Vegetative Buffer Types and Sizes for Controlling Fairway Runoff

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Objectives:

1. To determine the relative efficacy of two types of vegetation, turfgrass and prairie, for reducing fairway runoff.
2. To determine the best buffer strip to fairway ratio for controlling fairway runoff, particularly during the first couple years of establishment.

Start Date: 2003
Project Duration: three years
Total Funding: $36,145

Prairie vegetation is often touted as a preferred buffer strip, but its long establishment time and low plant density compared to turf may reduce its effectiveness as a buffer vegetation compared to turf. In addition, several states have or are considering mandated buffer strips around managed turf areas to prevent runoff contaminants from reaching surface waters. Information on the size, particularly the ratio, of vegetated buffer strips is needed.

Plots were dormant-seeded in 2003 and sample collection began winter of 2004. Record-setting precipitation caused one of the fairway replications (Fairway 9) to be almost constantly flooded throughout 2004 and spring, 2005 resulting in a loss of the replicate. Plots established well on Fairways 4 and 8, with fine fescues completely filling in the buffer strip plots by late spring, 2004. Annual weeds largely filled in the prairie plots during summer, 2004, though by July germination of some prairie plants could be seen. In 2005, fine fescues continued to grow well. In the prairie plots, prairie species continued to develop and by midsummer covered 10-20% of the plot areas.

Over 75% of samples from 2004-2005 have been analyzed. Results were not statistically significant for either vegetation type nor buffer strip length.

Researchers at the Univesity of Wisconsin are detemining the relative efficacy of two types of vegetation, turfgrass and prairie, for reducing fairway runoff.

During the spring of both 2004 and 2005, the high water table and precipitation caused groundwater to enter the culverts containing the runoff collectors which interfered with sample collection. In 2004, concrete bases were placed at the bottom of the culverts to reduce the problem but were not always effective.

The 2005 growing season has been relatively dry once the initial late winter/early spring precipitation and snow melt occurred. Only four precipitation events occurred during the spring which caused runoff yielding a total of 38 samples compared to over 100 samples during the same time period in 2004. In the summer, the region suffered the worst drought conditions seen since 1988. Autumn precipitation and runoff is lagging behind that of 2004.

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In 2004, total annual phosphorus in runoff ranged from 150-400 mg per plot. Soluble reactive phosphorus (orthophosphorus) ranged from 12-38 mg per plot. Biologically active phosphorus ranged from 32-72 mg per plot. Biologically active phosphorus is an estimate of the type deemed responsible for algae blooms in ponds and lakes.

Summary Points

- Plots were dormant-seeded in 2003, and sample collection began winter of 2004.
- In 2005, fine fescues continued to grow well. In the prairie plots, prairie species continued to develop and by midsummer covered 10-20% of the plot areas.
- Over 75% of samples from 2004-2005 have been analyzed. Results were not statistically significant for either vegetation type nor buffer strip length.
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