

Habitat Loss and the Florida Panther

Florida Panther Recovery Criteria Review Team

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Habitat Loss Over Time

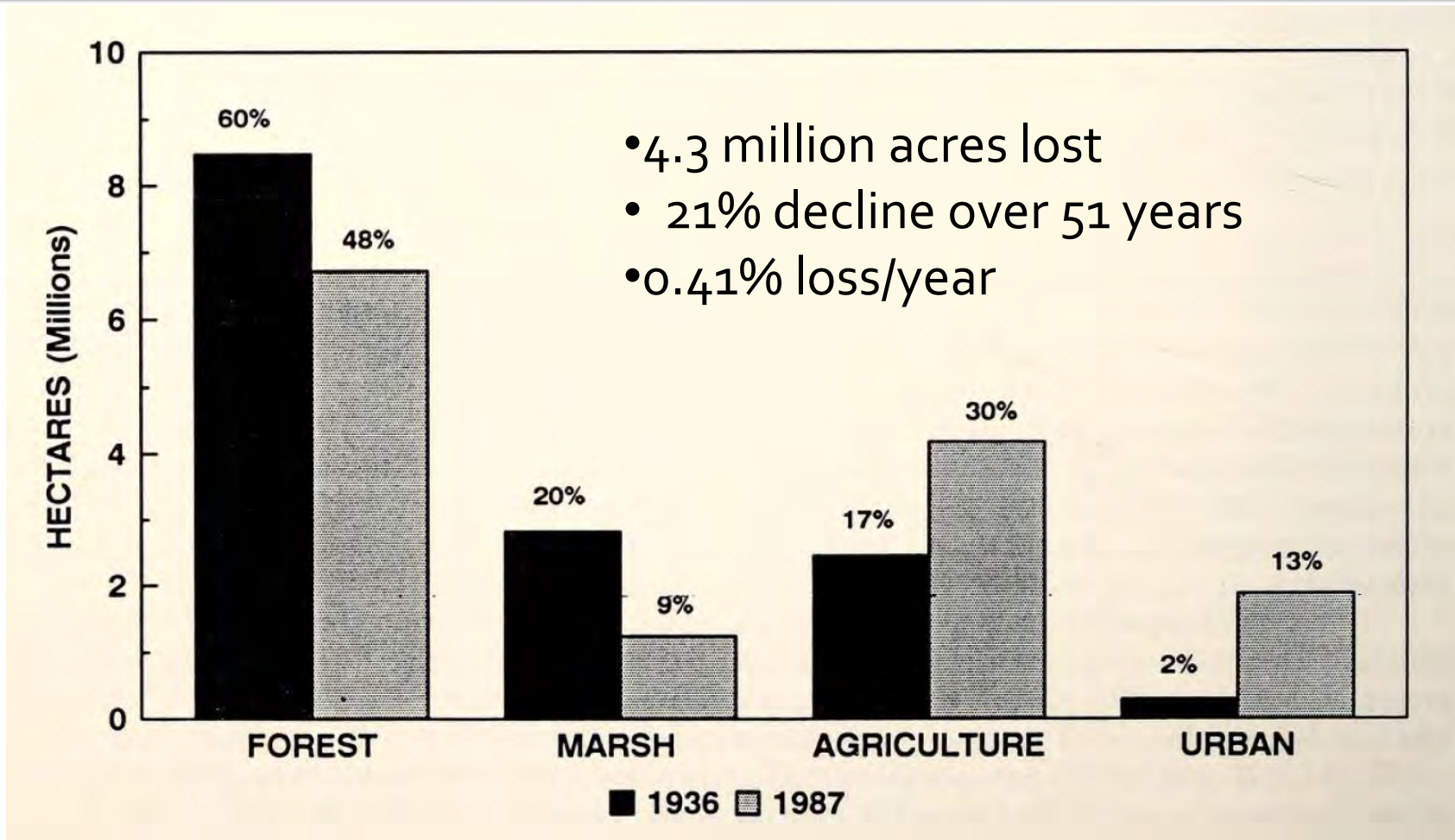
- Past

- Florida and South Florida: 1936-1987
- Statewide Change Detection: 1987-2003
- Cooperative Land Cover Data: 2003-2015

- Future

- Developments on the Books: DRI, PUD, Sector Plan, HCP
- UF 2060 Growth Model

Florida Forests 1936-1987

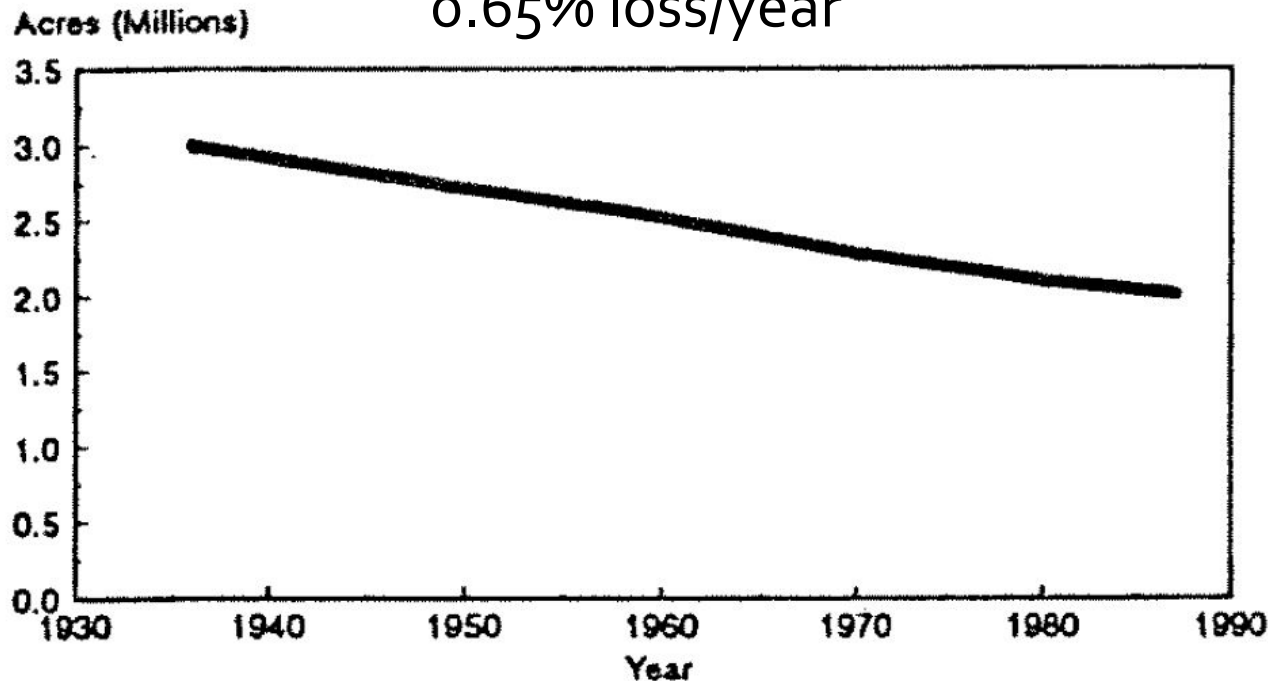


Source: Kautz, R. 1993. Trends in Florida wildlife habitat 1936-1987. Florida Scientist 56(1):7-22.
(Based on an analysis of USFS Forest Inventory Assessment data).

South Florida Forests 1936-1987

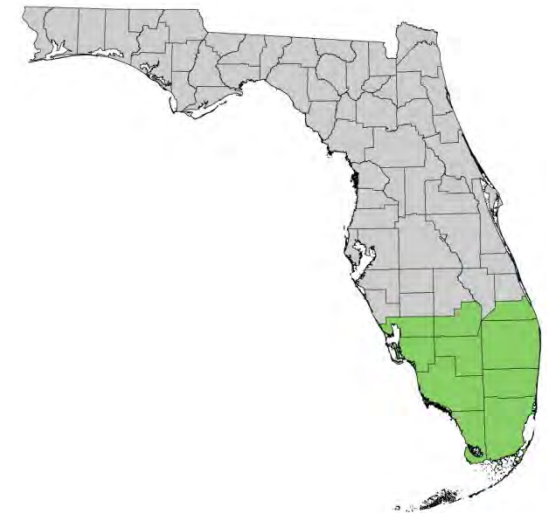
Forest Area in South Florida
33% Decline in 51 Years - 0.98 Million Acres Lost

0.65% loss/year



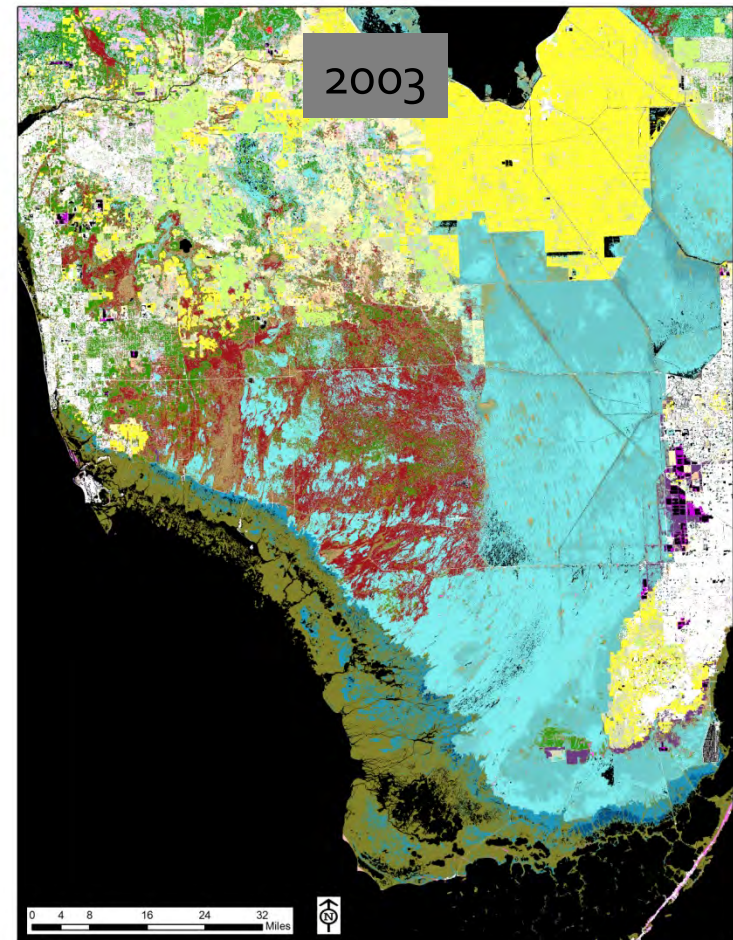
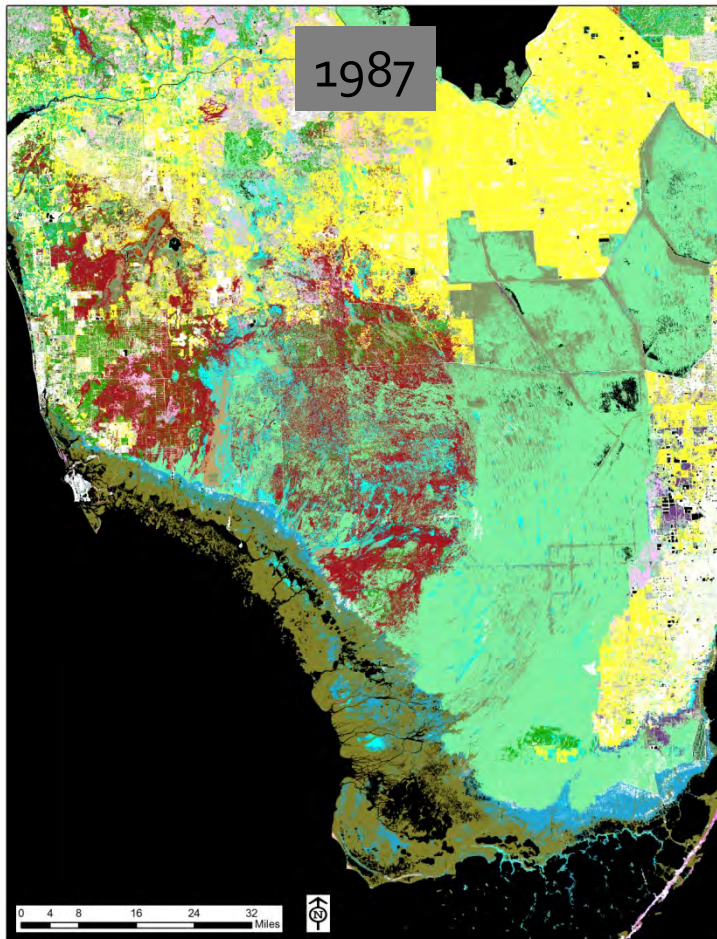
Ten Counties:

Charlotte, Glades, Lee,
Hendry, Collier, Martin,
Palm Beach, Broward,
Miami-Dade, Monroe



Source: Kautz, R. 1994. Historical trends within the range of the Florida panther. Pages 285-296 in Jordan, D. B., editor. Proceedings of the Florida panther conference. Florida Panther Society, Inc.

Change Detection 1987-2003



Source: Kautz, R., B. Stys, R. Kawula. 2007. Florida vegetation 2003 and land use change between 1985-89 and 2003. *Florida Scientist* 70(1):12-23.

Change Detection Classifications to Account for Differences in Dates

■ Natural Cover Types:

- Pinelands
- Forested Wetlands
- Upland Hardwoods
- Dry Prairie
- Shrub and Brushland
- Shrub Swamp
- Freshwater Marsh and Wet Prairie
- Scrub
- Coastal Salt Marsh
- Mangroves

■ Conversion Classes:

- Natural to Agriculture
- Natural to Urban/Developed
- Agriculture to Urban/Developed
- Natural to Water

**Primary Zone
1987-2003**

Change Type	Acres
Natural to Agriculture	55,883
Natural to Developed	3,952
Agriculture to Developed	11,745
Natural to Water	30,744
Total Change	102,324
Loss of Natural Habitat	90,579

0.28% loss of natural
habitats per year

0 3 6 12 18 24
Miles



- Primary Zone
- Conservation Lands
- Water
- Change Detection 1987-2003**
- Agriculture to Urban/Developed
- Natural to Agriculture
- Natural to Urban/Developed
- Natural to Water

**Adult Breeding
Habitat
1987-2003**

Change Type	Acres
Natural to Agriculture	45,611
Natural to Developed	1,987
Agriculture to Developed	8,252
Natural to Water	11,841
Total Change	67,691
Loss of Natural Habitat	59,439

0.30% loss of natural
habitats per year

0 3 6 12 18 24
Miles



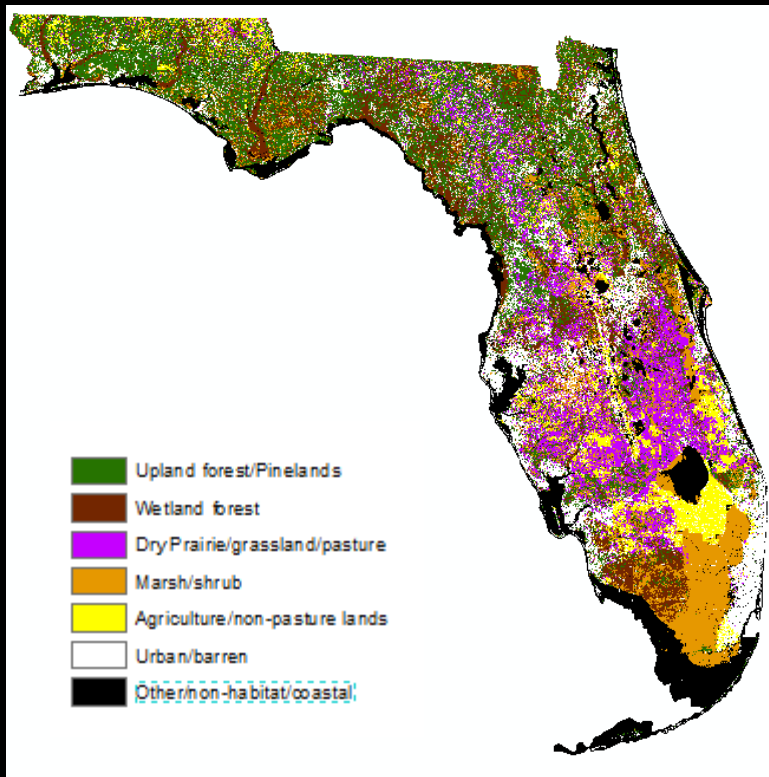
- Adult Breeding Habitat
- Conservation Lands
- Water
- Change Detection 1987-2003**
- Agriculture to Urban/Developed
- Natural to Agriculture
- Natural to Urban/Developed
- Natural to Water

FWC Land Cover Data 2003 and Cooperative Land Cover Map 2015

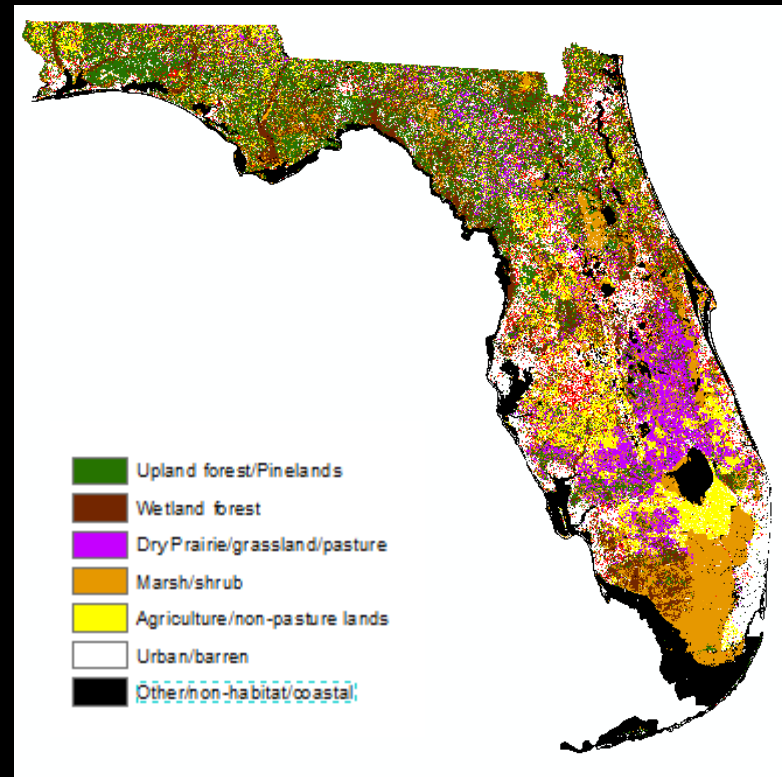
- Analyses by Dr. Robert Kawula (FWC)
 - Presented to Panther Recovery Implementation Team Meeting April 2016
 - Compares FWC 2003 land cover data with Cooperative Land Cover Map data for 2015
 - Primary, Secondary, and Dispersal Zones
- Analyses by Randy Kautz (unpublished data)
 - Obtain source data layers from Robert Kawula
 - Clip to Primary Zone and Adult Breeding Habitat

Panther Habitat Reclassification

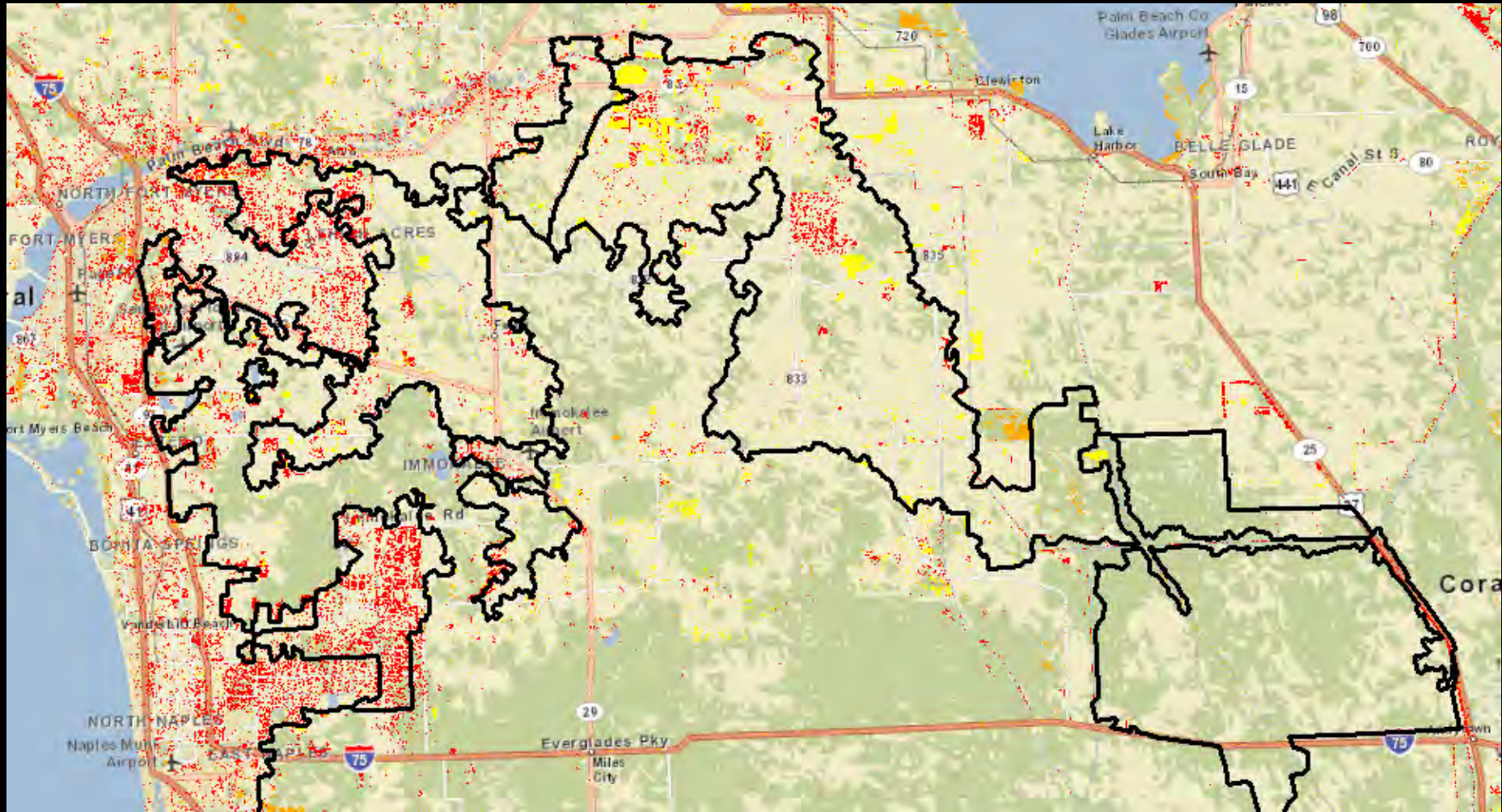
FWC 2003



CLC



Habitat Change (2003-2015)

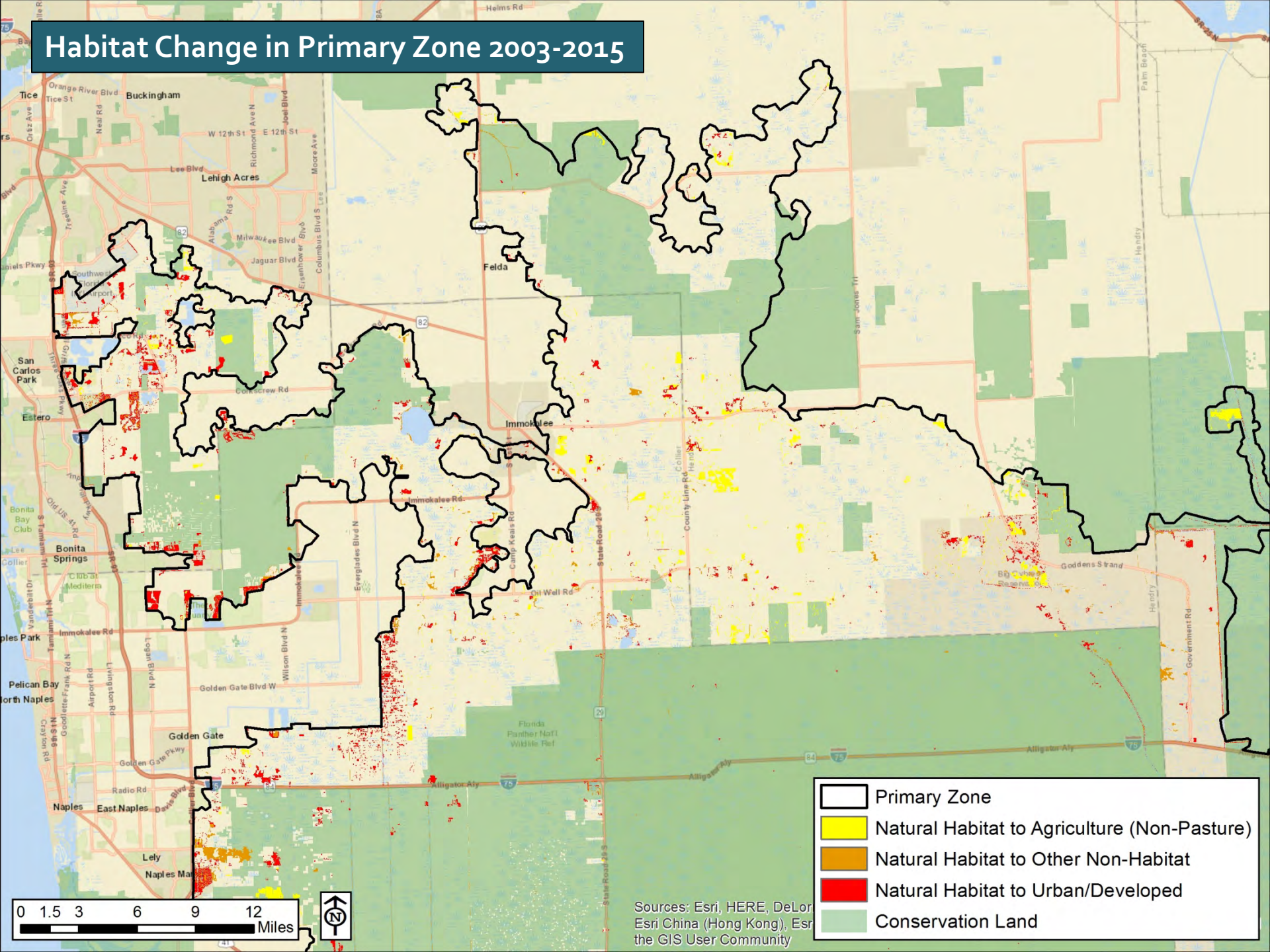


Natural Habitat → Agriculture (non-pasture) Natural Habitat → Urban/Developed Natural Habitat → Other Non-habitat

Difference between 2003 and current CLC 2015 (ac)

Habitat Type	Primary	Secondary	Dispersal	Total difference
Upland Forest	-23372	-12480	-526	-36377
Wetland Forest	-136677	-3433	594	-139517
Open grassland/pasture	1737	-25331	306	-23288
Marsh/shrub/scrub	130613	3333	-215	133731
Agriculture	288	297	-256	330
Urban/developed	15035	31953	-773	46215
Other	12376	5661	-182	17855

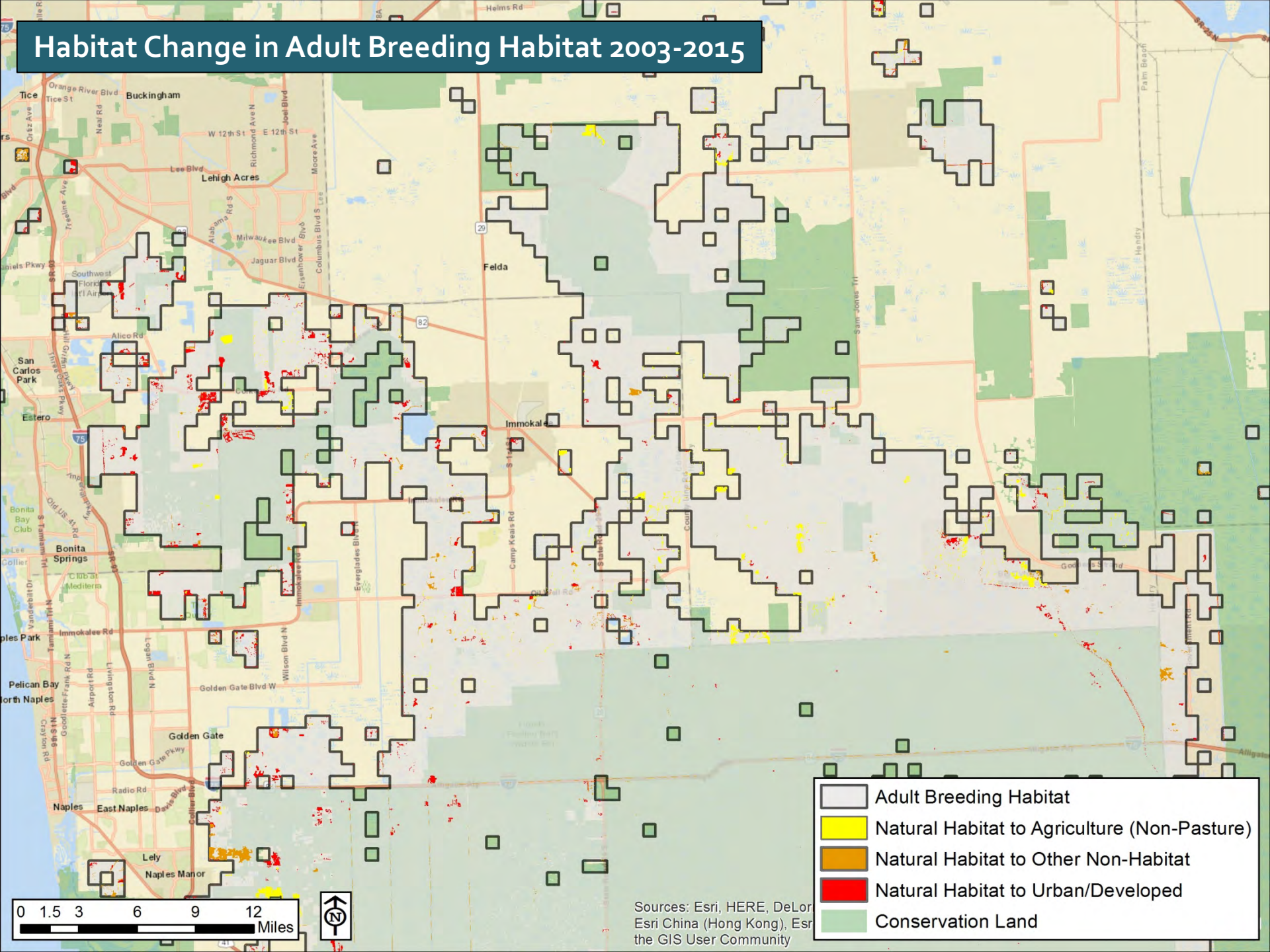
Habitat Change in Primary Zone 2003-2015



Panther Habitat Change in the Primary Zone: 2003-2015

Major Cover Types	2003 Acres	2015 Acres	Difference Acres	Percent Change	Percent Per Year
Upland Forest/Pinelands*	143,003	119,636	-23,367	-16.34	-1.36
Wetland Forest*	661,820	525,145	-136,676	-20.65	-1.72
Dry Prairie/Grassland/Pasture*	129,320	131,070	1,750	1.35	0.11
Agriculture (Non-pasture)	63,989	64,295	306	0.48	0.04
Marsh/Shrub*	1,131,893	1,262,502	130,609	11.54	0.96
Coastal Wetlands/Other Non-habitat	81,019	93,394	12,375	15.27	1.27
Urban/Barren	44,805	59,808	15,003	33.48	2.79
Total	2,255,850	2,255,850	-	-	-
*Natural and Semi-natural	2,066,036	2,038,353	-27,684	-1.34	-0.11

Habitat Change in Adult Breeding Habitat 2003-2015



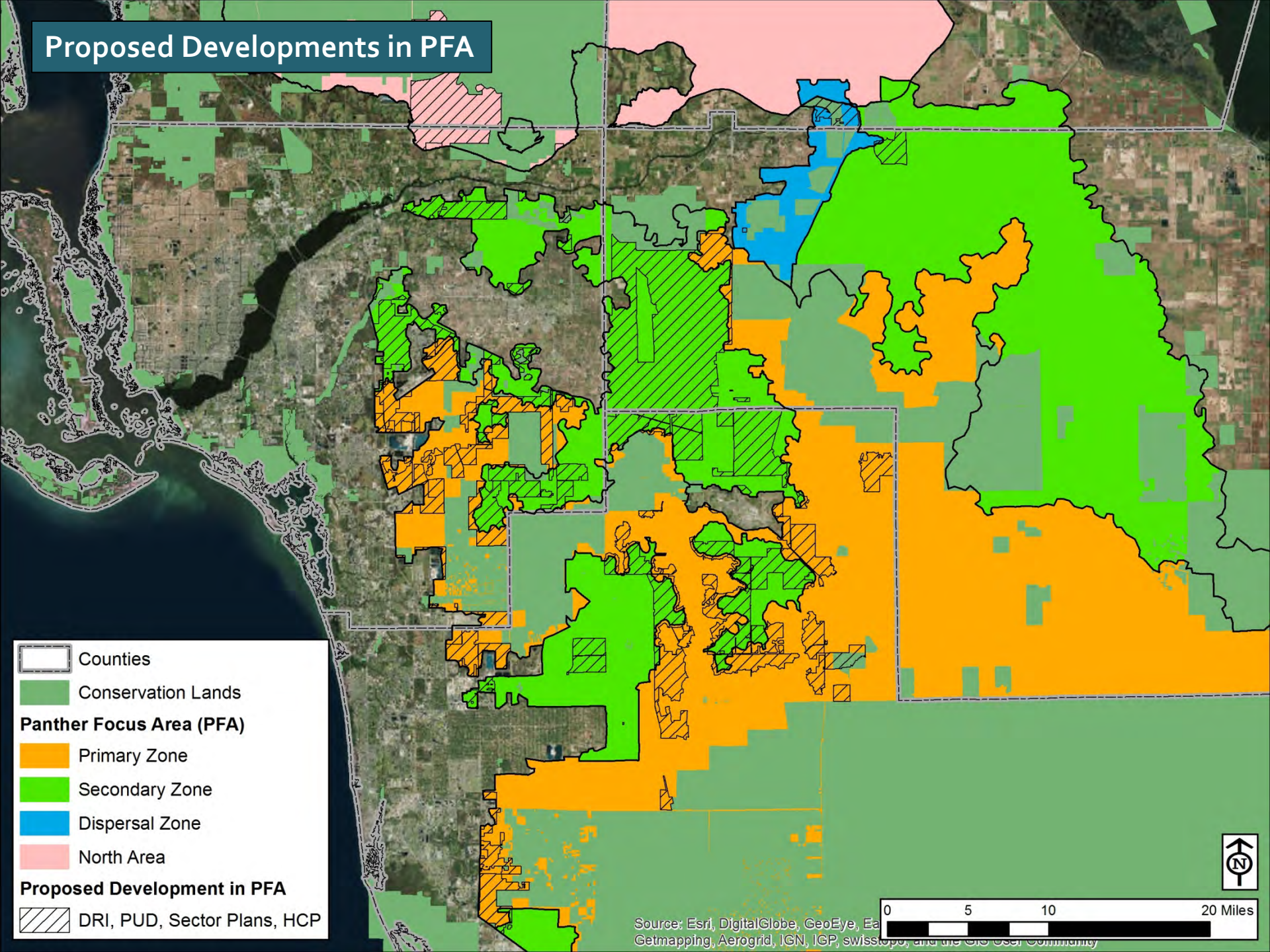
Panther Habitat Change in Adult Breeding Habitat: 2003-2015

Major Cover Types	2003 Acres	2015 Acres	Difference Acres	Percent Change	Percent Per Year
Upland Forest/Pinelands*	131,561	113,462	-18,100	-13.76	-1.15
Wetland Forest*	610,596	493,929	-116,666	-19.11	-1.59
Dry Prairie/Grassland/Pasture*	96,041	101,606	5,566	5.80	0.48
Agriculture (Non-pasture)	43,460	43,737	277	0.64	0.05
Marsh/Shrub*	441,636	556,748	115,112	26.06	2.17
Coastal Wetlands/Other Non-habitat	20,510	26,773	6,263	30.54	2.54
Urban/Barren	26,003	33,551	7,548	29.03	2.42
Total	1,369,807	1,369,807	-	-	-
*Natural and Semi-natural	1,279,834	1,265,745	-14,089	-1.10	-0.09

Future Loss of Panther Habitat: DRIs, PUDs, Sector Plans, HCP

- Proposed Developments on the Books
 - Developments of Regional Impact (DRI)
 - Planned Unit Developments (PUD)
 - Sector Plans
 - Habitat Conservation Plan (East Collier RLSA)
- Methods
 - Union development shape files with Panther Focus Area and Adult Breeding Habitat
 - Calculate area lost to future development by area
 - Estimate panther impacts using density estimates
- Randy Kautz, unpublished data

Proposed Developments in PFA



Counties

Conservation Lands

Panther Focus Area (PFA)

Primary Zone

Secondary Zone

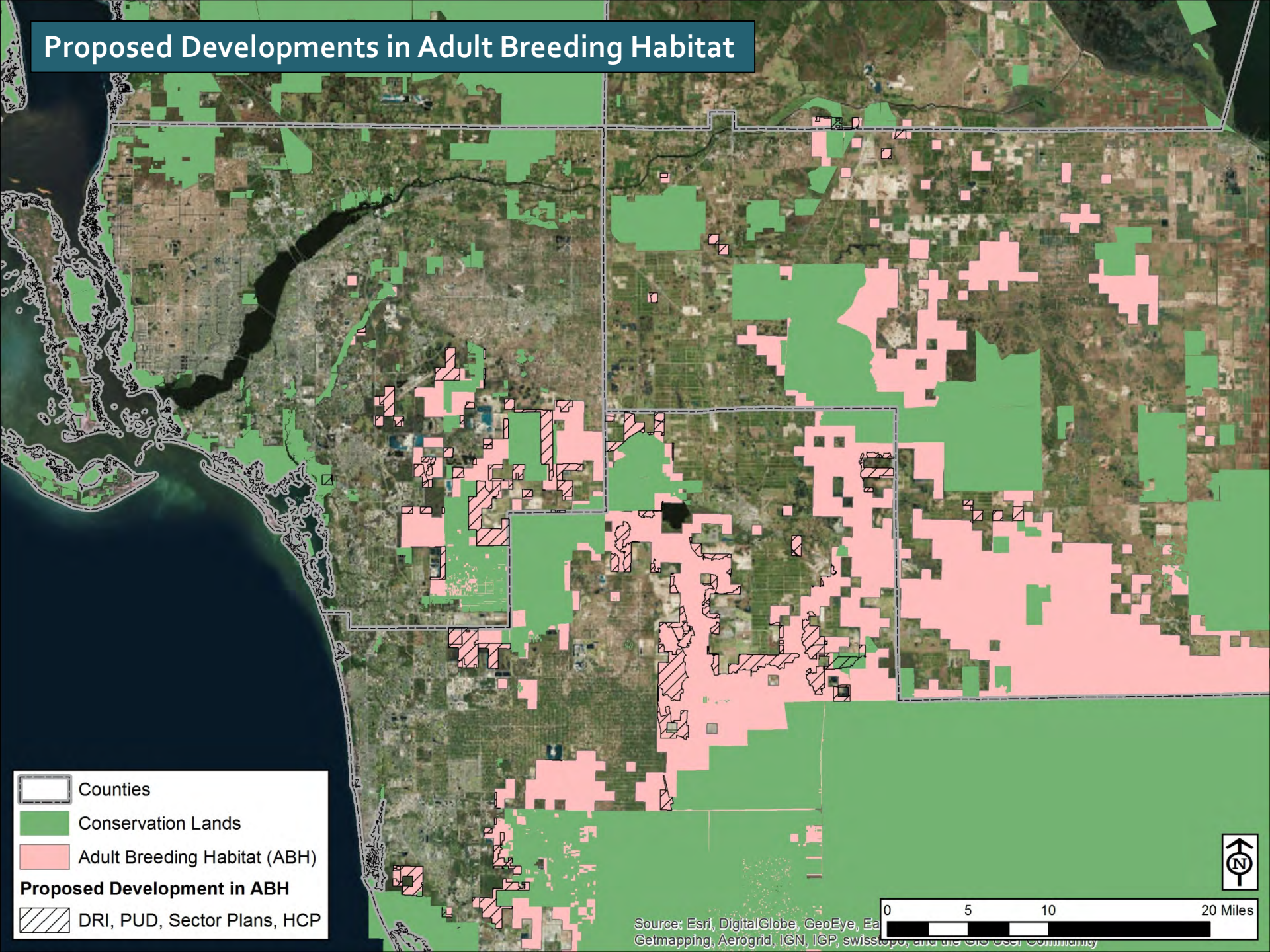
Dispersal Zone

North Area

Proposed Development in PFA

DRI, PUD, Sector Plans, HCP

Proposed Developments in Adult Breeding Habitat



 Counties

 Conservation Lands

 Adult Breeding Habitat (ABH)

Proposed Development in ABH

 DRI, PUD, Sector Plans, HCP

Estimated Future Habitat Loss: DRIs, PUDs, Sector Plans, HCP

Estimates of Florida Panther Density

Sources	Panther Density	
	Ha	Acres
Maehr et al (1991)	11,000	27,181
Dorazio & Onorato (2015) (BCNP-Addition Lands)	7,299	18,036
Sollmann et al (2013) (PSRP Area)	6,135	15,160
Sollmann et al (2013) (PSRP Area)	6,024	14,886
Onorato (pers. comm.) (FPNWR/PSRP Area)	2,857	7,060

Panther Habitat Lost to Development and Estimated Impact on Population

Area	Total Acres	Proposed Development		Panthers Lost to Development	Estimated Population	% Loss
		Acres	% of Area	No.	No.	
Primary Zone	2,270,417	69,872	3.1	4.7*	153*	3.1
Primary Zone	2,270,417	69,872	3.1	9.9**	322**	3.1
Adult Breeding Habitat	1,378,476	45,296	3.3	3.0*	93*	3.3
Adult Breeding Habitat	1,378,476	45,296	3.3	6.4**	195**	3.3

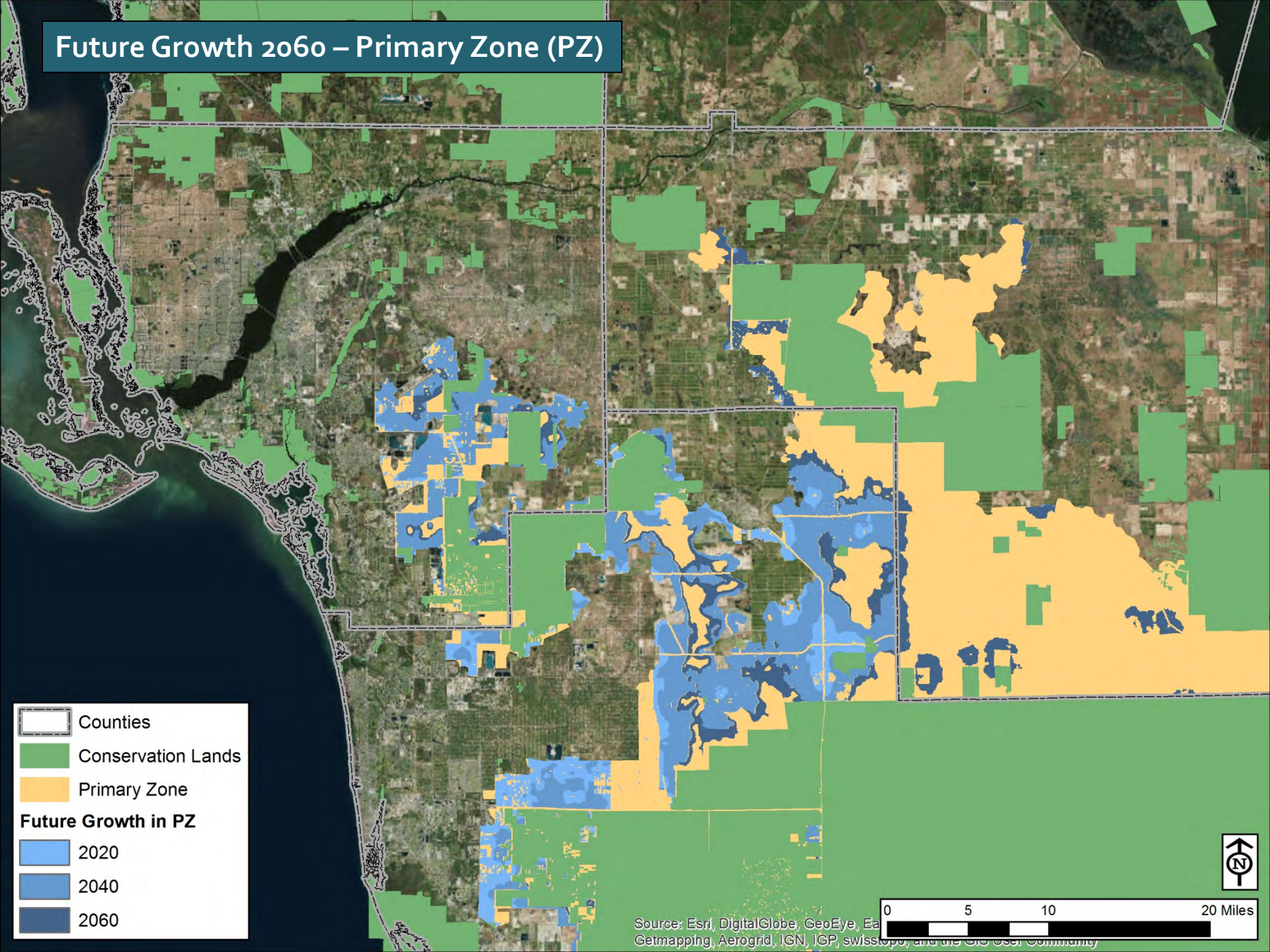
*Estimated based on panther density of one panther per 14,886 acres (Sollmann et al. 2013)

**Estimated based on panther density of one panther per 7,060 acres (Onorato, pers. comm.)

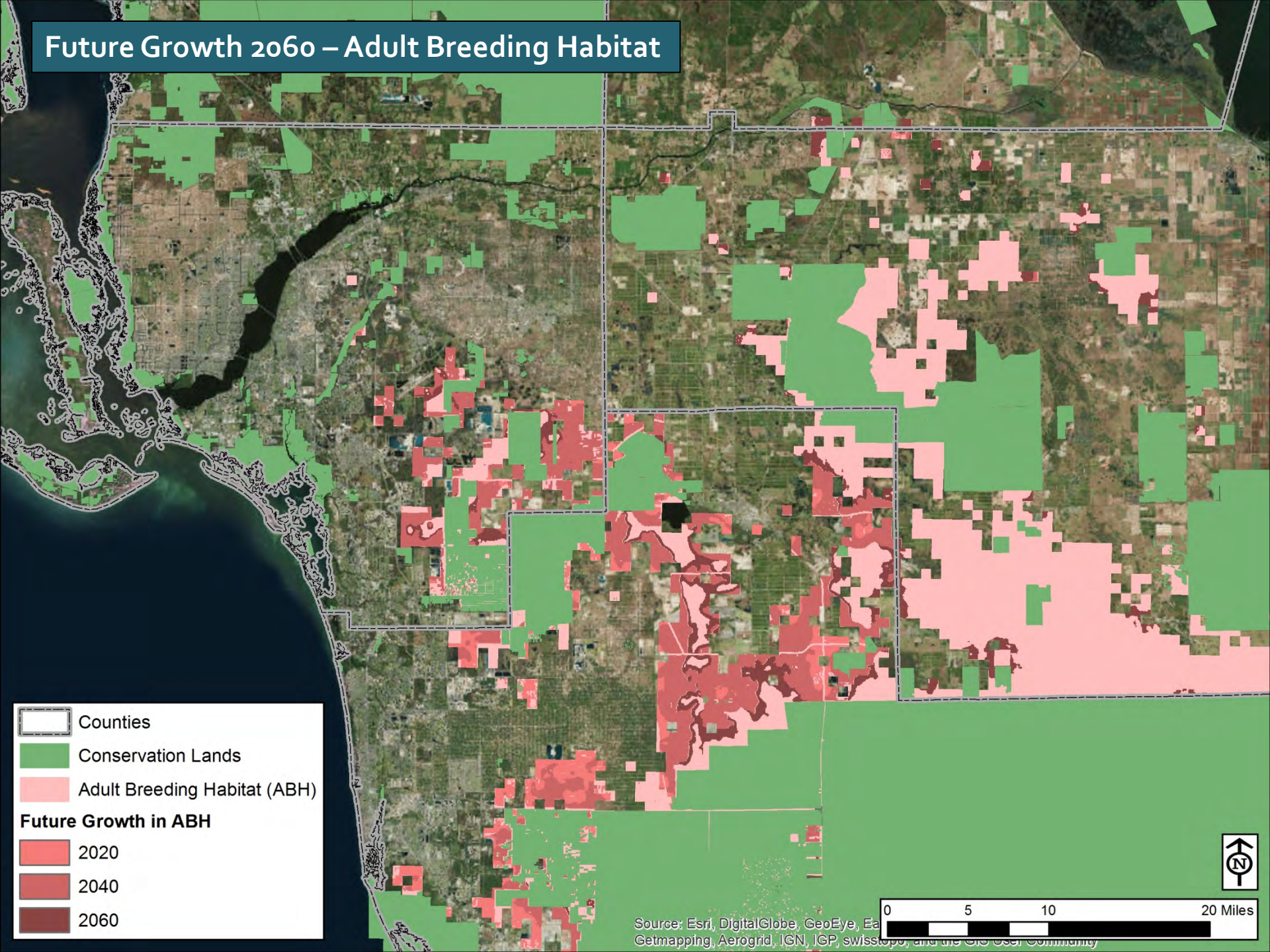
Future Loss of Panther Habitat: UF GeoPlan 2060 Growth Model

- UF GeoPlan Center Growth Model 2060
 - Model of future development through 2060 based on census projections and models that stress location
 - No additional public acquisition of conservation lands
- Methods
 - Clip 2060 growth model to Panther Focus Area and Adult Breeding Habitat
 - Calculate area projected to be lost to development by 2060
 - Estimate panther impacts using density estimates
- Randy Kautz, unpublished data

Future Growth 2060 – Primary Zone (PZ)



Future Growth 2060 – Adult Breeding Habitat



Estimated Future Habitat Loss: 2060 Growth Model

Estimates of Florida Panther Density

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Panther Habitat Lost to Development and Estimated Impact on Population

Area	Total Acres	Proposed Development		Panthers Lost to Development	Estimated Population	% Loss
		Acres	% of Zone	No.	No.	
Primary Zone	2,270,417	188,754	8.3	12.7*	153*	8.3
Primary Zone	2,270,417	188,754	8.3	26.7**	322**	8.3
Adult Breeding Habitat	1,378,476	147,210	10.7	9.9*	93*	10.7
Adult Breeding Habitat	1,378,476	147,210	10.7	20.8**	195**	10.7

*Estimated based on panther density of one panther per 14,886 acres (Sollmann et al. 2013)

**Estimated based on panther density of one panther per 7,060 acres (D. Onorato pers. comm.)

Habitat Loss Summary

- Habitat Has Been and Continues to Be Lost
 - 1936-1987 (USFS Data)
 - Florida: 4.3 M acres of forest lost (21% decline; 0.41%/year)
 - South Florida: 0.98 M acres lost (33% decline; 0.65%/year)
 - 1987-2003 (FWC Land Cover and Change Detection Data)
 - Primary Zone: 90,600 acres of natural habitat lost (0.28%/year)
 - Adult Breeding Habitat: 59,400 acres of natural habitat lost (0.30%/year)
 - 2003-2015 (FWC Land Cover and Cooperative Land Cover Map)
 - Primary Zone: 27,700 acres of natural/semi-natural habitat lost (0.11%/year)
 - Adult Breeding Habitat: 14,100 acres of natural/semi-natural habitat lost (0.09%/year)
- Future Loss of Habitat
 - DRIs, PUDs, Sector Plans, East Collier HCP Developments Currently Planned
 - Primary Zone: loss of 69,900 acres of habitat capable of supporting 5-10 panthers
 - Adult Breeding Habitat: loss of 45,300 acres of habitat capable of supporting 3-6 panthers
 - Loss of ~3% of panther population
 - 2060 Growth Model (UF)
 - Primary Zone: loss of 188,800 acres that could support 13-27 panthers
 - Adult Breeding Habitat: loss of 147,200 acres that could support 10-21 panthers
 - Loss of ~8-11% of panther population