

Fifth Generation

Integrated Management Plan

Jointly Developed by the

Nebraska Department of Natural Resources

and the

Lower Republican Natural Resources District

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I. Authority

This Integrated Management Plan (IMP) was prepared by the Board of Directors for the Lower Republican Natural Resources District (LRNRD) and the Nebraska Department of Natural Resources (NeDNR) in accordance with the Nebraska Ground Water Management and Protection Act (*Neb. Rev. Stat. §§ 46-701 through 46-755*).

II. Background

An IMP is jointly developed and adopted by NeDNR and an NRD for integrated surface water and groundwater management within the NRD. This IMP between NeDNR and LRNRD is required under *Neb. Rev. Stat. § 46-715 (1)(a)*. The entirety of LRNRD was determined to be fully appropriated on July 16, 2004, under the requirements of LB962 Laws 2004, Sec. 60 (3)(b). Under this legislation, areas for which NeDNR had previously determined a joint action plan was necessary, under prior law, were designated as fully appropriated as of the operative date of LB962 (2004).

LRNRD is located in south-central Nebraska, within the Republican River Basin. It contains Furnas, Harlan, and Franklin Counties and parts of Webster and Nuckolls Counties, as shown in Figure 1 (page 10).

This IMP is the fifth generation IMP that has been jointly developed and adopted by NeDNR and LRNRD for integrated surface water and groundwater management with this NRD. The four previous IMP generations for this NRD took effect in 2005, 2008, 2011, and 2016, with each one remaining in effect until replaced by the subsequent plan.

In addition to this IMP, integrated water management within LRNRD is also subject to an interstate water compact and a basin-wide plan. The Republican River Compact (Compact, 1943) is an interstate agreement among Nebraska, Kansas, and Colorado that provides for the

apportionment of the Virgin Water Supply of the Republican River Basin among the three states. The Final Settlement Stipulation (FSS, 2002) and RRCA Resolutions define how compliance within the Compact's requirements is to be determined, including detailed accounting procedures and the use of a jointly-developed groundwater model. The current jointly-developed groundwater model is called the RRCA Groundwater Model. The Republican River Compact Administration (RRCA) administers the Compact and consists of one Commissioner from each of the three states. This IMP must ensure compliance with the Compact.

The *Republican River Basin-Wide Plan* (basin-wide plan) was jointly developed over a five-year period (2014–2019) by NeDNR and the Upper Republican (URNRD), Middle Republican (MRNRD), Lower Republican (LRNRD), and Tri-Basin (TBNRD) NRDs, in consultation and collaboration with a 42-member stakeholder advisory committee, to fulfill the requirements of *Neb. Rev. Stat. § 46-755*. NeDNR and the NRDs met with the stakeholder committee 15 times during plan development. The basin-wide plan took effect on March 1, 2019, and the timeframe to implement the basin-wide plan is approximately 25 years (through April 17, 2044). Under *Neb. Rev. Stat. § 46-755*, this IMP and the other Republican River Basin IMPs must be consistent with the basin-wide plan. Within the boundaries of the district, NeDNR and LRNRD are jointly responsible for the implementation of both this IMP and the basin-wide plan.

III. Abbreviations

Basin-Wide Plan

Republican River Basin-Wide Plan

CBCU

Computed Beneficial Consumptive Use

Compact

Republican River Compact

FSS

Final Settlement Stipulation

IMP

Integrated Management Plan

IWS

Imported Water Supply

LRNRD

Lower Republican Natural Resources District

MRNRD

Middle Republican Natural Resources District

NeDNR

Nebraska Department of Natural Resources

NRD

Natural Resources District

RRCA

Republican River Compact Administration

TBNRD

Tri-Basin Natural Resources District

Technical Memorandum

Monitoring & Studies Technical Memorandum for the Republican River Basin IMPs

URNRD

Upper Republican Natural Resources
District

IV. Definitions**Allowable Groundwater Depletions for Nebraska**

The depletions to streamflow from groundwater pumping within URNRD, MRNRD, and LRNRD, cumulatively, that can be allowed in any one year without exceeding the Compact allocation, calculated as described in the Technical Memorandum.

Allowable Groundwater Depletions for LRNRD

The volume of depletions from groundwater pumping that is allowed to occur in the LRNRD, calculated as described in the Technical Memorandum (page 18).

Averaging Period

Two-year averaging is a Compact compliance condition that occurs when the Water-Short Year provision established in the FSS is triggered, or as specified in an RRCA resolution. When two-year averaging is in effect, Compact accounting is performed for the portion of the basin upstream of Guide Rock and a two-year averaging period is used.¹ Five-year averaging always exists as a Compact compliance condition, regardless of whether two-year averaging is also in effect. This condition results in the use of a five-year averaging period for determining Compact compliance, and accounting is performed for the portion of the basin upstream of Hardy.

Baseline Depletion Percentage

The percentage of mean annual depletions to streamflow in the Republican River Basin caused by groundwater use within URNRD, MRNRD, and LRNRD during the years 1998 to 2002 inclusive. The Baseline Depletion Percentage for each NRD depends on whether Compact compliance is evaluated using two-year averaging for the basin upstream of Guide Rock or five-year averaging for the basin upstream of Hardy. Baseline Depletion Percentages are specified in the Technical Memorandum (page 18).

Baseline Pumping Volumes

The annual mean groundwater pumping within an NRD during the period 1998 to 2002 inclusive. The baseline pumping volumes are 542,407 acre-feet for URNRD, 313,631 acre-feet for MRNRD, and 244,465 acre-feet for LRNRD.

Basin-Wide Plan

See "*Republican River Basin-Wide Plan.*"

¹ The two-year averaging period applies unless an approved Alternative Water-Short Year Plan (AWSYP) is approved by the RRCA. If an AWSYP is approved, then a three-year averaging period may be used.

Compact

See "Republican River Compact."

Compact Call Year

A year in which the maximum amount of water that may be available from streamflow for beneficial use in the short-term to comply with the Compact is expected to be exceeded if sufficient surface water and groundwater controls and management actions are not taken, as determined by the Forecast procedures outlined in the Technical Memorandum (page 18).

Compact Compliance

Adhering to the water use stipulations outlined in the Compact, the FSS, and Resolutions adopted by the RRCA.

Compliance Standard

The criteria that will be used to determine whether LRNRD's rules, regulations, and other programs are sufficient to meet the IMP and requirements related to groundwater depletions over both the near term and long term.

Computed Beneficial Consumptive Use (CBCU)

Streamflow depletion resulting from activities of man, as defined in the RRCA Accounting Procedures.

Final Settlement Stipulation (FSS)

An agreement entered into on December 15, 2002, by the RRCA member states that defines how compliance within the Compact's requirements is to be determined.

Forecast

An annual forecast of the maximum amount of water that may be available from streamflow for beneficial use in the short-term and long-term to comply with the Compact, as described in the "Forecast and Compact Call Year Determination" section of this IMP (page 20), in compliance with *Neb. Rev. Stat. § 46-715 (6)*.

Imported Water Supply (IWS)

The water supply imported by Nebraska from outside the basin resulting from the activities of man.

Management Actions

Actions taken to achieve the water management objectives described in this IMP; include, but are not limited to, controls, groundwater regulations, surface water leases or agreements, augmentation, and incentive programs.

Measurable Hydrologic Objective (MHO)

A quantifiable target, related to the movement and distribution of water, used to evaluate the extent to which reasonable progress is made toward achieving the final goals and objectives of the basin-wide plan.

Monitoring Plan

The components of the "Monitoring and Studies" section (page 17) constitute a monitoring plan for this IMP, including tracking and reporting requirements and procedures for monitoring, evaluating, and ensuring compliance with this IMP and the Compact.

Nebraska Allocation

Nebraska's available water supply under the Compact, calculated for the basin upstream of Hardy for five-year averaging and for the basin upstream of Guide Rock for two-year averaging.

Net Groundwater Depletions for LRNRD

The volume of depletions to streamflow that occur as a result of groundwater pumping within LRNRD. This volume is determined using the RRCA Groundwater Model and taking into account all management actions specifically taken by LRNRD.

Rapid Response Area (10 Percent/Five-Year Area)

An area in which additional groundwater controls and regulations may be applied during a Compact Call Year if necessary to maintain compliance with the Compact, as described in the "Groundwater Controls" section of this IMP (page 12). Defined as the area with a stream depletion factor of 10 percent or more in a five-year period.

Republican River Basin-Wide Plan

A basin-wide plan for integrated surface water and groundwater management that was jointly developed by NeDNR, URNRD, MRNRD, LRNRD, and TBNRD, in consultation and collaboration with a stakeholder advisory committee, in fulfillment of *Neb. Rev. Stat. § 46-755*.

Republican River Compact (Compact)

An agreement between Colorado, Kansas, and Nebraska that allocates supplies for the beneficial consumption of the waters of the Republican River Basin among the three states; *Neb. Rev. Stat. Appendix § 1-106*.

Republican River Compact Administration (RRCA)

The entity that administers the Compact; comprised of one member each from Colorado, Kansas, and Nebraska.

RRCA Accounting Procedures

The procedures outlined in *RRCA Accounting Procedures and Reporting Requirements*, a document describing the definitions, procedures, basic formulas, data requirements, and reporting formats to be used by the RRCA.

RRCA Groundwater Model

The computer-based groundwater model developed under the provisions of the FSS of the Compact and subsequently adopted and revised through action of the RRCA.

RRCA Resolution

A formal agreement entered into by the RRCA.

Stream Depletion Factor

A measure of how much groundwater pumping at a specific location would deplete streamflow after a specified period of time.

V. Goals and Objectives

LRNRD and NeDNR have adopted the following Goals and Objectives:

A. Goals

1. Maximize LRNRD's efficient and beneficial consumptive use of the available water supply, increase certainty for long-range planning of water supplies, and increase collaboration among all water users in LRNRD.
2. Ensure that groundwater and surface water users within LRNRD assume their share of the responsibility to keep Nebraska in compliance with the Compact.
3. Provide that LRNRD's share of that responsibility be distributed in an equitable manner and to minimize adverse economic, social, and environmental consequences to the extent possible.
4. Sustain a balance between water uses and water supplies within LRNRD so that the economic viability, social and environmental health, safety, and welfare of LRNRD can be achieved and maintained for both the near and long-term.
5. Reserve any streamflow available from regulation, incentive programs, and purchased or leased surface water and groundwater required to maintain Compact compliance from any use that would negate the benefit of such regulations or programs, to the extent allowed by statute and the surface water controls of this IMP.

B. Objectives

1. With limited exceptions, prevent the initiation of new or expanded uses of water that increase Nebraska's computed beneficial consumptive use of water within LRNRD, as required for Compact Compliance and by Nebraska law.
2. Achieve the required reductions in water use through a combination of regulatory and incentive programs designed to reduce beneficial consumptive use.
3. NeDNR shall ensure administration of surface water appropriations in the basin is in accordance with the Compact and Nebraska law.
4. Make such additional reductions in groundwater use in Compact Call Years as are necessary, after taking into account any reduction in beneficial consumptive use achieved through basin-wide incentive and streamflow augmentation programs, to achieve a reduction in beneficial consumptive use in LRNRD that ensures the district limits its groundwater depletions to the Allowable Groundwater Depletions for LRNRD. Compact Call Years will be determined as described in the "Final Forecast and Compact Call Year Determination" section of this IMP (page 21).
5. To assist in ensuring long-term Compact compliance, reduce existing groundwater use within LRNRD by 20 percent from the 1998 to 2002 baseline pumping volumes under average precipitation conditions so that, when combined with streamflow augmentation and incentive programs, LRNRD's groundwater depletions are maintained within their portion of Nebraska's Allowable Groundwater Depletions as computed through use of the RRCA Groundwater Model. Additionally, voluntary reduction in baseline pumping volumes will continue to be pursued by LRNRD with the incentive of limiting the level of long-term management actions that are necessary during Compact Call Years.
6. LRNRD and NeDNR will continue to investigate and explore augmentation projects that would add to or retime the water supply within the basin. Such augmentation and retiming projects include, but are not necessarily limited to, the following:
 - a. Leasing or purchasing surface water and/or groundwater.
 - b. Augmentation wells, both within and outside of the Republican River Basin.
 - c. Exploring trans-basin diversion projects.
 - d. Conjunctive management of surface water irrigation projects.

VI. Plan Areas and Limitations for Certain Purposes

Except as noted in the next paragraph, the area subject to this IMP is the geographic area within the boundaries of LRNRD (Figure 1). The 10 percent/Five-Year Region (Rapid Response Area) is

shown as a sub-area within the boundaries of LRNRD (Figure 2). The Rapid Response Area is the area with a stream depletion factor of 10 percent or more in a five-year period, where additional groundwater regulations may be applied during a Compact Call Year if necessary to maintain compliance with the Compact as described in the "Groundwater Controls" section of this IMP (page 12).

To the extent provisions of this IMP relate to and accommodate or provide for regulatory actions intended to achieve compliance with the Compact and FSS when two-year averaging applies, this IMP applies to portions of the Republican River Basin lying in the Nebraska counties of Furnas, Harlan, Franklin, Webster, and Nuckolls, lying upstream of Guide Rock, Nebraska: those areas within the basin lying west of a line proceeding north from the Nebraska-Kansas state line and following the western edge of Webster County, Township 1, Range 9, Sections 34, 27, 22, 15, 10, and 3 through Webster County, Township 2, Range 9, Sections 34, 27, and 22; then proceeding west along the southern edge of Webster County, Township 2, Range 9, Sections 16, 17, and 18; then proceeding north following the western edge of Webster County, Township 3, Range 9, Sections 31, 30, 19, 18, 7, and 6 to its intersection with the northern boundary of Webster County.

When this IMP refers to Guide Rock and Hardy, it is referring to RRCA compliance points at the Guide Rock Diversion Dam and near Hardy, Nebraska. Guide Rock is downstream of Harlan County Lake, and Hardy is near the Nebraska-Kansas state line. Nebraska's Compact compliance is evaluated for the basin upstream of Hardy over a five-year averaging period. In years when two-year averaging also applies, Nebraska's compliance is evaluated over a two-year averaging period for the basin upstream of Guide Rock.

Lower Republican Natural Resources District Integrated Management Plan Area

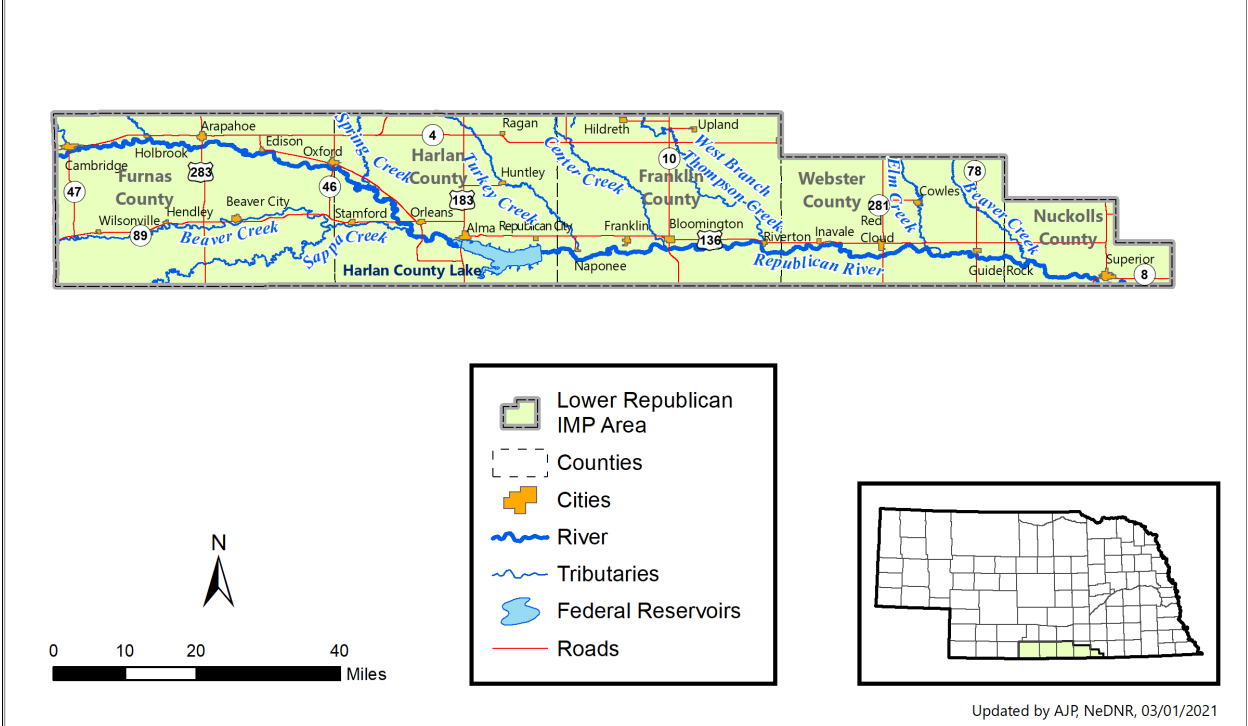


Figure 1. Except as noted in the text of this section, the area subject to this IMP is the geographic area within the boundaries of LRNRD.

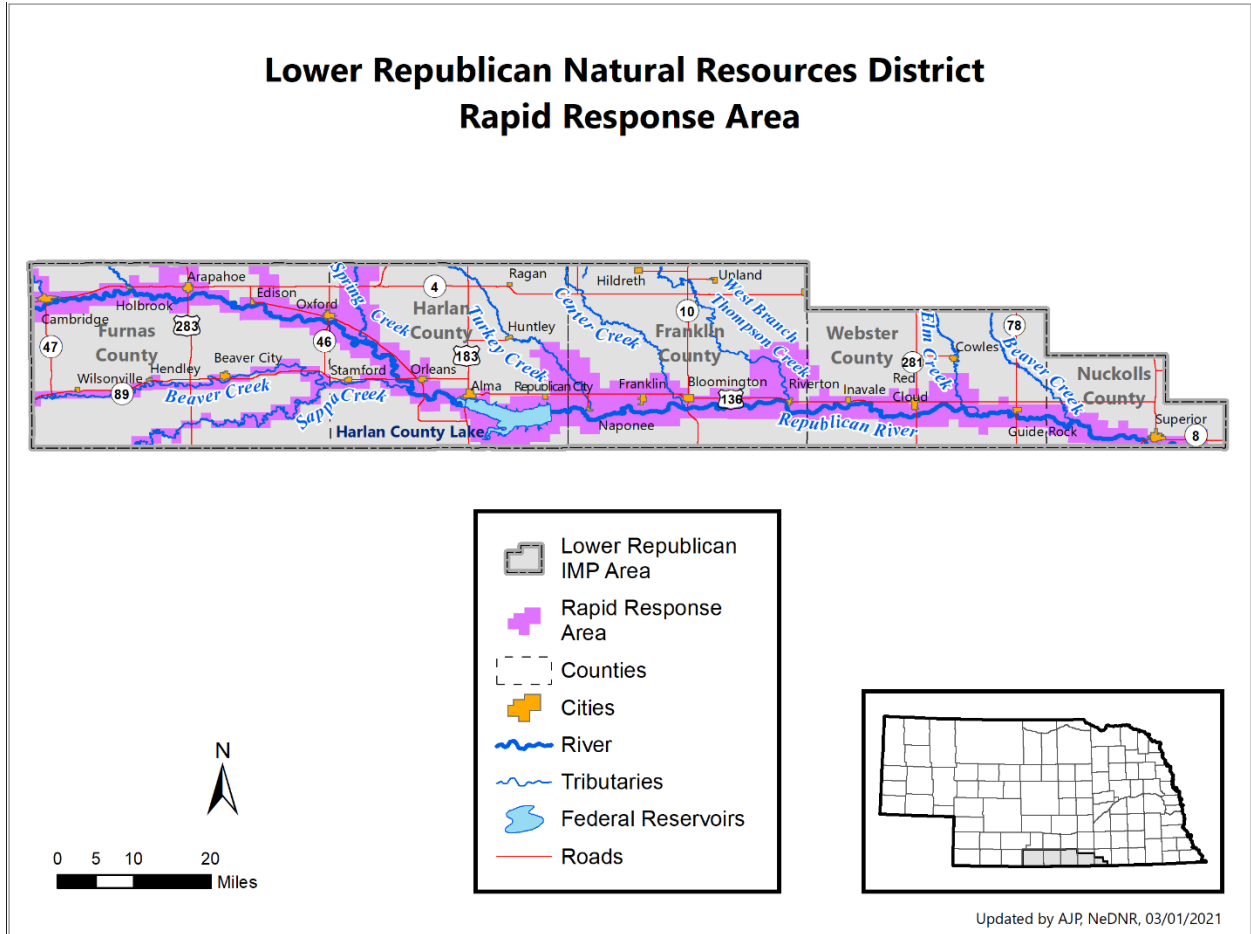


Figure 2. The Rapid Response Area is the area with a stream depletion factor of 10 percent or more in a five-year period, where additional groundwater regulations may be applied during a Compact Call Year if necessary to maintain compliance with the Compact.

VII. Controls

The following subsections contain the groundwater and surface water controls for this IMP. The groundwater controls are further subdivided into “Compliance Standards” and “Other Controls and Management Activities.”

LRNRD and NeDNR recognize that the required reductions in water consumption could be accomplished by means other than those adopted in this IMP. The IMP and associated controls may need to be amended in the future to implement any such revisions.

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A. Groundwater Controls

LRNRD will utilize the groundwater controls as provided by *Neb. Rev. Stat.* §§ 46-715, 46-739, and 46-740 to form the Groundwater Controls component of this IMP. The controls that NeDNR and LRNRD agree are necessary and shall be continued are: 1) groundwater allocations and 2) a moratorium on new water wells and irrigated acres as are required by the FSS. In order to provide LRNRD flexibility in addressing compliance, LRNRD may implement a reduction in irrigated acres and incentive programs targeting acres with a higher streamflow depletion factor as alternatives to LRNRD-wide reductions in allocation or irrigated acres. The rules shall be set forth in detail and implemented through LRNRD’s Rules and Regulations and the provisions of LRNRD’s Rules and Regulations shall be sufficient so as to meet the Compliance Standards and Controls set forth below.

In addition to satisfying the Compliance Standards, the Rules and Regulations adopted by LRNRD shall contain provisions that adequately ensure that no new groundwater uses initiated after July 14, 2004, will adversely impact surface water appropriators or groundwater users whose water wells are dependent upon recharge from the stream or river. If the Compliance Standards are met, LRNRD may amend or modify its Rules and Regulations without the approval of NeDNR, except for the Rules and Regulations pertaining to the satisfaction of the requirements of *Neb. Rev. Stat.* §§ 46-715(4)(b) and 46-715(4)(c). LRNRD will still notify NeDNR of any other Rules and Regulations modifications, such that the Department can provide testimony pursuant to *Neb. Rev. Stat.* § 46-743.

The groundwater controls in this IMP include the Compliance Standards and the Other Controls and Management Activities listed below.

1. Compliance Standards

a. Purpose

These Compliance Standards are established by NeDNR and LRNRD to assess whether the course of action taken by LRNRD, with the intention of providing their proportionate share of assistance to the State in order for the State to maintain Compact compliance, is sufficient. The action taken by LRNRD shall be evaluated in connection with the action taken by the other NRDs in the

Republican River Basin and any other relevant considerations, including the information and data provided by NeDNR and past action by LRNRD.

b. Duration

These Compliance Standards shall be used to assess the action taken by LRNRD. On an annual basis NeDNR and LRNRD shall reexamine the sufficiency and effectiveness of the Compliance Standards to determine whether amendments or modifications are necessary to ensure Nebraska's compliance with the FSS, RRCA Resolutions, and Compact. Nothing contained herein shall prohibit or preclude any amendment or revision, at any time, by joint agreement of NeDNR and LRNRD, when such action is necessary. Further, nothing contained in this subsection shall be construed as eliminating the review of the provisions of this IMP as required by *Neb. Rev. Stat. § 46-715*.

c. Standards

LRNRD shall adopt and implement rules and regulations that shall ensure that the following standards are met. The standards shall be effected through the procedure described in the "Monitoring and Studies" section (page 17). The "Monitoring and Studies" section specifies a forecast and resulting actions needed at the Guide Rock compliance point (when two-year averaging is in effect) and at the Hardy compliance point in all years. The procedures for determining whether the Compliance Standards are met will be based on the RRCA Accounting Procedures and on the annual forecast as outlined in the "Monitoring and Studies" section. The Compliance Standards are:

- i. To assist with ensuring long-term Compact compliance, provide for a twenty percent (20%) reduction in pumping from LRNRD's Baseline Pumping Volume, using a combination of regulation and supplemental programs, so that the average annual groundwater pumping volume is no greater than 195,572 acre-feet over the long term.

The objective of this standard is to maintain groundwater depletions at a relatively constant level over the long-term. NeDNR and LRNRD will evaluate the trends in long-term groundwater depletions over typically wet and dry cycles and jointly assess whether additional management actions are necessary to accomplish this objective. This standard will be assessed every five years using the methodology established for MHO B of the basin-wide plan.

- ii. The Net Groundwater Depletions for LRNRD shall be no greater than the Allowable Groundwater Depletions for LRNRD (applying LRNRD's Two-Year Averaging or Five-Year Averaging Baseline Depletion Percentage as

appropriate). If the Net Groundwater Depletions for LRNRD exceed the Allowable Groundwater Depletions for LRNRD, management actions will be required in the amount the Net Groundwater Depletions for LRNRD exceeded the Allowable Groundwater Depletions for LRNRD. This standard will be evaluated annually.

2. Other Controls and Management Activities

The following groundwater controls and management activities are in addition to the Compliance Standards listed above.

- a. During Compact Call Years, LRNRD will seek to implement management actions to ensure compliance with this IMP, including but not limited to, surface water leasing, groundwater leasing, and augmentation. These management actions will be implemented through the authorities granted by the Nebraska Ground Water Management and Protection Act, *Neb. Rev. Stat.* §§ 46-701 to 46-755. LRNRD will provide a letter describing the details of such management actions to NeDNR by January 31 of each year for evaluation. If NeDNR determines that the management actions detailed in LRNRD's letter are insufficient to ensure compliance with this IMP, LRNRD will implement additional groundwater controls and regulations to make up for any expected shortfall as identified in the annual forecast and described in the "Monitoring and Studies" section of this IMP. Such additional controls will include, but not be limited to, curtailment of groundwater pumping within the Rapid Response Area of LRNRD. Procedures and deadlines for compliance with this control are described in the "Monitoring and Compliance" section, beginning on page 21.
- b. When necessary to ensure Compact compliance or during Compact Call Years, LRNRD may set a one-year pumping allocation within the NRD. Such allocation will set the maximum pumping level in that year within any region or sub-region.
- c. Maintain requirements for metering of all groundwater uses according to LRNRD standards.
- d. Provide for transfers according to LRNRD rules and regulations and statutory standards.
- e. Maintain a moratorium on new uses with the exceptions noted in the FSS.
- f. Limit or prevent the expansion of irrigation uses.

B. Surface Water Controls

The authority for the surface water component of this IMP is *Neb. Rev. Stat. §§ 46-715 and 46-716*. The surface water controls that will be continued and/or begun by NeDNR are as follows:

1. NeDNR will do the following additional surface water administration as required by the FSS:
 - a. To provide for regulation of natural flow between Harlan County Lake and Superior-Courtland Diversion Dam, Nebraska will recognize a priority date of February 26, 1948, for Kansas Bostwick Irrigation District, the same priority date held by the Nebraska Bostwick Irrigation District's Courtland Canal water right.
 - b. When water is needed for diversion at Guide Rock and the projected or actual irrigation supply is less than 130,000 acre-feet of storage available for use from Harlan County Lake as determined by the Bureau of Reclamation using the methodology described in the Harlan County Lake Operation Consensus Plan attached as Appendix K to the FSS, Nebraska will close junior, and require compliance with senior, natural flow diversions of surface water between Harlan County Lake and Guide Rock.
 - c. Nebraska will protect storage water released from Harlan County Lake for delivery at Guide Rock from surface water diversions.
 - d. Nebraska, in concert with Kansas and in collaboration with the United States, and in the manner described in Appendix L to the FSS, will take actions to minimize the bypass flows at Superior-Courtland Diversion Dam.
2. Metering of all surface water diversions at the point of diversion from the stream will continue to be required. For surface water canals that are not part of Bureau of Reclamation projects, farm turnouts are required to install and maintain an NeDNR-approved measuring device by the start of the 2005 irrigation season. All measuring devices shall meet the NeDNR standards for installation, accuracy, and maintenance. All appropriators will be monitored to ensure that neither the rate of diversion nor the annual amount diverted exceeds that allowed by the applicable permit or by statute.
3. NeDNR's moratorium on the issuance of new surface water permits was made formal by Order of the Director dated July 14, 2004. Exceptions may be granted by NeDNR to the extent permitted by *Neb. Rev. Stat. § 46-714(3)* or to allow issuance of permits for existing reservoirs that currently do not now have such permits. Such reservoirs are limited to those identified through the FSS-required inventory of reservoirs with over 15 acre-feet of capacity.

4. All proposed transfers of surface water rights shall be subject to the criteria for such transfers as found in *Neb. Rev. Stat.* §§ 46-290 to 46-294.04 and related NeDNR rules, or the criteria found in *Neb. Rev. Stat.* §§ 46-2,120 to 46-2,130 and related NeDNR rules.
5. NeDNR will utilize NeDNR records to monitor use of surface water and to make sure that unauthorized irrigation is not occurring. NeDNR will also be proactive in initiating subsequent adjudications whenever information available to NeDNR indicates the need for adjudication as outlined by state statutes.
6. During Compact Call Years, as determined from the procedures and analysis set forth in the Technical Memorandum (page 18), NeDNR may regulate and administer surface water in the basin as necessary to ensure Compact compliance. During Compact Call Years, NeDNR will issue a "Compact Call" on the Republican River at Hardy or Guide Rock to carry out necessary administration for the Compact in a manner consistent with the doctrine of prior appropriation. A "Compact Call" may result in NeDNR issuing closing notices on natural flow and storage permits in the basin until such time as NeDNR, in consultation with LRNRD and other basin NRDs, determines that yearly administration is no longer needed to ensure Compact compliance.
7. During Compact Call Years, as determined from the procedures and analysis set forth in the Technical Memorandum (page 18), NeDNR will regulate and administer surface water in the basin as necessary to ensure that augmentation waters for the purpose of Compact compliance are administered to the location of Compact compliance. NeDNR will issue closing notices on the necessary natural flow and storage permits in the basin until such time as NeDNR, in consultation with LRNRD and other basin NRDs, determines that administration is no longer needed to ensure augmentation deliveries have been completed.

VIII. Augmentation and Incentive Programs

LRNRD and NeDNR, alone or in cooperation with other parties, intend to establish and implement financial, incentive, and qualified projects as described in *Neb. Rev. Stat.* §§ 2-3226.04 and *Neb. Rev. Stat.* §§ 2-3252, or other incentive programs to reduce beneficial consumptive use of water within LRNRD. These projects include, but are not limited to:

1. Acquisition by purchase or lease of surface water or groundwater rights, including storage water rights with respect to a river or any of its tributaries,
2. Acquisition by purchase or lease or the administration and management, pursuant to mutual agreement, of canals and other works, including reservoirs, constructed for irrigation from a river or any of its tributaries,

3. Vegetation management, including, but not limited to, the removal of invasive species in or near a river or any of its tributaries, and
4. The augmentation of river flows.

As a condition for participation in an incentive program, water users, landowners, or LRNRD may be required to enter into and perform such agreements or covenants concerning the use of land or water as are necessary to produce the benefits for which the incentive program is established. Such incentive programs may include, but shall not be limited to, any program authorized by state law and/or federal programs operated by the United States Department of Agriculture.

Any reductions in depletions to streamflow generated through supplemental programs funded entirely by the State of Nebraska and/or the United States Government, including acreage retirement or other incentive programs undertaken through programs available throughout the Republican River Basin, will not accrue to any specific NRD, regardless of the location or other conditions of the acreage included in the program or of the location of the effect of such water savings on the river system. Any reductions in depletions to streamflow resulting from any such basin-wide programs shall be considered in the calculation of each NRD's compliance with Allowable Groundwater Depletions. This calculation is outlined in the Technical Memorandum (page 18). However, should any NRD establish, fund partially or in total, and implement its own such conservation program, available only for acreage within such district, the accounting of credit for the resulting water savings shall be given exclusively to that NRD. With agreement of the NRDs involved, the benefits from a supplemental program may be allocated to each NRD based upon its share of the cost of the program.

IX. Monitoring and Studies

The overarching purpose of the "Monitoring and Studies" section of this IMP is to ensure that, in cooperation with the other Republican River Basin NRDs, NeDNR and LRNRD maintain compliance with the Republican River Compact as adopted in 1943 and as implemented in accordance with the FSS approved by the United States Supreme Court on May 19, 2003. The objectives of the "Monitoring and Studies" section of this IMP are:

- To gather and evaluate data, information, and methodologies that could be used to increase understanding of the surface water and hydrologically connected groundwater system;
- To test the validity of the conclusions and information upon which this IMP is based; and
- To provide timely data and information that will support decision makers in properly managing the water resources within the LRNRD and the Republican River Basin as a whole.

Together, the components of this "Monitoring and Studies" section constitute a monitoring plan for this IMP. This monitoring plan includes tracking and reporting requirements and procedures

regarding how NeDNR, LRNRD, and the other Republican Basin NRDs will complete the following:

- Track and report water use activities, including annual reporting and accounting for the RRCA and annual reporting for the basin-wide plan (page 19),
- Forecast the maximum amount of water that may be available from streamflow for beneficial use in the short term and long-term to comply with the Compact in accordance with *Neb. Rev. Stat. § 46-715(6)* and use that information to determine whether the following year will be a Compact Call Year (page 20),
- Monitor and ensure compliance with the Compact, this IMP, and the basin-wide plan (page 21), and
- Gather and Evaluate Data, Information, and Methodologies (page 24).

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A. Technical Memorandum

This monitoring plan is accompanied by a technical memorandum, entitled *Monitoring & Studies Technical Memorandum for the URNRD, MRNRD, and LRNRD IMPs* (Technical Memorandum), which contains the specific calculations and other procedures to fulfill many of the monitoring plan’s requirements. The Technical Memorandum is a joint publication of NeDNR, URNRD, MRNRD, and LRNRD. The scope of the Technical Memorandum is limited to specifying technical details of procedures for fulfilling the

requirements of the monitoring plans in the IMPs for URNRD, MRNRD, and LRNRD. Nothing in the Technical Memorandum may contradict or supersede any part of these three IMPs.

The first version of the Technical Memorandum has been developed and adopted by NeDNR, URNRD, MRNRD, and LRNRD concurrently with development and adoption of the fifth generation IMPs for all three NRDs. NeDNR and the NRDs may reevaluate the procedures in the Technical Memorandum and make changes to them at any time as deemed necessary to reflect management actions being taken in the basin, changes to RRCA procedures, or other new information or changing circumstances. The procedures in the Technical Memorandum can only be changed if NeDNR and the three NRDs all agree to the revisions and all adopt a new version of it. Adopting a new version of the Technical Memorandum requires approval by the boards of directors of all three NRDs and by the NeDNR Director. Each NRD's board will submit a letter to the NeDNR Director indicating its approval of the changes, and once the NeDNR Director has received letters of approval from all three NRD boards, the NeDNR Director will return a letter to all three of the NRD boards indicating NeDNR's approval. Once this letter exchange indicating approval by all parties is complete, the approved new version of the Technical Memorandum will become effective immediately as of the date of the NeDNR Director's letter, unless a different effective date has been specified by all parties in the approval letters exchanged. Once effective, the new version will supersede all previous versions. Following adoption, each version of the Technical Memorandum is to be labeled with its effective date to distinguish it from previous or subsequent versions.

B. Reporting Water Use Activities

The following subsections describe how water use activities will be tracked and reported. These include exchanging data for Compact accounting and for the basin-wide plan.

1. Compact Accounting Data

The LRNRD and NeDNR will make all documents, reports, records, and other calculations or material necessary to determine compliance with the Compact available to each other, regardless of whether such documents are available under the Nebraska Public Records Act or otherwise, unless such materials are identified as confidential under Nebraska statutes or by a ruling of a court of competent jurisdiction. LRNRD agrees to make available annually GIS coverage maps of all lands irrigated, if such GIS coverage maps have been revised by the NRD since the previous version provided to NeDNR, and to annually meter, record, and provide to NeDNR its groundwater usage records and irrigation system details. LRNRD will provide NeDNR with this data no later than March 1 of each year. The LRNRD shall make copies of district actions taken on variances, offsets, and similar actions available to NeDNR.

The NeDNR agrees to make available to LRNRD all reports and records of the other NRDs necessary to determine their compliance with IMP requirements, as well as all documentation and reports utilized by NeDNR to determine the basin's virgin water supplies and Nebraska's compliance with the Compact.

In the event any materials are withheld by either NeDNR or LRNRD under a claim of statutory confidentiality, the party withholding such materials shall describe the contents of the materials and reasons for the denial in accordance with *Neb. Rev. Stat. § 84-712.04*.

Compact accounting and data exchanges among the states shall be done annually in accordance with the FSS, dated December 15, 2002, including the *RRCA Accounting Procedures and Reporting Requirements*, which are contained in Appendix C thereof. An annual report of the RRCA is published each year. The accounting procedures, reporting requirements, and annual report of the RRCA are independent of this monitoring plan, and therefore not restated within this monitoring plan.

2. Data for Basin-Wide Plan Annual Report

NeDNR, LRNRD, and the other Republican Basin NRDs will annually produce a report of progress on the basin-wide plan. As specified in the basin-wide plan, this report will include data related to water supplies and uses. To assist with preparation of the report, LRNRD will provide to NeDNR data as described in the basin-wide report's Table 3.1 and a summary of annual progress on each of the basin-wide plan's action items.

C. Forecast and Compact Call Year Determination

Each year, in compliance with *Neb. Rev. Stat. § 46-715(6)*, the NeDNR, in conjunction with the Republican Basin NRDs, shall forecast the maximum amount of water that may be available from streamflow for beneficial use in the short term and long term to comply with the Compact. In addition, to assist NeDNR and the NRDs in ensuring compliance with the Compact, NeDNR, in conjunction with the NRDs, shall forecast Nebraska's available water supplies, beneficial consumptive use, and Compact accounting balances and shall evaluate these forecasted values and other available information. If this evaluation indicates that additional management actions might be necessary in the coming year for Compact compliance, a Compact Call Year will be designated. The short and long-term forecasts and Compact Call Year determination will be calculated and evaluated following procedures specified in the Technical Memorandum (page 18).

Each year, NeDNR will present at least one preliminary forecast at a basin-wide meeting ("Preliminary Forecast and Basin-Wide Meeting," page 21) and will publish a final

forecast prior to January 1 ("Final Forecast and Compact Call Year Determination," page 21). The details of these two forecasts and their required participants are as follows.

1. Preliminary Forecast and Basin-Wide Meeting

NeDNR will present preliminary forecast results at a basin-wide meeting each year. At least one such basin-wide meeting will take place each year, between September 15 and the end of the year. This meeting shall include representatives of NeDNR, NRDs, and surface water project sponsors, and participants will discuss the forecasted streamflow and surface water consumptive use. From these discussions, surface water project sponsors may present a plan to NeDNR to achieve a consumptive use that is less than forecasted consumptive use. Such a plan could allow surface water project sponsors to avoid a potential Compact Call Year.

2. Final Forecast and Compact Call Year Determination

NeDNR will publish the final forecast before January 1 of each year as required by *Neb. Rev. Stat. § 46-715(6)*, including both short and long-term forecasts and whether a Compact Call Year will be designated. If any potential deficit between allowable and forecast depletions is projected, that information will also be included with the final forecast. In Compact Call Years, NeDNR and the NRDs will take additional steps to monitor and ensure Compact compliance ("Compact Compliance," page 21).

D. Monitoring and Compliance

This section indicates the actions NeDNR and LRNRD will take to monitor and ensure compliance with the Compact, this IMP, and the basin-wide plan. Monitoring and ensuring compliance with the Compact is described beginning on page 21. Monitoring and ensuring compliance with other aspects of this IMP and the basin-wide plan is described beginning on page 22.

1. Compact Compliance and Management Actions Evaluation

a. Compact Compliance

Before January 1 of each Compact Call Year (page 21), NeDNR will provide LRNRD with an estimate of how much yield from potential management actions may be needed within the year. This will be LRNRD's share of estimated Compact obligations, as specified in the Technical Memorandum (page 18). By January 31 of each year designated as a Compact Call Year, LRNRD will inform NeDNR of the management actions the NRD intends to take to ensure compliance, and then NeDNR will evaluate whether the planned management actions are sufficient to

ensure compliance, as described under "Management Actions Notification, Response, and Evaluation," page 22.

In Compact Call Years, NeDNR will implement additional surface water controls (page 15). NeDNR will also provide preliminary accounting estimates to LRNRD by the 10th of each month, beginning in May of each Compact Call Year.

In addition, as needed during each Compact Call Year, NeDNR will provide LRNRD with updated estimates of how much yield from additional management actions may be needed within the year, taking into account LRNRD actions to date. The estimated volume of water needed to make up remaining deficits will continue to be updated through December 31 of each Compact Call Year and will be partitioned among the NRDs as described in the Technical Memorandum (page 18). If updated estimates indicate that additional management actions might be needed beyond those already evaluated by NeDNR, LRNRD will inform NeDNR of the additional management actions the NRD intends to take to ensure compliance, and then NeDNR will evaluate whether the planned management actions are sufficient to ensure compliance, as described under "Management Actions Notification, Response, and Evaluation," page 22.

This IMP's short-term Compliance Standard (standard ii, page 13) examines whether each NRD has kept its Net Groundwater Depletions within its share of Allowable Groundwater Depletions, applying applicable Compact averaging and baseline depletion percentages. This Compliance Standard is equivalent to MHO A of the basin-wide plan. If LRNRD's Net Groundwater Depletions exceeded LRNRD's Allowable Groundwater Depletions, management actions will be required. NeDNR and LRNRD will communicate about and evaluate management actions as described under "Management Actions Notification, Response, and Evaluation," below.

b. Management Actions Notification, Response, and Evaluation

When NeDNR determines that management actions are or might be necessary, as described under "Compact Compliance" (page 21), NeDNR will notify LRNRD of the volume of water necessary to ensure compliance with the Compact, this IMP, or the basin-wide plan. Within 30 days of such notification, LRNRD will provide a letter to NeDNR containing details about the management actions LRNRD intends to take to ensure compliance. NeDNR will evaluate the management actions details in LRNRD's letter to determine whether they are sufficient to ensure compliance and then will send LRNRD a letter summarizing the results of NeDNR's evaluation. If NeDNR determines that the management actions detailed in LRNRD's letter are insufficient to ensure compliance with the Compact, IMP, or basin-wide plan as described under "Compact Compliance"

(page 21) LRNRD will implement additional controls and regulations to make up the remaining deficit.

2. IMP and Basin-Wide Plan Compliance

As described in the previous section, this IMP contains several provisions to ensure annual Compact compliance. The IMP also includes monitoring and mitigation requirements for other purposes, including long-term management of groundwater depletions to streamflow and protecting existing surface water and groundwater users. In addition, the basin-wide plan contains five Measurable Hydrologic Objectives (MHOs) for monitoring the progress of plan implementation. NeDNR and the NRDs will monitor and evaluate compliance with each of these provisions to determine whether management actions are necessary, as described in this section.

The objective of the IMP's long-term Compliance Standard (standard i, page 13) is to maintain groundwater depletions to streamflow at a relatively constant level over the long-term. This Compliance Standard is the equivalent of MHO B from the basin-wide plan. As described in the Compliance Standard, NeDNR will assess this standard every five years using the methodology established for MHO B (*Supplement to the Republican River Basin-Wide Plan: Methodology for MHO B*, 2020). If this analysis indicates that depletions to streamflow are increasing in the long-term, NeDNR and LRNRD will jointly assess whether additional management actions are necessary to accomplish this objective.

In accordance with *Neb. Rev. Stat. § 46-715 (4)(c)* and the "Groundwater Controls" section of this IMP (page 12), NeDNR will annually evaluate whether offsets are necessary to mitigate new net depletions resulting from augmentation pumping or other management actions, in order to protect existing surface water appropriators and groundwater users. If NeDNR's evaluation indicates offsets may be necessary, NeDNR and LRNRD will jointly assess whether additional management actions are necessary to mitigate new depletions.

The basin-wide plan's MHOs will be evaluated as described in the basin-wide plan, *Supplement to the Republican River Basin-Wide Plan: Methodology for MHO B* (2020), and *Supplement to the Republican River Basin-Wide Plan: Methodology for MHO C* (2020), according to the schedule laid out in the basin-wide plan. Should evaluation indicate that any MHO is not being achieved, NeDNR and LRNRD will jointly assess whether additional management actions are necessary, as described in the basin-wide plan.

E. Plan to Gather and Evaluate Data, Information, and Methodologies

As outlined in *Neb. Rev. Stat. § 46-715(2)(e)*, ongoing programs and new studies or other projects may become a source of information that is used to evaluate the effectiveness of controls adopted by LRNRD and NeDNR. NeDNR and LRNRD will jointly pursue and/or evaluate studies, contingent upon budget and staff resources, to evaluate their potential effectiveness in achieving the goals and objectives of this IMP.

The following potential studies have been identified by NeDNR and LRNRD:

1. Crop rotation,
2. Vegetation management,
3. Irrigation scheduling,
4. A survey of the type and location of irrigation systems throughout LRNRD,
5. Tillage practices, and
6. Conjunctive management.

Additionally, data gathered and assessed as described in the "Monitoring" section of the Republican River Basin-Wide Plan, or any studies undertaken in fulfillment of that plan, may be considered for the purposes outlined in *Neb. Rev. Stat. § 46-715(2)(e)* for this IMP.

F. Harlan County Lake Operations

In the event that operations of Harlan County Lake are not in accordance with Appendix K of the Final Settlement Stipulation, NeDNR and the NRDs will meet to discuss whether any changes are needed to the methods of implementing this IMP until normal operations resume.

X. Modifications to the Integrated Management Plan

Except as provided herein, modifications to this IMP, including the Controls contained within this IMP, shall require mutual agreement by both LRNRD and NeDNR. After the proposed changes have been agreed to, a joint hearing on those changes will be required. Following the joint hearing, LRNRD and NeDNR shall issue an order reflecting the decision made.

Additionally, any basin NRD (LRNRD, MRNRD, or URNRD) may identify an issue within the IMP that they desire NeDNR to address through modification(s) within their own IMP that may have implications on one or more of the other basin NRDs' IMPs. Upon identifying the issue in writing to NeDNR, NeDNR will schedule at least one meeting to discuss the issue with each affected NRD. Each affected NRD and NeDNR will make good faith efforts to resolve the issue and implement any necessary modification(s) to each respective IMP. If the issue is unable to be satisfactorily resolved, then the affected NRD(s) and NeDNR will each develop a written summary of their position on the issue. The written summaries, along with any other

information, may be used by the affected NRD or NeDNR to pursue remedies that are available to them pursuant to *Neb. Rev. Stat. §§ 46-719*.

XI. Information Considered

Information used in the preparation of this IMP and to be used in the implementation of this IMP can be found in the list below. If any of the documents below are updated during implementation of this IMP, the newer versions will also be considered. These materials can be obtained by contacting LRNRD or NeDNR.

A. Republican River Compact Information

- The Republican River Compact, *Neb. Rev. Stat. Appendix § 1-106*, effective December 31, 1942
- Supreme Court of the United States, in the Matter of *Kansas v. State of Nebraska*, First Report of the Special Master, January 28, 2000
- Final Settlement Stipulation of the Supreme Court of the United States in the Matter of *State of Kansas v. the State of Nebraska and State of Colorado*, Effective December 15, 2002
- Supreme Court of the United States, in the Matter of *Kansas v. States of Nebraska and Colorado*, Opinion of the court, on Exceptions to Report of Special Master, Decided February 24, 2015
- RRCA Ground Water Model, June 30, 2003, updates 2001–2007, and simulation runs of said model
- *Rules and Regulations of the RRCA*, revised August 21, 2020
- *RRCA Accounting Procedures and Reporting Requirements*, revised August 21, 2020
- Current RRCA resolutions

B. NeDNR and NRD information

- *Neb. Rev. Stat. §§ 46-713 through 46-720, 46-739 through 46-740, 46-743, and 46-755*
- Plans
 - The four previous generations of the *Integrated Management Plan Jointly Developed by the Department of Natural Resources and the Lower Republican Natural Resources District* (2004, 2008, 2011, and 2016)
 - The *Republican River Basin-Wide Plan*, jointly developed by the Upper Republican, Middle Republican, Lower Republican, and Tri-Basin Natural Resources Districts and the Nebraska Department of Natural Resources, effective March 1, 2019

- The Lower *Republican Natural Resources District Ground Water Management Plan*
- Rules and Regulations
 - The Lower Republican Natural Resources District's Rules and Regulations
 - *Department of Natural Resources Rules for Groundwater, Title 456 Neb. Admin. Code*
 - *Department of Natural Resources Rules for Surface Water, Title 457 Neb. Admin. Code*
 - The items listed in *Department of Natural Resources Rules for Process and Procedures, Title 454 Neb. Admin. Code*
- *Forecast of Allowable Depletions in the Republican Basin*, published annually by NeDNR beginning in 2013
- Department of Natural Resources Order Declaring Formal Moratoriums in the Matter of the Platte River Basin, the North Platte River Basin, the South Platte River Basin, the Republican River Basin, the White River Basin, and the Hat Creek River Basin, dated July 14, 2004
- Notice to the Public and to the Lower Republican Natural Resources District of Fully Appropriated Areas and Applicable Stays, dated July 16, 2004
- Applicable Case Law
- Additional data on file with LRNRD and NeDNR