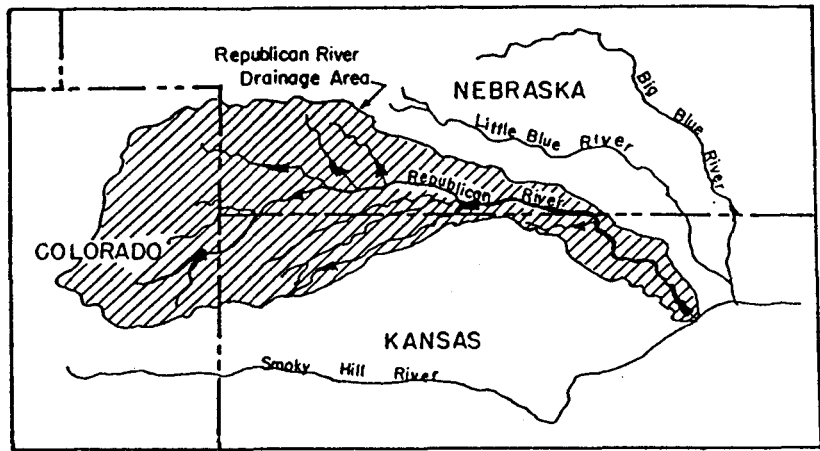


# REPUBLICAN RIVER COMPACT ADMINISTRATION

## TWENTY-NINTH ANNUAL REPORT



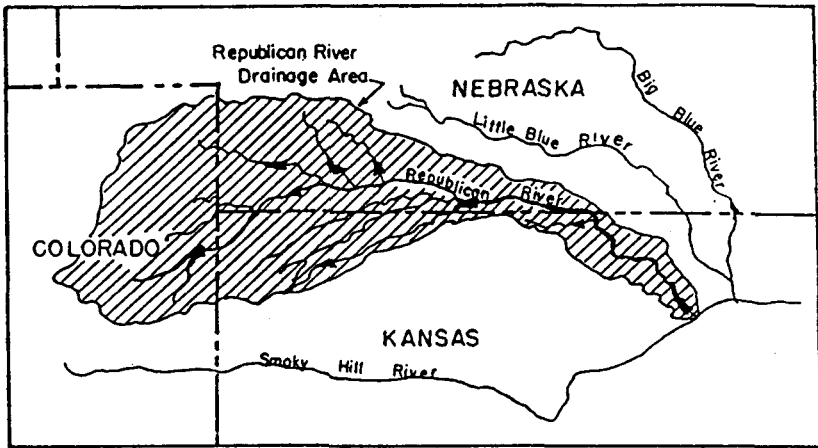
For The Year 1988

Lincoln, Nebraska

July 21, 1989

# REPUBLICAN RIVER COMPACT ADMINISTRATION

## TWENTY-NINTH ANNUAL REPORT



For The Year 1988

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Lincoln, Nebraska

July 21, 1989

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## TWENTY-NINTH ANNUAL REPORT

### REPUBLICAN RIVER COMPACT ADMINISTRATION

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

1. Pursuant to Rule 12, as amended, this report covers the period from July 7, 1988, to July 21, 1989.
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

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 Thirtieth Annual Meeting of the Administration was held on July 21, 1989, at Lincoln, Nebraska. 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 use for the 1988 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 of the Republican River.
6. By consensus, Michael Jess, Nebraska member of the Administration, served as Chairman from July 1989 to July 1990.

MINUTES  
30TH ANNUAL MEETING  
REPUBLICAN RIVER COMPACT ADMINISTRATION

The meeting was called to order by Chairman J. Michael Jess at 9:10 a.m. on July 21, 1989, in the Natural Resources Commission Conference Room, Nebraska State Office Building in Lincoln, Nebraska. Those in attendance were:

<u>Name</u>	<u>Agency</u>	<u>Location</u>
Michael Jess	Nebraska Commissioner	Lincoln, Nebraska
Jeris A. Danielson	Colorado Commissioner	Denver, Colorado
David L. Pope	Kansas Commissioner	Topeka, Kansas
Hal Simpson	Engineer Advisor	Denver, Colorado
Bob Bishop	Engineer Advisor	Lincoln, Nebraska
Jerry Hilmes	Engineer Advisor	Topeka, Kansas
Alan Berryman	Div. of Water Resources	Greeley, Colorado
James Bagley	Div. of Water Resources	Topeka, Kansas
Thomas Stiles	Kansas Water Office	Topeka, Kansas
Leland E. Rolfs	Div. of Water Resources	Topeka, Kansas
Bob Kutz	U.S. Bureau of Reclamation	Grand Island, Nebraska
Dennis E. Allacher	U.S. Bureau of Reclamation	McCook, Nebraska
Russell Oaklund	Dept. of Water Resources	Cambridge, Nebraska
Ann Bleed	Dept. of Water Resources	Lincoln, Nebraska
Mary Lonowski	Dept. of Water Resources	Lincoln, Nebraska

Chairman Jess asked for introductions of persons in attendance.

### Approval of Minutes

Chairman Jess noted that minutes of the 29th Annual Meeting had been distributed, reviewed and signed by all commissioners and asked if corrections or notations were necessary. All three commissioners agreed that none were needed. No motion was made.

### Report of Chairman

Chairman Jess reported on the ground water control area located in the southwest Nebraska counties of Chase, Perkins and Dundy. This control area is administered and regulated by the Upper Republican Natural Resources District and contains approximately 2,500 wells - most tapping the Ogallala Aquifer and most being metered. There presently exists a three-year allocation which averages out to 14 acre inches per year to be used at any time within that three-year period.

Russell Oaklund, Division Engineer, reported that all permits were regulated on Frenchman Creek on April 27 of this year. Oaklund advised that water administration accelerated on June 20, 1989, when all permits on Frenchman Creek above the Culbertson Canal diversion were closed and seven permits below that diversion were regulated; 15 junior permits on Red Willow Creek were closed and senior permits were regulated; and on the Republican River, from Trenton Dam to the Cambridge Diversion, permits on the mainstem were closed. On June 22, 1989, all permits were regulated on the Republican River from Harlan County to Guide Rock. During the week of July 17, 40 junior permits on Medicine Creek were closed and 14 senior permits were regulated.

Bob Bishop, Operations Chief, reported that adjudication hearings were held this year concerning appropriations on the Cambridge and Bartley canals with Orders of Cancellation being issued for 164 acres under Cambridge Canal and 66 acres under the Bartley Canal. Bishop noted the Department has

adjudicated all appropriations in the Republican Basin above Harlan County Reservoir and that it will be reviewing project operations on canals this fall below Harlan County.

Commissioner Jess reported little legislative activity concerning water matters in the Nebraska Unicameral this year. Recalling that a four to one Low Level Radioactive Waste Compact vote selected Nebraska as host state for a waste disposal facility, Jess said a contractor has been selected and three tentative sites have been proposed. He noted an initiative on the ballot to withdraw Nebraska from the compact failed, however, resistance to locating the site is still very vocal and active. Bills dealing with this issue occupied much of the Legislature's time.

An application from the Nebraska Game and Parks Commission for an instream flow designation for trout on Long Pine Creek was received. A lengthy administrative proceeding was held. A ruling on this matter is anticipated soon.

#### Colorado Report

Commissioner Danielson reported the ground water monitoring program in eastern Colorado involving about 700 wells was reinstated. An average decline in excess of one foot in the water table was measured for last year. Irrigation and cropping changes have occurred as people have become more conscious of the cost of water.

Commissioner Danielson said in most areas no new wells have been drilled in the Northern High Plains Designated Basin since 1965. Existing wells are carefully monitored for compliance with permit conditions. For example, the State Engineer obtained a court order against a person for repeated violations of permit conditions. The court ordered the person comply with permit conditions and the payment of a fine of \$29,000 to the State Engineer's Office

and payment of court costs of \$7,000. The fine was based on the value of the crop produced.

Danielson said there was no major legislation this past session affecting ground or surface water in the high plains. One bill reorganizing agency functions relating to the water quality protection program will entail more enforcement responsibilities by the State Engineer's Office. Another bill was passed requiring gravel pit operators who expose ground water to augment depletions. This legislation was prompted by a lawsuit brought by the State Engineer's Office.

#### Kansas Report

Commissioner Pope reported on drought related and other activities that occurred in Kansas during the year.

He reported an active legislative session in natural resources and other matters. The 1985 Chemigation Act was amended and strengthened as was the Kansas Groundwater Exploration and Protection Act. Five additional streams were added to the minimum desirable streamflow program bringing the total to 23.

Commissioner Pope distributed fact sheets outlining Kansas' State Water Plan. He summarized the enactment, implementation and funding of the plan noting his department's role in its enforcement. A discussion of the plan followed.

Pope reported a water assurance district has been formed in the Kansas River area and negotiations are underway to contract for storage in Milford, Tuttle Creek and Perry reservoirs.

#### Bureau of Reclamation Report

Bob Kutz, Project Manager, noted several personnel changes occurred during the past year. He then gave a report on Bureau activities within the Republican Basin.



A new toedrain has been constructed in Bonny Reservoir resulting in lower piezometric levels in the dam. He noted this should alleviate the danger of piping potential at the reservoir.

Legislation was introduced in Congress which would allow Frenchman-Valley Irrigation District a more favorable Bureau contract concerning operation and maintenance responsibilities for Enders Dam due to reduced water supplies. Kutz said the Bureau opposed this legislation.

The Bostwick Irrigation District lawsuit is now in the court of appeals. A stay of execution was not requested by the districts in their appeal, necessitating the Bureau to work out a temporary arrangement to allow for delivery of water pending the outcome of this case.

Kutz reported the South Platte/Frenchman diversion study report has been completed and given to its sponsors for comment. The report cited numerous problems with a diversion of this type, particularly concerning economics, endangered species on the Platte, and water quality. It also concluded future studies were not worthwhile.

A summary on the states' ground water recharge demonstration projects was given. In Nebraska, the York project will have a ground breaking ceremony in August. The Wood River site is being added pending resolution of the Fish & Wildlife Service's endangered species problems. Colorado's three project sites are the Plains Arikaree, Frenchman and Denver Basin. The first two sites had funding in 1989; the third will be funded in 1990. Kansas has two active sites - Equus Beds, to be funded in 1990, and Smoky Hill, located below Cedar Bluff Reservoir. Kutz noted the irrigation district below Cedar Bluff Reservoir has received no water since 1978 and severe water supply problems exist.

The Bureau is studying the drainage problems of the upper Courtland Canal. Past repairs and improvements have not corrected the situation. A final report is expected soon.

Kutz reported on the funding problems of the North Loup construction project. He indicated, however, the project will go forward. A major fish hatchery is to be constructed below the Calamus Reservoir.

Dennis Allacher of the Bureau reported on operations and maintenance in the Republican River basin. In 1988, rainfall varied from 69 percent of normal at Lovewell Reservoir to 129 percent of normal at Swanson Lake. Harry Strunk and Harlan County lakes were full prior to the start of irrigation season. All the irrigation districts received project water for the third consecutive year. Allacher noted that most districts had full supplies. Diversions in the Frenchman-Cambridge Division were about the same as the ten-year average while diversions in the Bostwick Division were about 30 percent higher. Some reservoirs were at eight or nine year lows at the end of 1988.

Allacher reported for 1989 that precipitation during the winter months was 60 percent of normal with Harry Strunk Lake being the only reservoir filled prior to irrigation season. Rainfall during the first four months ranged from 23 percent of normal at Keith Sebelius Lake to 54 percent of normal at Bonny Reservoir. A major storm upstream from Bonny Dam in late June filled the reservoir for the first time since 1982. Later storms produced flooding on Beaver and Driftwood creeks.

Allacher noted no major maintenance activities are scheduled. Inspections of all dams were made last year. In conjunction with the dam safety program, instrumentation was added at Bonny, Trenton and Medicine Creek with future work scheduled for Enders and Norton.

Allacher reported a bomb scare at Bonny Dam prompted a review of Emergency Action Preparedness procedures.

#### Report of the Engineering Committee

Robert Bishop, chairman of the Engineering Committee, gave the committee report which is included in the 29th Annual Report.

Bishop reported the 1988 Virgin Water Supply (VWS) was about ten percent greater than the original supply the allocations were based on. The total VWS was 190,000 A-F less than 1987. Total consumptive use was up about 18,000 A-F from 1987, a rise of seven percent from the previous year. No state overused its total allocation. Kansas' consumptive use exceeded adjusted allocations in Prairie Dog and Beaver Creek sub-basins. Nebraska consumptive use exceeded adjusted allocations in the Sappa, Beaver, Medicine, Red Willow and Driftwood creeks sub-basins. The Computed VWS and Consumptive Use for the 1988 water year are shown in Exhibits A and B of the report.

Bishop then reported on the Commissioner's special committee assignment to revise formulae to reflect consumptive use being charged to the basin of use rather than the basin of diversion exclusively. The net result of the formulae change transferred about 9,500 A-F of consumptive use from Medicine Creek and Red Willow Creek to Nebraska's mainstem allocation and resulting in Nebraska overusing allocations in six sub-basins instead of five. Bishop referred to Exhibit B where changes to the formulae were reflected in the consumptive use values. A brief explanation of the formulae changes and illustration of Nebraska's problems with allocation overuse followed.

Commissioner Danielson then moved to accept the Engineering Advisory Report including adoption of the formulae changes suggested in assignment two affecting Medicine Creek, Red Willow Creek and Republican River mainstem. Motion died for lack of a second.

Pope then moved to accept the Engineering Committee Report. Motion died for lack of a second.

Jess then moved to receive the Report. Pope seconded. Motion was approved. The Engineering Committee was then asked to and did recommend the adoption of the formulae changes. Danielson moved to accept the altered computation formulae for Medicine Creek, Red Willow Creek and the Republican

River mainstem as reflected on pages three and four of the Engineering Advisory Report. Pope requested deferrment on this action until later discussion. Jess seconded. Motion was tabled.

Unfinished Business

Chairman Jess gave the floor to Commissioner Pope who reviewed the proposal Kansas submitted recommending seven alternatives for more effective Compact administration.

Pope reported that Kansas was taking measures to come into compliance with adjusted allocations by closing alluvial valleys in the Republican River Basin in northwest Kansas to further appropriation of water and suggested each member should comply as well. He said the Kansas proposal reinforces the intent of the Compact which is to limit beneficial use through allocations and to provide an equitable apportionment between states and to protect those allocations.

Pope noted that the use of original allocations, until such time as information shows they should be adjusted, would give each state advance knowledge of their allocations and consumptive use thus allowing compliance measures of their own choosing.

Commissioner Danielson questioned whether the proposal's conclusion No. 4 regarding the VWS was correct. With regard to conclusion No. 3, Danielson said he believes that no enforcement authority exists within the commission.

A lengthy discussion followed between Commissioners Pope and Danielson concerning equitable apportionment of water supply in the basin, computation of annual VWS, the factoring of ground water use into those computations and the definition of basin boundaries.

Danielson concluded that he agreed with the proposal except for No. 3 which, he felt, was unclear.

Chairman Jess noted Kansas' useage is substantially below allocations. He then outlined Nebraska's opinion regarding the proposal items as follows: Item 1 - believed Compact Article III must be read in conjunction with Article IV which clearly indicates adjustments in VWS must be done annually; Item 2 - in agreement; Item 3 - was vague, but could agree with; Item 4 - disagreed due to Articles III and IV of the Compact; Item 5 - this item would require a legislative change in Nebraska and, therefore, could not agree; Item 6 - was contrary to Article III of the Compact and, therefore, disagreed; and Item 7 - agreed. Jess suggested the proposal should be presented to water users in the basin for their input.

Pope disagreed with Chairman Jess' interpretation of Articles III and IV and believed a clear decision needed to be made as to when computations should occur. He also felt a good faith effort should be made in Nebraska to begin legislative action with regard to proposal item No. 5, indicating Colorado and Kansas have already taken steps to curtail ground water use. Although Jess did not concur, Pope felt ground water should be included in calculations of allocations. Pope also indicated that Kansas may not be using all of its allocation above the state line but depends heavily on the flows of the river below the state line for various purposes. These include existing uses, plus the state's investment in Milford Reservoir water for M & I purposes.

Bob Kutz related the Compact was initiated at the Bureau's insistence to protect its investments. He noted the document itself was open to interpretation and needed clarification. Kutz, foreseeing severe problems, agreed a good faith effort to curtail allocations on over-appropriated basins was necessary.

Following discussion of the potential injury question and the interpretation of Articles III and IV, Danielson moved to accept Commissioner

Pope's proposal except for proposal No. 3. Pope seconded. Kansas and Colorado voted Yes. Nebraska voted No. Motion failed.

A lengthy discussion followed on the proposal and possible alternatives and/or alterations. Questions concerning allocation adjustments and the basis of the original allocations were also discussed. Bob Kutz said Bureau archives may contain information on the latter. Jess asked Kutz to research Bureau archives relating to the Compact suggesting it may provide guidance to the members. Kutz agreed to report to the administration on his research.

Commissioner Pope distributed copies of a revised booklet entitled "Republican River Compact Administration Formulas for the Computation of . . . Consumptive Use". Pope explained revisions to the booklet omit computation of annual VWS and retain formulas for consumptive use, thereby providing a new methodology for compact administration. He said this mechanism would compare the calculated consumptive use to allocation under the compact until such time as they are adjusted. Pope moved the amendment of the formulas contained in the booklet as per markup be adopted. Danielson seconded. Kansas voted Yes. Colorado and Nebraska voted No. Motion failed.

Chairman Jess then opened discussion on the tabled motion to change formulae used by the Compact on Medicine Creek, Red Willow Creek and the mainstem. Jess noted the change would provide more accurate reporting and reduce the allocation amount on Medicine and Red Willow creeks while increasing it at an equal amount on the mainstem. Motion approved.

Commissioner Pope then requested Nebraska to attempt to share the issues discussed with interested parties in the state. Jess agreed and said he would notify interested Compact members of any future action.

A tentative date of July 19, 1990, was set for the next annual meeting.

Danielson then moved to instruct the Engineer Advisors to perform their normal computations. Pope seconded the motion under protest concerning the methodology. Motion approved.

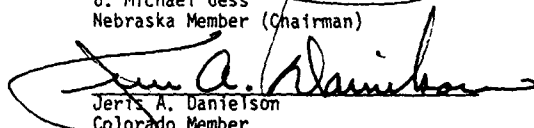
New Business

Chairman Jess asked for any further items of discussion. Kutz and Danielson volunteered to review their respective records concerning any relevant Compact information. It was agreed that if pertinent information be found, Compact members would be informed and, if necessary, a special meeting convened to deal with that information.

Danielson moved to adjourn. Pope seconded. ~~Motion~~ passed. The meeting adjourned at 3:15 p.m.



J. Michael Jess  
Nebraska Member (Chairman)



Jeris A. Danielson  
Colorado Member



David L. Pope  
Kansas Member

REPORT OF THE ENGINEERING COMMITTEE  
TO THE  
REPUBLICAN RIVER COMPACT ADMINISTRATION  
FOR THE 1988 WATER YEAR

The Engineering Committee met in Lincoln, Nebraska on May 3, 1989, to address the work assigned by the Compact Administration at the July 7, 1988, annual meeting. Those in attendance were as follows:

Bob Bishop	Nebraska Department of Water Resources
Russ Oaklund	Nebraska Department of Water Resources
Ann Bleed	Nebraska Department of Water Resources
Jerry Hilmes	Kansas Division of Water Resources
James Bagley	Kansas Division of Water Resources
Hal Simpson	Colorado Division of Water Resources
Alan Berryman	Colorado Division of Water Resources

The Compact Administration gave the Engineering Committee two assignments, one being the computation of virgin water supply, consumptive use, and adjustment of allocations. The other assignment was to evaluate the possible changes in computation formulae to more accurately reflect the consumptive use of water in the mainstem of the Republican River in those cases where the virgin water supply originates in a tributary basin i.e. Red Willow Creek and Medicine Creek basins.

Assignment No. 1

The Engineering Committee reviewed the computations of virgin water supply and consumptive use by basin for 1988 using the previously approved procedures. Exhibit A attached, includes Table 1, a summary of the results of the virgin water supply computations and adjusted allocations and Table 2, a



summary of consumptive uses by each state from the mainstem and sub-basins. The Engineering Committee also reviewed the printouts of the detailed computations including five and ten year averages. The Engineering Committee noted that the virgin water supply declined from 1987 and that consumptive use increased. It also noted that no state exceeded the total of adjusted allocations but that in some sub-basins, adjusted allocations were exceeded.

The Engineering Committee decided that it could improve Table 2 by inserting adjusted allocations directly below the total consumptive use values for each sub-basin. Ann Bleed agreed to make these changes to the program that produces Table 2.

The Engineering Committee reviewed Nebraska's procedure to compute consumptive use which assumes a crop consumptive use requirement of 26 inches and subtracts April 1 - September 30 precipitation. It was agreed that the procedure could be improved by using monthly estimates of consumptive use and effective precipitation. Nebraska will consider this proposal for next year.

Colorado reported on its 1988 field survey of ground water use for the North Fork of the Republican River basin and the Arikaree River basin. The South Fork of the Republican River basin will be done in 1989.

Jerry Hilmes inquired about Nebraska's definition of an alluvial well which is a well within one mile of the stream. Nebraska will review this definition and determine if it should be revised to consider the width of the alluvium.

#### Assignment No. 2

With respect to the special assignment, the Engineering Committee reviewed the computation of consumptive use in the Medicine Creek and Red Willow Creek basins. The consumptive use formulae could be changed as shown in the following discussion to better reflect the location of consumptive use.

## Medicine Creek

The Engineering Committee agreed that the net evaporation from Harry Strunk Lake should be charged to the Republican River mainstem allocation since the irrigation supported by this reservoir water is on land along the mainstem. This change would reduce the consumptive use on Medicine Creek by surface water from 3940 a-f to 590 a-f and the total consumptive use would be 9320 a-f. The Republican River mainstem consumptive use would have the 3350 a-f net evaporation from Harry Strunk Lake added to it.

The Engineering Committee agreed that the virgin water supply formula would not have to be changed.

## Red Willow Creek

The Engineering Committee reviewed the use of surface water in the basin. There are 1750 acres supplied by surface water in the basin with 505 acres of the 1750 acres served by the Red Willow Canal. The Red Willow Canal serves a total of 5055 acres. Thus, 10 percent of the Red Willow Canal diversions and 10 percent of the net evaporation from Hugh Butler Lake should be charged to the Red Willow Creek basin and the remaining 90 percent to the mainstem.

The Red Willow Creek basin consumptive use formula should be changed as follows:

"The annual consumptive use equals the other surface water diversions; plus, 10 percent of the Red Willow Canal diversions; plus, ground water diversions; minus, the return flows from the above diversions; plus, 10 percent of the net evaporation from Hugh Butler Lake."

For 1988, this formula would reduce the consumptive use in the Red Willow Creek basin from 11,430 a-f to 5,250 a-f.

The virgin water supply formula will not have to be changed.

**Republican River Mainstem**

The consumptive use formula would have to be modified by adding the following:

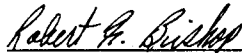
"plus, the net evaporation from Harry Strunk Lake;  
plus, 90 percent of the net evaporation from Hugh Butler Lake;  
plus, 90 percent of the Red Willow Canal diversions;  
minus, the return flow to the mainstem from 90 percent of the Red Willow Canal diversions."

For 1988, the above formula would increase the consumptive use of the mainstem by 9,530 a-f bringing it to 171,270 a-f.

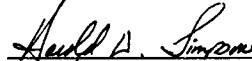
Exhibit B attached is an extra copy of Table 2 on which the values of the old formulae are lined through and the values from the new formulae added.

The next meeting will be the first Wednesday of May in 1990, unless the Compact Administration assigns tasks that require additional meetings.

Respectfully Submitted,



Robert F. Bishop, Chairman



Harold D. Simpson, Secretary



Gerald E. Himes

Table 1

1988 Computed Annual Virgin Water Supply and  
Original and Annual Adjusted Allocations

EXHIBIT "A"

Sub-basin and the Original Compact Virgin Water Supply	Computed Annual Virgin Water Supply Republican River Basin 1988 (Acre Feet)			Comparison of Original Compact Allocations and 1988 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	22530	8000	30530		12600	13940	2100	2320	14700	16260	
Sappa Cr.	21400	21430	6100	27530		8800	11320	8800	11320	17600	22640	
Beaver Cr.	16500	17700	790	18490	3300	3700	6400	7170	6700	7510	16400	18380
Medicine Cr.	50800	8090	40230	48320					4600	4600	4600	4600
Red Willow Cr.	21900	4290	21110	25400					4200	4870	4200	4870
Driftwood Cr.	7300	1260	4340	5600			500	380	1200	920	1700	1300
Frenchman Rv.	98500	29850	63530	93380					52800	52800	52800	52800
South Fork of the Republican Rv.	57200	10120	17610	27730	25400	12320	23000	11160	800	390	49200	23870
Rock Cr.	11000	120	8330	8450					4400	3380	4400	3380
Buffalo Cr.	7890	630	4210	4840					2600	1590	2600	1590
Arikaree Rv.	19610	7240	5880	13120	15400	10300	1000	670	3300	2210	19700	13180
N.F. Republican Rv in Colorado	44700	760	35800	36560	10000	8180			11000	9000	21000	17180
N.F. and Main Stem of Republican Rv. incl. Blackwood Cr. in Nebraska§	94500	73360	112410	185770			138000	176290	132000	169380	270000	345670
<b>TOTALS</b>	<b>478900</b>	<b>197380</b>	<b>328340</b>	<b>525720</b>	<b>54100</b>	<b>34500</b>	<b>190300</b>	<b>220930</b>	<b>234500</b>	<b>270290</b>	<b>478900</b>	<b>525720</b>

§ Main Stem 87,700  
Blackwood Creek 6,800

Table 2

1988 Computed Consumptive Use within the  
Republican River Basin (Acre Feet)

EXHIBIT "A"

Sub-basin	Colorado		Total	Kansas		Total	Nebraska		Total	Total Basin		Total
	Ground Water	Surface Water		Ground Water	Surface Water		Ground Water	Surface Water		Ground Water	Surface Water	
Prairie Dog Cr.				22530	5300	27830 13940 †	770	150	920 2320 †	23300	5450	28750 16260 †
Sappa Cr.				7820	130	7950 11320 †	14330	520	14850 11320 †	22150	650	22800 22640 †
Beaver Cr.	0	0	0 3700 †	9160	30	9190 7170 †	8540	160	8700 7510 †	17700	190	17890 18380 †
Medicine Cr.							8730	3940	12670 4600 †	8730	3940	12670 4600 †
Red Willow Cr.							4290	7140	11430 4870 †	4290	7140	11430 4870 †
Driftwood Cr.				0	0	0 380 †	1260	0	1260 920 †	1260	0	1260 1300 †
Frenchman Rv.							29850	17010	46860 52800 †	29850	17010	46860 52800 †
South Fork of the Republican Rv.	2530	7940	10470 12320 †	7590	160	7750 11160 †		0	0 390 †	10120	8100	18220 23870 †
Rock Cr.							120	70	190 3380 †	120	70	190 3380 †
Buffalo Cr.							630	370	1000 1590 †	630	370	1000 1590 †
Arikaree Rv.	6110	0	6110 10300 †	250	0	250 670 †	880	0	880 2210 †	7240	0	7240 13180 †
N.F. Republican Rv in Colorado	760	3980	4740 8180 †				0	3130	3130 9000 †	760	7110	7870 17180 †
N.F. and Main Stem of Republican Rv. incl. Blackwood Cr. in Nebraska †				180	58120	58300 176290 †	71050	90690	161740 169380 †	71230	148810	220040 345670 †
TOTALS	9400	11920	21320 34500 †	47530	63740	111270 220930 †	140450	123180	263630 270290 †	197380	198840	396220 525720 †

† indicates adjusted allocations from Table 1)

EXHIBIT "B"  
Showing Value Changes  
From Revised Formulae

Table 2  
1988 Computed Consumptive Use within the  
Republican River Basin (Acres 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.				22530	5300	27830 13940 *	770	150	920 2320 *	23300	5450	28750 16260 *
Sappa Cr.				7820	130	7950 11320 *	14330	520	14850 11320 *	22150	650	22800 22640 *
Beaver Cr.	0	0	0 3700 *	9160	30	9190 7170 *	8540	160	8700 7510 *	17700	190	17890 18380 *
Medicine Cr.							8730	<del>590</del> <del>3940</del> 9320 12670 4600 *		8730	3940	12670 4600 *
Red Willow Cr.							4290	<del>960</del> <del>7140</del> 5250 11430 4870 *		4290	7140	11430 4870 *
Briftwood Cr.				0	0	0 380 *	1260	0	1260 920 *	1260	0	1260 1300 *
Frenchman Rv.							29850	17010	46860 52800 *	29850	17010	46860 52800 *
South Fork of the Republican Rv.	2530	7940	10470 12320 *	7590	160	7750 11160 *		0	0 390 *	10120	8100	18220 23870 *
Rock Cr.							120	70	190 3380 *	120	70	190 3380 *
Buffalo Cr.							630	370	1000 1590 *	630	370	1000 1590 *
Arikaree Rv.	6110	0	6110 10300 *	250	0	250 670 *	880	0	880 2210 *	7240	0	7240 13180 *
N.F. Republican Rv in Colorado	760	3980	4740 8180 *				0	3130	3130 9000 *	760	7110	7870 17180 *
N.F. and Main Stem of Republican Rv. incl. Blackwood Cr. in Nebraska				180	58120	58300 176290 *	71050	<del>100220</del> <del>30690</del> 171270 161740 169380 *		71230	148810	220040 345670 *
<b>TOTALS</b>	<b>9400</b>	<b>11920</b>	<b>21320</b> <b>34500 *</b>	<b>47530</b>	<b>63740</b>	<b>111270</b> <b>220930 *</b>	<b>140450</b>	<b>123180</b>	<b>263630</b> <b>270290 *</b>	<b>197380</b>	<b>198840</b>	<b>396220</b> <b>525720 *</b>

(\* indicates adjusted allocations from Table 1)