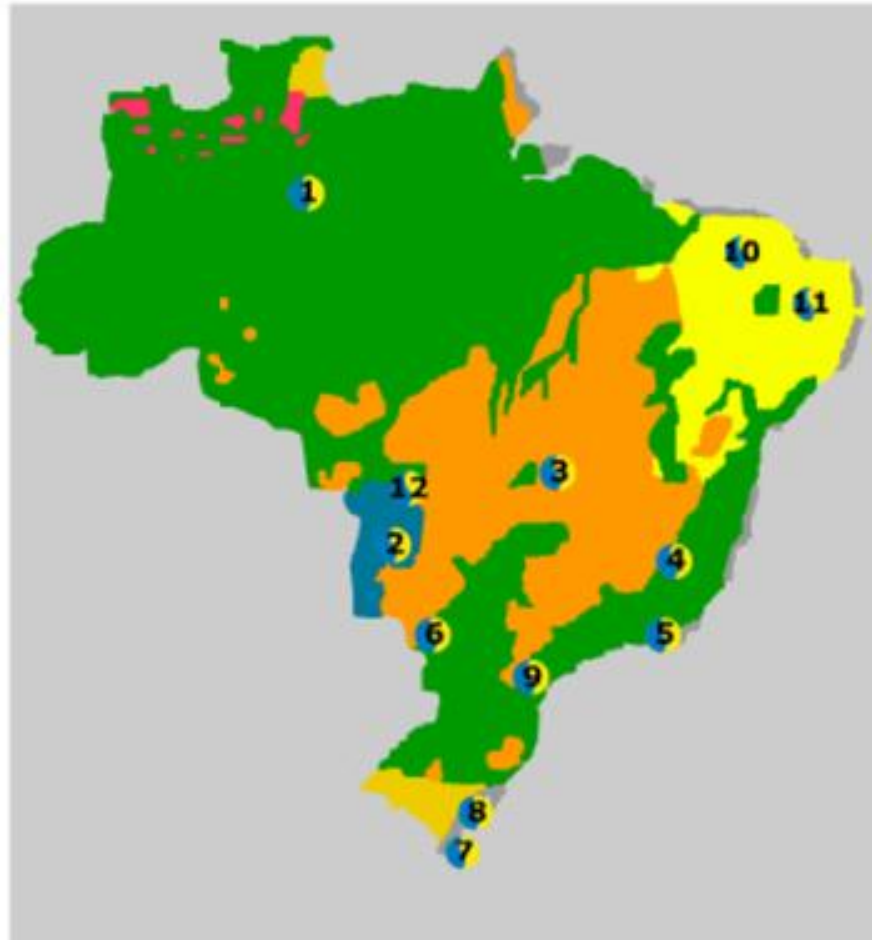




# Long Term Ecological Research in Brazil (PELD)

Luiz Carlos Gomes  
Maringá State University/Nupélia

# Sites do PELD



Sponsors: MCT/CNPq

Website: <http://www.icb.ufmg.br/peld>

1. Tropical Wet Forest;
2. Southern Pantanal;
3. Central West Region – Cerrado;
4. Atlantic Forest and lacustrine ecosystems of the middle rio Doce River;
5. Restingas and coastal lagoons of the Northern Fluminense region;
6. Floodplain of the upper Paraná River;
7. Hydrological System of the Taim wetlands;
8. Patos Lagoon estuary;
9. Mixed ombrofilous forest and transitions;
10. Marginal Cerrados of the Northeast;
11. Caatinga;
12. Northern Pantanal.



# Site 6

Floodplain of the upper Paraná River

Coordenador: Angelo Antônio Agostinho  
Universidade Estadual de Maringá – Nupélia  
Maringá, PR - Brazil

# Objectives

## **-Evaluation of large scale perturbations;**

**-El Niño, anthropogenic activities (damming) and actions towards conservation (creation of protected areas);**

## **-Evaluation of process of high variability;**

**-Population dynamics;**

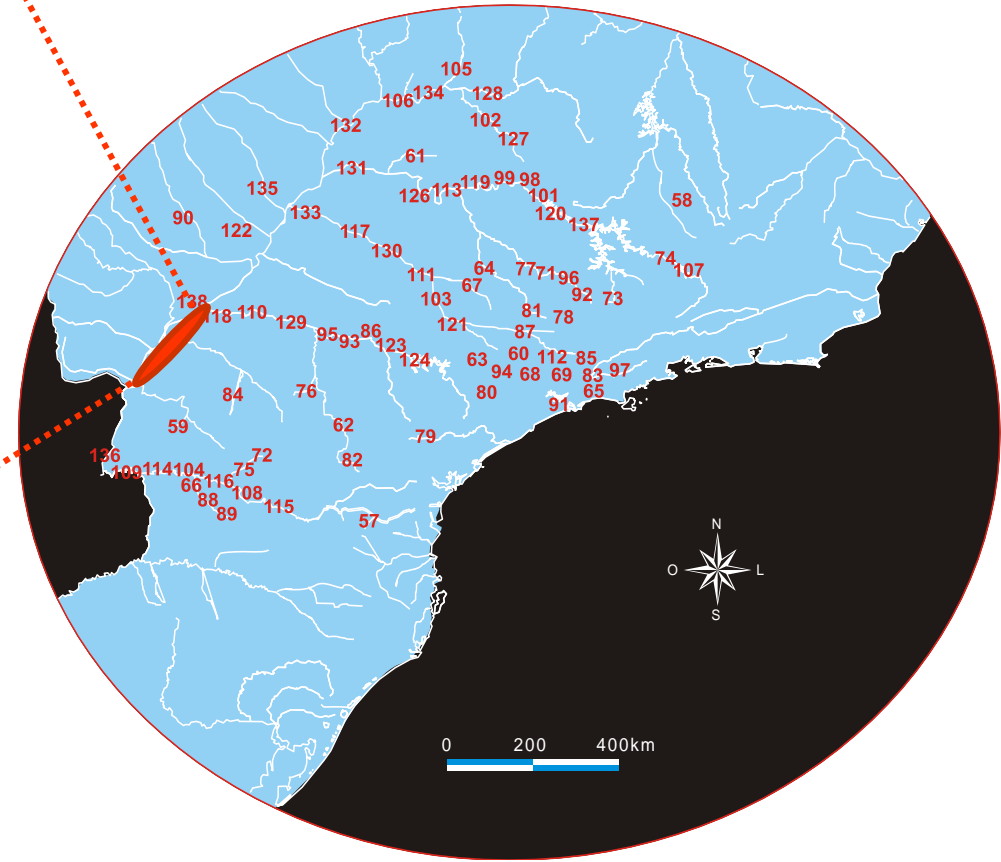
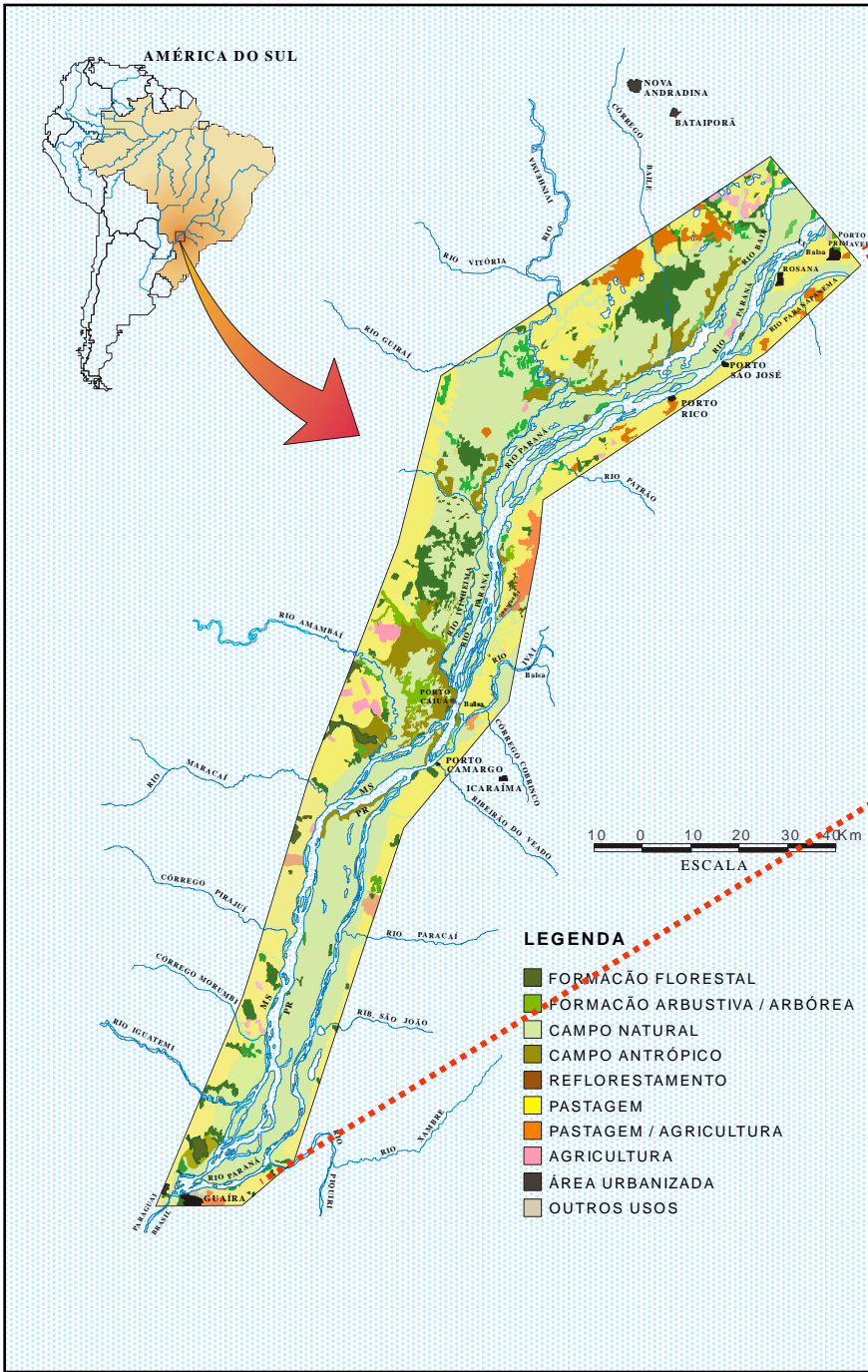
## **-Evaluation of complex processes;**

**-Biotic interactions;**

Their effect on regional biodiversity

# Remnant of floodplain

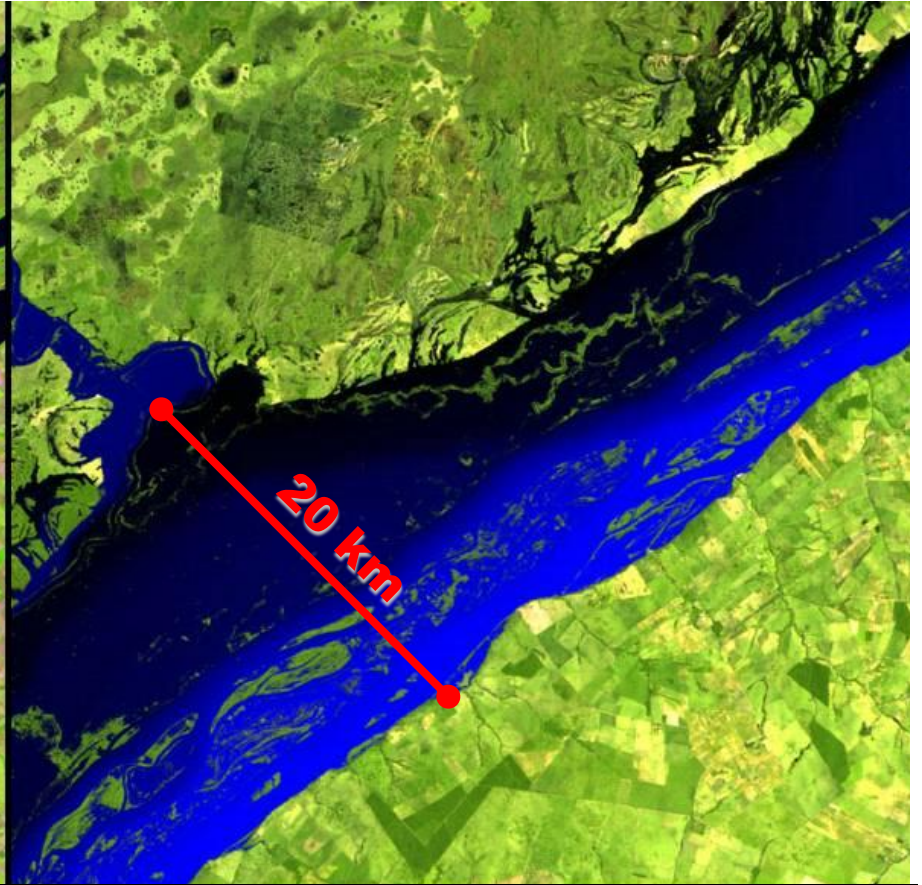
230 km (10,000 km<sup>2</sup>)



# Flooding



**Low water season - October**



**High water season - January**

# Paraná river floodplain



# Duration of the studies in the area

PELD

Padct/Ciamb

Finep












- Hydric resources - 22
- Climatology/meteorology - 21
- Bacteria (plankton) - 20
- Food webs - 19
- Autotrophic sources of carbon - 18
- Fisheries - 17
- Population genetics - 16
- Macrophytes - 15
- Microeconomics (alternatives) - 14
- Health (indices, habits, needs) - 13
- Geology and geomorphology - 12
- Regional history - 11
- Demographics and economics - 10
- Social representation - 9
- Life quality and jobs - 8
- Limnology - 7*
- Phytoplankton - 6*
- Zooplankton - 5*
- Zoo benthos - 4*
- Ictioplankton - 4*
- Fish - 3*
- Ictioparasitology - 2*
- Riparian vegetation - 1*

86 88 90 92 94 96 98 00 02 04 06 08 10





# Upper Paraná River Floodplain Species richness

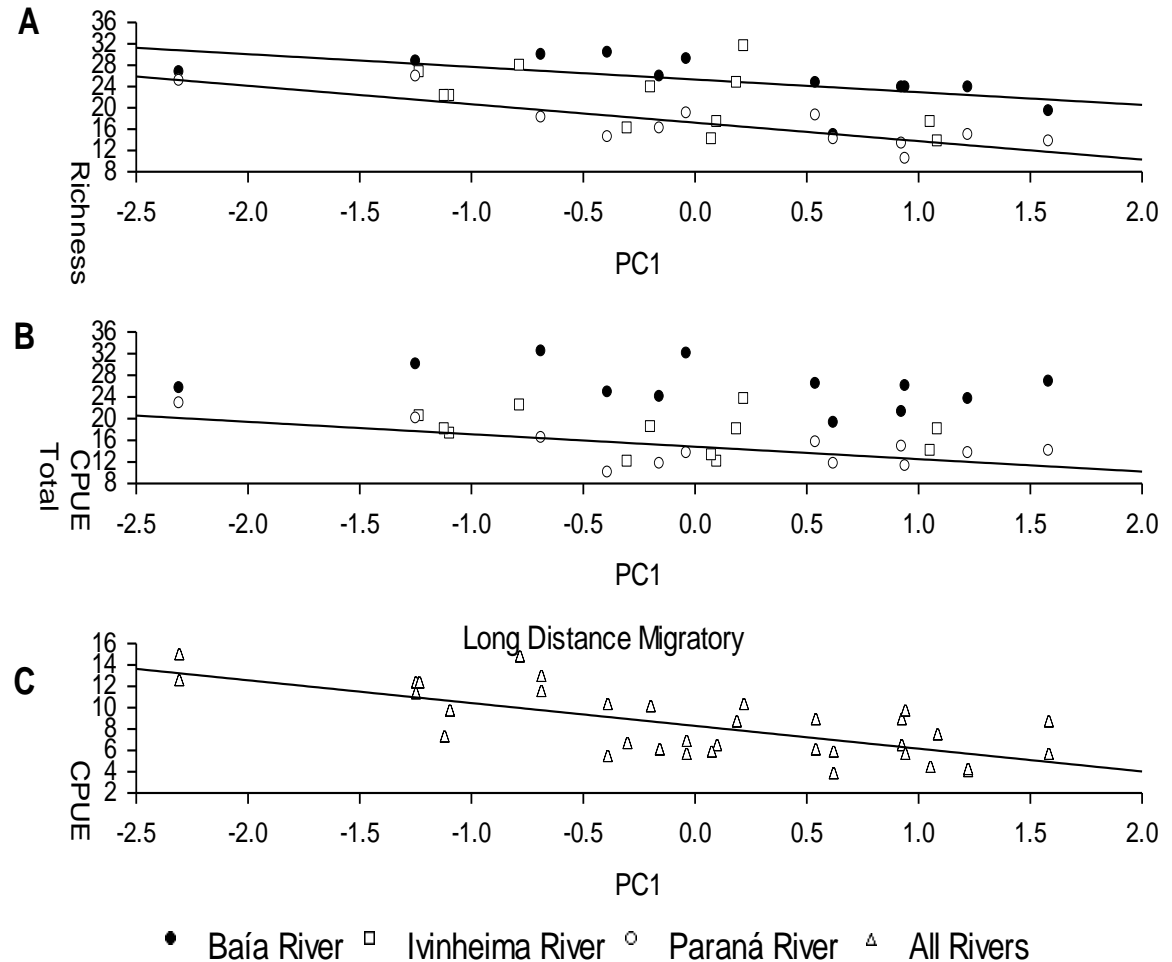
• <b>Plants</b>	<b>951</b>	
• <b>Aquatic macrophytes</b>	<b>118</b>	
• <b>Phytoplankton</b>	<b>585</b>	
• <b>Periphyton</b>	<b>474</b>	
• <b>Zooplankton (+ciliados+rotíferos)</b>	<b>1011</b>	
• <b>Benthic invertebrates(+Ostracoda)</b>	<b>315</b>	
• <b>Ictioparasites</b>	<b>284</b>	
• <b>Fishes</b>	<b>137</b>	
• <b>Amphibian</b>	<b>22</b>	
• <b>Reptiles</b>	<b>37</b>	
• <b>Birds</b>	<b>295</b>	
• <b>Mammals</b>	<b>60</b>	
• <b>TOTAL</b>	<b>4289</b>	

A scenic sunset over a body of water. The sky is filled with soft, golden light, transitioning from a pale blue at the top to a warm orange near the horizon. The water reflects the colors of the sky. In the foreground, there are silhouettes of trees and reeds, some of which are partially submerged in the water. The overall mood is peaceful and serene.

# **Modelling in site 6**

# Identification of important hydrographic attributes

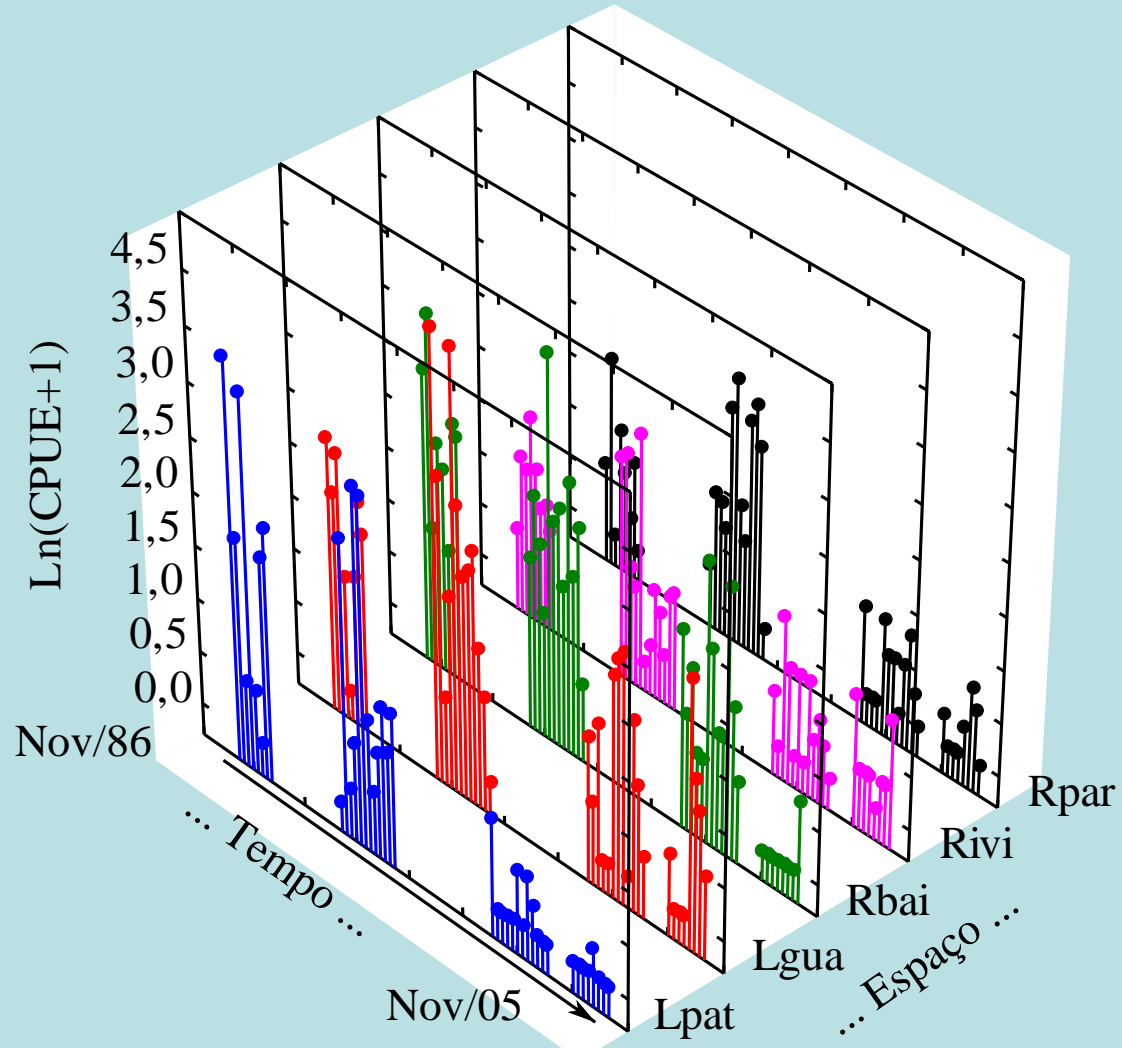
Variables	PCA1
Intensity of potamophase	<b>-0.21</b>
Intensity of limnophase	<b>-0.18</b>
Days of potamophase	<b>-0.96</b>
Days of limnophase	<b>0.96</b>
Elasticity	<b>-0.19</b>
Connectivity	<b>-0.94</b>
Fraction of potamophase	<b>-0.96</b>
Number of pulses	<b>-0.61</b>
Timing	<b>-0.54</b>
Eigenvalues	<b>4.602</b>
Explained variation (%)	<b>46.0</b>



# Prediction

## Panel data analysis

Painel de Dados para *P. Lineatus*



# Prediction

$$P = 15,895 + 0,424F + 0,089T - 0,289TS - 0,015CE + 0,500UHE + (-0,086C + 0,00011C^2)$$

Where:

***P*** = ln (CPUE+1) of piscivores;

***F*** = Prey availability (ln (CPUE+1); individuals/1000 m<sup>2</sup> gillnet 24 hs)

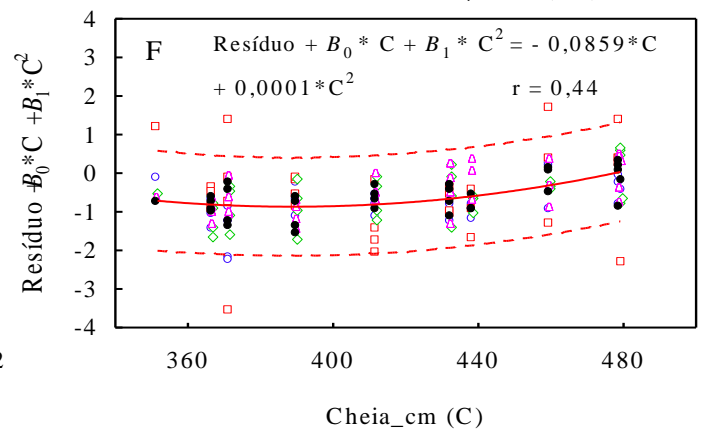
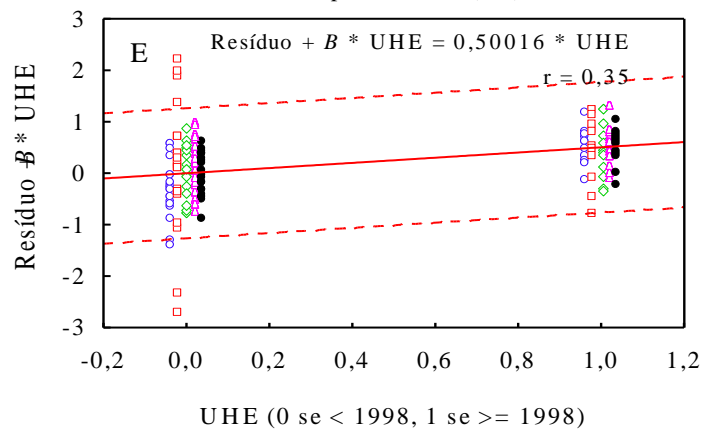
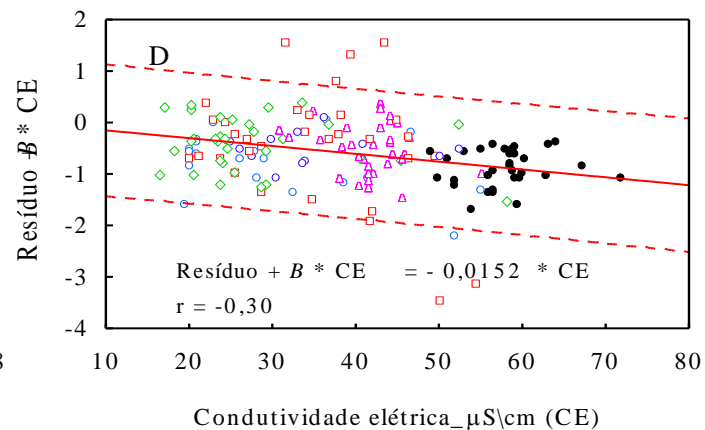
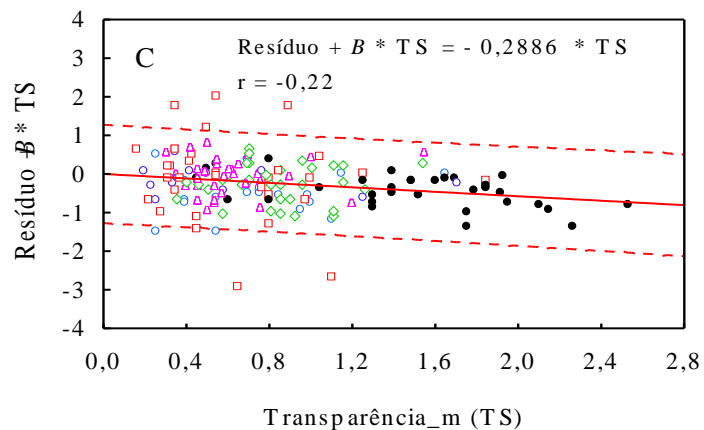
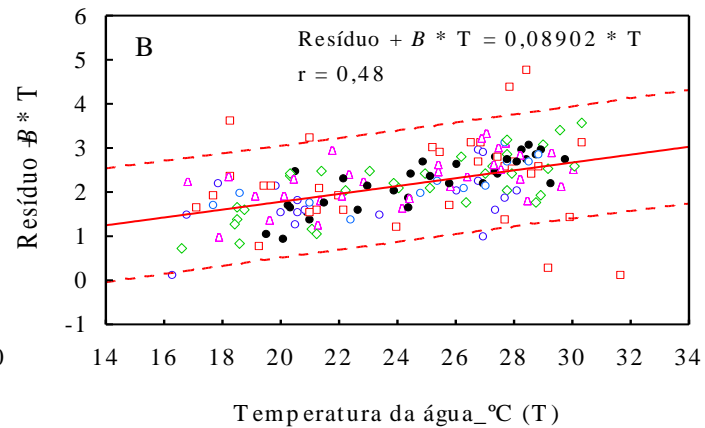
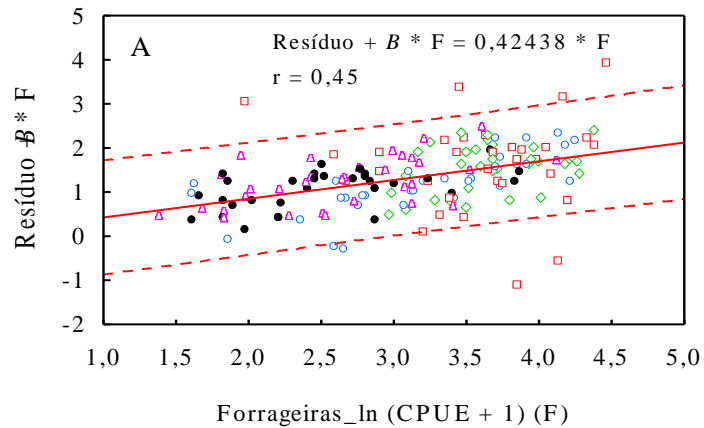
***T*** = Water temperature (°C).

***TS*** = Secchi depth (m)

***CE*** = Conductivity (μs/cm)

***UHE*** = Dummy variables: 0 for the periods before the conclusion of Porto Primavera Dam in 1998; 1 for the periods after the dam.

***C*** = intensity of the flood during the spawning period (mean river level above 350 cm in the fluviometric station of Porto São José, Paraná River; m)



Piana (2008)

# Synthesis of functioning, identification of gaps and integration among labs

## Ecopath

Free software available in <http://www.data.fisheries.ubc.ca/ecopath/>.

Production of the group (i) = Predation mortality on (i) + Other mortalities of (i) + Catches of (i) + *Export* of (i)

Mathematically described by:

$$B_i * P_{Bi} * EE_i - \sum_j (B_j * Q_{Bj} * DC_{ji}) - EX_i = 0$$

Where:

$B_i$  – Biomass of prey (i);

$P_{Bi}$  - Production / biomass of (i);

$EE_i$  – ecotrophic efficiency of (i) – between 0 and 1;

$B_j$  – biomass of predator (j);

$Q_{Bj}$  - consumption / biomass of the predator (j);

$DC_{ji}$  – fraction of the prey (i) in the diet of predator (j);

$EX_i$  - *export* de (i).

