



Managing Nebraska's Water Resources

Jennifer J. Schellpeper, Integrated Water Management

Beth Eckles, Permits and Registrations

Andrew Christenson, Floodplain Management

Carol Myers Flaute, Integrated Water Management



Overview

1. Who is DNR?
2. Surface and Groundwater Permitting in Nebraska
3. Floodplain Management, Mapping, and Mitigation
4. Integrated Water Management

WHO IS DNR?

Jennifer J. Schellpeper,
Integrated Water Management Acting Division Head

Who is NDNR?



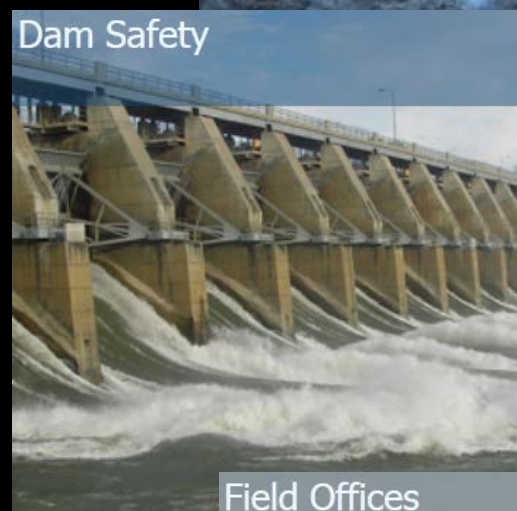
Surface Water



Floodplain Management



Dam Safety



Field Offices



Agency Mission

VISION and MISSION

- The DNR is dedicated to working with Nebraska's citizens and leaders to plan, establish, and administer policies and programs for the effective management and conservation of the State's water and land resources.
- Committed to performing statutory responsibility to manage and conserve the State's water and land resources in an effective and efficient manner.

Available Data

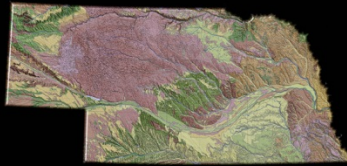
- New Website Design - <http://dnr.ne.gov/>
- Streamgaging - <http://data.dnr.nebraska.gov/RealTime>
- NERain - <http://nerain.dnr.nebraska.gov/nerain/>
- Ice Jam Monitoring - <http://dnr.ne.gov/fpm/ice-jam>
- INSIGHT - <http://dnr.ne.gov/insight/>
- Voluntary Water Use Database -
<http://data.dnr.nebraska.gov/wateruse>

SURFACE AND GROUNDWATER PERMITTING IN NEBRASKA

Beth Eckles, Natural Resources Program Specialist

Surface and Groundwater Permitting in Nebraska

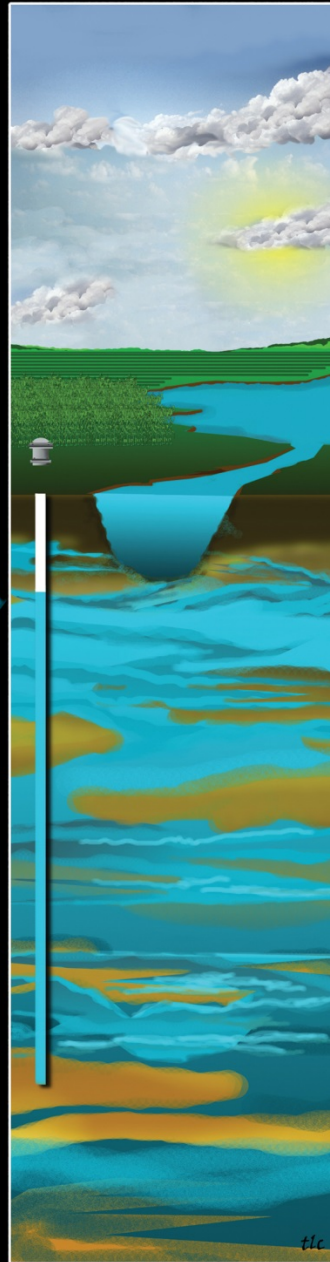
- Surface water or groundwater?
- What is a water right?
- Types of water rights
- Filing an application
- Approval of an application
- DNR field offices
- Little known aspects
- Groundwater permitting



Groundwater

- **Correlative Rights**
- Regulated by local Natural Resources Districts

Share and share alike
Beneficial use

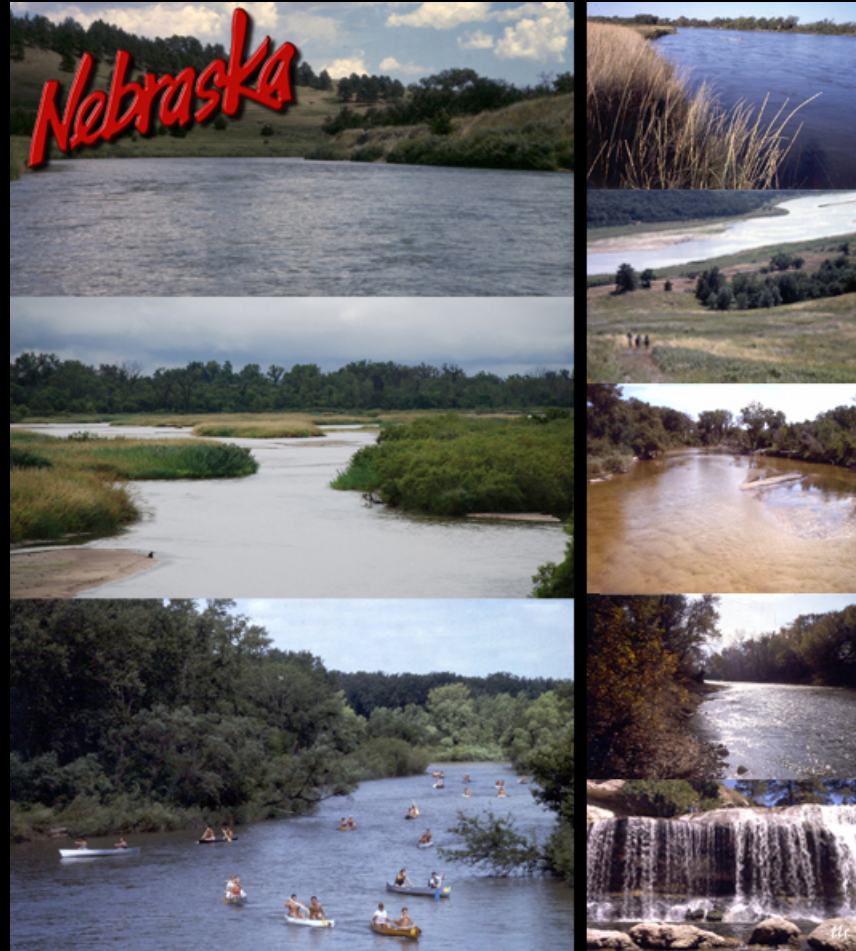


Surface Water

- **Prior Appropriations**
- Regulated by Nebraska Department of Natural Resources

First in time
is first in right

Surface Water Belongs to the People of Nebraska



Nebraska Has More Miles of River than Any Other State



Water Right, Permit, Appropriation

Three common types of water rights:

1. Irrigation from a naturally flowing source
2. Storage
3. Storage-use

Natural Flow Irrigation



Storage



Storage-use



Irrigation District River Diversion vs. Private Pumper



Application Form

DNR Form APA-001
August 2008

STATE OF NEBRASKA

DEPARTMENT OF NATURAL RESOURCES

APPLICATION FOR A PERMIT TO APPROPRIATE WATER

Complete items 1 through 10 by printing in ink or typing the appropriate information and by placing an X in the appropriate box.

For Department Use Only

1. Name and address of owner of land under proposed project. Names must be exactly as described on the deed or document transferring ownership of property. Landowner must sign the application.

Filed in the office of the Department of

Natural Resources at _____ a.m./p.m.

on _____

Application No. _____

Map No. _____

Water Division _____

Receipt No. _____ Amount _____

Right ID _____

E-mail address: _____ Telephone No. (____) _____

2. Name, address, and telephone number of applicant if different than landowner.

E-mail address: _____ Telephone No. (____) _____

3a. A permit is sought to:

☐ Use natural flow ☐ Use impounded water*

3b. A permit is sought for the purpose of:

☐ Irrigation ☐ Manufacturing ☐ Domestic

☐ Other _____

☐ Temporary** _____

4a. Identify the source of water (name of stream or reservoir).

4b. If applicable, identify the facility name for transporting water from the source (portable pump, name of canal or pipeline).

5. Identify the location of the ☐ Headgate ☐ Pump

Section _____ Township _____ North, Range _____ E _____ W _____ County _____

[illegible]

Required Plans

Title 457 & Title 458



STATE OF NEBRASKA
DEPARTMENT OF NATURAL RESOURCES
APPROVAL OF APPLICATION A-18676
WATER DIVISION 2-F

ORDER

IT IS HEREBY ORDERED that application A-18676 is APPROVED subject to the following limitations and conditions:

The source of water is Bazile Creek.

The water shall be used for the purpose of irrigation.

The priority date is September 3, 2009.

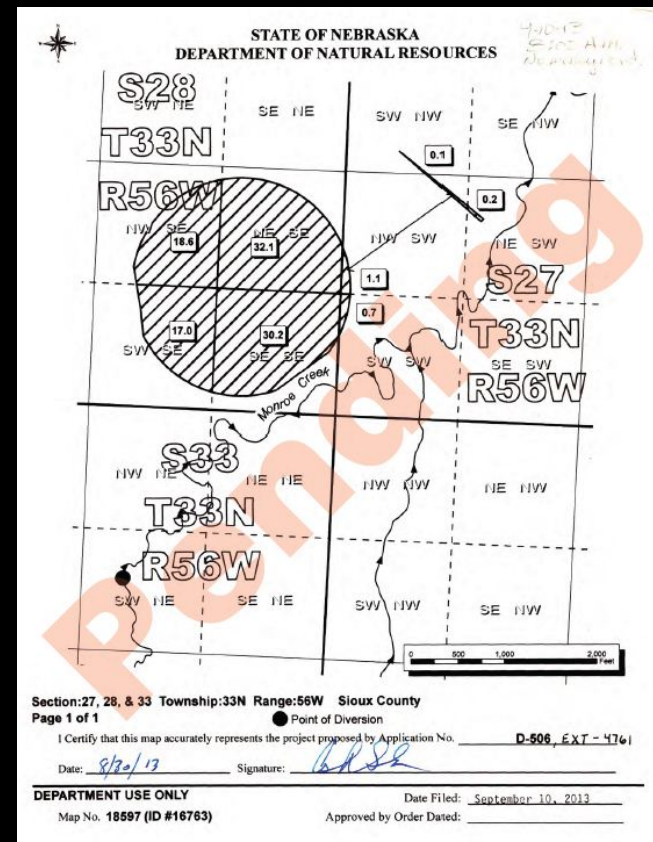
Only the land shown on map number 17750 may be irrigated under appropriation A-18676.

The rate that water may be diverted under appropriation A-18676 shall not exceed one cubic foot per second (cfs) for every 70 acres irrigated. Total annual volume of water diverted may not exceed 3 acre-feet per acre irrigated.

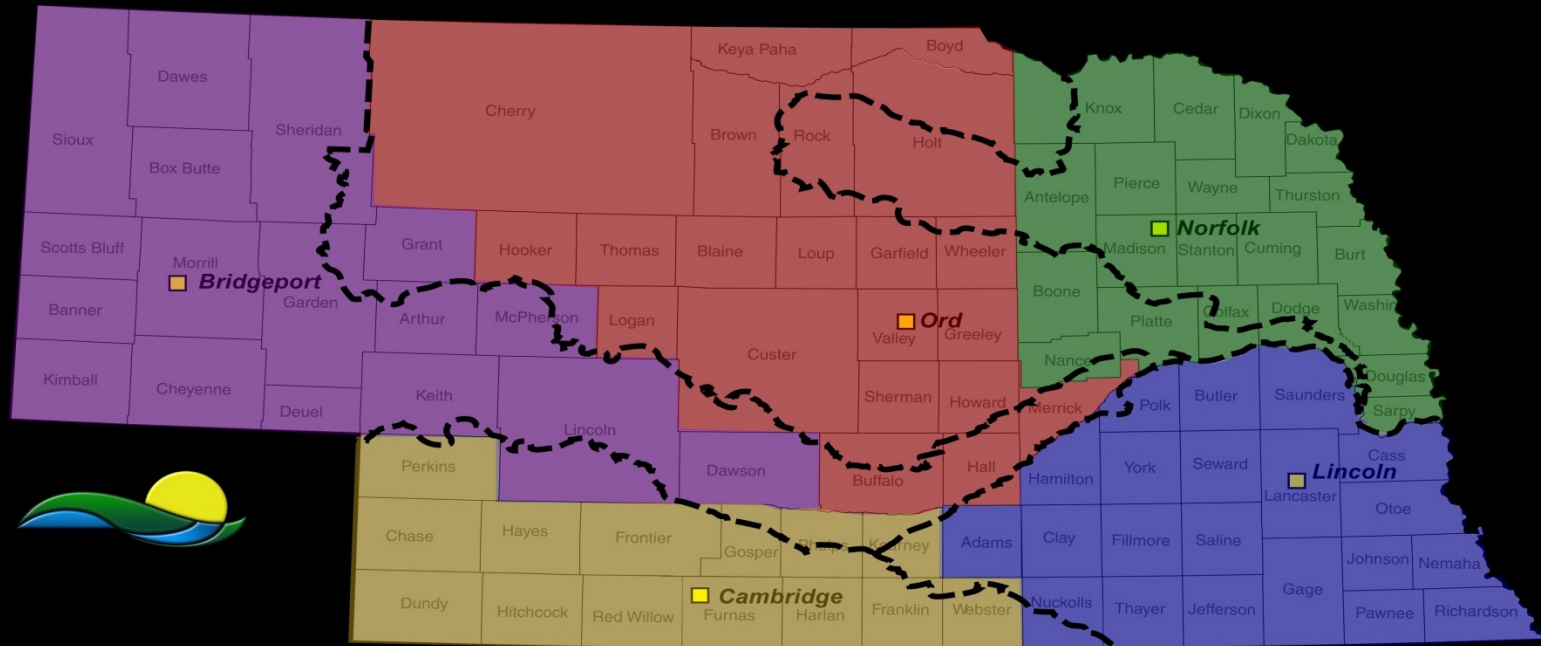
Any diversion or check dam for this appropriation shall not be larger than necessary. The Department or Norfolk field office retains the right to determine if a diversion or check dam is excessive or unlawful.

The appropriator must comply with all relevant statutes. The statutes include, but are not limited to, the following:

Application Approval and a Pending Map



DNR Field Offices



Nebraska Department of Natural Resources Field Office Boundaries Map

Dam Inspection Boundaries

- Ord Field Office
- Bridgeport Field Office
- Norfolk Field Office
- Cambridge Field Office
- Lincoln Field Office
- DNR Field Office Location

Surface Water Administration Boundaries



Bridgeport Field Office
 729 Main Street
 P.O. Box 787
 Bridgeport, Nebraska 69336-0787
 Phone: 308-262-1930
 Fax: 308-262-1939

Cambridge Field Office
 622 Patterson
 P.O. Box 426
 Cambridge, Nebraska 69022
 Phone: 308-697-3730
 Fax: 308-697-3200

Norfolk Field Office
 601 East Benjamin Ave., Suite 101
 Norfolk, Nebraska 68701
 Phone: 402-370 3377
 Fax: 402-371-0653

Ord Field Office
 North Highway 11
 P.O. Box 251
 Ord, Nebraska 68862
 Phone: 308-728-3325
 Fax: 308-728-9967

Lincoln Field Office
 301 Centennial Mall South
 P.O. Box 94676
 Lincoln, Nebraska 68509-4676
 Phone: 402-471-2363
 Fax: 402-471-2900

MAY BE A SURPRISE TO LEARN ABOUT CURRENT WATER LAW

- Nebraska law does not require any water to remain in a stream or river
- Water for cattle is not protected regarding natural flow diversion permits

Groundwater Permits at DNR

1. Municipal transfer permit – need depends on NRD rules
2. Industrial transfer permit
3. Transfers to adjoining state
4. Permits to violate well spacing

DNR does NO domestic and agricultural transfers – these are handled by the NRD



FLOODPLAIN MAPPING, MITIGATION, AND MANAGEMENT

Andrew Christenson, CFM, Floodplain Engineering Specialist

Photo: Wahoo Flooding 1963

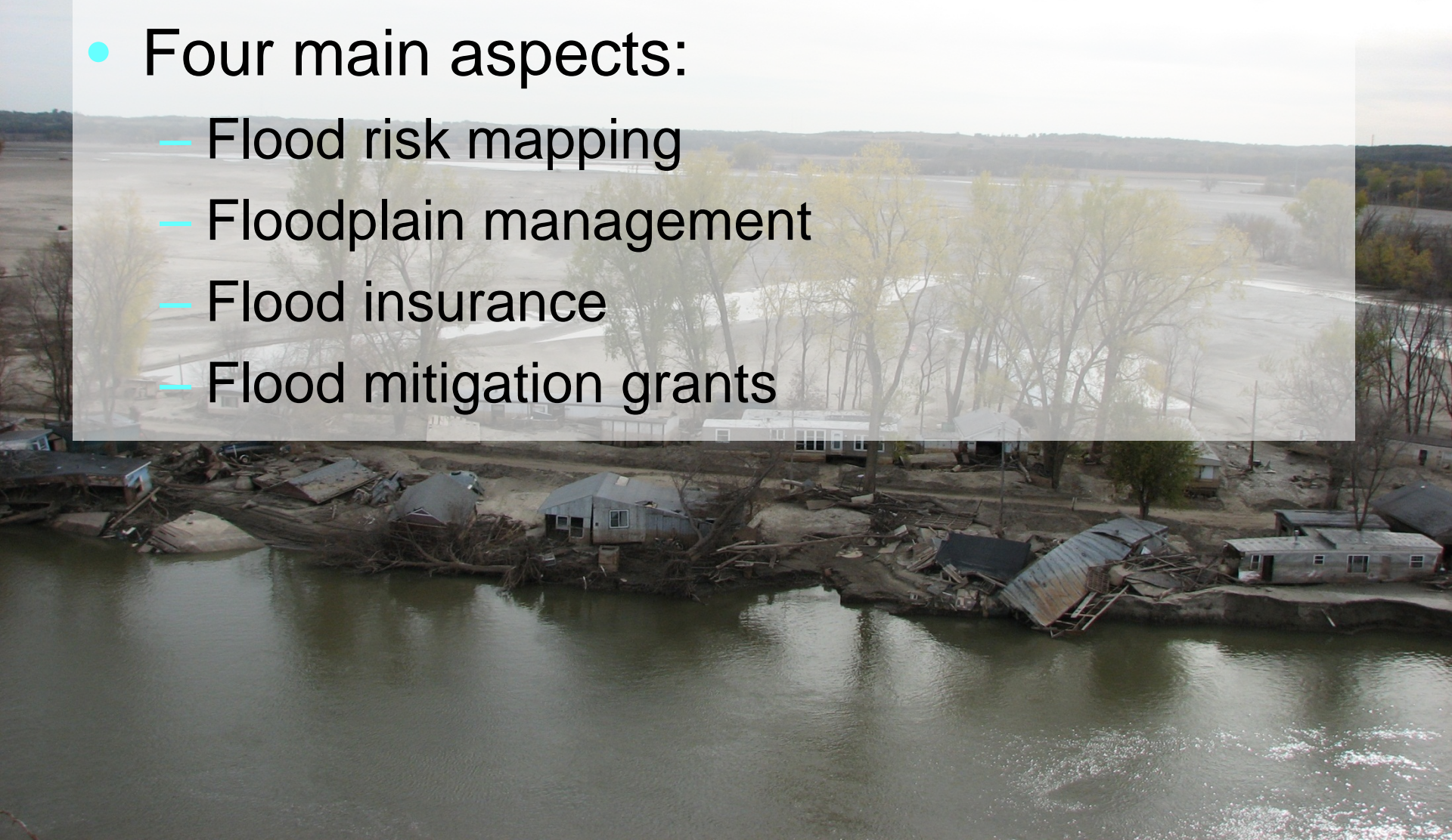


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FOR SALE

National Flood Insurance Program

- Four main aspects:
 - Flood risk mapping
 - Floodplain management
 - Flood insurance
 - Flood mitigation grants



National Flood Insurance Program (NFIP)

The NFIP is a federal program:

- Established with the passage of the National Flood Insurance Act of 1968
- Enables property owners in participating communities to purchase insurance as protection against flood losses
- Participation is voluntary and based on an AGREEMENT between local communities and the Federal Government

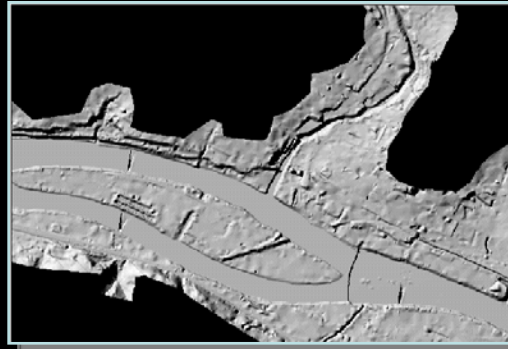
AGREEMENT: The Federal Government makes flood insurance available within communities as a financial protection against flood losses for communities that adopt and enforce a floodplain management regulations to reduce flood risk to new development in floodplains

Floodplain Mapping – How Are Floodplain Maps Created?

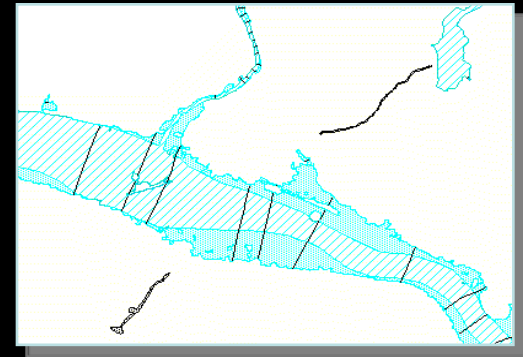
- **Base** + **Topography** + **Flood Data** = **DFIRM**



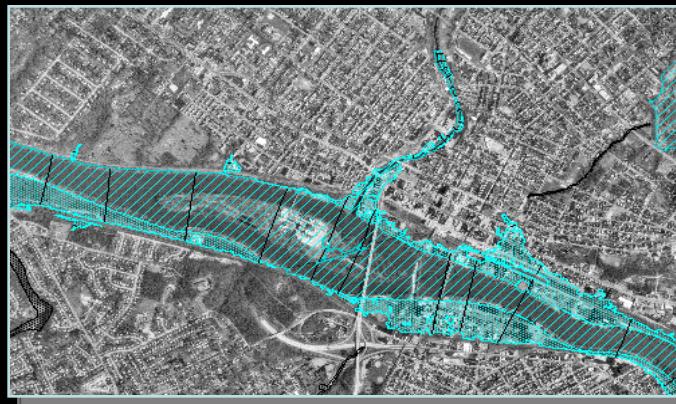
Base



Topography



Flood Data



DFIRM

Floodplain Management

Overall community program of corrective and preventative measures for reducing future flood damage



- Guide future development away from high flood risk areas
- Floodplain Management Regulations
 - Minimum State Standards
 - 44 CFR 60.3
 - Minimum Federal Requirements
 - Local Higher Standards

The Black and White

- If **development** occurs in the floodplain, it requires a **permit**
- Types of **development**:
 - Including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation, or drilling operations or storage of equipment or materials.

Structures

- Definition for floodplain management:
walled and roof buildings
- Definition for flood insurance:
2 rigid walls and a roof
- 2 main types of structures:
 - Residential
 - Nonresidential



Elevation with flow-
through walls
(residential)

Lincoln, NE

Common Risk Mitigation Techniques

- Techniques
 - Elevation
 - Relocation / Buyout / Acquisition (*Floodplain Evacuation*)
 - Localized Berms and Floodwalls
 - Dry Flood Proofing (non-residential only)
 - Wet Flood Proofing
- Grant Funding Sources
 - Flood Mitigation Assistance –NDNR
 - Hazard Mitigation Grant Program – NEMA
 - Pre-Disaster Mitigation - NEMA

Thank You

- Contacts:
 - Andrew Christenson – Presenter
402-471-1223 andrew.christenson@nebraska.gov
 - John Callen – NFIP Coordinator
402-471-3957 john.callen@nebraska.gov
 - Mitch Paine – Mitigation Specialist
402-471-9252 mitch.paine@nebraska.gov

INTEGRATED WATER MANAGEMENT

Carol Myers Flaute, Integrated Water Management Analyst

Integrated Water Management

IMPLEMENTATION

Water Management
Projects

Strategic Planning Actions

PLANNING
AND PUBLIC
PARTICIPATION

Goals and Objectives
for Water Planning

Stakeholder Involvement

Water Availability and Water
Shortages

Water Supplies and Water Uses

SCIENCE

Hydrologic Models, Data, and Analyses

Integrated Water Management



Planning and Public Participation: Integrated Management Plans and Basin-Wide Plans

IMPLEMENTATION

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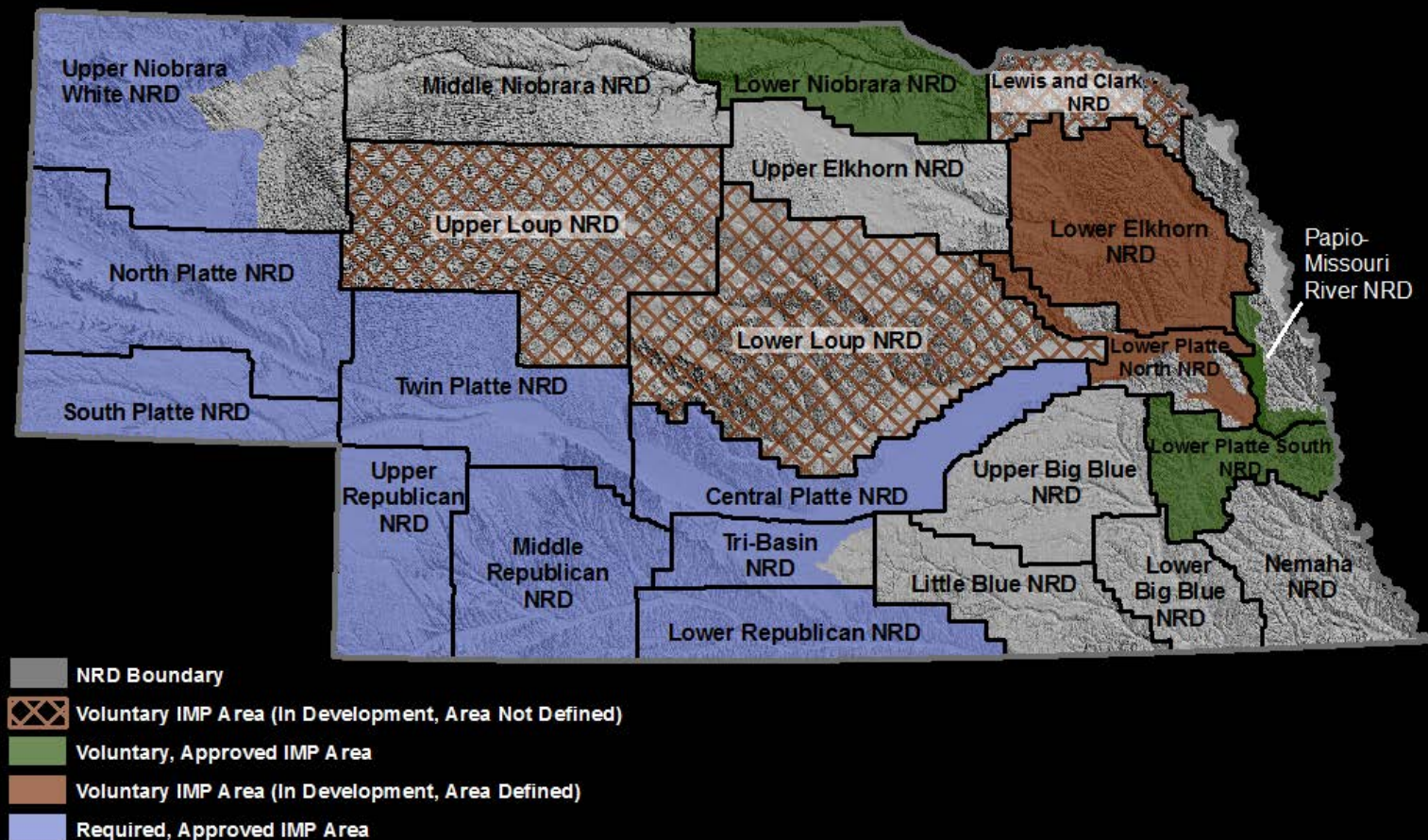
Integrated Management Planning: What Is It?

- A pro-active approach to address water supply opportunities & issues
- Combines surface water and groundwater management
- Jointly developed with a local NRD
- Flexible—Adaptive Management



Integrated Management Planning in Nebraska

(As of November 2014)



Integrated Management Planning: Stakeholder Involvement

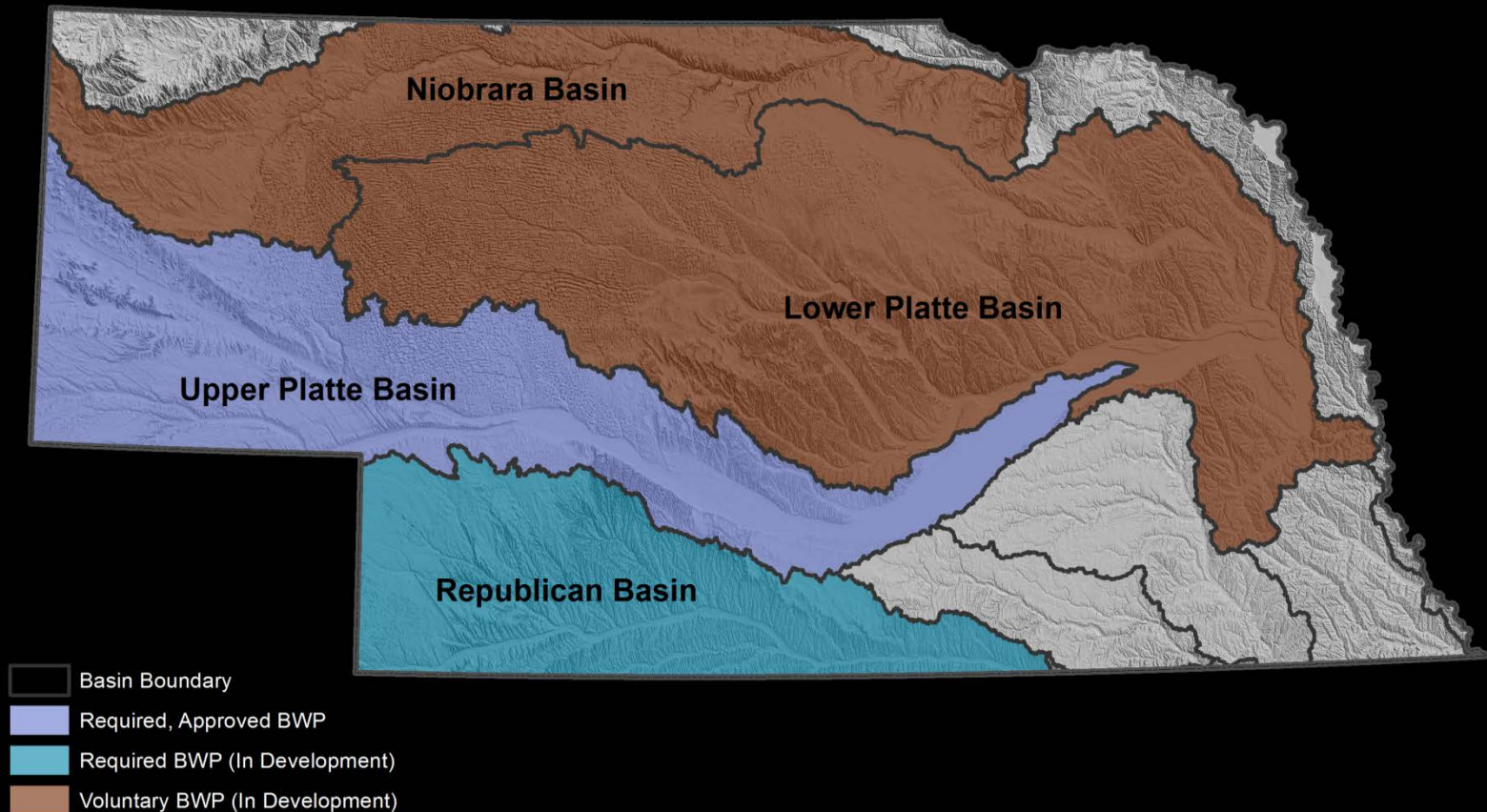
- Each IMP development process includes a stakeholder advisory committee
- DNR and the NRD consult with the stakeholder committee to:
 - Identify local issues and priorities
 - Determine planning goals and objectives
- Each plan's action items and controls are based on these goals and objectives

Basin-Wide Planning

- Involves DNR and all NRDs in a basin
- A framework for consistent basin-wide goals & objectives
- Addresses connectivity between NRDs
 - Facilitates water management projects that cross NRD boundaries
 - Can help establish consistent, agreed-upon basin-wide guidelines for monitoring and distribution of data

Basin-Wide Planning in Nebraska

(As of November 2014)



To Learn More about Basin-Wide Planning

- Lower Platte:
<http://dnr.nebraska.gov/LPRBC>
- Upper Platte:
<http://dnr.nebraska.gov/iwm/upper-platte#BasinWide>
- Niobrara:
<http://dnr.nebraska.gov/iwm/niobrara#BasinWide>
- Republican:
Page Coming Soon!

Niobrara Basin-Wide Plan Public Input Survey

- <http://go.unl.edu/39wo>
- Deadline March 11, 2015

Science: Fully Appropriated Basin Analysis and INSIGHT

IMPLEMENTATION

Water Management Projects

Strategic Planning Actions

PLANNING
AND PUBLIC
PARTICIPATION

Goals and Objectives
for Water Planning

Stakeholder Involvement

Water Availability and Water Shortages

Water Supplies and Water Uses

SCIENCE

Hydrologic Models, Data, and Analyses

Annual Fully Appropriated Basin Analysis: New Rules/Methodology

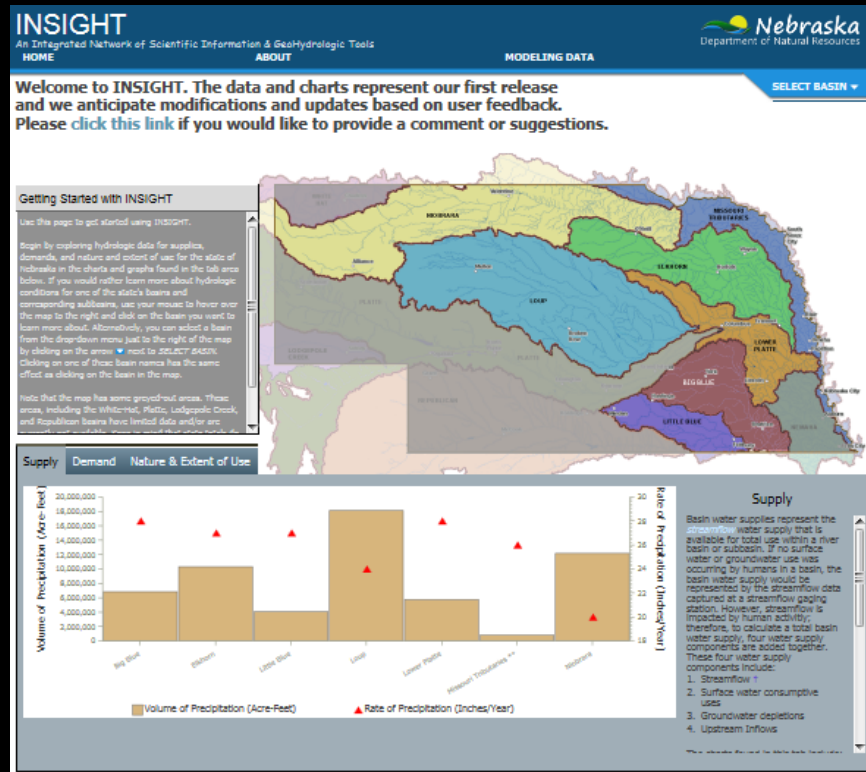
- Current method:
 - Based on the amount of water that the most junior irrigation right in a basin has been able to divert, relative to the amount of water a corn crop needs (“65/85 Rule”)
- Proposed method:
 - Based on a water balance concept – is the water supply in a basin sufficient to meet short and long-term demands?

Annual Fully Appropriated Basin Analysis: New Rules/Methodology

- Current status:
 - Public meetings and public input deadline occurred in December 2014
 - Expect public hearing soon
- For more information:
 - <http://dnr.nebraska.gov/iwm/state-laws-and-rules#newFABrules>

INSIGHT: An Integrated Network of Scientific Information and GeoHydrologic Tools

<http://dnr.nebraska.gov/insight/>



INSIGHT Example: Loup Basin, Basin Overview

INSIGHT

An Integrated Network of Scientific Information & GeoHydrologic Tools

HOME ABOUT MODELING DATA

Nebraska
Department of Natural Resources

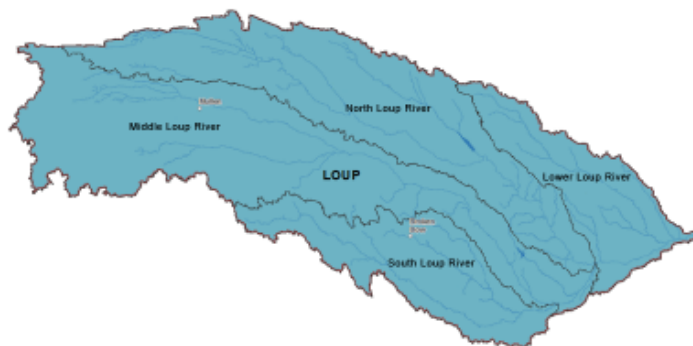
Welcome to INSIGHT. The data and charts represent our first release and we anticipate modifications and updates based on user feedback. Please [click this link](#) if you would like to provide a comment or suggestions.

SELECT BASIN ▾

Explore the Loup Basin

Use this page to explore hydrologic data for the Loup Basin in the tab area below. If you'd rather learn more about one of the Loup's subbasins, use your mouse to hover over the map to the right and click on the subbasin you want to learn more about. Hydrologic data at the basin and subbasin levels are presented below in each tab by big picture, supplies, demands, nature and extent of use, and balance.

Navigate to another basin by selecting one from the drop-down list or use the back button in your browser to reach the statewide map to click on another basin in the map.



Basin Overview Big Picture Supply Demand Nature & Extent of Use Balance

At a Glance

Basin:	Loup
Approximate Area:	14,200 square miles
Basin Water Supply:	2,097,424 acre-feet/year
Near Term Water Demand:	2,208,510 acre-feet/year
Long Term Water Demand:	2,515,742 acre-feet/year
Projected Water Demand:	2,641,925 acre-feet/year
Number of Irrigated Acres:	890,960 acres *

Average Consumption by Sector (Acre-Feet)

	Surface Water		Groundwater	
Irrigation	144,832	100%	419,054	99%
Municipal	0	0%	3,002	1%
Industry	0	0%	1,059	0%

* Fields suffixed with a * display the most recent year's total. All other data displayed above is computed as an average of available years of record.

The Loup Basin is located in central Nebraska, and is entirely contained within the state. The Loup Basin has an area of approximately 14,200 square miles.

At its farthest western extent, the Loup Basin boundary is about halfway between Alliance, Nebraska, and Hyannis, Nebraska, in Sheridan and Garden Counties. The Loup River headwaters are about seven miles northwest of Hyannis, Nebraska. The basin is defined as draining to the confluence of the Loup River and Beaver Creek, about 25 miles upstream from Columbus, Nebraska. The Loup River extends beyond the basin boundary to its junction with the Platte River at Columbus, Nebraska.

According to the 2010 U.S. Census, the largest city in the basin is Broken Bow, with a population of about 3,600. In descending order, the next largest cities include St. Paul (2,300), Ord (2,100), Ravenna (1,400), and Fullerton (1,300).

The topography of more than half of the upstream end of the Loup Basin consists of sand hills, which are sand dunes stabilized in place by a grass cover. The downstream portion of the basin consists mostly of dissected plains, with small areas of upland plains. The upland plains are land that is flat to gently rolling and dissected plains are where streams have cut into former plains creating hilly land with steep slopes and sharp ridge crests, along with remnants of the plains on the hilltops. There are several valleys in the Loup Basin, which are the flat-lying areas along the Loup River and its major tributaries.

The primary aquifer in the Loup Basin is the Ogallala Formation, which consists of poorly sorted, generally unconsolidated clay, silt, sand, and gravel. The Ogallala Formation is part of a vast system of related sediments that make up the High Plains Aquifer. The eastern margin of the basin is uncertain

Niobrara Basin, Precipitation Distribution

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An Integrated Network of Scientific Information & GeoHydrologic Tools
HOME
ABOUT
MODELING DATA

Nebbraska
Department of Natural Resources

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Explore the Niobrara Basin

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Basin Overview
Big Picture
Supply
Demand
Nature & Extent of Use
Balance

Chart: Precipitation Distribution

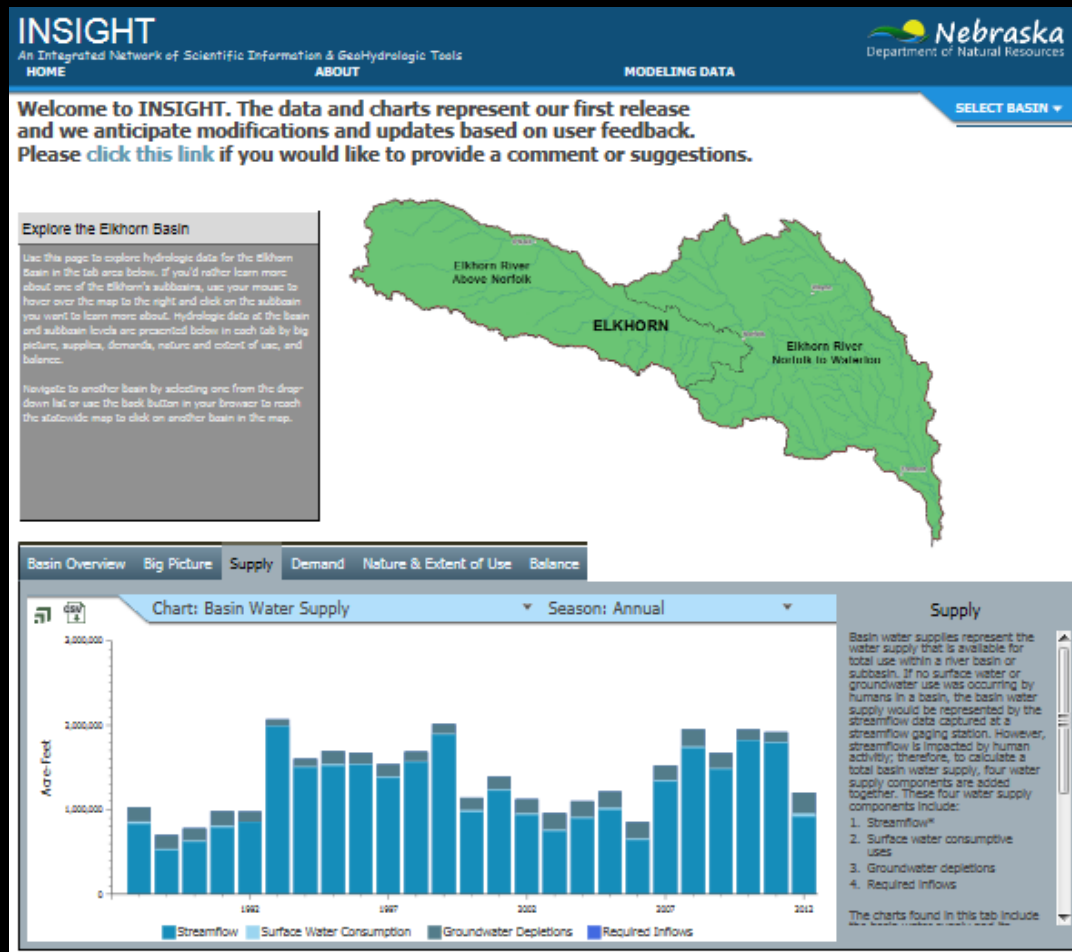
Big Picture

The Big Picture tab is intended to provide a general overview of the water supplies and uses. This overview allows one to view how much precipitation falls in an area, how much of that precipitation makes its way to a stream via runoff or recharge and how much of that water is consumed on the landscape through evapotranspiration not only cropped lands but all land uses. This tab provides the user with insight into the variability that exists within a given basin for water supply and how that variability translates to more or less water in streams or more or less evapotranspiration on the land.

The charts found in this tab include:

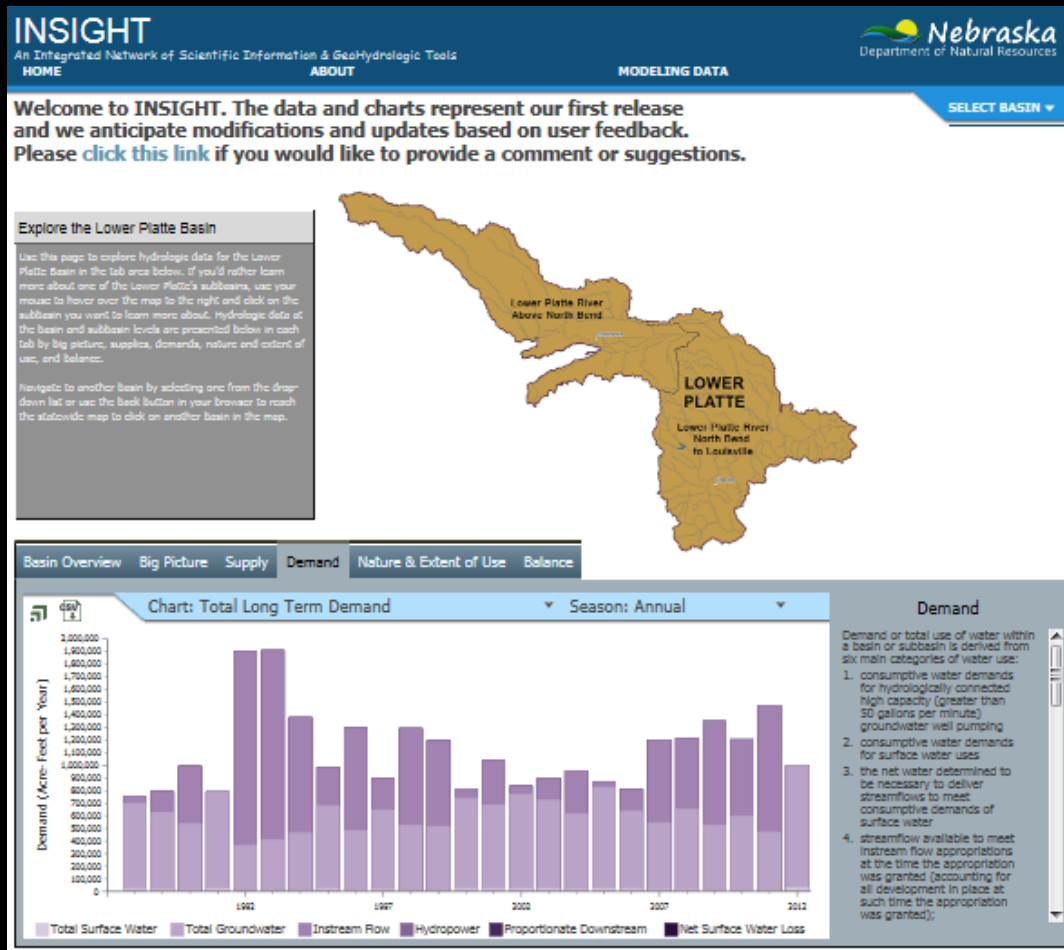
- precipitation rates and volume for the basin
- annual runoff of

INSIGHT Example: Elkhorn Basin, Basin Water Supply



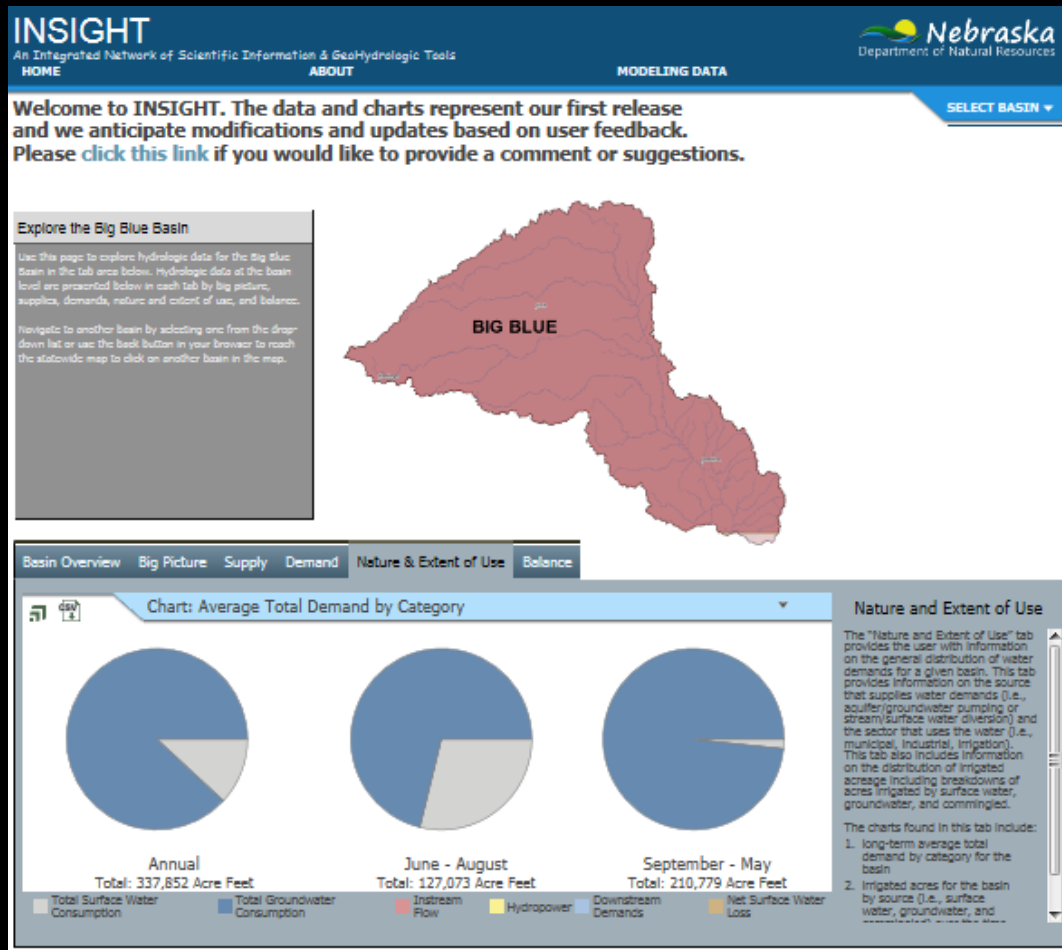
INSIGHT Example:

Lower Platte Basin, Total Long Term Demand



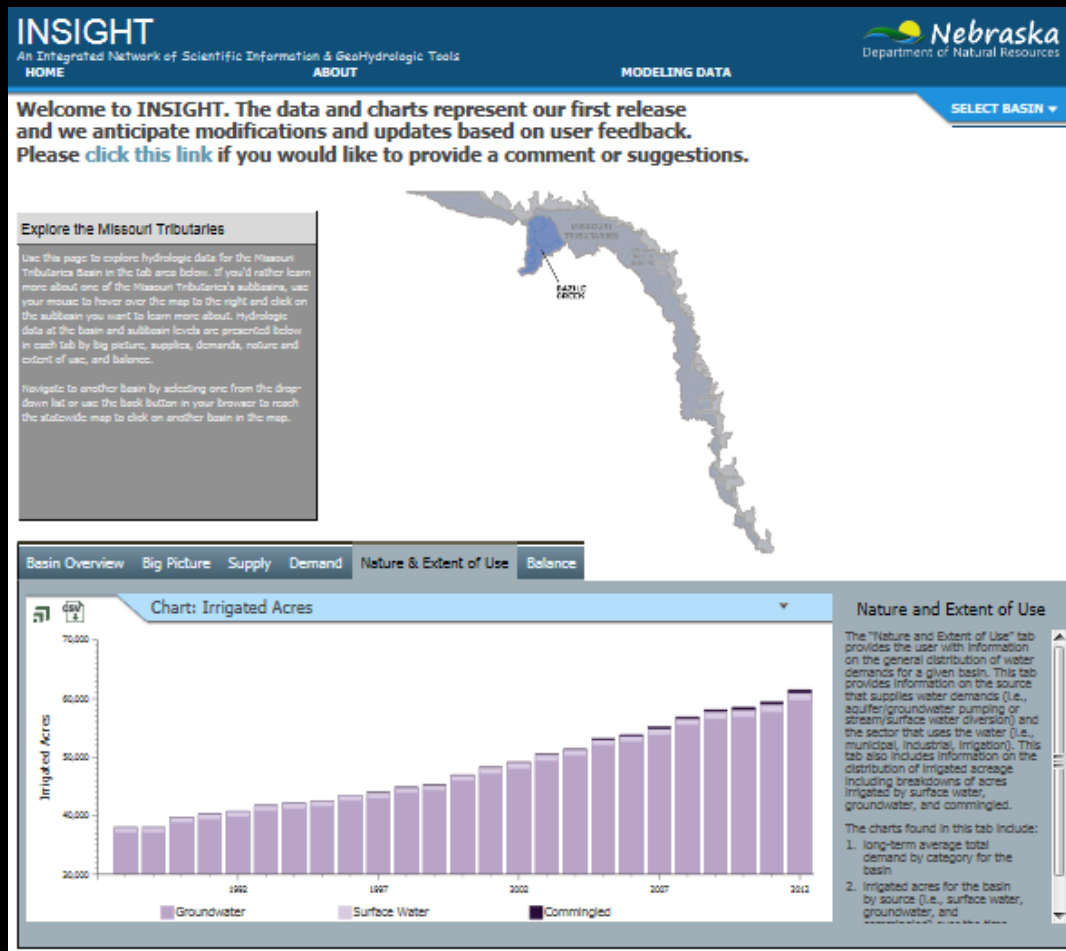
INSIGHT Example:

Big Blue Basin, Average Total Demand

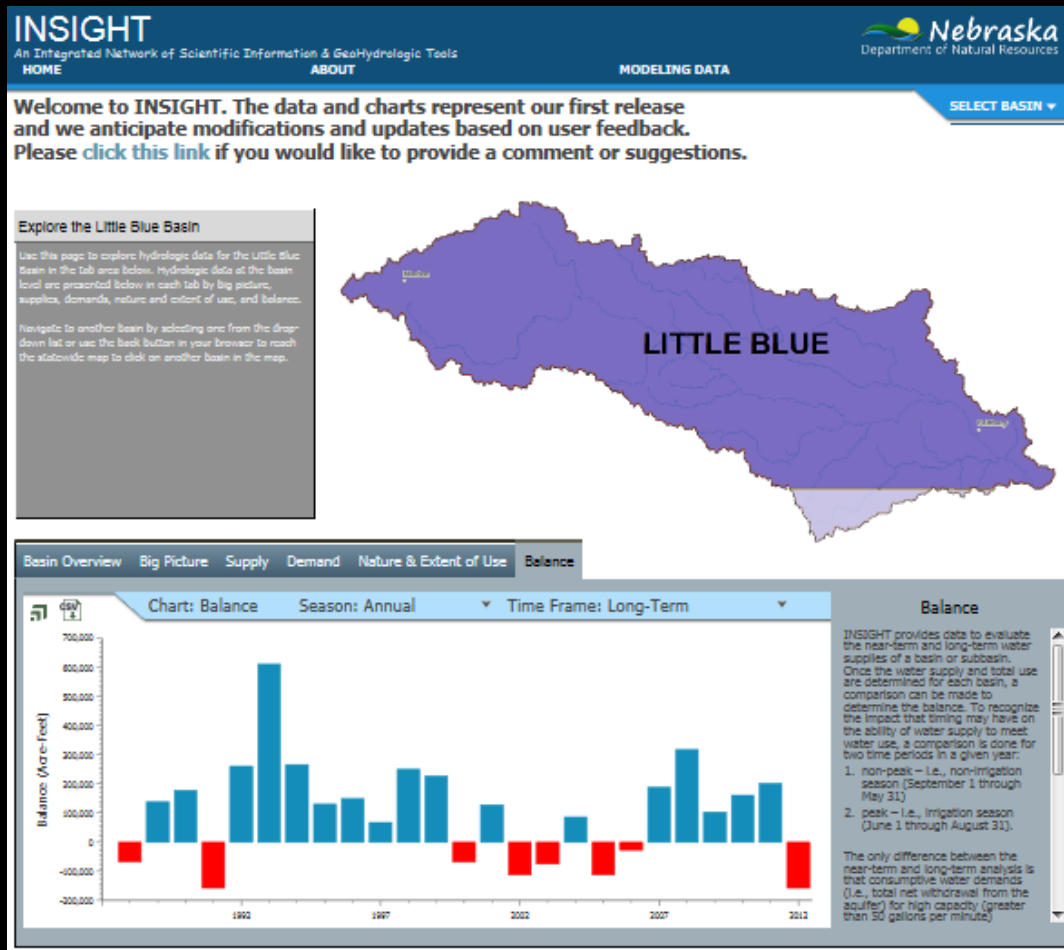


INSIGHT Example:

Missouri Tributaries Basin, Irrigated Acres



INSIGHT Example: Little Blue Basin, Long Term Balance



INSIGHT: Feedback

INSIGHT

An Integrated Network of Scientific Information & GeoHydrologic Tools

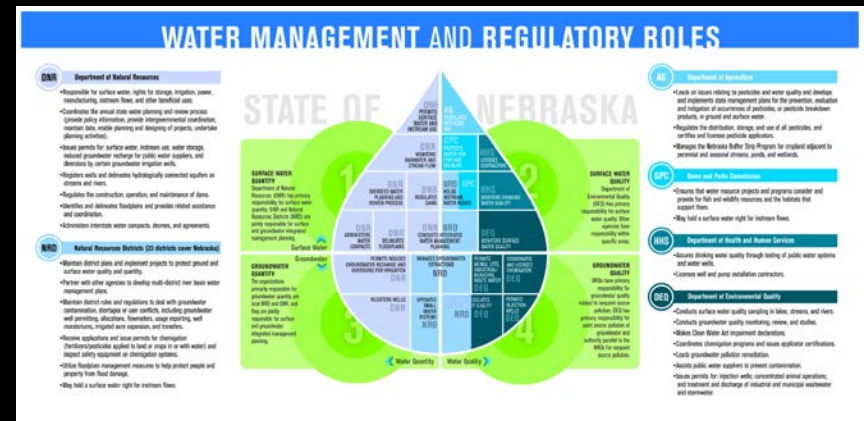
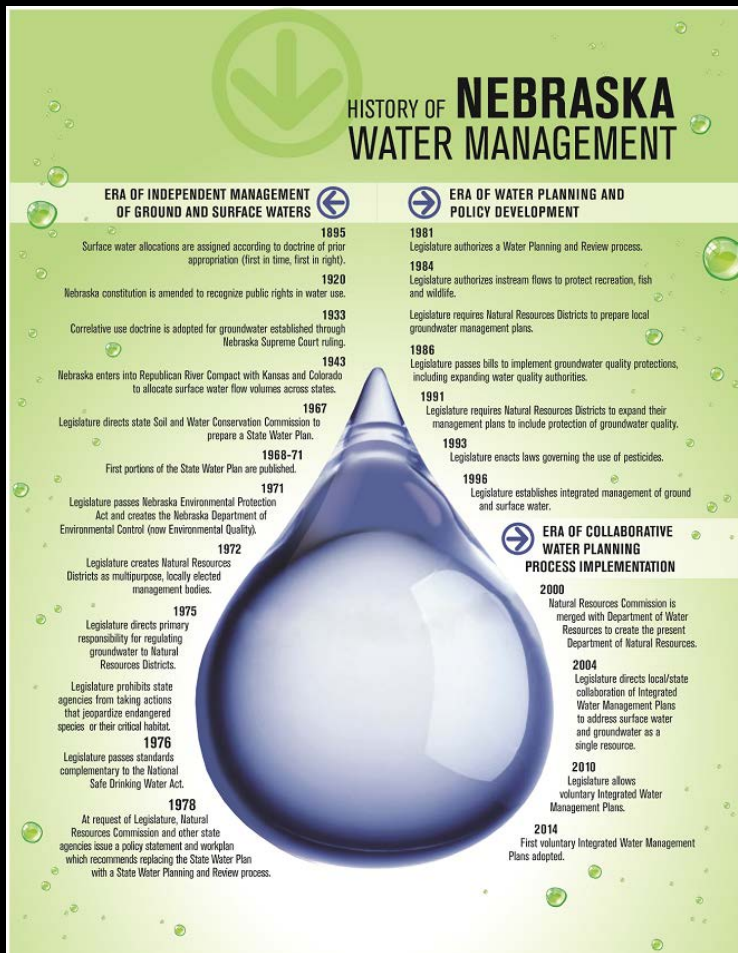
HOME

ABOUT

MODELING DATA

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Water Management in Nebraska





Thank
You