



In 2008, the Florida Panther Protection Program partners convened a scientific review team to evaluate the strategy outlined in the Memorandum of Understanding.

The Panther Review Team (PRT), composed of six scientists with expertise in Florida panther ecology and landscape-level natural resource planning, was asked the simple question: does the Florida Panther Protection Program as a whole provide additional conservation benefit to the Florida panther when compared to current programs? The PRT unequivocally and unanimously responded in the affirmative.

The PRT was also invited to offer comments and suggestions on the program. These will be carefully considered by the partners for feasibility and in relation to other issues not addressed by the PRT including private property rights and economic viability.

The final report may be utilized by U.S. Fish and Wildlife Service in the development of a Florida Panther Habitat Conservation Plan which includes a thorough scientific analysis and transparent public process.

For complete and current information on the Florida Panther Protection Program, go to [www.floridapantherprotection.com](http://www.floridapantherprotection.com).

The final report is presented in four parts. This is Part 2 of 4.

Part 1 of 4 - Cover through Section 3.5

Part 2 of 4 - Section 4.0 through Section 11.0

Part 3 of 4 - Figures

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## **4.0 Analysis of Panther Habitat Units Generated from Stewardship Sending Areas**

### **4.1 Introduction**

The Parties acknowledged that the acres preserved following approval of SSAs under the RLSA program will also generate PHUs to fulfill USFWS panther habitat mitigation requirements. The accounting system for PHUs generated from SSAs would be in addition to and independent of the RLSA Stewardship Credit system used to transfer Stewardship Credits from SSAs to sites proposed as SRAs where development may occur. The Parties anticipate that more PHUs than are required for mitigation may be generated as a result and contemplate an agreement with the USFWS and the FWC that unused PHUs generated from SSA lands may be used, sold, or transferred to third parties for use within the southern PFA.

The PRT was charged with conducting a technical review of the generation and use of PHUs that may be derived from SSA lands. The review was accomplished by using a GIS analysis to estimate the PHUs associated with existing and proposed SSAs as well as RLSA lands most likely to be designated as SSAs (i.e., HSAs, FWAs, and WRAs). The quantity of PHUs available from these areas was compared to the mitigation requirements resulting from impacts to 45,000 acres of RLSA land eventually subject to development. The mitigation requirements associated with Ave Maria were estimated and compared with PHUs of designated SSAs. A similar analysis was not possible with the Town of Big Cypress or Hogan Mine because SSAs have yet to be dedicated for these projects. These projects are currently in the consultation process with the USFWS and FWC pending permit authorization. The number and impact of PHUs potentially available for sale to mitigate developments outside of the RLSA was assessed.

### **4.2 Methods**

Land use/land cover data for 2004-2005 were downloaded from the SFWMD web site and used as the basis for calculating PHUs. These data were selected because they were the most recent readily available data that depicted the landscape of the RLSA prior to beginning of construction for Ave Maria. Land use/land cover data were clipped to the RLSA boundary, and acreages were recalculated. Fields were added to the resulting land use/land cover data tables to crosswalk the SFWMD FLUCFCS (FDOT 1999, as modified by SFWMD) codes to the more general USFWS land cover types and associated land cover scores. The modified land use/land cover data set was used to calculate PHUs associated with the major RLSA land use categories (i.e., Open, HSA, FWA, WRA, and Lake Trafford). These data were further clipped to the boundaries of SSAs 1 through 16, and PHUs were calculated for each SSA and for each major RLSA land use category within each SSA.

### **4.3 Results**

*Approved and Pending SSAs:* The SSA log obtained from the Collier County web site indicates that, as of November 26, 2008, Collier County had approved 15 applications to designate specific parcels of land as SSAs for the generation of Stewardship Credits for transfer to SRAs. The site numbers of approved SSAs are 1, 2, 3, 3A, 4, 5, 5A, 6, 7, 8, 9, 11, 14, 15, and 16. In addition, applications were pending for designation of two sites (SSAs 10 and 12), and an application for designation of SSA 13 was pending submittal. SSAs 1-6 were dedicated to the generation of Stewardship Credits needed for Ave Maria (Tom Jones, Barron Collier, personal communication).

The 17 approved and pending SSAs cover 48,280 acres (25% of the total area of the RLSA). The total panther habitat value of all SSAs was estimated at 382,938 PHUs (Table 4.3-1). Wetlands are the dominant land cover type within the SSAs, accounting for 53% of the total area. Pasture and croplands account for an additional 31% of the area within all SSAs, and natural uplands account for 15%. Lands approved or pending for designation as SSAs consist primarily of HSA and FSA categories, which account for 59% and 32% of all SSAs respectively (Table 2.4-2). Lands within the RLSA Open and WRA categories comprise only 6% and 3%, respectively, of lands within the SSAs.

*Protection of Habitat, Flowways and Adjacent Water Retention Areas as SSAs:* Given that all HSAs, FSAs, and WRAs will eventually be designated as SSAs to obtain the Stewardship Credits needed to develop 45,000 acres of SRAs, an estimate of the PHUs of these lands provides information useful in assessing the value of these future sending areas to panther habitat conservation. All HSAs, FSAs, and WRAs within the Primary Zone of the RLSA contain an estimated 98,390 acres with a panther habitat value of 806,675 PHUs (Tables 4.3-2 and 4.3-3). Approximately 29,499 acres containing an estimated 239,736 PHUs are already in public ownership or dedicated as SSAs for Ave Maria (Tables 4.3-2 and 4.3-3). This leaves approximately 68,691 acres with an estimated 566,939 PHUs available for future mitigation (Table 4.3-2), of which 31,228 acres and 253,161 PHUs are in approved or pending SSAs 7-16.

*Mitigation for 45,000 Acres of Impact:* The Parties propose to limit future development within the RLSA to 45,000 acres. The PRT estimated the number of PHUs of mitigation needed for 45,000 acres of development based on five scenarios of Primary versus Secondary Zone impacts and based on application of the existing 2.5:1 and proposed 3.125:1 mitigation ratios for impacts to the Primary Zone (Table 3.3-1). Only Scenarios 4 and 5, which assume 75% and 100% of future development impacts occurring in the Primary Zone, would require enough PHUs to protect an acreage of habitat equivalent to the number of acres that would be preserved as SSAs using the Stewardship Credit system. Development scenarios involving less than approximately 75% impact to the Primary Zone would result in the preservation of fewer acres of habitat than will be preserved as SSAs. (see Section 4.0).

Approximately 39,373 acres remain available for future development after the acreage for Ave Maria is subtracted from the 45,000-acre development cap (Note: acreages for the Town of Big Cypress and Hogan Mine were not subtracted from the development cap for purpose of this analysis because permit conditions for these projects have not yet been established and both projects would be subject to the 3.125:1 mitigation ratio for Primary Zone impacts proposed by the Parties). The PRT has recommended a development scenario in which the remaining acreage for future growth would occur first within the Secondary Zone, and the remaining acreage would occur within Primary Zone habitats within the RLSA. The PRT estimates that this development scenario would result in a requirement for 342,000-361,000 PHUs of mitigation based on the existing 2.5:1 and proposed 3.125:1 mitigation ratios for impacts occurring in the Primary Zone. The proposed 45,000-acre development cap would be accomplished by dedicating all remaining areas of the RLSA as HSAs, FSAs, WRAs, and Agriculture Preservation SSAs. The PRT estimates that remaining HSAs, FSAs, and WRAs with panther habitat value contain an estimated 567,000 PHUs (Table 4.3-3), and the 38,746 acres identified by the PRT for additional protection contain approximately 214,000 PHUs. These areas combined contain approximately 781,000 PHUs, but no more than 361,000 PHUs of mitigation would be required to reach the 45,000-acre development cap. Thus, all lands eventually dedicated as SSAs would contain approximately 420,000 PHUs more than needed to mitigate impacts within the RLSA.

**Table 4.3-1 Estimated Total Acreages and Panther Habitat Units (PHU) by Major Land Use Category Within All Approved and Pending Rural Land Stewardship Area Stewardship Sending Areas (SSA), SSAs Dedicated to Mitigation for Development of Ave Maria, and SSAs Approved or Pending but not Dedicated to Specific Stewardship Receiving Areas (SRA).**

Land Use	All SSAs		Ave Maria Mitigation		No SRA Dedication	
	Total	Total	SSA 1-6	SSA 1-6	SSA 7-16	SSA 7-16
	Acres	PHU	Acres	PHU	Acres	PHU
Natural Uplands	7,313	64,877	2,592	22,855	4,721	42,022
Wetlands	25,428	228,853	8,175	73,577	17,253	155,275
Pasture/Cropland	14,994	87,680	5,919	32,207	9,075	55,473
Exotics	509	1,528	360	1,080	149	448
Urban/Barren/Water	36	0	1	0	34	0
<b>Total</b>	<b>48,280</b>	<b>382,938</b>	<b>17,048</b>	<b>129,720</b>	<b>31,232</b>	<b>253,218</b>

**Table 4.3-2 Acreages of FSAs, HSAs, and WRAs Within the Florida Panther Primary Zone Within the Entire RLSA, on Public Lands as of December 2008, and SSAs Used to Mitigate Ave Maria and Available for Future Mitigation After Subtracting Acreages on Public Lands and Ave Maria SSAs.**

SSA Category	RLSA Total	Public Lands <sup>1</sup>	Ave Maria SSAs	Public & Ave Maria	Available For SSAs
	Acres	Acres	Acres	Acres	Acres
Flowways	37,197	6,670	6,564	13,234	23,963
Habitat	45,755	5,898	10,345	16,243	29,512
Water Retention	15,439	0	23	23	15,416
Total	98,390	12,568	16,931	29,499	68,891

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<sup>1</sup> As of December 2008; includes pending purchase of Pepper Ranch.

**Table 4.3-3 PHUs of FSAs, HSAs, and WRAs Within the Florida Panther Primary Zone Within the Entire RLSA, on Public Lands as of December 2008, and Within SSAs Used to Mitigate Ave Maria and Available for Future Mitigation After Subtracting Acreages on Public Lands and Ave Maria SSAs.**

SSA Category	RLSA Total	Public Lands <sup>1</sup>	Ave Maria SSAs	Public & Ave Maria	Available For SSAs
	PHU	PHU	PHU	PHU	PHU
Flowways	329,882	59,992	58,081	118,073	211,809
Habitat	346,646	51,075	70,409	121,484	225,162
Water Retention	130,147	0	179	179	129,968
Total	806,675	111,067	128,669	239,736	566,939

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<sup>1</sup> As of December 2008; includes pending purchase of Pepper Ranch.

*SSAs for Ave Maria:* The Ave Maria project is authorized for construction; SSAs 1-6 have been approved as dedicated sending areas to generate the Stewardship Credits needed for the project; and impacts to Florida panther habitats have been mitigated (USFWS 2005). The Ave Maria project would have required an estimated 50,584 PHUs of mitigation based on the data sets, assumptions, and methods used for this analysis. SSAs 1-6, which were dedicated to sending Stewardship Credits for Ave Maria (Tom Jones, personal communication), contained an estimated 129,720 PHUs (Table 4.3-1). This analysis indicates that the SSAs used to send Stewardship Credits to the Ave Maria SRA contained 79,136 PHUs (2.56 times) more than needed to mitigate impacts to panther habitats. This finding suggests that the Stewardship Credit system is a better tool for protecting significant panther habitats in the RLSA than the PHU credit system.

#### **4.4 Discussion**

The Parties have proposed to limit future development within the RLSA to 45,000 acres. The existing Stewardship Credit system with proposed revisions would result in the eventual protection of approximately 150,846 total acres within the RLSA. WilsonMiller (2008) indicates that the protected areas would include 92,000 acres of HSAs, FSAs, and WRAs; 16,546 acres of public and miscellaneous lands; approximately 40,000 acres of agricultural lands that have some value as buffers to natural areas used by panthers; and 2,300 acres of proposed panther corridors. The WilsonMiller (2008) estimate that 40,000 acres of agriculture would remain as a result of the development cap, and this acreage would be sufficient to accommodate the 38,746 acres (Table 2.4-3) recommended for preservation by the PRT. The PRT estimated that the mitigation needed to reach the 45,000-acre development cap would require protection of between 38,559 acres and 85,364 acres of Primary Zone habitat, depending on extent of Primary Zone impacts (Table 3.3-1). Under the worst case scenario where all 45,000 acres of development occurred within the panther Primary Zone, the quantity of PHUs of mitigation would result in the preservation of approximately 132,000 acres of habitat in comparison to the 150,846 acres that would be preserved under the Stewardship Credit system. The PRT cautions that using unused PHUs generated from designated Stewardship areas to mitigate for panther habitat loss outside of the RLSA would be detrimental to panther conservation.

The PRT's analysis of the PHU value of SSAs shows that less mitigation acreage is required by the USFWS Methodology when compared to acres required by the RLSA credit system. The net result is that landowners of SSAs would be able to bank approximately 420,000 PHUs that would be available for sale to developers outside of the RLSA. These PHUs are sufficient to mitigate the development impacts to approximately 20,600 acres of Primary Zone habitat or 53,400 acres of Secondary Zone habitat outside of the RLSA.

## **5.0 Agricultural Preservation Proposal**

### **5.1 Current Rural Lands Stewardship Area Policies Relevant to Agricultural Preservation**

A primary goal of the current RLSA program is to protect agricultural lands from conversion to non-agricultural uses and continue the viability of agricultural production through a combination of voluntary stewardship incentives and land-efficient compact rural development (Group 2 Policies, Collier County RLSA Program). Agricultural lands protected through the use of stewardship incentives are designated as SSAs (Policies 1.6, 1.7, and 1.17, Collier County RLSA Program). Agricultural lands determined to have high natural resource values and that would qualify for designation as a SSA have been categorized in the current RLSA program as FSAs, HSAs, or WRAs. Stewardship Credits are generated when these agricultural lands are approved by Collier County for designation as SSAs. Agricultural lands determined to have lower natural resource values were categorized as Open Lands and are eligible for development through the receipt of transferred Stewardship Credits. A significant portion of the lands designated as SSAs under the current RLSA program is used or available for lower intensity agriculture (Florida Department of Community Affairs [DCA] 2007). Therefore, the current Stewardship Credit System provides a mechanism for designating agricultural lands that may have higher natural resource values as SSAs. Conversely, agricultural lands in Open Areas that have lower natural resource values would more likely become either SRAs or be developed at the underlying land use of one dwelling unit per five acres (DCA 2007).

### **5.2 Agricultural Preservation Component of the Florida Panther Protection Program**

The Parties have proposed the creation of Agricultural Preservation areas that have not been designated as FSAs, HSAs, or WRAs as a system for compensating private property owners in the RLSA for the voluntary stewardship and retention of agriculture on Open Lands. The Agricultural Preservation system of compensation provides an alternative to developing these Open Lands under regulatory processes within the current RLSA (Policy 4.3, Collier County RLSA). Landowners would be eligible to receive 2.0 Stewardship Credits for each acre of Open Land that is designated for Agricultural Preservation outside of the Big Cypress ACSC and 2.6 Stewardship Credits for each acre of Open Land that is designated for Agricultural Preservation within the Big Cypress ACSC. Lands designated for Agricultural Preservation and approved as SSAs would have all non-agricultural use options removed and the remaining uses would be limited to agriculture and associated support operations such as farm worker housing that exist prior to designation. Intensification from Ag2 to Ag1 would not be permitted subsequent to Agricultural Preservation designation and SSA approval. The Parties did not identify specific areas of Open Lands proposed for future SRA or Agricultural Preservation designation within the RLSA inside or outside of the Big Cypress ACSC.

### **5.3 Technical Merits of the Agricultural Preservation Policy**

The Agricultural Preservation components of the FPPP as proposed by the Parties would increase the number of Stewardship Credits necessary to entitle development within the RLSA up to the proposed 45,000-acre SRA cap. Limiting future development to 45,000 acres and preserving agricultural lands may address DCA criticism that the current RLSA program does not sufficiently protect and conserve agricultural lands from conversion to urban development (FPPP MOU, DCA 2007). The Agricultural Preservation component as proposed has the capability to preclude future development of all Open Lands



outside of the proposed 45,000-acre SRA footprint because the option for development under the existing base zoning of one housing unit per five acres would be removed. The PRT understands and supports the Parties' stated intent (Tom Jones, personal communications) to limit future development to 45,000 acres and remove baseline development densities for all other RLSA lands.

Whereas the Agricultural Preservation proposal would provide a mechanism to promote the Agricultural Preservation goals described in the MOU, conservation of the Florida panther was not specifically identified as an objective of these goals. The 2.0 and 2.6 proposed Agricultural Preservation credit values are calibrated to achieve the proposed 45,000-acre development cap and are not tied to underlying natural resource values, with the exception of the additional 0.6 credit awarded to lands that would be designated for Agricultural Preservation within the Big Cypress ACSC. The PRT was not provided the site-specific locations or acreages of proposed future SRAs or Agricultural Preservation areas, even though information from WilsonMiller (2008) indicates that approximately 40,000 acres would be designated for Agricultural Preservation to achieve the 45,000-acre cap. Therefore, insufficient information was available to determine whether the entitlement of 45,000 acres of RLSA-style development through the proposed Agricultural Preservation component and reduction of the existing baseline zoning density benefits the Florida panther relative to the existing RLSA program. Although the Agricultural Preservation component does have the capacity to protect specific agricultural areas with high panther value (Section 2.0), this component does not appear to have the capability of steering preservation to these same areas.

The PRT finds that specific areas (currently designated as Open Lands that would qualify for the proposed Agricultural Preservation designation and SSA approval) have natural resource value and could contribute to the conservation of the Florida panther by maintaining the spatial extent and integrity of existing panther habitat. The PRT estimated that approximately 40,462 acres of agricultural cover types are categorized as Open Lands within the Primary Zone (Kautz et al. 2006). The PRT also identified specific agricultural areas within these Open Lands with high conservation value for panthers (Section 2.0) and should be considered for additional preservation and protected from development (Figure 13). Whereas agricultural areas may rank lower in importance as panther habitats (Kautz et al. 2006, Land et al. 2008), many agricultural areas contain important natural landscape connections that support panther home ranges, panther reproduction, dispersal movements, and prey populations (Maehr et al. 2002). Open Lands, particularly those within the Big Cypress ACSC, also contain areas of natural habitat that support use by panthers. Therefore, designating agricultural lands with high conservation value for the panther for Agricultural Preservation would benefit the panther if those lands are restricted in perpetuity to agricultural uses at levels no greater than existed prior to designation. These areas would, therefore, be protected from future urban development. This benefit is predicated on the assumption that the amount and configuration of natural cover types interspersed within the agricultural landscape recommended for preservation is also maintained in perpetuity. However, the PRT finds that the proposed credit system for Agricultural Preservation for Open Lands inside and outside of the Big Cypress ACSC will not provide the appropriate incentives necessary to secure areas identified by the PRT that have conservation to the panther (Figure 13). The proposed Agricultural Preservation credit system also would not provide the appropriate converse incentive to designate as SRAs those Open Lands with minimal panther conservation value relative to the areas identified by the PRT for additional preservation, most importantly those Open Lands outside of the Primary Zone (Figure 13 and 17).

The PRT recommends that the proposed Agricultural Preservation component be modified to incorporate a panther-resource value for certain agricultural lands categorized as Open Lands that the PRT identified as important to panther conservation. These areas deserve additional preservation and protection from

development. The provision of adequate incentives to encourage the preservation of these lands through either designation of these specific areas for Agricultural Preservation or as SSAs using existing categories (e.g., HSA) would meet the Agricultural Preservation Goals described in the MOU. Most importantly, this approach would direct future SRA development away from lands of conservation value to the panther. It is beyond the PRT's charge to recommend specific credit values for Open Lands specifically designated for Agricultural Preservation that would simultaneously contribute to the number of Stewardship Credits needed to meet the proposed 45,000-acre SRA development cap and protect those Open Lands identified as having important conservation value to the panther. However, the 2.0 and 2.6 Stewardship Credits as proposed appear arbitrary and not scaled appropriately for the underlying natural resource values identified for panthers, even though the additional 0.6 credit proposed for Open Lands within the Big Cypress ACSC is intended to reflect the natural resource value of the Big Cypress ACSC. Therefore, the PRT recommends that if an Agricultural Preservation system is implemented, the Stewardship Credit values should be revised to more appropriately reflect the underlying natural resource value for preserving these lands for panthers inside and outside the Big Cypress ACSC. The PRT also recommends that a greater benefit to the panther would be achieved if portions of these lands designated for Agricultural Preservation would be restored or enhanced to native land cover types and landscape configurations that would increase the quality, functionality, and availability of habitat for panthers and their prey.

## **5.4 Summary Conclusions and Recommendations**

### **5.4.1 Conclusions**

1. Conservation of the Florida panther was not specifically identified as a goal of the Agricultural Preservation policy proposed in the MOU.
2. The 2.0 and 2.6 proposed Agricultural Preservation credit values appear arbitrary and not tied to underlying natural resource values, with the exception of the additional 0.6 credit awarded to lands that would be designated for Agricultural Preservation within the Big Cypress ACSC.
3. The Parties did not identify specific areas proposed for future SRA or Agricultural Preservation designation within the RLSA; therefore, the PRT has insufficient information to determine whether the entitlement of 45,000 acres of RLSA-style development through the proposed Agricultural Preservation component and reduction of the existing baseline zoning density benefits the Florida panther relative to the existing RLSA program.
4. The PRT identified specific areas currently designated as Open Lands that would
  - A. Qualify for the proposed Agricultural Preservation designation.
  - B. Contribute to Florida panther conservation, if preserved, because these lands have natural resource value.
  - C. Maintain more of the spatial extent and integrity of existing panther habitat.
  - D. Direct future developments away from areas of greatest conservation value to the panther.

5. The PRT finds that designating Open Lands for Agricultural Preservation as proposed by the Parties and focusing on those lands identified by the PRT in Figure 13, would provide a greater benefit to the Florida panther when compared to the current RLSA program. This conclusion assumes the following: 1) these lands would be restricted in perpetuity to agricultural uses at levels no greater than their current condition and therefore protected from future urban development; and 2) the amount and configuration of natural cover types interspersed within the agricultural landscape designated for preservation would also be maintained in perpetuity.

#### **5.4.2 Recommendations**

1. The PRT recommends that the proposed Agricultural Preservation component be modified to incorporate a panther-resource value for certain agricultural lands that the PRT identified as important to panther conservation and deserving of additional preservation and protection from development.
2. The PRT recommends that a greater benefit to the panther would be achieved if portions of those lands designated for Agricultural Preservation would be restored or enhanced to native land cover types and landscape configurations that increase the quality, functionality, and availability of habitat for panthers and their prey.

## **6.0 RLSA Transportation Network**

### **6.1 Introduction**

Florida panthers have increased in number from an estimated 20 – 30 panthers in the 1980s to a current estimate of 80 – 100 animals. Concurrent with the increase in panther numbers, the number killed in collisions with vehicles also has increased since 2000 (Figure 18). Collisions with vehicles are one of the most significant sources of mortality for Florida panthers, but they are human-caused and, therefore, preventable. Annual panther roadkills were 4 or fewer prior to 2000, but these numbers increased ranging from 6 to 11 between 2000 and 2006. This trend continued in 2007 and 2008 with 15 and 10 panthers killed, respectively.

Certain segments of the primary road network in the RLSA impede, obstruct, or alter wildlife movement, in many instances resulting in road-kills (Main and Allen 2003, Smith et al. 2006). A minimum of 31 Florida panthers have been killed or injured in vehicle collisions on roads in the RLSA since 1990, and most of these mortalities occurred on four road segments (Figure 3): 1) SR 29, north of CR 858 (5); 2) SR 29, south of CR 858 (8); 3) CR 846, east of Immokalee (8); and 4) CR 858, from Camp Keais Road to SR 29 (3).

Future development within the RLSA would require the construction of new roads in addition to maintenance and upgrading of existing roads. Nine proposed new roads are of concern because they either bisect or abut important conservation and agricultural areas used by Florida panther and other wildlife.

The following section provides a review of how and to what extent Florida panthers may be affected by the existing and proposed road networks within the RLSA and includes recommendations to avoid or minimize adverse affects.

### **6.2 Methods**

This review includes two elements: 1) a basic assessment of roadway characteristics and traffic volume, and 2) identification of road segments that intersect or abut important resource areas used by the Florida panther.

Location, proposed number of lanes, and traffic volume projections of existing and proposed roads in the RLSA were obtained from WilsonMiller, Inc., Collier County and the FDOT. Datasets used to identify important road segments included Florida panther telemetry and road-kill locations (FWC), least-cost-path model results for Florida panther (Swanson et al. 2005, Kautz et al. 2006), existing and proposed conservation lands (Florida Department of Environmental Protection), HSAs, FSAs, and WRAs designated under the RLSA program (Collier County), PRT-proposed revisions to the RLSA map (Section 2.0), and Primary and Secondary habitat zones for the Florida panther (USFWS).

### **6.3 Results**

The PRT identified 17 segments of existing roads and 24 segments of proposed roads within the RLSA that potentially could impact important resource areas used by the Florida panther (Table 6.3-1). The length of each segment (in miles) was calculated, and lane widths and traffic levels were tabulated.

**Table 6.3-1. A Summary of Roadway Characteristics and Traffic Levels for Existing and Proposed Roads in the RLSA.**

Road	Segment	Segment Length (m)	Miles	Current Number of Lanes	Proposed Number of Lanes	FDOT Actual Daily Trips 2006	FDOT Projected Daily Trips 2011	FDOT Projected Daily Trips 2016	Landowner Projected Daily Trips 2050	Magnitude Increase in Daily Trips (2006-2050)
<b>Existing</b>										
CR <sup>1</sup> 850	South of SR 82 <sup>2</sup>	8,397	5.22	2	6	1,910	Not Applicable	Not Applicable	44,886	23.5
SR <sup>1</sup> 82	West of SR 29	11,274	7.01	2	6	12,200	14,500	Not Applicable	60,994	5.0
SR 29	North of SR 82	3,334	2.07	2	6	6,200	7,100	8,000	23,686	3.8
SR 29	South of SR 82	4,771	2.96	2	6	15,372	19,100	Not Applicable	44,499	2.9
Lake Trafford Road	West of Little League Road	1,440	0.89	2	2	Not Applicable	Not Applicable	Not Applicable	Not Applicable	—
CR 846	East of Immokalee City Limit	11,155	6.93	2	2	1,488	Not Applicable	Not Applicable	4,637	3.1
CR 846	Camp Keais Road to City of Immokalee	3,200	1.99	2	6	10,285	Not Applicable	Not Applicable	40,081	3.9
CR 846	West of Camp Keais Road	10,200	6.34	2	6	5,408	Not Applicable	Not Applicable	42,458	7.9
SR 29	City of Immokalee to CR 858	12,099	7.52	2	4	8,200	8,400	Not Applicable	22,259	2.7
SR 29	South of CR 858	5,673	3.53	2	4	3,000	3,900	4,800	12,997	4.3
Ave Maria Boulevard	CR 858 to Anthem Parkway North	6,164	3.83	2	4	Not Applicable	Not Applicable	Not Applicable	19,125	—
Ave East	In Town of Ave Maria	2,166	1.35	2	4	Not Applicable	Not Applicable	Not Applicable	39,272	—
Camp Keais Road	CR 858 to CR 846	8,030	4.99	2	6	Not Applicable	Not Applicable	Not Applicable	35,235	—
CR 858	West of Camp Keais Road <sup>3</sup>	11,257	6.99	2	6	6,788	Not Applicable	Not Applicable	50,366	7.4
CR 858	Camp Keais Road to SR 29	7,584	4.71	2	4	Not Applicable	Not Applicable	Not Applicable	8,468	—
CR 858	East of SR 29	7,517	4.67	2	2	Not Applicable	Not Applicable	Not Applicable	2,085	—
CR 858	County Line <sup>4</sup>	12,345	7.67	2	2	309	Not Applicable	Not Applicable	2,085	6.7
<b>New</b>										
Immokalee Loop Road	North of CR 846	13,448	8.36	—	4	—	Not Applicable	Not Applicable	10,210	—
Immokalee Loop Road	South of CR 846	5,364	3.33	—	4	—	Not Applicable	Not Applicable	10,201	—
Gopher Ridge	North of Immokalee Circle	3,169	1.97	—	4	—	Not Applicable	Not Applicable	30,668	—
Gopher Ridge	Immokalee Circle to City of Immokalee	3,684	2.29	—	6	—	Not Applicable	Not Applicable	39,511	—
Little League Road	North of SR 82	2,696	1.68	—	2	—	Not Applicable	Not Applicable	3,589	—

Table 6.3-1. Continued.

Road	Segment	Segment Length (m)	Miles	Current Number of Lanes	Proposed Number of Lanes	FDOT Actual Daily Trips 2006	FDOT Projected Daily Trips 2011	FDOT Projected Daily Trips 2016	Landowner Projected Daily Trips 2050	Magnitude Increase in Daily Trips (2006-2050)
Little League Road	SR 82 to Immokalee Circle	4,254	2.64	—	4	—	Not Applicable	Not Applicable	27,270	—
Little League Road	South of Immokalee Circle	9,917	6.16	—	6	—	Not Applicable	Not Applicable	41,679	—
Grove Road	South of SR 82	5,138	3.19	—	4	—	Not Applicable	Not Applicable	14,251	—
Carson Road	North of Immokalee Circle	3,826	2.38	—	2	—	Not Applicable	Not Applicable	3,510	—
Carson Road	Immokalee Circle to City of Immokalee	1,266	0.79	—	4	—	Not Applicable	Not Applicable	15,415	—
Immokalee Circle	East of SR 29	5,389	3.35	—	4	—	Not Applicable	Not Applicable	8,544	—
Immokalee Circle	West of SR 29	5,890	3.66	—	4	—	Not Applicable	Not Applicable	17,617	—
Serenoa Circle	East of CR 846	2,284	1.42	—	4	—	Not Applicable	Not Applicable	12,764	—
Serenoa Circle	West of CR 846	4,894	3.04	—	4	—	Not Applicable	Not Applicable	16,413	—
Serenoa East	Serenoa Circle to CR 846	1,521	0.95	—	4	—	Not Applicable	Not Applicable	14,470	—
Ave Maria Boulevard	North of Anthem Parkway North	3,095	1.92	—	4	—	Not Applicable	Not Applicable	16,771	—
Anthem Parkway	In Town of Ave Maria	5,475	3.40	—	4	—	Not Applicable	Not Applicable	15,000	—
Randall Extension	Big Cypress Parkway to CR 858	3,379	2.10	—	6	—	Not Applicable	Not Applicable	34,320	—
Big Cypress Parkway	In Town of Big Cypress	7,187	4.47	—	4	—	Not Applicable	Not Applicable	26,903	—
Horse Trial	CR 858 to SR 29	3,638	2.26	—	4	—	Not Applicable	Not Applicable	11,205	—
Citrus East	Camp Keais Road to Immokalee Extension	7,795	4.84	—	4	—	Not Applicable	Not Applicable	8,718	—
Citrus West	CR 858 to Immokalee Extension	11,078	6.88	—	4	—	Not Applicable	Not Applicable	17,215	—
Immokalee Extension	CR 846 to SR 29	6,190	3.85	—	6	—	Not Applicable	Not Applicable	23,043	—
Stockade Road	East of SR 29	2,748	1.71	—	4	—	Not Applicable	Not Applicable	6,186	—

<sup>1</sup> CR = County Road; SR = State Road

<sup>2</sup> actual daily trips from 2004

<sup>3</sup> actual daily trips from 2005

<sup>4</sup> actual daily trips from 2001

### **Existing Road Network**

Approximately 105 centerline miles of roads currently exist within the RLSA (excludes local city/town roads); road density is relatively low at 0.32 mi/mi<sup>2</sup> (Table 6.3-1, Figure 19). All existing roads are currently two-lane configurations with traffic levels (on certain segments) as high as 15,000 trips/day (SR 29) and as low as 300 trips/day (CR 858). Most roads in the RLSA have traffic levels well below 10,000 vehicles per day. The FDOT provided some traffic projections for State roads; SR 29 is projected to experience traffic levels of 19,000/day by 2011.

The proposed plan to accommodate anticipated development would include adding lanes to all but four segments of existing roads (Table 6.3-1, Figure 19). Traffic projections at build-out (in 2050) range from 2,000 to 61,000 trips/day. Seven of these road segments could have more than 40,000 trips/day; another four road segments are projected to have over 20,000 trips/day. Even very low-level traffic roads (CR 858 east of Camp Keias Road and east of SR 29, CR 846 east of the City of Immokalee, and SR 29 south of CR 858) are projected to increase significantly over current levels and likely would increase the probability of panther collisions with vehicles (Seiler 2003).

Road mortality and telemetry records (Table 6.3-2, Figures 1 and 3) indicate that panthers have crossed (or attempted to cross) 10 of the 17 existing road segments within the RLSA, and all but two (SR 29 south of SR 82 and Lake Trafford Rd) were crossed multiple times. Least-cost-path results support these findings. Important existing road segments crossed include CR 846 east of Immokalee, CR 846 west of Camp Keias Road, SR 29 north of CR 858, SR 29 south of CR 858, and all segments of CR 858 in the analysis (Figure 18).

The identified road segments also bisect designated HSAs, FSAs, and WRAs, PRT-proposed revisions to the RLSA map, and Primary and Secondary habitat zones for the Florida panther (Table 6.3-3, Figure 20). Two existing roads (SR 82 and SR 29) would divide the proposed northern corridor; also, PRT-proposed modifications to the northern corridor would increase the length of the corridor affected by SR 82. Only CR 850 borders existing conservation lands (Table 6.3-3). A significant number of wildlife roadkills was documented (Main and Allen 2002) on CR 850 adjacent to Corkscrew Marsh, including one Florida panther.

### **Proposed Road Network**

The proposed road network includes 87.5 centerline miles of additional roads (Table 6.3-1, Figure 19). Road density for existing and proposed roads (excludes all city and town streets) would be 0.59 mi/mi<sup>2</sup>, nearly doubling the size of the current road network. All but two of the 24 road segments examined are proposed as four or more lanes wide. Traffic projections on these road segments are expected to range from 3,500 to 41,700 vehicles/day; average traffic level for the proposed roads will be 17,728 vehicles/day.

The PRT also estimated that panthers would have crossed 16 of the 24 proposed roads (Table 6.3-2). Seven would have been crossed multiple times, nine only once (8 of the 9 were occurrences in 1989-1990). Proposed road segments identified that intersect important existing travel routes of panthers include Immokalee Loop Road (SR 29 bypass), Stockade Road (east of SR 29), Horse Trial, Little League Road (south of Serenoa Circle), and Randall Boulevard extension (Figure 20).

Segments of other proposed roads pose threats to more minor travel routes of panthers or encroach on HSAs, FSAs, WRAs, PRT-proposed revisions to the RLSA map, the Corkscrew Marsh and wetlands associated with

**Table 6.3-2. A Summary of Florida Panther Road-kills, Telemetry Path and Least Cost Path Crossings by Road Segment for the RLSA.**

Road	Segment	Miles	Florida Panther Road-kill (1990-2008)	Florida Panther Telemetry Path-Road Crossing (ID-year)	Least Cost Paths Cross
<b>Existing</b>					
CR <sup>1</sup> 850	South of SR 82	5.22	1	None	None
SR <sup>1</sup> 82	West of SR 29	7.01	None	None	3
SR 29	North of SR 82	2.07	None	None	1
SR 29	South of SR 82	2.96	None	28-1989	1
Lake Trafford Road	West of Little League Road	0.89	None	64-1998	None
CR 846	East of Immokalee City Limit	6.93	8	11-2001, 126-2004, 13-1987, 132-2004, 139-2005, 143-2007, 18-1987, 20-1987, 28-1989, 46-1993, 50-1993, 52-1995, 58-1997, 62-1998, 65-2002, 97-2001	4
CR 846	Camp Keais Road to City of Immokalee	1.99	None	None	None
CR 846	West of Camp Keais Road	6.34	3	131-2008, 28-1989, 96-2002	1
SR 29	North of CR 858	7.52	5	11-2001, 131-2006, 135-2006, 154-2007, 31-1994, 52-1994, 59-2000, 97-2001	1
SR 29	South of CR 858	3.53	8	05-1983, 11-2000, 13-1987, 131-2007, 135-2006, 143-2007, 19-1997, 29-1989, 30-1989, 47-1992, 48-2006, 51-1998, 52-1993, 59-1999, 63-2000, 64-1998, 75-2005, 98-2002	None
Ave Maria Boulevard	CR 858 to Anthem Parkway North	3.83	None	None	None
Ave East	In Town of Ave Maria	1.35	None	None	None
Camp Keais Road	CR 858 to CR 846	4.99	None	None	None
CR 858	West of Camp Keais Road	6.99	None	96-2002, 59-2002, 34-1990, 31-1991, 131-2008, 12-1992, 04-1984	1
CR 858	Camp Keais Road to SR 29	4.71	3	106-2002, 11-2000, 12-1992, 131-2008, 135-2006, 154-2007, 19-1997, 31-1993, 48-1992, 51-1998, 52-1993, 59-2002, 66-2000, 75-2000, 97-2001	1
CR 858	East of SR 29	4.67	1	13-1987, 131-2005, 135-2005, 143-2007, 20-1987, 29-1992, 48-2006, 59-2000	2
CR 858	County Line	7.67	2	13-1987, 132-2004, 143-2007, 17-1989, 18-1990, 20-1988, 28-1991, 46-1998, 50-1993, 52-1994, 58-1997, 65-2008	1
<b>New</b>					
Immokalee Loop Road	North of CR 846	8.36	Not Applicable	11-2001, 143-2007, 28-1989, 50-1993, 58-1996, 62-1998, 65-2002,	2
Immokalee Loop Road	South of CR 846	3.33	Not Applicable	143-2007, 52-1994, 58-1997, 65-2002	None
Gopher Ridge	North of Immokalee Circle	1.97	Not Applicable	28-1989, 58-1996, 62-1998	1
Gopher Ridge	Immokalee Circle to City of Immokalee	2.29	Not Applicable	None	None



**Table 6.3-2. Continued.**

Road	Segment	Miles	Florida Panther Road-kill (1990-2008)	Florida Panther Telemetry Path-Road Crossing (ID-year)	Least Cost Paths Cross
Little League Road	North of SR 82	1.68	Not Applicable	None	1
Little League Road	SR 82 to Immokalee Circle	2.64	Not Applicable	28-1989	None
Little League Road	South of Immokalee Circle	6.16	Not Applicable	99-2001	1
Grove Road	South of SR 82	3.19	Not Applicable	28-1989	2
Carson Road	North of Immokalee Circle	2.38	Not Applicable	28-1989	None
Carson Road	Immokalee Circle to City of Immokalee	0.79	Not Applicable	None	1
Immokalee Circle	East of SR 29	3.35	Not Applicable	62-1998	None
Immokalee Circle	West of SR 29	3.66	Not Applicable	28-1989	1
Serenoa Circle	East of CR 846	1.42	Not Applicable	None	None
Serenoa Circle	West of CR 846	3.04	Not Applicable	None	None
Serenoa East	Serenoa Circle to CR 846	0.95	Not Applicable	None	None
Ave Maria Boulevard	North of Anthem Parkway	1.92	Not Applicable	12-1990	None
Anthem Parkway	In Town of Ave Maria	3.40	Not Applicable	None	None
Randall Extension	Big Cypress Parkway to CR 858	2.10	Not Applicable	131-2006, 59-2002, 96-2001	None
Big Cypress Parkway	South of Randall Extension	2.33	Not Applicable	96-2001, 34-1990, 30-1989, 60-1999, 66-1998, tx104-1996	None
Citrus East	Camp Keais Road to Immokalee Extension	4.84	Not Applicable	None	None
Citrus West	CR 858 to Immokalee Extension	6.88	Not Applicable	65-1998	None
Immokalee Extension	CR 846 to SR 29	3.85	Not Applicable	65-1998	None
Horse Trial	From CR 858 to SR 29	2.26	Not Applicable	11-2000, 131-2007, 135-2006, 154-2007, 31-1994, 48-1992, 51-1996, 52-1993, 59-2002, 66-2000, 97-2001	1
Stockade Road	East of SR 29	1.71	Not Applicable	52-1994, 58-1997, 65-2002	None

<sup>1</sup> CR = County Road; SR = State Road

**Table 6.3-3. A Summary of Resource Area Overlap by Road Segment for the RLSA.**

Road	Segment	Miles	Existing Conservation Lands	Proposed Conservation Lands	HSAs	FSAs	WRAs	PRT-Proposed Revisions to RLSA Map	PRT-Proposed North Corridor	Primary Zone	Secondary Zone
<b>Existing</b>											
CR <sup>1</sup> 850	South of SR 82	5.22	3,750 and 9,750	1,250 and 2,250	—	—	—	—	—	6,000, 3,500, and 8,500	3,250, 3,750, and 15,000
SR <sup>1</sup> 82	West of SR 29	7.01	—	—	—	—	—	—	5,000	—	37,000
SR 29	North of SR 82	2.07	—	—	—	—	—	—	—	—	11,500
SR 29	South of SR 82	2.96	—	—	—	—	—	—	—	—	14,500
Lake Trafford Road	West of Little League Road	0.89	—	—	—	—	—	—	—	—	—
CR 846	East of Immokalee City Limit	6.93	—	—	15,000 and 9,000	2,500	—	—	—	36,500	—
CR 846	Camp Keais Road to City of Immokalee	1.99	—	—	—	—	750	—	—	—	10,500
CR 846	West of Camp Keais Road	8.33	—	10,750	1,000 and 5,500	2,750	3,250 and 6,750	3,750 and 6,000	—	3,500 and 26,000	9,000 and 6,000
SR 29	North of CR 858	7.52	—	—	—	—	5,750 and 2,000	23,000	5,500	39,500	7,000
SR 29	South of CR 858	3.53	—	—	6,250	—	—	2,500 and 2,000	—	18,750	—
Ave Maria Boulevard	CR 858 to Anthem Parkway North	3.83	—	—	—	—	—	—	—	7,500 and 2,500	4,000 and 6,000
Ave East	In Town of Ave Maria	1.35	—	—	—	—	—	—	—	—	7,500
Camp Keais Road	CR 858 to CR 846	4.99	—	—	—	—	2,000	—	—	4,000	22,500
CR 858	West of Camp Keais Road	6.99	—	8,000	250 and 4,750	3,750	1,500	—	—	18,000 and 6,250	6,500 and 5,500
CR 858	Camp Keais Road to SR 29	4.71	—	—	2,000	—	9,000	25,000	—	25,000	—
CR 858	East of SR 29	4.67	—	—	3,250 and 1,500	2,250	—	—	—	25,000	—
CR 858	County Line	11.71	—	—	12,250, 7,000, and 4,000	1,500	3,000	—	—	40,000	—
<b>New</b>											
Immokalee Loop Road	North of CR 846	8.36	—	—	—	—	500, 500, 250, 250, 1,000, 500, and 500	—	—	5,250 and 15,500	3,750, 9,500, and 19,000

**Table 6.3-3. Continued.**

Road	Segment	Miles	Existing Conservation Lands	Proposed Conservation Lands	HSAs	FSAs	WRAs	PRT-Proposed Revisions to RLSA Map	PRT-Proposed North Corridor	Primary Zone	Secondary Zone
Immokalee Loop Road	South of CR 846	3.33	—	—	—	—	—	—	—	17,500	—
Gopher Ridge	North of Immokalee Circle	1.97	—	—	—	—	1,250 and 1,000	—	—	—	10,500
Gopher Ridge	Immokalee Circle to City of Immokalee	2.29	—	—	—	—	750	—	—	—	7,000
Little League Road	North of SR 82	1.68	—	—	—	—	—	—	1,500	—	9,000
Little League Road	SR 82 to Immokalee Circle	2.64	—	—	—	—	—	—	—	—	14,000
Little League Road	South of Immokalee Circle	6.16	4,000	2,750 and 4,000	500, 750, 1,000, and 1,000	500 and 750	—	3,750 and 4,000	—	8,000 and 7,250	2,500 and 7,250
Grove Road	South of SR 82	3.19	—	—	—	—	3,750	—	—	13,500	15,750
Carson Road	North of Immokalee Circle	2.38	—	—	—	—	—	—	—	—	12,500
Carson Road	Immokalee Circle to City of Immokalee	0.79	—	—	—	—	—	—	—	—	3,250
Immokalee Circle	East of SR 29	3.35	—	—	—	—	1,000	—	—	—	17,750
Immokalee Circle	West of SR 29	3.66	—	—	—	—	1,500 and 1,000	—	—	2,500	16,500
Serenoa Circle	East of CR 846	1.42	—	—	—	—	—	—	—	—	8,250
Serenoa Circle	West of CR 846	3.04	—	—	—	—	500	—	—	12,000	5,500 and 5,250
Serenoa East	Serenoa Circle to CR 846	0.95	—	—	—	—	—	—	—	2,500	500 and 2,250
Ave Maria Boulevard	North of Anthem Parkway	1.92	—	—	—	—	2,000	6,500	—	9,750	—
Anthem Parkway	In Town of Ave Maria	3.40	—	—	—	—	—	—	—	6,000 and 3,750	11,500 and 500
Randall Extension	Big Cypress Parkway to CR 858	2.10	—	—	—	—	7,250	—	—	8,250	—
Big Cypress Parkway	South of Randall Extension	2.33	—	—	—	—	2,000 and 2,500	—	—	12,500 and 1,500	10,750
Citrus East	Camp Keais Road to Immokalee Extension	4.84	—	—	—	—	—	250	—	1,500, 2,000, and 2,000	6,500, 1,250, and 7,500
Citrus West	CR 858 to Immokalee Extension	6.88	—	—	—	—	1,250 and 2,500	—	—	15,500	1,750 and 20,750

**Table 6.3-3. Continued.**

Road	Segment	Miles	Existing Conservation Lands	Proposed Conservation Lands	HSAs	FSAs	WRAs	PRT-Proposed Revisions to RLSA Map	PRT-Proposed North Corridor	Primary Zone	Secondary Zone
Immokalee Extension	CR 846 to SR 29	3.85	—	—	—	—	—	—	—	—	20,250
Horse Trial	From CR 858 to SR 29	2.26	—	—	—	—	500	n/a	—	11,750	—
Stockade Road	East of SR 29	1.71	—	—	—	—	—	—	—	8,500	—

Notes: Each value represents an occurrence (in linear feet) where a road crosses or is adjacent to the respective features; figures are approximate and rounded to nearest 250 ft

<sup>1</sup> CR = County Road; SR = State Road

Lake Trafford, and Primary and Secondary habitat zones for the Florida panther (Tables 6.3-2 and 6.3-3, Figure 20).

Planning for all new roads constructed within the RLSA should attempt to avoid bisecting HSAs, FSAs, WRAs, and areas the PRT recommends for protection. All new roads should be designed to minimize the loss or fragmentation of panther habitat if no alternative routes that avoid panther habitat exist. The PRT identified five examples where impacts could be avoided. FDOT has proposed three planning corridors as alternatives for the SR 29 bypass: eastern, central and western planning corridors (Figure 21). An alignment within the central planning corridor would be preferable from an ecological perspective; it avoids all significant wetlands and would affect less panther habitat important to panthers. The eastern segment of Stockade Road would be unnecessary with the realignment of Immokalee Loop (SR 29 Bypass) to the central planning corridor (Figure 21). The PRT has recommended consideration of additional preservation to protect the SSSL as an important habitat segment for Florida panthers; construction of Horse Trial Road within this area would greatly diminish value of the SSSL as habitat for Florida panthers (Figure 20). The proposed alignment of Little League Road (south of Serenoa Circle) and Ave Maria Boulevard (proposed north extension) would effectively separate two large, valuable, supporting wetland-habitat areas from Camp Keais Strand (Figure 20). Little League Road (north of SR 82) would cross over the proposed northern corridor if constructed (Figure 20).

### **Wildlife Crossings**

Analyses of road-kill data for the Florida panther, similar to studies for other species (Huijser et al. 2007, Gilbert and Wooding 1994), were useful (along with telemetry data and landscape characteristics) for identifying potential locations for wildlife crossings within the RLSA. The PRT identified significant segments of four existing roads where wildlife crossings or alternative effective measures (e.g., Roadside Animal Detection Systems [RADS]) should be considered to reduce the occurrence of road-kills and maintain connectivity between resource areas (Figure 20). These include Immokalee Road (CR 846), Oil Well Road (CR 858), SR 29, and SR 82. These results are supported by Logan and Kautz (2006), Smith et al. (2005), and a proposal by representatives of the landowners (Figure 3).

Several wildlife crossing designs have been implemented and proven effective at reducing the occurrence of vehicle related mortalities of panthers on I-75, SR 29 and CR 850 (Foster and Humphrey 1995, Land and Lotz 1996). As such, several designs are available for application to minimize transportation effects on panthers that may exist within the RLSA. Three crossings are currently in the planning/design phase: two on CR 858 in the Camp Keais Strand and another is planned for CR 846, east of Immokalee. Wildlife crossings should only be constructed in areas where the landscape on either side of the road is in some form of permanent protection.

The function of wildlife crossings and other mechanisms to facilitate safe crossing of transportation corridors by panther and other wildlife is enhanced by proper use of fencing that directs animals toward the crossings and away from the road surface and associated traffic (Huijser et al. 2007). Fencing specifications such as type, height, and distance that it extends away from the crossing vary based on site details and requirements of the species it is intended for protection.

## **6.4 Discussion**

The magnitude of the proposed development and associated traffic projections on most of these roads will convert much of this area from rural to urban in character. The extent of proposed increases in lane widths

and traffic could detrimentally affect wildlife through increased risk of wildlife-vehicle collisions and increased aversion to roads resulting in altered movement patterns, habitat use and behavioral changes (Brody and Pelton 1989, Forman et al. 2003, Seiler 2003, Smith 2003, Huijser et al. 2007).

These projections stress the need to make informed decisions regarding construction of roads in areas that may impact panthers. Planning should focus on impact avoidance, minimization, and mitigation, in that order. The need for incorporating wildlife crossings at selected locations on new and existing road construction projects should be evaluated early in the planning stages of the transportation project, preferably prior to the Project Development and Environment (PD&E) phase. Once a determination is made that a wildlife crossing is required, details of the site design and structure specifications can be determined in the PD&E phase. Transportation planners should consult with state and federal wildlife and land management agencies when making decisions regarding the need, location, and design of wildlife crossing structures.

Roads, in some cases, may border resource areas of high value on one side with lands of lower habitat value on the other. These areas may require fencing or other measures to prevent wildlife-vehicle collisions. Specific areas where future development may result in the need for fencing are CR 850, Little League Road and Grove Road (adjacent to the CREW lands), Immokalee Loop Road (north and south of CR 846), Serenoa Circle and Serenoa Circle East adjacent to the large water retention area (connected to Camp Keais Strand) east of Camp Keais Road (Figure 20).

## **6.5 Conclusions**

Eight existing road segments were identified where wildlife crossings or other proven alternative measures should be considered to reduce the occurrence of panther mortality and maintain connectivity between resource areas. These include where CR 846 and CR 858 bisect Camp Keais Strand and OK Slough, on CR 858 just west of SR 29 and along the Hendry County Line, and on SR 29 north and south of CR 858. Creation of a northern corridor will require that wildlife crossings be installed on SR 82 and SR 29.

Segments of twelve proposed roads could significantly fragment, degrade, or encroach on important habitat and movement corridors of the Florida panther, including

- Big Cypress Parkway and the Randall Boulevard extension,
- Little League Road (north connection to County Line Road and south of Immokalee Circle),
- Ave Maria Boulevard (proposed northern extension),
- Serenoa Circle (west of Serenoa Circle East),
- Serenoa Circle East,
- Horse Trial,
- Immokalee Loop Road north and south of CR 846,
- Stockade Road (eastern segment), and
- Grove Road.

The PRT recommends relocation/alternative alignments for four of these proposed road segments:

- Immokalee Loop Road north of CR 846 (SR 29 bypass),
- Immokalee Loop Road south of CR 846 (SR 29 bypass),

- Serenoa Circle, and
- Serenoa Circle East.

The PRT proposes a no-build alternative for five others:

- Horse Trial,
- Little League Road (northern connection to County Line Road),
- Stockade Road (eastern segment),
- Little League Road (south of Serenoa Circle), and
- Ave Maria Boulevard (proposed northern extension).

### **General Recommendations**

- Construction of new roads that bisect public conservation lands, HSAs, FSAs, WRAs, or areas recommended by the PRT for additional protection should be avoided.
- Plans for construction of new roads through or adjacent to public conservation lands, HSAs, FSAs, WRAs or areas recommended by the PRT for additional protection, should be designed to minimize habitat impacted.
- Wildlife crossings and fencing should be evaluated for existing road upgrades and new road projects in accordance with Local, State and Federal regulations and through the use of generally accepted standards and guidelines for identifying need, design and construction.
- Wildlife crossings should only be constructed in areas where the landscape on either side of the road is in some form of permanent protection unless site-specific circumstances suggest otherwise.
- Wildlife crossings and other technologies of proven design and effectiveness should be incorporated where appropriate.
- Mitigation for road project impacts that occur within the RLSA should be provided within the RLSA.

## 7.0 Evaluation of Proposed Corridors

### 7.1 Introduction

The Collier County RLSA is strategically located between three major areas used by Florida panthers: CREW, FPNWR/BCNP, and OSSF. Florida panthers currently have the ability to move among these areas, but maintaining connectivity within and among these panther habitats is essential to the long-term viability of the panther population (Morrison and Boyce 2008). HSAs, FWAs, and WRAs have been designated within the RLSA to protect areas of high resource value; these areas also are known to be used by Florida panthers and other listed species. However, these areas do not fully address the need to protect panther movement pathways within and through the RLSA to adjacent areas of high importance to panthers. Therefore, the Landowners have proposed two wildlife movement corridors within the RLSA to accommodate future panther movements.

The Landowners' proposed south corridor, referred to by the PRT as the SSSL, would preserve a connection between FPNWR and the Okaloacoochee Slough flowway (and ultimately to OSSF) by preserving existing panther habitat north of the FPNWR, west of SR 29 through Summerland Swamp and across SR 29 near Owl Hammock (Figure 22). This area has been used by several Florida panthers over the past two decades.

A proposed northern corridor would connect CREW to the OSSF through active citrus groves, WRAs, Open Lands, and some remnant native upland habitats (Figure 15). Establishment of this corridor would involve some habitat restoration and would cross both SR 82 and SR 29 north of Immokalee.

### 7.2 Summerland Swamp Habitat Linkage

The Landowners' proposed SSSL connects the FPNWR through approved SSA 10 and land designated as an HSA south of CR 858 to the Okaloacoochee Slough system to the north. The northern terminus of SSSL abuts the western side of SR 29 near Owl Hammock. CR 858 marks the southern terminus of the proposed linkage, but panther movements continue south through natural habitats associated with an HSA and SSA 10 and ultimately to FPNWR.

Since 1992, 17 radio-collared Florida panthers (6 females, 11 males) have utilized SSSL between Owl Hammock and CR 858. One female panther (FP66) denned within SSSL in December 1999. Panther use within the SSSL, as indicated by telemetry data, is concentrated within Summerland Swamp south to CR 858 and in the Horse Trial grounds northwest of the intersection of SR 29 and CR 858 (Figure 23). These data show that panthers successfully cross SR 29 at two locations: 1) at the Owl Hammock curve of SR 29; and 2) near a southeast extension of the Summerland Swamp approximately 1.5 miles north of CR 858 (Figure 23). Additionally, eight Florida panthers (since 2000) have been killed by vehicles in failed attempts to cross SR 29 and CR 858 at various locations adjacent to the SSSL; half of these deaths were juvenile panthers between three and eight months of age (Table 7.2-1).

These data clearly indicate that the SSSL area not only functions to facilitate panther movements but also constitutes a portion of male and female panther home ranges.

An Agricultural Preservation Area that coincides with the Big Cypress ACSC east of SR 29 has been proposed as a component of the FPPP. The PRT understands that these Agricultural Preservation Areas will



**Table 7.2-1 Florida Panthers Killed by Vehicles on State Road (SR) 29 and County Road (CR) 858 Within the Summerland Swamp Habitat Linkage Since 2000.**

<b>Date</b>	<b>PantherID</b>	<b>Sex</b>	<b>Age (years)</b>	<b>Location</b>	<b>Cause</b>
2/28/2000	K76	M	3 months	CR 858, 1 mile west SR 29	Vehicle
5/25/2003	UCFP53	F	2-3	SR29, 1.4 miles north of CR858	Vehicle
6/3/2003	UCFP54	M	8-10 months	SR29, 1.7 miles north of CR858	Vehicle
11/2/2003	UCFP59	M	3-4 months	CR 858, 1.2 miles west of SR 29	Vehicle
10/25/2004	UCFP69	F	2	SR 29, 2.5 miles N of CR 858	Vehicle
12/1/2004	UCFP70	F	1	SR 29 at Owl Hammock Curve	Vehicle
6/19/2005	UCFP75	M	2	SR 29 at Owl Hammock Curve	Vehicle
11/28/2008	UCFP114	F	4	CR858, 1 mile east of Camp Keais Rd	Vehicle

be maintained as agricultural lands and will be protected from more intensive land uses. Florida panthers currently use this mosaic of agriculture and native habitats, and, therefore, these preservation areas should serve to ensure the long-term functionality of the eastern destination for the SSSL.

The Landowners' proposed corridor west of SR 29 is comprised of 65% designated WRA and 35% areas designated as Open Land. Land cover types within these WRAs and Open Lands are primarily cypress swamps and agriculture, respectively. Habitat restoration will be necessary in portions of the corridor currently in agricultural use to increase the amount of acceptable cover for Florida panther. The Landowners' proposed SSSL does not protect the Horse Trial area, and only a single location is proposed for panthers to cross SR 29. The PRT recommends that additional areas consisting of native land cover and agriculture be protected within the SSSL to allow this area to continue to function as occupied panther habitat into the future (Figure 23). A mechanism that provides incentives to designate this area under an appropriate form of preservation is warranted.

### **7.3 North Corridor**

The proposed North Corridor (Figure 15) would be a restoration project within the RLSA, whereby a connection between CREW and OSSF would be re-established through an area dominated by agriculture, primarily citrus production. The greater CREW area, comprised of state lands, Audubon's Corkscrew Swamp Sanctuary, Lee County preserves, and lands preserved through the Collier County RLSA program, is roughly 40,500 acres. This area is bordered by I-75 to the west, SR 82 to the north and CR 846 to the south (Figure 24). The greater CREW area is currently occupied by both male and female panthers. However, panthers can only move into and out of the area via the CKS to the south. A three-year-old male panther (FP155) was documented traveling along the proposed North Corridor, north of SR 82, lending credibility to the future utility of this restoration project.

The greater CREW area is largely a dead-end destination for panthers and probably, at best, could support fewer than ten panthers at any given time. Recruitment and dispersal, key mechanisms for ensuring genetic exchanges among the entire panther population, are compromised by the restricted access into the CREW. By creating a new connection between the CREW and Okaloacoochee Slough, panthers would be able to travel through CKS from the south and through the new corridor to the north and east. Panther use of the proposed North Corridor is likely to be less than the use of larger habitat blocks more typical within a panther's home range. Nevertheless, the corridor could offer a potential benefit to the panther population as a whole because the corridor could maintain and improve gene flow within the occupied range.

The PRT recommends the following design principles be considered in the restoration of a functional corridor: 1) broad approaches should be included at either end to create a "funneling" effect; 2) habitat nodes along the corridor should be preserved or created to act as stopovers or stepping stones; and 3) adequate buffers along the corridor should be established to avoid negative edge effects (i.e., increased risk of human/panther interactions, disturbance from human and domestic animal presence, noise and artificial lighting in adjacent areas, overall reduction in functionality due to proximity of hostile habitat). The PRT recognizes that a corridor with these characteristics will be comprised of native habitat and agricultural land uses. In fact, preservation of existing agricultural land uses could provide quality corridor buffers. The PRT does note, however, that the northern edge of the corridor is also the northern boundary of the RLSA and Collier County, so buffering under RLSA and FPPP guidelines would only apply along the corridor's southern edge. Nevertheless, we suggest that similar measures be implemented to protect the integrity of the corridor from the Hendry County side.

Data on the lengths and widths of corridors used by Florida panthers are generally lacking. The PRT analyzed existing panther telemetry data to quantify the dimensions of corridors used by Florida panthers as an aid to reviewing the proposed North Corridor. Movement patterns of two male Florida panthers (i.e., FP130, FP131) were measured by using Hawth's Analysis Tools (version 3.27) to create lines from time-series hourly GPS-collar telemetry records. Telemetry records and movement paths were overlaid on 2004 aerial photography, and nine areas were located where panthers appeared to have used linear landscape features on a repeated basis to move from one patch of larger habitat to another. Length was estimated by digitizing a multi-segment line along the approximate center of each linear feature, and width was estimated by digitizing a series of lines at random intervals perpendicular to the axis of each corridor. The termini of width lines were located visually from landscape features in relation to telemetry records. Metrics concerning the average lengths, widths, and width:length ratios of the corridors were quantified. The center line of each corridor was buffered to create 462-foot- and 4,835-foot-wide corridors, the average minimum and maximum widths of the nine corridors. The relative importance of land cover features within the corridors was quantified by extracting 2004 land use/land cover data within the average minimum and maximum buffers, calculating acreages of land cover types, and comparing acreages of vegetation types within core corridor areas to acreages within the larger buffer along the corridors.

The PRT found that corridors used by panthers averaged 5.1 miles in length and ranged between 1.97 and 8.38 miles in length. The land cover types within corridors used by GPS-equipped male panthers were principally forest and grassland/pasture (80-90% of the area) and the corridors had more area of forest habitats near their centerlines (Table 7.3-1). In comparison, citrus groves dominate the landscape in and surrounding the proposed North Corridor, and forest and grassland/pasture cover types constitute less than 30% of the area. These results are not surprising because the North Corridor is intended to be a restoration component of the FPPP, not the preservation of an existing corridor. Also considered in the review of the North Corridor were the following recommendations made by Beier (1995) for corridor widths for pumas in a California setting of wild lands surrounded by urban areas: 1) corridors less than 0.5 mile in length should be greater than 328 feet wide; 2) corridors with lengths in the range of 0.62 - 4.35 miles in length should be 1,312 feet wide; and 3) corridor width should increase as length increases.

The PRT revised North Corridor is a linear landscape feature comprising approximately 3,178 acres that are predominantly in agricultural uses (Table 2.3-1). The PRT recommends that the minimum width of the north corridor should be increased from 600 feet to 1,200 feet. This increase allows for the interior core of the corridor to be buffered from the affects of future developments likely to occur adjacent to the corridor. The recommended increase in the minimum width also is more consistent with Beier's (1995) recommendation that corridors up to 4.35 miles long should be at least 1,320 feet wide. Although the PRT revised North Corridor is approximately 10.5 miles in total length, the distances between nodes of existing habitat average approximately 0.5 miles in length and ranged between 0.15 - 0.85 mile in length ( $N=12$ ). The total length of the proposed North Corridor is significantly greater than the 4.35-mile length suggested by Beier (1995) as the maximum length for corridors with a width of 1,312 feet. However, the PRT North Corridor has a mean width of 2,276 feet ( $n = 17$ ;  $s = 446$  ft.). This mean width is greater than the mean width of 1,884 feet for nine corridors used by panthers wearing GPS collars (Table 2.3-2). The PRT also recommends that the North Corridor should include two islands of existing natural habitat that could serve as additional stepping stones for panthers that may eventually utilize the corridor.

The eastern terminus of the corridor was revised to include multiple points of entry to increase the likelihood of eventual use by panthers moving among large patches of protected habitat including OSSF and HSAs, FSAs,



and WRAs at the east end of the corridor. The western terminus of the north corridor has been increased to approximately 1,800 feet wide to improve the likelihood that panthers using the CREW area could eventually find the corridor entrance. The corridor was located such that it crosses SR 82 between the intersections of CR 850 and the proposed Grove Road. This location is designed to allow sufficient distance for a grade increase between the intersections as needed to accommodate a future underpass constructed to FDOT specifications for road design. The PRT recommended design also includes buffer areas along the east and north sides of CREW to further ameliorate the affects of future intensive human developments on the west entrance to the corridor. Existing agricultural operations could continue adjacent to natural habitats in the entrance and exit areas of the corridor as long as the integrity of natural wetlands and uplands leading to the corridor are maintained.

Some initial restoration will be required to connect the habitat nodes or stepping stones. Identifying existing farm roads, dikes or other linear features between these nodes and then enhancing them with native vegetation would be the most practical form of restoration. The importance of existing patches of natural habitat and the proposed restoration of stepping stones of natural habitats along the proposed corridor is demonstrated by the predominance of natural cover types within the core areas of nine corridors used by Florida panthers (Table 2.3-3). Panthers are known to frequently use dirt roads and trails (Beier 1995). The North Corridor passes currently through a predominately agricultural landscape; from a panther perspective, there would be little to distinguish the corridor boundaries. If the agricultural lands are converted to other uses in the future, increased restoration within the corridor would become necessary. This restoration should be planned with future management needs in mind (exotic plant control, prescribed fire); a combination of native forests and grasslands is recommended.

### **Recommendations**

- Current land uses at both ends of the corridor should remain in agriculture and future intensification of land use in these areas should be discouraged. These agricultural lands and WRAs, some of which are already in designated SSAs, will have significant value in directing panther movement into the corridor. Restoration of the corridor approach areas to native cover types would be even more beneficial to encouraging use of the corridor. Existing native habitats along the corridor were identified that should also be protected because they would function as habitat nodes within the corridor.
- A minimum corridor width of 1,200 feet comprised of existing agricultural lands and habitat nodes is recommended. If future development is planned adjacent to the corridor, land uses should be designed along a gradient of more intensive uses to less intensive uses as the corridor boundary is approached. Design elements such as perimeter lakes or fencing may be appropriate to discourage panther movements into new developments. Ultimately, if the surrounding agricultural lands are destined for development, habitat restoration within the PRT corridor boundary will become necessary to ensure future use by panthers.
- Restoration activities should focus on connecting habitat nodes within the corridor. Panthers will travel along farm roads, dikes, ditches and trails, so identifying and enhancing these existing features within the corridor would be advantageous. Vegetative cover should exist along the prospective path and could be comprised of native trees and other plant species. Citrus groves could complement native cover as well as provide added buffer adjacent to the corridor.

Agricultural operations could continue on farm roads that comprise a panther pathway. Some habitat nodes are in need of restoration, primarily in the form of providing for vegetative cover; habitat nodes with existing native vegetation should be managed to maintain existing cover. If the citrus operations are stopped within the corridor, the groves should be restored with a combination of native forest and grassland/pasture.

These recommendations are intended to increase the probability that a proposed North Corridor will successfully facilitate movements by Florida panthers and other wildlife within and through the RLSA. Restoration efforts needed to establish a successful corridor should be approached from an adaptive management perspective. The PRT recommends continual monitoring prior to, during, and after construction of the corridor to determine actual use of the corridor and to design and implement changes, if necessary, to improve its functionality.

## **8.0 Paul J. Marinelli Florida Panther Protection Fund**

### **8.1 Introduction**

The Parties have established the Paul J. Marinelli Florida Panther Protection Fund (Panther Fund) to receive and facilitate funding for implementation of conservation actions within the RLSA that are intended to assist implementation of the FPPP and conservation of the Florida panther. They further have proposed an additional conservation measure for implementation within the RLSA that would provide funds for deposit into the Panther Fund generally associated with the generation and utilization of PHUs from SSAs or other designated/approved conservation lands within the RLSA.

The Parties propose to deposit funds into the Panther Fund that would be derived from the sale and use of PHUs for mitigation for project impacts and for sale and resale of residential housing within the RLSA. A rural landowner would make a contribution to the Panther Fund in an amount of 1) 10% of the sale price of the PHU for each PHU transferred or sold to third persons for use as mitigation or 2) the lesser of \$75 or 10% of fair market value for each PHU used internally or as part of a joint venture by a rural landowner for mitigation purposes. Those PHUs may be used as mitigation for project impacts within or outside the RLSA. Deposit of that amount would be made at time of transfer or sale of a PHU to a third party to satisfy mitigation that is specified as a condition of project authorization. The deposit for internal use of approved PHUs by a landowner would be phased, with one-third of the amount due to be deposited upon issuance of an ACOE permit (Section 7 of the ESA) or other federal authorization (Section 10 of the ESA), and the remaining two-thirds of the amount due would be deposited within 90 days of the first Certificate of Occupancy being issued for a residential or commercial facility within the approved project. The Parties also propose that a fee of \$200 be imposed on each sale of residential housing (both initial and resale) to occur within the RLSA. All deposits would be made to and administrated by the Wildlife Foundation of Florida (within the FWC) as governed by a Board of Directors that would be comprised of selected representatives of the Parties.

The Parties estimate that approximately \$150 million dollars may be generated for deposit into the Panther Fund for management through 2050. Uses proposed for these funds include the following:

- Restoration of panther habitat.
- Establishment and creation of buffers to minimize undesirable human/panther interactions.
- Determination of appropriate locations and construction of wildlife crossings to minimize the occurrence of panther mortalities resulting from collisions with motor vehicles along public transportation corridors.
- Acquisition of habitat demonstrated to be important to panther protection and management.

### **8.2 Conclusions**

Management programs typically are designed and recommended for implementation without thought for funds that will be required to support management or, even more importantly, the mechanisms for generating the required funds. The Parties, in this case, have proposed a mechanism that would both generate needed management funds and serve as an additional incentive for landowners to commit important habitats of the Florida panther for perpetual conservation and benefit to the species.

Although explanation was provided in the available documents for how and when funds would be deposited into the Panther Fund on a per PHU use and/or sale basis, it was not clear how or when PHU values would be approved and/or established as available for sale and use, other than for individual projects for which federal authorization would be requested under Sections 7 or 10 of the ESA. Management action is needed now to most expediently benefit and assist conservation of the Florida panther. Therefore, essential funding for those actions should be generated and approved for qualifying management actions at the earliest convenience. This will require that a mechanism be established for assessment and necessary agency approval of PHU values for early dedication of lands for conservation within the RLSA, independent of and prior to agency authorization of proposed development and associated mitigation. PHUs approved in this manner for preserved lands would be available for use or sale at anytime in the future, dependant upon necessary authorization for use of such PHUs as mitigation on a project-by-project basis. The mechanism also would provide an incentive for landowners to dedicate lands for conservation now regardless of when and if approved PHUs would be used and/or sold in the future. Early approval of PHUs for use and sale would also potentially accelerate deposit of payments into the Panther Fund for timely management use.

### **8.3 Recommendations**

The following general recommendations are intended to improve the utility of the Panther Fund and timely application of received funds for conservation action:

- A mechanism should be designed and implemented to facilitate early assessment and authorization of PHU values for future use and/or sale as an incentive for landowners to dedicate additional valuable habitats for the Florida panther for perpetual conservation and management early on and independent of future project-related mitigation needs. This will encourage more timely preservation of valuable habitat and generation of management funding.
- The Panther Fund should not be used to finance land management activities that would be implemented to satisfy conditions or authorizations for project-related impacts to Florida panthers and/or their habitats (i.e. residential or commercial developments, construction and/or upgrading public transportation corridors, etc.).
- The Panther Fund should consider conservation actions proposed within the RLSA as first priority for funding but not limit expenditures for approved conservation actions within other important habitats of the Florida panther outside the RLSA.
- Payments into the Panther Fund should not be considered an alternative to habitat preservation.

Conservation actions the PRT recommends for Panther Fund support include but are not limited to the following:

- Construction of wildlife crossings with fencing at recommended locations where approved project-related funding sources (i.e. conditions of agency authorization) are not available. Wildlife crossing and fencing should be of designs with proven success at facilitating safe movements of Florida panthers and other wildlife across public transportation corridors with reduced occurrence of animal mortality. Experimental designs for wildlife crossings and other technologies that would facilitate safe movements of Florida panthers across public transportation corridors may be approved for installation and evaluation, with expected success.
- Acquisition of key landscape features or parcels to complement broader management actions (i.e. corridors, buffers, lands adjacent to wildlife crossings, key linkages, etc.) where other funding sources are not available.



- Habitat restoration to complement other management where such restoration has not been required as a condition of agency authorization for land development activities (i.e. Agricultural Preservation lands that are no longer used for agriculture and/or where habitat restoration may be voluntarily implemented to enhance prey base and panther cover and access to prey).
- Habitat management or restoration activities on public lands (fee title or easements) where funding is limited and where such investments would provide more immediate enhancements to panther conservation.
- Research and monitoring of the RLSA Program, proposed conservation measures and related management actions to provide evaluation and design for adaptive management within the RLSA and for other areas outside the RLSA and within the functional range of the Florida panther. Research that would be conducted under the normal responsibility of agencies or as conditions of agency authorizations for land development projects should not be candidates for Panther Fund support. Research methods and results should be transparent.

## 9.0 Proposed New Interchanges for Interstate 75

### 9.1 History of Alligator Alley Conversion to Interstate 75

The portion of I-75 known as Alligator Alley connects Collier and Broward counties and was constructed from 1988 – 1992. This project was the culmination of more than 20 years of planning that examined projected population growth, expected traffic levels, alternative corridors, access issues and environmental concerns. Authorization for the expansion of I-75 was provided by the 1968 Federal Highway Act (FDOT, Final Environmental/Section 4(f) Statement, 1972), and designs were completed for the portion of I-75 from Tampa to a point south of Fort Myers. However, further planning for the remaining link between Fort Myers and Fort Lauderdale in 1970 was suspended pending resolution of a route across the peninsula. An Environmental Study Panel was assembled in August 1970 to provide recommendations on alternative routes across the peninsula as well as recommendations to limit the impact of the proposed interstate on natural resources. This panel submitted its findings in September 1971, and its recommendations provided the basis for selecting the Alligator Alley corridor as the final portion of I-75 between Naples and Ft. Lauderdale.

Access to I-75 along the Alligator Alley portion was recognized as a potential detriment to surrounding sensitive ecosystems. Improved access to undeveloped lands was identified as a secondary impact of this project in the Final Environmental/Section 4(f) Statement (FDOT 1972, page 17). Therefore, limited access to this portion of I-75 was a deliberate decision to minimize this impact. Specific language in the Environmental/Section 4(f) document states: “The major purpose of the east-west length of this I-75 project is to provide fast, safe, and efficient transportation across South Florida, *not to improve transportation and accessibility for the intermediate land areas. Interchanges would be limited as previously described*” (page 19, emphasis added). Only four interchanges were included in this segment of I-75: 1) CR 951; 2) SR 29; 3) Indian Reservation Road (Snake Road); and 4) US 27. Subsequent to this report, the SR 29 interchange was removed from the project because of Florida panther concerns. This interchange was ultimately included in the project once specific conditions intended to prevent development along SR 29 and to provide safe passage for panthers across SR 29 were put into place. Clearly, the possibility for later inclusion of new interchanges was not built into the original planning for this portion of I-75.

Significant conservation lands inhabited by panthers have been acquired along I-75 since its construction: BCNP and Fakahatchee Strand State Preserve were acquired in 1974; the FPNWR was created in 1989; the majority of Picayune Strand State Forest was acquired by 2003. Within the Primary Zone for panthers (Kautz et al. 2006), conservation lands are present on either side of I-75 for 38 miles. Just to the east of Naples, conservation lands are present for 10.5 miles along the south side of I-75. The lands north of I-75 to the east of Naples include northern Golden Gate Estates and the North Belle Meade; both of these areas are regularly used by panthers. These acquisitions have certainly minimized the likelihood of secondary impacts to panther habitat identified during the original planning for the I-75 corridor but they have not completely eliminated them.

### 9.2 Overview of Two Proposed Locations for New Interstate 75 Interchange

Two locations for a potential new interchange have been discussed: 1) Everglades Boulevard in north Golden Gate Estates and 2) between DeSoto Boulevard and the FPNWR. Everglades Boulevard is a north-south road that serves northern Golden Gate Estates and has an existing overpass across I-75. The

conceptual second interchange would be approximately two miles east of Everglades Boulevard and would require that a new road be constructed through the Collier RLSA. The northern terminus of this new road would be at Randall Boulevard and the Town of Big Cypress.

Panthers currently occupy Primary Zone habitat north of I-75 between the FPNWR westward into the North Belle Meade including the northern Golden Gate Estates. The functionality and contiguity of this panther habitat would be compromised by either of the two proposed interchange locations. Improved access to hundreds of undeveloped residential lots in Golden Gate would lead to more residences within areas occupied by panthers and, over time, the portion of north Golden Gate Estates within the Primary Zone may be lost as panther habitat. If panthers no longer can use Golden Gate, the only remaining link to the Primary Zone habitat within North Belle Meade would be from the south out of Picayune Strand State Forest requiring panthers to cross I-75. No dedicated wildlife crossings or protective fencing exist along this segment of the interstate but some panthers have learned to use an existing bridge to safely cross beneath the highway.

The road corridors that lead to a new interchange would face some significant design challenges with respect to accommodating panther movements. Road projects elsewhere have incorporated wildlife crossings and barrier fencing to manage human and wildlife safety issues but these tools are only effective for long-term conservation if substantial property on either side of the highway has been permanently protected. There is no current conservation acquisition program within North Golden Gate Estates. Therefore, including wildlife crossings into the design for either Everglades Boulevard or the conceptual new eastern road could not adequately accommodate movements of panthers between the Collier RLSA and North Belle Meade without also preserving lands within North Golden Gate Estates. Barrier fencing could only be considered along the new conceptual eastern road as a way to prevent panthers from crossing the highway from FPNWR and accessing Golden Gate Estates. However, barrier fencing would also lead to unwanted side effects such as trapping black bears, deer, panthers and other wildlife within Golden Gate Estates as they move eastward from the North Belle Meade. Finally, the conceptual eastern interchange access road would be built primarily through lands designated as HSAs, FWAs and WRAs within the Collier RLSA and would result in a “take” of panther habitat.

### **9.3 Recommendation**

The PRT recommends that the conceptual new interchange within the Collier RLSA boundaries receive no further consideration based on the projected loss of existing panther habitat required for constructing a new road and the overall cumulative impacts this alternative would have on the surrounding Primary Zone panther habitat. The PRT also cautions that an interchange at Everglades Boulevard, as proposed without preservation of the lands between the Collier RLSA and North Belle Meade, would impact the Collier RLSA by reducing the availability of panther habitat to the west of the RLSA boundary.

## 10.0 Summary of Conclusions and Recommendations

Florida panther habitat typically was conserved or enhanced prior to the creation of the 2002 Collier County RLSA through land acquisition (fee simple or easements) or through mitigation. These approaches achieved some levels of long-term preservation on portions of occupied panther habitat but they seldom worked in unison over a larger landscape nor did they take into consideration that panther conservation is compatible with rural land uses such as agriculture and production of large livestock. The 2002 RLSA is a voluntary program that encompasses nearly 200,000 acres of northeastern Collier County. Areas were assigned to one of four RLSA land use categories based on their natural resource values (primarily wetland and wildlife habitat qualities). A credit-based system was then created such that new developments were entitled only after areas with high natural resource values were preserved. The PRT found that the RLSA credit system preserved more acres of panther habitat than the USFWS Methodology would require. This fact alone demonstrates that the 2002 RLSA program enhances panther conservation when compared to existing regulatory processes.

The Parties developed new conservation measures during the five-year review of the Collier County RLSA that are proposed by the Parties as either modifications to the RLSA program or the FPPP. These measures generally consist of the following: 1) the Paul J. Marinelli Florida Panther Protection Fund; 2) additional mitigation for impacts to Primary Zone habitat; 3) maintenance of an existing corridor and the creation of a new corridor; and 4) an Agricultural Preservation component. The PRT believes that the greatest enhancement for panther conservation would result from an Agricultural Preservation component that could successfully steer development away from areas with high panther value identified by the PRT (Section 2). The PRT proposes that the Parties adopt a strategy to avoid, minimize, and mitigate impacts to panther habitat in the Primary Zone; however, if this approach is successful, it may reduce financial deposits into the Panther Fund and provide a minimal amount of additional mitigation. The PRT concludes that preserving existing panther habitat is far more valuable than generating funds or providing more mitigation for impacts to the Primary Zone. Finally, the creation of a North Corridor would be a panther conservation enhancement, but only if its design is robust enough to ensure use by panthers as future land use changes occur.

The PRT was given the charge of evaluating whether or not the additional conservation measures the Parties propose for implementation within the RLSA would represent a panther conservation enhancement over the status quo. The PRT believes that the existing RLSA program plus the additional measures proposed as the FPPP would be an enhancement over the existing regulatory processes and that, if its recommendations are incorporated, the conservation value to panthers would be increased further. However, the PRT also recognizes that the on-going loss of panther habitat within the occupied range as well as the loss of potential habitat within the historic range conflicts with Florida panther recovery. Therefore, the PRT makes a clear distinction in its assessment of enhancements to panther conservation within the RLSA over the status quo versus the conservation implications of habitat loss and fragmentation within the occupied range of the Florida panther. The PRT also recognizes that the conclusions and recommendations resulting from these analyses may have economic implications for landowners and others, but an analysis of economic impacts of the FPPP was beyond the PRT's scope of work.

The PRT's conclusions and recommendations concerning the proposed conservation measures and associated issues follow.

### **10.1 Proposed Revisions to the Rural Lands Stewardship Area Map**

- Public lands, approved as SSAs, future SSAs, and recommended for preservation consideration by the PRT would result in the preservation of 140,922 acres (71.9% of the RLSA).
- The additional areas the PRT recommends for preservation consideration (Figure 13) were strategically identified to best complement the habitats that will contribute to the conservation of the panther within the RLSA and southwest Florida.
- The combined preservation of these lands will result in the preservation of core habitat areas and adjacent buffers, provision of corridors to connect occupied habitats on public lands, and minimize future habitat fragmentation within the RLSA.
- The lands remaining available for development would be sufficient to accommodate the proposed cap of 45,000 acres and impact only 2,084 acres of Primary Zone panther habitat.
- The PRT recommends that future development occurs first in Open Lands that are within the Secondary Zone before lands within the Primary Zone are considered for conversion to urban uses.

### **10.2 Analysis of Additional Mitigation Proposed for Impacts to the Primary Zone**

- The PRT's analyses show that more panther habitat would be preserved by the RLSA Stewardship Credit system than by the USFWS Methodology, even after including the proposed 25% increase in PHUs for impacts to the Primary Zone.
- More PHUs exist on SSAs than are needed to fulfill USFWS mitigation requirements; therefore, the unused PHUs could be banked for future use. The 25% increase in PHUs for Primary Zone impacts would reduce, but not eliminate, those unused PHUs.
- The PRT cautions that using unused PHUs generated from designated SSAs to mitigate panther habitat loss outside of the RLSA conflicts with Florida panther conservation.
- The PRT acknowledges that the proposed 25% increase in mitigation of Primary Zone impacts would result in a commensurate increase in revenues for deposit within the Panther Fund

### **10.3 Analysis of Panther Habitat Units Generated from Stewardship Sending Areas**

- The PRT finds that the existing RLSA program will preserve more acres of significant panther habitat through generation of stewardship credits than could be accomplished using the USFWS Methodology. Therefore, use of the USFWS Methodology provides no additional conservation benefit when compared to the RLSA program.
- More PHUs exist on Stewardship areas than are needed to fulfill USFWS mitigation requirements; therefore, the unused PHUs could be banked for future use.
- The PRT cautions that using unused PHUs generated from designated Stewardship areas to mitigate for panther habitat loss outside of the RLSA would be detrimental to panther conservation.
- Sale of proposed unused PHUs for uses outside the RLSA would have the potential to compromise the economics associated with the establishment of Florida Panther Conservation Banks in other important areas of the panther's range.

#### **10.4 Agricultural Preservation Proposal**

- The PRT identified specific areas currently designated as Open Lands within the RLSA both inside and outside the Big Cypress ACSC that have natural resource value and could contribute to Florida panther conservation by maintaining the spatial extent and integrity of existing panther habitat.
- The PRT finds that an Agricultural Preservation designation of RLSA Open Lands that the PRT identified as important to panthers would accomplish the following: 1) provide certainty that future uses of those lands would be restricted at no greater than existing uses; 2) remove the potential for those lands to be developed at 1 unit per 5 acres; and 3) preserve the value of these lands to conservation of the Florida panther in perpetuity.
- The PRT recommends that any proposed changes to the Stewardship Credit system include an incentive-based mechanism that directs future SRA development away from and steers preservation towards those agricultural lands identified by the PRT as having value to panthers.

#### **10.5 Evaluation of Proposed Core Public Transportation Network**

- The PRT recommends that transportation planners avoid constructing new roads that bisect HSAs, FSAs, WRAs or areas identified by the PRT for additional protection.
- The amount of habitat impacted should be minimized if construction of a new road through HSAs, FSAs, WRAs or an area recommended by the PRT for protection can not be avoided.
- Wildlife crossings and fencing should be constructed of proven designs other than in those cases where installation of experimental new designs may be appropriate for evaluation.
- Wildlife crossings should only be constructed in areas where the landscape on either side of the road is in some form of permanent protection, unless site-specific circumstances suggest otherwise.
- Mitigation for road projects within the RLSA should occur within the RLSA.

#### **10.6 Evaluation of Proposed Corridors**

- The PRT recommends that additional areas consisting of native land cover and agriculture be protected within the SSSL to allow this area to continue to function as occupied panther habitat.
- The PRT recommends that the following three design principles be considered for restoration of a functioning North Corridor: 1) broad approaches should be planned at either end to create a “funneling” effect; 2) habitat nodes along the corridor should be preserved or created to act as stopovers or stepping stones; and 3) adequate buffers should be established along the corridor to avoid negative edge effects (e.g., increased risk of human/panther interactions, disturbance from human and domestic animal presence, noise and artificial lighting in adjacent areas, overall reduction in functionality due to proximity of hostile habitat).
- The PRT recommends a redesign of the North Corridor that follows the same general alignment as the corridor proposed by the Landowners with the exception of the corridor’s western terminus.

- Current land uses at both ends of the North Corridor should remain in agricultural uses or restored to native land covers, and future intensification of land use in these areas should be discouraged.
- Existing native habitats along the PRT revised North Corridor should be protected because they would function as native habitat nodes within the corridor.
- The PRT recommends a minimum corridor width of 1,200 feet comprised of existing agricultural lands and native habitat nodes.
- Habitat restoration within the PRT revised North Corridor should focus first on connecting habitat nodes along the entire length of the corridor.
- The PRT recommends continual monitoring prior to, during, and after construction of the revised North Corridor to determine actual use of the corridor and to design and implement changes, if necessary, to improve its functionality.

### **10.7 Paul J. Marinelli Florida Panther Protection Fund**

- The Parties have established the Paul J. Marinelli Florida Panther Protection Fund (Panther Fund) to support Florida panther conservation actions and, in particular, those actions where no funding was available previously. Revenues would be generated from a proposed PHU transaction fee as well as a proposed transaction fee on residential housing sales (new and existing) within the RLSA. The PRT believes that the Panther Fund will benefit conservation efforts as long as the fund is not considered as an alternative to habitat preservation.
- The PRT recommends that Panther Fund revenue should not be used for project-related mitigation such as funding a wildlife crossing for a new road project.
- Conservation actions within the RLSA should receive priority for use of Panther Fund revenues but the use of revenues should not be restricted to the RLSA.
- Habitat acquisition (fee simple or easements), habitat restoration, wildlife crossings and monitoring of FPPP conservation measures would be acceptable uses of the Panther Fund.

### **10.8 Proposed New Interchanges for Interstate 75**

- It is the opinion of the PRT that construction of an interchange with I-75 at either Everglades Boulevard or between DeSoto Boulevard and the FPNWR could compromise the functionality and contiguity of the habitats along the north side of I-75 that are used by panthers to travel between North Belle Meade and the FPNWR.
- The PRT recommends that the conceptual interchange between DeSoto Boulevard and FPNWR receive no further consideration based on the projected loss of existing panther habitat required for constructing a new road and the overall cumulative impacts this alternative would have on the surrounding Primary Zone panther habitat.
- The PRT stresses that significant design challenges exist if an interchange with I-75 at Everglades Boulevard receives further consideration. These challenges include the following:
  1. Preventing the isolation of Primary Zone panther habitat in the North Belle Meade;
  2. Preserving movement corridors between North and South Belle Meade and between North Belle Meade and FPNWR;

3. Facilitating safe panther movements across I-75 and Everglades Boulevard;
4. Minimizing the potential for human-panther interactions in the northern Golden Gate Estates; and
5. Ensuring that these panther considerations are compatible with the needs of other wildlife species.

#### **10.9 Evaluation of 45,000-Acre Development Cap**

- The Parties have proposed a 45,000-acre development cap as one of the added conservation measures of the FPPP within the RLSA. The proposed development cap would be a good measure to provide certainty that additional development that is theoretically possible under existing conditions (2002 baseline) within the RLSA does not occur. Such certainty does not currently exist.
- The Stewardship Credits that could be generated if all HSAs, FSAs and WRAs are designated and approved as SSAs will only support 43,000 acres of development; so, additional SSAs will be necessary to entitle the remaining 2,000 acres of development under the proposed cap. Agriculture Preservation within the areas identified by the PRT could be a source of additional Stewardship Credits.
- The existing RLSA program would allow for 43,000 acres of development through credits transferred from SSAs, and an additional 44,000 acres could be developed at one unit per five acres if the 45,000-acre cap were not implemented.

#### **10.10 Mining Activities within the Rural Lands Stewardship Area**

- Mining is a land use that results in the direct loss of panther habitats. Mining may also have secondary impacts as the water bodies remaining at the end of mining operations may provide attractive amenities for future waterfront developments that may further result in the loss of panther habitats.
- The PRT recommends that mining should be a prohibited land use in areas of the RLSA identified for additional protection by the PRT.
- The PRT views mining as a form of development, and acreages of future mine lands should be deducted from the 45,000-acre development cap proposed for the RLSA.



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