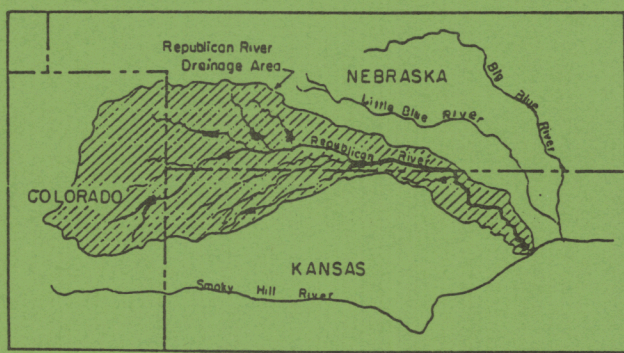


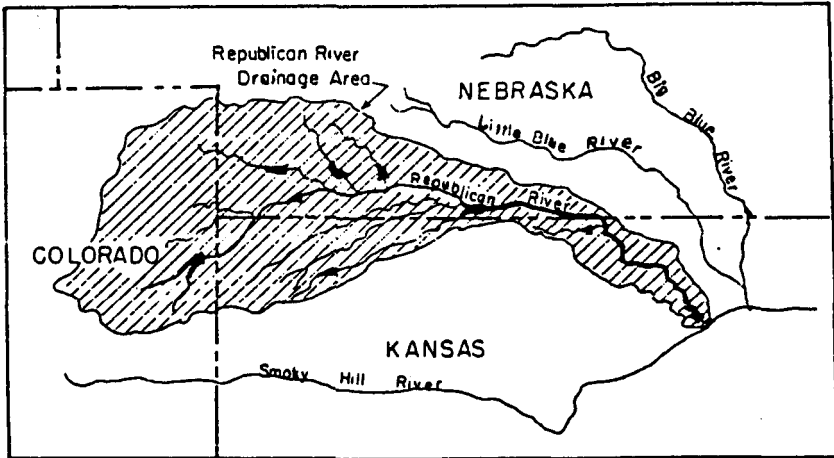
**REPUBLICAN RIVER COMPACT
ADMINISTRATION
TWENTY-FIFTH ANNUAL REPORT**



For the Year 1984

Wray, Colorado
July 11, 1985

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TWENTY-FIFTH ANNUAL REPORT
REPUBLICAN RIVER COMPACT ADMINISTRATION

In conformity with the Rules and Regulations of the Republican River Compact Administration, the Twenty-Fifth Annual Report is submitted as follows:

1. Pursuant to Rule 12, as amended, this report covers the period from July 13, 1984 to July 11, 1985.
2. Members of the Republican River Compact Administration are the officials of each of the states who are charged with the duty of administering the public water supplies, and are as follows:

Jeris A. Danielson, State Engineer, Colorado

J. Michael Jess, Director, Department of Water Resources, Nebraska

David L. Pope, Chief Engineer-Director, Division of Water Resources,
State Board of Agriculture, Kansas

3. The Twenty-Sixth Annual Meeting of the Administration was held on July 11, 1985 at Wray, Colorado. The minutes of the meeting are included in this report.
4. During the period covered by this report, one meeting of the Engineering Committee was held. A report from that committee together with summary tabulations of the computed annual water supply and consumptive uses for the 1984 water year in the Republican River Basin were presented and accepted by the Administration and are included in this report.
5. Reports were received from the Bureau of Reclamation on operation and administration of their projects in the basin and on the Republican River Water Management Study.
6. Jeris Danielson, Colorado member of the Administration, will serve as Chairman for 1985 and 1986.

MINUTES
26th ANNUAL MEETING
REPUBLICAN RIVER COMPACT ADMINISTRATION

The meeting was called to order by Chairman Jeris Danielson at 9:00 a.m., July 11, 1985 in the Community Building at Wray, Colorado. Those in attendance were:

<u>Name</u>	<u>Agency</u>	<u>Location</u>
Jeris Danielson	Colorado Commissioner	Denver, Colorado
Michael Jess	Nebraska Commissioner	Lincoln, Nebraska
David Pope	Kansas Commissioner	Topeka, Kansas
Hal Simpson	Deputy State Engineer	Denver, Colorado
Robert F. Bishop	Dept. of Water Resources	Lincoln, Nebraska
Lee Becker	Dept. of Water Resources	Lincoln, Nebraska
Gerald E. Hilmes	Kansas, Div. of Water Res.	Topeka, Kansas
Leland E. Rolfs	Kansas, Div. of Water Res.	Topeka, Kansas
Bob Cooper	Colo. State Engineer-Greeley	Greeley, Colorado
Darrell Ewing	U.S. Bureau of Reclamation	Denver, Colorado
Jim Hanrahan	Colo. State Engineer-Greeley	Greeley, Colorado
Dudley Jackson	Nebr. Dept. of Water Resources	Cambridge, Nebraska
Dennis E. Allacher	U.S. Bureau of Reclamation	McCook, Nebraska
Ben Saunders	Ground Water Mgmt. Districts	Holyoke, Colorado
Ashton Wilson	Pioneer Irrigation Districts	Wray, Colorado
Leo McCoy	Pioneer Irrigation Districts	Wray, Colorado
Wayne Bossert	NWKS GMD #4	Colby, Kansas
Ronald Milner	Upper Republican NRD	Imperial, Nebraska
Wayne Heathers	Middle Republican NRD	Curtis, Nebraska
Jeffery Thomsen	Middle Republican NRD	Curtis, Nebraska

Chairman Danielson asked each Commissioner to introduce members of staff and persons in the audience from each state.

Approval of Minutes

A Motion was made by Commissioner Pope and seconded by Commissioner Jess that the minutes of the 25th Annual Meeting as previously circulated and approved be ratified. The motion passed.

Report of the Chairman

Chairman Danielson reported on ground water legislation approved by the Legislature in the present session. A key act was Senate Bill 5 which dealt with the appropriation and use of non-tributary ground water. House Bill 1322 addressed the use of designated ground water. This bill modified the procedures for issuing final well permits by the Colorado Ground Water Commission. Local Ground Water Management Districts can take over administration of the wells once the final well permit is issued.

Legislation was also approved that establishes a fee of \$50 per acre-foot on water exported from the state. Chairman Danielson has requested an opinion from the Attorney General on the constitutionality of the act.

The State Engineer's Office budget was reduced by the Legislature this year. This reduction included 5 positions in the office including the Water commissioner position in Wray. Administration of the North Fork of the Republican River will be handled by the Greeley office on a limited basis.

Chairman Danielson pointed out that irrigated land is continuing to decline in Colorado. Crops are also being replaced with less water intensive varieties.

Report of Kansas Commissioner

Commissioner Pope reported that the past year has been a very active year for water issues. The Kansas State Water Plan was submitted to the Legislature who, rather than approving the plan, modified the statutes so that the plan is effective upon adoption by the Kansas Water Authority. The plan has now been adopted and deals with policy but does not have the force and effect of regulation or law. The plan includes policy and recommended standards for minimum desirable streamflows. Based on these recommendations, the Legislature has passed into law minimum streamflows for nine streams which will be administered by the Division of Water Resources. Other policies in the new water plan will be proposed for implementation in 1986 by means of new legislation and/or funding measures by the Legislature. These include policies related to water conservation, management, development, and quality.

Another legislative act addressed chemigation. The Kansas Board of Agriculture will administer the act which requires permits and the use of check valves and other equipment to help prevent ground water pollution.

Administrative activities over the past year include the designation of ground water use control areas. Kansas now has five areas designated and two areas pending. Most of the alluvial aquifers in the western one-third of Kansas have either been designated as control areas or are subject to administrative policies that have closed the areas to new appropriation of both surface and ground water. The Ogallala Aquifer use is controlled by policies and/or rules and regulations developed by the Ground Water Management Districts and adopted by the Chief Engineer.

Report of Nebraska Commissioner

Commissioner Jess reported on several activities of the Nebraska Legislature for the past session. With respect to the budget, the funding was limited to the same level as the previous year. A bill was passed dealing

with dam safety clarifying that approval by the Department of the design was necessary and that a water right for the structure had to be obtained. Structures less than 15 acre-feet in capacity were exempted.

Commissioner Jess also discussed a bill dealing with ground water recharge. Recognition of incidental recharge of ground water as part of a water right was enacted. Previously, only recharge as a part of a specific recharge project had been recognized.

The Nebraska Water Management Board has been appointed by Governor Kerrey to aid in State financing of water projects costing over \$10 million. It may be awhile before the Board is organized and functional since funding for its activities was very limited.

Two bills dealing with chemigation and licensing of well drillers were considered but no action was taken.

The interbasin water transfer application that was filed in 1981 to transfer water from the South Platte River to Enders Reservoir is nearing resolution with hearings completed and briefs being prepared.

The Upper Republican River Ground Water Control Area has been experiencing recovery of ground water levels in recent months due to the higher than normal precipitation and reduction in irrigated areas due to the PIK program.

Commissioner Jess reported that seven ground water users are exporting water to Colorado along the Colorado-Nebraska border.

Commissioner Jess asked Dudley Jackson, Division Engineer, to report on water administration on the Upper Republican River and its tributaries during the past year. Mr. Jackson reported that from the first of July to the Middle of September of 1984 administration was necessary on some of the tributaries.

Bureau of Reclamation Report

Mr. Darrell Ewing with the Bureau of Reclamation in Denver discussed the Republican River Water Management Study which was completed in February, 1985. This report showed that water is being used in excess of the safe yield and that ground water level declines and streamflow declines are being experienced. The conclusions were briefly discussed and long term trends presented.

Mr. Ewing indicated that the Bureau of Reclamation has been requested by various ground water management districts in both Colorado and Nebraska to study the transbasin diversion of surplus flows from the South Platte River near Sterling, Colorado to the head waters of the Frenchman Creek drainage to recharge the Ogallala Aquifer. Funding for a study has been requested by the Bureau of Reclamation for fiscal year 1986.

Mr. Ewing discussed the High Plains Recharge Program authorized by H.R. 71. The program has not been funded yet but would authorize small scale projects to recharge aquifers experiencing declines in water levels.

Mr. Ewing mentioned that the Kansas River Basin Study will include the Republican River Basin downstream of Harlan County Dam.

Chairman Danielson inquired about the conclusions dealing with soil and water conservation practices in the Republican River Management Study that indicate that these practices are the largest consumptive use of water in the basin. Mr. Ewing replied that these uses were larger than anyone expected until the study was completed.

Chairman Danielson expressed his concern about getting the High Plains Recharge Program funded by Congress in this session. It is very important to all these states to have something done to increase the life of the Ogallala Aquifer. Mr. Ewing suggested that members of Congress from each state be contacted to encourage support for funding.

Mr. Dennis Allacher from the Bureau of Reclamation office in McCook, Nebraska reported on some of the activities of this office. Legislation has been approved to reduce the repayment obligation of the H and RW Irrigation District due to the reduction in the firm water supply. Dam failure inundation maps for Bureau of Reclamation dams in the Kansas-Nebraska Project are being completed and will be distributed soon. Several dams will receive safety inspections by Bureau personnel this year as part of the SEED program. He also reported that the Colorado Division of Wildlife is selling excess water in Bonny Reservoir to the other two users of the Hale Ditch.

Report of the Engineering Committee

Mr. Bob Bishop, Chairman of the Committee, presented the report and a copy is attached to these minutes. He discussed the recommendations of the committee on page 2 and Tables 1 and 2 which contain the computed annual virgin water supply and computed consumptive use for 1984 for each of the sub-basins.

Mr. Lee Becker discussed the single mass curves attached to the Engineering Committee Report. These curves indicate the cumulative totals of the adjusted allocation and consumptive use for the period 1959 to 1984 for each of the sub-basins. Commissioner Danielson suggested that single mass curves of combined surface and ground water virgin water supply and combined surface and ground water consumptive use may be useful.

Commissioner Jess moved that the Report of the Engineering Committee be accepted and Commissioner Pope seconded the motion.

Commissioner Jess expressed some concerns about the recommendations of the Engineering Committee. For example, Commissioner Jess does not have the authority to place a moratorium on the use of ground water in alluvial aquifers. The recommendations don't include pumping from the Ogallala Aquifer and the implications of this use.

Commissioner Pope stated that this Commission is at the cross roads of what it can and cannot do to manage the resources of the basin. To date, the Commission only has accounted for uses and now has to move beyond accounting. The Commission must decide what to do about uses in sub-basins that exceed allocations.

Commissioner Jess responded that he is limited by law as to what he can do to regulate ground water use and this will control his vote on the issue.

Chairman Danielson clarified the meaning of Commissioner Jess' motion. The recommendations of the Engineering Committee are not necessarily endorsed by the Commission. With this clarification the Engineering Committee's Report was accepted unanimously.

New Business

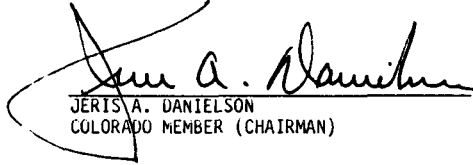
Commissioner Jess moved and Commissioner Pope seconded that the Commission send a letter to the appropriate Congressional Subcommittee stating the Commissions support for H.R. 71 and requesting funding of a sufficient level to allow implementation of the act. The motion passed.

Commissioner Pope introduced a motion that the Engineering Committee review methods of computing virgin water supply and consumptive use with special attention to ground water depletions including the impact of pumping the Ogallala Aquifer and that the Commission review institutional arrangements or administrative procedures for dealing with water shortages and use in excess of compact allocations. Chairman Danielson recommended that this motion be divided into two separate motions. Commissioner Pope agreed and introduced the following motion that was seconded by Commissioner Jess. The Engineering Committee shall review methods of computing virgin water supply and consumptive use with special attention to ground water depletions including the impact of pumping the Ogallala Aquifer. The motion passed.

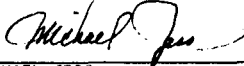
Commissioner Pope moved and Commissioner Jess seconded that the Engineering Committee pursue development of administrative procedures that would be utilized to address uses in excess of allocations and water shortages. Commissioner Jess suggested that the Administration should get involved in this area and not require the Engineering Committee to address this complex issue. Chairman Danielson expressed concern whether this issue needed Administration action. Commissioner Pope then modified his motion to read. The Republican River Compact Administration shall meet prior to its next annual meeting at

the call of the Chairman to specifically consider developing administrative procedures for handling potential water shortages and implementation of provisions of the compact concerning uses in excess of allocations. Commissioner Jess agreed to second the motion if it included a review of the transfer of ground water across statelines. Commissioner Pope agreed to this amendment and Commissioner Jess seconded the amended motion which was then approved unanimously.

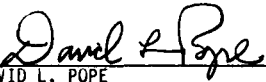
Both Commissioners Pope and Jess extended their appreciation to Chairman Danielson for hosting the meeting in Wray. The next annual meeting will be in Colorado on July 10, 1986. The meeting was adjourned at 12:50 p.m.



JERVIS A. DANIELSON
COLORADO MEMBER (CHAIRMAN)



J. MICHAEL JESS
NEBRASKA MEMBER



DAVID L. POPE
KANSAS MEMBER

Report of Engineering Committee to the
Republican River Compact Administration
For the 1984 Water Year

The meeting of the Engineering Committee was held in the office of the Colorado Division of Water Resources on May 1 and 2, 1985.

Committee members present were:

H. Lee Becker, Nebraska Department of Water Resources
Robert F. Bishop, Nebraska Department of Water Resources
Harold D. Simpson, Colorado State Engineer's Office
Gerald E. Hilmes, Kansas Division of Water Resources

Others in attendance were:

Robert Swain, U. S. Bureau of Reclamation, Denver
Larry Arneson, U. S. Bureau of Reclamation, Denver

Computation of Virgin Water Supplies and Consumptive Uses

The Committee completed its annual assignment of computing the virgin water supply and consumptive uses by states. The procedures utilized were similar to those used in previous years; however, in accordance with revised formulas which now include municipal and industrial uses. The formulas were computed and results printed by Lee Becker with Nebraska's IBM Computer using the input data provided by each state.

Shown in Table 1 is the 1984 computed virgin water supply by ground water and surface water components and the original computed virgin water supply and the original allocations to each state by sub-basin along with the 1984 adjusted allocations. Adjusted allocations for each state were computed for each sub-basin. A state's allocation is adjusted when the computed annual virgin water supply varies "more than ten percent from the virgin water supply" as set forth originally in the Compact. The allocations made from such a source are "increased or decreased in the relative proportions that the future computed virgin water supply of such source bears to the computed virgin water supply" as set forth originally in the Compact.

The 1984 consumptive use computations were made for each state and for each sub-basin. Table 2 summarizes those quantities. Annual consumptive use was computed for diversions from surface and ground water sources. Both measured and estimated data were utilized. Allowance was made for reservoir evaporation, return flow, and other losses.

Attachments to this report are Tables 1 and 2, computer printouts of the calculations and the minutes of our annual meeting.

The computed virgin water supply, consumptive use and adjusted allocations have been displayed graphically for presentation and discussion at this year's meeting of the compact officials.

In addition to the customary assignment of computing virgin water supplies and consumptive uses, the committee was instructed to review and assess the Bureau of Reclamation's Special Report, "Republican River Basin Water Management Study."

The committee has reviewed the report and our assessment of it is as follows:

The study is equivalent to many basin-wide general studies performed by the U.S.B.R. and others. It is comprised of one booklet entitled "Special Report, Republican River Basin Water Management Study," consisting of 120 pages, and is supported by appendices of volumes 1-4 on hydrology, volume 5 on engineering, volume 6 on environmental and volume 7 on economic and social assessment.

Attached are copies of the findings and conclusions of the report. In general it was shown that ground water pumping and soil and water conservation practices are the major sources of depletions to the surface water supply in the Basin. It was acknowledged in the report and supported in discussion with U.S.B.R. personnel that the magnitude of these depletions may be overstated, and we concur with this conclusion. Nevertheless, the study identifies trends that are occurring.

The Report indicates that soil and water conservation practices are the largest source of depletion of surface water in the Basin. For the study period, 1949-1978, this appears to be true. However, in recent years, starting in the mid-1970's, well pumpage appears to be the greatest source of surface water depletions.

No specific recommendations for the enhancement of surface water supplies are presented in the summary finding and conclusions. Implied, however, is the restriction of future well development as a possible remedial action.

In view of this report and the evidence of trends in the overall diminishment of surface water supplies within the Basin, the Engineering Committee recommends the following:

1. The report and appendices should be retained in the libraries of compact officials for future reference, however, we caution use of it because of change in trends since the end of the study period and because of inconsistencies in this report and other U.S.B.R. operation reports and summaries of states non-project water rights which could be misinterpreted.
2. Review of the present method used by the Engineering Committee for calculating virgin water supply and consumptive use within the Basin.
3. Discourage future ground water development in alluvial aquifers or implement a moratorium on ground water development in alluvial aquifers.
4. Encourage soil and water conservation practices that minimize depletions of the surface water supply.
5. Encourage utilization of crops with less consumptive use and improvement of overall irrigation efficiency.
6. Study the feasibility of increasing irrigation conservation storage in reservoirs.

The next regular meeting of the Engineering Committee will be held in Denver, Colorado, May 1, 1986.

Respectfully submitted,
Engineering Committee
Republican River Compact


H. Lee Becker


Robert F. Bishop


Gerald E. Himes



Harold D. Simpson

Table 1

1984 Computed Annual Virgin Water Supply and
Original and Annual Adjusted Allocations

Sub-basin and the Original Compact Virgin Water Supply	Computed Annual Virgin Water Supply Republican River Basin 1984 (Acre Feet)				Comparison of Original Compact Allocations and 1984 Adjusted Allocation (Acre Feet)							
	Ground Water [§]	Surface Water	Total Basin	Colorado Compact Alloc.	Colorado Adj. Alloc.	Kansas Compact Alloc.	Kansas Adj. Alloc.	Nebraska Compact Alloc.	Nebraska Adj. Alloc.	Total Basin Compact Alloc.	Total Basin Adj. Alloc.	
Prairie Dog Cr.	27600	16800	4020	20820			12600	9500	2100	1580	14700	11080
Sappa Cr.	21400	23190	6050	29240			8800	12020	8800	12020	17600	24040
Beaver Cr.	16500	17790	1890	19680	3300	3940	6400	7640	6700	7990	16400	19570
Medicine Cr.	50800	11620	41560	53180					4600	4600	4600	4600
Red Willow Cr.	21900	4240	18750	22990					4200	4200	4200	4200
Driftwood Cr.	7300	1390	2670	4060			500	280	1200	670	1700	950
Frenchman Rv.	98500	32050	74580	106630					52800	52800	52800	52800
South Fork of the Republican Rv.	57200	10870	31200	42070	25400	18670	23000	16900	800	590	49200	36160
Rock Cr.	11000	130	8450	8580					4400	3430	4400	3430
Buffalo Cr.	7890	670	4390	5060					2600	1670	2600	1670
Aritaree Rv.	19610	5270	8280	13550	15400	10640	1000	690	3300	2280	19700	13610
N.F. Republican Rv in Colorado	44700	380	42810	43190	10000	10000			11000	11000	21000	21000
N.F. and Main Stem of Republican Rv. incl. Blackwood Cr. in Nebraska [§]	94500	62170	368230	430400			138000	309230	132000	297110	270000	606340
TOTALS	478900	186570	612880	799450	54100	43250	190300	356260	234500	399940	478900	799450

§ Main Stem 87,000

Blackwood Creek 6,800

§ Ground water from alluvial stream deposits within one mile of the stream

Table 2

1984 Computed Consumptive Use within the
Republican River Basin (Acre Feet)

Sub-basin	Colorado			Kansas			Nebraska			Total Basin		
	Ground Water#	Surface Water	Total	Ground Water#	Surface Water	Total	Ground Water#	Surface Water	Total	Ground Water#	Surface Water	Total
Prairie Dog Cr.				16800	3000	19800	1280	0	1280	18080	3000	21080
Sappa Cr.				8700	220	8920	15170	150	15320	23870	370	24240
Beaver Cr.	0	0	0	8770	120	8890	9020	110	9130	17790	230	18020
Medicine Cr.							12340	3930	16270	12340	3930	16270
Red Willow Cr.							4240	7720	11960	4240	7720	11960
Driftwood Cr.							1390	0	1390	1390	0	1390
Frenchan Rv.							32050	20780	52830	32050	20780	52830
South Fork of the Republican Rv.	2150	8460	10610	8720	0	8720	0	0	0	10870	8460	19330
Rock Cr.							130	0	130	130	0	130
Buffalo Cr.							670	60	730	670	60	730
Arikaree Rv.	4060	0	4060	270	0	270	940	0	940	5270	0	5270
N.F. Republican Rv in Colorado	380	6540	6920				0	2940	2940	380	9480	9860
N.F. and Main Stee of Republican Rv. incl. Blackwood Cr. in Nebraska				90	51200	51290	59400	94590	153990	59490	145790	205280
TOTALS	6590	15000	21590	43350	54540	97890	136630	130280	266910	186570	199820	386390

§ Evaporation from Harlan County Reservoir -- Kansas 53 percent 9520 Acre Feet
Nebraska 47 percent 8440 Acre Feet

Ground water from alluvial stream deposits within one mile of the stream