Ecosystem services of runoff marshes in urban lowland basins: proposals for their management and conservation

The city of La Plata, Argentina, is situated in a low alluvial zone, with streams having insufficient drainage into the Río de la Plata estuary. In April 2013, a prodigious storm front caused unprecedented flooding in the city and environs that resulted in extensive loss of life and property, especially in the Del Gato stream basin. Through an analysis of water quality and the conditions of the habitat on the basis of the macroinvertebrates present as bioindicators of environmental quality, this work aims to contribute to a reevaluation of the role of the marshes adjacent to the stream as flood-alleviation elements, and then propose alternatives for flooding management in the basin. Consequently, quantitative seasonal samples of vegetation, sediments, and benthic organic matter were taken and limnologic parameters measured in three sectors of the basin having different land uses: rural, periurban, and urban-industrial. The macroinvertebrate assemblages, as analyzed through the application of ecological indices, exhibited a marked decline in richness and in the Pampean Biotic Index towards the low-lying basin. Principal-components analysis associated Site 1 with the dissolved-oxygen concentration, Site 2 with high nitrate values, and Site 3 with oxygen demands. Redundancy analysis indicated a positive relationship between Baetidae and Aeolosomatidae with the dissolved-oxygen concentration and between Enchytraeidae and Stratiomyidae with the conductivity. These marshes are fundamental in maintaining good environmental conditions and attenuating the effects of the flooding that is predicted to become increasingly catastrophic in this region as the climate changes.

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