

Golf course "hazard" filters runoff pollution. (Wetlands).

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Golfers may see it as just another water hazard, but, in fact, the constructed wetlands on Purdue University's Kampen Course, West Lafayette, Ind., prevent potential pollutants from damaging the environment. Moreover, the constructed wetlands' efficacy in enhancing water quality improves as the system ages, according to researchers. Their findings could provide solutions for protection of similar areas by using urban golf courses.

The cleanup occurs when microscopic organisms--primarily bacteria--in wetland plants, sediments, and golf course grass trap and use much of the residue that otherwise might harm environmentally sensitive areas. "This is an ongoing study of how created wetlands on a golf course can filter water from commercial and residential areas to protect the environment," notes Zac Reicher, a Purdue Department of Agronomy turf specialist.

The researchers wanted to determine whether constructed wetlands on a golf course could substantially improve water quality by reducing or even eradicating chemicals such as atrazine, chloride, nitrogen nitrate, ammonia nitrogen, organic carbon, phosphorus, aluminum, iron, potassium, manganese, and various solids before the water entered natural waterways. In this study, the recovering natural wetland is West Lafayette's Celery Bog bordering the Kampen Course, part of Purdue's Birck Boilermaker Golf Complex.

"We already knew that proper use of fertilizers and pesticides on golf courses does not add any chemicals to surface or ground water," Reicher says. "In fact, the grass itself actually will use or trap most of the nutrients and chemicals contained in runoff from adjacent areas." The tracts from which runoff flows into the golf course wetland system includes not only the golf course, but two residential highways, a motel parking lot, gas station, and 200 homes.

"This system has allowed us to integrate golf aesthetics with the protection of natural wetland systems," indicates Ron Turco, a soil microbiologist and director of the Purdue Environmental Sciences and Engineering Institute. "Although we knew that both wetlands and golf courses can improve the quality of runoff water, studying how they work together will help us incorporate constructed wetlands into existing settings and to optimize their use."

The study has yielded some surprising information, including showing that oil and grease are almost nonexistent in water entering constructed wetlands despite the adjacent highways and parking lot. In addition, no heavy metals, such as mercury or lead, have been detected. The latest chemical analyses of the runoff water exiting the golf course offer a positive environmental outlook since no unusually high levels of any potential

pollutants were detected. Some aluminum, magnesium, and silicon were occasionally recorded, but that was most likely erosion from bunker sand, researchers suggest.

"Wetlands can be more than just a challenge to golfers," Reicher concludes. "They also can benefit people and the environment. Use of wetlands in conjunction with golf courses can make those 18 fairways and greens good neighbors by cleaning up the water."