

INTEGRATED MANAGEMENT PLAN
Jointly Developed by the
DEPARTMENT OF NATURAL RESOURCES
and the
LOWER REPUBLICAN NATURAL RESOURCES DISTRICT

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 (DNR) in accordance with the Nebraska Ground Water Management and Protection Act, *Neb. Rev. Stat.* §§ 46-701 to 46-754 (Cum. Supp. 2008).

II. Limitations for Certain Purposes

To the extent provisions of this IMP relate to and accommodate or provide for Water-Short Year regulatory actions intended to achieve compliance with the Compact and FSS, 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 2, Range 9, Sections 18, 7 and 6, through Webster County, Township 3, Range 9, Sections 31, 30, 19, 18, 7, and 6 to its intersection with the northern boundary of Webster County.

III. Definitions

- A. Allowable Ground Water Depletions** - the maximum level of depletions to streamflow from ground water pumping within the Nebraska portion of the Republican River Basin that can be allowed in any one year without exceeding the Compact allocation over the appropriate averaging period .
- B. Allowable Ground Water Depletions for the LRNRD** - the volume of depletions to streamflow from ground water pumping that are allowed to occur in the LRNRD. This volume is calculated by multiplying the Baseline Depletion Percentage by the Allowable Ground Water Depletions.
- C. Actual Ground Water Depletions for the LRNRD** - the volume of depletions to streamflow that occur as a result of groundwater pumping in the LRNRD. This volume is determined using the RRCA groundwater model, and by taking into account all management actions specifically taken by the LRNRD.
- D. Normal-Year Baseline Depletion Percentage** - the percentage of mean annual depletions to streamflow in the Republican River Basin upstream of Hardy caused

by ground water use within the URNRD, MRNRD, and LRNRD during the years 1998 to 2002 inclusive. The percentages of mean annual depletions assigned to the NRDs are: URNRD, 43.9 percent; MRNRD, 30.8 percent; and LRNRD, 25.3 percent.

- E. Water-Short Year Baseline Depletion Percentage** - the percentage of mean annual depletions to streamflow in the Republican River Basin upstream of Guide Rock caused by ground water use within the URNRD, MRNRD, and LRNRD during the years 1998 to 2002 inclusive. The percentages of mean annual depletions assigned to the NRDs are: URNRD, 44.4 percent; MRNRD, 31.1 percent; and LRNRD, 24.5 percent.
- F. Baseline Pumping Volumes** - the annual mean ground water pumping from the period 1998 to 2002. The baseline pumping volumes are 542,407 acre-feet for the URNRD, 313,631 acre-feet for the MRNRD, and 244,465 acre-feet for the LRNRD.
- G. Compliance Standard** - the criteria and controls that will be used to determine whether LRNRD's rules, regulations, and other programs are sufficient to meet the statutory obligations pertaining to ground water depletions both over the near term and long term.
- H. Compact Compliance Volume** - the statewide Compact accounting shortfall that is determined by the Department prior to October 1st within each Compact Call Year. This value shall be calculated in conformance with RRCA Accounting procedures, available data, and year end estimates. This value shall be used to determine if the regulations and management actions implemented to date have been sufficient or will need to be increased to ensure Compact compliance. The value will be continuously updated as data and year end estimates are refined.
- I. Compact Call Year** - A year in which the Department's forecast procedures outlined in Section IX.B.2.b of this IMP indicate the potential for non-compliance if sufficient surface water and ground water controls and/or management actions are not taken. Compact Call Year streamflow administration will be conducted by the Department in a manner consistent with this IMP.

 - a. Water-Short Year** - A trigger established in the Final Settlement Stipulation (FSS) requiring that Compact accounting is performed for only that portion of the basin upstream of Guide Rock and that a two-year¹ averaging period is utilized.
 - b. Normal Year** - The Compact compliance condition that exist when Water-Short Year is no longer in effect. This condition results in the use of a five-year averaging period for determining Compact Compliance.

¹ The two-year average 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 utilized.

- c. **Current Year's Balance** - A calculation performed prior to December 31st of each year that determines the Compact accounting balance for that year that is attributable to the LRNRD. The calculation shall utilize the RRCA accounting procedures, available data, and end of year estimates and be assigned to each NRD within the basin based on the proportional amount of ground water depletions caused by that NRD and the management actions taken by the NRD.

IV. Goals and Objectives

The LRNRD and the DNR have adopted the following Goals and Objectives:

A. Goals:

1. Ensure that ground water and surface water users within the LRNRD assume their share of the responsibility to keep Nebraska in compliance with the Republican River Compact.
2. 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.
3. Sustain a balance between water uses and water supplies within the LRNRD so that the economic viability, social and environmental health, safety, and welfare of the LRNRD can be achieved and maintained for both the near and long term.
4. Reserve any streamflow available from regulation, incentive programs, and purchased or leased surface water and ground water 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 the 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. The DNR shall ensure that administration of surface water appropriations in the basin is in accordance with the Compact and in full compliance with Nebraska law.
4. Make such additional reductions in ground water 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 the LRNRD that ensures the District limits its ground water depletions to the Allowable Ground Water Depletions for the LRNRD.

Compact Call Years will be determined through the procedures outlined in Section IX of this IMP.

5. To assist in ensuring long-term Compact compliance, reduce existing ground water use within the 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, the LRNRD's ground water depletions are maintained within their portion of Nebraska's Allowable Ground Water Depletions as computed through use of the Republican River Compact Administration Ground water Model. Additionally, voluntary reductions in baseline pumping volumes will continue to be pursued by the LRNRD with the incentive of limiting the level of long-term management actions that are necessary during Compact Call Years.
6. The LRNRD and the DNR 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 ground water.
 - 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.

V. Map

Except as noted in Section II above, the area subject to this IMP is the geographic area within the boundaries of the LRNRD (see Map 1). The 10 Percent/Five-Year Region is shown as a sub-area within the boundaries of the LRNRD (see Map 2).

VI. Ground Water Controls

The LRNRD will utilize the ground water controls as provided by *Neb. Rev. Stat.* §§ 46-715, 46-739, and 46-740 to form the Ground Water Controls component of this IMP. The controls that the DNR and LRNRD agree are necessary and shall be continued are: 1) ground water allocations and 2) a moratorium on new water wells and irrigated acres as are required by the Final Settlement Stipulation (FSS). In order to provide the LRNRD flexibility in addressing compliance, the 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 the LRNRD's Rules and Regulations and the provisions of the 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 the LRNRD shall contain provisions that adequately ensure that no new ground water uses initiated after July 14, 2004, will adversely impact surface water appropriators or ground water users whose water wells are dependent upon recharge from the stream or river. If the Compliance Standards are met, the LRNRD may amend or modify its rules and regulations without the approval of DNR, 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 the Department of any other rules and regulations modifications, such that the Department can provide testimony pursuant to *Neb. Rev. Stat. § 46-743*.

A. Compliance Standards

1. Purpose

These Compliance Standards are established by DNR and LRNRD to assess whether the course of action taken by the LRNRD, with the intention of providing their proportionate share of assistance to the State in order for the State to maintain compliance with the FSS and Compact, are sufficient. The action taken by the 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 DNR and past action by the NRD.

2. Duration

These Compliance Standards shall be used to assess the action taken by the LRNRD. On an annual basis the DNR and LRNRD shall reexamine the sufficiency and effectiveness of the Compliance Standards to determine if amendments or modifications are necessary to ensure the State's compliance with the FSS and Compact. Nothing contained herein shall prohibit or preclude any amendment or revision, at any time, by the DNR 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*.

3. Standards

The 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 Section IX - Monitoring and Studies. Section IX specifies a forecast and resulting actions needed at the Guide Rock compliance point (during Water-Short Years) and at the Hardy compliance point in all other years. The procedures for determining whether the compliance standards are met will be based on the RRCA Accounting Procedures, and the annual forecast as outlined in Section IX. The standards are:

- a. To assist with ensuring long-term Compact compliance, provide for a twenty percent (20%) reduction in pumping from the 1998 to 2002 pumping volume using a combination of regulation and supplemental programs so that the average

ground water pumping volume is no greater than 195,572 acre-feet over the long term. The objective of this standard is to maintain ground water depletions at a relatively constant level over the long-term. The DNR and NRD will annually evaluate the trends in long-term ground water depletions over typical wet and dry cycles (approximately 12 years) and jointly assess if additional management actions are necessary to accomplish this objective.

- b.** The LRNRD's net depletions to streamflow shall be no greater than the Actual Ground Water Depletions for the LRNRD as determined in accordance with RRCA Accounting Procedures using the RRCA GWM. The Actual Ground Water Depletions for the LRNRD shall be computed using the same years as are used to determine the averages for Nebraska's compliance with the FSS.

B. Other Controls and Management Activities

The LRNRD and the DNR 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.

- 1.** During Compact Call Years, the LRNRD will seek to implement management actions including but not limited to surface water leasing, ground water leasing, augmentation, etc., to ensure compliance with this IMP. 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 46-753. Details of such management actions will be provided to DNR by January 31 of each year for evaluation. If such management actions are insufficient to ensure compliance with this IMP, the LRNRD will implement additional ground water controls and regulations to make up for any expected shortfall as identified in the annual forecast and described in Section IX of this IMP. Such additional control will include curtailment of ground water pumping within the 10 Percent/5-Year Area of the LRNRD.
- 2.** When necessary to ensure Compact compliance or during Compact Call Years, the LRNRD may set a one year pumping allocation within the District. Such allocation will set the maximum pumping level in that year within any region or sub region.
- 3.** Maintain requirement for metering of all ground water uses according to LRNRD standards.
- 4.** Provide for transfers according to LRNRD rules and regulations and statutory standards.

VII. Surface Water Controls - Department of Natural Resources

The authority for the surface water component of this IMP is *Neb. Rev. Stat.* §§ 46-715 and 46-716 (Reissue 2004). The surface water controls that will be continued and/or begun by the DNR are as follows:

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- A.** The DNR will do the following additional surface water administration as required by the Settlement Agreement:
- 1.** 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 as the priority date held by the Nebraska Bostwick Irrigation District's Courtland Canal water right.
 - 2.** 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 Harlan County Lake Operation Consensus Plan attached as Appendix K to the Settlement Agreement, Nebraska will close junior, and require compliance with senior, natural flow diversions of surface water between Harlan County Lake and Guide Rock.
 - 3.** Nebraska will protect storage water released from Harlan County Lake for delivery at Guide Rock from surface water diversions.
 - 4.** Nebraska, in concert with Kansas and in collaboration with the United States, and in the manner described in Appendix L to the Settlement Agreement, will take actions to minimize the bypass flows at Superior-Courtland Diversion Dam.
- B.** 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 a Bureau of Reclamation project, farm turnouts are required to install and maintain a DNR-approved measuring device by the start of the 2005 irrigation season. All measuring devices shall meet the DNR 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.
- C.** The DNR'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 the DNR to the extent permitted by *Neb. Rev. Stat. § 46-714(3)* (Reissue 2004) 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 Settlement Agreement required inventory of reservoirs with over 15 acre-feet capacity.
- D.** 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* (Reissue 2004) and related DNR rules or the criteria found in *Neb. Rev. Stat. §§ 46-2,120 to 46-2,130* (Reissue 2004) and related DNR rules.
- E.** Utilize DNR records to monitor use of surface water and to make sure that unauthorized irrigation is not occurring. The DNR will also be proactive in initiating subsequent adjudications whenever information available to the DNR indicates the need for adjudication as outlined by state statutes.

- F. During Compact Call Years, as determined from the procedures and analysis set forth in Section IX below, DNR may regulate and administer surface water in the basin as necessary to ensure Compact compliance. During Compact Call Years, DNR 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 DNR issuing closing notices on natural flow and storage permits in the basin until such time as DNR, in consultation with the LRNRD and other basin NRDs, determines that yearly administration is no longer needed to ensure Compact compliance, pursuant to Section IX.
- G. During Compact Call Years, as determined from the procedures and analysis set forth in Section IX below, DNR will regulate and administer surface water in the basin as necessary to ensure that augmentation deliveries for the purpose of Compact compliance are administered to the location of Compact compliance. DNR will issue closing notices on the necessary natural flow and storage permits in the basin until such time as DNR, in consultation with the LRNRD and other basin NRDs, determines that administration is no longer needed to ensure augmentation deliveries have been completed.

VIII. Incentive Programs

The LRNRD and the DNR, 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, LB 862 (2010), Neb. Rev. Stat. §§ 2-3252* or other incentive programs to reduce beneficial consumptive use of water within the LRNRD. These projects include, but are not limited to (1) acquisition by purchase or lease of surface water or ground water 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 the 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 water savings generated through conservation programs, including acreage retirement or other conservation incentive programs undertaken through programs available throughout the Republican River Basin with the use of funds distributed by the State of Nebraska or the United States Government, 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 water savings resulting from any such basin-wide programs shall be considered in the calculation of each NRD’s depletions allocated to each of the NRDs based upon the 1998 to 2002 baseline depletion proportions.

However, should any NRD establish, fund, and implement its own such conservation program within its NRD's boundaries, the accounting of credit for the resulting water savings shall be given exclusively to that NRD. Any credit resulting from an inter-district conservation program shall be credited as agreed to by the NRDs involved. Also, if multiple NRDs cooperate in a streamflow augmentation project, the benefits shall be provided to each NRD based upon their share of the cost of the program.

With agreement of the NRDs involved, the benefits from a supplemental program may be allocated to each NRD based upon their share of the cost of the program.

To the extent possible, it is the intent of the LRNRD to provide compensation to water users that are required to forgo water use to allow the LRNRD and the State to comply with the Compact. This may be in addition to or as part of any other LRNRD incentive or retirement program developed to facilitate Compact compliance.

IX. Monitoring and Studies

The overarching purpose of the Monitoring and Studies Section is to ensure that, in cooperation with the other Republican River Basin NRDs, the DNR 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 objective of the Monitoring and Studies Section of this IMP is to gather and evaluate data, information, and methodologies that could be used to increase understanding of the surface water and hydrologically connected ground water system; to test the validity of the conclusions and information upon which this IMP is based; and to assist decision makers in properly managing the water resources within the LRNRD and the Republican River Basin as a whole.

On an annual basis the results of monitoring and studies will typically be discussed in a basin-wide meeting that will take place prior to November 15th each year. The purpose of the meeting will be to discuss the preliminary accounting for the current year, the forecast of allowable streamflow depletions for the coming year, and potential management actions as necessary. Table 1 outlines important dates and objectives related to section IX.

Table 1. Important Dates and Objectives

Date	Objective
	LRNRD
September - October	Obtain power records and other estimates to determine pumping for T=0 ground water model run.
Prior to November 15 th	Discuss results of monitoring and studies, preliminary accounting for current year, and early forecast of allowable streamflow depletions for the upcoming year.
November 15 – January 1	LRNRD and DNR will discuss potential management alternatives in the situation that the coming year (T+1) will be a Compact Call Year.
Prior to January 1	Provide final forecast of allowable streamflow depletions and determination of Compact Call Years.
Prior to January 31 (year T+1)	LRNRD will provide DNR with details regarding existing management alternatives in lieu of additional ground water regulations or controls to make up for the expected shortfall.
Prior to February 1 (Year T+1)	LRNRD will provide DNR with meter reading database and GIS coverage maps to be used for the RRCA annual model update.
Prior to October 1 st (Year T+1)	The DNR will provide the Compact Compliance Volume to LRNRD for implementation of any of their portion of any remaining management actions that are necessary for Compact compliance

A. 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 the LRNRD and the DNR. The DNR and the 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 the DNR and the LRNRD: (1) crop rotation; (2) vegetation management; (3) irrigation scheduling; (4) a survey of the type and location of irrigation systems throughout the LRNRD; (5) tillage practices; and (6) conjunctive management.

B. Monitoring

Part One of the Monitoring Section describes the tracking and reporting of water use activities within fully appropriated areas of the district by the LRNRD and the DNR. Part Two of the Monitoring Section describes the analyses that will be utilized to annually forecast the projected depletions in each subsequent year. This accounting and the forecast in accordance with *Neb. Rev. Stat.* § 46-715(6) will serve to increase the understanding and test the validity of the conclusions and information upon which this plan is based.

Compact accounting and data exchanges among the states shall be done annually in accordance with the FSS, dated December 15, 2002, including the Republican River Compact Administration (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 the Monitoring Section of this plan.

1. Part One: Tracking and Reporting of Water Use Activities

The LRNRD and the DNR will make all documents, reports, records, computer runs or 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. Specifically, and without limitation, the LRNRD agrees to annually provide GIS coverage maps of all lands irrigated and to meter, record and provide to the DNR its ground water usage records and irrigation system details. The LRNRD shall make copies of district actions taken on variances, offsets, and similar actions available to DNR.

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

In the event any materials are withheld by either DNR 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.

2. Part Two: Forecast Procedures

Each year in compliance with *Neb. Rev. Stat.* § 46-715(6) the DNR in consultation with the Republican River 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. This forecast will be used to assist the DNR and the NRDs in ensuring compliance with the Compact. DNR in conjunction with the NRDs will annually evaluate the forecast procedures and make changes as deemed necessary to reflect management actions being taken in the basin.

In order to complete the forecast, the DNR and LRNRD in conjunction with the other NRDs will review available information and determine if additional controls must be implemented within any district for Compact Call Year compliance. The forecast will be completed prior to January 1 of each year, and will detail the expected shortfall within each district in the event that the coming year is a Compact Call Year. By the following January 31, if necessary, the LRNRD will provide DNR with details regarding existing management alternatives (such as execution of existing surface water leases) in lieu of additional ground water regulations or controls to make up for the expected shortfall.

The procedures developed to complete the forecast will be reviewed annually by the DNR to determine if modifications are necessary. The forecast will project the next year's balance (projected Nebraska allocation plus projected Imported Water Supply less the projected Computed Beneficial Consumptive Use, or CBCU), and the projected Water-Short Year and Normal Year accounting balances. These balances will be utilized in conjunction with other information to determine if a Compact Call Year exists.

The DNR’s calculation of allowable ground water depletions for the LRNRD and determination of the necessity for additional controls will utilize additional ground water model information, estimated end-of-year information for reservoir volumes, and estimated streamflow to determine on an annual basis whether additional NRD-specific controls must be implemented.

a. Determination of Available Streamflow

The forecast will typically determine the forecast values for both Guide Rock (Water-Short Year accounting point) and Hardy (Normal Year accounting point). The DNR’s forecast values for Guide Rock will include: 1) the one-year balance (projected allocation less the projected CBCU plus the imported water supply); two-year average, and three-year average. The DNR’s forecast values for Hardy will include: 1) the one-year balance (projected allocation less the projected CBCU plus the imported water supply); and 2) the five-year average. These forecasted values will be used in conjunction with sections IX.B.2.b, IX.B.2.c, IX.B.2.d and IX.B.2.e to determine when management actions or controls must be implemented. The DNR will calculate forecast values for the next year using the variables in table 2:

Table 2. Information Used for Forecast of Allowable Depletions.

Year	Item	Information Source
T – 3		Draft; current Accounting Procedures (v. 2015)
T – 2		Draft; current Accounting Procedures (v. 2015)
T – 1		Draft; current Accounting Procedures (v. 2015)
Provisional Data for T = 0 (Current Year or Immediate Past Irrigation Season)	Pumping	Power records estimate or estimated from preliminary information
	Surface Water Use	Estimated from preliminary data and previous years values
	Streamflow	Available provisional records end of year estimated
	Evaporation	T – 1 records or estimated from preliminary information
Forecast Year T + 1 (Coming Irrigation Season)	Ground Water Consumptive Use and Imported Water Supply Credit	Average values for T = 0 and T - 1
	Surface Water Consumptive Use	Colorado: Average of T – 1 and T – 2 use Kansas: + (.1858 x HCL content) + 9,575 Nebraska: - $(4 \times 10^{-7}) \times (\text{NE lake volume})^2$ + (0.52) x (NE lake volume) - 42,000
	Streamflow	+ (5-year average of state line flows) x 0.41 + 0.23 x HCL content - 27,450

In accordance with *Neb. Rev. Stat.* § 46-703(6), DNR, NRDs, and surface water project sponsors shall meet prior to the final forecast of allowable streamflow depletions and determination of Compact Call Years. At this meeting the involved parties will discuss the forecasted streamflow

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and surface water consumptive use. From these discussions, surface water project sponsors may present a plan to DNR 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. This plan must be completed and provided to the Department no later than December 1 of the current year (T=0).

The following equations will be utilized to determine the one year balance for the forecast year:

$$\begin{aligned} \text{CWS} = & \quad + \text{SwCBCU}_{\text{NE}} + \text{SwCBCU}_{\text{KS}} + \text{SwCBCU}_{\text{CO}} \\ & \quad + \text{GwCBCU}_{\text{NE}} + \text{GwCBCU}_{\text{KS}} + \text{GwCBCU}_{\text{CO}} \\ & \quad + \text{Stateline Streamflow} \end{aligned}$$

$$\text{Nebraska Allocation} = \text{CWS} * 0.5$$

$$\text{CBCU}_{\text{NE}}^2 = \text{SwCBCU}_{\text{NE}} + \text{GwCBCU}_{\text{NE}}$$

$$\text{IWS} = \text{Imported Water Supply Credit}$$

$$\text{Hardy One Year Balance} = \text{Nebraska Allocation} + \text{IWS} - \text{CBCU}_{\text{NE}}$$

$$\text{Guide Rock One Year Balance} = \text{Hardy One Year Balance} * 0.89 - 9040$$

$$\text{Nebraska Allocation Upstream of Guide Rock} = \text{Guide Rock One-Year Balance} - \text{IWS} + \text{CBCU}_{\text{NE}}$$

Where:

T-3 = Three years ago from the current year

T-2 = Two years ago from the current year

T-1 = One year ago from the current year

T=0 = The current year

T+1 = The upcoming year that is being forecasted

CWS = Computed Water Supply

GW CBCU_{NE, KS, CO} = Ground water Computed Beneficial Consumptive Use for each respective state

SW CBCU_{NE, KS, CO} = Surface Water Computed Beneficial Consumptive Use for each respective state

² When using the Nebraska Allocation Upstream of Guide Rock, these values will be limited to the SwCBCU and GwCBCU that occurs upstream of Guide Rock.

Nebraska Allocation = The amount of water the State of Nebraska is allowed to use in year T+1 under Normal Year provisions.

Nebraska Allocation Upstream of Guide Rock = The amount of water the state of Nebraska is allowed to use in year T+1 under Water-Short Year provisions

Balance = The sum of Nebraska's Allocation, plus the Nebraska Imported Water Supply, less Nebraska's Computed Beneficial Consumptive Use

The year T+1 balance for Normal Year accounting (Hardy One Year Balance) and Water-Short Year accounting (Guide Rock One Year Balance) will be utilized in conjunction with the applicable previous years balances to project the five-year average upstream of Hardy and the two-year and three-year average balances upstream of Guide Rock.

b. Compact Call Year Evaluation

This section of the monitoring plan specifies the process that will be completed by the DNR to determine the Compact Call Years, as detailed in Attachment 1, Republican River Water Supply Evaluation and Required Actions Flowchart. This evaluation takes into account reservoir content and recent balances upstream of Guide Rock and Hardy and the annual forecast as described above in Section IX.B.2.a. This process will be completed and provided to the LRNRD by DNR prior to January 1 of each year.

Checklist A. Water-Short Year Test

Is the forecast projection provided by the United States Bureau of Reclamation for the coming year's irrigation supply less than 119 kAF?

Yes. Proceed to Checklist B.

No. Proceed to Checklist C.

Checklist B. Water-Short Year

Is the current year's balance ($T = 0$) upstream of Guide Rock sufficient to offset the dry year forecast for next year's balance upstream of Guide Rock minus 10 kAF³?

Yes. Proceed to Checklist D.

No. COMPACT CALL YEAR: The DNR will determine each NRD's share of any potential overuse and propose adjustments in accordance to Section IX.B.2.c. of this IMP.

³ In the event it is the second consecutive Compact Call Year, this value will be reduced to 5kAF. For any remaining consecutive Compact Call Years, it will be reduced to zero.

Note: If it is beneficial to utilize the Alternative Water-Short Year Plan provisions from the FSS (the previous two years have a greater balance than last year alone), and an Alternative Water-Short Year Plan has been approved by the RRCA, then the two-year balance (for $T = 0$, the current year, and the prior year, $T - 1$) will be substituted for the current year's balance in Checklist B.

Checklist C. Early Warning System for Water-Short Year Compliance

When Harlan County Lake declines from one year to the next, the December end-of-month (EOM) content is generally about 84 percent of what it was last year. A December EOM of 246 kAF provides a high level of confidence that the coming year ($T+1$) will not be a Water-Short Year. Based on the current year's ($T=0$) Harlan County Lake December EOM content, compute a dry-year projection for next year ($T+1$) based on this relationship. Is the value greater than 246 kAF?

Yes. Proceed to Checklist D.

No. Advance to the next question.

Is the dry year forecast for next year's ($T+1$) balance upstream of Guide Rock greater than zero?

Yes. Proceed to Checklist D.

No. Advance to the next question.

Is the current year's balance ($T = 0$) upstream of Guide Rock sufficient to offset the dry year forecast for next year's balance ($T + 1$) upstream of Guide Rock minus 10 kAF⁴?

Yes. Proceed to Checklist D.

No. COMPACT CALL YEAR: The DNR will determine each NRD's share of any potential overuse and propose adjustments in accordance to Section IX.B.2.c. of this IMP.

Checklist D. Normal Year Administration

Will the forecast for next year ($T + 1$) result in a 5-year balance at Hardy that is greater than 50 kAF?

Yes. Analyze long term trends and additional adjustments in accordance to Section IX.B.2.e

No. Advance to the next question.

⁴ In the event it is the second consecutive Compact Call Year, this value will be reduced to 5kAF. For any remaining consecutive Compact Call Years, it will be reduced to zero.

Will both the forecast for next year result in a 5 year balance at Hardy ($T - 3$, $T - 2$, $T - 1$, $T = 0$, and $T + 1$) that is greater than zero and the balance at Hardy of the most recent four years ($T - 2$, $T - 1$, $T = 0$, and $T + 1$) be greater than zero?

Yes. Analyze long term trends and additional adjustments in accordance to Section IX.B.2.e

No. COMPACT CALL YEAR: The DNR will determine each NRD's share of any potential overuse and propose adjustments in accordance to Section IX.B.2.c. of this IMP.

c. Calculation of Allowable Ground water Depletions for the LRNRD and Determining the necessity of Additional Controls

This section of the monitoring plan specifies the calculations that will be completed by the DNR to determine the allowable ground water depletions for the LRNRD in any Compact Call Year. These procedures are utilized to indicate when additional controls must be implemented by the LRNRD and DNR to ensure compliance with this IMP in the event that the DNR's forecast, provided prior to January 1 of each year, indicates a Compact Call Year. These procedures will incorporate information provided by the LRNRD (contracts for water leasing, augmentation, etc.) to the DNR by January 31 of each year following a forecast that indicates a Compact Call Year. When such Compact Call Year is indicated, the DNR will implement additional surface water controls contained within this IMP. The procedures for determining the allowable ground water depletion for the LRNRD are as follows:

The Allowable ground water depletion for the LRNRD =
(Nebraska Allocation + IWS - SWCBCU_{NE} - Other NRD CBCU) * Normal-Year Baseline Depletion Percentage⁵

Where:

Nebraska Allocation = Nebraska's available water supply under the Compact⁶

IWS = Imported Water Supply credit

SWCBCU_{NE} = The surface water consumptive use by Nebraska, includes net evaporative losses

Other NRD CBCU = The GWCBCU_{NE} calculated for the South Platte NRD, Twin Platte NRD, Tri-Basin NRD, Central Platte NRD, and Little Blue NRD

⁵ This percentage would be modified in Water-Short Years to reflect the Water-Short Year Baseline Depletion Percentage

⁶ For Compact Call Years in which Water-Short Year administration is in effect, the allocation shall be based on Nebraska's Allocation Upstream of Guide Rock.

The DNR will utilize information provided by the LRNRD by January 31 to evaluate the following:

Step 1. LRNRD Estimated Ground Water Depletions

Ground water depletions for the LRNRD will be based on the previous 2-year average (as described in Table 2 above), unless such plan provided by the LRNRD indicates that additional restrictions on ground water pumping will be imposed. If the additional restrictions would limit the pumping to be less than the previous two year average then the lower estimate will be used. In cases where that year's allocation will be less the LRNRD will provide the DNR a map indicating the geographic area subject to the allocation for that year and the maximum allocation available. The DNR will utilize the information provided by the LRNRD and represent such information in the RRCA GWM.

Step 2. Potential yield from LRNRD regulations, surface water leases/agreements, augmentation, etc.

The DNR will determine the potential yield from any regulations, surface water lease/agreement, augmentation, etc. entered into or provided by the LRNRD. In the event that augmentation is utilized, procedures for determining the project yield must have been approved by the RRCA. This potential yield will be incorporated as NRD management actions in section IX.B.2.d.

If a Compact Call Year is reached as a result of checklist B1 or C3 the final step to determine if additional ground water and surface water controls contained within this IMP must be implemented is as follows:

- A. Allowable ground water depletions for LRNRD (as determined above) - Forecasted LRNRD's portion of $GWCBCU_{NE}$ (Step 1) + Potential yield from LRNRD regulations, surface water leases/agreements, augmentation, etc. (Step 2) + Current Year's Balance ($T = 0$) - 3333⁷.
- B. If the resulting balance is greater than or equal to negative one hundred (-100) ac-ft, no additional ground water and surface water controls will be implemented.
- C. If the resulting balance is less than negative one hundred (-100) ac-ft, the additional ground water and surface water controls contained within this IMP must be implemented.

Note: If it is beneficial to utilize the alternative Water-Short Year provisions from the FSS (the previous two years have a greater balance than last year alone), and an Alternative Water-Short Year Plan has been approved by the RRCA, then the two-year balance (for $T = 0$, the current year, and the prior year, $T - 1$) will be substituted for the current year's balance in Checklist B.

⁷ In the event it is the second consecutive Compact Call Year, this value will be reduced to 1667. For any remaining consecutive Compact Call Years, it will be reduced to zero.

If a Compact Call Year is reached as a result of checklist D2 the final step to determine if additional ground water and surface water controls contained within this IMP must be implemented is as follows:

- A. Allowable ground water depletions for LRNRD (as determined above) - Forecasted LRNRD's portion of GWCBCU_{NE} (Step 1) + Potential yield from LRNRD regulations, surface water leases/agreements, augmentation, etc. (Step 2) + Previous Years Balances (T - 3, T - 2, T - 1, T = 0 or if applicable + T - 2, T - 1, T = 0).
- B. If the resulting balance is greater than or equal to negative one hundred (-100) ac-ft, no additional ground water and surface water controls will be implemented.
- C. If the resulting balance is less than negative one hundred (-100) ac-ft, the additional ground water and surface water controls contained within this IMP must be implemented.
- D. If augmentation pumping is the selected management action and sufficient augmentation capacity has been demonstrated by the LRNRD then the LRNRD in conjunction with the other NRDs in the basin will coordinate to make good faith efforts to pump the augmentation water associated with their NRD management actions prior to June 1st of that Compact Call Year, with the exception that augmentation pumping may be suspended once the Kansas Bostwick Irrigation District's (KBID) total storage water supply (water not under Warren Act Contract) in Harlan County Lake has reached 40,000 acre-feet, as long as the total sum of the basin NRDs remaining management actions is less than 20,000 acre-feet by June 1st of that Compact Call Year. The estimate of the water supply available to KBID will be updated each month with the first update completed on or before April 10th. Additionally, all new net depletions to streamflow that result from augmentation pumping (as calculated by the RRCA ground water model) will be mitigated to ensure the protection of existing surface water appropriations.

d. Calculation of Compact Compliance Volume

Prior to October 1st of each Compact Call Year the Department shall provide the Compact Compliance Volume for that year. If this indicates that management actions beyond those implemented to date are needed then the LRNRD shall implement its portion of management actions to address the remaining shortfall. The calculation to determine the LRNRD's remaining shortfall shall be performed as follows:

$$[(\text{Compact Compliance Volume}) - \text{All NRD management actions to date}] * \text{Normal-Year Baseline Depletion Percentage}^8 + \text{LRNRD management actions}^9$$

⁸ This percentage would be modified in Water-Short Years to reflect the Water-Short Year Baseline Depletion Percentage

⁹ The final volume will include positive or negative balances remaining for each NRD (LRNRD, MRNRD, URNRD) from the previous year (T - 1).

EFFECTIVE DATE JANUARY 15, 2016

The Compact Compliance Volume will be computed using the RRCA Accounting Procedures, available data and end of year estimates and revised for each individual NRD based on Actual Ground Water Depletion to start each forecast year.

If the Compact Compliance Volume indicates that sufficient management actions have been implemented such that a Compact Shortfall will not occur in that Compact Call Year then no further management actions will be necessary at the time. The Compact Compliance Volume will continue to be updated through December 31. Additionally, by December 31st the Actual Ground Water Depletions for the LRNRD will be calculated to determine the subsequent year forecast as the $T = 0$ balance for the LRNRD. The positive or negative balance remaining for each NRD (LRNRD, MRNRD, URNRD) will be added or subtracted for the following year ($T + 1$) Allowable Ground Water Depletions forecast on January 1st ($T + 1$).

e. Additional adjustments related to long-term trends

The DNR and LRNRD in conjunction with the other basin NRDs will annually meet to evaluate long-term ground water depletion trends.

The purpose of this consultation will be to review the impacts of ground water pumping trends on long term (12 to 25 year) increases in depletions to streamflow with the goal of maintaining or reducing current rates of ground water depletions. If long term increases in depletions to streamflow are indicated the DNR and LRNRD will discuss potential mitigation measures that may be necessary.

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, the DNR will work in consultation with the NRDs to modify Sections VI, VII, and IX of this IMP until normal operations resume.

X. Modifications to the Integrated Management Plan

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

Additionally, any basin NRD (LRNRD, MRNRD, and URNRD) may identify an issue within the IMP that they desire the DNR to address through modification(s) within their own IMP that may have implications on one or more of the other basin NRD's IMPs. Upon identifying the issue in writing to DNR, the DNR will schedule at least one meeting to discuss the issue with each affected NRD. Each affected NRD and the DNR 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 DNR will each develop a written summary of their position on the issue. The written summaries along with any other information may be

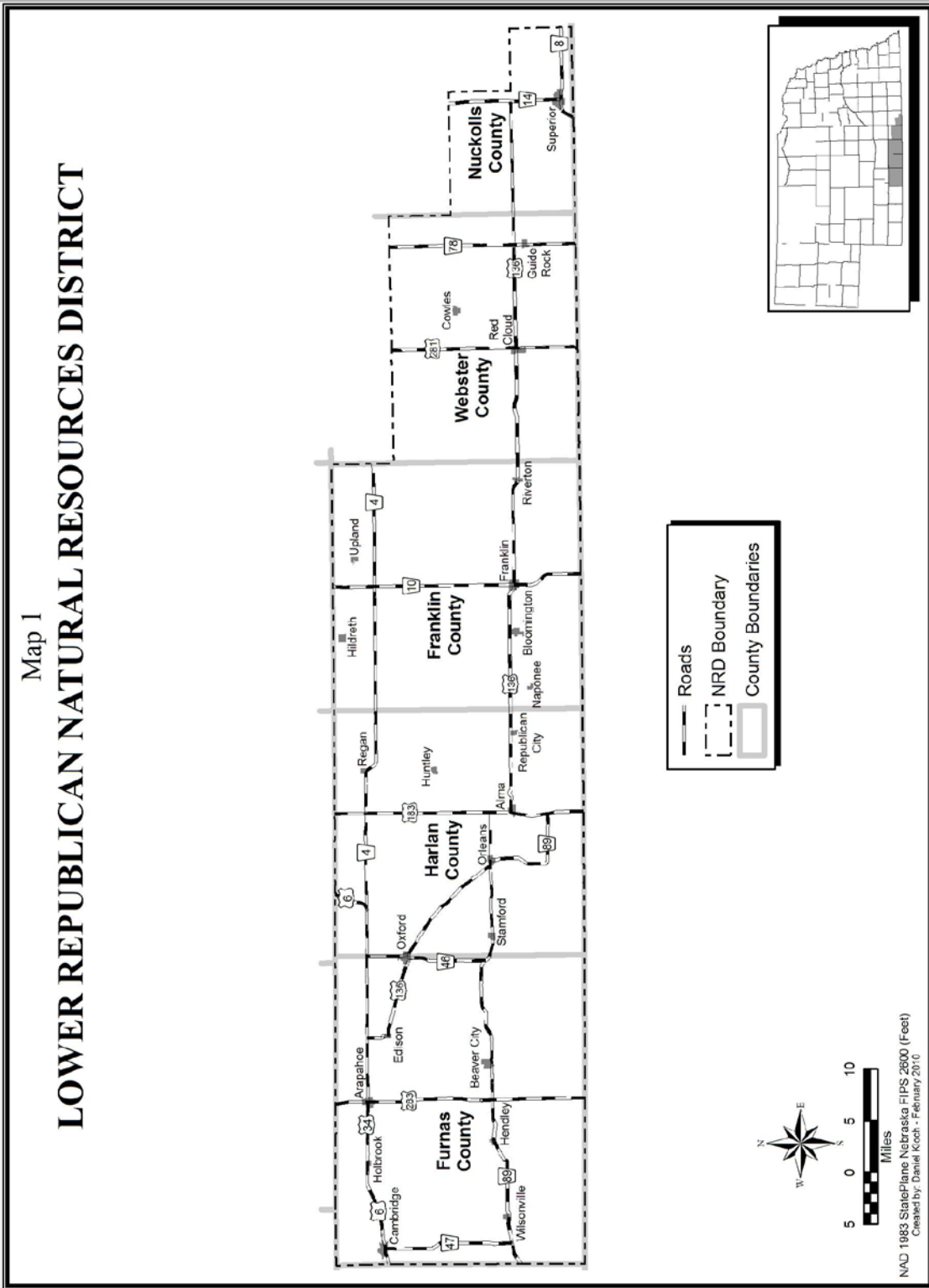
used by the affected NRD or DNR to pursue remedies that are available to them pursuant to *Neb. Rev. Stat.* §§ 46-719.

XI. INFORMATION CONSIDERED

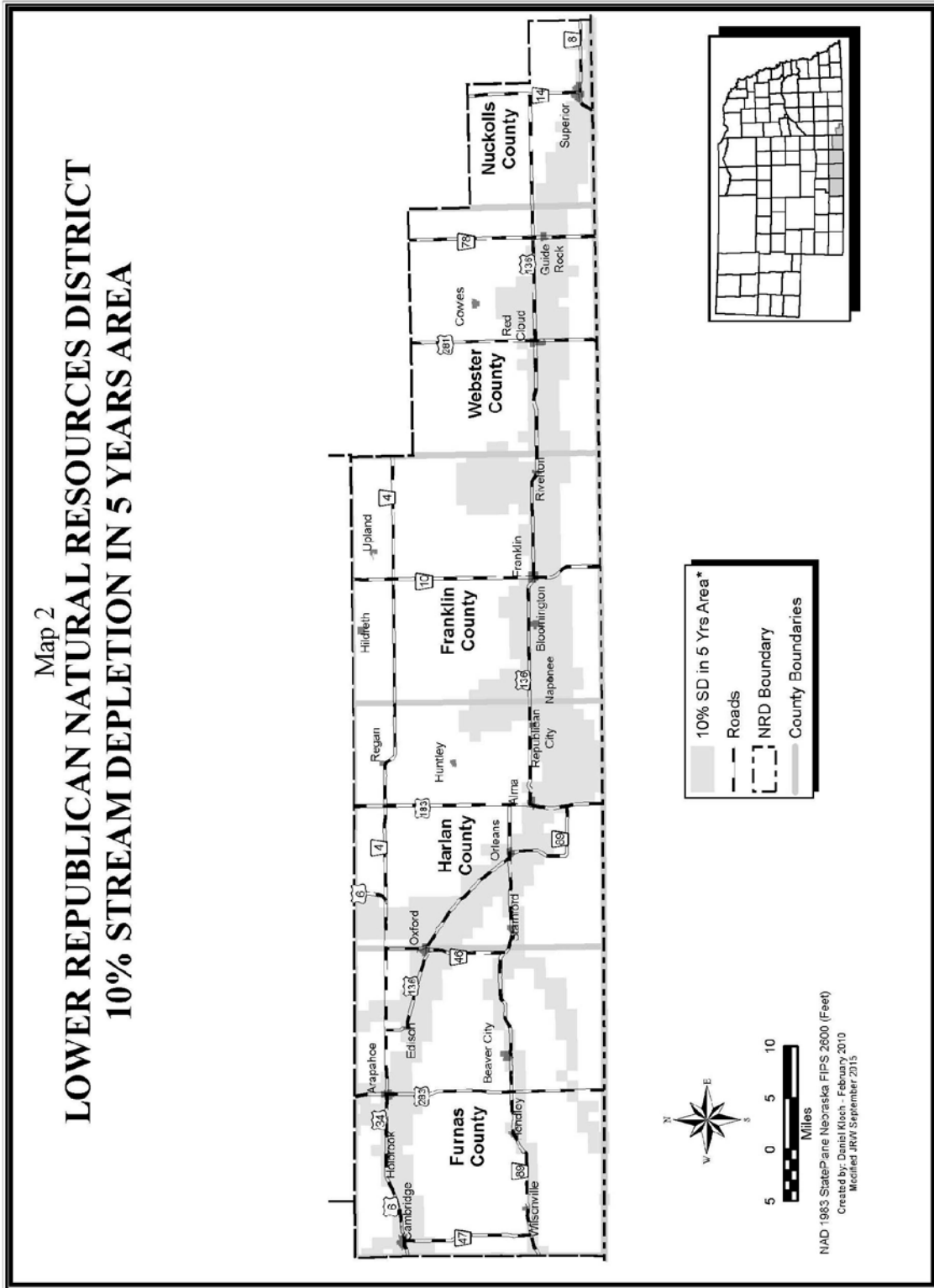
Information used in the preparation and to be used in the implementation of this IMP can be found in:

- Simulation runs of the Republican River Compact Administration Ground water Model.
- The data tables of the FSS for the Republican River Compact.
- Chapters 3, 6 and 7 of the 1994 Lower Republican NRD Ground Water Management Plan.
- The formulae and data compliance tables of the Final Settlement Stipulation for the Compact.
- The LRNRD's Rules.
- Report of Special Master and United States Supreme Court Ruling.
- Additional data on file with the LRNRD and the DNR.
- Nebraska statutes and case law.

MAP 1. Lower Republican Natural Resources District

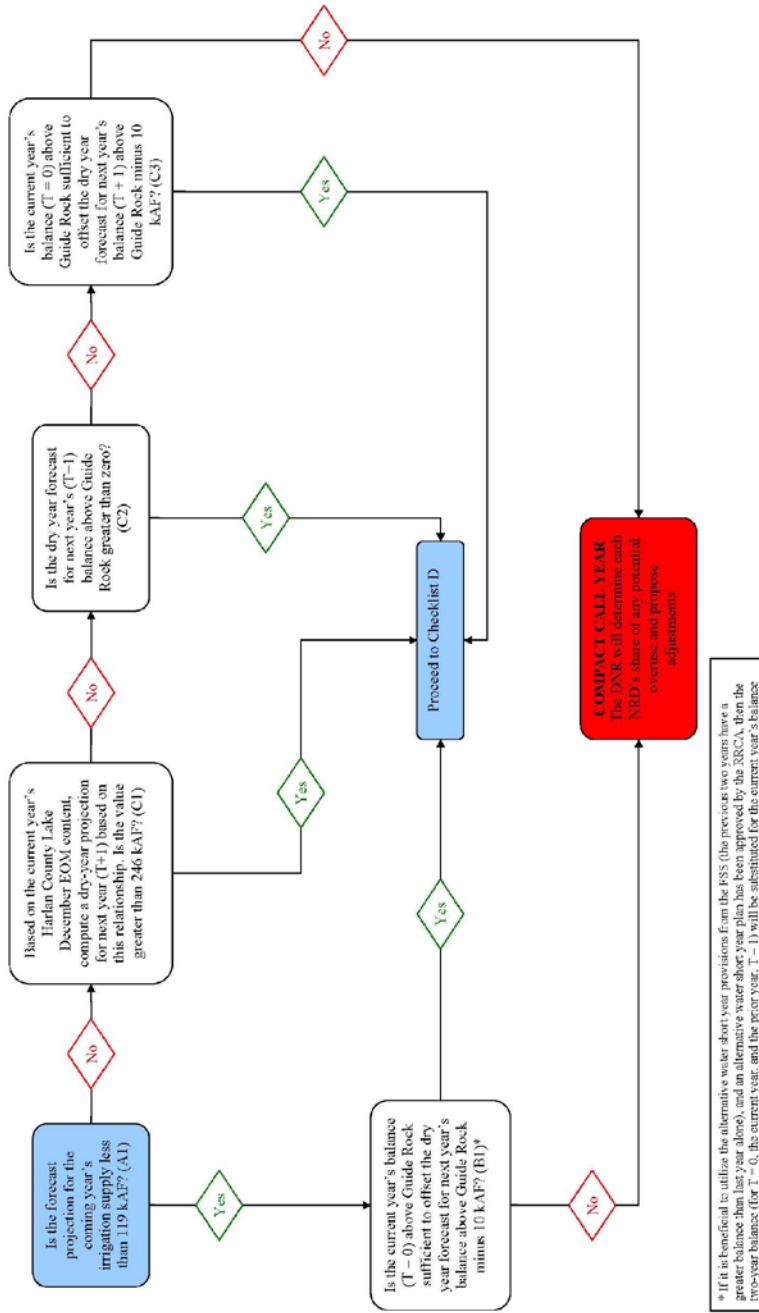


MAP 2. Lower Republican Natural Resource District 10%/5-Year Response Region



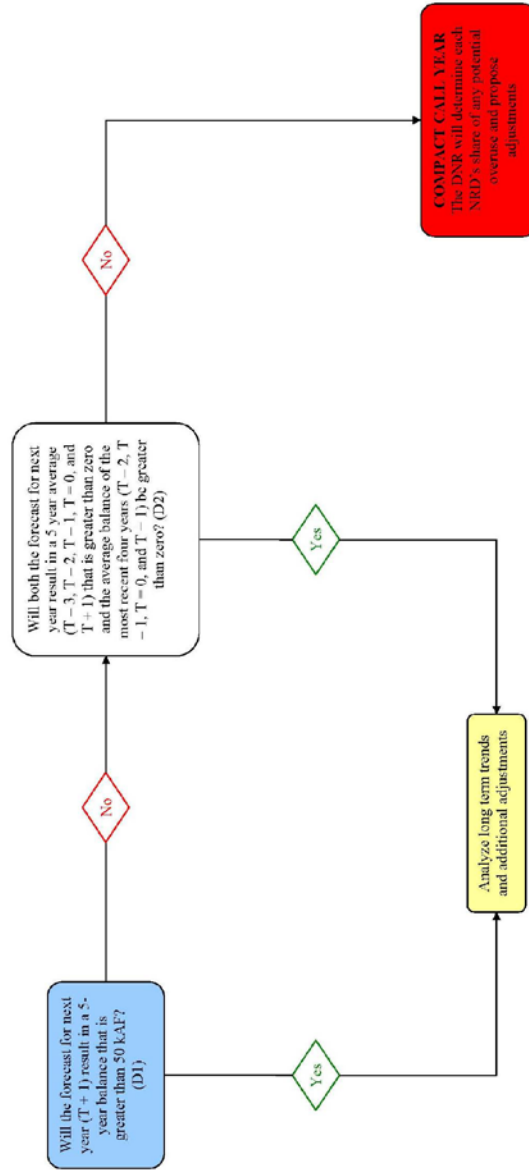
ATTACHMENT 1. Republican River Water Supply Evaluation and Required Actions

Republican River Water Supply Evaluation and Required Actions
Water Short Year Administration—Checklists A, B, and C



August 5, 2010

Republican River Water Supply Evaluation and Required Actions
Normal Year Administration—Checklist D



August 5, 2010