# VI. DESCRIPTION OF THE AFFECTED ENVIRONMENT

This section presents a general description of the environment that could be affected by the alternatives presented. Included are discussions of the physical, biological, social, and economic components of the environment.

**A. Physical and Biological Factors** - The only known population remaining for the Florida panther occurs in and around the south Florida counties of Collier, Dade, Hendry, and Monroe (Figure 1). There are no reliable numbers for this population prior to radio-telemetry studies initiated in 1981. Over the recent past (5-10 years), the wild population appears to have been stable at approximately 30 to 50 adult panthers. The Big Cypress Swamp physiographic region comprises much of the presently occupied area. Water is the dominant natural resource of this region. Because of the relatively flat limestone underlain topography, 50 to 75 percent of the area may be flooded during the wet season. These conditions typically last for several months and have played a major role in the relatively undeveloped status of much of the region. Extensive sawgrass marshes, prairies, forested swamps, shallow sloughs and upland hammocks and ridges characterize the region. Public lands comprise approximately half of the known panther habitat in this region. Detailed descriptions of the physical and biological environments of the area, including the climate, geology, soils, mineral resources, hydrology, vegetation and wildlife are found in Craighead (1971) and Duever et al., (1986).

Because of the vast, undeveloped nature of much of the area, hunting and associated human activities have played and continues to play a dominant role in the nature of recreational activities within panther occupied areas. With the exception of Everglades National Park, Florida Panther National Wildlife Refuge, and Fakahatchee Strand State Preserve, most public and private lands experience various levels of traditional hunting activities. To address panther needs and concerns, varied regulatory actions have been implemented within the area.

Mercury contamination, most notably in the southeastern portion of the panther's occupied range, is a point of concern. Human health advisories have been issued to curtail consumption of certain aquatic foods in some areas of southern Florida. The role of mercury, as well as other environmental contaminants as a causative or contributing agent in various physiological abnormalities and the general health of the panther, is undetermined at this time. Mercury toxicosis was

attributed as the cause of death of a female panther in 1989 and considered to have possibly played a role in the death of a female panther in 1991. The Service, in collaboration with the Florida Game and Fresh Water Fish Commission and others, is developing a study design to investigate and evaluate panther exposure to environmental contaminants and how exposure may cause or contribute to genetic or other abnormalities which could affect recovery (see Enclosure II).

Since 1981, 56 panthers have been captured, immobilized, radio-instrumented and monitored. As of November 1, 1994, 16 are radio-instrumented (7 males and 9 females). A great deal of biological information has been learned regarding the panther over the past 14 years. According to Maehr (1990a), from a demographic and behavioral perspective, Florida panthers exhibit characteristics typical of healthy, stable mountain lion populations elsewhere. He found that panthers in southwest Florida prefer uplands, especially hardwood hammocks and pine flatwoods over wetland forest cover. He observed that forested uplands cover a relatively small area of inhabited panther range but receive a disproportionately high level of use. He also found that daytime cover and female den sites usually are located in dense understory vegetation, typically saw palmetto. He reports that daybeds usually are relocated daily, while den sites are used for up to 2 months by female panthers and their litters from parturition to weaning.

Panther home range sizes in southwest Florida varied from 20 to 457 $mi^2$ and averaged 74 $mi^2$ for adult females and 215 $mi^2$ for adult males between 1985 and 1990 (Maehr 1990a). The author noted that home range shifts in adult females were the result of a home range vacancy and dispersal from a natal range. He observed that shifts in adult male home ranges were due to male deaths and home range establishment by an adjacent male. Maehr reported that mean dispersal distance for 6 males (mean age = 17.3 months) was 32 mi (range 14-50 mi), and was 10 mi for 1 female.

Florida panthers are essentially solitary except while females raise kittens and during mating or attempted mating. Maehr (1990a) observed that the most frequent interactions were between females and their kittens, followed by adult males and adult females, and adult males and subadult females. He also observed that panthers are usually greater than 1.2 miles apart.

Since 1972, documented panther mortality has totalled over 55 animals (through July 1994). Since the development of the Florida

Panther Viability Analysis and Species Survival Plan in 1989, only 3 of the 11 full genetic founders identified in the wild at that time are known to still survive. Maehr (1990a) reports that panthers in southwest Florida exhibit mortality patterns typical of non-hunted mountain lion populations in the west. He observed that turnover in resident adults is extremely low and mortality in subadults males is relatively high. He reports that the lack of frequent home range vacancies makes the likelihood of male recruitment low. He observed that the greatest known cause of panther mortality is highway collision, however, this number is skewed towards males and panthers living in or adjacent to the Fakahatchee Strand. According to Maehr (1990a), adult female panthers avoid busy paved highways, while males readily cross them. He observed that female panthers appear to distribute themselves evenly through available habitat but do not establish home range areas that are bisected by Interstate 75.

Studies in southwest Florida from 1977 through 1989 indicated that wild hog was the most common prey followed by white-tailed deer, raccoon, and 9-banded armadillo (frequency of occurrence in 270 scats) (Maehr et al. 1990). The authors reported that no seasonal variation in diet was found; however, panthers inhabiting an area of better soils consumed a greater percentage of large prey.

The productivity of females varies by location, and like physical condition and hematology values, appears to be related to the type and abundance of prey in the respective habitat (Roelke 1990). Females successfully producing and rearing young through dispersal age typically produce one litter every two years. Roelke (1990) reported that 23 likely pregnancies had been determined through actual palpation of fetuses (n = 4), ultrasound analysis (n = 1), necropsy results (n = 2), capture or visual sightings of kittens with the respective females (n = 5), kitten remains in panther feces (n = 1), and radio telemetry data indicating denning behavior 90-95 days following association with males (n = 10). The author reports that of these 23 likely pregnancies, only 10 (43%) resulted in at least one offspring surviving beyond 6 months of age. Maehr (1990a) reports that of 6 females documented as denning in southwest Florida, litter sizes after 2 months ranged from 1 to 4.

The physical and biological features of sites that may serve as future population reestablishment areas cannot be specifically addressed at this time because site evaluation, analysis and selection have not been completed. Existing Service policy would require that future reestablishment sites be located within the panther's historic range.

This area includes all or portions of Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, South Carolina and Tennessee. Habitat requirements of the panther would limit candidate sites to areas possessing large expanses of relatively undeveloped, forest-dominated landscapes. Public lands could account for a significant component of some sites. Preliminary evaluations utilizing size of candidate site, human population density, road density and degree of forest cover as evaluation criteria have resulted in the initial identification of 14 candidate population reestablishment sites within the historic range of the Florida panther. Six of these sites had cumulative ranking scores that exceeded the score received by the presently occupied area in southwest Florida. Based solely on size, each of these candidate sites could possibly support a population of 50 or more panthers.

3. **Socioeconomic Factors** - The entire Region's economy is heavily dependent upon the tourist industry, which has contributed to a rapid growth for the area. Tourism is an important part of Florida's economy. Over 41 million visitors pumped $32 billion dollars into Florida's economy in 1993 (FDOC 1993). Clean air, a subtropical climate, and diverse recreational opportunities make the south Florida area extremely attractive to tourists, retirees, and year-round residents. The extensive natural resource amenities of south Florida have been widely advertised and marketed worldwide resulting in phenomenal growth, especially along the coasts. The population statewide, now over thirteen million, has doubled every 20 years since 1830 (Shermyen 1990). Fifty percent of the state's residents now live in south Florida.

According to the 1990 census, five of the top ten fastest growing metropolitan areas in the nation; Naples (Collier County), Fort Myers (Lee County), Punta Gorda (Charlotte County), Fort Pierce (St. Lucie County), and West Palm Beach (Palm Beach County) are located in south Florida. In 1987 there were 499,982 acres or 781 $mi^2$ of land designated as urban in southwest Florida. During the decade of the 1980's most southwest Florida counties experienced rapid human population growth. Collier County, which receives perhaps the greatest level of panther use of all counties, experienced a population growth in excess of 50 percent (Figure 2). Population densities in 1990 for the two most important counties in terms of recent panther use-levels remain relatively sparse at between 50-99/$mi^2$ for Collier County and less than 50/$mi^2$ for Hendry County (Figure 3). However, the Southwest Florida Regional Planning Council concludes that a doubling of the population in southwest Florida in the next 20 years

as projected, will create a demand for an additional 292 $mi^2$ of urban land at today's housing densities (SWFRPC 1990). Southwest Florida's continued rapid population growth has the potential to magnify the loss of natural resources.

Agriculture, another important state industry in this region, adds a certain amount of diversification and stability to the south Florida economy (U.S. Fish and Wildlife Service 1985). The importance of agriculture to the state economy is reflected in the following figures for 1992; citrus - $1.23 billion on the tree, row crops - $1.73 billion, and livestock - $1.14 billion in gross receipts (FDACS 1992a, FDACS 1992b, FDACS 1992c). Citrus, row crops and cattle are common in the interior of south Florida. Regional economic figures are not readily available.

Citrus - Severe freezes in 1983, 1985 and 1989 destroyed about half (435,000 acres) of Florida's citrus acreage. Since the 1984-85 freeze, the southwest Florida region has become the fastest growing citrus area in the state. Approximately 120,000 acres of citrus have been developed in southwest Florida since 1972, with nearly 100,000 developed in the past eight years alone. Citrus acreage has more than doubled in Hendry County in the past ten years. Collier County's 1990 citrus acreage is almost three times its 1980 level. The average acreage of citrus developed annually in southwest Florida increased from about 3,500 acres in 1984-85 to over 16,000 acres in 1990-91. South Florida agricultural extension agents estimate that 60 to 70 percent of the acreage converted to citrus was rangeland and that 30 to 40 percent was native habitat. However, future citrus developments likely will be established on previously cleared land (D. Townsend, Hendry County Extension Agent, personal communication, 1991). Final results of a citrus feasibility study indicate that 704,000 acres (46%) of a 1,536,000 acre area encompassing the Immokalee Rise physiographic region in Hendry County and Collier County is suitable for citrus development (Mazzotti et al. 1992).

Vegetables - Acreage for major crops in southwest Florida (tomato, pepper, watermelon, cucumber, eggplant, squash) has increased about 20,000 acres over the past two decades. Row crop acreage increased 21 percent between 1986 and 1990 (Townsend 1991). Much of this was former vegetable fields and improved pasture being brought back into production. Thus, little clearing of native habitat occurred. The economics of winter vegetable production are such that no more than 1,000 acres per year are expected to be put into production for the next two decades and production will likely occur

on lands formerly cleared for vegetables (D. Land, Collier Enterprises, personal communication, 1993).

Livestock - There are about 3.6 million acres of cattle range in south Florida. Based on data from eleven of the twenty south Florida counties, about 50 percent of the range is native and 50 percent is improved. Range acreage is steadily decreasing, primarily due to citrus development, but with some loss to urban development. Cattle range in southwest Florida decreased 11 percent from 1.5 million acres to 1.34 million acres between 1986 and 1990 (Townsend 1991). Florida ranks 10th in the United States for the total number of cows and calves. The majority of these cattle are raised on south Florida ranches. Though livestock are prevalent in south Florida, losses to panthers are rare (Maehr et al. 1990b).

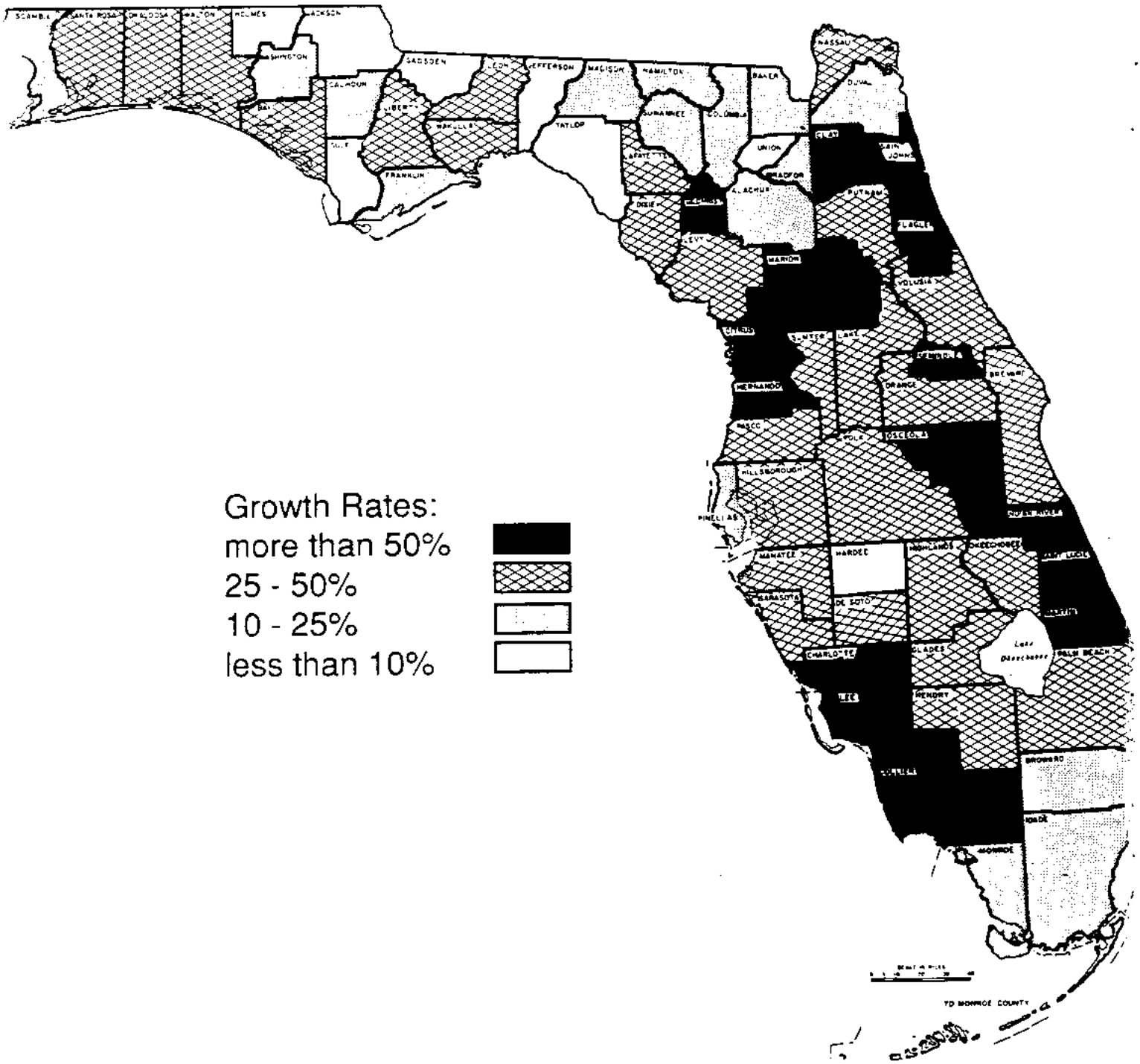
Minerals - Mineral resources within the southwest Florida region include: sands, shells, marls, and clays (used in construction); differing grades of phosphatic sands and clays, limestones and Fuller's Earth; and, peats, petroleum and natural gas deposits (L. Zippay, FDEP, pers. comm. 1991). This area has proven important to the petroleum and gas industry, and is currently one of the few areas producing oil and gas in the state.

Oil and gas reserves have been drilled in Collier, Lee and Hendry Counties. There are about 26 active wells, 100 abandoned wells, and 80 permitted, yet undrilled wells in the south Florida Sunniland Reef Trend Region. The potential for important oil deposits increases on a gradient from Palm Beach to Collier County.

Open-pit mining in south Florida is used to extract sand (27,362 acres), shell (80 acres), peat (49 acres), limerock (54,235 acres), and phosphate (426,000 acres)(L. Zippay, FDEP, pers. comm. 1991).

Rapid growth and lack of environmental safeguards prior to 1970 resulted in the loss or significant alteration of hundreds of thousands of acres of productive wetlands and upland habitats. Canal dredging, road construction, wetlands drainage, and destructive wildfires have markedly impacted viable interior wetlands in south Florida. The alteration of beneficial, pristine wetlands preceded much of the major growth era. Legal and illegal dredge and fill activities associated with modern road construction and urban and agricultural development have further affected water quality, water storage capacity, native landscapes, and the diversity, abundance, and distribution of regional wildlife.

Figure 2.--Percentage Population Change in Florida Counties, 1980 to 1990

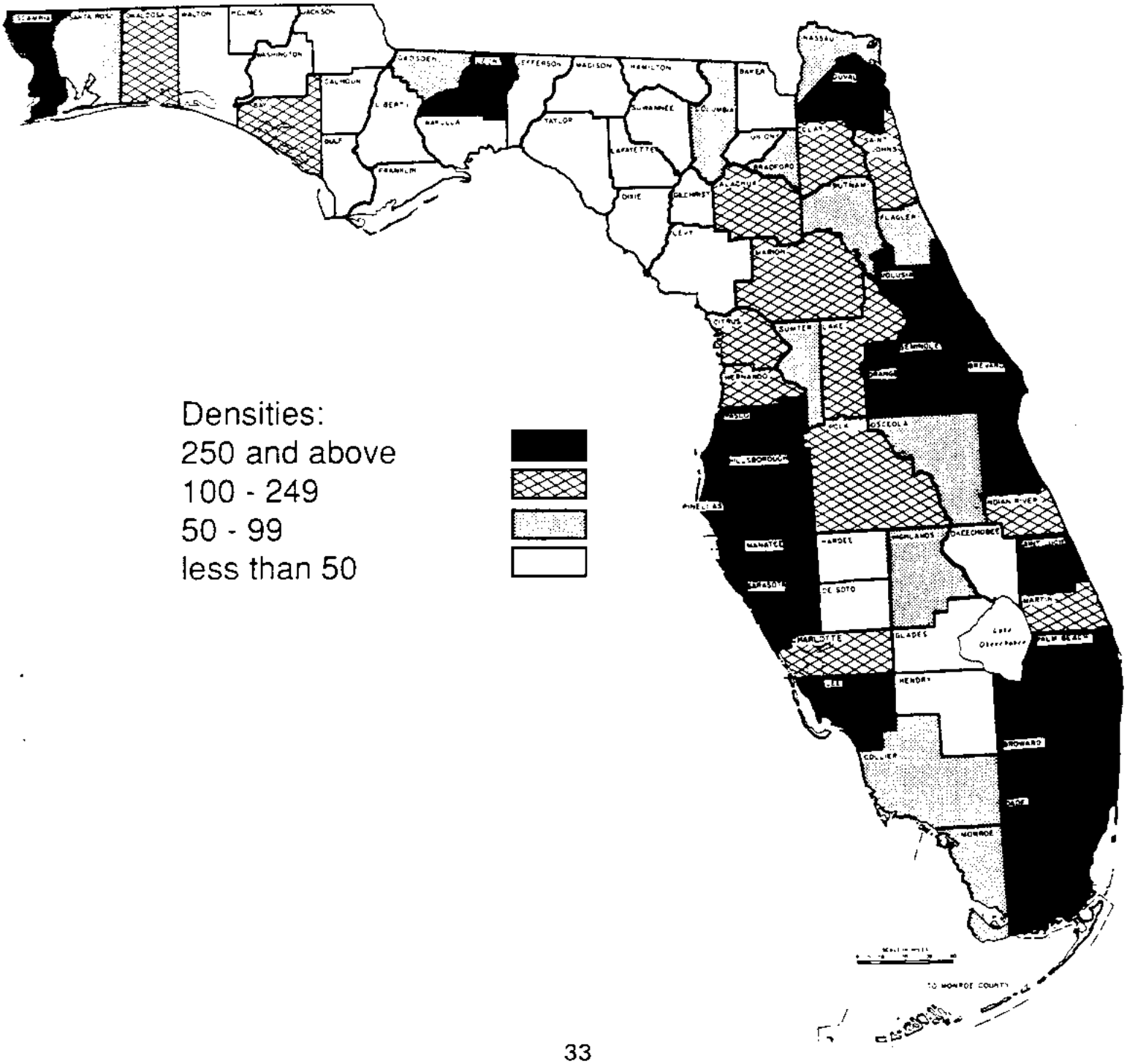





Note: The 1990 population counts are subject to possible adjustment for undercount or overcount by the U.S. Bureau of the Census.

Source: *Florida Population: Census Summary 1990*

**Figure 3.--Population Per Square Mile in Florida Counties, 1990**






Note: The 1990 population counts are subject to possible adjustment for undercount or overcount by the U.S. Bureau of the Census.

Source: *Florida Population: Census Summary 1990*

Public lands comprise approximately half of the panther's currently known occupied range (Figure 4). Public lands of primary importance in this region include the Big Cypress National Preserve (area B - approximately 728,000 acres), Everglades National Park (area A - approximately 1,000,000 acres excluding Florida Bay), Fakahatchee Strand State Preserve (area D - approximately 50,000 acres), Florida Panther National Wildlife Refuge (area E - approximately 26,300 acres), and the Water Conservation Areas (area C - approximately 800,000 acres). Maehr (1990b) reported that occupied panther range in south Florida totals approximately 2.2 million acres. He also indicated that of these acres, approximately 1.2 million are in public ownership in Broward, Collier, Dade, Monroe and Palm Beach Counties. Nearly all panther range in Glades, Hendry, and Highlands Counties is privately owned (Maehr 1990b). Public lands are managed for varying degrees of resource conservation and recreation. Land use in the Region's private sector is characterized by increasing urban development and an expanding, more intensively managed agribusiness (Figure 5).

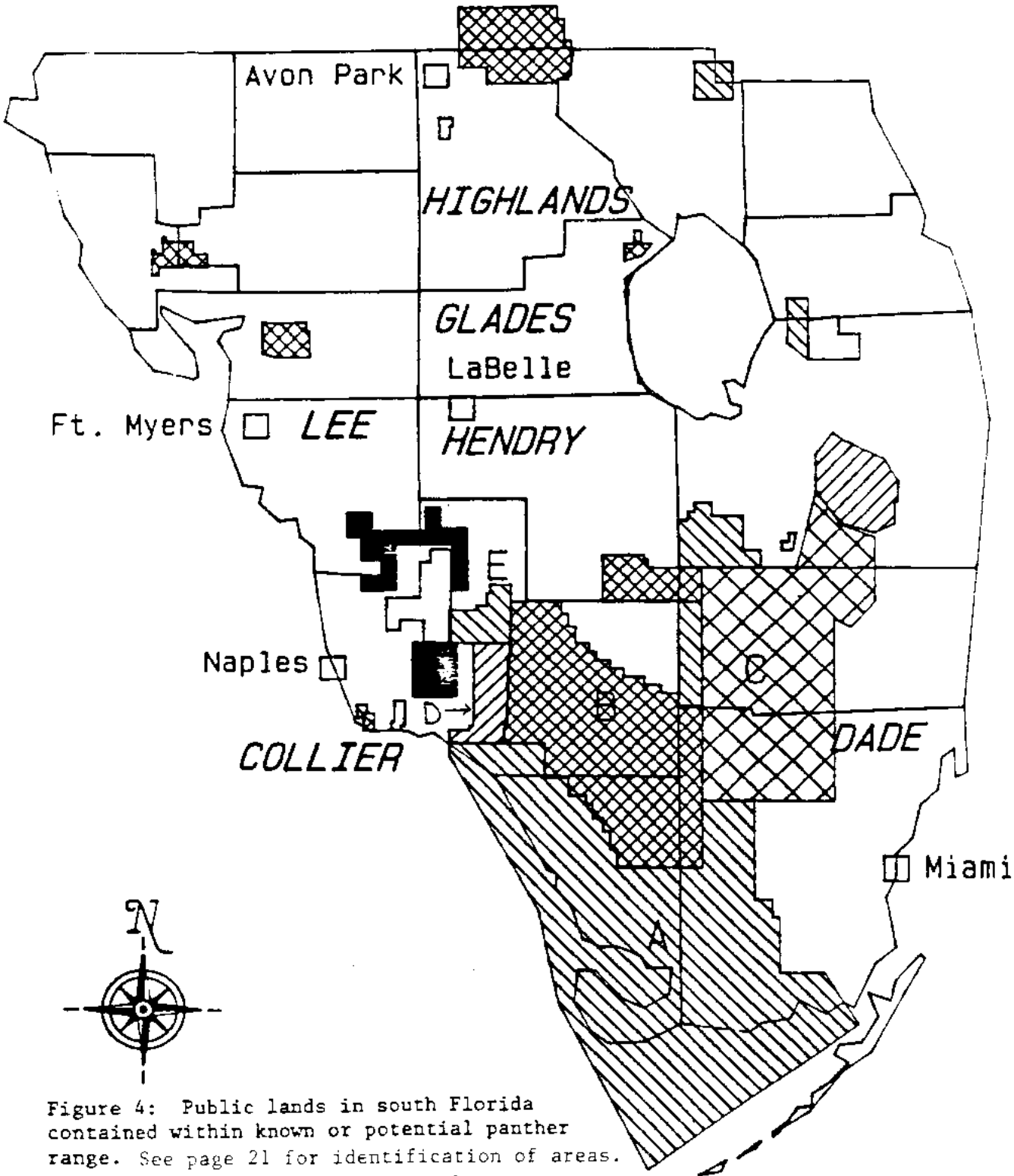
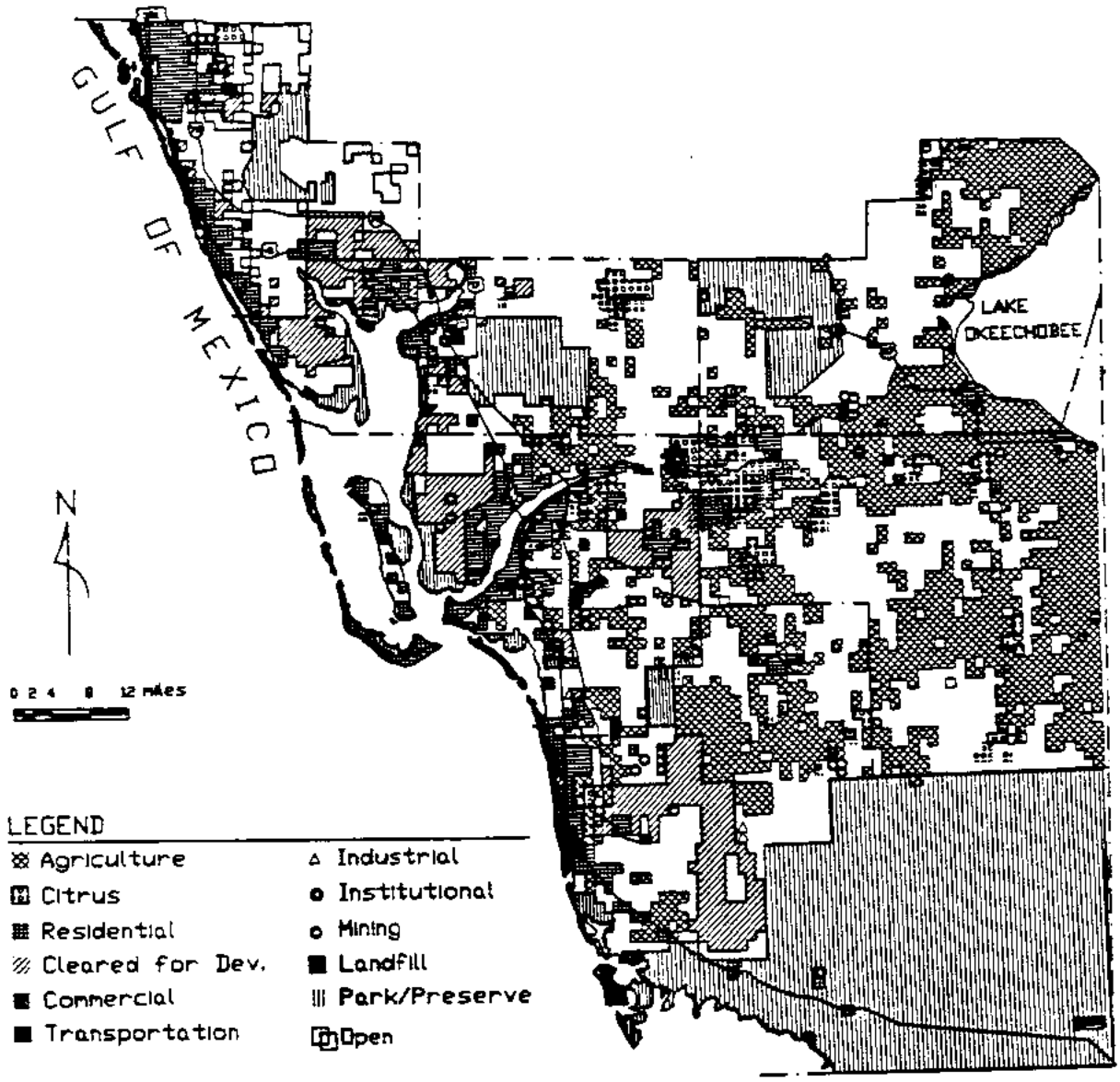



Figure 4: Public lands in south Florida contained within known or potential panther range. See page 21 for identification of areas.



Source: D. Maehr, Fla. Game & Fresh Water Fish Commission, Naples, Fl




SWFRPC Figure 5:

# DOMINANT LAND USE BY SECTION IN SOUTHWEST FLORIDA, 1984



Source: Southwest Florida Regional Planning Council