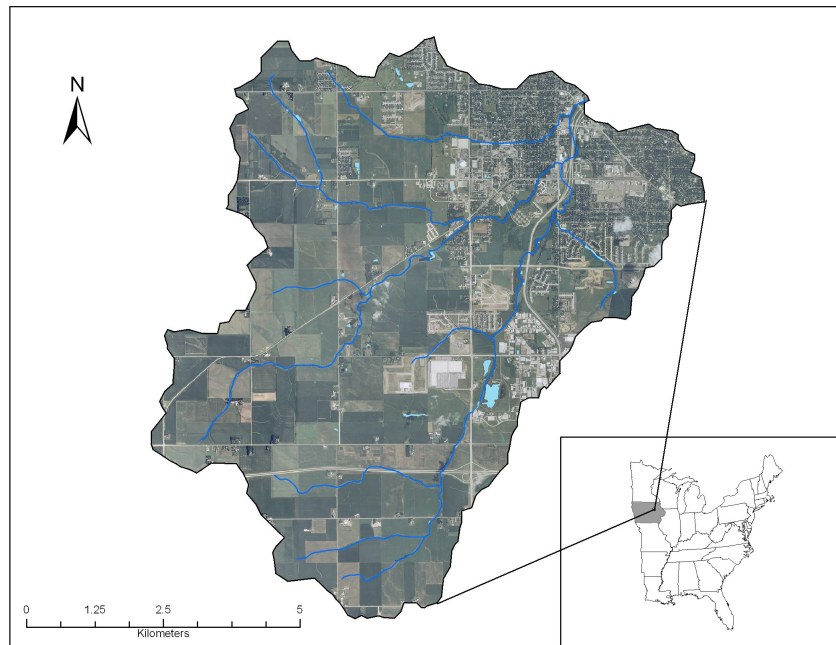


Development and Validation of a Watershed Management Spatial Decision Support System to Conserve Water Resources

Goal

The goal of the project is to develop and validate a watershed management spatial decision support system (SDSS) to protect and improve water resources through the involvement and cooperation of stakeholders (who are affected by, bring knowledge or information to, and possess the power to influence a decision or program, such as government agencies, planners, non profit organizations, and citizens). The whole system will be tested at the Dry Run Creek Watershed of Black Hawk County in Iowa.



Dry Run Creek Watershed of Black Hawk County, Iowa

Objectives

1. A SDSS to prioritize areas within a watershed that influence water quality and quantity, thus help stakeholders to make restoration or conservation plans;
2. SDSS to calculate Total Maximum Daily Loading (TMDL) for sediment and nitrogen;
3. Agent based modeling to predict land use / land cover change and facilitate the planning and management of the watershed;
4. A watershed management framework including web-based SDSS, desktop SDSS, and strategies for public participation that can be implemented in other watersheds.

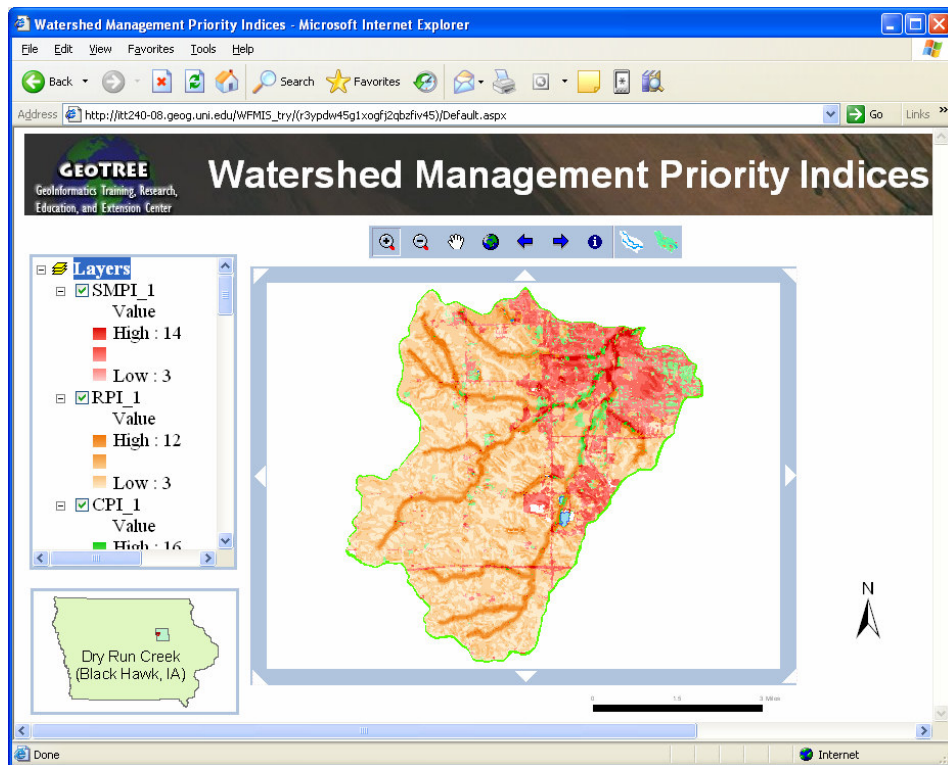
Methods

Because of the wide usage of ArcGIS, it is chosen as the platform of the proposed SDSS and Visual Studio and ArcObjects are the programming languages. Grid analysis and overlay will be used in the prioritization process. RUSSEL 2 is the base for sediment source identification.

Agent based simulation would be used in land use/cover predication model. ArcGIS Server, Java, ASP, and Vusual Studio will be used in the web-based SDSS. We will cooperate with local and state governments, non profit organizations, and interested citizens, at the same time, undergraduate students and graduate students will be involved in the project.

Expected Products

1. Database development which includes spatial data (DEM, LiDAR, hydrology, soil, land cover/land use, etc.) and non spatial data (for example census data) for Dry Run Creek watershed;
2. Critical areas for water resources within the watershed for watershed management;
3. Spatial location of sediment and nitrogen sources to improve land use practices and conservation strategies;
4. land use change trend and pattern within the watershed for next ten and twenty years;
5. Desktop SDSS for watershed management as ArcGIS extension for professional users;
6. Web-based SDSS templates that can be used for other watersheds. Web-based SDSS will allow stakeholders to assess the watershed and run relevant models to prioritize land parcels or spatially locate pollutant locations. It will help the communication among stakeholders and the public, at the same time, up to date technologies can be accessed by all the end users.



Web-based SDSS analysis

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