Pages 193-201. In Herpetological Communities. N. J. Scott, ed. U.S. Dept. of Interior. Fish and Wildlife Service Research Report 13.

GUIDELINES FOR COMPLETING QUESTION 22

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1. On a vegetation map of the site, show the location of all proposed retention/detention lakes and ponds, swales, water control structures, and other water management system facilities.

2. Provide design detail for proposed lakes, ponds, swales, etc. including depths, sideslopes, littoral zone creation, proposed wetland vegetation to be planted, high and low water elevations and inundation duration, and hydrologic connections to native wetlands or other stormwater management facilities.

3. Discuss the proposed functioning of the stormwater management system with emphasis on impacts to native plant communities and mechanisms to ensure continued viability of these communities.

Standardized State-Listed Animal Survey Procedures
For Use in the Review of SWFRPC Projects

James W. Beever III
Regional Planner
Southwest Florida Regional Planning Council
1926 Victoria Avenue
Fort Myers, Fl 33901
(239) 338-2550 ext 224
FAX (239) 338-2560
EMAIL jbeever@swfrpc.org
WEBSITE www.swfrpc.com

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First Edition

First Edition

The primary purpose of this document is to establish a standardized recommended survey methodology for documented and potential state-listed species in the project vicinity in sufficient detail to allow a meaningful evaluation of the impact of a proposed projects in the Southwest Florida Regional Planning Council (SWFRPC) on those species that have been afforded listed species status by the State of Florida. For each species and species group, this document presents a survey methodology designed to aid in determining the on-site status of the species. The recommended methods range from general, qualitative reviews to specific quantitative procedures. Some species are extremely difficult to detect due to seasonality of occurrence, large individual ranges, cryptic lifestyle and behavior, or low population size. Cursory survey findings that fail to detect the occurrence of a listed species on the project do not automatically imply species absence. Some situations will require a more intensive sampling approach, coupled with an examination of museum records and the current literature, before an on-site status determination can be made.

The geographic area covered by this document includes Charlotte, Collier, Glades, Hendry, Lee, and Sarasota Counties. This document does not cover surveys for pelagic marine mammal species that are found in the deeper near shore habitats and that occasionally strand on the shorelines of the coastal counties in the region.

In all cases, the investigator (SWFRPC staff or their consultants) should contact the Florida Fish and Wildlife Conservation Commission (FWC) biologists and the staff of the U.S. Fish and Wildlife Service (USFWS), Vero Beach field office for pre-survey assistance in determining the survey information requirements for a given project. In many cases, prior to the survey, investigators are advised to consult the current pertinent scientific literature, including the known geographic range and presence of suitable habitats, and consider the probability of species occurrence within the project area. Some situations may require that the methodologies presented below be modified in order either to achieve the desired level of accuracy or to better reflect actual conditions on a site.

Recommended procedure for addressing listed species concerns for the proposed project consists of five (5) steps:

1) Review of existing data and literature, and consultation with area biologists and species experts;

2) On-site surveys of specific habitats for potential state-listed species;

3) Avoidance of impacts to confirmed listed species;

4) Minimization of impacts to confirmed listed species;

5) Mitigation of unavoidable impacts to confirmed listed species.

This document addresses step 1 and 2 as follows.

STEP 1

Dependence upon single external expert sources or a limited range of scientific literature is not a sufficient review of existing data. For example, existing published range maps may not contain complete up-to-date information on the distribution of listed species. Use of all of available data sources increases the accuracy, utility, and veracity of the listed species survey.

An accurate map of the habitat types within the project and areas within one mile of the project should be made during the initial project review. The map should follow the *Florida Land Use, Cover and Forms Classification System* (FLUCFCS) (Florida Department of Transportation 1999). This FLUCFCS mapping should reflect the actual habitat as characterized by vegetation type, not the human land use or zoning of the site.

A list of potential listed species for mapped areas should be generated, based on the habitat types present. This list is available from the HCS staff upon request. The FLUCFCS map and a list of listed species should be provided to HCS for review.

Existing data sources may confirm the presence of listed species for the project area. A table should be created that indicates which species have been confirmed and which species potentially occur on the site. Additional surveys may or may not be necessary for those confirmed species, depending on how impacts to these species are addressed.

Upon completion of step 1, the project applicant, the FWC, the USFWS, and the SWFRPC will have a complete and agreed-upon FLUCFCS habitat map of the site, a list of potential listed species for the specific project, and an indication of the species that have been confirmed as present on-site by existing data sources.

STEP 2

For those species that have been identified to be present or potentially present in the habitats on the project site, a variety of specific site survey techniques exist. The specific sampling methodologies range from simple to complex, depending upon the level of verification required and the species of interest.

For example:

The presence of the gopher tortoise is easily confirmed by a walking transect of the habitat for visual observation of burrows. In contrast, the presence of a gopher tortoise burrow commensal such as the Florida mouse or gopher frog may require a complex trapping program. Furthermore, while determining gopher tortoise presence is not difficult, but the determination of gopher tortoise population densities and habitat quality for gopher tortoises requires more detailed and complex field effort.

For improved organization and to avoid repetition, the following survey methods for listed species are provided by species group and habitat group where practical or, alternatively, by species. In the following discussion, when a FLUCFCS number is indicated in brackets following a habitat, as for example Wetlands (600), this indicates all wetland cover types; when indicated as Coniferous Swamp (620), this indicates all coniferous swamp wetland types; and when indicated as Pine Flatwoods (411), this indicates all pine flatwood types, including xeric, mesic, and hydric pine flatwoods.

<u>SEA TURTLE GROUP</u>

Atlantic Green Turtle, Atlantic Hawksbill Turtle, Atlantic Loggerhead Turtle, Atlantic Ridley Turtle, Leatherback Turtle

These endangered and threatened sea turtles are found typically in association with Tidal Passes, Estuarine Waters (540), Sea Grass Beds (911) and Nesting Beaches (181, 652, 710).

The green turtle nests on the east cost, from Volusia to Dade County. Population concentrations of adults occur in Sea Grass systems (911) of the Gulf of Mexico, Florida Bay and the Indian River Lagoon (Ehrhart and Witherington 1992).

The hawksbill turtle is associated with hard bottom communities (no existing FLUCFCS code) north to Duval County on the east coast and north to Levy County on the west coast. Diffuse nesting can occur from Cape Canaveral to the Dry Tortugas (Meylan 1992).

Ridley turtles occur south to Cape Canaveral on the east coast and along the entire Gulf of Mexico coast (Ogren 1992). One successful nesting is known from Pinellas County. Young forage over Sand and Mud Bottoms (650) of

less than 2-m (6.6-feet) depth.

Loggerhead turtles nest on beaches west of the Apalachicola River, south of Pasco County and north of Dade County. They utilize a wide range of marine habitats (540, 650, 911) (Dodd 1992).

Surveys for sea turtle presence will typically begin with a request for information from the Florida Fish and Wildlife Research Institute (FWRI) in St. Petersburg , consultation with the local turtle watch organization, review with marine herpetologists familiar with the project area, and consultation with local government biologists, (USFWS, FWC, Department of Environmental Protection (DEP), and local jurisdiction). Local commercial fishermen, dive shops, and marine laboratories, such as Mote Marine Laboratory will have information on water body use in their areas. These sources will be likely to have pertinent data on sea turtle use for specific beaches and areas.

If specific site surveys are necessary, due to lack of existing documentation, a standard survey method for nesting beaches consists of nightly "turtle watch walks." This consists of a linear transect walks of a beach frontage from one hour after sunset to one hour before dawn during sea turtle nesting season (May through September). Turtles, turtle crawls, and turtles nests confirm presence. More involved survey methods include tagging, egg counts, egg removal for protection, etc. These are not typically necessary for FDOT projects.

Surveys of water bodies for sea turtle presence are complex and typically require a fully outfitted trawling vessel capable of operating in the water depths and site conditions of the water body. A review of surveyors' capabilities to perform such surveys should be made with the FWRI and permits for accidental take will be needed from USFWS. A basic survey would involve two weeks of timed controlled trawls during the season of presence for the species (typically April through October) in the area.

BEACH AND SHOREBIRD GROUP

Piping Plover, Southeastern Snowy Plover, Least Tern, Roseate Tern, Black Skimmer, American Oystercatcher

The endangered snowy plover requires large open areas of dry Sandy Beaches (181, 652, 710) for breeding and tidal unvegetated Sand Flats (181, 652, 650, 710) for feeding. The piping plover also feeds and roosts in the same habitats.

The least tern requires open areas of dry, open areas that are typically Sandy Beaches (181, 652 and 710) for breeding. They will also nest on building rooftops in Commercial (140), Industrial (150), and Institutional (170) areas near feeding water bodies; at Mine Sites (160) particularly on Sand Mines (162); on other sandy Open Land (190, 260, 720), sandy Disturbed Land (741, 742, 743 and 744); on sandy parts of Airports (811), Ports (815), and Facilities Under Construction (819, 829, 839). Least terns forage in a wide variety of water bodies, including Marine, Estuarine and Riverine systems, Borrow Pits, and Lakes (500, 641, 642, 643, 650, 911).

The roseate tern requires nests on sandy Beaches (181, 652, 710) and sandy Spoil Areas (743). Roseate terns forage in Marine and Estuarine systems (540, 642, 650, 911).

The black skimmer requires dry, open areas that are typically sandy Beaches (181, 652, 710) for breeding. They will also nest on other sandy Open Land (190, 260, 720), sandy Disturbed Land (741, 742, 743, 744), sandy parts of Airports (811), Ports (815), and Facilities Under Construction (819, 829, 839). Black skimmers forage in a wide variety of water bodies including Marine, Estuarine and Riverine systems, Borrow Pits, and Lakes (500, 641, 642, 643, 650, 911).

The American oystercatcher requires broad open areas of sandy Beaches (181, 652, 710) for breeding and a Mudflats (650, 651, 652) and Mollusk Beds (654) for feeding.

Generally, large, regularly used nesting areas for the plovers, terns, and oystercatcher are known and documented by the FWC, the Florida Natural Areas Inventory (FNAI) (Johnson and Muller 1992), and the Audubon Society. Use of disturbed sites, buildings, mines, and spoil areas tends to be less well documented. Small groups of shorebirds are less conspicuous and therefore less well documented. Of this group, oystercatcher nesting areas are the least well known.

All suitable habitats indicated above should be surveyed for the listed shorebirds for a minimum of five days. The days do not need to be consecutive. Surveys may be performed at any daylight hour, provided weather conditions are sunny, without rain or high winds. Surveys for the snowy plover, least tern, roseate tern, black skimmer, and oystercatcher must occur in the months of April through August. Surveys for piping plover must occur in the months of September through March.

For areas less than 10 acres in size, a visual scanning is usually sufficient. Use of a spotting scope is highly recommended. Long, linear sites (such as beaches) and sites that exceed 10 acres in size should be sampled by either spot or pedestrian surveys to attain complete coverage. Use of vehicles on beaches is not recommended.

Estimates of individuals by species should be reported for each survey. All observed nesting sites should be mapped and reported by latitude and longitude. Feeding areas need only be mapped.

WADING BIRD AND PELICAN GROUP

Wood Stork, Florida Sandhill Crane, Whooping Crane, Roseate Spoonbill, Little Blue Heron, Snowy Egret, Tricolored Heron, Reddish Egret, White Ibis, Limpkin, Brown Pelican

Generally, rookeries and nesting areas for the wood stork, spoonbills, egrets, and herons are known and documented by the FWC (Runde et al. 1991), the FNAI, and the Audubon Society. Similarly, brown pelican rookeries are typically known and documented. In contrast, cranes and limpkins nest individually and can be verified by ground survey only. Also, new rookeries are found on occasion in freshwater wetlands. Currently all spoonbill nesting sites in Florida is in Mangroves (612) and Cypress (621). The wood stork, little blue heron, tricolored heron, and snowy egret utilize both freshwater and saltwater Forested systems (610, 620, and 630) for nesting. Sandhill cranes typically nest in circular ephemeral Ponds and Prairies systems (640, 641, and 643). Limpkins utilize Riverine Vegetation (510, 550, 560, 644), Freshwater Forested systems (610, 620, 630), and Marshes (640) for nesting.

Wading birds forage in a variety of wetland systems, including hydric pine flatwoods, seasonal wetlands, and artificial systems (wet 160, 181, 182, 184, drainage structures in 200s, 254, 500s, 600s, 710, 720, 731, 742, 911).

Critical foraging areas can be determined during the woodstork-nesting season during the late wet season when the dry-down hydrology concentrates fish for breeding season foraging. While rookery areas are found in deep wetland Mangrove Islands (612), Cypress Swamps (621) and Forested Wetlands (610 and 620), the principal foraging areas are in depressional wetlands. This critical foraging habitat of 6-10 inches of water, with an abundance of small fishes and other aquatic life, is essential for foraging at the critical February to April breeding season (Ogden 1978d). Wood stork critical foraging habitat is also found in association with Mangrove Fringes and Islands (612), Seagrass Beds (911), Oyster Bars (654), Productive Unvegetated Mudflats (651), and Tributary Stream Marshes (641 and 642).

The Florida sandhill crane prefers Wet Prairies (643), Marshy Lake Margins (652), Low-lying Pasture (211 and 212), Open Marsh (641), and Shallow Flooded Open Areas (653) (Williams 1978). Nesting occurs in marshy depressional ponds vegetated in pickerelweed, arrowhead, fire-flag, maidencane, and other herbaceous wetland vegetation in the upland/wetland matrix. Sparsely canopied Hydric Pine Flatwoods (624), Pastures (200s, 261, 741),

and Prairies (310, 321) provide suitable foraging habitat for nesting sandhill cranes, near to ponds and marshes utilized as nesting areas. Sparsely canopied Hydric Pine Flatwoods (624), Pastures (200s, 261, 741), and Prairies (310, 321) provide suitable foraging habitat for nesting sandhill cranes, usually in proximity to ponds and marshes utilized as nesting areas. The Florida sandhill crane will also forage across open recreational areas such as Golf Courses (182).

Limpkins utilize slow-moving Freshwater Streams and Rivers (510), Marsh (640s), Cypress Heads (621), Hardwood Swamps (610), and Shoreline (652 Fresh) habitats. Diet consists of apple snails, other snails, freshwater mussels, lizards, insects, frogs, worms, and crustaceans. Nesting occurs in a mat of aquatic vegetation (Nesbitt 1978). The nests are very hard to find.

Little blue herons utilize a wide variety of Freshwater Habitats (500 and 600) in Florida. Diet consists of crustaceans, insects, small fish, frogs, and lizards. Rodgers (1978) notes that they appear to prefer foraging in freshwater habitats even when nesting in saltwater wetlands. Nesting colonies are located in Mangroves (612); Cypress (621); Willow, Buttonbush, and Red Maple copses (610); and on wetland tree and shrub islands in the center of Ponds and Lakes (520). Breeding occurs during periods of high water.

White ibis utilize a wide variety of Freshwater and Saltwater habitats (500 and 600) in Florida. Diet consists of a variety of invertebrates, particularly burrow dwellers, small fish, frogs, and lizards. They appear to prefer to forage in freshwater habitats even when nesting in saltwater wetlands. Nesting colonies are located in Mangroves (612); Cypress (621); Willow, Buttonbush, and Red Maple copses (610); and on tree islands in the center of Ponds and Lakes (520).

Roseate spoonbills nest predominately in Mangrove Forests (612) and are now reported to nest in cypress (621) (Church Roberts, pers.com. 2006) and forage wherever concentrations of small fish and crustaceans allow the birds to utilize their unique bills for feeding (Ogden 1978b). Seasonal Wetlands (653) and Hydric Pine Flatwoods (624) provide foraging areas during the March dispersal to interior freshwater wetlands (Allen 1942).

Snowy egrets utilize a wide variety of Freshwater and Saltwater habitats (500 and 600) in Florida. Diet consists of crustaceans, insects, and small fish. Nesting can occur in a variety of wetland trees. Ogden (1978c) includes Willow, Wax Myrtle, and Buttonbush (610) as freshwater colony trees. Breeding in Estuarine (612) and Freshwater rookeries (610) occurs during periods of high water in freshwater wetlands.

Tricolored herons utilize a wide variety of Freshwater and Saltwater habitats (500 and 600) in Florida. Diet consists of small fish, crustaceans, and insects. Nesting can occur in a variety of wetland trees. Ogden (1978a) includes Willow, Wax Myrtle, Marsh Elder, Pond Apple, and Buttonbush as Freshwater Colony Trees (610). Breeding in Estuarine (612) and Freshwater (610) rookeries occurs during periods of high water in freshwater wetlands.

Brown pelicans occur throughout all Marine, Estuarine, and Riverine (500 and 600) habitats. Nesting on the west coast of Florida occurs exclusively in natural Mangrove canopies (612). Some colonies in the Indian River Lagoon use Australian pine on Spoil Islands. Nesting is typically documented on islands. Regular roosting sites are located on both Mangrove Islands and Mangrove Fringes (612).

All Wetlands (600s) and Beaches (181, 652 and 710), particularly shoreline and upland transitional zones, should be surveyed for wading birds and brown pelicans for a minimum of five days at dawn and dusk. The days do not need to be consecutive. A typical schedule would include three dawn and two dusk surveys at each wetland area. Since wading birds are opportunistic in their foraging patterns, survey times should always be selected to indicate seasonal use by the species in question.

For herbaceous and non-vegetated wetlands less than 10 acres in size, a visual scanning of the wetland is usually sufficient. Wetlands that are either Forested (610, 620, 630) or exceed 10 acres in size must be sampled by either spot or pedestrian surveys to attain complete coverage. Aerial surveys and airboats may be utilized under a set of agreed-upon criteria, utilizing experienced observers other than from the vehicle operator.

Aerial surveys will not locate limpkin nests. The presence of flightless young limpkins and Florida sandhill cranes is considered presumptive of a nest being present. Surveys for the Florida sandhill crane are only valid to subspecies if performed in a period from March through September, when the migratory sandhill cranes are not present; or if flightless young are observed from January through July. If the applicant specifies that any crane observed is a Florida sandhill crane or, given Florida sandhill crane habitat is present, Florida sandhill crane is present, then the seasonal survey restriction can be omitted. Surveys for the nesting Florida sandhill crane are only valid if performed in a period from January through July. If the applicant specifies that Florida sandhill cranes are nesting on-site, then this seasonal survey restriction can be omitted.

Estimates of individual wading birds by species should be reported for each survey. All observed nesting and roosting sites should be mapped and reported by latitude and longitude. Foraging areas should be mapped.

LARGE RAPTORS GROUP

Snail Kite, Bald Eagle

Powerful optics, spotting scopes, and binoculars are recommended in surveying for this group of birds.

Snail Kite

The snail kite feeds almost entirely on apple snails, which it takes from shallow, open freshwater areas. In addition to permanent Freshwater Marshes (641) snail kites will use Ephemeral Ponds (653), open wet Hydric Pine Flatwoods (624), area near deeper Marsh areas (520), and Drainage Canals (510, 520). Specific perches are used as feeding stations, with accumulations of apple snail shells piled beneath them. Perch trees may be located both in wetlands and in uplands.

The locations of many snail kite nesting areas in Florida are available from the FWC and USFWS snail kite experts at each regional FWC office (Appendix A). New nests are started each year, however, and new nest locations and new territories are common. In southwest Florida, the snail kite has been documented from eastern and central Collier County (Sykes 1978), and has extended its range westward to nest in Lehigh Acres in eastern Lee County.

The following FLUCFCS classes are potential snail kite habitat: Streams and Waterways (510), Lakes (520), Reservoirs (530), Sloughs (560), open Hydric Pine Flatwoods (6241), Freshwater Marshes (641), Sawgrass (6411), Cattail (6412), Spike Rush (6413), Maidencane (6414), Arrowroot (6416), Wet Prairies (643), Aquatic Vegetation (644), Submergent Aquatic Vegetation (645), Intermittent Ponds (653), and Borrow Areas (742).

Snail kite use of a site can also be divided into two broad categories based on the structural characteristics of the vegetation. Type I habitat nesting sites consists of type II habitats with areas of shrubs, small trees, or cattails with 5% canopy closure. Type II habitats are open marsh communities with less than 5% canopy closure and with no more than 4 feet of water depth. To define potential snail kite use of a site prior to transect surveys the Type I and Type II habitats should be mapped.

The most effective survey technique for snail kites involves the use of airboats, supplemented with observation from the air and from dry land stations. All transect surveys should pass through all potential snail kite habitats present on the site. Use of airboats may be limited to habitats open enough to allow passage of the airboat and sighting of individual birds at a distance from the vessel. The distance between transect surveys should be spaced according to

the limits on visibility imposed by vegetation, water depth and terrain. The initial survey should concentrate on locating kites in the air and then focus closer to roosting and nesting areas. Due to constraints on speed required for airboat travel the survey will involve fast travel between stationary points. Some sites may provide road access on roadways, berms, trails through, or near marshes and these access roads can be utilized to supplement airboat surveys.

Surveys must be carried out from November through March unless water levels have remained high into late dry season. Conducting surveys early in the breeding season will enhance the ability to sight snail kites due to conspicuous courtship behavior. Surveys should be conducted during the day, from 1 to 2 hours past sunrise to allow thermals to form, on calm, clear days. Direction of travel along transect surveys should be reversed on alternate surveys to eliminate direction of travel bias. Surveys should be conducted 6 to 8 times with 4 to 7 days between each. The same individual(s) should conduct all surveys to eliminate observer bias.

Surveyors should observe from both sides of the air boat, looking for snail kites flying, soaring, hovering, and perched on perching areas in trees. When a snail kite is sighted, the observer should have the airboat stop and record the location. Binoculars or spotting scopes should be used to verify identification. The specific habitat category for each snail kite observed should be recorded at the point where the snail kite was first observed. The estimated perpendicular distance from the center of the transect to the snail kite should be measured with a range finder and plotted on the map. An attempt should be made to identify the sex of the snail kite. If the snail kite leaves or moves to a new location while being observed, the flight direction and, if possible, the location to which the snail kite travels should be noted. Behavior and vocalizations should be noted, especially behavior that would indicate courtship or nesting. The surveyor should look for and record signs of snail kite activity (e.g., piles of apple snail shells, white feces stains at perches or roosts). The surveyor should also look for potential nest sites while conducting foot surveys. Potential nest sites include small trees, low shrubs, and thick clumps of sawgrass or cattails. Locations of snail kites, possible snail kite activity, and potential nest sites should be recorded on a map. Upon completion of all transect surveys, surveys for nest sites should begin.

Airboat surveys will be needed to locate nests. The surveyor should return to areas where snail kites were repeatedly located; where snail kite pairs were observed; or where snail kites were exhibiting courtship, breeding, or territorial behavior during the transect surveys. If a snail kite is in sight upon arriving in an area, the surveyor should observe the bird for signs of courtship, nesting behavior, and vocalizations, and look for snail kite nest sites in suitable areas. Estimates of the number of individuals should be reported for each survey. Nest site location should be plotted on map and the compass direction and distance from a permanent landmark should be recorded. In addition, all observed nesting and roosting sites should be mapped and reported by latitude and longitude. Feeding areas need only be mapped.

Bald Eagle

Southern bald eagles usually utilize pines as nest trees, particularly where this community is located near a riverine or lacustrine foraging area. One- and two-year-old immature bald eagles, and some adults, may remain in Florida year-round. Large groups of eagles of up to 20 or more individuals may be spotted soaring on thermals during fall and spring migration.

The locations of most bald eagle nesting territories in Florida are available from the HCS Non-Game staff and the Division of Wildlife eagle experts at each regional FWC office. New nests occur each year, however, and new nest locations and new territories unknown to FWC biologists are possible.

Pine flatwood habitats near open bodies of water and landfills should be surveyed for nests. In Monroe, Collier, and Dade counties large mangroves may also support eagle nests. On occasion other tall trees, such as cypress and

Australian pines, may support nests. The following FLUCFCS classes are potential bald eagle habitat: Swimming Beaches (181), Open Land (190), Unimproved Pastures (212), Woodland Pastures (213), Coastal Scrub (322) if tall trees are present, Mixed Rangeland (330), Coniferous Forests (410), Pine Flatwoods (411), Longleaf - Xeric Oak (412), Sand Pine Scrub (413), Pine - Mesic Oak (414), Longleaf - Upland Oak (415), Other Pine (419), Oak - Pine - Hickory (423), Tropical Hardwood Hammock (426), Hardwood - Conifer Mixed (434), Australian Pines (437), Coniferous Tree Plantations (441), Streams and Waterways (510), Lakes (520), Reservoirs (530), Bays and Estuaries (540), Major Springs (550), Sloughs (560), Mangrove Swamps (612), Stream and Lake Swamps (Bottomland) (615), Wetland Coniferous Forests (620), Cypress (621), Pond Pine (622), Hydric Pine Flatwoods (624), Wetland Forested Mixed (630), Vegetated Non-Forested Wetlands (640), Freshwater Marshes (641), Sawgrass (6411), Cattail (6412), Spike Rush (6413), Maidencane (6414), Dog fennel and Low Marsh Grasses (6415), Arrowroot (6416), Saltwater Marshes (642), Cordgrass (6421), Needlerush (6422), Wet Prairies (643), Aquatic Vegetation (644), Submergent Aquatic Vegetation (645), Non-Vegetated (650), Tidal Flats (651), Shorelines (652), Intermittent Ponds (653), Oyster Bars (654), Beaches Other Than Swimming Beaches (710), Sand Other Than Beaches (720), Exposed Rock (730), Disturbed Lands (740), Rural Land in Transition Without Positive Indicators of Intended Activity (741), Borrow Areas (742), Spoil Areas (743), Fill Areas (744), Burned Areas (745), and Sea Grass (911).

All potential habitat within 3,000 feet of open water; open wetlands, shoreline, and open water zones (retention ponds, reservoirs, etc.); and landfills should be surveyed for nests and foraging. For open habitat patches less than 10 acres in size, a visual scanning of the area is usually sufficient. Areas that are either forested or exceed 10 acres in size should be sampled by either spot, aerial, or pedestrian surveys to attain complete coverage.

Bald eagle use of a site can be divided into two broad categories, based on the structural characteristics of the vegetation. Type I habitats are plant communities with potential nest trees (pines, mangroves, cypress). Type II habitats are those utilized as foraging areas (open water). To define potential bald eagle use of a site prior to transect surveys, Type I and Type II habitats should be mapped.

Surveys must be carried out from October through May (November to April is preferred) for confirmation of breeding activity. Surveys should be conducted on calm, clear days.

The most effective survey technique for bald eagle nests involves the use of aerial surveys of Type I habitat located near Type II habitat, supplemented with on-the-ground site inspections. In order to use aerial methods for a survey, the aircraft should survey all potential bald eagle habitats present. There should be no helicopter or fixed-wing aircraft operation within a 500-foot vertical distance or a 1,000-foot horizontal distance from a known nest. Observers should be separate individuals from the pilot. Two observers with optics should be located to face opposite sides of the aircraft. The observers should be able to communicate with the pilot so as to direct or redirect flight for improved observation. The distance between aerial transect surveys should be spaced according to the limits on visibility imposed by weather conditions, vegetation, and terrain. Air traffic zones and flight path approaches around airports, which do not allow circling or unusual flight patterns, may limit effective use of aerial survey techniques in some areas.

Pedestrian surveys should be conducted in those areas unsuitable for or inaccessible by, aerial survey, or may be performed instead of an aerial survey. Field staff should establish parallel line transects, spaced so that all potential habitat areas that qualify as Type I or Type II habitat are surveyed. Transect length and distances between transect surveys will vary with size of the area, topography, and vegetative structure. All transect surveys should be individually labeled on a map of the project site and individually identified by numbering or labeling.

Direction of travel along transect surveys should be reversed on alternate surveys to eliminate direction of travel bias. The same individual(s) should conduct all surveys to eliminate observer bias. Surveyors conducting ground and aerial transect surveys should observe both sides of the transect for bald eagles perched on trees, snags, or poles; nests in trees; and for bald eagles flying or soaring. When a bald eagle is sighted, the observation should be recorded on the map. Binoculars and spotting scopes should be used to verify identification. The specific habitat

category for each bald eagle observed should be recorded at the point where the bald eagle was first observed. If the bald eagle leaves or moves to a new location while being observed, the flight direction and the location where the bald eagle lands should be noted. Behavior and vocalizations (ground survey only) should be noted, especially behavior that would indicate courtship or nesting. Surveyors should walk transect surveys at a steady pace. The surveyors should not knowingly intrude closer than 750 feet to a nest. Birds may silently flush before being observed as surveyors approach a territory. The surveyor should look for and record signs of bald eagle activity (e.g., prey remains, feathers, debris including droppings accumulated at roosts and nests). The surveyor should also look for potential nest sites while conducting foot surveys. Locations of bald eagles, bald eagle activity, roost sites, and nest sites should be recorded on a map (plot compass direction and distance from a permanent landmark), preferably including latitude and longitude for nest and roost sites. Habitat type and use should be recorded for bald eagle sightings. Binoculars should be used to differentiate adult eagles from immature birds.

AQUATIC GROUP

West Indian Manatee, American crocodile, American Alligator, Atlantic Sturgeon, Common Snook, Mangrove Rivulus,

Detection of individuals within this group can be difficult since these species are aquatic, generally mobile, and are difficult to observe. For this reason, cursory survey efforts that fail to detect any of these species should not be construed to imply species absence. In areas of documented presence, these species will be considered present if suitable habitat is present.

West Indian Manatee

Principle manatee feeding areas are located in Sea Grass Beds (911), Submerged Aquatic Vegetation (645), Bank Grasses (644), and overhanging Mangroves (612) and in Rivers and Waterways (500s). Sheltered Bays, Coves, and Canals (540) are important resting, feeding and reproductive area. Major travel routes include Passes, Rivers, and Waterways (510). Manatees utilize natural deep channels and dredged channels to access shallow-water feeding and resting areas. Manatees require unobstructed access through these travel waterways to access important wintering areas in Tributary Creeks (510) and Springs (550). The distribution and abundance of manatees is a function of season and water temperature.

Surveys for West Indian manatee presence will typically begin with a request for information from the Florida Marine Research Institute (FMRI) in St. Petersburg or the USFWS Sirenia Laboratory in Gainesville (Appendix A), consultation with the local manatee watch organization, review with marine mammalogists familiar with the project area, and consultation with local government biologists (USFWS, FWC, DEP, and local jurisdiction). Local commercial fishermen, local guides, and marine laboratories, such as Mote Marine Laboratory, will have information on water body use in their areas. In many areas, recent studies (Nabor and Patton 1989) of manatees have identified and mapped preferred feeding areas and travel paths within specific water bodies.

On October 24, 1989, the Governor and Cabinet approved a number of recommendations from Department of Natural Resources (DNR) (subsequently DEP and now BPS/FWC) designed to improve manatee protection and boating safety. One recommendation dealt with the development of rules to implement speed zones in 14 counties identified as having significant manatee activity. The FWC has requested that each of these "key" counties either select one of the speed zone options or develop their own site specific manatee protection plan. In those counties with proposed or adopted maps, designated zones are presumptive of manatee presence.

If specific site surveys are necessary due to lack of existing documentation, an aerial survey and a fully outfitted vessel capable of operating in the water depths and site conditions of the water body would be required. A review of

the surveyors' capabilities to perform such surveys should be made with the FMRI. A basic survey would involve two weeks of timed, controlled transect surveys during season of presence for the species. Near shore areas should be surveyed in late fall to early spring in south Florida and in summer in north Florida; offshore areas should be surveyed in summer in south Florida. Surveys of open waters in winter or of north Florida areas in winter are not acceptable.

American crocodile

The American crocodile is found in marine and estuarine habitats from south Charlotte Harbor, Lee County to southern Palm Beach County in Mangroves (612), High Marsh (642), and Saline Lakes (no FLUCFCS code). Courtship and mating occur in late winter through early spring. Nesting begins in late April to early May on beaches, stream banks, and levees. Hatching is in late July and early August. Current documented breeding occurs from Cape Sable to Turkey Point on the mainland, on North Key Largo, and on some islands in Florida Bay (Moler 1992).

Surveys for American crocodile presence will typically begin with a request for information from the FWC Wildlife Research Laboratory in Gainesville, review with crocodile experts familiar with the project area, and consultation with local government biologists (USFWS, FWC, DEP, and local jurisdiction) including where appropriate Everglades National Park, Crocodile Lake National Wildlife Refuge, Rookery Bay National Marine Estuary, and the Southwest Florida Aquatic Preserves. These sources will be likely to have pertinent data on crocodile use for specific water bodies and areas.

If specific site surveys are necessary due to lack of existing documentation an aerial survey and a fully outfitted vessel capable of operating in the water depths and site conditions of the water body would be required. A review of the surveyors' capabilities to perform such surveys should be made with the USFWS and FWC. A basic survey would involve two weeks of timed, controlled transect surveys during breeding season. Surveys during non-breeding season will be deemed informational but not sufficient.

American alligator

American alligators utilize a wide variety of water bodies (500s) and wetlands (600s). During late winter and early spring, as wetland areas dry down, alligators move across uplands between wetlands. Large adult alligators construct "gator hole" ponds in herbaceous Wetlands (640) and depressional Pools (653). These gator holes become centers of wildlife activity in the dry season. Young alligators utilize shallow wetlands, including Hydric Pine Flatwoods (624) and Freshwater Marshes (640), with a water depth of 1 to 2 feet throughout the wet season. As adults grow larger, they no longer frequent shallow wetlands, but utilize areas with longer hydroperiods, such as swamps, ponds, lakes, and deep marshes (Fogarty and Campbell 1978).

Specific site surveys may be necessary, due to lack of existing documentation. This typically requires aerial survey or a fully outfitted vessel capable of operating in the water depths and site conditions of the water body. Surveyor expertise should be documented. A basic survey may involve two weeks of time-controlled transect surveys during the breeding season.

Fishes Group

The mangrove rivulus is found in Indian River and Brevard counties and is distributed continuously from Dade County to Lee County in Mangrove Swamps (612) and high Saltmarsh (642). They are found in stagnant water with high leaf litter, isolated pools, and crab burrows, including land crabs (Taylor and Snelson 1992). They are also found in mosquito impoundment ditches in the Indian River Lagoon system.

The life cycle of the snook is linked to healthy Mangrove (612), Sea Grass (911) and Unvegetated Bottom (650) habitats. Early life stages enter Estuarine (510) tributaries and high Marsh (642) habitats for protection, feeding and

osmoregulation. Adults forage in vegetated and unvegetated estuarine habitats, sheltering in mangrove prop root habitat during the day.

The Atlantic sturgeon has two subspecies in Florida. The Atlantic subspecies is found in St. Johns River, Port Canaveral, Brevard County, Ft. Pierce Inlet, and Hutchinson Island (St. Lucie County). The Gulf subspecies is found in most major Rivers (510) and Estuaries (540) from the panhandle south to Florida Bay. The Suwannee River is a critical spawning area for Gulf sturgeon (Gilbert 1992). It is anadramous. Adults enter fresh water in mid-February with spawning from March through May in the Suwannee River. Gulf sturgeons migrate downstream from October through December. Preferred habitats lack Vegetation (650).

Surveys for listed marine fish presence will typically begin with a request for information from experts familiar with the project area, and consultation with local government biologists (USFWS, FWC, DEP, and local jurisdiction) including where appropriate National Wildlife Refuge, National Marine Estuary, and Aquatic Preserves. Local marine laboratories, such as Mote Marine Laboratory and Harbour Branch Laboratory, will have information on water body use in their areas.

If specific site surveys are necessary, due to lack of existing documentation, this typically involves a creel or fish trap survey and may involve a fully outfitted vessel capable of operating in the water depths and site conditions of the water body. A review of surveyors' capabilities to perform such surveys should be made with the USFWS and FWC. A basic survey would involve two weeks of trapping during clement weather.

PINE FLATWOODS CAVITY NESTING GROUP

Red-cockaded Woodpecker, Southeastern American Kestrel, Mastiff Bat

The red-cockaded woodpecker in Florida utilizes southern slash pine (Pinus elliottii var. densa) flatwoods, often hydric, as nesting and foraging habitat in south Florida (Beever and Dryden 1992), and upland mesic and xeric longleaf pine (Pinus palustris) forest in north, central, and panhandle Florida (Baker 1978, Bradshaw 1990, Crosby 1971, Henry 1989). The territories of red-cockaded woodpeckers in hydric slash pine flatwoods are documented to be larger, on average 356.7 acres (144.4 h), than in northern longleaf pine, which ranges from 172.4 to 233.2 acres (69.8 to 94.4 h) (Nesbitt et al. 1983, Patterson and Robertson 1981).

The following FLUCFCS classes are potential red-cockaded woodpecker habitat: Recreational Land (180), Unimproved Pasture (212), Woodland Pasture (213), Specialty Farms (250), Other Open Lands (260), Coniferous Forests (410), Pine Flatwoods (411), Mixed Pine/Cypress (620), Longleaf-Xeric Oak (412), Pine-Mesic Oak (414), Hardwood-Conifer Mixed (434), Hydric Slash Pine Flatwoods (624), Rural Land in Transition Without Positive Indicators of Intended Activity (741), and Burned Areas (745). Red-cockaded woodpeckers are documented to avoid areas of dense midstory; however, site tenacity influences habitat utilization.

Foraging and cavity tree surveys should be conducted at least one-half mile from a roadway corridor in potential habitat (typically open pinelands with limited midstory). Proposed rights-of-way should be surveyed intensively. Detection of foraging red-cockaded woodpeckers requires an extensive time commitment.

Red-cockaded woodpecker use of a site can be divided into two broad categories based on use by the birds. Pinelands with mature pine trees of known age of 60 years or more, open midstory, and regular burns are potential colony and foraging habitat areas. Pine trees in this habitat will have a 6-inch diameter at breast height (DBH) or greater. Other habitat, such as areas with sparse pine canopy, areas with melaleuca or Brazilian pepper invasion, mixed pine/cypress habitat, cypress heads, open areas between forested habitats (wax myrtle, saw palmetto), and

very young pine habitat, is utilized in south Florida, although this habitat use may not be typical throughout this species' range. Red-cockaded woodpeckers will forage on 2 to 5 year-old pine trees (1.5 to 3-inch DBH) in south Florida. To define potential use of a site by red-cockaded woodpeckers prior to transect surveys all forested habitat meeting the initial criteria should be mapped. In areas where other habitat use, as stated, has been documented, additional habitats should be mapped for survey.

The most effective survey technique for red-cockaded woodpeckers involves the use of parallel pedestrian transect surveys. Surveys from vehicles will often miss red-cockaded woodpecker presence. Pedestrian transect surveys should pass through all potential red-cockaded woodpecker habitats present on the site in order to allow sighting of cavities, start holes, and individual birds. The distance between transect surveys should be spaced according to the limits on visibility imposed by vegetation and terrain. Typically, transect surveys spaced 200 feet apart are acceptable, except for areas of dense midstory or exotic plant invasion. Field staff should establish parallel transect lines spaced so that all potential habitat areas are surveyed. Transect length and distances between transect surveys will vary with size of the area, topography, and vegetative structure. All transect surveys should be individually labeled on a map of the project site.

Surveys for red-cockaded woodpecker presence may be performed throughout the year, but are most effective if conducted during the breeding season (late April to early June) and in the fall. Surveys for breeding must be performed during the breeding season (late April to early June). Conducting surveys in the breeding season will enhance the ability to locate active cavity trees and nest sites. Surveys for cavity trees should be performed in early morning or late afternoon when cavities are most visible because of sunlight shining on the trunks. Surveys for foraging red-cockaded woodpeckers are more successful in the early morning hours, at least during hot weather. Direction of travel along transect surveys should be reversed on alternate surveys to eliminate direction of travel bias and tree face bias. Fall surveys are more conducive to documenting the full non-nesting territory of a red-cockaded woodpecker clan. Both nesting season and non-nesting season surveys should be conducted for a period of two weeks each, for each project.

Surveyors conducting transect surveys should observe all sides of pine trees; look for red-cockaded woodpeckers foraging on trees and in flight. In the early morning, red-cockaded woodpeckers will often forage with other birds, including other woodpeckers, nuthatches, and warblers. The surveyor should listen for red-cockaded woodpecker activity. Tapes of red-cockaded woodpeckers are available from the Audubon and Peterson field guide series and can be used, but not depended on, in surveying for this species. When a red-cockaded woodpecker is sighted, the observer should stop and record the location. Binoculars and spotting scopes should be used to verify identification.

The specific habitat category for each red-cockaded woodpecker should be recorded at the point where the red-cockaded woodpecker was first observed. Data should be collected at half-hour intervals. If the red-cockaded woodpecker moves to a new location while being observed, the flight direction and location where the red-cockaded woodpecker lands should be noted. Behavior and vocalizations should be noted, especially behavior that would indicate courtship or nesting.

Locations of red-cockaded woodpeckers (including vocalizations), cavity trees, and start holes should be recorded on a map (plot compass direction and distance from a permanent landmark). Habitat type and use should be recorded for red-cockaded woodpecker sightings. Tree species, tree height, tree diameter at breast height (DBH), and activity level should be recorded for start holes and cavity trees. Surveys for cavity tree activity should be conducted after initial transect surveys are surveyed across the site.

Surveys to determine cavity tree activity should be conducted during the morning hours, from 1 hour prior to sunrise to 3 to 4 hours past, on calm, clear days. Each cavity should have its individual observer. Cavity trees should be categorized as active, inactive, or abandoned based on appearance and survey of clan activities on the site. Surveyors should observe members of the red-cockaded woodpecker clan for signs of courtship and nesting behavior in late April to early June. Nest site location should be plotted on map, with a record of compass direction and distance from a permanent landmark. The same individual(s) should conduct all surveys to eliminate observer

bias.

It is not possible to determine that a cluster is inactive by the appearance of the trees alone, especially over short survey times. Using tree appearance criteria alone, active colonies have been reported to be inactive. In physically undisturbed colony sites in southwest Florida, red-cockaded woodpeckers may utilize what appear to be completely inactive or abandoned cavities for roost trees. Studies (Doerr, 1988) indicate that 60% of inactive clusters in some North Carolina study sites are typically re-activated within 10 years and that red-cockaded woodpeckers may reoccupy abandoned clusters of trees due to a shortage of trees from natural events or interspecies competition. Doerr states that in active cluster sites "it is essential that there be an apparent surplus of trees to provide secure roosting for each bird, in a given year each clan usually uses 2-12 or more cavity trees, and that in a given year not all cavity trees are likely to be used."

Southeastern American kestrel

The southeastern American kestrel is a small falcon that utilizes open habitat for foraging and nests in tree cavities, typically abandoned woodpecker holes in dead pine trees. Foraging is performed from tall pine trees, snags, power and telephone poles and wires, and other tall objects. The kestrel feeds on large insects and, occasionally, on small rodents, reptiles, and birds (Wiley 1978). Open pine flatwoods provide for the life history requirements of the kestrel. The observed foraging areas for these birds often extend to adjacent open habitats, such as pasture, both wet and dry prairies, and mowed roadway edges. Survey guidelines for the resident Florida subspecies are found in Stys (1993) and are recounted here.

The following FLUCFCS classes may be potential kestrel habitat: Recreational Land (180), Improved Pasture (211), Unimproved Pasture (212), Woodland Pasture (213), Specialty Farms (250), Other Open Lands (260), Herbaceous Rangeland (310), Coniferous Forests (4101), Pine Flatwoods (4111), Longleaf-Xeric Oak (4121), Pine-Mesic Oak (4141), Xeric Oak (4211), Hardwood-Conifer Mixed (4341), Mixed Hardwood (4381), Forest Regeneration Areas (443), Hydric Slash Pine Flatwoods (624), Rural Land in Transition Without Positive Indicators of Intended Activity (741), and Burned Areas (745).

Kestrel use of a site can also be divided into two broad categories based on the structural characteristics of the vegetation. Type I habitats are plant communities with less than 10% canopy closure and with at least 60% herbaceous ground cover of less than 25 cm. in height. Type II habitats are open woodland communities with greater than 10% but less than 25% canopy closure and with at least 60% herbaceous ground cover of less than 25 cm. in height. To define potential kestrel use of a site prior to transect surveys, Type I and Type II habitats should be mapped.

The most effective survey technique for kestrels involves the use of vehicle transect surveys supplemented with pedestrian transect surveys. Vehicle transect surveys should include all potential kestrel habitats present on the site, and these habitats should be open enough to allow sighting of individual birds at considerable distance from the vehicle. The distance between transect surveys should be spaced according to the limits on visibility imposed by vegetation and terrain. A driving speed of 10 to 25 MPH is recommended, varying in response to terrain, road condition, or visibility. High-traffic roads that do not allow slow driving or frequent stopping cannot be utilized. On sites with limited vehicular access, vehicular surveys must be supplemented with pedestrian surveys.

Surveyors conducting road transect surveys should observe both sides of the road, looking for kestrels perched on fencerows, telephone poles and lines, and trees; and for kestrels flying or hovering. When a kestrel is sighted, the observer should stop the vehicle and record the location (both by odometer reading and on the map). Binoculars and spotting scopes should be used to verify identification. The specific habitat category for each kestrel observed should be recorded at the point where the kestrel was first observed. The perpendicular distance from the center of

the road to the kestrel should be measured by range finder and plotted on the map. An attempt should be made to identify the sex of the kestrel. If the kestrel leaves or moves to a new location while being observed, the flight direction and possibly the location where the kestrel lands should be noted. Behavior and vocalizations should be noted, especially behavior that would indicate courtship or nesting.

For pedestrian surveys, field staff should establish parallel line transect surveys spaced so that all potential habitat areas that qualify as Type I or Type II habitat are surveyed. Transect length and distances between transect surveys will vary with size of the area, topography, and vegetative structure. All transect surveys should be individually labeled on a map of the project site.

Surveyors on foot transect surveys should walk transects at a steady pace. Often birds will silently flush before being observed as surveyors approach a territory. The surveyor should look for and record signs of kestrel activity (e.g., prey remains, feathers at plucking sites, white feces stains accumulated at perches or roosts). The surveyor should also look for potential nest sites while conducting foot surveys. Potential nest sites include dead or dying trees, dead limbs on trees, and buildings.

Surveys must be carried out from April through August. Conducting surveys early in the breeding season will enhance the ability to sight kestrels due to conspicuous courtship behavior. Morning surveys should be conducted 3 to 4 hours following sunrise, on calm, clear days. Direction of travel along transect surveys should be reversed on alternate surveys to eliminate direction of travel bias. Surveys should be conducted 6 to 8 times with 4 to 7 days between each. The same individual(s) should conduct all surveys to eliminate observer bias.

Locations of kestrels, possible kestrel activity, and potential nest sites should be recorded on a map (plot compass direction and distance from a permanent landmark). Habitat type and use should be recorded for kestrel sightings. Binoculars should be used to identify and possibly determine the sex of the birds. Upon completion of all transects, surveys for nest sites should begin.

Foot surveys will be needed in locating actual nests. The surveyor should return to areas where kestrels were repeatedly located; or where kestrel pairs were observed; or where kestrels were exhibiting courtship, breeding, or territorial defense behavior during the transect surveys. If the kestrel(s) are in sight upon arriving in an area, the surveyor should observe the bird for signs of courtship, nesting behavior and vocalizations, and look for kestrel nest sites in snags, old woodpecker cavities, and buildings. Although pine snags are the most frequently used nest trees, surveyors should examine possible nest sites in all types of trees. Nest site location should be plotted on a map with record of compass direction and distance from a permanent landmark.

Locations of snags observed on road and foot surveys should be plotted on the area map. All structures (artificial and natural) that qualify as suitable perch sites should also be recorded and plotted on the area map.

Florida mastiff bat

The Florida mastiff bat is found in south Florida from Charlotte to Palm Beach counties and in the Florida Keys (Belwood 1992). It is found in buildings, in royal palm cavities and shafts, and in pine flatwoods in red-cockaded woodpecker cavity trees. Surveys for red-cockaded woodpeckers in south Florida will address the native habitats utilized by this species. Confirmation of cavity utilization requires trained bat specialists.

Since surveys for cavity nesting species such as Florida mastiff bat require an extensive time commitment and surveyor expertise, granture based on the documented range of this species is highly recommended.

First Edition

PRAIRIE BIRD GROUP

Audubon's Crested Caracara, Burrowing Owl, Florida Grasshopper Sparrow

Audubon's crested caracara is found in peninsular Florida in open areas and sparsely forested savannas with cabbage palms. Typical range accounts span from Volusia to Collier counties. Nesting typically occurs in a cabbage palm from September through April, with peak reproduction in January through March. It feeds on carrion, small reptiles, birds, and mammals (Layne 1987, Kale and Maehr 1991). Sightings are often made of birds perched on slash pines, cabbage palms, fence posts, spoil piles, and telephone poles, or foraging on carrion by roadways.

The following FLUCFCS classes may be potential caracara habitat: Open Land (190), Unimproved Pastures (212), Woodland Pastures (213), Herbaceous (310), Shrub and Brushland (320), Palmetto Prairies (321), Coastal Scrub (322), Other Shrubs and Brush (329), Mixed Rangeland (330), Open Pine Flatwoods (4111), Open Longleaf - Xeric Oak (4121), Cabbage Palm (428), Forest Regeneration Area (443), Hydric Pine Flatwoods (624), Shorelines (652), Beaches Other Than Swimming Beaches (710), Sand Other Than Beaches (720), Disturbed Lands (740), Rural Land in Transition Without Positive Indicators of Intended Activity (741), Spoil Areas (743), Fill Areas (744), Burned Areas (745), Open Pasture-Like Areas of Educational Institutions (170), Recreational Areas (180), Airports (811), Ports (815), and Facilities Under Construction (819, 829, 839).

Caracara use of a site can also be divided into two broad categories based on the structural characteristics of the vegetation. Type I habitats are cabbage palm clusters which serve as nesting sites. Type II habitats are foraging habitat. To define potential caracara use of a site prior to transect surveys the Type I and Type II habitats should be mapped.

Survey techniques for caracara are summarized in the general prairie bird survey section.

Burrowing Owl

The burrowing owl is found in open, high sandy ground including prairies, fencerows, sandhills, pastures, and open prairie-like expanses of airports, campuses, industrial areas, and cleared developments, occasionally with sparse open pines. Nesting may occur in the burrow year-round, with March to June being the peak-nesting season (Kale and Maehr 1990, Owre 1987). Contiguous breeding range is from Lake County to the south, although pocket populations are found on I-10 in Suwannee County and Duval County at the former Imesen airport. Most foraging is nocturnal. Some foraging and nest sentry activity occurs during the day.

The following FLUCFCS classes may be potential burrowing owl habitat: Open Land (190), Unimproved Pastures (212), Herbaceous (310), Shrub and Brushland (320), Palmetto Prairies (321), Other Shrubs and Brush (329), Mixed Rangeland (330), open Pine Flatwoods (4111), open Longleaf-Xeric Oak (4121), open Cabbage Palm (4281), Forest Regeneration Area (443), Sand Other Than Beaches (720), Disturbed Lands (740), Rural Land in Transition Without Positive Indicators of Intended Activity (741), Spoil Areas (743), Fill Areas (744), Burned Areas (745), Open Pasture-Like Areas of Educational Institutions (170), Recreational Areas (180), Airports (811), and Facilities Under Construction (819, 829, 839).

Survey technique for burrowing owls may include the use of vehicles, horsebacks transect surveys, or pedestrian transect surveys. Transect surveys should pass through all potential habitat on site at distances that allow sighting of individual birds. The distance between transect surveys should be spaced according to the limits on visibility imposed by vegetation and terrain. A driving speed of less than 5 mph is recommended to spot burrowing owls, varying in response to terrain, road condition, or visibility. High traffic roads that do not allow slow driving or

frequent stopping cannot be utilized. On sites with limited road and 4X4 vehicle access, the surveys should be conducted on horseback or on foot. All transect surveys should be individually labeled on a map of the project site.

Simple presence surveys should be conducted from November to June. Breeding surveys must occur in March to June for the burrowing owl. Surveys for burrow use should be conducted on calm, clear days. Surveys should be conducted during the morning and evening hours. Direction of travel along transect surveys should be reversed on alternate surveys to eliminate direction of travel bias. Burrowing owl burrows will be assumed to be active (e.g., potential nest sites) unless extensive surveys are conducted throughout the year to determine otherwise. The same individual(s) should conduct all surveys to eliminate observer bias.

Surveyors conducting transect surveys should observe both sides of the transect, looking for perching burrowing owls and for birds flying, soaring, or hovering. When a bird is sighted, the observer should stop and record the location. Binoculars and spotting scopes should be used to verify identification. The specific habitat for each owl observed should be recorded at the point where the owl was first observed. The perpendicular distance from the center of the transect to the owl should be measured by a range finder and plotted on the map. If the owl leaves or moves to a new location while being observed, the flight direction and the location where the owl lands should be noted. Behavior and vocalizations should be noted, especially behavior that would indicate courtship or nesting.

Pedestrian surveyors should walk transect surveys at a steady pace. The surveyor should return to areas where owls were repeatedly located; or where pairs were observed; or where owls were exhibiting courtship, breeding, or territorial defense behavior during the transect surveys. If the owl(s) is in sight upon arriving in an area, the surveyor should observe the bird for signs of courtship, nesting behavior, and vocalizations, and look for nest sites as described above. Nest site locations should be plotted on a map with record of compass direction and distance from a permanent landmark.

Florida grasshopper sparrow

The Florida grasshopper sparrow is found in south central Florida in treeless, poorly drained open pasture and prairies. The song is very weak and difficult to hear. The nest is built on the ground from early April to late June (Kale and Maehr 1990, Stevenson 1978).

The following FLUCFCS classes may be potential Florida grasshopper sparrow habitat: Open Land (190), Unimproved Pastures (212), Herbaceous (310), Shrub and Brushland (320), Palmetto Prairies (321), Other Shrubs and Brush (329), Mixed Rangeland (330), Forest Regeneration Area (443), Freshwater Marshes (641) particularly seasonal Juncus marshes, Dog Fennel and Low Marsh Grasses (6415), Wet Prairies (643), Disturbed Lands (740), Rural Land in Transition Without Positive Indicators of Intended Activity (741), and Burned Areas (745).

Prairie Bird Survey Techniques

The most effective survey technique for these three prairie birds involves the use of vehicle (typically 4X4) or horseback transect surveys supplemented with foot transect surveys. Transects should pass through all potential prairie bird habitats present on the site and these habitats should be open enough to allow sighting of individual birds at considerable distance from the vehicle. The distance between transect surveys should be spaced according to the limits on visibility imposed by vegetation and terrain. A driving speed of less than 5 MPH is recommended to spot burrowing owls and sparrows, varying in response to terrain, road condition, or visibility. High-traffic roads that do not allow slow driving or frequent stopping cannot be utilized. On sites with limited road and 4X4 access, the surveys must be supplemented with horseback and foot surveys.

Foot and horseback surveys should be conducted in those areas unsuitable for, or inaccessible by, vehicle transect surveys. Field personnel should establish parallel line transects spaced so that all potential habitat areas that qualify as Type I or Type II habitat are surveyed. Transect length and distances between transect surveys will vary with size of the area, topography, and vegetative structure. All transect surveys should be individually labeled on a map of

the project site.

Breeding surveys must occur in January to March for caracara, March to June for burrowing owl, and April to June for grasshopper sparrow. Surveys should be conducted during the day, on calm, clear days for caracara, grasshopper sparrow, burrowing owl burrows. Surveys should be conducted crepuscularly during the morning and evening hours, from plus or minus 1 hour before and after sunrise and sunset for burrowing owl burrow use. Direction of travel along transect surveys should be reversed on alternate surveys to eliminate direction of travel bias. Surveys should be conducted 6 - 8 times with 4 - 7 days between each for caracara and grasshopper sparrow presence. Surveys should be performed for 5 consecutive days for burrowing owl nesting. Surveys may be performed 1 time for burrowing owl burrow presence. The same individual(s) should conduct all surveys to eliminate observer bias.

Surveyors conducting transect surveys should observe both sides of the transect, looking for caracaras and burrowing owls perched on objects, and high points and for prairie birds flying, soaring, or hovering. When a prairie bird is sighted the observer should stop and record the location. Binoculars and spotting scopes should be used to verify identification. The specific habitat category for each prairie bird observed should be recorded at the point where the prairie bird was first observed. The perpendicular distance from the center of the transect to the prairie bird should be measured (range finder) and plotted on the map. If the prairie birds leaves or moves to a new location while being observed, the flight direction and possibly the location where the prairie bird lands should be noted. Behavior and vocalizations should be noted, especially behavior that would indicate courtship or nesting.

Surveyors should walk transects at a steady pace. Often Florida grasshopper sparrows will silently flush, fly low, and return to vegetation before being observed as surveyors approach them. The surveyor should also look for potential nest sites while conducting foot surveys. Potential nest sites include cabbage palm trees for caracara, burrows for burrowing owls, and ground nests for grasshopper sparrows. Locations of prairie birds, possible prairie bird activity, and potential nest sites should be recorded on a map by plotting compass direction and distance from a permanent landmark. Habitat type and use should be recorded for prairie birds' sightings. Surveys for nest sites should begin upon completion of all transects.

Foot surveys will be needed in locating actual nests. The surveyor should return to areas where prairie birds were repeatedly located; or where prairie bird pairs were observed; or where prairie birds were exhibiting courtship, breeding, or territorial defense behavior during the transect surveys. If the prairie bird(s) are in sight upon arriving in an area, the surveyor should observe the bird for signs of courtship, nesting behavior, and vocalizations, and look for prairie bird nest sites as described above. Nest site location should be plotted on map with record of compass direction and distance from a permanent landmark.

Florida Scrub Jay

The Florida scrub jay is found in peninsular Florida in areas of xeric oak occurrence. Classic habitats include xeric oak scrub, sand pine scrub, rosemary scrub, and xeric pine flatwoods. The Florida scrub jay can also be found in agricultural and residential situations where sufficient native oaks have been retained to support acorn caching.

The following are potential habitats of the Florida scrub jay: Improved, Unimproved and Woodland Pastures (211, 212, 213), Citrus Groves (221), Rangeland (310-330), Pine Flatwoods (411), Long-Leaf Pine-Xeric Oak (412), Sand Pine (413), Sand-Pine Plantations (4411), Forest Regeneration Areas (443), Sand Other Than Beaches (720), Disturbed Rural Land in Transition Without Positive Indicators of Intended Activity (741), and Disturbed Burned Areas (745).

Three habitat types are utilized by the Florida scrub jay. Two of these habitat types, Type I and Type II, collectively, include any and all areas where one or more species of scrub oak are present, even if only vestigially

represented. TYPE I HABITAT: Any upland plant community in which percent cover of the substrate by scrub oak species is 15% or more. TYPE II HABITAT: Any plant community, not meeting the definition of Type I habitat, in which one or more scrub oak species is represented. In most instances, Type I habitat is easily recognized as xeric oak scrub, scrubby pine flatwoods, scrubby coastal strand, or sand pine scrub. Conventional classification schemes are of less value in identifying or predicting the presence of Type II habitat; the presence of scrub oaks is the key indicator.

The third habitat type includes a variety of plant communities where scrub oak species are not represented, but that are nearby or adjacent to Type I or Type II habitat. TYPE III HABITAT: Any upland or seasonally dry wetland within 1/4 mile of any area designated as Type I or Type II habitat.

Grid the vegetation map in 1-acre units. Label each acre identified as Type I, Type II, or Type III habitat. Qualitative field inspection normally will be adequate for distinguishing Type I from Type II habitat. If a quantitative approach is desired, Breininger's (1981, 1989) modification of Canfield's (1941) line transect method is recommended.

The primary objective of these procedures is to obtain verification of scrub jay presence on the site and an accurate count of the number of jay groups on-site. Secondary objectives include mapping the location of each jay group, and estimating the size and age constituency of each group.

The initial methodology for surveying a site for jays is to traverse the area systematically, using a high quality tape recording of Florida scrub jay territorial scolding, in an attempt to attract the jays. The recording should include clear examples of all typical territorial scolds, including the female "hiccup" call. Copies of taped vocalizations may be obtained from Archbold Biological Station, P.O. Box 2057, Lake Placid, Florida 33852. Establish parallel line transects, and playback stations along each transect, on the vegetation map developed earlier. Space the transects and playback stations so that all Type I, II, and III habitat onsite will be sampled for jays (e.g., so that the taped calls unquestionably will be effectively broadcast across areas of concern). Distances between transects, and between stations along transects, depend on many factors, including the power of the speaker used for broadcasting the calls, topography, and the density of the surrounding vegetation. Adequate spacing between transects can be estimated roughly as the distance at which a person listening to the tape directly in front of the speaker perceives the "bird" to be no more than about 100 meters away. A distance of 100 to 200 meters between transects and between stations is generally adequate when using a good-quality, hand-held cassette player broadcasting at full volume. However, in habitat such as xeric oak hammock where visual and auditory observation is limited, more closely spaced transects are recommended. Surveys should be carried out on calm, clear days about one hour after sunrise, and should terminate before midday heat or wind. Surveys should not be conducted in winds stronger than a moderate breeze (5-8 mph), in mist or fog, or in precipitation exceeding a light, intermittent drizzle. Heat, and especially wind, lowers the tendency for jays to respond to distant territorial scolds, and wind reduces the distance over which recordings can be heard. Furthermore, jays are reluctant to fly on windy days regardless of hour or season.

Tape surveys should be conducted during: 1) spring (especially March), and 2) fall (September and October), when territorial displays (spring) and acorn caching (fall) are most frequent and vigorous.

Transect surveys may be driven or walked. If driven, the vehicle must be stopped and the engine turned off. All extraneous noise (e.g., radios, door-ajar buzzers, mobile telephones) should be stopped. Broadcast the calls at each station for at least 1 minute in all four compass directions around the playback station, emphasizing any direction in which low-growing oak scrub is the predominant vegetation.

The absence of a response to a tape survey is not proof of scrub jay absence. Tape surveys do not always succeed in attracting Florida scrub jays in a variety of situations and are not sufficient without additional pedestrian surveys. Scrub jay populations are not always responsive to tapes in areas of moderate to ambient background noise (e.g., existing highways, airports, waterways, residential neighborhoods), when habituation responses occur, or when scrub jays are elsewhere during tape playback, etc. In addition to tape surveys, pedestrian observations must be

performed. This should consist of morning and evening pedestrian surveys across suitable habitat on the site for a minimum of five days in spring and five days in fall. Transect surveys should be meandered through areas of suitable habitat and changed after each survey to maximize site coverage. Fall transect surveys should be conducted to coincide with acorn caching activities on the site. This is especially true in areas of overgrown habitat, such as xeric hammock, where jay activities are confined to seasonal collection of acorns.

On the vegetation map, plot the locations and indicate group sizes of all Florida scrub jays where they are first seen or heard. Distinguish adult-plumaged jays from juvenile-plumaged jays whenever possible. Once a group is located, stop at that station. Remain at this station until assembly of the entire group.

Sometimes two or more groups will be attracted to one station, usually from different directions. Observers should be careful, therefore, to plot each group where it was first spotted or heard, not at the site to which the jays were attracted. In rare circumstances, especially at sites where numerous groups congregate at artificial food or water sources, it may be difficult to differentiate groups. This is especially true where the jays have become habituated and tame to human approach. Again, in such cases, careful observation is extremely important. Studies of such congregations using color-marked jays have confirmed that they may consist of members of different family groups. Often they may have crossed several territory boundaries to reach a neutral feeding or drinking area. The result gives a false impression of extremely high jay density.

It is essential that the subject area be visited as often as necessary, with a minimum of 5 days in spring and 5 days in fall, to establish Florida scrub jay presence and an accurate count of jay groups. If more than 8 to 10 jays are encountered at a single station during a survey period, the jays at this site should be monitored carefully over several visits and different times of day. Numbers will shift as groups arrive and depart. Often it is possible to watch where the jays come from or return to as a means of determining how many families are represented.

The products of the activity survey are a complete count of all jay groups on-site, and an approximate territory map or home range center for each group.

MAMMAL GROUP

Sherman's Fox Squirrel, Big Cypress (Mangrove) Fox Squirrel, Florida Panther, Florida Black Bear, Everglades Mink

Detection of individuals within this group can be difficult since these species tend to exhibit either inherently low or dispersed populations, cryptic lifestyles, solitary behavior, and/or are nocturnal. For this reason, survey efforts that fail to detect any of these species should not be construed to imply species absence. In areas of documented presence, these species may be considered present if suitable habitat is present.

Note that while vehicles can be used to access a survey site for these species, vehicles should not be used in transects or sighting surveys. Signs of wandering mammals, including tracks, scat, tree scratches, discarded or hidden food and nests cannot be easily observed from a vehicle. Vehicle sound and smell may result in avoidance behavior by these species. Similarly, carrying equipment like car phones or walkie-talkies; making unusual noises; loud talking; wearing bright clothes; and using mosquito repellent, perfumes and colognes, soaps, hair toiletries, and other sources of artificial scent may result in avoidance behavior by these species. Surveying for these listed mammal species requires woods person skills, patience, quiet, and observation.

Specially trained hunting dogs are utilized to track and capture Florida black bear and Florida panthers for research and radio-collaring purposes. Use of these dogs is a regulated activity that requires permits from the FWC. Chasing

these species with dogs, without the proper permits, can constitute harassment.

The Sherman's fox squirrel inhabits a wide variety of upland areas including Unimproved Pastures (212), Woodland Pastures (213), Herbaceous (310), Shrub and Brushland (320), Palmetto Prairies (321), Coastal Scrub (322), Other Shrubs and Brush (329), Mixed Rangeland (330), Coniferous Forests (410), Pine Flatwoods (411), Longleaf - Xeric Oak (412), Sand Pine Scrub (413), Pine- Mesic Oak (414), Longleaf - Upland Oak (415), Other Pine (419), Upland Hardwood Forests (420), Xeric Oak (421), Oak - Pine - Hickory (423), Temperate Hardwood Hammock (425), Tropical Hardwood Hammock (426), Live Oak Hammock (427), Cabbage Palm (428), Wax Myrtle - Willow (429), Beech - Magnolia (431), Sand Live Oak (432), Hardwood - Conifer Mixed (434), Dead Trees (435), Australian Pines (437), Mixed Hardwoods (438), Other Hardwoods (439), Tree Plantations (440), Coniferous Tree Plantations (441), Hardwood (442), Forest Regeneration Area (443), Experimental Tree Plots (444), Seed Plantation (445), Sand Other Than Beaches (720), Disturbed Lands (740), Rural Land in Transition Without Positive Indicators of Intended Activity (741), Spoil Areas (743), Fill Areas (744), and Burned Areas (745).

This fox squirrel forages into wetland habitats: Sloughs (560), Wetland Hardwood Forests (610), Bay Swamps (611), Stream and Lake Swamps (Bottomland) (615), Wetland Coniferous Forests (620), Cypress (621), Hydric Pine Flatwoods (624), Wetland Forested Mixed (630), Vegetated Non-Forested Wetlands (640), Freshwater Marshes (641), Spike Rush (6413), Maidencane (6414), Dog fennel and Low Marsh Grasses (6415), Wet Prairies (643), and Intermittent Ponds (653) on a seasonal basis as part of its large home range (26 hectares or greater) utilizing plant and animals from a wide variety of habitats.

The principal Sherman's fox squirrel habitat in north and central Florida is Longleaf Pine-Turkey Oak Sand Hills (412 and 415) (Moore 1956, Ehrhart 1978, and Kantola 1992). In the Tampa Bay region, Rough Pastures (212 and 213), Pine Flatwoods (411), Mixed Flatwood-Hardwood (438), Hydric Pine Flatwoods (624), and Riverine Forests (630) are the principal habitats for this subspecies of the fox squirrel. They are documented to use improved pasture (300's) in Osceola and Okeechobee counties.

The Sherman's fox squirrel is found south into Palm Beach County on the east coast. The southern limit of the Sherman's fox squirrel on the west coast of Florida includes the hydric pine flatwoods and riverine hardwood forests of Charlotte and Lee counties north of the Caloosahatchee River. Its range extends west into Gilchrist and Levy counties. The principal north and central Florida habitat of Longleaf Pine-Turkey Oak Sand Hills (412 and 415) (Moore 1956, Ehrhart 1979 and Kantola 1992), is not found in southwest Florida. In the Tampa Bay region and southwest Florida, Rough Pastures (212 and 213), Pine Flatwoods (411), Mixed Flatwood-Hardwood (438), Hydric Pine Flatwoods (624), and Riverine Forests (630) are the principal habitats for this subspecies of the fox squirrel.

Sherman's fox squirrels forage on both male and female pinecones. Acorns from a variety of oaks (live, laurel, and sand live), cabbage palm fruits, bromeliad buds, and insects are also consumed. Hydric pine flatwoods adjacent to oak and hardwood hammocks, xeric sandhill ridges, small stands of longleaf pine, and riverine forests provide additional forage on a seasonal rotational basis. Nesting occurs in pines; hardwoods, including oak and bay; cypress; cabbage palms; and bromeliad clumps. In southwest Florida it appears that Sherman's fox squirrels occupy a smaller territory than do Big Cypress fox squirrels, and are more site constant. This appears to be related to the availability of oak trees and water.

The name Big Cypress fox squirrel should not be interpreted as a range restriction to the Big Cypress Swamp. This squirrel is found south of the Caloosahatchee River from the Gulf coast east to the western edge of the Everglades sawgrass marshes. Currently there is greater abundance of the Big Cypress fox squirrel outside of the Big Cypress Swamp National Preserve proper.

The Big Cypress fox squirrel utilizes a wide variety of forested and non-forested upland and wetland systems including Unimproved Pastures (212), Woodland Pastures (213), Herbaceous (310), Shrub and Brushland (320), Palmetto Prairies (321), Coastal Scrub (322), Other Shrubs and Brush (329), Mixed Rangeland (330), Coniferous Forests (410), Pine Flatwoods (411), Longleaf - Xeric Oak (412), Sand Pine Scrub (413), Pine - Mesic Oak (414),

Xeric Oak (421), Melaleuca (425), Temperate Hardwood Hammock (425), Tropical Hardwood Hammock (426), Live Oak Hammock (427), Cabbage Palm (428), Wax Myrtle - Willow (429), Sand Live Oak (432), Western Everglades Hardwoods (433), Hardwood - Conifer Mixed (434), Dead Trees (435), Australian Pines (437), Mixed Hardwoods (438), Other Hardwoods (439), Tree Plantations (440), Coniferous Tree Plantations (441), Hardwood (442), Forest Regeneration Area (443), Experimental Tree Plots (444), Seed Plantation (445), Sloughs (560), Wetland Hardwood Forests (610), Bay Swamps (611), Mangrove Swamps (612), Stream and Lake Swamps (Bottomland) (615), Wetland Coniferous Forests (620), Cypress (621), Hydric Pine Flatwoods (624), Wetland Forested Mixed (630), Vegetated Non-Forested Wetlands (640), Freshwater Marshes (641), Dog Fennel and Low Marsh Grasses (6415), Wet Prairies (643), Intermittent Ponds (653), Sand Other Than Beaches (720), Disturbed Lands (740), Rural Land in Transition Without Positive Indicators of Intended Activity (741), Spoil Areas (743), Fill Areas (744), and Burned Areas (745).

The Big Cypress fox squirrel possesses a large territory from which it harvests seasonally available bounties of cones, nuts, and seeds. The fox squirrel forages on slash pine male cones in winter and female cones during the summer. Male and female cones from cypress, cabbage palm fruits, bromeliad buds, and acorns are also consumed (Humphrey and Jodice 1991). Nesting occurs in pines; hardwoods, including oak and black mangrove; cypress; cabbage palms; and bromeliad clumps. The wide variety of habitats are used in a seasonal rotating basis depending on food availability, hydrology and the reproductive cycle. Optimal natural habitat consists of a reticulate matrix of upland and wetland habitats including hydric, mesic and xeric pine flatwoods, mature mangrove forest, open cypress and wet prairies, oak and hardwood hammocks, and riverine hardwoods.

The Big Cypress fox squirrel is not common in pine flatwoods dominated by a thick saw palmetto understory, dense, monocultural melaleuca forest, monocultural Brazilian pepper forest, monocultural Australian pine stands, and man-made habitats that do not possess a superabundance of food. Utilization of man-made habitats, such as bird feeders in residential areas and golf courses planted in exotic fruit trees, is dependent upon the availability of excess food and cover near adjacent natural areas, such as cypress strands and hydric pine flatwoods.

To define potential fox squirrel use of a site prior to transect surveys the Type I and Type II habitats should be mapped. Sherman's fox squirrel use of a site can be divided into two broad categories based on the structural characteristics of the vegetation. Type I nesting habitats are plant communities with moderate canopy closure and with a dependable freshwater source. Type II foraging habitats are open woodland and pasture communities with less than 25% canopy closure and with at least 50% herbaceous ground cover of less than 25 cm. in height.

Big Cypress fox squirrel use of a site can also be divided into two broad categories based on the structural characteristics of the vegetation. Type I nesting habitats are plant communities with low to full canopy closure of pine, oak, bay, cypress, mangrove, melaleuca, and other trees. Type II foraging habitats are open woodland and pasture communities with less than 25% canopy closure and with at least 50% herbaceous ground cover of less than 25 cm. in height.

The most effective survey technique for detecting the fox squirrel is by performing morning and evening pedestrian surveys across suitable habitats for a minimum of 6 to 8 days. Transect surveys should pass through all potential fox squirrel habitats present on the site. Transect surveys should meander through areas of suitable habitat and include stationary sighting at locations with high visibility of suitable habitat. Transects should be changed after each survey to maximize site coverage. The distance between transects should be spaced according to the limits on visibility imposed by vegetation and terrain. A slow walking speed is recommended, varying in response to terrain or visibility. Transect length and distances between transects will vary with size of the area, topography, and vegetative structure. All transects should be individually labeled on a map of the project site.

Surveys should be conducted during periods when abundant pinecones or acorn crops are available. Extreme

weather condition days (excess heat, freezing cold, storms, and fog) should be avoided. Conducting surveys early in the morning will enhance the ability to sight foraging fox squirrels. Morning surveys should be conducted during the 3 hours following sunrise. Direction of travel along transect surveys should be reversed on alternate surveys to eliminate direction of travel bias. Surveys should be conducted 6-8 times with 4-7 days between each. The same individual(s) should conduct all surveys to eliminate observer bias.

Surveyors conducting transect surveys should observe both sides of the transect, looking for fox squirrels on the ground, on fencerows, telephone poles and lines, and trees. Fox squirrels may observe a surveyor first and will freeze in position. When a fox squirrel is sighted, the observer should stop and record the location on the map. Binoculars and spotting scopes should be used to verify identification. The specific habitat category for each fox squirrel observed should be recorded at the point where the fox squirrel was first observed. The perpendicular distance from the center of the transect to the fox squirrel should be measured (rangefinder) and plotted on the map. If the fox squirrel leaves or moves to a new location while being observed, the direction and the location of the fox squirrel movement should be noted. Behavior should be noted. The surveyor should look for and record signs of fox squirrel activity (e.g., characteristic pine cone remains, scat, and tracks). The surveyor should also look for potential nest sites while conducting foot surveys.

Florida black bear

The black bear is a forest habitat generalist with seasonal preference for wherever food is most available. Black bears utilize all the natural forested systems of Florida, with a decided preference for upland/wetland ecotones (Maehr and Wooding 1992). The documented movements of radio-collared Florida black bears; documented sign and sightings of Florida black bears; and periodic road kills indicate that the large areas of relatively undisturbed forested wetlands, mesic upland forests and the major wetland basins provide the principal habitat of the black bear in Florida (Brady and Maehr 1985, Maehr 1984, Maehr et al. 1988).

The black bear utilizes a wide variety of areas including: Unimproved Pastures (212), Woodland Pastures (213), Shrub and Brushland (320), Palmetto Prairies (321), Coastal Scrub (322), Other Shrubs and Brush (329), Mixed Rangeland (330), Coniferous Forests (410), Pine Flatwoods (411), Longleaf - Xeric Oak (412), Sand Pine Scrub (413), Pine - Mesic Oak (414), Longleaf - Upland Oak (415), Other Pine (419), Upland Hardwood Forests (420), Xeric Oak (421), Oak - Pine - Hickory (423), Melaleuca (424), Temperate Hardwood Hammock (425), Tropical Hardwood Hammock (426), Live Oak Hammock (427), Cabbage Palm (428), Wax Myrtle - Willow (429), Beech - Magnolia (431), Sand Live Oak (432), Western Everglades Hardwoods (433), Hardwood - Conifer Mixed (434), Dead Trees (435), Mixed Hardwoods (438), Other Hardwoods (439), Tree Plantations (440), Streams and Waterways (510), Sloughs (560), Wetland Hardwood Forests (610), Bay Swamps (611), Mangrove Swamps (612), Gum Swamps (613), Titi Swamps (614), Stream and Lake Swamps (Bottomland) (615), Wetland Coniferous Forests (620), Cypress (621), Pond Pine (622), Atlantic White Cedar (623), Hydric Pine Flatwoods (624), Wetland Forested Mixed (630), Vegetated Non-Forested Wetlands (640), Freshwater Marshes (641), Sawgrass (6411), Cattail (6412), Spike Rush (6413), Maidencane (6414), Dog Fennel and Low Marsh Grasses (6415), Arrowroot (6416), Wet Prairies (643), Intermittent Ponds (653), Sand Other Than Beaches (720), Disturbed Lands (740), Rural Land in Transition Without Positive Indicators of Intended Activity (741), Borrow Areas (742), Spoil Areas (743), Fill Areas (744), and Burned Areas (745).

Surveys for Florida black bear presence should begin with a request for information from the FWC's Division of Wildlife and Habitat Conservation Scientific Services, and the USFWS for the area of interest; review with black bear experts familiar with the project area; and consultation with local biologists. These sources should have pertinent data on Florida black bear use for specific sites and areas.

An accurate survey of habitat for Florida black bear presence is difficult and time-consumptive. Surveys typically require a tracking and sign expert. A review of a surveyor's expertise to perform such surveys should be made with the USFWS and FWC. A basic survey should involve at least two weeks of tracking in the area.

Pedestrian survey technique for the Florida black bear requires surveys across suitable habitat for a minimum of two weeks. Transect surveys should consist of meandered walks through all potential black bear habitats present on the site. Transect surveys should be changed after each survey to maximize site coverage. The distance between transects should be spaced according to the limits on visibility imposed by vegetation and terrain. A slow walking speed is recommended, varying in response to terrain, or visibility. Transect length and distances between transects will vary with size of the area, topography, and vegetative structure. All transect surveys should be individually labeled on a map of the project site.

Surveys are best carried out in autumn and winter. Extreme weather condition days (excess heat, freezing cold, storms, and fog) should be avoided. Direction of travel along transect surveys should be reversed on alternate surveys to eliminate direction of travel bias. The same individual(s) should conduct all surveys to eliminate observer bias.

Surveyors conducting transect surveys should observe both sides of the transect, looking for Florida black bear sign (scat, tracks, remnants of foraging activity, claw mark trees, denning areas, crushed down cabbage palms and palmettos, and raided bee hives). When sign is sighted, the observer should stop and record the location on the map. Samples of scat, hair, and tracks should be taken to confirm the siting for scientific record. The specific habitat category for each sign found should be recorded. The perpendicular distance from the center of the transect to the sign should be measured (range finder) and plotted on the map.

Florida panther

Pine flatwoods, in combination with other forested upland and seasonal wetland habitats, provide critical foraging, breeding, and wildlife corridor habitat for the Florida panther. The documented foraging and breeding territories of radio-collared Florida panthers and documented sightings of Florida panther include large expanses of undisturbed forests (Maehr 1992). The panther utilizes hydric, mesic, and xeric pine flatwoods, and savanna, hardwood hammocks, and mixed swamp forest. Ecotones are particularly important to the panther because they support an increased variety and density of species. Prey animals, including white-tailed deer and wild hog, utilize the plant diversity of edge communities such as the hydric pine flatwoods (Layne and McCauley 1976). Recently burned pine flatwoods provide more prey for panther, and panthers are documented to move toward fires and stay in areas of recent burns (Belden 1986).

Panthers require large territories and abundant prey. Adult male panther territories average 400 square kilometers and adult female territories average 200 square kilometers (Maehr 1992). Panthers may travel up to 19 miles overnight, or stay in the same wooded habitat for a week or more (USFWS 1987). Additionally, forests associated with natural drainage patterns provide the travel corridors essential to the panther for moving between the fragmented foraging areas remaining in Florida.

The Florida panther utilizes a wide variety of areas including: Unimproved Pastures (212), Woodland Pastures (213), Shrub and Brushland (320), Palmetto Prairies (321), Coastal Scrub (322), Other Shrubs and Brush (329), Mixed Rangeland (330), Coniferous Forests (410), Pine Flatwoods (411), Pine- Mesic Oak (414), Other Pine (419), Upland Hardwood Forests (420), Xeric Oak (421), Melaleuca (424), Temperate Hardwood Hammock (425), Tropical Hardwood Hammock (426), Live Oak Hammock (427), Cabbage Palm (428), Wax Myrtle - Willow (429), Sand Live Oak (432), Western Everglades Hardwoods (433), Hardwood - Conifer Mixed (434), Dead Trees (435), Mixed Hardwoods (438), Other Hardwoods (439), Tree Plantations (440), Streams and Waterways (510), Sloughs (560), Wetland Hardwood Forests (610), Bay Swamps (611), Mangrove Swamps (612), Gum Swamps (613), Stream and Lake Swamps (Bottomland), (615), Wetland Coniferous Forests (620), Cypress (621), Pond Pine (622), Atlantic White Cedar (623), Hydric Pine Flatwoods (624), Wetland Forested Mixed (630), Vegetated Non-Forested Wetlands (640), Freshwater Marshes (641), Sawgrass (6411), Cattail (6412), Spike Rush (6413), Maidencane

(6414), Dog Fennel and Low Marsh Grasses (6415), Arrowroot (6416), Wet Prairies (643), Intermittent Ponds (653), Sand Other Than Beaches (720), Disturbed Lands (740), Rural Land in Transition Without Positive Indicators of Intended Activity (741), Borrow Areas (742), Spoil Areas (743), Fill Areas (744), and Burned Areas (745).

Florida panther and introduced western cougar in central, north and panhandle Florida also use: Longleaf - Xeric Oak (412), Sand Pine Scrub (413), Longleaf - Upland Oak (415), Oak - Pine - Hickory (423), Beech - Magnolia (431), and Titi Swamps (614).

Surveys for Florida panther presence should begin with a request for information from the FWC's Division of Wildlife and Habitat Conservation Scientific Services, and the USFWS for the area of interest; review with panther experts familiar with the project area; and consultation with local biologists. These sources will have pertinent data on Florida panther use for specific areas.

An accurate survey of habitat for Florida panther presence is difficult and time-consumptive. Surveys typically require a tracking and sign expert. A review of a surveyor's capabilities to perform such surveys should be made with the USFWS and FWC.

Survey technique for Florida panther should follow the methods outlined by Roof and Maehr (1988). When sign is sighted, the observer should stop and record the location on the map. Samples of scat, hair, and tracks should be taken to confirm the siting for scientific record. The specific habitat category for each sign found should be recorded. The perpendicular distance from the center of the transect to the sign should be measured (range finder) and plotted on the map.

Since surveys for large mammals such as black bears and panthers require an extensive time commitment and surveyor expertise, granture based on the documented range of this species is highly recommended.

Everglades mink

The Everglades mink is found in the Big Cypress Swamp; the freshwater wetlands of western Collier County; the western edge of the Everglades; and marshes north to Lake Okeechobee (Allen and Neill 1952). Brown (1978b) indicates a distribution in southeastern Lee County and all of Collier County. Humphrey and Setzer (1989) define a more limited range to Dade, mainland Monroe, Collier, and southern Lee counties. Humphrey (1992) further restricts the range to southern Collier, mainland Monroe and Dade Counties.

Mink are nocturnal and crepuscular predators of mammals, reptiles, birds, amphibians, fishes, and eggs. The species does not appear to be numerous and, given its period of activity, the literature on distribution is based primarily on road kills.

The everglades mink is found in a wide variety of shallow wetland systems: Streams and Waterways (510), Lakes (520), Reservoirs (530), Sloughs (560), Wetland Hardwood Forests (610), Bay Swamps (611), Mangrove Swamps (612), Stream and Lake Swamps (Bottomland) (615), Wetland Coniferous Forests (620), Cypress (621), Hydric Pine Flatwoods (624), Wetland Forested Mixed (630), Vegetated Non-Forested Wetlands (640), Freshwater Marshes (641), Sawgrass (6411), Cattail (6412), Spike Rush (6413), Maidencane (6414), Dog Fennel and Low Marsh Grasses (6415), Arrowroot (6416), Saltwater Marshes (642), Cordgrass (6421), Needlerush (6422), Wet Prairies (643), Aquatic Vegetation (644), Submergent Aquatic Vegetation (645), Non-Vegetated (650), Shorelines (652), Intermittent Ponds (653), Sand Other Than Beaches (720), Borrow Areas (742), Spoil Areas (743), Fill Areas (744).

Surveys for everglades mink presence will typically begin with a request for information from the FWC Division of Wildlife and Habitat Conservation Scientific Services, and the USFWS for the area of interest (Appendix A), review with mink experts familiar with the project area, and consultation with local government biologists (USFWS, FWC, DEP, and local jurisdiction). These sources will be likely to have pertinent data on everglades mink use for specific sites and areas.

Surveys of habitats for everglades mink presence are difficult. This typically requires use of chalk-dusted track boards and anal scent attractant during September to November, by experienced biologists. A review of surveyors capabilities to perform such surveys should be made with the USFWS and FWC. A basic survey would involve two weeks of track captures in the area.

The location and number of everglades mink track capture transect surveys should be based on the distribution of available habitat across the site. Each transect should consist of a minimum of 25 stations (one chalk-dusted track board with scent) per 50 acres of suitable habitat. Each transect should be sampled for four consecutive 24-hour periods to obtain the necessary 200 trap-nights per transect. Traps should be checked once each day. All track marks should be identified to species and tabulated. Final survey reports should include all habitat/transect data. All transect surveys should be individually labeled on a map of the project site.

Surveys must occur from September to November, during mating season. Extreme weather condition days; excess heat, freezing cold, storms, and fog should be avoided. Rain which obscures chalk will disqualify a day's survey. The same individual(s) should conduct all surveys to eliminate observer bias.

Surveyors conducting transects should look for everglades mink sign, scat, tracks, remnants of kill, and denning areas. When sign is sighted the observer should stop and record the location on the map. Samples of scat, hair, and tracks (note this can be videotaped) should be taken to confirm the siting for scientific record. The specific habitat category for each sign found should be recorded.

TERRESTRIAL REPTILES AND AMPHIBIANS

Indigo Snake, Florida Pine Snake, Gopher Frog, Blue-tailed Mole Skink, Sand Skink, Short-tailed Snake, Gopher Tortoise

The species in this group are extremely difficult to census due to their highly cryptic behavior and activity patterns. Investigators should be aware of how seasonal and local conditions may influence individual species sampling success (Moler 1992).

Eastern Indigo Snake

The eastern indigo snake utilizes a wide variety of habitats throughout Florida, in habitats ranging from mangroves to xeric scrub. Populations in the panhandle may be very localized. Where available, gopher tortoise burrows are utilized as shelter, particularly in winter in north Florida. Kochman (1978) states that eastern indigo snakes are susceptible to desiccation and are more characteristic of mesic than xeric habitats in south Florida. It is diurnal and actively searches for prey particularly at upland/wetland ecotones. Summer range extends from 125 to 250 acres or more. Winter range tends to be smaller as the snakes stay close to shelter. Shedding occurs frequently. Breeding occurs from November through April. Eggs are laid from May through June. Diet includes small mammals, birds, frogs, lizards, and other snakes (Moler 1992). In the dry season indigo snakes are found in the moister, but not submerged, areas of marshes, hydric pine flatwood and other seasonal wetlands.

Indigo snakes occur in and should be surveyed for in the following habitats: Unimproved Pastures (212), Woodland Pastures (213), Herbaceous (310), Shrub and Brushland (320), Palmetto Prairies (321), Coastal Scrub (322), Other Shrubs and Brush (329), Mixed Rangeland (330), Coniferous Forests (410), Pine Flatwoods (411), Longleaf - Xeric Oak (412), Sand Pine Scrub (413), Pine - Mesic Oak (414), Longleaf - Upland Oak (415), Other Pine (419), Upland Hardwood Forests (420), Xeric Oak (421), Brazilian Pepper (422), Oak - Pine - Hickory (423), Melaleuca (424), Temperate Hardwood Hammock (425), Tropical Hardwood Hammock (426), Live Oak Hammock (427), Cabbage

Palm (428), Wax Myrtle - Willow (429), Beech - Magnolia (431), Sand Live Oak (432), Western Everglades Hardwoods (433), Hardwood - Conifer Mixed (434), Dead Trees (435), Australian Pines (437), Mixed Hardwoods (438), Other Hardwoods (439), Tree Plantations (440), Coniferous Tree Plantations (441), Hardwood (442), Forest Regeneration Area (443), Experimental Tree Plots (444), Seed Plantation (445), Streams and Waterways Edges (510), Lakes Edges (520), Reservoirs Edges (530), Major Springs Edges (550), Sloughs (560), Wetland Hardwood Forests (610), Bay Swamps (611), Mangrove Swamps (612), Gum Swamps (613), Titi Swamps (614), Stream and Lake Swamps (Bottomland) (615), Wetland Coniferous Forests (620), Cypress (621), Pond Pine (622), Atlantic White Cedar (623), Hydric Pine Flatwoods (624), Wetland Forested Mixed (630), Vegetated Non-Forested Wetlands (640), Freshwater Marshes (641), Spike Rush (6413), Maidencane (6414), Dog Fennel and Low Marsh Grasses (6415), Arrowroot (6416), Saltwater Marshes (642) High Marsh, Wet Prairies (643), Shorelines (652), Intermittent Ponds (653), Beaches Other Than Swimming Beaches (710), Sand Other Than Beaches (720), Disturbed Lands (740), Rural Land in Transition Without Positive Indicators of Intended Activity (741), Borrow Areas (742), Spoil Areas (743), Fill Areas (744), and Burned Areas (745).

Burrowing Snakes and Skinks

The Florida pine snake is found in xeric upland communities including Unimproved Pastures (212), Woodland Pastures (213), Herbaceous (310), Shrub and Brushland (320), Palmetto Prairies (321), Other Shrubs and Brush (329), Mixed Rangeland (330), Coniferous Forests (410), Xeric Pine Flatwoods (411), Longleaf-Xeric Oak (412), Sand Pine Scrub (413), Pine-Mesic Oak (414), Longleaf-Upland Oak (415), Other Pine (419), Upland Hardwood Forests (420), Xeric Oak (421), Temperate Hardwood Hammock (425), Cabbage Palm (428), Sand Live Oak (432), Hardwood-Conifer Mixed (434), Dead Trees (435), Mixed Hardwoods (438), Other Hardwoods (439), Tree Plantations (440), Coniferous Tree Plantations (441), Hardwood (442), Forest Regeneration Area (443), Experimental Tree Plots (444), Seed Plantation (445), Sand Other Than Beaches (720), Disturbed Lands (740), Rural Land in Transition Without Positive Indicators of Intended Activity (741), Borrow Areas (742), Spoil Areas (743), Fill Areas (744), and Burned Areas (745). This species is also found in former xeric habitat such as old fields and vacant lots. During drought conditions, the Florida pine snake will seek open habitats near wetlands. This snake is a burrowing snake that seeks out both pocket gopher and gopher tortoise burrow systems. Pine snakes are most active in May, June, July, and October during the breeding, laying, and the hatching season (Franz 1992).

The short-tailed snake is a burrowing snake of Longleaf Pine/Turkey Oak habitats (415 and 412), Upland Hammocks (425 and 427), and Sand Pine Scrub (413), near to Longleaf Pine-Turkey oak. It appears to select Norfolk, Blanton fine, and St. Lucie soils. It is seldom above ground, except in April and October (Campbell and Moler 1992).

The blue-tailed mole skink is found just under the sand in Sand Pine Scrub (413), Rosemary Scrub (310), Oak Scrub (421), Turkey Oak barrens (No FLUCFCS Code), Xeric Pine (411), and Xeric Hammock (412) on the Lake Wales Ridge in Polk, Highlands and Osceola Counties (Christman 1992). The sand skink is found just under the sand in Rosemary Scrub (310), Sand Pine Scrub (413), Oak Scrub (421), scrubby Flatwoods (411) and Turkey Oak barrens (No FLUCFCS Code) on the Lake Wales and Winter Haven Ridges in Polk, Highlands, Osceola, Orange, Lake and Marion Counties (Christman 1992).

It is extremely unlikely that burrowing snakes will be observed above ground during a visual survey of habitats. Sites located within suitable habitat in the documented range of burrowing snakes should be surveyed for presence of listed snake species by the drift fence array method described by Campbell and Christman (1982). A minimum of two arrays (situated at least 500 feet apart) is recommended for each 100 acres of suitable habitat. Arrays should be monitored twice a week for a minimum of six weeks.

If gopher tortoise burrows are present, portions of the site that support moderate to high densities of gopher tortoises (0.4 individuals per acre or greater) should have one-way funnel traps (minimum three-foot length) placed at the burrow entrance of at least twenty-five percent of the active and inactive gopher tortoise burrows on a site. Traps should be shaded and left in place for at least four consecutive days and checked twice each day.

Active searching with raking and pitfall traps can be employed as an alternative method for burrowing skinks, if survey plans and surveyors qualifications are submitted for prior review by the FWC.

Gopher Frogs

During the months of February through October, (March through September is best) following heavy rains, nighttime monitoring of frog vocalizations from appropriate wetland habitats intermittent wetlands can be conducted to determine the presence of listed frog breeding habitat within a site. Visual observation of listed frogs is possible in suitable habitat and suitable time of day during breeding periods.

The gopher frog utilizes gopher tortoise burrows, mouse burrows, stump holes, and postholes in the habitats where the gopher tortoise is found. In the breeding season, gopher frogs congregate at night in shallow, vegetated ponds to breed (Fogarty 1978b). Preferred breeding habitats include seasonally flooded grassy ponds and cypress heads that lack predatory fish populations (Godley 1992). The adults are nocturnal, but may be observed at the mouth of burrows on dark, damp days. Breeding occurs in February through April in north Florida and in spring and summer, depending on hydrology, in south Florida. The gopher frog may call throughout the year, but it is most likely to be heard in the breeding season. Sampling for gopher frog should be performed whenever gopher tortoises or their burrows are found in any or all of the following habitat types: Unimproved Pastures (212), Woodland Pastures (213), Herbaceous (310), Shrub and Brushland (320), Palmetto Prairies (321), Other Shrubs and Brush (329), Mixed Rangeland (330), Coniferous Forests (410), Pine Flatwoods (411), Longleaf-Xeric Oak (412), Sand Pine Scrub (413), Pine-Mesic Oak (414), Longleaf-Upland Oak (415), Other Pine (419), Upland Hardwood Forests (420), Xeric Oak (421), Temperate Hardwood Hammock (425), Live Oak Hammock (427), Cabbage Palm (428), Wax Myrtle-Willow (429), Sand Live Oak (432), Hardwood-Conifer Mixed (434), Dead Trees (435), Australian Pines (437), Mixed Hardwoods (438), Other Hardwoods (439), Tree Plantations (440), Coniferous Tree Plantations (441), Hardwood (442), Forest Regeneration Area (443), Experimental Tree Plots (444), Seed Plantation (445), Sand Other Than Beaches (720), Disturbed Lands (740), Rural Land in Transition Without Positive Indicators of Intended Activity (741), Borrow Areas (742), Spoil Areas (743), Fill Areas (744), and Burned Areas (745).

The gopher frog should be censused using a combination of directed pedestrian surveys and funnel trapping. At portions of the site that support moderate to high densities of gopher tortoises (0.4 individuals per acre or greater), one-way funnel traps (minimum three-foot length) should be placed at the burrow entrance of at least twenty-five percent of the active and inactive gopher tortoise burrows on a site. Greater sampling effort for gopher frog populations should be expended on burrows within one-half mile of intermittent wetlands. Traps should be shaded and left in place for at least four consecutive days and checked twice each day.

Upland pedestrian surveys must be performed during the active months (March through September) for the gopher frog. During cool weather, investigators should closely observe gopher tortoise burrows for gopher frogs, just inside the burrow entrance.

Gopher Tortoise

The gopher tortoise utilizes dry, well-drained soils with areas of open herbaceous understory (Auffenberg 1978).

Sampling for gopher tortoises should be performed in the following habitat types: Unimproved Pastures (212), Woodland Pastures (213), Herbaceous (310), Shrub and Brushland (320), Palmetto Prairies (321), Coastal Scrub (322), Other Shrubs and Brush (329), Mixed Rangeland (330), Coniferous Forests (410), Pine Flatwoods (411), Longleaf - Xeric Oak (412), Sand Pine Scrub (413), Pine- Mesic Oak (414), Longleaf - Upland Oak (415), Other Pine (419), Upland Hardwood Forests (420), Xeric Oak (421), Brazilian Pepper (422), Oak - Pine - Hickory (423),

Melaleuca (424), Temperate Hardwood Hammock (425), Tropical Hardwood Hammock (426), Live Oak Hammock (427), Cabbage Palm (428), Wax Myrtle - Willow (429), Beech - Magnolia (431), Sand Live Oak (432), Western Everglades Hardwoods (433), Hardwood - Conifer Mixed (434), Dead Trees (435), Australian Pines (437), Mixed Hardwoods (438), Other Hardwoods (439), Tree Plantations (440), Coniferous Tree Plantations (441), Hardwood (442), Forest Regeneration Area (443), Experimental Tree Plots (444), Seed Plantation (445), Beaches Other Than Swimming Beaches (710), Sand Other Than Beaches (720), Disturbed Lands (740), Rural Land in Transition Without Positive Indicators of Intended Activity (741), Borrow Areas (742), Spoil Areas (743), Fill Areas (744), and Burned Areas (745).

In most of south Florida, perennially dry habitats exist as islands surrounded by a reticulation of hydric habitats. The gopher tortoise forages in both the upland and the adjacent hydric habitats when water levels recede and throughout the dry-season. The gopher tortoises that utilize natural hydric habitats construct dry-season burrows in hydric habitats, and wet-season burrows in dry, upland ridge islands. In drained Hydric Pine Flatwoods (624), gopher tortoises construct dry-season burrows in the upper portions of the flatwoods.

If granture indicates that each habitat area identified by cursory pedestrian survey is significant habitat, then no additional survey for gopher tortoises is required. If granture is not indicated, at least 15% of each appropriate habitat type within the project right-of-way should be surveyed for tortoise burrows. Transects should be 270 yards long, and all tortoise burrows found within 10 yards of either side of the transect are counted. The area covered by this transect is 1.2 acres. The number of transects needed, when acres are used as the unit for area, is approximately 1 transect per 8 acres for areas larger than 50 acres, and 1 transect per 7 acres for areas smaller than 50 acres. Cross-sections of habitat extending outside the right-of-way may be used to determine density in each habitat type. Surveys of 100% of the habitat are typically less time-consumptive than partial surveys and may be used as an alternative. Where dense vegetative cover may result in reduced visibility, transect width should be narrowed and a corresponding number of transects added to ensure equal site coverage.

Each burrow detected within 10 meters of the transect line is classified as "active", "inactive", or "abandoned" using the following criteria: "Active": obvious tortoise tracks or shell scraping signs at the burrow mouth; "Inactive": no tracks or shell scrapings, burrow unblocked by debris, but recent use apparent; and "Abandoned": burrow covered with sticks, weeds, grass, burrow collapsed, dilapidated.

Unless a site-specific conversion factor can be documented, the conversion factor recommended by Auffenburg and Franz (1982) is to be used to relate the density of "active" and "inactive" gopher tortoise burrows to the density of gopher tortoises on a site. This conversion factor is 0.614 unless sufficient site-specific documentation is provided to demonstrate that the factor is incorrect.

Utilizing the methods specified in Cox et al. (1987), each habitat should be designated as valuable, significant, or less than significant. This information should be provided in a tabular format and indicated on a map.

SMALL MAMMAL GROUP

Florida Mouse, Sanibel Island Rice Rat, Sherman's Short-tailed Shrew

The endemic Florida mouse is found in association with gopher tortoise burrows in xeric upland habitats on well-drained soils (Layne 1992). It has its southern limits of range in the coastal ridges and dunes of Charlotte County including the barrier island and mainland relictual Pleistocene sand ridges on the west coast, and Boca Raton, Palm Beach County on the east coast. Taylor County is the contiguous range western limit. An isolate population occurs in Carabelle, Franklin County (Layne 1992).Sampling for Florida mouse should be conducted in any or all of the following habitat types: Sand Pine Scrub (413), Longleaf Pine-Turkey Oak Sandhills (412 and 415), Mixed Hardwoods and Pines (423 and 438), Upland Hardwood Hammocks (427), Oak Hammocks (425), North and South Florida Flatwoods (411) - particularly xeric, Sand Live Oak Scrub (432), Palmetto Prairie (321), Mixed Rangeland

(330), Unimproved Pasture (212), Woodland Pasture (213), Rangeland (300), Tree Plantations (440), Sand (720), and Disturbed Lands (740). To maximize Florida mouse capture, sampling stations should be located in the immediate vicinity of stumps, fallen logs, pathways, and gopher tortoise burrows. In some cases, it may be appropriate to rely on gopher tortoise survey results to assist with the location of live trap transects.

The Sanibel Island rice rat is found on Sanibel Island in Freshwater (641) and Salt Marshes (642) of the Sanibel River and high Marsh areas (642).

Sherman's short-tailed shrew was described in 1955 from a location two miles north of Fort Myers, in drainage ditches with Dense Grass (641). This site corresponds with an area in the historic distribution of Hydric Pine Flatwoods (624) in northern Lee County. It is also recorded in 1980, 1984, and 1985, perhaps as intergrades with the Florida short-tailed shrew, in the Hickey Creek area of Lee County south of the Caloosahatchee River in Mesic Oak Hammock (427) and Pine Flatwoods (411) (Layne 1992).

The location and number of small mammal transects should be based on the distribution of available target habitat across the site. In sampling for mice, drift fences should be incorporated to funnel animals into traps. Each transect should consist of a minimum of 25 stations (two live-traps placed within a 10-foot radius of the station) per 50 acres of suitable habitat. Each transect should be sampled for four consecutive 24-hour periods to obtain the necessary 200 trap-nights per transect. Traps should be shaded and checked twice each day to prevent dehydration of captured animals. Captured animals should be identified to species and released. Final survey reports should include all habitat/transect data.

MIGRATORY PASSERINE BIRD GROUP

Bachman's Warbler, Kirtland's Warbler

Kirtland's Warbler is a migratory species that travels through Florida between northern Michigan and the Bahamas. They are present in Florida from April through May, and from September through October. Most observations occur on the east coast of Florida (Stevenson 1987).

Bachman's Warbler is a migratory species that traveled through Florida between bottomland hardwood swamps of the central south United States to Cuba. They are recorded as present in Florida from February through April, and from July through September. Most recorded observations occur in Key West during autumn migration (Stevenson 1987).

Migratory bird habitats consist of thickly Vegetated Coastal Forests (425, 426, 427, 428, 433, 434, 437, 438, 439) often at the end of peninsulas or on barrier islands. Often, these habitats are found within an Urban (100) or suburban matrix in Undeveloped Land (190) and Recreational Facilities (180). Bachman's warbler may use Bamboo Thickets and Cypress systems (621, 624) in Florida.

An appropriate survey methodology for migratory warblers consists of morning pedestrian surveys across the suitable migratory bird habitats for a minimum of five days in spring and five days in fall. Survey days should occur during the appropriate months. Autumn surveys should be performed the day following a cold front. Transects should be meandered through areas of suitable habitat and changed after each survey to maximize site coverage. Map all observations of listed species as well as nests, and song/call observations.

NON-MIGRATORY PASSERINE BIRD GROUP

Cape Sable Seaside Sparrow, White-crowned Pigeon

Detection of individuals within this species group can be difficult since these species tend to small, stay in cover, and occur in difficult habitat for visual observation. For this reason, survey efforts that fail to detect any of these species should not be construed to imply species absence.

The Cape Sable seaside sparrow is found in Cordgrass (6421), Spike Rush (6413), Salt Grass (6443), Sawgrass (6411) and Hair grass Marshes (6415) of Cape Sable, the Big Cypress Swamp and Taylor Slough in Collier, Monroe, and Dade Counties. Formerly it was found to from Carnestown to Shark Valley Slough (Werner 1987). Nesting occurs from February through August. Nests are woven of fine marsh grass in a dome or cup shape. Singing and nesting decline with marsh flooding.

Seaside sparrows are extremely secretive. These species are well camouflaged in their habitat and stay in cover for foraging and protection. Presence is best established by song during breeding season. Surveys should be performed at breeding season in quiet fair weather conditions. Surveys should be non-obtrusive. Survey's should consist of pedestrian surveys across or adjacent to the suitable habitats for the species on the site for a minimum of five days. Boats may be used provided engines are turned off to listen for birds and wakes are controlled. A canoe, kayak, or light vessel with a trolling motor can be efficient in some situations. Transects should be meandered through, or in visual and auditory distance of, suitable habitat and changed after each survey to maximize site coverage. The presence of an expert experienced in locating the species is very helpful and recommended. The presence of a seaside sparrow or marsh wren on a site in nesting season is presumptive of nesting occurring. Scanning microphones may prove useful on large parcels. Map all visual and song-call observations of seaside sparrows and marsh wrens as well as any encountered nests. The presence of a seaside sparrow or marsh wren on a site in nesting season is presumptive of nesting occurring.

The white-crowned pigeon is found in mangroves and tropical hardwood hammocks in the Florida Keys and Florida Bay in Collier, Monroe and Dade Counties. Nesting occurs on small islands in mangroves in Florida Bay. Breeding occurs from March to June. Some of the population migrates to the Caribbean for the winter but some birds are present all year. It is most abundant in the Upper Keys.

The following FLUCFCS classes may be potential white-crowned pigeon habitat: Tropical Hardwood Hammock (426), Western Everglades Hardwoods (433), Mangrove Swamps (612).

White-crowned pigeon use of a site can also be divided into two broad categories based the birds use of the area. Type I habitats are breeding sites and typically consist of mangrove islands. Type II habitats are foraging sites, and typically consist of the main Florida Keys and mainland Florida Bay. To define potential white-crowned pigeon use of a site prior to transects the Type I and Type II habitats should be mapped.

Nesting birds are extremely secretive. Presence of a nesting are is best established by calls, and morning and evening flights from and to nesting areas during breeding season. Surveys should be performed at breeding season in quiet fair weather conditions. Surveys should be non-obtrusive. Surveys should consist of boat surveys adjacent to the suitable island habitats on a single circuit basis. Boats may be used provided engines are turned off to listen for birds, propeller dredging is stringently avoided, and wakes are controlled. A canoe, kayak, or light vessel with a trolling motor can be efficient in some situations. Scanning parabolic microphones may prove useful on large surveys.

Surveys of Type II habitat should consist of pedestrian surveys across or adjacent to the suitable habitats for a minimum of five days. The presence of an expert experienced in locating the species is very helpful and recommended. Map all visual and call observations of white-crowned pigeon as well as any encountered nesting colonies.

Florida Tree Snail

The Florida tree snail is found throughout most of the Florida Keys, on the mainland from Collier County to Yamato Hammock, Palm Beach County. Introduced Florida tree snail populations are also found on Sanibel Island, Lee County and Boynton Beach, Palm Beach County. Tree snails inhabit Tropical Hardwood Hammocks (426) where they feed on epiphytic growths on leaf and bark surfaces (Diesler 1982a, 1982b). The Florida tree snail prefers smooth barked trees. These species have been severely impacted by freezes, Hurricane Andrew, habitat loss, and mosquito control practices. At the time of this writing, most of the Stock Island tree snail population is in captive breeding in Gainesville (Endler, pers. comm. 1993).

Surveys for tree snails will typically begin with a request for information from the Habitat Conservation Scientific Services in the Florida Keys, and the USFWS for the area of interest (Appendix A), review with tree snail experts familiar with the project area, and consultation with local government biologists (USFWS, FWC, DEP, and local jurisdiction). These sources will be likely to have pertinent current data on these species.

If specific site surveys are deemed necessary, all suitable hammock habitat, should be surveyed for a minimum of five days. The days do not need to be consecutive. Surveys should be performed during the day when snails are most visible. Survey days should not include periods of extreme weather: storms, freezes, droughts. Hammocks should be sampled by pedestrian surveys of all appropriate surfaces to attain complete coverage. Estimates of individuals should be reported for each survey. All observations should be mapped.

EXTINCT SPECIES GROUP

Chadwick Beach Cotton Mouse, Florida Red Wolf, West Indian Monk Seal, Ivory-billed Woodpecker, Dusky Seaside Sparrow

The Chadwick Beach cotton mouse is now considered to be extinct. It was present in Vegetated Dunes (322) and maritime Forest (No FLUCFCS Code) on Manasota Key in Charlotte and Sarasota Counties (Humphrey 1992). Any cotton mouse collected from this area during small mammal surveys should be photographed and reported immediately to the FWC the Florida Museum of Natural History.

The Florida red wolf became extinct in Florida sometime after 1922. Red wolf from Texas and Louisiana are planned to be reintroduced on St. Vincents Island in Florida by the USFWS (Robson 1992). If red wolf became prevalent, a survey methodology similar to Florida panther will be utilized.

The West Indian monk seal became extinct in Florida sometime after 1922. It is believed that it is now extinct throughout the Caribbean (Wing 1992).

The ivory-billed woodpecker became extinct in Florida sometime after 1969. Its critical habitat was mature lowland swamp forest including Wetland Hardwood Forests (610), Bay Swamps (611), Gum Swamps (613), Stream and Lake Swamps (Bottomland), (615), Wetland Coniferous Forests (620), Cypress (621), and Wetland Forested Mixed (630). Its extinction is a model of the situation now in progress for the red-cockaded woodpecker. A remaining population of ivory-billed woodpecker was found in the mountains of Cuba in 1986. Although recently reported from Louisiana, this has not yet been confirmed.

The dusky seaside sparrow became extinct in 1987. It was in Blackrush (6422) and Cordgrass (6421) marshes of Orange and Brevard Counties on the east central Atlantic Coast (Ehrlich et al. 1992).

GENERAL FINAL SURVEY REPORT INFORMATION REQUIREMENTS

1. A valid collector's permit is required by Chapter 39-9.002 (F.A.C.) for individuals engaged in the handling and collection of birds, mammals, and all listed species. If such collection occurs, the FDOT or their consultant must provide the permit number, expiration date, and name(s) of the individuals(s) involved with sampling activities that require a permit.

2. Based on literature review, substantiate reports from authorities, on-site observations, sampling, and survey results; and list all evidence of endangered species, threatened species, and species of special concern observed on the project site. The status of a species can be determined by reviewing either Chapter 39 (F.A.C.), or the most recent edition of OFFICIAL LISTS OF ENDANGERED AND POTENTIALLY ENDANGERED FAUNA AND FLORA IN FLORIDA. Copies of this publication may be obtained by writing to the FWC, Endangered Species Coordinator, 620 South Meridian Street, Tallahassee, Florida 32399-1600.

3. Report which species were surveyed for and what sampling methodologies were employed, as well as any variations from the methodologies described above. This report should also include the names of the field surveyors, the sampling dates and times, weather conditions, and any other factors that may have influenced the results of the sampling effort.

4. Identify on a map (minimum scale 1"=200') the location of all-pedestrian transects, trap grids, reptile arrays, or other sampling plots used to determine the on-site status of listed species.

5. Present the results of all sampling efforts in terms of the number of individuals recorded, and map (minimum scale 1"=200') the locations of all observed individuals and/or colonies.

6. For each listed species observed on the site, discuss what habitat factors influence or contribute to the occurrence of the species on the site. Relevant literature, survey, and sampling information should be used to discuss the perceived home range, distribution, and population of each species. Indicate whether use of the site is considered to be year-round permanent, year-round transitory, or migratory.

7. For each species known to utilize the site, discuss what measures will be employed to avoid and minimize the proposed project's impact on both the individual and its habitat. If on-site protection is judged to be inappropriate or unfeasible, discuss in detail any provision for off-site mitigation.

In conclusion, this letter addresses the procedures for steps 1 and 2 of the recommended listed animal species review for a proposed FDOT project:

1) Review of existing data and consultation with area and species experts, and

2) Onsite sampling specific to the habitats present and the potential state-listed species.

Upon completion of the above survey phases we will confer with you and provide our recommendations with regard to:

3) Avoidance of impacts to verified/confirmed listed species.

4) Minimization of impacts to verified/confirmed listed species, and

5) Mitigation of unavoidable impacts to verified/confirmed listed species.

First Edition

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REFERENCES

Allen, R.P. 1942. The roseate spoonbill. Research Rept. No. 2. National Audubon Society. New York. 142 pp.

Allen, E.R. and W.T. Neill. 1952. Notes on the abundance of Everglades mink. J. Mamm. 33:113-114.
Auffenberg, W. 1978. Gopher tortoise. Pages 33-35. in McDiarmid, R.W. (ed.), Rare and endangered biota of Florida. Vol. III. Amphibians and Reptiles. University Presses of Florida, Gainesville, Florida.

Auffenberg, W. and R. Franz. 1982. The status and distribution of the gopher tortoise (Gopherus polyphemus). Pages 95-126. in North American Tortoises: Conservation and Ecology. R. Bury, ed. U.S. Dept. of Interior. Fish and Wildlife Service Research Report 12.

Baggett, H.D. 1982. Schaus' swallowtail. Pages 73-74. in Franz (ed.) Rare and Endangered Biota of Florida. Volume VI. Invertebrates. University Presses of Florida. Gainesville.

Baker, W.W. 1978. Red-cockaded woodpecker. Pages 11-13. in H.W. Kale II (ed.), Rare and endangered biota of Florida. Vol. II. Birds. University Presses of Florida, Gainesville, Florida.

Belden, R.C. 1986. Florida panther recovery plan implementation - a 1983 Progress Report. Pages 159-172 in S.D. Miller and D.D. Everett (eds.) Cats of the World: Biology, Conservation and Management. Proceedings of the Second International Cat Symposium. Caesar Kleberg Wildlife Research Institute. Kingsville, Texas.

Belwood, J.J. 1992. Florida mastiff bat. Pages 29-34 in S.R. Humphrey (ed.) Rare and Endangered Biota of Florida. Volume I. Mammals. University Presses of Florida. Gainesville.

Brady, J.R. and D.S. Maehr. 1985. Black bear distribution in Florida. Florida Field Naturalist 13:1-7.

Brown, L.N. 1972. Florida's rarest carnivore. Florida Wildlife 25(11):4-6.

Brown, L.N. 1973. The everglades fox squirrel (*Sciurus niger avicennia*). pp. 222-223 in Threatened wildlife of the United States. U.S. Fish and Wildlife Service, Resource Publication 114.

Brown, L.N. 1978a. Mangrove fox squirrel. Pages 5-6. in J.N. Layne (ed.), Rare and endangered biota of Florida. Vol. 1. Mammals. University Presses of Florida, Gainesville, Florida.

Brown, L.N. 1978b. Everglades mink. Pages 26-27. in J.N. Layne (ed.), Rare and endangered biota of Florida. Vol. 1. Mammals. University Presses of Florida, Gainesville, Florida.

Brown, L.N. 1978c. Florida weasel. Pages 38-39. in J.N. Layne (ed.), Rare and endangered biota of Florida. Vol. 1. Mammals. University Presses of Florida, Gainesville, Florida.

Campbell, H.W. and S.P. Christman. 1982. Field Techniques for herpetofaunal community analysis. Pages 193-201. in Herpetological Communities. N.J. Scott, ed. U.S. Dept. of Interior. Fish and Wildlife Service Research Report 13.

Campbell, H.W. and P.E. Moler. 1992. Short-tailed snake. Pages 150-153 in P.E. Moler (ed.) Rare and Endangered Biota of Florida. Volume III. Reptiles. University Presses of Florida. Gainesville.

Cox, J., D. Inkley, and R. Kautz. 1987. Ecology and habitat protection needs of gopher tortoise (Gopherus polyphemus) populations found on lands slated for large-scale development in Florida. Florida Game and Fresh Water Fish Commission. Nongame Wildlife Program Technical Report No. 4.

Christman, S.P. 1992. Blue-tailed mole skink. Pages 117-122 in P.E. Moler (ed.) Rare and Endangered Biota of Florida. Volume III. Reptiles. University Presses of Florida. Gainesville.

Christman, S.P. 1992. Sand skink. Pages 135-140 in P.E. Moler (ed.) Rare and Endangered Biota of Florida. Volume III. Reptiles. University Presses of Florida. Gainesville.

Diemer, J.E. 1992. Gopher tortoise. Pages 105-110 in P.E. Moler (ed.) Rare and Endangered Biota of Florida. Volume III. Reptiles. University Presses of Florida. Gainesville.

Diesler, J.E. 1982. Florida tree snail. Pages 15-18 in R. Franz (ed.) Rare and Endangered Biota of Florida. Volume VI. Invertebrates. University Presses of Florida. Gainesville.

Drew, R.D. and N.S. Schomer. 1984. An ecological characterization of the Caloosahatchee River/Big Cypress Watershed. 225 pp.

Dunson, W.A. 1992. Striped mud turtle. Pages 105-110 in P.E. Moler (ed.) Rare and Endangered Biota of Florida. Volume III. Reptiles. University Presses of Florida. Gainesville.

Ehrhart, L.M. 1978. Sherman's fox squirrel. pp. 17-18. in J.N. Layne (ed.), Rare and endangered biota of Florida. Vol. 1. Mammals. University Presses of Florida, Gainesville, Florida.

Ehrlich, P.R., D.S. Dobkin, and D. Wheye 1992. Birds in Jeopardy. Stanford University Press, 260 pp.

Fitzpatrick, J.D., G.E. Woolfenden, and M.T. Kopeny. 1991. Ecology and development-related habitat requirements of the Florida scrub jay (Aphelocoma coerulescens coerulescens). Florida Game and Fresh Water Fish Commission. Nongame Wildlife Program Technical Report No. 8.

Fogarty, M.J. and H.W. Campbell. 1978a. American alligator. Pages 65-67. in McDiarmid, R.W. (ed.), Rare and endangered biota of Florida. Vol. III. Amphibians and Reptiles. University Presses of Florida, Gainesville, Florida.

Fogarty, M.J. 1978b. Florida gopher frog. Pages 5-6. in McDiarmid, R.W. (ed.), Rare and endangered biota of Florida. Vol. III. Amphibians and Reptiles. University Presses of Florida, Gainesville, Florida.

Franz, R. 1992. Florida pine snake. Pages 105-110 in P.E. Moler (ed.) Rare and Endangered Biota of Florida. Volume III. Reptiles. University Presses of Florida. Gainesville.

Gilbert, C.R. 1992. Atlantic sturgeon. Pages 31-39 in C.R. Gilbert (ed.) Rare and Endangered Biota of Florida. Volume II. Fishes. University Presses of Florida. Gainesville.

Godley, J.S. 1992 Gopher frog. Pages 15-19 in P.E. Moler (ed.) Rare and Endangered Biota of Florida. Volume III. Reptiles. University Presses of Florida. Gainesville.

Hamilton, W.J., Jr. 1955. A new subspecies of *Blarina brevicauda* from Florida. Proc. Biol. Soc. Wash. 68:37-40.

Humphrey, Stephen R. 1992. Chadwick Beach cotton mouse. Pages 24-28 in S.R. Humphrey (ed.) Rare and Endangered Biota of Florida. Volume I. Mammals. University Presses of Florida. Gainesville.

Humphrey, Stephen R. 1992. Southern Florida population of mink. Pages 319-327 in S.R. Humphrey (ed.) Rare and Endangered Biota of Florida. Volume I. Mammals. University Presses of Florida. Gainesville.

Humphrey, S.R. and P.G.J. Jodice. 1992. Big Cypress fox squirrel. Pages 234-241 in S.R. Humphrey (ed.) Rare and Endangered Biota of Florida. Volume 1. Mammals. University Presses of Florida. Gainesville.

Humphrey, S.R. and H.W. Setzer. 1989. Geographic variation and taxonomic revision of mink (Mustela vison) in Florida. Journal of Mammalogy, 70:241-252.

Johnson, A.F. and J.W. Muller 1992. An assessment of Florida's remaining coastal upland communities: southwest Florida. 162 pp.

Kantola, A.T. 1992. Sherman's fox squirrel. Pages 234-241 in S.R. Humphrey (ed.) Rare and Endangered Biota of Florida. Volume I. Mammals. University Presses of Florida. Gainesville.

Kochman, H.I. 1978. Eastern indigo snake. Pages 68-69. in McDiarmid, R.W. (ed.), Rare and endangered biota of Florida. Vol. III. Amphibians and Reptiles. University Presses of Florida, Gainesville, Florida.

Kushlan, J.A. 1976. Environmental stability and fish community diversity. Ecology 57:821-825.

Layne, J.N. 1974. The land mammals of south Florida. Pages 386-413 in P.J. Gleason, (ed.) Environments of south Florida: present and past. Miami Geol. Soc. Mem. 2.

Layne, J.N. 1978. Sherman's short-tailed shrew. Pages 42-43 in J.N. Layne (ed.), Rare and endangered biota of Florida. Vol. 1. Mammals. University Presses of Florida, Gainesville, Florida.

Layne, J.N. 1982. Sherman's short-tailed shrew. Pages 328-334 in J.N. Layne (ed.), Rare and endangered biota of Florida. Vol. 1. Mammals. University Presses of Florida, Gainesville, Florida.

Layne, J.N. 1992. Florida mouse. Pages 250-264 in S.R. Humphrey (ed.) Rare and Endangered Biota of Florida. Volume I. Mammals. University Presses of Florida. Gainesville.

Layne, J.N. and M.N. McCauley. 1976. Biological overview of the Florida panther. Pages 5-45 in P.C.H. Pritchard (ed.) Proceedings of the Florida Panther Conference. Florida Audubon Society. 121 pp.

Maehr, D.S. 1984. Distribution of black bears in eastern North America. Proc. East. Workshop Black Bear Manage. Res. 7:74.

Maehr, D.S. 1992. Florida panther. Pages 176-189 in S.R. Humphrey (ed.) Rare and Endangered Biota of Florida. Volume I. Mammals. University Presses of Florida. Gainesville.

Maehr, David S. and John B. Wooding 1992. Florida black bear. Pages 265-275 in S.R. Humphrey (ed.) Rare and Endangered Biota of Florida. Volume I. Mammals. University Presses of Florida. Gainesville.

Maehr, D.S., J.N. Layne. E.D. Land, J.W. McCowan, and J. Roof. 1988. Long distance movements of a Florida

black bear. Florida Field Naturalist 16:1-6.

Moler, P.E. 1992. American crocodile. Pages 83-89 in P.E. Moler (ed.) Rare and Endangered Biota of Florida. Volume III. Reptiles. University Presses of Florida. Gainesville.

Moler, P.E. 1992. Eastern indigo snake. Pages 181-186 in P.E. Moler (ed.) Rare and Endangered Biota of Florida. Volume III. Reptiles. University Presses of Florida. Gainesville.

Nesbitt, S.A. 1978. Limpkin. Pages 86-87. in H.W. Kale II (ed.), Rare and endangered biota of Florida. Vol. II. Birds. University Presses of Florida, Gainesville, Florida.

Nesbitt, S.T., A.E. Jerauld, and B.A. Harris. 1983. Red-cockaded woodpecker summer range sizes in southwest Florida. in Proceedings of the Red-cockaded Woodpecker Symposium II, Florida Game and Fresh Water Fish Commission.

Ogden, J.C. 1978a. Louisiana heron. Pages 77-78 in H.W. Kale II (ed.), Rare and endangered biota of Florida. Vol. II. Birds. University Presses of Florida, Gainesville, Florida.

Ogden, J.C. 1978b. Roseate spoonbill. Pages 53-54 in H.W. Kale II (ed.), Rare and endangered biota of Florida. Vol. II. Birds. University Presses of Florida, Gainesville, Florida.

Ogden, J.C. 1978c. Snowy egret. Pages 75-76 in H.W. Kale II (ed.), Rare and endangered biota of Florida. Vol. II. Birds. University Presses of Florida, Gainesville, Florida.
Ogden, J.C. 1978d. Wood stork. Pages 3-4 in H.W. Kale II (ed.), Rare and endangered biota of Florida. Vol. II. Birds. University Presses of Florida, Gainesville, Florida.

O'Shea, T.J., and M.E. Ludlow 1992. West Indian manatee. Pages 190-200 in S.R. Humphrey (ed.) Rare and Endangered Biota of Florida. Volume I. Mammals. University Presses of Florida. Gainesville.

Robson, M.S. 1992. Florida red wolf. Pages 29-34 in S.R. Humphrey (ed.) Rare and Endangered Biota of Florida. Volume I. Mammals. University Presses of Florida. Gainesville.

Rogers, J.A. 1978. Little blue heron. Pages 72-73 in H.W. Kale II (ed.), Rare and endangered biota of Florida. Vol. II. Birds. University Presses of Florida, Gainesville, Florida.

Soil Conservation Service. 1979. 26 Ecological Communities of Florida. USDA. Fort Worth, TX.

Shapiro, A.E. 1983. Characteristics of red-cockaded woodpecker cavity trees and colony areas in south Florida. Florida Scientist 46(2):89-95.

Stys, B. 1993. Ecology and habitat protection needs of the southeastern American kestrel (Falco sparverius paulus) on large-scale development sites in Florida. Florida Game and Fresh Water Fish Commission. Nongame Wildlife Program Technical Report No. 13.

Sykes, P.W. 1978. Florida Everglade kite. Pages 5-7 in H.W. Kale II (ed.), Rare and endangered biota of Florida. Vol. II. Birds. University Presses of Florida, Gainesville, Florida.

Taylor, D.S. and F.F. Snelson. 1992. Mangrove rivulus. Pages 200-207 in C.R. Gilbert (ed.) Rare and Endangered Biota of Florida. Volume II. Fishes. University Presses of Florida. Gainesville.

U.S. Fish and Wildlife Service. 1987. Florida panther (Felis concolor coryi) Recovery Plan. Prepared by the Florida Panther Interagency Committee for the U.S. Fish and Wildlife Service, Atlanta, Georgia. 75 pp.

Weaver, W.C., Christman, S.P. and P.E. Moler 1992. Big Pine Key ringneck snake. Pages 150-153 in P.E. Moler (ed.) Rare and Endangered Biota of Florida. Volume III. Reptiles. University Presses of Florida. Gainesville.

Wiley, J.W. 1978. Southeastern American kestrel. Pages 32-34 in H.W. Kale II (ed.), Rare and endangered biota of Florida. Vol. II. Birds. University Presses of Florida, Gainesville, Florida.

Williams, L.E. 1978. Florida black bear. Pages 23-25 in J.N. Layne (ed.), Rare and endangered biota of Florida. Vol. 1. Mammals. University Presses of Florida, Gainesville, Florida.

Williams, L.E. Jr. 1978. Florida sandhill crane. Pages 36-37 in H.W. Kale II (ed.), Rare and endangered biota of Florida. Vol. II. Birds. University Presses of Florida, Gainesville, Florida.
Wing, E.S. 1992. West Indian monk seal. Pages 35-40 in S.R. Humphrey (ed.) Rare and Endangered Biota of Florida. Volume I. Mammals. University Presses of Florida. Gainesville.

Appendix A Addresses of Wildlife Agency Contacts

Florida Fish and Wildlife Conservation Commission
Big Cypress Field Office
566 Commercial Blvd.
Naples FL 34104
Phone: (239) 643-4220
Fax: (239) 643-0385

Florida Fish and Wildlife Conservation Commission
Gainesville Wildlife Research Laboratory
4005 South Main Street
Gainesville, FL 32601
Phone: (352) 955-2230
Fax: (352) 376-5359

Florida Fish and Wildlife Conservation Commission
Habitat Conservation Scientific Services
3941 Tamiami Trail, Suite 3111
Punta Gorda Florida 33950
Phone: (941) 575-5784

Florida Fish and Wildlife Conservation Commission
Bryant and Bloxham Buildings
620 S. Meridian Street
Tallahassee, FL 32399-1600
Phone: (850) 488-5460
Fax: (850) 413-0381

Florida Fish and Wildlife Research Institute
100 Eighth Avenue SE
St. Petersburg, FL 33701-5020
Phone: (727) 896-8626
Fax: (727) 823-0166

U.S. Fish and Wildlife Service
South Florida Ecological Services Office
1339 20th Street
Vero Beach, FL 32960
Phone:(772) 562-3909
Fax: (772) 562-4288

First Edition

Appendix B

Listed Animal Species of Florida in the Order of Endangerment, as of April 5, 2002

State Endangered Species

Florida panther, everglades mink, Key deer, West Indian manatee, Lower Keys marsh rabbit, Goff's pocket gopher, Chadwick beach cotton mouse, Anastasia Island beach mouse, Choctawhatchee beach mouse, pallid beach mouse, Perdido Key beach mouse, St. Andrews beach mouse, Key Largo woodrat, silver rice rat, Key Largo cotton mouse, Florida saltmarsh vole, Florida mastiff bat, gray bat, Indiana bat, wood stork, snail kite, Bachman's warbler, Kirtland's warbler, Florida grasshopper sparrow, Cape Sable seaside sparrow, dusky seaside sparrow, American crocodile, lower Florida Keys striped mud turtle, Atlantic green turtle, leatherback turtle, Atlantic ridley turtle, Atlantic hawksbill turtle, shortnose sturgeon, Okaloosa darter, Blackmouth shiner, Schaus' swallowtail butterfly, Stock Island tree snail

State Threatened Species

Florida black bear, Big Cypress fox squirrel, southeastern beach mouse, bald eagle, Florida sandhill crane, least tern, roseate tern, piping plover, southeastern snowy plover, white-crowned pigeon, red-cockaded woodpecker, Florida scrub jay, Audubon's crested caracara, blue-tailed mole skink, sand skink, eastern indigo snake, short-tailed snake, Atlantic salt-marsh water snake, Big Pine key ringneck snake, Miami black-headed snakes, lower Florida Keys Florida brown snake, lower Florida Keys Florida ribbon snake, Atlantic loggerhead turtle, Crystal darter, Key silverside

State Species of Special Concern

Sherman's fox squirrel, eastern chipmunk, Florida mouse, Sanibel Island rice rat, Sherman's short-tailed shrew, Homosassa shrew, roseate spoonbill, little blue heron, reddish egret, snowy egret, tricolored heron, white ibis, whooping crane, limpkin, brown pelican, American oystercatcher, black skimmer, lower Florida Keys osprey, burrowing owl, southeastern American kestrel, Worthington's marsh wren, Wakulla seaside sparrow, Scott's seaside sparrow, gopher tortoise, Florida mole skink, Florida pine snake, lower Florida Keys red rat snake, Suwannee cooter, Barbour's map turtle, alligator snapping turtle, American alligator, gopher frog, bog frog, Pine barrens treefrog, Georgia blind salamander, flatwoods salamander, Atlantic sturgeon, Lake Eustis pupfish, harlequin darter, southern tessellated darter, saltmarsh topminnow, Suwanee bass, shoal bass, bluenose shiner, mangrove rivulus, key blenny, Black Creek crayfish, Econfina crayfish, Sims Sink crayfish, Florida tree snail

Note that the down-listing of the West Indian manatee and the delisting of the bald eagle will not take effect until the adoption of an approved management plan by the FWC.

Appendix C

Florida Land Use, Cover and Forms Classification System (FLUCCS)(Florida Department of Transportation 1985) codes utilized in this document.

300 RANGELAND

- 310 Herbaceous
- 320 Shrub and Brushland
  - 321 Palmetto Prairies
  - 322 Coastal Scrub
  - 329 Other Shrubs and Brush
- 330 Mixed Rangeland

400 FORESTLAND

- 410 Coniferous Forests
  - 411 Pine Flatwoods
  - 412 Longleaf - Xeric Oak
  - 413 Sand Pine Scrub
  - 414 Pine- Mesic Oak
  - 415 Longleaf - Upland Oak
  - 419 Other Pine
- 420 Upland Hardwood Forests
  - 421 Xeric Oak
  - 422 Brazilian Pepper
  - 423 Oak - Pine - Hickory
  - 424 Melaleuca
  - 425 Temperate Hardwoods (Hammock)
  - 426 Tropical Hardwoods (Hammock)
  - 427 Live Oak - Upland Temperate Hammock
  - 428 Cabbage Palm
  - 429 Wax Myrtle - Willow
- 430 Upland Hardwood Forests (Continued)
  - 431 Beech - Magnolia
  - 432 Sand Live Oak
  - 433 Western Everglades Hardwoods
  - 434 Hardwood - Conifer Mixed
  - 435 Dead Trees
  - 437 Australian Pines
  - 438 Mixed Hardwoods
  - 439 Other Hardwoods
- 440 Tree Plantations
  - 441 Coniferous
  - 442 Hardwood
  - 443 Forest Regeneration Area
  - 444 Experimental Tree Plots
  - 445 Seed Plantation

500 WATER

CONSENT TO USE STATE-OWNED SUBMERGED LANDS

DO YOU LIVE OR DO BUSINESS ON THE WATER?

If so, you may need authorization to use the lands under the water from the owners of those lands. This authorization is in addition to any city, county, Department of Environmental Regulation, U.S. Army Corps of Engineers or Water Management District permit.

WHAT LANDS ARE WE TALKING ABOUT AND WHO OWNS THEM?

Sovereign submerged lands are all those submerged lands waterward of the ordinary or mean high water line under navigable fresh and salt water bodies. The Governor and Cabinet, sitting as the Board of Trustees of the Internal Improvement Trust Fund, hold title to all of those lands below navigable waters which have not been previously conveyed into private ownership. Portions of these submerged lands have been designated as "aquatic preserves" and because of their unique biological, aesthetic or scientific value, they are held and managed to a higher degree of care. Since the state owns these lands, both public and private entities must obtain consent to use them.

WHY IS CONSENT NECESSARY AND BY WHAT AUTHORITY IS IT REQUIRED?

These lands are held in trust for the use and benefit of the people of the state, as set forth in the state constitution; therefore, the private use of these lands must be balanced with the need to conserve and protect the scientific value and beauty of those lands. The intent of the regulations is to ensure that all sovereign submerged lands are managed primarily for the propagation of fish and wildlife, and public recreation. The legislative origins of the procedures employed in the review of applications to use sovereignty submerged lands are contained within Chapters 253 and 258 of the Florida Statutes. These statutes are implemented through rules which are contained within Chapters 18-14, 18-18, 18-20 and 18-21 of the Florida Administrative Code. It is important to contact the Department of Natural Resources before you use these lands.

WHAT TYPE OF ACTIVITIES REQUIRE AUTHORIZATION?

Uses that require authorization must be approved before they are conducted. The most commonly requested uses are: the construction of docks; the placement of riprap; dredging for access or channels; mangrove trimming; bridge and utility crossings; and beach renourishment projects.

WHAT DO YOU HAVE TO DO AND IS THERE A FEE?

The form of consent that is required depends upon the type of activity that is proposed. Forms of consent include letters, easements, use agreements, management agreements and leases. The type of activity proposed also determines the amount of fees; however, commercial uses will always require payment of fees.

WHAT HAPPENS IF YOU DO NOT RECEIVE AUTHORIZATION TO USE THESE LANDS?

Alterations to, or structures discovered on, sovereignty, submerged lands without authorization are subject to lease fees in arrears, with interest, and fines. In some cases, removal of structures may also be required.

WHO DO YOU CONTACT TO INQUIRE ABOUT THE USE OF THESE LANDS?

The Department of Natural Resources Division of State Lands field offices listed below.

FIELD OFFICES	COUNTIES
NORTHWEST FLORIDA 41 N. Jefferson St., Ste. 402 P.O. Box 13463 Pensacola, FL 32591-0091 904/444-8608	Bay, Calhoun, Escambia, Franklin, Gadsden, Gulf, Holmes, Jackson, Leon, Liberty, Okaloosa, Santa Rosa, Wakulla, Walton, Washington
NORTHEAST FLORIDA Highland Building, Ste. 201 4151 Woodcock Dr. Jacksonville, FL 32207 904/348-2710	Alachua, Baker, Bradford, Clay, Columbia, Dixie, Duval, Flagler, Gilchrist, Hamilton, Jefferson, Lafayette, Levy, Madison, Nassau, Putnam, St. Johns, Suwannee, Taylor, Union
WEST CENTRAL FLORIDA Interstate Business Park 8402 Laurel Fair Cir., Ste. 212 Tampa, FL 33610 813/622-7364	Citrus, DeSoto, Hardee, Hernando, Hillsborough, Manatee, Pasco, Pinellas Polk, Sarasota, Sumter
EAST CENTRAL FLORIDA 3319 Maguire Blvd., Ste. 136 Orlando, FL 32803 407/897-2766	Brevard, Indian River, Lake, Marion, Orange, Osceola, Seminole, Volusia
SOUTHWEST FLORIDA 2180 W. First St., Ste. 308 Ft. Myers, FL 33901 813/278-7166	Charlotte, Collier, Glades, Hendry, Highlands, Lee
SOUTHEAST FLORIDA 7400 H South Georgia Ave. West Palm Beach, FL 33405 407/547-5825	Broward, Dade, Martin, Okeechobee, Palm Beach, St. Lucie
FLORIDA KEYS 13365 Overseas Hwy., Ste. 102 Marathon, FL 33050 305/289-2336	Monroe

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