

2019 WIMS/WSWC Workshop

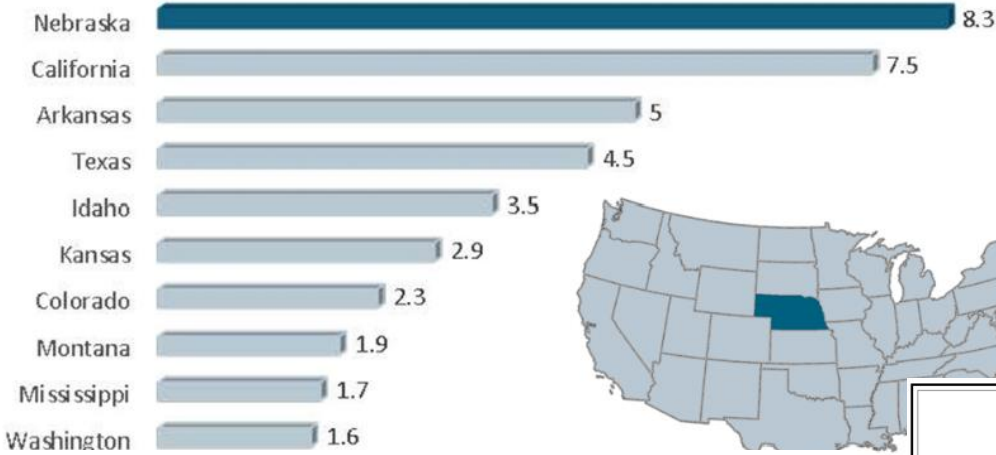
Ft. Collins, CO



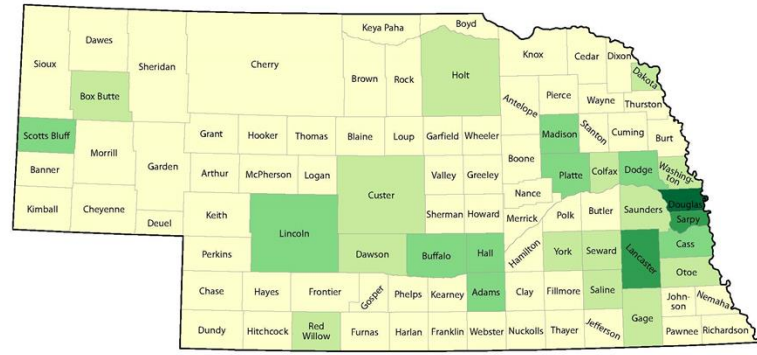
Jesse Bradley, Assistant Director
Nebraska Department of Natural Resources

Nebraska Overview

Top 10 States in Total Irrigated Acres



NEBRASKA - 2010 Census Results
Total Population by County



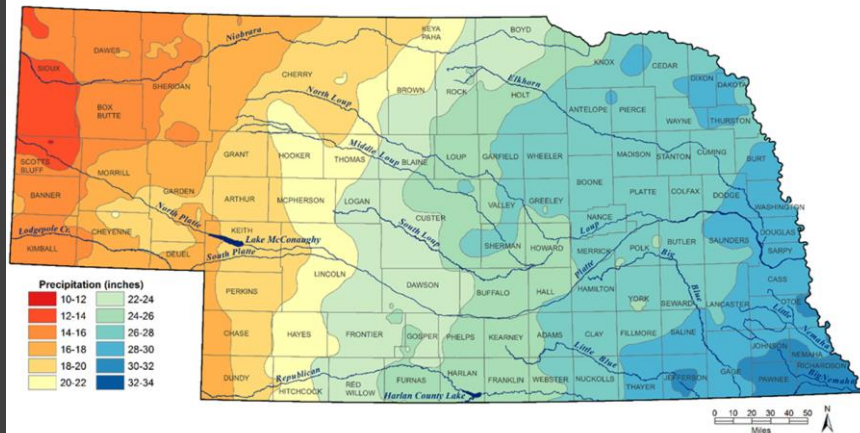
Pop. 1.9 M

Number of People
 51,110
 60,000 to 299,999
 25,000 to 59,999
 10,000 to 24,999
 400 to 9,999
 Total State Population: 1,826,341

Source: U.S. Census Bureau, 2010 Census Redistricting Data Summary File
 For more information visit www.census.gov

United States
Census
 Bureau

Information presented on this map is the best available as of 2008. To order a copy of this map go to www.census.gov

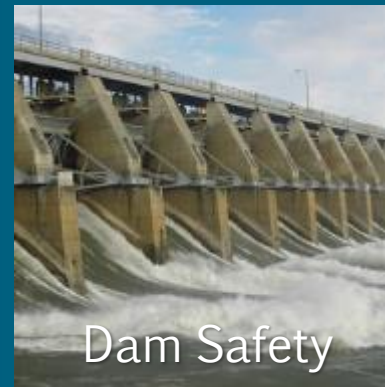
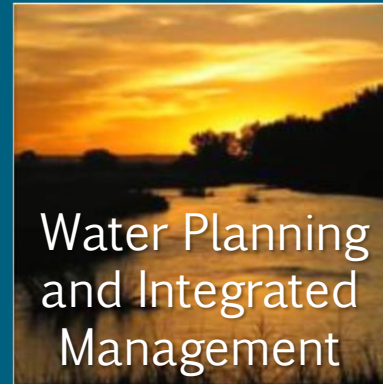


NEBRASKA

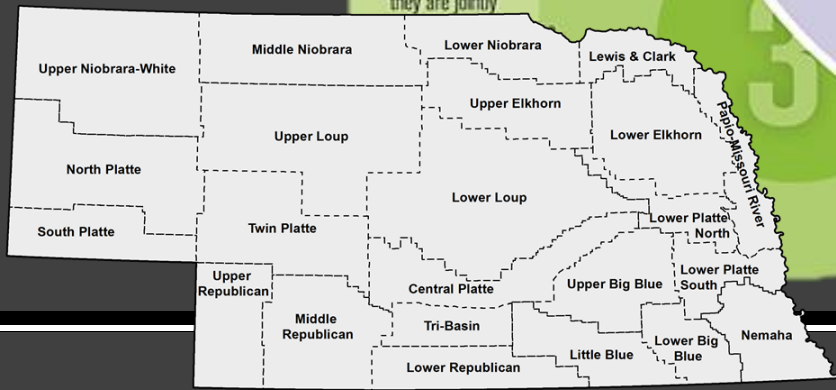
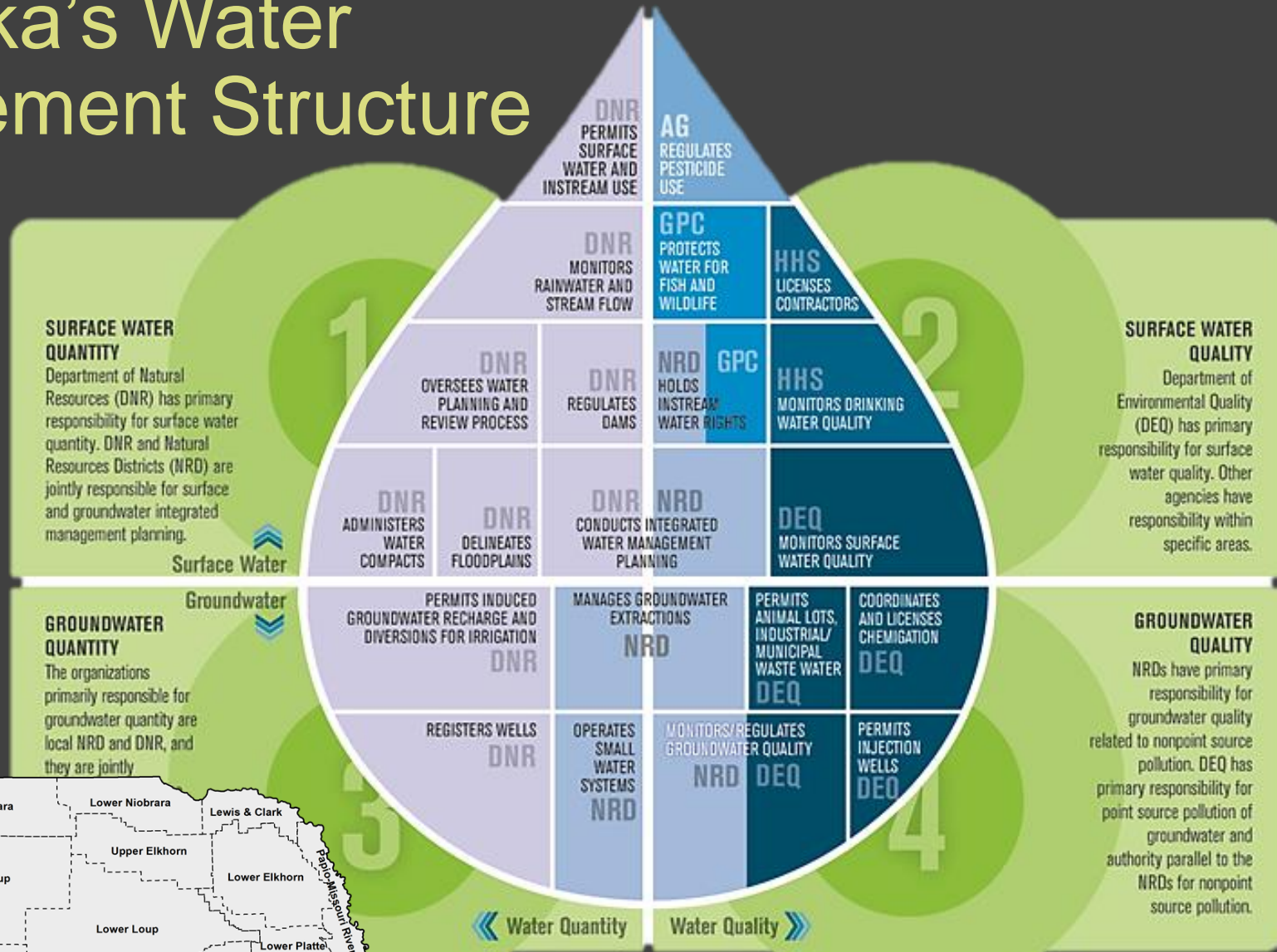
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Providing the sound science and support for managing Nebraska's most precious resource.



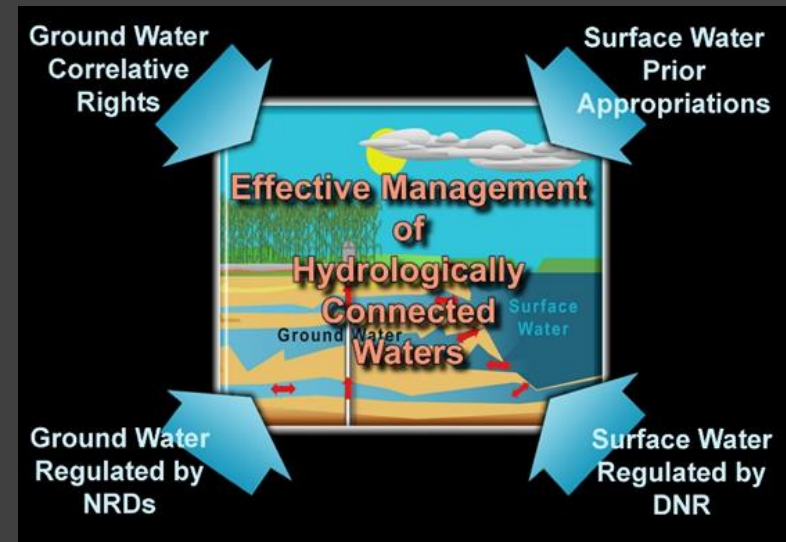
Nebraska's Water Management Structure



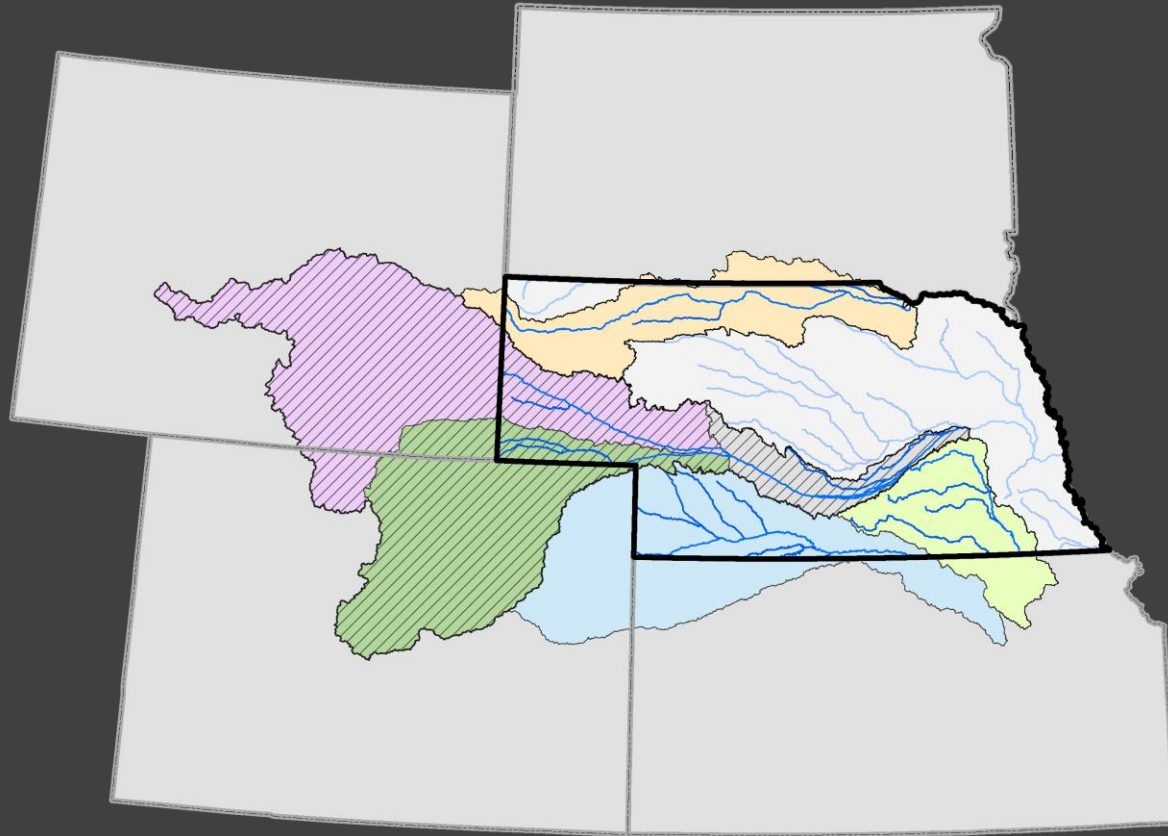
Integrated Management Planning (Nebraska State Water Planning Process)







Each plan must contain:

- (a) Clear goals and objectives with a purpose of sustaining a balance between water uses and water supplies so that the economic viability, social and environmental health, safety, and welfare of the river basin, subbasin, or reach can be achieved and maintained for both the near term and the long term
- (b) a map clearly delineating the geographic area subject to the integrated management plan
- (c) one or more ground water and surface water controls
 - (a) a plan to gather and evaluate data, information, and methodologies that could be used to implement the plan and increase understanding of the surface water and hydrologically connected ground water system, and test the validity of the conclusions and information upon which the integrated management plan is based.

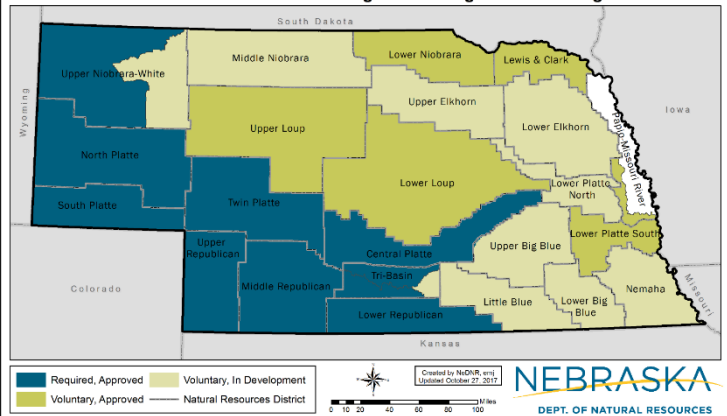


Interstate Compact Areas



- | | | |
|--|---|--|
|  PRRIP Agreement |  North Platte River Settlement |  Big Blue River Compact |
|  Upper Niobrara River Compact |  Republican River Compact |  River/Stream |
|  South Platte River Compact | | |

NRD Areas Involved in Integrated Management Planning



Integrated Management Plans

IMPLEMENTATION

- Water Management Projects
- Strategic Planning Actions

PLANNING AND PUBLIC PARTICIPATION

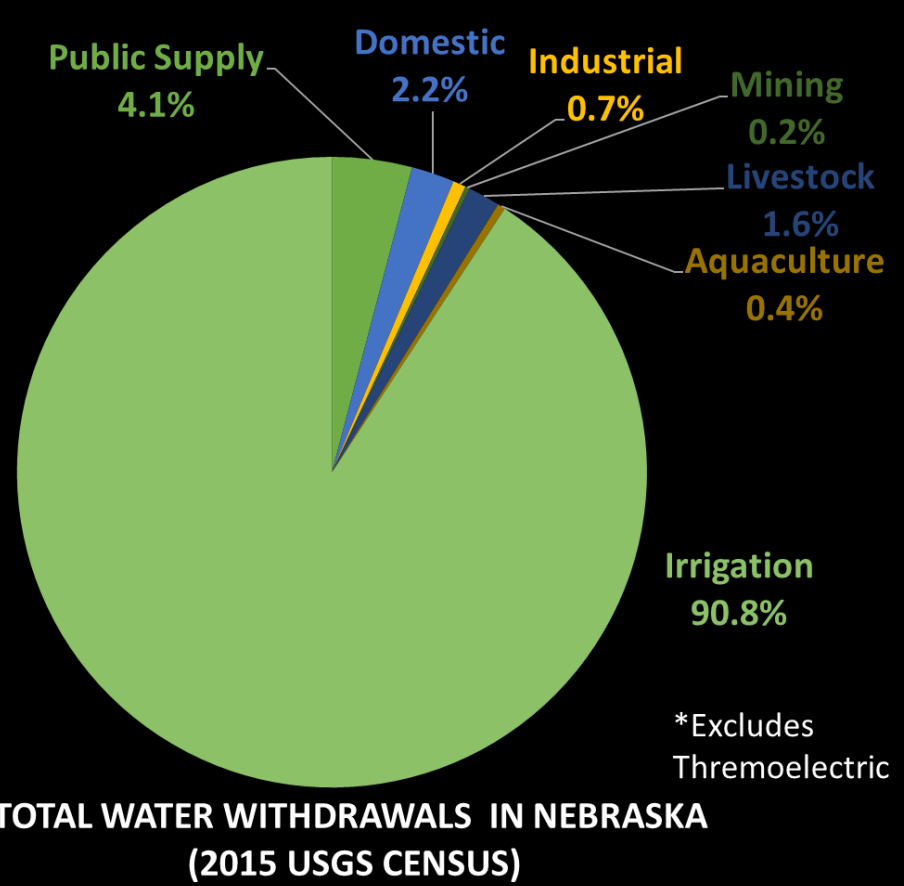
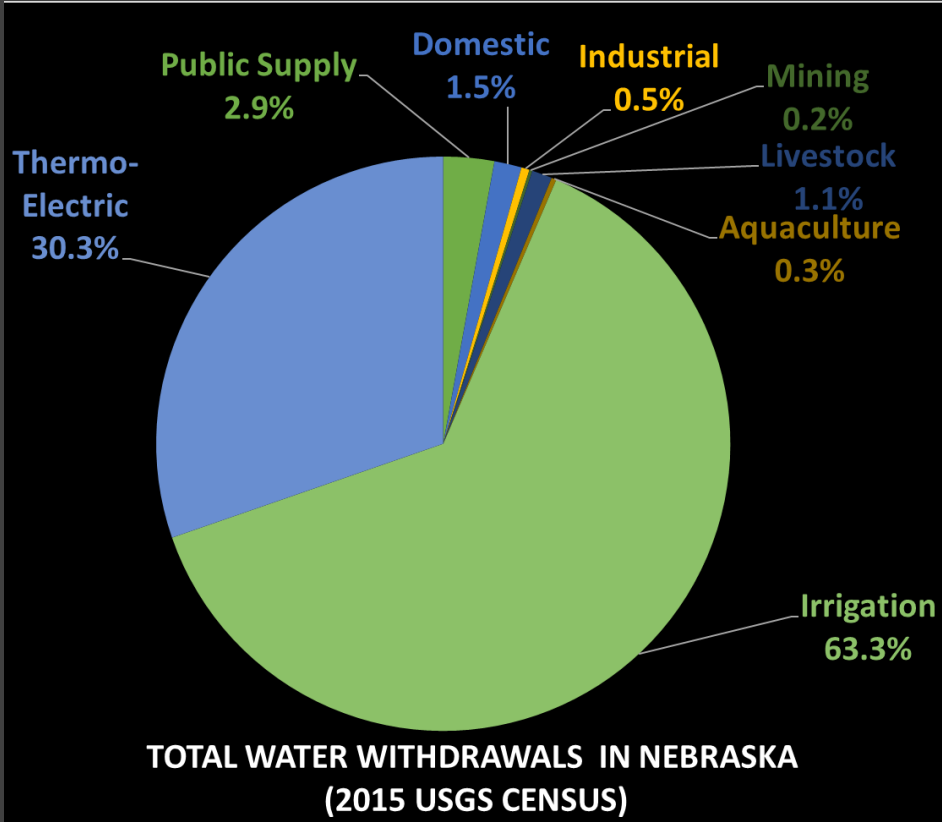
- Goals and Objectives for Water Planning
- Stakeholder Involvement

SCIENCE

- Water Availability and Water Shortages
- Water Supplies and Water Uses
- Hydrologic Models, Data, and Analyses



Water Withdrawals in Nebraska



Current Water Use Data Collection Activities (Surface Water, NeDNR)

- Irrigation Use
 - Online reporting (mandatory/voluntary) – since 2015
 - Meters – where reporting is required
 - USBR canal reports
 - Gages for diversion (all major canals 1,000 – 100,000 acres)
 - PWAP – storage and natural flow tracking (Platte River Basin)
 - Estimated based on GIS permit boundaries, irrigation requirements, and administrative restrictions
- Municipal Transfer Permits (groundwater)
- Industrial Transfer Permits (groundwater)
- Instream Flow
- Power (thermoelectric and hydropower)

Current Water Use Data Collection Activities (Groundwater, NRD's)

NRDs Are Managing Water Statewide:

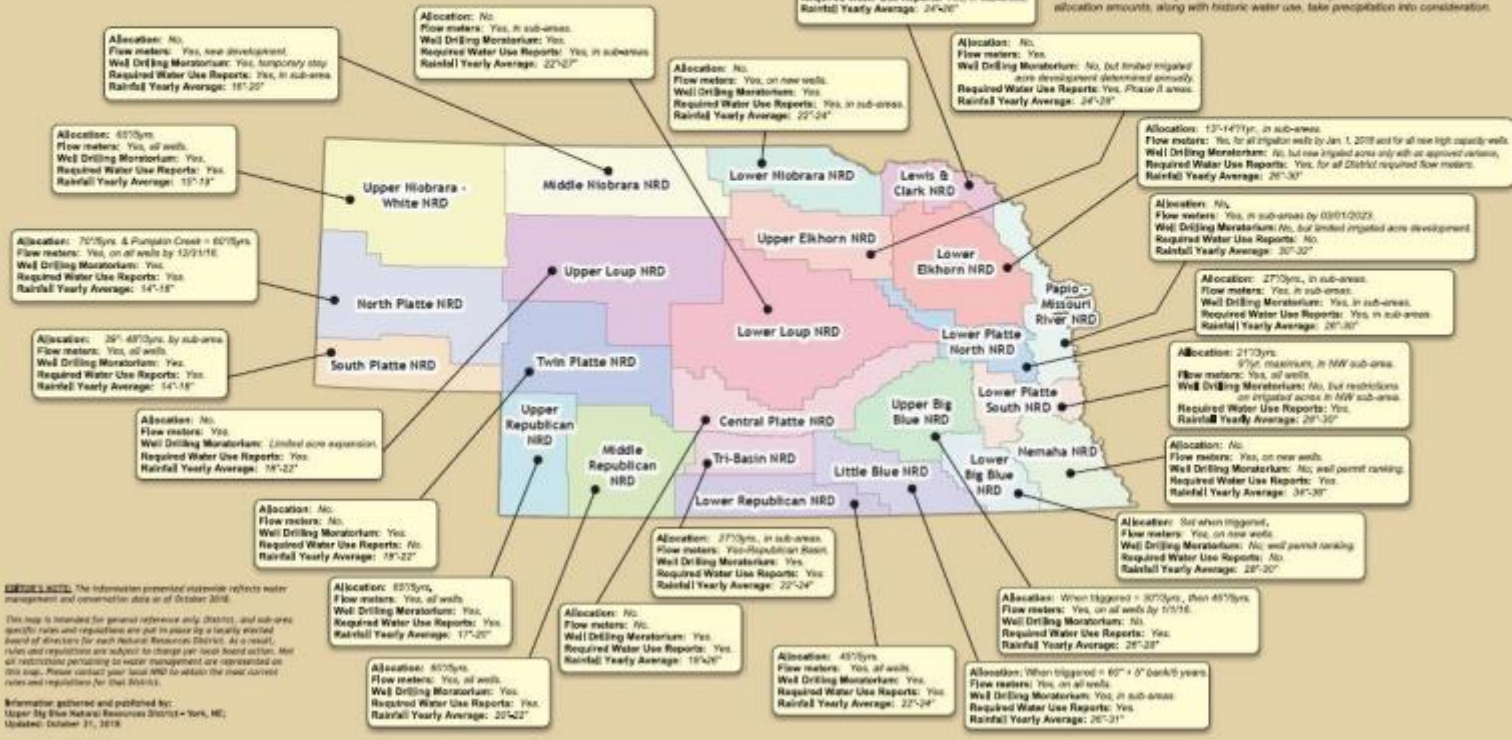
Nebraska's 23 Natural Resources Districts (NRDs) are uniquely positioned to manage the conservation of the state's natural resources through local governance. Because of Nebraska's diverse geology, climatology, and hydrology, each NRD—and its locally elected board of directors—are able to enact rules, regulations, and programs that can assist its District's citizens and protect local natural resources for future generations to share. Water management regulations in particular include allocating groundwater, augmenting surface water, requiring flow meters, instituting well drilling moratoriums, requiring water use reports, and restricting the expansion of irrigated acres. Individual NRDs use these regulations in different combinations and to different degrees depending on their respective geographic areas of concern. Below is a map showing all 23 NRDs and their most recent status of water management techniques.

So why does this matter to you? Quite simply, Nebraska's NRDs are working to ensure that you and future generations can continue to share in the use and enjoyment of our natural resources. Nebraska's NRDs: Protecting Lives, Protecting Property, and Protecting the Future...



Precipitation varies dramatically across the state ranging from 14" to 16" a year in the Panhandle to 24"-26" a year in the most southwestern portion of Nebraska. Therefore, allocation amounts, along with historic water use, take precipitation into consideration.

NRD GROUNDWATER QUANTITY REGULATIONS ACROSS NEBRASKA (October 2018)



DISCLAIMER: The information presented statewide reflects water management and conservation data as of October 2018.

This map is intended for general reference only. District and sub-area specific rules and regulations are put in place by a locally elected board of directors for each Natural Resources District. As a result, rules and regulations are subject to change per local board action. Not all restrictions pertaining to water management are represented on this map. Please contact your local NRD to obtain the most current rules and regulations for that District.

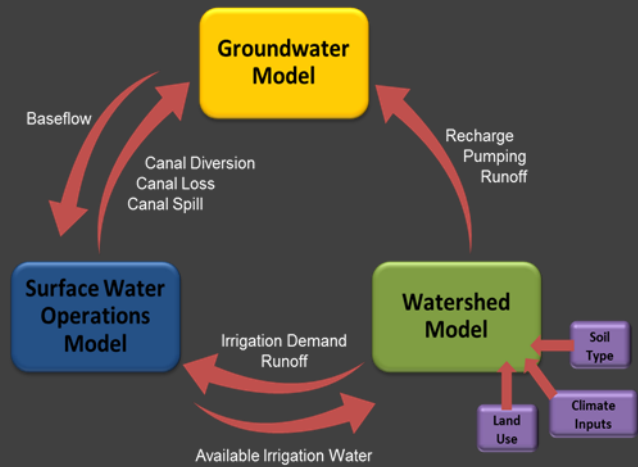
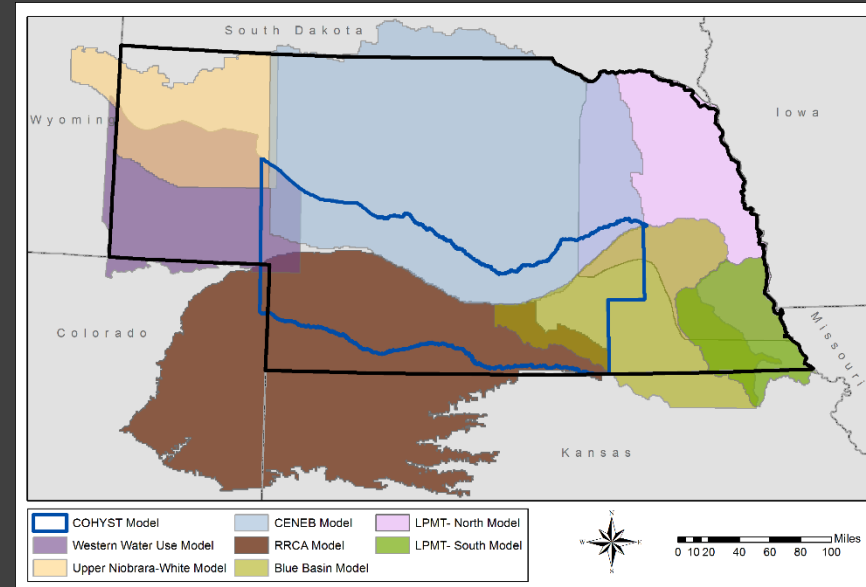
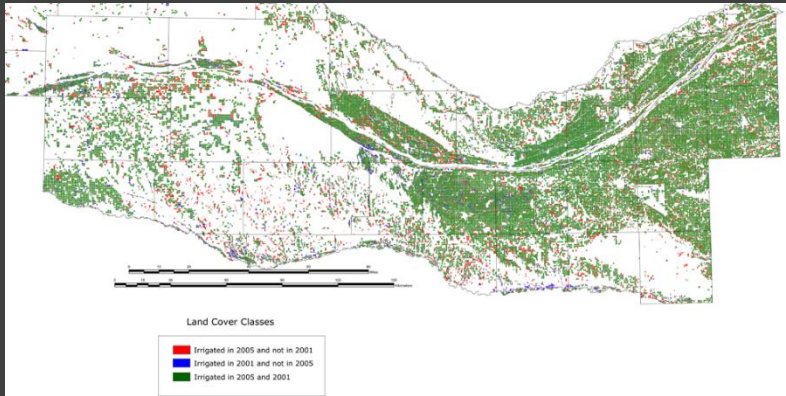
Information gathered and published by:
Upper Big Blue Natural Resources District • York, NE
Updated: October 31, 2018

Current Water Use Data Collection Activities (Groundwater, NRD's)

- Irrigation Use
 - Reporting (mandatory/voluntary)
 - Meters
 - Estimated based on GIS permit boundaries, irrigation requirements, and administrative restrictions
 - Remote sensing (actual irrigation/crop typing)
- Municipal (meters and population-based estimates)
- Self-supplied industrial (meters and estimates)
- Power (thermoelectric cooling)
- Augmentation (meters)

- Domestic wells, livestock wells, and other small uses are not currently estimated

Technical Tools and Methods for Water Use Estimation



Official Nebraska Government Website

INSIGHT

An Integrated Network of Scientific Information & GeoHydrologic Tools

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Welcome to INSIGHT! The "Getting Started with INSIGHT" box explains how you can interact with the site. The methodology document contains more detailed information on the analysis behind the charts below and the data used can be accessed on the Modeling Data page. Be watching for updates to the interface and more data to be added soon!

Getting Started with INSIGHT

Begin by exploring hydrologic data for supplies, demands, and nature and extent of use for the state of Nebraska in the charts and graphs found below. If you would rather learn more about one of the state's basins and corresponding subbasins, start by double-clicking the map to zoom in to the basin level. The red dot in the center of the map will hover over the basin whose data will be displayed. Use your mouse to pan to the basin of interest by clicking and dragging until the red dot is in that basin or simply click on the basin you wish to view. You may double-click again to zoom in to the subbasin level and use your mouse to pan to or click on the subbasin of interest. The plus and minus buttons in the upper left of the map also allow you to zoom in and out. Alternatively, you can select a basin or subbasin from the SELECT REGION drop-down menu above the

Chart: Precipitation Rates and Volumes by Basin Season: Annual

Basin	Volume of Precipitation (Acre-Feet)	Rate of Precipitation (Inches/Year)
Big Blue	~18,000,000	~25
Elkhorn	~12,000,000	~20
Little Blue	~8,000,000	~15
Loup	~16,000,000	~25
Lower Platte	~10,000,000	~15
Missouri Tributaries	~14,000,000	~20
Niobrara	~12,000,000	~20


Supply

Basin water supplies represent the water supply that is available for total use within a river basin or subbasin. If no surface water or groundwater use was occurring by humans in a basin, the basin water supply would be represented by the streamflow data captured at a streamflow gaging station. However, streamflow is impacted by human activity; therefore, to calculate a total basin water supply, four water supply components are added together. These four water supply components include:

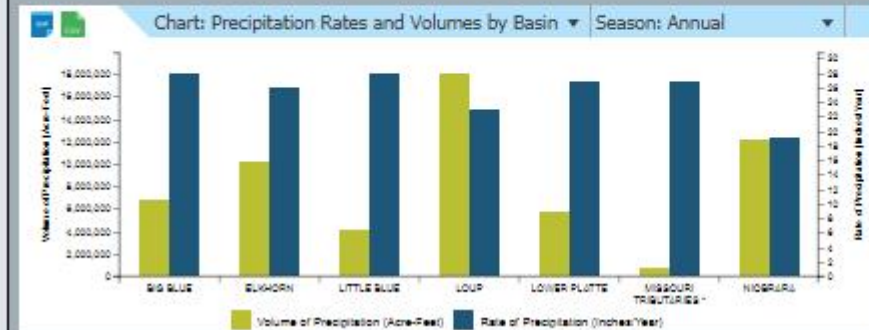
1. Streamflow +
2. Surface water consumptive uses

INSIGHT

Central Nebraska (CENEB) Model
Blue Basin Model information
Republican River Compact Administration Model
Upper Niobrara-White Model information


INSIGHT data and documentation 
INSIGHT methodology document (Revised May
Report on Land Use Classification: A Surface En
Vegetation Index Application to Map and Monitor



INSIGHT Methods



Basin water supplies streamflow water available for total use basin or subbasin. If water or groundwater occurring by humans basin water supply is represented by the at captured at a stream station. However, streamflow is impacted by human activity, therefore, to calculate a total basin water supply, four water supply components are added together. These four water supply components include:

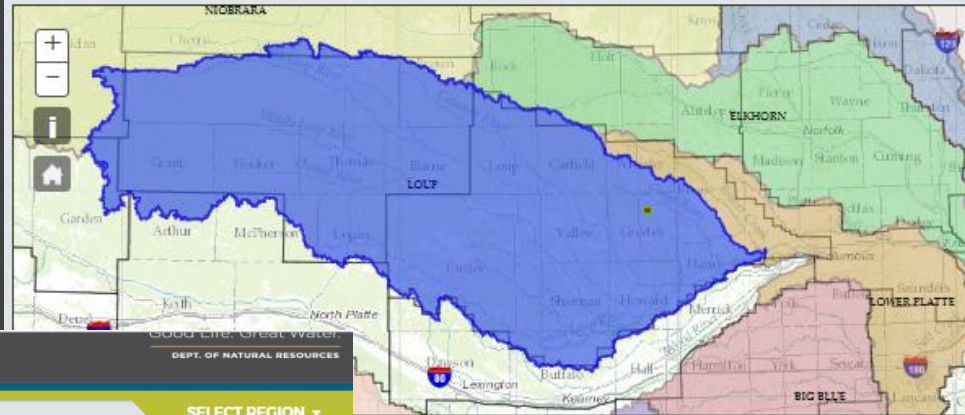
Index of /Pub/INSIGHTDocumentation/

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 20150501_INSIGHTDataAndDocumentationGuide.pdf	25.3 kB	4/30/15, 7:00:00 PM
 2016_May1DataUpdate/		4/27/16, 7:00:00 PM
 DataSourcesbySubbasin/		4/30/15, 7:00:00 PM

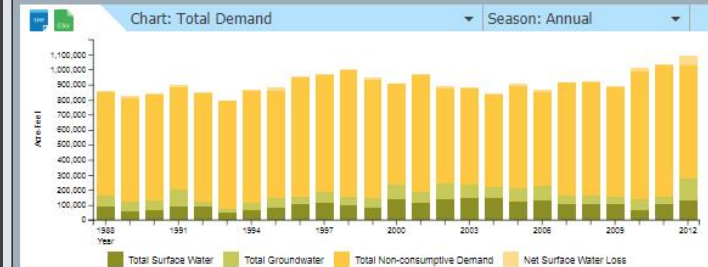
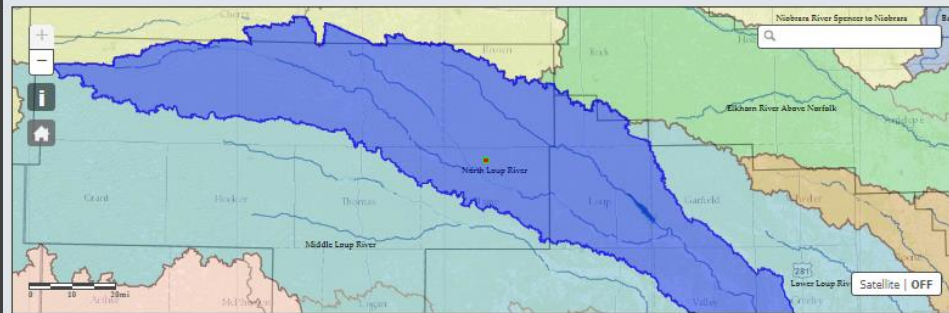
INSIGHT

SELECT REGION ▾



- State
 - Nebraska
- Basins
 - Big Blue
 - Elkhorn
 - Little Blue
 - Loup
 - Lower Platte
 - Missouri Tributaries
 - Niobrara
 - Republican
- Subbasins
 - Bazile Creek
 - Big Blue River
 - Elkhorn River Above Norfolk
 - Elkhorn River Norfolk to Waterloo
 - Little Blue River
 - Lower Loup River**
 - Lower Platte River Above North Bend
 - Lower Platte River North Bend to Louisville
 - Middle Loup River
 - Niobrara River Above Box Butte
 - Niobrara River Box Butte to Gordon
 - Niobrara River Gordon to Sparks
 - Niobrara River Sparks to Spencer
 - Niobrara River Spencer to Niobrara
 - North Loup River
 - South Loup River
 - Republican

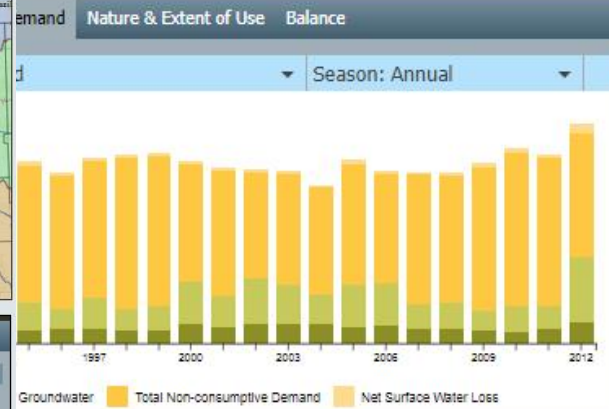
SELECT REGION ▾



North Loup River Demand

Demand or total use of water within a basin or subbasin is derived from six main categories of water use:

1. consumptive water demands for hydrologically connected high capacity (greater than 50 gallons per minute) groundwater well pumping
2. consumptive water demands for surface water uses
3. the net water determined to be necessary to deliver streamflows to meet consumptive demands of surface water (i.e., water needed to convey water to irrigation fields through canals)



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Current WUDR Project:

Goal: Develop database for all non-agricultural water use and begin testing interface for new agricultural permits

Non-Ag Water Use Database Dashboard Reporting Upload Preview Non-Ag Data Non-Ag Reporting About Contact

Nebraska Non-Ag Water Use Database

Upload

Import new wells and certified acre changes

Upload Data

View

Dashboard description here.

Dashboard

Report

Export and Reporting description h

Reporting »



Lower Platte Coalition Dashboard Reporting Upload Preview USGS Data USGS Reporting About Contact

USGS Water Use Reporting

Report Type

Water Use Summary Report

Report Year

All

Report Grouping

None

None

NRD

County

INSIGHT BASIN

HUC8

HUC12

Thermoelectric GW

Aquaculture GW

Self Supplied GW

Livestock GW

Mining

Public Supply SW

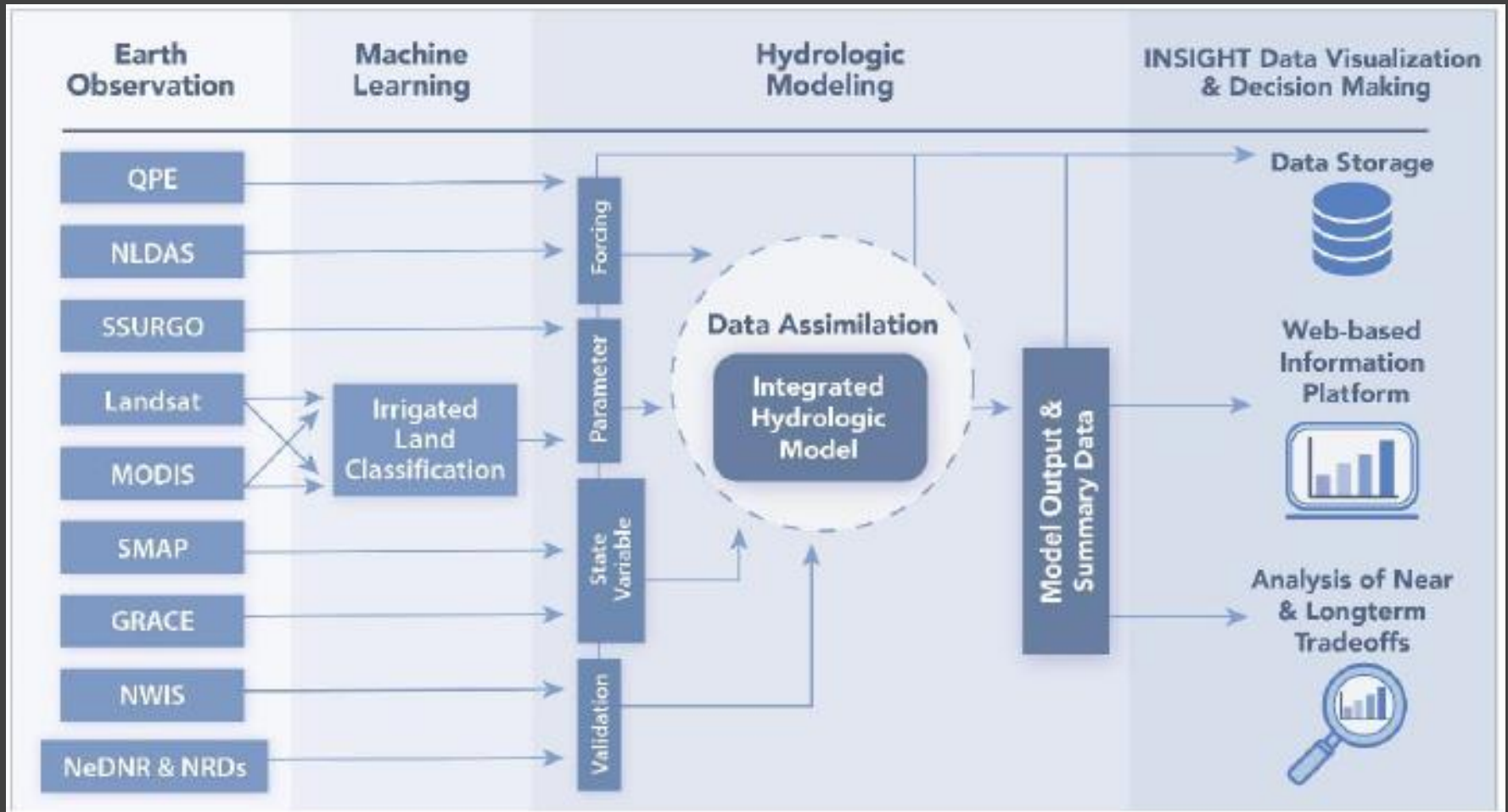
Commercial/Industrial SW

Thermoelectric SW

Aquaculture SW

Submit

Future Data Management and Modeling Goals:





Thank
You

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WSWC Workshop Questions

1. What are the challenges in getting the data you need to meet your regulatory, water planning and other obligations? Do you have adequate information/data on surface/groundwater uses? If not, do you have plans for a solution to those challenges? What data are missing now?
 - Challenge: Getting data in different formats from different entities. Standardized format within or across basins, or among NRDs, or among states in interstate agreements
 - Challenge: different reporting requirements, different timeframes, different data available in different areas of the state.
 - Challenge: hesitancy/reservations of some water users to share their data with us. & it's voluntary in some areas for them to share it, so we can't make them do it.
 - Challenge: M&I data - ease of getting this varies by NRD
 - Adequacy of the information/data depends on where you are in the state, because of varying IMP and GWMP requirements
 - NRD-led efforts are one way we can address the challenges (metering, other data collection)
 - Example: Twin-Platte pumping records database

WSWC Workshop Questions

2. What water use reporting (2020 and beyond) for regulatory and institutional purposes are most important to your State? What data standards for QA/QC, accuracy, and completeness do you use in the State to monitor water supply or use?
- Most important: everything that gets reported for interstate compacts/decrees/agreements (RRCA, PRRIP, NPDC, BBRC)
 - Irrigation data (95+ % of consumptive use)
 - Data standards: important to make sure units are included; include metadata; source data (versioning)
 - QA/QC: compare to previous years to make sure values are logical and reasonable; review reported data reasonableness compared to other estimates, is the amount reported consistent with the type of use

WSWC Workshop Questions

3. What are your State's water use reporting systems and gaps in technical support, and methods? What future updates/plans for data collaboration, models, data services do you have? If water use data are reported voluntarily by water users, does your agency provide guidelines for reporting?
- Groundwater data is generally collected and reported by NRDs, through IMPs we have some required reporting, some voluntary and no reporting in other areas
 - Varying levels of technical expertise among staff of various NRDs, and some have very small staffs and so don't have much time for working with us on data needs
 - Intend to update some existing models in collaboration with other agencies/entities to ensure consistency and to ensure mutual needs are met
 - Updating land use datasets for water use estimate updates
 - Voluntary surface water use surveys (administered by NeDNR) or mandatory surface water use reporting, depending on location
 - Reported uses typically from meter data and estimated from power records if meter fails
 - Example: Working with Republican NRDs to improve RRCA data exchange process (uniformity of data, getting data in format that's useful for us, QA/QC, etc.)

WSWC Workshop Questions

4. What is an acceptable lag time given reporting schedules? Monthly time-step? What are acceptable, optimal, spatial resolutions for State assessments of supply and use information (site-specific, HUC-8, custom spatial units)? What are the challenges in working in a common spatial unit (HUC 8, 10, 12)?
- Try to allow about 6 -12 months after end of year for data processing (for IMP reporting)
 - Depends on the data type. Monthly time-step is a typical goal, but different scales apply
 - HUC 8 is a good size for big picture assessment. Could go finer as data exist or are developed. (INSIGHT sub-basins, RRCA sub-basins, PRRIP water rights locations)
 - Model grid size: our statewide grid is 1 square mile; some models have finer grids
 - A challenge: surface water watershed boundaries and groundwater boundaries don't align and uses can effect multiple basins
 - Political boundaries for regulation do not always match the common spatial unit, or a stream gage location
 - A challenge: streamgages don't necessarily line up with specific HUC watershed outlets

WSWC Workshop Questions

5. What can WaDE or WUDR do to help your state meet its challenges?

- Continue to work with state when developing water use estimates
- Recognize complex hierarchy of data sources (best available data)
- Improve documentation of USGS estimates (can be fragmented and backup data not always included)
- Create more efficient ways to compare estimates and other data sources
- Understand uncertainty in estimates
- Matching funding helps get projects off the ground

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