Abstract

Soil erosion initiated by water runoff from agricultural areas contributes to nonpoint source pollution of surface waters. Through mutual uses of remotely sensed data, GIS and hydraulic modeling technologies, a study was conducted to develop a process for evaluating sediment reduction using Water Erosion Prediction Project (WEPP) model simulations as an assessment tool. Field monitoring was not conducted, therefore all results reflect model sensitivity. WEPP parameter inputs were spatially derived from data layers in ArcView software. Cotton and soybean field boundaries were individually selected along the St. Francis River in NE Arkansas to determine the health of those systems. Required evaluation of large areas can be very expensive and time consuming.

Combining the technologies of computer assisted programs of remote sensed imagery and hydraulic models can provide decision makers with rapid cost-effective assessment tools for compliance.

Cotton Results

Soybean Results

Conclusion

In most situations, it is impractical to physically monitor each farm or land parcel that is suspect of contributing nonpoint source pollution. This, however, is approachable through application of remote sensed data toward environmental planning of sensitive areas. Precision and specific features of remote sensed data are considered comparable to actual field measurements. This study demonstrated that use of GIS technologies and available remote sensed databases provided detailed measurements for characterization of the St. Francis watershed study areas. This information was then used as direct parameter inputs into the hydraulic model, WEPP. Subwatershed evaluations were then accomplished through the linking of GIS and hydraulic models. This study also demonstrated that WEPP was sufficiently robust to show differences between BMP effects among varying row crop production fields and land management practices. Application of appropriate BMPs allows the user to specifically plan land use for potential environmental compliance of nonpoint source sediment control.