



Article 91

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Pollutant Removal by Constructed Wetlands in an Illinois River Floodplain

Rivers and their floodplains have been dramatically altered by man in the interest of flood control or navigation. Nowhere is this more evident than the urbanized Midwest. The Des Plaines River, located near Chicago, is an excellent example. The riparian ecology of this river and its floodplain has been severely altered by channelization over the last 50 years. Important functions such as flood control, wildlife habitat, wetlands and pollutant removal have all been sharply diminished.

Over the last 10 years, Hey and his colleagues (Hey *et al.*, 1994a, 1994b; Mitsch *et al.*, 1995; Sanville and Mitsch, 1994) have embarked on an ambitious effort to restore the drainage characteristics and habitat quality of the river, primarily through the construction of off-line wetlands within the river's floodplain. The wetlands were designed to mimic the complex interaction between a river and its floodplain. As part of the Des Plaines River Demonstration Project (Table 1), Hey and Mitsch have independently analyzed the capability of the off-line wetlands to reduce sediment and nutrient levels found in river runoff.

The Des Plaines River drains a watershed of 200 square miles, 80% of which is agricultural and the remainder urban. Four experimental wetlands (EWs) were placed in linear succession along the western bank of the river containing dense emergent wetland vegetation (Table 2). Ranging in size from five to 8.6 acres, and with maximum depths of five feet, each wetland received water diverted from the river through a pump and irrigation pipeline system. EWs three and five were subjected to high flow conditions (13.4 to 38.2 in/wk), while EWs four and six received lower flows (2.8 to 6.3 in/wk).

Pollutant levels were measured from flows entering and leaving each wetland. Since the wetlands received water from the same river source, only one inlet location was necessary to determine pollutant concentrations. All total suspended solids (TSS) and nitrate-nitrogen measurements reported by Hey *et al.* (1994a) were taken during the 1990 and 1991 growing seasons (April through September—Table 3). Phosphorous data reported by Mitsch *et al.* covered the 1990-1992 growing seasons.

Table 1: The Des Plaines River Demonstration Project

Location:	Upper Des Plaines River, Wadsworth, IL (35 miles north of Chicago)
Land use:	80% agriculture, 20% urban
Watershed:	200 mi ²
Objectives:	<ul style="list-style-type: none"> • restore presettlement flora and fauna • restore drainage characteristics associated with original creeks and floodplains • create diverse wetland habitat
Parties involved:	Wetland Research, Inc. IL Dept. of Energy & Natural Resources U.S. Fish & Wildlife Service Lake County Forest Preserve District
Wetlands:	8 man-made wetlands ranging in size from 4.0 to 11.2 acres in size (data from 4 wetlands are in this Technical Note)
Pollutants:	Point and nonpoint; primarily sediment and nutrients
Final products:	<ul style="list-style-type: none"> • design manual laying out the conditions for creating wetlands • operations manual describing methods and procedures for managing recreated wetlands (water level controls, public health, and posts) • hour-long documentary on before and after conditions • living example of the benefits wetlands can provide to a modern society