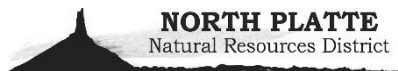




NPNRD IMP

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

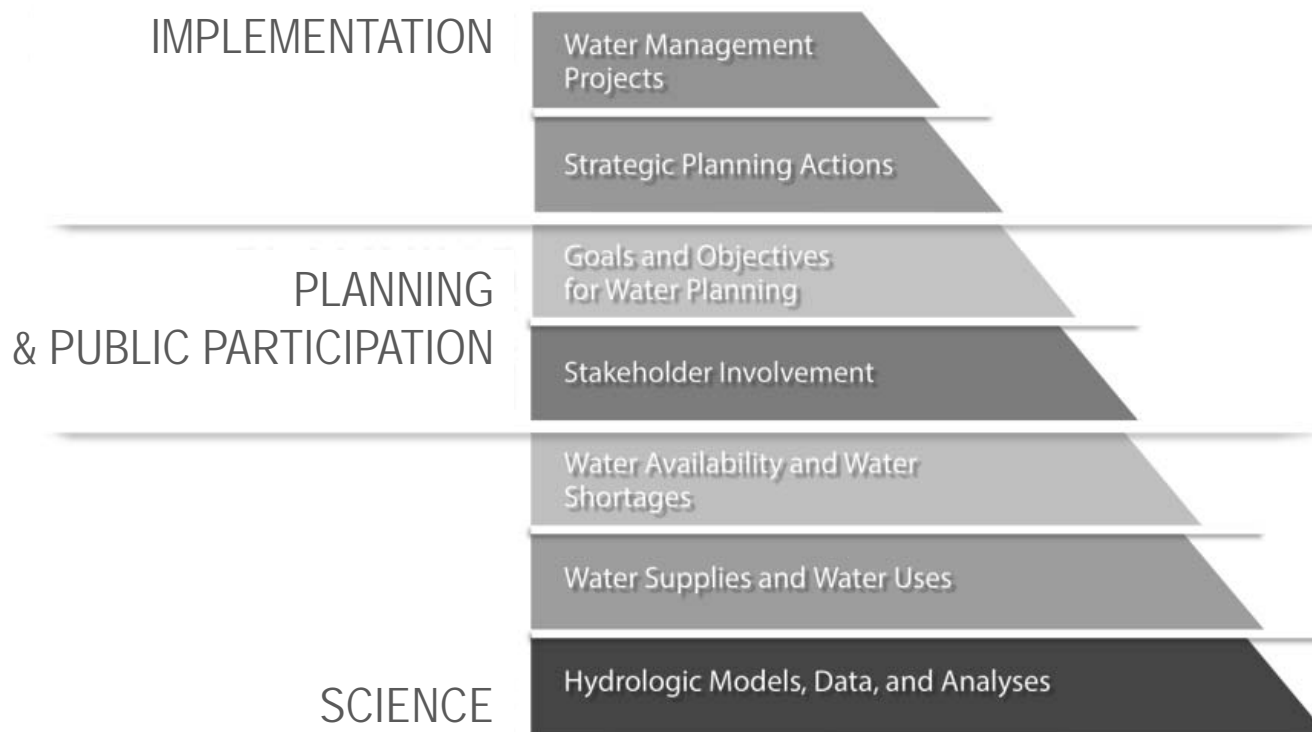
(How did we get here?)

Current Basin-Wide Plan

(What has been done?)

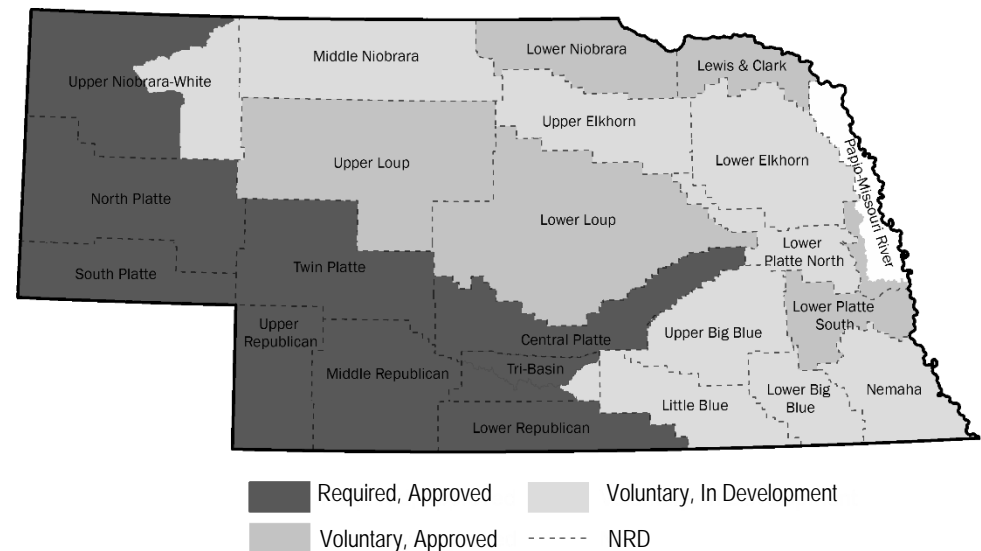
Basin-Wide Plan & IMPs

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

LB 962

Platte Overappropriated Area Basin-Wide Plan

- New Nebraska State Law
 - Legislative Bill 962 passed in 2004
- Groundwater Management and Protection Act



STATUTORY DEFINITION § 46-713(4)(a)

Platte Overappropriated Area Basin-Wide Plan

Why?

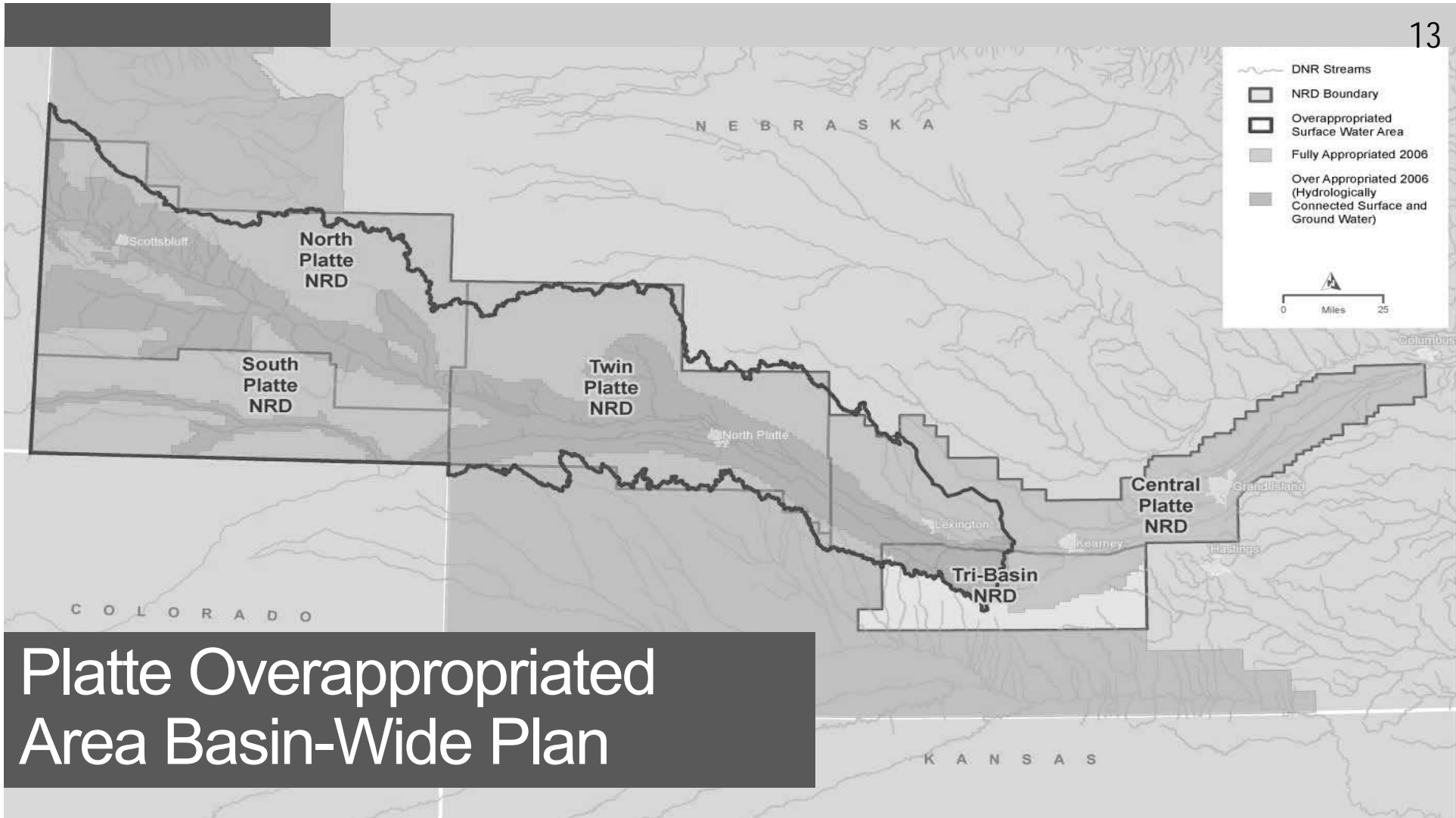
- Criteria for an overappropriated basin designation
 - Interstate agreement
 - Moratorium on surface water appropriations
 - Stays on well construction

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)

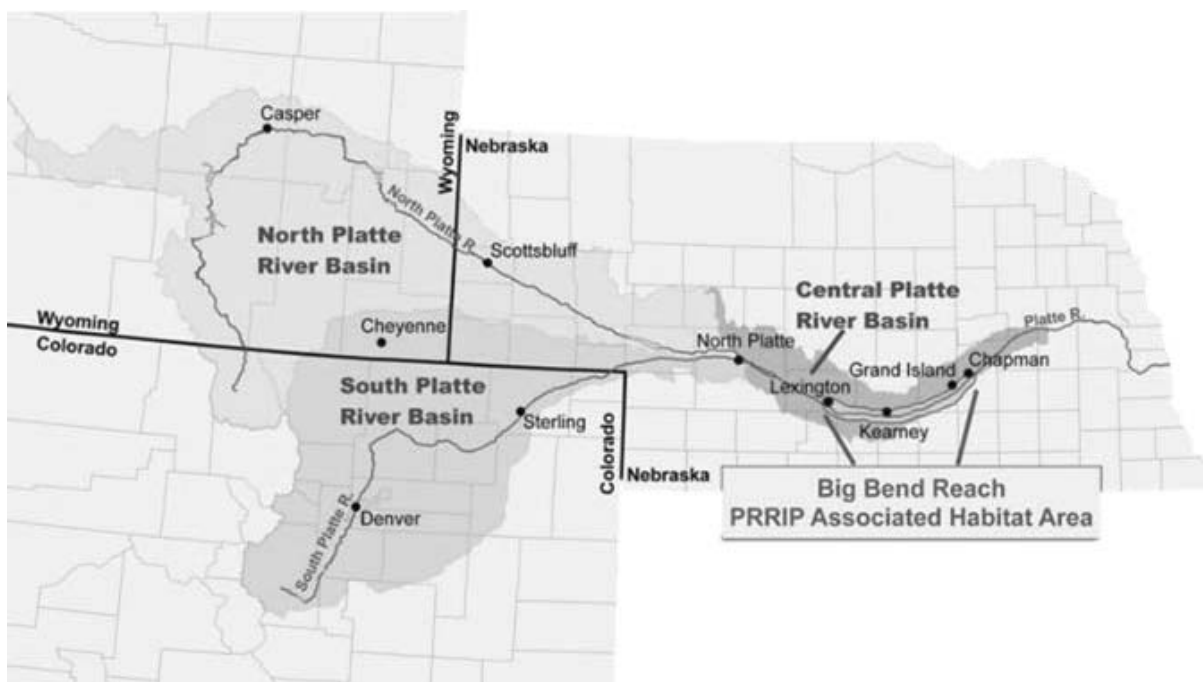
- A map of the area subject to the integrated management plan
- At least one groundwater control and at least one surface water control
- A monitoring plan
 - Plan to gather and evaluate data, information, and methodologies to increase understanding of the surface water and hydrologically connected groundwater 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)

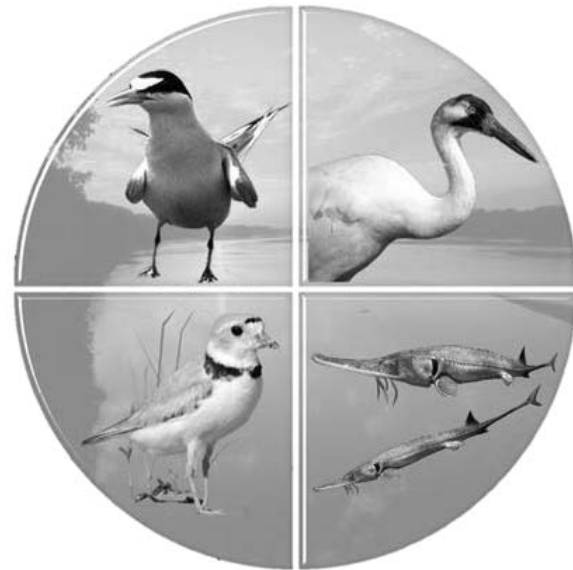


- Began January 1, 2007
- Basin-wide effort by Department of Interior, Colorado, Wyoming, and Nebraska
- Implementation of PRRIP is incremental
 - The first increment is 13 years, through 2019

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

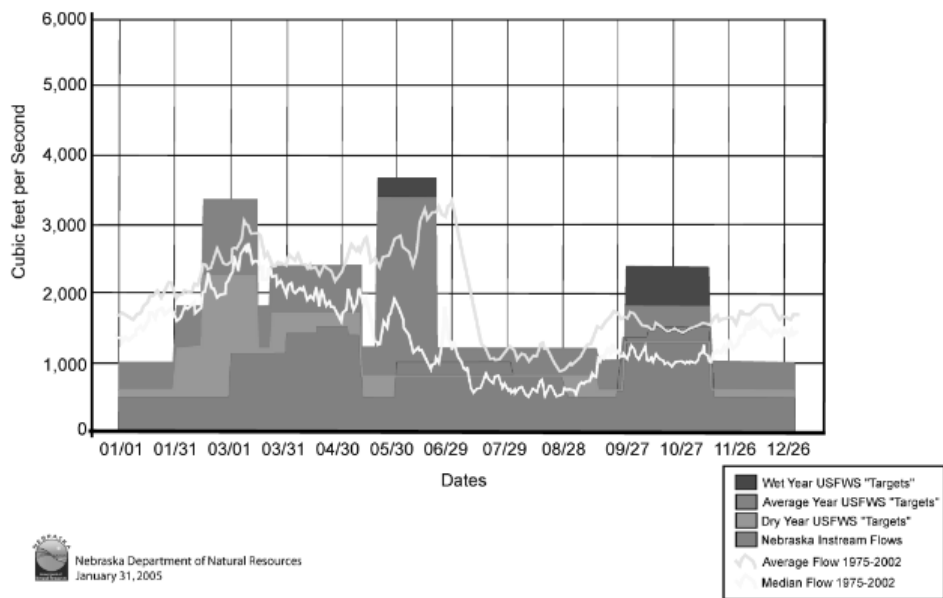


INTERSTATE AGREEMENT – PRRIP

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



- 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

Nebraska Department of Natural Resources
January 31, 2005



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)

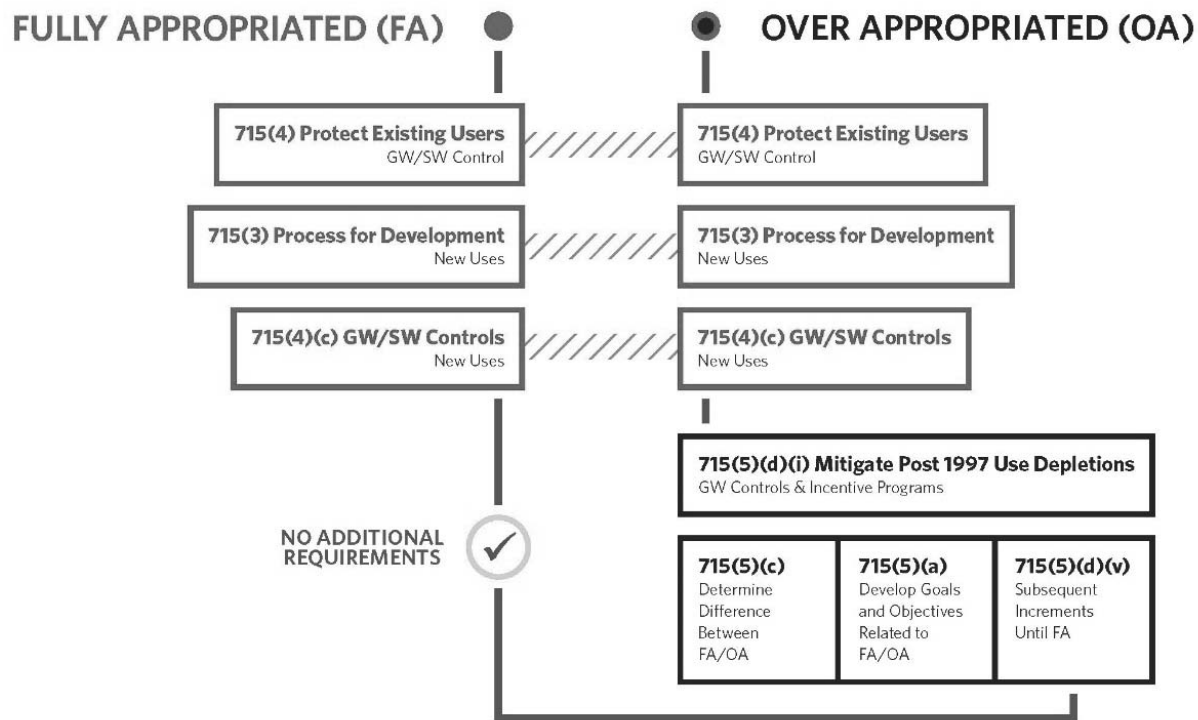
- Process for economic development opportunities and economic sustainability
- Clear and transparent procedures to track depletions and gains to streamflow utilizing the best available / generally accepted methods, information, data, and science
- Procedures the NRD / NeDNR use to report, consult, and 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



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

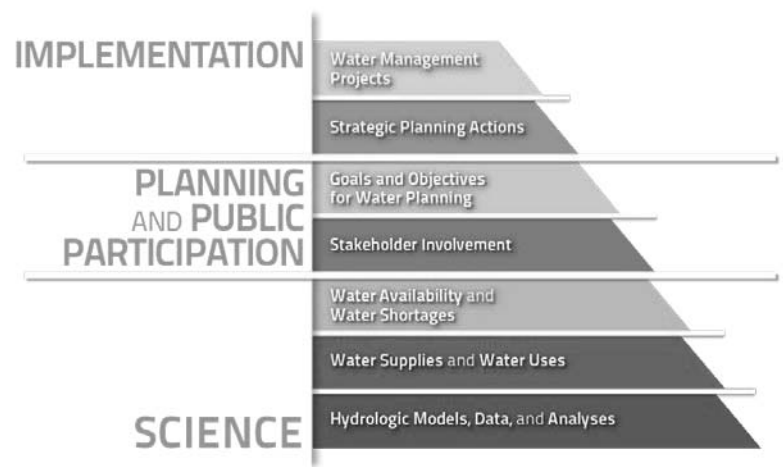
Basin-Wide Plan

- 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

➤ 1st increment basin-wide plan

- Current plan went into effect in September 2009

➤ 2nd increment basin-wide plan

- 2nd increment Basin-wide Plan process began in 2016 with Stakeholders
- Current process to incorporate stakeholder input into 2nd increment basin-wide plan
- Will present draft 2nd increment plan to stakeholders in September 2018
- 2nd 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 human-induced 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...
	Maintain first increment mitigation efforts		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 determine the difference between the current and fully appropriated levels of development...		
	Use available funds and actively pursue new funding opportunities to...implement this Plan		
	Update and continue implementing IMPs in each Platte River Basin NRD		

Goals	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
Objectives	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

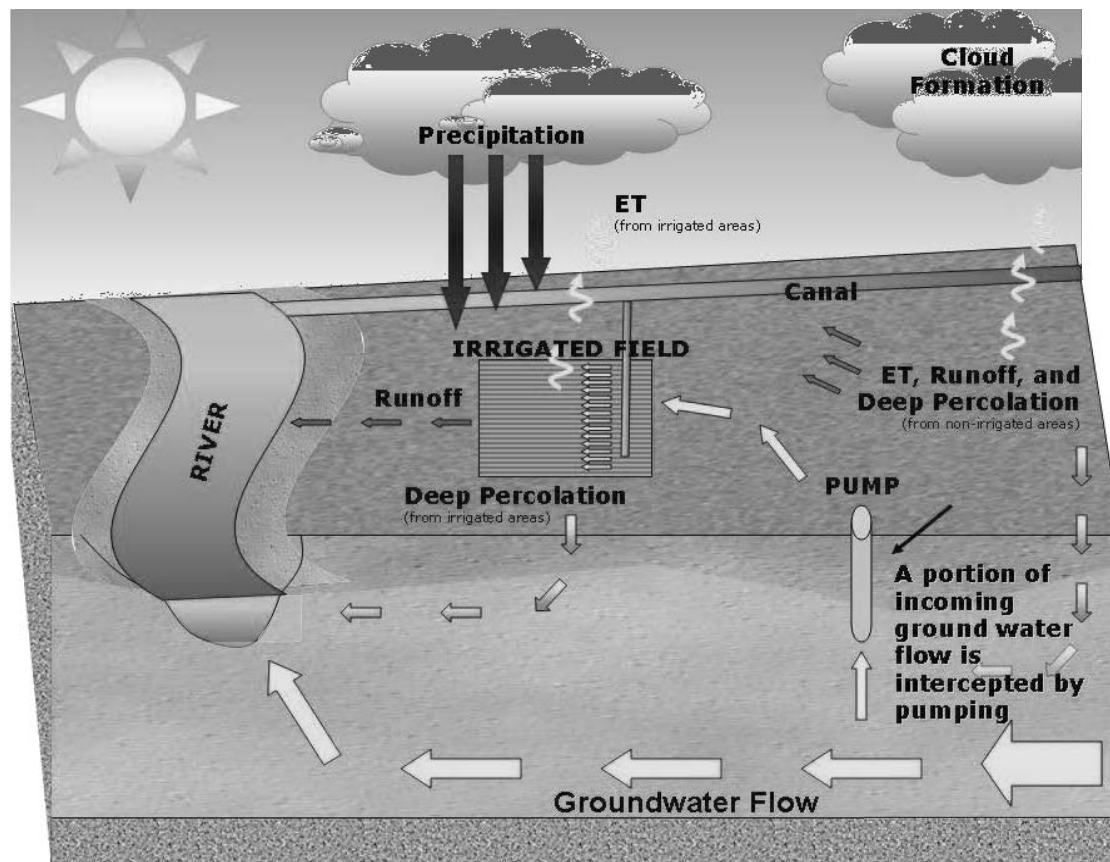
Second Increment Considerations
Next Steps



STREAM DEPLETIONS 101

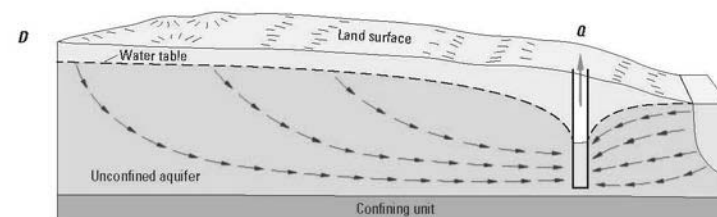
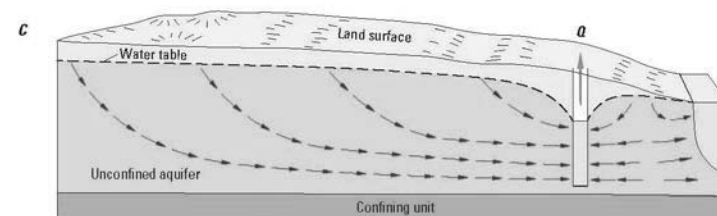
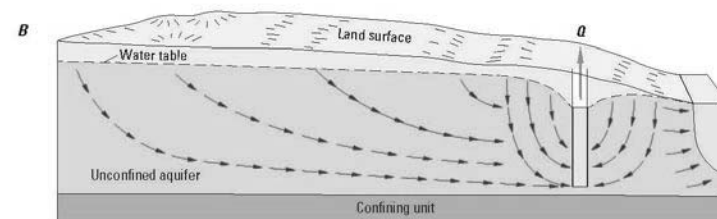
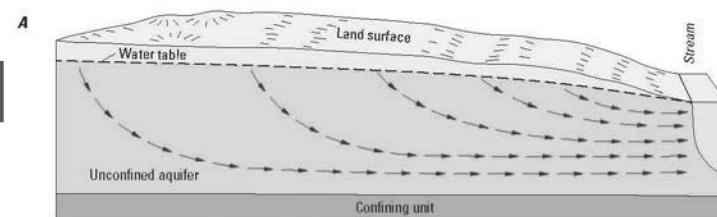
STREAM DEPLETIONS 101

- Typical elements of ground and surface water budgets

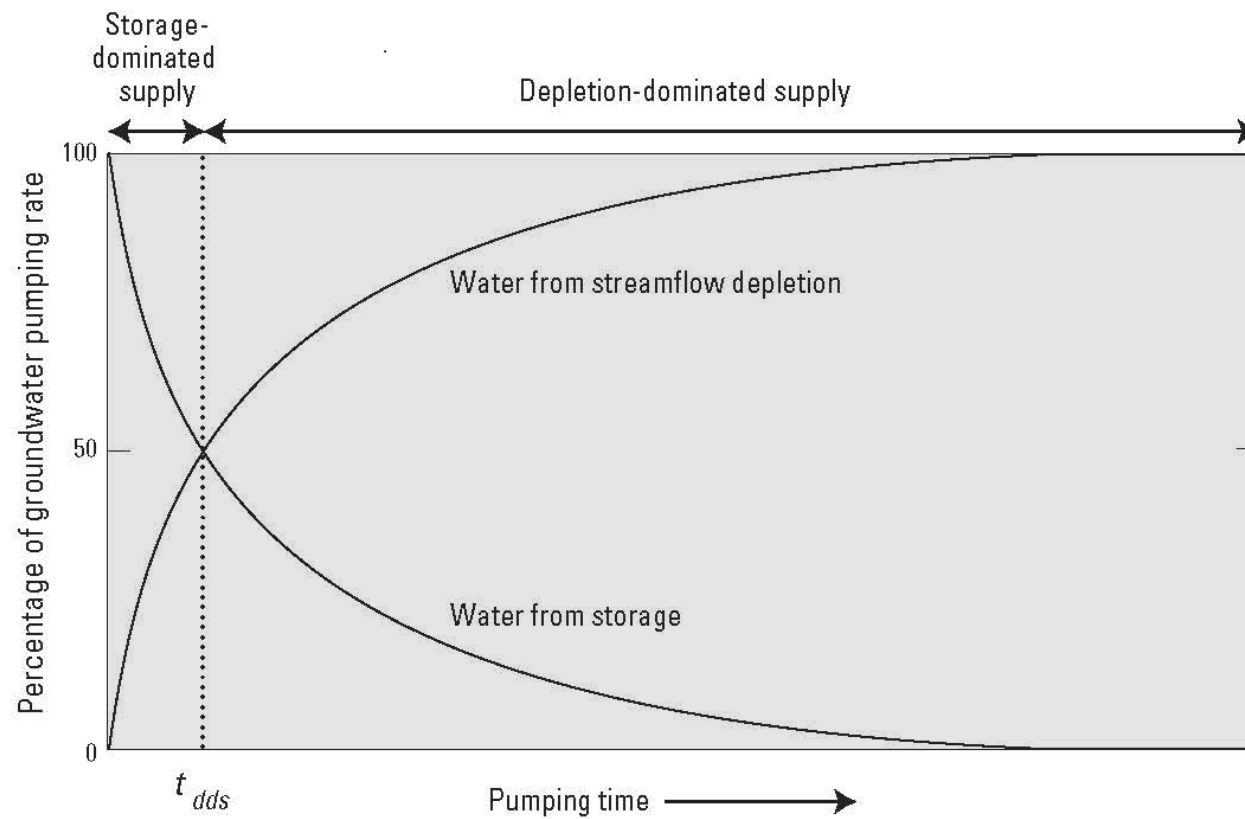


STREAM DEPLETIONS 101

- 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

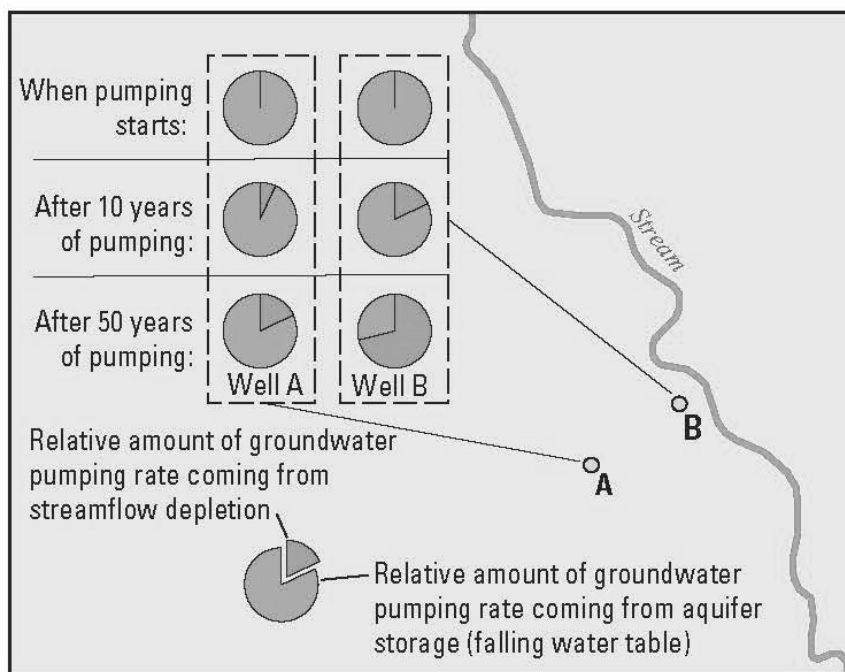


STREAM DEPLETIONS 101

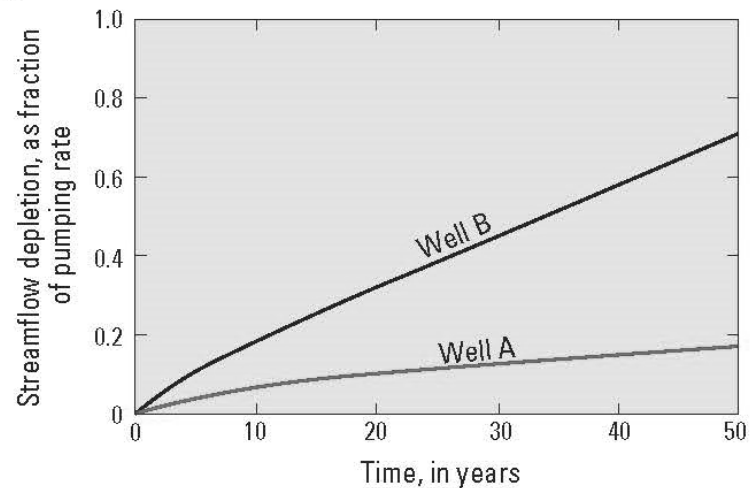
- Factors that affect timing, rates, and locations of streamflow depletion:
 - Geology and hydraulic properties of aquifer
 - Aquifer size/volume
 - Geometry of the surface water streams
 - Well location (vertical and horizontal distance from streams)
 - Pumping rates and operational characteristics

STREAM DEPLETIONS 101

A



B

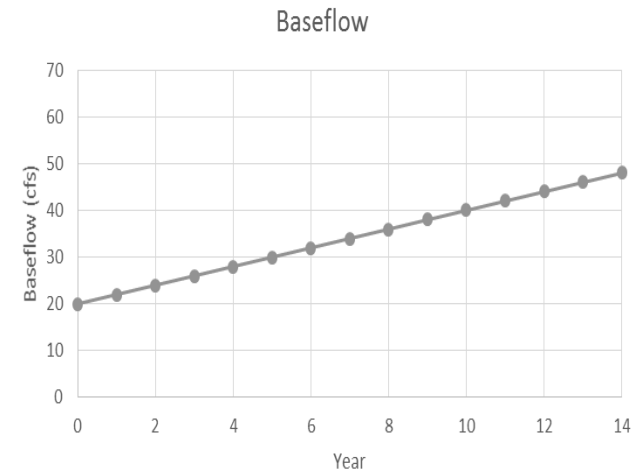
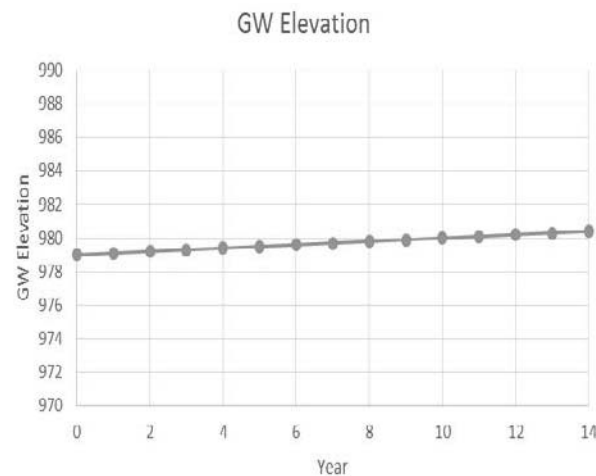


STREAM DEPLETIONS SUMMARY

- 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.

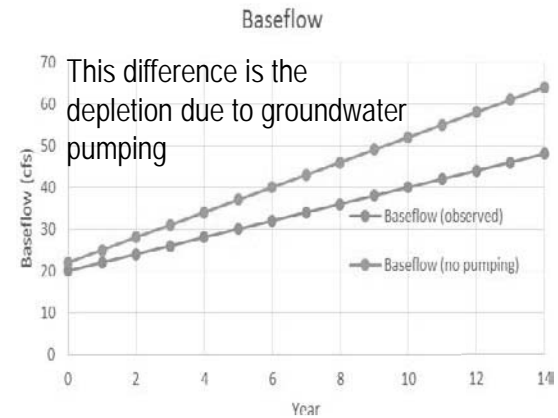
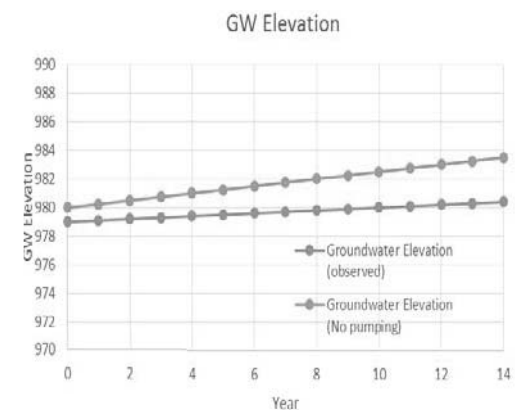
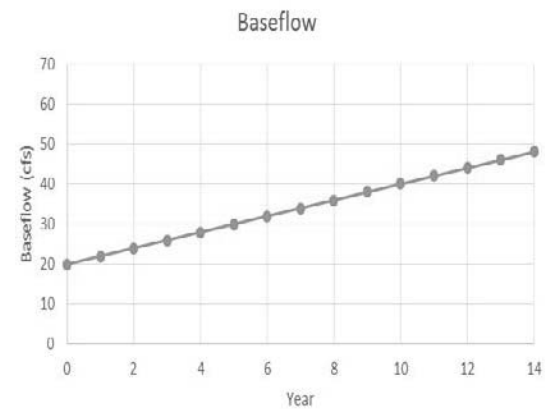
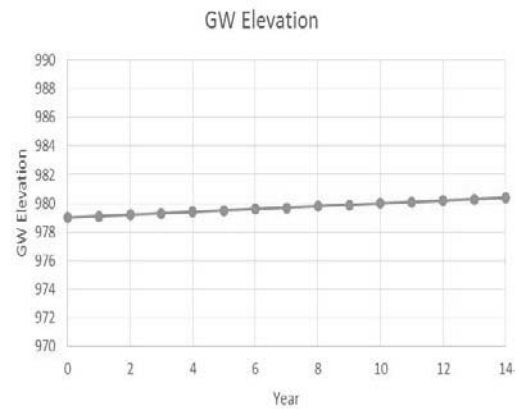
Why?

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

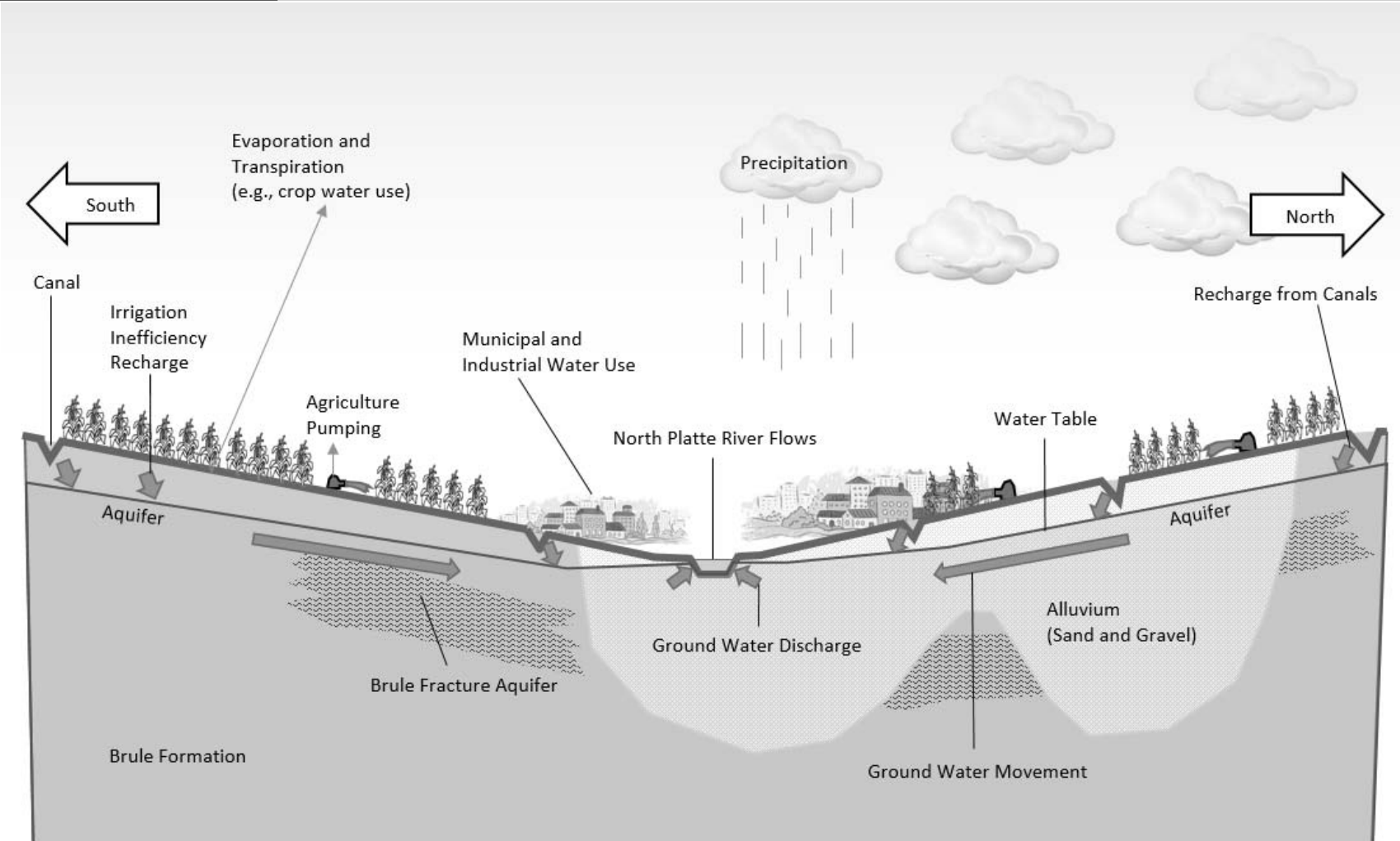
- Modeling started in 2009

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

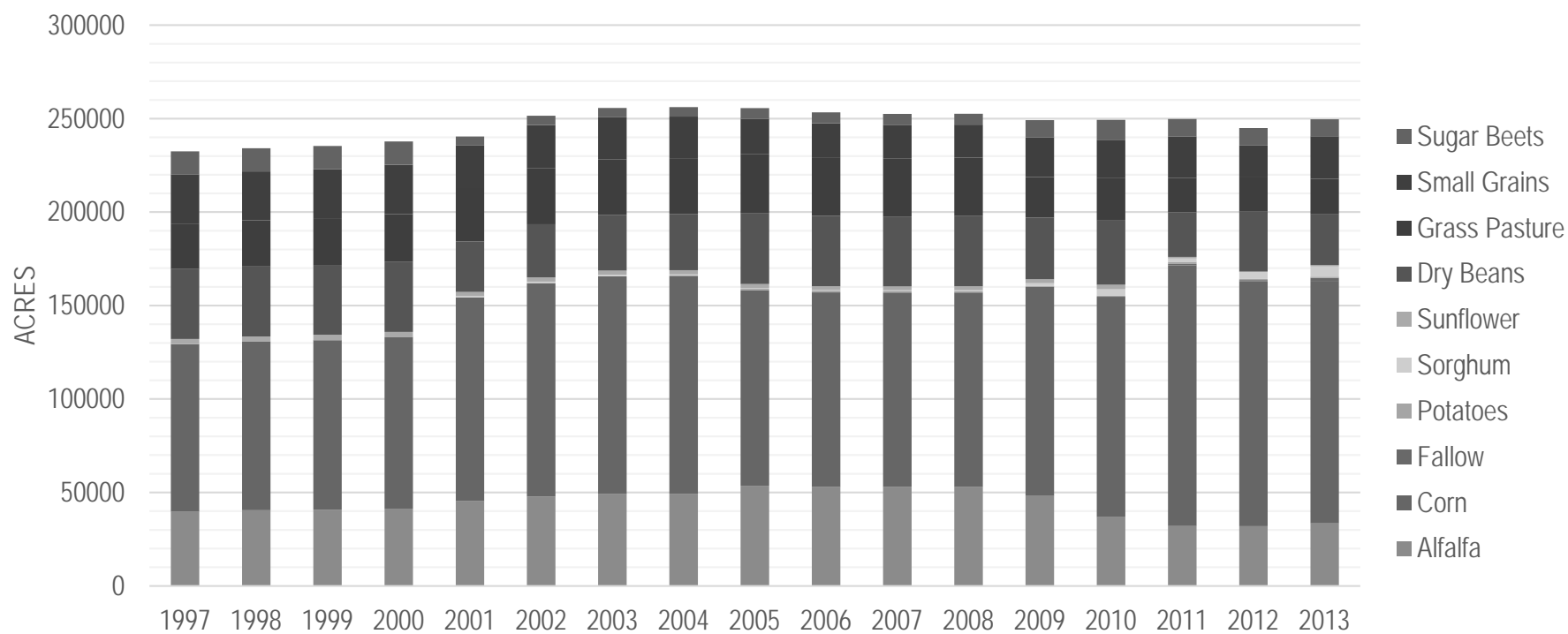
LAND USE DATASETS

1953 - 2013

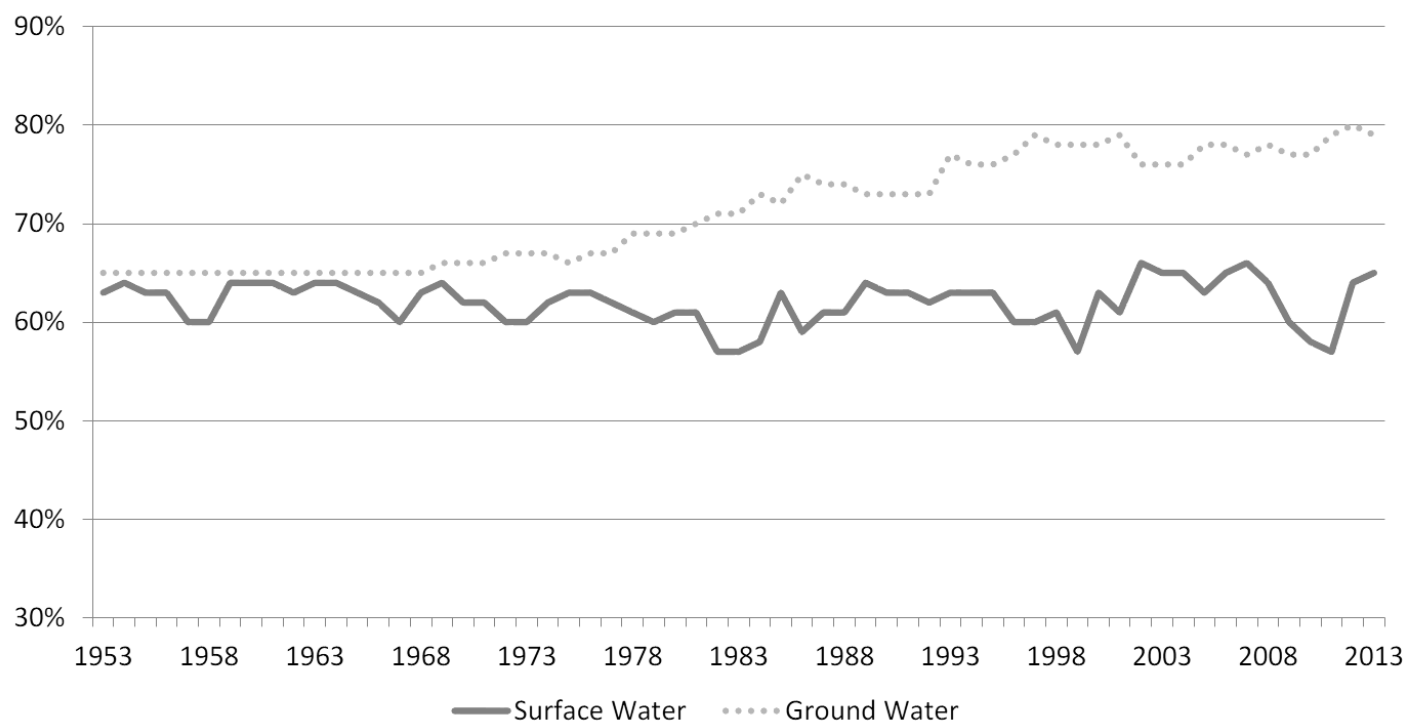


Refined Parcel Boundaries

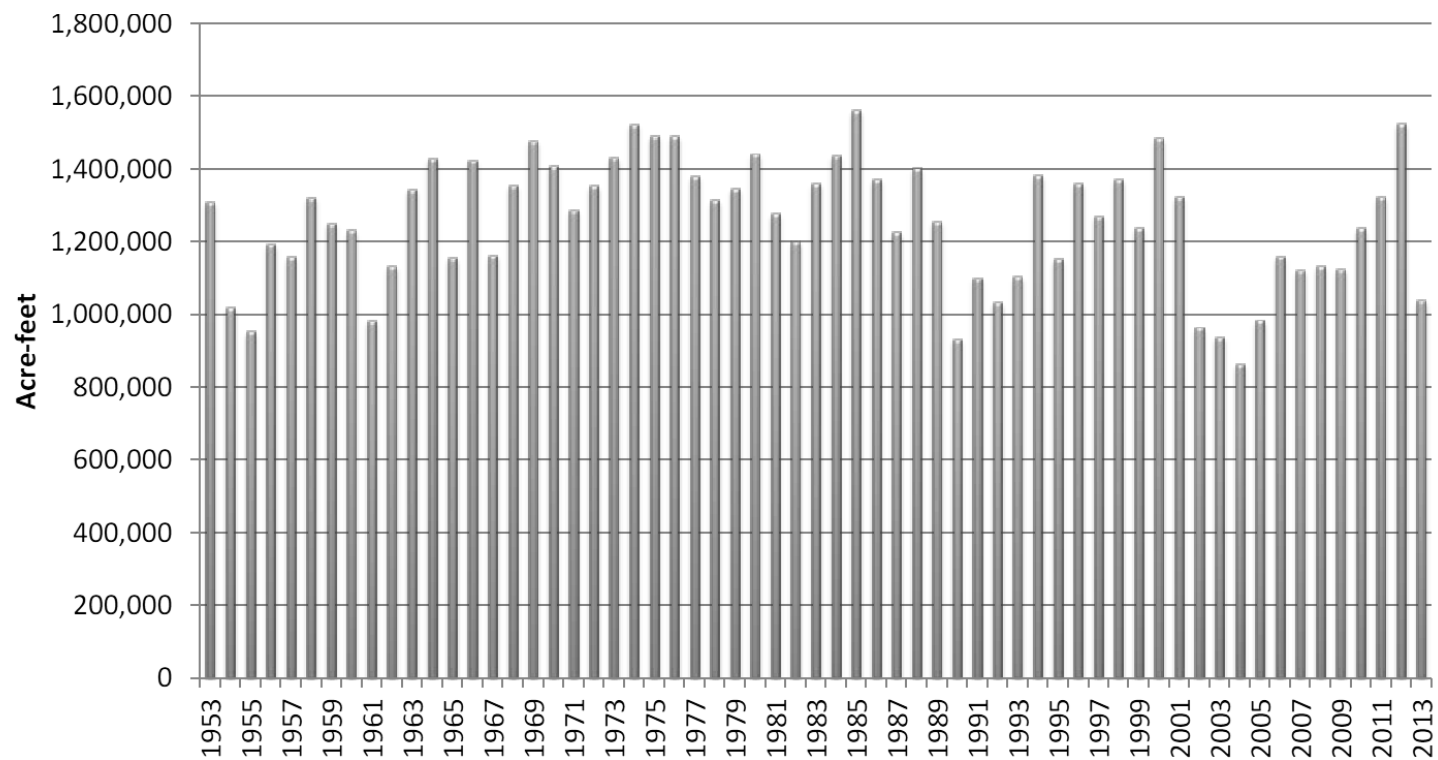
NPNRD ANNUAL CROP STATISTICS 1997 - 2013



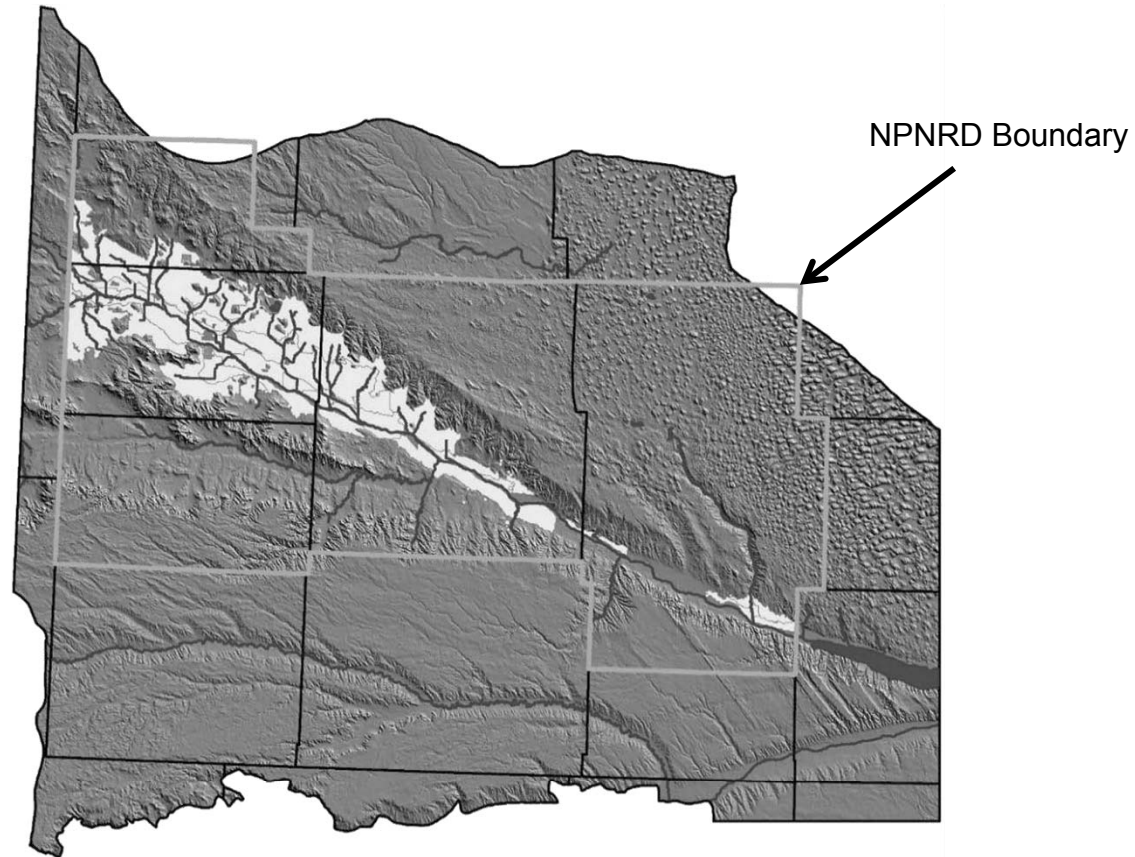
NPNRD IRRIGATION EFFICIENCY 1953 - 2013



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

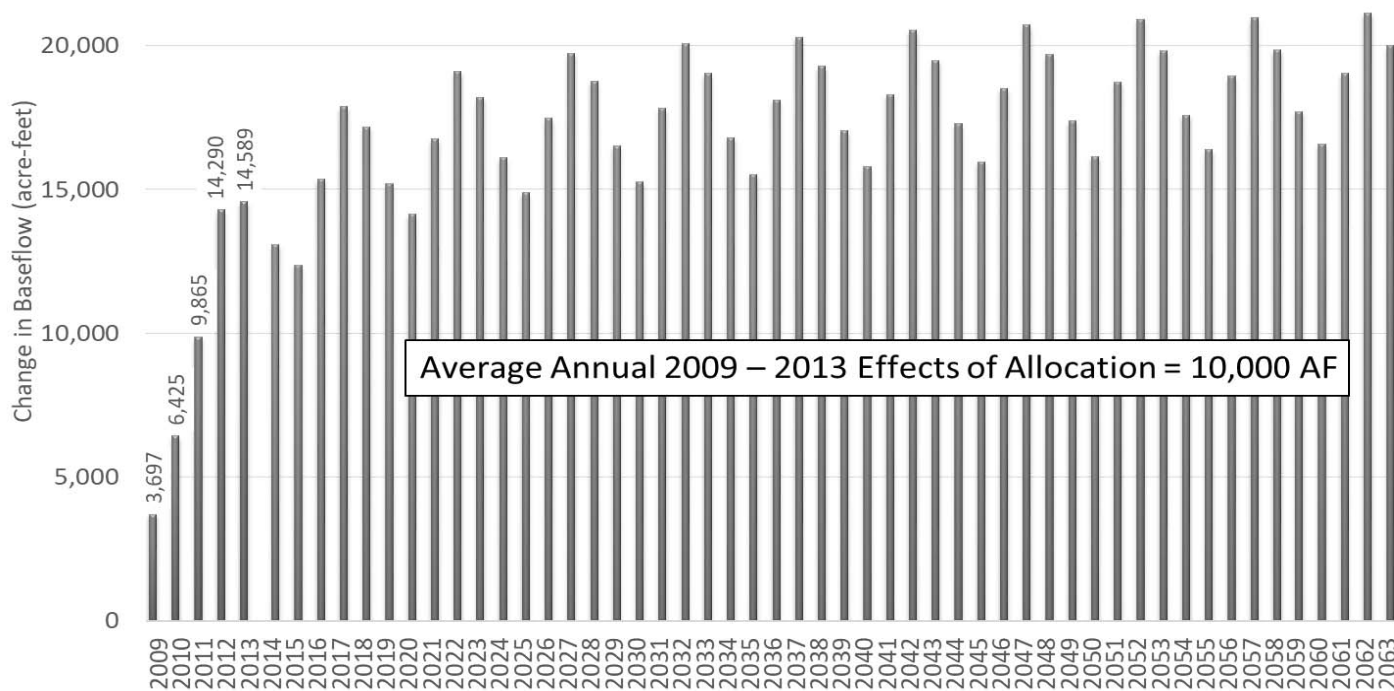
- Comparison of:
 - Metered pumping from NPNRD
 - ✓ Actual pumping on each field

 - 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.

- NPRND 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
 - NPRND 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