



A Generalized Methodology for Identification of Thresholds for HRU Delineation in SWAT Model

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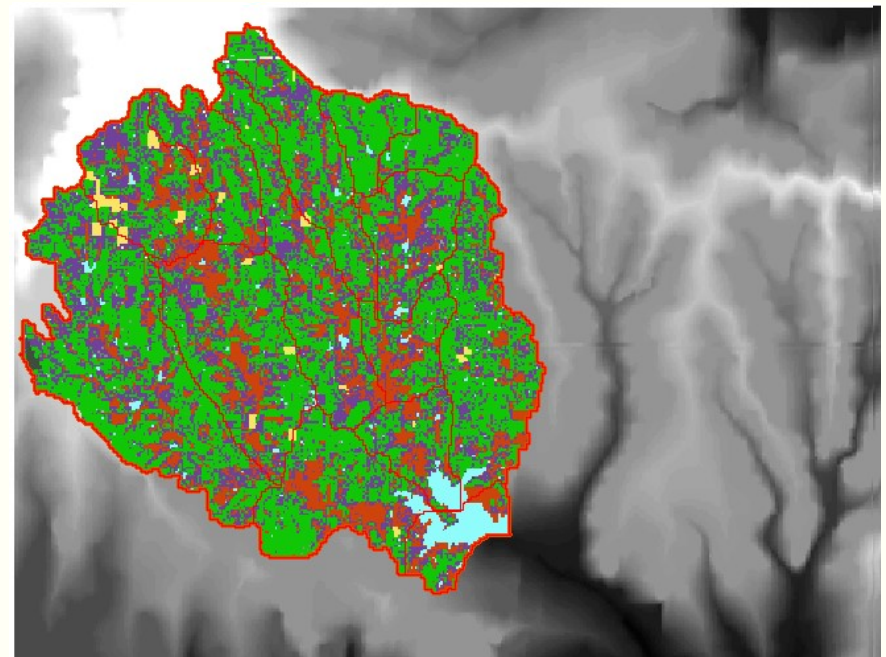
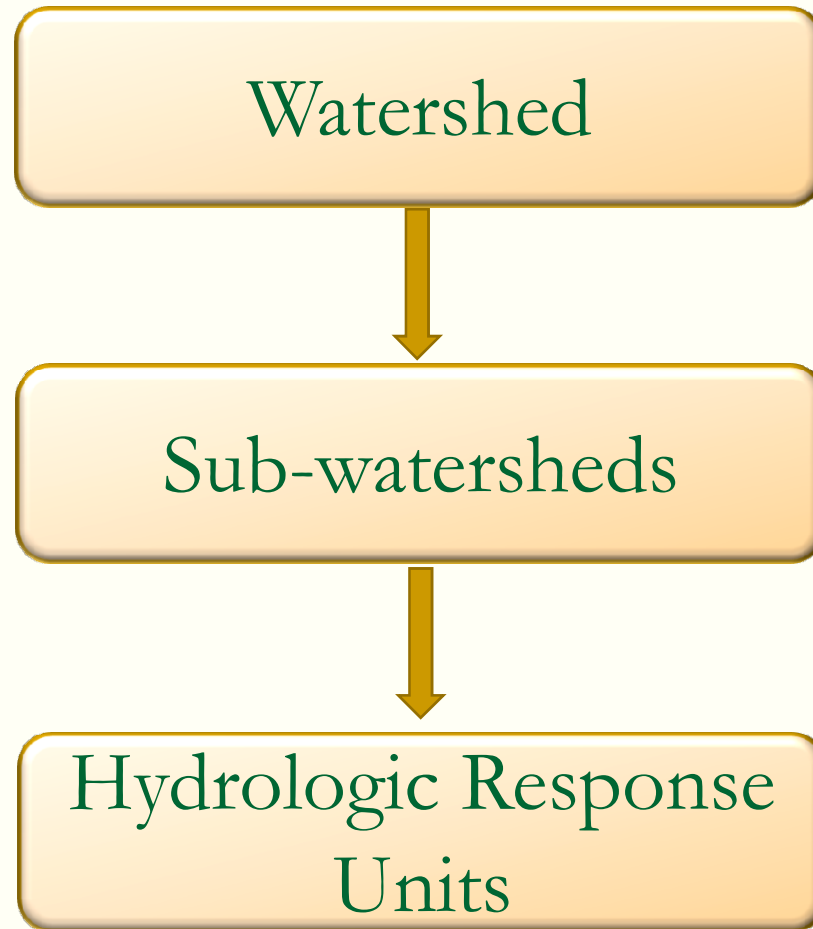


Spatial Discretization

- Discretization of the watershed into different homogeneous units is the base for semi-distributed hydrological models
- Spatial Discretization influences
 - the averaging units of inputs (precipitation, temperature)
 - topographic parameters (path length, slope, aspect)

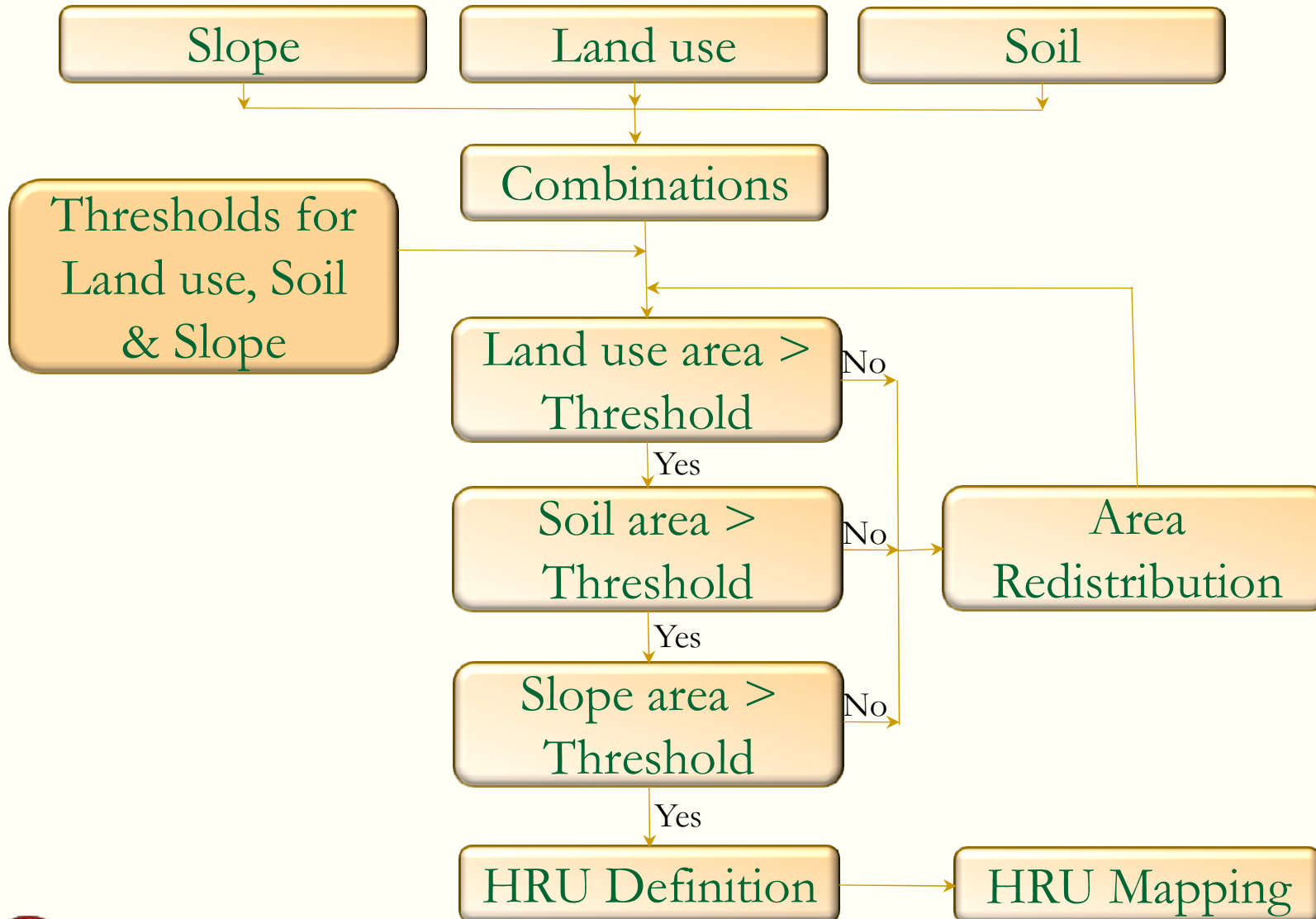


SWAT

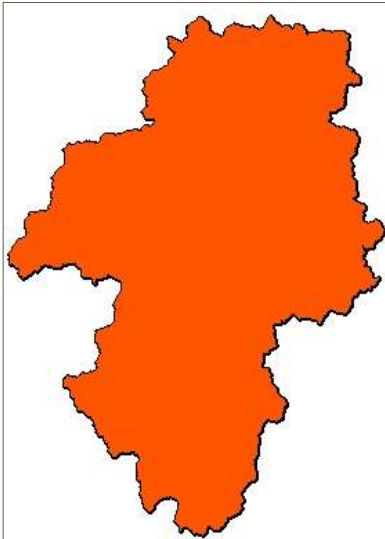


Representative watershed

Current HRU Delineation in SWAT

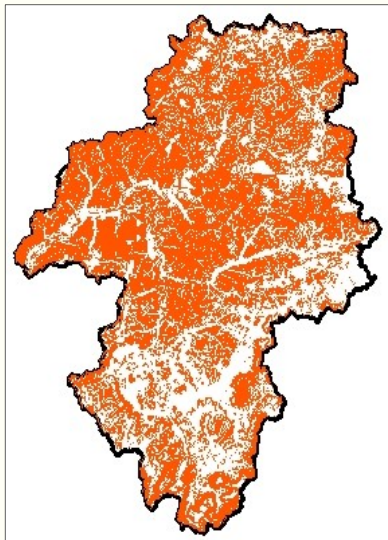


Current Delineation - Limitations

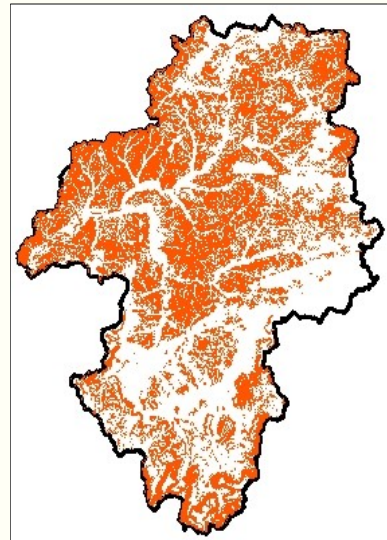


Inappropriate representation of the area

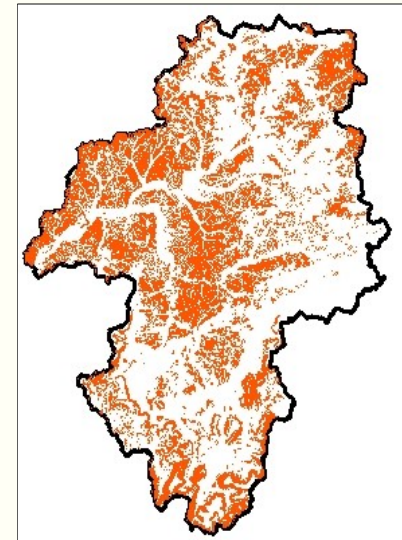
Introduces some level of ambiguity in simulation



5% - 5%



10% - 10%



15% - 15%

Illinois Watershed

Objectives

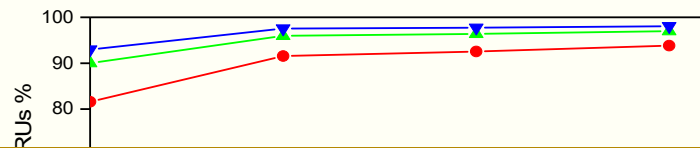
- To evaluate the effect of the threshold values for HRU delineation in the SWAT model.
- To suggest guidelines for arriving at an appropriate threshold for HRU delineation in sediment simulation of SWAT model.



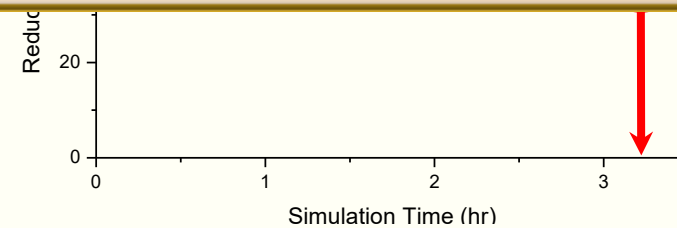
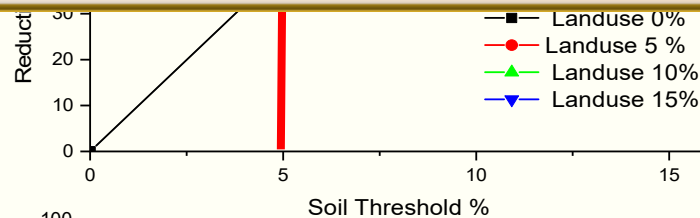
Preliminary Analysis

- Reduction in number of HRUs
- Change in area
- Change in sediment
- Simulation time

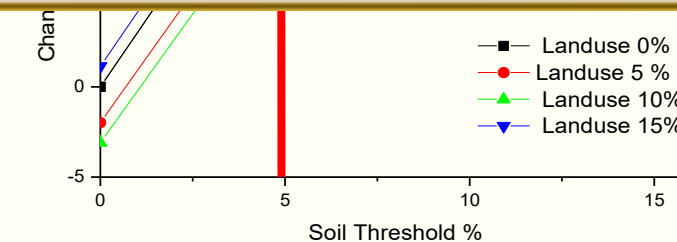
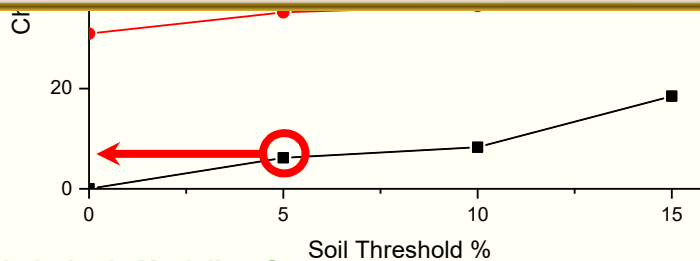
Guidelines : Case Study on Illinois Basin



More number of simulations



More computational time



Algorithm

- Reduction in number of HRUs
- Change in area
- Change in sediment factor

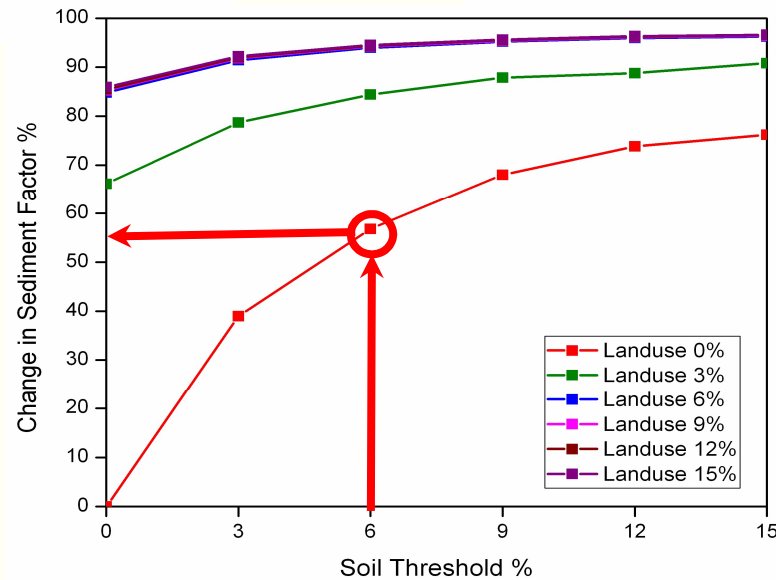
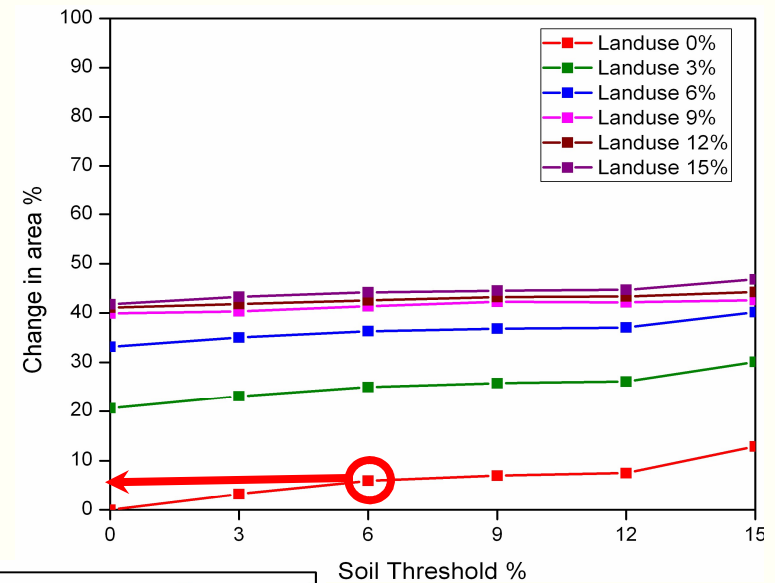
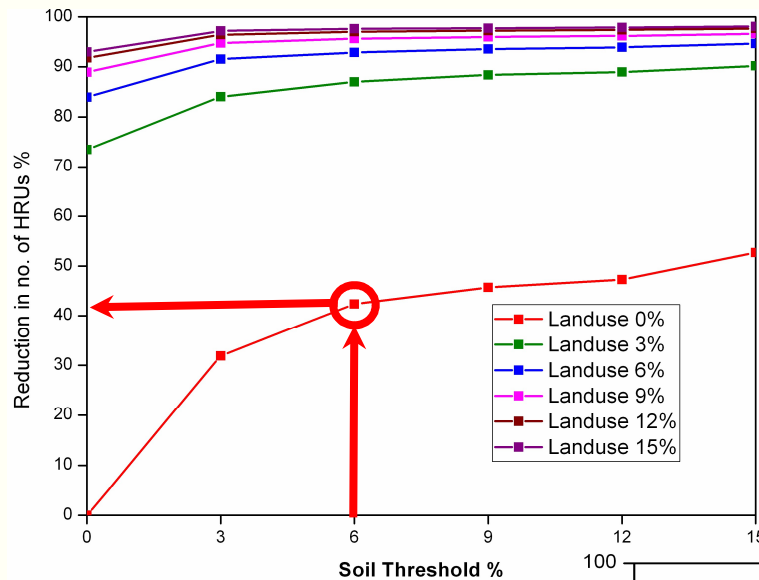
Decision Variables

- Land use threshold %
- Soil threshold %

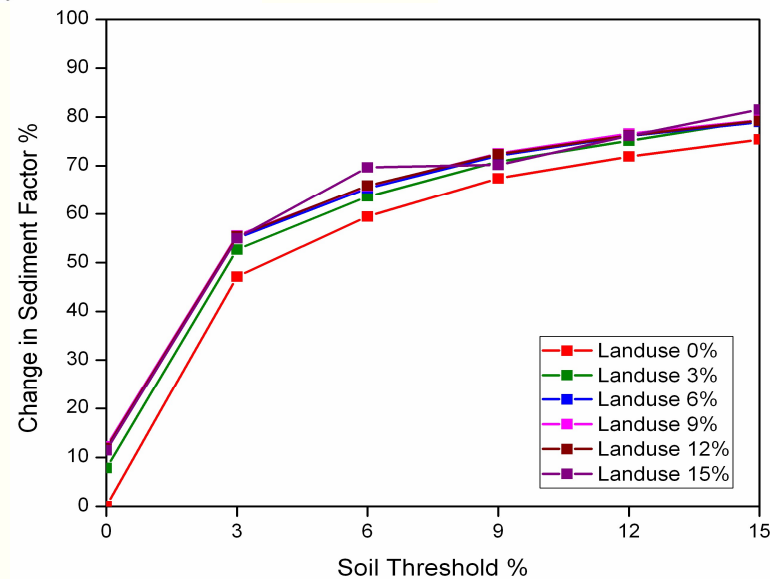
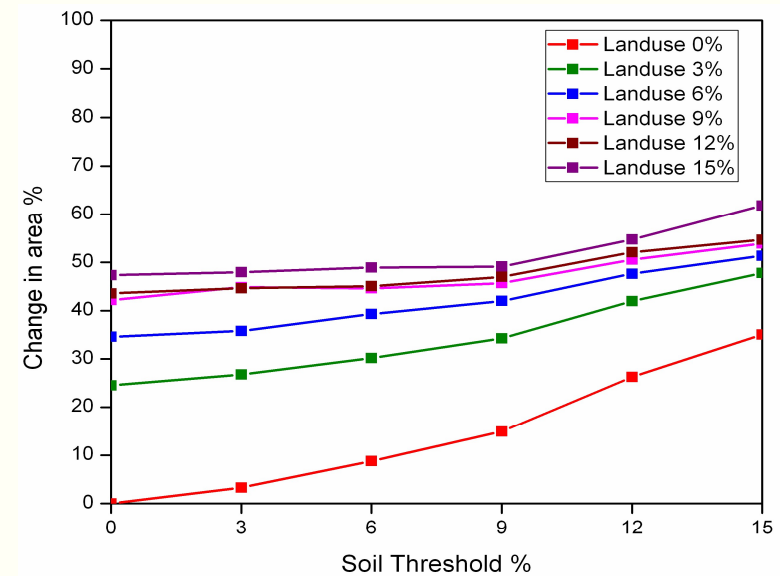
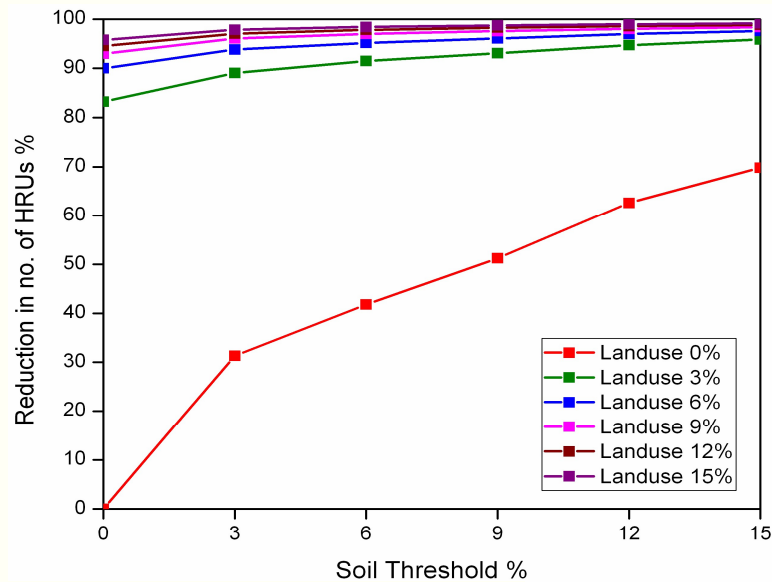
$$sed = 11.8 \cdot (Q_{surf} \cdot q_{peak} \cdot area_{hru})^{0.56} \cdot K_{USLE} \cdot C_{USLE} \cdot P_{USLE} \cdot LS_{USLE} \cdot CFRG$$

$$Sediment\ Factor = (Area_{hru})^{0.56} K_{USLE} C_{USLE} P_{USLE} LS_{USLE} CFRG$$

Generalized Guidelines



Generalized Guidelines



Summary

- The generalized guidelines for the selection of threshold percentage on HRU delineation are developed and demonstrated graphically.

