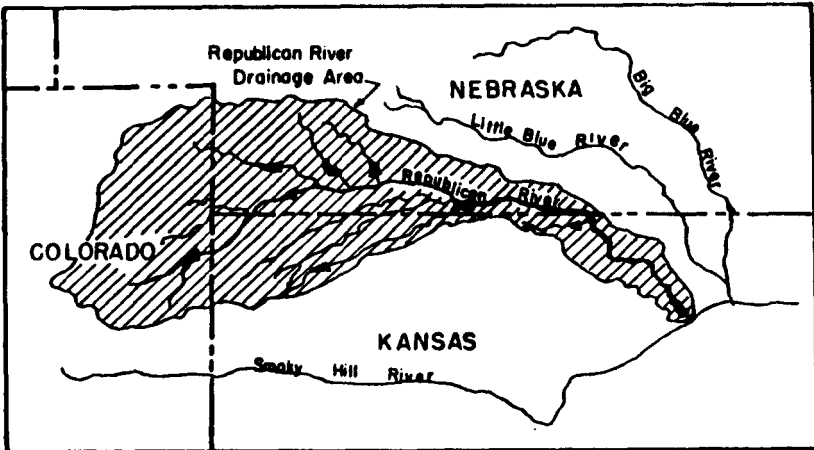




# REPUBLICAN RIVER COMPACT ADMINISTRATION

## TWENTY-FOURTH ANNUAL REPORT



For the Year 1983

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Alma, Nebraska

July 12, 1984

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## TWENTY-FOURTH ANNUAL REPORT

### REPUBLICAN RIVER COMPACT ADMINISTRATION

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

1. Pursuant to Rule 12, as amended, this report covers the period from July 8, 1983 to July 12, 1984.
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-Fifth Annual Meeting of the Administration was held on July 12, 1984, at Alma, 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 1983 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 the next two years.

## MINUTES

### 25th Annual Meeting Republican River Compact Administration

The meeting was called to order by Chairman Michael Jess at 9:00 a.m., July 12, 1984, in the Harlan County Courthouse, Alma, Nebraska. Those in attendance were:

<u>Name</u>	<u>Agency</u>	<u>Location</u>
Michael Jess	Nebraska Commissioner	Lincoln, NE
Jeris A. Danielson	Colorado Commissioner	Denver, CO
David L. Pope	Kansas Commissioner	Topeka, KS
Hal Simpson	Engineer Advisor	Denver, CO
Jerry Hilmes	Division of Water Resources	Topeka, KS
James Bagley	Division of Water Resources	Topeka, KS
Bob Bishop	Department of Water Resources	Lincoln, NE
Tom Lamberson	Department of Water Resources	Lincoln, NE
Keith Paulsen	Department of Water Resources	Lincoln, NE
Dudley Jackson	Department of Water Resources	Cambridge, NE
Brad Edgerton	Department of Water Resources	Cambridge, NE
Larry Arneson	U. S. Bureau of Reclamation	Denver, CO
Bob Kutz	U. S. Bureau of Reclamation	Grand Island, NE
Bob Swain	U. S. Bureau of Reclamation	Denver, CO
Dennis Allacher	U. S. Bureau of Reclamation	McCook, NE
Robert Prouty	U. S. Bureau of Reclamation	Grand Island, NE
Larry Janicek	Lower Republican NRD	Alma, NE

#### Approval of Minutes

A motion was made by Pope and seconded by Danielson to adopt the minutes of the July 7, 1983, meeting. Motion passed.

#### Report of Chairman

Chairman Jess reported that three Republican valley irrigation districts have applied for rights to divert South Platte River water into Enders Reservoir. The Nebraska Game and Parks Commission reviewed the application to determine its effect on nongame and endangered species, and submitted a biological opinion. The opinion indicated jeopardy to endangered species would result if the project was built and operated.

Chairman Jess reported on the status and activities of the Upper Republican Ground Water Control Area. The Control Area is located along the Colorado-Nebraska state line and has been managed by the NRD since its creation in 1977. Ground water declines within the area have slowed considerably in the past several years.

The Department of Water Resources has granted permits to several well owners along the Colorado-Nebraska state line. These permits were issued as a result of the Sporhase and Moss Supreme Court decision allowing interstate transfer of ground water.

Chairman Jess reported on the past years' activities of Governor Kerrey's Water Independence Congress. As a result of Congress recommendations, LB 1106 was passed. This bill established a five-member Water Management Board whose primary responsibility is to review, evaluate and fund all major water projects exceeding \$10 million in cost. Another provision of the bill allows granting water appropriations for maintaining instream flows for fish and wildlife or recreation. The bill also requires natural resources districts to establish ground water management plans by January 1986.

Dudley Jackson reported on water administration activities within the Republican Basin. Ample water supply conditions were in existence up to the time of the annual meeting.

#### Commissioners' Reports

Jeris Danielson reported a leveling off of ground water declines in Colorado. The decline is less than the management goal. He also stated that there has been significant changes in farming practices.

Danielson reported that no significant ground water legislation was passed in the last Colorado legislative session. The Governor has, however, formed a ground water task force that is reviewing the issue of nontributary ground water.

Commissioner Dave Pope informed the group of recent legislation in Kansas. Senate Bill 555, an amendment to the appropriation act, allows out-of-state water users to apply for a permit to appropriate ground water or surface water from Kansas for use outside the state. This bill was essentially Kansas' response to the Sporhase case. Another new bill, Senate Bill 497, states that all future permits to appropriate water filed after the effective date of this bill shall be conditional. These permits would be junior to any future minimum stream flow requirements that are established prior to July 1, 1990.

Kansas is in the process of developing a state water policy plan. The one-year job was extended to two years. A series of public meetings on the plan resulted in approval and adoption of one subsection. That subsection provides the procedure for establishing minimum stream flow standards for four Kansas rivers. As of July 1, 1984, Prairie Dog Creek and Beaver Creek alluvial valleys were closed to further surface and ground water appropriations.

Pope reported on the proposed transfer of water from Milford Reservoir to central Kansas. A feasibility study is being conducted.

#### Bureau of Reclamation Report

Bob Kutz, Project Manager for the Bureau of Reclamation, gave a report on recent Bureau activities within the Republican Basin.

The Bureau has completed a Bostwick Irrigation District feasibility study of converting open-ditch laterals to buried plastic pipe. The plan, however, was voted down. The Frenchman-Cambridge Irrigation District's \$5.5 million buried lateral project will be finished in fiscal year 1985.

The Corps of Engineers has been requested to help flood victims downstream of Red Cloud, Nebraska. A preliminary study found it infeasible to construct any major projects. Two hundred thousand dollars has been requested for further Republican Basin studies. The appropriations bill has passed the House and Senate and is awaiting the President's signature.

The Bureau has completed replacement of cables on Trenton Dam spillway gates.

A new reclamation law requires all irrigators to certify lands that receive water from federal projects. New certification forms are now being completed.

Kutz reported that the sale of Bonny Reservoir storage water rights to the State of Colorado was completed two years ago. The last payment is due this year.

Starting in 1984, irrigation districts must pay a portion of the Corps' operation and maintenance costs for Harlan County Dam. This amounts to \$1.50 per irrigated acre for the lands below Harlan County in Nebraska and Kansas. An agreement has been reached by state, local and federal officials concerning a minimum flow schedule below Harlan County Dam.

The Bureau of Reclamation is preparing emergency preparedness plans for all reservoirs. All Republican Basin plans are due to be completed by September 1984. The Bureau is also making safety evaluations of all existing dams.

The Bureau of Reclamation has been researching low-cost methods of improving earth canal systems. After some experimenting on the Farwell Irrigation project using a bottom only canal lining with 10 millimeter plastic and covering it with one-half to one foot of soil, it appears about 50 percent of canal seepage loss may be saved. The Bostwick and Frenchman-Cambridge irrigation districts were selected for further study. Because of the excessive rainfall this spring, the projects were delayed until the fall of 1984.

Kutz reported that the Middle Republican NRD has completed ground water model studies of the Republican Basin. The studies indicate that base flows will be depleted in some streams by the year 2000 unless the continuation of ground water development in Red Willow and Medicine Creek basins is stopped. These studies are available from the NRD office.

Bob Swain reported on the proposed Colorado-Nebraska recharge project.

Larry Arneson reported on the Bureau's Republican Water Management Study. The main purpose of the study is to re-evaluate the water supply in the Republican River Basin and to address the causes of declining inflows. The past hydrologic records have been reviewed. The most significant changes have occurred in the South Fork Republican River subbasin, the Beaver and Sappa Creeks subbasins, and the Arikaree subbasin. Baseflow predictions have been made with and without additional well development after 1978.

#### Report of Engineering Committee

Copies of the Engineering Committee report were distributed. Bob Bishop reported that the Engineering Committee met May 2, 1984. At that meeting, the Committee was briefed on the Republican Water Management Study. Because the Bureau's report is not completed, the Engineering Committee requested an additional year to make an assessment.

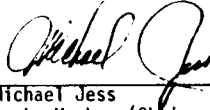
Motion was made by Danielson and seconded by Pope that the Engineering Committee analyze the Bureau's Republican Water Management Study and present their recommendations at the next Compact meeting. Motion passed.

Motion was made by Pope and seconded by Danielson to accept the Engineering Committee report. Motion passed. Danielson suggested that the committee utilize graphic materials in future reports.

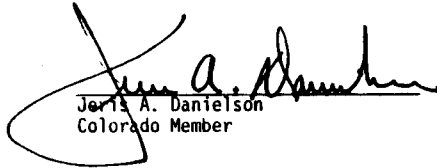
New Business

Danielson moved that the Compact Administration adopt a resolution in recognition of Glen Brees' service to the Republican Compact Administration. Pope seconded the motion. Motion carried.

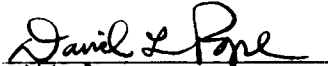
The next meeting will be held July 11, 1985 in Colorado. Meeting adjourned.



J. Michael Jess  
Nebraska Member (Chairman)



Jerry A. Danielson  
Colorado Member



David L. Pope  
Kansas Member

Report of Engineering Committee to the  
Republican River Compact Administration  
For the 1983 Water Year

The meeting of the Engineering Committee was held in the office of the Kansas Division of Water Resources on May 2, 1984.

Committee members present were:

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:

Lon Knapp, U. S. Bureau of Reclamation, Denver  
Robert Swain, U. S. Bureau of Reclamation, Denver  
Larry Arneson, U. S. Bureau of Reclamation, Topeka  
James O. Bagley, 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; however, in accordance with revised formulas which now include municipal and industrial uses. The formulas were computed and printed by Lee Becker with Nebraska's Apple Computer using the input data provided by each state.

Shown in Table 1 are the 1983 computed virgin water supply by ground water and surface water components shown together with the original computed virgin water supply and the original allocations to each state by sub-basin along with the 1983 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 1983 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 measures 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.

At the last annual meeting of the Administration the Engineering Committee was directed to "review and assess" the Bureau of Reclamation's Republican River Basin water studies and report to the Compact at the forthcoming annual meeting.

As a result of this directive the Engineering Committee requested a presentation on this matter by the Bureau. Larry Arneson along with Robert Swain and Lon Knapp of the Bureau presented an update on the Republican River Basin Water Management Study. Information given was from preliminary reports, and it is anticipated that a final copy will not be available until October.

Mr. Arneson advised that the main purpose of the study is to examine the future water supply in the Republican River Basin. Several component studies have been completed, or nearly so, in an attempt to verify the sources of surface water depletions. These are the analysis of: (1) conservation practices, (2) ground water pumping, (3) distribution systems, (4) the precipitation regime, and (5) changes in riparian vegetation.

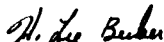
Each of the above items were addressed and/or discussed and summary results were viewed. Preliminary drafts of components of the study report were provided to Engineering Committee members about two weeks prior to our regular meeting. We were cautioned about the use or assessment of the report at this preliminary stage.

After hearing the report, the Engineering Committee agreed that an assessment of the study should not be made until the final report is available. We respectfully request another year in which to make an assessment of the study to the Compact officials.

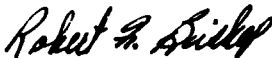
The next regular meeting of the Engineering Committee will be held in Denver, Colorado, May 1, 1985.

Respectfully submitted,

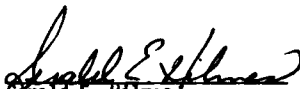
Engineering Committee  
Republican River Compact



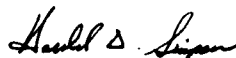
H. Lee Becker



Robert F. Bishop



Gerald E. Himes



Harold D. Simpson

Table 1

Computed Annual Virgin Water Supply and  
Original and Annual Adjusted Allocations, 1983

Sub-basin and the Original Compact Virgin Water Supply	Computed Annual Virgin Water Supply Republican River Basin 1983 (Acre Feet)			Comparison of Original Compact Allocations and 1983 Adjusted Allocations (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.	27,600	16,860	6,250	23,110			12,600	10,550	2,100	1,760	14,700	12,310
Sappa Cr.	21,400	18,590	4,930	23,520			8,800	8,800	8,800	8,800	17,600	17,600
Beaver Cr.	16,500	15,130	23,140	38,270	3,300	7,650	6,400	14,840	6,700	15,540	16,400	38,030
Medicine Cr.	50,800	7,170	36,150	43,320					4,600	3,920	4,600	3,920
Red Willow Cr.	21,900	3,740	19,380	23,120					4,200	4,200	4,200	4,200
Driftwood Cr.	7,300	1,180	4,040	5,220			500	360	1,200	860	1,700	1,220
Frenchman Rv.	98,500	23,510	81,590	105,100					52,800	52,800	52,800	52,800
South Fork of the Republican Rv.	57,200	9,310	27,860	37,170	25,400	16,510	23,000	14,950	800	520	49,200	31,980
Rock Cr.	11,000	80	8,170	8,250					4,400	3,300	4,400	3,300
Buffalo Cr.	7,890	320	4,680	5,000					2,600	1,650	2,600	1,650
Arikaree Rv.	19,610	5,080	7,770	12,850	15,400	10,090	1,000	660	3,300	2,160	19,700	12,910
N.F. Republican Rv. in Colorado	44,700	380	42,820	43,200	10,000	10,000			11,000	11,000	21,000	21,000
*N.F. and Main Stem of Republican Rv. incl. Blackwood Cr. in Nebraska	94,500	62,770	241,670	304,440			138,000	240,540	132,000	231,110	270,000	471,650
TOTALS	478,900	164,120	508,450	672,570	54,100	44,250	190,300	290,700	234,500	337,620	478,900	672,570

\*Main Stem 87,700

Blackwood Creek 6,800

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

Table 2

Computed Consumptive Water Use for 1983 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 Creek				16,920	2,190	19,110	990	0	990	17,910	2,190	20,100
Sappa Creek				9,270	180	9,450	9,840	740	10,580	19,110	920	20,030
Beaver Creek	0	0	0	8,590	100	8,690	6,540	320	6,860	15,130	420	15,550
Medicine Creek							7,610	4,610	12,220	7,610	4,610	12,220
Red Willow Creek							3,740	7,420	11,160	3,740	7,420	11,160
Driftwood Creek				0	0	0	1,180	0	1,180	1,180	0	1,180
Frenchman River							23,510	29,010	52,520	23,510	29,010	52,520
South Fork of the Republican River	2,150	11,470	13,620	7,160	0	7,160	0	0	0	9,310	11,470	20,780
Rock Creek							80	0	80	80	0	80
Buffalo Creek							320	30	350	320	30	350
Arikaree River	4,060	0	4,060	460	0	460	560	0	560	5,080	0	5,080
N.F. Republican Rv. in Colorado	380	5,810	6,190				0	2,370	2,370	380	8,180	8,560
N.F. & Main Stem of Republican Rv. incl. Blackwood Cr. in Nebraska				180	64,390	64,570	60,640	88,620	149,260	60,820	153,010	213,830
TOTALS	6,590	17,280	23,870	42,580	66,860	109,440	115,010	133,120	248,130	164,180	217,260	381,440

\*Evaporation from Harlan County Reservoir apportioned to Kansas (62%) 12,800 and to Nebraska (38%) 7,840 AF  
#Ground water from alluvial stream deposits within one mile of the stream

**RESOLUTION**

**WHEREAS**, Glen E. Brees, Chief of the Hydrographic Branch, Colorado Division of Water Resources, served as a member of the Engineering Committee from 1967; and

**WHEREAS**, Mr. Brees retired from his duties as Chief of the Hydrographic Branch on February 1, 1984; and

**WHEREAS**, Mr. Brees through the years has contributed knowledge, professional expertise and judgment to the fulfillment of the purposes of the Republican River Compact and to the performance of the Engineering Committee;

**NOW, THEREFORE, BE IT RESOLVED** that the Republican River Compact Administration does hereby acknowledge the outstanding contribution to the States of Colorado, Kansas, and Nebraska and does express on behalf of the people of these states their appreciation for his services and extend to him best wishes for good health and an enjoyable retirement.

**BE IT FURTHER RESOLVED** that this resolution be entered into the records of this Administration and that the Chairman be instructed to send a copy to Mr. Brees.

Adopted at the Twenty-Fifth Annual Meeting of the Republican River Compact Administration at Alma, Nebraska, on the 12th day of July, 1984.

REPUBLICAN RIVER COMPACT ADMINISTRATION



J. Michael Jess, Chairman