

Title: The Wind Erosion Prediction System for planning conservation systems.

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Abstract:

Wind erosion of soil is a threat to a sustainable agriculture as well as human, soil, air, and water resources. The Wind Erosion Prediction System (WEPS) was developed with a goal of providing the most accurate, universal, and simple tool available for simulating soil loss by wind. WEPS incorporates approximately 60 years of wind erosion research by the USDA and utilizes advances in computer technology to provide a powerful research and decision-support tool for producers and policy-makers. WEPS models the surface state and wind erosion as physically based processes as much as possible. It operates on a daily or shorter time-step to simulate field hydrology, plant growth and decomposition, land management, and soil surface erodibility and accounts for soil loss by wind (total, saltation plus creep, suspension, and PM10 sizes) as affected by stochastically simulated local weather. The model interface was designed for easy selection of inputs from the provided databases and basic outputs that are straightforward to interpret. However, when taking full advantage of the detailed inputs and reports, WEPS is a powerful research tool for studying surface state and erosion processes in detail and developing more efficient control strategies. The strongest utility of WEPS is its ability to apply different “what-if” management scenarios to the land for developing and evaluating alternatives of wind erosion control. Examples are presented using WEPS to develop alternative erosion control strategies for common US Central Great Plains cropping systems.