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Multi-Scenario Simulation Analysis in prioritizing management options for an impacted watershed system

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Abstract
Waco Lake (Texas, U.S.A.) is a municipal water supply fed by largely agricultural watersheds and is characterized by poor water quality because of elevated nutrient concentrations. Watershed modeling is used to prioritize management options to reduce nutrient loading into the reservoir. A natural (pre-agricultural) system scenario of the dominant watershed resulted in 80% reduction of total phosphorus and 74% reduction of total nitrogen. Agricultural management, followed by dairy treatment fields (DTF), and then waste water treatment plants (WWTP) inflows are the largest contributors of nutrients into Waco Lake. Removing small flood control reservoirs (U.S. Soil Conservation Service PL-566 design) resulted in an 82% increase in total phosphorus and a 92% increase in total nitrogen, while the removal of other anthropogenic features resulted in decreased nutrient loading. PL-566 reservoirs store nutrients in the watershed, and are probably useful in pollution mitigation.
Key words: Best Management Practice; Nutrients; Phosphorus; SWAT; Model

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Determination of flow regimes for protection of in-river values in New Zealand: an overview

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Abstract
Competition for water has intensified. Determining when, and how much, water needs to be left for in-river values is a challenge world-wide. In New Zealand there is now a well established connection between the flow regime, as defined by the magnitude and variability of flows, and suitability for in-river values. Physical habitat requirements of the biota have been defined and related to overall flow regimes (e.g., mountain fed, hill fed and lowland fed). Key to this is understanding both minimum flow and variability requirements of the biota. This paper overviews some of this science and illustrates how this knowledge has helped resolve river resource management issues in New Zealand.
Key words: environmental flows, water allocation, river ecology, trout, eels, invertebrates

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Channel-floodplain geomorphology and connectivity of the Lower Paraguay hydrosystem

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Abstract

The Paraguay River is the main tributary of the Paraná River hydrosystem. Despite several studies resulting from the proposed navigation project known as the Hidrovía Paraguay-Paraná, little is known about the physical structure of their aquatic environments and its biota. The main purpose of this work is the knowledge of the primary factors which form the structure of the physical habitats in this fluvial segment. In this way, the hydrological and hydraulic regime, channel shape, substrate, hydrological connectivity and the floodplain ontogeny and its evolution were analyzed. Synthesizing we stressed herein that the dynamics of the river-floodplain morphology dependent on the large-scale longitudinal and lateral hydrological connections, and the type and degree of these connections between lotic and lentic environments drive the changes of this seasonally inundated floodplain and its water bodies. In a second paper in this volume, is presented a classification of the Lower Paraguay physical habitats and their relationships with the main physical factors.
Key words: Large river, main channel, riverine geomorphology, floodplain ontogeny, hydrological connectivity, lentic water phases.

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The Lower Paraguay river-floodplain habitats in the context of the Fluvial Hydrosystem Approach

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Abstract
We report herein the first description of the physical structure of the aquatic habitats of the Lower Paraguay River along 390 km from Asunción city (Paraguay) to the confluence with the Paraná River. The hierarchical ordination of the Fluvial Hydrosystem Approach (FHA) allowed us to classify the Lower Paraguay as a meandering functional sector where five functional sets were identified: (a) main channel, (b) floodplain channel, (c) floodplain lentic environment, (d) tributary, and (f) aquatic-terrestrial transition zone. These functional sets encompassed twenty one functional units and sixty one major mesohabitats. We attribute the riverine habitat diversity to the changes in the channel-floodplain morphology and in the strength, duration and frequency of their hydrological connectivity. The variable river-floodplain-tributary complex developed several types of fluvial-lacustrine boundaries and riverine ecotones.
Key words: Large river, physical habitat, connectivity, boundaries, ecotones.

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Enhancing the available water content in unsaturated soil zone using hydrogel, to improve plant growth indices

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Abstract

The effects of hydrogels on the soil water retention characteristic curve (WRC) and on the growth indices of *Ligusrum ovalifolium* (an ornamental plant dominating in the landscape of central Iran) were studied. Various amounts of hydrogels (Suprab A200) were added to soil samples having different percentage of water proportional to potential evapotranspiration data. A factorial experiment was used for statistical analysis of data. The results of the soil water retention model showed that, hydrogel caused the residual water content and saturated water content to increase. Available water content increases to a maximum of about 2.3 times the control. Application of hydrogels can result in significant reduction in the required irrigation frequency particularly for coarse-textured soils. This is an important issue in arid and semi-arid regions of the world for enhancing the water management of coarse-textured soils.

Key words: Soil water retention, *Ligusrum ovalifolium,* super absorb, arid zones, water scarcity

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Threats to a small river and its urban catchment: Hydrological and hydrochemical assessment of Jaroszówka River in Białystok, Poland

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Abstract
Hydrological and hydrochemical analyses in the Jaroszówka river basin were carried out in hydrological year 2003. The quality of the Jaroszówka water is characterized by the lowest level of transformation of physical and chemical composition among the Białystok rivers. Specific pollution load, which was discharged from the catchment to the Jaroszówka riverbed was much smaller than the load discharged to the main Białystok waterway (Biała), but was similar to the load of the small urban rivers (Bażantarka and Dolistówa). A lower degree of the Jaroszówka spring water transformation demonstrates a significant role for pollution that flows directly to the riverbed.
Key words: water quality, urban river, urban springs, specific pollution load

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Effects of copper toxicity on growth, reproduction and metal accumulation in chosen ornamental fishes

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Abstract

The 96 h LC50 values of copper for *Carassius auratus* and *Xiphophorus helleri* were 0.30 and 0.36 ppm. Sublethal concentrations of copper affected specific growth rate and reproductive performance in both species. Metal accumulation in muscle and gonad tissues was linearly increased with increase in sublethal levels of copper and exposure period. Young ones accumulated same or more amount of metal found in gonad tissue of parent fish and it might be due to the direct transfer of copper from gonad to young ones during development. Metal accumulation caused significant ($P<0.05$) reduction in mean diameter and weight of eggs in *C. auratus* and mean body length and weight of fry in *X. helleri*. Ovo-viviparous fish is more severely affected by copper toxicity than oviparous fish.

Key words: Specific growth rate, gonad weight, Copper burden, fry, egg, parent fish.

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