

Preliminary Ecopath Model of Itaipu Lagoon, Niterói, Rio de Janeiro – Brazil

Alan Motta Cardoso*, Rafael de Almeida Tubino & Cassiano Monteiro-Neto



Laboratório ECOPESCA, Departamento de Biologia Marinha,
Universidade Federal Fluminense - UFF. <http://www.uff.br/ecopesca>
* E-mail: alanmottacardoso@gmail.com



Introduction

Coastal lagoons are important ecosystems for maintaining coastal biological processes, especially regarding the renewal of fish stocks. In such environments we usually find high biodiversity and productivity, linked through complex and dynamic food chains. This work provides preliminary insights on the trophic organization of Itaipu Lagoon, Rio de Janeiro Brazil, aiming to promote coastal zone management and conservation of resources.

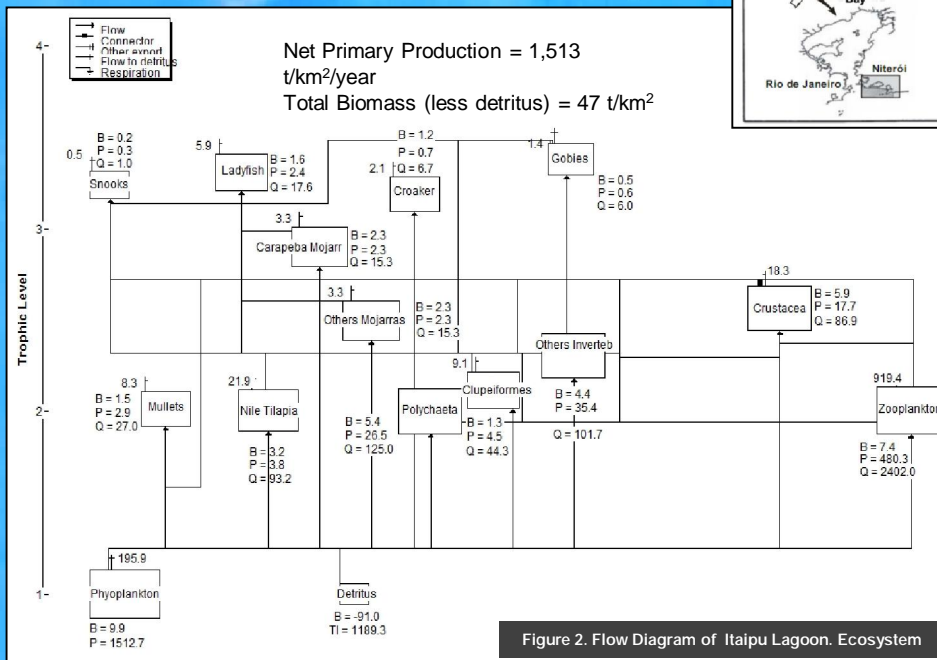
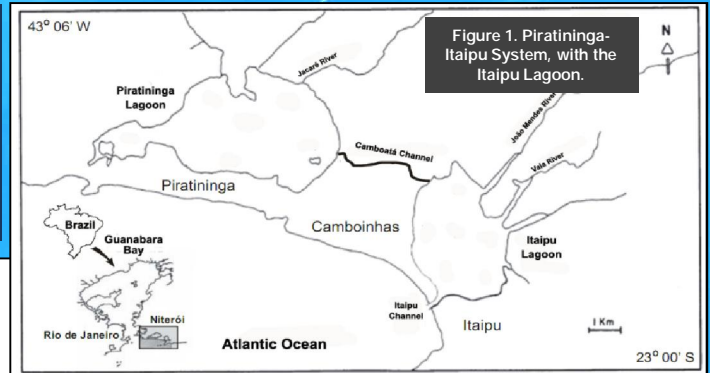
Materials and Methods

Study Site

The Itaipu lagoon (Fig. 1) has an area of approximately 1km² and an average depth of 1.5m. It is hypertrophic due to large inputs of domestic waste, but the water mass residence time is short, providing strong circulation and renewal within the system.

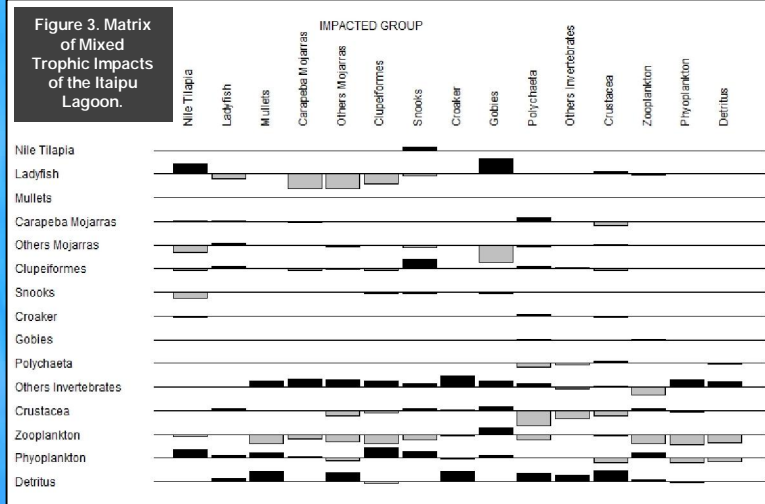
Ecopath

We used historical data on fish and shellfish abundance collected over the past few years to build the preliminary Ecopath model.



Results

Figure 2 shows the Ecopath trophic flow diagram proposed for the 15 boxes model. Most abundant species (e.g. ladyfish, snook, carapeba mojarra, Nile tilapia) were considered as individual groups, whereas forage fishes (mostly clupeiforms) and crustaceans were respectively pooled into separate boxes. Calculated total biomass was 47 t/km², whereas estimated net primary production was 1.513 t/km²/y. These figures are below values found for the Terminos Lagoon in Mexico. Differences in size and depth between lagoon systems may account for the discrepancies. Despite the high organic inputs, strong circulation and high water turnover rates may be responsible for the large phytoplankton contribution as compared with detritus. Nevertheless, model needs refinement to test this hypothesis.



The mixed trophic impact matrix (Fig. 3), showed the positive impacts of the lowest levels (detritus, phytoplankton and benthic invertebrates) on most groups. Mullet, important fisheries resources, apparently had no trophic effect on any of the groups considered, whereas, the Nile tilapia, an accidentally introduced species showed positive trophic impacts on snook, probably the top fish predator in the system. These results are preliminary and must be viewed with caution. Nevertheless, the Itaipu Lagoon Ecopath model appears to be a promising tool for understanding species or species groups roles within the system, therefore providing useful information for coastal zone and artisanal fisheries management.

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