

**Republican River Basin-Wide Plan
Stakeholder Advisory Meeting Minutes
November 30, 2017 | Community Center, Cambridge, Nebraska**

Stakeholder Advisory Committee members in attendance were:

Brad Edgerton	Bradly Knuth	John Rundel
Troy Fletcher	Jerry Kuenning	Daniel Smith
Josh Friesen	Kent Lorens	Aaron Thompson
Wayne Haarberg	Jeff Loschen	Ted Tietjen
Dick Helms	Gale Lush	Marcia Trompke
Bill Hoyt	Cedric McDaniel	Jerda Garey Vickers
Max Kaiser	Dave Oxford	Tom Vickers
Jim Kent	Ross Montgomery	Todd Watson

Plan Development Team members in attendance were:

Patti Banks	Jeff Fassett	Jennifer Schellpeper
Emily Bausch	Carol Flaute	Brian Harmon
Todd Siel	Tatiana Height	Stacey Roach
Scott Dicke	Nate Jenkins	John Thorburn
Beth Eckles	Jack Russell	

Individuals from the community present during the meeting included:

Jean Eichorst	Robert Martin	Camaura Scott
Chelsea Erickson	Gary Mohr	
Chelsea Johnson	Logan Mohr	

Note: See Attachment A for a copy of the sign-in sheets.

NOTICE OF THE MEETING

Notice of the meeting was published on the Department of Natural Resources web site (dnr.nebraska.gov). Notices were also published in the Holdrege Daily Citizen, McCook Gazette, Imperial Republican, and the Benkelman Post & News Chronicle.

INFORMATIONAL MATERIALS

The following informational materials were distributed to stakeholders:

- Meeting Agenda (Attachment B)
- Draft Funding Section of the Plan handout (Attachment C)
- Draft Measurable Hydrologic Objectives handout (Attachment D)
- Stakeholder Comments on Draft Plan Language handout (Attachment E)
- MRNRD Summary of Medicine Creek Study handout (Attachment F)
- Draft Goals and Objectives handout (Attachment G)
- New Draft Objectives and Action Items handout (Attachment H)
- What Has Been Added to the Draft Goals and Objectives Since the August Stakeholder Meeting (Attachment I)
- September and October Coordination Meeting Summaries handout (Attachment J)
- Why Watershed Management handout (Attachment K)
- Water Markets Concept handout (Attachment L)
- Water Balance Discussions handout (Attachment M)

1. WELCOME

- Jennifer Schellpeper, NeDNR, welcomed everyone and reviewed the agenda and stated that this meeting is subject to the Nebraska Open Meetings Act.
- Jack Russell, MRNRD Manager, gave a brief explanation of the Medicine Creek Study and instructed the group to come to him with any questions. He then shared that there will be no augmentation pumping until at least October 2018.
- Jeff Fassett, NeDNR Director, then addressed the group including updates on the Water Sustainability Fund and the State's revenues and budget.
- Summaries of the September and October coordination meetings were distributed.
- The group was asked to review the Draft August Stakeholder Meeting Minutes and provide comments within 15 days. If no comments are received then the August minutes will be considered final and will be posted to the Republican River Basin-Wide Plan website.

2. PLAN LANGUAGE AND RELATED DISCUSSION ITEMS

- *Note: Throughout this section of the minutes, objectives and action items are referred to by their numbers, which may change during the course of plan development. To see what plan language each of these discussions and votes are referring to, please refer to Attachment H, "New Draft Objectives and Action Items"*
- Funding section of plan
 - Jennifer opened the discussion beginning with a handout of the Draft Funding Section of the Plan, which was sent to the stakeholders for review in advance of the meeting. It was explained that the funding section is meant to iterate that NeDNR and the NRDs will look for both internal and external funding resources but that budget cuts may potentially impact the ability to carry out incentive programs
 - **A vote was taken on whether to approve the language in the Draft Funding**

Section of the Plan, as written, and the vote passed by consensus.

- Water markets
 - The group was then asked to refer to the handout summarizing NeDNR and the NRDs' previous discussion of the water markets concept, including draft plan language about water markets (Objective 5.3, action item 5.3.1., and action item 5.3.2), which had been sent to the stakeholders for review in advance of the meeting.
 - It was explained that any legal aspects of creating a water market and decisions about the types of water user exchanges available will be explored during implementation of the Plan.
 - **A vote was taken, and it was decided by consensus to approve objective 5.3, action item 5.3.1, and action item 5.3.2.**

- New DRAFT Objectives and Action Items
 - Carol Flaute, NeDNR, reviewed the Draft Goals and Objectives handout and a handout summarizing which language had been added since the group last reviewed a draft of the goals and objectives. The Draft Goals and Objectives had been sent to the stakeholders in advance of the meeting for review.
 - The New Draft Objectives and Action Items handout was distributed and introduced. This handout is a list of all of the draft objectives and action items that have been added to the plan since the stakeholders last voted on individual goals, objectives, or action items.
 - Jennifer Schellpeper then led the group in discussion and voting on these new objectives and action items, beginning with objective 2.2 and action item 2.2.1.
 - **A vote was taken, and it was decided by consensus to approve objective 2.2 and action item 2.2.1.**
 - Action item 3.1.3 was introduced for consideration.
 - There was discussion about whether the intent of action item 3.1.3 is really to proactively educate or merely to inform by distributing information, and it was confirmed that the intent is to proactively educate.
 - **A vote was taken, and it was decided by consensus to approve action item 3.1.3.**
 - Objective 3.2 and action items 3.2.1, 3.2.2, 3.2.3, and 3.2.4 were introduced for consideration.
 - There was discussion about how annual data will be shared with the public. Some of the ideas were to share a summary of and link to the annual report in local newspapers, making presentations to local chambers of commerce, aggregating data so as not to reveal personal information, and making the data user friendly.
 - There was also a question about who would be compiling and reporting the data, and it was clarified that this would be NeDNR and the NRDs.
 - **A vote was taken, and it was decided by consensus to approve objective 3.2 and action items 3.2.1, 3.2.2, 3.2.3., and 3.2.4.**
 - Objective 4.3 and action items 4.3.1 and 4.3.2 were introduced for consideration.

- During discussion of objective 4.3, action item 4.3.1, and action item 4.3.2, there was discussion on whether or not improving reliability, efficiency, and availability of water are connected, and the group agreed that these items need to be revised and clarified.
 - **A vote was taken, and it was decided by consensus to table a vote on objective 4.3, action item 4.3.1, and action item 4.3.2 until after these items have been revised and clarified by NeDNR and the NRDs.**
 - Objective 4.5, and action items 4.5.1 and 4.5.2 were introduced for consideration.
 - **A vote was taken, and it was decided by consensus to approve objective 4.5, action item 4.5.1, and action item 4.5.2.**
 - Objective 4.6 and action items 4.6.1 and 4.6.2 were introduced for consideration.
 - There was a question about whether there would be one annual meeting for the entire basin or if there would be an annual meeting in each NRD. As an example, for the existing Upper Platte Basin-Wide Plan, there is one annual meeting at a central location in the basin. A stakeholder pointed out that if a meeting were to take place within each NRD, more people might be reached.
 - **A vote was taken, and it was decided by consensus to approve objective 4.6, action item 4.6.1, and action item 4.6.2.**
 - Objective 5.1 and action items 5.1.1 and 5.1.2 were introduced for consideration.
 - **A vote was taken, and it was decided by consensus to approve objective 5.1, action item 5.1.1, and action item 5.1.2**
 - Objective 5.2 and action item 5.2.1 were introduced for consideration.
 - **A vote was taken and it was decided by consensus to approve objective 5.2 and action item 5.2.1.**
- Watershed Management proposal
 - Ted Tietjen distributed a handout and presented to the group about using a watershed management planning approach to recharge the aquifer and improve streamflow and proposed a pilot study to include in the plan.
 - **A vote was taken, and it was decided by consensus that NeDNR and the NRDs will discuss this concept further, with input from Ted, and bring back plan language for the group to vote on.**
- Measurable Hydrologic Objectives
 - A handout about measurable hydrologic objectives was distributed. This handout had been sent to stakeholders in advance of the meeting for review.
 - Jennifer provided an overview of the handout. The first page includes the statutory background of why we need measurable hydrologic objectives, and the second page includes draft "straw dog" measurable hydrologic objectives for discussion.
 - Draft Measurable Hydrologic Objectives 1 & 2: Depletions
 - A handout was distributed to focus discussion on the first 2 draft measurable hydrologic objectives, which pertain to depletions.

- Jennifer opened the discussion of depletions with a PowerPoint presentation and handout showing the historical distribution of Nebraska's allocation among groundwater and surface water uses.
- Discussion about the first draft measurable hydrologic objective, about maintaining depletions within each NRD's portion of the Nebraska's allowable groundwater depletions, centered around the idea that it was a duplication of something already required by the IMPs and not necessary; however, it was also considered a reinforcement of the IMP and no harm is done by including it to demonstrate consistency between the basin-wide plan and the IMPs.
- Discussion about the second measurable hydrologic objective, "maintain groundwater depletions to streamflows at a relatively constant level over the long term" led to substantial group discussion about aquifer declines, depletions to streamflow, and whether maintaining steady depletions was sustainable or if there ought to be a measurable hydrologic objective about reducing depletions.
- A stakeholder proposed a new measurable hydrologic objective to achieve at least a 10% reduction to groundwater depletions to streamflows by the end of the planning period.
- Another stakeholder proposed inclusion of the concept of returning groundwater aquifer levels in the basin to pre-development levels.
- Both new ideas were discussed, but no decisions were reached on this topic.
- Measurable Hydrologic Objective #3: Balance water for future use during drought
 - After some discussion clarifying that #3 is about water storage and carrying water over to drought years for economic viability, stakeholders restated the basic idea of this measurable hydrologic objective as not overusing water when it is abundant so it is available when it is not, or balancing water to maximize use.
 - Concerns were raised about whether this objective is measurable, and stakeholders asked for more detail on how measurement might be accomplished.
 - Stakeholders suggested changing "balance" to "conserve"
- Measurable hydrologic objectives 4 and 5 were not discussed due to time limitations.
- Discussion of measurable hydrologic objectives was tabled until the next meeting.

3. OTHER REMAINING DISCUSSION LEADING TO ADDITIONAL GOALS

- This agenda item was not discussed at this meeting, due to time limitations.

4. PARKING LOT

When members of the group brought up topics that should be addressed, but best discussed at another time, they were written down, and added to the "Parking Lot" for future discussion. The parking lot will be reviewed at the close of every Stakeholder Advisory Committee meeting. Items which have been addressed will be removed from the parking lot and new items may also be added to the parking lot. At the November 2017 meeting, discussion of objective 4.3 and associated action items were added to the parking lot. Items shown in strikethrough below are those that were identified at the November 2017 meeting as having been addressed, and have therefore been removed from the parking lot.

- Dr. Goeke speaking to the group
- Delineation of the basin-wide plan's geographic area
- Definition of sustainability
- Objective 4.3 with action items 4.3.1 and 4.3.2

5. PUBLIC COMMENT

No public comments

6. STAKEHOLDER COMMENT

No stakeholder comments

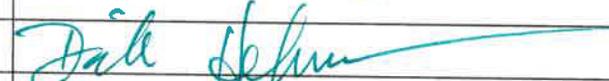
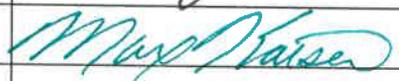
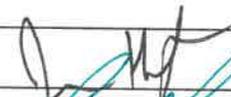
7. NEXT MEETING

On behalf of the entire basin-wide plan development team, including the four NRDs and NeDNR, Schellpeper thanked the stakeholders for attending and participating in this process. The next meeting will be held at the Ella Missing Community Building, in Arapahoe, NE, from 10:00 am to 3:00 pm C.S.T. on December 13, 2017.

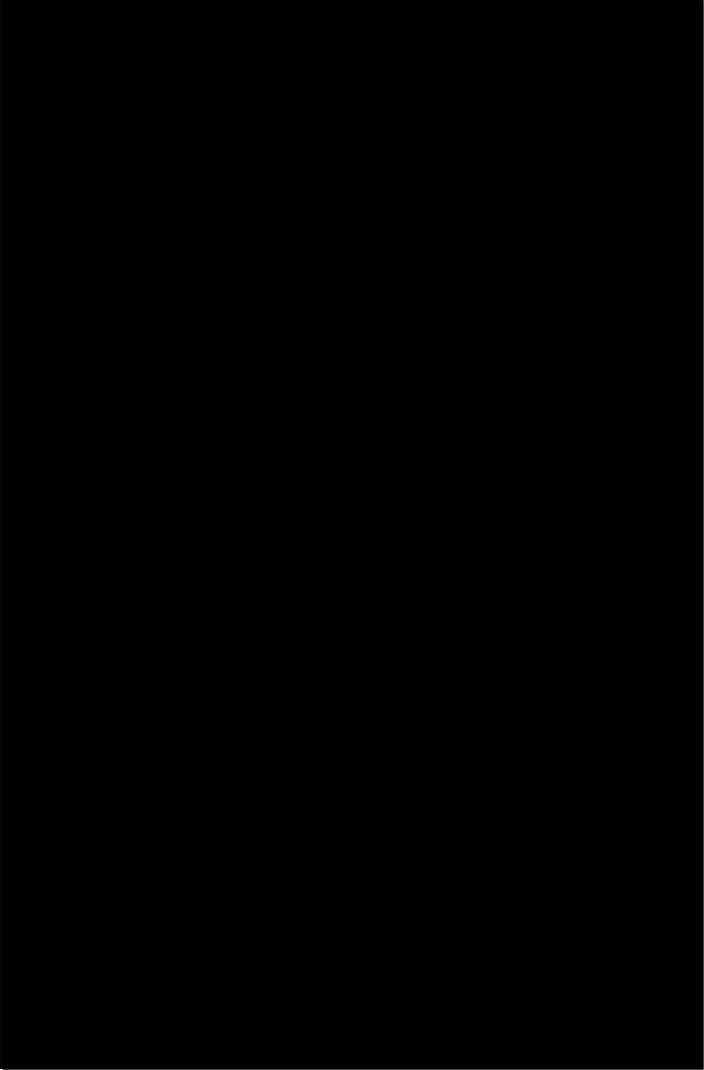
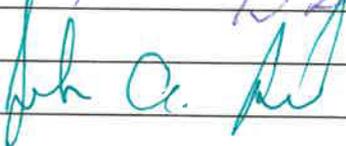
Project Website = <http://rrbwp.nebraska.gov/>

Attachment A – Sign-in Sheets

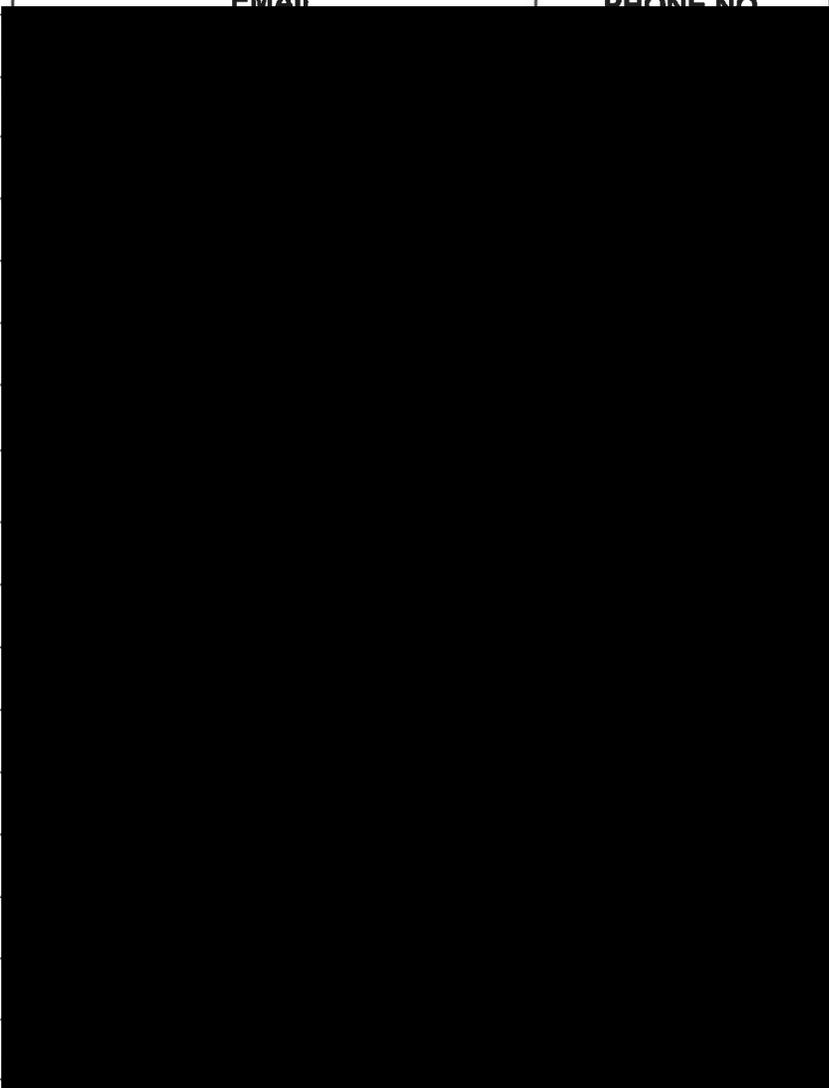
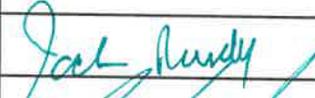
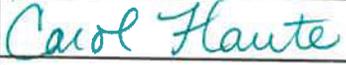
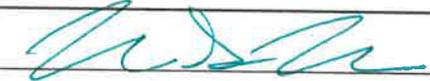
STAKEHOLDER ATTENDANCE RECORD
Republican River Basin-Wide Plan
November 30, 10:00 AM
Community Center - Cambridge, NE

NAME	SIGNATURE	EMAIL	PHONE NO.
Jared Baker			
Kurt Bernhardt			
Ross Montgomery			
Brad Edgerton			
Jerry Ehrke			
Chris Flaming			
Troy Fletcher			
Josh Friesen			
Mike George			
Wayne Haarberg			
Dale Helms			
Dick Helms			
Robin Hinrichs			
Bill Hoyt			
Michael J. Kahrs			
Max Kaiser			
Curtis Kayton			
Jim Kent			
Bradly Knuth			

STAKEHOLDER ATTENDANCE RECORD
Republican River Basin-Wide Plan
November 30, 10:00 AM
Community Center - Cambridge, NE

NAME	SIGNATURE	EMAIL	PHONE NO.
Jerry Kuenning			
Kent Lorens			
Jeff Loschen			
Gale Lush			
Scott Lutz			
Timothy McCoy			
Cedric McDaniel			
Dan Nelsen			
Dave Oxford			
Roric Paulman			
John Rundel			
Nate Schneider			
George Schortberger			
Richard Siel			
Kevin Slocum			
Steve Smith			
Daniel Smith			
Shad Stamm			
Glenn Taubenheim			

STAKEHOLDER ATTENDANCE RECORD
Republican River Basin-Wide Plan
November 30, 10:00 AM
Community Center - Cambridge, NE

NAME	SIGNATURE	AGENCY	EMAIL	PHONE NO.
John Thorburn		Tri-Basin NRD		
Ray Winz		Tri-Basin NRD		
Todd Siel		Lower Rep NRD		
Scott Dicke		Lower Rep NRD		
Sylvia Johnson		Middle Rep NRD		
Jack Russell		Middle Rep NRD		
Nate Jenkins		Upper Rep NRD		
Jasper Fanning		Upper Rep NRD		
Carol Flaute		NDNR		
Jennifer Schellpeper		NDNR		
Amy Zoller		NDNR		
Jeff Fassett		NDNR		
Tatiana Height		NDNR		
Beth Eckles		NDNR		
Shea Winkler		NDNR		
Brian Harmon		NDNR		
Emily Bausch		Olsson		
Stacey Roach		Olsson		

STAKEHOLDER ATTENDANCE RECORD
Republican River Basin-Wide Plan
November 30, 10:00 AM
Community Center - Cambridge, NE

NAME	SIGNATURE	EMAIL	PHONE NO.
Aaron Thompson	<i>[Signature]</i>		
Ted Tietjen	<i>[Signature]</i>		
Marcia Trompke	<i>[Signature]</i>		
Dack Vesta			
Jerda Garey Vickers	<i>[Signature]</i>		
Tom Vickers	<i>[Signature]</i>		
Todd Watson	<i>[Signature]</i>		
	PUBLIC		
<i>CARY Mohr</i>			
<i>Logan Mohr</i>			
<i>Chelsea Erickson</i>			
<i>Chelsea Johnson</i>			
<i>Samara Scott</i>			
<i>Jean Eichhorst</i>	<i>[Signature]</i>		
<i>Robert Martin</i>	<i>[Signature]</i>		

Attachment B - Meeting Agenda

Republican River Basin-wide Plan Stakeholder Advisory Committee Meeting Agenda

*Thursday, November 30, 2017, 10:00 AM – 3:00 PM
Cambridge Community Center, 722 Patterson Avenue, Cambridge, Nebraska*

Meeting Objectives

At this meeting, stakeholders will build upon discussion from the August 2017 Stakeholder meeting including continued discussions of how the plan can help to balance water supply and use in the basin and draft plan language.

1. Welcome

2. Plan Language and Related Discussion Items

Working Lunch – 12:00 to 12:30

(Lunch is provided for Stakeholder Advisory Committee, NDNR, NRD, and Consultant Staff only)

3. Other Remaining Discussion Leading to Additional Goals

- a. How can the plan help to balance water supply and use?

4. Parking Lot

5. Public Comment

6. Upcoming Meetings

- a. 12/13/2017 (tentative)
- b. 03/20/2018

Project Website = <https://rrbwp.nebraska.gov/>

Attachment C - Draft Funding Section of the Plan handout

4. Funding

Section Overview

The Funding section of this plan establishes guidelines and limitations related to funding for carrying out the goals, objectives, and action items of the Republican River Basin-Wide Plan (Plan).

Guidelines

When possible, NeDNR and the NRDs will work together to pursue external funding or appropriate incentive programs to implement the goals, objectives, and action items of this Plan.

Some existing potential funding sources are summarized in Table 0.1.

Table 0.1. Some existing funding sources to consider that could potentially support management actions related to implementation of this Plan.

Program	Administering agency or commission
CREP (Conservation Reserve Enhancement Program)	Farm Service Agency, US Department of Agriculture
EQIP (Environmental Quality Incentives Program)	Natural Resources Conservation Service, US Department of Agriculture
Natural Resources Districts' funding (e.g., occupation taxes and levies)	Natural Resources Districts
Nebraska Environmental Trust grants	Nebraska Environmental Trust
Water Resources Cash Fund	Nebraska Department of Natural Resources
WaterSMART Grants (Sustain and Manage America's Resources for Tomorrow)	US Bureau of Reclamation
Water Sustainability Fund	Nebraska Natural Resources Commission

Limitations

The ability of NeDNR and the NRDs to implement the goals, objectives, and action items for this Plan, including their ability to meet the implementation timeline and intermediate deadlines set forth herein, may be limited by the availability of resources, including (but not limited to) funding or staff resources.

If limited resources prohibit completion or initiation of a specific management action, or if they delay the ability of NeDNR or an NRD to complete a task by an established deadline, such limitations and delays will be discussed by NeDNR and the NRDs at an Annual Meeting [*Cross reference to Annual Meeting section*]. If such a delay results in the need for revisions to this Plan, the necessary revisions will be made following the procedures set forth in [*Cross reference to plan revisions section*].

Attachment D - Draft Measurable Hydrologic Objectives handout

Discussion of Measurable Hydrologic Objectives for the Plan

Relevant language from statute

Purpose of plan's goals and objectives (*Neb. Rev. Stat. § 46-744 (4)*):

A basin-wide plan shall (a) have 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 river basin, subbasin, or reach can be achieved and maintained for both the near term and the long term, (b) ensure that compliance with any interstate compact or decree or other formal state contract or agreement or applicable state or federal law is maintained, and (c) set forth a timeline to meet the goals and objectives as required under this subdivision, but in no case shall a timeline exceed thirty years after April 17, 2014.

Requirement to include measurable hydrologic objectives (*Neb. Rev. Stat. § 46-755 (5)(b)*):

A basin-wide plan developed under this section shall include a schedule indicating the end date by which the stated goals and objectives are to be achieved and the management actions to be taken to achieve the goals and objectives. To ensure that reasonable progress is being made toward achieving the final goals and objectives of the plan, the schedule shall also include measurable hydrologic objectives and intermediate dates by which the objectives are expected to be met and monitoring plans to measure the extent to which the objectives are being achieved. Such intermediate objectives shall be established in a manner that, if achieved on schedule, will provide a reasonable expectation that the goals of the plan will be achieved by the established end date.

Requirements of five-year analysis (*Neb. Rev. Stat. § 46-755 (5)(d)*):

Within five years after the adoption of the basin-wide plan, and every five years thereafter, the department and affected natural resources districts shall conduct a technical analysis of the actions taken in a river basin to determine the progress towards meeting the goals and objectives of the plan. The analysis shall include an examination of (i) available supplies, current uses, and changes in long-term water availability, (ii) the effects of conservation practices and natural causes, including, but not limited to, drought, and (iii) the effects of the plan in meeting the goal of sustaining a balance between water uses and water supplies. The analysis shall determine if changes or modifications to the basin-wide plan are needed to meet the goals and objectives pursuant to subdivision (4)(a) of this section. The department and affected natural resources districts shall present the results of the analysis and any recommended modifications to the plan at a public meeting and shall provide for at least a thirty-day public comment period before holding a public hearing on the recommended modifications. The department shall submit a report to the Legislature of the results of this analysis and the progress made under the basin-wide plan. The report shall be submitted electronically. Any official participant or stakeholder may submit comments to the department and affected natural resources districts on the final basin-wide plan adopted by the department and affected natural resources districts, which shall be made a part of the report to the Legislature.

Draft measurable hydrologic objectives, for discussion

1. Maintain each NRD's groundwater depletions within their portion of Nebraska's allowable groundwater depletions, as specified in the IMPs
2. Maintain groundwater depletions at a relatively constant level over the long-term
3. Balance water storage for future use during drought. Evaluate existing and new management actions to determine the long-term water availability trends that provide carry-over storage supplies to meet crop-water needs during drought.
4. Take actions that help prevent special regulations in the Rapid Response area for Compact compliance
5. Take actions that help prevent administration of surface water use for Compact compliance

Current draft plan language about measurable hydrologic objectives, for discussion

The purpose of this Plan's measurable hydrologic objectives is to ensure that reasonable progress is being made toward achieving the Plan's overall goal of balancing water supply and use within the Basin. As described in *Neb. Rev. Stat. § 46-755 (5)(b)*, each measurable hydrologic objective must include intermediate objectives and dates by which those intermediate objectives are expected to be met, and the Plan must include monitoring plans to measure the extent to which the objectives are being achieved.

A detailed timeline and monitoring plan for each of this Plan's measurable hydrologic objectives is described in the *[Cross reference to Monitoring Section of the Plan]*. The general timeline for each measurable hydrologic objective is as follows:

1. Intermediate objectives for each measurable hydrologic objective are set at five-year intervals, to correspond with each five-year technical analysis.
2. NeDNR and the NRDs will exchange any data required to evaluate progress towards each measurable hydrologic objective annually, as part of each annual review.
3. Progress towards each intermediate objective will be evaluated as part of each five-year technical analysis.
4. If the evaluation of any measurable hydrological objective indicates a need to revise this Plan, the resulting Plan modifications will be made following the procedures described in *[Cross reference to Modifications to the Plan section]*.

Attachment E - Stakeholder Comments on Draft Plan Language handout

Compiled stakeholder written comments following August 2017 stakeholder meeting

Comments about draft plan language for goal 5

(Gray text = the draft plan language the comments are referring to, for reference)

Goal 5: When possible, pursue projects that not only benefit water supplies and uses, but also create benefits for fish, wildlife, conveyance, and recreation within the Republican River Basin	
Objectives	Action Items
5.1. Where feasible and beneficial, protect and enhance fish and wildlife habitat and public outdoor recreational opportunities	5.1.1. Partner with wildlife-focused organizations on projects that benefit the organizations' habitat and wildlife interests while also helping to fulfill other goals of this Plan
	5.1.2. Promote public recreation-on the river, when doing so can also help to fulfill other goals of this Plan
	5.1.3. Cooperate in projects to assess and restore riparian wetlands while also helping to fulfill other goals of this Plan
5.2. Where feasible and beneficial, reduce the effects of undesirable vegetation on water conveyance	5.2.1. Cooperate in removing undesirable vegetation impacting water conveyance and managing reinfestation

...

Action Item 5.1.1: Partner with wildlife-focused organizations on projects that benefit the organizations' habitat and wildlife interests while also helping to fulfill other goals of this Plan

If it is feasible and beneficial to do so as part of actions taken to benefit water supply and use in fulfillment of this Plan's other goals, NeDNR and the NRDs will partner with wildlife-focused organizations on projects that benefit wildlife and their habitat. Some examples of wildlife and habitat-focused groups operating in Nebraska include the Nebraska Game and Parks Commission, the US Fish and Wildlife Service, Ducks Unlimited, Audubon Nebraska, the Nature Conservancy, and the Crane Trust. The level of involvement of partner organizations may vary according to the needs and circumstances of each individual project, ranging from, for example, consultation on

Comment [CJMF1]:

Comment from Stakeholder #1:
Delete Objective 5.1. and its action items.

Imported water should not be held up unless and until all existing water rights have been met from the point of entry to the Hardy gauge.

The Reclamation and the Corps of Engineers work to enhance the fisheries and allow fishing contests and the like in the reservoirs; these efforts are appropriate but should not be part of a Basin Plan.

Promoting tubing, etc. recreational opportunities

Comment [CJMF2]:

Comment from Stakeholder #1:
I think 5.2 should be included.

questions related to their area of expertise, to collaboration on project planning and design, to sharing project costs for projects that benefit the groups' wildlife and habitat-related interests.

Projects undertaken to fulfill this objective may involve establishing new or utilizing existing infrastructure. One example of a type of project that could benefit both the Basin's water supplies and wildlife habitat would be to use water diverted through an interbasin transfer project during periods of high flows to enhance wildlife habitat.

...

Action Item 5.1.3: Cooperate in projects to assess and restore riparian wetlands while also helping to fulfill other goals of this Plan

NeDNR and the NRDs will participate in projects to assess and restore riparian wetlands if it is feasible and beneficial to do so as part of actions taken to benefit water supply and use in fulfillment of this Plan's other goals, such as for aquifer recharge (Objective [placeholder for cross-reference to the relevant objective, currently 3.2]). As appropriate, they will do so in cooperation with organizations with interest and expertise in wetland restoration. Because of the wide-range of benefits wetlands provide, such as groundwater recharge, wildlife habitat, flood control, and water quality, the primary focus of potential partner organizations for mutually beneficial wetland assessment and restoration projects also varies widely.

Action Item 5.1.3 includes two parts: wetland assessment and wetland restoration. Wetland assessment involves evaluating wetland condition and function. This may be done for many purposes, such as to identify and inventory existing wetlands, to compare and prioritize wetlands for development and mitigation purposes, or to establish a baseline condition and then monitor changes in condition and function over time. Wetland restoration involves rehabilitating the hydrology, plants, and soils of a degraded wetland or reestablishing a wetland that has been destroyed.

...

Comment [CJMF3]:

Comment from Stakeholder #1:

A new water right for this purpose should not be issued for imported water as long as current water rights in the basin are not being filled. This plan is tasked with achieving and sustaining a balance between existing uses and supplies.

Comment [CJMF4]:

Comment from Stakeholder #1:

Imported water should not be held up unless and until all existing water rights have been met from the point of entry to the Hardy gauge.

Other comments

Comment from Stakeholder #2:

The one thing I see missing here that may be somewhere else is a way to retire or reduce the number of underground irrigated acres because like it or not at the end of day that is the problem, and it has to be addressed. You will not ever be able to increase surface flow without doing that and the sad truth is it might not be able to be restored anyway, and that includes upland wells as well because they are at fault just as much because they have stopped the natural spring flow of water and I do not care what a stupid computer model shows this is just the real facts of what has happened. Ignoring this fact is just kicking a can down the road as it has been for 40 years. You will never have water for recreation, wildlife etc, till you have surface water surplus and it is stupid to think pumping underground water to replenish surface water is a viable solution or transferring surface water from one basin to another may not be a viable solution either.

Comment from Stakeholder #3

I don't have anything to add to Goal 5 but would like to mention something that I think is still missing from the overall plan. A method to measure progress or achievement of the overall plan goal of sustainability. I would suggest we use "ground water level measurements" to evaluate where we are and where we want to be long term. Tri Basin NRD has experience with this and the management system seems to be working. It is adaptable and allows for some declines and raises within its implementation. It also allows for varying implementation depending on the severity of the declines or no declines. A presentation by Tri Basin would be educational and something close to their plan could be implemented basin wide. If implemented to achieve an overall goal of "NO MORE DECLINES" it would be a big first step toward sustainability.

Attachment F - MRNRD Summary of Medicine Creek Study handout

Medicine Creek Basin Model Summary

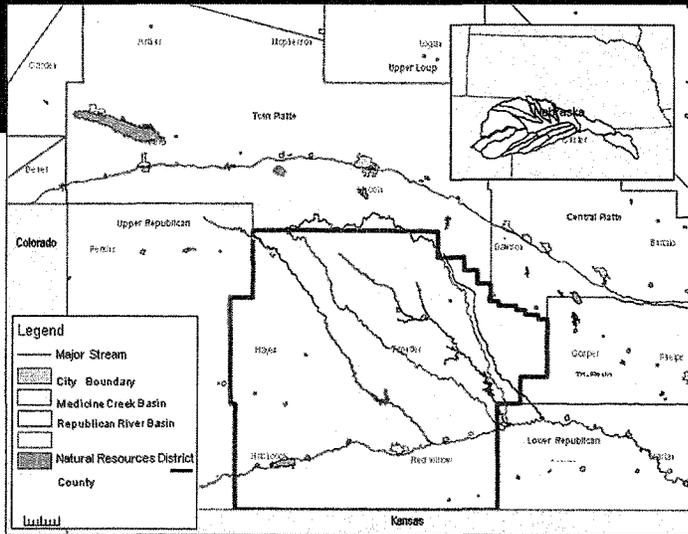
The Medicine Creek groundwater model is a transient groundwater model of the High Plains Aquifer in the Medicine Creek Basin developed by Brown and Caldwell. It consists of 77,512 active 40 acre cells in two layers. The model domain covers an approximate area of 1,550,246 acres between the Platte River and Republican river north to south, and between the Redwillow creek and Deer Creek east to west. These natural boundaries extend beyond the area of focus of the Medicine Creek Basin to aid in understanding groundwater/surface water interactions between the area of focus and the surround area. Stress periods start during predevelopment in 1950 and extends to 2013, simulating in monthly hydraulic stresses. The model was calibrated using 52 monitoring well locations using 1,753 water level measurements.

Hydraulic zones and other hydraulic properties used in the model were based off of well drillers logs, the COHYST ground water model, and the Republican River compact model. The model was then calibrated, using monitoring well data, to find how fast or slow water flows between cells; known as hydraulic conductivity. Stresses on the aquifer such as pumping, ET, and recharge were include by taking metered pumping, land use, and climate data and running those variables through a cropsim model. This differs from many models in that pumping and crop type were a known variable; where other models use a net irrigation requirement to determine the volume of irrigation.

The Medicine Creek Basin model was developed to determine an irrigation allocation on the medicine creek watershed to minimize the negative impacts on the aquifer. Streamflow was included this model, however, it was not the primary intent of this model. Using the highest resolution model and data available allows for a more comprehensive understanding of how the aquifer reacts to hydraulic stresses. It can also serve the purpose of understanding how irrigation density and intensity can affect a localized area. The long term goal for the MRNRD is to have a watershed model on every watershed within the MRNRD to determine a sustainable allocation in each one.

Middle Republican NRD

Medicine Creek Basin Model



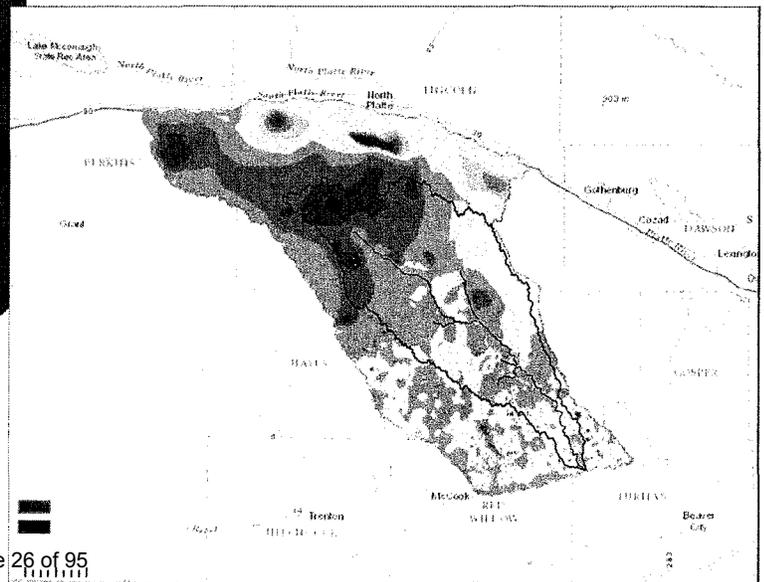
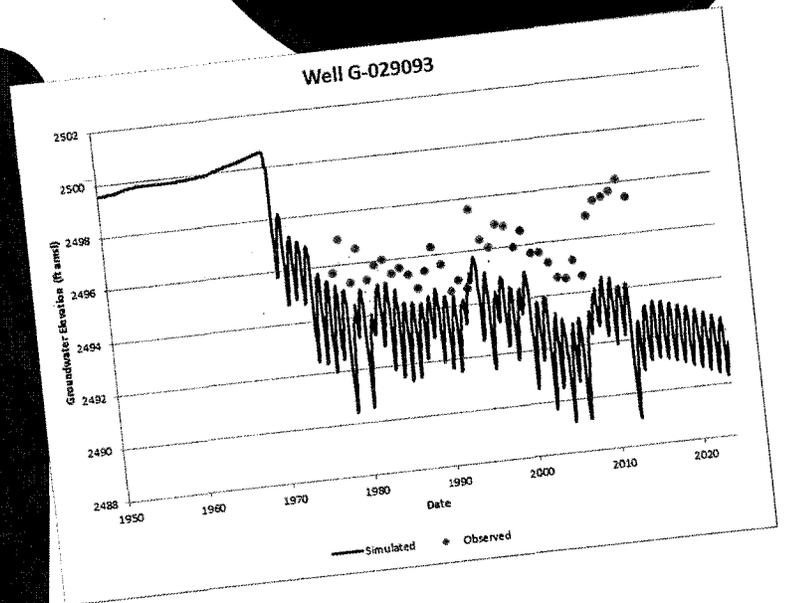
Medicine Creek Basin Model

Developing a calibrated transient groundwater flow model of the Medicine Creek Basin. This will develop a robust tool for the Board of Directors to be able to use for decision making with a more science based answer.

MRNRD will use the Basin Model to evaluate future water management scenarios that optimize the use of surface water and groundwater resources, while minimizing or avoiding long-term declines in aquifer water levels.

The Basin Model was built with 77,512 active 40-acre cells

Developing a robust modeling framework with the flexibility to analyze and evaluate groundwater wells/pumping, aquifer-stream interactions, aquifer-reservoir interactions, surface water/groundwater augmentation, and water consumption/irrigation for various crops and native landscapes



Natural Resources District
Middle Republican

Attachment G - Draft Goals and Objectives handout

2. Goals and Objectives

Section Overview

The Goals and Objectives section of the Republican River Basin-Wide Plan (Plan) begins with a listing of the Plan's measurable hydrologic objectives and other goals and objectives of the plan. Then, the management actions that will be taken to achieve the Plan's goals and objectives are described in detail, including a general overview of the timeline for each.

Section Contents

List of goals and objectives	1
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List of Goals and Objectives

The goals and objectives of this Plan are separated into two categories: measurable hydrologic objectives, and other goals and objectives. The measurable hydrologic objectives are hydrologic targets related to fulfilling the Plan's overarching mission and goal of balancing water supply and use within the Republican River Basin (Basin). The Plan's other goals and objectives focus on more specific management actions that will help achieve both the measurable hydrologic objectives and other desired outcomes identified by stakeholders during the Plan development processes. Both types of goals and objectives are listed below. A description of the management actions that will be taken to achieve each objective begins on page 5.

Measurable Hydrologic Objectives

Table 2.1 lists the measurable hydrologic objectives of the Plan. *Neb. Rev. Stat. §46-755 (5)(b)* specifies that measurable hydrologic objectives are a requirement of this Plan, in order to ensure

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that reasonable progress is being made toward achieving the goals and objectives of this plan. *Neb. Rev. Stat. §46-755 (5)(b)* also requires intermediate objectives and intermediate dates by which the intermediate objectives are expected to be met. General information about the timeline for and other details related to meeting these objectives can be found in the subsection *Management Activities to Achieve Objectives* (page 5), and more detailed information about how the measurable hydrologic objectives will be assessed and reported can be found in [cross reference to Monitoring section].

Table 2.1. List of Measurable Hydrologic Objectives for the Republican River Basin-Wide Plan

Goal 1: Balance water supply and use within the Basin	
Hydrologic Objective 1.1	Maintain each NRD's groundwater depletions within their portion of Nebraska's allowable groundwater depletions, as specified in the IMPs
Hydrologic Objective 1.2	Maintain groundwater depletions at a relatively constant level over the long-term
Hydrologic Objective 1.3	Balance water storage for future use during drought. Evaluate existing and new management actions to determine the long-term water availability trends that provide carry-over storage supplies to meet crop-water needs during drought.
Hydrologic Objective 1.4	Take actions that help prevent special regulations in the Rapid Response area for Compact compliance
Hydrologic Objective 1.5	Take actions that help prevent administration of surface water use for Compact compliance

Other Goals and Objectives of the Plan

Table 2.2 lists the plan's other goals and objectives. Action items, a general timeline for implementation, and other information about the management actions that will be undertaken to achieve these goals and objectives are described in detail under *Management Activities to Achieve Objectives* (page 6). A more detailed timeline for implementation of these goals, objectives, and Action Items can be found in [cross-reference to relevant portion of Monitoring section].

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Table 2.2. List of other goals and objectives for the Republican River Basin-Wide Plan.

Goal 2: Maintain Nebraska's compliance with the Republican River Compact and applicable state laws	
Objective 2.1	Coordinate basin-wide plan management actions with Nebraska's Compact compliance efforts and adherence to applicable state laws
Objective 2.2	Understand the effects of management actions for Compact compliance on water supplies
Goal 3: Positive public relations, including information sharing, within and outside the Basin	
Objective 3.1	Improve information sharing with decision-makers and the public about solutions formed within the Basin
Objective 3.2	Improve information sharing with water users who are reliant on the Basin's water supplies
Goal 4: Increase certainty for long-range planning of water supplies to reduce the need for regulatory actions, and increase collaborative efforts among water users across the Basin	
Objective 4.1	Increase water supply through interbasin transfers during periods of high flows
Objective 4.2	Improve water availability through conjunctive management projects within the Basin, such as, but not limited to: <ol style="list-style-type: none"> a. Aquifer recharge b. Streamflow augmentation projects
Objective 4.3	Improve the availability and reliability of water supplies for current surface water irrigators
Objective 4.4	<i>[Placeholder—other objectives related to increasing certainty are likely to result from discussion of the remaining challenges during upcoming stakeholder meetings]</i>
Objective 4.5	Compare the relative potential economic and environmental impacts of the types of management actions that would increase certainty for water users in the Basin through increased water supplies or improved water availability
Objective 4.6	Provide opportunities for collaboration among the Basin's water users

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Goal 5: Basin-wide collaboration among water management entities and stakeholders to maximize Nebraska's efficient and beneficial consumptive use of its portion of the water supply

- Objective 5.1** Promote conservation programs available to the water users in the Basin
- Objective 5.2** Understand how various water management activities of independent decision-makers affect water supplies
- Objective 5.3** Evaluate the feasibility and potential outcomes of establishing water markets in the Basin
- Objective 5.4** *[Placeholder for any other objectives related to this goal that may arise from further stakeholder discussion.]*

May include: studies, grants, recommendations, education, promotion of best management practices, sharing information, or any other type of activity that involves supporting or promoting a desirable management action indirectly.]

Goal 6: When possible, pursue projects that not only benefit water supplies and uses, but also create benefits for fish, wildlife, conveyance, and recreation within the Republican River Basin

- Objective 6.1** Where feasible and beneficial, protect and enhance fish and wildlife habitat and public outdoor recreational opportunities
- Objective 6.2** Where feasible and beneficial, reduce the effects of undesirable vegetation on water conveyance
-

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Management Activities to Achieve Objectives

A description of the management activities to achieve the Plan's measurable hydrologic objectives follows. A description of the management activities to achieve the Plan's other goals and objectives begins on page 6

Measurable Hydrologic Objectives

The purpose of this Plan's measurable hydrologic objectives is to ensure that reasonable progress is being made toward achieving the Plan's overarching goal of balancing water supply and use within the Basin. As described in *Neb. Rev. Stat. § 46-755 (5)(b)*, each measurable hydrologic objective must include intermediate objectives and dates by which those intermediate objectives are expected to be met, and the Plan must include monitoring plans to measure the extent to which the objectives are being achieved.

A detailed timeline and monitoring plan for each of this Plan's measurable hydrologic objectives is described in the *[Cross reference to Monitoring Section of the Plan]*. The general timeline for each measurable hydrologic objective is as follows:

1. Intermediate objectives for each measurable hydrologic objective are set at five-year intervals, to correspond with each five-year technical analysis.
2. NeDNR and the NRDs will exchange any data required to evaluate progress towards each measurable hydrologic objective annually, as part of each annual review.
3. Progress towards each intermediate objective will be evaluated as part of each five-year technical analysis.
4. If the evaluation of any measurable hydrological objective indicates a need to revise this Plan, the resulting Plan modifications will be made following the procedures described in *[Cross reference to Modifications to the Plan section]*.

The Plan's measurable hydrologic objectives are listed on page 1. An overview of each measurable hydrologic objective is given below.

Goal 1: Balance water supply and use within the Basin

The overarching purpose of this Plan is specified in statute (*Neb. Rev. Stat. § 46-755 (4)(a)*), and the purpose outlined in statute served as the basis for the Plan's mission statement, which is "to sustain a balance between water uses and water supplies so that the economic viability, social and environmental health, safety, and welfare of the Republican River Basin can be achieved and maintained for both the near term and long term." The purpose described in both statute and the mission statement form the basis of this central, overarching goal for the Plan to balance water supply and use within the Basin.

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The measurable hydrologic objectives described below are hydrologic targets related to the fulfillment of this overarching goal.

Hydrologic Objective 1.1. Maintain each NRD's groundwater depletions within their portion of Nebraska's allowable groundwater depletions, as specified in the IMPs

[Placeholder for description of Measurable Hydrologic Objective 1.1]

Hydrologic Objective 1.2. Maintain groundwater depletions at a relatively constant level over the long-term

[Placeholder for description of Measurable Hydrologic Objective 1.2]

Hydrologic Objective 1.3. Balance water storage for future use during drought. Evaluate existing and new management actions to determine the long-term water availability trends that provide carry-over storage supplies to meet crop-water needs during drought.

[Placeholder for description of Measurable Hydrologic Objective 1.3]

Hydrologic Objective 1.4. Take actions that help prevent special regulations in the Rapid Response area for Compact compliance

[Placeholder for description of Measurable Hydrologic Objective 1.4]

Hydrologic Objective 1.5. Take actions that help prevent administration of surface water use for Compact compliance

[Placeholder for description of Measurable Hydrologic Objective 1.5]

Other Goals and Objectives of the Plan

The goals and objectives listed on page 2 and described on the following pages provide a framework for how the plan will be carried out and what specific outcomes we hope to achieve. In contrast, the measurable hydrologic objectives that are described beginning on page 5 focus more broadly on overall hydrologic indicators of the success of this Plan.

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A timeline with intermediate objectives for each objective and details about how the implementation of each objective will be reported and evaluated are given in the *[Cross-reference to monitoring and reporting section]*.

The following framework was followed to set the timeline for each objective:

1. Intermediate objectives are set at five-year intervals, to correspond with each five-year technical analysis.
2. NeDNR and the NRDs will exchange any data required to evaluate progress towards each objective annually, as part of each annual review.
3. Progress towards each intermediate objective will be evaluated as part of each five-year technical analysis.
4. If the evaluation of progress made toward any objective indicates a need to revise this Plan, the resulting Plan modifications will be made following the procedures described in *[Cross reference to Modifications to the Plan section]*.

The following pages list the action items associated with the Plan's goals and objectives, provide details about how each goal, objective, and action item will be implemented, and indicate how various goals, objectives, and action items relate to one another and to other parts of this Plan.

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Goal 2: Maintain Nebraska's compliance with the Republican River Compact and applicable state laws	
Objectives	Action Items
2.1. Coordinate basin-wide plan management actions with Nebraska's Compact compliance efforts and adherence to applicable state laws	2.1.1. Review each basin-wide plan management action prior to implementation to ensure it does not negatively impact efforts to achieve Compact compliance in the most efficient and cost-effective way practicable while adhering to state laws
	2.1.2. Implement appropriate offsets for any basin-wide plan action that would exceed Nebraska's allocation under the Compact
2.2. Understand the effects of management actions for Compact compliance on water supplies for Nebraska's water users	2.2.1. Qualitatively evaluate the net effect on water supplies of any management actions that are taken for Compact compliance

Goal 2: Maintain Nebraska's compliance with the Republican River Compact and applicable state laws

Goal 2, maintaining compliance with the Republican River Compact (Compact) and state laws, is an overarching goal for this Plan that must be considered throughout implementation of all other goals, objectives, and action items for this Plan. Compliance with the Compact, including consistency with Compact accounting procedures, applies to implementation of both this Plan and also to the individual integrated management plans (IMPs).

Objective 2.1: Coordinate basin-wide plan management actions with Nebraska's Compact compliance efforts and adherence to applicable state laws

Objective 2.1 means that all actions of this Plan must be evaluated in the context of both Nebraska's obligations under the Compact and applicable Nebraska laws; therefore, the action items associated with Objective 2.1 must be carried out any time an action is taken in pursuit of any other goal, objective, or action item found within this Plan. Action Items 2.1.1 and 2.1.2 provide details about how to coordinate management actions with Compact compliance and adherence to state laws.

Action Item 2.1.1: Review each basin-wide plan management action prior to implementation to ensure it does not negatively impact efforts to achieve Compact compliance in the most efficient and cost-effective way practicable while adhering to state laws

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Action Item 2.1.1 specifies that before any management action may be taken under this Plan, NeDNR and the NRDs will evaluate the potential action to ensure that two criteria are satisfied: no negative impact on Nebraska's efforts to achieve Compact compliance in the most efficient and cost-effective way practicable, and adherence to state laws. This evaluation is described in more detail in the following paragraphs.

One criterion that must be satisfied under Action Item 2.1.1 is that each proposed management action will adhere to all Nebraska's state laws. Examples of state laws to consider include, but are not limited to, the laws protecting existing surface water and groundwater users and laws related to permits required for water management projects.

The other criterion that must be satisfied under Action Item 2.1.1 is that each proposed management action will not negatively impact Nebraska's efforts to achieve compliance with the Compact in the most efficient and cost-effective way practicable. These efforts include any management actions undertaken by NeDNR or the NRDs for the purpose of Compact compliance in accordance with the joint integrated management plan (IMP) for each NRD.

In situations where one aspect of a project would have a negative impact on Nebraska's efforts to achieve compliance and another aspect of the same project would have a positive impact, then the final evaluation of the project's impact on Compact compliance efforts described under Action Item 2.1.1 should consider the cumulative impacts of the project as a whole. For example, a management action that increases consumptive use of water might be expected adversely impact Nebraska's Compact compliance efforts; however, if the same project includes a component that reduces consumptive use in another location in the Basin, the net effect might be to reduce overall consumptive use in the Basin, which would have a positive effect on Nebraska's Compact compliance efforts.

Action Item 2.1.2: Implement appropriate offsets for any basin-wide plan action that would exceed Nebraska's allocation under the Compact

If any basin-wide plan action does cause Nebraska to exceed its allocation under the Compact, appropriate offsets will be implemented during the same accounting period following the procedures detailed in the IMPs for the Basin's NRDs.

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Objective 2.2: Understand the effects of management actions for Compact compliance on water supplies for Nebraska's water users

The purpose of this objective is to ensure that for any management actions undertaken for Compact compliance, the effects of those management actions on the water supplies available to Nebraska's existing surface water and groundwater users are understood.

Action Item 2.2.1: Qualitatively evaluate the net effect on water supplies of any management actions that are taken for Compact compliance

For any management action undertaken for the purposes of complying with the Compact, NeDNR or the NRDs will not only evaluate the effect of those actions on Nebraska's Compact allocation and balance, but will also qualitatively evaluate the net effect of those management actions on the water supplies available to Nebraska's existing surface water and groundwater users. This information will be reported at each annual meeting as a generalized, qualitative description.

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Goal 3: Positive public relations, including information sharing, within and outside the Basin	
Objectives	Action Items
3.1. Improve information sharing with decision-makers and the public about solutions formed within the Basin	3.1.1. Use existing resources to share information about Basin progress and activities with outside entities
	3.1.2. Educate civic leaders and the public on implementation efforts within the Basin
	3.1.3. Educate civic leaders and the public about the policies and institutional infrastructure that contribute to the development and implementation of solutions
3.2. Improve information sharing with water users who are reliant on the Basin's water supplies	3.2.1. Share data and information related to the Republican River Compact with the public in an easily accessible, user-friendly format
	3.2.2. Annually prepare and exchange reports containing data and information about water supplies and uses in the Basin, and make these reports publically accessible
	3.2.3. Regularly communicate with the Plan's Stakeholder Advisory Committee about implementation progress and potential Plan revisions
	3.2.4. Encourage and support water users to share information about their management practice improvements with other water users and the public
	3.2.5. <i>[Placeholder for additional actions related to Objective 2.2, if the group determines other kinds of information they think should be shared within the Basin and how]</i>

Goal 3: Positive public relations, including information sharing, within and outside the Basin

Goal 3 and its associated objectives and action items are focused on promoting positive public relations by improving information sharing, with both outside decision-makers and the Basin's water users, about the Basin's water supplies and use as well as management efforts of the Basin's water users and managers.

Objective 3.1: Improve information sharing with decision-makers and the public about solutions formed within the Basin

The overarching focus of Objective 3.1 is sharing information about the Basin's water management solutions, and also about the challenges those solutions are intended to address, with people who are not directly involved in developing or implementing those solutions. Sharing information with the Basin's water users is addressed separately in

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Objective 3.2. Part of Objective 3.1 is to improve information sharing about the Basin's water management solutions with decision-makers, especially those outside the Basin. This is because during Plan development, the Stakeholder Advisory Committee expressed concern that Legislators, the Governor's Office, and other decision-makers were unaware of many of the achievements, efforts, and overall progress that water users and managers in the Basin have already made toward addressing the Basin's water management challenges. Sharing information about implementation efforts with the general public is also part of Objective 3.1. The following action items provide details about how Objective 3.1 will be achieved.

Action Item 3.1.1: Use existing resources to share information about Basin progress and activities with outside entities

Action Item 3.1.1 specifies that outreach about Basin progress and activities will be undertaken using existing resources. Some examples of existing resources include NeDNR and the NRDs' staff, websites, and other outreach, education, or lobbying mechanisms.

Action Item 3.1.2: Educate civic leaders and the public on implementation efforts within the Basin

Action Item 3.1.2 clarifies that the "outside entities" mentioned in Action Item 3.1.1 include both civic leaders and the public. Some examples of civic leaders include the Legislature, the Governor's Office, and municipal leadership.

Some examples of potential topics for public relations campaigns or education about implementation efforts within the Basin and the challenges those solutions are intended to address are:

- Efficiency improvements
- The NRDs' allocations systems and resulting successes
- Other management activities and successes
- Factors that have contributed to streamflow reduction in the Basin
- Variations in groundwater management that reflect natural wet/dry cycles
- Realistic expectations for outcomes

Additional details can be found in *[placeholder for cross-reference to Monitoring and Reporting section]*.

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Action Item 3.1.3: Educate civic leaders and the public about the policies and institutional infrastructure that contribute to the development and implementation of solutions

Policies and institutional infrastructure have contributed and will continue contribute to the development and implementation of water management solutions for Nebraska and this Basin. During Plan development, stakeholders identified that civic leaders and the public may not be aware of what those policies and institutional infrastructure are, how they can contribute to effective water management, or how they differ from those of other states. Therefore, as part of plan implementation, efforts will be made to educate civic leaders and the public about how existing and new policies and institutional infrastructure contribute to the development and implementation of water management solutions for the Basin.

Examples of the types of policies and institutional infrastructure that could be addressed in outreach efforts include:

- The NRD system
- Correlative groundwater rights
- Integrated management plans
- This Plan
- The Republican River Compact
- Other aspects of Nebraska's surface water and groundwater statutes
- Other NRD Rules, Regulations, and Plans

Objective 3.2: Improve information sharing with water users who are reliant on the Basin's water supplies

Whereas Objective 3.1 is focused on sharing information with outside entities, Objective 3.2 is about sharing information internally, with the Basin's water users. The action items associated with Objective 3.2 describe multiple specific ways that information sharing within the Basin will be improved.

Action Item 3.2.1: Share data and information related to the Republican River Compact with the public in an easily accessible, user-friendly format

NeDNR and the NRDs already gather and share a considerable amount of data and information about Nebraska's water supplies and uses in the Basin with the states of Kansas and Colorado as part of the Republican River Compact

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Association's (RRCA's) annual data exchange process for the purposes of RRCA accounting. These data are currently available on the RRCA website; however, they are not easy to find and are not very user-friendly for users outside the RRCA. In accordance with Action Item 3.2.1, data and information related to the Compact will be shared with the public in a user-friendly format in an easily accessible, centralized location. Specific categories of RRCA data to be shared are listed in the *[Cross-reference to Monitoring and Reporting Section]*.

Action Item 3.2.2: Annually prepare and exchange reports containing data and information about water supplies and uses in the Basin, and make these reports publically accessible

As specified in 4.6.1, NeDNR and the NRDs will hold an annual public meeting to discuss Plan implementation and exchange information about the Basin, as described in the *[placeholder for cross reference to part of plan that describes the annual meetings]*. For this meeting, NeDNR and the NRDs will exchange reports containing data and information about water supplies and uses in the Basin, management activities, and progress towards the goals, objectives, and action items of this Plan, as described in *[placeholder for cross reference to part of plan that describes monitoring and reporting]*. Following the annual meeting, the reports exchanged will be made available to the public.

Action Item 3.2.3: Regularly communicate with the Plan's Stakeholder Advisory Committee about implementation progress and potential Plan revisions

Action Item 3.2.3 specifies that after this Plan goes into effect, NeDNR and the NRDs will continue to communicate with the Plan's Stakeholder Advisory Committee on a regular basis about Plan implementation progress and any potential revisions to the Plan. NeDNR and the NRDs will:

- Invite the members of the Stakeholder Advisory Committee to each annual meeting and five-year technical review meeting
- Notify the members of the Stakeholder Advisory Committee of potential plan revisions
- Notify the members of the Stakeholder Advisory Committee when annual reports, five-year technical reviews, or other new reports related to implementation of this plan are published

Additional information about meetings, reports, and the plan-revision process can be found in *[placeholder for cross-reference to Monitoring and Reporting section]*.

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Action Item 3.2.4: Encourage and support water users to share information about their management practice improvements with other water users and the public

Throughout implementation of this Plan, NeDNR and the NRDs will encourage and support water users to share information about their management practice improvements with other water users and the public. Various methods of implementation of this action item may be employed to fit specific circumstances. Examples of opportunities for individuals to share their successes with other water users include, but are not limited to, articles for NeDNR or NRD newsletters, websites, or social media, presentations or reports shared at the annual meeting to review implementation of this Plan, presentations at annual water user conferences or other outreach events, or coverage by external news media. NeDNR and the NRDs will discuss opportunities to implement this action item at each annual meeting.

[Placeholder for additional actions related to Objective 2.2, if the group determines other kinds of information they think should be shared within the Basin and how]

[Placeholder for details about any additional Action Items under Objective 2.2]

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Goal 4: Increase certainty for long-range planning of water supplies to reduce the need for regulatory actions, and increase collaborative efforts among water users across the Basin	
Objectives	Action Items
4.1. Increase water supply through interbasin transfers during periods of high flows	4.1.1. For each new project, study hydrologic and regulatory feasibility and evaluate potential economic and environmental impacts
	4.1.2. Where feasible and beneficial, apply for necessary permits, establish new or utilize existing infrastructure, then begin operations
	4.1.3. Operate Implement interbasin transfers as opportunities arise
4.2. Improve water availability through conjunctive management projects within the Basin, such as, but not limited to: a. Aquifer recharge b. Streamflow augmentation projects	4.2.1. For each new project, conduct a feasibility study and evaluate potential economic and environmental impacts
	4.2.2. Where feasible and beneficial, apply for necessary permits, establish new or utilize existing infrastructure, then begin operations
	4.2.3. Operate Implement conjunctive management projects as opportunities arise
	4.2.4. Where appropriate, work with partners such as the US Bureau of Reclamation, irrigation districts, or private landowners to identify, evaluate, and operate potential new projects
4.3. Improve the availability and reliability of water supplies for current surface water irrigators	4.3.1. Work with irrigation districts to identify opportunities to improve the efficiency of the Basin's surface water delivery systems, when it is both feasible and beneficial to Nebraska's Compact accounting balance to do so
	4.3.2. Encourage the conversion of surface water irrigated acres to a more efficient and reliable method of irrigation, when it is both feasible and beneficial to Nebraska's Compact accounting balance to do so
4.4. <i>[Placeholder—other objectives related to increasing certainty are likely to result from discussion of the remaining challenges during upcoming stakeholder meetings]</i>	

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Goal 4: Increase certainty for long-range planning of water supplies to reduce the need for regulatory actions, and increase collaborative efforts among water users across the Basin	
Objectives	Action Items
4.5. Compare the relative potential economic and environmental impacts of the types of management actions that would increase certainty for water users in the Basin through increased water supplies or improved water availability	4.5.1. Within the first five-year increment, conduct a study comparing the predicted economic and environmental impacts of likely potential management actions identified in Objectives 4.1 through [4.4?] and jointly develop recommendations based on the results of the study
	4.5.2. Consider the results of this study, once it is available, when making decisions about which potential future management actions to pursue in fulfillment of Objectives 4.1 through [4.4?]
4.6. Provide opportunities for collaboration among the Basin's water users	4.6.1. Hold an annual public meeting to discuss Plan implementation and exchange information about the Basin
	4.6.2. Work cooperatively to identify, investigate, and address conflicts between water users resulting from implementation of this Plan by following the procedures for addressing conflicts that are outlined in this Plan

Goal 4: Increase certainty for long-range planning of water supplies to reduce the need for regulatory actions, and increase collaborative efforts among water users across the Basin

Goal 4 is comprised of two distinct but related ambitions: to increase certainty about the availability of water supplies for long-range planning to reduce the need for regulatory actions, and to increase collaboration among the Basin's water users. The next three paragraphs provide some background information about regulatory actions for Compact compliance and how the regulatory burden of Compact compliance has at times contributed to conflicts among the basin's water users.

Under the Republican River Compact (Compact), Nebraska has an allocation that limits how much water from within the Basin can be used. This allocation varies each year with available water supplies and consumptive use within all three states (Nebraska, Kansas, and Colorado). To comply with the terms of the Compact, Nebraska's water use must remain within its allocation over specified averaging periods. To assist with ensuring long-term Compact compliance, certain ongoing regulatory controls have been established for both groundwater and surface water in each the IMP for each NRD, including groundwater allocations, certification of irrigated acres, moratoriums on new wells and new surface water permits, and metering of all wells and surface water diversions in the Basin.

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In years designated by the State as Compact Call Years, Nebraska must take additional action to meet its Compact obligations by either reducing consumption or generating additional streamflow. These potential actions can be regulatory or non-regulatory, and are outlined in the joint IMP for each NRD. For surface water, NeDNR may need to regulate and administer surface water in the Basin to ensure compliance. For groundwater, potential additional groundwater regulatory actions to ensure compliance for the Lower Republican, Middle Republican, and Upper Republican NRDs include establishing more restrictive one-year allocations and curtailment of groundwater pumping within a designated portion of each NRD. The IMP for Tri-Basin NRD also allows for additional regulatory actions as needed to maintain a hydrologically balanced condition (i.e., no net depletions to streamflow).

Regulation to ensure Compact compliance has contributed to a lack of certainty among water users about whether sufficient water supplies will be available in a given irrigation season. In addition, for most of the history of regulation of water rights in Nebraska, state legislation considered surface water and groundwater separately without recognizing that they are hydrologically connected resources that impact one another (*cross-reference to legislative and regulatory history appendix*). Together, these and other factors have contributed to a history of conflict between surface water and groundwater users in the Basin. This basin-wide planning process represents an opportunity to decrease conflict and increase collaboration among the Basin's water users, beginning with the exchange of ideas that has taken place at stakeholder meetings throughout Plan development and continuing through Plan implementation.

Objective 4.1: Increase water supply through interbasin transfers during periods of high flows

Objective 4.1 relates to increasing water supply through interbasin transfers. This idea of diverting available water to the Republican Basin from other basins during periods of high flows has garnered much support from stakeholders throughout the plan development process. The most likely basin to serve as a suitable basin or origin for an interbasin transfer project would be the Upper Platte Basin in Nebraska, but other basins within and outside the state have also been suggested at times during Stakeholder Advisory Committee meetings. Interbasin transfers would benefit the Republican Basin by bringing additional water into the Basin, and may also benefit the basin of origin (such as the Upper Platte Basin) by potentially reducing the impacts of flooding downstream of the diversion site.

Action Items 4.1.1 through 4.1.3 outline the steps that would need to be taken in order for each potential new interbasin transfer project. In other words, for new interbasin transfer projects, Action Item 4.1.1 must precede Action Item 4.1.2, which must precede Action Item 4.1.3.

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Action Item 4.1.1: For each new project, study hydrologic and regulatory feasibility and evaluate potential economic and environmental impacts

For each potential new interbasin transfer project, the project proponents will study hydrologic and regulatory feasibility and evaluate potential economic and environmental impacts.

In addition to examining technical feasibility, the feasibility study will, in accordance with Action Item 2.1.1, include an examination of whether the project adheres to applicable state laws and whether it negatively impacts Nebraska's Compact compliance efforts. As part of this evaluation, any factors outlined in statute for the Director of Natural Resources' evaluation of interbasin transfer applications will be included in the feasibility study and evaluation of impacts (as of *[date of plan draft]*, these factors are listed in *Neb. Rev. Stat. §46-289*).

For any potential new interbasin transfer projects initiated after completion of the comparative study of economic impacts of various potential management actions (Action Item 4.5.1), the evaluation of economic impacts required under Action Item 4.1.1 will include consideration of the results of that study, as required by Action Item 4.5.2.

Action Item 4.1.2: Where feasible and beneficial, apply for necessary permits, establish new or utilize existing infrastructure, then begin operations

For each potential new interbasin transfer project, Action Item 4.1.2 is recommended to be preceded by Action Item 4.1.1. For any project where circumstances do not allow adequate time for Action Item 4.1.1 to be completed before implementation of the project, the project proponents will, at a minimum, report on and discuss the considerations outlined in Action Item 4.1.1 at the annual meeting, allowing time for questions from the public.

As noted in this Action Item, interbasin transfer projects implemented under this Plan may involve either the construction of new infrastructure or utilization of existing infrastructure.

Action Item 4.1.3: ~~Operate~~ **Implement** interbasin transfers as opportunities arise

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For implementation of existing interbasin transfer projects, evaluate whether Action Items 4.1.1 or 4.1.2 have been satisfactorily completed before proceeding to Action Item 4.1.3.

Objective 4.2: Improve water availability through conjunctive management projects within the Basin, such as, but not limited to:

- a. Aquifer recharge
- b. Streamflow augmentation projects

Objective 4.2 examines whether more efficient use can be made of water within the Basin by retiming availability of water resources through conjunctive management projects. There are generally two categories of conjunctive management activities: storing water during periods when water is naturally abundant and using stored water during dry periods. Aquifer recharge and augmentation projects are listed within Objective 4.2 as examples of potential conjunctive management projects and are discussed in further detail in the next two paragraphs. These are intended to be examples only; other types of conjunctive management activities are also permissible for fulfilling this objective. Action Items 4.2.1 through 4.2.4 outline the steps that would need to be taken for each potential conjunctive management project.

Aquifer recharge projects fall within the category of conjunctive management activities related to storing excess water when it is available. Specifically, aquifer recharge projects are those that hold surface water in infrastructure such as canals, reservoirs, or terraces to encourage infiltration to recharge the underlying aquifer. Aquifer recharge projects undertaken to fulfill Objective 4.2 may include creating new infrastructure for the purposes of recharge, utilizing existing infrastructure for this purpose, or improving existing infrastructure to enhance its recharge capabilities. Canals and large reservoirs that existed within the Basin during Plan development are shown in Figure [x].

In contrast to aquifer recharge projects, augmentation projects fall within the category of conjunctive management activities related to using stored water during dry periods. Specifically, augmentation projects involve pumping groundwater out of the aquifer for the purposes of enhancing streamflow. Augmentation projects that exist in the Basin during development of this Plan include N-CORPE, Rock Creek Augmentation Project, and the Turkey Creek Augmentation Project (Figure [x]). Augmentation activities undertaken to fulfill Objective 4.2 may make use of these existing augmentation facilities or may involve identifying and developing new potential augmentation projects.

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As noted above, aquifer recharge and augmentation are listed in Objective 4.2 as examples of potential conjunctive management projects, not as an exhaustive list. Other types of conjunctive management projects may also be considered.

Action Item 4.2.1: For each new project, conduct a feasibility study and evaluate potential economic and environmental impacts

For each potential new conjunctive management project, the project proponent will conduct a feasibility study and evaluate potential economic and environmental impacts.

In addition to examining technical feasibility, the feasibility study will, in accordance with Action Item 2.1.1, include an examination of whether the project adheres to applicable state laws and whether it negatively impacts Nebraska's Compact compliance efforts.

For any potential new conjunctive management projects initiated after completion of the comparative study of economic impacts of various potential management actions (Action Item 4.5.1), the evaluation of economic impacts required under Action Item 4.2.1 will include consideration of the results of that study, as required by Action Item 4.5.2.

Action Item 4.2.2: Where feasible and beneficial, apply for necessary permits, establish new or utilize existing infrastructure, then begin operations

For each potential new conjunctive management project, Action Item 4.2.2 is recommended to be preceded by Action Item 4.2.1. For any project where circumstances do not allow adequate time for Action Item 4.2.1 to be completed before implementation of the project, the project proponents will, at a minimum, report on and discuss the considerations outlined in Action Item 4.2.1 at the annual meeting, allowing time for questions from the public.

As noted in this Action Item, conjunctive management projects implemented under this Plan may involve either the construction of new infrastructure or utilization of existing infrastructure.

Action Item 4.2.3: Operate Implement conjunctive management projects as opportunities arise

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For operation of existing conjunctive management projects, evaluate whether Action Items 4.2.1 and 4.2.2 are needed before proceeding to Action Item 4.2.3.

Action Item 4.2.4: Where appropriate, work with partners such as the US Bureau of Reclamation, irrigation districts, or private landowners to identify, evaluate, and operate potential new projects

Action Item 4.2.4 recognizes that other entities, such as the US Bureau of Reclamation, irrigation districts, or individual landowners, own and operate some of the existing infrastructure that may be suitable for conjunctive management projects. Examples of existing infrastructure that may be suitable for this purpose include wellfields, canals, reservoirs, or small dams and terraces. For conjunctive management projects that utilize existing infrastructure owned and operated by other entities, NeDNR and the NRDs will always first pursue voluntary cooperation with the partner who owns and operates the existing infrastructure.

Objective 4.3: Improve the availability and reliability of water supplies for current surface water irrigators

As available surface water supplies in the Basin have decreased over the last several decades due to a variety of factors, the amount of water available to surface water irrigators has decreased, which has resulted primarily from a combination of decreased runoff and increased groundwater pumping (Appendix [X]). During Plan development, surface water irrigators identified both the availability and reliability of surface water supplies as challenges. This objective and its associated action items focus on pursuing opportunities to improve availability reliability for existing surface water irrigators.

Action Item 4.3.1: Work with irrigation districts to identify opportunities to improve the efficiency of the Basin's surface water delivery systems, when it is both feasible and beneficial to Nebraska's Compact accounting balance to do so

NeDNR and the NRDs will work with irrigation districts to identify opportunities to improve the efficiency of the Basin's surface water delivery systems. At the time of this Plan's adoption, irrigation districts in the Basin include Nebraska Bostwick Irrigation District, Frenchman Valley Irrigation District, Frenchman-Cambridge Irrigation District, H & RW Irrigation District, and Pioneer Irrigation District [placeholder: reference to map]. Such improvements will only be undertaken as part of implementation of this Plan if it is both feasible and beneficial to Nebraska's Compact accounting balance to do so.

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Action Item 4.3.2: Encourage the conversion of surface water irrigated acres to a more efficient and reliable method of irrigation, when it is both feasible and beneficial to Nebraska's Compact accounting balance to do so

Groundwater irrigation is generally a more reliable source of water than surface water irrigation, because the aquifer is sheltered from the variations in weather and climate that cause surface water supplies to vary widely, both within a season and from year to year. Because of the variability and uncertainty of, surface water supplies, surface water irrigators in the Basin have found it difficult to plan in recent years. Some surface water-only acres are located in areas where it would be feasible to convert them to commingled or groundwater-only acres if they were allowed to drill new wells and obtain new groundwater permits; however, there are currently moratoriums on new wells in most of the Basin. Because of this, allowing these surface water users to drill wells would require a variance. If any new depletions result from use of the new wells, they will be offset following the procedures outlined in the IMPs, in accordance with Action Item 2.1.2.

[Objective 4.4: *[Placeholder—other objectives related to increasing certainty are likely to result from discussion of the remaining challenges during upcoming stakeholder meetings]*

[Placeholder for discussion of other objectives and associated action items related to increasing certainty]

Objective 4.5: Compare the relative potential economic and environmental impacts of the types of management actions that would increase certainty for water users in the Basin through increased water supplies or improved water availability

The purpose of Objective 4.5 is to provide NeDNR and the NRDs with a better understanding of the comparative magnitude of the potential economic and environmental impacts of various management actions that could be taken to fulfill Objectives 4.1 through [4.4?]. NeDNR and NRDs will conduct a study comparing the predicted economic and environmental impacts of likely potential management actions and develop recommendations based on the study (Action Item 4.5.1). NeDNR and NRDs will consider the results of the study when deciding which potential future management actions to pursue (Action Item 4.5.2).

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Action Item 4.5.1: Within the first five-year increment, conduct a study comparing the predicted economic and environmental impacts of likely potential management actions identified in Objectives 4.1 through [4.4?] and jointly develop recommendations based on the results of the study

NeDNR and the NRDs will conduct a study comparing the predicted economic and environmental impacts to the Basin of potential interbasin transfer (Objective 4.1), conjunctive management (Objective 4.2), and *[Placeholder; other potential management actions related to increasing certainty may be added as a result of discussion of the remaining challenges during upcoming stakeholder meetings, Objective 4.4]* projects. Additional types of management actions that would increase certainty for water users may also be included in the analysis for comparative purposes, even if they are not specifically mentioned in Objectives 4.1 through [4.4?]. For example, the management actions allowed under the joint IMP for each NRD may be included.

NeDNR and the NRDs will jointly develop recommendations based on the results of the study. The study and jointly developed recommendations will be completed before the first five-year review of Plan progress.

Action Item 4.5.2: Consider the results of this study, once it is available, when making decisions about which potential future management actions to pursue in fulfillment of Objectives 4.1 through [4.4?]

The results of the study described in Action Item 4.5.1 and the recommendations jointly developed by NeDNR and the NRDs will be used to help NeDNR and NRDs prioritize potential management actions to pursue under Objectives 4.1 through [4.4?].

Action Item 4.5.2 only applies to potential management actions being considered after completion of the study described in Action Item 4.5.1; therefore, NeDNR and the NRDs are not required to wait for this study to be completed before taking management actions in fulfillment of Objectives 4.1 through [4.4?].

Objective 4.6: Provide opportunities for collaboration among the Basin's water users

Objective 4.6 includes two avenues for increasing collaborative opportunities for the Basin's water users: opportunities for discussion and information exchange at an annual

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public meeting (Action Item 4.6.1) and collaboration to address conflicts between water users that result from implementation of this Plan (Action Item 4.6.2).

Please note that in addition to the opportunities for collaboration outlined in the action items associated with Objective 4.6, Goal 4 and its associated objectives and action items contain additional opportunities for collaboration among the Basin's water users.

Action Item 4.6.1: Hold an annual public meeting to discuss Plan implementation and exchange information about the Basin

Information about the annual meeting can be found *[Placeholder for cross-reference to section about the Annual Meeting]*.

Action Item 4.6.2: Work cooperatively to identify, investigate, and address conflicts between water users resulting from implementation of this Plan by following the procedures for addressing conflicts that are outlined in this Plan

Conflicts between water users resulting from implementation of this Plan will be identified, investigated, and addressed following the Procedures for Addressing Conflicts between Water Users for the Republican River Basin-Wide Plan (Appendix *[x]*).

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Goal 5: Basin-wide collaboration among water management entities and stakeholders to maximize Nebraska's efficient and beneficial consumptive use of its portion of the water supply	
Objectives	Action Items
5.1. Promote conservation programs available to the water users in the Basin	5.1.1. Work together to identify, investigate, and discuss existing and potential new water conservation programs
	5.1.2. Collaborate to promote conservation program opportunities to the Basin's water users
5.2. Understand how various water management activities of independent decision-makers affect water supplies	5.2.1. Study the effects of conservation practices on streamflow, if feasible
	5.2.2. <i>[Placeholder for any other related action items based on future discussion]</i>
5.3. Evaluate the feasibility and potential outcomes of establishing water markets in the Basin	5.3.1. Cooperate in determining the feasibility of water markets in the Basin
	5.3.2. Test conclusions through implementation of a water market program in a pilot area, if feasible
5.4. <i>[Placeholder for any other objectives related to this goal that may arise from further stakeholder discussion.</i> <i>May include: studies, grants, recommendations, education, promotion of best management practices, sharing information, or any other type of activity that involves supporting or promoting a desirable management action indirectly.]</i>	5.4.1. <i>[Placeholder for action item(s) related to additional objectives]</i>

Goal 5: Basin-wide collaboration among water management entities and stakeholders to maximize Nebraska's efficient and beneficial consumptive use of its portion of the water supply

Goal 5 focuses on collaboration among NeDNR, the NRDs, other water management entities, and stakeholders to improve water management in the Basin by supporting and promoting desirable management actions. "Water management entity" refers to any entity that makes independent decisions about water use within the Basin. This includes, but is not limited to, the NRDs, NeDNR, irrigation districts, the Bureau of Reclamation, municipalities, and individual

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water users. So the first part of Goal 5, “basin-wide collaboration among water management entities and stakeholders,” means that this goal encompasses any objectives and actions that involve NeDNR and the NRDs collaborating with each other and others on a basin-wide scale to support beneficial water management actions that remain under control of other entities or individuals. For actions taken under Goal 5, management decisions currently under local control will remain under local control; the purpose of Goal 5 and its objectives and action items is to support beneficial management actions across the Basin, not to mandate participation by water management entities or stakeholders in any specific beneficial management action. As an example, under Objective 5.1, NeDNR and the NRDs will collaborate to promote conservation programs to the Basin’s water users, but the decision of whether or not to participate in those conservation programs remains under the control of those individual water users.

The second part of Goal 5, “to maximize Nebraska’s efficient and beneficial consumptive use of its portion of the water supply,” gives direction and focus to these efforts.

Objective 5.1: Promote conservation programs available to the water users in the Basin

NeDNR and the NRDs will collaborate to evaluate and promote existing and new water conservation programs related to the use of integrated water resources. These are programs that provide incentives to encourage voluntary modification by water users for the purposes of water conservation. Incentive programs may include, but are not limited to, federal programs or any program authorized by state law. Some examples of this are programs that incentivize acreage retirements or best management practices.

The IMPs for all four NRDs already include guidelines for the establishment and implementation of incentive programs to reduce beneficial consumptive use of water within each NRD. Objective 5.1 of this plan does not replace the existing incentive program guidelines contained in the four IMPs, nor does it require that all four NRDs implement exactly the same incentive programs. What it does require is that NeDNR and the NRDs share information about and evaluate water conservation programs as described under Action Item 5.1.1 and work together to promote conservation opportunities to water users as described under Action Item 5.1.2.

Action Item 5.1.1: Work together to identify, investigate, and discuss existing and potential new water conservation programs

NeDNR and the NRDs will exchange information about and evaluate existing and potential new water conservation programs available to water users in the Basin. At a minimum, this will occur at annual meetings. NeDNR and the NRDs may also

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discuss water conservation programs between annual meetings, for example, as new opportunities are identified or as deadlines approach for a specific program. Evaluation of each conservation program opportunity should include consideration of whether and how that conservation program might help advance progress towards the goals and objectives of this Plan.

For each conservation program opportunity that NeDNR and the NRDs agree might help advance progress towards the goals and objectives of this Plan, NeDNR and the NRDs should discuss whether to promote such a program to water users on a basin-wide scale, as described under Action Item 5.1.2.

Implementation and administration of conservation programs will remain the responsibility of individual NRDs and NeDNR, following existing guidelines found in each joint IMP.

Action Item 5.1.2: Collaborate to promote conservation program opportunities to the Basin's water users

If NeDNR and the NRDs agree that a specific conservation program opportunity might help advance progress towards the goals and objectives of this Plan, NeDNR and the NRDs may determine that the program should be collaboratively promoted users on a basin-wide scale (Action Item 5.1.1).

Potential opportunities for collaboration on the promotion of conservation programs include, but are not limited to:

1. Collaborative development of educational materials about the program, such as written materials or presentations,
2. Sharing or joint development of implementation tools such as forms or databases, or
3. Joint applications for funding to support and promote conservation program opportunities.

Objective 5.2: Understand how various water management activities of independent decision-makers affect water supplies

NeDNR and the NRDs will improve their understanding of how various water management activities of independent decision-makers affect water supplies. Independent decision-makers in this context include any water management entities in

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the Basin other than NeDNR and the NRDs, such as producers, irrigation districts, municipalities, and other government agencies.

Action Item 5.2.1: Study the effects of conservation practices on streamflow, if feasible

NeDNR and the NRDs will study the effects of various agricultural conservation practices on streamflow, if and when enough funds and staff resources are available to make it feasible to do so. The results of and recommendations based on the results of any such study will be shared with producers in the Basin. NeDNR and the NRDs may also use the results of this kind of study to inform discussion and promotion of conservation incentive programs (Objective 5.1).

Action Item 5.2.2. *[Placeholder for any other related action items based on future discussion]*

[Placeholder for description of any other related action items based on future discussion]

Objective 5.3: Evaluate the feasibility and potential outcomes of establishing water markets in the Basin

During Plan development, stakeholders were enthusiastic about the idea of trying a water market in the Basin for the purposes of exchanging water among groundwater and surface water users. Much is still unknown about the logistics, feasibility, and desirability of such water markets; therefore, the purpose of this objective is to conduct a study and possible pilot program to evaluate the feasibility and potential outcomes of establishing a water market or water markets within the Basin.

The intent is to complete this evaluation (Action Items 5.3.1 through 5.3.2) within five years of this plan taking effect and to report on findings from the evaluation as part of the first five-year technical review, provided that sufficient funding and staff resources are available to do so.

Nothing about this objective or its listed action items precludes NRDs or other entities from pursuing water markets in the Basin outside of this planning process.

Action Item 5.3.1: Cooperate in determining the feasibility of water markets in the Basin

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This action item would include studying existing water markets, as well as working cooperatively with the US Bureau of Reclamation, water users, and irrigation districts, to evaluate the feasibility of water markets for surface water and groundwater users in the Basin. This feasibility analysis will include such considerations as Compact compliance obligations, program costs, regulatory framework, and water user interest. If the conclusions from these efforts indicate that water markets in the Basin would be feasible, then NeDNR and the NRDs may choose to proceed with testing their conclusions in a pilot area (Action Item 5.3.2).

Action Item 5.3.2: Test conclusions through implementation of a water market program in a pilot area, if feasible

If the evaluation in Action Item 5.3.1 indicates that water markets in the Basin would be feasible, and if sufficient funding and staff resources are available to do so, then NeDNR and the NRDs will work cooperatively with the US Bureau of Reclamation, the Basin's irrigation districts, and water users in the Basin to conduct a water market pilot program within a portion of the Basin.

Objective 5.4. *[Placeholder for any other objectives related to this goal that may arise from further stakeholder discussion.]*

May include: studies, grants, recommendations, education, promotion of best management practices, sharing information, or any other type of activity that involves supporting or promoting a desirable management action indirectly.]

[Placeholder for discussion of any other objectives and associated action items related to this goal that may arise from further stakeholder discussion. May include: studies, grants, recommendations, education, promotion of best management practices, sharing information, or any other type of activity that involves supporting or promoting a desirable management action indirectly.]

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Goal 6: When possible, pursue projects that not only benefit water supplies and uses, but also create benefits for fish, wildlife, conveyance, and recreation within the Republican River Basin	
Objectives	Action Items
6.1. Where feasible and beneficial, protect and enhance fish and wildlife habitat and public outdoor recreational opportunities	6.1.1. Partner with wildlife-focused organizations on projects that benefit the organizations' habitat and wildlife interests while also helping to fulfill other goals of this Plan
	6.1.2. Promote public recreation on the river, when doing so can also help to fulfill other goals of this Plan
	6.1.3. Cooperate in projects to assess and restore riparian wetlands while also helping to fulfill other goals of this Plan
6.2. Where feasible and beneficial, reduce the effects of undesirable vegetation on water conveyance	6.2.1. Cooperate in removing undesirable vegetation impacting water conveyance and managing reinfestation

Goal 6: When possible, pursue projects that not only benefit water supplies and uses, but also create benefits for fish, wildlife, conveyance, and recreation within the Republican River Basin

During the development of this Plan, stakeholders expressed that it was important to them that this Plan provide benefits to fish, wildlife, conveyance, and recreation within the Basin. While these potential areas of benefit do not directly relate to integrated management of the Basin's water supplies and uses, there are likely to be opportunities for projects that can benefit fish, wildlife, or recreation while also benefiting water supplies and uses according to the Plan's other goals and their associated objectives and action items. The objectives and action items that fall under Goal 6 outline ways in which projects to manage water supplies and uses can provide additional benefits to the Basin's fish, wildlife, conveyance, and recreation.

It is important to note that for any action taken in fulfillment of any objective or action item under Goal 6 to benefit fish, wildlife, conveyance, or recreation, the action must also benefit water supplies and uses in fulfillment of one or more of the Plan's other goals, objectives, or action items. Actions that only benefit fish, wildlife, conveyance, or recreation without also benefiting hydrologically connected water supplies fall outside of the statutory authority of this Plan.

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Objective 6.1: Where feasible and beneficial, protect and enhance fish and wildlife habitat and public outdoor recreational opportunities

NeDNR and the NRDs will pursue opportunities to protect and enhance wildlife habitat and outdoor recreation opportunities, if it is feasible and beneficial do to so as part of projects that also benefit water supply and use. Further details are given in the action items below.

Action Item 6.1.1: Partner with wildlife-focused organizations on projects that benefit the organizations' habitat and wildlife interests while also helping to fulfill other goals of this Plan

If it is feasible and beneficial to do so as part of actions taken to benefit water supply and use in fulfillment of this Plan's other goals, NeDNR and the NRDs will partner with wildlife-focused organizations on projects that benefit wildlife and their habitat. Some examples of wildlife and habitat-focused groups operating in Nebraska include the Nebraska Game and Parks Commission, the US Fish and Wildlife Service, Ducks Unlimited, Audubon Nebraska, the Nature Conservancy, and the Crane Trust. The level of involvement of partner organizations may vary according to the needs and circumstances of each individual project, ranging from, for example, consultation on questions related to their area of expertise, to collaboration on project planning and design, to sharing project costs for projects that benefit the groups' wildlife and habitat-related interests.

Projects undertaken to fulfill this objective may involve establishing new or utilizing existing infrastructure. One example of a type of project that could benefit both the Basin's water supplies and wildlife habitat would be to use water diverted through an interbasin transfer project during periods of high flows to enhance wildlife habitat.

Action Item 6.1.2: Promote public recreation on the river, when doing so can also help to fulfill other goals of this Plan

If it is feasible and beneficial to do so as part of actions taken to benefit water supply and use in fulfillment of this Plan's other goals, NeDNR and the NRDs will promote public recreation on the river. Some examples of recreational floating include recreational floating such as tubing, kayaking, and canoeing.

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For promotion of public recreation, it may be beneficial for NeDNR and the NRDs to partner with organizations with an interest in public recreation, such as the Nebraska Game and Parks Commission or local river outfitters.

Action Item 6.1.3: Cooperate in projects to assess and restore riparian wetlands while also helping to fulfill other goals of this Plan

NeDNR and the NRDs will participate in projects to assess and restore riparian wetlands if it is feasible and beneficial to do so as part of actions taken to benefit water supply and use in fulfillment of this Plan's other goals **and objectives**, such as for aquifer recharge (Objective 4.2). As appropriate, they will do so in cooperation with organizations with interest and expertise in wetland restoration. Because of the wide-range of benefits wetlands provide, such as groundwater recharge, wildlife habitat, flood control, and water quality, the primary focus of potential partner organizations for mutually beneficial wetland assessment and restoration projects also varies widely.

Action Item 6.1.3 includes two parts: wetland assessment and wetland restoration. Wetland assessment involves evaluating wetland condition and function. This may be done for many purposes, such as to identify and inventory existing wetlands, to compare and prioritize wetlands for development and mitigation purposes, or to establish a baseline condition and then monitor changes in condition and function over time. Wetland restoration involves rehabilitating the hydrology, plants, and soils of a degraded wetland or reestablishing a wetland that has been destroyed.

Objective 6.2: Where feasible and beneficial, reduce the effects of undesirable vegetation on water conveyance

NeDNR and the NRDs will pursue opportunities to reduce the effects of undesirable vegetation on water conveyance, if it is feasible and beneficial do to so as part of projects that also benefit water supply and use. Conveyance is the transport of water from one location to another. Further details are given in the action item below.

Action Item 6.2.1: Cooperate in removing undesirable vegetation impacting water conveyance and managing reinfestation

NeDNR and the NRDs will participate in projects to remove undesirable vegetation impacting water conveyance, if it is feasible and beneficial to do so as

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part of actions taken to benefit water supply and use in fulfillment of this Plan's other goals.

A summary providing background information about the relationship between removal of invasive vegetation and evapotranspiration is included as Appendix [X]. This information should be taken to consideration when considering projects involving riparian vegetation removal and management.

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Attachment H - New Draft Objectives and Action Items handout

New DRAFT Objectives and Action Items, for discussion

DRAFT objectives and action items that have been drafted more recently than the Stakeholder Advisory Committee's most recent vote on goals, objectives, and action items, which took place at the June 2017 stakeholder meeting*

Objectives	Action Items
2.2. Understand the effects of management actions for Compact compliance on water supplies for Nebraska's water users	2.2.1. Qualitatively evaluate the net effect on water supplies of any management actions that are taken for Compact compliance
	3.1.3. Educate civic leaders and the public about the policies and institutional infrastructure that contribute to the development and implementation of solutions
3.2. Improve information sharing with water users who are reliant on the Basin's water supplies	3.2.1. Share data and information related to the Republican River Compact with the public in an easily accessible, user-friendly format
	3.2.2. Annually prepare and exchange reports containing data and information about water supplies and uses in the Basin, and make these reports publically accessible
	3.2.3. Regularly communicate with the Plan's Stakeholder Advisory Committee about implementation progress and potential Plan revisions
	3.2.4. Encourage and support water users to share information about their management practice improvements with other water users and the public
4.3. Improve the availability and reliability of water supplies for current surface water irrigators	4.3.1. Work with irrigation districts to identify opportunities to improve the efficiency of the Basin's surface water delivery systems, when it is both feasible and beneficial to Nebraska's Compact accounting balance to do so
	4.3.2. Encourage the conversion of surface water irrigated acres to a more efficient and reliable method of irrigation, when it is both feasible and beneficial to Nebraska's Compact accounting balance to do so

* Excludes new draft plan language about water markets (draft Objective 5.3, Action Item 5.3.1, and Action Item 5.3.2), as these items are included on a separate handout for a discussion about water markets.

Objectives	Action Items
4.5. Compare the relative potential economic and environmental impacts of the types of management actions that would increase certainty for water users in the Basin through increased water supplies or improved water availability	4.5.1. Within the first five-year increment, conduct a study comparing the predicted economic and environmental impacts of likely potential management actions identified in Objectives 4.1 through [4.4?] and jointly develop recommendations based on the results of the study
	4.5.2. Consider the results of this study, once it is available, when making decisions about which potential future management actions to pursue in fulfillment of Objectives 4.1 through [4.4?]
4.6. Provide opportunities for collaboration among the Basin's water users	4.6.1. Hold an annual public meeting to discuss Plan implementation and exchange information about the Basin
	4.6.2. Work cooperatively to identify, investigate, and address conflicts between water users resulting from implementation of this Plan by following the procedures for addressing conflicts that are outlined in this Plan
5.1. Promote conservation programs available to the water users in the Basin	5.1.1. Work together to identify, investigate, and discuss existing and potential new water conservation programs
	5.1.2. Collaborate to promote conservation program opportunities to the Basin's water users
5.2. Understand how various water management activities of independent decision-makers affect water supplies	5.2.1. Study the effects of conservation practices on streamflow, if feasible

Attachment I - What Has Been Added to the Draft Goals and Objectives Since the August Stakeholder Meeting

What has been added to the draft goals and objectives since the August stakeholder meeting:

- Section overview summarizing this section of the plan
- Section table of contents
- List of goals and objectives, including:
 - List of measurable hydrologic objectives (New), including Goal 1 (New) as umbrella goal for measurable hydrologic objectives
 - List of other goals and objectives of the plan – please note that due to the addition of Goal 1, the numbers of all previously existing goals have been shifted backward by 1 (for example, what was previously Goal 1 is now Goal 2)
- Management Activities to Achieve Objectives heading, with introductory background material explaining and describing the two categories of goals and objectives and a general framework for the timeline of each – this introductory material leads into the goals, objectives, action items, and descriptions that the stakeholders have previously reviewed
- Placeholders for descriptions of measurable hydrologic objectives, to be filled in after the 11/30 stakeholder discussion of measurable hydrologic objectives
- Some new objectives and action items for consideration by the group, based on discussion at and written feedback following June 2017 stakeholder meeting
- Descriptive text for these new objectives and action items
- Some small revisions or additions to existing goals, objectives, and action items and their descriptions

Attachment J- September and October Coordination Meeting Summaries handout

Republican River Basin-Wide Plan September Coordination Meeting Summary

*Tuesday, September 19, 2017 10:00 AM – 12:00 PM
Tri-Basin Natural Resources District – 1723 Burlington Street, Holdrege, NE*

Attendance

Scott Dicke (LRNRD)	Sylvia Johnson (MRNRD)	Jasper Fanning (URNRD)
Nate Jenkins (URNRD)	Shea Winkler (NeDNR)	Larry Reynolds (TBNRD)
John Thorburn (TBNRD)	Alex Boyce (MRNRD)	Todd Siel (LRNRD)
Carol Flaute (NeDNR)	Jeff Fassett (NeDNR)	Aaron Thompson (USBR)
Jennifer Schellpeper (NeDNR)	Patti Banks (Vireo)	Craig Scott (USBR)
Jack Russell (MRNRD)	Marcia Trompke (CNPPID)	Brad Edgerton (FCID)

The meeting opened with general updates and a report on DNR news. The USBR has awarded new WaterSmart funding for LRNRD for a real-time allocation tracking system. Discussed updates to the Platte-Republican Diversion project.

The group then reviewed and discussed the Agenda for the November 30, 2017 Stakeholder Advisory Committee Meeting.

The next issue was the discussion of a water market as a means to reduce consumptive use in the Republican Basin. USBR delivered an idea for a framework for the market to be based off of in order to run a pilot program. Details about how to include language for a potential water market study and eventual water market in the Basin-Wide Plan were discussed. DNR will make a summary of the concepts discussed and send to everyone for review and comment. The plan is to finalize discussion about this at October 24, 2017 Coordination Meeting.

After water markets, the group did a quick walk-through of a hand-out relating to measurable hydrologic objectives. Input was sought from NRDs to ensure the framework makes sense and all measurable hydrologic objectives are being represented on the hand-out. Further discussion on this topic will occur at the October 24, 2017 Coordination Meeting.

Future meeting dates were discussed and there will likely be an additional Stakeholder meeting in December and will finalize the date at the next Coordination Meeting. The next Stakeholder meeting will be November 30, 2017. There will also be another Stakeholder meeting on March 20, 2018. Coordination Meetings are scheduled for November 14, 2017 and January 16, 2018.

The next Republican River Basin-Wide Plan coordination meeting will be held Tuesday, October 24, 2017.

For distribution at 11/30/2017 Stakeholder meeting for the Republican River Basin-Wide Plan

Republican River Basin-Wide Plan

October Coordination Meeting Notes

Tuesday, October 24, 2017 10:00 AM – 12:00 PM
Tri-Basin Natural Resources District – 1723 Burlington Street, Holdrege, NE

Attendance

Scott Dicke (LRNRD)	Jennifer Schellpeper (NeDNR)	Jeff Fassett (NeDNR)
Nate Jenkins (URNRD)	Jack Russell (MRNRD)	Todd Siel (LRNRD)
John Thorburn (TBNRD)	Aaron Thompson (USBR)	Patti Banks (Vireo)
Carol Flaute (NeDNR)	Shea Winkler (NeDNR)	Craig Scott (USBR)

The meeting opened with project updates in the basin. TBNRD is working with Olsson and Central to develop an application for the necessary water right for the Platte River Diversion project. Jeff mentioned that this week NeDNR was meeting with NBID and LRNRD to discuss specifics of the work plan Jesse Bradley had developed for NBID as well as tour the NBID facilities. Jeff also shared details on the 3-states meeting scheduled for 10/26.

The group then discussed the November 30th Stakeholder Advisory Committee meeting. Plan language items and remaining discussion items will be addressed at this meeting.

Next, the water markets discussion from the September Coordination meeting was recapped and the hand-out for the November SAC meeting was reviewed. The language about water markets to be included in the plan will also be presented at the November SAC meeting. It was agreed that, with some minor changes, both the summary language and the draft plan language was ready to be presented to the SAC. In relation to funding for the water markets study, a WATERSMART informational meeting is being held in McCook on November 2nd.

The next topic discussed was the updates to plan language for the measurable hydrologic objectives for the Basin-Wide Plan. There was a general discussion about whether or not the plan language should discuss maintaining groundwater levels (and what to compare to) or maintaining levels of depletions. The Stakeholder group will have an opportunity to give their input about the groundwater levels. There was also discussion of managing water resources better in average and above-average precipitation years in order to be prepared for years of drought. The group will continue to revise plan language to present at the November Stakeholder meeting.

Lastly, the benefits of updated IMPs and recent RRCA resolutions were reviewed. Some of the information will have additional details added for clarity before it is posted to the website for Stakeholders.

Upcoming meetings include the following: Forecast meeting on November 14th, SAC Meeting November 30th, if necessary SAC Meeting December 13th, and the next Coordination meeting is January 16th, 2018.

For distribution at 11/30/2017 stakeholder meeting for the Republican River Basin-Wide Plan

Attachment K - Why Watershed Management handout

Why Watershed Management?

By Ted Tietjen

Nov 18, 2017

To: The Republican River Stakeholders

From Ted Tietjen

Why Watershed Management?

The Republican River Basin is trying to manage a basin that is suffering from the “Tragedy of The Commons”; where water demands exceed what’s available and to comply with the Republican River Compact. It appears the Republican River Compact Administration has come up with a plan that should keep NE in compliance for a number of years. Unfortunately, the compact does not address the challenges we face in the state of NE. If during the growing season we would normally receive 30 plus inches rain per year, there would be no reason to meet as the availability would exceed demand.

The Natural Resource Districts were approved in 1969 by the NE Legislature and then implemented in 1972. The 23 districts were designed to represent watersheds as much possible along county lines. Correlative Rights relating to ground water management are also put in place. “Share and share alike” is the standard that can be used to further the “Tragedy of the Commons” or to use it as a tool to help solve some the challenges in over appropriated watersheds.

At the last stakeholders meeting in Aug a proposal was made to conduct a 4 to 5 year research project on a small Hydrologic Unit Code (HUC 12) to analyze the value in using water balance as a management tool. The committee requested that more detailed information be provided and then report back to the group for further consideration. Some of the concepts and opportunities this research could help identify and quantify are listed in the following bullets.

- Over the long term, the total average annual water supply or less is a limit and could be managed for consumption at similar to native consumption rates
- Anticipated water consumption amount distributions, per field, can be managed through crop selection to maximize land productivity.
- Each landowner determines how much water to consume on each of their fields based on their long-term average annual water supply
- Both surface and groundwater irrigation would be protected to help recapture and retime the average annual water supply in its most effective manner
- Irrigation can be used to maintain the expected consumption on only a portion of the land adequate to maintain a consumption verses supply balance
- Irrigation helps produce maximum benefits and address the variability of high and low precipitation periods
- This concept offers the opportunity to bring the local hydrologic system back to a native historic balance where sustainable aquifers and working streams can coexist
- Based on the landowner’s specific production and conservation goals, any extra water conserved could either be further consumed by them or traded to other water interests

A HU12 located in Perkins County, NE was selected (number 10250006043) and comprises 33,459 acres. What is unique about this watershed is that it is an enclosed watershed. That means no water comes in or goes out of the watershed other than precipitation and a small amount of ground water flux at the boundary. This eliminated a lot of variables such as streams flowing in or out, large dams with a large surface water area and canals. Flood plains or riparian areas are not in the project either.

One of the challenges is that the underground aquifer does not follow the watershed. Since the aquifer water movement is very slow it isn't that hard to measure. This ground water flux could be assumed to be zero because it can operate in opposing directions in different parts of the boundary or it could be quantified with the model. The local NRD has enough information to measure it accurately so it should not present a problem.

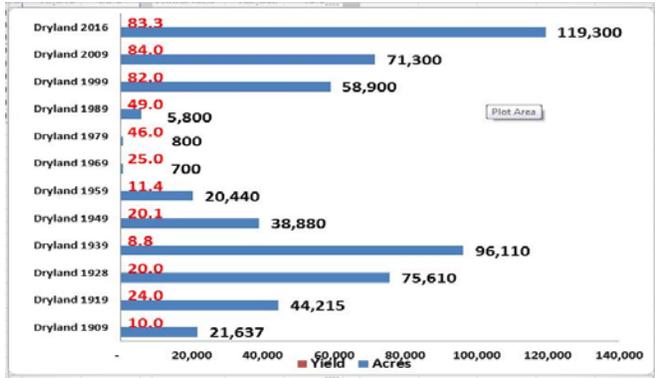
One of the R & D objectives would be to identify recharge opportunities when the soil profile is already full and the area gets additional precipitation. Another opportunity would be when precipitation events exceed the water intake rate of the soil. These opportunities coupled with better residue management to reduce evaporation, elimination of undesirable vegetation and using cropping systems options to establish a baseline. Once the aquifer recharge baseline has been quantified and becomes measurable, ground water allocations and educational programs can be adjusted to meet the watersheds budgetary goals.

HUC 12 # 102500060403 in Perkins County, NE

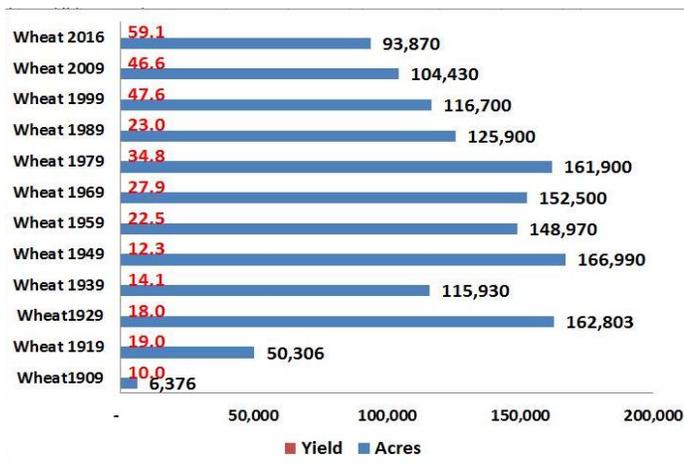


As the data was being gathered for the presentation it became clear there was another strong factor influencing cropping systems that was driving water management was economics. It became very clear that economics was the factor and had a greater impact on what was happening and took precedence over everything else. Each grower's behavior also affected management strategies relating to their farming practices.

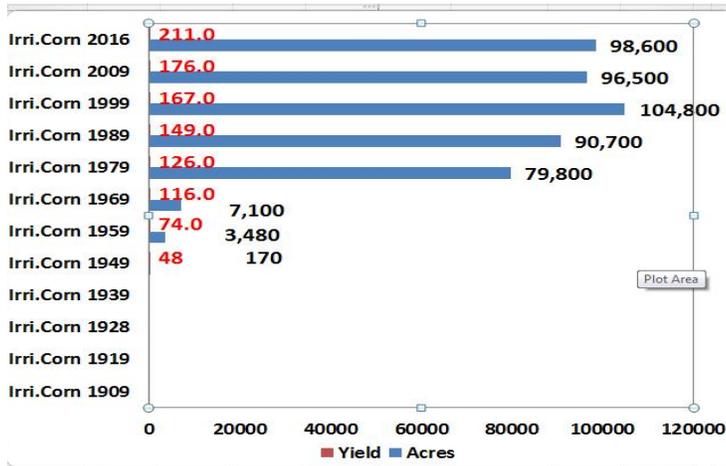
Before laying out the details for the HUC 12 in the R & D project it was decided to look at the cropping history in Perkins County from 1909 to 2016 for three crops, corn, wheat and soybeans. The information was derived from the NE Dept. of Ag Statistics



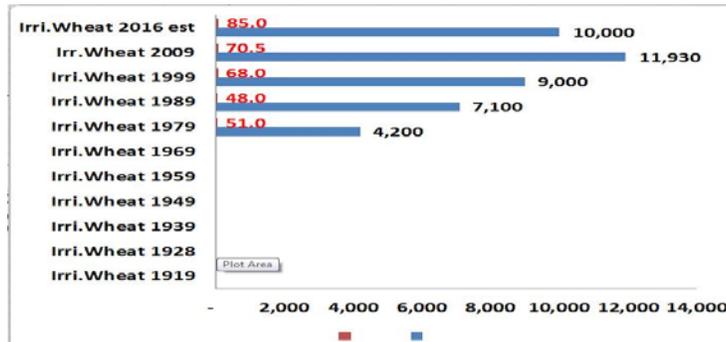
The bar graphs show how the corn cropping system changed. From 1909 to 1939 much of the corn was grown for the livestock. Then starting in the late forties summer fallowing before planting wheat became the norm and lasted until the early 90's when eco-fallow became more common. These eco-fallow acres were then planted to dryland corn rather than wheat as it produced more income due to higher yields and price. By 2016 Perkins County had more acres in dryland corn than wheat.



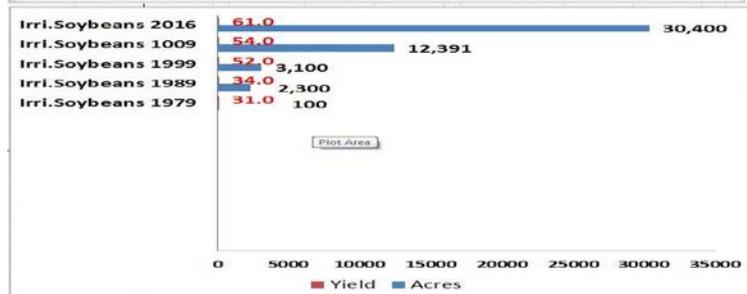
Wheat acres in 1909 were low because only 15% of the land had been broken out and the price was not attractive. By 1919 the acres jumped partly because of WWI and many more acres were being farmed. By 1928, 65 % of the acres in Perkins County were farmed and wheat became a major crop that surpassed the dryland corn acres. Summer fallow acres increased in the late 1940's as it increased yields and lasted till growers started using eco-fallow to save moisture and then switched to corn. New high yielding varieties came along in the 1990's and continued to increase, where 70 to 110Bu/A yields are not uncommon today.



Irrigated corn acres came to the county in the 1950's with yields in the 75 to 80 Bu/A range. Center pivots became popular in the 1970's. At the same time hybrid corn varieties were increasing yields to 125 Bu/A. By **2016 the irrigate corn yields reached an average of 211 Bu/A. Irrigated corn acres kept increasing until a moratorium on drilling irrigation wells was implemented in the 1970's.**

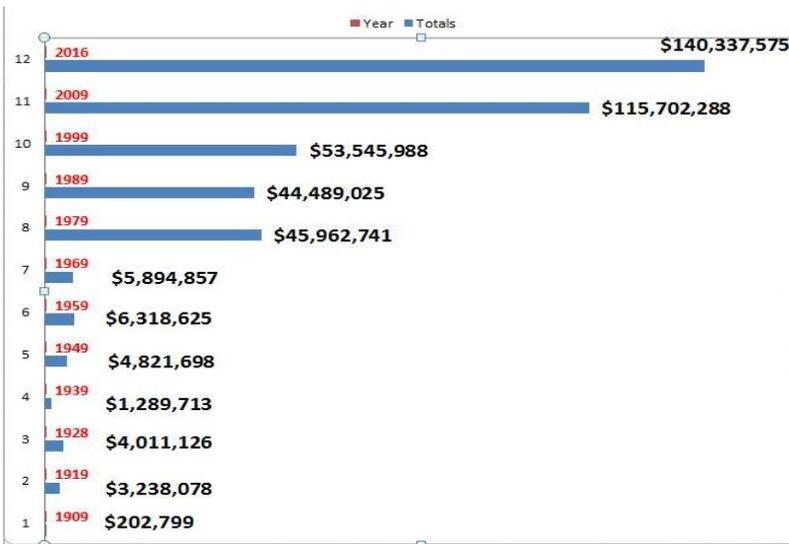


Some growers started irrigating wheat in the 1970's as center pivots became more common. New high yield varieties are still being grown in the crop rotations where yields above 80 Bu/A are common.



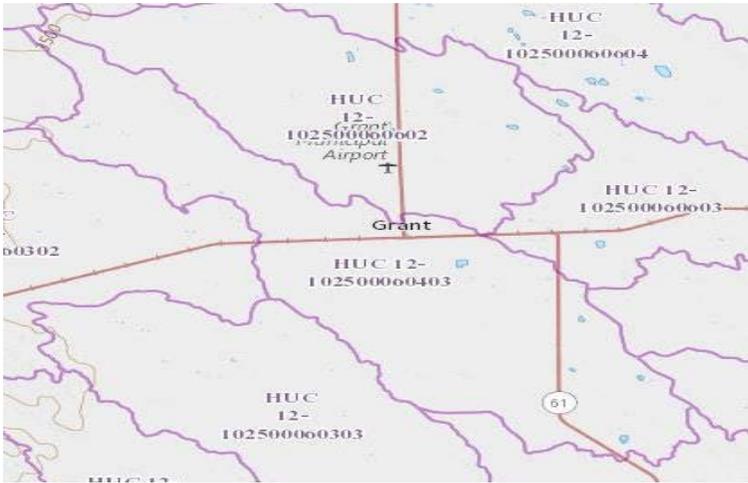
Soybean production under irrigation started

in the 1970's and has grown because it fit well into the crop rotation. Yields have also increased from 30 to 70 Bu/A making it an income producing crop as well.



One can easily see how yield and price increases changed the revenue stream and how they impacted the decision making process. In 1909 when only 15 % of the land was broken out of sod only produced \$202,799. WWI prices encouraged farmers to plant more acres. Steam engines and other innovations helped growers to expand their farmable acres in a very short period of time. Revenue from wheat and corn increased 160 % or \$3,238,078 by 1919. By 1928 65% of the land in Perkins County was being farmed and increase wealth by another \$773,048.

Increased revenue did not really take off until center pivot irrigation development took place. By 1979 the revenue from corn and wheat increased to \$45,962,741. In 2016 corn, wheat and soybeans had a cash value of \$140,337,575. We did not include other crops and livestock as the data was not available. It is not hard to see why economics is the driver and how we manage our resources.



We need to explain how USGS’s Hydrologic Unit Code (HUC) 12, #**102500060403** units came about:

The numbers designate the following:

First two digits: **10** is in the Missouri River Basin

The Next two digits are: **1025**: designates the Republican River Basin

The next 4 digits are: **10250006**: Designates the Stinking Water.

The next 4 digits are: # **102500060403** and is the HUC 12 recommended for the project.

How was the data collected?

Both USGS: <https://water.usgs.gov/GIS/huc/html> or <https://viewer.nationalmap.gov/advanced-viewer> and NRCS websites: <https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx> were used in the data gathering process.



Actual NRCS map with acres and crops grown in 2017 in **Section 11 & 12-10-38**, which includes part of **Grant**.

The watershed boundary is color coded in **Red**.

Irrigated land is **Yellow**.

Dry land is **Gray**.

Buildings and waste land is **Orange**

Acres of each crop grown in the HUC 12 in 2017 are as follows:

Irrigated crop acres

Corn	Wheat	Soybeans	Pinto's	Sudan	Irrigated Acres
6555	292	2592	393	195	10,027

Rain fed acres

Corn	Wheat	soybeans	sunflowers	Milo	Sudan	J Millet	Millet	Fallow	Rain fed Acres
7261	2608	98	207	186	913	530	262	3410	15,475

Pasture, buildings, roads and wasteland acres

Pasture	Grass	CRP	Shelter belts	Buildings/City	Roads/waste	Other Acres
5181	452	135	127	572	1629	<u>7,957</u>

The acres in the HUC 12 watershed are: Total Acres 33,459

What did the crops look like?

**Irrigated Corn 1n 2017
on E ½ 18-10-38**



**Irrigated Soybeans in 2017
on NE 19-10-38**



**Stripper Head Wheat Stubble in 2017
on NW 32-10-38**



**Tilled Dryland Summer Fallow in 2017
on NW 5-10-39**



Chemical Fallow in 2017 on 14-11-40



Dryland Corn planted in Wheat stubble in 2017 on SW-5-10-39



Dryland Corn in 2017 on SE 35-11-40



Dryland Sunflowers in 2017 on SE-25-11-40



Dryland Sorghum Sudan 1n 2017 on NE-6-10-39



Dryland Japanese Millet in 2017 on SW 8-9-38



**Dryland Sudan Bailed & planted to Wheat
in 2017 on SE 25-9-39**



Bailed Sudan in 2017 on SEC 36-11-40



**Irrigated Sudan after wheat in 2017 on
NW 12-9-39**



**Native Dryland Pasture in 2017
on SW 36-10-39**



CRP Field in 2017 on SE 30-11-39



**Center Pivot Corners in 2017
including CRP and Shelter Belts**



Some observations

The soil moisture conditions in the fall of 2016 were very dry to a depth of five feet. Precipitation during the off season was very low and going into the spring the soil was still very dry prior to planting. The fields that were probed only had moisture to less than a foot. The April rains filled the soil from 3 ½ ft. to 4 ½ ft. depending on the WHC. Corn planted on soils with little residue ran out of moisture before the late July and early Aug rains came had a devastating effect on the yield potential. The September rains filled the soil profile. So we are starting with the soil profile that is full before off season precipitation. That means precipitation received during the off season will help recharge the aquifer provided it doesn't run off.

Fields that had the residue baled in 2016 and then planted to corn in 2017 had yields in the range of 20 to 40 Bu/A. Fields that had been corn in 2016 and then planted back to corn yielded in the 60-to 80 Bu range. Fields that were in wheat in 2016 and planted to corn yielded from 110 to 140 Bu/A.

Most of the fields that were summer fallowed in 2017 were tilled as chemical resistant weeds became such a problem.

What was learned?

Each field in the watershed showed that consumptive water use was quite different with each grower as their cropping systems management had different objectives. The previous year's residue management also played a major role in the following year's production, especially on dryland. Implementing watershed management will require getting a better understanding of why growers make the decisions they do. Real time data from an adequate weather station network, satellite consumptive water use, residue measurement, good information on soil texture and water holding capacity (WHC) in the top five feet and cropping plans that include Growing Degree Days (GDD) will be useful. The information can then be used in developing advanced watershed management strategies.

The first year would be used to develop a base line. In the second year, the project would start to implement what was learned. The third and fourth year would be used to measure the results. Hopefully the information could then be transferred to larger sub-basins. Sub-basins that have riparian areas with undesirable vegetation, dams and streams flowing in and out plus canal systems will require additional management strategies to maximize the beneficial use of water.

What are some of the benefits of watershed management?

There is enough data already to encourage better residue management; cutting three foot trenches in flat terraces and putting wood chips in them for aquifer recharge are already proven. The same concept works for storm water drainage systems and lagoons in fields. Unfortunately, some of the lagoon areas in farm fields may be classified as a wetland and the penalties for modification are very high.



Storm water study in Grant between the Railroad tracks and Highway in 2010



The proposed management model would embrace the concept that each landowner should quantify consumed water on his land, like native consumption, based on the average annual precipitation supply. Over time this concept could bring the hydrologic system back to a natural balance where sustainable aquifers and working streams can coexist. Both surface and groundwater irrigation would be protected to help retime the available water supply to maintain the expected consumption on portions of the property for maximum benefit and address the variability of high and low precipitation periods.

The consumptive use template used here came from earlier work by Frank Kwapnioski. The process demonstrated is currently workable but the consumption data and other assumptions will need better quantification that can be produced by and verified with this proposed research project.

Attached are two consumptive use tables showing water consumption in the HUC 12 with and without residue management. The 3.50-inch credit is based on information from an August 23, 2017 NE Farmer article, "Crop Residue Helps Prevent Unnecessary Water Losses" by Tyler Harris, where he quotes Steve Melvin on UNL research. The third sample of consumptive use is from the LT Farm on the E ½ 18-10-38 Acres, which includes each crop grown in 2017 and the defined 3.50-inch residue credit:

12-Nov-17		HUC 12 crops 2017				
Average Rainfall 2017	20.84	Inches	Precipitation in 2017			
Used LT Farm rain gauge	0	Residue benefit				
HUC 12, #102500060403	20.84					Growing Season
CROP	Acres	Inches Consumption	Inches Depletion	Acre/Inches	Growing Season	Season Precip
Irrigated Com (95 Rmor GDD)	0	23.2	-4.4	0	April - Sept.	16.5
Irrigated Com (100 RM or GDD)	0	24.4	-5.6	0	April - Sept.	16.5
Irrigated Com (105 RM or GDD)	0	25.6	-6.8	0	April - Sept.	16.5
Irrigated Com (110 RM or GDD)	6555	26.8	-8.0	-52,728	April - Sept.	16.5
Irrigated Com (115 RM or GDD)	0	28.0	-9.2	0	April - Sept.	16.5
Irr. Sugar Beets ("x" ton/ac)	0	32.7	-13.9	0	April - Sept.	16.5
Irr. Soybeans (50 bu/ac)	0	23.0	-4.2	0	May - Sept.	14.3
Irr. Soybeans (60 bu/ac)	2592	24.0	-5.2	-13,592	May - Sept.	14.3
Irr. Soybeans (70 bu/ac)	0	25.8	-7.0	0	May - Sept.	14.3
Irr. Sorghum ("x" bu/ac)	195	23.0	-4.2	-828	May - Sept.	14.3
Irr. Dry Edible Beans ("x" lbs/ac)	393	22.0	-3.2	-1,275		
Irr. Potatoes ("x" tons/ac)	0	29.0	-10.2			
Irrigated Alfalfa ("x" tons/ac)	0	40.6	-21.8	0		
Irr. Sunflowers ("x" lbs/ac)	0	23.5	-4.7			
Irrigated Wheat ("x" bu/ac)	293	26.6	-7.8	-2,298	August - June	9.4
Irr. Small Grains (other)	0	26.6	-7.8	0		
Dryland Com (100 bu/ac)	7261	17.8	1.0	6,942	April - Sept.	16.5
Dryland Soybeans (45 bu/ac)	98	16.7	2.1	201	May - Sept.	14.3
Dryland Milo, Sudan & J Millet	1629	17.6	1.2	1,883	April - Sept.	16.5
Wheat/Corn/Soybean/Wheat	0	17.5	1.3	0		
Dryland Edible Beans	0	11.4	7.3	0	May - Sept.	14.3
Dryland Alfalfa	0	19.2	-0.4	0	March - Nov.	18.4
Dryland Wheat	2608	5.7	13.1	34,144	August - June	9.4
Summer Fallow Wheat	3410	15.6	3.2	10,762	August - June	9.4
Summer Fallow Wheat/Com	0	7.8	10.9	0		
Dryland Small Grains (Oats/Millet)	262	18.0	0.8	198		
Conservation Reserve(CRP)	135	21.1	-2.3			
Other AG. Lands, Sunflowers	207	16.6	2.2	446		
Range, Pasture, Grasses	5633	16.2	2.6	14,601	March - Oct.	18.0
Riparian Forest & Woodlands	127	47.0	-28.2	-3,587	March - Oct.	18.0
Wetlands	0	57.0	-38.2	0	Feb. - Oct.	18.0
Open Water	0	48.0	-29.2	0	Precipitation use is based	
Waste Land		19.0	-0.2		on no runoff	
Buildings & Building Sites	572	16.6	2.2	1,233	Representative Equivalent Net	
Urban Land & towns	0	19.7	-0.9	0	-4262	Acre inches
Rural Roads (Unsurfaced)	1490	19.0	-0.2	-364	-355	Acre feet
Totals	33,460			-4262		

12-Nov-17		HUC 12 crops 2017 # 102500060403				
Average Rainfall 2017	20.84	Inches	Precipitation in 2017			
Used LT Farm Rain Gauge	3.50	Residue benefit	Based on WCR&E data			
HUC 12, #102500060403	24.34					Growing Season
CROP	Acres	Inches Consumption	Inches Depletion	Acres/Inches	Growing Season	Growing Season Precip
Irrigated Corn (95 RM or GDD)	0	23.2	-1.3	0	April - Sept.	16.5
Irrigated Corn (100 RM or GDD)	0	24.4	-2.5	0	April - Sept.	16.5
Irrigated Corn (105 RM or GDD)	0	25.6	-3.7	0	April - Sept.	16.5
Irrigated Corn (110 RM or GDD)	6555	26.8	-4.9	-32,080	April - Sept.	16.5
Irrigated Corn (115 RM or GDD)	0	28.0	-6.1	0	April - Sept.	16.5
Irr. Sugar Beets ("x" ton/ac)	0	32.7	-10.8	0	April - Sept.	16.5
Irr. Soybeans (50 bu/ac)	0	23.0	-1.1	0	May - Sept.	14.3
Irr. Soybeans (60 bu/ac)	2592	24.0	-2.1	-5,428	May - Sept.	14.3
Irr. Soybeans (70 bu/ac)	0	25.8	-3.9	0	May - Sept.	14.3
Irr. Sorghum ("x" bu/ac)	195	23.0	-1.1	-213	May - Sept.	14.3
Irr. Dry Edible Beans ("x" lbs/ac)	393	22.0	-0.1	-37		
Irr. Potatoes ("x" tons/ac)	0	29.0	-7.1			
Irrigated Alfalfa ("x" tons/ac)	0	40.6	-18.7	0		
Irr. Sunflowers ("x" lbs/ac)	0	23.5	-1.6			
Irrigated Wheat ("x" bu/ac)	293	26.6	-4.7	-1,375	August - June	9.4
Irr. Small Grains (other)	0	26.6	-4.7	0		
Dryland Corn (100 bu/ac)	7261	17.8	4.1	29,814	April - Sept.	16.5
Dryland Soybeans (45 bu/ac)	98	16.7	5.2	510	May - Sept.	14.3
Dryland Milo, Sudan & J Millet	1629	17.6	4.3	7,014	April - Sept.	16.5
Wheat/Corn/Soybean/Wheat	0	17.5	4.4	0		
Dryland Edible Beans	0	11.4	10.5	0	May - Sept.	14.3
Dryland Alfalfa	0	19.2	2.7	0	March - Nov.	18.4
Dryland Wheat	2608	5.7	16.2	42,359	August - June	9.4
Summer Fallow Wheat	3410	15.6	6.3	21,503	August - June	9.4
Summer Fallow Wheat/Corn	0	7.8	14.1	0		
Dryland Small Grains (Oats/Millet)	262	18.0	3.9	1,023		
Conservation Reserve(CRP)	135	21.1	-2.3	-316		
Other AG. Lands, Sunflowers	207	16.6	5.3	1,098		
Range, Pasture, Grasses	5633	16.2	2.6	14,601	March - Oct.	18.0
Riparian Forest & Woodlands	127	47.0	-28.2	-3,587	March - Oct.	18.0
Wetlands	0	57.0	-38.2	0	Feb. - Oct.	18.0
Open Water	0	48.0	-29.2	0	Precipitation use is based on no runoff	
Waste Land		19.0	-0.2			
Buildings & Building Sites	572	16.6	2.2	1,233	Representative Equivalent Net	
Urban Land & towns	0	19.7	-0.9	0	75756	Acre inches
Rural Roads (Unsurfaced)	1490	19.0	-0.2	-364	6313	Acre feet
Totals	33,460			75,756		

Revised 11-12-17		LT Farms 2017 crop year			Field #: 18-1 through 18-5	
LT Farm weather station		20.84	rainfall for 2017			
Residue Management credit		3.5	Residue benefit, Based on WCR&E data			
		24.3				Growing Season
CROP	Acres	Inches Consumption	Inches Depletion	Acre/Inches	Growing Season	Precip
Irrigated Corn (95 RM)	-	23.2	-1.3	0	April - Sept.	16.5
Irrigated Corn (100 RM)	-	24.4	-2.5	0	April - Sept.	16.5
Irrigated Corn (105 RM)	-	25.6	-3.7	0	April - Sept.	16.5
Irrigated Corn (110 RM)	120	26.8	-4.9	-589	April - Sept.	16.5
Irrigated Corn (115 RM)	-	28.0	-6.1	0	April - Sept.	16.5
Irr. Sugar Beets ("x" ton/ac)	-	32.7	-10.8	0	April - Sept.	16.5
Irr. Soybeans (50 bu/ac)	-	23.0	-1.1	0	May - Sept.	14.3
Irr. Soybeans (60 bu/ac)	-	24.0	-2.1	0	May - Sept.	14.3
Irr. Soybeans (70 bu/ac)	-	25.8	-3.9	0	May - Sept.	14.3
Irr. Sorghum ("x" bu/ac)	-	23.0	-1.1	0	May - Sept.	14.3
Irr. Dry Edible Beans ("x" lbs/ac)	-	22.0	-0.1	0		
Irr. Potatoes ("x" tons/ac)	-	29.0	-7.1	0		
Irrigated Alfalfa ("x" tons/ac)	-	40.6	-18.7	0		
Irr. Sunflowers ("x" lbs/ac)	-	23.5	-1.6	0		
Irrigated Wheat ("x" bu/ac)	-	26.6	-4.7	0	August - June	7.6
Irr. Small Grains (Millet/Oats)	-	26.6	-4.7	0		
Dryland Corn (100 bu/ac)	-	17.8	4.1	0	April - Sept.	16.5
Dryland Soybeans (45 bu/ac)	-	16.7	5.2	0	May - Sept.	14.3
Dryland Sorghum	-	17.6	4.3	0	April - Sept.	16.5
Dryland Sunflowers	-	17.5	4.4	0	April - Sept.	16.5
Dryland Edible Beans	-	11.4	10.5	0	May - Sept.	14.3
Dryland Alfalfa	-	19.2	2.7	0	March - Nov.	18.0
Dryland Wheat	-	4.5	17.4	0	August - June	7.6
Summer Fallow Wheat	-	15.6	6.3	0	August - June	7.6
Summer Fallow	81	7.4	14.5	1,171		
Dryland Small Grains (Millet/Oats)	-	18.0	3.9	0		
Conservation Reserve(CRP)	-	21.1	0.8	0		
Other Ag Land	-	16.6	5.3	0		
Range, Pasture, Grasses	-	16.2	5.7	0	March - Oct.	18.0
Riparian Forest & Woodlands	-	47.0	-25.1	0	March - Oct.	18.0
Wetlands	-	57.0	-35.1	0	Feb. - Oct.	18.0
Open Water	-	48.0	-26.1	0	Precipitation used based	
Waste Land	3	19.0	2.9	9	on no run off	
Buildings & Building Sites	5	16.6	5.3	27	Representative Equivalent Net	
Urban Land & towns	-	19.7	2.2	0	617	Acre inches
Rural Roads (Unsurfaced)	-	19.0	2.9	0	51	Acre feet
Totals	209			617		

The first two spreadsheets above demonstrate how this concept can be applied to quantify the 2017 watershed precipitation verses consumption balance both without and with residue management. The remaining spreadsheet represents how the concept can be used to quantify precipitation verses consumption balance on an individual producer basis with adequate residue retention.

These examples apparently indicated that 2017 levels of irrigation could be sustainably implemented in this area with 2017 levels of precipitation, proper cropping and land use management. The total 2017 precipitation was about 58 KAF and the balance remainder for the watershed with total residue management is equal to 6.3 KAF or about 11% of surplus. A slightly larger remainder value of about 14% is calculated for the individual landowner example. However, all the values and assumption used in the above examples are based on current best understandings that should be further developed, improved and verified through this project.

This proposed management model provides tools (tables) so that each landowner can quantify the water consumed on their land based on their cropping patterns and their average annual precipitation supply. Sustainable aquifers and working streams would be possible based on approximating a native hydrologic system. Both surface and groundwater irrigation will be protected to help retine the available water supply and maintain the expected consumption on sustainable portions of the property for maximum benefit and also to address the variability of high and low precipitation periods.

I ask that the Republican River Stakeholders give serious consideration to this project and that it be approved. The next step would be to identify the base line in a watershed and then develop budgets to meet the desired goals and objectives. These goals and objectives would be developed in cooperation and input from the local NRD's, NE Department of Natural Resources, UNL and other interested parties.

Thank you for consideration.

Attachment L - Water Markets Concept handout

Coordinating Committee

September 19, 2017

SUMMARY OF WATER MARKET DISCUSSION

Aaron Thompson introduced the idea of establishing a water market in the Republican Basin at the August Stakeholder Meeting. After much discussion, the stakeholder group agreed to have Aaron attend the next Coordination Meeting to explore the potential of such a market and bring back additional information at the next stakeholder meeting. Stakeholders did comment that the market should be set up in such a way that it would incentivize/encourage conservation and that the market be designed to reduce consumptive use.

At the coordination meeting Aaron refined his thoughts into a draft proposal which he presented to the group. Discussion followed on two "tracks":

- How the idea should be addressed in the planning document.
- Determining the best way to move the idea forward.

Planning Document

There was general agreement to approach the issue as a short term (within the first five years) Action Item under the general goal of Balancing Water Supply and Use. Given the schedule, there was concern that implementing a pilot and understanding the results would delay plan completion considerably. It was agreed that including the Action Item in the plan would give it traction and support as it relates to possible funding applications (i.e. WaterSmart). The Coordinating Committee asked for stakeholder input on whether the action item should be:

1. Cooperate in determining the feasibility of a Water Market in the Republican Basin and seek WaterSmart funding.
2. Cooperate in determining the feasibility of a Water Market in the Republican Basin, seek WaterSmart funding and test conclusions through implementation of the program in a pilot area.

The coordinating committee agreed this approach should not preclude a group of interested stakeholders in moving the idea forward as quickly as possible.

Water Markets Concept

Summary of Coordinating Committee discussion and resulting draft plan language

Moving forward

Based on discussion at the Coordination Meeting there are a number of items to consider, probably more questions than answers. It is suggested that an independent group (a subset of the current stakeholder group possibly) begin work on the feasibility effort.

There are some items that the Coordination Meeting attendees found essential to any program:

- The Water Market be a truly cooperative effort between groundwater (GW), surface water (SW), State and Federal partners
- The program supports water conservation and **does not** increase consumptive use.
- Assumptions should be tested with a pilot program.
- The program should be voluntary.

The goal of the feasibility work and pilot program implementation is to provide information to users about the risks and costs associated with the program. Users need to determine from the results of the pilot if the concept is good for them personally and for the basin as a whole.

There is likely money available to support this effort. A joint application for WaterSmart funds between an irrigation district and an NRD with State and Federal support was discussed as the best idea.

In terms of where to start, the Coordination Committee talked about questions to be answered. They also talked about current practices of buying/selling/trading water in the Republican Basin and the need to understand and document these to help guide or contribute ideas to water market feasibility efforts.

Aaron Thompson's initial idea: Establish a Pilot Water Market within the Nebraska Republican River Basin. To simulate the entire basin it is suggested that the pilot have a 10:1 ration of Ground Water and Surface Water users. The Pilot area will receive the same allocation. The pilot area will be allocating the supply not the shortage. To enter the "water exchange" or "water pool" a transaction cost will be paid by everyone in the exchange. Those in the exchange that do not have access to the entire allocation will be paid a stipend by the exchange. For example, if the allocation is 10" and someone only has an 8" supply the exchange will compensate the 2" difference with dollars or wet water. The exchange will then ask for willing buyers and sellers. Limits will be established on the amounts that can be bought and sold.

Water Markets Concept

Summary of Coordinating Committee discussion and resulting **draft** plan language

Questions Raised:

Aaron's proposal generated a lot of discussion and the following questions were raised in the Coordination Meeting in response. The group also talked about possible candidates for the pilot area, and other resources that may provide guidance to the feasibility effort.

1. Who holds the money and administers the program?
2. Who does the accounting?
3. How would the value of water be determined?
4. How would allocations be determined?
5. Can SW allocation move to a GW user? Vice versa?
6. How does the water market system work with already established compact accounting procedures?
7. What is the appeal of the water market to a GW user?
8. Can it work as a SW only market?
9. Is this really an opportunity to purchase offsets for a depletion? The offset of depletion appears to be the most marketable item. Should this be a market where people are basically buying offsets for depletion? It is simpler and may be a market some users would have an incentive to participate in.

Location of Pilot Area:

A desirable pilot area contains a GW/SW ratio that generally mirrors that of the rest of the Republican River Basin. A ratio of 10:1, GW:SW users was suggested as appropriate. It is also helpful to have the pilot area within one NRD.

Red Willow Basin was suggested as a possible pilot area.

Other Resources:

1. The Murray-Darling Basin in Australia is an example of a market of this kind, although it isn't clear that it covers both ground water and surface water. It may be a helpful template for developing the idea of a Water Market for the Republican Basin.
2. The Palo Verde, California GW/SW system may also be a valuable example.

DRAFT PLAN LANGUAGE RESULTING FROM WATER MARKETS DISCUSSION

Objective 5.3: Evaluate the feasibility and potential outcomes of establishing water markets in the Basin

During Plan development, stakeholders were enthusiastic about the idea of trying a water market in the Basin for the purposes of exchanging water among groundwater and surface water users. Much is still unknown about the logistics, feasibility, and desirability of such water markets; therefore, the purpose of this objective is to conduct a study and possible pilot program to evaluate the feasibility and potential outcomes of establishing a water market or water markets within the Basin.

The intent is to complete this evaluation (Action Items 5.3.1 through 5.3.2) within five years of this plan taking effect and to report on findings from the evaluation as part of the first five-year technical review, provided that sufficient funding and staff resources are available to do so.

Nothing about this objective or its listed action items precludes NRDs or other entities from pursuing water markets in the Basin outside of this planning process.

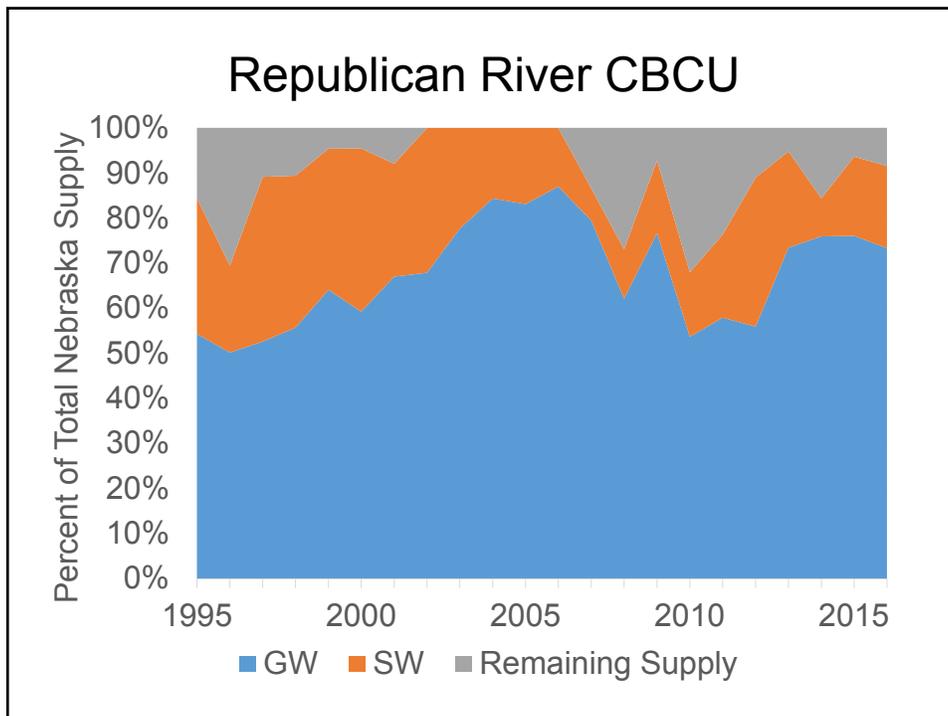
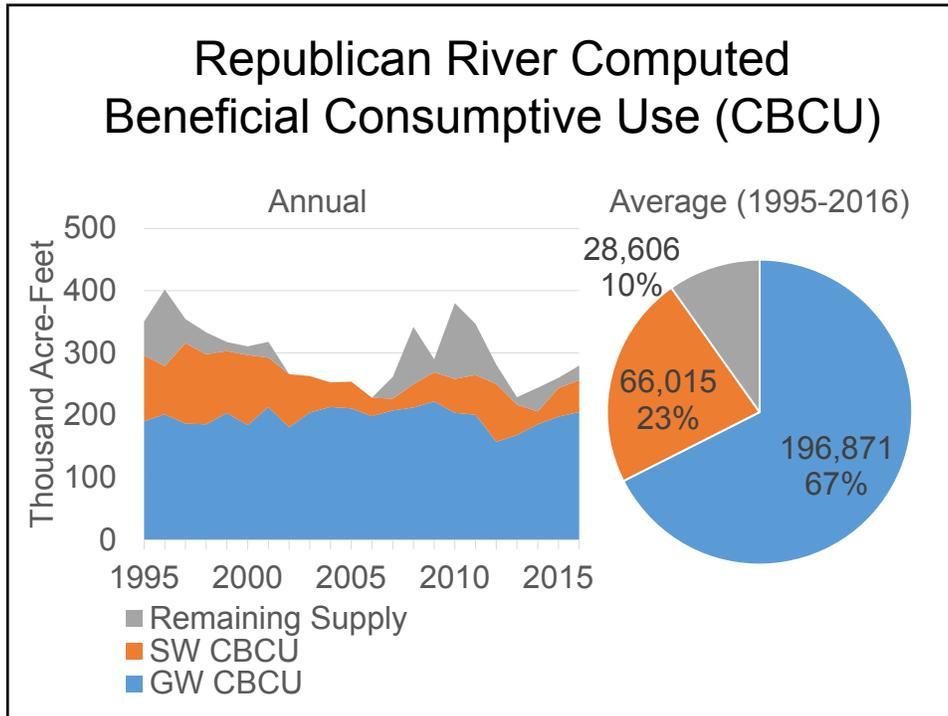
Action Item 5.3.1: Cooperate in determining the feasibility of water markets in the Basin

This action item would include studying existing water markets, as well as working cooperatively with the US Bureau of Reclamation, water users, and irrigation districts, to evaluate the feasibility of water markets for surface water and groundwater users in the Basin. This feasibility analysis will include such considerations as Compact compliance obligations, program costs, regulatory framework, and water user interest. If the conclusions from these efforts indicate that water markets in the Basin would be feasible, then NeDNR and the NRDs may choose to proceed with testing their conclusions in a pilot area (Action Item 5.3.2).

Action Item 5.3.2: Test conclusions through implementation of a water market program in a pilot area, if feasible

If the evaluation in Action Item 5.3.1 indicates that water markets in the Basin would be feasible, and if sufficient funding and staff resources are available to do so, then NeDNR and the NRDs will work cooperatively with the US Bureau of Reclamation, the Basin's irrigation districts, and water users in the Basin to conduct a water market pilot program within a portion of the Basin.

Attachment M - Water Balance Discussions handout



RRCA Accounting Data above Hardy Gage for 1995-2016 (af)												
Year	Computed Water Supply	NE Allocation	NE CBCU	Compact Accounting Groundwater CBCU	NE Imported Water Supply (Mound Credit) from Groundwater Model	NE Surface Water CBCU	NE Allocation Minus CBCU	NE Allocation Plus Imported Water Supply	NE Allocation Minus CBCU, (Plus IWS Credit)	NE Resolution Water Supply Credit	NE Allocation Minus CBCU (Plus IWS & Nebraska Resolution Water Supply Credit)	NE Non-federal Reservoir Evaporation
1995	644,010	332,550	295,880	190,317	17,902	105,563	226,987	350,452	54,572	0	54,572	0
1996	734,040	377,300	278,900	201,532	24,394	77,368	299,932	401,694	122,794	0	122,794	0
1997	644,210	337,700	315,680	186,345	16,434	129,335	208,365	354,134	38,454	0	38,454	0
1998	602,120	315,410	297,750	185,460	17,677	112,290	203,120	333,087	35,337	0	35,337	0
1999	569,030	299,050	302,890	203,488	18,444	99,402	199,648	317,494	14,604	0	14,604	0
2000	549,700	291,920	296,530	184,020	18,656	112,510	179,410	310,576	14,046	0	14,046	0
2001	560,520	299,380	292,320	212,871	18,242	79,449	219,931	317,622	25,302	0	25,302	0
2002	441,480	236,550	265,910	180,438	13,996	85,472	151,078	250,546	-15,364	0	-15,364	0
2003	416,780	227,580	262,780	204,164	9,780	58,616	168,964	237,360	-25,420	0	-25,420	0
2004	364,620	205,630	252,650	213,115	10,380	39,535	166,095	216,010	-36,640	0	-36,640	3,472
2005	361,310	199,450	253,740	210,881	11,966	42,859	-54,290	211,416	-42,324	0	-42,324	2,869

Water-Short Years are highlighted in blue

CBCU = Computed Beneficial Consumptive Use

IWS = Imported Water Supply

af = acre-feet

The Hardy gaged streamflow is used for compact compliance accounting during water-short years and the Guide Rock gaged streamflow is used during

RRCA Accounting Data above Hardy Gage for 1995-2016 (af)													
Year	Computed Water Supply	NE Allocation	NE CBCU	Compact Accounting Groundwater CBCU	NE Imported Water Supply (Mound Credit) from Groundwater Model	NE Surface Water CBCU	NE Allocation Minus CBCU	NE Allocation Plus Imported Water Supply	NE Allocation Minus CBCU, (Plus IWS Credit)	NE Resolution Water Supply Credit	NE Allocation Minus CBCU (Plus IWS & Nebraska Resolution Water Supply Credit)	NE Non-federal Reservoir Evaporation	
2006	332,670	187,060	236,150	198,412	12,214	37,719	-49,090	199,274	-36,876	0	-28,785	1,263	
2007	429,540	239,510	226,380	207,665	21,933	18,706	13,130	261,443	35,063	0	35,063	2,387	
2008	594,750	315,790	249,730	212,314	26,050	37,400	66,060	341,840	92,110	0	92,110	1,940	
2009	500,480	267,120	269,000	222,154	22,743	46,857	-1,880	289,863	20,863	0	20,863	1,798	
2010	680,990	355,040	258,160	203,807	24,766	54,350	96,880	379,806	121,646	0	121,646	2,945	
2011	616,380	323,130	264,520	200,748	23,452	63,755	58,610	346,582	82,062	0	82,062	3,302	
2012	499,150	266,320	250,110	157,257	14,765	92,858	16,210	281,085	30,975	0	30,975	3,519	
2013	356,310	200,480	216,850	167,951	12,463	48,901	-16,370	212,943	-3,907	15,766	11,859	2,493	
2014	293,630	168,970	206,010	185,414	12,981	20,603	-37,040	181,951	-24,059	62,155	38,096	1,989	
2015	412,040	223,860	243,530	197,724	17,473	45,820	-19,670	241,333	-2,197	18,698	16,501	1,318	
2016	399,830	217,880	256,120	205,086	19,894	51,034	166,846	237,774	-18,346	41,935	23,589	1,414	

Water-Short Years are highlighted in blue

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IWS = Imported Water Supply

af = acre-feet

The Hardy gaged streamflow is used for compact compliance accounting during water-short years and the Guide Rock gaged streamflow is used during

RRCA Accounting Data above Guide Rock Gage 1995-2016 (af)													
Year	Computed Water Supply	NE Allocation	NE CBCU	Compact Accounting Groundwater CBCU	NE Groundwater Impacts from Groundwater Model	NE Imported Water Supply (Mound Credit) from Groundwater Model	NE Surface Water CBCU	NE Allocation Minus CBCU	NE Allocation Plus Imported Water Supply	NE Allocation Minus CBCU, (Plus IWS Credit)	NE Resolution Water Supply Credit	NE Allocation Minus CBCU (Plus IWS & Nebraska Resolution Water Supply Credit)	NE Non-federal Reservoir Evaporation
1995	592,333	307,280	293,975	188,412	188,412	17,902	105,563	201,717	325,182	31,207	0	31,207	0
1996	679,364	350,564	277,024	199,656	199,656	24,394	77,368	273,196	374,958	97,934	0	97,934	0
1997	610,129	321,035	313,850	184,515	184,515	16,434	129,335	191,700	337,469	23,619	0	23,619	0
1998	559,528	294,582	296,024	183,734	183,734	17,677	112,290	182,292	312,259	16,235	0	16,235	0
1999	525,094	277,565	301,097	201,695	201,695	18,444	99,402	178,163	296,009	-5,088	0	-5,088	0
2000	536,270	285,353	293,477	182,094	182,094	18,656	111,383	173,970	304,009	10,532	0	10,532	0
2001	508,678	274,029	289,531	210,863	210,863	18,242	78,668	195,361	292,271	2,740	0	2,740	0
2002	423,256	227,638	262,680	178,603	178,603	13,996	84,077	143,561	241,634	-21,046	0	-21,046	0
2003	392,943	215,924	259,050	201,606	201,606	9,780	57,444	158,480	225,704	-33,346	0	-33,346	0
2004	339,361	193,278	249,751	210,733	210,733	10,380	39,018	154,260	203,658	-46,093	0	-46,093	3,132
2005	351,931	194,864	249,689	207,925	207,925	11,965	41,764	-54,825	206,829	-42,860	0	-42,860	2,732

Water-Short Years are highlighted in blue
 CBCU = Computed Beneficial Consumptive Use
 IWS = Imported Water Supply
 af = acre-feet

The Hardy gaged streamflow is used for compact compliance accounting during water-short years and the Guide Rock gaged streamflow is used during non-water-short years

RRCA Accounting Data above Guide Rock Gage 1995-2016 (af)													
Year	Computed Water Supply	NE Allocation	NE CBCU	Compact Accounting Groundwater CBCU	NE Groundwater Impacts from Groundwater Model	NE Imported Water Supply (Mound Credit) from Groundwater Model	NE Surface Water CBCU	NE Allocation Minus CBCU	NE Allocation Plus Imported Water Supply	NE Allocation Minus CBCU, (Plus IWS Credit)	NE Resolution Water Supply Credit	NE Allocation Minus CBCU (Plus IWS & Nebraska Resolution Water Supply Credit)	NE Non-federal Reservoir Evaporation
2007	395,736	224,584	223,013	204,728	204,728	21,939	18,531	1,571	246,523	23,510	0	23,510	2,224
2008	558,366	300,032	247,110	210,027	210,027	26,056	39,696	52,922	326,088	78,978	0	78,978	1,793
2009	483,357	260,263	266,204	219,909	219,909	22,765	44,264	-5,941	283,028	16,824	0	16,824	1,589
2010	632,992	333,799	255,225	201,313	201,313	24,768	54,350	78,574	358,567	103,342	0	103,342	2,765
2011	562,258	298,239	261,692	198,539	198,539	23,475	61,336	36,547	321,714	60,022	0	60,022	3,058
2012	486,905	261,335	246,552	154,946	154,946	14,786	94,864	14,783	276,121	29,569	0	29,569	3,220
2013	341,455	193,881	213,851	165,639	165,639	12,486	47,477	-19,970	206,367	-7,484	15,766	8,282	2,443
2014	280,737	163,296	203,675	183,502	183,502	13,006	20,021	-40,379	176,302	-27,373	62,155	34,782	1,922
2015	343,564	191,417	240,590	195,389	195,389	17,497	44,019	-49,172	208,914	-31,675	18,698	-12,977	1,304
2016	373,495	206,195	253,362	202,853	202,853	19,907	50,509	155,686	226,102	-27,260	41,935	14,675	1,380

Water-Short Years are highlighted in blue

CBCU = Computed Beneficial Consumptive Use

IWS = Imported Water Supply

af = acre-feet

The Hardy gaged streamflow is used for compact compliance accounting during water-short years and the Guide Rock gaged streamflow is used during non-water-short years