How Much is Enough? Landscape-scale Conservation for the Florida Panther

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Wide-ranging Species Conservation

"The overwhelming message from population viability studies of large carnivores is that conservation planning must be undertaken at vast spatial scales and must consider connectivity. . . If maintaining viable populations of species that have large home ranges and are vulnerable to human activities is an objective, then the conservation planner must grapple with the design and management of entire landscapes." (Noss et al. 1996)

MERIT Panther Subteam Members and Co-authors:

Author	Affiliation	Expertise
Randy Kautz	FFWCC	Conservation planning
Bob Kawula	FFWCC	GIS data analysis
Tom Hoctor	UF	Landscape modeling
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David Maehr	UK	Panther researcher
Frank Mazzotti	UF	Wildlife and land use
Roy McBride	FFWCC	Panther capture team
Larry Richardson	FPNWR	Public land biologist
Karen Root	BGSU	PVA modeling

Panther Subteam Goals:

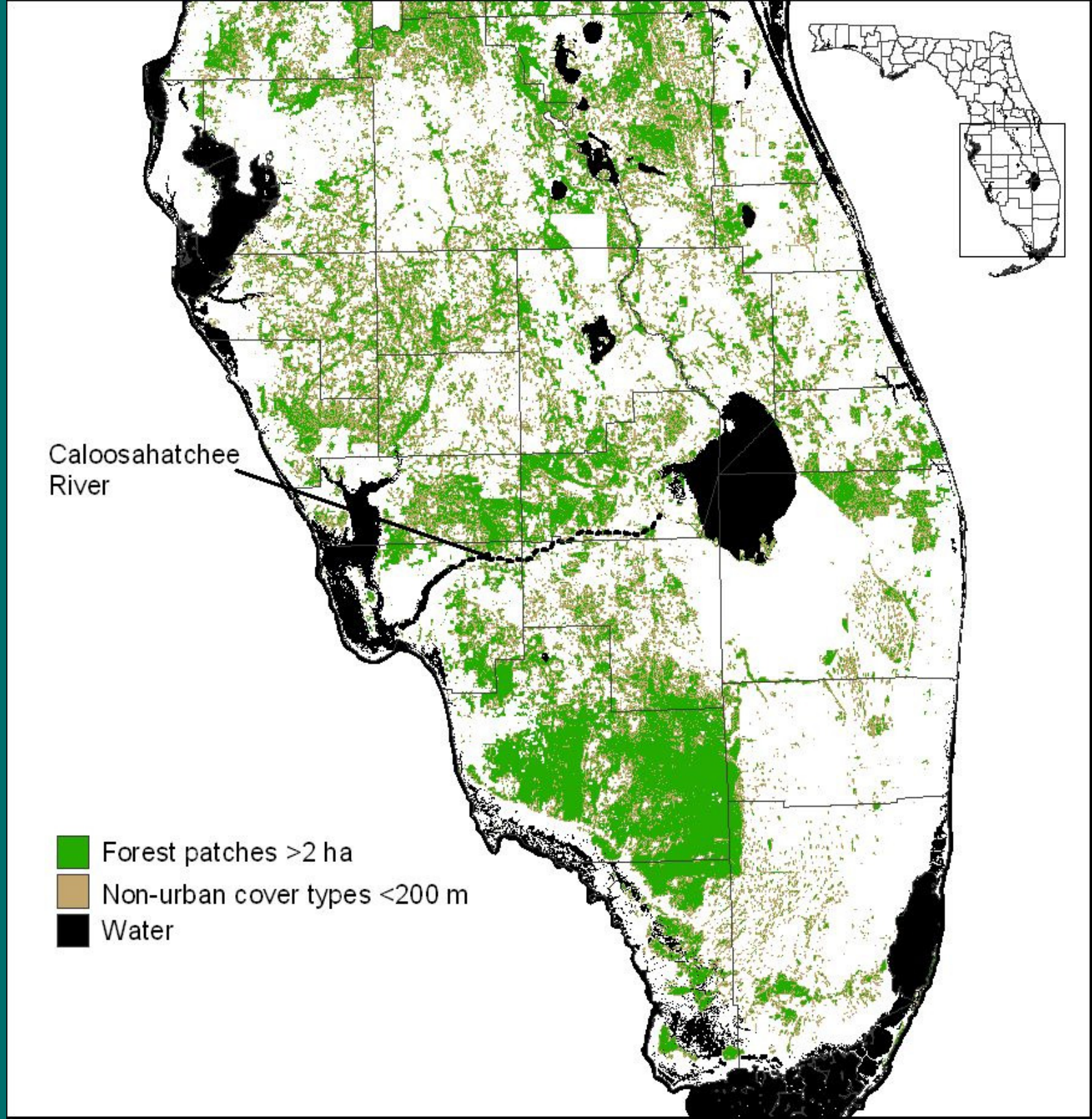
- Identify areas essential to the long-term survival of the Florida panther in the wild.
- Identify landscape linkage(s) to habitats north of Caloosahatchee River to ensure future dispersal.
- Identify areas that could be restored to provide additional habitat for panthers.
- All of this work done in a best science, consensus-based reserve design process

Panther Subteam Steps:

- Conduct compositional analyses
- Model potential habitat patches
- Delineate habitat conservation zones
- Conduct population viability analysis
- Develop conservation recommendations

Potential Habitat Model

Model of Occupied and Potential Habitat Patches as Base



Panther Habitat/Landscape Zones:

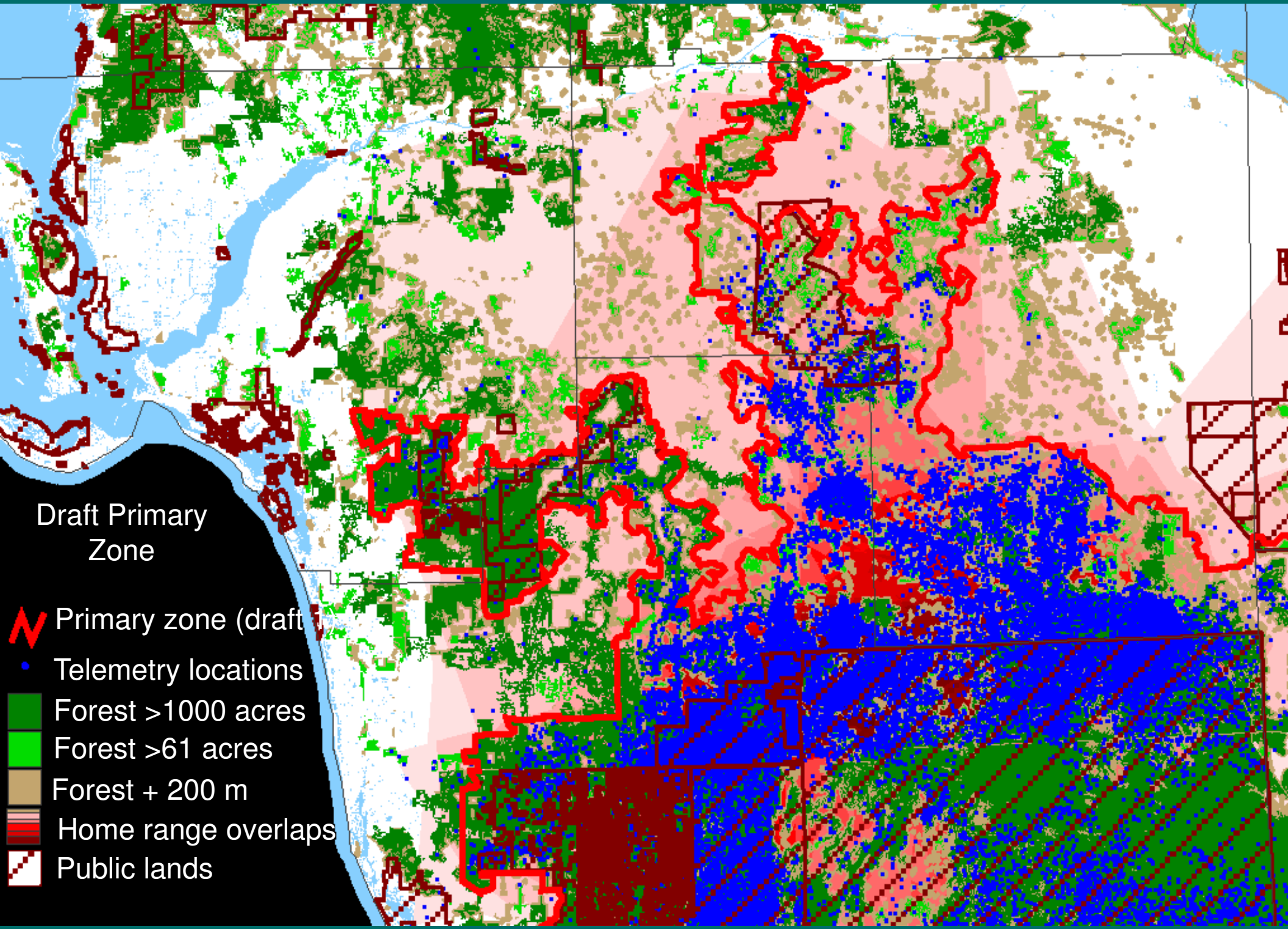
- Primary Zone
- Dispersal Zone
- Secondary Zone

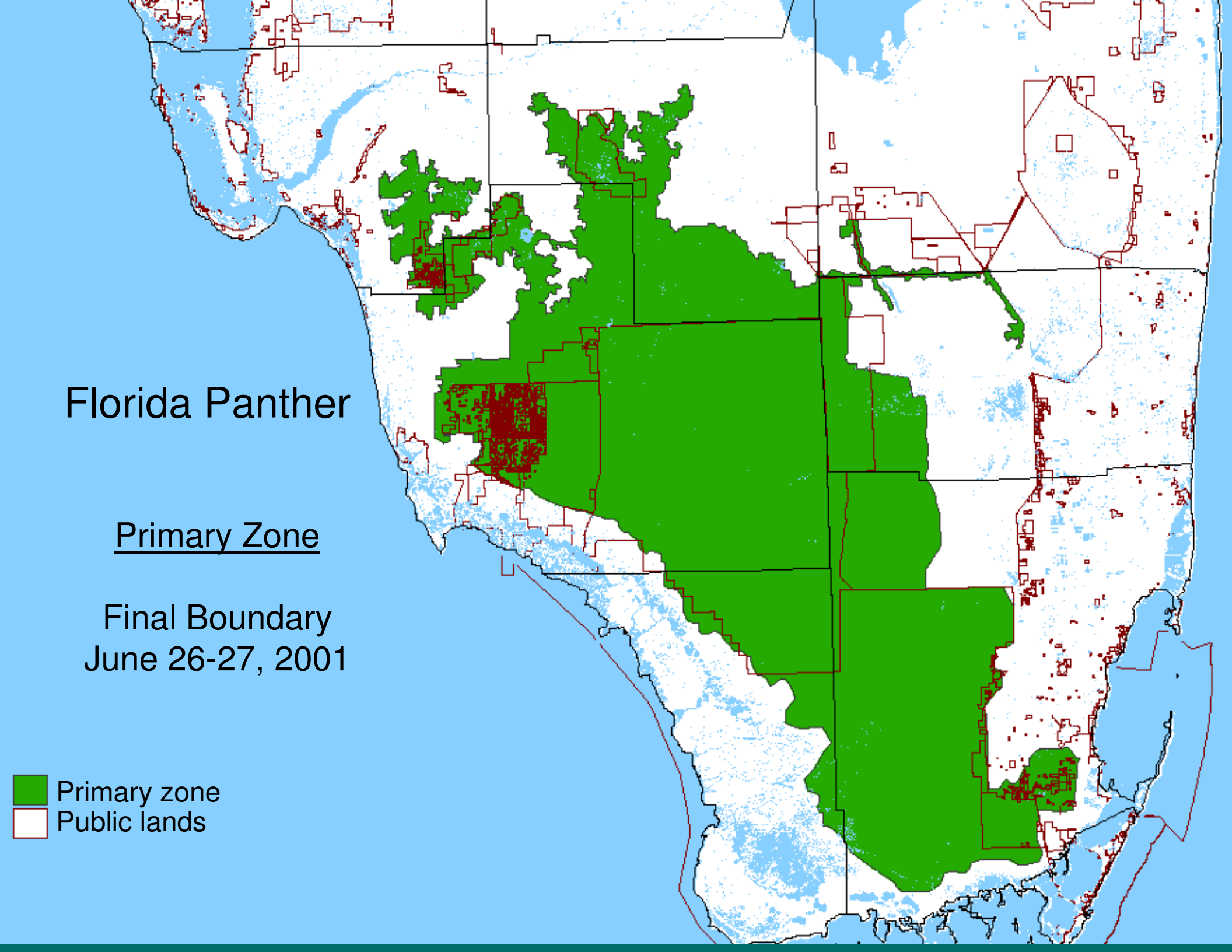
"The Primary, Dispersal and Secondary zones comprise essential components of a landscape-scale conservation plan for the protection of a viable Florida panther population in south Florida."

Primary Zone

- Definition:
  - All lands within this zone are essential to the long-term viability and survival of the Florida panther.
  - The current population in this zone represents the foundation of one of the self-sustaining populations needed for the recovery of the species.

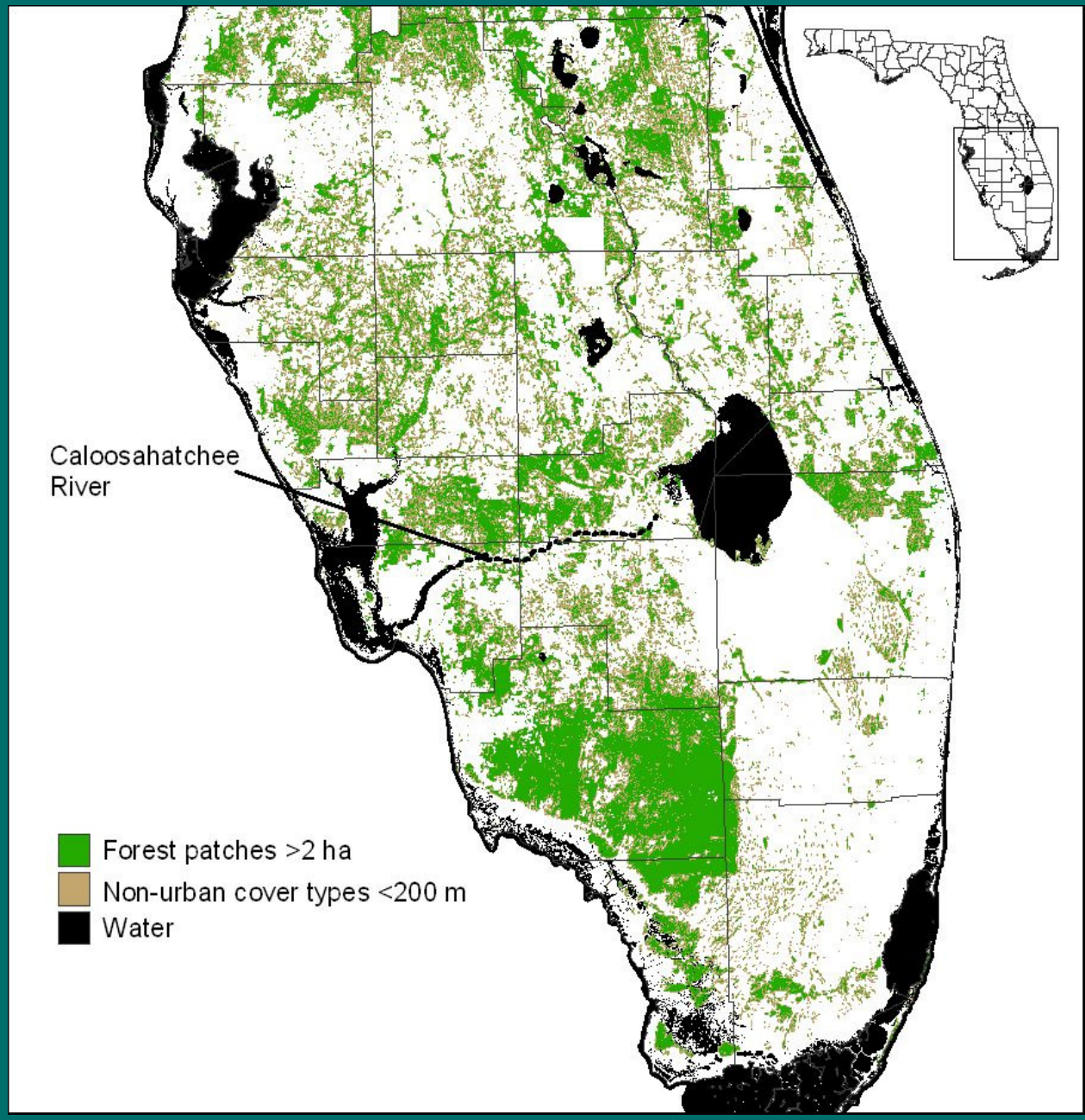
"The habitat of the Florida panther is an extensive landscape comprised of a mix of natural, semi-natural, and agricultural land uses (Maehr and Cox, 1995; Comiskey et al., 2002)."


Draft Primary Zone
Primary zone (draft
Telemetry locations
Forest >1000 acres
Forest >61 acres
Forest + 200 m
Home range overlaps
Public lands


Florida Panther
Primary Zone
Final Boundary
June 26-27, 2001
Primary zone
Public lands

Model of Occupied and Potential Habitat Patches as Base (e.g., the Swiss Cheese Map)

"Whereas the model in Fig. 4 [the base habitat model] indicates habitat patches providing important cover for panthers, the zones integrate the patches into a connected landscape mosaic of land cover types needed to support the population."

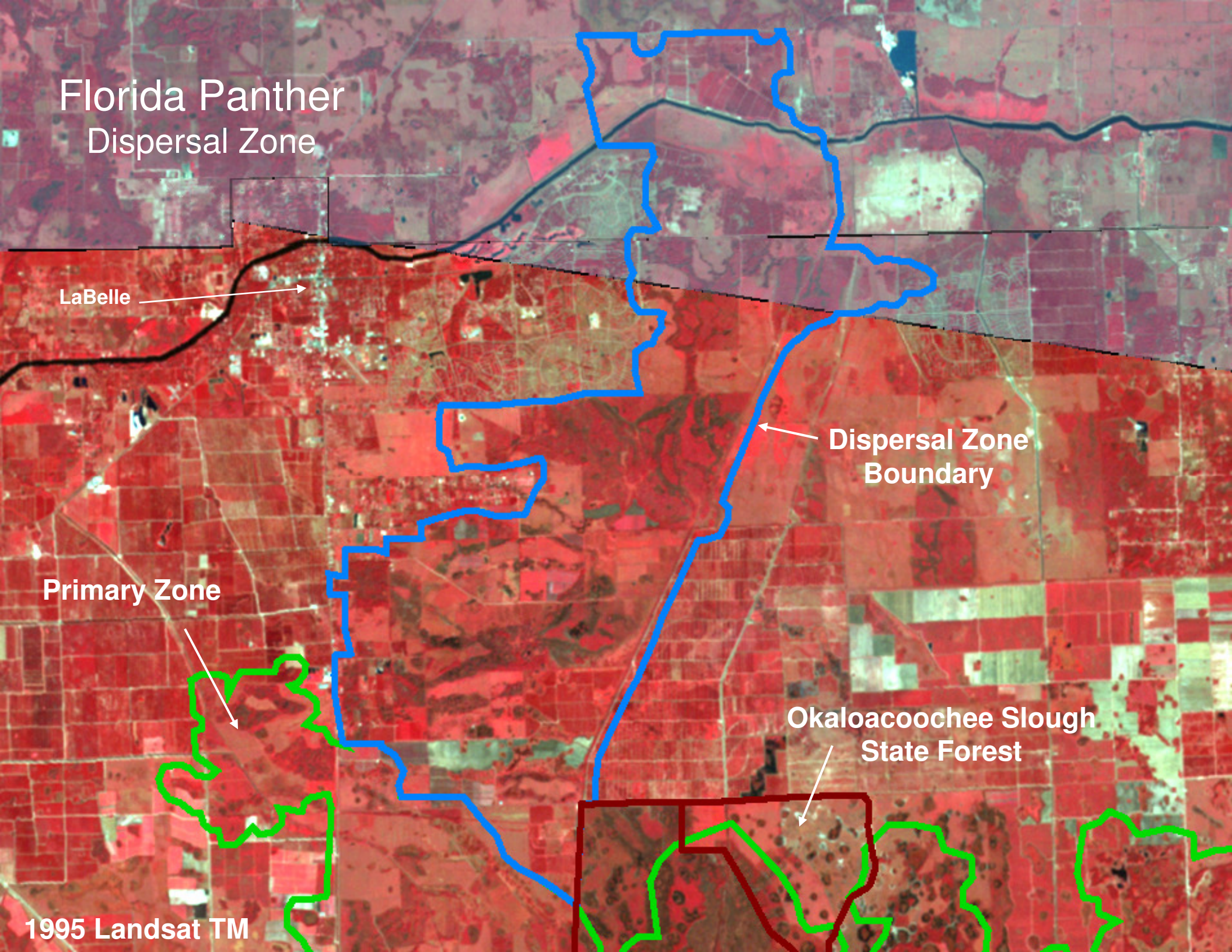


Dispersal Zone

- Team Statements:
  - A landscape linkage is needed to maintain and restore connectivity from the Primary Zone to potentially suitable habitats north of the Caloosahatchee River.
  - Efforts to protect a landscape linkage shall not detract from habitat conservation in, and contiguous with, the Primary Zone.

Functional Corridor Characteristics

- Located along natural travel routes such as riparian strips
- Have ample woody cover
- Include underpasses with ample fencing at large/high-speed road crossings
- Lack artificial outdoor lighting
- Have less than 1 human dwelling/16 hectares (app. 40 acres)
- Local width: >100 m if < 800 m long; >400 m if 1-7 km
- Regional width: >1.6 km (1.0 mi) wide with no bottlenecks <400 m wide


Florida Panther
Dispersal Zone
LaBelle
Dispersal Zone
Boundary
Primary Zone
Okaloacoochee Slough
State Forest
1995 Landsat TM

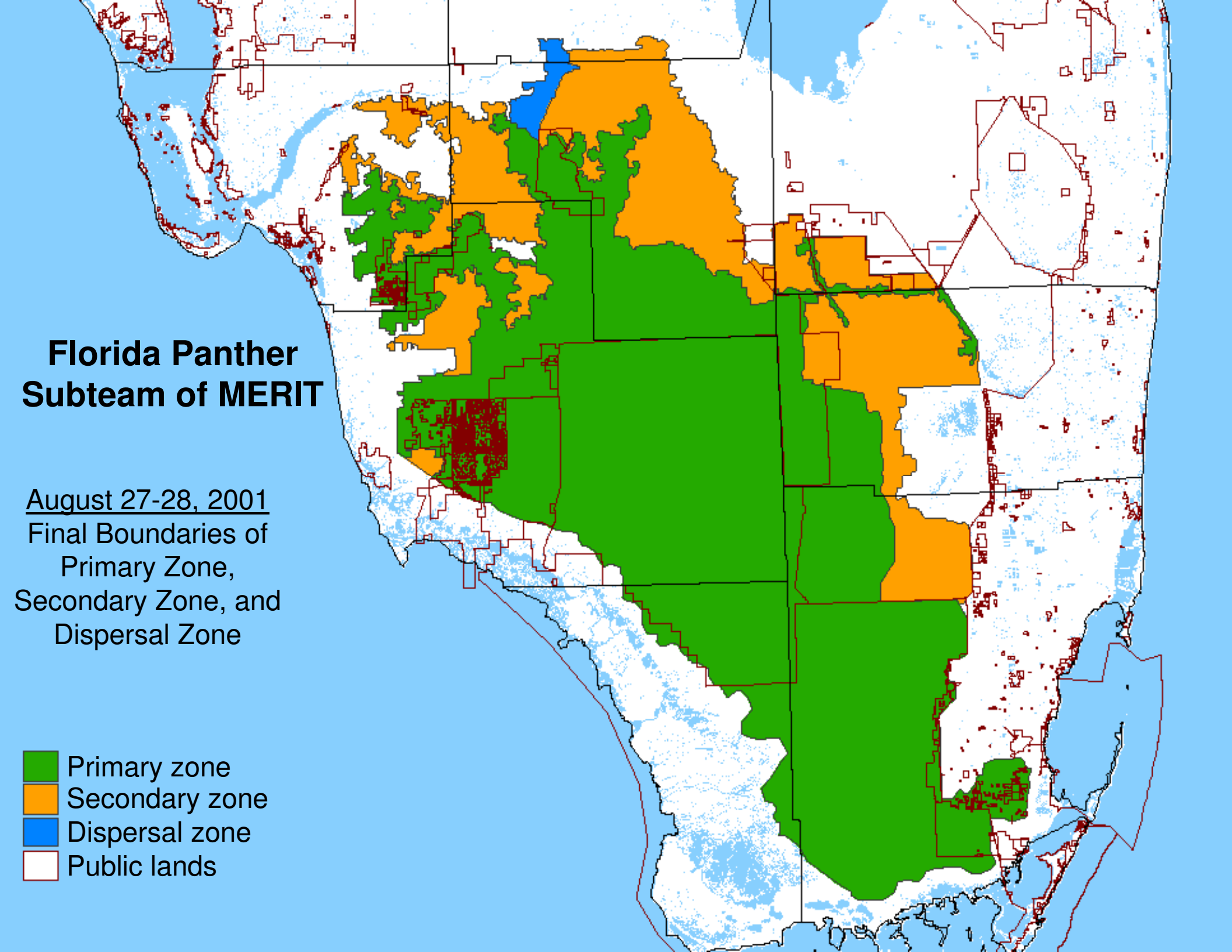
Secondary Zone

- Definition:
  - Lands within this zone are needed to support the Florida panther population found in the Primary Zone. Development in the Secondary Zone could impact habitat quality within the Primary Zone.
  - Some lands in the Secondary Zone are in need of restoration before they will provide suitable habitat for panthers.

    "Although Subteam members consider the Secondary Zone to be a lower priority than the Primary and Dispersal Zones, the security of the population could be significantly enhanced by protection and restoration in this zone."

Secondary Zone Landscape Context Analysis

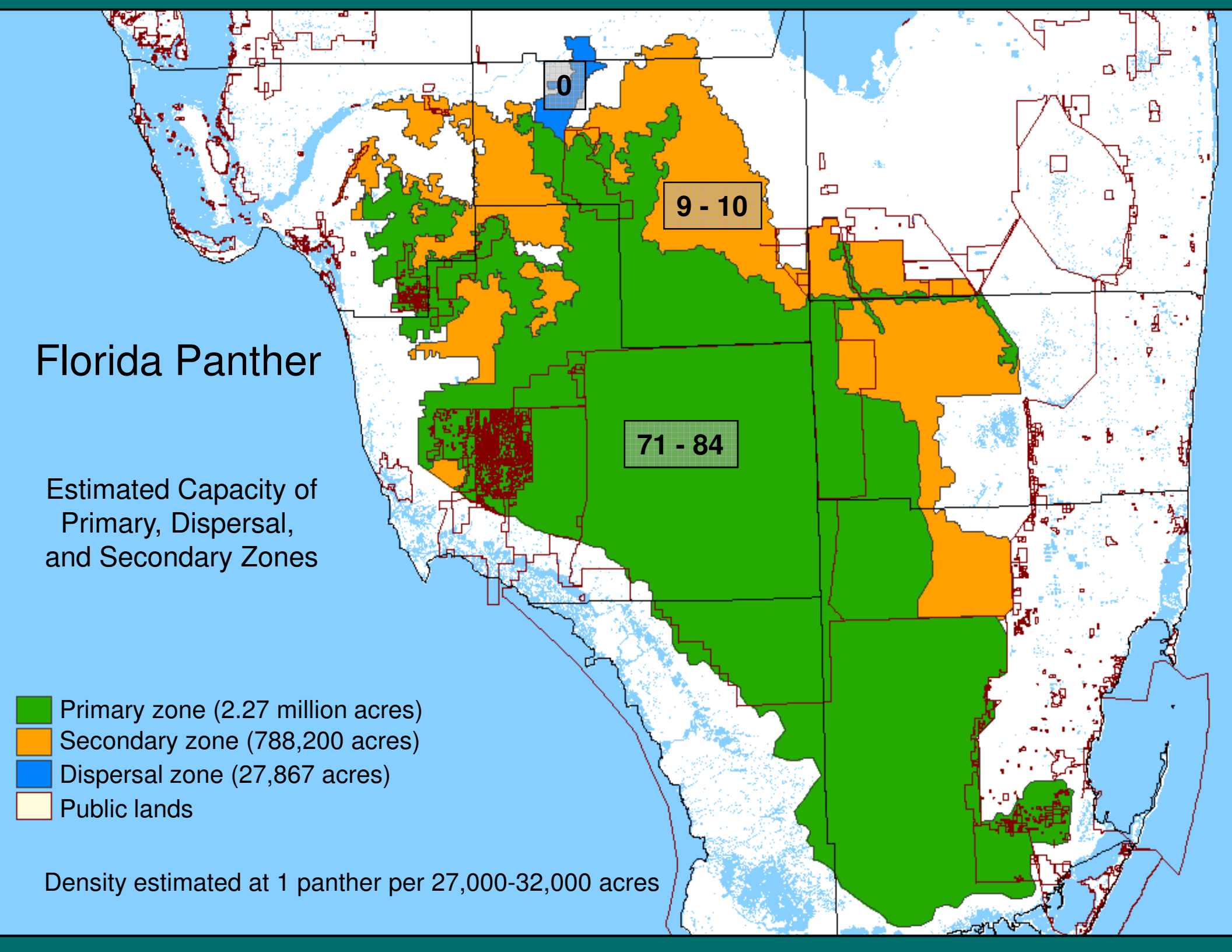
- Proximity to primary zone
- Proximity to potential habitat patch
- Size of potential habitat patch
- Proximity to urban areas
- Intensity of land use
- Road type and density


Florida Panther
Subteam of MERIT
August 27-28, 2001
Final Boundaries of
Primary Zone,
Secondary Zone, and
Dispersal Zone
Primary zone
Secondary zone
Dispersal zone
Public lands

Summary of PVAs

Population Size*	Viability
<50	Likely to go extinct
60-70	Barely viable
80-100	Moderately viable
>240	High persistence probability

*Adults and sub-adults, but not kittens


Florida Panther
Estimated Capacity of Primary, Dispersal, and Secondary Zones
0
9 - 10
71 - 84
Primary zone (2.27 million acres)
Secondary zone (788,200 acres)
Dispersal zone (27,867 acres)
Public lands
Density estimated at 1 panther per 27,000-32,000 acres

Conservation Implications

- 3 zones could support 79-94 panthers
- High probability of persistence, assuming
  - No habitat loss in Primary Zone
  - Population expansion into Secondary Zone
  - No unforeseen catastrophes
- Population likely to remain stable or decline slightly without significant habitat loss
- Population likely to have genetic problems, requiring management
- "Thus, it appears that the Primary Zone, a large landscape consisting of a matrix of natural and disturbed cover types, provides just enough space to support a population that is barely viable demographically as long as the habitat base remains stable."

Recommendations for Primary Zone

- No net loss of landscape function or carrying capacity
- Factors to consider:
  - Avoid reduction or degradation of habitat base
  - Avoid reduction in total area
  - Avoid landscape fragmentation
  - Avoid land use intensification including transportation infrastructure
- When impacts unavoidable you need both:
  - Habitat restoration or enhancement in Primary Zone
  - Secure and restore lands in Secondary Zone
- "The maintenance of existing home ranges and habitat function within the Primary Zone is essential to maintaining a viable Florida panther population."
- From the Panther Recovery Plan: "To prevent further loss of population viability, habitat conservation efforts should focus on maintaining the total available area, quality, and spatial extent of habitat within the Primary Zone. The continued loss of habitat functionality through fragmentation and loss of spatial extent pose serious threats to the conservation and recovery of the panther."

Panther Subteam Road Recommendations

- "Avoid construction of new roads and the widening of existing roads in all panther habitat zones. Retrofit existing roads . . . to minimize roadkills and to maximize connectivity between blocks of habitat bisected by roads."



Future Land Use Scenarios for the Southwest Florida Region

Sarasota, Desoto, Glades, Hendry, Charlotte, Lee and Collier

Geoplan Center
College of Design, Construction and Planning

UF UNIVERSITY of FLORIDA

Projected Population

COUNTY	Rank	2005*	2060	2005 Gross Urban Density	Additional Population 2060
COLLIER	2	317,788	929,300	2.11	611,512
CHARLOTTE	4	154,030	311,800	1.43	157,770
DESOTO	6	32,606	62,900	1.37	30,294
GLADES	7	10,729	16,700	.445	5,971
HENDRY	5	38,376	73,400	.78	35,024
LEE	1	549,442	1,415,800	2.37	866,358
SARASOTA	3	367,867	691,600	3.10	323,733
TOTAL		1,470,838	3,501,500		2,030,662

* Source: BEBR: Detailed Population Projections by Age, Sex, Race, and Hispanic Origin for Florida and Its counties, 2004 - 2030

Observations

- Density – Land Consumption Relationship
- Density – Alternative Transportation Relationship
- Conservation Areas:

  If densities are increased, there is sufficient land to accommodate the large projected population increase while also providing permanent protection for more than 1,000,000 additional acres including all of the Panther Primary Zone.

Florida Panther: Do We Have the Political Will to Save It?