

# Water Matters

Published by the Nebraska Department of Natural Resources

A guide to **integrated water management** in Nebraska

## INSIGHT

Providing the Public with a Snapshot of Water Conditions Across Nebraska

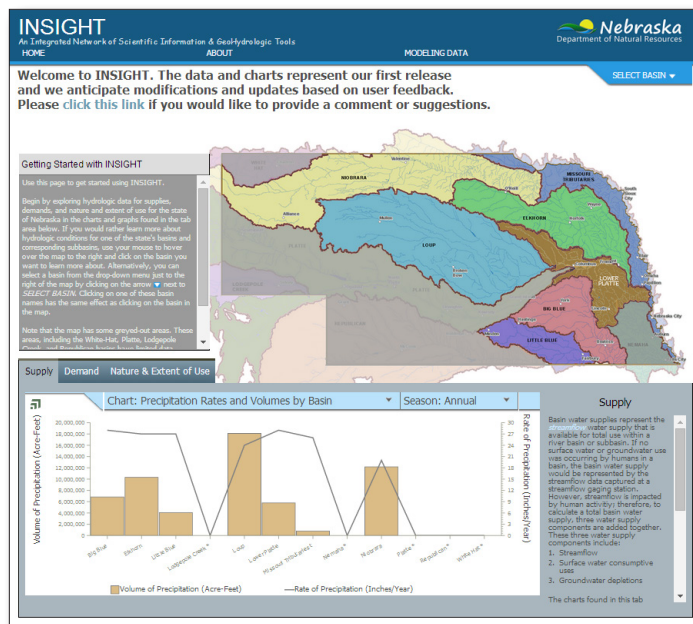
### Key concept

*INSIGHT is a new web-based tool that provides the public with access to information about the balance of water supplies and demands, both statewide and locally*

### Introduction

Knowing about water availability is important to everyone, not only water professionals. For example, numerous websites provide both summarized and detailed information about the amount of precipitation received, as well as forecasts. This information is useful for many purposes, ranging from floodplain management to planning a summer vacation. Similarly, INSIGHT (an Integrated Network of Scientific Information and Geohydrologic Tools) provides information about the amount of water available in multiple river basins throughout Nebraska. INSIGHT provides detailed information for water managers and engineers and also showcases summarized data to inform the public about water availability and use within a region.

INSIGHT<sup>1</sup> (Figure 1) is a new web-based tool from the Nebraska Department of Natural Resources (the Department) that provides the public with a comprehensive and easily accessible snapshot of water conditions across the state. Because INSIGHT allows users to tailor the level of detail and amount of information that they access to their specific needs, it can serve as a resource for varied levels of interest. For the public, it provides individuals with a means of better understanding local water challenges and opportunities. For water managers and members of the public who would like to be involved in water planning in their communities, it allows

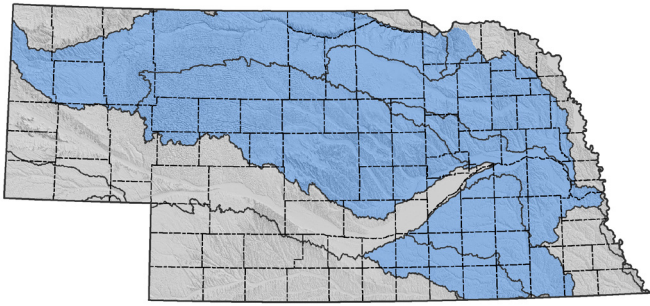


**Figure 1.** INSIGHT is a new web-based tool that provides a snapshot of Nebraska's water supply.

users to weigh decisions based on the current and projected balances between water supply and demand.

This issue of Water Matters focuses on INSIGHT's role as a resource for the public. It begins by providing an overview of where in the state INSIGHT data are currently available, explores what INSIGHT can reveal about the availability of water in Nebraska, and concludes with information about how the public can use the information available in INSIGHT by becoming involved with local water planning decisions.

<sup>1</sup> For information about INSIGHT's vision, purpose, and development process, see *Water Matters, No. 6: INSIGHT: An Integrated Network of Scientific Information & GeoHydrologic Tools* (September 2011).



**Legend**  
 INSIGHT data currently available  
 INSIGHT data not yet available  
 County boundaries  
 Basin boundaries

**Figure 2.** Locations for which information is currently available on the INSIGHT website.

### Getting to Know INSIGHT

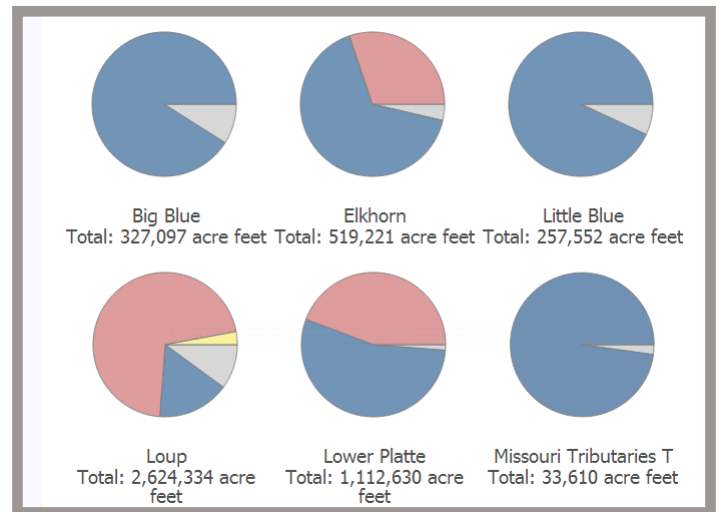
INSIGHT data are currently available for the Big Blue, Little Blue, Loup, Lower Platte, and Missouri Tributaries river basins, as well as for one subbasin within the Missouri Tributaries Basin (Figure 2). By focusing its initial efforts on providing INSIGHT data to the areas of the state that have not yet been designated as fully appropriated, the Department hopes to assist water managers with making proactive decisions that might help those basins to maintain a balance between water supplies and demands in the future. Additional basins will continue to be added as sufficient surface and groundwater models are developed for those areas.

INSIGHT’s data are available at three different scales: statewide, basin-level, and subbasin-level. Statewide data allow users to compare average annual water conditions among basins, while basin-level data are more detailed and present data for each of the last 25 years individually. Due to the considerable variation within a basin, many basins are divided into subbasins to provide a more localized picture of water conditions. For more information, see Table 1. The charts displayed on INSIGHT provide a quick visual reference, but users can also download full data and documentation of the INSIGHT process from the Modeling Data page.

### What You Can Learn from INSIGHT

INSIGHT includes information about water uses and supplies within each basin and subbasin. The data provided fall within six general categories: basin overview, big picture, supply, demand, nature and extent of use, and balance. These six categories are further described in Table 2. Each category of data is accessible from a separate tab in the chart area at the bottom of each page. Within most of the categories, there are multiple charts depicting different kinds of data, which can be accessed through a drop-down menu in the chart area.

The water balance charts are where data from other categories are combined to form a meaningful picture that can help you understand the overall health of your basin’s water supply. The concept of water balance is explored in more detail on page 4.



**Figure 3.** Statewide-level data displayed on INSIGHT allow a comparison of average annual water conditions among major basins. This example compares how each basin’s water demands are divided among different types of uses, such as groundwater (blue) and surface water (gray).

**Table 1.** Information is available on INSIGHT at three different scales.

Scale	Level of Detail	Where to Access
<b>Statewide</b>	Displays a comparison of average annual water conditions among the state’s major basins (Figure 3)	At the bottom of the INSIGHT home page
<b>Basin-level</b>	Depicts annual data for each of the last 25 years individually and illustrates greater detail than the statewide level	At the bottom of basin pages, which can be accessed by either clicking on the map in the middle of the INSIGHT home page or by using the drop-down basin menu in the upper right corner of the site
<b>Subbasin-level</b>	Presents data at the same level of detail as the basin-level, but for a smaller geographic area	At the bottom of subbasin pages, which can be accessed by clicking on the map in the middle of each basin-level page

This issue of *Water Matters* is focused on INSIGHT as a tool for the public. Expect a future issue of *Water Matters* that will be focused the more technical aspects of INSIGHT. Examples of topics that may be discussed in a future issue include:

- Models used (both existing models and those developed specifically for INSIGHT)
- A timeline of the process of developing INSIGHT
- Organizations that have collaborated with the Department on the development of INSIGHT
- INSIGHT’s data sources

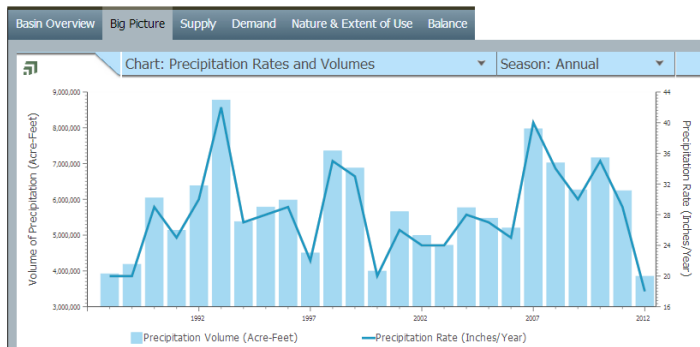
## Conclusion

INSIGHT provides the public with access to information about the balance of water supplies and demands statewide, within their regional basin, and within their local subbasin. By providing this information, INSIGHT gives the public a means to better understand the water challenges and opportunities where they live, while helping to inform people who wish to become more involved in water supply planning issues.

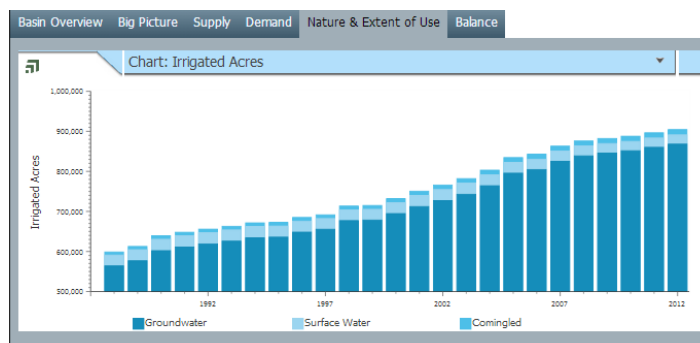
INSIGHT provides basic information that is crucial to water quantity planning efforts on both basin-wide and local scales. The information gathered and summarized through the INSIGHT web portal can inform efforts in your community to create and implement an integrated management plan (IMP).

If you are interested in becoming more involved in water planning in your area, talk to your local natural resources district to learn more about current opportunities. Ask whether there is a local water planning stakeholder group you can join, and find out whether there is an IMP or voluntary IMP process going on in your community, or whether there are plans to begin one in the future.

*INSIGHT provides information that is crucial to water quantity planning efforts and that can inform efforts in your community to create and implement an integrated management plan*



**Figure 4.** A chart representing precipitation variability in the Lower Platte Basin over the last 25 years. This is an example of the type of data available on INSIGHT under “Big Picture” at the basin and subbasin levels.



**Figure 5.** A chart revealing an increase in the number of irrigated acres in the Elkhorn Basin over the last 25 years. This is an example of the type of data available on INSIGHT under “Nature and Extent of Use” at the basin and subbasin levels.

**Table 2.** Information provided on INSIGHT at the basin and subbasin levels. Categories marked with an asterisk (\*) are also available at the statewide level.

Category	Description
<b>Basin Overview</b>	Summarizes a basin’s water use and provides demographic information
<b>Big Picture</b>	Provides a general overview of precipitation variability within a basin (Figure 4)
<b>Supply*</b>	Displays the total volume of water that is available for use within a basin, broken down according to how supply data were measured and calculated
<b>Demand*</b>	Shows the total volume of water used within a basin, broken down into six categories of water use, differentiating between consumptive uses (water is removed from the system) and non-consumptive uses (water remains in the system for reuse)
<b>Nature and Extent of Use*</b>	Provides additional information about water demands within a basin, including a chart of the number of irrigated acres (Figure 5)
<b>Balance</b>	Displays the difference between a basin’s water supplies and demands (Figure 6)

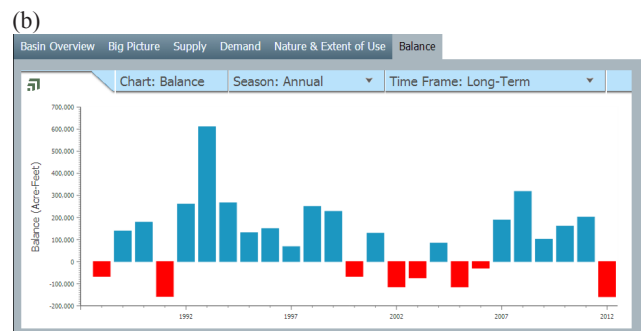
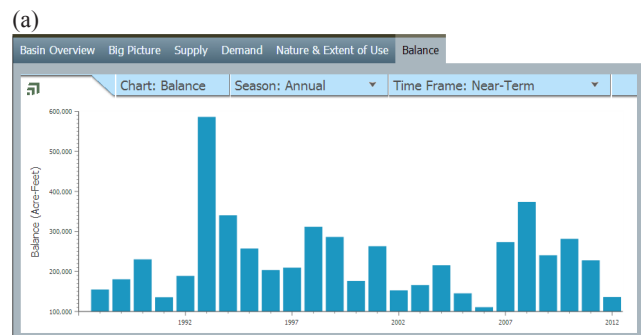
## What You Can Learn from INSIGHT: Understanding Water Balance

INSIGHT's balance charts show the difference between a basin's water supply and water demands. A positive water balance indicates that more water was available within in a particular year than was needed to meet existing water demands; conversely, a negative water balance indicates that demands outweighed the available water supply.

Water balance data are represented on INSIGHT in three different ways: near-term balance, long-term balance, and projected long-term balance. These representations differ according to how the total demand component of the balance calculation was determined. The near-term balance (Figure 6a) and long-term balance (Figure 6b) representations both display the balance of water supplies and existing demands. The difference between them is that the near-term balance charts show whether there was enough water available in a basin in a particular year to meet that year's existing demands, whereas the long-term balance charts also include the long-term impacts of that year's water consumption. The need to consider long-term impacts is mainly due to the delayed impact of groundwater pumping, because while the effects of surface water consumption are often immediate, groundwater use can take longer to manifest, as described below.

Why does water consumption have long term effects? Some aquifers are hydrologically connected to surface streams, meaning that groundwater withdrawn from them will eventually result in a reduction of the amount of water in the stream. Depending on the materials in the aquifer and how far a well is from the stream, it can take a long time for the resulting stream depletion to occur<sup>2</sup>. The near-term balance charts described above display the result of water balance calculations that only take into account depletions from groundwater use that affected the stream that year; in contrast, the long-term balance charts display the results of water balance calculations that take into account the full effect of groundwater withdrawals on those same water supplies, once all of the

<sup>2</sup> For a detailed explanation of this topic, see *Water Matters, No. 5: Stream Depletion and Groundwater Pumping Part Two: The Timing of Groundwater Depletion* (July 2010).



**Figure 6.** An example comparing the annual near-term (a) and long-term (b) water balance in the Little Blue Basin for the last 25 years. The difference between near-term and long-term water balance is explained in the text. Blue bars represent years in which water supplies exceeded water demands, while red bars represent years when demands exceeded supplies. The third representation of balance data on INSIGHT is projected long-term (not depicted in this publication).

groundwater impacts to the stream have occurred.

The third representation of balance data on INSIGHT is projected long-term. The projected long-term charts are intended to represent a basin's capacity for increased water demands by calculating the long-term water balance that would result from a five percent increase in water usage above current levels.

When evaluating the balance of water supplies and demands in your basin, it is important to take into account all three scenarios. As shown in the example, some basins have sufficient water to meet their current demands, but may not have sufficient water for those same demands in the long-term.

A future issue of *Water Matters* will explore the relationship between water balance and monitoring for integrated management plans.