Comparative Studies in Support of Sustainable Management of the Pantanal and the Everglades

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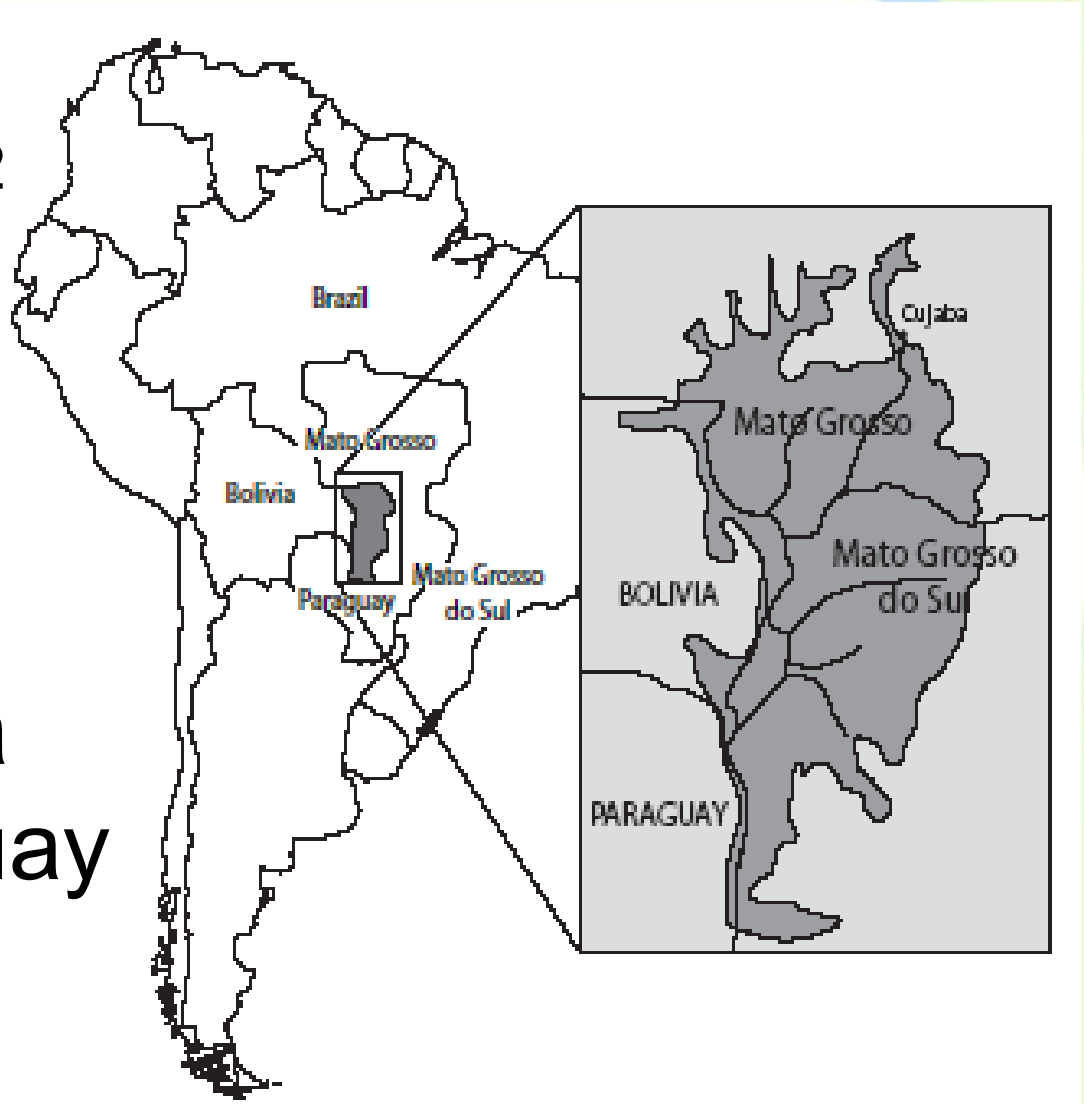
The Largest Tropical Wetland in the World

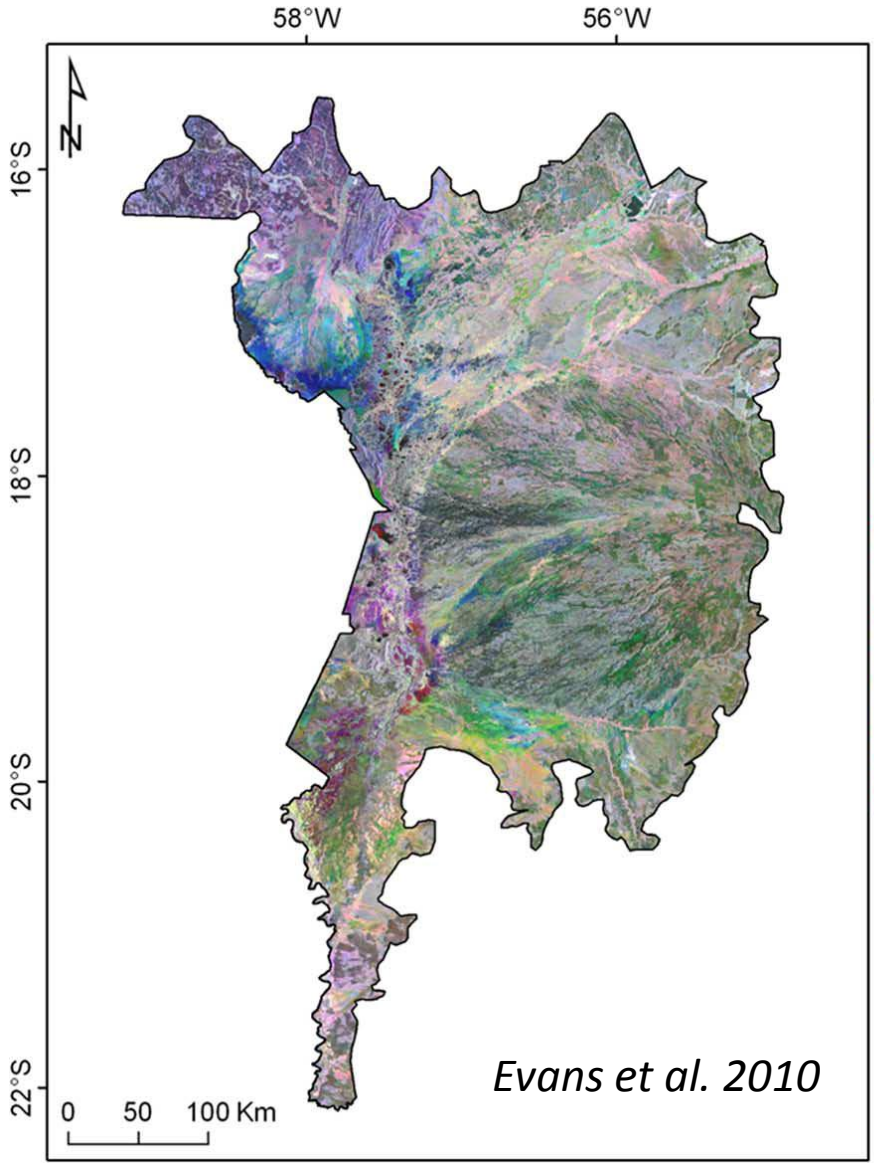
CENTRO DE PESQUISA DO PANTANAL
Pantanal Research Center

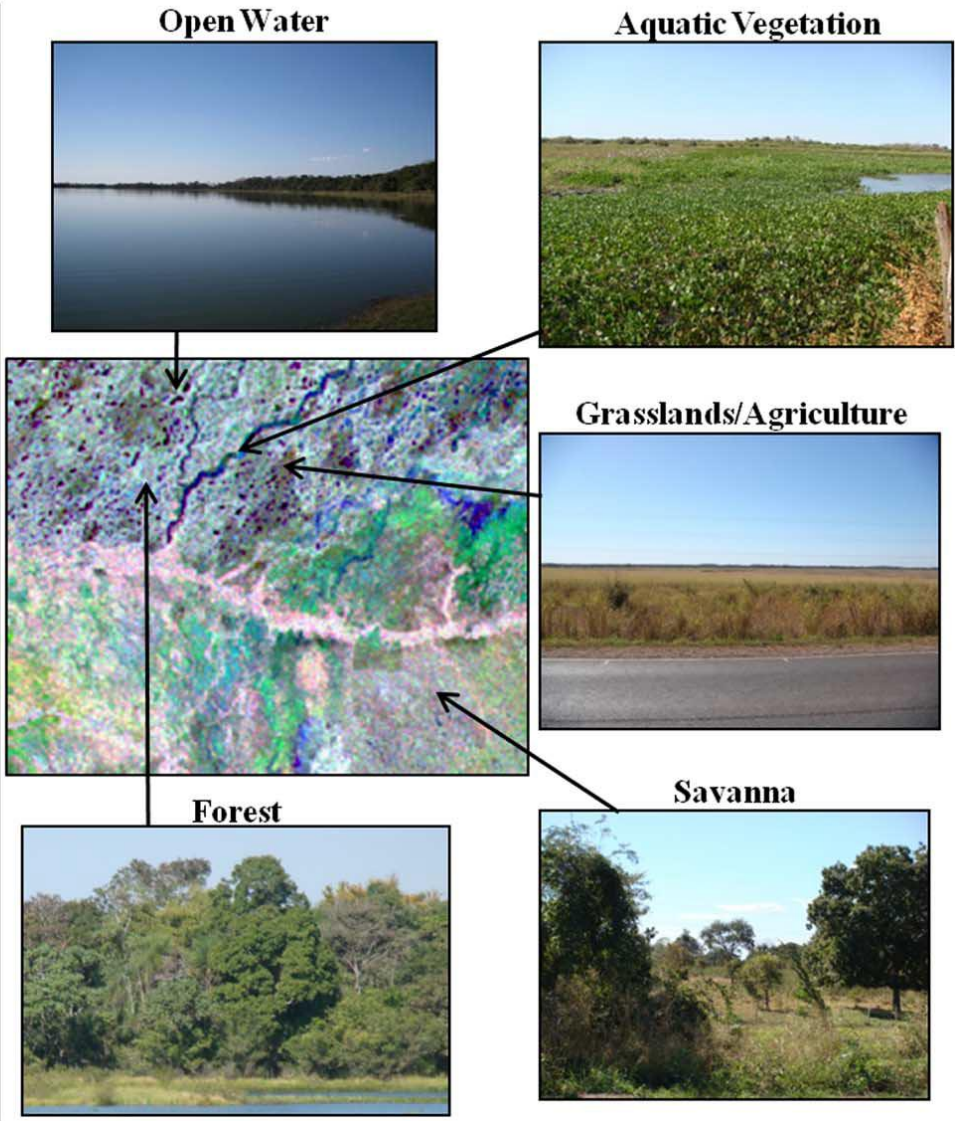
165.000 Km²



- 85% Brazil
- 10% Bolivia
- 5% Paraguay

The Largest Tropical Wetland in the World





1700 espécies vegetais:

200 gramíneas

200 leguminosas

240 forrageiras

10 palmáceas

665

162

Produtividade do Ecosistema

246

Fase Terrestre

Fase Aquática

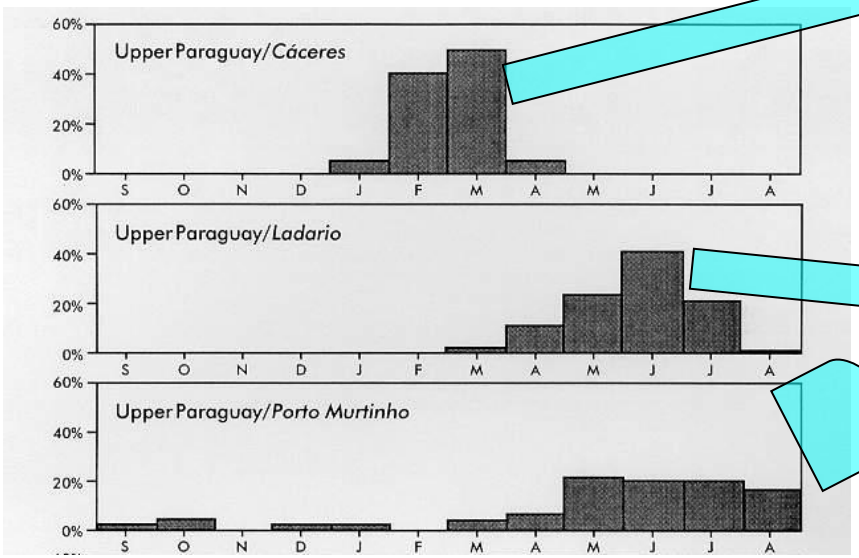
40

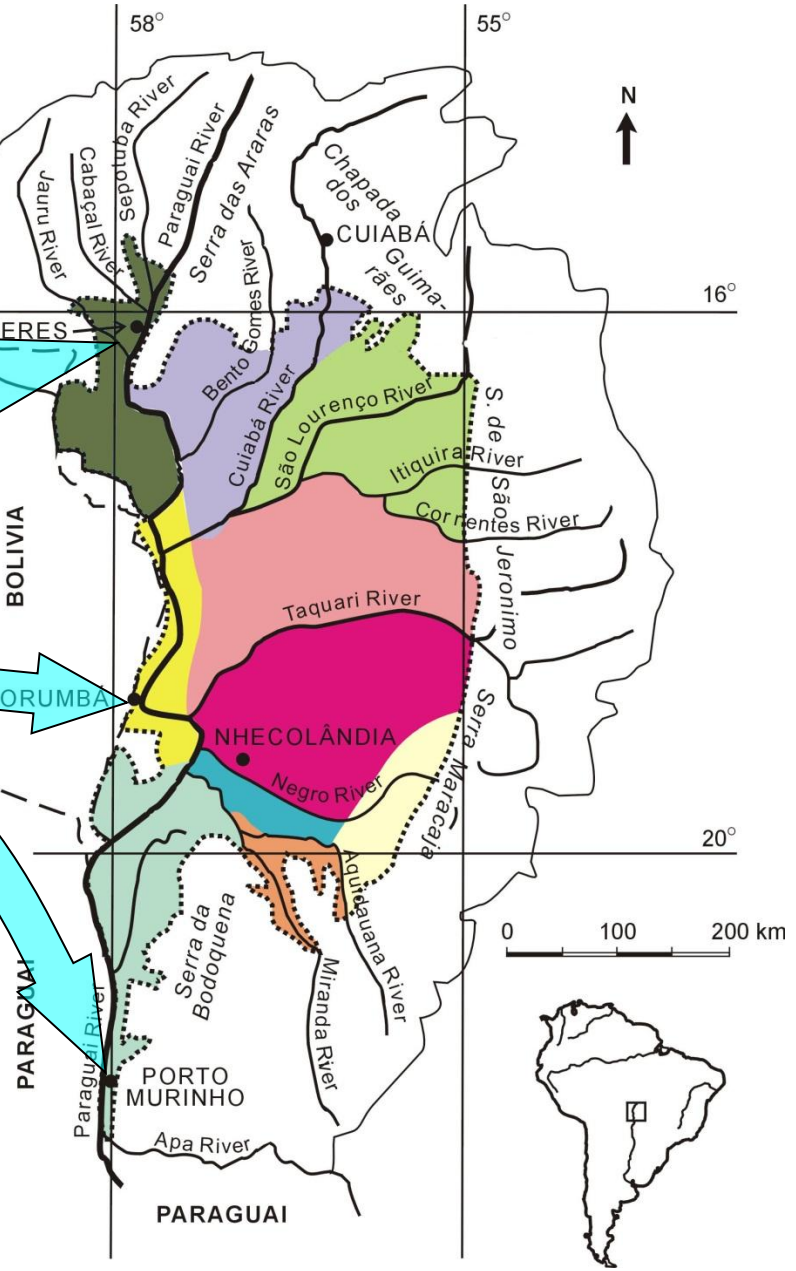
1000

263

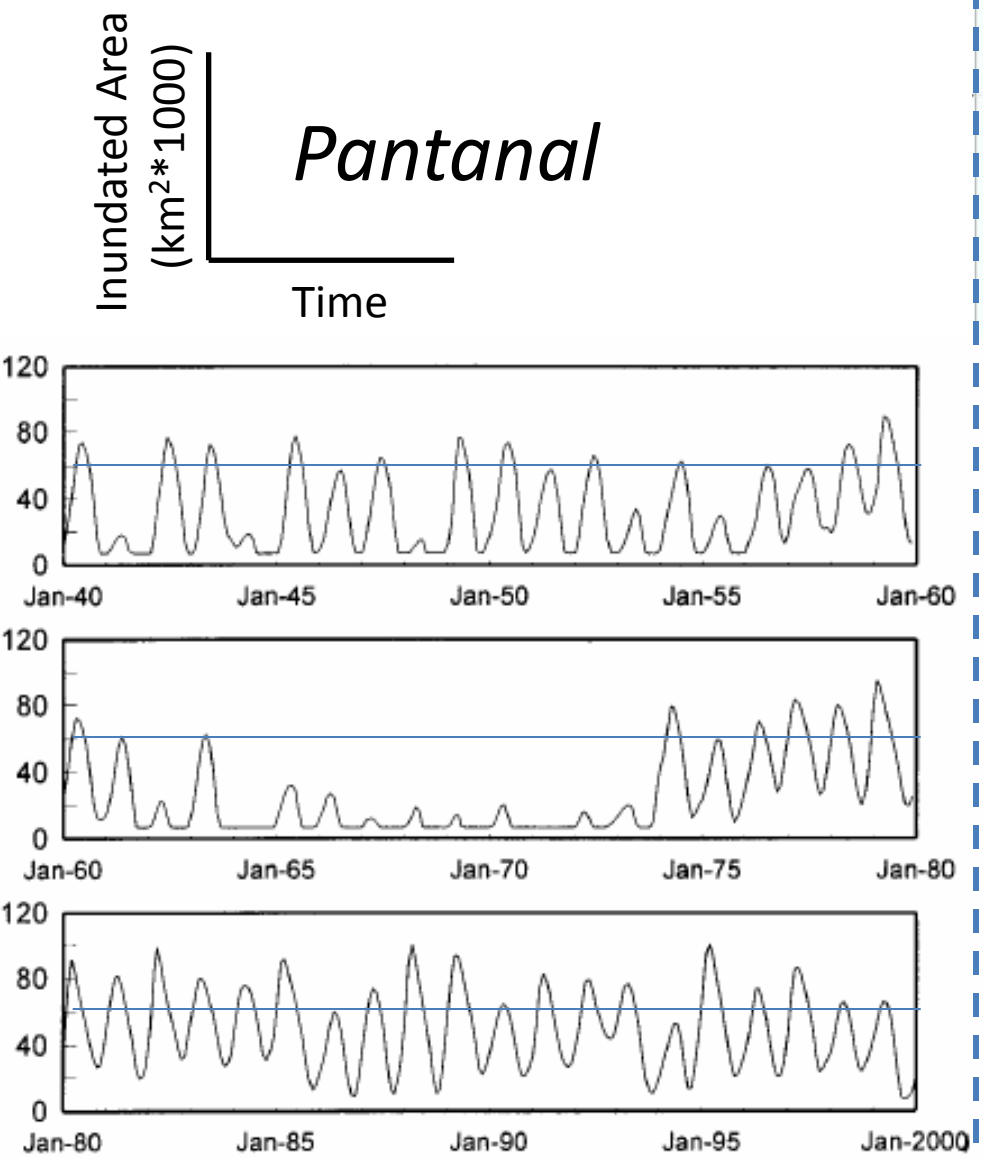
95

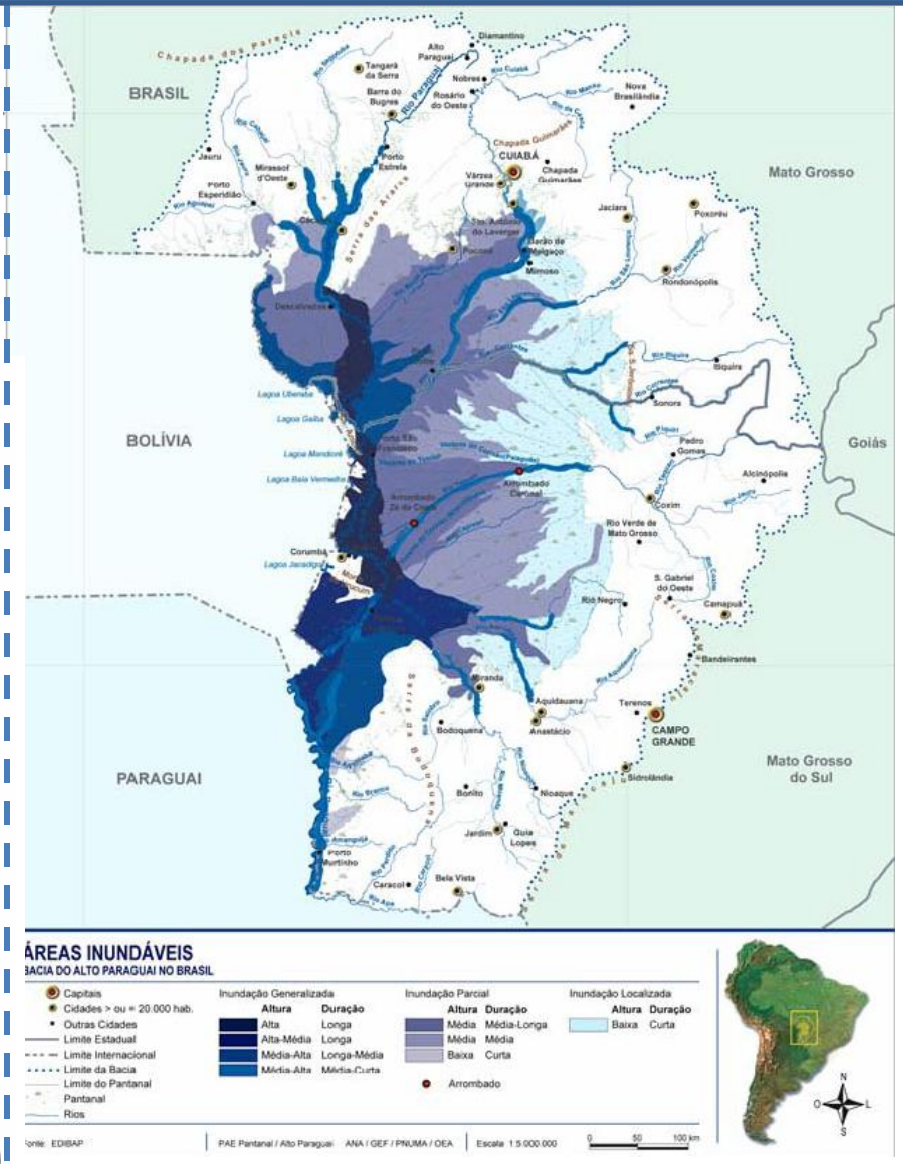
A pulsing system





Annual extent of inundation since the mid-20th century





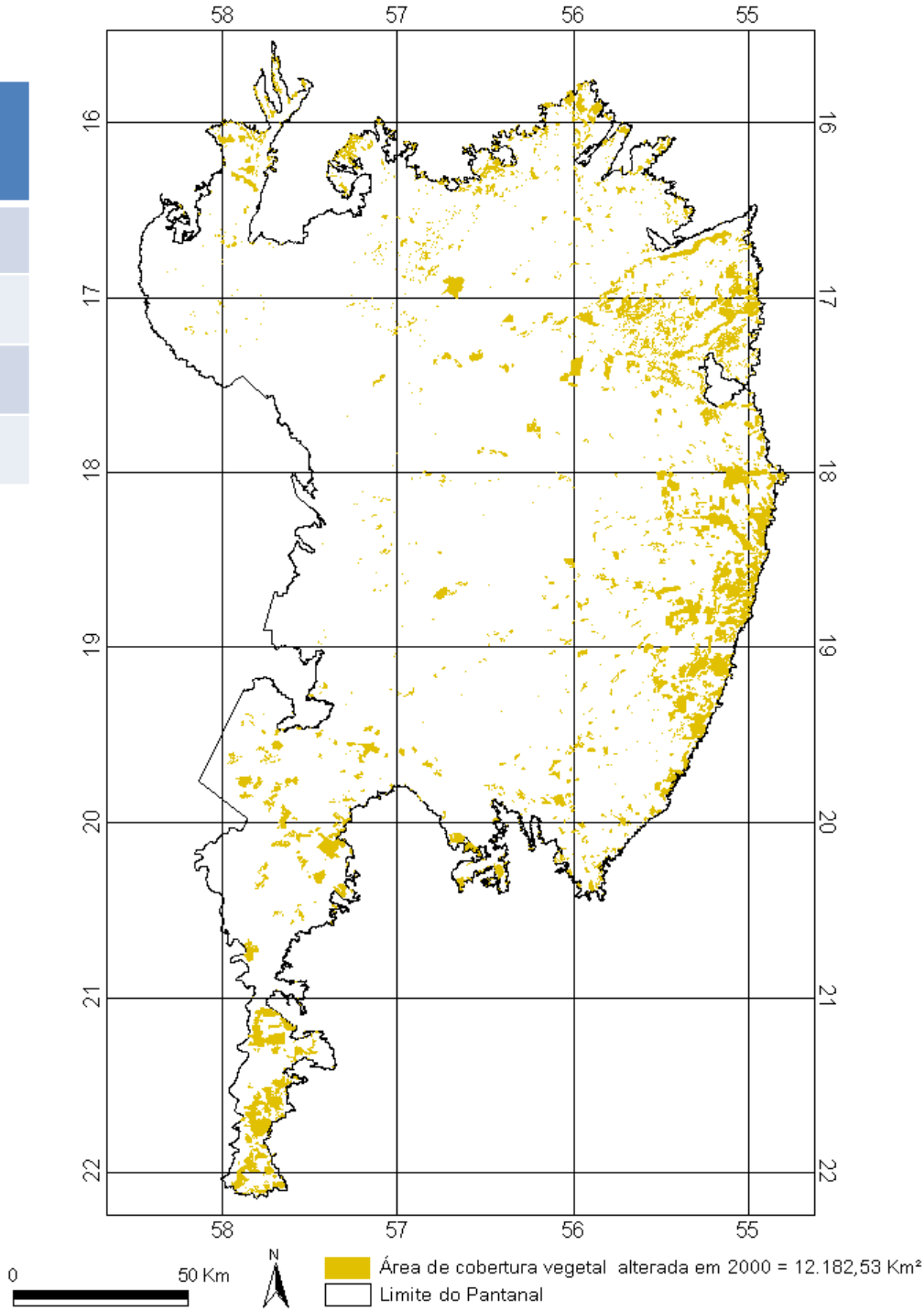
Hamilton et al. 1996

Da área do Pantanal com supressão da vegetação nativa	
1990	3.9%
2000	8.8%
2002	11.3%
2004	12.0%

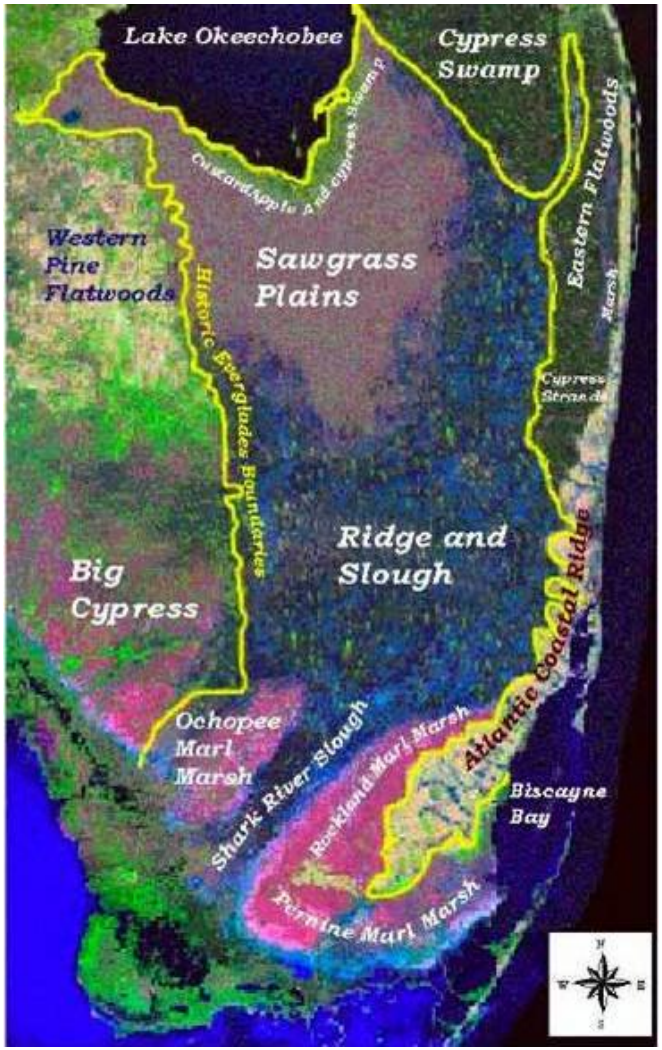
Embrapa Pantanal
Gomes, Vanessa dos Santos

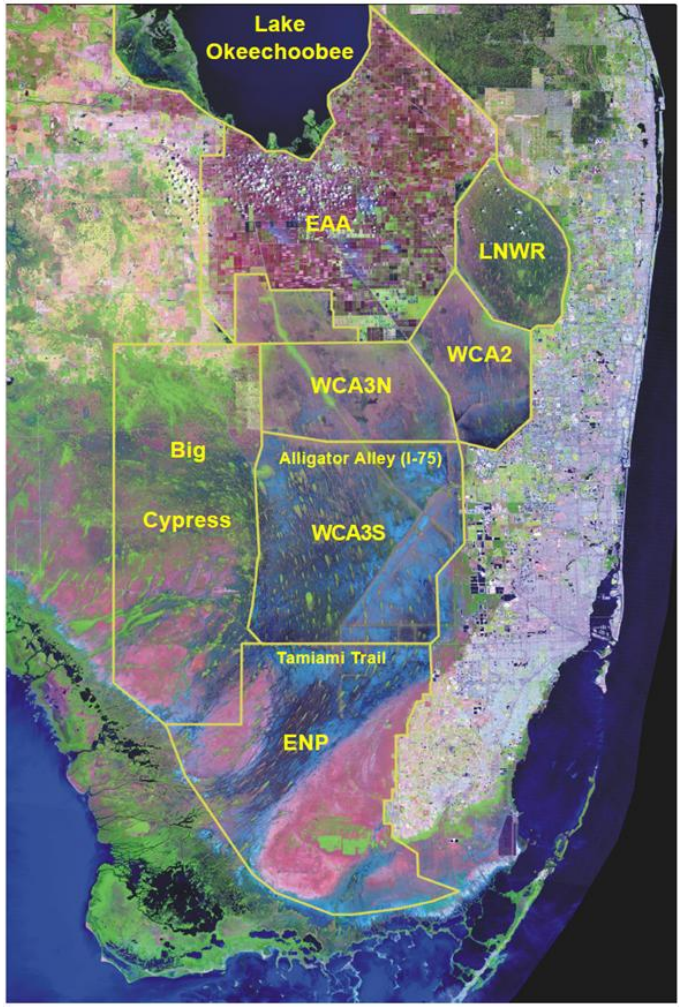
- *Pantanal*:
  ~0.5% yr^{-1} loss

- *Everglades*:
  ~0.6% yr^{-1} loss

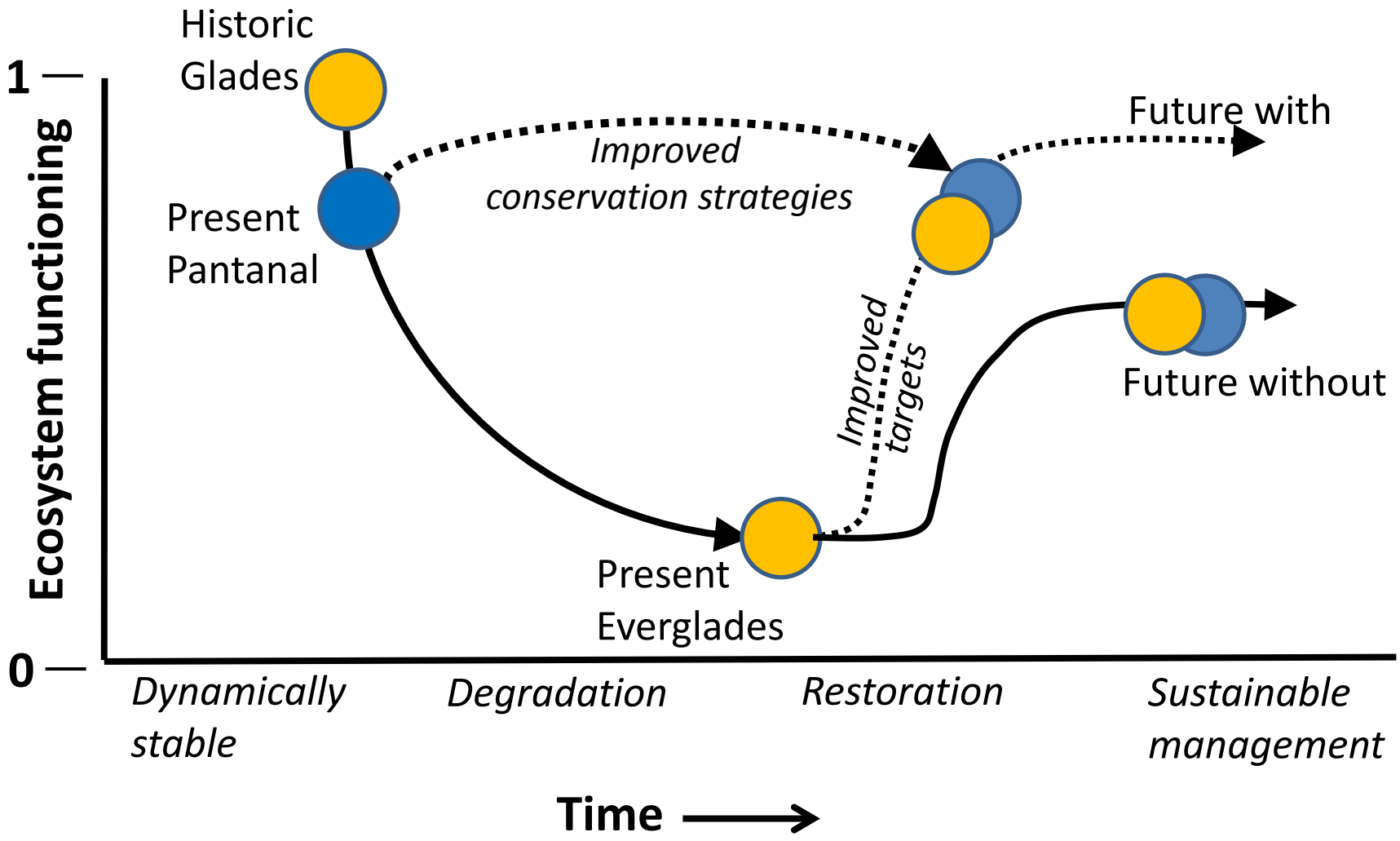


The Everglades: A history of disturbance

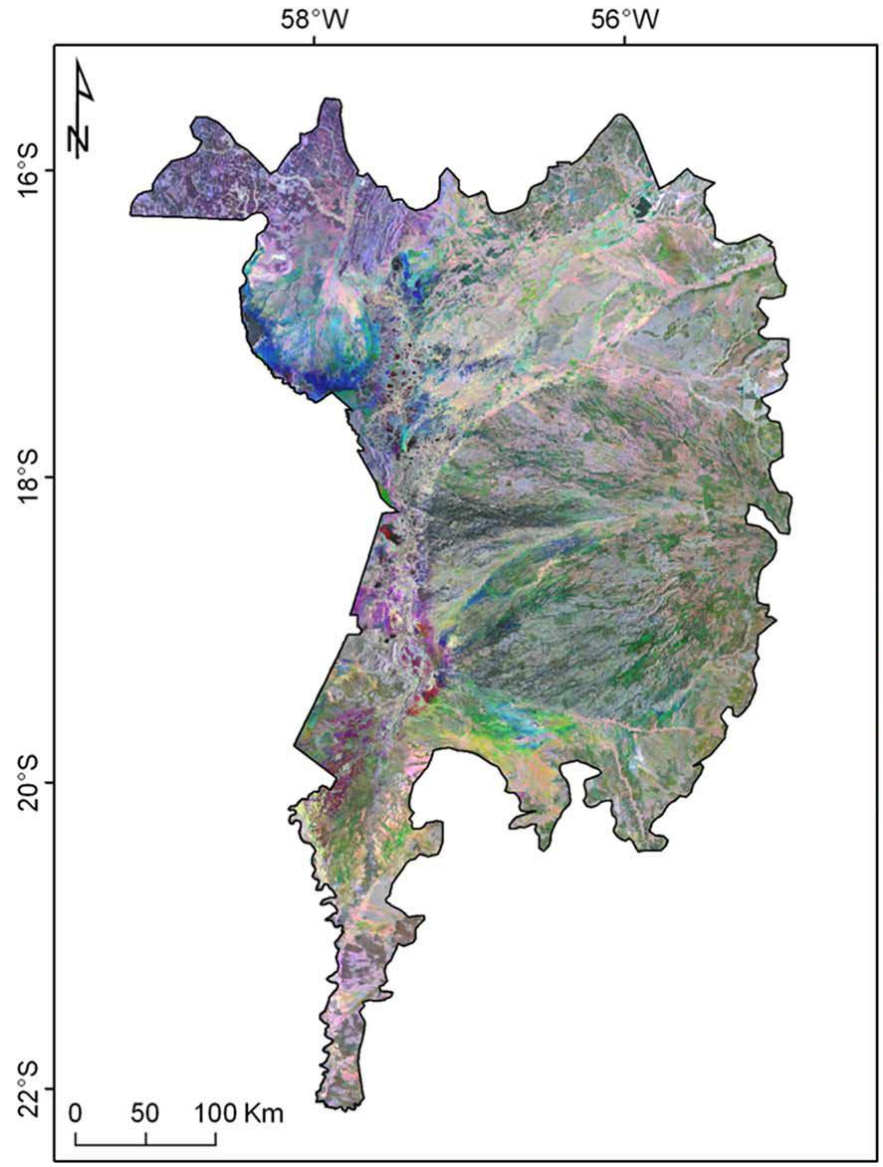


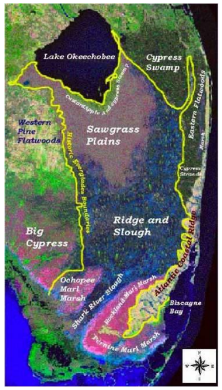


Why we want to compare……..



Now the tough part……..

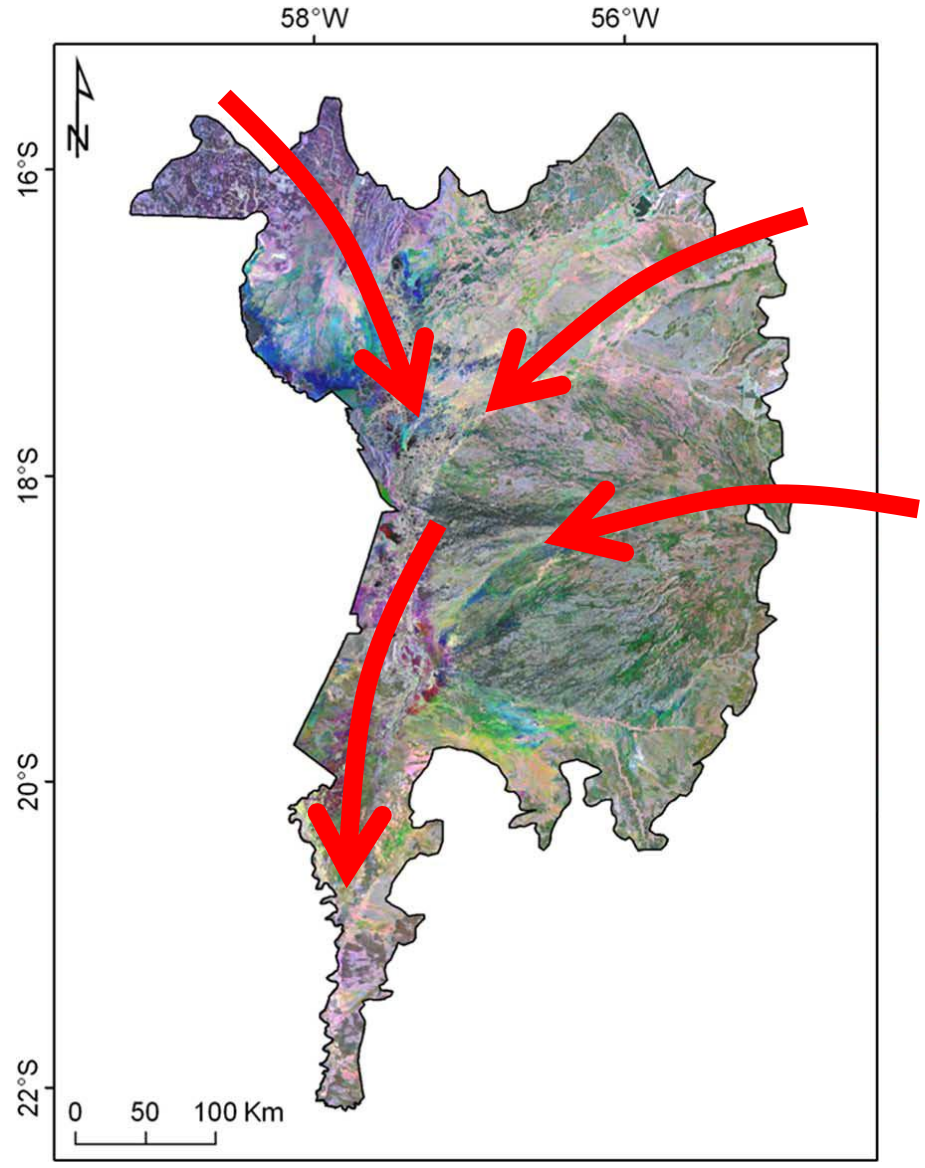




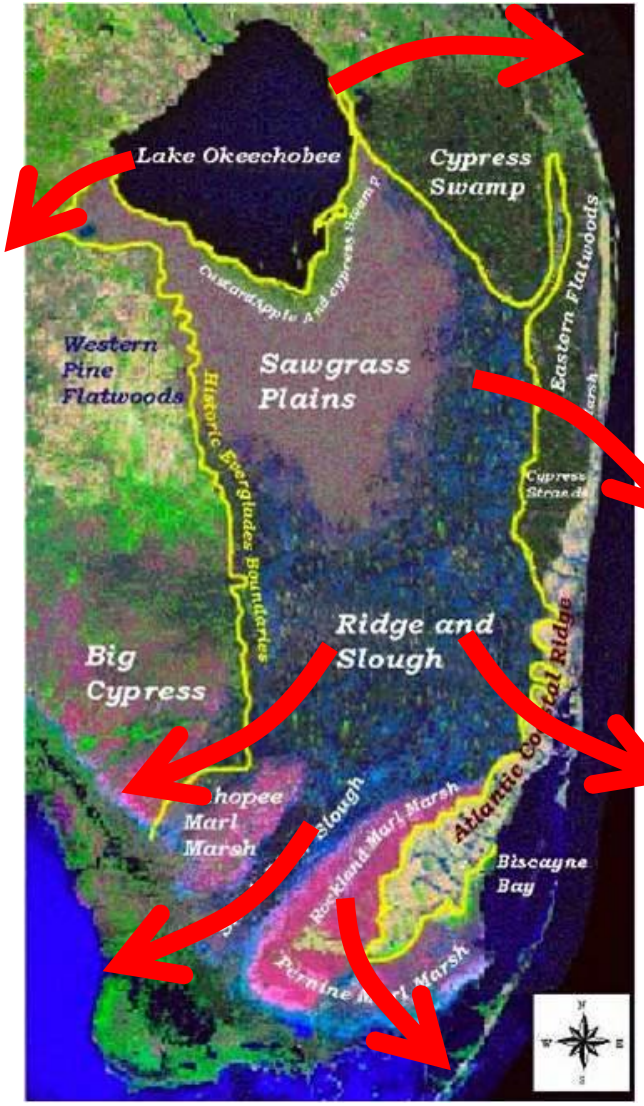
But how?
Mas como?

	Pantanal	*Everglades*
Area (km^2)	165,000	28,000*
Rainfall	1.0 – 1.5 m	1.0 – 1.3 m
Slope	2.0E-5 N-S 2.5E-4 E-W	~4E-5 N-S
Flooding depths	Variable < 1.5 m	< 1 m
Major Impacts	Dams, agriculture, ranching, habitat loss	

Pantanal



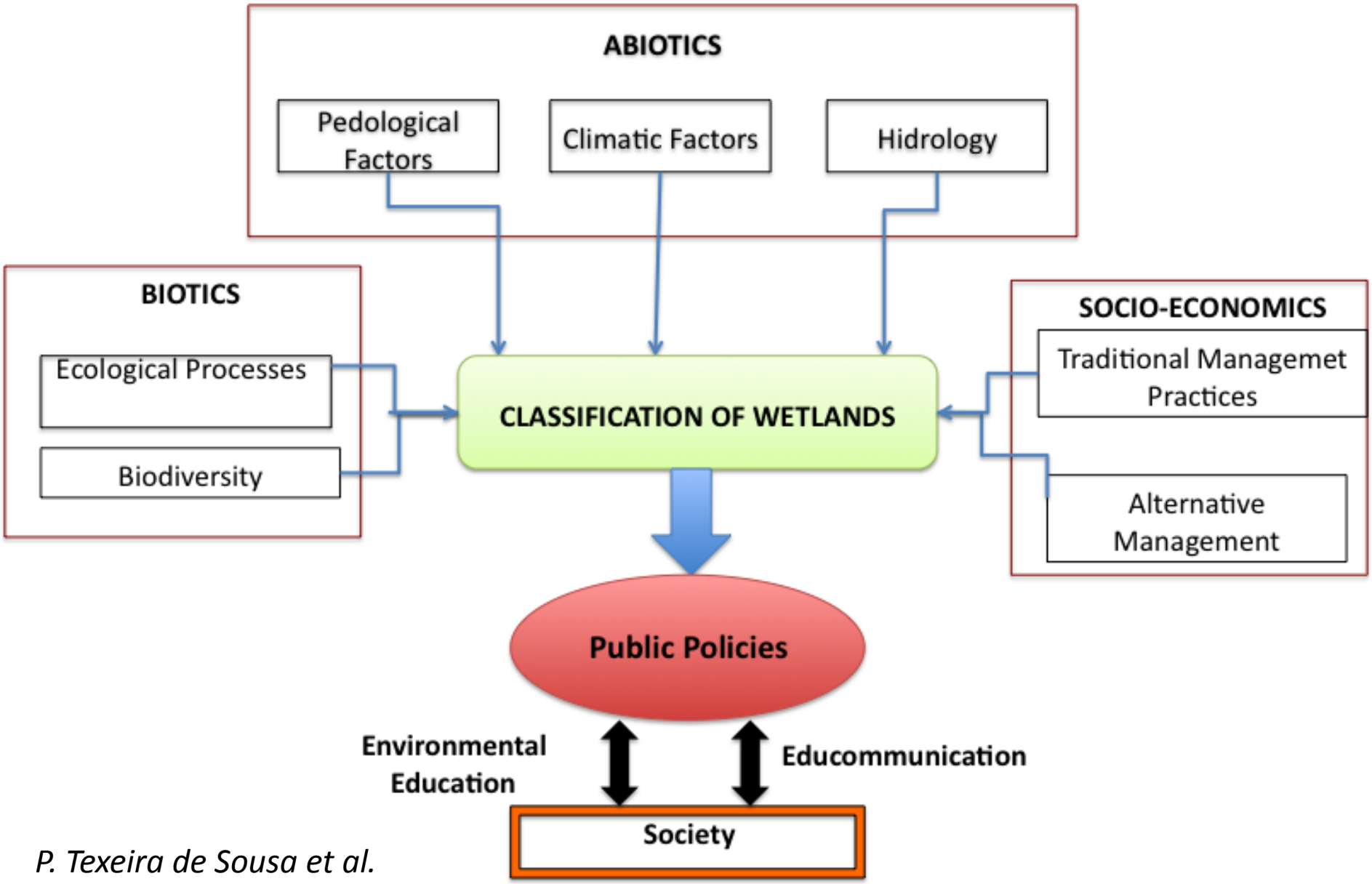
Everglades



“Convergent” flow

“Divergent” flow

First we can start with similar classification schemes



P. Texeira de Sousa et al.

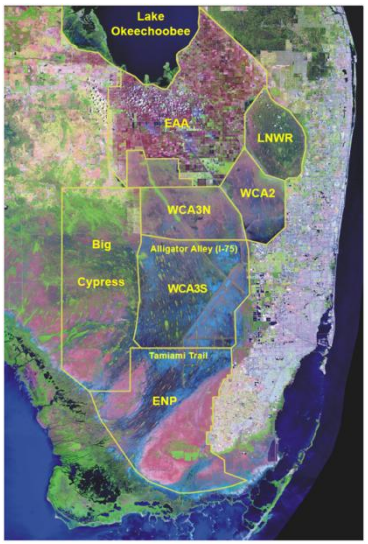
What types of comparisons are most appropriate?

- **Scale – independent or scale – able**
  e.g. metrics of ecological and hydrologic connectivity

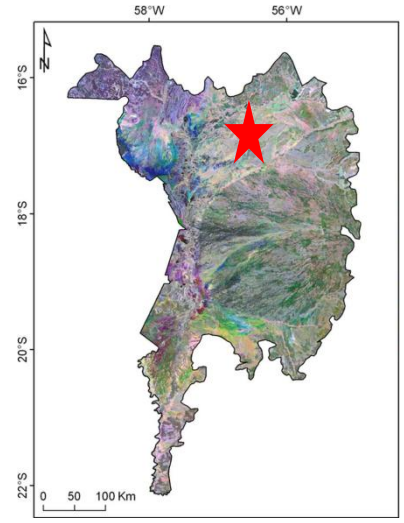
- **Comparisons need to be relevant to managers and capable of informing conservation or restoration actions**

What's happening in the headwaters?

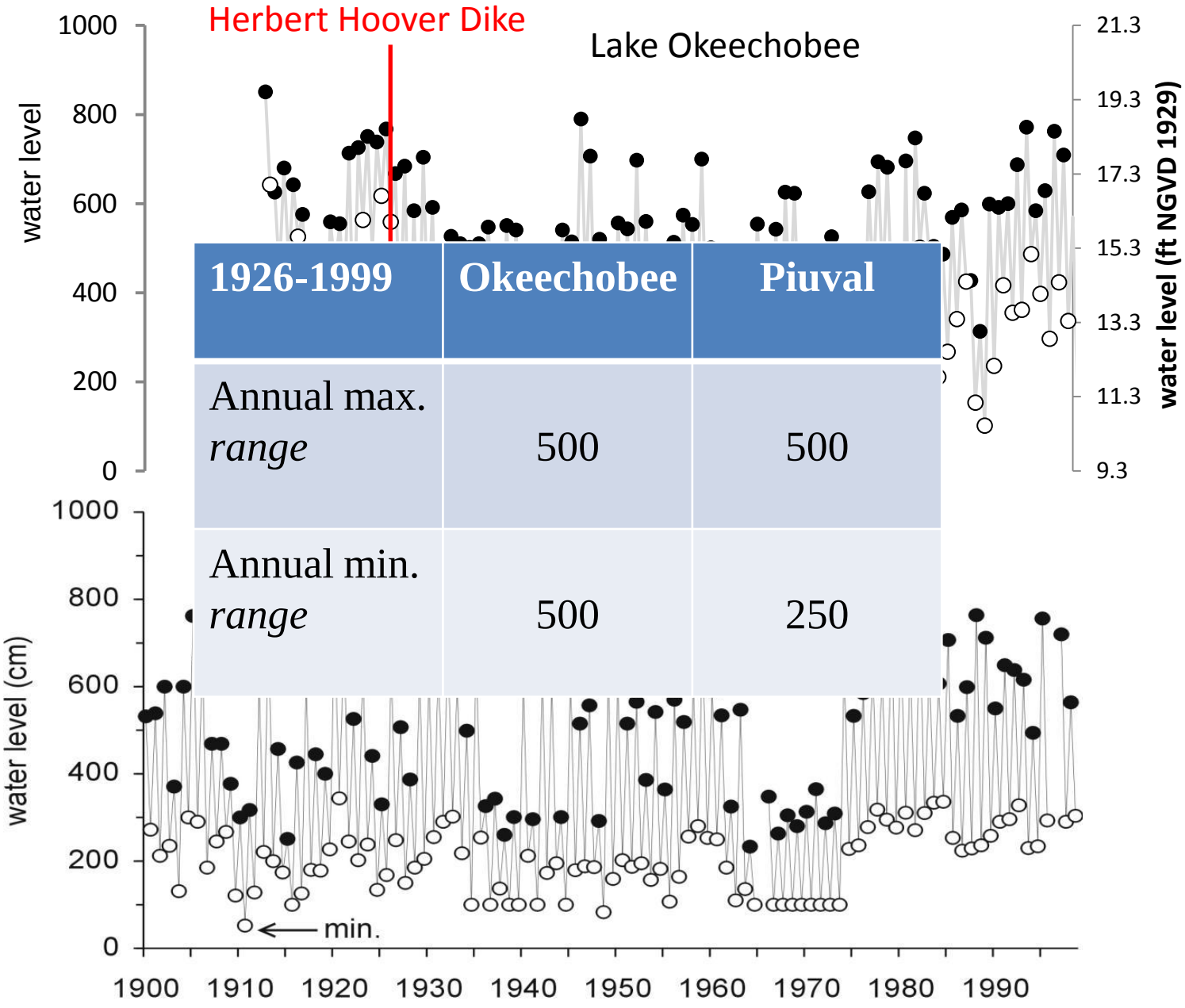
Lake Okee.



Lake Piuval



Not to scale



1926-1999	Okeechobee	Piuval
Annual max. *range*	500	500
Annual min. *range*	500	250

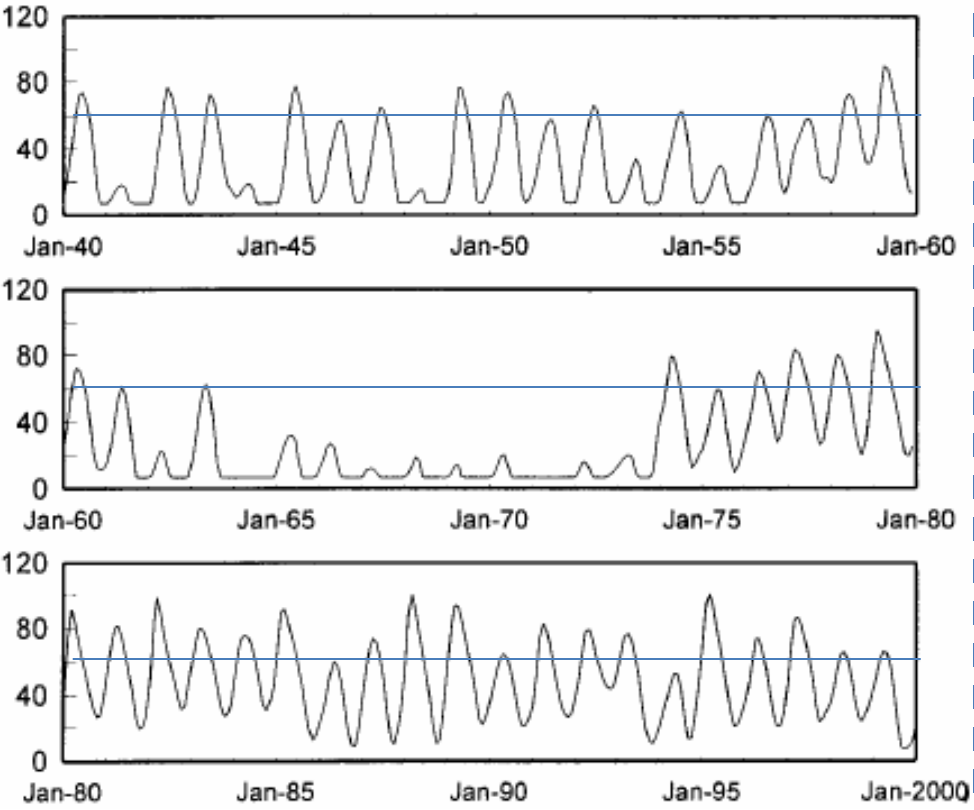
Annual extent of inundation since the mid-20th century

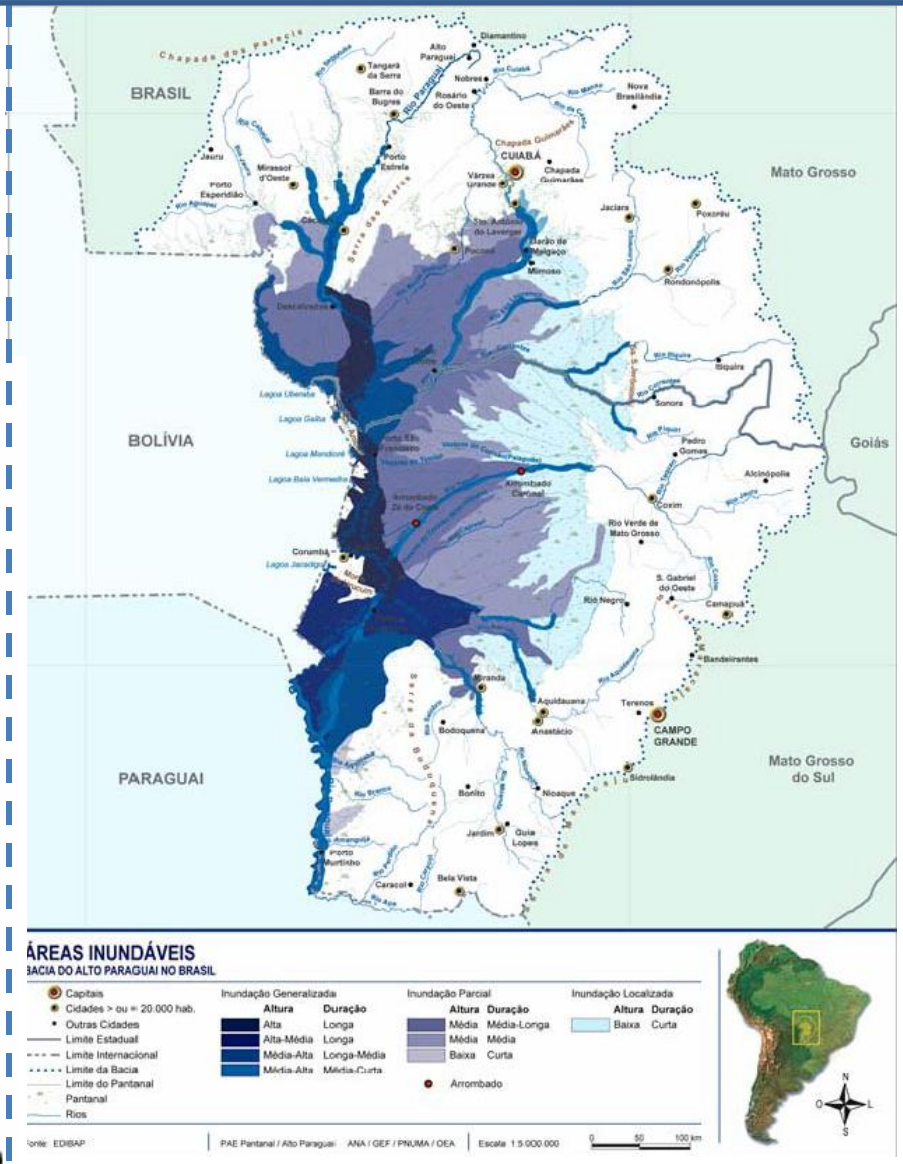
Inundated Area (km^2*1000)

Pantanal

Hamilton et al. 1996

Time





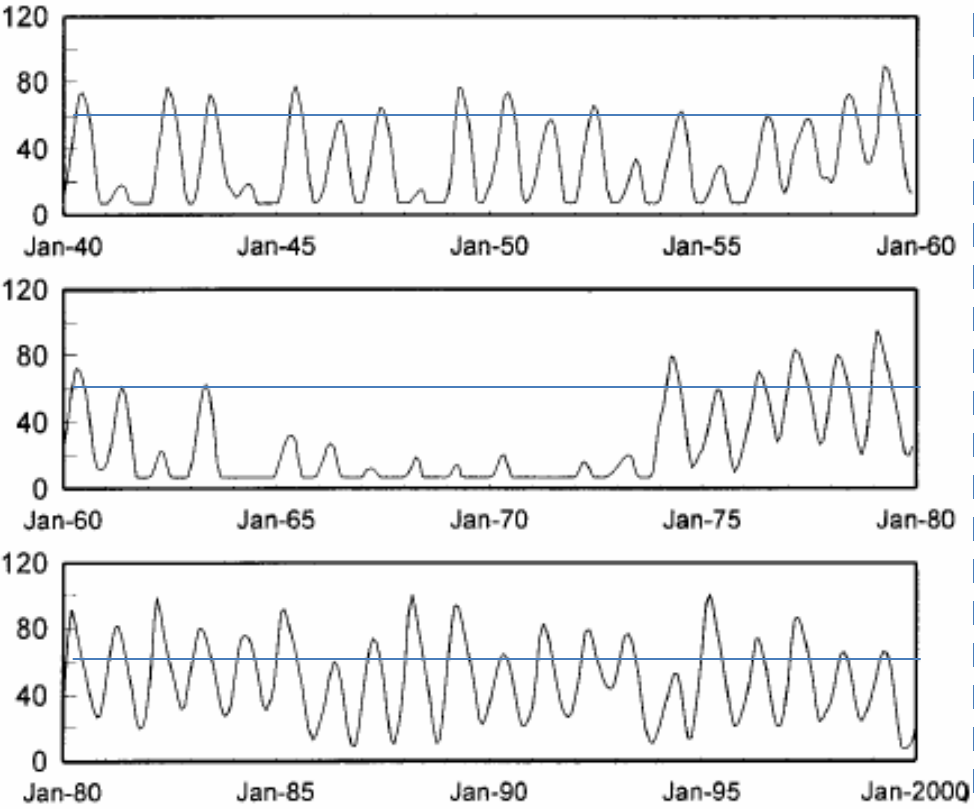
How and why do the patterns of these systems differ?

Inundated Area (km^2*1000)

Pantanal

Hamilton et al. 1996

Time

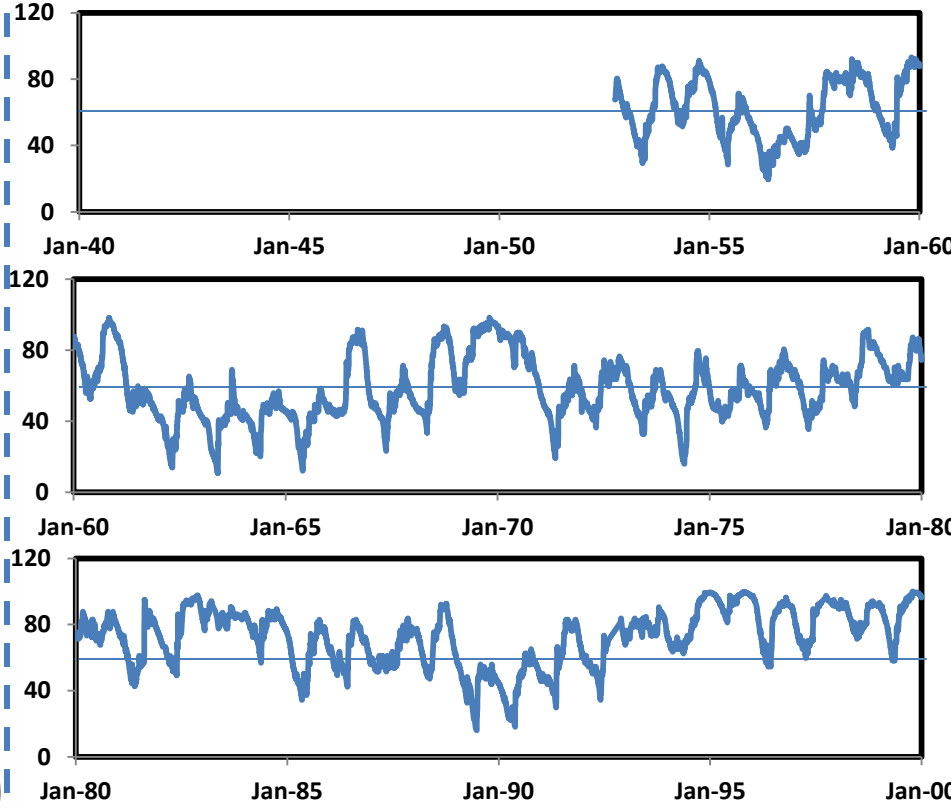


Inundated Area (%total*1.2)

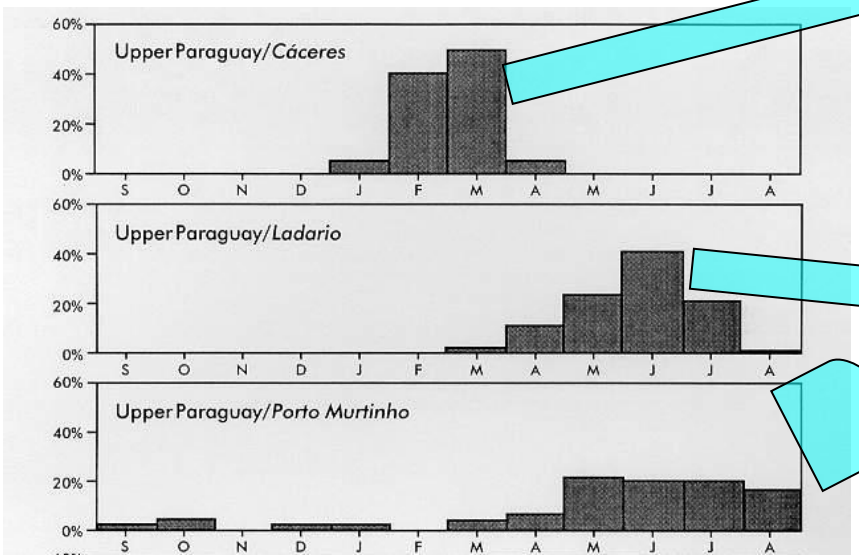
Northern ENP

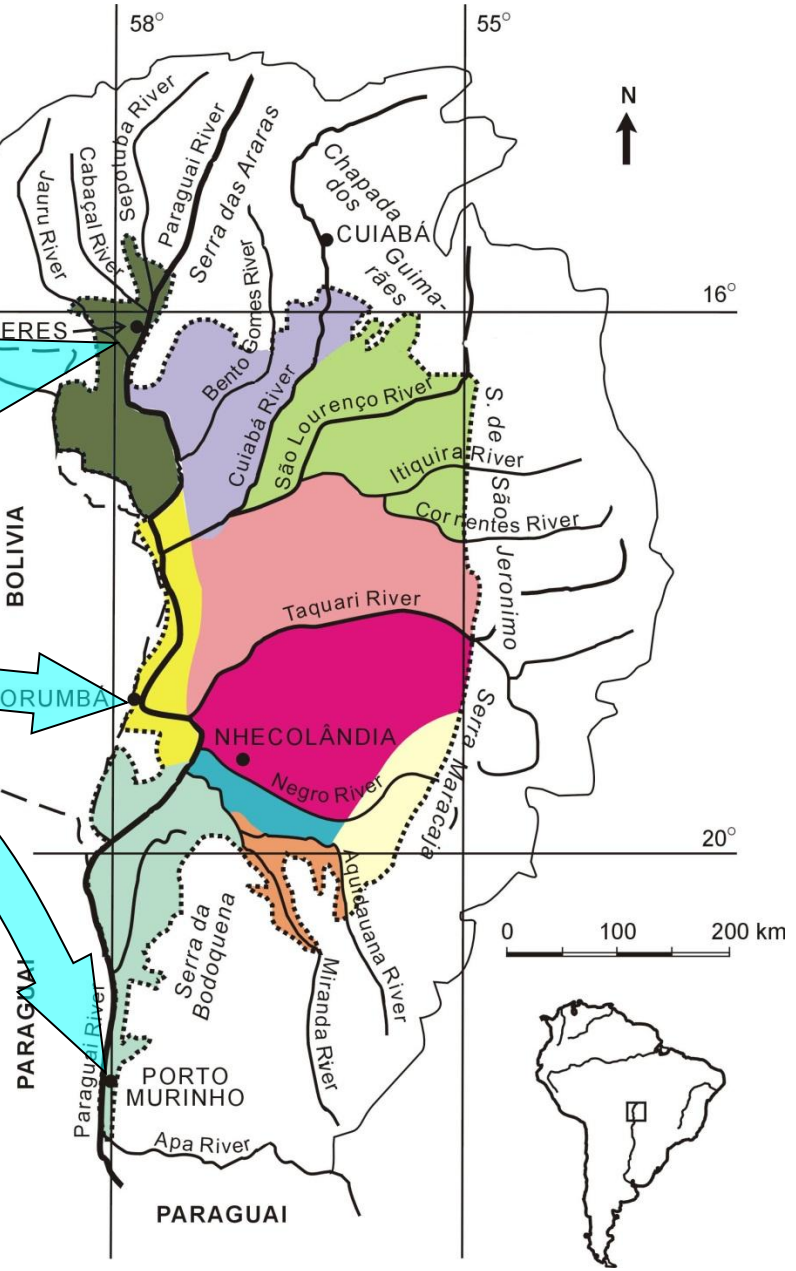
P33 and 8 USGS quadrangles

Time



A pulsing system

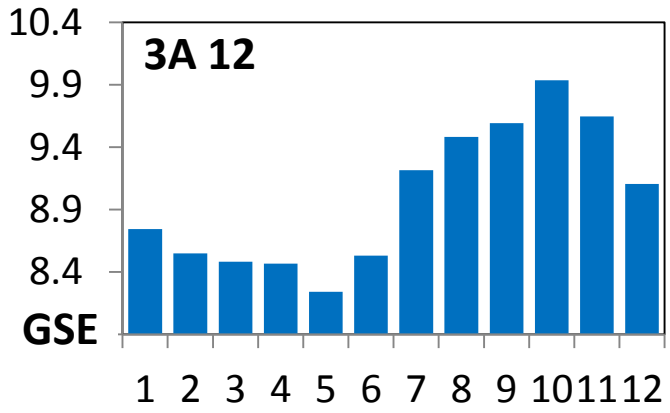


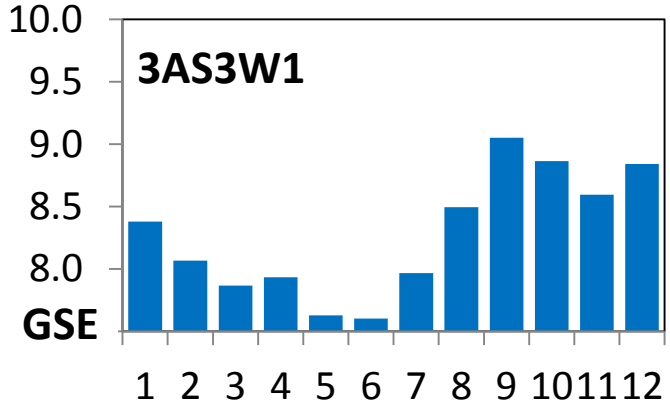


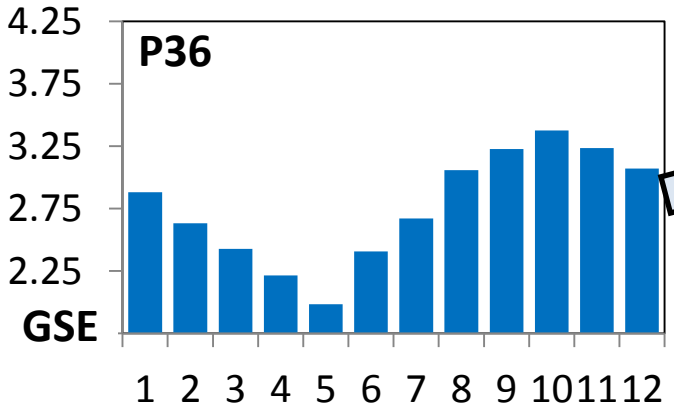
2000- 2005 Average Monthly Water Levels

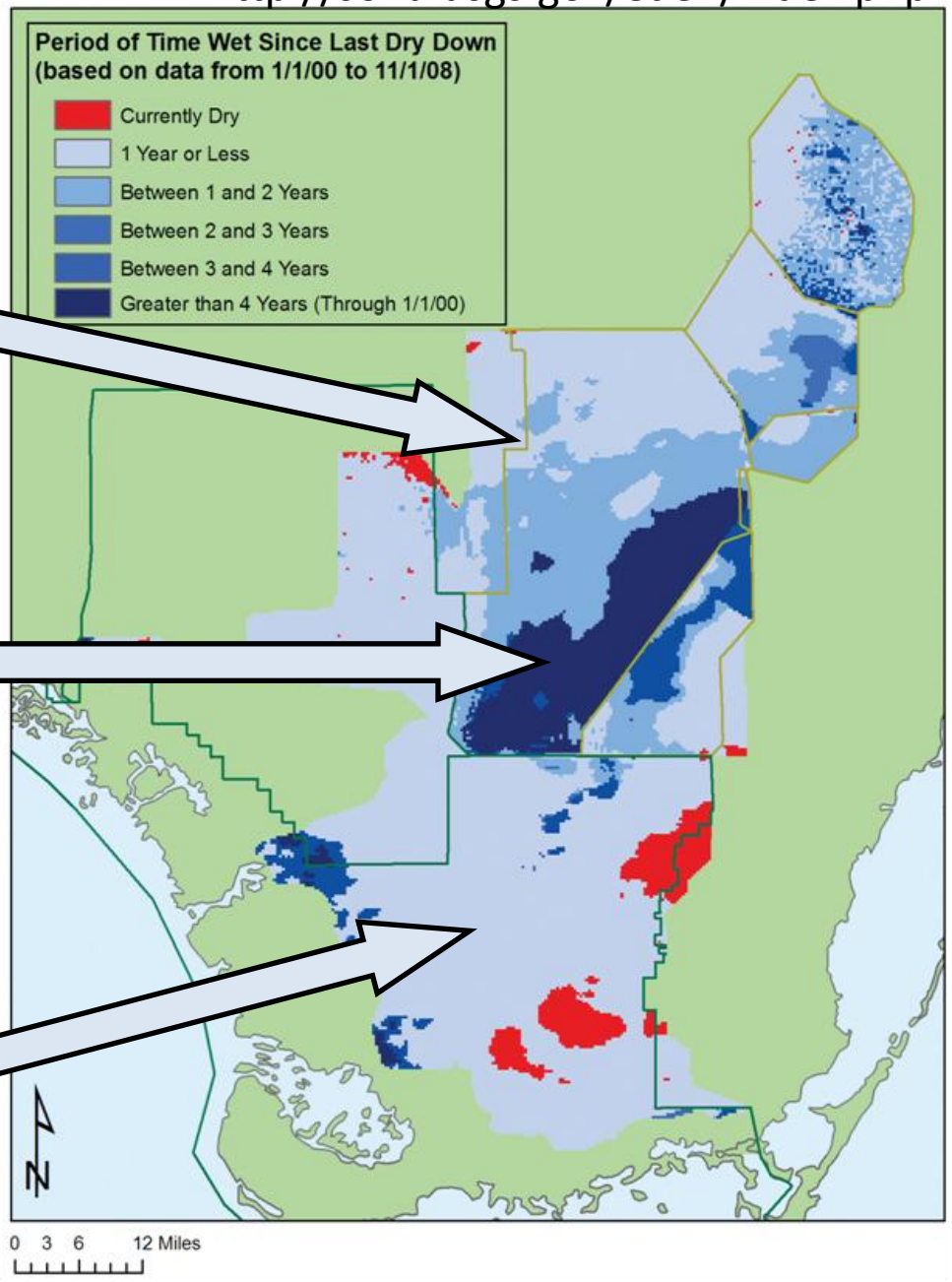
USGS EDEN Network
http://sofia.usgs.gov/eden/index.php

ft (NAVD 88)

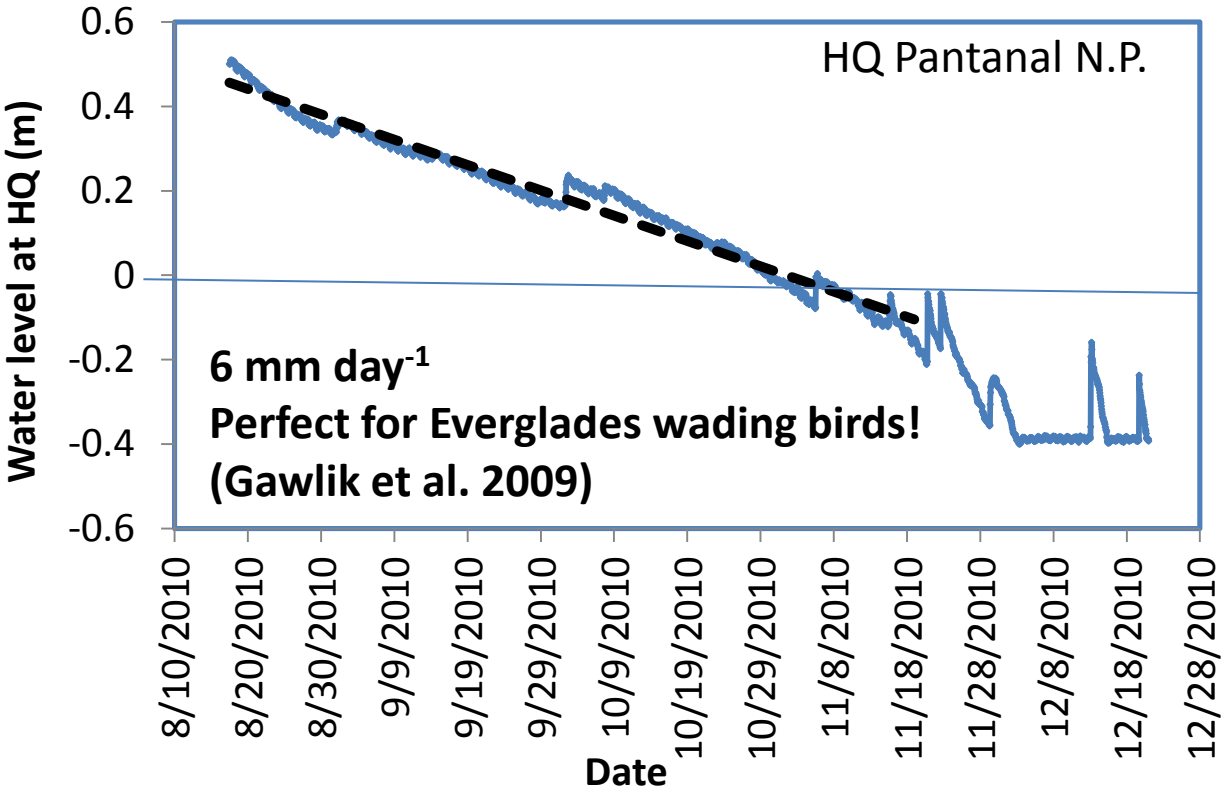








A Pantanal dry season recession



Data courtesy of Tiffany Troxler

**** One season of data does not a target make!***

****Comparing probability distributions of Pantanal and Everglades dry season recession rates is more appropriate***

Its not all about hydrology….

Conservation and restoration programs will also benefit from studies focusing on…

- ***Ecological responses to stressors rather than on ecosystem structures***
- ***Trophic interactions, rather than biodiversity or population ecology***
- ***Biogeochemical responses to increasing levels of nutrients and other pollutants***
- ***Eco-hydologic connectivity NSF PIRE proposal (Jaffe, Larsen, et al.)***

http://www.earthwatch.org/

Photo courtesy of Don Eaton

Acknowledgements

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