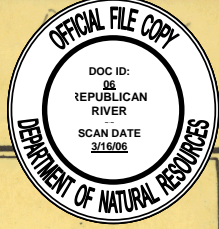
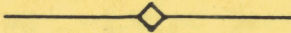


OFFICIAL



SIXTH ANNUAL REPORT

Republican River
Compact
Administration
For the Year 1965



LINCOLN, NEBRASKA
April 7, 1966

SIXTH ANNUAL REPORT

Republican River

Compact

Administration

For the Year 1965



LINCOLN, NEBRASKA

April 7, 1966

Sixth Annual Report
REPUBLICAN RIVER COMPACT ADMINISTRATION

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

1. Pursuant to Rule 12, as amended, this report covers the period from May 27, 1965, to April 7, 1966.
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, as follows:
 - A. Ralph Owens, Deputy State Engineer of Colorado
(May 27, 1965 to January 31, 1966.)
State Engineer of Colorado
(February 1, 1966 to April 7, 1966)
 - Dan S. Jones, Jr., Director, Department of Water
Resources, Nebraska
 - R. V. Smrha, Chief Engineer, Division of Water Resources,
State Board of Agriculture, Kansas
3. The Seventh Annual Meeting of the Administration was held on April 7, 1966, in the State Capitol Building, Lincoln, Nebraska. Minutes of that 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 a summary tabulation of the computation of virgin water supply for the 1965 water year and a summary tabulation of consumptive use for the 1965 water year were presented to and accepted by the Administration at the Seventh Annual Meeting. Copies of these presentations are included elsewhere in this report.
5. On April 7, 1966, Mr. A. R. Owens, Colorado Member, was unanimously elected Chairman to serve until the next annual meeting of the Administration.

Respectfully submitted,

REPUBLICAN RIVER COMPACT ADMINISTRATION

By:

A. Ralph Owens Colorado Member

R. V. Smrha Kansas Member

Dan S. Jones, Jr. (Chairman)
Nebraska Member

Minutes of the
Seventh Annual Meeting
Republican River Compact Administration

Lincoln, Nebraska -- April 7, 1966

The meeting was called to order by the Chairman, Dan S. Jones, Jr., at 1:00 o'clock P.M., in the Supreme Court Hearing Room No. 2, Capitol Building, Lincoln, Nebraska.

The following were in attendance:

<u>Name</u>	<u>Agency</u>	<u>Location</u>
R. V. Smrha	Official Member	Topeka, Kans.
Dan S. Jones, Jr.	Official Member	Lincoln, Nebr.
Clark E. Schnurr	Representing the Official Member from Colorado	Denver, Colo.
Winston Hedges	Bureau of Reclamation	McCook, Nebr.
Fred Zabel	Nebr. Dept. of Water Resources	Cambridge, Nebr.
James M. Ingles	Bureau of Reclamation	McCook, Nebr.
W. L. Northrop	Corps of Engineers	Kansas City, Mo
R. T. Coomes	Corps of Engineers	Kansas City, Mo
Ralph Waddington	Soil & Water Cons. Comm.	Lincoln, Nebr.
K. A. MacKichan	U. S. G. S.	Lincoln, Nebr.
Jesse L. Honnold	Bureau of Reclamation	Denver, Colo.
Ray E. Aldrich	Bureau of Reclamation	McCook, Nebr.
W. H. Sunderland	Kans. Division of Water Resources	Topeka, Kans.
Clark I. Stocking	Kans. Division of Water Resources	Stockton, Kans.
C. H. Christensen	Bureau of Reclamation	Denver, Colo.
Jack McNeice	Bureau of Reclamation	McCook, Nebr.
Ken Kauffman	Bureau of Reclamation	McCook, Nebr.
M. E. Ball	Nebr. Dept. of Water Resources	Lincoln, Nebr.
H. L. Mackey	Kans. Division of Water Resources	Topeka, Kans.
John Armstrong	Associated Press	Lincoln, Nebr.

The Chairman stated that this meeting constitutes the regular annual meeting of the Administration in accordance with the Rules and Regulations which provide that such meeting be held in March or April of each year.

The Chairman presented a letter dated March 29, 1966, from A. R. Owens, State Engineer of Colorado and Colorado's official member, appointing Mr. Clark E. Schnurr to act for Colorado at the 1966 annual meeting of the Administration. A copy of Mr. Owen's letter is attached as Exhibit "A". There being no objection, Mr. Schnurr was seated upon motion of Mr. Smrha.

1. Approval of Minutes of Sixth Annual Meeting.

Mr. Smrha noted the minutes of the Sixth Annual Meeting had been previously approved by each member through correspondence and moved that they be approved as published in the Fifth Annual Report. The motion was seconded by Mr. Schnurr and passed unanimously.

2. Report of the Chairman.

No official action was taken during the year other than the calling of the annual meeting. The 1965 water supply in the Republican River Basin was one of the best of record. The consumptive use of water did not approach the amounts allocated by the compact in any of the three states.

The Chairman has had informal discussions with Mr. K. A. MacKichan, District Chief, Nebraska District, U. S. Geological Survey, and Mr. M. E. Ball, Chairman of the Engineering Committee, concerning the proposed return flow studies in the Basin between Trenton and Cambridge. I am glad to report that Mr. MacKichan has initiated the installation of additional gauging stations which are considered necessary for this study. Mr. MacKichan is present and will make a progress report during this meeting.

3. Reports of the Official Members or Representatives.

Mr. Smrha reported that, as past Chairman, he had compiled the Fifth Annual Report of the Administration and had copies of the report distributed to the members, to representatives of the Federal agencies and to other interested persons. He stated that he is concerned about return flow data, and that the Kansas Water Resources Board will make a report to the Legislature on its basic data program needs which may result in additional return flow studies in his state.

Mr. Schnurr had no report.

4. Unfinished Business.

The continuing request of the Fish and Wildlife Service to maintain continuous flows in the river below the Guide Rock Diversion Dam was discussed briefly. It was the consensus of the members that the problem is not one to concern the Administration at this time.

5. New Business.

A. Report of the Engineering Committee: Mr. M. E. Ball, Chairman, presented a report of the Engineering Committee. A copy of that report is attached hereto as Exhibit "B". Accompanying the report are Exhibits "C" and "D", tabulations of the Computed Virgin Water Supply, and the Computed Annual Consumptive Use for the 1965 Water Year, respectively. Mr. Harris Mackey, the Kansas member of the Engineering Committee, discussed Exhibits "C" and "D" in considerable detail. Exhibit "C" shows the computed annual virgin water supplies by source and compares them with the virgin water supplies used in the compact. He noted that the lower, or downstream, tributaries on the south side of the river in 1965 generally greatly exceeded the compact amounts, while the northerly and upstream tributaries were generally below the compact amounts. Mr. Mackey reported that the Engineering Committee had computed annual virgin water supply for each source and consumptive use in each state for a seven-year period. Further study and computations had been made of possible methods to adjust allocations as provided in the Compact but no decision had been reached on how this might be accomplished.

In the discussion of the report it was brought out that some consideration was given, in the 1965 computation, to including municipal water uses for the first time, but such use was not included. The City of Norton, Kansas started the use of Norton Reservoir water for municipal purposes in 1965, and the Bureau of Reclamation has had inquiries regarding the use of basin water from two other cities.

B. Report of the U. S. Bureau of Reclamation:

1. Use of Water Under Warren Act Contracts: Mr. Winston Hedges, Superintendent of Irrigation, Bureau of Reclamation, McCook, reported that it is expected that some of the water stored in the Bonny Reservoir will be delivered for irrigation of lands in Colorado, Kansas and Nebraska during 1966. There have been inquiries from persons in all three states. Water will be delivered to Kansas lands along Prairie Dog Creek from Norton Reservoir for the second year. There have been two inquiries from Nebraska appropriators on Prairie Dog Creek for water from Norton Reservoir. Mr. Hedges pointed to the need for assurances that the states would administer the streams so that any waters contracted for can be delivered. He mentioned also that a contract is now being drafted between the Midwest Oil Corp. and the Bureau under which water will be released from Bonny Reservoir to repay the river for water which may be withdrawn therefrom by induced recharge to a well field along the river from which water will be pumped for use in the secondary recovery of oil from a nearby oil field. It was the consensus of the Administration that the proposed use of storage water from Bonny Reservoir under the proposed oil company contract would not be objected to as long as the terms of the compact are complied with.

2. Use of Reservoir Water for Municipal Purposes: Mr. Kenneth Kauffman, Planning Engineer, U. S. Bureau of Reclamation, McCook, reported that preliminary studies have been made on a proposal to furnish water from Harlan County Reservoir to the City of Phillipsburg, Kansas, for municipal purposes. Very preliminary studies are in progress with respect to a proposal for serving the City of Belleville, Kansas, as a part of the proposed Scandia Unit Development.

3. Consumptive Use Studies: Mr. Hedges summarized the study now in progress by the Bureau on the Meeker-Driftwood area southwest of McCook, which is one of two such studies being conducted by the Bureau of Reclamation in Region 7. The Driftwood study, in which solar radiation, rainfall, surface run-off, irrigation delivery, and other factors are measured was initiated in 1965 on 185 acres. In 1966 it will be detailed over 380 acres. He reported the results of the 1965 study and said he would furnish a copy of the 1965 report to each of the members of the Administration.

Pursuant to a request from the Engineering Committee, Mr. J. M. Ingles, Projects Manager, McCook, submitted a letter to the Administration concerning methods of computing river depletion caused by pumping from wells, together with a reprint of Section F from Technical Memorandum 657, "River Depletion Resulting from Pumping of a Well near a River". Mr. Kauffman discussed the report at some length and agreed to send copies of the reprint to members of the Engineering Committee.

C. Report of U. S. Geological Survey on Progress of Return Flow Studies: Mr. Kenneth MacKichan, District Chief, Lincoln District, reported that recorders and other gaging equipment are being assembled to establish seven gaging stations to measure a portion of the presently ungaged areas within the reach of the Republican River from Trenton to Cambridge, Nebraska. These stations will be installed within the next few months and the study developed by Floyd LeFever, former District Engineer, and presented to the Administration in 1965, will be carried out as planned.

D. Comments of Federal Agencies: Representatives of the other Federal agencies present expressed their thanks for being invited to the meeting. Mr. W. L. Northrup, Corps of Engineers, said that an engineer from the Kansas City District would be assigned to cooperate with the Engineering Committee in place of Mr. LeRoy Balke who recently transferred to the U. S. Weather Bureau.

6. Engineering Committee Assignments.

The administration agreed that the assignments to the Engineering Committee would include continuation of the present assignments plus exploring the need for modifying the Annual Virgin Water Supply and Consumptive Use Formulas to include municipal and industrial diversions from ground water and surface water. These assignments are as follows:

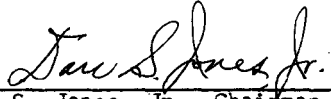
1. Compute annual virgin water supply for 1966;
2. Compute annual consumptive use for 1966;
3. Continue studies of method of computing inflow to Lovewell Reservoir;
4. Continue study of proration of reservoir evaporation losses;
5. Compute adjusted allocations on annual, 5-year and average annual basis;
6. Continue investigation of depletions by wells in the alluvium and the effect of well distance from a stream on those depletions;
7. Explore the need for modifying Annual Virgin Water Supply and Consumptive Use Formulas to include municipal and industrial diversions from ground water and surface water.

7. Election of Chairman.

Mr. A. R. Owens, Colorado member, was unanimously elected Chairman for the ensuing year.

8. Adjournment.

On motion of Mr. Schnurr, the meeting was adjourned at 4:00 P. M.



Dan S. Jones, Jr., Chairman

JOHN A. LOVE
Governor



A. RALPH OWENS
State Engineer

DIVISION OF WATER RESOURCES

232 STATE SERVICES BUILDING
1525 SHERMAN STREET
DENVER, COLORADO 80203
March 29, 1966

Republican River Compact Administration
Department of Water Resources
State Capitol
Lincoln, Nebraska 68509

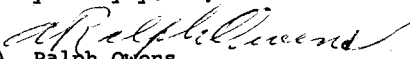
Attention: Mr. Dan S. Jones, Jr.,
Chairman

Gentlemen:

It will be impossible for me to meet with
you gentlemen this spring.

In my stead, I am appointing Mr. Clark E.
Schnurr to act for Colorado at your forthcoming
meeting.

Very truly yours,


A. Ralph Owens
State Engineer

ARO:L

Report of Engineering Committee
Republican River Compact Administration

April 7, 1966

The Republican River Compact Administration, in its annual meeting held May 27, 1965, agreed that the assignments to the Engineering Committee would include continuation of present assignments, items 1 through 5 plus new assignments item 6 & 7.

1. Virgin Water supply computations for 1965;
2. Consumptive use computations for 1965;
3. Continuation of studies of method of computing inflow to Lovewell Reservoir for 1965;
4. Continuation of study of proration of evaporation losses;
5. Adjust allocations on annual and 5-year basis;
6. Investigation of depletion by wells in the alluvium and the effect of well distance from a stream on those depletions.
7. Confer with the U.S.B.R. and the U.S.G.S. on consumptive use studies by those agencies.

The Engineering Committee held one meeting during the year, March 2 and 3, 1966, the Twelfth Meeting of the Committee, to study the above assignments. The Secretary of the Committee, by letter of March 10, 1966, submitted the following exhibits to the members of the Compact Administration for review prior to the annual meeting.

1. Virgin water supply computations, 1965 water year;
2. Summary Computed annual virgin water supply, Republican River Basin;
3. Computed annual consumptive use, Republican River Basin, 1965 water year;
4. Computation of inflow to Lovewell Reservoir, 1965 water year;

5. Computed operations of Lovewell Reservoir, 1965 Water year;
6. Consumptive use computations--Kansas--Main Stem Republican River;
7. Adjusted allocations on an annual basis, 1959 to 1965.
8. Adjusted allocations on a 5-year average basis by 5-year moving averages.

The virgin flow and consumptive use formulas, presented in previous reports of the Committee, were used without change in the preparation of the above data. Exhibits 1 and 4 through 8, are presented for discussion, without written recommendations.

James Ingles, Winston Hedges, and Kenneth Kauffman, from the U.S. Bureau of Reclamation at McCook, Nebraska, met with the Engineering Committee, to discuss matters pertinent to studies made by the Bureau of Reclamation.

Mr. Hedges reviewed the consumptive use studies being made along a section of the Driftwood Canal. The information provided by Mr. Hedges is summarized in the minutes of the meeting of the Committee, and it is expected that Mr. Hedges will present a summary of this information to the administration at its meeting. Mr. Hedges also briefly discussed procedures used by the Bureau of Reclamation to determine the effect on stream depletions by wells and he agreed to investigate the matter further and to bring that information to the annual meeting of the administration.

Mr. Hedges reported that the Bureau of Reclamation expects requests for storage water under Warren Act Contracts by water users below Bonny Reservoir in Kansas and Nebraska and below the Norton Reservoir in Kansas and Nebraska.

A place has been set aside in the agenda for a discussion of this item and the use of water for municipal purposes from reservoirs in the Basin.

Mr. Kauffman reported that the Herndon Project on Beaver Creek had been reviewed in the Commissioner's office and that office had recommended, in view of the marginal feasibility, that studies be discontinued. Copies of the report will be supplied to the states as informational data. Mr. Kauffman also stated that a reconnaissance report on the Scandia Unit should be completed by May, 1966, and detailed investigations begun next fiscal year. This project involves 16,000 acres for irrigation, and includes supplemental water for the town of Belleville.

Mr. Hedges reported that the U.S.B.R. and the U.S.C.E. have been discussing the addition of riprap at Harlan County Dam so that the reservoir can be drawn down in the future to elevation 1920 when needed. This work will be done within a few years between irrigation seasons and during a comparatively wet cycle so replacement storage can be kept in upstream reservoirs. The matter of obtaining funding is also holding up the project.

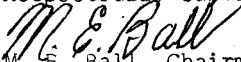
The Engineering Committee agreed to bring these matters to the attention of the administration at the annual meeting, with the suggestion that they consider setting guidelines for future Bureau of Reclamation studies, particularly as to the use of reservoir water from Bonny Reservoir. The Committee agreed that no specific recommendations would be made by the Committee concerning the matters discussed by the Bureau of Reclamation as a part of this report; however, the Committee agreed to refer to the

administration the question of including Municipal and Industrial diversions of return flows in future virgin water supply and consumptive use computations.


The committee has no new recommendations concerning the formulas for computation of the virgin water supply and consumptive use. In addition, the Committee has not discovered new information considered sufficient value for changing its policies for computing the consumptive use by irrigation wells.

The Twelfth Meeting of the Engineering Committee was not attended by a member of the Corps of Engineers. Mr. E. C. Balke of the Kansas City Office of the Corps of Engineers, has been of great help to the Engineering Committee in the past years in the study of evaporation rates from reservoirs by the Engineering committee. Mr. Balke has been transferred to the Weather Bureau. The chairman of the Engineering Committee considered that further discussion concerning evaporation was not necessary at this time and no invitation was made to the Corps of Engineers for a representative to attend this year's meeting of the Committee.

Respectfully submitted,


M. E. Ball, Chairman
Nebraska


H. L. Machee
Kansas


Charles E. Schuur
Colorado

Computed Annual Consumptive Use
Republican River Basin

1965 Water Year

Drainage Basin	Colorado	Kansas	Nebraska	Total
Prairie Dog Creek	-	8,160	0	8,160
Sappa Creek	-	1,700	6,660	8,360
Beaver Creek	0	3,020	5,020	8,040
Medicine Creek	-	-	5,220	5,220
Red Willow Creek	-	-	7,670	7,670
Driftwood Creek	-	0	360	360
Frenchman Creek	-	-	37,600	37,600
South Fork of the Republican River	7,550	1,940	110	9,600
Rock Creek	-	-	250	250
Buffalo Creek	-	-	840	840
Arikaree River	0	60	0	60
North Fork of the Republican River	4,600	-	4,650	9,250
Main Stem of the Republican River	-	43,690	93,050	136,740
TOTALS	12,150	58,570	161,430	232,150

Computed Annual Virgin Water Supply
Republican River Basin

Drainage Basin	Compact Ac. Ft.	1965 W.Y. Ac. Ft.
Prairie Dog Creek	27,600	50,120
Sappa Creek	21,400	62,180
Beaver Creek	16,500	51,160
Medicine Creek	50,800	32,250
Red Willow Creek	21,900	17,380
Driftwood Creek	7,300	8,350
Frenchman Creek	98,500	118,800
South Fork of the Republican River	57,200	53,220
Rock Creek	11,000	11,590
Buffalo Creek	7,890	5,670
Arikaree River	19,610	16,850
North Fork of the Republican River	44,700	47,300
Main Stem of the Republican plus Blackwood Creek	*94,500	71,700
Totals	478,900	546,570
*Main Stem	87,700	
Blackwood Creek	6,800	