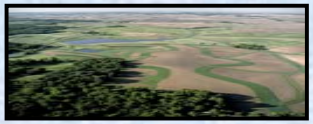

Change in Filter Strip Performance over Time

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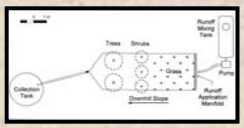
Issues

Effectiveness of filter strips is difficult to predict because soil properties and vegetation conditions probably change over time after installation. Furthermore, it is commonly assumed that grass vegetation provides a better filter than forest, implying that the degree of change in filter effectiveness depends upon vegetation type. Both of these issues remain unresolved.

Objectives

- Quantify change in the performance of filter strips over time.
- Determine if temporal change depends on vegetation type.
- Partition temporal and vegetation effects among fundamental processes of infiltration, deposition, and dilution.



Methods

Plot Treatments: Four vegetation types were replicated on plots measuring 3m wide x 7.5m and 15m down a 6% slope.

- Crop (control) – Cultivated and replanted annually with grain sorghum
- Old Grass (control) – Established 1970 with mixed grasses
- New Grass – Established 1995 with mixed grasses
- New Forest – Established 1995 with mixed grasses, shrubs, and trees

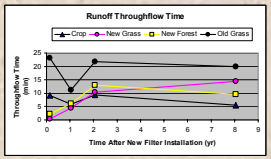
Procedure: When plots are 0.2, 1, 2, 8, and 9 years old, we apply identically-prepared solutions containing sediment, N and P fertilizer, and bromide tracer to the upper end of filter strip plots, and then measure their load and concentration in outflow. We simulated a typical thunderstorm (2.5 cm rainfall in 30 min) and crop field runoff (1890 L in 25 min) onto each plot.

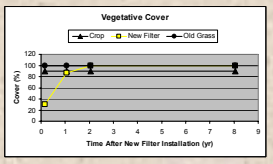
Measurements: Water volume, Nitrate-N, Total N, Total-P, Total Dissolved P, Total Suspended Sediment, Bromide (tracer).

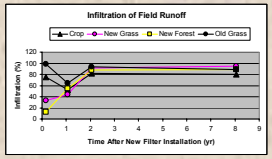
Evaluation:

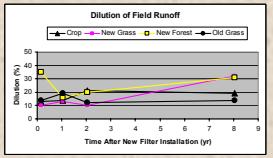
- Infiltration indicated by Bromide mass
- Deposition indicated by Sediment mass
- Dilution indicated by Bromide concentration

Preliminary Results









Anticipated Results

- Improvement should be seen in performance of new filter strip plots over the 9-year test period. We expect a trajectory of change in "New Grass" and "New Forest" plots from a condition similar to "Crop" (representing initial conditions) toward that of "Old Grass" (representing a final stable condition).
- Performance of "New Grass" and "New Forest" will begin to diverge by ages 8 and 9 as the trees mature and dominate on those plots.