



Kansas Water Resources Institute

KWRI Mission

The Kansas Water Resource Institute develops and supports research on high priority water resource problems and objectives, as identified through the state water planning process. It is also designed to facilitate effective communication between water resources professionals and to foster the dissemination and application of research results.

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2012 KWRI Sponsored Projects

Sediment Baseline Assessment:

Sediment deposition was investigated on three similar Kansas lakes with the following preliminary results:

- Implementation of conservation practices have altered sediment load from silt-dominated to clay-dominated.
- Modeling confirmed that grassland dominated watersheds will contribute less sediment than cropland dominated watersheds. However, it may not account for gully erosion.
- Helicopter imagery, aerial photography and qualitative characterization of the stream channels are contained in a GIS database at www.kwo.org.
- Soils are dynamic and many years of management has an impact on the properties of the surface soil.
- Much of the lake sediment source is suggested to be from in-channel erosion.

Aquifer Storage and Recovery in Near-Surface Aquifers: Development of a New Recharge Approach Using Small-Diameter, Low Cost Wells

This study involves the development of a new recharge approach using small-diameter, low-cost wells for aquifer storage and recovery utilizing direct push technology. These injection wells are low in construction and maintenance costs and limited to depths of less than 30m. Potential sites for the aquifer recharge have been chosen and simulations are planned for the summer of 2013.

Governor's Conference on the Future of Water in Kansas

The first statewide Kansas "Governor's Conference on the Future of Water in Kansas" was held on October 30-31, 2012 in Manhattan, Kansas. The conference was highly successful with 573 people attending both days of the conference. Forty-eight volunteer scientific and 10 invited presentations were presented in plenary and concurrent sessions. Thirty scientific posters were presented in the poster session. An undergraduate/graduate student poster award program was conducted to encourage student participation. Twenty-two students participated.

Sediment Core Analysis for Understanding Reservoir History

Intensive analysis of sediment cores of Lake Kahola were used to determine the effects of climate and land use/management on the sedimentation of the reservoir and link observed sediment core patterns to possible causative events in reservoirs and watersheds. This study offers methods in which reservoirs could be employed as tools for historical reconstructions of local environmental histories.



Impacts of In-channel Dredging on the Morphology of the Kansas River

In year one of the project, two active dredge holes in the Kansas River were surveyed using an ADCP (Acoustic Doppler Current Profiler) on two occasions, once in Fall of 2012 and once in Spring of 2013. A third site has been targeted for survey, but low water has prevented access to the site even with small boats (kayaks). During this time period, no significant transport active flow occurred on the Kansas River. Repeat surveys show substantial deepening and enlargement of each dredge hole due to continued excavation and no/insufficient transport-related replacement or infilling by the river. Resampling will occur with the ADCP when flow rises on the Kansas River.

Evaluation of the Kansas P Index using APEX

During the first year of the study, collaboration was conducted with research scientists in Missouri and Nebraska to establish standardized guidelines for predicting phosphorus loss using the Agricultural Policy Environmental Extender (APEX) model. This consisted of a detailed review of over 230 parameters defining the operating options and equation parameters for the model. Also developed were standardized soil and management templates for data collection and organization. This led to a further developed and defined methodology to represent best management practices specific to the region within the APEX model including grassed water ways, terraces, buffers, and conservation tillage. Collaborations have been initiated with the APEX development team to integrate new non-linear adsorption isotherm equations into the APEX model. These improvements will be tested with the model calibration. Data was assembled for all the weather, soils, cropping, and water quality data required for the APEX model exercises and parameterized for base-line model predictions at the one location. Further calibrations will be done at a second site and model evaluation will be conducted in the next phase of the project.

Investigation of Recharge to the High Plains Aquifer, Northwestern Kansas

This study directly addresses the issue of water availability in a high priority area of the High Plains Aquifer by identifying recharge sources, quantifying recharge amounts, and providing important information on the behavior of low permeability units that have become perched as a result of declining water levels. In areas of groundwater mining, year-over-year increases in water levels are not expected to occur because water extracted from the aquifer is not replaced by recharge. In one area of the Kansas High Plains Aquifer with assumed groundwater mining conditions (water level declines exceed 20 m, saturated thicknesses reduced in excess of 35% of pre-development values), unexpected year-over-year increases in water-levels were recently recorded by enhanced monitoring as part of the Kansas Geological Survey (KGS) Index Well Program. Hydrograph analysis indicates post-irrigation season recovery is not tied to precipitation, amount of water pumped, length of pumping, or pumping rate. Rather, recovery is constant from year to year – indicating an unknown source of inflow (recharge) to the system.



Getting the Information Modelers Need: Extracting Hydrostratigraphic Information From Driller's Logs

Understanding aquifer characteristics is important for effective ground-water management practices. A largely overlooked source of geologic information is drillers' logs, which contain vast amounts of qualitative information regarding subsurface structure. The purpose of this project, which has recently been dubbed HyDRA (Hydrostratigraphic Drilling Record Assessment), is to develop and test procedures for employing this lithologic information in the development of quantitative three-dimensional depictions of subsurface properties for estimation of aquifer yield and use in flow and transport models.



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