

Ecological pressures and impacts in the Pantanal Wetland

Dra. Débora F. Calheiros

*Ecology of rivers and connected wetlands
Pantanal Water Network*

*2nd International Workshop on Catchment
Management in the Cuiabá River Basin - Brazil*

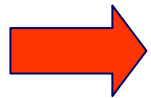


Ministério da Agricultura,
Pecuária e Abastecimento



PANTANAL - Xaraés Sea

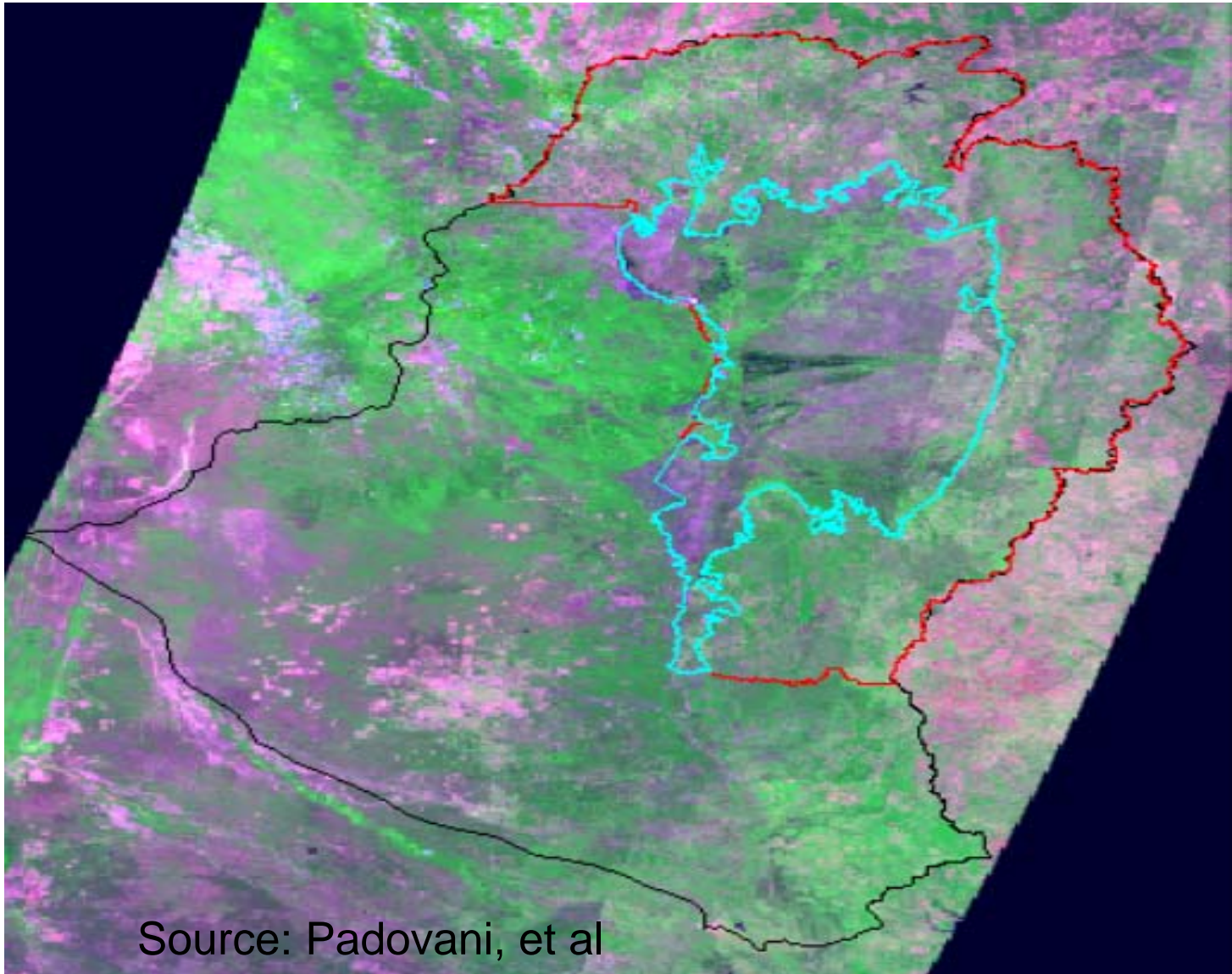
National Heritage
(Federal Constitution 1988)
Humanity Heritage and
Biosphere Reserve
(UNESCO 2000)
One of the biggest
wetland in the world
(Ramsar Convention):



**critical level
of conservation**



HIGH PARAGUAY RIVER BASIN



Source: Padovani, et al

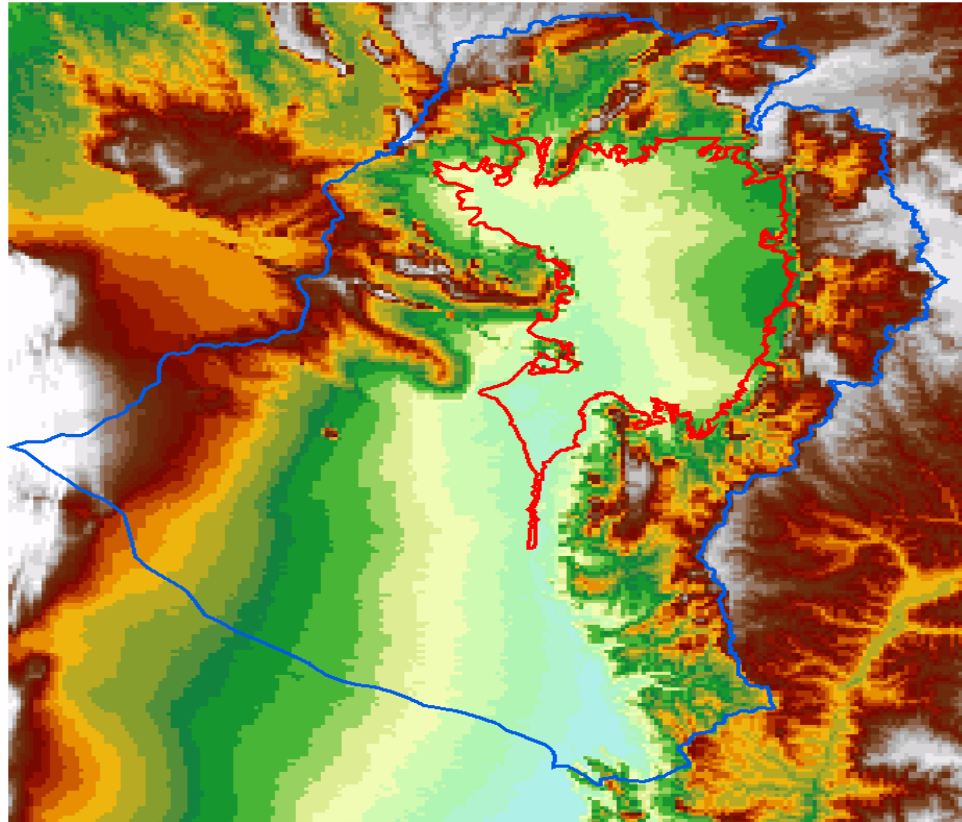


Embrapa
Pantanal

Ministério da Agricultura,
Pecuária e Abastecimento



RELIEF OF THE HIGH PARAGUAY RIVER BASIN



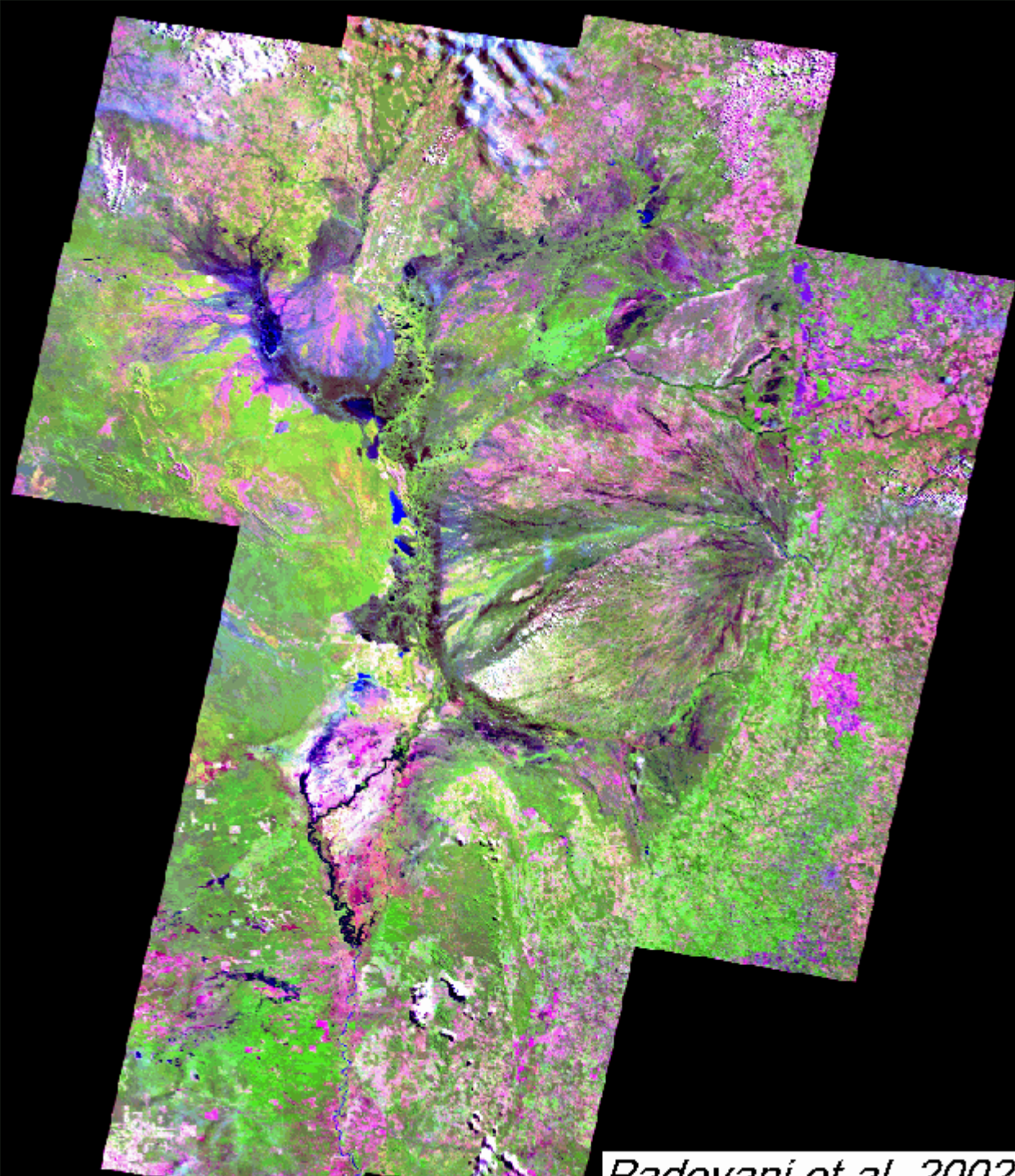
Source: Padovani, et al

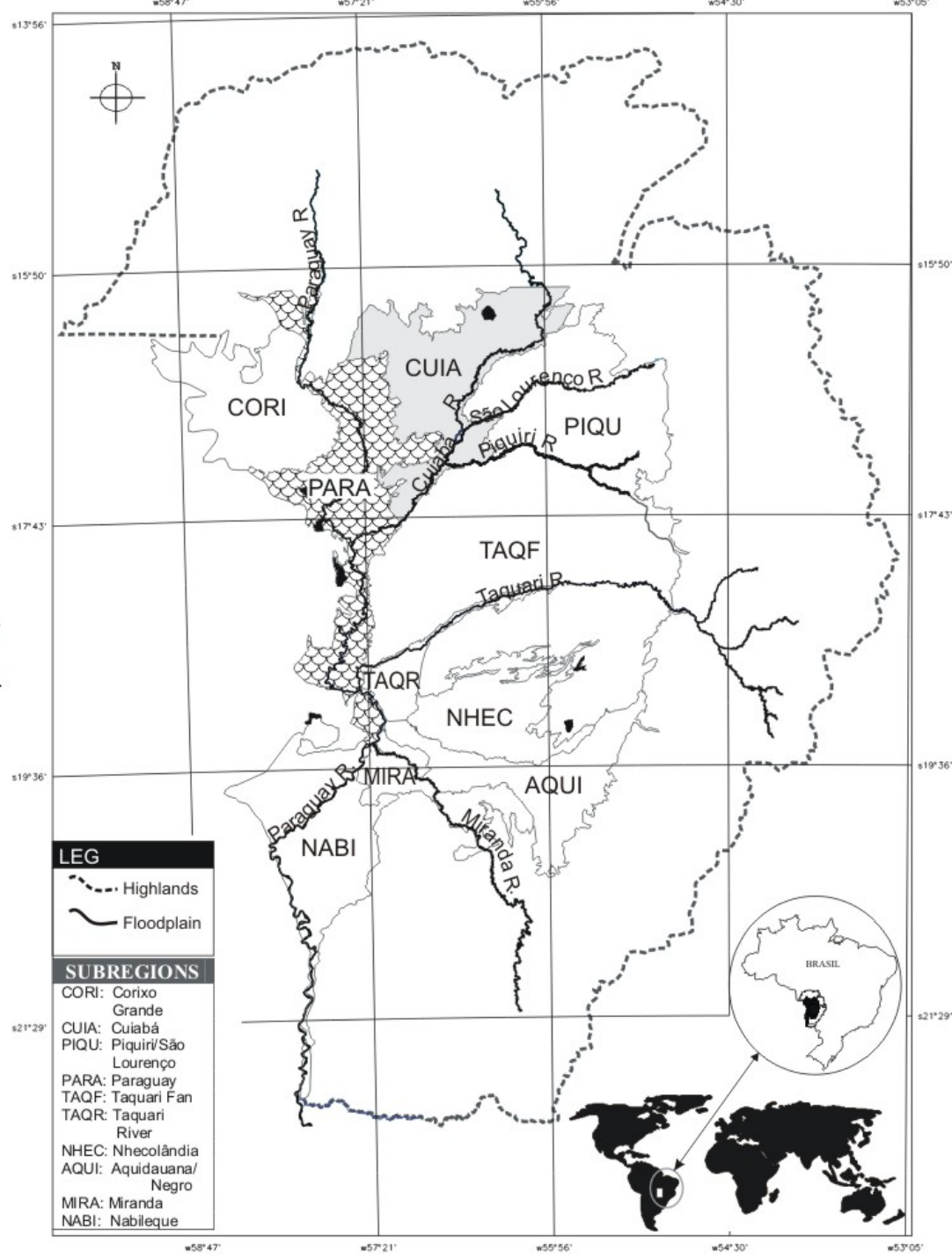
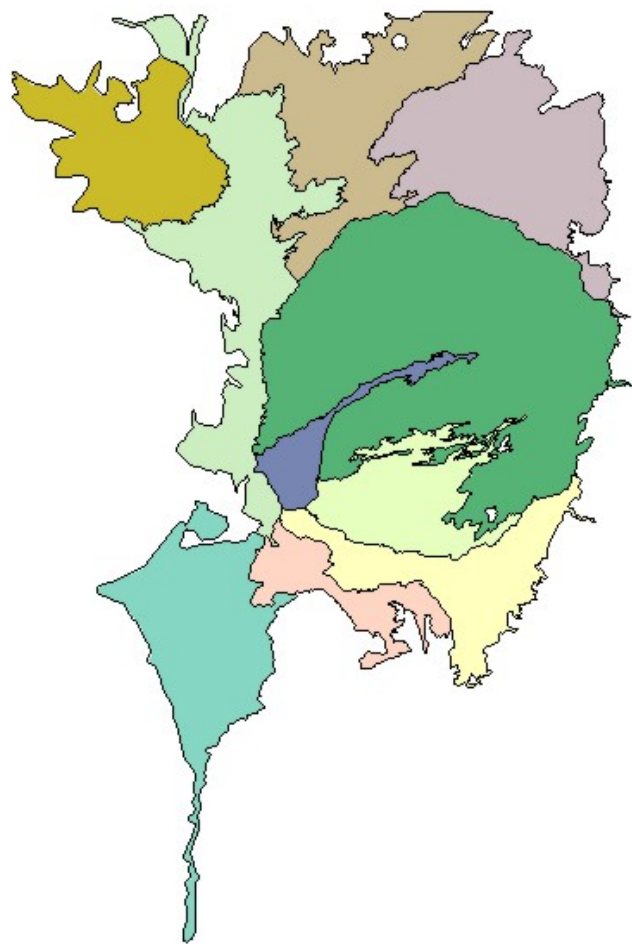


Embrapa
Pantanal

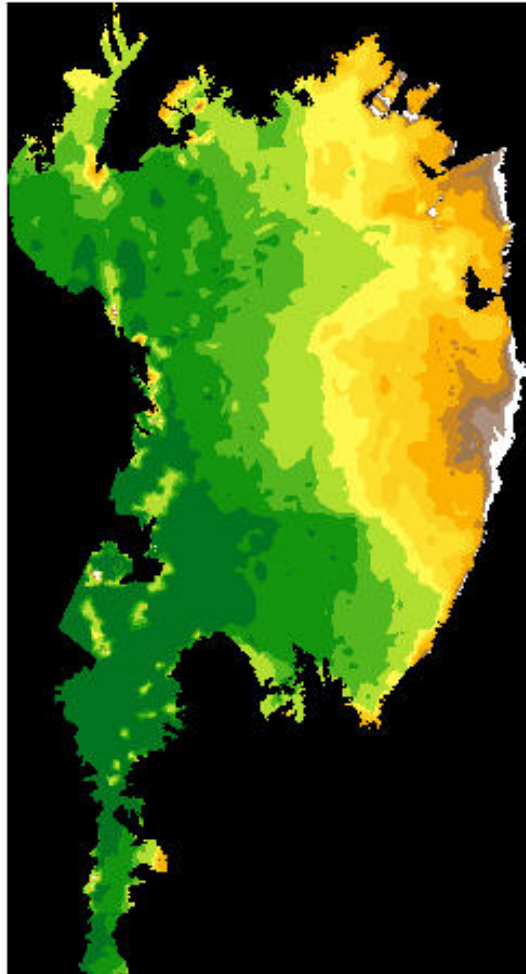
Ministério da Agricultura,
Pecuária e Abastecimento



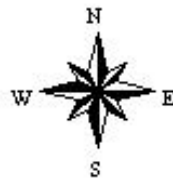
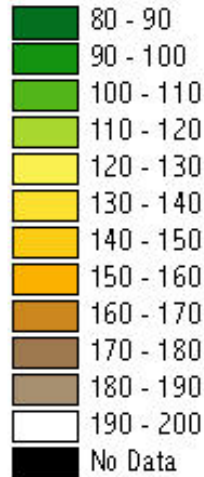




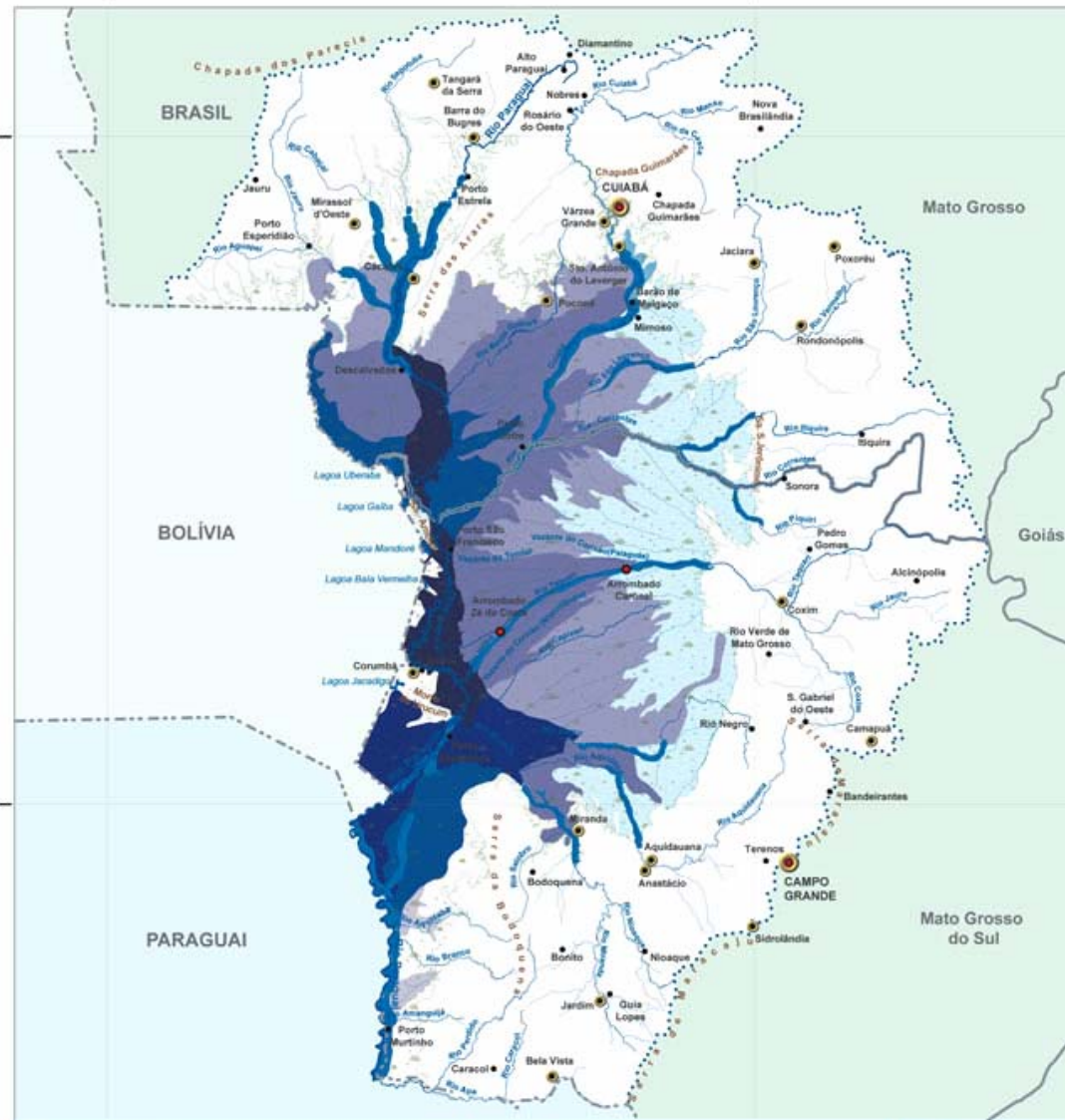
Mapa da altimetria do Pantanal



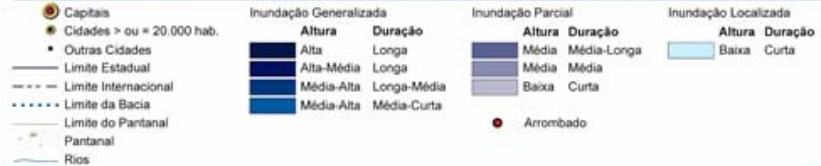
Altimetria do Pantanal

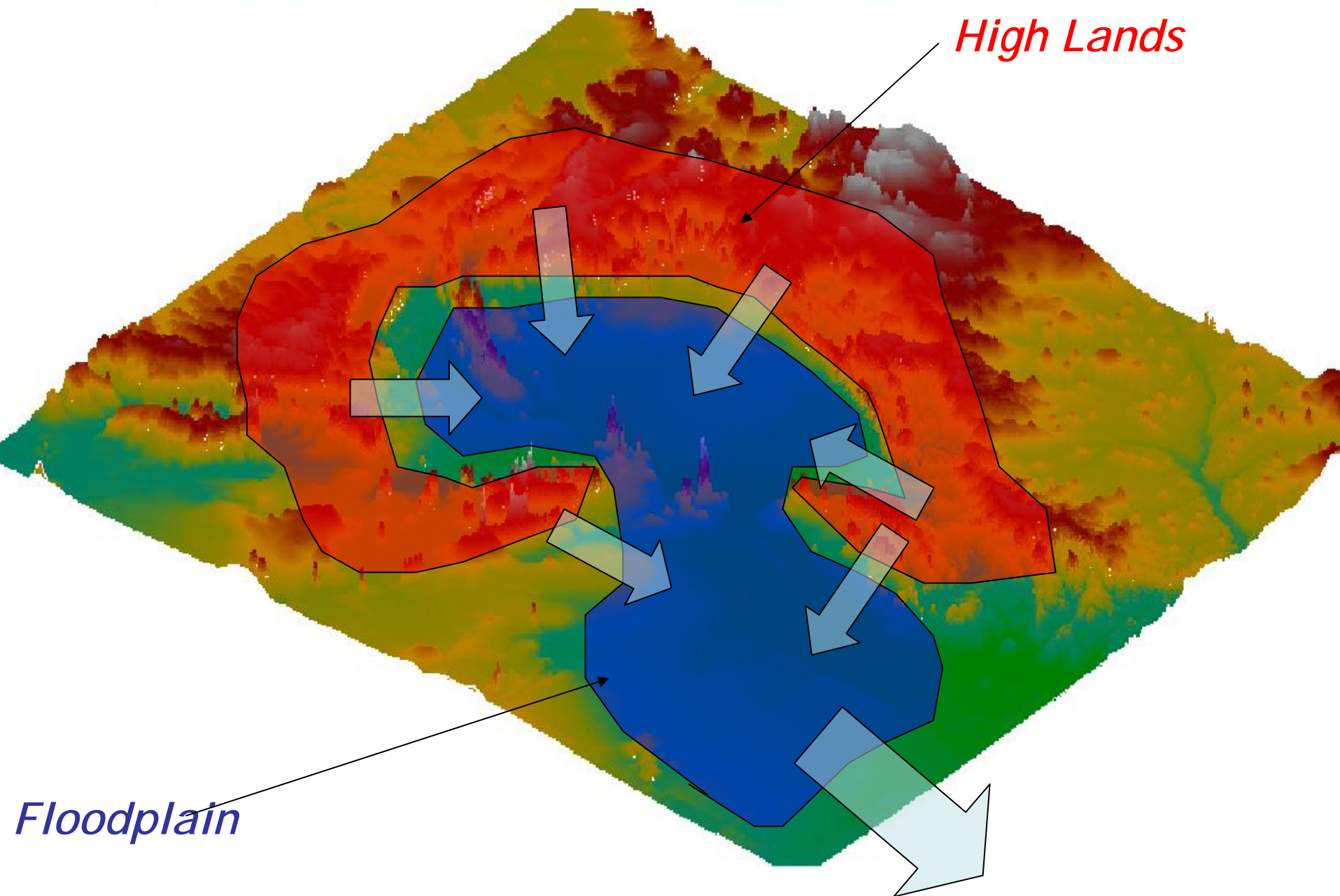


0 90 180 Kilometers



ÁREAS INUNDÁVEIS BACIA DO ALTO PARAGUAI NO BRASIL

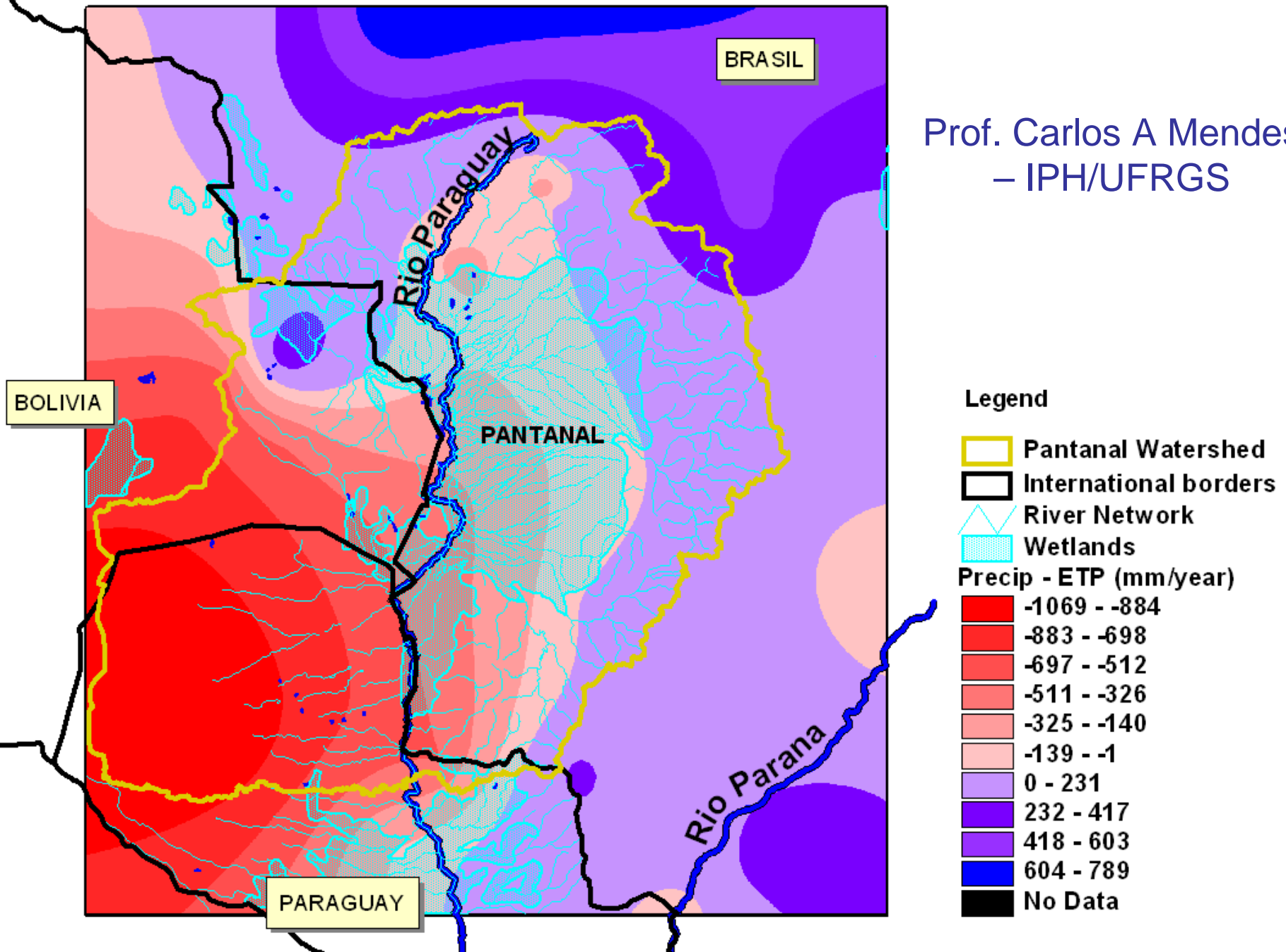




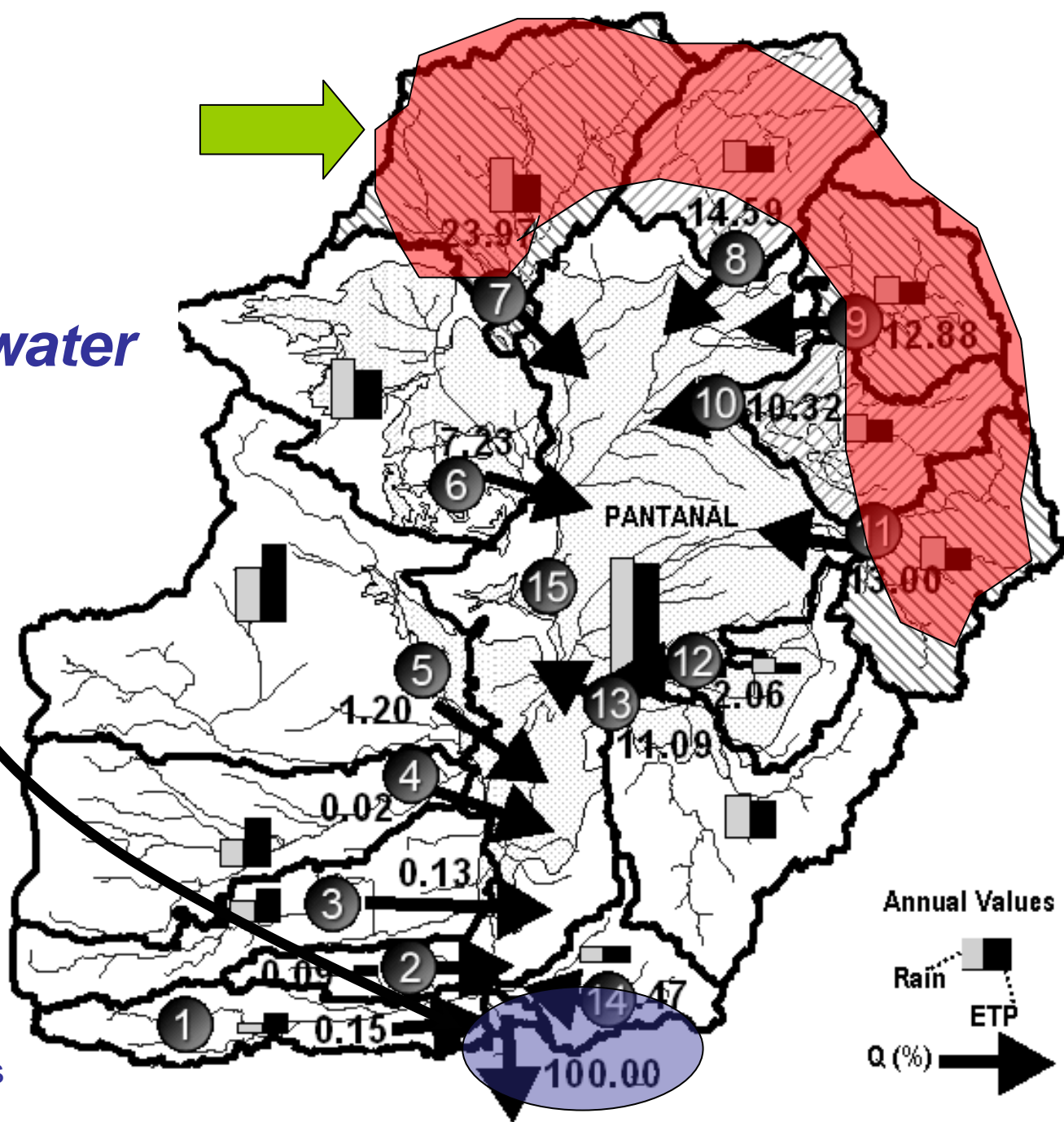
High Lands

Floodplain

Prof. Carlos A Mendes
– IPH/UFRGS



75 % of water



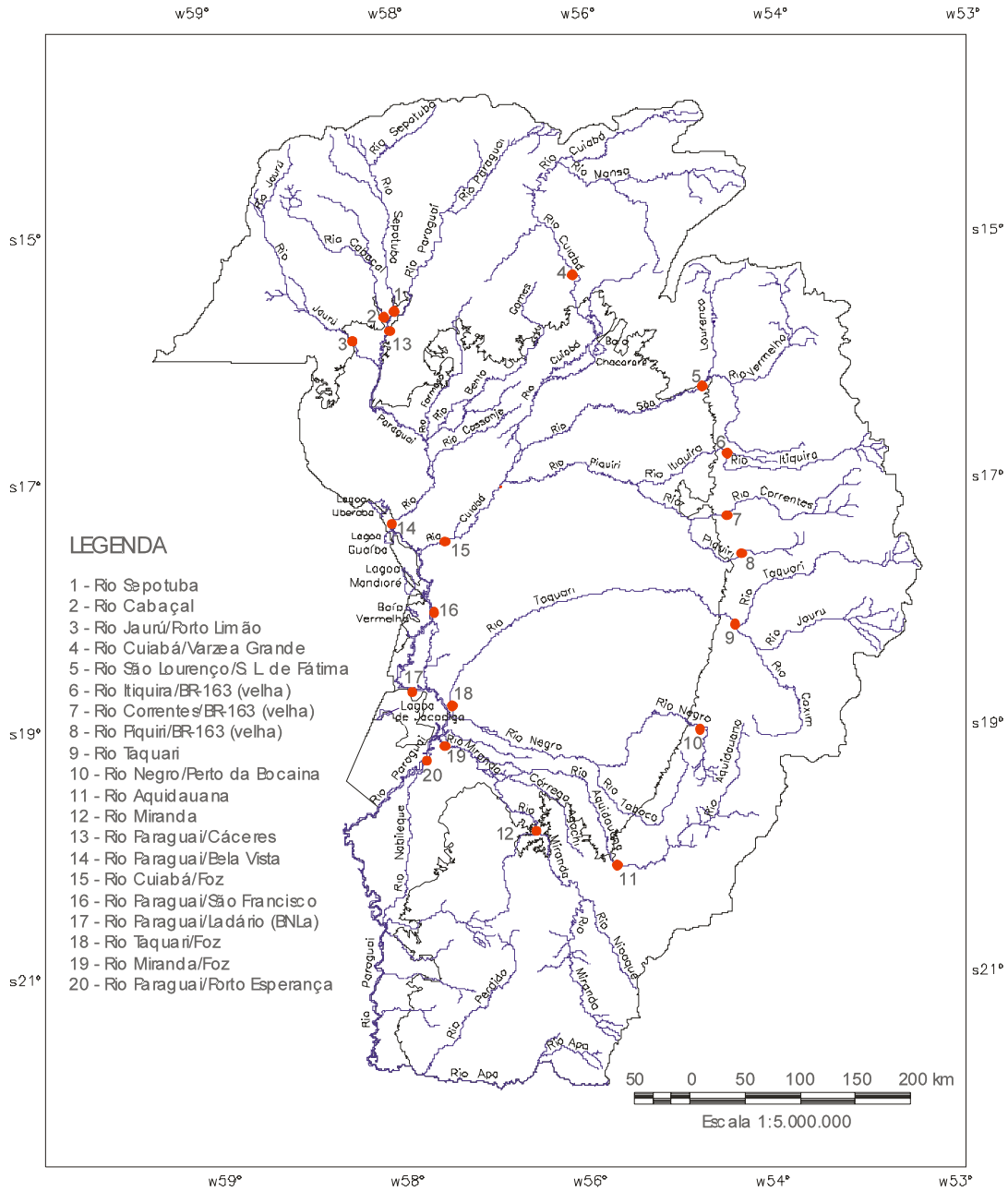


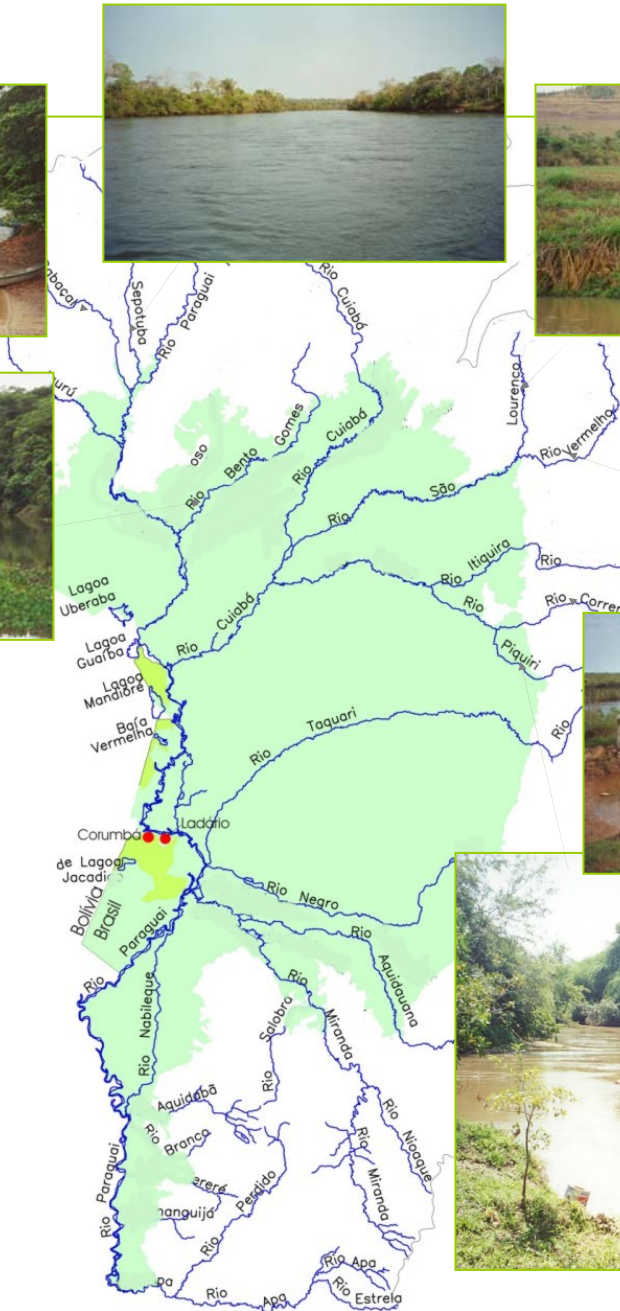


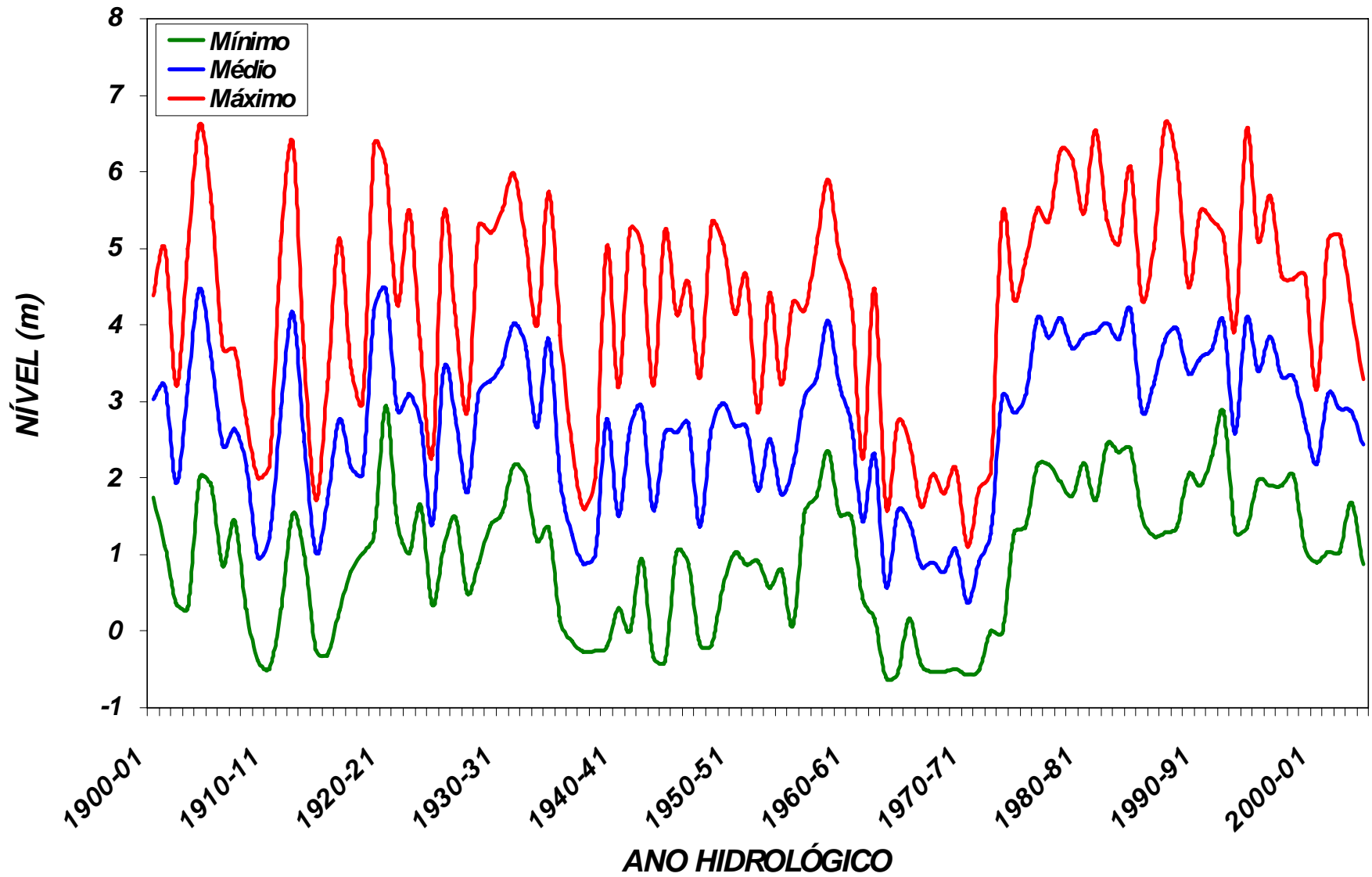


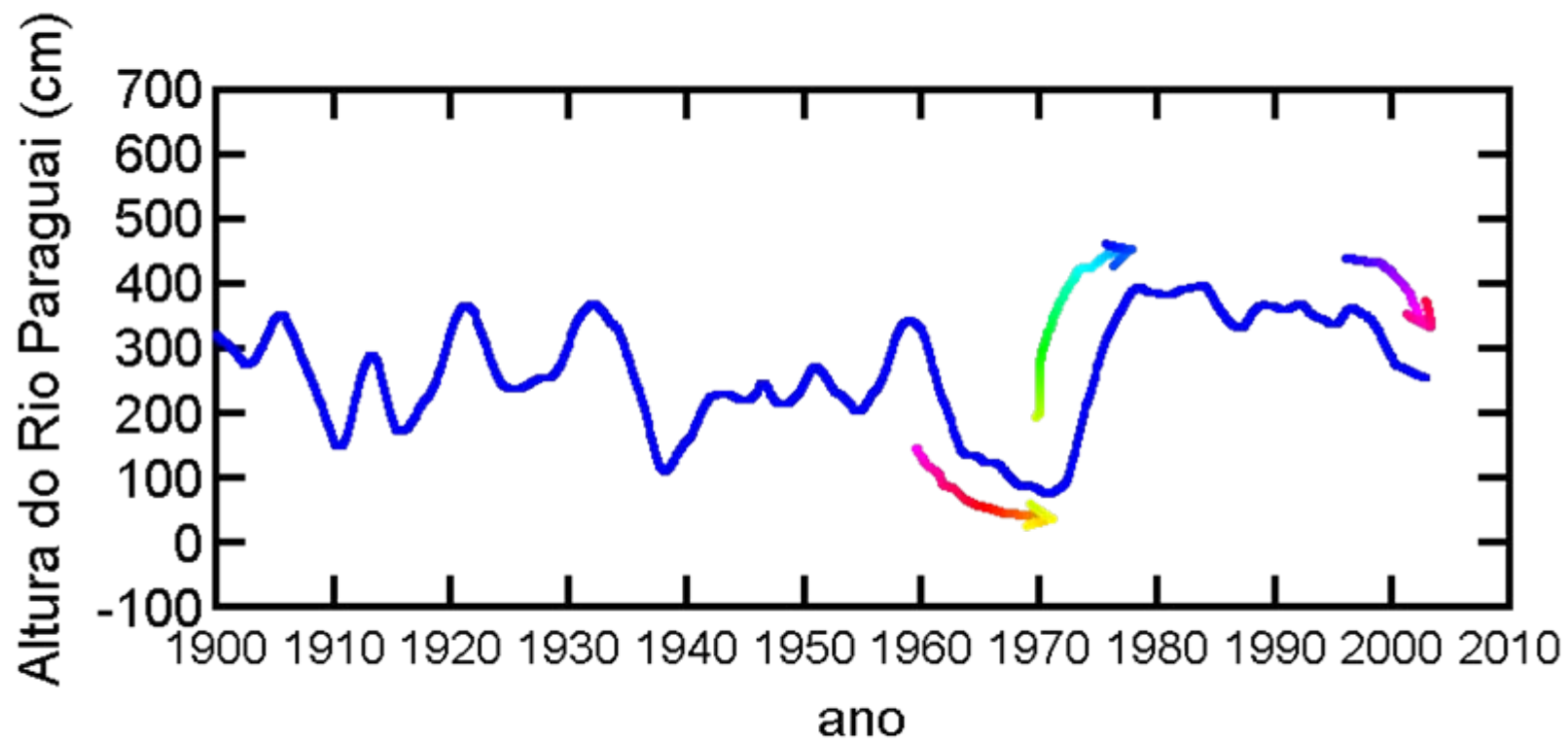
Estações de coleta de dados limnológicos do projeto PELD/Pantanal na BAP

Long Term Ecological Research - High Paraguay River Basin, Pantanal Wetland – Brazil (Site 2 - South Pantanal)









FLOOD MONITORING

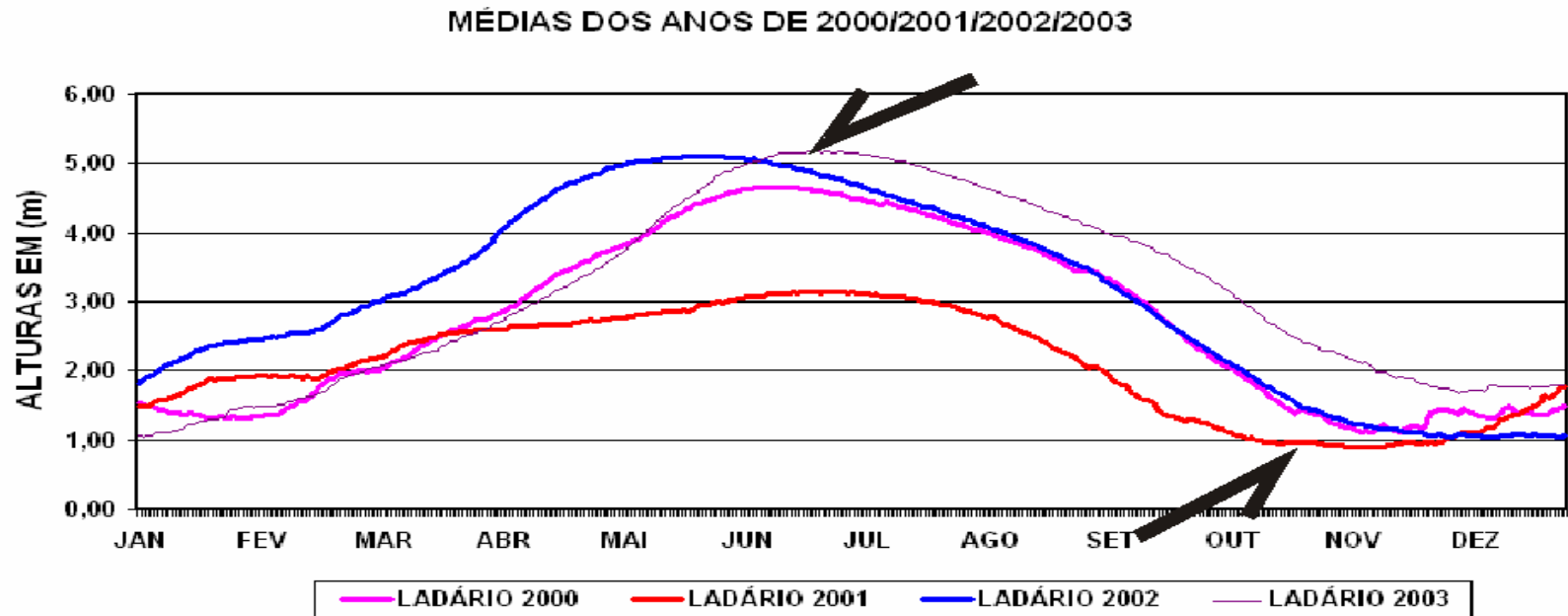


Fig. 1 – Paraguay River hydrograph. October, 2001 and June, 2003 was the lowest and the highest water level for the study period of February, 2000 to December, 2003.



Embrapa
Pantanal

Ministério da Agricultura,
Pecuária e Abastecimento

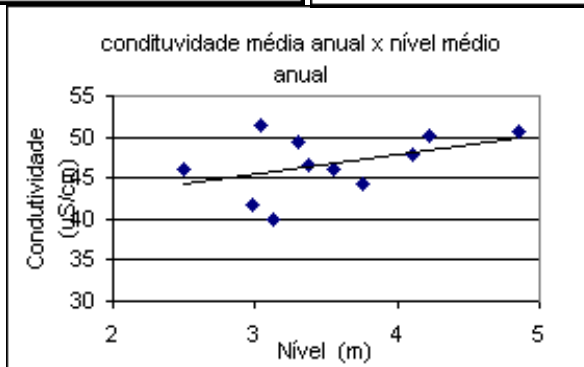
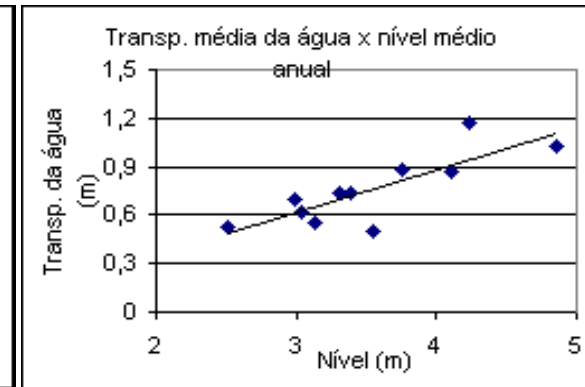
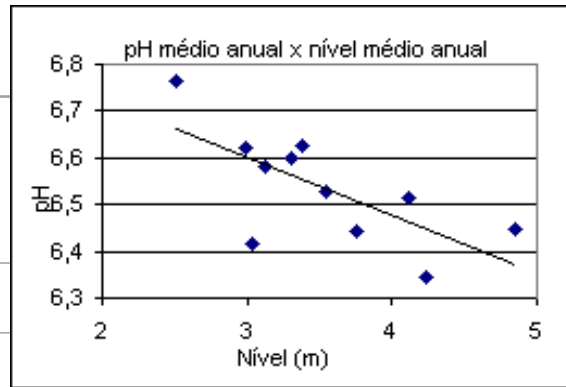


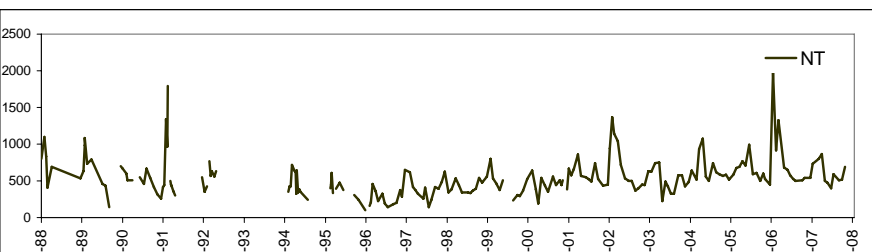
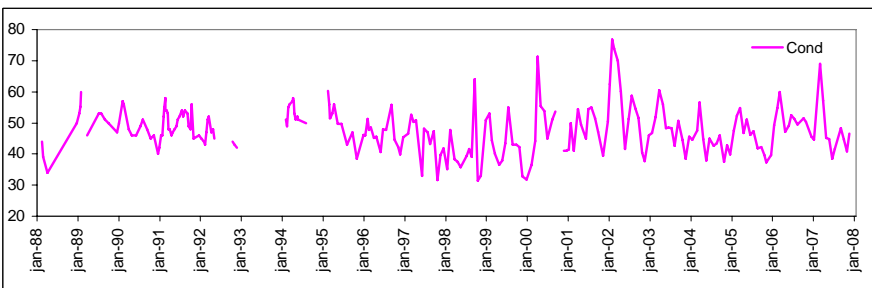
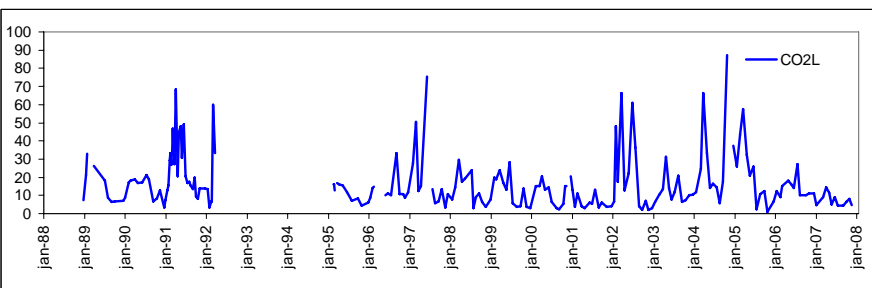
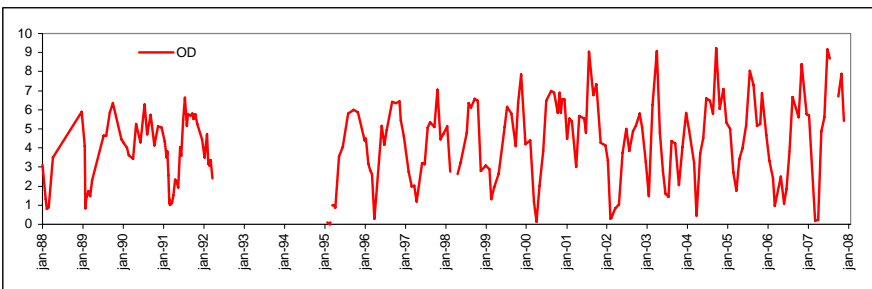
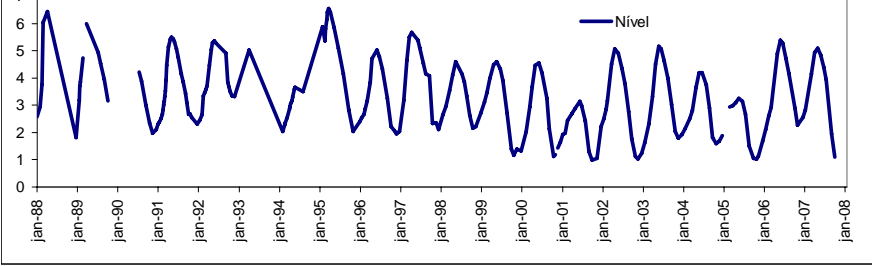


Paraguay River water quality monitoring – 20 years

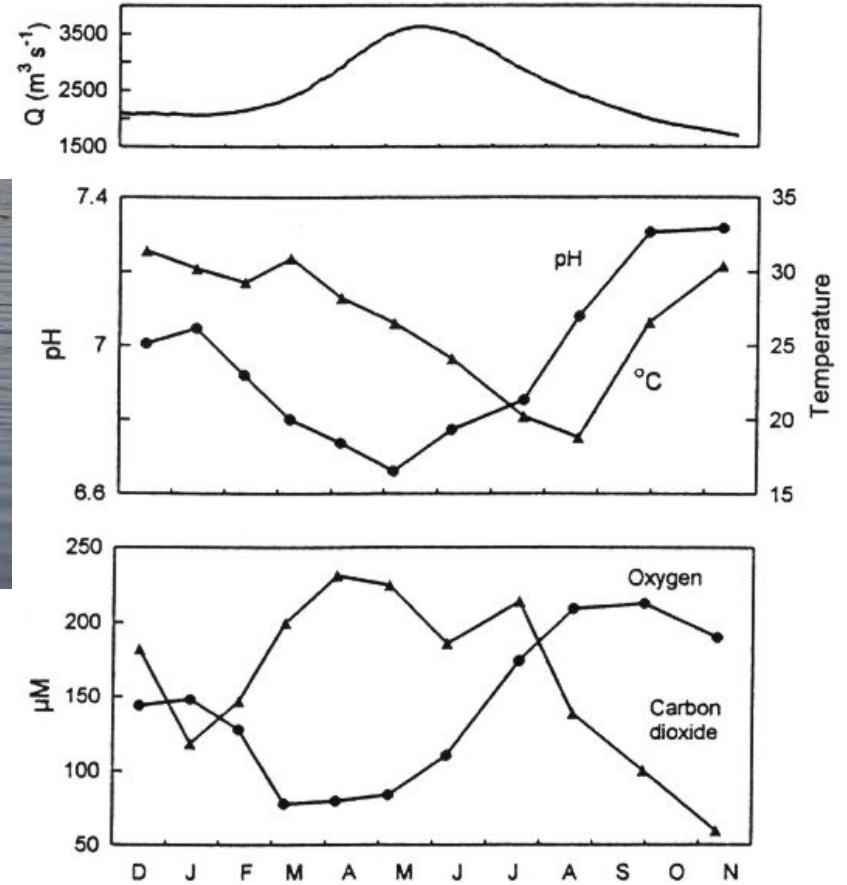
(Time series study)

Variáveis	Intervalo (max –min)
Air Temperature (°C)	16.0 - 34.0
Water Temperature (°C)	16.0 - 31.5
Dissolved Oxygen (mg. L ⁻¹)	0.2 - 8.0
Alcalinity (meq. L ⁻¹)	0.4 - 0.8
Free CO ₂ (mg. L ⁻¹)	1.1 - 56.4
pH	5.9 - 7.4
Conductivity (μS. cm ⁻¹)	47.2 - 98.4
Ca ⁺⁺ (mg.L ⁻¹)	2.0 - 10.0
Turbidity (NTU)	3.7 - 68.3
Suspension Matter (mg.L ⁻¹)	5.5 - 59.1
Total Nitrogen (mg. L ⁻¹)	0.2 - 0.9
Total Phosphorus (mg.L ⁻¹)	nd - 0.2
Chlorophyl- <i>a</i> (μg.L ⁻¹)	nd - 12.0

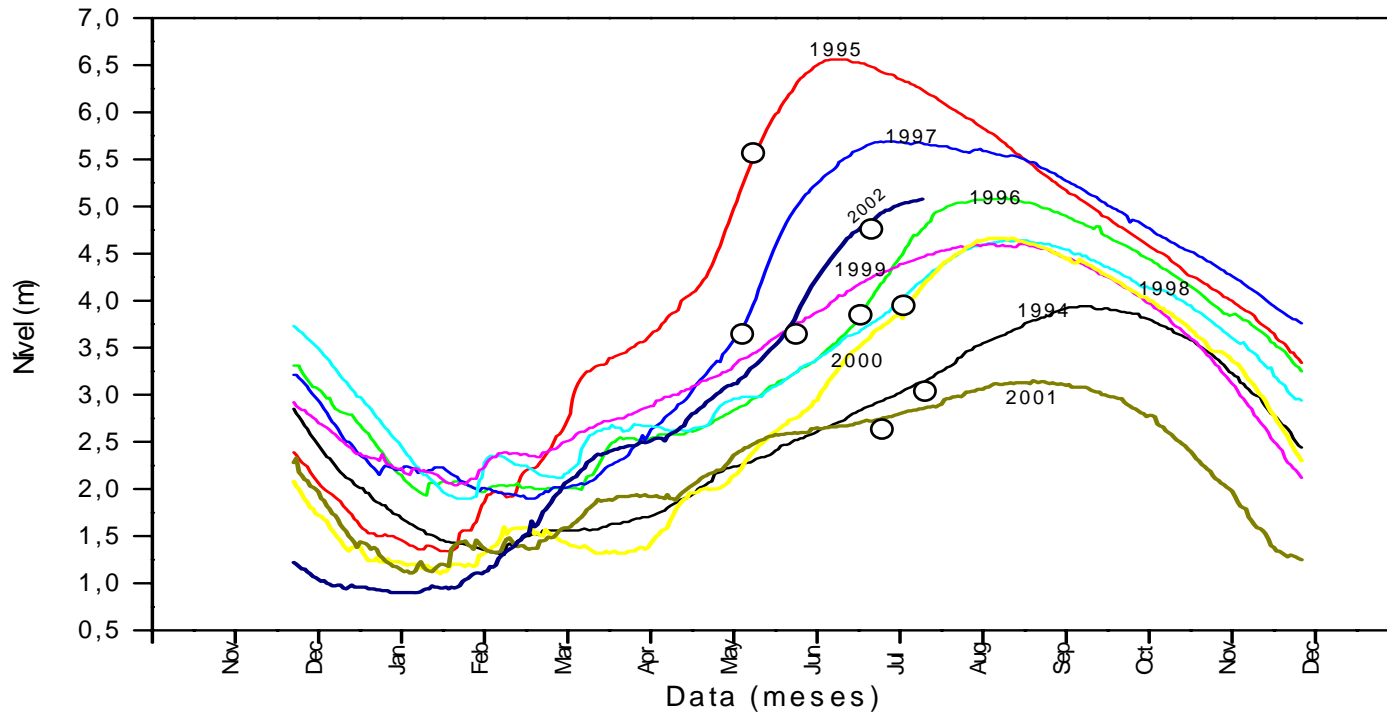




Decoada" Phenomenon







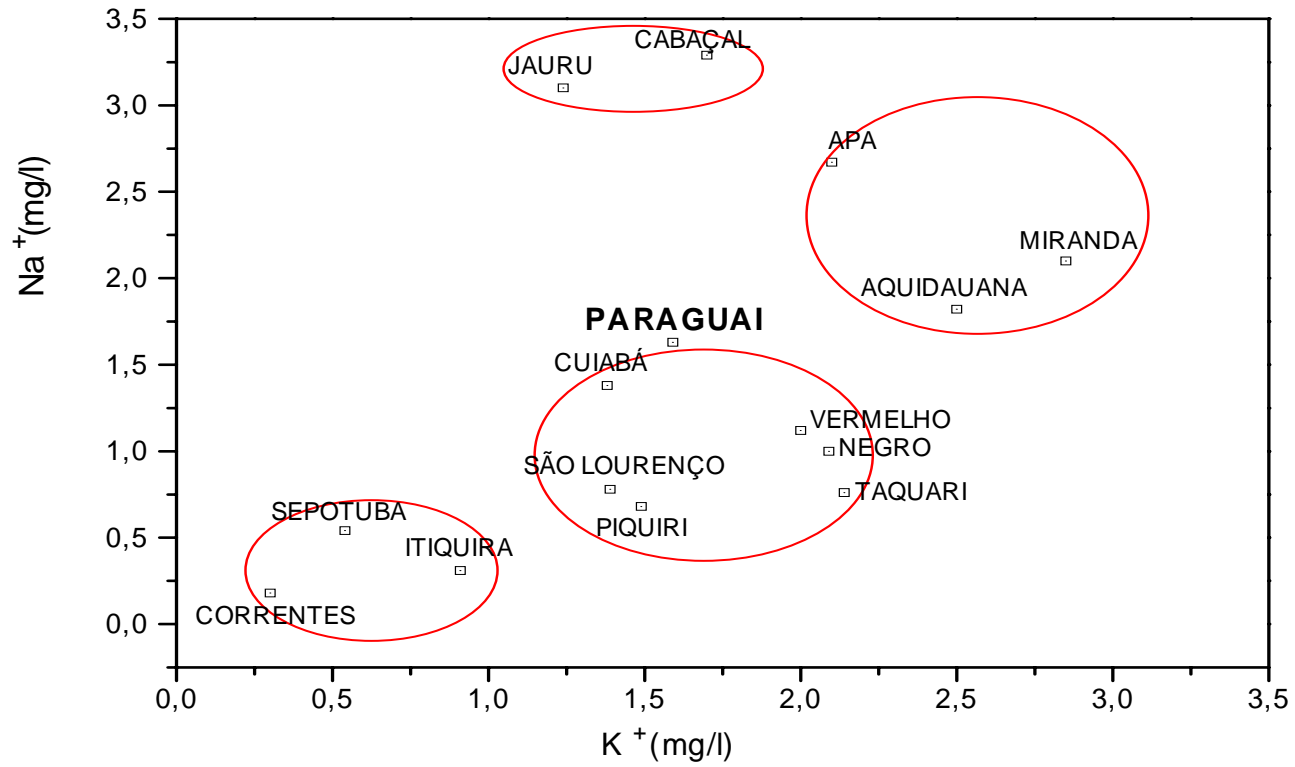
Paraguay River Level variation and the occurrence of decoada phenomenon.

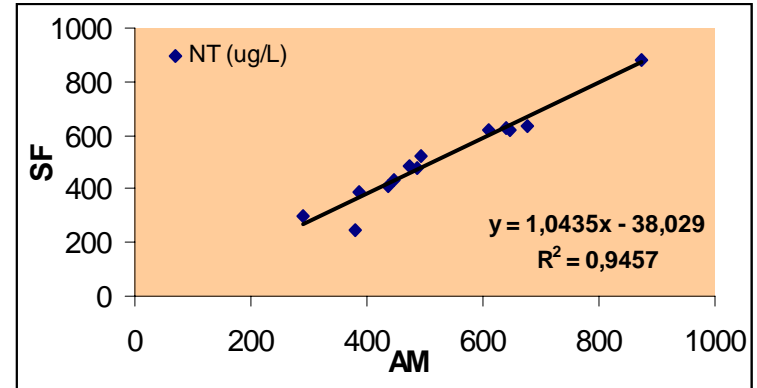
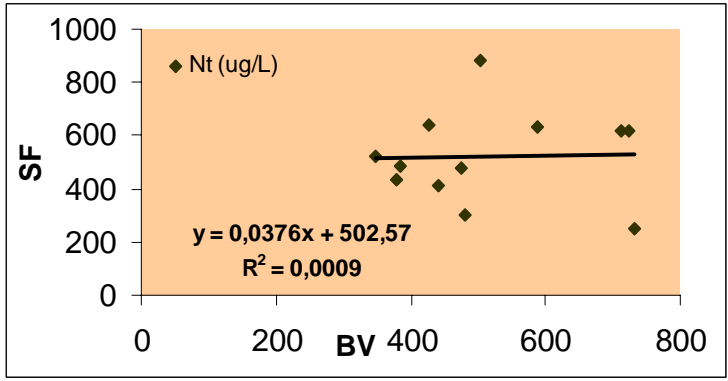
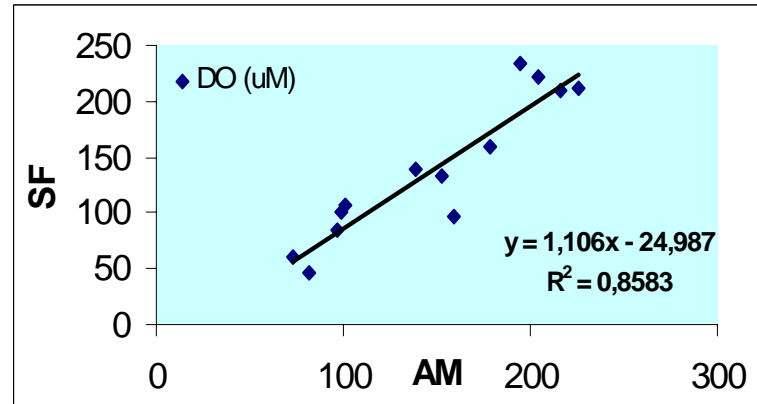
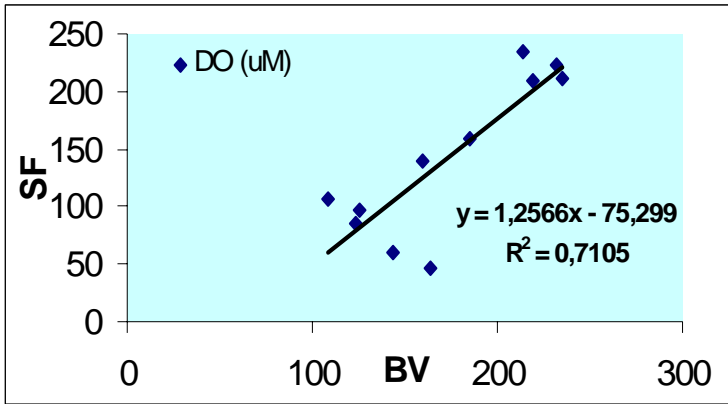


Título: Respostas ecológicas de longo prazo a variações plurianuais das enchentes no Pantanal Mato-Grossense

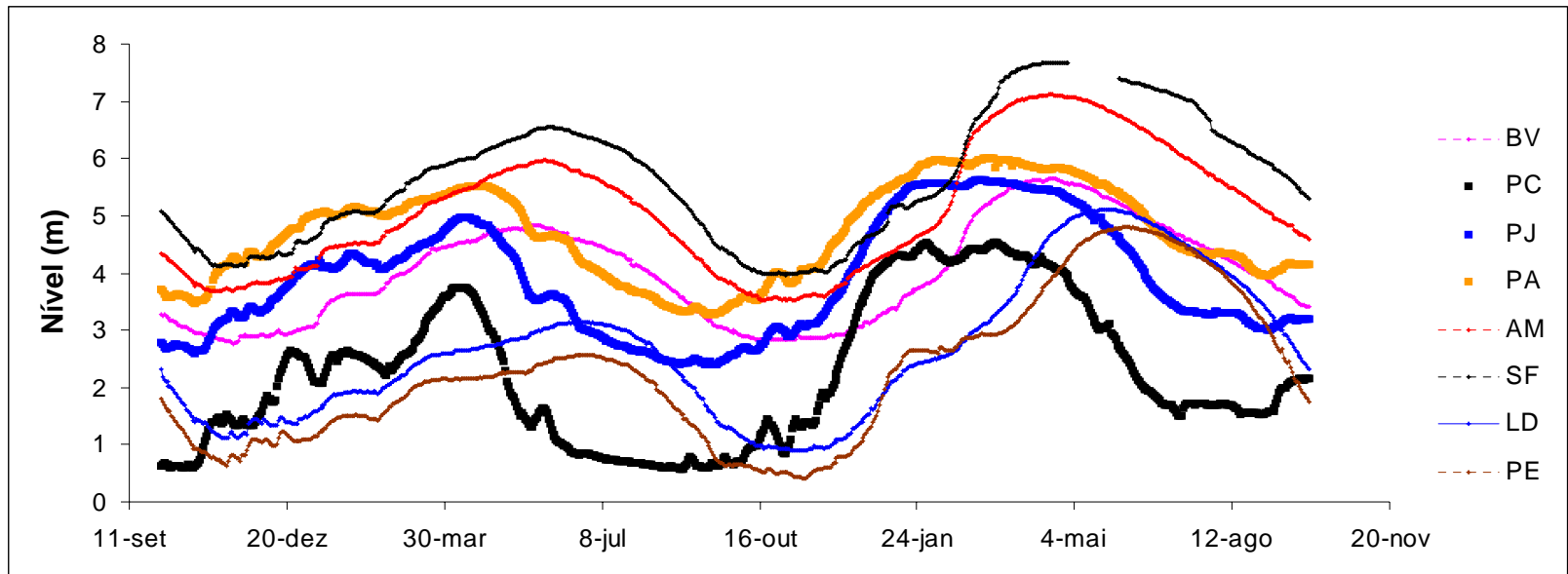
Objetivos específicos:

1. Determinar como os compartimentos “água” e “sedimento” respondem às variações hidrológicas de longo prazo no Pantanal;
2. Determinar os níveis de contaminação por metais pesados e pesticidas, e os níveis de poluição por material em suspensão e nutrientes em água e sedimento, determinando alterações antrópicas;
3. Identificar áreas prioritárias e as principais variáveis que devam ser monitoradas com maior frequência subsidiando políticas de gestão ambiental;
4. Correlacionar as variáveis hidrológicas, limnológicas e ecotoxicológicas monitoradas, tendo como base as séries históricas disponíveis, com as **variações da área inundada na planície e da área antropizada (uso e ocupação do solo)**, visando subsidiar a modelagem matemática do(s) sistema(s).



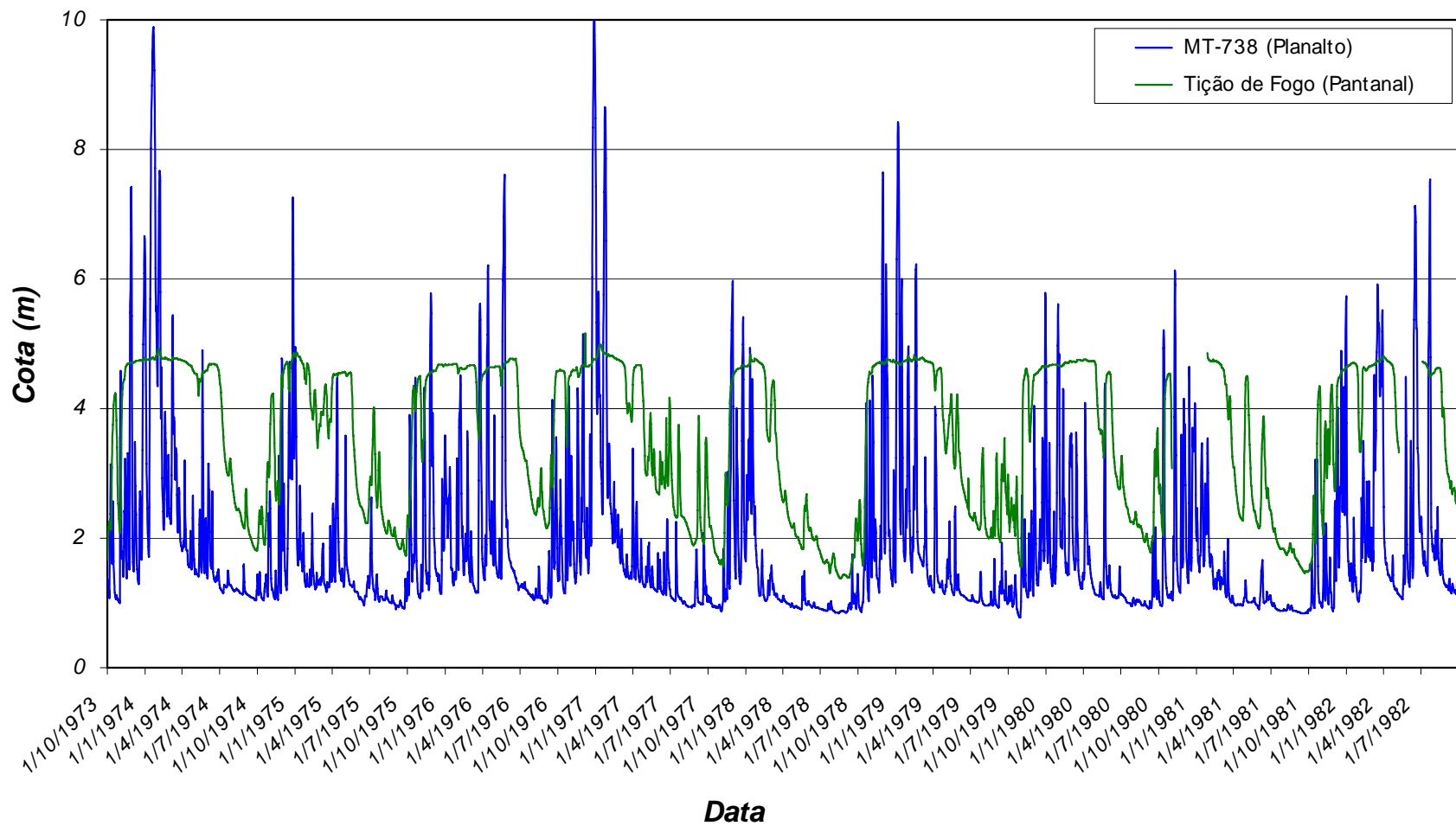


Seasonal variation of limnological values of different river sections studied in the Paraguay River.

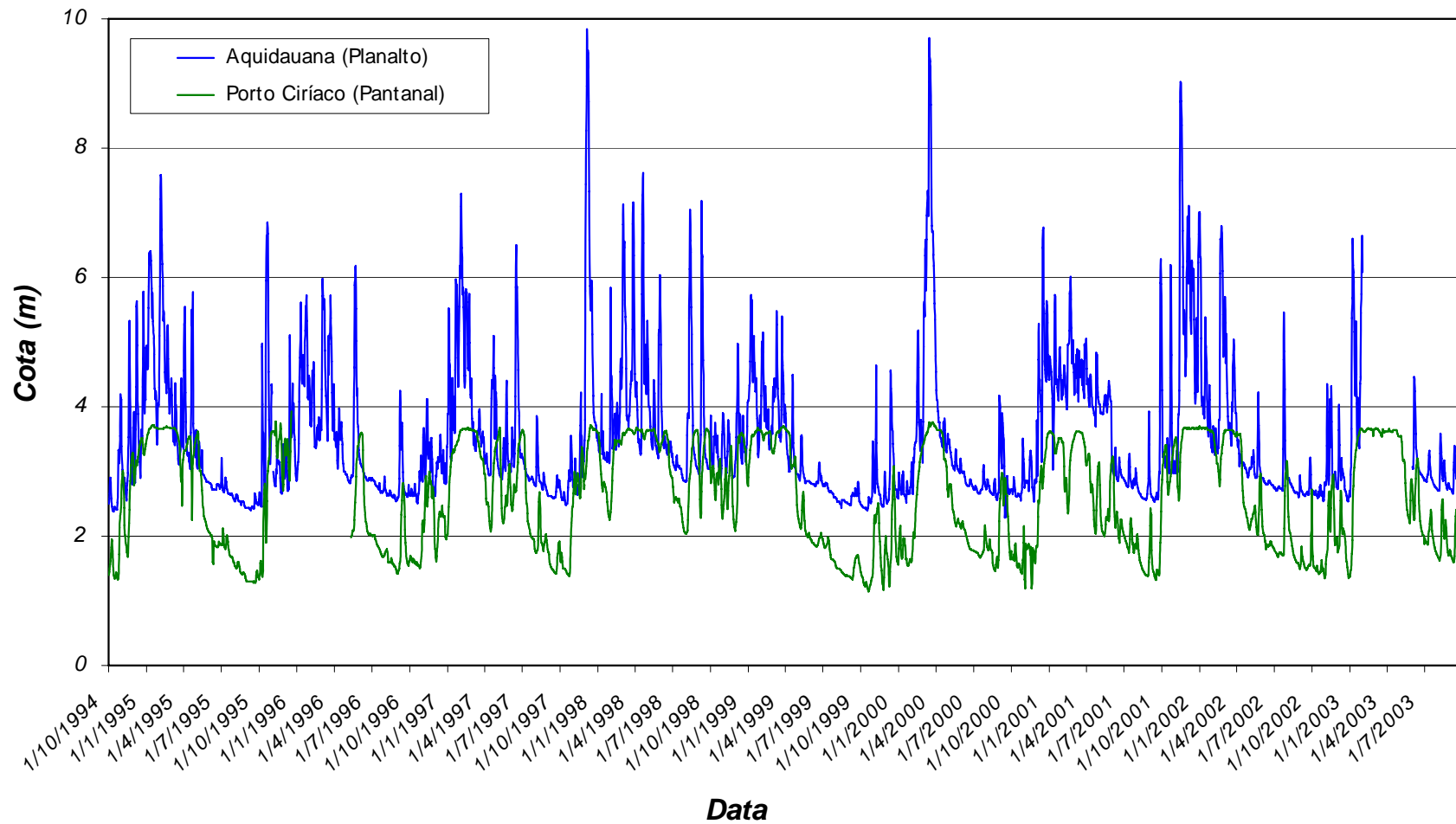


Seasonal Variation of hydrological levels of different sections of Paraguay and Cuiabá rivers.

Cotas diárias do Rio Miranda

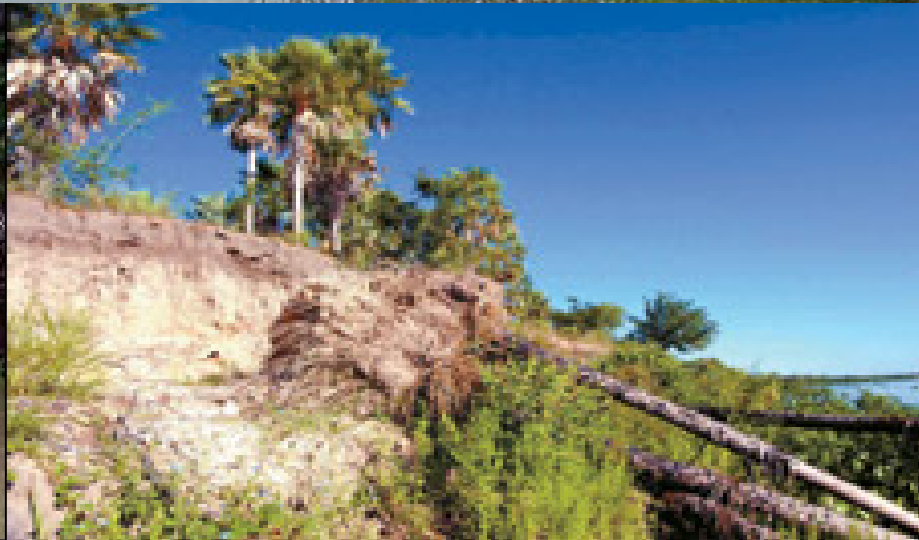


Cotas diárias do Rio Aquidauana



Threats



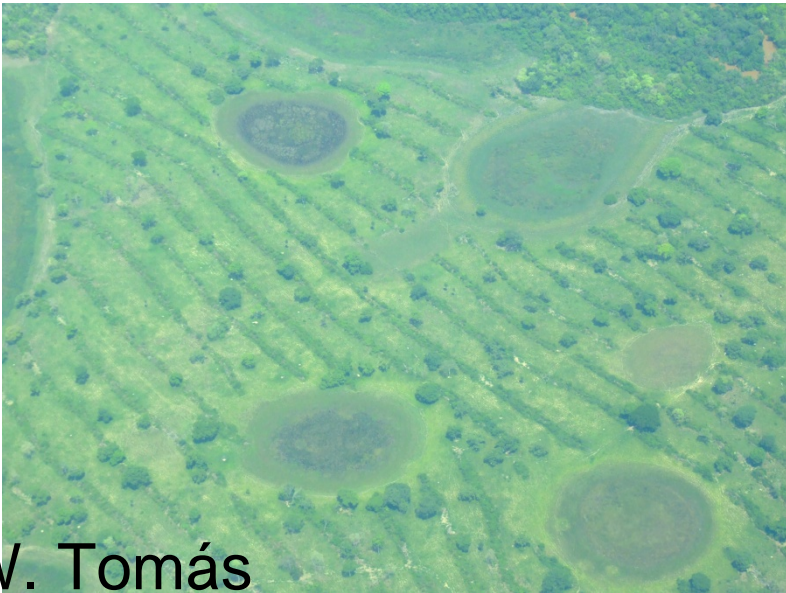




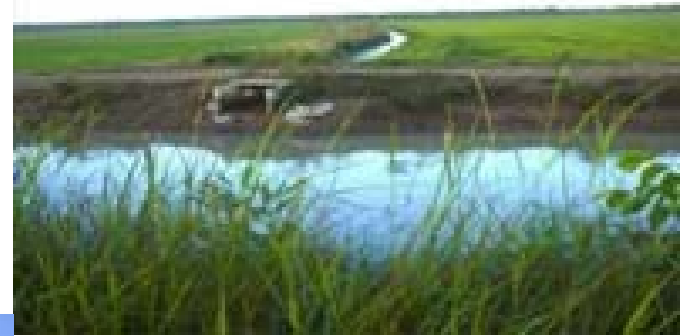


W. Tomás





W. Tomás





Miranda Basin –
irrigated rice
fields





- UHEs – energy ≥ 100 MW
(Manso)

- $100 \text{ MW} > \text{energy} > 30 \text{ MW}$

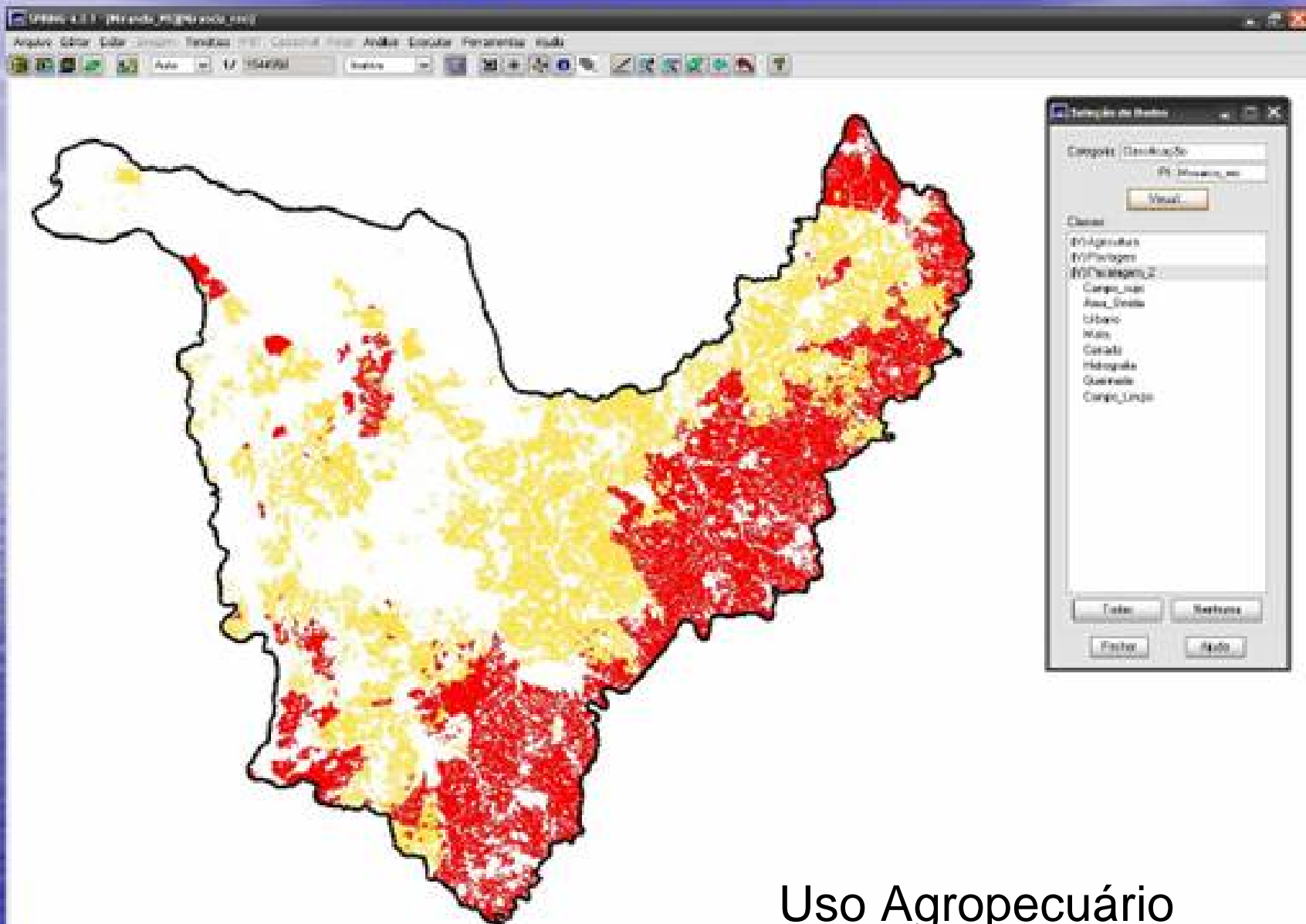
- (Juba I e Juba II)

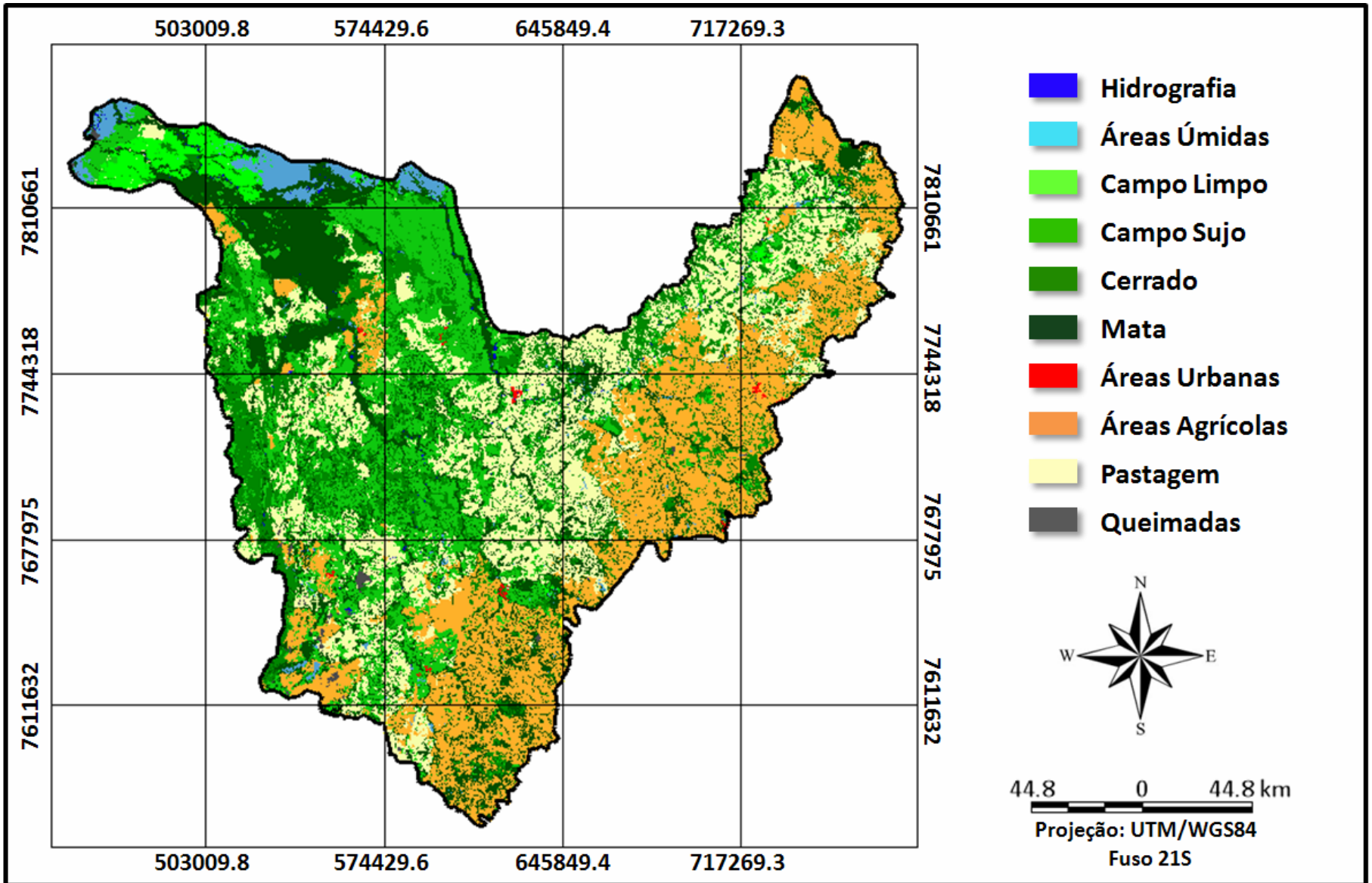
- PCHs energy ≤ 30 MW

- (PCHs)



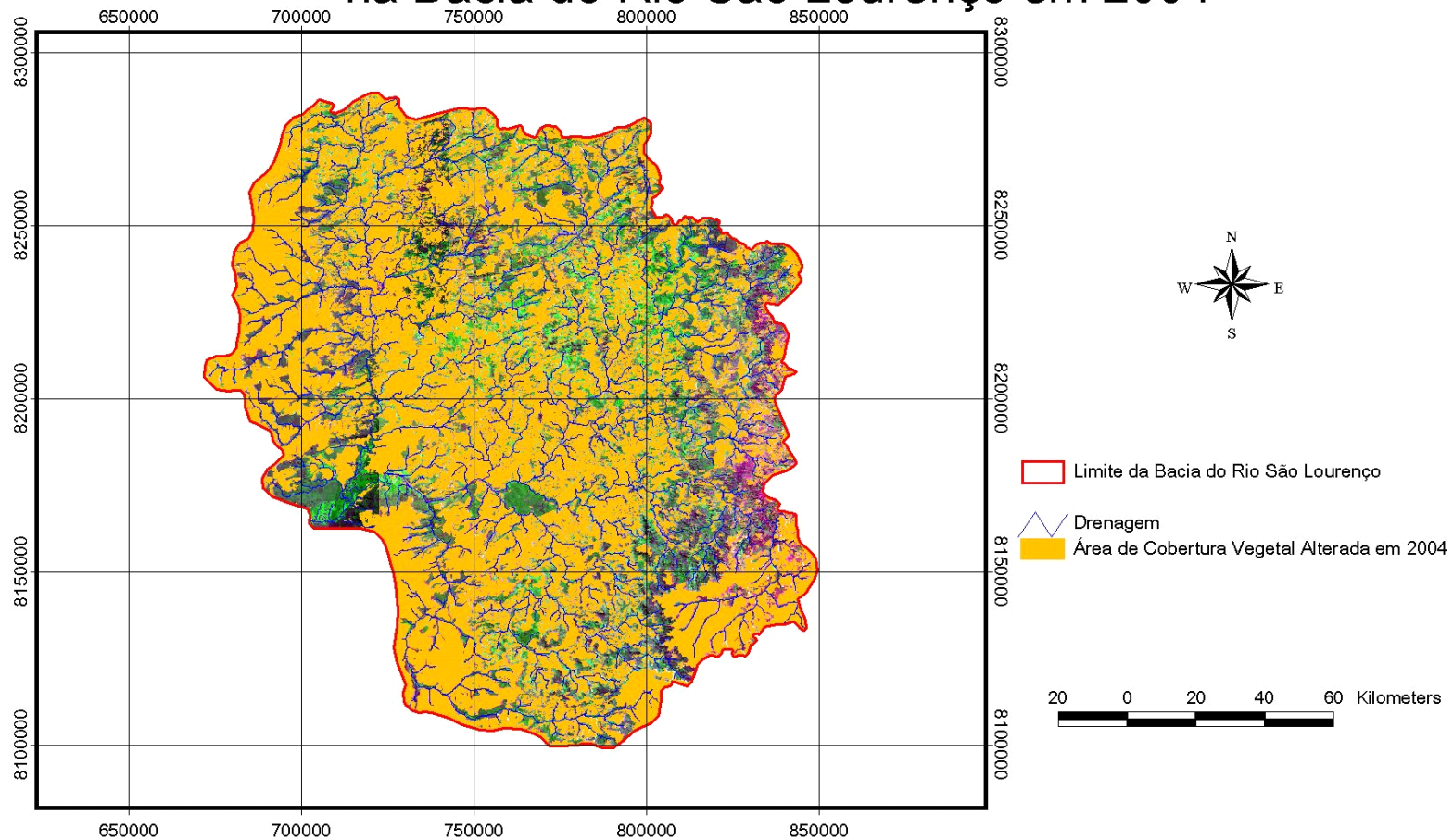






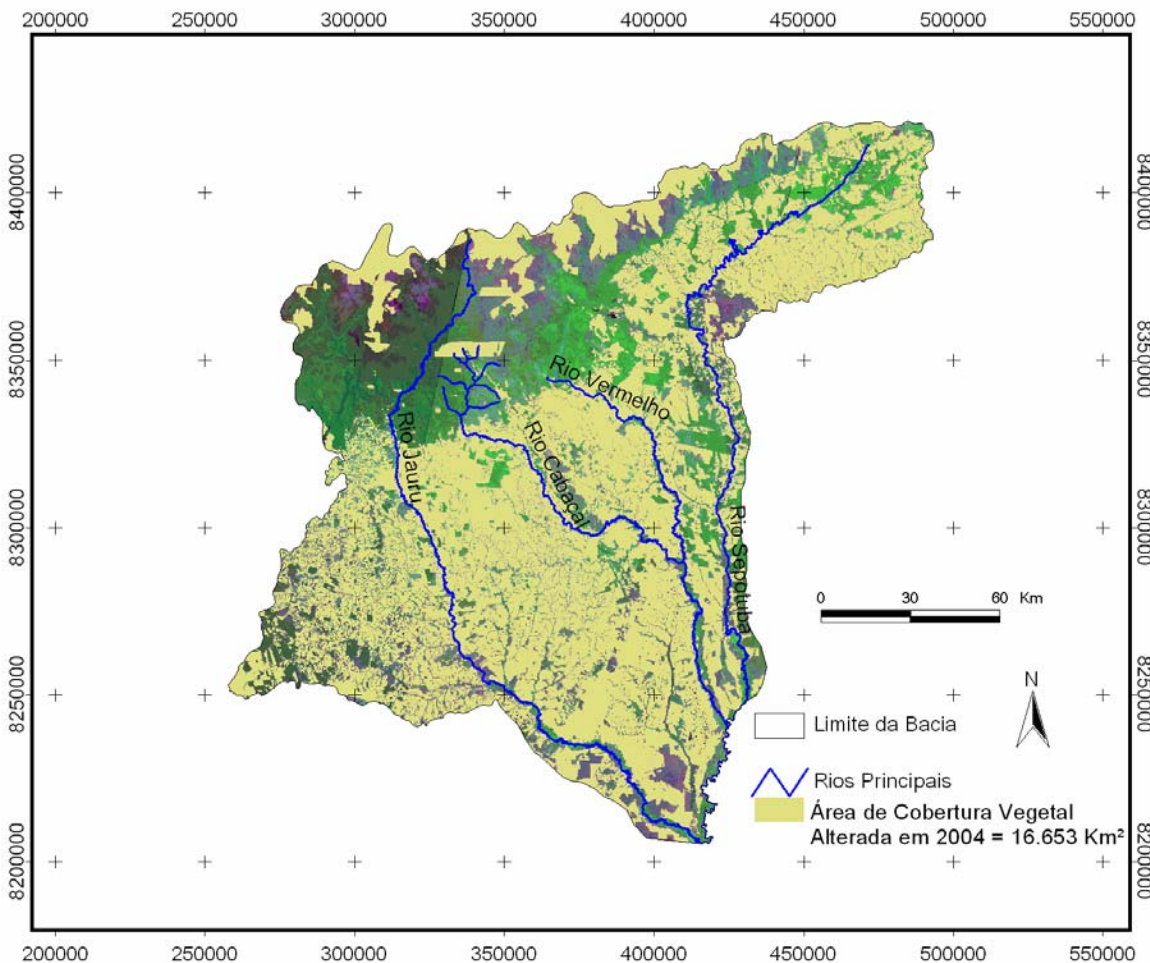
Uso do solo

Área de Cobertura Vegetal Alterada na Bacia do Rio São Lourenço em 2004



Uso do solo na parte alta em 2004 = **61% de área alterada**
Projeto PELD/CNPq

Bacia do Rios Jauru, Cabaçal, Vermelho e Sepotuba - MT



Uso do solo na parte alta em 2004 = **56 % de área alterada**

Projeto PELD/CNPq

Alteração da Cobertura Vegetal do Pantanal para o Ano de 2004

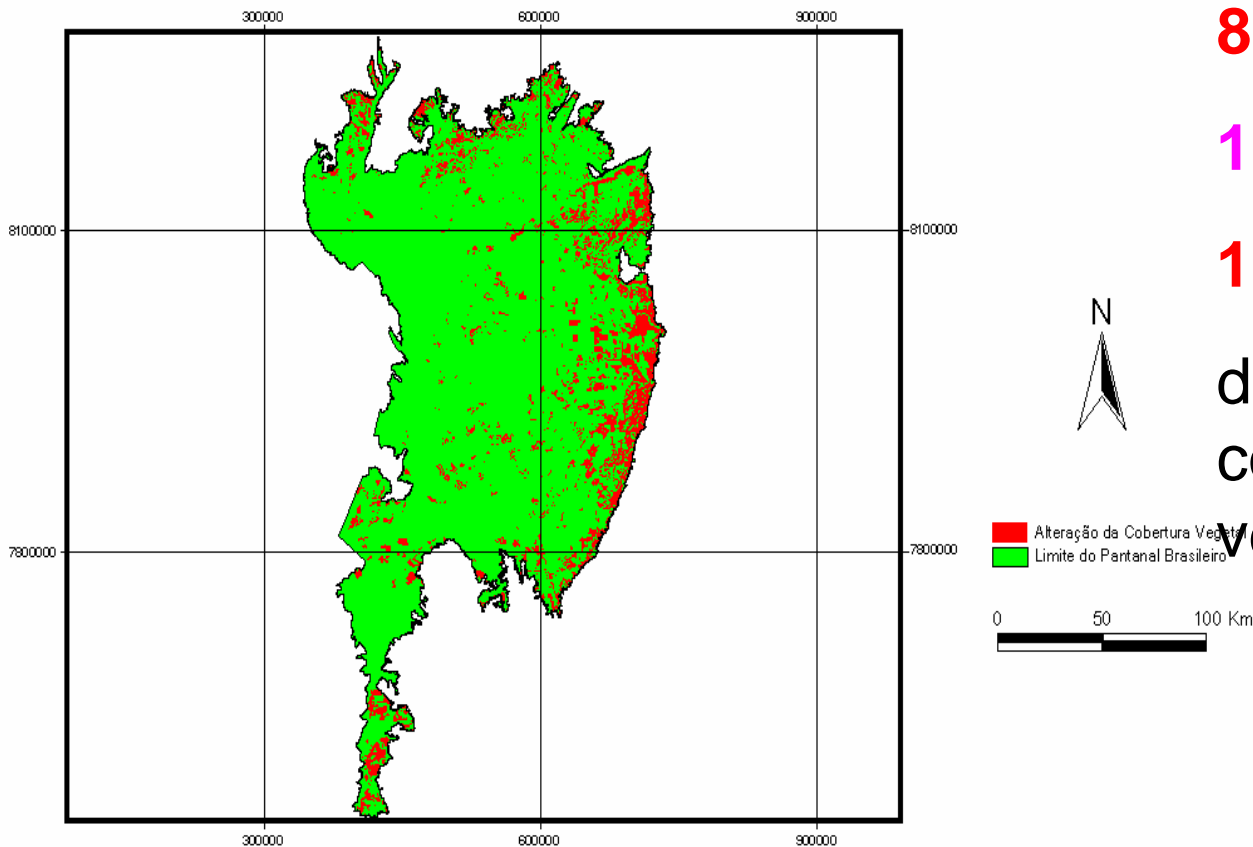
3,9 % 1990-91*

8,8 % 2000*

11,3 % 2002

12,0 % 2004*

da área do Pantanal
com supressão da
vegetação nativa



Fonte: Embrapa Pantanal
Org.: Gomes, Vanessa dos Santos.

* Projeto PELD/CNPq – Padovani et al. 2000

Área da planície pantaneira = 138.183 km²

11,27 % do
Pantanal com
supressão da
vegetação
nativa em
2002

MATO GROSSO

1. Porto Esperidião
2. Araputanga
3. Glória do Oeste
4. Reserva do Cabaçal
5. Lambari do Oeste
6. Cáceres
7. N. Senhora do Livramento
8. Cuiabá
9. Chapada dos Guimarães
10. S. Antonio do Leverger
11. Jucimeira
12. Barão do Melgaço
13. Itiquira

MATO GROSSO DO SUL

14. Corumbá
15. Sonora
16. Coxim
17. Rio Verde de MT
18. Rio Negro
19. Aquidauana
20. Miranda
21. Bodoquena
22. Porto Murtinho
23. Ladário

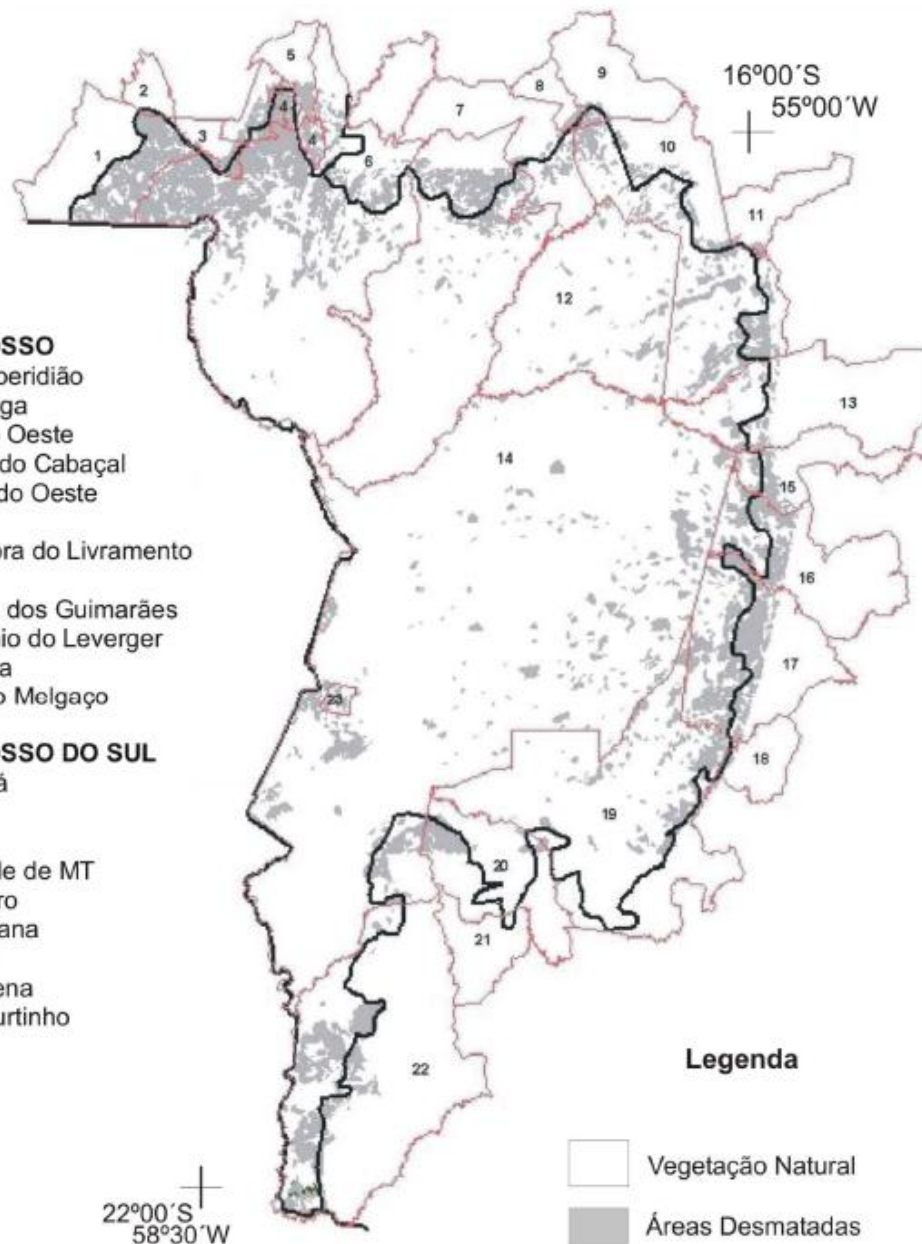
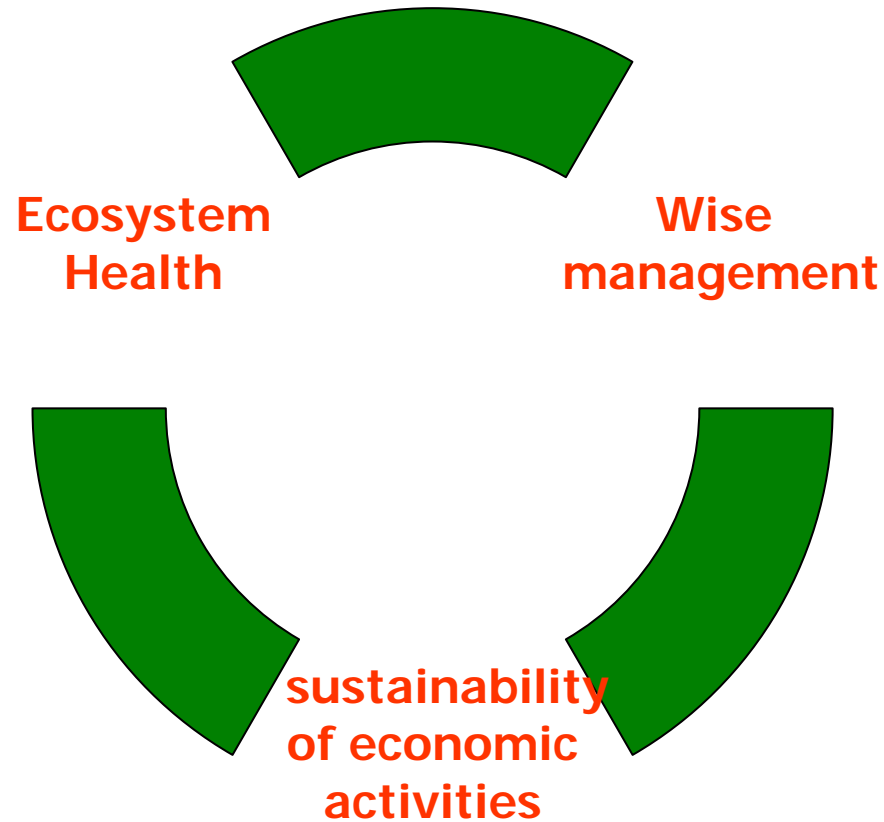


Fig. 3 – Distribuição das áreas desmatadas nos municípios que compõem a área do Bioma Pantanal.

Abdon et al. 2007
(Bioma Pantanal 150.355 km²)

Ecosystem Management



Thank you!

<http://www.cpap.embrapa.br>

debora@cpap.embrapa.br

Tel.: 55 67 3234-5800

Fax: 55 67 3234-5815



Ministério da Agricultura,
Pecuária e Abastecimento

