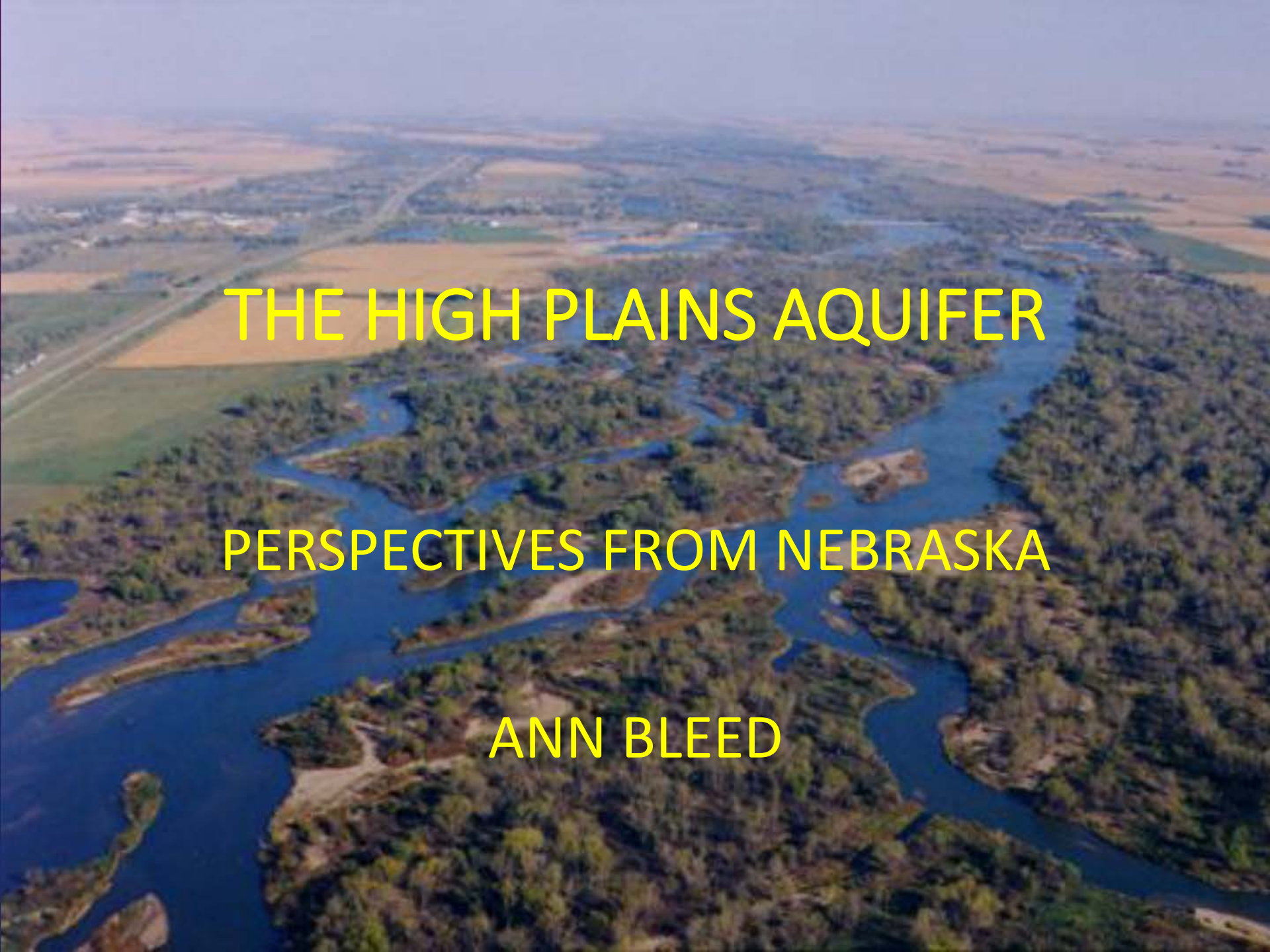
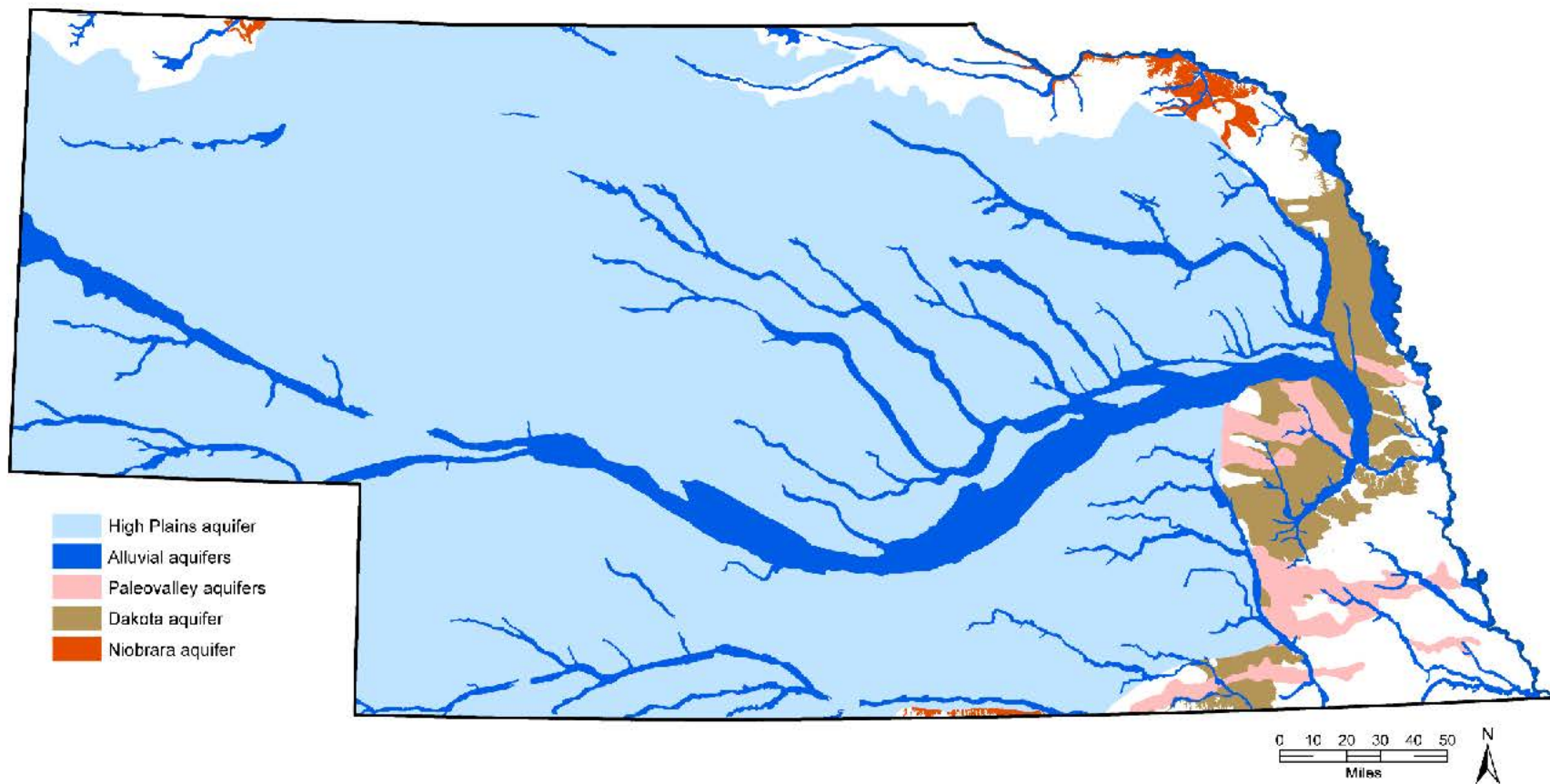


An aerial photograph showing a river meandering through a dense, green forested area. The river is a vibrant blue, contrasting with the surrounding greenery. In the upper left, there are patches of brown and tan agricultural fields, some with small clusters of buildings. The sky is a pale, hazy blue. The text 'THE HIGH PLAINS AQUIFER' is overlaid in large, bold, yellow capital letters across the middle of the image.

# THE HIGH PLAINS AQUIFER

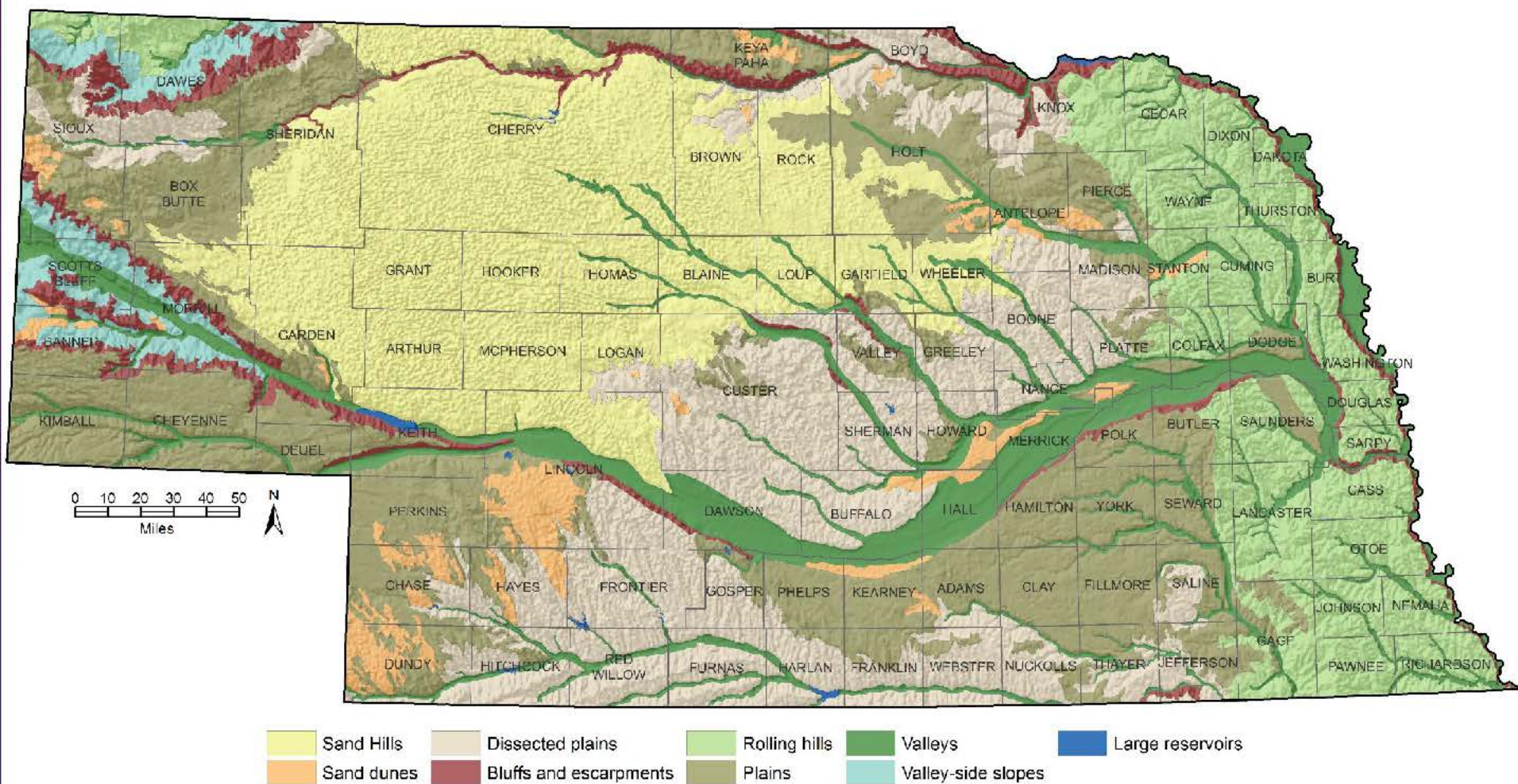
PERSPECTIVES FROM NEBRASKA

ANN BLEED

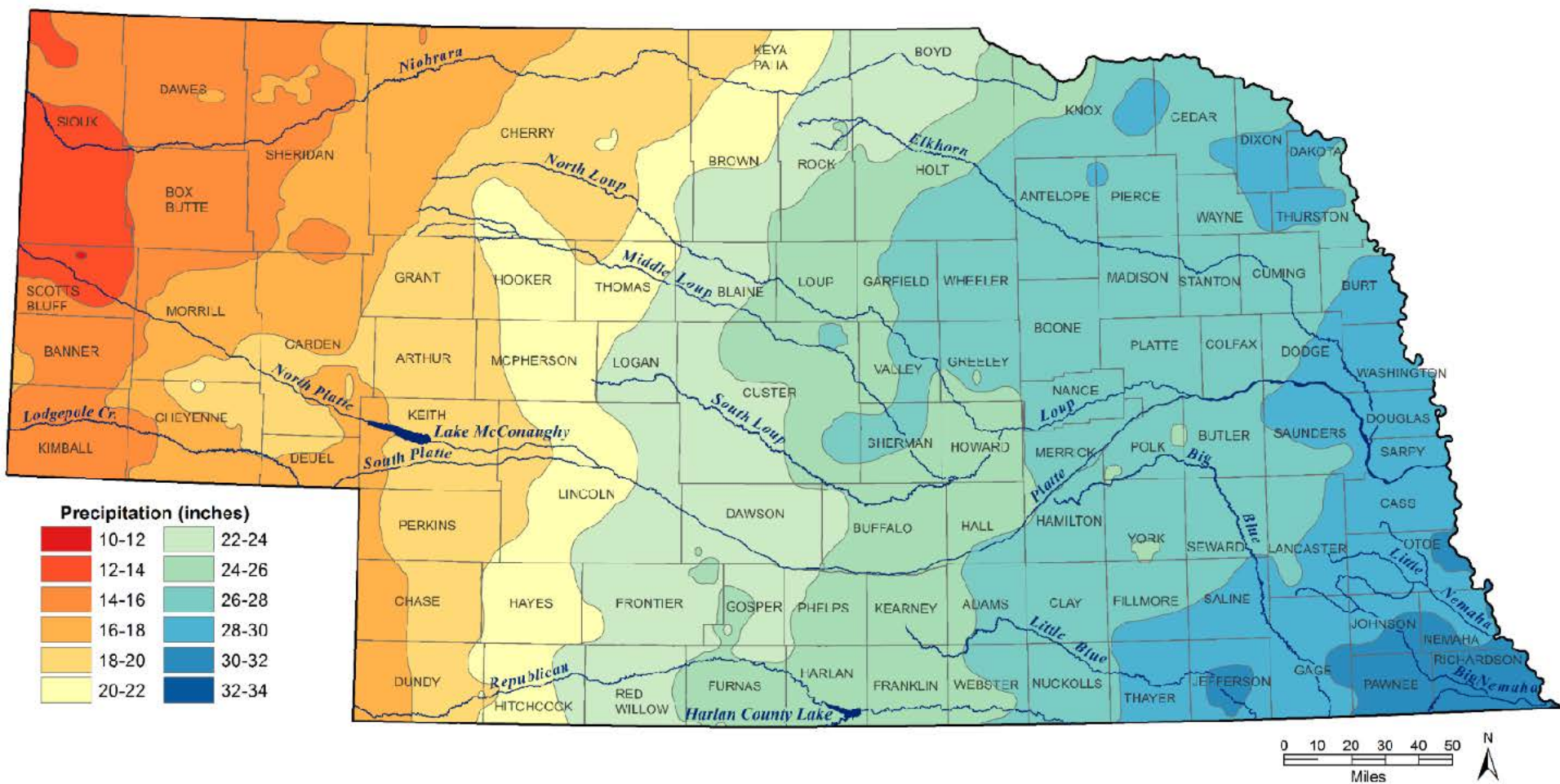


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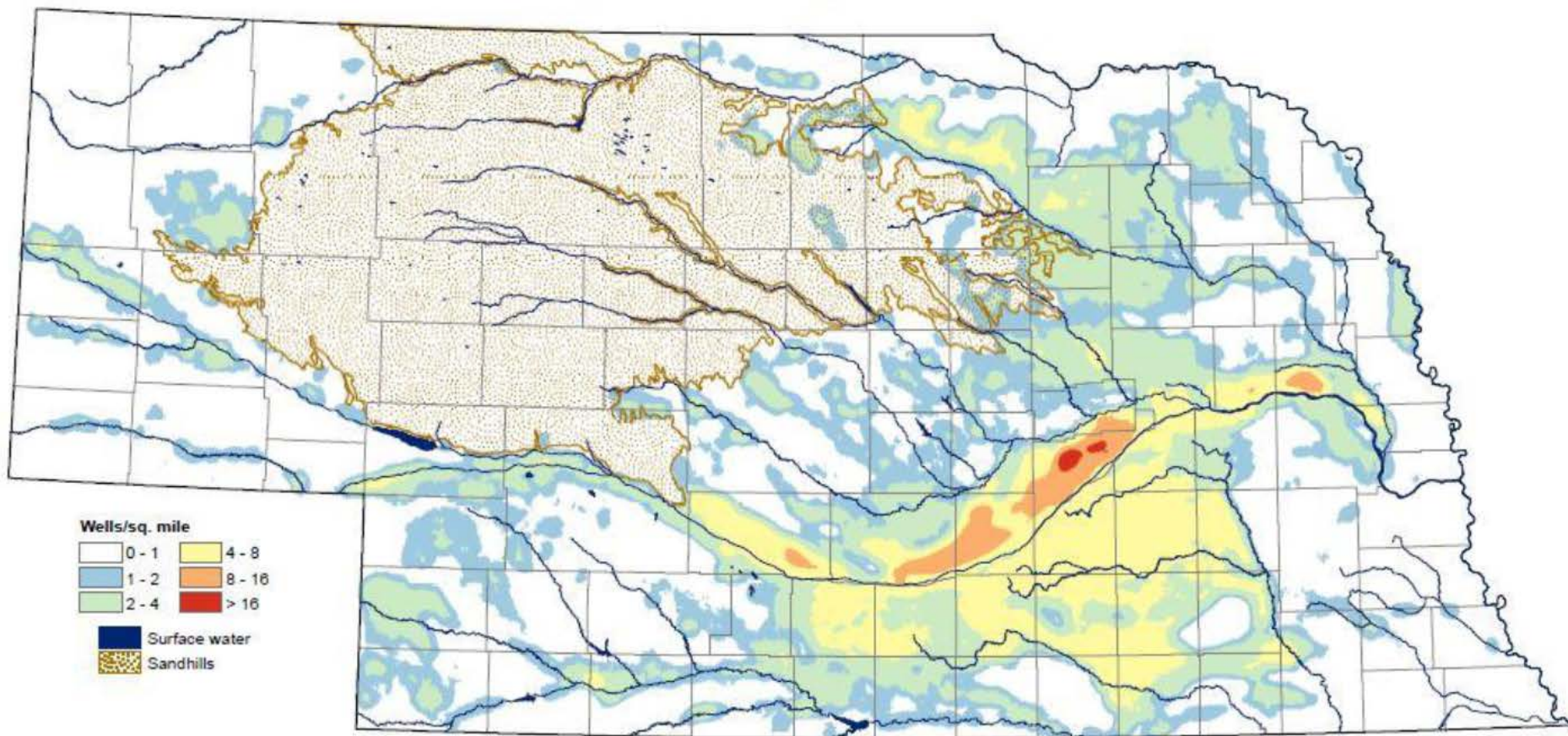








# Density of Active Registered Irrigation Wells - December 2015



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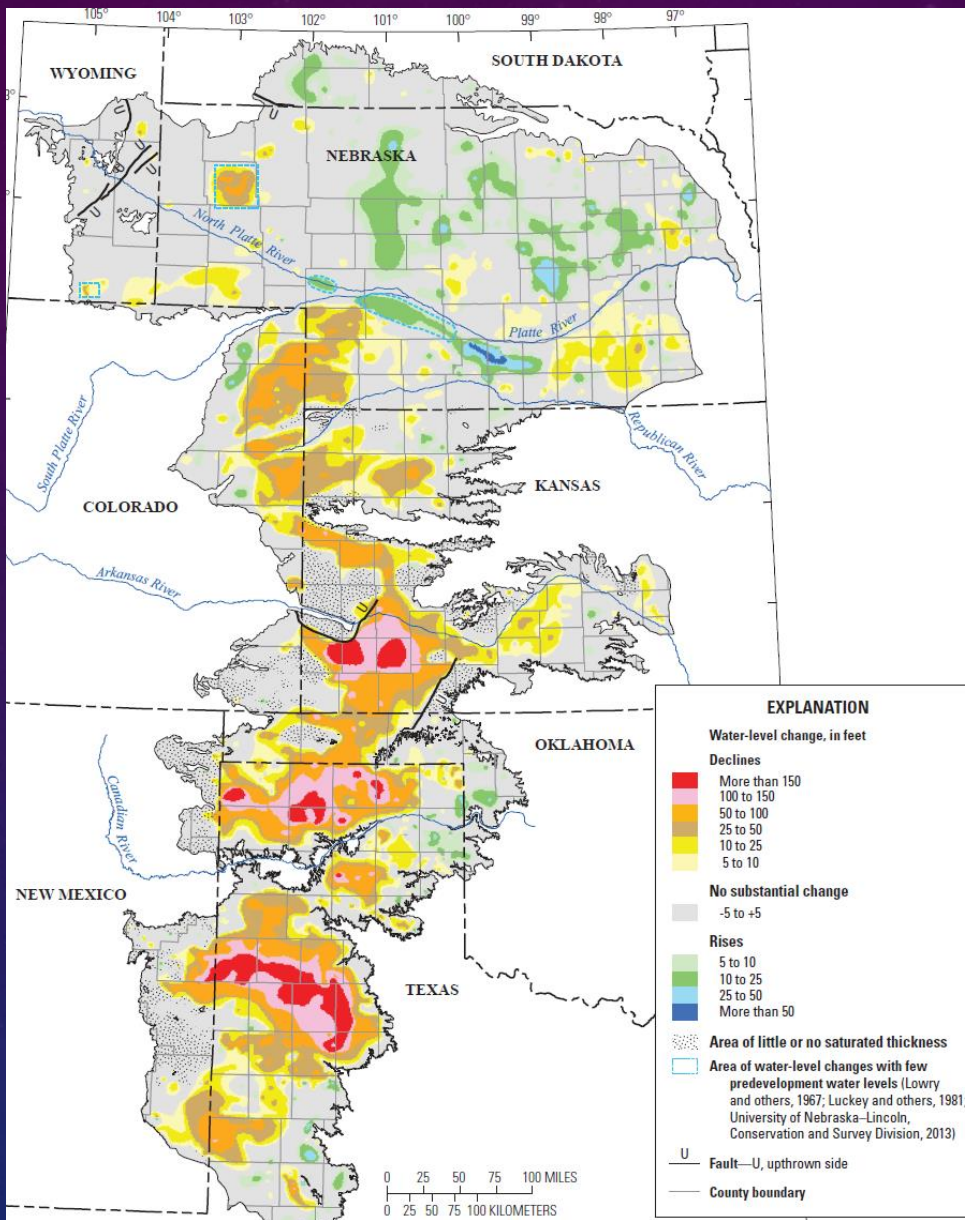
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 School of Natural Resources (<http://snr.unl.edu>)  
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 University of Nebraska-Lincoln

Source:  
 Nebraska Department of Natural Resources

Aaron Young, Survey Geologist, CSD  
 Mark Burbach, Water Levels Program Supervisor, CSD  
 Les Howard, GIS Manager, CSD

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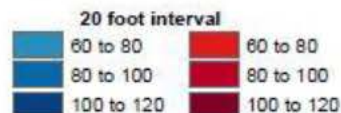
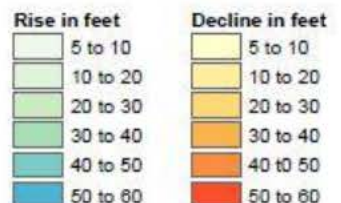
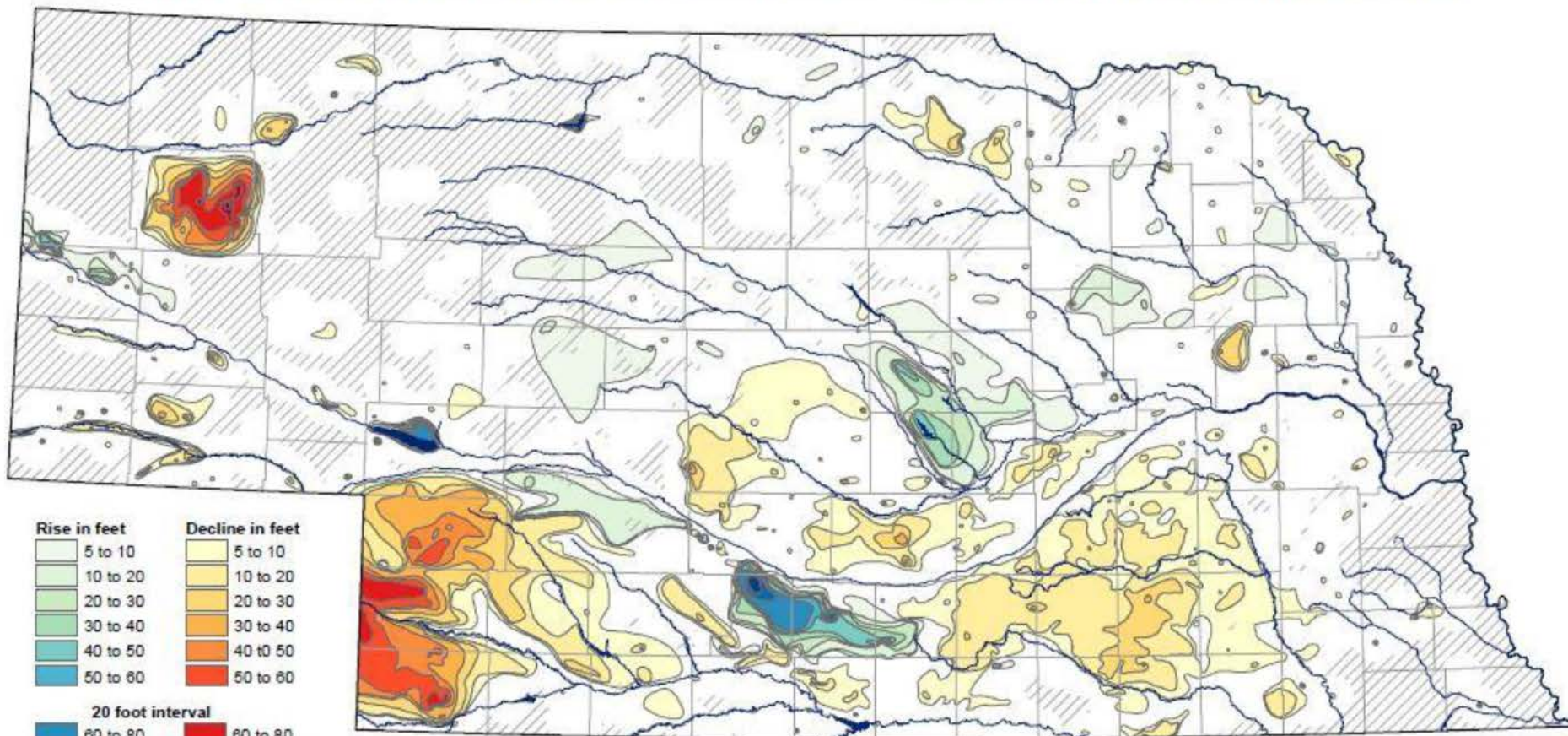


## Area-weighted Average Water Level Change Predevelopment to 2013

|                 |             |
|-----------------|-------------|
| Colorado        | -14.3       |
| Kansas          | -25.5       |
| <b>Nebraska</b> | <b>-0.3</b> |
| New Mexico      | -16.5       |
| Oklahoma        | -12.3       |
| South Dakota    | 1.8         |
| Texas           | -41.2       |
| Wyoming         | -0.8        |
| High Plains     | -15.4       |

WATER LEVEL CHANGES IN THE HIGH PLAINS AQUIFER  
PREDEVELOPMENT TO 2013. MAGUIRE USGS

# Groundwater-Level Changes in Nebraska - Predevelopment to Spring 2015



□ < +/- 5 feet

▨ Sparse data

■ Surface water

(1 foot = .3048 meters)

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 Nebraska Water Science Center

U.S. Bureau of Reclamation  
 Kansas-Nebraska Area Office

Nebraska Natural Resources Districts

Central Nebraska Public Power and Irrigation District

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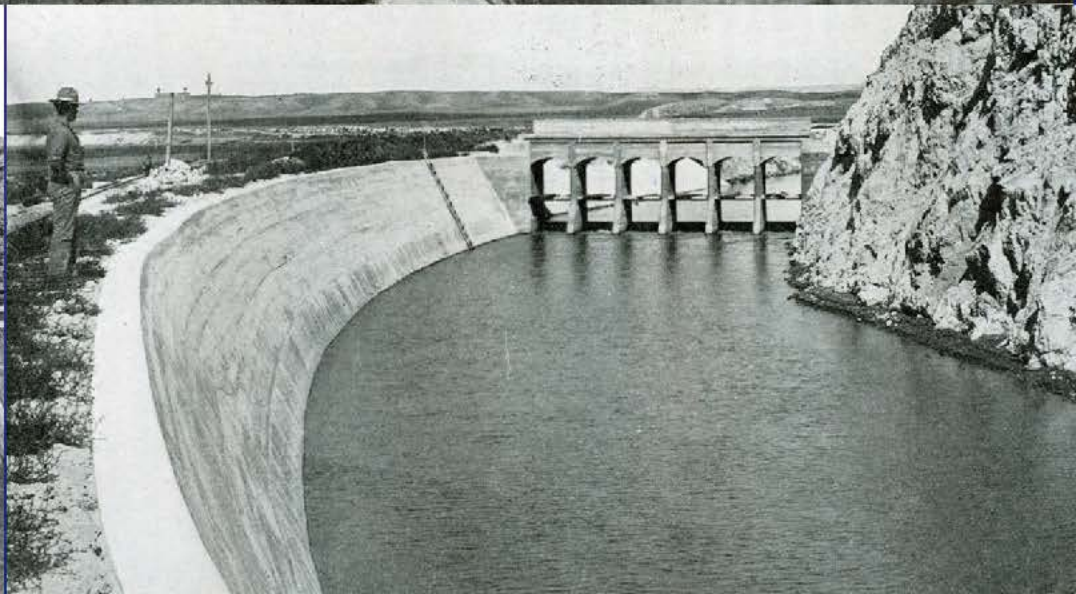
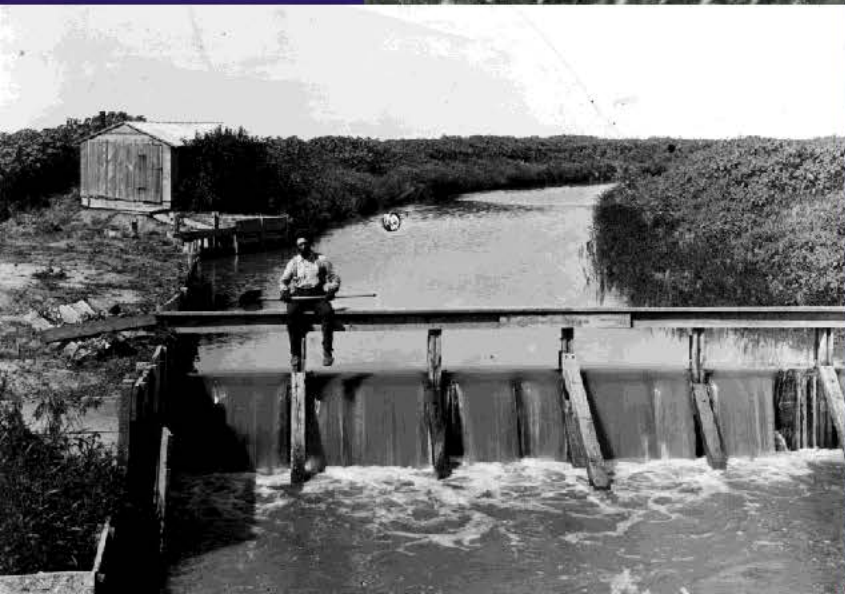
December 2015



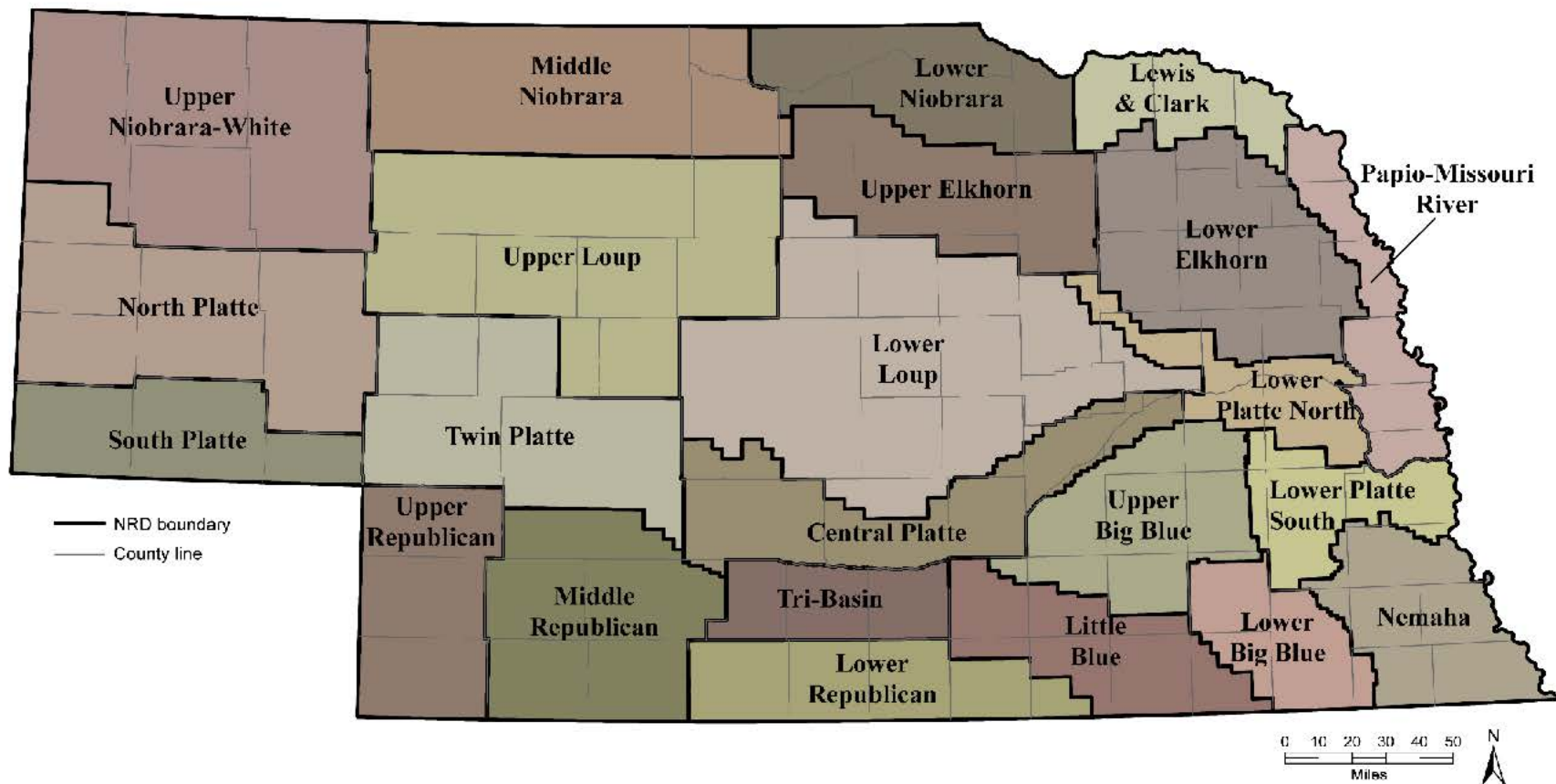
Surface Water

Prior Appropriation

1895







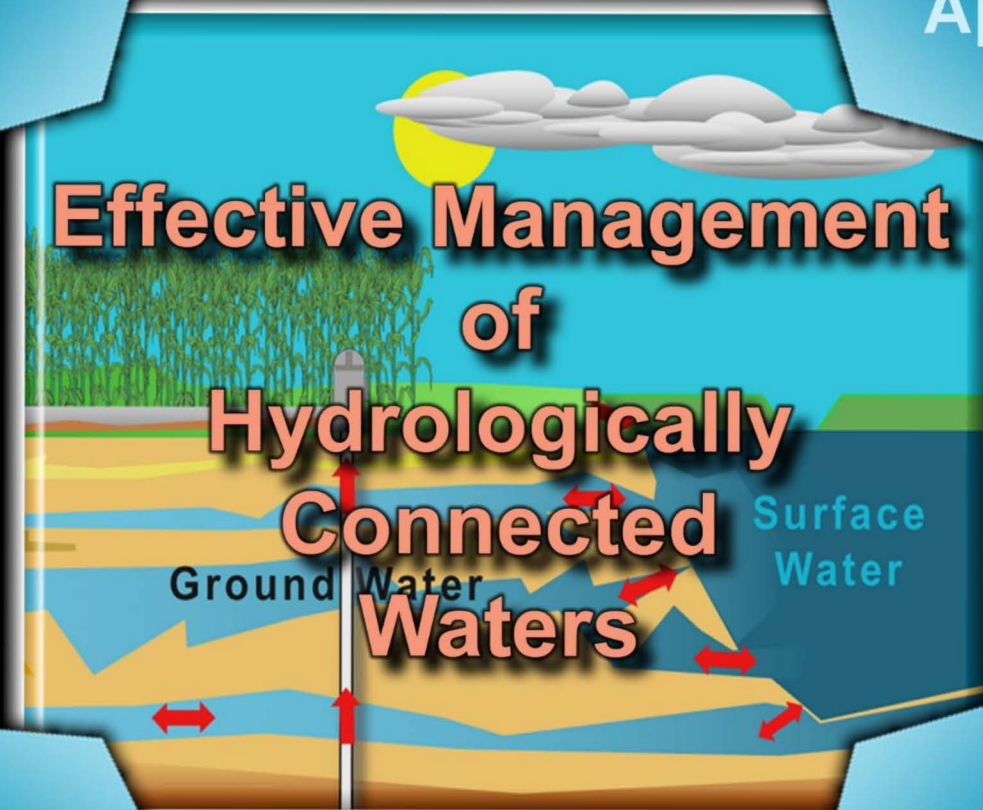
**Groundwater  
Correlative  
Rights**

**Surface Water  
Prior  
Appropriations**

**Effective Management  
of  
Hydrologically  
Connected  
Waters**

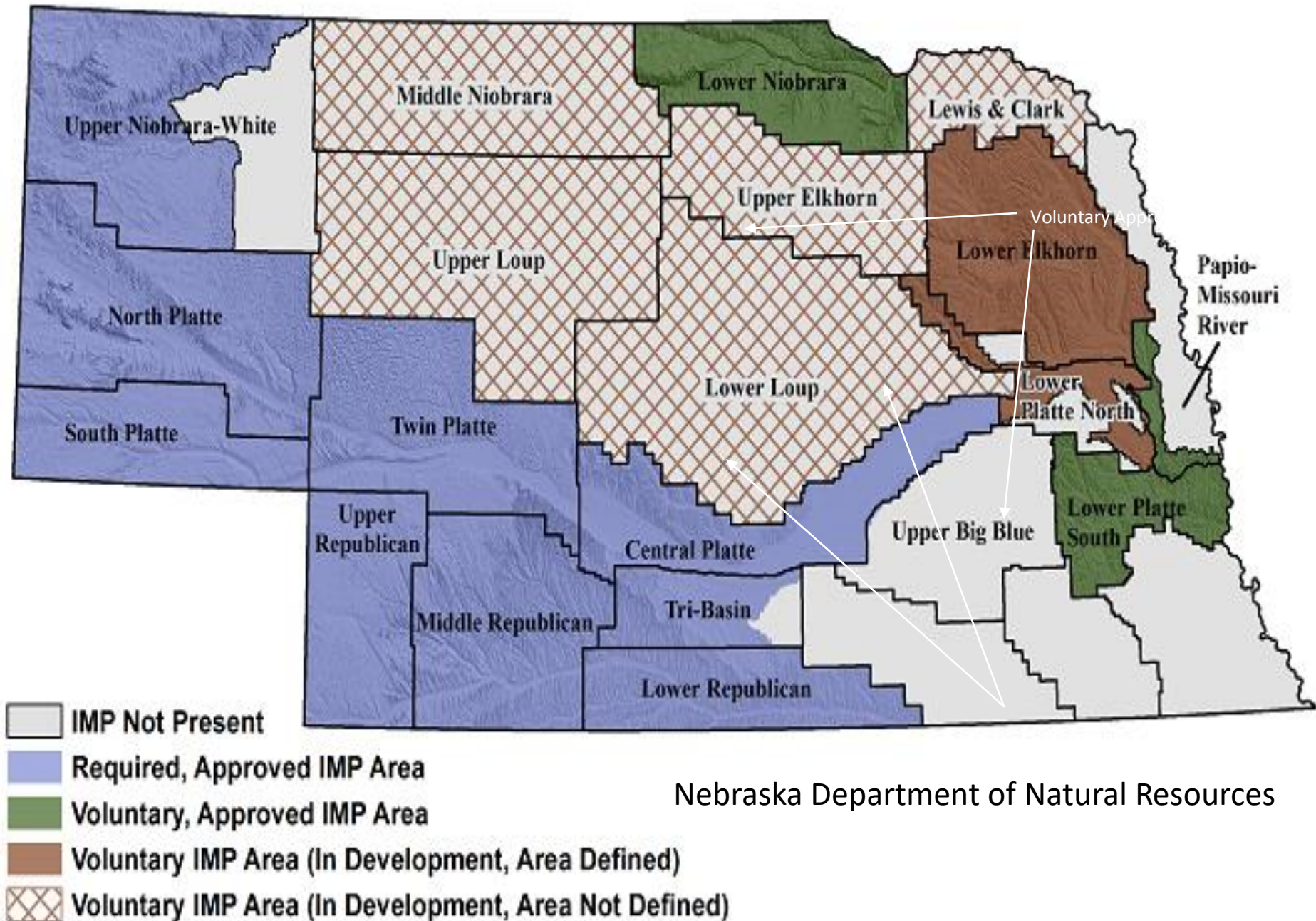
**Groundwater  
Regulated by  
NRDs**

**Surface Water  
Regulated by  
DNR**

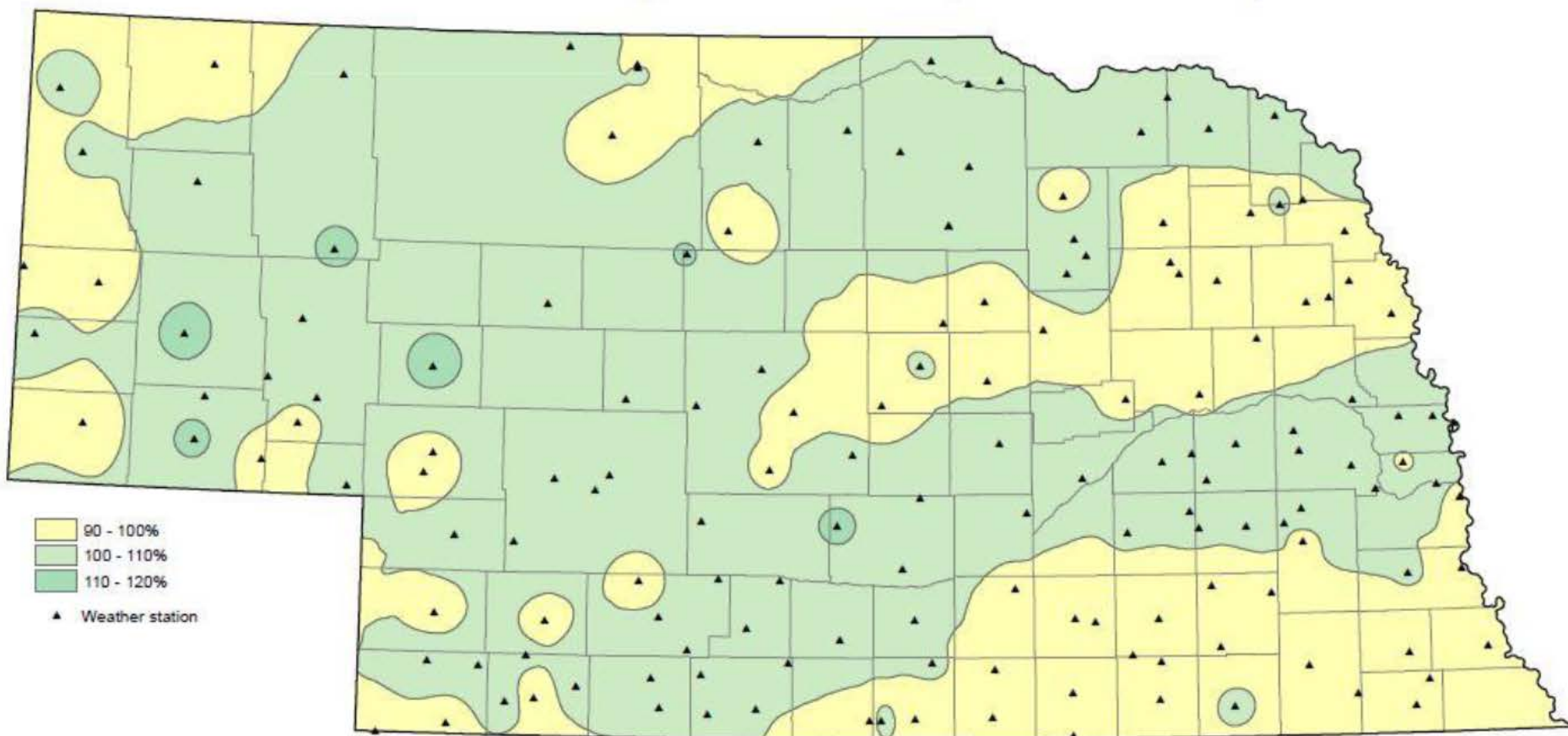




# Areas Involved in Integrated Water Management Planning as of June 2015



## Percent of Normal Precipitation - January 2005 to January 2015



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National Climate Data Center  
Asheville, North Carolina

High Plains Regional Climate Center  
University of Nebraska - Lincoln

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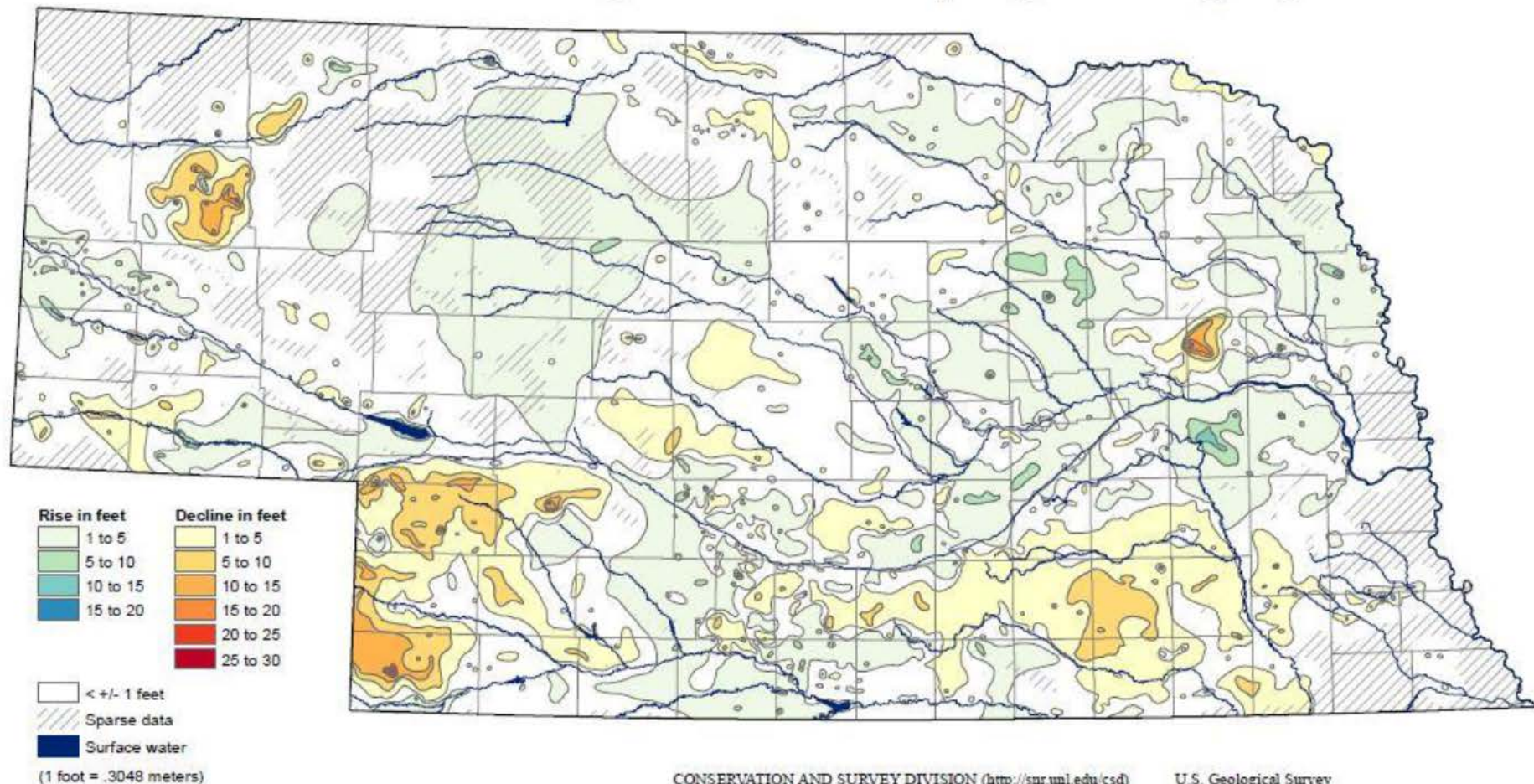
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# Groundwater-Level Changes in Nebraska - Spring 2005 to Spring 2015



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# Nebraska's Natural Resources Districts

## An Assessment of a Large-Scale Locally Controlled Water Governance Framework By Ann Bleed and Christina Hoffman Babbitt



<http://waterforfood.nebraska.edu/wp-content/uploads/2015/04/layout07b-web.pdf>





**ELINOR OSTROM**

2009 Nobel Laureate  
in Economic Sciences

Nobel medal © 2010 The Nobel Foundation



**Governing the Commons 1990**

✓ **Determined by  
State Law**

- ✓ Recognition of Right to Organize Locally
- ✓ River Basin Approach
- ✓ Clearly Defined Boundaries
- Nested Enterprise

**Partially Determined by State Law  
Implemented by DNR and NRDs**

- ✓ Rules to Prevent Overharvesting
- ✓ Congruence Between Rules and Local Conditions (NRDs)
- ✓ Graduated Sanctions
- ✓ Monitoring
  - Adequate Funding
- ✓ Adaptive Management
- ✓ Effective Communication
  - Collective Choice Arrangements/ Collaboration
  - Equity and Procedural Fairness
- Secure Tenure Rights
- Rapid Access to Conflict Resolution Mechanisms

**Encouraged by  
Emphasis on Local  
Control**

- Trust
- Leadership



## TO COPE WITH CLIMATE CHANGE

- ✓ Transcend artificial political boundaries
- ✓ Match governance system to issues and scales appropriate to problem
- ✓ Facilitate multiple actors
- ✓ Provide adequate public participation to add legitimacy, increase understanding, promote trust
- ✓ Adaptive Management
  - Allow for experimentation in a way that diversifies risk
  - Allow flexibility to adapt to changing conditions

# PROBLEM AREAS

Equity

Rapid access to conflict resolution  
processes

Nested enterprise





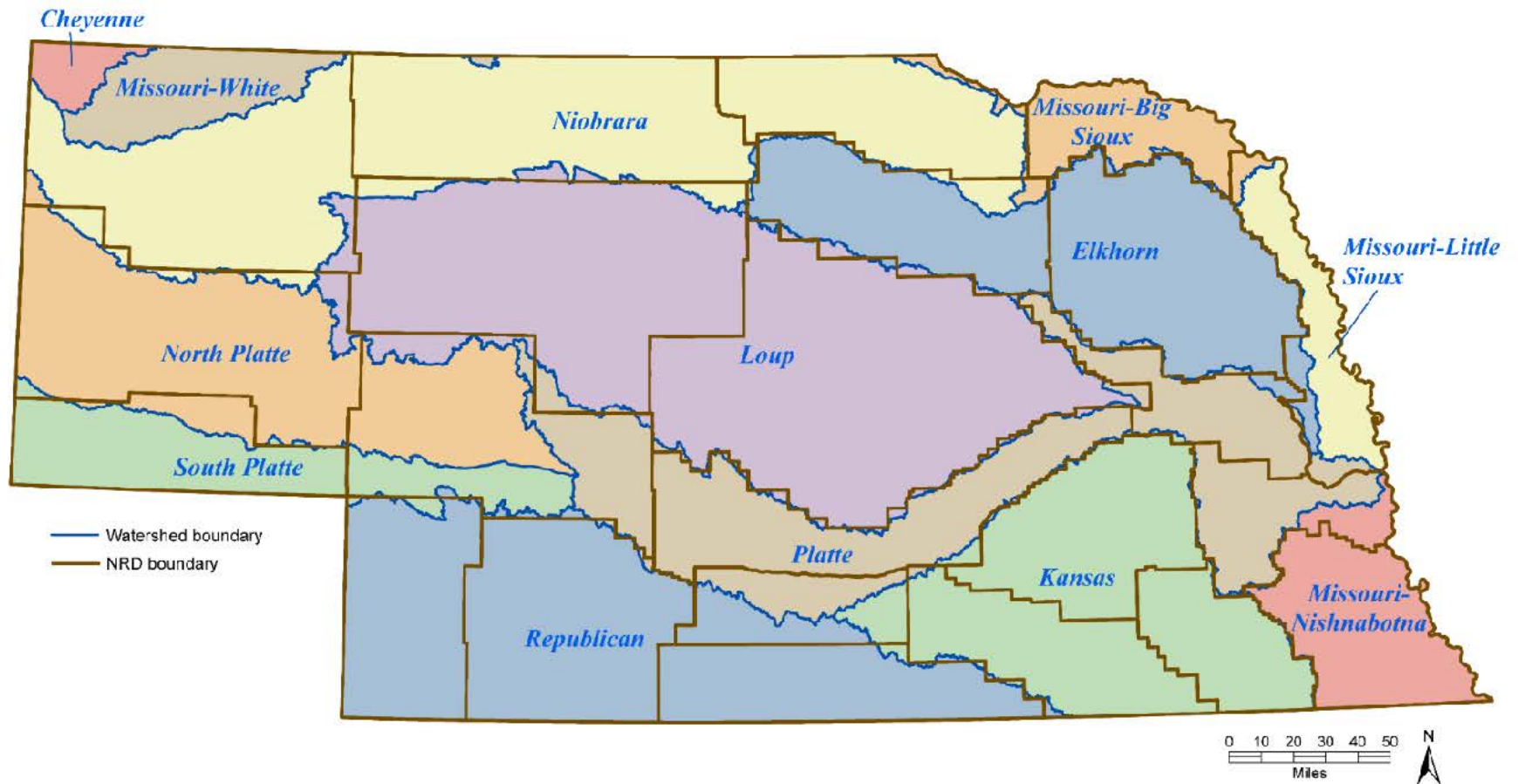
# NEBRASKA SUPREME COURT SPEAR T RANCH, INC. V. KNAUB, 2005, P. 201

“Although the integrated management law is a step toward reducing future conflicts through general regulation, ideally, the Legislature would develop a more comprehensive administrative appropriation system, including procedures and remedies, to adjudicate direct conflicts between groundwater and surface water users in Nebraska”

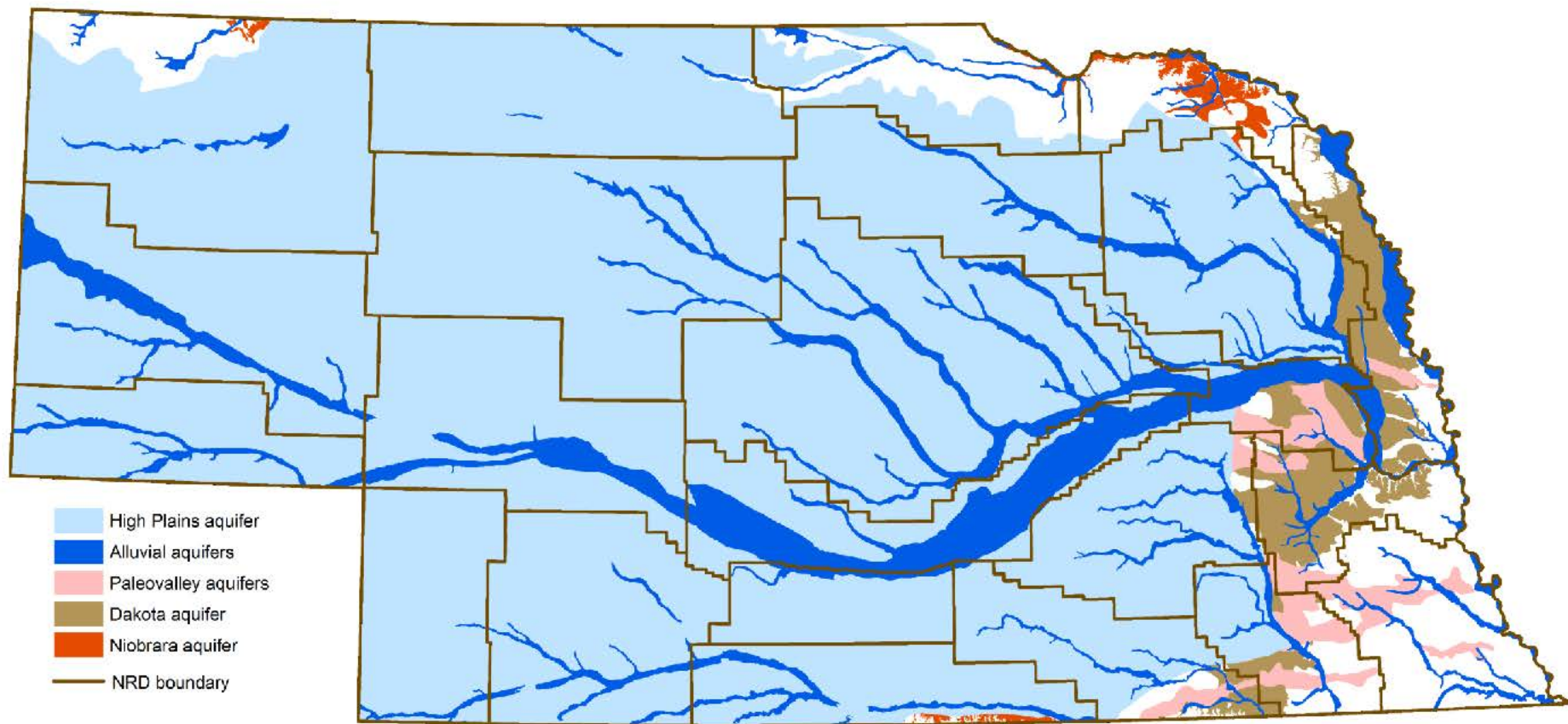
# NESTED HIERARCHY

Local institutions are part of a larger integrated network with different hierarchies and scales that collaborate with each other to manage the resource.





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**The Legislature intends and expects that each natural resources district within which water use is causing external impacts will accept responsibility for ground water management ... in the same manner and to the same extent as if the impacts were contained within that district;**

Neb. Rev. Stat §46-703

## NESTED HIERARCHY

Because local entities are under intense pressure from local entitlement holders, it is difficult for them to restrict water rights without support from higher level institutions.

Elinor Ostrom





The NRDs do not always agree and there are times when the State should be an arbitrator between NRDs

There is a need for overall guidance from the State where impacts extend beyond NRD boundaries and where there are issues related to the sustainability of the water supply.



The State should provide a statewide perspective, set a common target and unified expectation of outcomes across watershed, and then give the NRDs the opportunity to carry out the necessary duties.

However, if the NRDs do not meet the targets, the State should have the regulatory power to step in to ensure the targets and the interests of the State are met.



# NEBRASKA'S NRD GOVERNANCE SYSTEM BASED ON LOCAL CONTROL

- Allows rules to be at appropriate scale and be flexible and adapted to local conditions
- Allows more people affected by the rules to make the rules
  - More acceptable
  - More likely to be followed without the need for enforcement
- Encourages initiative and creativity
- Increases communication
- Encourages the Development of Leaders
- Generates trust



**Good  
Government**  
depends on

The will of the people themselves to communicate and collaborate with all stakeholders, to work to develop trust, and to provide the leadership necessary to ensure that the intent of the laws is in fact realized.