APPLICATION FOR CERTIFICATION OF A PROPOSED ELECTRICAL TRANSMISSION LINE CORRIDOR

CENTRAL FLORIDA – KATHLEEN 500 kV TRANSMISSION PROJECT

FLORIDA POWER CORPORATION

ST. PETERSBURG, FLORIDA

JUNE 1981

TABLE OF CONTENTS

TABLE OF CONTENTS (Cont'd.)

TABLE OF CONTENTS (Cont'd.)

LIST OF TABLES

LIST OF FIGURES

PERTINENT APPLICANT INFORMATION

Applicant's Official Name: Florida Power Corporation

Address: 3201 Thirty-fourth Street South, P. O. Box 14042, St. Petersburg, Florida 33733

Address of Official Headquarters: Same

Business Entity: Corporation

Chief Executive Officer: A. H. Hines, Jr.

Responsible Official: W. S. O'Brien

Corridor Location: Sumter, Hernando, Pasco and Polk Counties

Incorporated Cities Within the Corridor: None

Termination Points: Central Florida Substation (existing), NE 1/4 of SE 1/4 of Section 24, T. 19 S., R. 23 E., approximately 3.0 miles (4.8 kilometers) west of Leesburg, Florida; to the Kathleen Substation (proposed), in Section 6, T. 26 S., R. 23 E., approximately 6.0 miles (9.6 kilometers) east of Zephyrhills, Florida.

Voltage: 500,000 volts (500 kV)

Line Type: Alternating Current (AC)

Line Length: 44.5 miles (71.6 kilometers)

Number of Circuits: One

CHAPTER 1

PROJECT OVERVIEW

1.1 PROJECT INTRODUCTION

Florida Power Corporation (FPC) has investigated various alternatives to expansion of the bulk power transmission system in west central Florida. This is needed to provide for adequate and reliable dispersion of the additional power generated at the Crystal River Plant when Unit 5 becomes operational in the fourth quarter of 1984. While the existing 500 kV system has the capability to carry this additional power out of the plant site, dispersion of this power at the ends of the existing 500 kV transmission lines becomes a problem of: one, further distribution and, two, reliability for contingency conditions. This project — Central Florida Substation to the proposed Kathleen Substation 500 kV transmission line — provides the best short and long-range solution to these two problems. Short-range, it disperses power through the supporting 230 kV system to rapidly growing Pasco County and to the large industrial load area from Lakeland south to Bartow, Ft. Meade, Ft. Green, and Vandolah. Long-range, it provides the most economical solution to contingency support of the large load area in the Tampa Bay area by later extension of the 500 kV system from the proposed Kathleen Substation to the Lake Tarpon Substation, which is the end of the present 500 kV system from Crystal River Plant to Pinellas County. Additionally, the proposed Kathleen Substation will provide the best location for a future west coast 500 kV transmission line to the south to connect to the Florida Power & Light Co. system at Ft. Myers.

With the completion of this project, Florida Power Corporation will be able to efficiently move large blocks of power — the primary purpose of the bulk power transmission system — economically, reliably, and adequately from the generating source at Crystal River Plant to the load areas in Polk, Pasco, Hardee, and Highlands Counties.

1.2 CORRIDOR LOCATION AND LAYOUT

The proposed corridor (Figure 1-1) measures approximately 44.5 miles (71.6 kilometers) in length. By county, it crosses 35.5 miles (57.2 kilometers) of Sumter County (79 percent),

4.0 miles (6.4 kilometers) of Polk County (9 percent), 3.0 miles (4.8 kilometers) of Hernando County (7 percent), and 2.0 miles (3.2 kilometers) of Pasco County (5 percent).

Beginning at the existing Central Florida Substation, located in Section 24 immediately south of State Route (SR) 44, the corridor proceeds directly south immediately west of the Sumter — Lake County line. Approximately 3.1 miles (5.0 kilometers) south of the substation, the corridor crosses the Sunshine State Parkway. The crossing is approximately 1.0 mile (1.6 kilometers) southeast of the Parkway's Okahumpka Plaza.

Continuing due south along the county line, the proposed corridor crosses SR 470, and northeast of the community of Center Hill, crosses the abandoned Seaboard Coast Line Railroad right-of-way and SR 48. The corridor passes Center Hill approximately 1.3 miles (2.1 kilometers) to the east.

It continues on its southerly routing, following SR 469 and crossing Youth Camp Road, Hanley Road, Tuscanoga Road, SR 50 and a branch of the Seaboard Coast Line Railroad between the hamlets of Mabel and Sloans Ridge.

Immediately north of the Withlacoochee State Forest, the corridor crosses a main track of the Seaboard Coast Line Railroad, and then makes a 90 degree turn to the west. This direct north-south alignment measures approximately 20 miles (32 kilometers).

Proceeding in a westerly direction, the corridor parallels the northern boundary of the Withlacoochee State Forest and crosses North Grade Road. After approximately 6 miles (10 kilometers), the corridor crosses SR 471 and the Little Withlacoochee River, enters Hernando County, and again turns due south. It is also at this point that the corridor enters the Withlacoochee State Forest.

On the west side of Route 471, the corridor proceeds in a southerly direction, crossing an unnamed dirt road in Section 1 (Hernando County), Richloam Clay Sink Road, and Center Grade Road, and enters Pasco County 3 miles (4.8 kilometers) south of the Little Withlacoochee River crossing. Two miles north of the west southern boundary of the state forest, the corridor expands to include both sides of Route 471 and crosses unnamed roads in Section 25 (Pasco County) and Section 30 (Sumter County). This alignment continues for 2

miles to the west southern boundary of the state forest. Here, the corridor reverts to the east side of the highway, again entering Sumter County and extends for another 2 miles through the state forest to the east southern boundary. It crosses an unnamed road in Section 31 (Sumter County).

The corridor then follows the highway on the east to the proposed Kathleen Substation site. Approximately 4 miles (6.4 kilometers) north of the site, the corridor crosses the Withlacoochee River and enters Polk County.

This north-south alignment measures over 18 miles (30 kilometers).

Detailed corridor alignments appear in Figure 2-4 A-M at a scale of 1:24,000, and on aerial photography in Appendix A.

1.2.1 Size

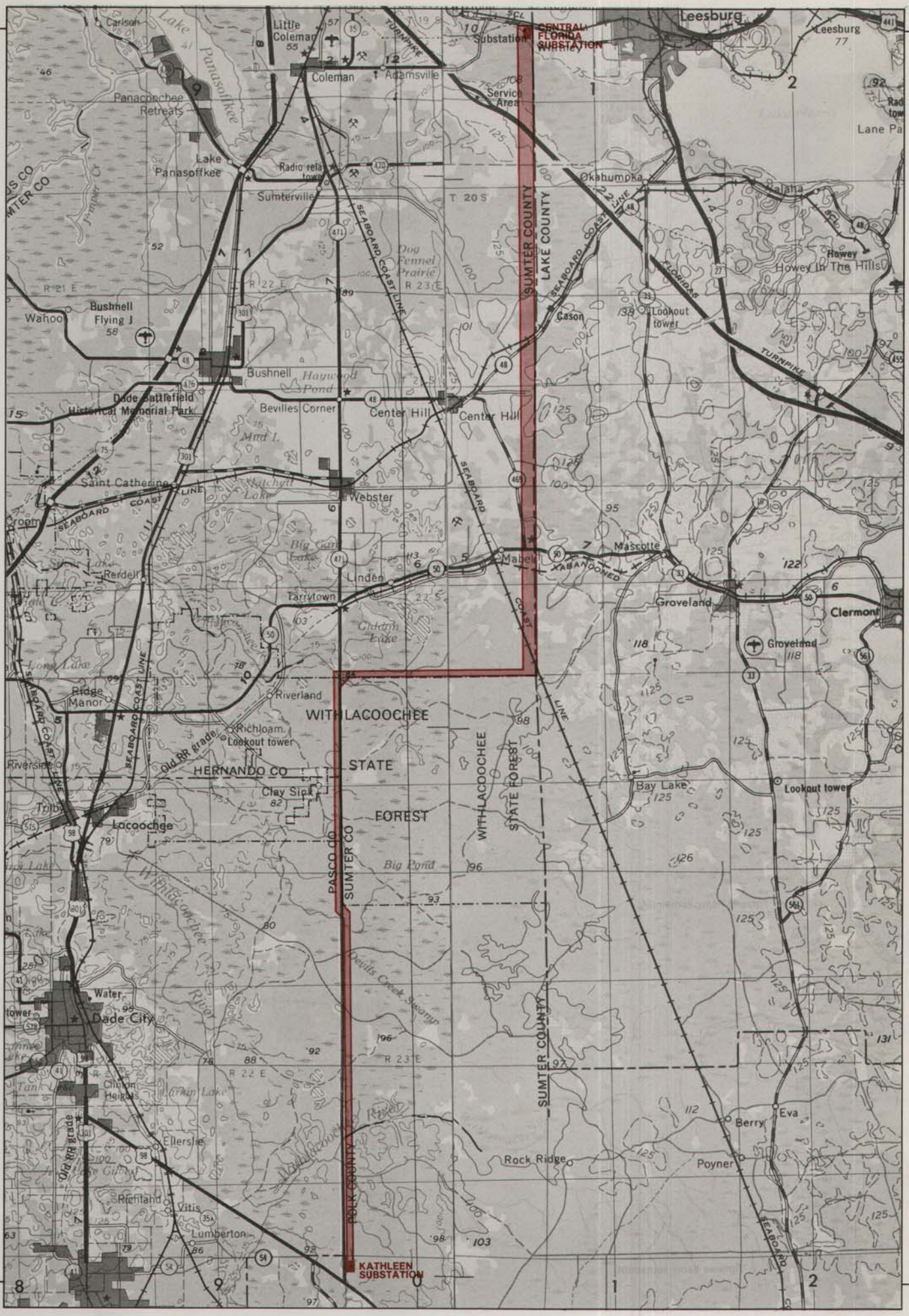
Corridor width varies from 1,000 feet (305 meters) to 2,600 feet (0.8 kilometer). Because of the variation in land uses north of the state forest resulting in the need for flexibility during final centerline delineation, the proposed corridor measures 2,600 feet in width from the Central Florida Substation to the northern limits of the Withlacoochee State Forest.

The remainder of the corridor width to the west and south has been established at 1,000 feet, except in two areas. Where the corridor crosses SR 471 and the Little Withlacoochee River, it has been widened to provide flexibility in final line route selection and structure placement because of the river, its floodplain, Route 471, and the highway bridge. The second area is 2 miles north of the east southern boundary of the state forest on either side of Route 471. Here, the corridor has been expanded to 1,000 feet on either side of the road right-of-way to accommodate routing options on state lands. Contaminated areas in this portion of the state forest will have a bearing on final route selection.

The right-of-way required for the proposed 500 kV transmission line will measure 190 feet (58 meters) in width. It will be purchased in fee and/or easements by the Florida Power Corporation. Where the right-of-way crosses state lands, Florida Power will negotiate a lease arrangement with the State of Florida.

IMAGE QUALITY

AS YOU REVIEW THE NEXT GROUP OF IMAGES, PLEASE NOTE THAT THE ORIGINAL DOCUMENTS WERE OF POOR QUALITY.


CENTRAL FLORIDA SUBSTATION
KATHLEEN SUBSTATION
SUMTER COUNTY
LAKE COUNTY
POLK COUNTY
PASCO CO
WITHLACOOCHEE STATE FOREST
HERNANDO CO
SEABOARD COAST LINE
Leesburg
Coleman
Sumterville
Bushnell
Webster
Center Hill
Linden
Mabel
Groveland
Clermont
Howey In The Hills
Okahumpka
Lacoochee
Dade City
Rock Ridge
Berry
Eva
Poyner
Bay Lake
Lookout tower
Riverland
Tarrytown
Ridge Manor
Richloam
Clay Sink
Ellerslie
Richland
Vitis
Lumberton
Chinsegut Hill
Wahoo
Bushnell Flying J
Dade Battlefield Historical Memorial Park
Saint Catherine
Reddell
Panacoochee Retreats
Lake Panasoffkee
Adamsville
Little Coleman
Service Area
Cason
Lookout tower
Ralph
Mascotte
ABANDONED
TURNPIKE
FLORIDA
Old RR grade
Water tower
Big Pond
Devils Creek Swamp
Withlacoochee River
Lane Pa
T 20 S
R 21 E
R 22 E
R 23 E

The project will consist of one single circuit 500 kV transmission line. The right-of-way required will be able to accommodate only the one transmission line.

1.3 TRANSMISSION LINE DESIGN CHARACTERISTICS

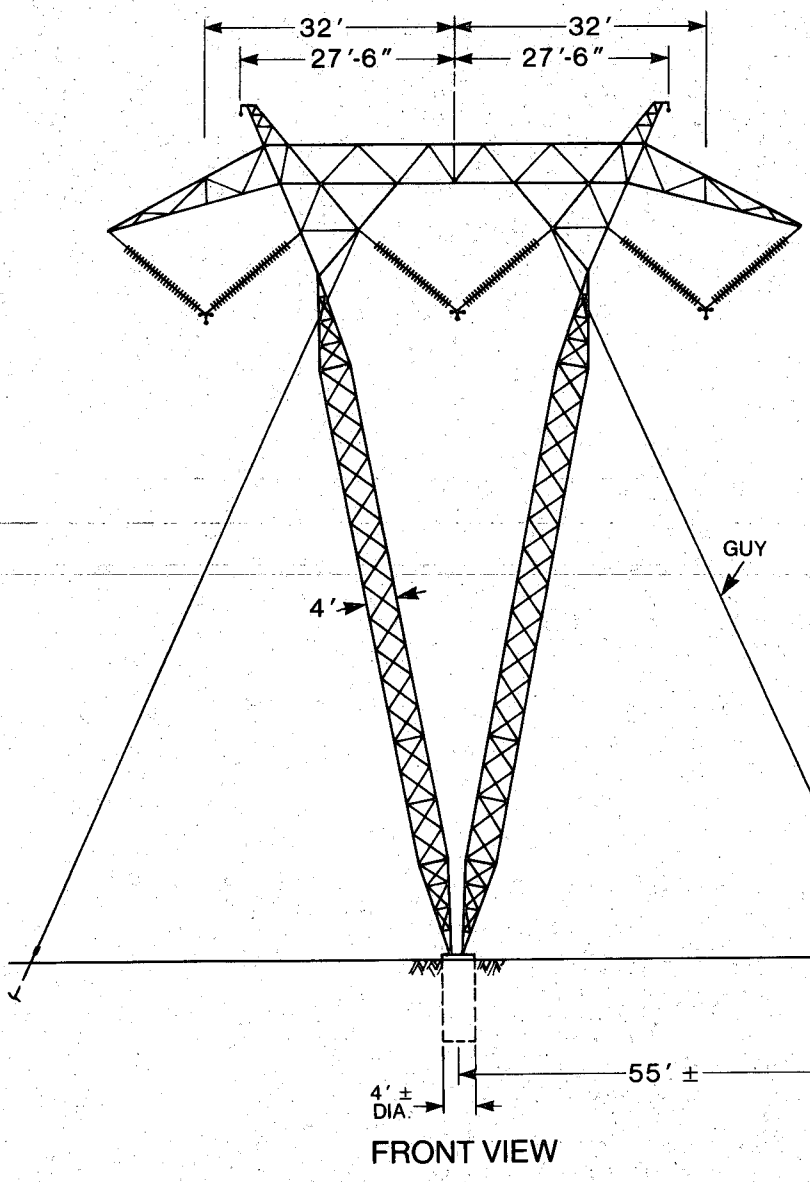
The basic structure type selected for the proposed transmission line is a steel lattice guyed V. This structure will be used to support the conductors on straight portions of the line. A typical tangent guyed V is shown in Figure 1-2. At angles in the transmission line, the conductors will be supported by a four legged, self-supporting, steel lattice tower (Figure 1-3). The structures will be constructed of steel angle sections and will be galvanized. The guy wires for the guyed V structure will be either aluminum coated steel cable or an aluminum cable with an approximate diameter of 1.0 to 2.0 inches. A four legged self-supporting steel lattice structure may be used on some straight portions of the transmission line where required due to soil conditions, clearances, or other engineering or environmental considerations.

The structures will support a single three phase alternating current, 500,000 volt circuit. The conductor is a 2156 kcmil aluminum conductor steel reinforced with a stranding of 84 aluminum wires and a core of 19 steel wires. Three conductors will be included in each phase, resulting in a total of nine conductors for the circuit. Each conductor is 1.76 inches in diameter. The structure also supports two overhead ground wires which protect the circuit from lightning strikes. The overhead ground wire is 7 #8 Alumoweld with a diameter of 0.39 inches and is constructed of 7 aluminum coated steel strands.

The conductor will be supported in the structure by insulator and hardware assemblies as shown in Figures 1-2 and 1-3. The insulators will be made of porcelain or glass and colored gray, brown, green or some other dark color.

A typical foundation for the guyed V structure is shown in Figure 1-2. The structure will be supported on a cast-in-place reinforced concrete foundation. Guy wires will be attached to multi-helix screw anchors. In certain areas, where the soil will not permit the installation of screw anchors, it may be necessary to attach the guys to concrete anchors. The angle structure will be supported on cast-in-place reinforced concrete cylinder foundations, as shown in Figure 1-3. The structures will be electrically grounded by driving a 5/8 inch diameter steel rod.

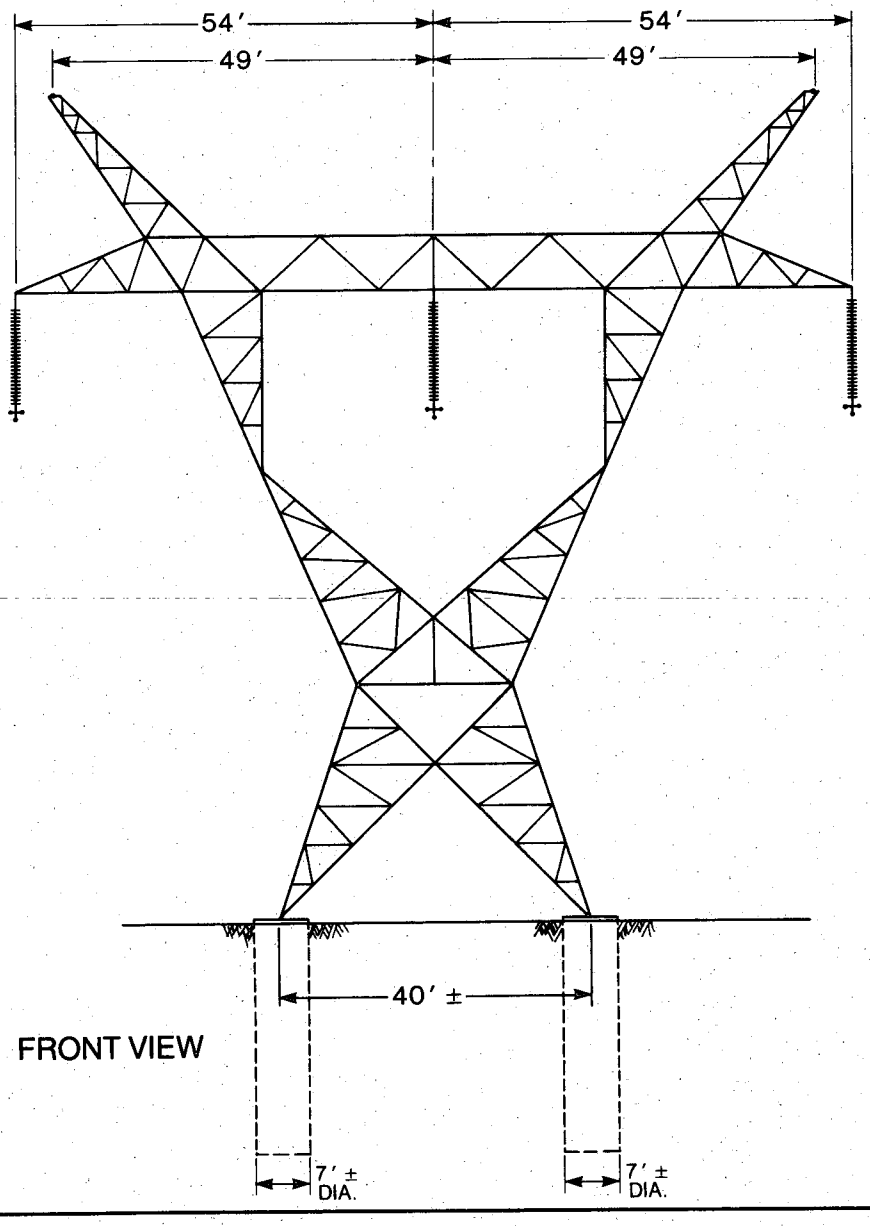
TYPICA
S
CI
FLO



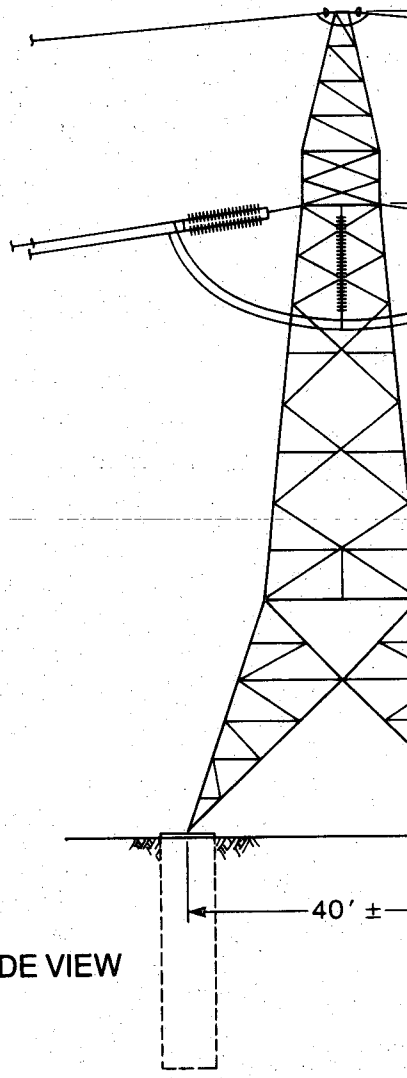
FRONT VIEW

TYP

FLO



FRONT VIEW



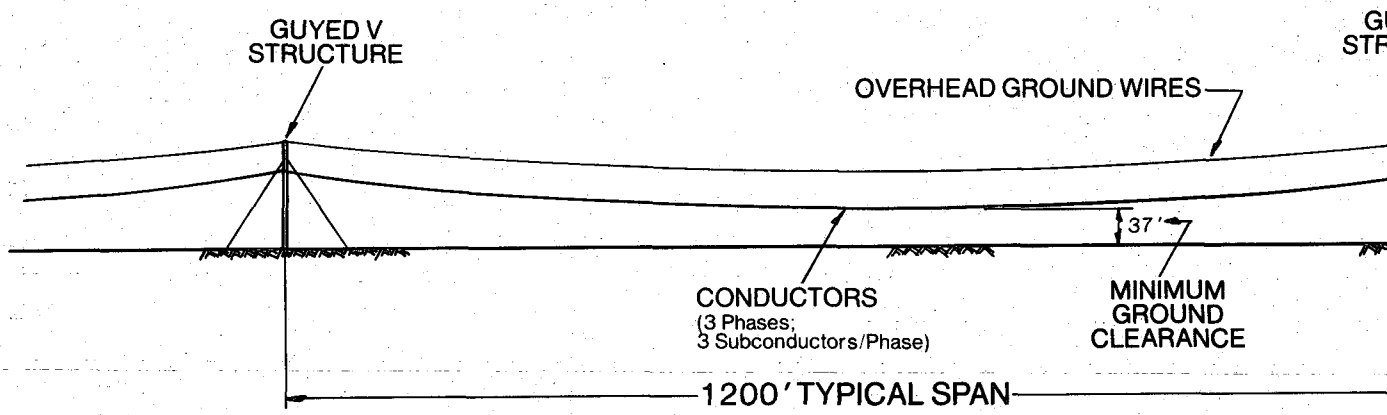
SIDE VIEW

The minimum conductor to ground clearance will be 37 feet at 120°F. A typical span between structures is 1200 feet, as shown in Figure 1-4. The transmission line will be designed to meet or exceed the requirements of the National Electric Safety Code, 1973 and 1981 Editions.

C

C

FLO


GUYED V
STRUCTURE
OVERHEAD GROUND WIRES
37'
CONDUCTORS
(3 Phases;
3 Subconductors/Phase)
MINIMUM
GROUND
CLEARANCE
1200' TYPICAL SPAN

G

overstory species (slash, longleaf, and pond pine) are dominant in different stands. The slash pine-dominated flatwoods were found to possess a greater diversity of vascular plants while pond pine flatwoods had the least diversity. A major conclusion by Edmisten was that succession to hardwood species was occurring in all stands sampled. Similarly, it is evident in the proposed corridor that hardwoods are invading many of the pine areas.

Southern mixed hardwoods, present in northern portions of the proposed corridor, are occasionally found in the southern alignment. This vegetative type is best developed in areas where limestone and phosphate deposits outcrop (Monk, 1965), a situation which exists in the study area along the proposed corridor. Monk (1968) indicated that for central Florida, mixed hardwoods are the most variable floristically. The variations are due, for the most part, to geographic location, soil moisture, and soil fertility (Monk, 1965).

The sandhill communities have long been the object of botanical studies, often in association with sand pine scrub communities. Laessle (1958) addressed sandhills in relation to origin and successional trends, as well as enumerating characteristic species. Apparently, the sand pine scrub community does not occur within the proposed corridor, but has been identified north of the study area near Wildwood. The sandhills are located primarily east of the proposed corridor, though an area of sandhills does occur near Alternative E.

2.2.8.2 Rare, Endangered and Important Species

Discussion of species will concentrate on those deemed rare, endangered, and important by the State of Florida. The Florida Department of Environmental Regulation Form 17-1.122 (118) entitled "Application for Certification of a Proposed Electrical Transmission Line Corridor" states in Chapter 2 Section 2.2.8.2 that a species is important if it: (1) is commercially or recreationally valuable; (2) is rare, endangered, threatened or protected; or (3) has unique ecological value. Further, it states that a rare, endangered, threatened or protected species is any species officially designated as such by the Florida Game and Fresh Water Fish Commission, the Florida Department of Agriculture and Consumer Services' Division of Forestry or the U.S. Fish and Wildlife Service.

Plants of importance have been presented in Table 2-5, while those wildlife species deemed important (by the Florida Game and Fresh Water Fish Commission) are presented in Table 2-7. This listing was presented to FPC on December 29, 1980 by the GFWFC.

Regarding plants, the methodology involved in ascertaining the species of concern followed the procedure of McFarlane and St. Clair (1978). Basically, it involves a review of pertinent state and federal lists, contacts with knowledgeable individuals, obtaining natural history information, and comparing the species habitat requirements and distribution with the environmental conditions in the study area. Table 2-6 summarizes contacts and references utilized to construct the list of important species portrayed in Table 2-5.

A majority of the important plants under consideration occur in the sandhill scrub or sandhill communities. These community types are located east of the study area for the most part and are commonly referred to as the Lake Wales Ridge or the Central Florida Ridge. Ward (n.d.) places the sandhill type in Highlands County north to southern Marion County. James (1961) also addresses the ridge, as well as the Brooksville Ridge located west of the study area, and indicates many of Florida's endemics are restricted to them. After contacting knowledgeable individuals, consulting soil surveys and conducting field investigations, it appears that the only areas which may support sandhill or scrub communities are located near Alternative Corridors A and E.

The following species-specific discussion is restricted to plants which have either been collected within or near the proposed corridor, or which have the potential for occurrence based on range descriptions provided by Ward (n.d.), ecological literature, and recommendations from state and regional botanists. Ranges are provided for species identified at the state level.

Asplenium auritum (Auricled spleenwort), an epiphyte, was located in 1894 in Cedar Hammock, which was at that time a virgin hardwood forest (Ward, n.d.). This area is located along Alternative Corridor D, but recent efforts to locate the species have been futile (Ward, n.d.). According to Ward, present populations are known in Collier County, Florida, the West Indies, and Central and South America.

TABLE 2-6
PERTINENT CONTACTS FOR COMPILATION OF IMPORTANT PLANT SPECIES

Agency/Individual

Dr. Ken R. Langdon, Florida Department of Agriculture and Consumer Services

Mr. Kent Perkins and Dr. Walter Judd, University of Florida, Vascular Plant Herbarium

Dr. Richard Wunderlin, Herbarium Curator, University of South Florida

Dr. Gail Baker, U.S. Fish and Wildlife Service, Jacksonville Office

Dr. Andrew Robinson, U.S. Fish and Wildlife Service, Atlanta Office

Publications

Florida Committee on Rare and Endangered Plants and Animals: Rare and Endangered Biota of Florida. Volume 5 — Plants. D. B. Ward. Ed. for University Presses of Florida.

Florida Department of Environmental Regulation, October 1980. Endangered and Potentially Endangered Plants in Florida. Mimeo.

U.S. Fish and Wildlife Service, 1980. Endangered and Threatened Wildlife and Plants; Review of Plant Taxa for Listing as Endangered or Threatened Species. Federal Register 45 (242):8240-82560

Source: Commonwealth Associates Inc., 1981.

Centrosema arenicola (Butterfly-peas) has been found along Clay Sink Road (personal communication, Wunderlin, January 26, 1981), and is west of the proposed corridor. Since its habitat, pinelands, is fairly abundant along the various corridors, its presence elsewhere can be expected.

Dicerandra frutescens (Scrub balm), a member of the sandhill scrub community, has been reported from northern Sumter County (personal communication, Langdon, 1980; Ward, n.d.). Records at the University of South Florida identified areas west of Wildwood (personal communication, Dr. R. Wunderlin). While the plant is known from the general area, specific information indicates it does not exist within the proposed corridor.

Drosera intermedia (Water sundew) has been collected from the study area (personal communication, Langdon, 1980). The species is restricted to aquatic habitats consisting of clear streams, ponds, and bogs. Its distribution in Florida covers many counties in the peninsula and panhandle as well as much of eastern North American (Ward, n.d.).

Hartwrighta floridana (Hartwrightia), while not known from the study area (Ward, n.d.), is considered likely to be present by personnel at the Vascular Plant Herbarium, University of Florida. Ward (n.d.) cites specific habitat as marshy grassland or among sphagnum in boggy swales. Ward also commented that its status should more appropriately be categorized as threatened. It is located in scattered locations from southern Highlands County north to Nassau County (Ward, n.d.).

A southern mesic forest inhabitant, *Justica cooleyi*, was collected in 1925 near Mascotte (Ward, n.d.). This community is located several miles east of the proposed corridor. Besides this old locality, it is endemic to a small area in Hernando County (Ward, n.d.) outside the study area.

Monotropis reynoldsiae (Pigmy-pipes), a root parasite on flowering dogwood, is known from the Withlacoochee State Forest. However, after examining the extant location near Brooksville and talking with local foresters, it was ascertained that appropriate habitat (i.e., flowering dogwood) does not exist within the confines of the proposed corridor. Present populations are restricted to Hernando County, with older collections (late 1800's) from St. Johns and Brevard Counties and a 1953 observation in Marion County (Ward, n.d.).

Although Ward (n.d.) placed *Nemastylis floridana* along the east coast of peninsular Florida, it has been identified as a possible candidate to be found locally. It occurs in a variety of wet habitats.

Another aquatic, *Peltandra sagittifolia* (Spoon-flower), ranges throughout the study area. It is known on the coastal plain from North Carolina southward along the central peninsula of Florida to Harlee and Highlands Counties (Ward, n.d.). Ward also documented a location in the Florida panhandle on the Eglin Air Force Base Reservation. Its wide ranging habitat requirements include both high and low light situations within boggy areas, ditches, valley bottoms, cypress swamps, and along lake margins and streams (Ward, n.d.).

Rhapidophyllum hystrix (Needle palm), according to Ward (n.d.), occurs in a variety of habitats based on its range. Wunderlin (personal communication, 1981) indicated it might be located in floodplain forests in the study area. Its range apparently covers southern Mississippi along the Coastal Plain and north to Georgia. In Florida, it occurs sparingly from Highlands County north to Clay County with disjunct populations along the Apalachicola River in Walton County (Ward, n.d.). Arcuri (1979) located this species in Oak and Cabbage Palm Hammock in the Hillsborough River State Park, southwest of the study area. As this hammock type borders the river, the community would be similar to the floodplain forest type mentioned for the study area.

Salix floridana (Florida willow) is located throughout central Florida, and consequently could be located in the study area.

Regarding wildlife, those species identified by GFWFC (December 29, 1980) as being threatened, endangered, of special concern, or of unique ecological value, and which may occur in the vicinity of the proposed corridor are addressed in Table 2-7 and the following text. Species range maps appear in Appendix C.

The Florida gopher frog (*Rana arcolata aesopus*) is found throughout the northern part of the state in sandhill communities of bluejack oak, blackjack oak, turkey oak and in sand pine scrub habitat (Fogarty, 1978). The preferred habitat is in the burrows of the gopher

TABLE 2-7
RARE, ENDANGERED, AND IMPORTANT WILDLIFE SPECIES THAT MAY OCCUR IN THE VICINITY OF THE PROPOSED CENTRAL FLORIDA – KATHLEEN 500 kV TRANSMISSION LINE CORRIDOR AND ALTERNATIVES[a]

Amphibians and Reptiles		Status[b]
Gopher frog	*Rana areolate aeopus*	Special Concern
Striped newt	*Notophthalmus perstriatus*	Unique Ecological Value[c]
Suwannee cooter	*Chrysemys concinna suwanniensis*	Special Concern
Gopher tortoise	*Gopherus polyphemus*	Special Concern
Short-tailed snake	*Stilosoma extenuatum*	Threatened
Eastern indigo snake	*Drymarchon corais*	Threatened
Birds		
Wood stork	*Mycteria americana*	Endangered
Bald eagle	*Haliaeetus leucocephalus*	Threatened
Southeastern kestrel	*Falco sparverius paulus*	Threatened
Florida sandhill crane	*Grus canadensis pratensis*	Threatened
Red-cockaded woodpecker	*Picoides borealis*	Threatened
Florida scrub jay	*Aphelocoma coerulescens*	Threatened
Mammals		
Sherman's fox squirrel	*S. niger shermani*	Special Concern
Florida mouse	*Peromyscus floridanus*	Threatened
Florida panther	*Felis concolor coryi*	Endangered

[a]See text for further explanation.

[b]GFWFC. 1980. Legal Status of Endangered and Potentially Endangered Species in Florida, 1 October 1980. GFWFC, Tallahassee, Florida. 5p.

[c]Determined to be of "Unique Ecological Value" as per GFWFC letter of December 29, 1980.

tortoise, however, when this tortoise is not found in the area the frog will use rodent burrows, stump holes, post holes, and crayfish burrows (Wright and Wright, 1975). The frog is generally nocturnal, feeding on insects, other invertebrates and small frogs. During the breeding season, which spans early spring to late fall, gopher frogs will travel great distances to breed in shallow ponds and cypress heads. Eggs are laid in masses and hatch in from 4 to 4.5 days; tadpoles transform into adults in 85 to 100 days (Wright and Wright, 1975). This species is unique in that it does share a burrow with the gopher tortoise and anything that will impact this reptile will also influence the gopher frog. In recent years, both species have experienced population declines from loss of habitat due to development of upland areas, exploitation for food, and destruction during the exploitation of other associated species (Hendry et al., 1980 and Bury et al., 1980).

The striped newt (*Notophthalmus perstriatus*) is restricted in range to northern Florida and southern Georgia. Its preferred habitats include the flatwood ponds in pine-palmetto forests, ponds of the cypress heads common in the Ocala National Forest and ponds in the scrub/sandhill areas (Christman and Means, 1978). The larvae (efts) are found in rather well drained sandy areas. Little is known about the ecology of the striped newt, however, Christman and Means (1978) report that the main portion of the diet consists of aquatic dipteria larvae or anything of similar size. Breeding takes place in the spring when males develop morphological features to aid in mating. Hatching occurs approximately one month after egg deposition. Christman and Means (1978) also report larvae can be found from April through December in ponds as well as upland well drained habitats. This species has displayed neotenous characteristics (i.e., retaining the gills in the adult form). Bury et al. (1980) feel the destruction of habitat, particularly breeding ponds, should be prohibited where this salamander is neotenic.

where?

The Suwannee cooter (*Chrysemys concinna suwanniensis*) is found along major rivers of central Florida that drain into the Gulf. Occurrence is highly unlikely in the study area. Habitat requirements restrict it to rivers with headwaters below 7.6 meters (Auffenberg, 1978b). The highest densities are found in grassy flats off river mouths. This turtle is almost completely herbivorous, feeding on aquatic plants. Reproduction begins in September and continues through May and may continue all year (Auffenberg, 1978b). Seventeen to

nineteen leathery-shelled elliptical eggs are laid in nests excavated in the soil. Young hatch in approximately 2.5 months. These turtles are highly adapted for swimming and are one of the few purely grazing turtles in the world. The Suwannee cooter has been undergoing a reduction in population densities in recent years, possibly from exploitation for food, and destruction by watercraft within its range. Habitat loss from dredging, which eliminates food plants, may also be a factor in its reduction.

The gopher tortoise (*Gopherus polyphemus*) has a range across the Gulf Coast from Mississippi to Florida and south into the northwest portion of the Florida peninsula. This species is found in appropriate habitats throughout the study area. Auffenberg (1978a) reports the gopher tortoise prefers the well drained soils of the xeric habitats consisting of beach scrub, sand pine, longleaf pine/turkey oak and the live oak hammocks. In addition, it will use old fields in successional stages leading to any of these. An unusual characteristic of this tortoise is that it digs a burrow which also serves as a home for many other animals. Behler and King (1979) report of one burrow being over 47 feet (14.3 meters) long. These burrows serve as a moisture and temperature regulator for the tortoise. Sexual maturity is attained at five to seven years. Breeding begins in early spring with nesting from late April to mid-July. Up to 15 eggs are deposited by the female in a nest usually excavated in sandy soil near the entrance of her burrow; these eggs are brittle and may be eaten by other residents of the gopher tortoise's burrow. The young hatch in about 65 days and construct their own burrows; they will remain in the general area for several years, which helps explain their tendency to form breeding colonies (Auffenberg, 1978a). The diet of the gopher tortoise is composed of several different types of grasses and occasionally leaves, wild fruit and berries. Young are omnivorous. Feeding is extremely habitual and can produce paths and clearings which are constantly grazed.

This species is presently a game species with harvesting regulated by the Florida Game and Fresh Water Fish Commission regulations (GFWFC, 1980a). One bleached carapace was found at the intersection of the proposed corridor and SR 48. Five other carapaces, plastrons and skulls were found at the juncture of the Little Withlacoochee River and State Route 471. These latter shells were all located together and gave the appearance that the tortoise was harvested by man.

Very little is known about the short-tailed snake (*Stilosoma extenuatum*), which is endemic to Florida (Campbell, 1978). The snake has been collected in the central portion of the

state. It is reportedly restricted to longleaf pine/turkey oak forests, but is occasionally found in upland hammocks and sand pine scrub. Campbell (1978) reports that extensive stands of longleaf pine/turkey oak habitat in Marion and Lake Counties still maintain populations of this snake. The ecological factors limiting the range of the short-tailed snake are thought to be habitat availability and preference for certain soil types (Campbell, 1978). A unique feature of this snake is that it is a burrower, remaining underground through most of the year except during the spring and fall (April and October). Reproduction is oviparous with males slightly thicker than females (Wright and Wright, 1957). The paucity of information on the ecology of this burrowing snake has undoubtedly aided in its decline, for its role in the habitat and intraspecies interactions is unknown. Apparently habitat destruction is the most serious threat to this snake as its habitats are prime areas for development and agriculture.

The eastern indigo snake (*Drymarchon corais couperi*) is restricted to extreme southeastern United States, including peninsular Florida. Although the snake is found in dry sandy areas, it is actually more characteristic of moister habitats. Wright and Wright (1957) report its susceptibility to desiccation, which may explain why it usually seeks out the burrows of the gopher tortoise in the pine flatwoods and higher hammocks. The eastern indigo snake is large, ranging from five to six feet (1.5 to 1.8 meters) (Kochman, 1978). It is perhaps the largest of the New World snakes (Wright and Wright, 1957). The snake is active during the day and omnivorous in diet, preying upon small mammals, birds, frogs, lizards, and snakes. Behler and King (1979) report that courtship begins in November to February, with egg deposition in May. Usually five to twelve leathery eggs are laid, with the hatching of 19-26 inch young occurring in late July to October. The young grow rapidly and may attain the length of 48 inches in their first year (Hendry et al., 1980). Maturity is reached at two to three years. Historically, this snake has been a favorite with snake collectors and animal dealers due to its impressive size and docile nature. Although legally protected in Florida, the snake continues to be exploited. An immediate threat to the snake appears to be habitat destruction in its dryer range, the same fate suffered by the gopher tortoise.

The wood stork (*Mycteria americana*), the only true stork native to North America, is found throughout peninsular Florida, excluding the Keys, and into southern Georgia. This population is probably disjunct from the population in Mexico south through Central America.

The wood stork is a bird of fresh or brackish water wetlands, nesting primarily in cypress or mangrove swamps and feeding in marshes, flooded pastures and roadside ditches. The bird is highly colonial, nesting in rookeries and feeding in flocks. Nests are typically found approximately 100 feet (30.5 meters) above the water in the cypress marshes (Hendry et al., 1980); they are constructed of sticks and lined with leaves and cypress sprigs. In central Florida, the rookeries form during February to April. Storks lay from two to four eggs and average about two young fledged per year (Ogden, 1978b). Feeding is by a specialized technique called grope-feeding, where the bird moves its bill through the water snapping shut on any fish it touches. Feeding usually takes place in six to ten inches of water, and best results are where fish are in high concentrations due to seasonally receding water levels. Ogden (1978b) reports that the wood stork may travel up to 80 miles (129 kilometers) to feed, and when not involved in feeding or nesting activities, spends many hours inactively roosting in the rookery. Loss of feeding areas has contributed to the decline of the wood stork in Florida. Wood stork nest failures have occurred for several years and can be attributed to reduced availability of food (Hendry et al., 1978). Several active and empty rookeries (wading bird colonies) exist within the study area, some known to be used by this species, e.g. the Little Gator Creek rookery.

The southern bald eagle (*Haliaeetus leucocephalus*) occurs in peninsular Florida, excluding the east coast from Indian River County south to the Everglades National Park. The westward limit appears to be the Apalachicola River. Adult birds mate for life and prefer nesting sites on shores of large bodies of water or large rivers. Nests are constructed of sticks and are usually at the apex of tall living or dead trees (pine or cypress). Generally, nests are flat-topped heaps of sticks with a finer material such as grass, leaves, seaweed, pine needles, or Spanish moss in the center. Nests are used for more than one year with new construction taking place each year. Breeding activities begin in early fall with eggs laid as early as October. The usual clutch is two, but one and four are not uncommon; eggs hatch in about 35 days (Florida Bald Eagle Committee, 1978). Chicks spend from ten to twelve weeks in the nest, and both parents share in the parental duties. Bald eagles are opportunistic feeders.

The main staples of the eagles' diet consist of fish, aquatic birds, and reptiles. Densities of eagles have declined in the past 30 years. Pesticides, habitat destruction, and disturbance of nesting pairs are precipitating factors in this decline (Hendry et al., 1978). Four eagle nests were identified in the study area (Figure 2-5).

The range of the southeastern American kestrel (*Falco sparverius paulus*) is restricted to the southeast portions of the United States including most of Florida. The bird prefers open habitats, but does use pine forests, open river bottoms, coastal regions, and urban areas (Wiley, 1978). The kestrel perches on telephone poles, wires, tops of dead trees, or dead stubs. It hunts by diving on its prey from these perches or while hovering; large insects, small rodents and some reptiles are the major components of its diet. Nests are located in enclosed cavities such as woodpecker holes, birdhouses, or the eaves of homes. Three to five eggs are laid from mid-March to early June directly on the nesting cavity floor. Eggs hatch in approximately 30 days, and the incubation is performed almost entirely by the female with the male feeding the female at the nest site. Young are fledged 30 days after hatching and remain in the area several weeks following. The southeastern American kestrel has experienced a decline in parts of Florida, and Wiley (1978) reports the magnitude and reasons for this decline are presently unclear. Numerous American kestrels were observed throughout the study area and the proposed corridor in many different habitat types. These observed birds may have been *Falco sparverius paulus* or *F. sparverius*, the northern migrant.

The Florida sandhill crane (*Grus canadensis pratensis*) is restricted to peninsular Florida, being rare in Dade and Monroe Counties in the south. It prefers wet prairies, marshy lake margins, and other shallow flooded open areas. The Florida subspecies, (*G. c. pratensis*) is very sendentary in that it will not attempt to return to its original home range when transplanted, and it will mix with the greater sandhill crane (*G. c. tabida*) when they migrate to Florida. The bird is colonial but large groups are rare. Breeding activities begin in early spring in central Florida with nest building. Nests are constructed of aquatic vegetation when the water levels and temperatures are right. Usually, the clutch contains two eggs and the male and female share the incubation duties. Williams (1978b) reports that both sexes will defend the nest against intruding animals. Young hatch in March and April and are precocial (i.e., fully feathered at hatching and can walk and feed within a few hours thereafter) (Hendry et al., 1980). The diet of the crane is varied, consisting of insects, frogs, small mammals, young shoots, grasses, tubers, and seeds. No systematic census has been made of the sandhill crane, but it is believed that the population is slowly declining. Williams (1978b) believes the major causes of this downward trend are low reproductive rates, specialized habitat requirements, inability to withstand human encroachments and, at one time, over-harvesting.

Historically, the red-cockaded woodpecker's (*Picoides borealis*) geographic range was primarily coastal plain pinewoods of the Southeastern United States, including most of Florida. Presently, its range is much reduced in Florida, being restricted to small colony sites throughout the state. The red-cockaded woodpecker is one of the very few species of birds which excavate their nesting cavities in live trees. The woodpecker appears to favor longleaf pine (*Pinus palustris*) but also utilizes loblolly (*P. taeda*), shortleaf (*P. echinata*) and slash (*P. elliotti*) (Baker, 1978). Cavity trees are mature or over mature pines that have been infected with red heart disease (*Fomes pini*). Colony sites often appear parklike with large mature pines and no understory or competing hardwoods. The bird drills through the living outer wood and excavates a chamber in the diseased heartwood. Resin wells are drilled around the entrance, and the bark is also chipped off, giving the cavity tree a characteristic "candle" appearance. The red-cockaded woodpecker does occur in more than one pair in a unit called a clan. However, generally only one pair will breed and have young within the clan. Unmated males in the clan may aid in the breeding cycle. Nesting occurs from late April through early June. The clutch is normally three to five white eggs and the incubation period is one of the shortest known: ten days (Baker, 1978). The young remain in the cavity approximately one month before joining the clan. Often only one or two birds are fledged. Roosting and nesting occur in the same colony site for many years, either in old cavities or new ones. The woodpecker is sedentary, foraging up to two miles from the colony. Food of the red-cockaded woodpecker is typical of many woodpeckers, including arthropods found in dead trees, seeds, and some berries. Florida has one of the largest remaining populations of this unique woodpecker. However, it is felt that current timber management practices, i.e., culling mature, over mature, and diseased trees are the major reason for the decline in the numbers of this bird (Baker, 1978). Although marginal red-cockaded woodpecker habitat does exist within the study area, no birds were observed during January field reconnaissance.

The Florida scrub jay (*Aphelocoma coerulescens coerulescens*) is restricted to scattered small patches of scrub oak in peninsular Florida. Their habitat requirements are very specific. They are very sedentary and remain within a small area for life. The scrub jay utilizes oak scrub consisting of live oak (*Quercus virginiana*), myrtle oak (*Q. myrtifolia*) and Chapman oak (*Q. chapmanii*); shrubby vegetation would consist of saw palmetto, sand palmetto, and rosemary (Woolfenden, 1978). The scrub jay generally mates for life and defends its territory. Nesting usually begins in early March to June. Clutch sizes vary from three to five eggs. A

pair may produce up to four clutches a year. Incubation lasts 17 days and generally coincides with the blooming of the oaks, which attracts hosts of insects and serves as food for the young (Hendry et al., 1980). The young remain in the vicinity of the nest for one year, helping to defend the territory and even to help in feeding the adult's brood. Breeding rarely occurs before the second year. The jay feeds on a wide variety of foods. Insects, especially arthopods, form the bulk of the diet. Woolfenden (1978) states that the eggs and nestlings of other birds are unimportant food as is the case with the western scrub jay. The Florida scrub jay readily takes artificial food and becomes tame where unmolested. Recent Florida scrub jay population declines may be attributed to its extremely narrow tolerances for habitat that is quickly being removed for development. Oak scrub habitat exists in the northern portion of the study area and several Florida scrub jays were observed along State Routes 48 and 469 in the proposed corridor.

Sherman's fox squirrel (*Sciurus niger shermani*) is a large tree squirrel, distinctly longer and heavier than the gray squirrel. It occurs throughout much of peninsular Florida east of the Suwannee River and north of Lake Okeechobee (Ehrhart, 1978). The fox squirrel's characteristic habitat is the longleaf pine/turkey oak forest of the sandhills, much of which have been removed for commercial timber. The biology of the fox squirrel is similar to that of the gray squirrel. It exhibits two breeding seasons with young born in January or February and again in June to August. Litter sizes range from one to four, with slow development. The young will spend up to six weeks in the brood nest. The fox squirrel does most of its foraging on the ground. Pine needles make up a large portion of its summer diet, then changing to acorns from the turkey oaks and other oaks the remainder of the year. The decline in recent years of the Sherman's fox squirrel can be attributed to the loss of habitat (Ehrhart, 1978). Apparently, the removal of longleaf pines leaves a forest dominated by the oaks, a suboptimal habitat. Habitat losses have also come from agricultural and residential development.

The Florida mouse (*Peromyscus floridanus*) is restricted to the northern portions of peninsular Florida. Its distribution is discontinuous, closely following the distribution of its habitat (Layne, 1978). The Florida mouse is found in sand pine scrub in early successional stages, but can also be found in pine-oak woods and scrubby flatwoods. Generally, the common characteristics of these habitats are the xeric conditions, open spaces, scrubby oaks

and other shrubs, and sandy soils. The mouse is a ground dweller, living in burrows, typically those of the gopher tortoise. Breeding takes place in the fall or early winter with litter sizes ranging from one to six. Natural enemies include those common to all small rodents, that is, snakes, birds of prey, foxes, bobcats, and raccoons. The main staples of the diet include seeds, nuts, fungi, plant material, insects, some small invertebrates and acorns. Layne (1978) feels that the Florida mouse and the gopher tortoise are an excellent example of commensalism between a reptile and a mammal. This species is threatened by the same problem which threatens the gopher tortoise, destruction of habitat. The sandy pine scrub ridges are prime lands for residential development because of draining qualities. Also, much of its habitat is being cultivated for agriculture.

At one time, the Florida panther (*Felis concolor coryi*) ranged throughout all of Florida. However, heavy pressures have reduced its populations to only occasional sightings. Early records show its habitat coincided with that of the white-tailed deer; this deer is very important to its diet. While the white-tail was able to adapt to man, the panther was not. Their densities were probably always very low as a result of the large territories required to maintain one animal. Up to six kittens are born to a female every two to three years. The young are born in dens, under logs, in caves, or in dense thickets. Panthers generally mature at three years of age. Adults are solitary and travel great distances while hunting, up to 20 miles (32 kilometers) (Williams, 1978a). It is believed that the species is on the verge of extinction and that there could not be more than 30 panthers remaining in Florida (Williams, 1978a). Hendry et al. (1980) feel hunting pressure, both legal (pre-1958) and illegal, reduction of habitat, and encroachment of man are the most important factors contributing to the decline of the species.

2.2.9 Other Environmental Features

The existing environmental characteristics of the study area, and particularly the proposed corridor, have been addressed in the preceding sections. Possible impacts to the environment resulting from construction and operation of the proposed Florida Power Corporation 500 kV transmission line can be addressed with information presented in this chapter.