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GIS-BASED OBJECT-ORIENTED HYDROLOGICAL MODEL AS A TOOL FOR THE ANALYSIS OF POPULATION DYNAMICS

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The Esteros del Ibera is an isolated basin wetland located in NE Argentina. The Ibera system is a vast flooding depression of some 13,000 Km^2. About 90 % of the surface is covered by aquatic and floating vegetation. Several lagoons, that coincide with the deeper depressions, are the only permanent free surface water. They are interconnected by channels and streams of permanent or temporary flux. Preferential runoff lines permit to distinguish two subsystems that match ancient beds of the Parana river. The input to the system are precipitation and ground-water inflow, mainly from the lake of the Yacyreta dam. The main loss (output) of water from the system is evapotranspiration. The only surface output is the Corriente river.

The dynamics of various vegetation and animal populations are strongly driven by water levels. As a tool for the analysis of population and community dynamics, a map-based flow simulation model with monthly time step is created. The model, built over a geographic information system (GIS), is based on the concepts of object oriented programming as a way to handle data series that are spatially and temporally sparse due to the isolation of the region. Continuity equations are calculated within each polygon and momentum equations applied at boundary lines couple the polygons.