

USE OF WATERSHED MODEL FOR ADAPTIVE MANAGEMENT OF PRAIRIE GRASSLANDS: A CONCEPTUAL FRAMEWORK

*MAHESH PUN, Department of Biological Systems Engineering, University of Nebraska-Lincoln, Lincoln, NE 68583, USA

WAYNE E. WOLDT, Department of Biological Systems Engineering, University of Nebraska-Lincoln, Lincoln, NE 68583, USA

Abstract: Prairie systems are a complex dynamic ecosystem, which is an interdependent community of living things, and is influenced by climate, soil condition, and water availability of the region. Understanding its complex nature is not only challenging but important as well due to its connection with different components of the environment. For adaptive management of prairie systems, a combination of different models could be applied to achieve optimal decisions for improving future management. Watershed models could be integrated with ecological models where simulation results are shared between models, and feedback loops could be utilized to enhance the quality of model results for better understanding of a system. WASH123D is an integrated watershed modeling system which considers various hydrogeologic and climatic properties of the study area, and simulates the surface and subsurface water flow in a fully integrated manner, providing a quasi real picture of the hydrologic system of a region. Application is focused on the Frenchman watershed that originates in Colorado and terminates in Nebraska with an east-west length of about 247 km, which is a sub-basin of the Republican Basin. It is a semi-arid region with land surface sloping from west to east. The restoration of prairie leads to increase in organic matter content of soil that could aid in absorbing precipitation, increasing the aquifer recharge and reducing runoff of an area. Discussion will center on analysis of the recharge and discharge zones of the study region from an integrated watershed perspective, along with the interaction of surface and subsurface flow.