

The Effects of the Invasive Burmese Python on the Florida Everglade Ecosystem with Reference to the Brown Tree Snake of Guam

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Abstract

Invasive species are among one of the biggest threats to biodiversity in the United States. The Burmese python is a newer invasive and the Brown tree snake is an established threat of Guam since 1949. This case study is to discuss how the Burmese python impacts the Florida ecosystem compared to how the Brown tree snake has already impacted Guam's ecosystem and the conservation issues with managing the Burmese python. The Brown tree snake caused the decline and extinction of many native bird species and the Burmese python caused the decline of many mammal species either through direct or indirect causes.

Introduction

- Invasive species are one of the most significant threats to biodiversity (Dorcas, et al. 2011).
- Burmese python is one of the largest snakes in the world and has successfully colonized over 1000 km² of Florida (Reed, et al. 2012).
- The Brown tree snake was introduced to Guam in 1949 and has led to the extinction of 13 of the 22 native bird species (Rodda & Savidge, 2007).
- **Research Question:** How destructive is the Burmese python compared to the Brown tree snake?
- With a better understanding, a conservation plan can be made to better manage the invasive python.

Methodology

Examined the snakes invasive ranges

Examined the Burmese pythons numbers

Compared the snakes predation risk and impacts to local organisms

Assessed conservation issues

Evaluated conservation strategies

Results

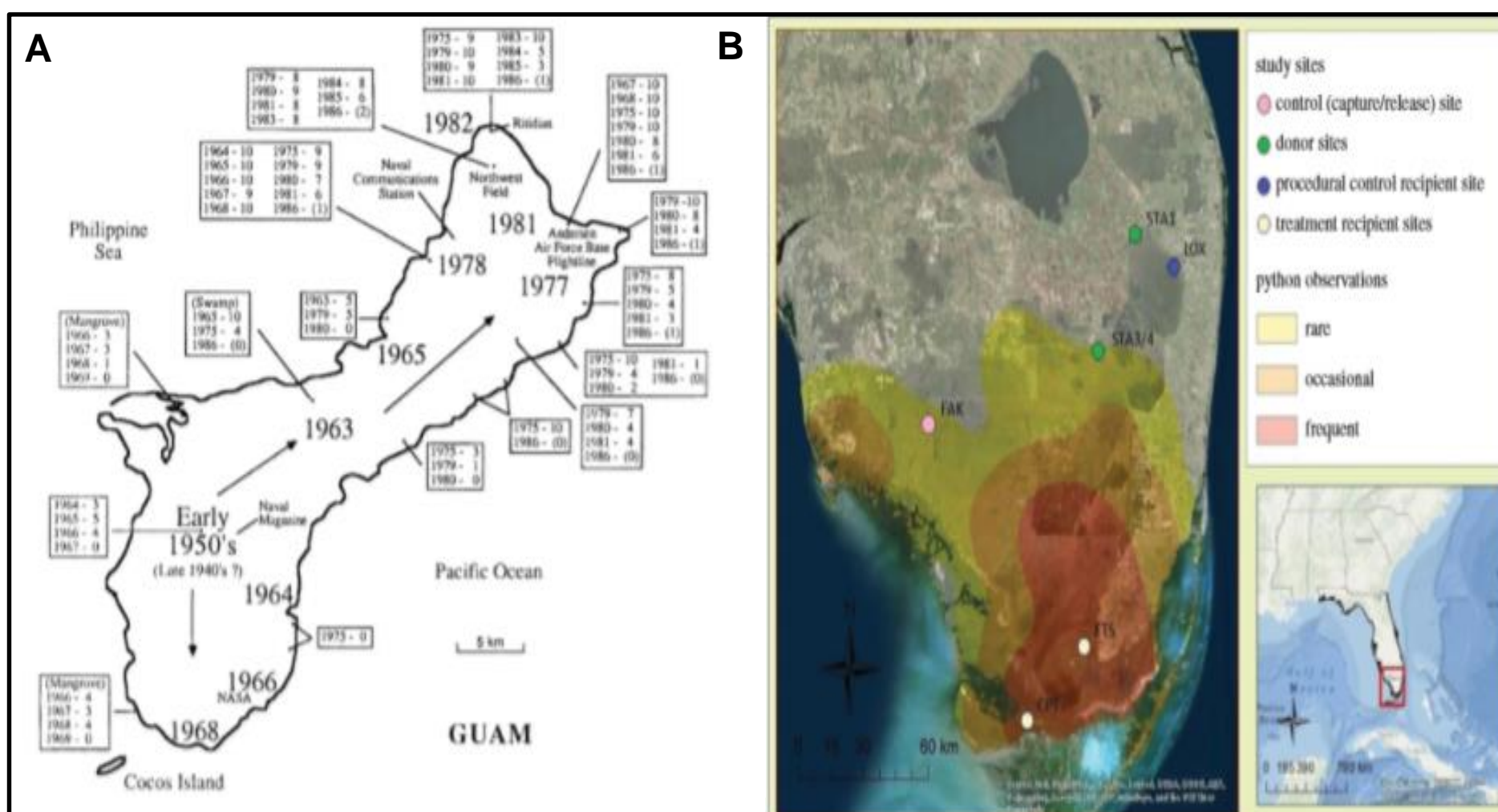


Figure 1. Distribution of Snakes. (A) Spread of the Brown tree snake in Guam. (B) Spread of the Burmese python throughout southern Florida (Savidge, 1987; McCleery, et al. 2015).

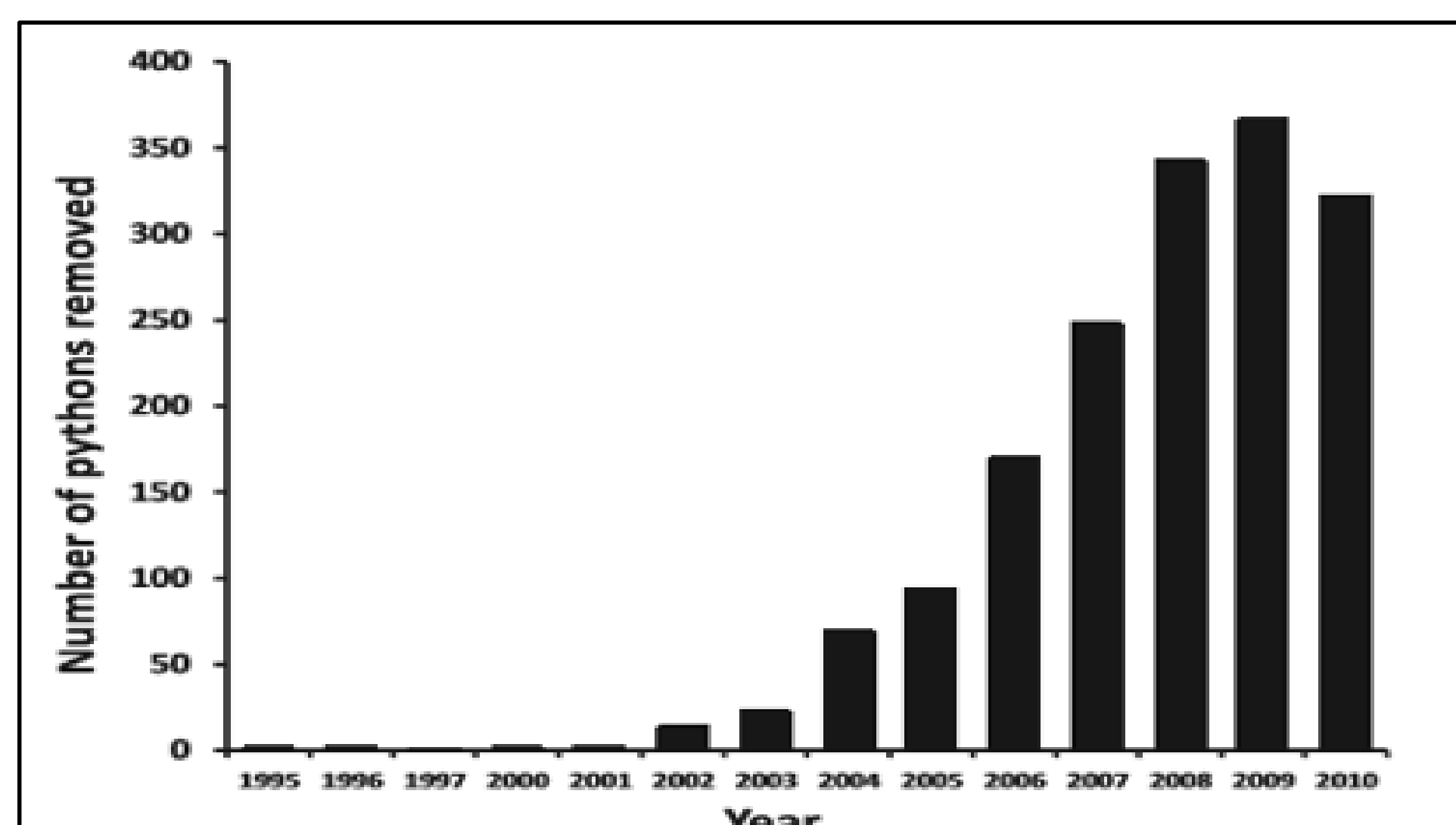


Figure 2. Python removals in Everglades National Park (Dorcas, et al. 2011).

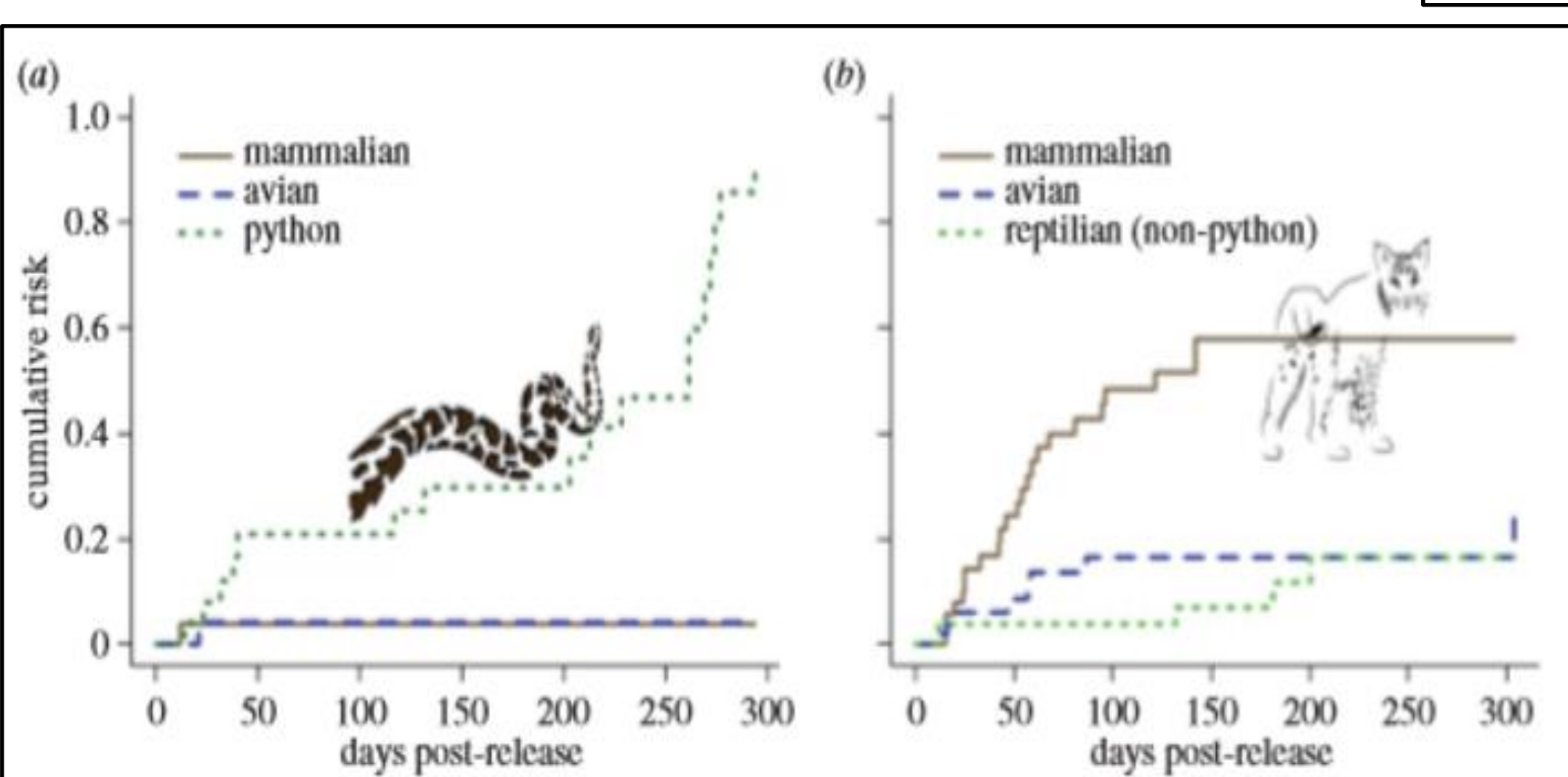


Figure 3. Predation risk by python. (A) Risk of Marsh rabbit getting preyed on by Python in ENP. (B) Risk of Marsh rabbit getting preyed on by Python not in ENP (McCleery, et al. 2015).

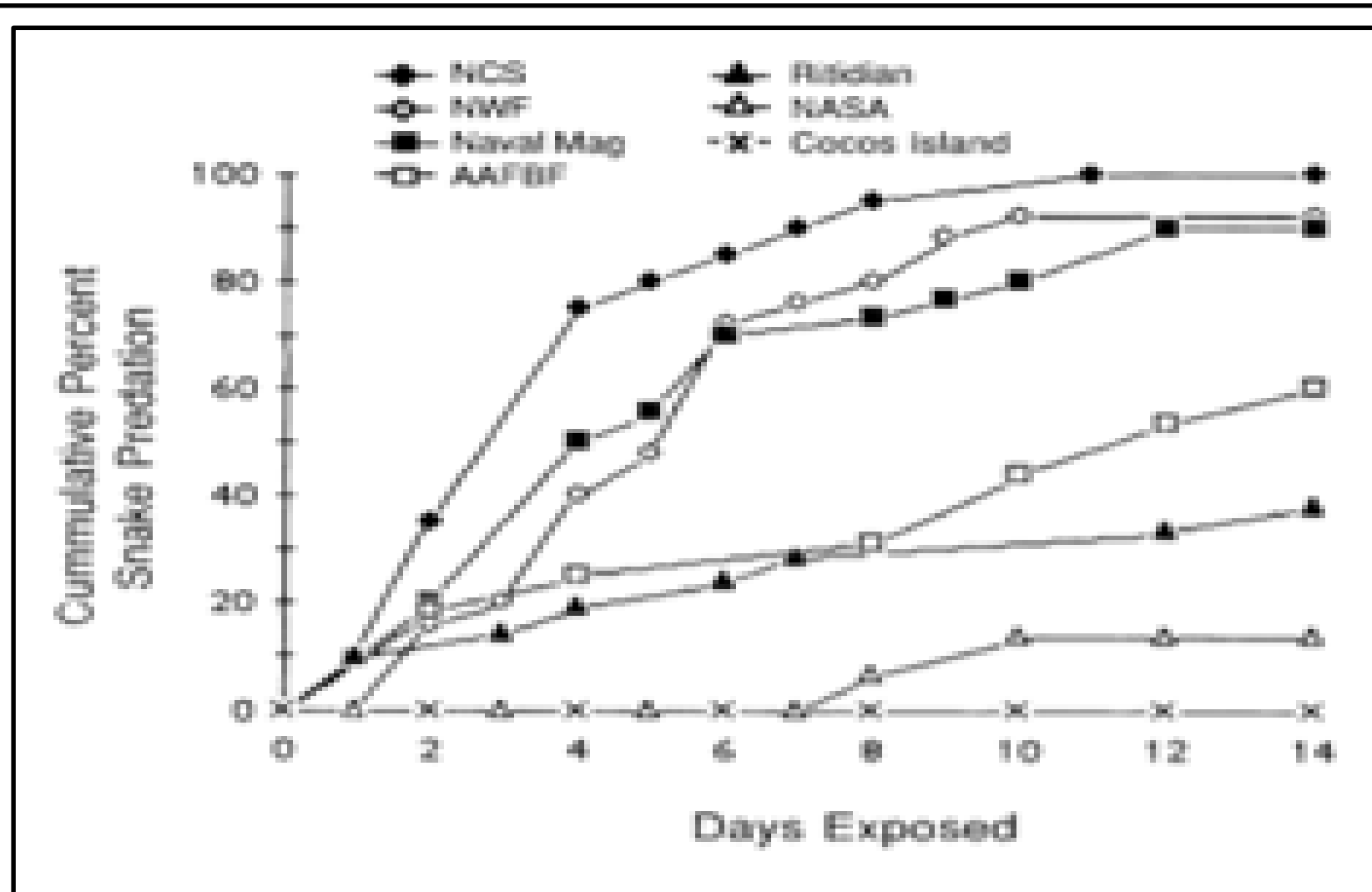


Figure 4. Brown tree snake predation. Predation on caged birds by Brown tree snakes at different locations in Guam (Savidge, 1987).

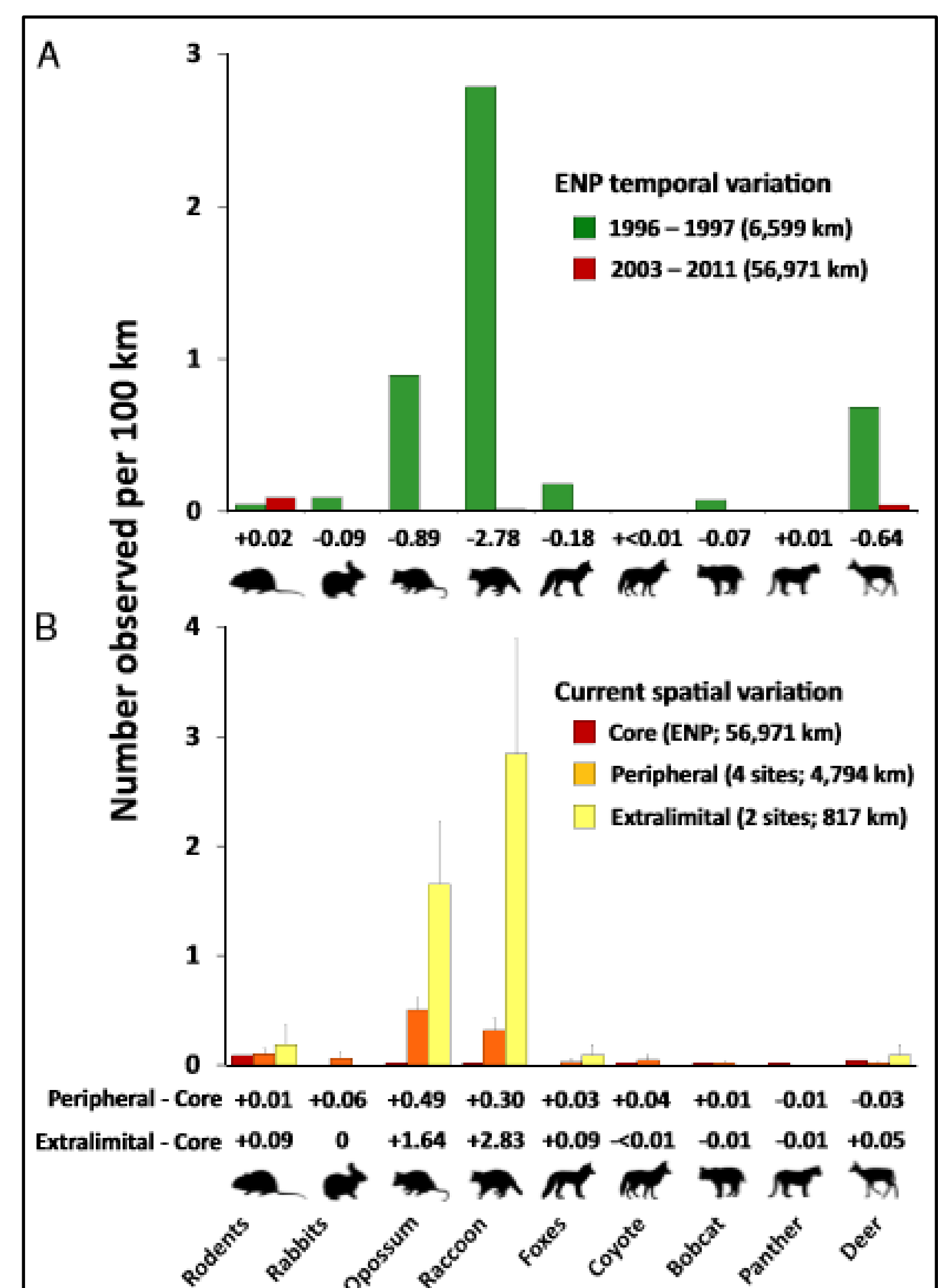


Figure 5. Spatial and temporal variation of mammal predation by python. (A) Pre-establishment ENP compared to established ENP. (B) ENP compared to a neighboring site and a farther away site (Dorcas, et al. 2011).

Conclusions

- Negligence against both species there have been significant repercussions (Fig 1-5).
- The brown tree snake has led to several extinctions (Fig. 4) and the Burmese python is soon following (Fig 3 and 5).
- So far conservation efforts have been lacking in the everglades region and if this continues the possibility for several species extinctions will happen.
- There are catch and kill programs as well as overall education programs.
- Education is a crucial component in the fight, by showing people the impacts of the pet trade and its detriments to the environment.

References

- Dorcas, M. E., Willson, J. D., Reed, R. N., Snow, R. W., Rochford, M. R., Miller, M. A., ... & Hart, K. M. (2012). Severe mammal declines coincide with proliferation of invasive Burmese pythons in Everglades National Park. *Proceedings of the National Academy of Sciences*, 109(7): 2418-2422.
- Reed, R. N., Willson, J. D., Rodda, G. H., & Dorcas, M. E. (2012). Ecological correlates of invasion impact for Burmese pythons in Florida. *Integrative zoology*, 7(3): 254-270.
- Hart, K.M., Rodda, G.H., Mazzotti, F.J., Snow, R.W., Cherkiss, M., Rozar, R. and Goetz, S., 2011. A field test of attractant traps for invasive Burmese pythons (*Python molurus bivittatus*) in southern Florida. *Wildlife Research*, 38(2): pp.114-121.
- Rodda, G. H., & Savidge, J. A. (2007). Biology and impacts of Pacific island invasive species. 2. *Boiga irregularis*, the brown tree snake (Reptilia: Colubridae). *Pacific Science*, 61(3):307-324.
- Savidge, J. A. (1987). Extinction of an island forest avifauna by an introduced snake. *Ecology*, 68(3):660-668.