



2008 USDA-CSREES National Water Conference
Sparks, NV

Watershed remediation: Considering co-benefits and tradeoffs

Andrew Sharpley and Tom Simpson

Abstract Text:

There are many conservation practices and strategies, which can lead to nutrient loss reductions at a watershed scale with careful selection and targeting to at risk areas. Although there is inherent site-specificity in reduction efficiencies among these practices, there are synergistic co-benefits of combinations of these practices that can enhance nutrient loss reductions. On the other hand, there are tradeoffs in nutrient loss reductions that need to be considered. Most importantly, watershed remediation needs to consider the 'big picture' of strategic planning, which dictates farm management decisions that can reap immediate increases in operation efficiency and production but have long-term impacts on water quality. For example, the drive for biofuel production to be a greater share of consumed energy in the U.S., has led to a 5.5 million ha increase in corn acreage from 2006 to 2007. Assuming fertilizer application rates will be maximized to obtain optimum yields, the potential for nutrient loss will likely increase. Further, dry distiller grain (DDG; 0.8 – 0.9% P), a by-product of ethanol production, can be used in animal feed. Even with <20% DDG supplementation of dairy cow diets, this elevates ration P, offsetting reductions gained through diet management. This will increase manure P and potential P loss in runoff when land applied. Clearly, increased ethanol production is a necessity and cellulosic biofuel production will increase. However, watershed management strategies must plan to minimize the potential for water quality degradation associated with such shifts in production. Finally, the lag time between implementation and water quality improvements can be several years. Despite our knowledge of controlling processes, it is difficult for the public to understand or accept this lack of response. Thus, assessing remediation efforts must consider re-equilibration of watershed signatures, where nutrient sinks may become sources with only slight changes in management.

Impact Statement:

This presentation reviews the efforts made to achieve water quality improvements via BMP implementation at a watershed scale. Although nutrient loss reductions have occurred, we feel that strategic planning is needed to avoid future impairment due unintended consequences of shifts in production to meet national energy needs.