

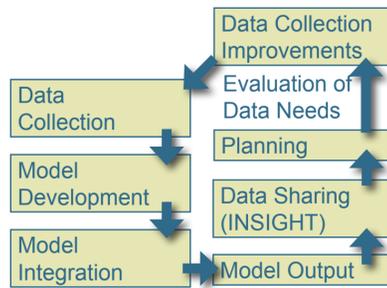
Surface and Groundwater Data Collection and Application for Integrated Water Management in Nebraska



Carol Myers Flaute, Colby Osborn, Mahesh Pun, and Jennifer Schellpeper
Nebraska DNR, Integrated Water Management Division

Poster Overview

This poster explores the path of hydrogeologic data for integrated water management in Nebraska. Integrated water management focuses on managing the availability of hydrologically connected surface and groundwater supplies as a single resource, based on a foundation of data and scientific analysis.



Data Collection Improvements

The need for improved data collection, monitoring, and studies is identified throughout the integrated water management process. For example, efforts to calibrate a model may highlight areas where having more information would lead to a more accurate model. Similarly, setting goals and objectives for an integrated management plan can help identify where additional data would better inform water supply management decisions.

Evaluation of Additional Data Needs

Data Collection

Monitoring Networks

NDNR gathers information from a variety of monitoring networks that collect data such as groundwater, evapotranspiration, streamflow, and weather data.

Other Data

Examples of other types of data that NDNR uses for integrated water management include land use (CALMIT) and soil (SSURGO) data.

Examples of the Categories of Data Collected through Monitoring Networks

Collection Network	Data Available
National Groundwater Monitoring Network (USGS)	Groundwater Monitoring well data (federal, state, and local networks)
Weather stations (High Plains Regional Climate Center)	Weather data for calculating evapotranspiration
Stream gage programs (USGS and NDNR)	Streamflow data

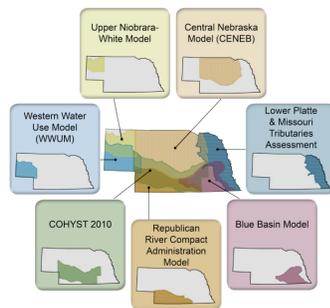
Model Development

NDNR has developed several models to assist with water management across Nebraska by providing a better understanding of regional hydrogeology and water availability. Each model was developed through collaborative efforts with local NRDs and stakeholders.

While the inputs, outputs, and objectives of each model differ somewhat due to specific local data needs and regional hydrogeologic differences, they all provide information about how surface water and groundwater interact and move through the hydrologic cycle. They also help water managers understand how water uses impact water supplies.

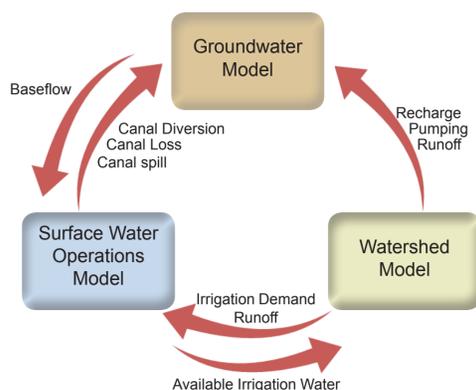
Most of these models have been completed and are now being used for integrated water management decisions across the state. The exception is a model for the Lower Platte River and Missouri River Tributaries basins, which is currently under development.

NDNR's Integrated Water Management Model Areas



Model Integration

NDNR's integrated water management models operate through the integration of groundwater, surface water operations, and watershed models. When interacting together, these models operate as an integrated water management model. The sequence of the interaction and integration of groundwater, surface water operations, and watershed models is illustrated by the figure below.



Each of NDNR's models (as shown in the "Model Development" section, above) was developed independently, according to local data needs and hydrologic characteristics. For each model area, only the information required to simulate the existing system is replicated in the model; therefore, some model areas do not include all three components of the integrated water management model (e.g., groundwater, watershed, and surface water operations models).

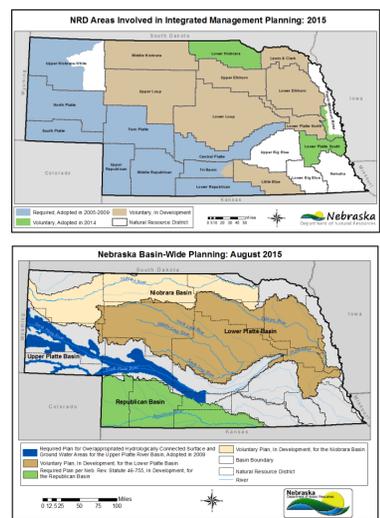
Planning

Integrated Management Plans and Basin-Wide Plans

NDNR works with natural resources districts (NRDs) and local stakeholders to develop integrated management plans (IMPs) and basin-wide plans. The objective of an IMP is to maintain or achieve a balance between hydrologically connected water supplies and demands within a single NRD, addressing either existing or potential future water supply problems. Basin-wide plans provide a framework for consistent basin-wide goals and objectives, facilitate coordination of cross-boundary projects, and can help establish consistent basin-wide guidelines for monitoring and distribution of data.

IMPs and basin-wide plans:

- Use best available data and analyses to inform management decisions
- Require ongoing monitoring
- Are re-evaluated when new data become available
- Identify additional data needs



Data Sharing (INSIGHT)

INSIGHT

An Integrated Network of Scientific Information and GeoHydrologic Tools

INSIGHT is a web-based tool that provides a series of maps that are directly linked to basin-specific data on water supply and demand, providing a visual, easily accessible snapshot of NDNR's modeling results and related data on water supplies and demands. INSIGHT presents water availability data at statewide, basin, and subbasin scales.

INSIGHT can aid natural resources districts and other water managers in understanding current and future demands, evaluating the effectiveness of water management strategies, and assessing critical areas of water shortage.



Model Output

NDNR's Integrated Water Management Division uses data and models to study surface water/groundwater interactions, analyze the impacts of water uses to stream baseflow and groundwater levels, and support decisions related to the integrated management of surface and groundwater supplies.

The figures below represent examples of some of the output from the integrated water management model that is taken into consideration for making water supply planning and management decisions.

