



# NPNRD IMP

## Meeting 1

# TODAY'S AGENDA

- Welcome
- Why are we here?
- How did we get here?
- What has been done?
- North Platte NRD IMP
  - Stream depletions101
  - Western water use model
  - IMP implementation status
  - Second increment considerations
  - Next steps
- Public comment

# WELCOME

- Open meeting notice
- Safety & logistics
- Introductions



# WHY ARE WE HERE?

## Process Summary

# PROCESS SUMMARY

## Upper Platte Basin-Wide Planning

**Statutory Authority**

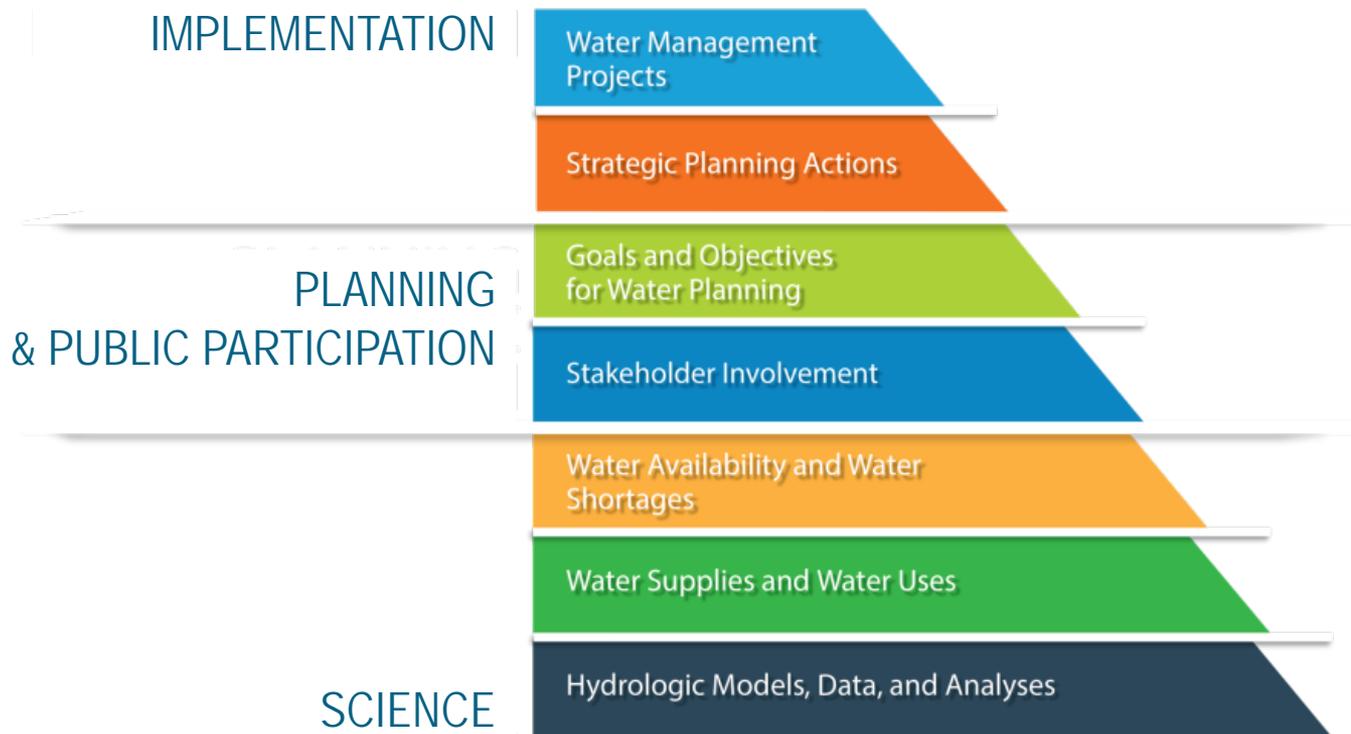
*(How did we get here?)*

**Current Basin-Wide Plan**

*(What has been done?)*

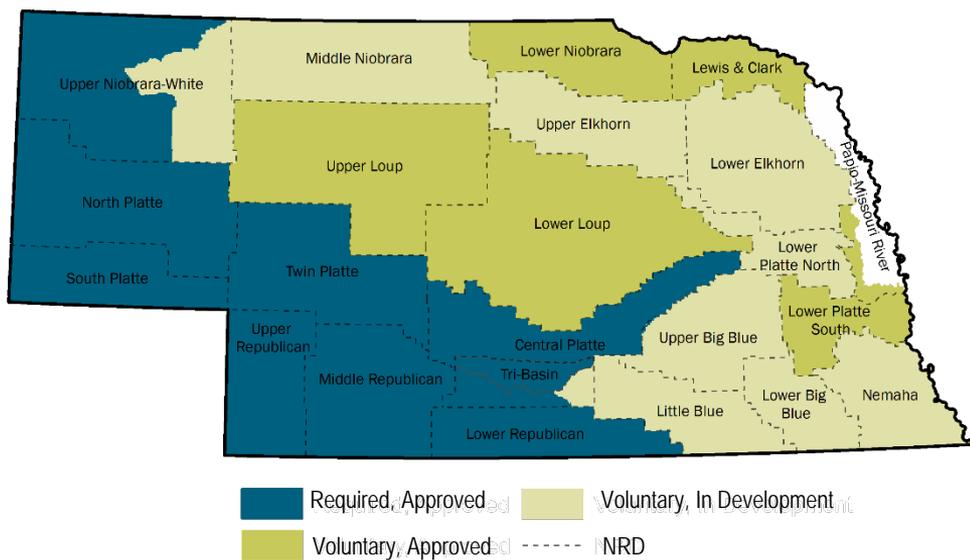
**Basin-Wide Plan & IMPs**

# INTEGRATED WATER MANAGEMENT



# INTEGRATED MANAGEMENT PLANNING IS A COLLABORATIVE PROCESS

- NeDNR + a Natural Resources District (NRD)
  - IMP development
  - Plan implementation
  
- Stakeholder collaboration (seeking agreement)



# STAKEHOLDER ROLES

- Convey local water issues/concerns
- Guide development of goals and objectives
- Disseminate information to local groups about IMP
- Attend meetings



# NRD & NeDNR ROLES

- Acquire/disseminate information/data needed for stakeholder process
- Help formulate goals and objectives with stakeholders
- Coordinate with each other, stakeholders, facilitators throughout IMP process
- Help determine/convey feasible actions for plan implementation
- Write the Integrated Water Management Plan





# HOW DID WE GET HERE?

Statutory Authority



# STATUTORY DEFINITION § 46-713(4)(a)

## Platte Overappropriated Area Basin-Wide Plan

### Why?

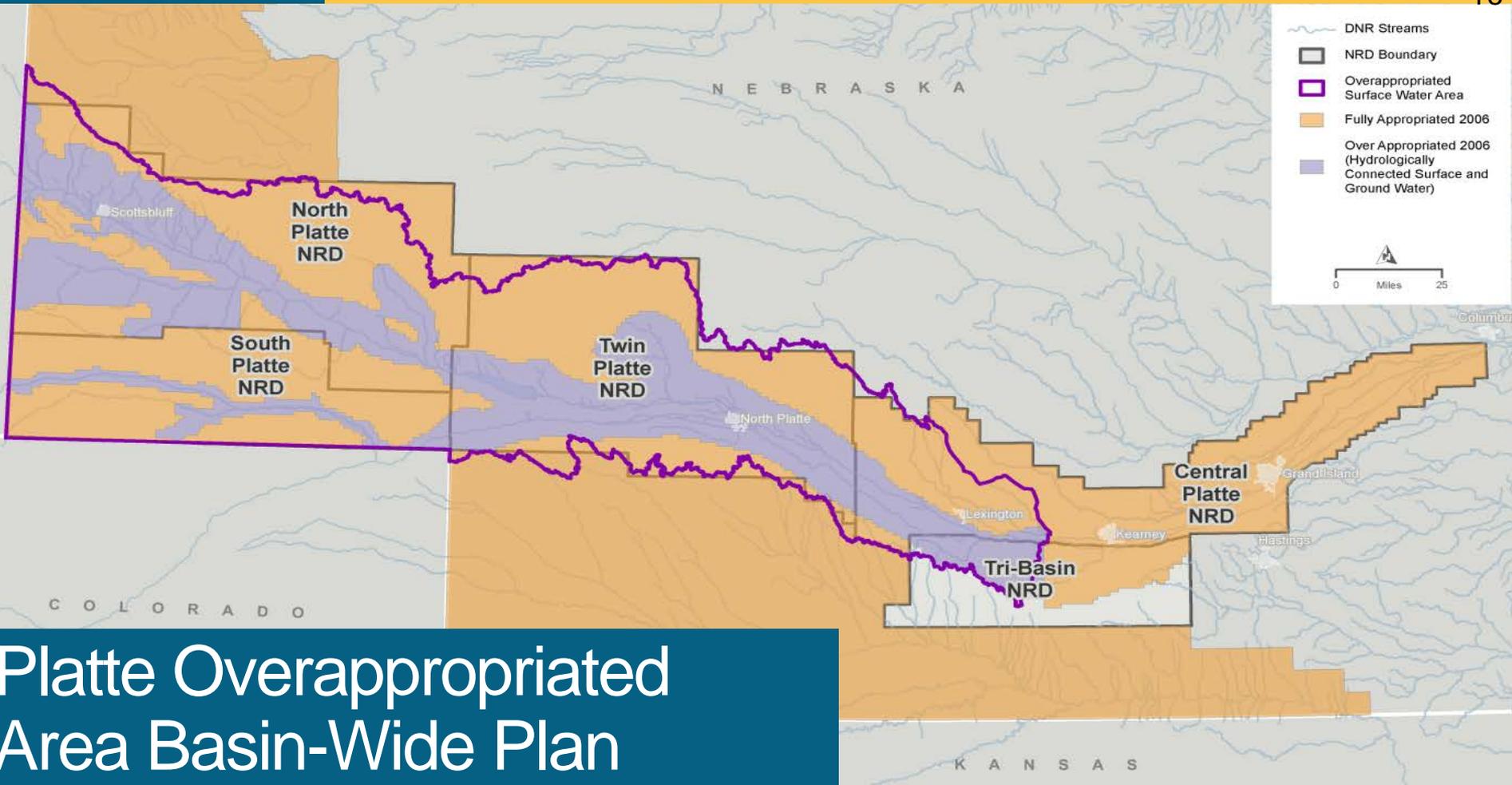
- Criteria for an overappropriated basin designation
  - Interstate agreement
  - Moratorium on surface water appropriations
  - Stays on well construction

### When?

- Designated in September 2004

### Where?

- Above Kearney Canal diversion



# Platte Overappropriated Area Basin-Wide Plan

# STATUTORY REQUIREMENTS § 46-715(2)(a)

The plan shall include **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 basin can be achieved and maintained for both the **near term** and the **long term**.

# STATUTORY REQUIREMENTS § 46-715(2)(b) – (e)

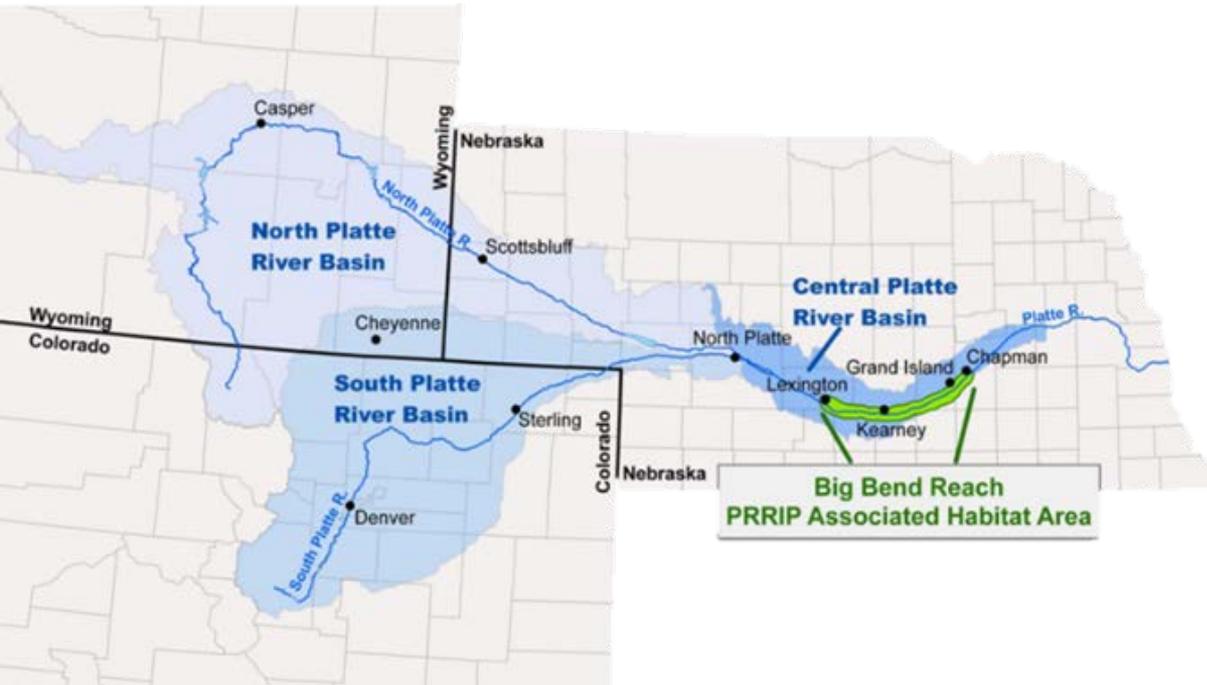
- A **map** of the area subject to the integrated management plan
- At least one **groundwater control** and at least one **surface water control**
- A **monitoring plan**
  - Plan to gather and evaluate data, information, and methodologies to increase understanding of the surface water and hydrologically connected groundwater system, and test the validity of the conclusions and information upon which the integrated management plan is based

# STATUTORY REQUIREMENTS § 46-715(4)

- Groundwater and surface water controls shall
  - Be consistent with the goals and objectives of the plan
  - Ensure Nebraska compliance with interstate agreement
  - Protect existing users (groundwater and surface water) from new uses

# INTERSTATE AGREEMENT – PRRIP

Platte River Recovery Implementation Program; § 46-715(4)(b)



- Began January 1, 2007
- Basin-wide effort by Department of Interior, Colorado, Wyoming, and Nebraska
- Implementation of PRRIP is incremental
  - The first increment is 13 years, through 2019

# INTERSTATE AGREEMENT – PRRIP

Platte River Recovery Implementation Program; § 46-715(4)(b)

- Endangered species
  - Improve habitat for four threatened and endangered species
    - Whooping Crane
    - Piping Plover
    - Least Tern
    - Pallid Sturgeon
  - Provide ESA Section 7 and Section 9 coverage for all water users in the basin
    - Avoid use of alternative ESA enforcement measures

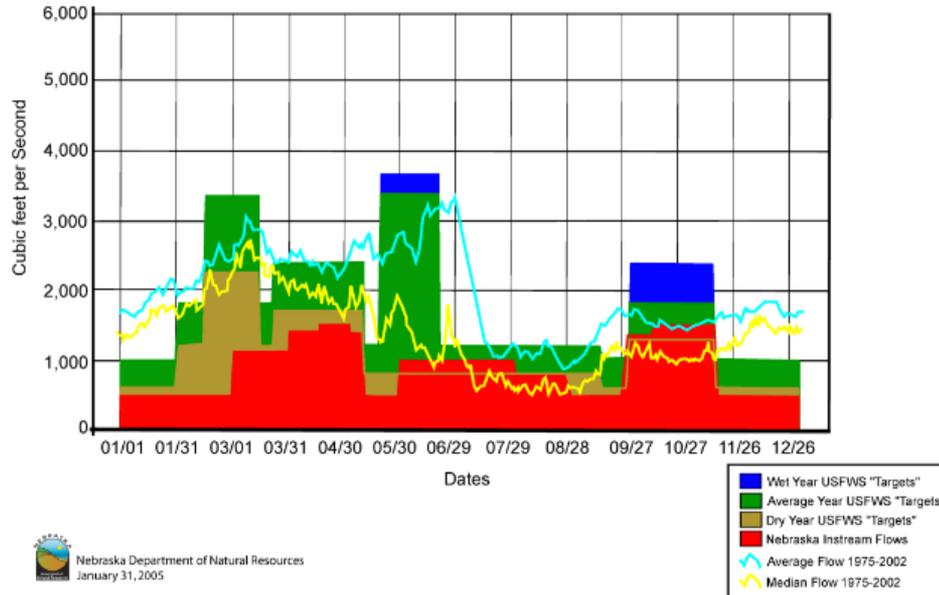


# INTERSTATE AGREEMENT – PRRIP

Platte River Recovery Implementation Program; § 46-715(4)(b)

## Comparison

USF&WS "Target Flows", Nebraska "Instream Flows",  
Average and Median Flows/  
Platte River at Grand Island



Nebraska Department of Natural Resources  
January 31, 2005

**NORTH PLATTE**  
Natural Resources District

- Target & state-protected flows
  - Reducing deficits to FWS Target Flows by average annual of 130,000 to 150,000 AFY
  - "Pulse" flows for adaptive management

# INTERSTATE AGREEMENT – PRRIP

Platte River Recovery Implementation Program; § 46-715(4)(b)

## ➤ Offsets & moratoriums

- Depletions to USFWS “target flows” and to “state-protected flows” because of groundwater and surface water uses begun or expanded between **July 1, 1997, and December 31, 2005**...will be offset in quantity, time, and location...

# INTERSTATE AGREEMENT – PRRIP

Platte River Recovery Implementation Program; § 46-715(4)(b)

## ➤ Offsets & moratoriums

- **Surface Water** (administered by NeDNR)

- Moratorium (1993) on issuance of any new surface water appropriations upstream of the Loup River confluence
- No new direct diversions of surface water allowed without offset (2006)

- **Groundwater** (administered by NRDs)

- No new uses of groundwater within the 28/40 area will be allowed without offset (2006)
- Stays on new wells

# STATUTORY REQUIREMENTS § 46-715(3)

- Process for economic development opportunities and economic sustainability
- **Clear and transparent procedures** to track depletions and gains to streamflow utilizing the best available / generally accepted methods, information, data, and science
- Procedures the NRD / NeDNR use to report, consult, and otherwise **share information**
- Identify water available to mitigate new uses (i.e. water rights leases, interference agreements, augmentation projects, conjunctive use management, and use retirement)
- **Guidelines for consultation with other water users** to provide for economic development opportunities
- **Rules to allow transfers** from an old use to a new use, and offsets, **as necessary**, for new uses that adversely affect existing users. Water banking may also be used when appropriate

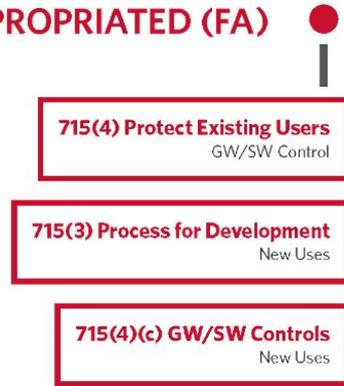
# STATUTORY REQUIREMENTS § 46-715(5)(a)

## ➤ Basin-Wide Plan

- When the designated **overappropriated area** lies within **two or more natural resources districts**, the department and the affected natural resources districts shall **jointly develop** a basin-wide plan for the area designated as overappropriated
- Such plan shall be developed using the **consultation and collaboration** process
- Shall be developed **concurrently** with the development of the integrated management plan
- Shall be designed to achieve, in an **incremental manner** described the goals and objectives described in 46-715(2)
- The basin-wide plan shall be **adopted after hearings** by the department and the affected natural resources districts.

# STATUTE § 46-715 INTERPRETATION

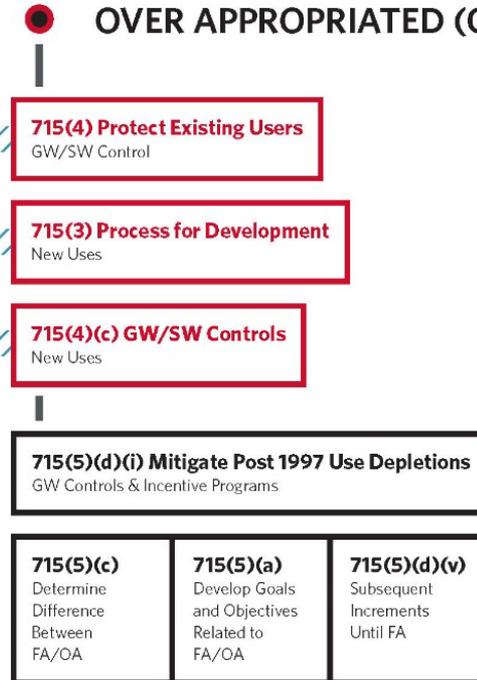
## FULLY APPROPRIATED (FA)



NO ADDITIONAL  
REQUIREMENTS



## OVER APPROPRIATED (OA)



# BASIN-WIDE PLAN VS. INTEGRATED MANAGEMENT PLAN

- Statute calls for a Basin-wide Plan (BWP) and individual Integrated Management Plans (IMP) in NRDs that have overappropriated area
- BWP is for the area designated as overappropriated
- IMP encompasses both overappropriated and fully appropriated areas
- Both BWP and IMPs must be adopted and take effect by September 2019

# THEY ARE SIMILAR BUT DIFFERENT

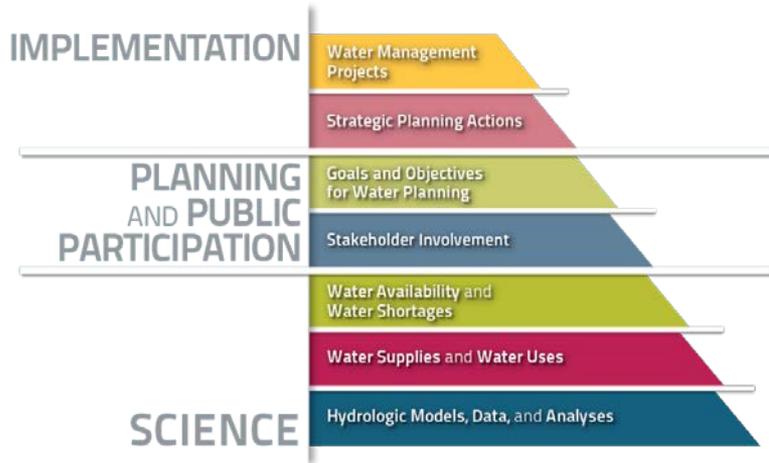
## Basin-Wide Plan

- All basin NRDs & NeDNR
- Overappropriated Area
- Goals & objectives
  - Focused on regional, cross-boundary issues and opportunities
  - Consistency and collaboration among basin NRDs
  - A broad framework

## Integrated Management Plan

- 1 NRD & NeDNR
- Overappropriated and fully appropriated areas
- Goals, objectives, & controls
  - Specific to one NRD
  - Tailored to local issues and opportunities
  - Specific targets and actions that each NRD will use to meet the goals of the Basin-Wide Plan as well as individual Integrated Management Plan goals

# INTEGRATED MANAGEMENT PLANNING - SUMMARY



- Surface water and groundwater management
- Jointly developed between NRD and NeDNR
- Protects existing users
- Adaptive management
- Suited to local conditions
- Proactive

# STAKEHOLDER CHARGE | What are you willing to do?



## First Increment

- Costs have ranged from \$10's to \$1,000's per AF

## Second Increment

- Most excess flows have been committed to projects in the first increment
- Incentive programs are willing seller/buyer
- Cost to maintain the projects that are currently in place

## Overall

- Costs likely to increase

§ 46-715(2)(a) - The plan shall include **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 basin can be achieved and maintained for both the **near term** and the **long term**.



# WHAT HAS BEEN DONE?

## Current Plan

# UPPER PLATTE BASIN-WIDE PLAN

## ➤ 1<sup>st</sup> increment basin-wide plan

- Current plan went into effect in September 2009

## ➤ 2<sup>nd</sup> increment basin-wide plan

- 2nd increment Basin-wide Plan process began in 2016 with Stakeholders
- Current process to incorporate stakeholder input into 2<sup>nd</sup> increment basin-wide plan
- Will present draft 2<sup>nd</sup> increment plan to stakeholders in September 2018
- 2<sup>nd</sup> increment plan will go effect in September 2019

| Goals      | 1: Incrementally achieve and sustain a fully appropriated condition   | 2: Prevent or mitigate human-induced reductions in the flow of a river or stream that would cause noncompliance with an interstate compact or decree or other formal state contract or agreement   | 3: Keep the Plan current   |
|------------|---|--|--|
| Objectives | Offset impacts of streamflow depletions... to the extent those depletions are due to water use initiated after July 1, 1997               | Prevent <b>human-induced</b> streamflow depletions that would cause noncompliance by Nebraska with the Nebraska New Depletions Plan (NDP) included within the Platte River Recovery Implementation Program (Program), for as long as the Program exists. | Meet at least annually to review progress toward achieving the goals and objectives of this Plan...                    |
|            | <b>Maintain first increment mitigation efforts</b>  |  | Gather and evaluate data and information to measure the effectiveness of controls, incentives and/or other programs... |
|            | Conduct a technical analysis...to determine whether the controls are sufficient...  |  |  |
|            | Continue to refine the methodology to <b>determine</b> the difference between the current and fully appropriated levels of development... |  |  |
|            | <b>Use available funds and actively pursue new funding opportunities to...implement this Plan</b>   |  |  |
|            | <b>Update and continue</b> implementing IMPs in each Platte River Basin NRD   |  |  |

|                   |  |  |  |
|-------------------|--|--|--|
| <b>Goals</b>      | 4: Work cooperatively to identify and investigate disputes between groundwater users and surface water appropriators and, if determined appropriate, implement management solutions to address such issues | 5: Partner with municipalities and industries to maximize conservation and water use efficiency  | 6: Work to maintain economic viability of the basin while implementing this plan                           |
| <b>Objectives</b> | Identify disputes between groundwater users and surface water appropriators  | Continue to collect data on water use and existing conservation plans of municipalities and industries within the Basin                | Support managers and users in the basin by better understanding the economic impacts of supply variability |
|                   | Investigate and address issues between groundwater users and surface water appropriators, based on investigation results   | Invite municipalities and industries to the annual meetings  | Management practices to improve sustainability/viability for surface water and groundwater uses            |
|                   |  | Establish allocations for each municipal and industrial user by 2026 and the M&I will offset their new uses themselves rather than NRD | Drought Planning   |
|                   |  |  | Discuss economic impacts and potential mitigation options at the annual meeting                            |

# INTEGRATED MANAGEMENT PLAN

- Map of the Areas
  - Overappropriated
  - Fully appropriated
- Incentives
  - Retirements
- Water banking
- Monitoring
- Studies
- Controls
  - Moratorium/certified acres
  - Transfer rules and restrictions
  - Municipal and industrial
  - Allocations
- Post-1997 Depletion Target (7,594 af)
  - EQIP Retirements (3,761 af)

# MANAGEMENT ACTIONS TAKEN

## ➤ Conjunctive Management

- Recharge of Excess Flows

- 2011 & 2016

- Includes Belmont, Castle Rock, Central, Chimney Rock, Enterprise, Farmers, Lisco, Minatare, Nine Mile, Pathfinder, and Winters Creek

- Total diversion ~92,100 acre-feet

- Total estimated recharge ~ **42,700** acre-feet

## ➤ Allocations

## ➤ Retirements



# NORTH PLATTE NRD IMP

Stream Depletions 101  
Western Water Use Model  
Current IMP Implementation Status

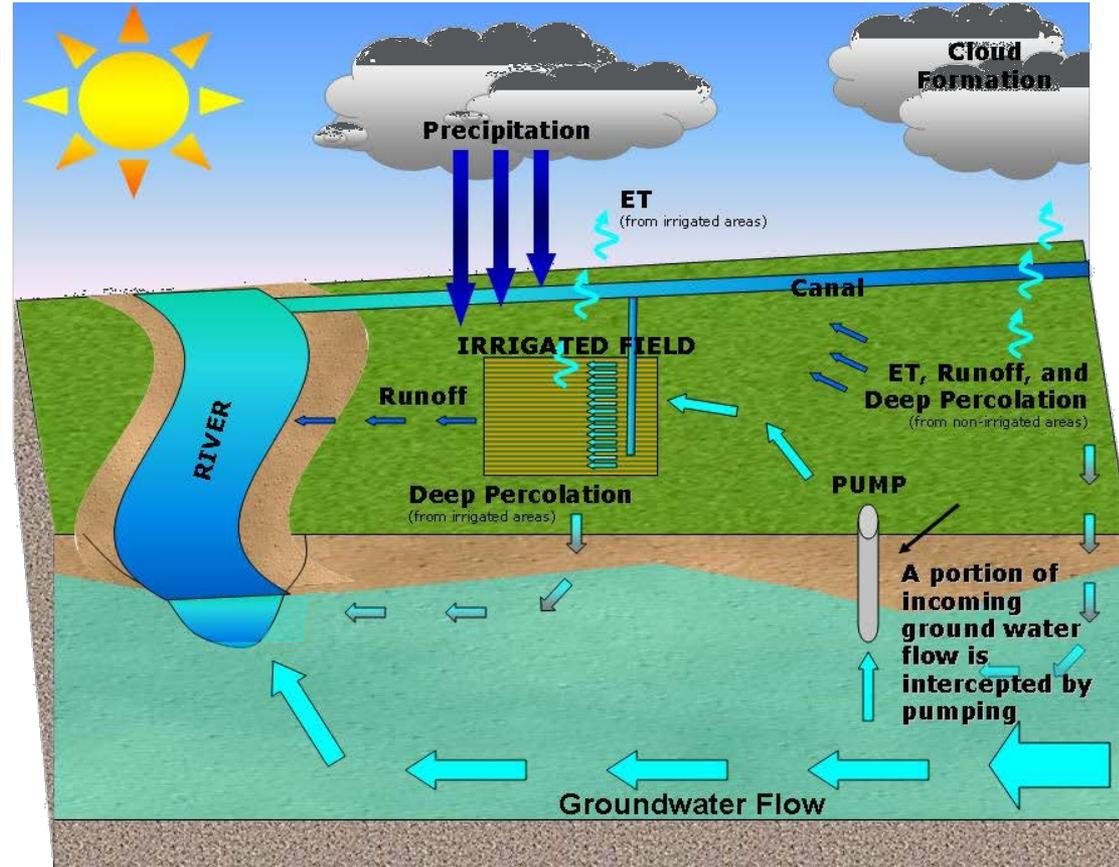
Second Increment Considerations  
Next Steps



# STREAM DEPLETIONS 101

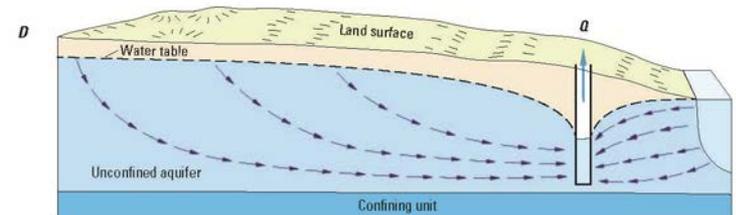
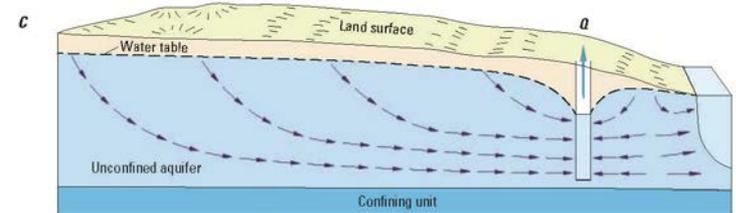
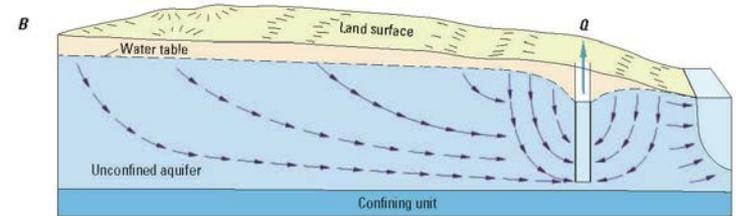
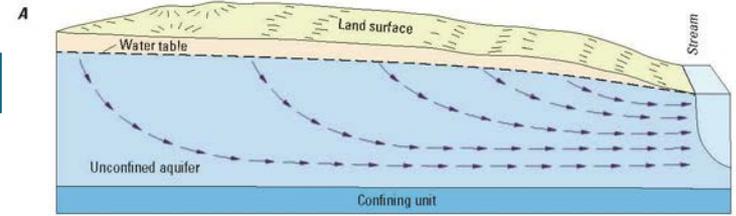
# STREAM DEPLETIONS 101

- Typical elements of ground and surface water budgets

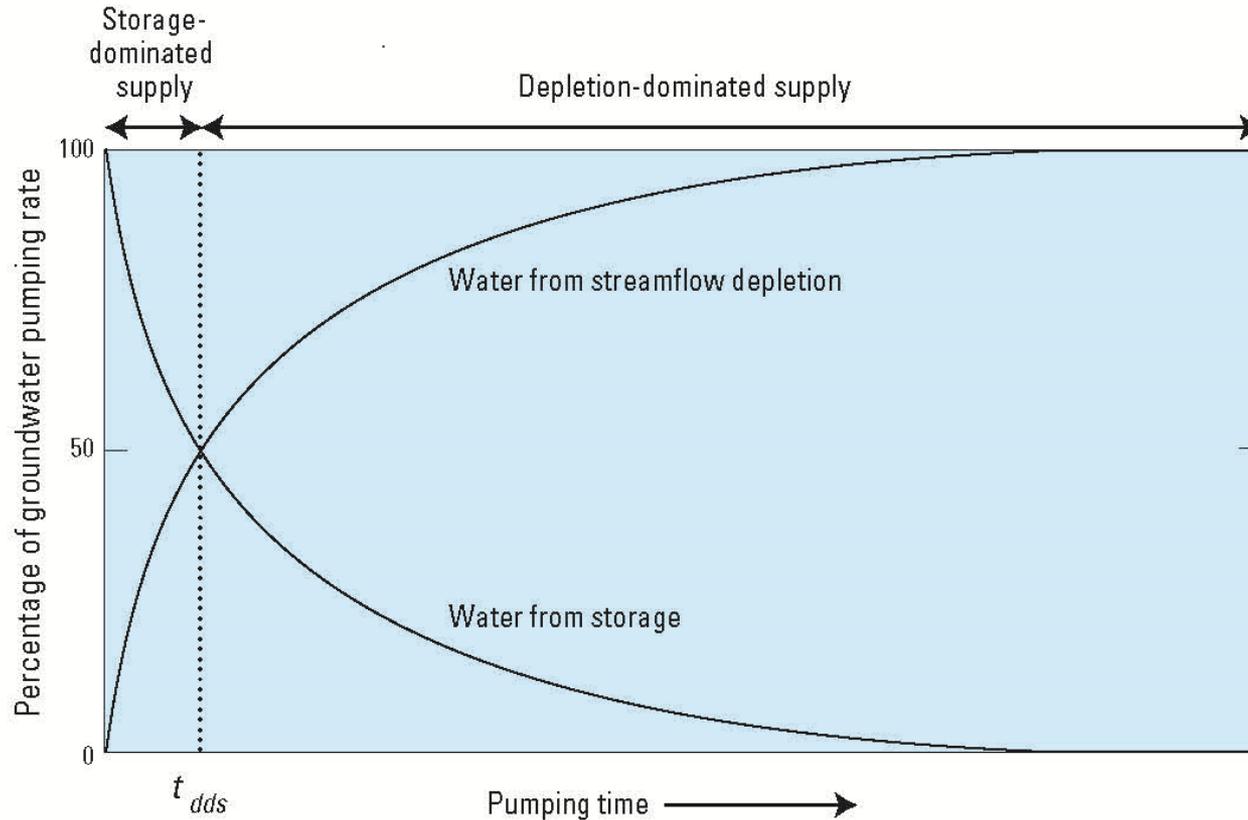


# STREAM DEPLETIONS 101

- A. Pre-development conditions
- B. Pumping from aquifer storage
- C. Interception of groundwater baseflow
- D. Interception of groundwater baseflow and induced infiltration



# STREAM DEPLETIONS 101

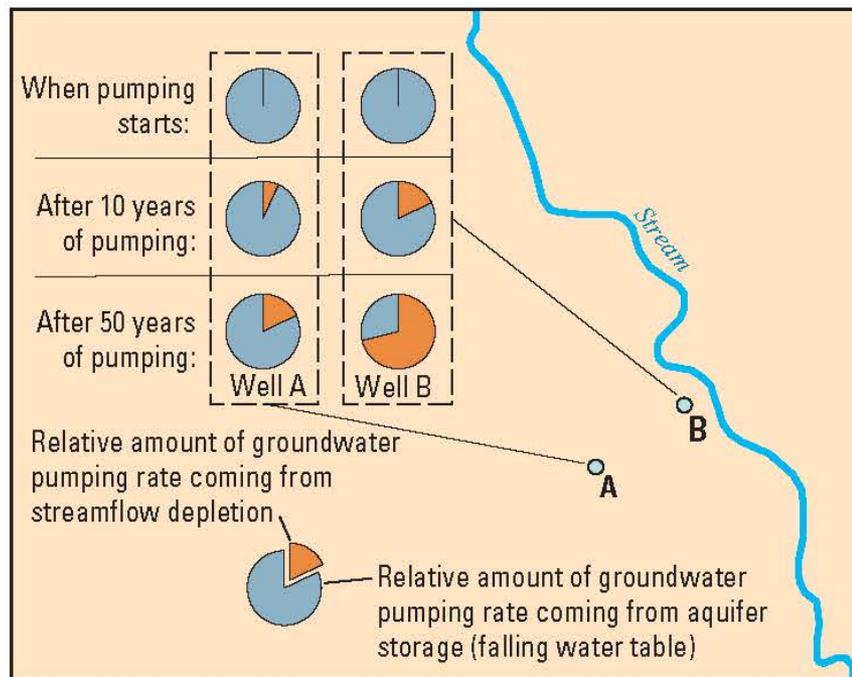


# STREAM DEPLETIONS 101

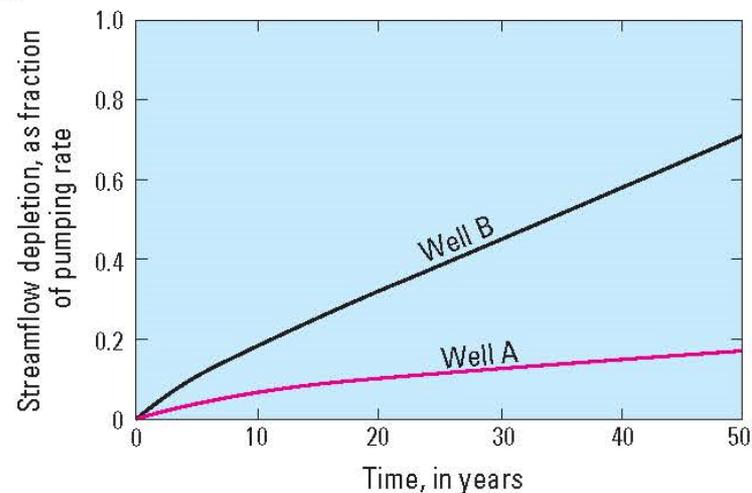
- Factors that affect timing, rates, and locations of streamflow depletion:
  - Geology and hydraulic properties of aquifer
  - Aquifer size/volume
  - Geometry of the surface water streams
  - Well location (vertical and horizontal distance from streams)
  - Pumping rates and operational characteristics

# STREAM DEPLETIONS 101

A



B

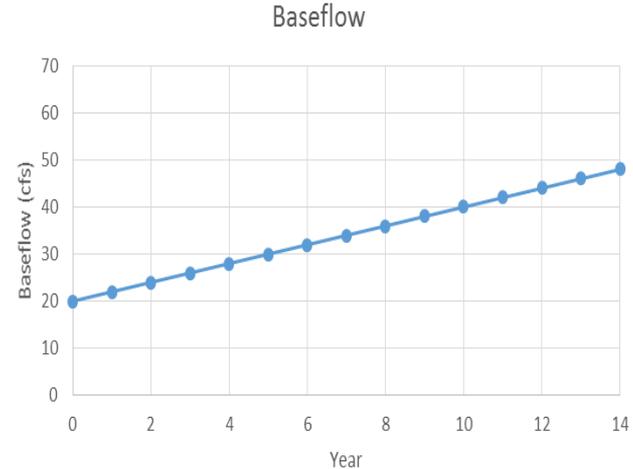
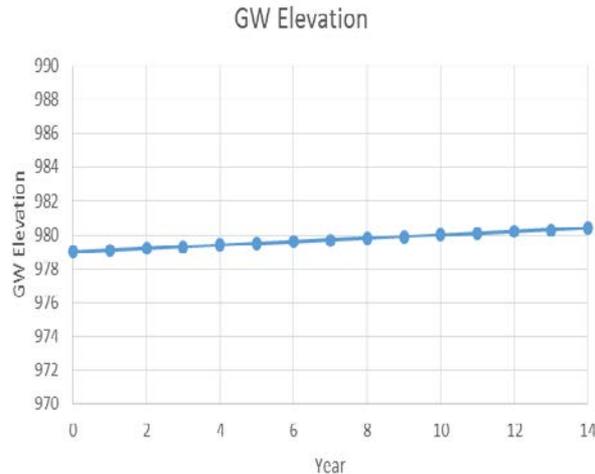


# STREAM DEPLETIONS SUMMARY

- Variability in aquifer properties across basin
  - Degree of ground/surface water connection
  - Number/distribution/capacity of wells
  - Timing of well impacts on surface water/aquifer
- Physical characteristics are included and considered in water resources planning and management

# PLUM CREEK EXAMPLE

- Example of Observed Groundwater Elevation and Baseflow Trends near Plum Creek, Nebraska



**QUESTION:** Are there depletions occurring due to groundwater pumping in this area?

# ANSWER...

We don't know for sure.

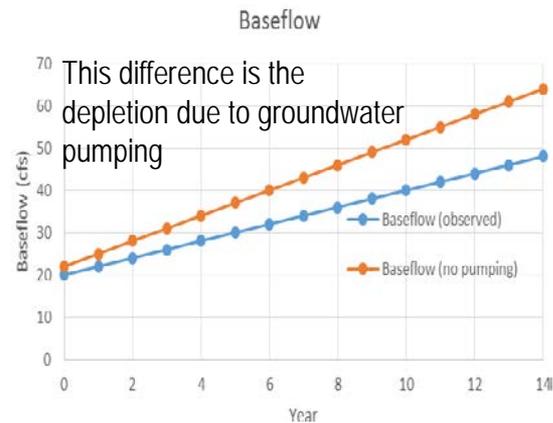
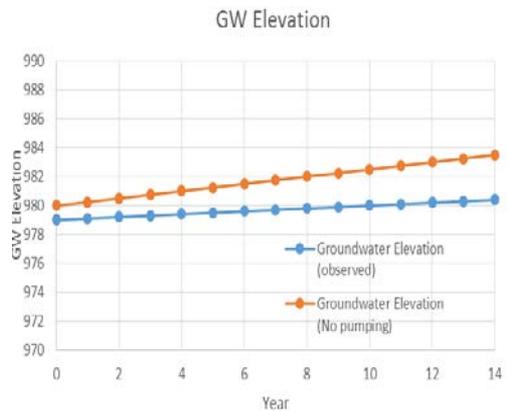
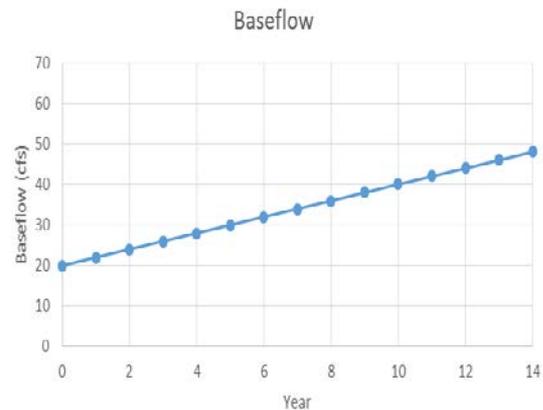
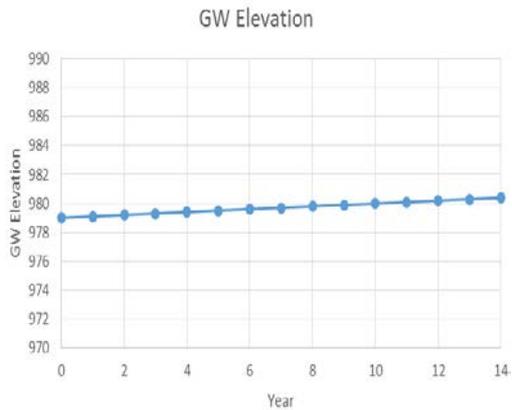
## Why?

Because we don't know what conditions would have been without groundwater pumping occurring. *This is what we use modeling tools for!*

## How?

To estimate conditions without the effects of pumping, a model is used to simulate two identical hydrologic scenarios – one with groundwater pumping occurring, one without.

# THE ESTIMATED EFFECTS OF GROUNDWATER PUMPING CAN BE DETERMINED





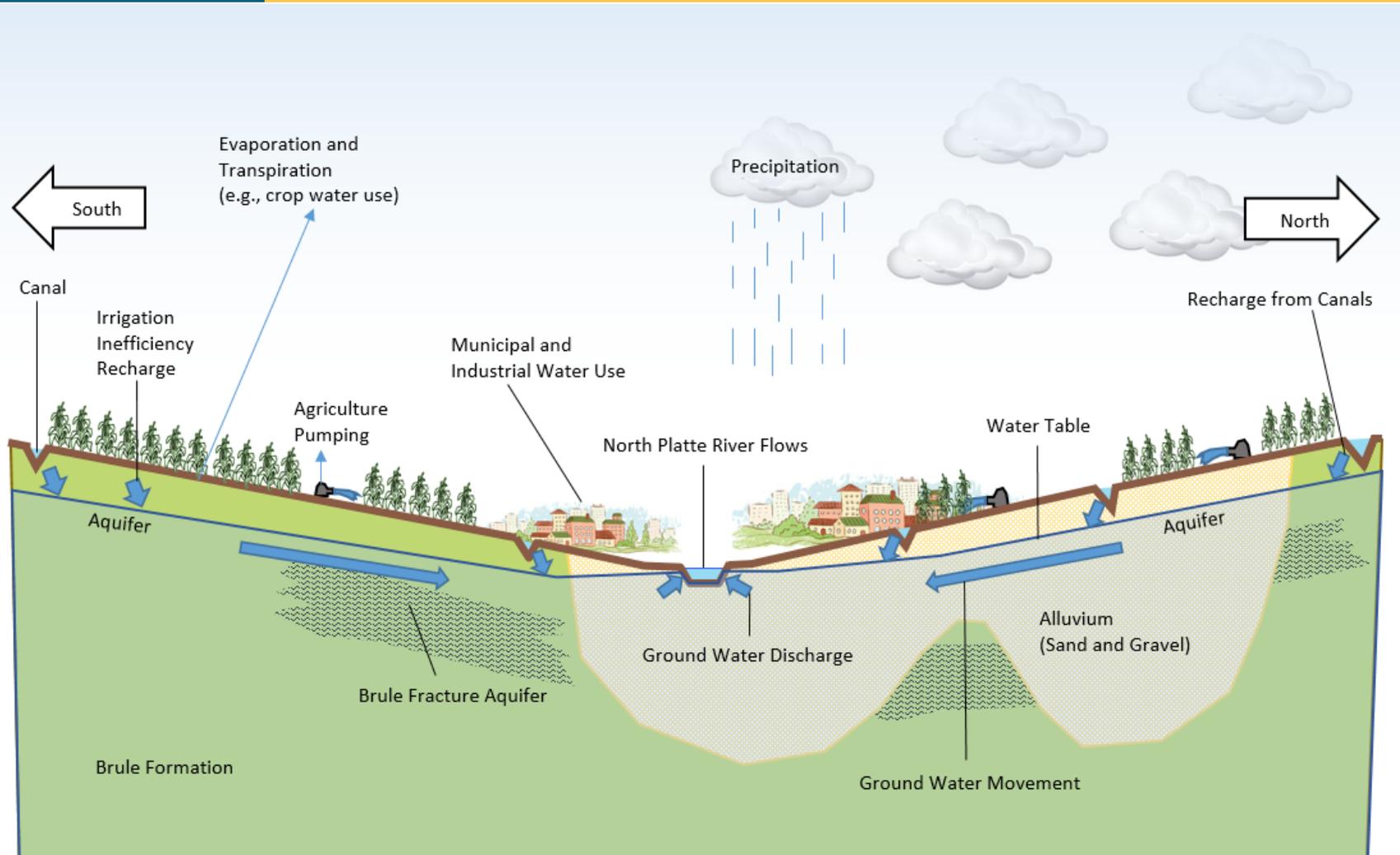
# WESTERN WATER USE MODEL

# WESTERN WATER USE MANAGEMENT MODELING

- Modeling was commissioned by:
  - North Platte NRD
  - South Platte NRD
  - Nebraska DNR
  
- Modeling started in 2009

# WESTERN WATER USE MANAGEMENT MODELING

- **Purpose:** Data centered and decision support modeling package to aid the South Platte NRD and the Nebraska DNR in water management decisions.
  
- **Uses two models:**
  - Regionalized Soil Water Balance Model
    - Provides crop water use and other information
  
  - Groundwater Model (MODFLOW)
    - Timing and movement of water through the aquifer

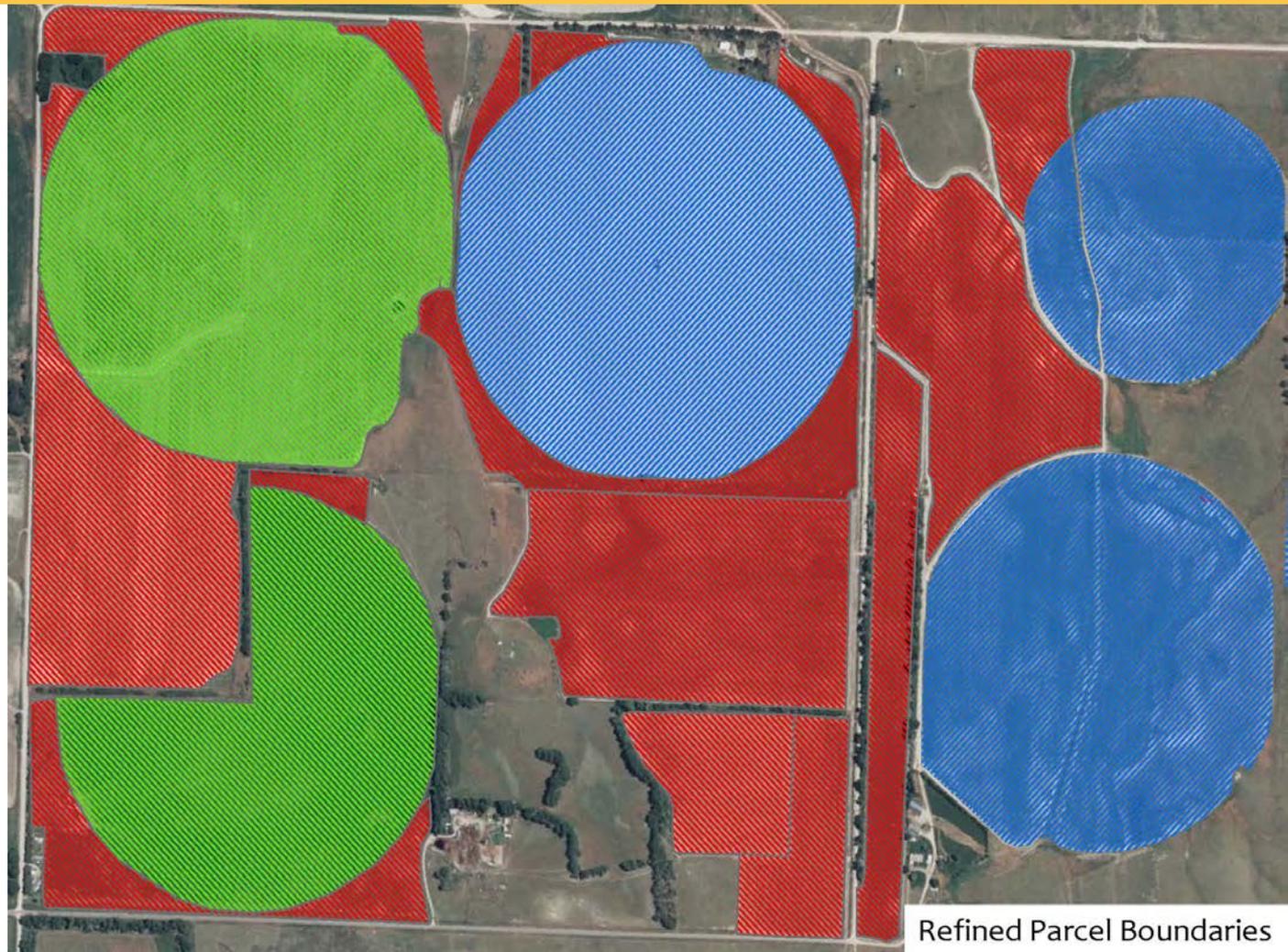


# MODELING THROUGH 2013

- Land Use – Yearly from 1953 - 2013
  - Aerial photo snap shot years
    - 1950s, 1970s, 1980s, 1993, 1997, 2001, 2003, 2005, 2009, 2010, 2012
    - Drew circles and squares around each parcel for each snapshot
  - Attributed with:
    - Crop type information
    - Irrigation water source from NPNRD and SPNRD
    - Flood or sprinkler irrigation method
    - Metered pumping information from each NRD

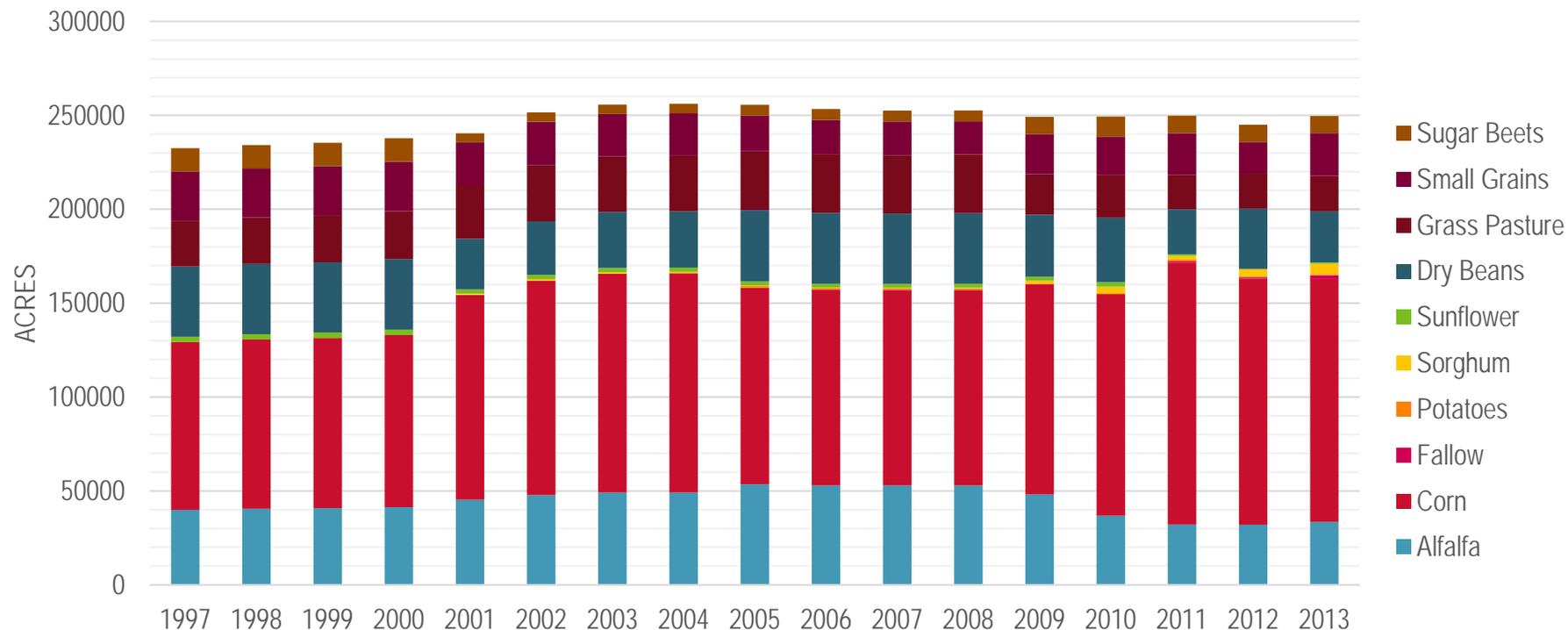
# LAND USE DATASETS

1953 - 2013

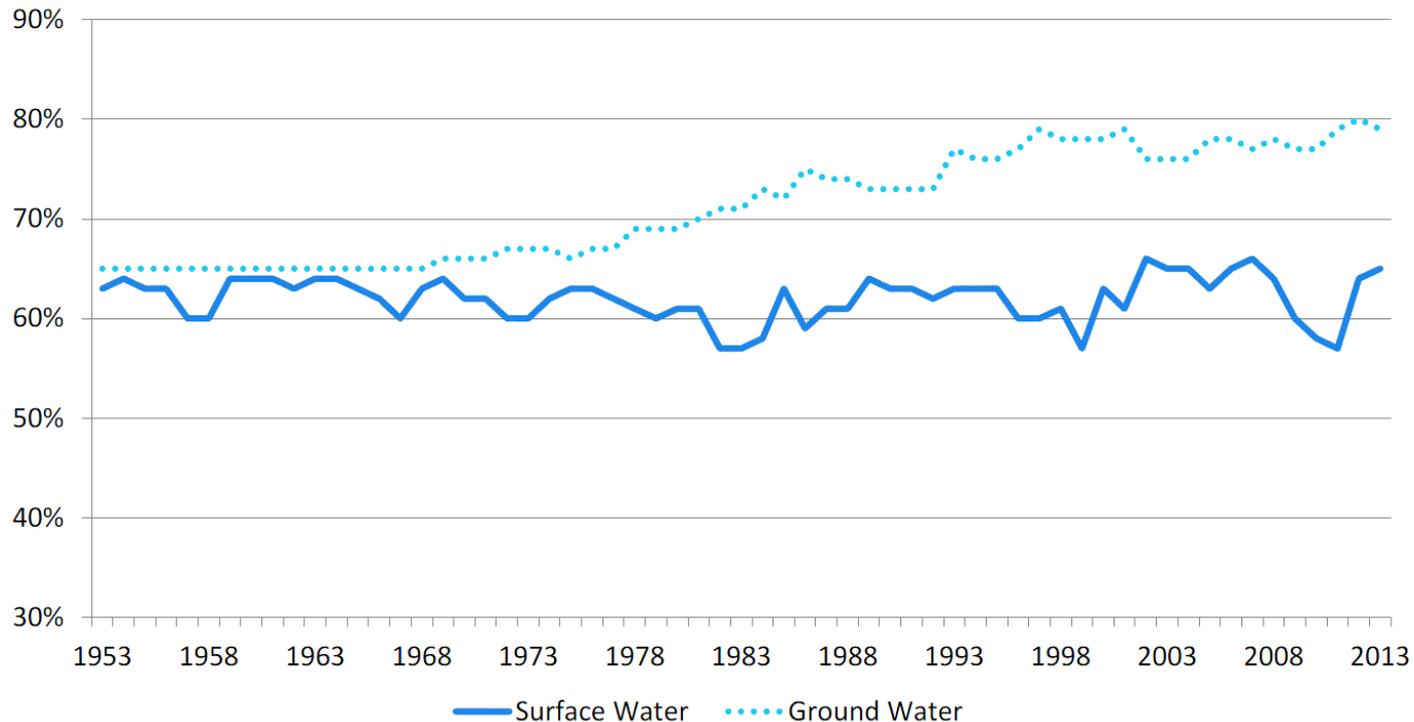


Refined Parcel Boundaries

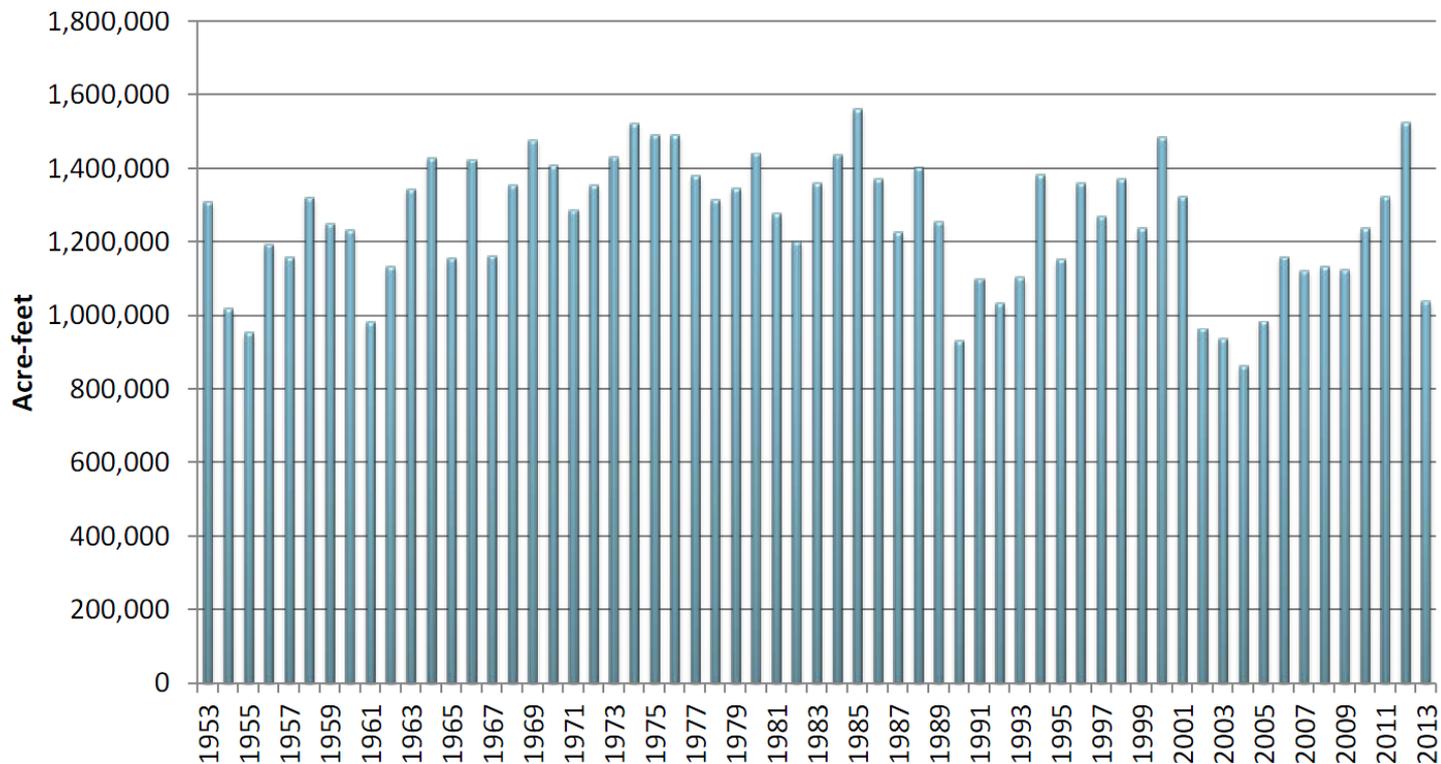
# NPNRD ANNUAL CROP STATISTICS 1997 - 2013



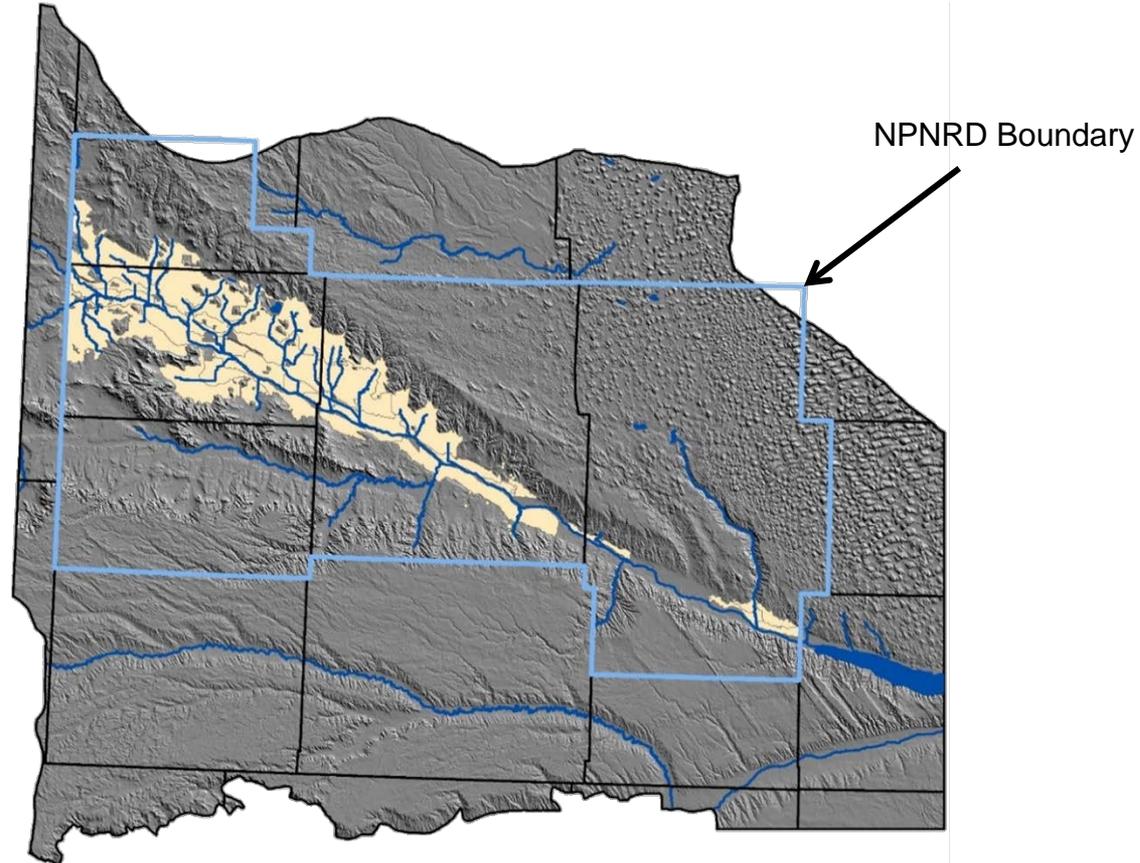
# NPNRD IRRIGATION EFFICIENCY 1953 - 2013



# HYDROLOGIC DATASETS 1953 - 2013



# SURFACE WATER LANDS UNDER CANALS WITHIN NPNRD



# NPNRD WATER RESOURCES ANALYSES

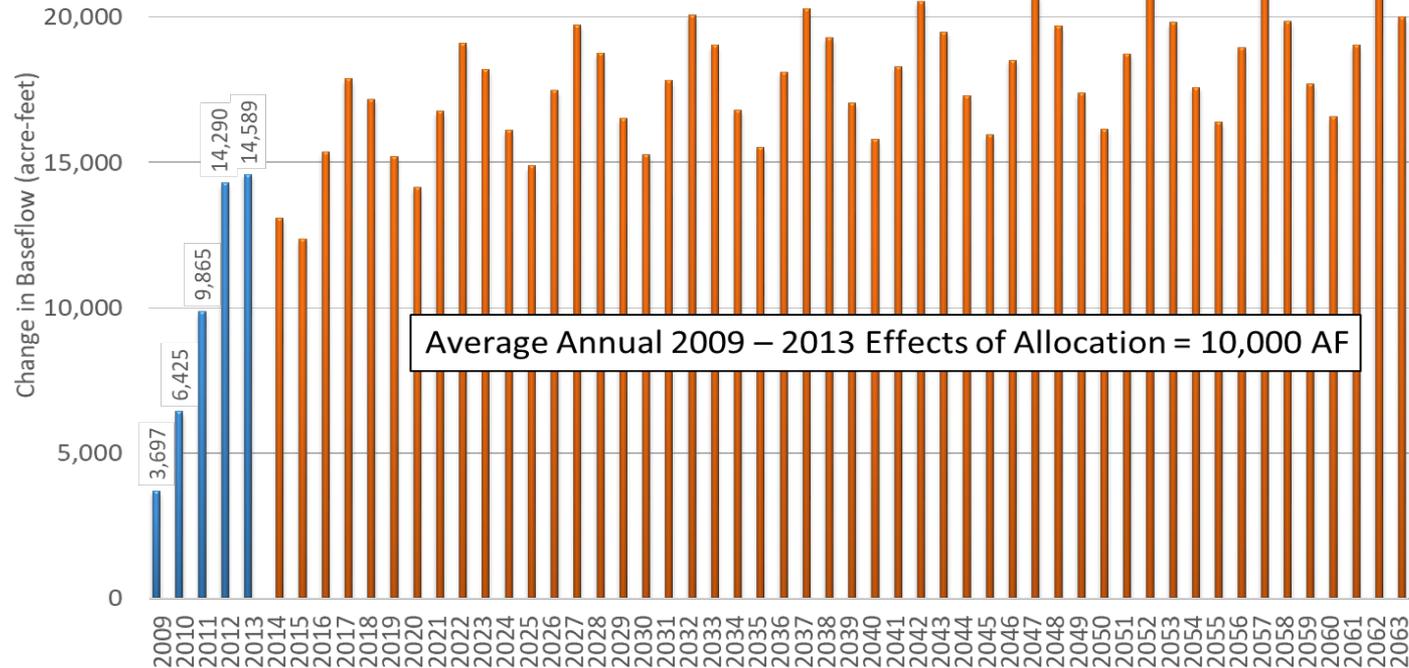
- Incentive Based Program Analyses
  - Groundwater certified acres retirements
  - Surface water and commingled leases
  - EPIC allocation buydowns
  
- Regulations Analyses
  - Groundwater transfers
  - Allocations analyses

# ALLOCATION ANALYSIS

- Generalized concept
  - Determine the effectiveness of NPNRD's allocations of reducing consumptive use and depletions through deficit crop irrigation
  
- Comparison of:
  - Metered pumping from NPNRD
    - ✓ Actual pumping on each field
  
  - Modeled Pumping created through WWUM Modeling
    - ✓ Pumping at the full consumptive use of the crops for the groundwater only lands
    - ✓ We assumed no benefit from allocations on commingled lands due to dual sources of water
  
  - Repeat recharge and pumping from 2009 through 2013 for 50 years into the future to provide planning information for the District

# ALLOCATION ANALYSIS

North Platte River and All Tributaries Annual Change in Baseflow (acre-feet)



*Note: This analyses was completed after the 2013 modeling update. An updated analysis will be conducted after the completion of the 2016 modeling update in calendar year 2019.*



# IMP IMPLEMENTATION STATUS

Components

Related Rules

Incentive Based Activities

# REGULATIONS

- Moratorium on new wells and expansion of irrigated acres in the District (Ref: Neb Rev Statute §§ 46-739 or IMP - Chapter 5, II, C1)
- Flow meters on all regulated wells in the District  
(NPNRD Rules & Regulations, Chapter 4)
- All groundwater acres must be certified  
(NPNRD Rules and Regulations, Chapter 3 or IMP - Chapter 5, II, C2)
- OA appropriated portion is allocated (IMP – Chapter 6, II, B, 3a)
  - North Platte River Valley 70 acre-inches over five years
  - Pumpkin Creek 60 acre-inches over five years

# FEDERAL/STATE PROGRAMS (IMP – Chapter 6, II,A,2a)

- 2005 – approximately 2,500 irrigated acres were permanently retired in Pumpkin Creek
  
- AWEF & EQIP acres
  - 3705 under contract right now – could add another 200 this year
  
- CREP acres
  - 5,617.03 GW/SW/Co-mingled

# NPNRD OUTREACH PROGRAMS

- Producer roundtables take place every Jan. & Feb
- Presentations at various organizations within district, state, nationally and internationally about NPNRD programs/projects
- Participation in conferences, meetings, and other natural resources related gatherings

# NPNRD OUTREACH PROGRAMS CONT.

- Presentations at social groups and other organizations with interest in natural resources (Rotary, Kiwanis, Chamber of Commerce, and others)
- Use of traditional media (press releases, radio, T.V., and press conferences)
- New media (Website, Facebook, Twitter, LinkedIn, and others)
- Visiting nearly 200 classrooms a year and more than 4,000 students

# INFORMATION/EDUCATION IN THE IMP

- Identify education programs to help reduce consumptive use and meet management goals and objectives (*IMP - Chapter 5, I,C1*)
- Non-regulatory action items (*IMP - Chapter 5, II,B1*)
  - Development of education activities to help inform about the various management programs
  - Educational materials for outreach activities
- Outreach programs cover activities in the entire district

# NRD PROGRAMS - CURRENT

- Surface water, groundwater, commingled retirements/leases
- 10/30 & EPIC (allocation buy-down) Programs
- Alternative Cropping
- Conservation cost-share changed to align with IMP obligation goals
- Credits from excess flow from NP River diverted through the canals (40,000 a/f in 2011, around 17,000 a/f in 2016)

*(IMP – Chapter 6, II, A, 2 & 3)*

# NRD PROGRAMS - FUTURE

- On-farm efficiencies improvements including Variable Rate Irrigation, pivot dropdown nozzles replacement, soil moisture sensors, weather stations, and other water saving technologies
- Expand the allocation buy-down program, which the NPNRD has budgeted \$284,000 in FY2018, with \$200,000 coming from the WRCF, which could provide additional **14,200 acre-inches or 1,183.3 a/f back to the river**

# NRD RETIREMENT/LEASE PROGRAMS

- 3,442.05 acres are enrolled in retirements/leases
- EPIC Program - purchased 6,401.5 acre-inches or 533.5 acre-feet from GW only users
- 2016-2018 – Money from the Water Sustainability Fund to permanently retire 1000 groundwater acres (*DNR Contract #934*)

# NPRND EXPENDITURES ON WATER MGMT.

- NPNRD has spent more than \$10.8 million to help meet out IMP obligations
- An additional \$6.8 is obligated through 2032
- Since 2008
  - 91,822 in hours worked, which equals \$2.4 million in salaries and benefits
  - 519,238.7 miles driven at a cost of \$285,581.29
  - NPNRD has use an average of 0.9 (minimum .3 cent; maximum 2 cents) of the three-cent levy authority, which was allowed to sunset in 2018
- Since 2013, NRD has spent more than \$2 million on permanent/temporary groundwater retirements and surface water and surface water leases in advantageous zones of depletion

# NPNRD ACHIEVEMENTS TO DATE

- Based upon a preliminary analysis, the NPNRD has met and exceeded their post-1997 depletions target identified in the first increment IMP



# SECOND INCREMENT CONSIDERATIONS

# ITEMS TO ADDRESS IN NEXT IMP

## ➤ IMP

- New efficiencies in the surface water system, which creates new depletions or takes away accretions from the river
- 25 million gallon rule and how it impacts municipalities, industry, and feedlots  
*(IMP – Chapter 5, II, C, 4C & 5 B & C)*
- Initiate a study to determine the potential aquifer recharge from farms that are flood irrigated

## ➤ DNR

- Can we make the permitting process more efficient
- Bankable water
- Field inspection for every lease/retirement

# DROUGHT PLAN

- How will the planning and mitigation for drought be integrated into the second increment of the IMP?
- NPNRD's Drought Plan *(Binder item 13) (IMP - Chapter 7, II, A & B)*



# NEXT STEPS

# MEETING DATES

- August 16
- November 15
- January 17, 2019



# PUBLIC COMMENT

Thank You