

DEPARTMENT OF
NATURAL RESOURCES

REPUBLICAN RIVER BASIN

REPORT OF PRELIMINARY FINDINGS

MAY 20, 2003

I. Introduction:

In 1943 the States of Colorado, Kansas and Nebraska entered into the Republican River Compact (hereinafter the "Compact") with the approval of Congress. The Compact provided for equitable apportionment of the Republican River stream flows for beneficial consumptive use. In 1959 the first annual meeting of the Republican River Compact Commission (hereinafter the "RRCA") was held. At that meeting, the RRCA began to discuss, among other things, how it should determine the annual virgin water supply, the annual allocations to the States and the States' annual consumptive use. It was not until 1964, however, that the parties adopted formulas to make these determinations. The formulas that were adopted included the estimated impact of wells located in the alluvial valley of the river and tributaries. Non-alluvial wells were not considered

By the late 1980's Kansas began to complain that Nebraska was consuming more water than was allocated to it in certain sub-basins. Kansas also complained that unlimited groundwater development in Nebraska's portion of the basin was resulting and was likely to continue to result in Kansas not receiving its full allocation. Nebraska responded to the Kansas complaints by noting that Kansas generally received from Nebraska volumes of water that were in excess of Kansas' allocations.

The Nebraska Legislature in 1996 passed LB 108 that allowed Natural Resource Districts to consider whether a whether a management area for integrated management of hydrologically connected ground water and surface water or that controls in a management area should be adopted to include such integrated management is necessary. Neb. Rev. Stat. § 46-656.28. If a District has reason to believe integrated management is necessary, a District may utilize the procedures established in 46-656.19 to 46-656.21 or may request that the affected appropriators, the affected surface water project sponsors, and the Department consult with the district and that studies and a hearing be held on the preparation of a joint action plan for the integrated management of hydrologically connected ground water and surface water.

In July, 1996, the Republican River Natural Resource Districts requested that the Department begin the studies and hearing process provided for in 46-656.28 (LB 108). (Attached hereto as Exhibits are the written requests from the Republican River Natural Resource Districts) The Department, pursuant to Neb. Rev. Stat. 46-656.28(2), made a preliminary determination, based on information available to the Department, that there was reason to believe that the use of hydrologically connected ground water and surface water resources is contributing to or is in the reasonably foreseeable future likely to contribute to disputes over the Republican River Compact (Attached hereto is the preliminary determination of the Department).

Pursuant to 46-656.28(2) the Department began, in cooperation with the Republican River Natural Resource Districts, studies to determine the cause of such possible disputes and the extent of the area affected (hereinafter integrated management studies). The Department contracted with the Conservation and Survey Division of the University of Nebraska to undertake a limited hydrological study of the Republican River Basin at selected sites along the main stem of the river and two tributaries thereof (hereinafter CSD study). The CSD was

contracted by the Department in 1997 to conduct an investigation that included pumping tests, a cross-sectional computer model of the hydrogeologic system, geochemical and isotopic characterization of surface water and groundwater, test-hole log books, and soil surveys. The work included pumping test analysis and evaluation of the impact of irrigation well pumpage on the stream-aquifer systems along the Republican Valley and Groundwater modeling and analysis of streamflow depletion in Franklin and Red Willow counties. The work of the CSD, ultimately was superceded by the work of the States in the litigation and settlement process. Much of the work done by CSD is reflected in the joint groundwater modeling work of the States. As a result, the CSD study was not relied upon by the Department in making its preliminary findings and determination.

While the CSD study was underway, the State of Kansas filed an original action in the United States Supreme Court against the State of Nebraska, alleging that Nebraska was consuming more than its allocation and that groundwater use in Nebraska was depriving Kansas of its full allocation. Kansas later amended its allegations to assert that groundwater use was regulated by the Republican River Compact.

Based on the nature of claims by Kansas against Nebraska, the Attorney General's Office determined that continuing the 46-656.28 (LB 108) process would compromise Nebraska's defense of the Kansas lawsuit. At the request of the Attorney General's Office, in June, 1999 the Republican River Natural Resource Districts asked the Department to suspend the 46-656.28 (LB 108) process pending resolution of the Kansas lawsuit. The Department complied with the Republican River Districts requests.

On December 15, 2002, Kansas, Nebraska and Colorado entered into a settlement agreement resolving all claims brought in the Kansas lawsuit. As part of the settlement agreement the three States agreed to undertake a joint groundwater modeling effort to create and adopt a functional joint groundwater model by July 1, 2003. In anticipation of the resolution of the Kansas v. Nebraska, No. 126 Original, litigation, the Republican River Districts requested that the Department resume the 46-656.28 (LB 108) process and utilize the settlement joint groundwater modeling efforts in carrying out the Department's duties under 46-656.28(2). The Department has examined the ongoing joint modeling efforts and determined sufficient information exists from which to make preliminary findings pursuant to Neb. Rev. Stat. § 46-656.28(2).

On April 15, 2003, the Special Master appointed by the United States Supreme Court formally recommended to the Court approval of the settlement agreement entered into by Kansas, Nebraska and Colorado. On May 19, 2003, the United States Supreme Court approved the Final Settlement Stipulation entered into by Kansas, Nebraska and Colorado.

As a result of the pending litigation between Kansas, Nebraska and Colorado, the proposed resolution of that litigation and the scarcity of resources to conduct large scale studies, the Department has limited its analysis to 46-656.28(2)(b), the extent to which use of hydrologically connected ground water and surface water resources is contributing to disputes over interstate compacts or decrees. The Department's review has been limited solely to the Republican River Basin as those boundaries are defined by the Republican River Compact and as that definition

has been interpreted by the States of Kansas, Nebraska, and Colorado. A map of the Basin boundaries is attached.

II. Applicable Statutes:

46-656.28

Joint action plan for integrated management of ground and surface water; preparation; when; procedure; factors; notice; hearing; determination; order; publication; modification; water use monitored; temporary suspension of drilling; variance.

(1) If a district on its own motion or following a request by a surface water appropriator, surface water project sponsor, ground water user, the Department of Natural Resources, or another state agency has reason to believe that a management area should be designated for integrated management of hydrologically connected ground water and surface water or that controls in a management area should be adopted to include such integrated management, the district may utilize the procedures established in sections 46-656.19 to 46-656.21 or may request that the affected appropriators, the affected surface water project sponsors, and the Department of Natural Resources consult with the district and that studies and a hearing be held on the preparation of a joint action plan for the integrated management of hydrologically connected ground water and surface water.

(2) If, following a request from a district and as result of information available to the Department of Natural Resources and following preliminary investigation, the Director of Natural Resources makes a preliminary determination that there is a reason to believe that the use of hydrologically connected ground water and surface water resources is contributing to or is in the reasonably foreseeable future likely to contribute to (a) conflicts between ground water users and surface water appropriators, (b) disputes over interstate compacts or decrees, or (c) difficulties fulfilling the provisions of other formal state contracts or agreements, the department shall, in cooperation with any appropriate state agency and district, conduct or coordinate any necessary studies to determine the cause of such conflicts, disputes, or difficulties and the extent of the area affected. Such studies shall be prioritized and completed within a reasonable time following such preliminary determination. The department shall issue a written report of such preliminary findings within ninety days after the completion of any such studies. The department shall consider all relevant portions of the ground water management plan developed by the district pursuant to sections 46-656.12 to 46-656.16 during the study required by this section.

III. Studies Conducted by the Department:

A. Republican River Districts Groundwater Management Plans, Groundwater Management Area Rules and Regulations.

The Department has reviewed the following Republican River Natural Resource District Management Plans, Rules and Regulations:

1. Upper Republican Natural Resource District RULES AND REGULATIONS FOR GROUND WATER CONTROL OF THE UPPER REPUBLICAN NATURAL RESOURCES DISTRICT MANAGEMENT AREA ORDER NO. 26 & TECHNICAL MANUAL TM – 26;
2. Middle Republican Natural Resource District GROUNDWATER MANAGEMENT PLAN FOR THE MIDDLE REPUBLICAN NATURAL RESOURCES DISTRICT. RULES AND REGULATIONS, GROUND WATER MANAGEMENT AREA, MIDDLE REPUBLICAN NATURAL RESOURCES DISTRICT. RULES AND REGULATIONS FOR THE ENFORCEMENT OF THE NEBRASKA GROUND WATER MANAGEMENT AND PROTECTION ACT. RULES AND REGULATIONS FOR THE TEMPORARY SUSPENSION OF THE DRILLING OF NEW WELLS ;
3. Lower Republican Natural Resource District GROUNDWATER MANAGEMENT PLAN;
4. Tri-Basin Natural Resource District RULES AND REGULATIONS FOR THE ENFORCEMENT OF THE NEBRASKA GROUNDWATER MANAGEMENT AND PROTECTION ACT.

B. Technical work prepared by joint groundwater modeling efforts and by Nebraska litigation consultants.

In connection with the settlement negotiations to resolve the Kansas v. Nebraska, No. 126 Original, litigation, Nebraska retained numerous consultants to examine and study the hydrology, geology and other conditions of the Republican River Basin that were possibly contributing to the dispute over the Republican River Compact. As part of the settlement documentation submitted to the United States Supreme Court, the states of Kansas, Nebraska and Colorado agreed to certain aspects of hydrology concerning historical stream flow in the Republican River Basin. The pertinent aspects of those agreements as they relate to the Department's determination are discussed below and attached hereto.

C. Final Settlement Stipulation as approved by the United States Supreme Court.

The following is a general description of the State of Nebraska's obligations pursuant to the Final Settlement Stipulation. (A copy of the Final Settlement Stipulation is attached hereto). A description of the specific obligations of the States is discussed below in the preliminary findings section.

The States agreed to resolve the currently pending litigation in the United States Supreme Court regarding the Republican River Compact by means of the Final Settlement Stipulation. The States have agreed to implement and comply with the obligations set forth in the Final Settlement Stipulation. The States shall implement the obligations and agreements in the Final Settlement Stipulation in accordance with the schedule set forth in Appendix B of the Final Settlement Stipulation

D. Joint groundwater modeling efforts and RRCA Joint Groundwater Model.

During the course of settlement negotiations to resolve the Kansas v. Nebraska, No. 126 Original, litigation, the States of Kansas, Nebraska and Colorado worked together in a joint examination of the hydrology, geology and other conditions in the Republican River Basin by creating a joint groundwater model. The States created a Modeling Committee, comprised of members designated by the States and the United States. The Modeling Committee by July 1, 2003 will have developed a groundwater model acceptable to the States to accomplish the purposes set forth in this Subsection IV.C., including determination of stream flow depletions caused by Well pumping of groundwater. A description of the relevant portions of the joint groundwater modeling efforts of the States is discussed below in the preliminary findings section.

IV. Preliminary Findings Regarding Use of Hydrologically Connected Groundwater and Surface Water Resources Contributing to 656.28(2)(b) disputes over interstate compacts and decrees.

The Department has limited its analysis to 46-656.28(2)(b), the extent to which use of hydrologically connected ground water and surface water resources is contributing to disputes over interstate compacts or decrees.

A. Agreements concerning Compact implementation and compliance

With the approval of the settlement agreement by the United States Supreme Court, beneficial consumptive use of hydrologically connected groundwater and surface water resources that results in depletion of stream flows in the Republican River Basin will be accounted for as virgin water supply and beneficial consumptive use under the Compact. To resolve the pending Compact dispute and to avoid future Compact disputes the State has entered into several agreements that address the use of hydrologically connected ground water and surface water resources. Those agreements that pertain to the use of hydrologically connected ground water and surface water resources include:

Agreement concerning additional groundwater well development - The settlement agreement provides for a moratorium on construction of new wells in Nebraska upstream of Guide Rock, Nebraska. The settlement agreement also requires Colorado and Kansas to maintain their existing rules and regulations, which have created a de facto moratorium in areas upstream of Nebraska. The States also agreed not to increase the level of development of Wells as of July 1, 2002 in the North Fork of the Republican River in Colorado, Arikaree River, South Fork of the Republican River, Buffalo Creek, Rock Creek, and that portion of the North Fork and Main Stem of the Republican River in Nebraska that lies upstream of Trenton Dam. The States also agreed to several exceptions to the moratorium which are set forth in Section III.B. of the Final Settlement Stipulation. As a result of consistent measurement over time of generally rising water tables in the Tri-Basin NRD section of the Republican River Basin

Agreement to include groundwater use in Compact Accounting - The States have agreed that to implement the Compact they will determine annually the Virgin Water Supply, Computed Water Supply, Allocations, Imported Water Supply Credit, augmentation credit and Computed Beneficial Consumptive Use (as those terms are defined in the Final Settlement Stipulation) based on a methodology set forth in the RRCA Accounting Procedures, attached to the Final Settlement Stipulation as Appendix C. As part of those determinations, the States have agreed that “[s]tream flow depletions caused by Well pumping for Beneficial Consumptive Use will be included in the determination of Virgin Water Supply, Computed Water Supply, Allocations and Computed Beneficial Consumptive Use in accordance with the formulas in the RRCA Accounting Procedures provided that the RRCA may agree to exclude from such accounting minimal stream flow depletions. Stream flow depletions caused by Well pumping for Beneficial Consumptive Use will be counted as Virgin Water Supply and Computed Beneficial Consumptive Use at the time and to the extent the stream flow depletion occurs and will be charged to the State where the Beneficial Consumptive Use occurs.” Final Settlement Stipulation, Section IV.C.1.

Agreements related to reporting, measurement and data collection – The States have agreed that each State will provide all information from their respective State that is needed for the Republican River Groundwater Model and RRCA Accounting Procedures and Reporting Requirements. A specific description of such information is contained in the RRCA Accounting Procedures attached to the Final Settlement Stipulation as Appendix C. The information includes in general terms, surface water diversions, groundwater diversions, irrigated acreage, climate information, crop irrigation requirements, stream flow records and reservoir information.

Agreements related to water short year administration – The States have agreed that 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 Final Settlement Stipulation), Nebraska will close junior, and require compliance with senior, natural flow diversions of surface water between Harlan County Lake and Guide Rock.

The States have also agreed that Water-Short Year Administration (as defined in the Final Settlement Stipulation) will be in effect in those years in which the projected or actual irrigation supply is less than 119,000 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.

During Water-Short Year Administration, Nebraska will limit its Computed Beneficial Consumptive Use above Guide Rock to not more than Nebraska's Allocation that is derived from sources above Guide Rock, and Nebraska's share of any unused portion of Colorado's Allocation. To accomplish this limitation, Nebraska may use one or more of the following measures: i) supplementing water for Nebraska Bostwick Irrigation District by providing alternate supplies from below Guide Rock or from outside the Basin; ii) adjusting well allocations for alluvial Wells above Guide Rock; iii) adjusting multi-year well allocations for non-alluvial Wells above Guide Rock; iv) reducing use of storage by Nebraska Bostwick Irrigation District above Guide Rock; v) dry year leasing of water rights that divert at or above Guide Rock, or; vi) any other measures that would help Nebraska limit Computed Beneficial Consumptive Use above Guide Rock to not more than that portion of Nebraska's allocation that is derived from sources above Guide Rock and would (1) produce water above Harlan County Lake; (2) produce water below Harlan County Lake and above Guide Rock that can be diverted during the Bostwick irrigation season; or (3) produce water that can be stored and is needed to fill Lovewell Reservoir. In years projected to be subject to Water-Short Year Administration, Nebraska will advise the other States and the United States no later than April 30 of measures Nebraska plans to take for that year and the anticipated water yield from those measures. In each Water-Short Year Administration year, Nebraska will advise the other States and the United States no later than June 30 of the measures it has taken or will take for the year and the anticipated water yield from those measures.

To resolve the pending dispute, implement and comply with the Compact and the United States Supreme Court approved settlement agreement, the Department and the Republican River Natural Resource Districts will need to develop a joint integrated management plan to administer, regulate and manage the use of hydrologically connected ground water and surface water resources in the Republican River Basin. Failure to implement and comply with the Compact and the United States Supreme Court approved settlement agreement will result in future disputes over the Compact. For purposes of Compact compliance, the extent of hydrologic connectivity will be determined by the RRCA Groundwater Model.

B. Relevant Findings and Agreements of Joint Groundwater Modeling Efforts:

The States agree that for determining Compact compliance the jointly developed groundwater model (RRCA Groundwater Model) will be utilized to quantify within the Republican River Basin the amount, location, and timing of depletions to stream flow from ground water pumping. The RRCA Groundwater Model will be adopted by the States by July 1, 2003. Sufficient information has been examined, studied and agreed to by the States such that the Department can make preliminary findings regarding the extent to which the use of hydrologically connected ground water and surface water resources is contributing to disputes over interstate compacts or decrees.

As part of the joint groundwater modeling efforts, the States studied, examined and ultimately agreed to a general determination of the extent of hydrological connection of ground water and surface water resources in the Republican River Basin. The States did not agree as to the specific connection of each individual use. The States did agree that certain analysis performed by technical consultants for each State and the United States Government revealed a general level of connectivity for the Republican River Basin as a whole and for specific streams therein. The analysis conducted was a baseflow hydrograph separation analysis and is documented at Appendix J1 of the Final Settlement Stipulation. Hydrograph baseflow separation is a technique that partitions the amount of surface water and ground water that is measured as total streamflow at a river gaging station. Determining the component of total streamflow that is contributed by ground water (also called baseflow) requires professional expertise and judgment. The hydrograph separation analysis used in this application is referred to as the Pilot Point method. This procedure was adopted for application in this ground water model since it combines the increased accuracy of graphical baseflow analysis with the computational efficiency afforded by electronic spreadsheets. For the RRCA Ground Water Model, fifty-seven (57) independent baseflow analyses were performed. In general terms, the States agreed that the baseflow analyses provided an overall assessment of the level of hydrologic connectivity between ground water and surface water resources in the analyzed streams.

For purposes of Compact compliance, the extent of hydrologic connectivity will be determined by the RRCA Groundwater Model. The Department and the Republican River Natural Resource Districts may use the RRCA Groundwater Model and such other analytical and technical tools as necessary to develop a joint integrated management plan to administer, regulate and manage the use of hydrologically connected ground water and surface water resources in the Republican River Basin that provides for compliance with the Compact and the United States Supreme Court approved settlement. Failure to implement and comply with the Compact and the United States Supreme Court approved settlement agreement will result in future disputes over the Compact.

C. Analysis of current status of effects of the use of hydrologically connected groundwater and surface water resources on the Republican River Compact dispute.

All Compact accounting projections using the RRCA Accounting Procedures and the baseflow analysis of the effects of the use of hydrologically connected groundwater and surface water resources, indicates that while Nebraska generally is within its Compact allocations in normal water supply years at the current time, in the future without limitations on new uses, Nebraska may be in a situation where it would be difficult to avoid violating the Compact. An integrated management plan with reasonable pumping regulation and a moratorium will provide Nebraska maximum protection from future disputes over Compact violations.

V. Conclusion:

The dispute over the Republican River Compact in Kansas v. Nebraska, No. 126 Original, includes the issue to what extent the use of hydrologically connected ground water and surface water resources in the Republican River Basin should be accounted for under the Compact. The geographic area affected by this dispute is the Republican River Basin as those boundaries are defined by the Republican River Compact and as that definition has been interpreted by the States of Kansas, Nebraska, and Colorado. A map of the Basin boundaries is attached.

As described above, to resolve the dispute, implement and comply with the Compact and the United States Supreme Court approved settlement agreement, the Department and the Republican River Natural Resource Districts will need to develop a joint integrated management plan to administer, regulate and manage the use of hydrologically connected ground water and surface water resources in the Republican River Basin. Failure to implement and comply with the Compact and the United States Supreme Court approved settlement agreement will result in future disputes over the Compact.

For purposes of Compact compliance, the extent of hydrologic connectivity will be determined by the RRCA Groundwater Model. The Department and the Republican River Natural Resource Districts may use the RRCA Groundwater Model and such other analytical and technical tools as necessary to develop a joint integrated management plan that provides for compliance with the Compact and the United States Supreme Court approved settlement agreement.

Pursuant to 46-656-28 and the preliminary findings in this report, the Department determines that present and future Compact disputes arising out of the use of hydrologically connected ground water and surface water resources in the Republican River Basin can be eliminated or reduced through the adoption of a joint action plan. Therefore, the Director shall, within thirty days after completion of this report, consult with the affected surface water appropriators and Natural Resource Districts and fix a time and place for a public hearing to consider the report, hear any other relevant evidence, and secure testimony on whether a joint action plan should be prepared.

May 20, 2003



Roger K. Patterson
Director, Department of Natural Resources

Decree

SUPREME COURT OF THE UNITED STATES

No. 126, Orig.

STATE OF KANSAS, PLAINTIFF *v.* STATES
OF NEBRASKA AND COLORADO

ON BILL OF COMPLAINT

[May 19, 2003]

The Final Report of the Special Master is received and ordered filed.

DECREE

This cause, having come to be heard on the Second Report of the Special Master appointed by this Court, and on the Parties' Joint Motion for Approval of Final Settlement Stipulation, which accompanies said Report, IT IS HEREBY ORDERED THAT:

1. The Final Settlement Stipulation executed by all of the parties to this case and filed with the Special Master on December 16, 2002, is approved;

2. This action is recommitted to the Special Master for the sole purpose of deciding procedural questions arising in the completion by the State parties of the RRCA Groundwater Model pursuant to the binding procedures prescribed by the Final Settlement Stipulation. All claims, counterclaims, and cross-claims for which leave to file was or could have been sought in this case arising prior to December 15, 2002, are hereby dismissed with prejudice effective upon the filing by the Special Master of a final report certifying adoption of the RRCA Groundwater Model by the State parties.

Figure 3 - Map Showing Sub-basins, Streams, and the Basin Boundaries
 RRCA Accounting Procedures and Reporting Requirements
 December 15, 2002

