

Southeastern Section - 58th Annual Meeting (12-13 March 2009)

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Presentation Time: 8:30 AM-12:30 PM

GEOMORPHOLOGY OF STREAMS IN URBAN GOLF COURSES IN THE SOUTH CAROLINA PIEDMONT REGION

FOWLER, Gwyn and MUTHUKRISHNAN, Suresh, Earth and Environmental Sciences, Furman University, 3300 Poinsett Highway, Greenville, SC 29613, gwyn.fowler1098@furman.edu

Golf courses are often built along streams for aesthetic purposes. Previous studies have speculated that golf courses may cause significant changes in stream geomorphology. In particular, use of riprap to increase bank stability along streams in golf courses is thought to promote channel incision. We tested the hypothesis that stream channels downstream of golf courses would be more incised than channels upstream of golf courses. We examined localities upstream and downstream of seven golf courses associated with urban land cover (n=14 localities in total), as well as three rural localities that were not associated with golf courses. Incision, stream width, bankfull width, and substrate were measured or described qualitatively following the Vermont Agency of Natural Resources Geomorphic Assessment Model. GIS was used to determine watershed areas, percent impervious cover, and stream lengths.

Among the upstream golf course localities, there was a positive correlation between bankfull width and incision ($r=0.83$; $p=0.042$). However, there was a negative correlation between bankfull width and incision among the downstream localities ($r=-0.84$; $p=0.036$). There were no significant differences in incision or bankfull width either between rural and upstream sites or between upstream and downstream sites. No significant correlations were found between incision and impervious area or between incision and percent impervious cover. Incision and stream length were correlated among the upstream sites ($r=0.89$; $p=0.019$) but not among the downstream sites. Eight of the fourteen golf course sites were considered "degraded" based on high percent impervious surface cover (26-100%) in their watersheds.

The change in relationship between bankfull width and incision upstream and downstream of a golf course suggests that bank stabilization affects stream geomorphology. Overall, however, the lack of relationships suggests that in contrast to previous hypotheses, golf courses do not appear to have a major impact on stream geomorphology. Alternatively, antecedent land use, particularly prior cotton farming, may be a controlling factor of current stream morphology.

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Session No. 16--Booth# 30

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