Introduction

In megacities with populations exceeding ten million inhabitants, water is a scarce resource that is in high demand. The exploration and application of new, more sustainable water use and reuse approaches are urgently needed. Water managers must change the perspectives and policies that assume that water can only be used once by considering the benefits obtained from the natural environment surrounding the urban areas.

In emerging economies, cities grow before sufficient hydraulic infrastructure has been developed to handle the water supply and wastewater disposal requirements [1]. This lack of infrastructure significantly affects the surface and groundwater systems, making waterways vulnerable to pollution and leading to deleterious effects on water sources and human health. There is a need for more adequate approaches regarding processes that occur at the basin level, in addition to directly considering hydrological effects on water sources and human health. There is a need for more adequate approaches regarding processes that occur at the basin level, in addition to directly considering hydrological ecosystem services, such as water provision and water quality.

During the evolution of what is now the Mexico City Metropolitan Area (MCMA), lakes and rivers have been transformed into drains or converted into sewers in the vicinity of modern avenues, and freeways transit over piped waterways [2]. The hydraulic system of the Basin of Mexico, where the MCMA and its 22 million inhabitants are located, has been irreversibly

Final Opportunity to Rehabilitate an Urban River as a Water Source for Mexico City

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Abstract

The aim of this study was to evaluate the amount and quality of water in the Magdalena-Esleta river system and to propose alternatives for sustainable water use. The system is the last urban river in the vicinity of Mexico City that supplies surface water to the urban area. Historical flow data were analyzed (1973–2010), along with the physicochemical and bacteriological attributes, documenting the evolution of these variables over the course of five years (2008–2012) in both dry and rainy seasons. The analyses show that the flow regime has been significantly altered. The physicochemical variables show significant differences between the natural area, where the river originates, and the urban area, where the river receives untreated wastewater. Nutrient and conductivity concentrations in the river were equivalent to domestic wastewater. Fecal pollution indicators and various pathogens were present in elevated densities, demonstrating a threat to the population living near the river. Estimates of the value of the water lost as a result of mixing clean and contaminated water are presented. This urban river should be rehabilitated as a sustainability practice, and if possible, these efforts should be replicated in other areas. Because of the public health issues and in view of the population exposure where the river flows through the city, the river should be improved aesthetically and should be treated to allow its ecosystem services to recover. This river represents an iconic case for Mexico City because it connects the natural and urban areas in a socio-ecological system that can potentially provide clean water for human consumption. Contaminated water could be treated and reused for irrigation in one of the green areas of the city. Wastewater treatment plants and the operation of the existing purification plants are urgent priorities that could lead to better, more sustainable water use practices in Mexico City.


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