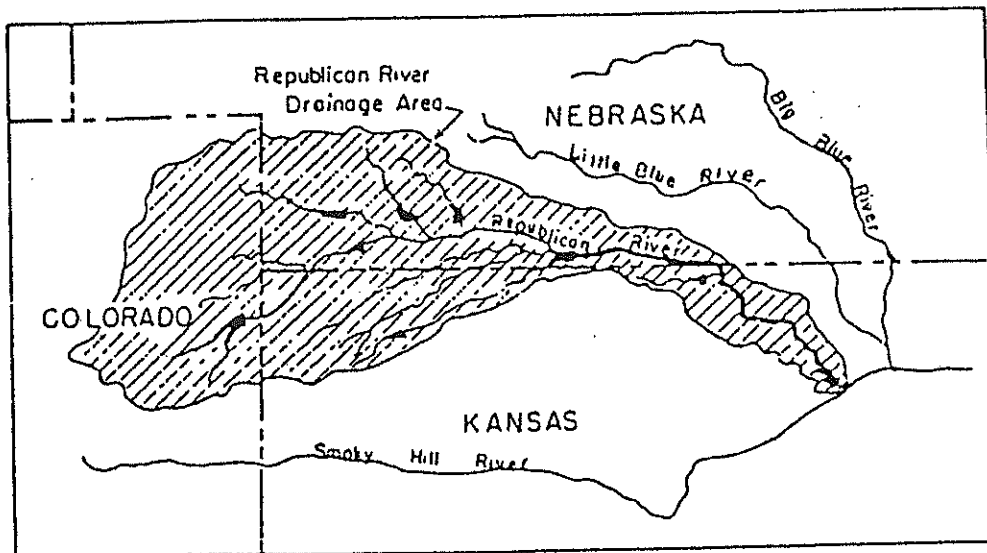


REPUBLICAN RIVER COMPACT ADMINISTRATION *TWENTY-SIXTH ANNUAL REPORT*



For the Year 1985

**Burlington, Colorado
July 10, 1986**

REPUBLICAN RIVER COMPACT ADMINISTRATION *TWENTY-SIXTH ANNUAL REPORT*

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TWENTY-SIXTH ANNUAL REPORT
REPUBLICAN RIVER COMPACT ADMINISTRATION

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

1. Pursuant to Rule 12, as amended, this report covers the period from July 11, 1985 to July 10, 1986.
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-Seventh Annual Meeting of the Administration was held on July 10, 1986 at Burlington, 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 1985 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. David Pope, Kansas member of the Administration, will serve as Chairman for the next two years.

MINUTES
27TH ANNUAL MEETING
REPUBLICAN RIVER COMPACT ADMINISTRATION

The meeting was called to order by Chairman Jeris Danielson at 9:15 a.m., July 10, 1986 in the Econo-Lodge at Burlington, Colorado. Those in attendance were:

<u>Name</u>	<u>Agency</u>	<u>Location</u>
Jeris A. Danielson	Colorado Commissioner	Denver, Colorado
Michael Jess	Nebraska Commissioner	Lincoln, Nebraska
David L. Pope	Kansas Commissioner	Topeka, Kansas
Hal D. Simpson	Deputy State Engineer	Denver, Colorado
Lee Becker	Dept. of Water Resources	Lincoln, Nebraska
Bob Bishop	Dept. of Water Resources	Lincoln, Nebraska
Gerald E. Hilmes	Division of Water Resources	Topeka, Kansas
Russell Oaklund	Dept. of Water Resources	Cambridge, Nebraska
Dennis E. Allacher	Bureau of Reclamation	McCook, Nebraska
Mike Whittington	Bureau of Reclamation	Billings, Montana
Darrell Ewing	Bureau of Reclamation	Loveland, Colorado
Alan Berryman	State Engineer's Office	Greeley, Colorado
James Bagley	Division of Water Resources	Topeka, Kansas
Leland E. Rolfs	Division of Water Resources	Topeka, Kansas
Doane Trail	Frenchman Cambridge Irrigation District, Director	McCook, Nebraska
Norma Sitzman	Frenchman Valley & H&RW Irrigation District	Culbertson, Nebraska
Ben Saunders	Ground Water Mgmt. District	Holyoke, Colorado
Clifford Hawthorne	Plains Ground Water Management District	Burlington, Colorado
Roy Patterson	Frenchman Cambridge Irrigation District	Cambridge, Nebraska
Lester Johnson	Frenchman Cambridge Irrigation District, Director	Cambridge, Nebraska

Chairman Danielson asked each person in attendance to introduce themselves and indicate which agency or entity they represented.

Approval of Minutes

A motion was made by Commissioner Pope and seconded by Commissioner Jess that the minutes of the 26th Annual Meeting as previously circulated and approved be ratified. The motion passed.

Report of the Kansas Commissioner

Commissioner Pope reported that there had been many activities in the state in the last year dealing with water issues. In particular, the Legislature considered about 35 bills pertaining to water. Many of the bills dealt with implementing the State Water Plan.

H.B. 2703 established conservation of water as a major state goal. This bill requires the Kansas Water Office to develop guidelines for the approval of water conservation plans. Also, new water right applicants may be required to include a water conservation plan with the application to the Kansas Division of Water Resources.

Another bill dealt with large reservoir construction and the funding of new reservoirs and the purchase of space in existing Federal reservoirs by the State to supplement the natural flow for local entities with water rights below the reservoir. Kansas pledged 4.0 million dollars towards the purchase of space in Federal reservoirs.

A significant issue was the proposed designation of minimum desirable streamflows on nine streams by the Kansas Water Office. The proposed designations were not approved by the Legislature, but apparently will be considered next year.

Additions to the State Water Plan are being prepared by developing local basin plans for each of the 12 major drainages in state. These will be submitted to the Kansas Water Authority next fall for adoption. Some items will require legislative action to implement.

A Drought Response Plan is being prepared for several basins. Exercises using computer models have proved enlightening.

The protection of ground water quality is receiving considerable study by various state and federal agencies. Some aquifers in Central Kansas are experiencing degradation in quality.

Report of the Nebraska Commissioner

Commissioner Jess reported that the 1986 session of the Legislature did more for water quality and especially ground water quality than any other legislative session.

A major bill dealt with chemigation and protection of ground water quality by requiring check valves and preventive devices.

A well driller licensing act was passed and will become effective in 1987. A Board will be appointed to implement the act.

Legislation was passed allowing the designation of special protection areas. These areas relate to ground water quality and may be designated by the Department of Environmental Control.

Ground Water Management Plans have been prepared for ground water management within 23 Natural Resources Districts in the State. Some plans were approved and some plans were rejected by the State. A total of nine plans were rejected and 14 approved.

The Enders Diversion Project hearings were completed and the application was denied because unappropriated water is not available. The decision has been appealed to the Nebraska Supreme Court and hearings are scheduled for the fall of 1986.

Report of the Chairman

Chairman Danielson stated that the agricultural economy is in a serious situation and the only benefit may be that reduced ground water pumping has resulted in a decrease in the rate of water table decline.

Colorado is very interested in the Demonstration Ground Water Recharge Program being sponsored by the U. S. Bureau of Reclamation. The Colorado Ground Water Commission was designated the lead agency in Colorado and four sites were identified for submittal to the Bureau.

The Water Commissioner position in Wray was re-established by the Legislature this year and the position will be filled in January 1987. The position will have about 25 percent surface water responsibilities and 75% ground water responsibilities.

Rules and Regulations have been promulgated by the Office of the State Engineer in accordance with Senate Bill 5 (1985). These Rules and Regulations deal with the appropriation and use of non-tributary ground water. The Rules and Regulations were appealed to the Water Court and the Water Court made them binding only on the State Engineer.

Colorado has not passed any legislation on chemigation; although, an interim committee is discussing chemigation this summer. The legislature will probably deal with chemigation in 1987. Some local ground water management districts have taken action at the local level to implement rules concerning chemigation.

Bureau of Reclamation Report

Dennis Allacher from the McCook Project Office reported on the maximum content of the various project reservoirs in the basin during the spring of 1986.

Research on lining the bottom of canals in the Meeker-Driftwood Canal system has indicated that seepage can be reduced by about 50 percent in the test section.

Mr. Darrell Ewing from the Colorado Projects Office reported on the impact of the consolidation of the Upper and Lower Missouri River Region with its office being in Billings, Montana. A small planning unit will be in the Colorado Projects Office.

Mr. Mike Whittington, Regional Hydrologist, from Billings, Montana, discussed the High Plains Ground Water Recharge Demonstration Program. He will be the coordinator of the program and gave a chronology of what has taken place to date on the program. At least 12 recharge sites will be selected in the eight high plains states. There have been 14 proposals submitted by seven states. The 14 proposals will be reviewed by February, 1987. A Draft Recommendations Report will be sent out for review to various state agencies by June, 1987. The final report with recommended sites will be forwarded to the Commissioner of Reclamation by October, 1987. The Secretary of Interior will submit his recommendations to Congress by December, 1987. However, this would result in funding by Congress not being available until Fiscal Year 1989, unless the Secretary of the Interior moves the final report date forward.

Report of the Engineering Committee

Mr. Bob Bishop, Chairman of the Committee, presented the report and a copy is attached to these minutes. The Engineering Committee computed the virgin water supply and consumptive uses by basin in each state for 1985. The results of these computations are shown in Tables 1 and 2 of this report. Commissioner Jess moved that the Report of the Engineering Committee be accepted and Commissioner Pope seconded the motion. The motion passed.

Commissioner Pope inquired about any discussion the Engineering Committee may have had on the computation of virgin water supply including ground water depletions and pumping of the Ogallala aquifer. Mr. Bishop stated that the Engineering Committee did discuss it at length at its meeting but that no agreement or conclusions were reached.

Review of Special Engineering Committee Report of June 14, 1979

Chairman Danielson informed the audience that the Commission met on February 7, 1986 to discuss present methods of computing virgin water supply and consumptive use. It also considered possible administrative procedures to address water shortages. At the February 7 meeting, it was agreed that each state would answer a series of questions presented in a Special Engineering Committee Report of June 14, 1979. Each state was to answer those questions and mail them to the other states by June 20, 1986. These questions were the result of discussion by the committee on administrative procedures for equitable division of the waters of the Republican River basin during water shortages.

Chairman Danielson took each state's answer to each question and wrote it on the chalkboard so the audience could compare the states' answers. Each question was read and the various answers discussed by each Commissioner.

With respect to Question I.1., "Should the definition that virgin flows are 'undepleted by the activities of man' be taken literally?", Colorado answered Yes, Kansas answered No, and Nebraska answered No. Chairman Danielson said he answered Yes because he said the definition must be taken literally. The other Commissioners said they could agree with Chairman Danielson, but as a practical matter it cannot be computed.

With respect to Question I.2., "Does the present procedure of determining virgin water supply comply with the compact definition?", all three states answered No. Reasons cited were method of accounting for ground water pumpage and storage changes and depletions due to conservation practices.

With respect to Question I.3., "Is the compact administrable under current procedures of determining virgin water supply?", Colorado answered Yes, Kansas answered No, and Nebraska answered No. Chairman Danielson stated that the answer to this question was dependent upon the definition of "administration". Administration could mean in accordance with the Compact as it is now or it could mean administration of water rights including curtailment of use to assure annual deliveries to the lower basin.

With respect to Question II.1., "Is the compact administrable under current procedures of determining consumptive use?", Colorado answered Yes, Kansas answered No, and Nebraska answered No. Commissioner Jess mentioned a memo from 1941 written by Bob Willis that indicated allocations were based on surface water only. Therefore, current procedures utilizing ground water consumptive use may not be correct. Chairman Danielson replied that Mr. M. C. Henderlinder, the State Engineer from Colorado who negotiated the Compact for Colorado, had written a summary of the Compact indicating that it did include ground water. Commissioner Pope stated that Kansas believes that ground water should be included. The major question concerning Kansas is should the states share equally in the shortages. Chairman Danielson indicated that it was his opinion that as long as each state stayed within its adjusted allocation, it was in compliance with the Compact even if a lower state did not receive sufficient water. Commissioner Pope also stated that he is especially concerned with the after-the-fact computation of consumptive use under the current procedures.

With respect to Question II.2., "Does the present procedure of determining consumptive use comply with the compact definition?", Colorado answered No, Kansas Answered No, and Nebraska answered No/Yes.

With respect to Question III.1., "Should specific allocations be revised on the basis of future computed virgin water supply? If so, what future computed virgin water supply?", all three states answered Yes. It was suggested that "specific" should be changed to "original" to clarify the question. Virgin water supply can vary in definition as discussed in Question I.1. Commissioner Pope stated that if long-term trends indicate that the virgin water supply in a basin was declining, then the allocation should be adjusted. This is being done to some degree by the Engineering Committee if it varies by more than 10 percent from the original allocation.

With respect to Question IV.1., "Should individual state allocations be fixed quantities, apportioned according to priority and allocated on the basis of available supply?", Colorado answered No, Kansas answered Yes, and Nebraska answered Yes. There was no discussion on the difference in answers since it had been previously discussed.

With respect to Question IV.2., "Are the figures intended to reflect flow rights available to each state every year?", all three states answered No.

With respect to Question IV.3., "Should each state consider and be bound by the compact prior to allowing additional water right permits?", all three states answered Yes. Chairman Danielson asked if all Commissioners had the authority to limit additional water right applications. Commissioner Jess said he did not have authority to limit ground water use. All Commissioners agreed that the states had the obligation to comply with the Compact.

With respect to Question V.1., "Do all compact Administrators want a working administrative mechanism for allocating supplies in the Republican River Basin?", Colorado answered No, Kansas answered Yes, and Nebraska answered No. Chairman Danielson said this probably reflects the relative location of the states in the basin. Commissioner Pope said something had to be done to address the present procedures since they don't handle shortages and over-use in some basins. Commissioner Jess said that there does not appear to be a justification at this time since Kansas has been receiving a considerable over-delivery at the stateline and the cost of accounting at such a detailed level is not warranted now. Commissioner Pope replied that Kansas was seeking assurance that the Kansas allocation would be available to Kansas users.

With respect to Question V.2., "Should such a procedure apply to year round or seasonal operations?", all three states answered Yes that it should be year around.

With respect to Question V.3., "Should such procedure be financed equally or proportionally?", all three states answered Yes that it should be done proportionally.

Chairman Danielson said there appears to be two issues that the Commission must deal with. One is should ground water be included in the computation and the second is whether administrative mechanisms should be developed.

Chairman Danielson stated that it appeared that three issues should be given to the Engineering Committee for consideration. The first is to estimate consumptive uses caused by watershed treatment and by ground water pumping in the entire basin and not just the alluvium. The second issue is to evaluate how to include ground water in the virgin water supply computation. The third is to calculate new allocations based on the past record and not just the annual record and to compare with the original allocations.

Commissioner Pope stated that each state uses different methods of computing ground water consumptive use and it would be desirable for the Engineering Committee to develop a consistent method between all three states.

Commissioner Pope suggested that if the Engineering Committee was to address Chairman Danielson's suggestions, that they select two basins and apply the proposed techniques or revisions to these basins to see what the impact may be. These two basins may be one that is over allocated and one that is not. This would deal with new allocations as well as consumptive use and virgin water supply.

Chairman Danielson asked whether the other two Commissioners agreed with the work suggested for the Engineering Committee. It was agreed that the Engineering Committee should use the USBR report and look at those data and methodology and see if they are appropriate. The Commission indicated that it does not want to overload the Engineering Committee. Two possible basins are Beaver Creek and Frenchmen. Danielson said it would be desirable to let the Engineering Committee select the basins. Mr. Lee Becker from Nebraska said that all the data are available and that all basins could be done if necessary with respect to revising allocations.

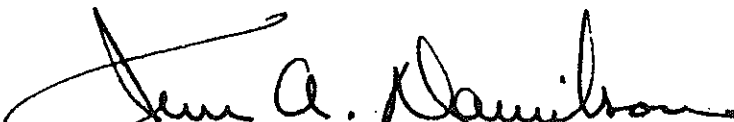
Commissioner Pope moved that the Engineering Committee perform this assignment to the best of their ability and to report back to the Commission at the next annual meeting. Commissioner Jess seconded the motion. Chairman Danielson clarified the motion by indicating that the annual accounting as done in the past would continue. The motion passed.

Commissioner Jess moved that the Chairman should be thanked for hosting the meeting this year and Commissioner Pope seconded the motion. The motion passed.


Commissioner Jess moved that Commissioner Pope be the Chairman for the next two years and Chairman Danielson seconded the motion. The motion passed.

The next meeting will be July 9, 1987 in Kansas at a location to be selected by the Chairman.

Commissioner Jess moved that the meeting adjourn and Commissioner Pope seconded the motion. The motion was adopted at 1:15 p.m.



JERIS A. DANIELSON
COLORADO MEMBER (CHAIRMAN)



J. MICHAEL JESS
NEBRASKA MEMBER



DAVID L. POPE
KANSAS MEMBER

MINUTES
SPECIAL MEETING
REPUBLICAN RIVER COMPACT ADMINISTRATION

The meeting was called to order by Chairman Jeris Danielson at 1:30 p.m., February 7, 1986, in the Centennial Building, 1313 Sherman Street, Denver, 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	Colorado Engineer Adviser	Denver Colorado
Bob Longenbaugh	Colorado Division of Water Resources	Denver, Colorado
Alan Berryman	Colorado Division of Water Resources	Denver, Colorado
Keith Kepler	Colorado Division of Water Resources	Denver, Colorado

Chairman Danielson asked if the proposed agenda sent out earlier was acceptable. The other Commissioners agreed that it was, and Chairman Danielson declared it adopted unanimously.

Chairman Danielson asked for comments concerning the draft of the minutes of the previous annual meeting held on July 11, 1985. Commissioners Pope and Jess provided revised drafts to Chairman Danielson for preparation of final minutes.

Review of Present Methods of Computing Virgin Water Supply and Consumptive Use

Chairman Danielson asked Commissioner Pope to offer his concerns about the present methods being utilized. Commissioner Pope stated that he does not think the present methods properly treat ground water. For example, ground water being pumped from storage may not be a part of the virgin water supply. He also stated that each state has a different procedure for determining ground water consumptive use. His main concern is with over-pumping increasing the virgin water supply and allowing over development of a basin that could result in reduction of streamflow in dry years.

There was general discussion between the three Commissioners concerning the Compact and what it originally may have contemplated with respect to ground water. There was not any final determination made by the three Commissioners as to the proper treatment of ground water in the present computations.

Discussion on Other Possible Methods of Computing Virgin Water Supply and Consumptive Use

A lengthy discussion was held concerning possible ways to modify the computations with respect to the ground water component. Commissioner Jess suggested that it may be easier to just drop ground water from the computations. Both Commissioners Danielson and Pope disagreed. The necessity for including pumping from the Ogallala formation as a part of the virgin water supply was discussed briefly with all Commissioners agreeing that it should not be considered at this time.

Possible Administrative Procedures to Address Water Shortages

Commissioner Pope distributed copies of the June 14, 1979 report of the Special Engineering Committee which had been submitted to the Compact Administration at its 1979 meeting. The Special Engineering Committee had been given the assignment by the Compact Administration in 1978 to make recommendations for administrative procedures in the event water shortages should occur. The Compact Administration did not take any action on the report and proposed a meeting in December of 1979 to consider the report. The meeting was not held, and the Special Engineering Committee Report remains as unfinished business.

There was general discussion about the Special Engineering Committee Report and the ability of each state to assure compliance with the Compact in the event over-development occurs. Chairman Danielson stated that he did not believe that the Compact imposes any delivery obligation on any state, only that consumptive use is limited to that allocated in the Compact.

Commissioner Pope indicated that the State of Kansas is investing considerable time and money in the development and implementation of plans to better manage the waters of the Kansas River and its tributaries in Kansas, including the Republican River, to help insure a dependable supply of water in the basin for all uses, including municipal and industrial water supply. As a result, the State needs to know what the dependable yield is for planning purposes, and to insure that the Kansas compact allocation will be reliably available for use in Kansas now and in the future.

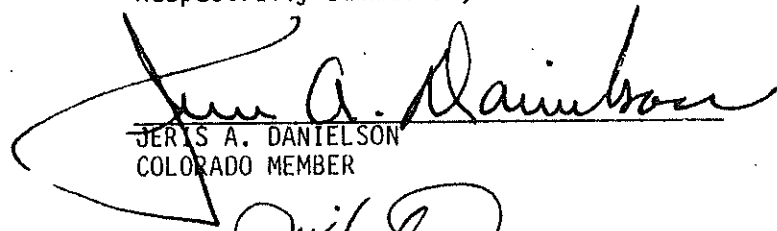
Chairman Danielson suggested that each state individually answer the questions by the Special Engineering Committee Report as a start to deal with the unfinished business from 1979. It was then moved and supported to have each Commissioner review the June 14, 1979 report of the Special Engineering Committee and prepare a response for exchange not less than 30 days before the annual meeting which is set for July 10, 1986. The motion was adopted.

Commissioner Jess raised the issue about ground water being pumped across the Colorado-Nebraska border from Nebraska. The pumping is primarily from the Ogallala formation. Chairman Danielson responded that this was probably not a compact issue and could be addressed by a discussion between the two states.

Each Commissioner reported on each state's progress in identifying candidate demonstration recharge sites for HR71 funds being administered by the Bureau of Reclamation.

Chairman Danielson adjourned the meeting at 4:45 p.m.

Respectfully submitted,


JERRY A. DANIELSON
COLORADO MEMBER


J. MICHAEL JESS
NEBRASKA MEMBER


DAVID L. POPE
KANSAS MEMBER

Report of Engineering Committee to the
Republican River Compact Administration
For the 1985 Water Year

The meeting of the Engineering Committee was held in the office of the Colorado Division of Water Resources on May 7, 1986. 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

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. 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 1985 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 1985 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 originally set forth in the Compact.

The 1985 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 and the computer printouts of the calculations.

The committee reviewed the June 14, 1979, report of the special Engineering Committee regarding development of administrative procedures for water shortages. No agreement was reached on recommendations to Compact officials on daily administrative procedures.

Further discussions were held on procedures and additional data collection necessary if total underground water storage were to be included in future virgin water supply computations.

The next annual meeting of the Engineering Committee is scheduled for May 1, 1987, in Denver, Colorado.

Respectfully submitted,

Engineering Committee
Republican River Compact Administration

H. Lee Becker

H. Lee Becker

Robert F. Bishop

Robert F. Bishop

Gerald E. Hilmes

Gerald E. Hilmes

Harold D. Simpson

Harold D. Simpson

Table 1

1985 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 1985 (Acre Feet)			Comparison of Original Compact Allocations and 1985 Adjusted Allocation (Acre Feet)								
	Ground Water	Surface Water	Total Basin	Colorado		Kansas		Nebraska		Total Basin		
				Compact Alloc.	Adj. Alloc.	Compact Alloc.	Adj. Alloc.	Compact Alloc.	Adj. Alloc.	Compact Alloc.	Adj. Alloc.	
Prairie Dog Cr.	27600	17540	4940	22480			12600	10260	2100	1710	14700	11970
Sappa Cr.	21400	17740	6150	23890			8800	9820	8800	9820	17600	19640
Beaver Cr.	16500	14630	1120	15750	3300	3300	6400	6400	6700	6700	16400	16400
Medicine Cr.	50000	12760	35450	48210					4600	4600	4600	4600
Red Willow Cr.	21900	4280	17550	21830					4200	4200	4200	4200
Driftwood Cr.	7300	1000	5220	6220			500	430	1200	1020	1700	1450
Frenchman Rv.	98500	41560	59620	101180					52000	52000	52000	52000
South Fork of the Republican Rv.	57200	10420	25560	35980	25400	15980	23000	14470	800	500	49200	30950
Rock Cr.	11000	110	8000	8190					4400	3200	4400	3200
Buffalo Cr.	7890	580	4990	5570					2600	1840	2600	1840
Arikaree Rv.	19610	5600	7280	12880	15400	10120	1000	660	3300	2170	19700	12950
N.F. Republican Rv in Colorado	44700	380	41600	41980	10000	10000			11000	11000	21000	21000
N.F. and Main Stem of Republican Rv. incl. Blackwood Cr. in Nebraska*	94500	65830	195310	261140			138000	216350	132000	207870	270000	424220
TOTALS	478900	192430	412870	605300	54100	39400	190300	258390	234500	307510	478900	605300

* Main Stem 87,700
Blackwood Creek 6,800

Table 2

1985 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.				17540	2320	19860	1370	0	1370	10910	2320	21230
Sappa Cr.				7310	160	7470	11160	240	11400	10470	400	10870
Beaver Cr.	0	0	0	7870	150	8020	6760	100	6860	14630	250	14880
Medicine Cr.							13270	3980	17250	13270	3980	17250
Red Willow Cr.							4280	7380	11660	4280	7380	11660
Driftwood Cr.							1000	0	1000	1000	0	1000
Frenchman Rv.							41550	17960	59520	41560	17960	59520
South Fork of the Republican Rv.	2530	12540	15070	7890	0	7890	0	0	0	10420	12560	22980
Rock Cr.							110	150	260	110	150	260
Buffalo Cr.							580	660	1240	580	660	1240
Arikaree Rv.	4060	0	4060	730	0	730	810	0	810	5600	0	5600
N.F. Republican Rv in Colorado	380	6180	6560				0	2990	2990	380	9170	9550
N.F. and Main Stem of Republican Rv. incl. Blackwood Cr. in Nebraska*				310	35970	36280	62910	79860	142770	63220	115830	179050
TOTALS	6970	10740	25710	41650	38690	80250	143010	113320	257130	192430	170660	363090

* Evaporation from Harlan County Reservoir -- Kansas 49 percent 5830 Acre Feet
Nebraska 51 percent 6070 Acre Feet