

Innovative Water Quality Management Utilizing Wetlands Construction on a Golf Course

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Objectives:

1. Use a golf course wetland to improve residential runoff.
2. Protect and improve a sensitive wetland environment.
3. Regenerate water supplies for golf course use.

Start Date: 1998

Project Duration: 5 years

Total Funding: \$125,000

Golf courses may actually improve the water quality in streams and rivers flowing through the course. This project takes this idea one step farther to determine if the created wetlands on Purdue's new Kampen Golf Course can filter possible impurities in runoff from the adjacent neighborhood.

The neighborhood includes two residential highways, parking lot of a motel, a gas station, and 200 residences. The water flowing through the Kampen Course eventually enters Celery Bog, a nature center which contains a natural wetland.

After construction of the Kampen Course, water quality samplers were installed at six points throughout the created wetlands. The samplers were located to track the progress of water as it enters the east edge of the course, through the wetland system, and exits the far northwest edge of the course. The water is sampled continuously for temperature, pH, oxygen content and other quality parameters.

During storm events, water is sampled for contaminants such as nutrients, pesticides,



Storm water from a residential area is monitored as it enters the Kampen Golf Course at Purdue University.

salt, metals, petroleum products, etc. All water samplers were installed by September, 1998 and storm events were analyzed in November, 1998, June 1999, November, 1999, and August, 2000.

It appears that as the golf course and wetlands mature, they become more efficient in improving the quality of the water as it flows through the course. For instance, 14 parameters or contaminants indicated a decrease in water quality from the urban runoff to the water exiting the golf course in the November 1998 sampling while only four parameters or contaminant levels indicated an improvement in water quality between the urban input and the water exiting the course.

But in the November 1999 sampling, 12 parameters or contaminants indicated an improvement in water quality from the urban runoff to the water exiting the golf course. Seven parameters or contaminant levels indicated a decrease in water quality between the urban input and the water exiting the course in that same sampling.

Key parameters like nitrogen and pesticide concentrations were either decreased as the water circulated through the golf course wetlands or were not detectable at either sampling site on any of the sampling dates.

Most of the parameters that indicate a decrease in water quality as the water moves across the course are minor parameters that would be typical of leaching out of sand bunkers such as calcium and magnesium.

No unusually high levels of any of a wide array of potential pollutants including pesticides and metals were detected at the golf course sampling sites. However,



A series of man-made wetlands on the Kampen Golf Course improve water quality before entering a protected wetland down stream.

atrazine and simazine were detected in November, 1998, at a site at the outlet of Celery Bog, which measures the water quality of the entire watershed. The watershed includes chemical manufacturing, farmland, housing subdivisions, apartment complexes, trailer courts, gas stations and other commercial areas. Atrazine was also detected in water exiting the neighborhood and entering the golf course.

Surprisingly, even from the urban runoff there is no measurable oil and grease. It is reassuring to note that heavy metals of concern, such as mercury and lead, are below detection limits in all samples.

Summary Points

- As the golf course and the wetland mature, they become more efficient in improving the water quality as it flows through the course.
- Key parameters like nitrogen and pesticide concentrations were either decreased as the water circulated through the golf course wetlands or were not detectable at either sampling site.
- No unusually high levels of any of a wide array of potential pollutants, including pesticides and metals were detected at the golf course sampling sites.