



Nutrient Farming

An economic strategy to improve water quality

Nitrogen is a powerful nutrient. It can make grass green and dramatically increase corn yields. It also has the power to threaten human health, choke out aquatic life, and foul our coastal waters when too much of it fills our streams and rivers.

Nitrogen—and its companion, phosphorus—is at the root of a global nutrient problem. As populations increase, nutrient runoff from agricultural fields and human waste increases, creating a rise in global nutrient pollution that reaches our ocean's estuaries, according to the United Nations Environment Program.¹ The result is that one of the largest “dead zones” in the country forms annually in the northern Gulf of Mexico as nutrient-rich discharge from the entire Mississippi River basin reaches the gulf. The nutrients fuel an explosion of algae, which then decompose and consume the available oxygen. This low-oxygen

condition, called hypoxia, causes fish, shrimp, crabs, and zooplankton to die. Scientists also have linked excess nitrogen to bladder cancer and blue-baby syndrome. The U.S. Environmental Protection Agency (EPA) has now required that states pass new water quality standards for nitrogen and phosphorus to reduce our nutrient pollution.

For most cities and industries, meeting new standards will be costly. Illinois water reclamation districts predict² it will cost ratepayers more than \$5 billion to install the best technology available and \$500 million annually to operate. This investment will do nothing to address the region's needs for for open space, wildlife habitat, and flood control.

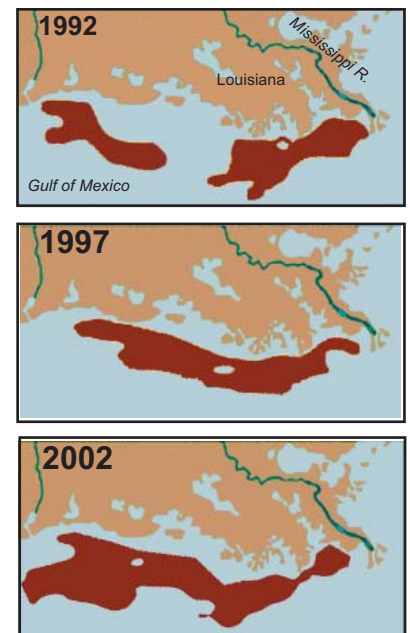
¹U.N. Says Sewage Growing Coastal Problem. *New York Times*, 10/4/06.

²Zenz, D. R. 2003. Technical feasibility and cost to nutrient standards in the state of Illinois. Report commissioned by the IL Assn. of Wastewater Agencies.



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Nutrient farming harnesses market forces to promote large-scale wetland restoration. The natural biological and chemical reactions in wetlands clean water, provide wildlife habitat, and store floodwaters.



Excess nutrients from the Mississippi River have fueled a growing dead zone, called hypoxia, in the Gulf of Mexico (shown in red above). Without the millions of acres of floodplain wetlands once common in the river basin, nutrients and other contaminants cannot be naturally processed.

The Wetlands Initiative and its partners have pioneered an alternative: Large-scale wetland restoration, financed by the purchase of nutrient removal credits—either through an open market or through long-term contracts. We call this strategy “nutrient farming.” In addition to improving our water quality, the restored wetlands will provide important environmental benefits for humans and wildlife—benefits that are unavailable through the use of traditional “concrete and steel” treatment technologies.

The potential market for nutrient credits is huge: An estimated \$60 to \$133 million in revenue in the Illinois River Watershed alone, if all industrial and municipal dischargers used wetlands to reduce their nutrient loads. Nutrient farming markets could be established throughout the entire Mississippi River Basin and other watersheds across the United States where high nutrient concentrations are of concern. The U.S. and Illinois EPAs have endorsed nutrient farming as a means to reach clean water goals.

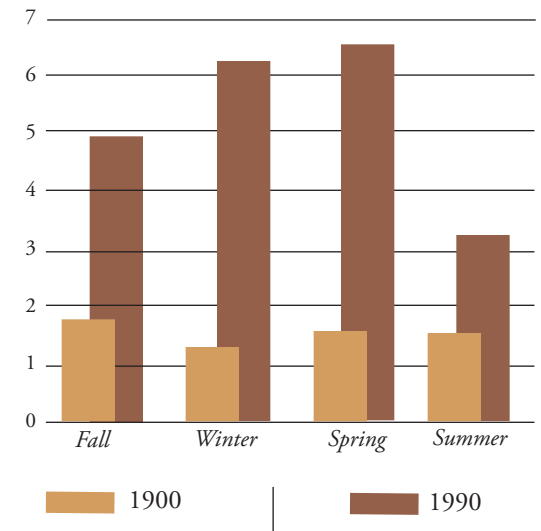
Impact of Land Use

The problem of nutrient pollution has been exacerbated by the changes to the landscape made by farmers and developers over the past 200 years. By dredging, channelizing and leveeing off rivers from their backwater lakes and floodplain wetlands, we have crippled the river’s natural ability to denitrify its waters. The regions with the highest losses of wetlands are also the areas with highest fertilizer usage and nitrogen yields. In the past 200 years, for example, three Midwestern states (Iowa, Missouri, Illinois) in the Upper Mississippi River Basin drained 85 to 90 percent of their wetlands, nearly 15 million acres of wetlands. Not surprisingly, these areas also have the highest nitrogen concentrations in their rivers.

The altered river systems of today cause billions of dollars in flood damage, as well. According to the U.S. Weather Bureau, national flood damages now average \$3.5 billion annually; earlier in the century (1903-1933), damages averaged \$1.4 billion annually (both sums are adjusted for inflation). This increase is in spite of, or because of, ever-rising federal spending on levees and other structures.

The Wetlands Initiative and its partners are developing pilot projects to test and demonstrate the economic efficiency and environmental benefits of nutrient farming. This new way of managing the quality of our nation’s waters will be less costly than conventional treatment methods, reduce demand on energy resources and provide additional benefits for biodiversity and wildlife.

Comparison of mean nitrogen concentrations in the Illinois River near Peoria (Milligrams per liter)



In the past century, nitrogen concentrations in the Illinois River near Peoria increased five-fold due to the influx of nitrogen, primarily from agricultural fertilizer.

Source: University of Illinois, 1902; U.S. Geological Survey, 1989-1991.



Rather than growing corn (above) or soybeans on our nation’s floodplains, farmers and other landowners can restore wetlands and “harvest” nutrient removal credits that can be sold to municipal or industrial dischargers. The Wetlands Initiative calls this pioneering strategy “nutrient farming.”



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