

# Nebraska Groundwater & Surface Water Issues

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*Nebraska Department of Natural Resources*



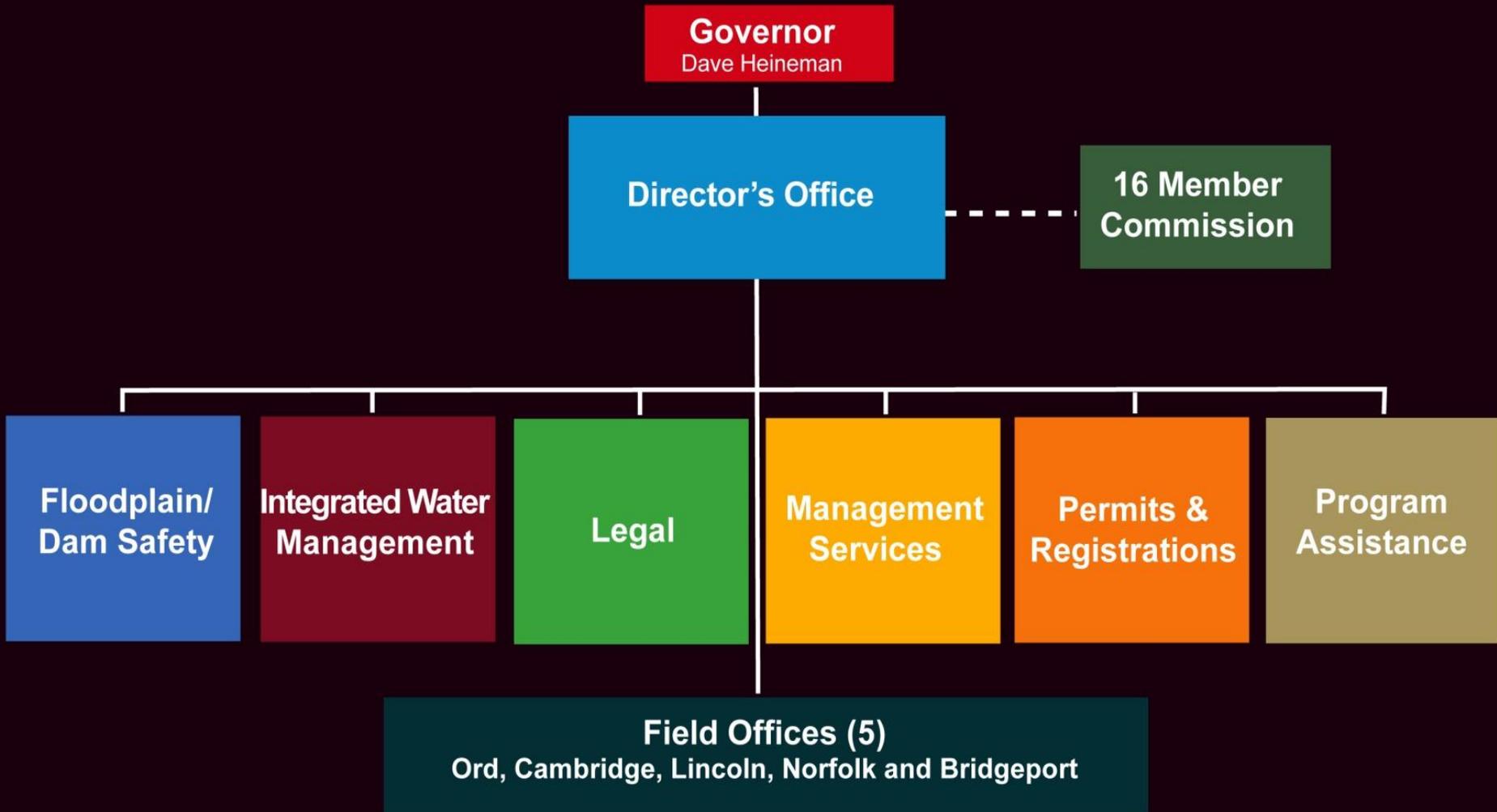
# Overview

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- Department of Natural Resources
- Nebraska Water
  - Surface Water-Groundwater Connections
  - Regulatory Structure
- Nebraska Water Issues
- Planning: Turning 'Issues' into Opportunities

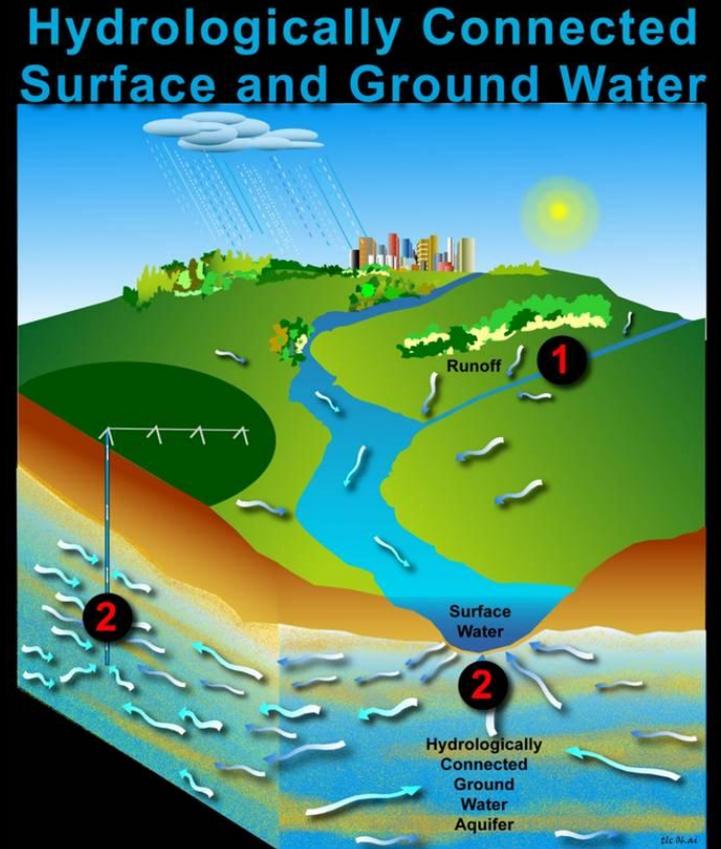


# Nebraska Department of Natural Resources



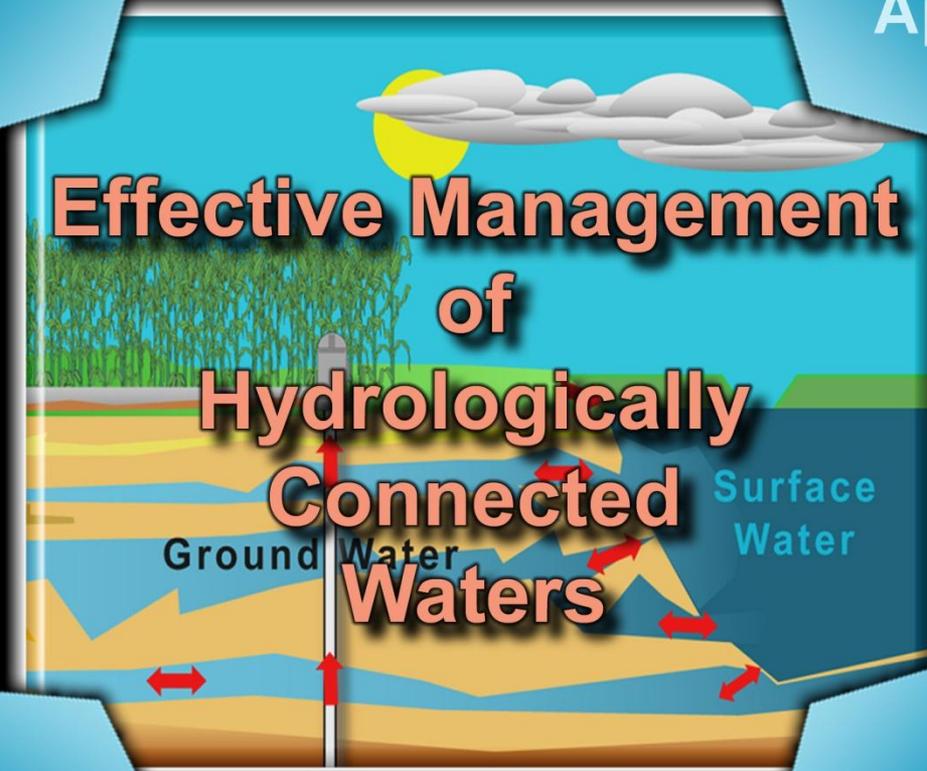
# Hydrologically Connected Surface Water and Groundwater

- In many areas of the state, surface water and groundwater are hydrologically connected. Therefore, it is important to manage them as a single resource.



**Ground Water  
Correlative  
Rights**

**Surface Water  
Prior  
Appropriations**



**Effective Management  
of  
Hydrologically  
Connected  
Waters**

**Ground Water  
Regulated by  
NRDs**

**Surface Water  
Regulated by  
DNR**

# Challenges

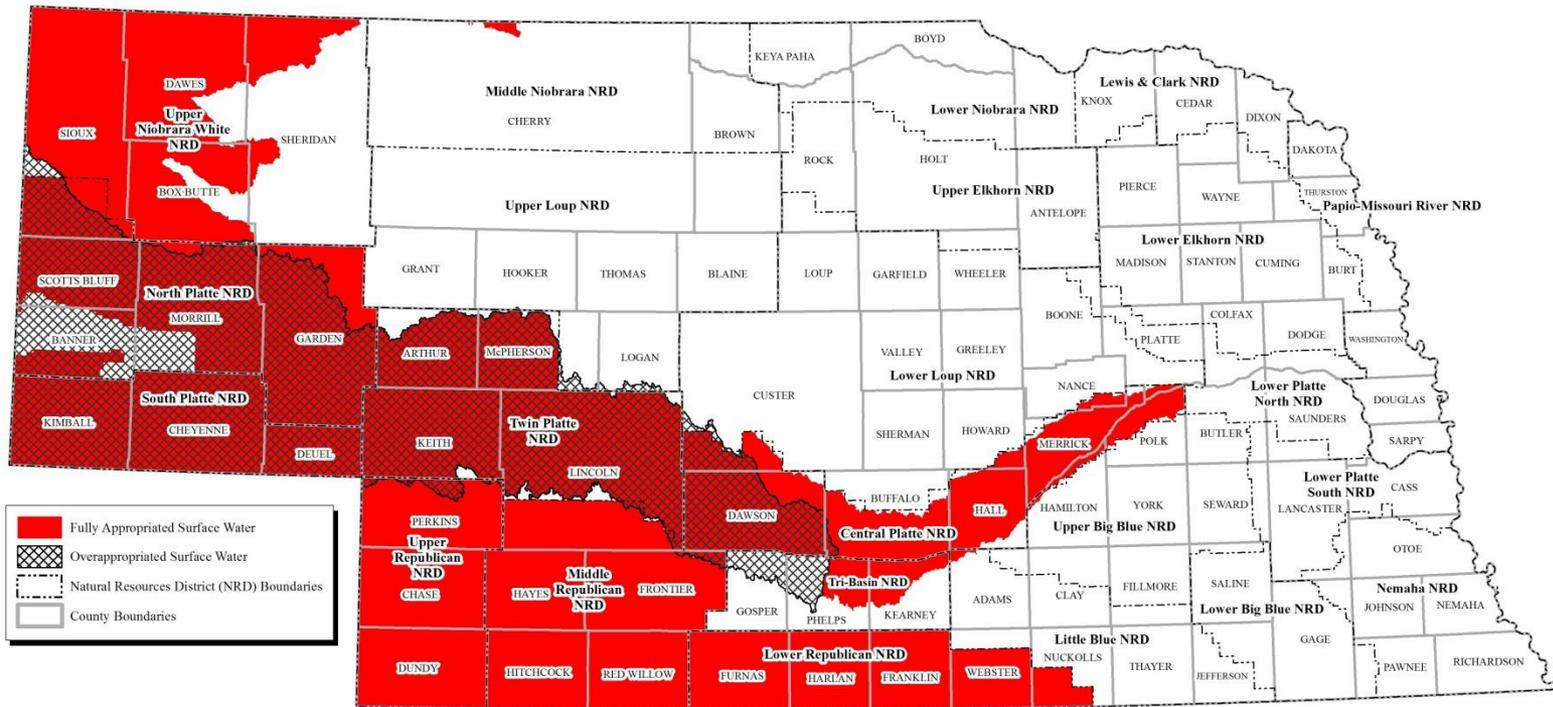


# Challenge: Finite Water Supply



## Fully Appropriated and Overappropriated Surface Water in Nebraska

Determinations made by the Department of Natural Resources as of September 09, 2011



|                                                                                                                                                                        |                                             |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
| <span style="display:inline-block; width:15px; height:10px; background-color:red;"></span>                                                                             | Fully Appropriated Surface Water            |
| <span style="display:inline-block; width:15px; height:10px; background: repeating-linear-gradient(45deg, transparent, transparent 2px, black 2px, black 4px);"></span> | Overappropriated Surface Water              |
| <span style="display:inline-block; width:15px; border-bottom: 1px dashed black;"></span>                                                                               | Natural Resources District (NRD) Boundaries |
| <span style="display:inline-block; width:15px; border-bottom: 1px solid black;"></span>                                                                                | County Boundaries                           |

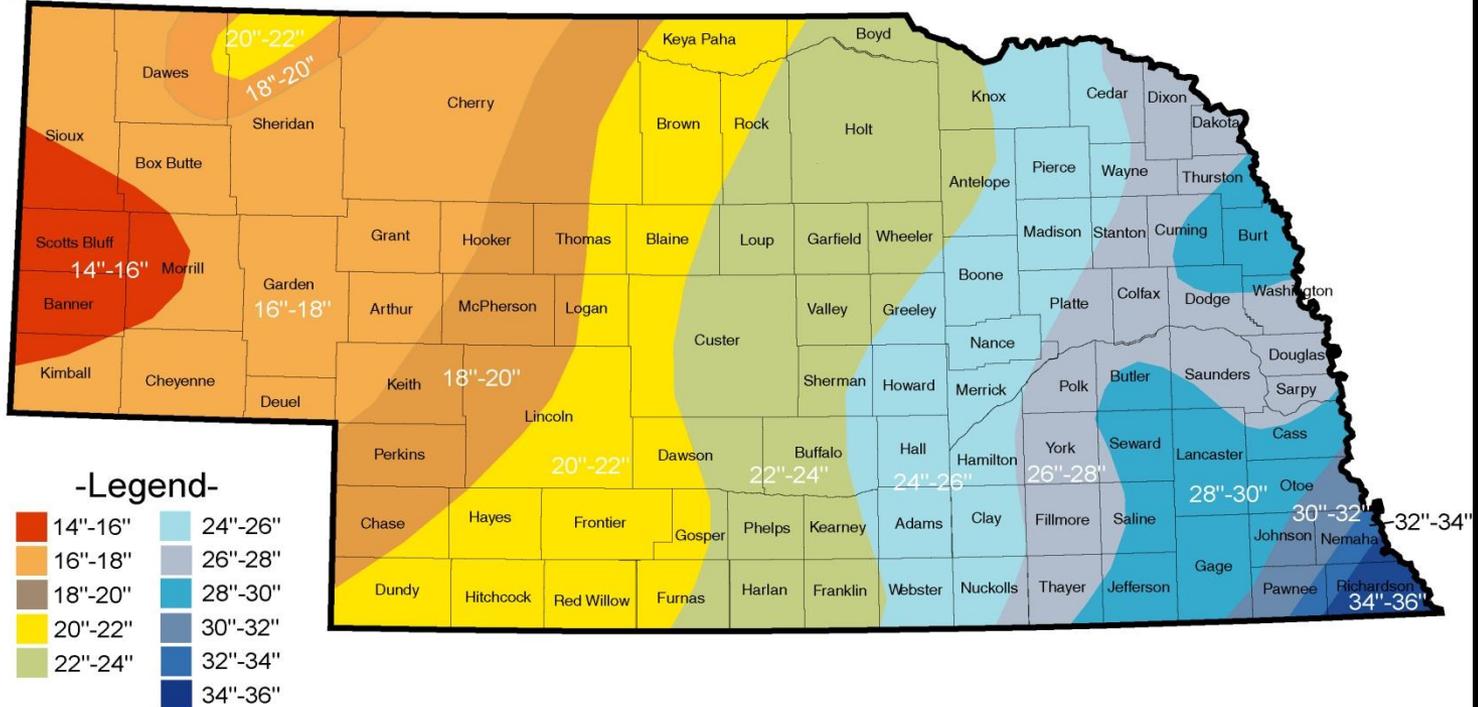
This map represents all areas in Nebraska where the surface water resources have been determined to be fully appropriated or overappropriated by The Department of Natural Resources (DNR) as of September 09, 2011. Detailed information regarding these determinations can be found in the individual Notices and Orders issued by DNR.



# Challenge: Variable Water Supply

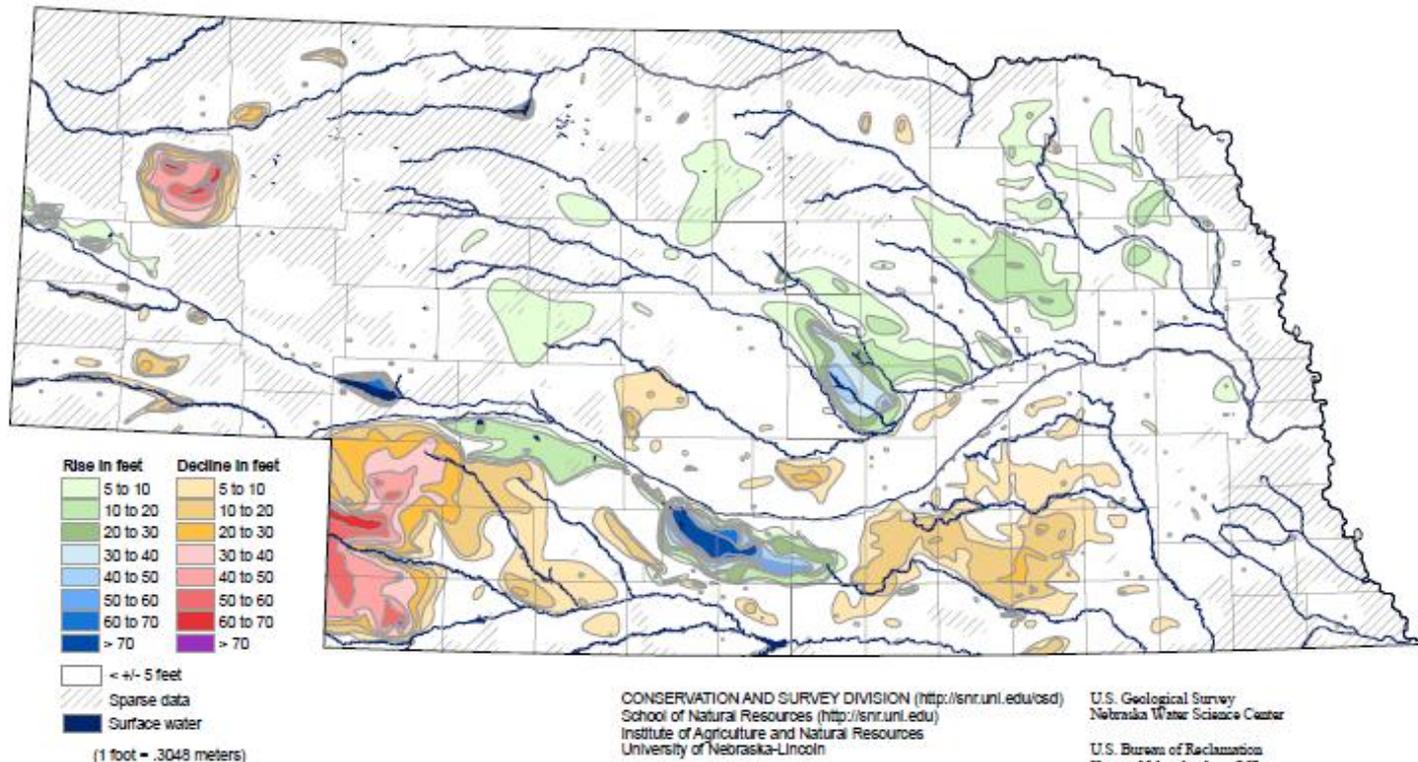


## Mean Annual Precipitation (in inches) From 1900-1979



# Challenge: Localized Issues

Groundwater-level Changes in Nebraska - Predevelopment to Spring 2011



CONSERVATION AND SURVEY DIVISION (<http://snr.unl.edu/csd>)  
 School of Natural Resources (<http://snr.unl.edu>)  
 Institute of Agriculture and Natural Resources  
 University of Nebraska-Lincoln

Jesse Korus, Survey Geologist, CSD  
 Mark Burbach, Water Levels Program Supervisor, CSD  
 Les Howard, GIS Manager, CSD

U.S. Geological Survey  
 Nebraska Water Science Center

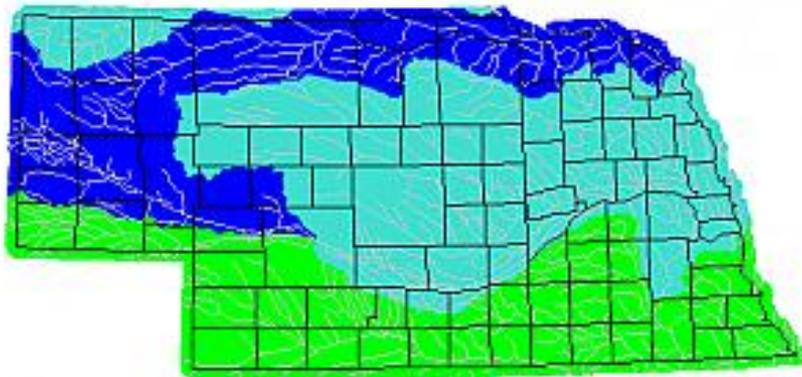
U.S. Bureau of Reclamation  
 Kansas-Nebraska Area Office

Nebraska Natural Resources Districts

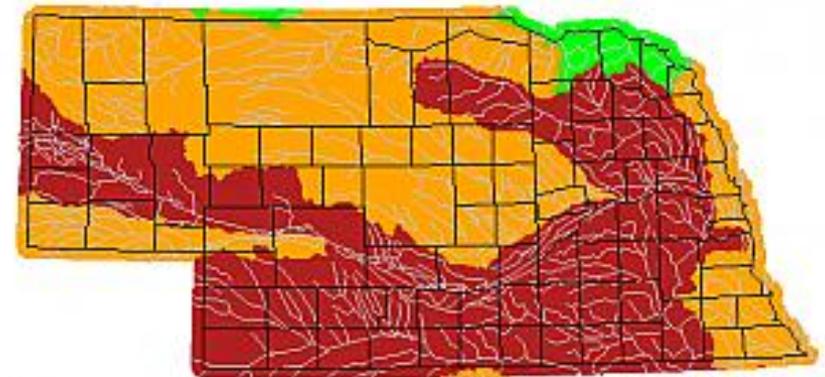
Central Nebraska Public Power and Irrigation District

# Challenge: Year to Year Variability

August 2011



August 2012



USGS

USGS

| Explanation - Percentile classes |                   |              |        |              |                   |      |
|----------------------------------|-------------------|--------------|--------|--------------|-------------------|------|
|                                  | ≤10               | 10-24        | 25-75  | 76-90        | >90               |      |
| Low                              | Well below normal | Below normal | Normal | Above normal | Much above normal | High |

# Challenge: Competing Interests

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- Agricultural
- Municipal
- Industrial
- Instream



# **PLANNING MORPHS CHALLENGES INTO OPPORTUNITIES**

# Planning Opportunities

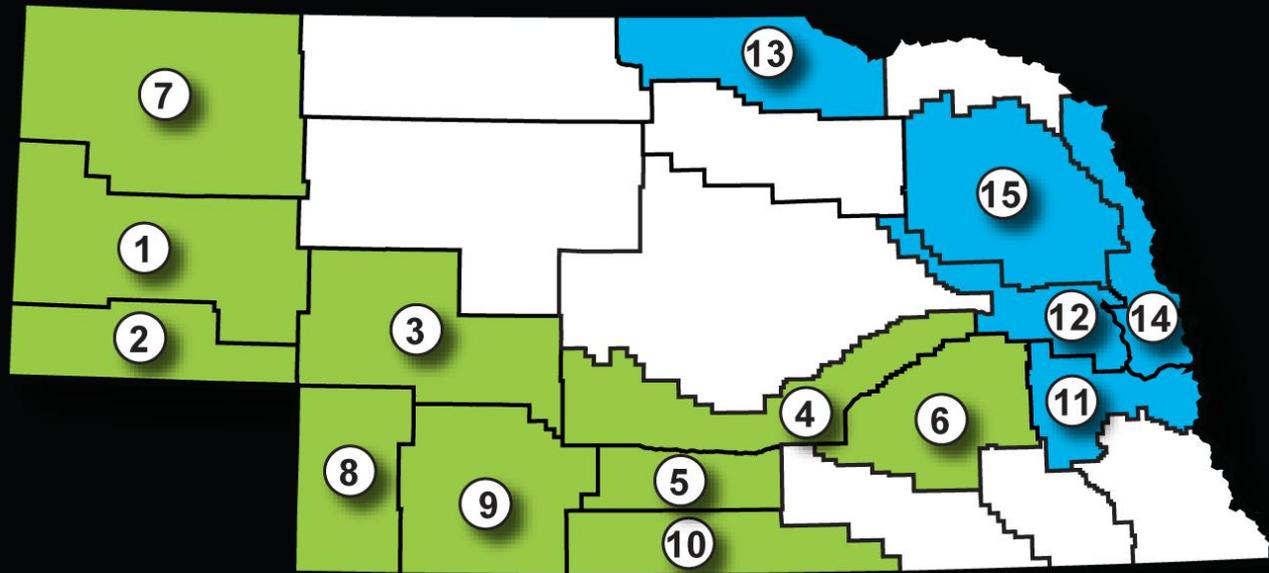
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- Dual regulatory structure
  - Conjunctive Management brings responsible parties together
- LB962
  - Provides mechanism for proactive and deliberate development of the available water resources
- Stakeholders have direct input on local water management decisions

# Water Management and Planning

## natural resources districts

1. North Platte NRD
2. South Platte NRD
3. Twin Platte NRD
4. Central Platte NRD
5. Tri-Basin NRD
6. Upper Big Blue NRD
7. Upper Niobrara-White NRD
8. Upper Republican NRD
9. Middle Republican NRD
10. Lower Republican NRD
11. Lower Platte South NRD
12. Lower Platte North NRD
13. Lower Niobrara NRD
14. Papio-Missouri River NRD
15. Lower Elkhorn NRD

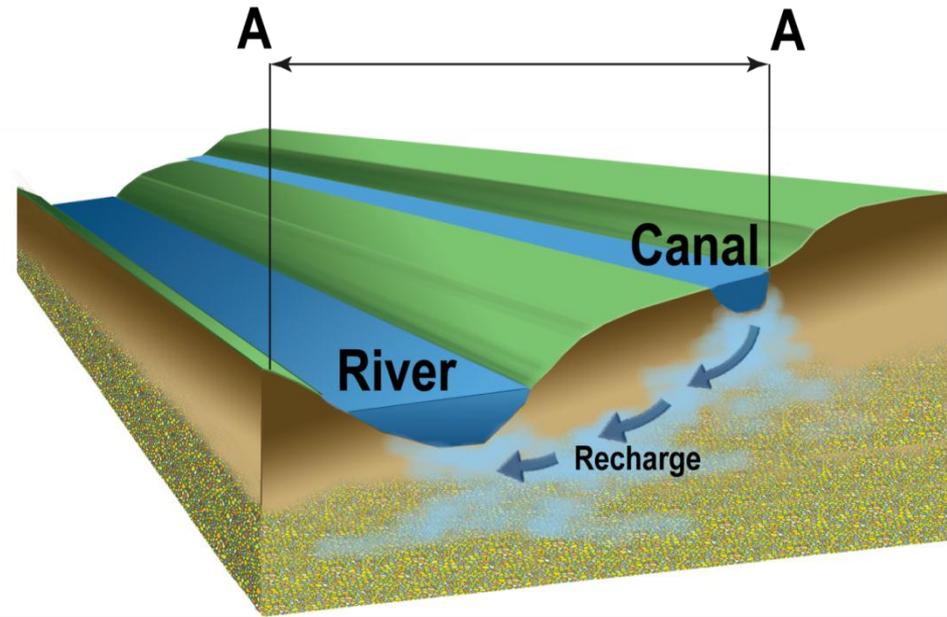
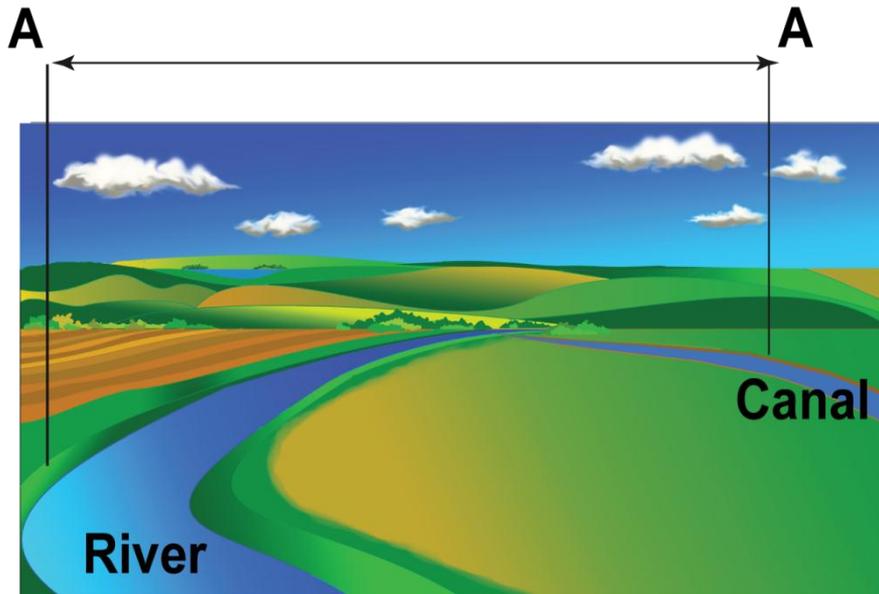


11-15 are participating in a voluntary integrated management planning process

May 15, 2012

# Project Opportunities

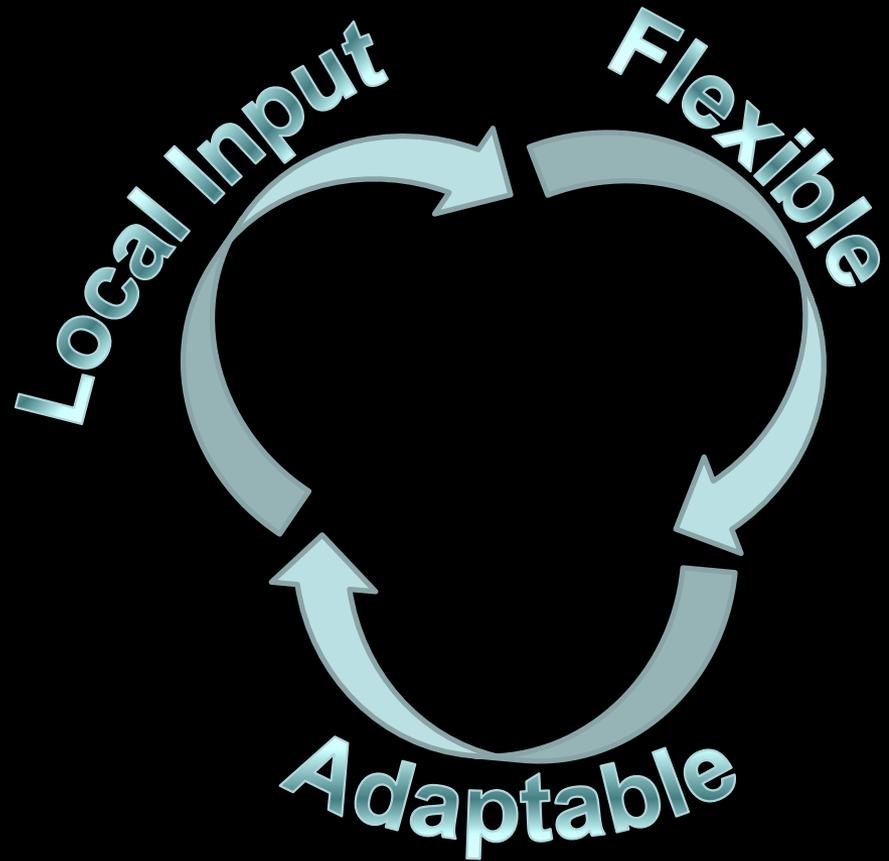
- Reservoir Storage
- Groundwater Storage
- Conjunctive Management



# Water Management and Planning Benefits

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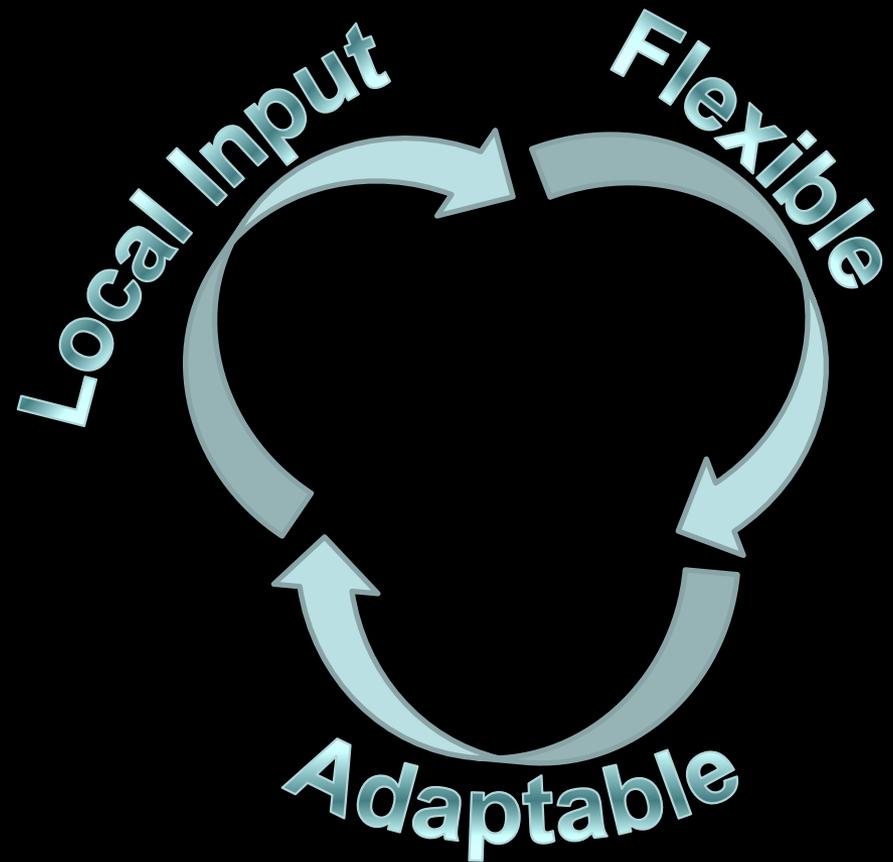
- Pro-active vs. Reactive
- DNR & NRD
  - Collaboration
  - Flexibility
- Stakeholder
  - Various means to provide input
  - Collaboration



# More Planning Benefits

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- Consistent goals & objectives
- Combined resources brought to projects
- Monitoring programs



# Integrated Water Management



# Platte River Example

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- Basin-wide and Integrated Management Plans (identified needed actions)
- Excess flow evaluation (identified potential opportunities)
- 2011 Demonstration Project (feasibility assessment)
- Conjunctive Management Projects (full implementation)

# Platte River Example:

## Canal Seepage Projects: 2011 Demonstration

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- For groundwater recharge and flood reduction
- Partners
  - 23 Canals
  - DNR
  - South Platte
  - Tri-Basin
  - Twin Platte
  - Central Platte
  - North Platte
- Results:
  - Diversion Total 142,000 a-f
  - Seepage Total 64,000 a-f
  - 2011-2019 Accretion Total 15,000 a-f
  - **Average annual accretion ~1,500 a-f/yr**

# Other Projects Moving forward

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- Cozad Canal
  - Accretions of 8,000 a-f/yr (2014-2019)
- Thirty-Mile Canal
  - Accretions of 8,000 a-f/yr (2014-2019)
- Orchard Alfalfa Canal
- J-2 Reregulating Reservoir
- N-CORPE



# Planning

Evaluating  
Collaboration



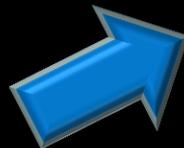
# Technical

Data  
Models



# Implementation

Projects  
Monitoring/Reporting



# Water Management

# Each Challenge Provides Opportunities with Planning

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## Challenge

- Water Supply
  - Finite
  - Variable
- Water Use
  - Competing Interests
- Planning
  - Surface water & groundwater
  - Compacts & Agreements

## Opportunity

- Water Supply
  - Vast
  - Infrastructure
- Water Use
  - Diverse
  - Beneficial
  - Find commonalities
- Planning
  - LB962
  - Conjunctive Management

