



صندوق محمد بن زايد  
للمحافظة على الكائنات الحية  
The Mohamed bin Zayed SPECIES CONSERVATION FUND



# Wild Cats Brazil: “Disease threat mitigation and long-term monitoring of northern tiger cat in Mirador State Park: assessing the threat from domestic dogs”

Project 192522659



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## Final Report

Year II







صندوق محمد بن زايد



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94.4%

of the dog population vaccinated for deadly diseases!

Northern tiger cat population at Mel, Cágados and Zé Miguel areas of Mirador State Park MSP secured against disease outbreaks for a year!

The most important and self-sustaining population of *Leopardus tigrinus tigrinus* stable between 2013/2015 and 2018/2019 (in 2005 the population at Cágados was 0, likely due to outbreak – de Oliveira et al., 2020);



ca. 80 kids living inside MSP took part in our environmental activities;

brand new series of games, brochures, booklet developed (especially during lockdown) – some being used in several other conservation projects across the Americas;

involvement of community members into project activities;

partnerships with private landowners in areas surrounding MSP;

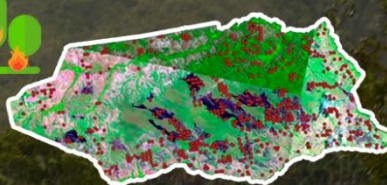


84.2%

of the dogs within park boundaries positive for canine (carnivore) distemper virus CDV;

61.9% just outside park borders

ALARMING numbers!



2019/2020 fire monitoring showed that 510 km<sup>2</sup> (ca. 10%) of prime tiger cat habitat burned. This could represent the home range of 50-94 tiger cats

"STABLE" POPULATION IN MSP, HIGHER THAN OUTSIDE PARK'S

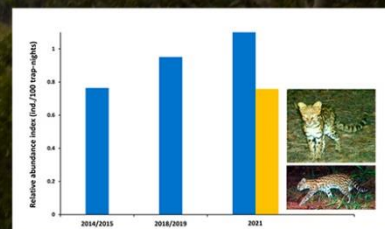


71.1%

of dogs positive for leishmaniasis inside the park and

52.4%

outside the park, creating a very serious sanitary problem for the human populations of the area





## OVERVIEW

### Highlights:

- ✓ 94.4% of the dog population vaccinated for deadly diseases;
- ✓ Northern tiger cat population at Mel, Cágados and Zé Miguel areas of Mirador State Park MSP now safe against disease outbreaks for a year!
- ✓ The most important and self-sustaining population of *Leopardus tigrinus tigrinus* stable between 2013/2015 and 2018/2020 (in 2005 the population at Cágados was 0, likely due to outbreak of disease – de Oliveira et al., 2020);
- ✓ 84.2% of the dogs within park boundaries positive for canine (carnivore) distemper virus (CDV); 61.9% positive just outside park borders – ALARMING numbers!
- ✓ 71.1% of dogs positive for leishmaniasis inside the park and 52.4% outside the park, creating a very serious sanitary problem for the human population of the area;
- ✓ Around 80 kids living inside MSP took part in our environmental activities;
- ✓ Brand new series of games, brochures, and a booklet developed (especially during COVID lockdown) – some being used in several other conservation projects across the Americas, as well as being sought after by Maranhão state government authorities to be used in the state run school system;
- ✓ Involvement of park community members in project activities;
- ✓ Training of wildlife conservationists from Brazil and abroad;
- ✓ Partnerships for small cat conservation with 4 private landowners in areas surrounding MSP (3 of which forming one block interconnected and the other adjacent to MSP) – connectivity is key;



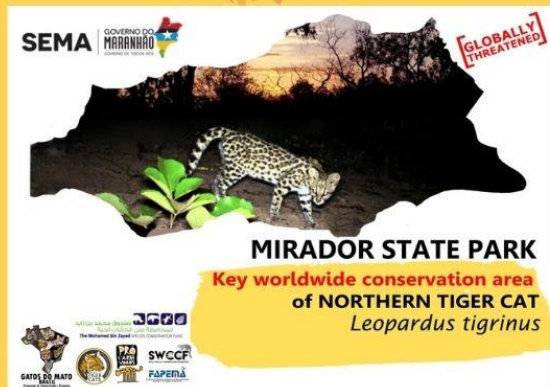


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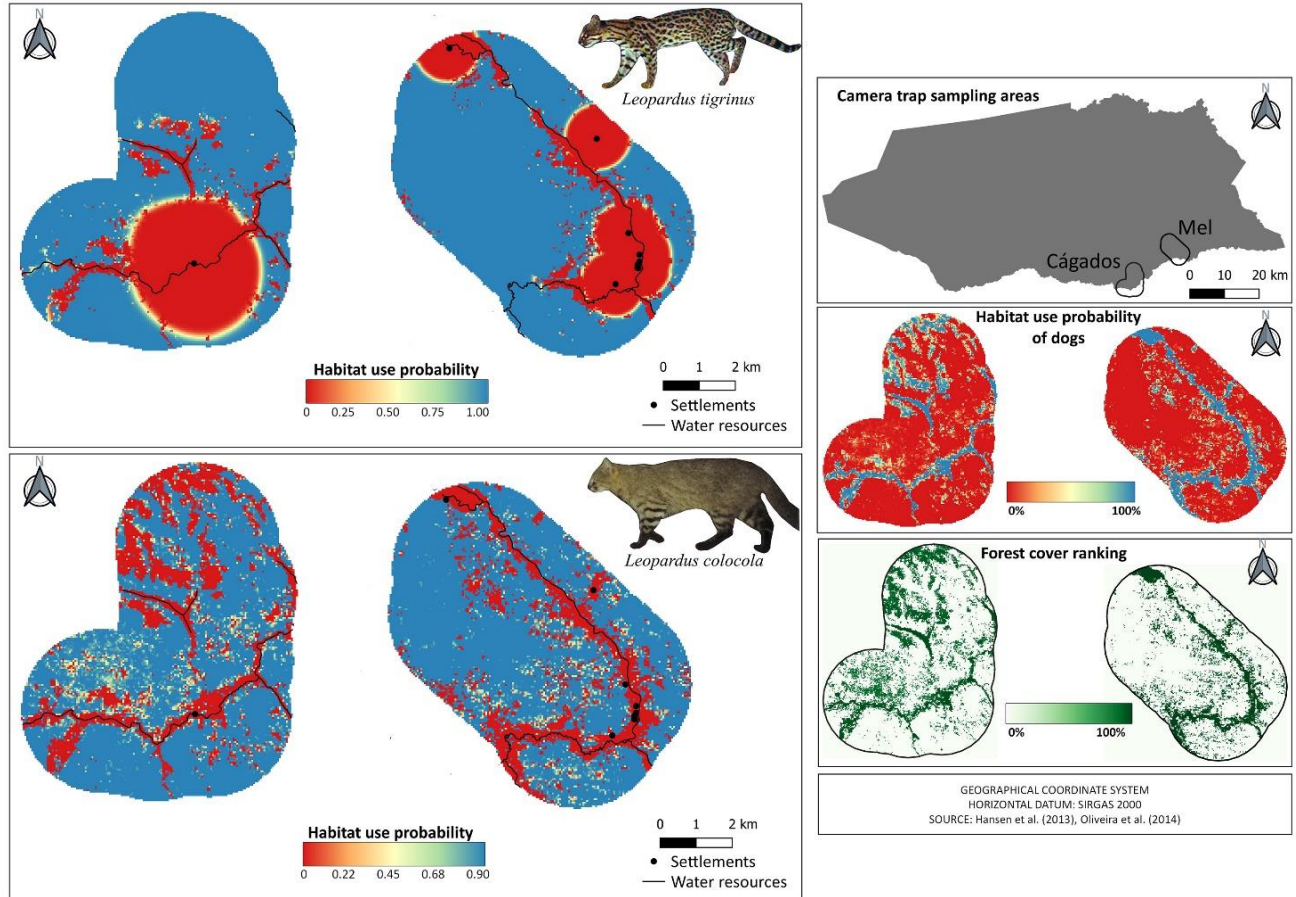
- ✓ 2019/2020 fire monitoring showed that 510 km<sup>2</sup> (ca. 10%) of prime tiger cat habitat burned. This could represent the home range of 50–94 tiger cats;
- ✓ Through the actions of Mirador tiger cat conservation project, Maranhão State Environmental Secretariat – SEMA approved the northern tiger cat or “pintadinho” (*Leopardus tigrinus*) to be Maranhão State symbol of biodiversity (still awaiting official decree);
- ✓ Our flagship conservation approach and vaccination program is under consideration to be adopted by SEMA at other state run protected areas;
- ✓ Camera monitoring (science for conservation) allowed us to discover:
  - The first interspecific relationships among tiger cat, pampas cat and dogs;
  - A refined habitat use analysis for both felid species;
  - Domestic dogs and human presence greatly influence habitat use by small felids;
  - Anthropogenic variables represent a conservation issue for both felids.

THROUGH OUR WORK IN MIRADOR, L.  
TIGRINUS WAS CHOSEN AS THE SYMBOL  
OF BIODIVERSITY CONSERVATION IN  
MARANHÃO STATE!



MARANHÃO BIODIVERSITY CONSERVATION LOGO  
(UNDER APPROVAL)





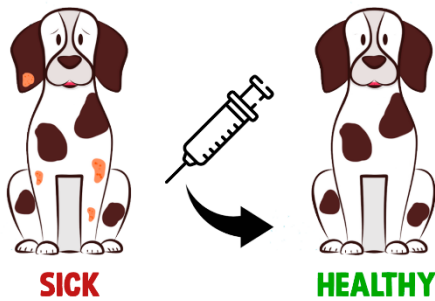
Predictive occupancy maps for *L. tigrinus* and *L. colocola braccatus* on the effectively surveyed areas of MSP, and maps for the main covariates.



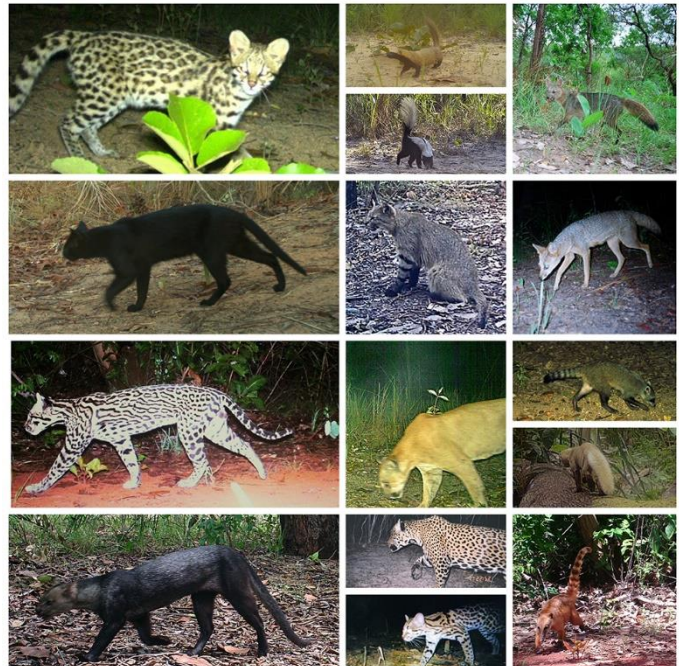




Our vaccination campaigns have immunized 94.4% of the dogs within MSP Mel, Cágados and Zé Miguel areas, and the Mato Grosso settlement (just outside park borders). This should minimize considerably the risk of disease outbreaks of the most important population of northern tiger cat in lowland South America for a year!



All the Mirador area's carnivores will benefit from this action!





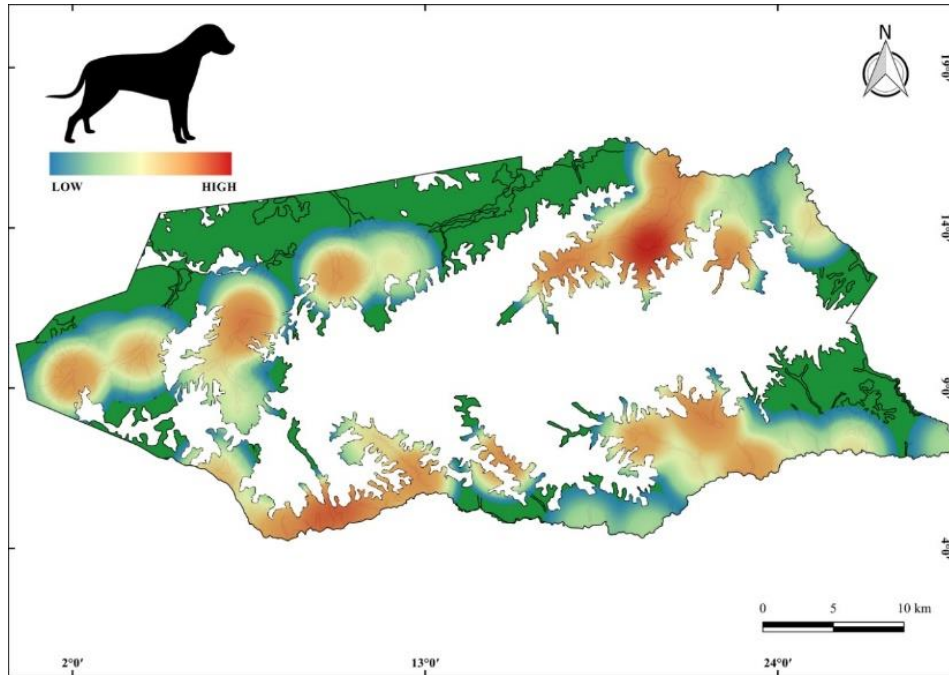


Resident dogs of Mirador State Park: A- Apathetic and anorexic domestic dog. B- Presence of ectoparasite in the cervical region. C- Puppy with signs of apathy and anorexia. D- Animal presenting pruritus and alopecic regions.



Dog with full-blown canine distemper virus symptoms during one of the vaccination campaigns.





Dogs potentially impact 65% of prime tiger cat habitat in Mirador State Park.

## POPULATION VIABILITY

**FIRST POPULATION VIABILITY ANALYSIS EVER DONE FOR A SMALL NEOTROPICAL CAT!**

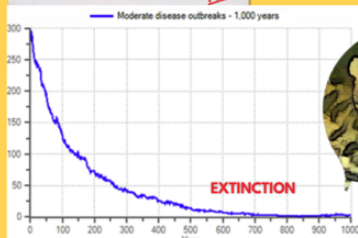
**IN THE LONG TERM (1000 YEARS), THE POPULATION OF LEOPARDUS TIGRINUS DIES OUT IN THE CASE OF MODERATE DISEASE OUTBREAKS.**

**BUT...**

**WITH LIGHT DISEASE OUTBREAKS OR NO CATASTROPHES AT ALL, THE MIRADOR POPULATION IS VIABLE IN THE LONG RUN (1,000 YEARS)**



THE EFFECT OF HABITAT LOSS IN THE SHORT TERM IS ALSO DEVASTATING!



Population viability of tiger cats in Mirador State Park.





Environmental education / **raising a conservation mind in kids, children are the future!**



Next generation of wildlife conservationists (biologists and veterinarians) in training, from Brazil and overseas (Costa Rica, Guatemala, Germany), and community enrolment in project activities. Moisés Pereira born and raised in MSP is now part of the “Pintadinho” team!

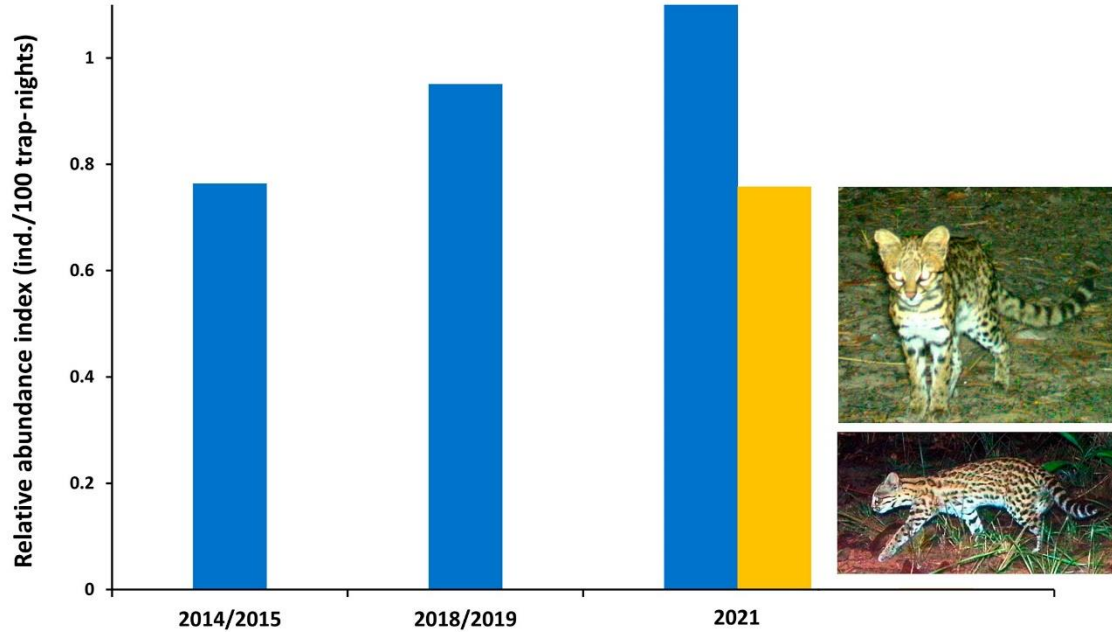




Our private partner landowners taking part of the action for small cats/biodiversity conservation, and the resulting pictures of their cam-trap placement. Our aim is twofold, guaranteeing protection in private lands and securing connectivity for gene flow and long-term viability of populations. Of our current four partners, three share contiguous properties near the park and the other is adjacent to MSP border.



## Monitoring



Population monitoring of northern tiger cats at its key worldwide population in Mirador State Park, and on private properties outside the park in Nova Colinas, in the vanishing Brazilian northern savannas. Blue bars – MSP, yellow bar – Nova Colinas.

Our monitoring program is showing that the population in MSP is fairly stable, maybe slightly increasing along the years. Although it looks as if actually increasing, difference among years might be attributed both to the areas sampled and year to year environmental variations. The relative abundance index in 2021 was higher inside MSP (1.12 ind./100 trap-nights) than on the private properties outside the park (0.761 ind./100 trap-nights). However, these differences might be related to variability in habitat features and a higher incidence of ocelots outside park borders. Monitoring up close this key worldwide population of *Leopardus tigrinus* is crucial.

### Study sites

- Cágados outpost
- Mel outpost
- ▲ Zê Miguel outpost
- Settlements

### Vegetation

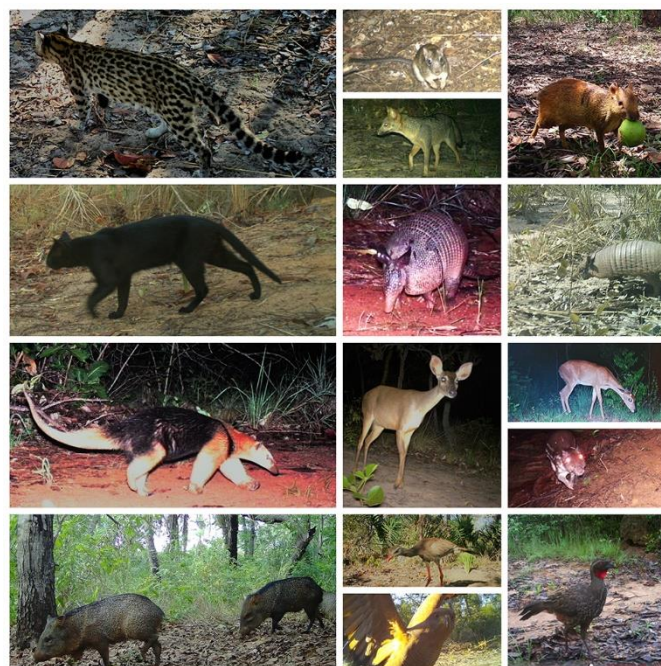
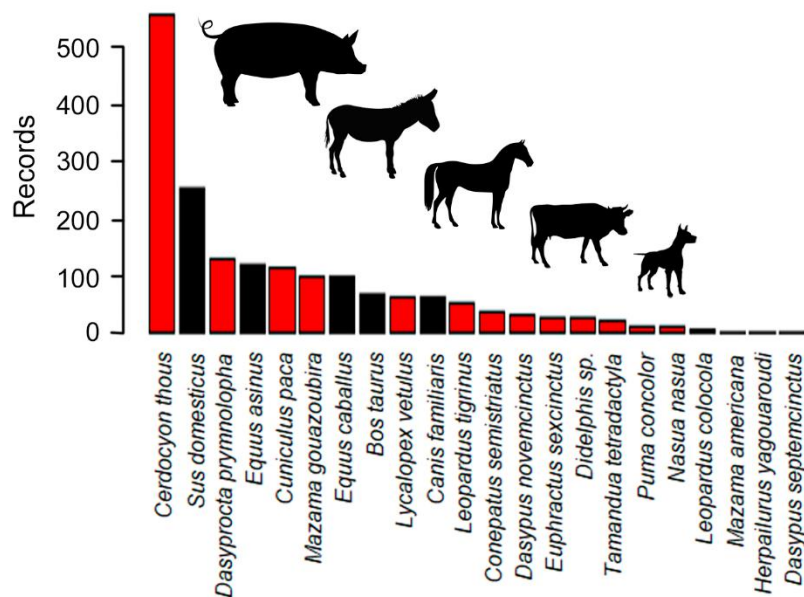
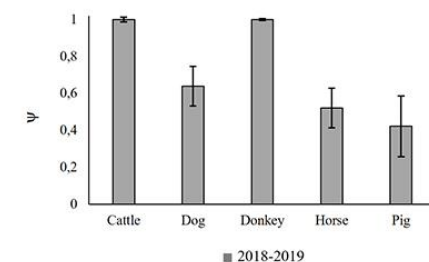
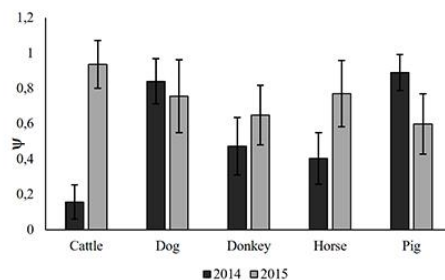
- Oldfields
- Gallery forest
- Woodland/shrubland savana
- Scattered tree-grassland savana
- Secondary vegetation
- Open savana



### HIGHLIGHTS

- Invasive species roam freely and extensively inside Mirador State Park;
- Elevation and distance to houses were the most important covariates;
- Dogs roamed over extremely large distances, posing a bigger threat than expected;
- Donkeys already seem to have feral populations established;
- Lack of changes in occupancy suggests their high adaptability and resilience.

9,222 trap-nights and 2,189 independent records which are:



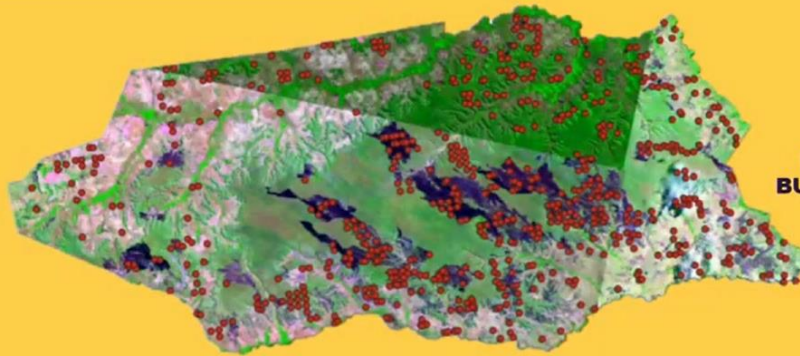


### HABITAT MONITORING:

MONITORING THE EXTENT OF THE  
2020 FIRES.  
MONITORING VEGETATION LOSS VIA  
SATELLITE IMAGERY.



FIRE MONITORING MIRADOR STATE  
PARK 2020 - BURNT AREAS IN SHADES  
OF PINK

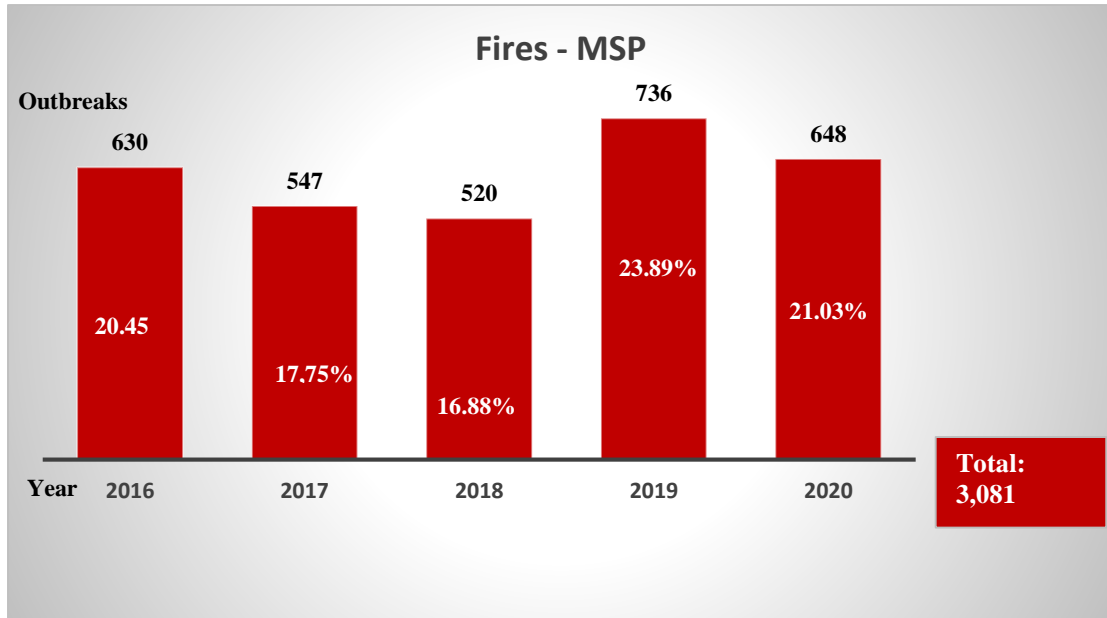


RED DOTS  
BURNED SITES

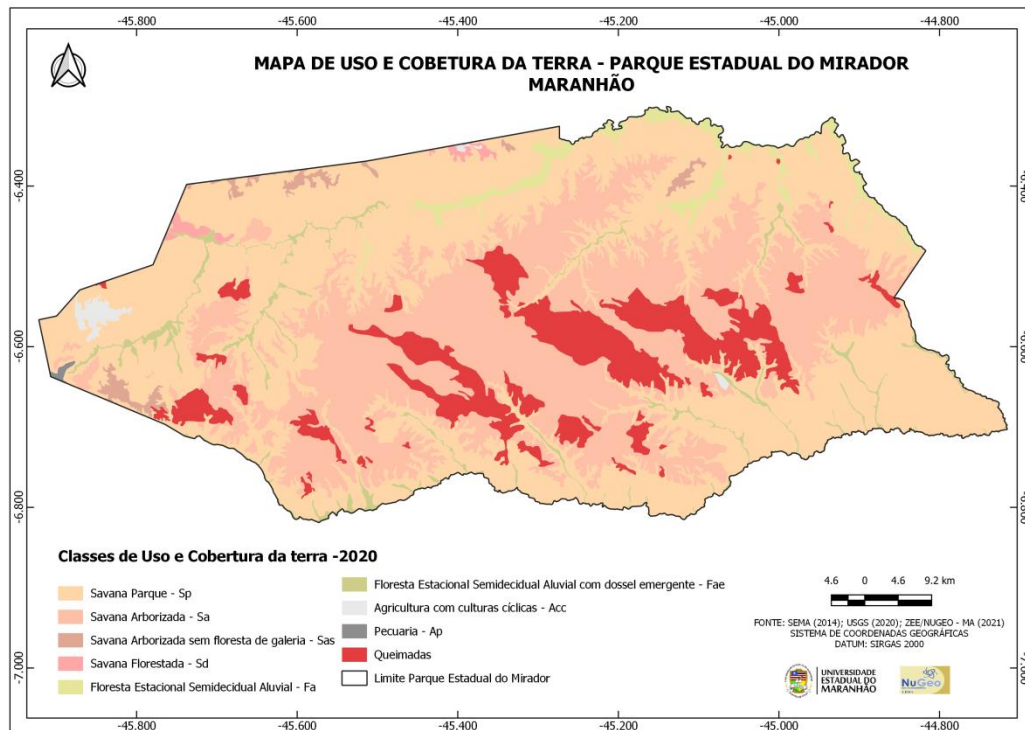
**MOST OF THE BURNT AREA COMPRISED  
PRIME LEOPARDUS TIGRINUS HABITAT**

Mirador State Park: 510 km<sup>2</sup>  
burned in the 2020 fires - ca.  
10% of the park. This area  
could represent the home  
range of 50-94 individual tiger  
cats, a very sizable  
population!





Cumulative fire hotspots in Mirador State Park from 2016-2020



Land use map of Mirador State Park in 2020 (burnt areas in red)



Previously... (Project 182517790)

Global Ecology and Conservation 22 (2020) e00927



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Global Ecology and Conservation

journal homepage: <http://www.elsevier.com/locate/gecco>



Original Research Article

## A refined population and conservation assessment of the elusive and endangered northern tiger cat (*Leopardus tigrinus*) in its key worldwide conservation area in Brazil

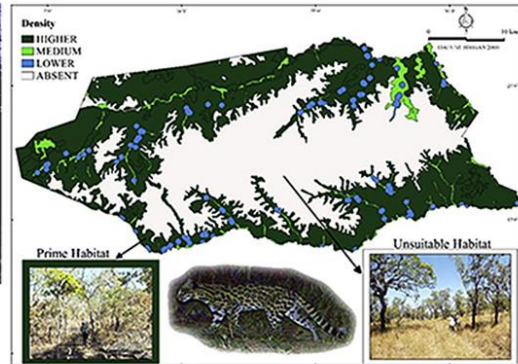
Tadeu G. de Oliveira <sup>a, b, \*</sup>, Breno C. Lima <sup>a</sup>, Lester Fox-Rosales <sup>c</sup>,  
Renata S. Pereira <sup>a</sup>, Elienê Pontes-Araújo <sup>d</sup>, Alana L. de Sousa <sup>a</sup>



➤ Density found are on the upper values known for small Neotropical felids:

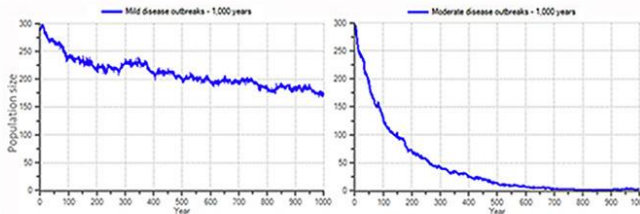
- 0.12 and 0.25 individuals/km<sup>2</sup> (nonspatial)
- 0.087 and 0.11 individuals/km<sup>2</sup> (spatial)

➤ The population at MSP is viable only in a mild disease scenario, but not with stronger outbreak or loss of habitat



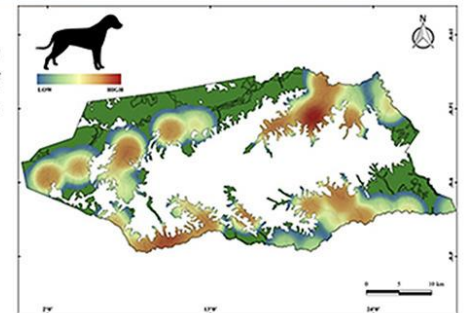
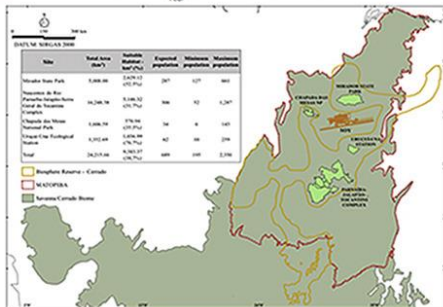
Density map of northern tiger cat at Mirador State Park, its key worldwide conservation area in the threatened MATOPIBA savannas

Healthy prey base and very low ocelot numbers allows for the higher densities at MSP



The threat of disease transmission by domestic dogs potentially impact 65% of the park, and seems to be the ultimate threat for the species there

➤ Given its density and abundance, as well as area size, compared to other locations of the northern savannas, MSP rises as the most important site for the worldwide long-term conservation of *Leopardus tigrinus*



<https://doi.org/10.1016/j.gecco.2020.e00927>





See more of our conservation actions on these links!

<https://youtu.be/dUFzw9TDDjA>

<https://youtu.be/5wfv4TTm6iI>  
<https://youtu.be/5WBLyaQLznU>

[https://youtu.be/6mzqL5\\_6CIk](https://youtu.be/6mzqL5_6CIk)  
<https://youtu.be/U4kAXzeye02Y>