PLOS ONE

RESEARCH ARTICLE

Landscape Analysis of Adult Florida Panther Habitat

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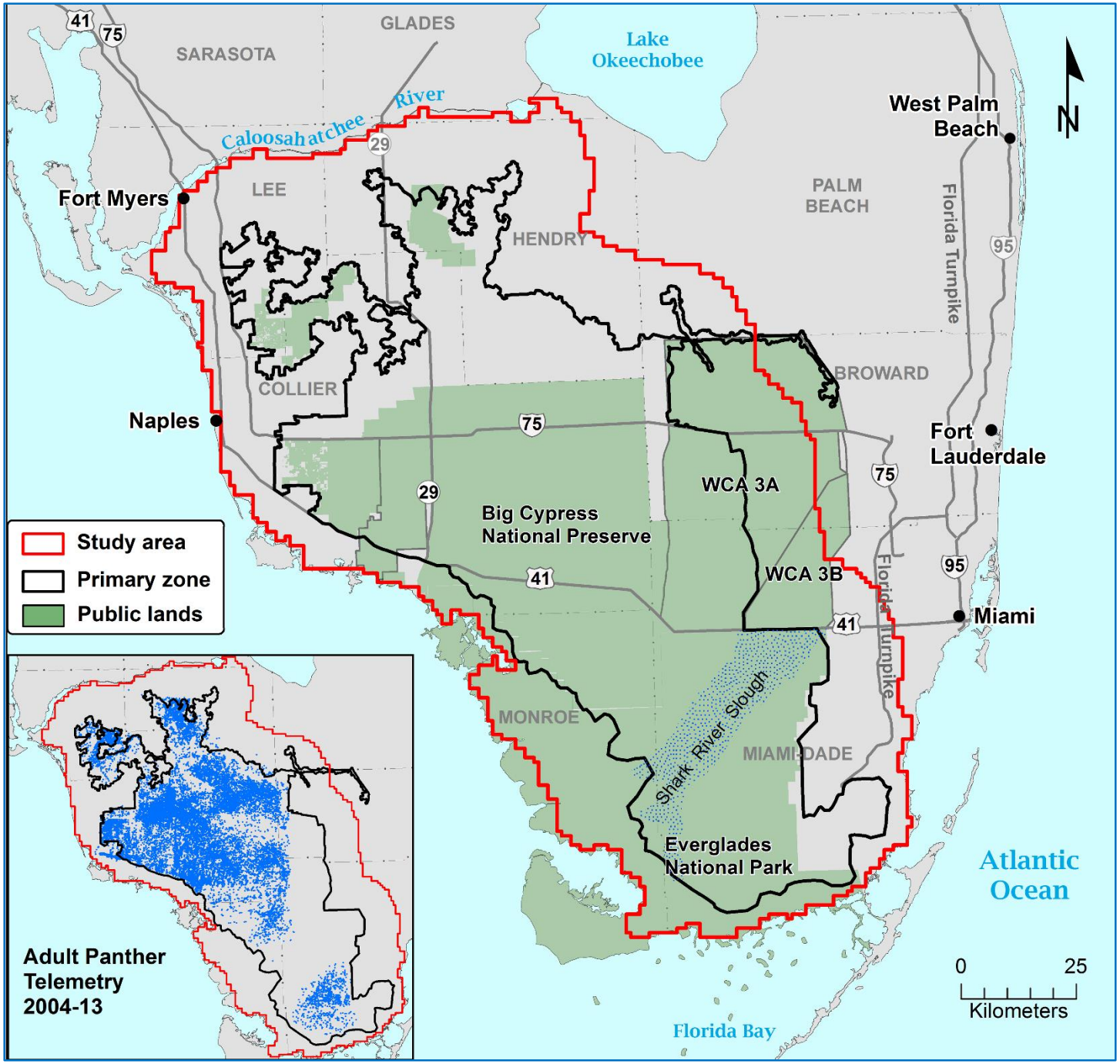
MODEL OVERVIEW

- Species Distribution Model (SDM) for the Florida panther in south Florida.
- Model type: Random Forest model with presence / absence design.
- Landscape scale model: Resolution = 1 km^2
- 15 explanatory (predictor) variables:
  - -10 land cover types
  - -Forest edge
  - -Human density
  - -Road density
  - -Dry season water depth
  - -Wet season water depth
- Model predicts probability of presence (panther use).

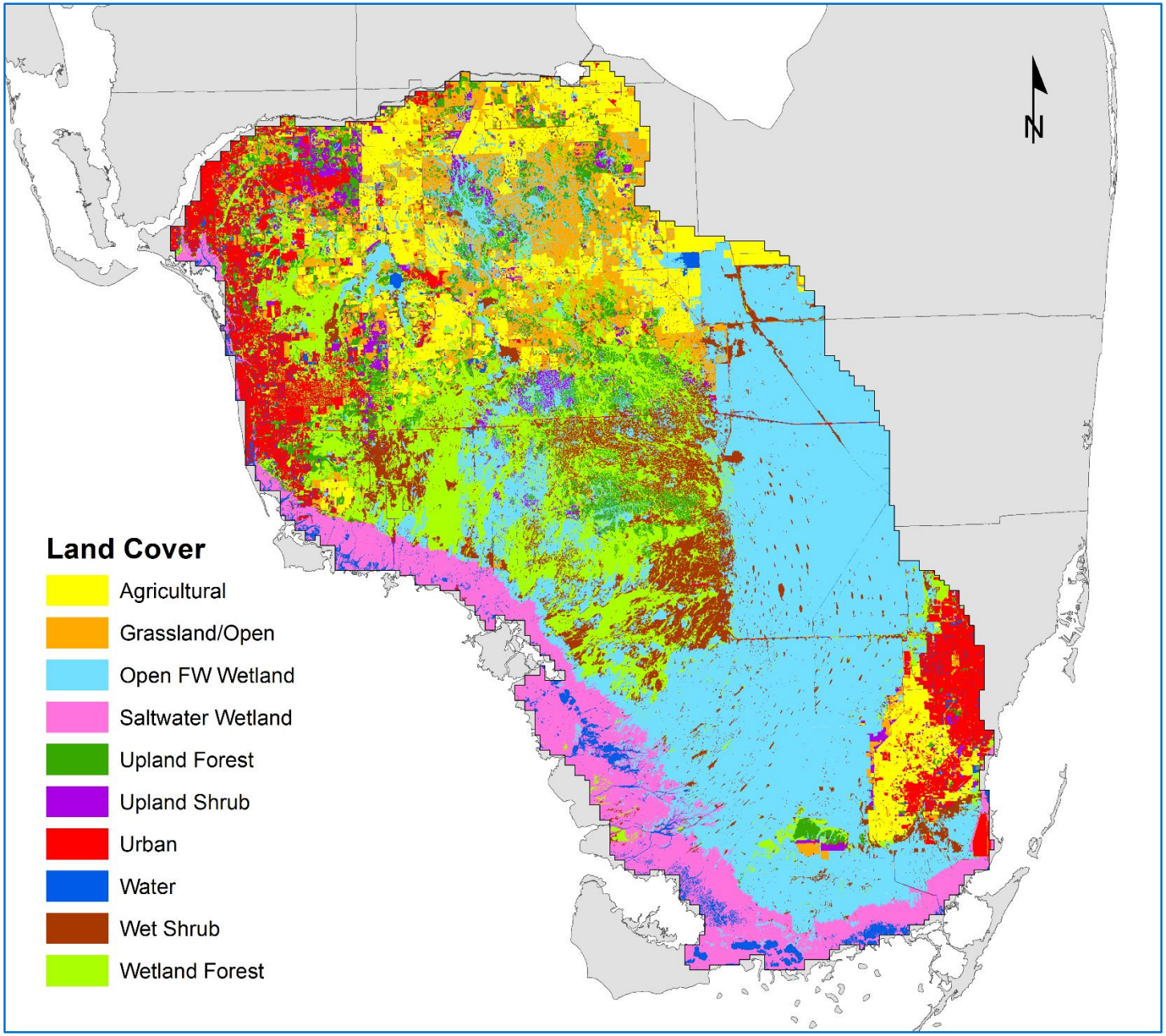
MODEL APPLICATIONS

- Evaluating impacts of proposed developments
- Prioritizing areas for panther conservation (e.g., panther conservation banks, fee title purchases)
- Identifying areas for possible panther reintroductions
- Evaluating the impacts of sea level rise and changes in hydrology (climate change, CERP)

STUDY AREA


41
75
SARASOTA
GLADES
Lake Okeechobee
Caloosahatchee River
29
West Palm Beach
N
Fort Myers
LEE
HENDRY
PALM BEACH
Florida Turnpike
95
COLLIER
BROWARD
Naples
75
Fort Lauderdale
WCA 3A
29
Big Cypress National Preserve
Study area
Primary zone
Public lands
41
WCA 3B
Miami
MONROE
Shark River Slough
MIAMI-DADE
Everglades National Park
Atlantic Ocean
Adult Panther Telemetry 2004-13
0
25
Kilometers
Florida Bay

EXPLANATORY VARIABLES: Land Cover



EXPLANATORY VARIABLES: Other

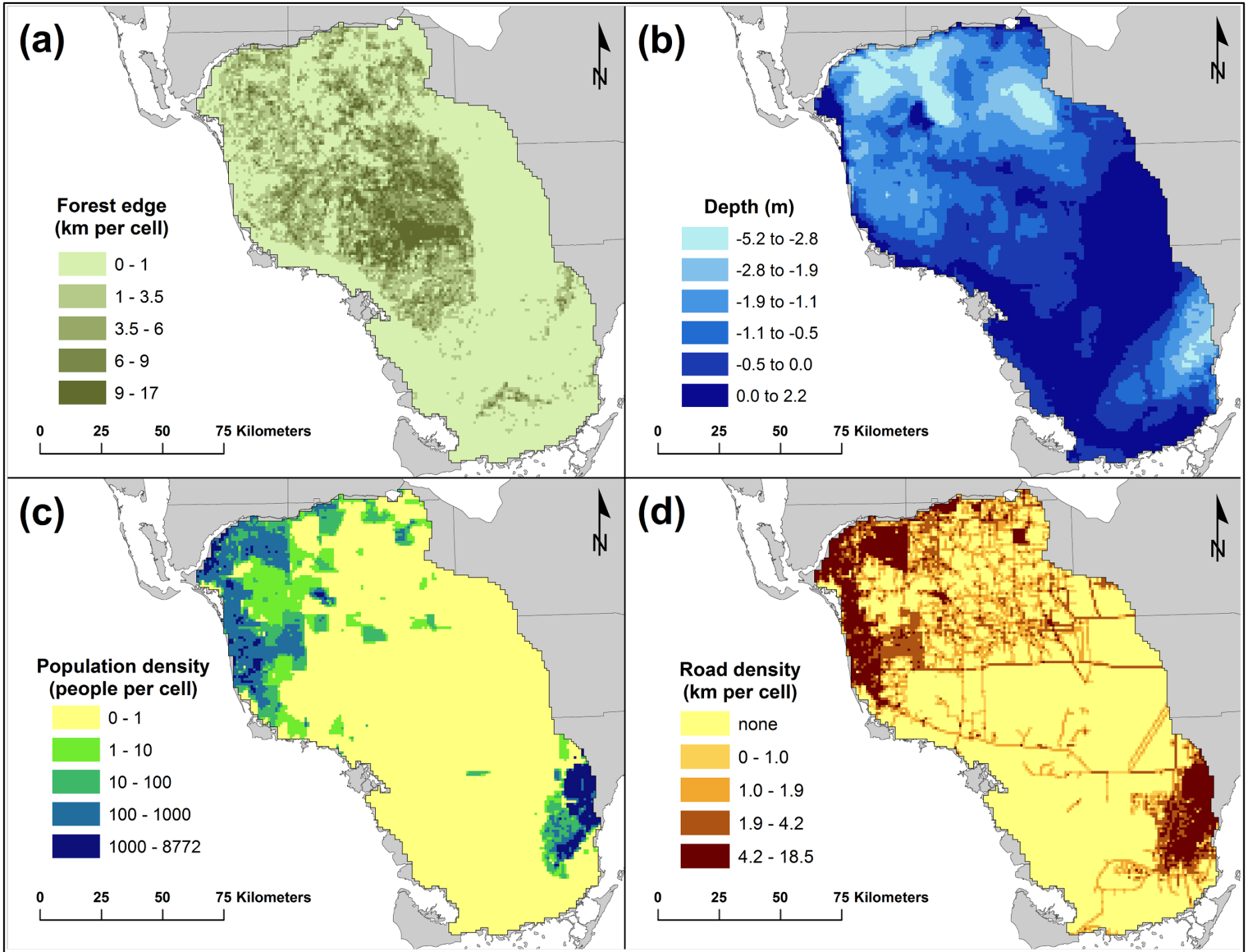
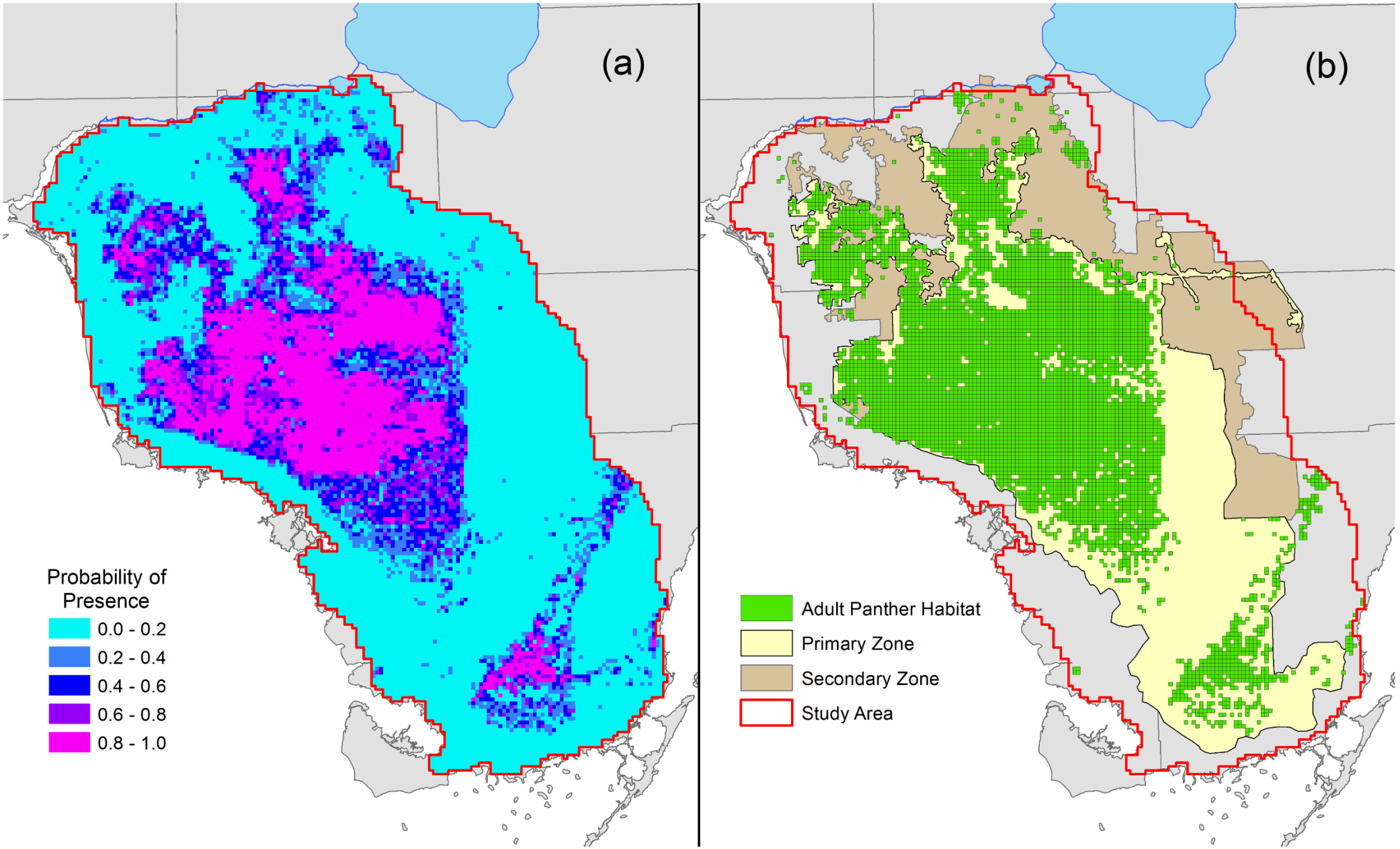


Fig 3. Probability of presence and adult panther habitat.



VARIABLE IMPORTANCE

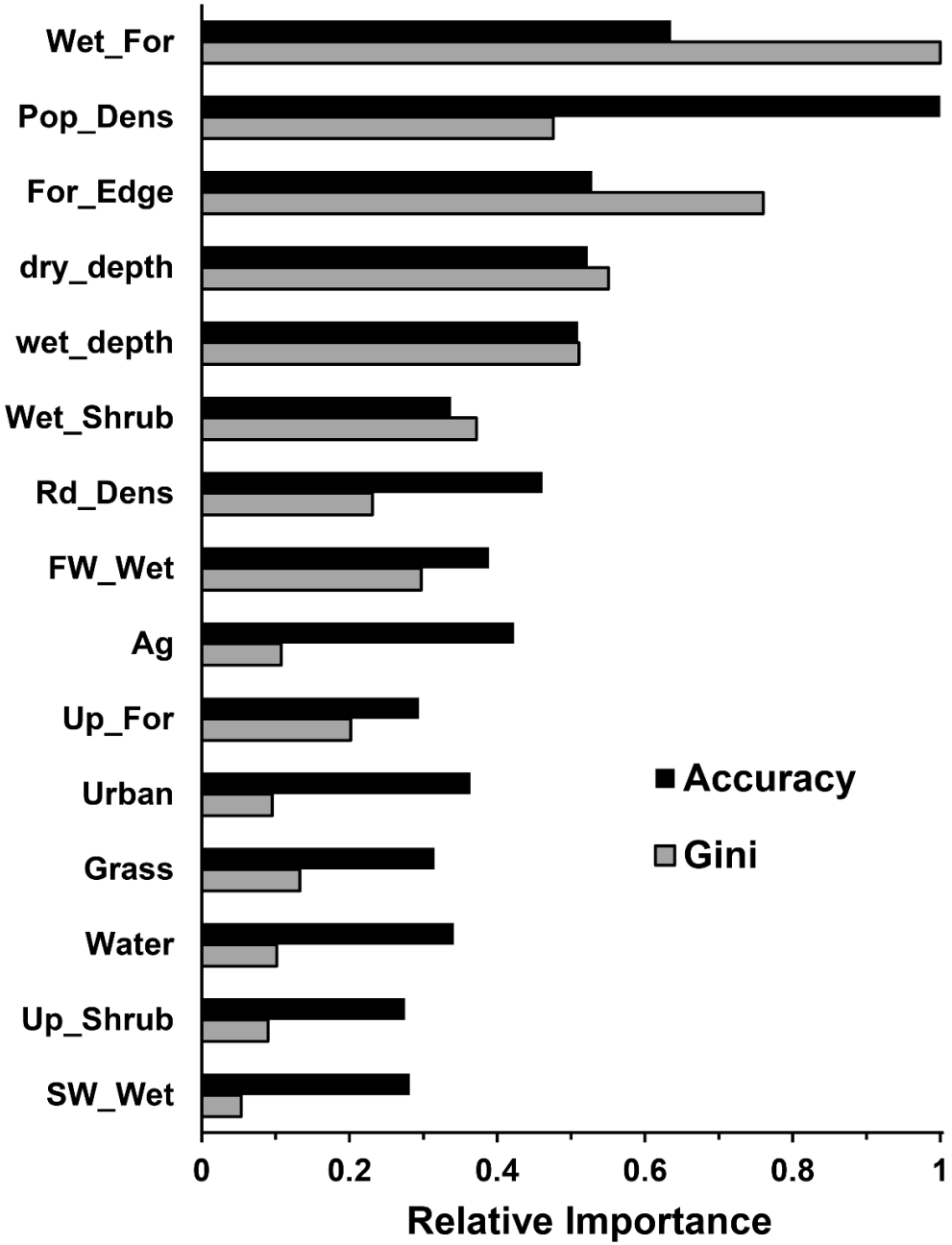


Fig 5. Sensitivity of model predictions (probability of presence, P) to changes in selected explanatory variables.

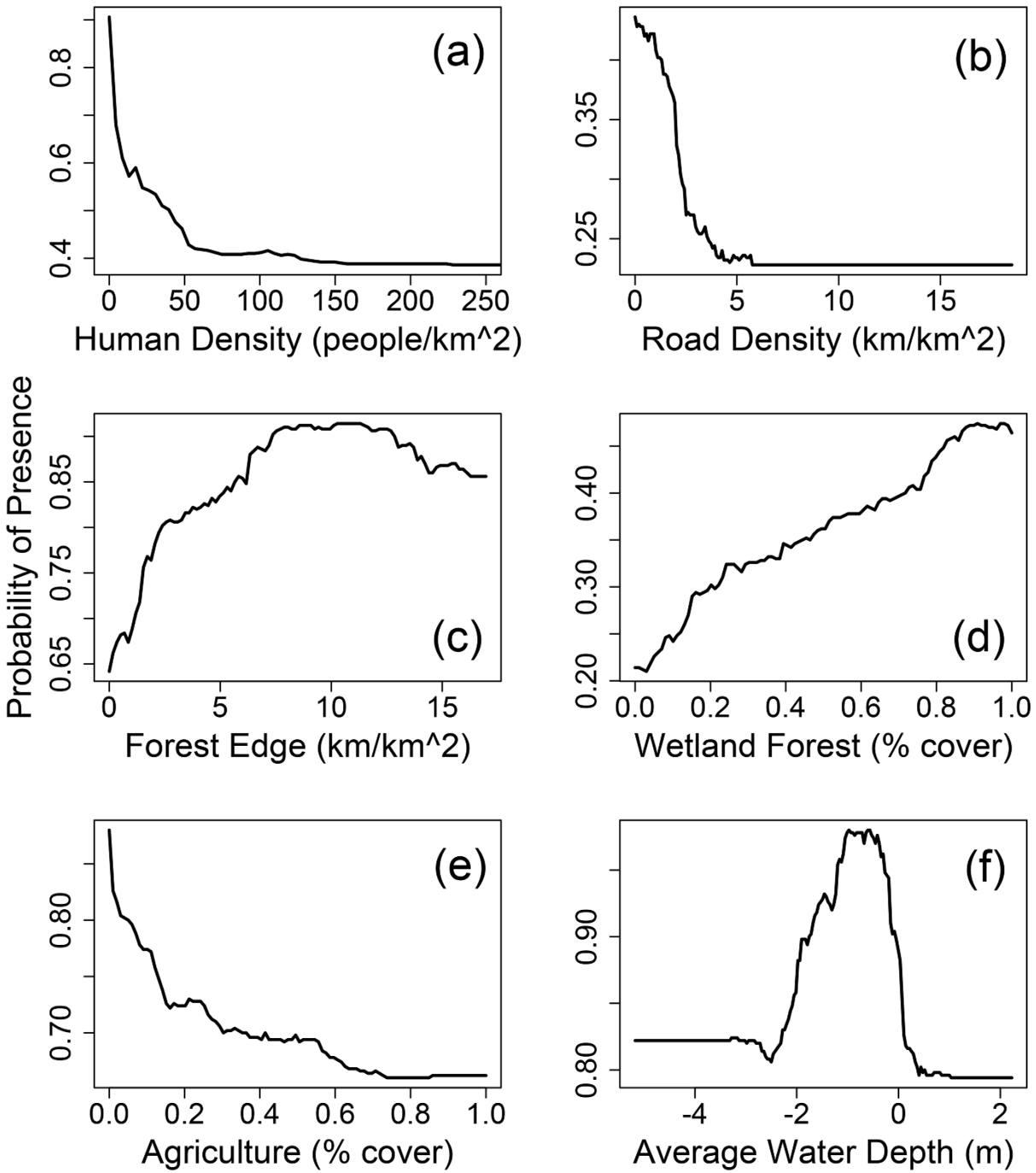
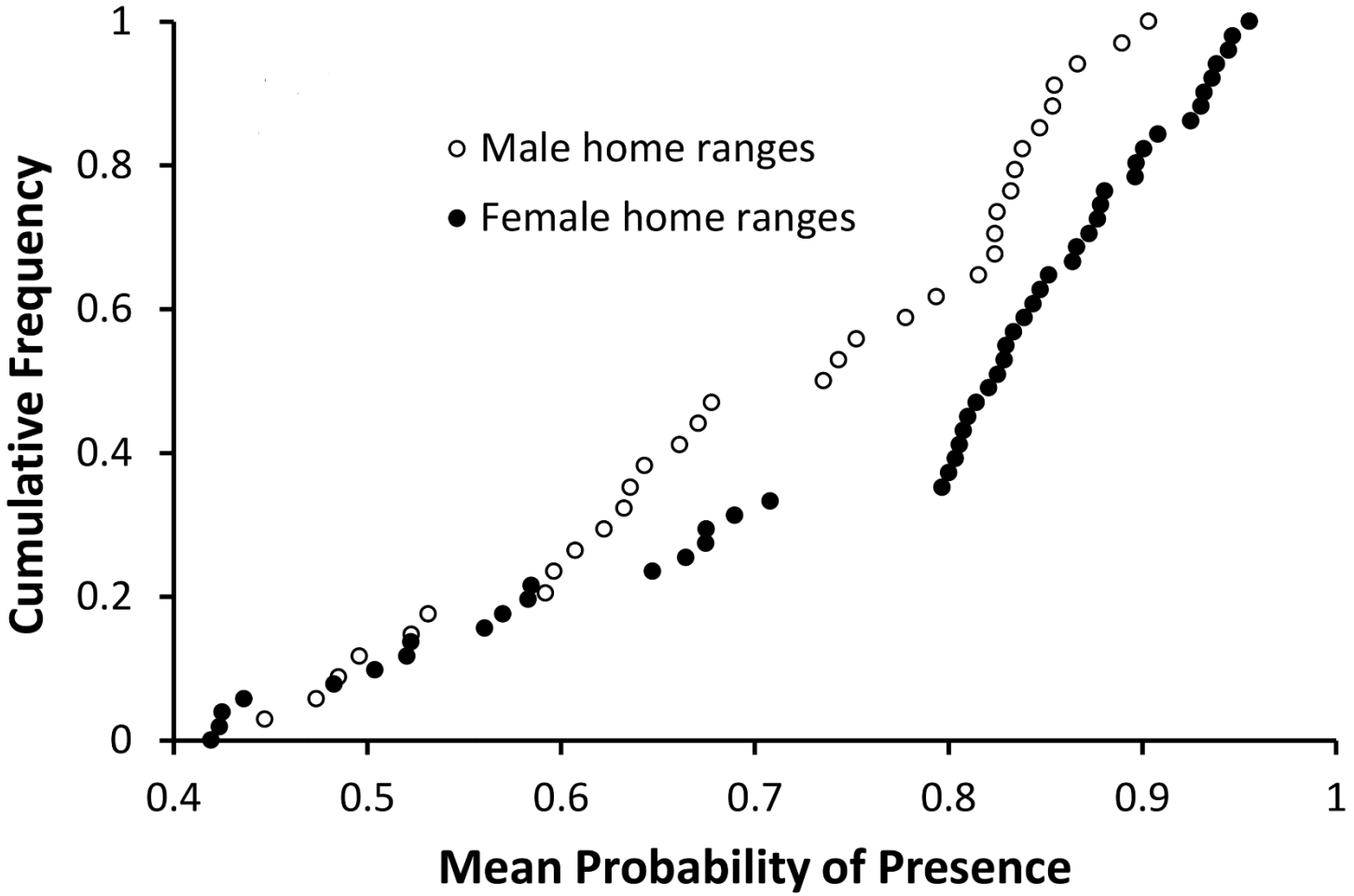


Fig 6. Average probability of presence in Florida panther home ranges.



SUMMARY OF RF MODEL RESULTS

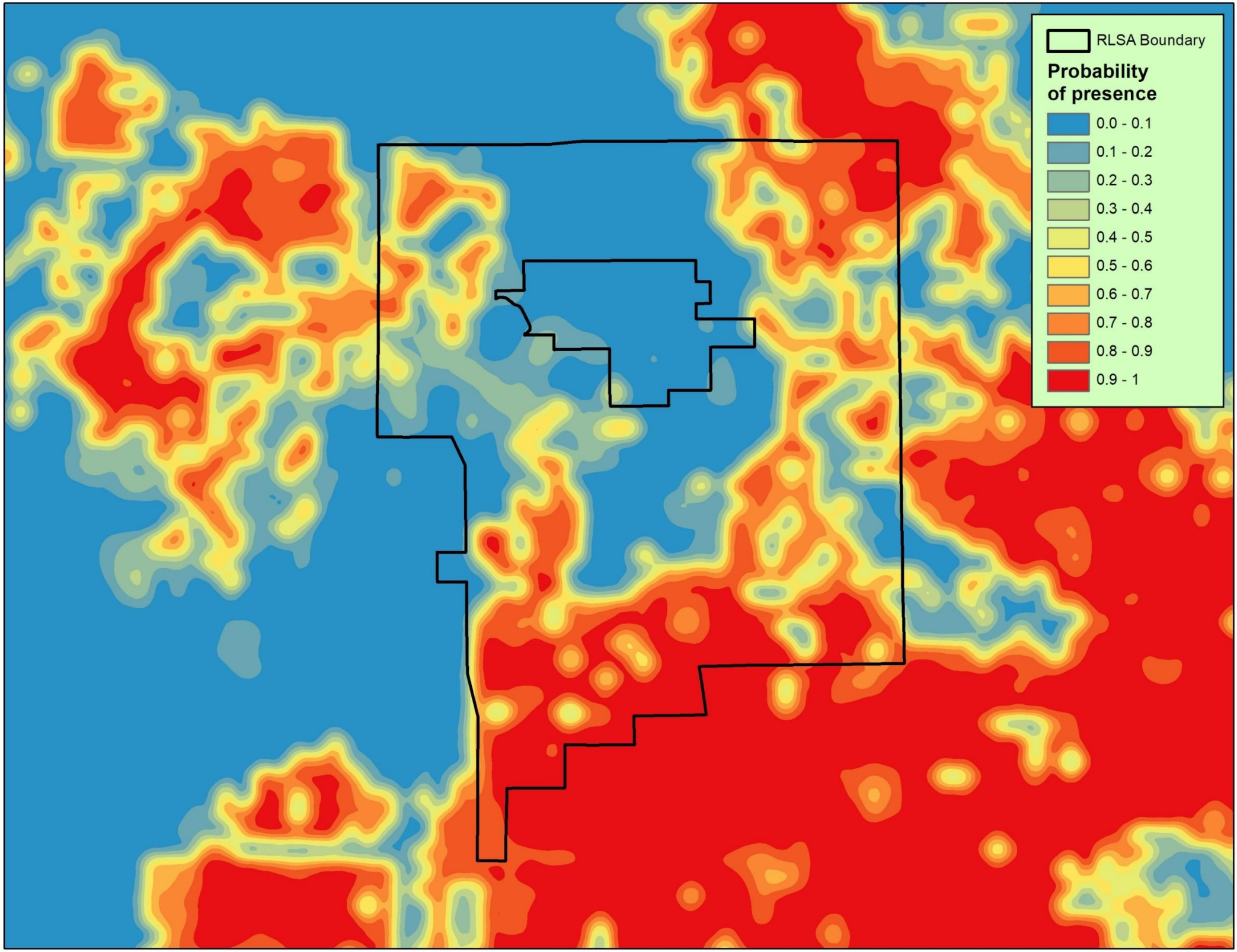
- The model identified 5579 km^2 of adult (breeding) panther habitat (cutoff threshold = 0.338).
- Model supports the current Primary Zone, except:
  - WCAs
  - Shark River Slough
  - “Witch’s finger”
- Secondary Zone contains very little adult habitat (3.8%).
- The most important factors determining panther presence are:
  1. Amount of forest cover (+)
  2. Human population density (-)
  3. Amount of forest edge (+)
  4. Water depth (Hydrology) (+/-)
- Panther home ranges have average P > 0.4 (median 0.8).

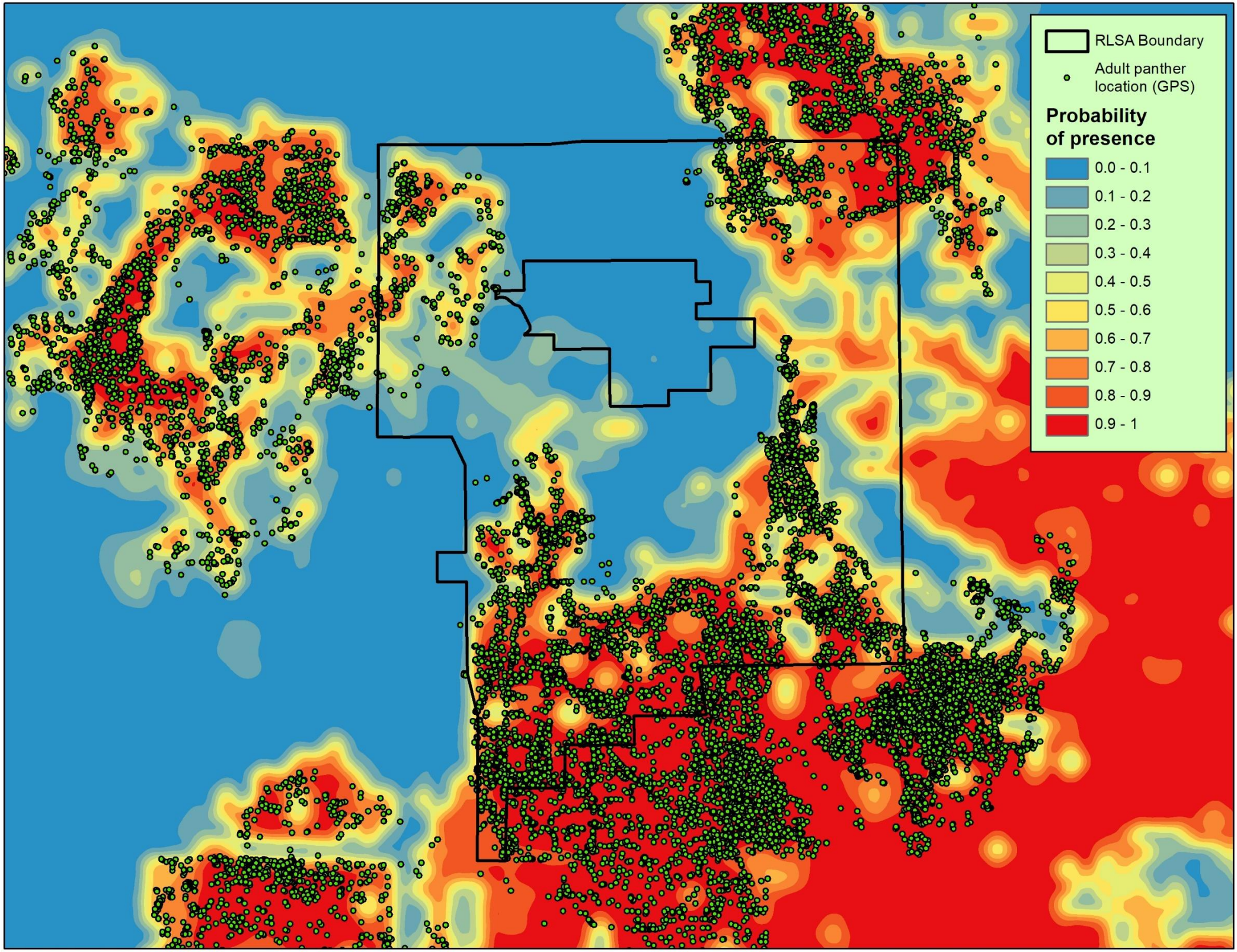
RECOMMENDATIONS

1. Protect the remaining breeding habitat.
   - There may already be insufficient habitat south of the river to support a viable population.

2. Revise or replace the current Panther Habitat Assessment Methodology ("panther tool").
   - There is much less habitat remaining than assumed by the tool.
   - Redraw the panther "zones" based on modeled habitat value.

3. Establish additional panther population(s) north of the river.
   - May require intentional reintroductions by wildlife agencies.
   - Use similar model to identify the best location(s).


RLSA Boundary
Probability of presence
0.0 - 0.1
0.1 - 0.2
0.2 - 0.3
0.3 - 0.4
0.4 - 0.5
0.5 - 0.6
0.6 - 0.7
0.7 - 0.8
0.8 - 0.9
0.9 - 1


RLSA Boundary
Adult panther location (GPS)
Probability of presence
0.0 - 0.1
0.1 - 0.2
0.2 - 0.3
0.3 - 0.4
0.4 - 0.5
0.5 - 0.6
0.6 - 0.7
0.7 - 0.8
0.8 - 0.9
0.9 - 1

Questions?

Acknowledgements

- Telemetry data collected by Florida Fish and Wildlife Conservation Commission and National Park Service.
- Tim Robinson (University of Wyoming) and Tom Edwards (Utah State University).
- US Fish and Wildlife Service.