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February 11, 2014

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Dear Messrs. Lavene and Steinbrecher,

Per action of the Republican River Compact Administration (RRCA) at its December 19, 2013 special meeting, attached is a copy of the fully executed resolution of the RRCA approving a temporary augmentation plan and related accounting procedures for the Colorado Compact Compliance Pipeline.

Sincerely,

David W Barfield

David Barfield, Chief Engineer
Kansas commissioner
Republican River Compact Administration

RESOLUTION BY THE REPUBLICAN RIVER COMPACT ADMINISTRATION APPROVING A TEMPORARY AUGMENTATION PLAN AND RELATED ACCOUNTING PROCEDURES FOR THE COLORADO COMPACT COMPLIANCE PIPELINE

Whereas, the States of Kansas, Nebraska, and Colorado entered into a Final Settlement Stipulation ("FSS") as of December 15, 2002, to resolve pending litigation in the United States Supreme Court regarding the Republican River Compact ("Compact") in the case of *Kansas v. Nebraska and Colorado*, No. 126 Original;

Whereas, the FSS was approved by the United States Supreme Court on May 19, 2003;

Whereas, the State of Colorado's Computed Beneficial Consumptive Use of the waters of the Republican River Basin exceeded Colorado's Compact Allocation using the five-year running average to determine Compact compliance from 2003 through 2012, as provided in Subsection IV.D of the FSS;

Whereas, the Republican River Water Conservation District is a water conservation district created by Colorado statute to assist the State of Colorado to comply with the Compact;

Whereas, the Republican River Water Conservation District, acting by and through its Water Activity Enterprise ("RRWCD WAE"), has acquired fifteen wells ("Compact Compliance Wells") in the Republican River Basin in Colorado and has constructed collector pipelines, a storage tank, a main transmission pipeline, and an outlet structure capable of delivering groundwater to the North Fork of the Republican River for the sole purpose of offsetting stream depletions in order to comply with the State of Colorado's Compact Allocations;

Whereas, the RRWCD WAE has purchased groundwater rights in the Republican River Basin within Colorado and proposes to pump the historical consumptive use of some or all of these groundwater rights from the Compact Compliance Wells into the pipeline it has constructed and deliver that water into the North Fork of the Republican River near the Colorado/Nebraska State Line to offset stream depletions in order to comply with Colorado's Compact Allocations (the "Colorado Compact Compliance Pipeline" or the "Pipeline");

Whereas, the States of Kansas, Nebraska, and Colorado adopted a Moratorium on New Wells in Subsection III.A of the FSS, with certain exceptions set forth in subsection III.B of the FSS;

Whereas, Subsection III.B.1.k of the FSS provides that the Moratorium shall not apply to wells acquired or constructed by a State for the sole purpose of offsetting stream depletions in order to comply with its Compact Allocations, provided that such wells shall not cause any new net depletion to stream flow either annually or long term;

Whereas, Subsection III.B.1.k of the FSS further provides that augmentation plans and related accounting procedures submitted under this Subsection III.B.1.k shall be approved by the Republican River Compact Administration ("RRCA") prior to implementation;

Whereas, Subsection I.F of the FSS also provides that: "The RRCA may modify the RRCA Accounting Procedures, or any portion thereof, in any manner consistent with the Compact and this Stipulation;" and

Whereas, the State of Colorado and the RRWCD WAE submitted an application for approval of an augmentation plan and related accounting procedures for the Pipeline to account for water delivered to the North Fork of the Republican River for the purpose of offsetting stream depletions in order to comply with Colorado's Compact Allocations;

Whereas, the States have agreed to a one-year agreement to operate the Pipeline on certain terms, which are described below; and

Whereas, because of the short-term nature of the temporary augmentation plan, the States have agreed to approve the temporary augmentation plan using the procedures described below instead of adopting revised RRCA Accounting Procedures and Reporting Requirements.

Now, therefore, it is hereby resolved that the RRCA approves a temporary augmentation plan and the related accounting procedures for the Colorado Compact Compliance Pipeline subject to the terms and conditions set forth herein. The Colorado Compact Compliance Pipeline project is described in the revised application submitted by the State of Colorado and the RRWCD WAE, which is attached hereto as Exhibit 1. The augmentation plan for the Pipeline and the terms and conditions for the operation of the augmentation plan are described below. The related changes to the accounting procedures and groundwater model are included in the revised RRCA Accounting Procedures and Reporting Requirements ("revised RRCA Accounting Procedures"), which are attached hereto as Exhibit 2, and "Modeling the Colorado Compliance Pipeline in the RRCA Groundwater Model", which is attached hereto as Exhibit 4. The Compact accounting for 2014 will follow the terms and conditions described in this resolution and its exhibits. This temporary approval of the augmentation plan and the related changes to the accounting procedures and groundwater model for the Pipeline is subject to the following terms and conditions:

1. The average annual historical consumptive use of the groundwater rights that will be diverted at the Compact Compliance Wells shall be the amounts determined by the Colorado Ground Water Commission pursuant to its rules and regulations, as shown on Exhibit 3.

2. Diversions from any individual Compact Compliance Well shall not exceed 2,500 acre-feet during 2014.

3. Diversions during any calendar year under the groundwater rights listed on Exhibit 3 and any additional groundwater rights approved for diversion through the Compact Compliance Wells pursuant to paragraph 11 shall not exceed the total average annual historical consumptive use of the rights, except that banking of groundwater shall be permitted in accordance with the rules and regulations of the Colorado Ground Water Commission, subject to the terms and conditions of this resolution..

4. Diversions from the Compact Compliance Wells shall be measured by totalizing flow meters in compliance with the Colorado State Engineer's rules and regulations for the measurement of groundwater diversions in the Republican River basin, and the measured groundwater pumping from such wells shall be included in the "base" run of the RRCA Groundwater Model in accordance with paragraph III.D.1 of the revised RRCA Accounting Procedures. Net depletions from the Colorado Compact Compliance Wells shall be computed by the RRCA Groundwater Model and included in Colorado's Computed Beneficial Consumptive Use of groundwater pursuant to paragraph III.D.1 of the revised RRCA Accounting Procedures (See Exhibit 2; also Exhibit 4).

5. Deliveries from the Colorado Compact Compliance Pipeline to the North Fork of the Republican River shall be measured by a Parshall flume or other measuring device located at the outlet structure. Authorized representatives of Kansas and Nebraska shall have the right to inspect the Parshall flume and other measurement devices for the Pipeline at any reasonable time upon notice to the RRWCD WAE.

6. The measured deliveries from the Colorado Compact Compliance Pipeline during 2014, to the extent they are in compliance with this resolution, shall offset stream depletions to the North Fork of the Republican River sub-basin on an acre-foot for acre-foot basis in accordance with the revised RRCA Accounting Procedures.

7. The measured deliveries from the Colorado Compact Compliance Pipeline during 2014 shall be added to the RRCA Groundwater Model in all model runs described in the revised RRCA Accounting Procedures (See Exhibit 2; also Exhibit 4). For the purpose of operating this temporary augmentation plan during 2014, the "base" run, the "no NE import" run, and the "no State pumping" run referred to in paragraph III.A.3. (Imported Water Supply Credit Calculation) and paragraph III.D.1. (Groundwater CBCU) of the RRCA Accounting Procedures and the RRCA Groundwater Model will be modified to include the "outflow of the CCP" as described in Exhibit 4.

8. Colorado shall determine the Projected Augmentation Water Supply Delivery ("Projected Delivery") for 2014 to estimate the volume of augmentation water that will be delivered from the Pipeline during 2014 as provided below, and the RRWCD WAE shall make deliveries from the Pipeline as provided below:

A. Colorado will initially estimate the Projected Delivery required for 2014 based on the largest stream depletions to the North Fork of the Republican River sub-basin during the previous five years without Pipeline deliveries. The RRWCD WAE will begin deliveries from the Colorado Compact Compliance Pipeline during 2014 based on the Projected Delivery and shall make a minimum delivery of 4,000 acre-feet per year as provided below.

B. Accounting for deliveries will start January 1.

C. The RRWCD WAE will begin deliveries from the Pipeline on or after January 1 and will make the minimum annual delivery of 4,000 acre-feet during the months of January, February, and March, unless such deliveries cannot be made due to operational conditions beyond the control of the RRWCD WAE. If the minimum annual delivery of 4,000 acre-feet cannot be made during the months of January, February and March due to such operational conditions, Colorado will consult with Nebraska and Kansas to schedule such deliveries later in the year.

D. Colorado will calculate and provide notice to the Kansas and Nebraska RRCA Members, by April 1, of the Projected Delivery as provided in paragraph 8.A of this resolution. Unless Colorado determines by April 1 that it will not be able to deliver additional required augmentation water in October through December, Colorado shall stop deliveries at the end of March. If Colorado anticipates that deliveries in the months of November and December will not be sufficient to replace stream depletions to the North Fork of the Republican River for Compact compliance, Colorado will maximize deliveries first in January, then sequentially in the months of February, March, and April. Deliveries will be made in May only if there is reason to believe that additional deliveries in the months of October through December will not be sufficient to replace stream depletions to the North Fork of the Republican River for Compact compliance.

E. Because the final accounting for determining Compact compliance is not done until after the compact year is completed and because Colorado's allocations and computed beneficial consumptive use are dependent upon such factors as runoff, the amount of pumping, precipitation and crop evapotranspiration, Colorado cannot know the precise amount of augmentation water that will be needed in 2014. After the initial minimum delivery of 4,000 acre-feet, Colorado will collect preliminary data for Compact accounting for 2014 and, no later than September 1, 2014, will update the Projected Delivery required for the remainder of 2014, , less the initial minimum delivery of the 4,000 acre-feet that has already been delivered; provided that for 2014, the RRWCD WAE may limit deliveries to the updated Projected Delivery for 2014 or the updated Projected Delivery for 2014

plus a percentage of the deficit owed from the previous 4 years; but not to exceed the average annual historical consumptive use of the groundwater rights as shown on Exhibit 3.

F. After updating the Projected Delivery, as described above, if additional deliveries in excess of the initial delivery of 4,000 acre-feet are necessary to offset projected stream depletions to the North Fork of the Republican River, Colorado and the RRWCD WAE will maximize such additional deliveries first in the month of December, then November and October of 2014. If the total necessary additional deliveries cannot be made within those three months, Colorado will attempt to schedule those deliveries in April and May of 2014, or at such time so as to avoid, to the extent practicable, deliveries during the subject accounting year's irrigation season.

G. Colorado's shortage and Projected Delivery will be calculated in accordance with the FSS.

9. The as-built design for the Colorado Compact Compliance Pipeline, including the location of the Compact Compliance Wells and the river outlet structure, is described in the revised application attached hereto as Exhibit 1. No future changes to the Pipeline that would materially change the location of the Compact Compliance Wells or the river outlet structure shall be made without prior approval of the RRCA.

10. Augmentation credit for deliveries from the Pipeline to the North Fork of the Republican River shall be limited to offsetting stream depletions to the North Fork of the Republican River Colorado sub-basin for the purpose of determining Colorado's compliance with the sub-basin non-impairment requirement (Table 4A) and for calculating Colorado's five-year running average allocation and computed beneficial use for determining Compact compliance (Table 3A).

11. The approval of this augmentation plan and the related accounting procedures for the Pipeline shall not govern the approval of any future proposed augmentation plan and related accounting procedures submitted by the State of Colorado or any other State under Subsection III.B.1.k of the FSS.

12. The approval of this augmentation plan and the related accounting procedures for the Pipeline shall not waive any State's rights to seek damages from any other State for violations of the Compact or the FSS subsequent to December 15, 2002.

13. Except for the approval of the augmentation plan and the related accounting procedures as provided herein, nothing in this Resolution shall relieve the State of Colorado from complying with the obligations set forth in the Compact or FSS.

14. Unless otherwise agreed to by States, operation of the augmentation plan and its related accounting and modeling will automatically cease at 12:00 AM on January 1, 2015.

15. Colorado agrees to collect data related to pumping of Pipeline wells and delivery of water through the outfall structure of the Pipeline on at least a daily basis and provide such data to Kansas and Nebraska on a monthly basis; and by January 30, 2014, will provide all spreadsheets and calculations related to the initial "Projected Delivery" of augmentation water as described in Exhibit 1. Colorado will provide to Kansas all updates to that projection within one week of the completion of any update.

16. The States agree that this one-year agreement does not obligate any State to support or approve any augmentation plan, including the CCP, at any time in the future.

17. The States agree that this one-year operation of the augmentation plan will not be considered precedent for the RRCA's approval of the CCP or any other augmentation proposal in the future, including a different version of the CCP if one should be submitted for consideration by the RRCA.

18. Kansas does not agree to implementation of the Bonny Reservoir Accounting Proposal.

19. The States do not waive any objections, positions, or arguments related to the CCP, augmentation plans or their approval under the FSS, or the Bonny Reservoir Accounting Proposal.

20. The States further agree that if any changes to the RRCA accounting procedures or RRCA groundwater model applicable to the compact accounting for 2014 are mandated by any order or decree of the United States Supreme Court, such changes will be implemented in the Compact Accounting for 2014.

Approved by the RRCA this 19th day of December, 2013.

Brian P. Dunnigan 1/13/2014

Brian Dunnigan, P.E. date
Nebraska Member
Chairman, RRCA

David W Barfield 2/11/2014

David Barfield, P.E. date
Kansas Member

Dick Wolfe, P.E.
Colorado Member

12-19-13
date

f) Non-Federal Reservoir Evaporation: 26
B. Specific Formulas for Each Sub-basin and the Main Stem 26
3. North Fork of Republican River in Colorado 27
4. Arikaree River 2 27
5. Buffalo Creek 28
6. Rock Creek 28
7. South Fork Republican River 29
8. Frenchman Creek in Nebraska 29
9. Driftwood Creek 30
10. Red Willow Creek in Nebraska 31
11. Medicine Creek 31
12. Beaver Creek 32
13. Sappa Creek 33
14. Prairie Dog Creek 33
15. The North Fork of the Republican River in Nebraska and the Main Stem of the Republican River between the junction of the North Fork and the Arikaree River and the Republican River near Hardy 34
V. Annual Data/ Information Requirements, Reporting, and Verification 38
A. Annual Reporting 38
1. Surface water diversions and irrigated acreage: 38
2. Groundwater pumping and irrigated acreage: 39
3. Climate information: 39
4. Crop Irrigation Requirements: 40
5. Streamflow Records from State-Maintained Gaging Records: 41
6. Platte River Reservoirs: 41
7. Water Administration Notification: 41
8. Moratorium: 42
9. Non-Federal Reservoirs: 42
B. RRCA Groundwater Model Data Input Files 43
C. Inputs to RRCA Accounting 43
1. Surface Water Information 43
2. Groundwater Information 45
3. Summary 45
D. Verification 45
1. Documentation to be Available for Inspection Upon Request 45
2. Site Inspection 46
TABLES 47
Table 1: Annual Virgin and Computed Water Supply, Allocations and Computed Beneficial Consumptive Uses by State, Main Stem and Sub-basin 47
Table 2: Original Compact Virgin Water Supply and Allocations 48
Table 3A: Table to Be Used to Calculate Colorado's Five-Year Running Average Allocation and Computed Beneficial Consumptive Use for Determining Compact Compliance 49

Table 3B. Table to Be Used to Calculate Kansas's Five-Year Running Average Allocation and Computed Beneficial Consumptive Use for Determining Compact Compliance 49
Table 3C. Table to Be Used to Calculate Nebraska's Five-Year Running Average Allocation and Computed Beneficial Consumptive Use for Determining Compact Compliance 51
Table 4A: Colorado Compliance with the Sub-basin Non-impairment Requirement 52
Table 4B: Kansas Compliance with the Sub-basin Non-impairment Requirement 52
Table 5A: Colorado Compliance During Water-Short Year Administration 54
Table 5B: Kansas Compliance During Water-Short Year Administration 54
Table 5C: Nebraska Compliance During Water-Short Year Administration 56
Table 5D: Nebraska Compliance Under a Alternative Water-Short Year Administration Plan 57
Table 5E: Nebraska Tributary Compliance During Water-Short Year Administration 57
FIGURES 58
Basin Map Attached to Compact that Shows the Streams and the Basin Boundaries 59
Line Diagram of Designated Drainage Basins Showing Federal Reservoirs and Sub-basin Gaging Stations 60
Map Showing Sub-basins, Streams, and the Basin Boundaries 61
ATTACHMENTS 62
Attachment 1: Sub-basin Flood Flow Thresholds 62
Attachment 2: Description of the Consensus Plan for Harlan County Lake 63
Attachment 3: Inflows to Harlan County Lake 1993 Level of Development 69
Attachment 4: Evaporation Loss Harlan County Lake 1993 Level of Development 72
Attachment 5: Projected Water Supply Spread Sheet Calculations 74
Attachment 6: Computing Water Supplies and Consumptive Use Above Guide Rock 76
Attachment 7: Calculations of Return Flows from Bureau of Reclamation Canals 77

I. Introduction

This document describes the definitions, procedures, basic formulas, specific formulas, and data requirements and reporting formats to be used by the RRCA to compute the Virgin Water Supply, Computed Water Supply, Allocations, Imported Water Supply Credit, ~~Augmentation Water Supply Credit~~CNF Augmentation Water Supply Credit, and Computed Beneficial Consumptive Use. These computations shall be used to determine supply, allocations, use and compliance with the Compact according to the Stipulation. These definitions, procedures, basic and specific formulas, data requirements and attachments may be changed by consent of the RRCA consistent with Subsection I.F of the Stipulation. This document will be referred to as the RRCA Accounting Procedures. Attached to these RRCA Accounting Procedures as Figure 1 is the map attached to the Compact that shows the Basin, its streams and the Basin boundaries.

II. Definitions

The following words and phrases as used in these RRCA Accounting Procedures are defined as follows:

Additional Water Administration Year - a year when the projected or actual irrigation water supply is less than 130,000 Acre-feet of storage available for use from Harlan County Lake as determined by the Bureau of Reclamation using the methodology described in the Harlan County Lake Operation Consensus Plan attached as Appendix K to the Stipulation.

Allocation(s): the water supply allocated to each State from the Computed Water Supply;

Annual: yearly from January 1 through December 31;

Augmentation Plan: a detailed program used by a State to offset stream depletions in order to comply with its Compact Allocations. An Augmentation Plan shall be approved by the RRCA prior to implementation in accordance with Subsection III.B.1.k of the Stipulation;

Augmentation Water Supply: the water supply developed through the acquisition or construction of wells for the sole purpose of offsetting stream depletions in order to comply with a State's Compact Allocations in conformance with an Augmentation Plan;

~~Augmentation Water Supply Credit~~CNF Augmentation Water Supply Credit: the amount of water measured and discharged to the North Fork of the Republican River by the Colorado CCPstream flow ~~of a Designated Drainage Basin~~ due to the acquisition or construction of wells for the purpose of offsetting stream depletions to comply with a States' Compact Allocation in conformance with an Augmentation Plan. The ~~Augmentation Water Supply Credit~~CNF Augmentation Water Supply Credit of ~~a State~~Colorado shall not be included in the Virgin Water Supply in the Designated Drainage Basin and shall be counted as a credit/offset against the Computed Beneficial Consumptive Use of water allocated to ~~that State~~Colorado;

Basin: the Republican River Basin as defined in Article II of the Compact;

Beneficial Consumptive Use: that use by which the Water Supply of the Basin is consumed through the activities of man, and shall include water consumed by evaporation from any reservoir, canal, ditch, or irrigated area;

Change in Federal Reservoir Storage: the difference between the amount of water in storage in the reservoir on December 31 of each year and the amount of water in storage on December 31 of the previous year. The current area capacity table supplied by the appropriate federal operating agency shall be used to determine the contents of the reservoir on each date;

Compact: the Republican River Compact, Act of February 22, 1943, 1943 Kan. Sess. Laws 612, codified at Kan. Stat. Ann. § 82a-518 (1997); Act of February 24, 1943, 1943 Neb. Laws 377, codified at 2A Neb. Rev. Stat. App. § 1-106 (1995), Act of March 15, 1943, 1943 Colo. Sess. Laws 362, codified at Colo. Rev. Stat. §§ 37-67-101 and 37-67-102 (2001); Republican River Compact, Act of May 26, 1943, ch. 104, 57 Stat. 86;

Computed Beneficial Consumptive Use: for purposes of Compact accounting, the stream flow depletion resulting from the following activities of man:

Irrigation of lands in excess of two acres;
Any non-irrigation diversion of more than 50 Acre-feet per year;
Multiple diversions of 50 Acre-feet or less that are connected or otherwise combined to serve a single project will be considered as a single diversion for accounting purposes if they total more than 50 Acre-feet;
Net evaporation from Federal Reservoirs;
Net evaporation from Non-federal Reservoirs within the surface boundaries of the Basin;
Any other activities that may be included by amendment of these formulas by the RRCA;

Computed Water Supply: the Virgin Water Supply less the Change in Federal Reservoir Storage in any Designated Drainage Basin, and less the Flood Flows;

Designated Drainage Basins: the drainage basins of the specific tributaries and the Main Stem of the Republican River as described in Article III of the Compact. Attached hereto as Figure 3 is a map of the Sub-basins and Main Stem;

Dewatering Well: a Well constructed solely for the purpose of lowering the groundwater elevation;

Federal Reservoirs:

Bonny Reservoir
Swanson Lake
Enders Reservoir
Hugh Butler Lake
Harry Strunk Lake
Keith Sebelius Lake
Harlan County Lake
Lovewell Reservoir

Flood Flows: the amount of water deducted from the Virgin Water Supply as part of the computation of the Computed Water Supply due to a flood event as determined by the methodology described in Subsection III.B.1.;

Gaged Flow: the measured flow at the designated stream gage;

Guide Rock: a point at the Superior-Courtland Diversion Dam on the Republican River near Guide Rock, Nebraska; the Superior-Courtland Diversion Dam gage plus any flows through the sluice gates of the dam, specifically excluding any diversions to the Superior and Courtland Canals, shall be the measure of flows at Guide Rock;

Historic Consumptive Use: that amount of water that has been consumed under appropriate and reasonably efficient practices to accomplish without waste the purposes for which the appropriation or other legally permitted use was lawfully made;

Imported Water Supply: the water supply imported by a State from outside the Basin resulting from the activities of man;

Imported Water Supply Credit: the accretions to stream flow due to water imports from outside of the Basin as computed by the RRCA Groundwater Model. The Imported Water Supply Credit of a State shall not be included in the Virgin Water Supply and shall be counted as a credit/offset against the Computed Beneficial Consumptive Use of water allocated to that State, except as provided in Subsection V.B.2. of the Stipulation and Subsections III.I. – J. of these RRCA Accounting Procedures;

Main Stem: the Designated Drainage Basin identified in Article III of the Compact as the North Fork of the Republican River in Nebraska and the main stem of the Republican River between the junction of the North Fork and the Arikaree River and the lowest crossing of the river at the Nebraska-Kansas state line and the small tributaries thereof, and also including the drainage basin Blackwood Creek;

Main Stem Allocation: the portion of the Computed Water Supply derived from the Main Stem and the Unallocated Supply derived from the Sub-basins as shared by Kansas and Nebraska;

Meeting(s): a meeting of the RRCA, including any regularly scheduled annual meeting or any special meeting;

Modeling Committee: the modeling committee established in Subsection IV.C. of the Stipulation;

Moratorium: the prohibition and limitations on construction of new Wells in the geographic area described in Section III. of the Stipulation;

Non-federal Reservoirs: reservoirs other than Federal Reservoirs that have a storage capacity of 15 Acre-feet or greater at the principal spillway elevation;

Northwest Kansas: those portions of the Sub-basins within Kansas;

Replacement Well: a Well that replaces an existing Well that a) will not be used after construction of the new Well and b) will be abandoned within one year after such construction or is used in a manner that is excepted from the Moratorium pursuant to Subsections III.B.1.c.-f. of the Stipulation;

RRCA: Republican River Compact Administration, the administrative body composed of the State officials identified in Article IX of the Compact;

RRCA Accounting Procedures: this document and all attachments hereto;

RRCA Groundwater Model: the groundwater model developed under the provisions of Subsection IV.C. of the Stipulation and as subsequently adopted and revised through action of the RRCA;

State: any of the States of Colorado, Kansas, and Nebraska;

States: the States of Colorado, Kansas and Nebraska;

Stipulation: the Final Settlement Stipulation to be filed in *Kansas v. Nebraska and Colorado*, No. 126, Original, including all Appendices attached thereto;

Sub-basin: the Designated Drainage Basins, except for the Main Stem, identified in Article III of the Compact. For purposes of Compact accounting the following Sub-basins will be defined as described below:

> North Fork of the Republican River in Colorado drainage basin is that drainage area above USGS gaging station number 06823000, North Fork Republican River at the Colorado-Nebraska State Line,

Arikaree River drainage basin is that drainage area above USGS gaging station number 06821500, Arikaree River at Haigler, Nebraska,

Buffalo Creek drainage basin is that drainage area above USGS gaging station number 06823500, Buffalo Creek near Haigler, Nebraska,

Rock Creek drainage basin is that drainage area above USGS gaging station number 06824000, Rock Creek at Parks, Nebraska,

South Fork of the Republican River drainage basin is that drainage area above USGS gaging station number 06827500, South Fork Republican River near Benkelman, Nebraska,

Frenchman Creek (River) drainage basin in Nebraska is that drainage area above USGS gaging station number 06835500, Frenchman Creek in Culbertson, Nebraska,

Driftwood Creek drainage basin is that drainage area above USGS gaging station number 06836500, Driftwood Creek near McCook, Nebraska,

Red Willow Creek drainage basin is that drainage area above USGS gaging station number 06838000, Red Willow Creek near Red Willow, Nebraska,

Medicine Creek drainage basin is that drainage area above the Medicine Creek below Harry Strunk Lake, State of Nebraska gaging station number 06842500; and the drainage area between the gage and the confluence with the Main Stem,

Sappa Creek drainage basin is that drainage area above USGS gaging station number 06847500, Sappa Creek near Stamford, Nebraska and the drainage area between the gage and the confluence with the Main Stem; and excluding the Beaver Creek drainage basin area downstream from the State of Nebraska gaging station number 06847000 Beaver Creek near Beaver City, Nebraska to the confluence with Sappa Creek,

Beaver Creek drainage basin is that drainage area above State of Nebraska gaging station number 06847000, Beaver Creek near Beaver City, Nebraska, and the drainage area between the gage and the confluence with Sappa Creek,

Prairie Dog Creek drainage basin is that drainage area above USGS gaging station number 06848500, Prairie Dog Creek near Woodruff, Kansas, and the drainage area between the gage and the confluence with the Main Stem;

Attached hereto as Figure 2 is a line diagram depicting the streams, Federal Reservoirs and gaging stations;

Test hole: a hole designed solely for the purpose of obtaining information on hydrologic and/or geologic conditions;

Trenton Dam: a dam located at 40 degrees, 10 minutes, 10 seconds latitude and 101 degrees, 3 minutes, 35 seconds longitude, approximately two and one-half miles west of the town of Trenton, Nebraska;

Unallocated Supply: the "water supplies of upstream basins otherwise unallocated" as set forth in Article IV of the Compact;

Upstream of Guide Rock, Nebraska: those areas within the Basin lying west of a line proceeding north from the Nebraska-Kansas state line and following the western edge of Webster County, Township 1, Range 9, Sections 34, 27, 22, 15, 10 and 3 through Webster County, Township 2, Range 9, Sections 34, 27 and 22; then proceeding west along the southern edge of Webster County, Township 2, Range 9, Sections 16, 17 and 18; then proceeding north following the western edge of Webster County, Township 2, Range 9, Sections 18, 7 and 6, through Webster County, Township 3, Range 9, Sections 31, 30, 19, 18, 7 and 6 to its intersection with the northern boundary of Webster County. Upstream of Guide Rock, Nebraska shall not include that area in Kansas east of the 99° meridian and south of the Kansas-Nebraska state line;

Virgin Water Supply: the Water Supply within the Basin undepleted by the activities of man;

Water Short Year Administration: administration in a year when the projected or actual irrigation water supply is less than 119,000 acre feet of storage available for use from Harlan County Lake as determined by the Bureau of Reclamation using the methodology described in the Harlan County Lake Operation Consensus Plan attached as Appendix K to the Stipulation.

Water Supply of the Basin or **Water Supply within the Basin:** the stream flows within the Basin, excluding Imported Water Supply;

Well: any structure, device or excavation for the purpose or with the effect of obtaining groundwater for beneficial use from an aquifer, including wells, water wells, or groundwater wells as further defined and used in each State's laws, rules, and regulations.

III. Basic Formulas

The basic formulas for calculating Virgin Water Supply, Computed Water Supply, Imported Water Supply, Allocations and Computed Beneficial Consumptive Use are set forth below. The results of these calculations shall be shown in a table format as shown in Table 1.

Basic Formulas for Calculating Virgin Water Supply, Computed Water Supply, Allocations and Computed Beneficial Consumptive Use

Sub-basin VWS	=	Gage + All CBCU – CNFAWS +ΔS – IWS
Main Stem VWS	=	Hardy Gage – Σ Sub-basin gages + All CBCU in the Main Stem +ΔS – IWS
CWS	=	VWS - Δ S – FF
Allocation for each State in each Sub-basin And Main Stem	=	CWS x %
State's Allocation	=	Σ Allocations for Each State
State's CBCU	=	Σ State's CBCUs in each Sub-basin and Main Stem

Abbreviations:

CNFAWS = ~~Augmentation Water Supply Credit~~Colorado North Fork (CNF) Augmentation Water Supply Credit
CBCU = Computed Beneficial Consumptive Use
FF = Flood Flows
Gage = Gaged Flow
IWS = Imported Water Supply Credit
CWS = Computed Water Supply
VWS = Virgin Water Supply
% = the ratio used to allocate the Computed Water Supply between the States. This ratio is based on the allocations in the Compact
Δ S = Change in Federal Reservoir Storage

A. Calculation of Annual Virgin Water Supply

1. Sub-basin calculation:

The annual Virgin Water Supply for each Sub-basin will be calculated by adding: a) the annual stream flow in that Sub-basin at the Sub-basin stream gage designated in Section II., b) the annual Computed Beneficial Consumptive Use above that gaging station, and c) the Change in Federal Reservoir Storage in that Sub-basin; and from that total subtract any Imported Water Supply Credit and any ~~Augmentation Water Supply Credit~~CNF Augmentation Water Supply Credit. The Computed Beneficial Consumptive Use will be calculated as described in Subsection III. D. Adjustments for flows diverted around stream gages and for Computed Beneficial Consumptive Uses in the Sub-basin between the Sub-basin stream gage and the confluence of the

Sub-basin tributary and the Main Stem shall be made as described in Subsections III. D. 1 and 2 and IV. B.

2. Main Stem Calculation:

The annual Virgin Water Supply for the Main Stem will be calculated by adding: a) the flow at the Hardy gage minus the flows from the Sub-basin gages listed in Section II, b) the annual Computed Beneficial Consumptive Use in the Main Stem, and c) the Change in Federal Reservoir Storage from Swanson Lake and Harlan County Lake; and from that total subtract any Imported Water Supply Credit for the Main Stem. Adjustments for flows diverted around Sub-basin stream gages and for Computed Beneficial Consumptive Uses in a Sub-basin between the Sub-basin stream gage and the confluence of the Sub-basin tributary and the Mains Stem shall be made as described in Subsections III. D. 1 and 2 and IV.B.,

3. Imported Water Supply Credit Calculation:

The amount of Imported Water Supply Credit shall be determined by the RRCA Groundwater Model. The Imported Water Supply Credit of a State shall not be included in the Virgin Water Supply and shall be counted as a credit/offset against the Computed Beneficial Consumptive Use of water allocated to that State. Currently, the Imported Water Supply Credits shall be determined using two runs of the RRCA Groundwater Model:

a. The "base" run shall be the run with all groundwater pumping, groundwater pumping recharge, and surface water recharge within the model study boundary for the current accounting year turned "on." This will be the same "base" run used to determine groundwater Computed Beneficial Consumptive Uses.

b. The "no NE import" run shall be the run with the same model inputs as the base run with the exception that surface water recharge associated with Nebraska's Imported Water Supply shall be turned "off."

The Imported Water Supply Credit shall be the difference in stream flows between these two model runs. Differences in stream flows shall be determined at the same locations as identified in Subsection III.D.1.for the "no pumping" runs. Should another State import water into the Basin in the future, the RRCA will develop a similar procedure to determine Imported Water Supply Credits.

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~~4. Augmentation Water Supply Credit~~CNF Augmentation Water Supply Credit:

The amount of ~~Augmentation Water Supply Credit~~CNF Augmentation Water

Supply Credit shall be the quantity of water delivered to the North Fork of the Republican River stream flow of a Designated Drainage Basin and shall be measured and subtracted from the Gaged Flow of the Designated Drainage Basin to calculate the Annual Virgin Water Supply. The ~~Augmentation Water Supply Credit~~CNF Augmentation Water Supply Credit of a ~~State~~Colorado shall not be included in the Annual Virgin Water Supply and shall be counted as a credit/offset against the Computed Beneficial Consumptive Use of water allocated to ~~that State~~Colorado.

B. Calculation of Computed Water Supply

On any Designated Drainage Basin without a Federal Reservoir, the Computed Water Supply will be equal to the Virgin Water Supply of that Designated Drainage Basin minus Flood Flows.

On any Designated Drainage Basin with a Federal Reservoir, the Computed Water Supply will be equal to the Virgin Water Supply minus the Change in Federal Reservoir Storage in that Designated Drainage Basin and minus Flood Flows.

1. Flood Flows

If in any calendar year there are five consecutive months in which the total actual stream flow[1] at the Hardy gage is greater than 325,000 Acre-feet, or any two consecutive months in which the total actual stream flow is greater than 200,000 Acre-feet, the annual flow in excess of 400,000 Acre-feet at the Hardy gage will be considered to be Flood Flows that will be subtracted from the Virgin Water Supply to calculate the Computed Water Supply, and Allocations. The Flood Flow in excess of 400,000 Acre-feet at the Hardy gage will be subtracted from the Virgin Water Supply of the Main Stem to compute the Computed Water Supply unless the Annual Gaged Flows from a Sub-basin were in excess of the flows shown for that Sub-basin in Attachment 1. These excess Sub-basin flows shall be considered to be Sub-basin Flood Flows.

If there are Sub-basin Flood Flows, the total of all Sub-basin Flood Flows shall be compared to the amount of Flood Flows at the Hardy gage. If the sum of the Sub-basin Flood Flows are in excess of the Flood Flow at the Hardy gage, the flows to be deducted from each Sub-basin shall be the product of the Flood Flows for each Sub-basin times the ratio of the Flood Flows at the Hardy gage divided by the sum of the Flood Flows of the Sub-basin gages. If the sum of the Sub-basin Flood Flows

[1] These actual stream flows reflect Gaged Flows after depletions by Beneficial Consumptive Use and change in reservoir storage above the gage.

is less than the Flood Flow at the Hardy gage, the entire amount of each Sub-basin Flood Flow shall be deducted from the Virgin Water Supply to compute the Computed Water Supply of that Sub-basin for that year. The remainder of the Flood Flows will be subtracted from the flows of the Main Stem.

C. Calculation of Annual Allocations

Article IV of the Compact allocates 54,100 Acre-feet for Beneficial Consumptive Use in Colorado, 190,300 Acre-feet for Beneficial Consumptive Use in Kansas and 234,500 Acre-feet for Beneficial Consumptive Use in Nebraska. The Compact provides that the Compact totals are to be derived from the sources and in the amounts specified in Table 2.

The Allocations derived from each Sub-basin to each State shall be the Computed Water Supply multiplied by the percentages set forth in Table 2. In addition, Kansas shall receive 51.1% of the Main Stem Allocation and the Unallocated Supply and Nebraska shall receive 48.9% of the Main Stem Allocation and the Unallocated Supply.

D. Calculation of Annual Computed Beneficial Consumptive Use

1. Groundwater

Computed Beneficial Consumptive Use of groundwater shall be determined by use of the RRCA Groundwater Model. The Computed Beneficial Consumptive Use of groundwater for each State shall be determined as the difference in streamflows using two runs of the model:

The "base" run shall be the run with all groundwater pumping, groundwater pumping recharge, and surface water recharge within the model study boundary for the current accounting year "on".

The "no State pumping" run shall be the run with the same model inputs as the base run with the exception that all groundwater pumping and pumping recharge of that State shall be turned "off."

An output of the model is baseflows at selected stream cells. Changes in the baseflows predicted by the model between the "base" run and the "no-State-pumping" model run is assumed to be the depletions to streamflows. i.e., groundwater computed beneficial consumptive use, due to State groundwater pumping at that location. The values for each Sub-basin will include all depletions and accretions upstream of the confluence with the Main Stem. The values for the

Main Stem will include all depletions and accretions in stream reaches not otherwise accounted for in a Sub-basin. The values for the Main Stem will be computed separately for the reach above Guide Rock, and the reach below Guide Rock.

2. Surface Water

The Computed Beneficial Consumptive Use of surface water for irrigation and non-irrigation uses shall be computed by taking the diversions from the river and subtracting the return flows to the river resulting from those diversions, as described in Subsections IV.A.2.a.-d. The Computed Beneficial Consumptive Use of surface water from Federal Reservoir and Non-Federal Reservoir evaporation shall be the net reservoir evaporation from the reservoirs, as described in Subsections IV.A.2.e.-f.

For Sub-basins where the gage designated in Section II. is near the confluence with the Main Stem, each State's Sub-basin Computed Beneficial Consumptive Use of surface water shall be the State's Computed Beneficial Consumptive Use of surface water above the Sub-basin gage. For Medicine Creek, Sappa Creek, Beaver Creek and Prairie Dog Creek, where the gage is not near the confluence with the Main Stem, each State's Computed Beneficial Consumptive Use of surface water shall be the sum of the State's Computed Beneficial Consumptive Use of surface water above the gage, and its Computed Beneficial Consumptive Use of surface water between the gage and the confluence with the Main Stem.

E. Calculation to Determine Compact Compliance Using Five-Year Running Averages

Each year, using the procedures described herein, the RRCA will calculate the Annual Allocations by Designated Drainage Basin and total for each State, the Computed Beneficial Consumptive Use by Designated Drainage Basin and total for each State and the Imported Water Supply Credit and the ~~Augmentation Water Supply Credit~~CNI Augmentation Water Supply Credit that a State may use for the preceding year. These results for the current Compact accounting year as well as the results of the previous four accounting years and the five-year average of these results will be displayed in the format shown in Table 3.

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F. Calculations To Determine Colorado's and Kansas's Compliance with the Sub-basin Non-Impairment Requirement

The data needed to determine Colorado's and Kansas's compliance with the Sub-basin non-impairment requirement in Subsection IV.B.2. of the Stipulation are shown in Tables 4.A. and B.

G. Calculations To Determine Projected Water Supply

1. Procedures to Determine Water Short Years

The Bureau of Reclamation will provide each of the States with a monthly or, if requested by any one of the States, a more frequent update of the projected or actual irrigation supply from Harlan County Lake for that irrigation season using the methodology described in the Harlan County Lake Operation Consensus Plan, attached as Appendix K to the Stipulation. The steps for the calculation are as follows:

Step 1. At the beginning of the calculation month (1) the total projected inflow for the calculation month and each succeeding month through the end of May shall be added to the previous end of month Harlan County Lake content and (2) the total projected 1993 level evaporation loss for the calculation month and each succeeding month through the end of May shall then be subtracted. The total projected inflow shall be the 1993 level average monthly inflow or the running average monthly inflow for the previous five years, whichever is less.

Step 2. Determine the maximum irrigation water available by subtracting the sediment pool storage (currently 164,111 Acre-feet) and adding the summer sediment pool evaporation (20,000 Acre-feet) to the result from Step 1.

Step 3. For October through January calculations, take the result from Step 2 and using the Shared Shortage Adjustment Table in Attachment 2 hereto, determine the preliminary irrigation water available for release. The calculation using the end of December content (January calculation month) indicates the minimum amount of irrigation water available for release at the end of May. For February through June calculations, subtract the maximum irrigation water available for the January calculation month from the maximum irrigation water available for the calculation month. If the result is negative, the irrigation water available for release (January calculation month) stays the same. If the result is positive the preliminary irrigation water available for release (January calculation month) is increased by the positive amount.

Step 4. Compare the result from Step 3 to 119,000 Acre-feet. If the result from Step 3 is less than 119,000 Acre-feet Water Short Year Administration is in effect.

Step 5. The final annual Water-Short Year Administration calculation determines the total estimated irrigation supply at the end of June (calculated in July). Use the result from Step 3 for the end of May irrigation release estimate, add the June computed inflow to Harlan County Lake and subtract the June computed gross evaporation loss from Harlan County Lake.

2. Procedures to Determine 130,000 Acre Feet Projected Water Supply

To determine the preliminary irrigation supply for the October through June calculation months, follow the procedure described in steps 1 through 4 of the "Procedures to determine Water Short Years" Subsection III. G. 1. The result from step 4 provides the forecasted water supply, which is compared to 130,000 Acre-feet. For the July through September calculation months, use the previous end of calculation month preliminary irrigation supply, add the previous month's Harlan County Lake computed inflow and subtract the previous month's computed gross evaporation loss from Harlan County Lake to determine the current preliminary irrigation supply. The result is compared to 130,000 Acre-feet.

H. Calculation of Computed Water Supply, Allocations and Computed Beneficial Consumptive Use Above and Below Guide Rock During Water-Short Administration Years.

For Water-Short-Administration Years, in addition to the normal calculations, the Computed Water Supply, Allocations, Computed Beneficial Consumptive Use and Imported Water Supply Credits, ~~and Augmentation Water Supply Credit~~CNF Augmentation Water Supply Credits shall also be calculated above Guide Rock as shown in Table 5C. These calculations shall be done in the same manner as in non-Water-Short Administration years except that water supplies originating below Guide Rock shall not be included in the calculations of water supplies originating above Guide Rock. The calculations of Computed Beneficial Consumptive Uses shall be also done in the same manner as in non-Water-Short Administration years except that Computed Beneficial Consumptive Uses from diversions below Guide Rock shall not be included. The depletions from the water diverted by the Superior and Courtland Canals at the Superior-Courtland Diversion Dam shall be included in the calculations of Computed Beneficial Consumptive Use above Guide Rock. Imported Water Supply Credits and ~~Augmentation Water Supply Credit~~CNF Augmentation Water Supply Credits above Guide Rock, as described in Sub-section III.I., may be used as offsets against the Computed Beneficial

Consumptive Use above Guide Rock by the State providing the Imported Water Supply Credits or ~~Augmentation Water Supply Credit~~CNF Augmentation Water Supply Credits.

The Computed Water Supply of the Main Stem reach between Guide Rock and the Hardy gage shall be determined by taking the difference in stream flow at Hardy and Guide Rock, adding Computed Beneficial Consumptive Uses in the reach (this does not include the Computed Beneficial Consumptive Use from the Superior and Courtland Canal diversions), and subtracting return flows from the Superior and Courtland Canals in the reach. The Computed Water Supply above Guide Rock shall be determined by subtracting the Computed Water Supply of the Main Stem reach between Guide Rock and the Hardy gage from the total Computed Water Supply. Nebraska's Allocation above Guide Rock shall be determined by subtracting 48.9% of the Computed Water Supply of the Main Stem reach between Guide Rock and the Hardy gage from Nebraska's total Allocation. Nebraska's Computed Beneficial Consumptive Uses above Guide Rock shall be determined by subtracting Nebraska's Computed Beneficial Consumptive Uses below Guide Rock from Nebraska's total Computed Beneficial Consumptive Use.

I. Calculation of Imported Water Supply Credits During Water-Short Year Administration Years.

Imported Water Supply Credit during Water-Short Year Administration years shall be calculated consistent with Subsection V.B.2.b. of the Stipulation.

The following methodology shall be used to determine the extent to which Imported Water Supply Credit, as calculated by the RRCA Groundwater Model, can be credited to the State importing the water during Water-Short Year Administration years.

1. Monthly Imported Water Supply Credits

The RRCA Groundwater Model will be used to determine monthly Imported Water Supply Credits by State in each Sub-basin and for the Main Stem. The values for each Sub-basin will include all depletions and accretions upstream of the confluence with the Main Stem. The values for the Main Stem will include all depletions and accretions in stream reaches not otherwise accounted for in a Sub-basin. The values for the Main Stem will be computed separately for the reach 1) above Harlan County Dam, 2) between Harlan County Dam and Guide Rock, and 3) between Guide Rock and the Hardy gage. The Imported Water Supply Credit shall be the difference in stream flow for two runs of the model: a) the "base" run and b) the "no State import" run.

During Water-Short Year Administration years, Nebraska's credits in the Sub-basins shall be determined as described in Section III. A. 3.

2. Imported Water Supply Credits Above Harlan County Dam

Nebraska's Imported Water Supply Credits above Harlan County Dam shall be the sum of all the credits in the Sub-basins and the Main Stem above Harlan County Dam.

3. Imported Water Supply Credits Between Harlan County Dam and Guide Rock During the Irrigation Season

a. During Water-Short Year Administration years, monthly credits in the reach between Harlan County Dam and Guide Rock shall be determined as the differences in the stream flows between the two runs at Guide Rock.

b. The irrigation season shall be defined as starting on the first day of release of water from Harlan County Lake for irrigation use and ending on the last day of release of water from Harlan County Lake for irrigation use.

c. Credit as an offset for a State's Computed Beneficial Consumptive Use above Guide Rock will be given to all the Imported Water Supply accruing in the reach between Harlan County Dam and Guide Rock during the irrigation season. If the period of the irrigation season does not coincide with the period of modeled flows, the amount of the Imported Water Supply credited during the irrigation season for that month shall be the total monthly modeled Imported Water Supply Credit times the number of days in the month occurring during the irrigation season divided by the total number of days in the month.

4. Imported Water Supply Credits Between Harlan County Dam and Guide Rock During the Non-Irrigation Season

a. Imported Water Supply Credit shall be given between Harlan County Dam and Guide Rock during the period that flows are diverted to fill Lovewell Reservoir to the extent that imported water was needed to meet Lovewell Reservoir target elevations.

b. Fall and spring fill periods shall be established during which credit shall be given for the Imported Water Supply Credit accruing in the reach. The fall period shall extend from the end of the irrigation season to December 1. The spring period shall extend from March 1 to May 31. The Lovewell

target elevations for these fill periods are the projected end of November reservoir level and the projected end of May reservoir level for most probable inflow conditions as indicated in Table 4 in the current Annual Operating Plan prepared by the Bureau of Reclamation.

c. The amount of water needed to fill Lovewell Reservoir for each period shall be calculated as the storage content of the reservoir at its target elevation at the end of the fill period minus the reservoir content at the start of the fill period plus the amount of net evaporation during this period minus White Rock Creek inflows for the same period.

d. If the fill period as defined above does not coincide with the period of modeled flows, the amount of the Imported Water Supply Credit during the fill period for that month shall be the total monthly modeled Imported Water Supply Credit times the number of days in the month occurring during the fill season divided by the total number of days in the month.

e. The amount of non-imported water available to fill Lovewell Reservoir to the target elevation shall be the amount of water available at Guide Rock during the fill period minus the amount of the Imported Water Supply Credit accruing in the reach during the same period.

f. The amount of the Imported Water Supply Credit that shall be credited against a State's Consumptive Use shall be the amount of water imported by that State that is available in the reach during the fill period or the amount of water needed to reach Lovewell Reservoir target elevations minus the amount of non-imported water available during the fill period, whichever is less.

5. Other Credits

Kansas and Nebraska will explore crediting Imported Water Supply that is otherwise useable by Kansas.

J. Calculations of Compact Compliance in Water-Short Year Administration Years

During Water-Short Year Administration, using the procedures described in Subsections III.A-D, the RRCA will calculate the Annual Allocations for each State, the Computed Beneficial Consumptive Use by each State, the ~~and~~ Imported Water Supply Credit, and the ~~Augmentation~~ CNI Augmentation Water Supply Credit that a State may use to offset Computed Beneficial Consumptive Use in that year. The resulting annual and average values will be calculated as displayed in Tables 5 A-C and E.

If Nebraska is implementing an Alternative Water-Short-Year Administration Plan, data to determine Compact compliance will be shown in Table 5D. Nebraska's compliance with the Compact will be determined in the same manner as Nebraska's Above Guide Rock compliance except that compliance will be based on a three-year running average of the current year and previous two year calculations. In addition, Table 5 D. will display the sum of the previous two-year difference in Allocations above Guide Rock and Computed Beneficial Consumptive Uses above Guide Rock minus any Imported Water Credits and compare the result with the Alternative Water-Short-Year Administration Plan's expected decrease in Computed Beneficial Consumptive Use above Guide Rock. Nebraska will be within compliance with the Compact as long as the three-year running average difference in Column 8 is positive and the sum of the previous year and current year deficits above Guide Rock are not greater than the expected decrease in Computed Beneficial Consumptive Use under the plan.

IV. Specific Formulas

A. Computed Beneficial Consumptive Use

1. Computed Beneficial Consumptive Use of Groundwater:

The Computed Beneficial Consumptive Use caused by groundwater diversion shall be determined by the RRCA Groundwater Model as described in Subsection III.D.1.

2. Computed Beneficial Consumptive Use of Surface Water:

The Computed Beneficial Consumptive Use of surface water shall be calculated as follows:

a) Non-Federal Canals
Computed Beneficial Consumptive Use from diversions by non- federal canals shall be 60 percent of the diversion; the return flow shall be 40 percent of the diversion

b) Individual Surface Water Pumps
Computed Beneficial Consumptive Use from small individual surface water pumps shall be 75 percent of the diversion; return flows will be 25 percent of the diversion unless a state provides data on the amount of

different system types in a Sub-basin, in which case the following percentages will be used for each system type:

Gravity Flow.	30%
Center Pivot	17%
LEPA	10%

c) Federal Canals

Computed Beneficial Consumptive Use of diversions by Federal canals will be calculated as shown in Attachment 7. For each Bureau of Reclamation Canal the field deliveries shall be subtracted from the diversion from the river to determine the canal losses. The field delivery shall be multiplied by one minus an average system efficiency for the district to determine the loss of water from the field. Eighty-two percent of the sum of the field loss plus the canal loss shall be considered to be the return flow from the canal diversion. The assumed field efficiencies and the amount of the field and canal loss that reaches the stream may be reviewed by the RRCA and adjusted as appropriate to insure their accuracy.

d) Non-irrigation Uses

Any non-irrigation uses diverting or pumping more than 50 acre-feet per year will be required to measure diversions. Non-irrigation uses diverting more than 50 Acre-feet per year will be assessed a Computed Beneficial Consumptive Use of 50% of what is pumped or diverted, unless the entity presents evidence to the RRCA demonstrating a different percentage should be used.

e) Evaporation from Federal Reservoirs

Net Evaporation from Federal Reservoirs will be calculated as follows:

(1) Harlan County Lake, Evaporation Calculation

April 1 through October 31:

Evaporation from Harlan County Lake is calculated by the Corps of Engineers on a daily basis from April 1 through October 31. Daily readings are taken from a Class A evaporation pan maintained near the project office. Any precipitation recorded at the project office is

added to the pan reading to obtain the actual evaporation amount. The pan value is multiplied by a pan coefficient that varies by month. These values are:

March	.56
April	.52
May	.53
June	.60
July	.68
August	.78
September	.91
October	1.01

The pan coefficients were determined by studies the Corps of Engineers conducted a number of years ago. The result is the evaporation in inches. It is divided by 12 and multiplied by the daily lake surface area in acres to obtain the evaporation in Acre-feet. The lake surface area is determined by the 8:00 a.m. elevation reading applied to the lake's area-capacity data. The area-capacity data is updated periodically through a sediment survey. The last survey was completed in December 2000.

November 1 through March 31

During the winter season, a monthly total evaporation in inches has been determined. The amount varies with the percent of ice cover. The values used are:

HARLAN COUNTY LAKE

Estimated Evaporation in Inches
Winter Season -- Monthly Total

PERCENTAGE OF ICE COVER

	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
JAN	0.88	0.87	0.85	0.84	0.83	0.82	0.81	0.80	0.78	0.77	0.76
FEB	0.90	0.88	0.87	0.86	0.85	0.84	0.83	0.82	0.81	0.80	0.79
MAR	1.29	1.28	1.27	1.26	1.25	1.24	1.23	1.22	1.21	1.20	1.19
OCT	4.87			NO ICE							
NOV	2.81			NO ICE							

DEC	1.31	1.29	1.27	1.25	1.24	1.22	1.20	1.18	1.17	1.16	1.14

The monthly total is divided by the number of days in the month to obtain a daily evaporation value in inches. It is divided by 12 and multiplied by the daily lake surface area in acres to obtain the evaporation in Acre-feet. The lake surface area is determined by the 8:00 a.m. elevation reading applied to the lake's area-capacity data. The area-capacity data is updated periodically through a sediment survey. The last survey was completed in December 2000.

To obtain the net evaporation, the monthly precipitation on the lake is subtracted from the monthly gross evaporation. The monthly precipitation is calculated by multiplying the sum of the month's daily precipitation in inches by the average of the end of the month lake surface area for the previous month and the end of the month lake surface area for the current month in acres and dividing the result by 12 to obtain the precipitation for the month in acre feet.

The total annual net evaporation (Acre-feet) will be charged to Kansas and Nebraska in proportion to the annual diversions made by the Kansas Bostwick Irrigation District and the Nebraska Bostwick Irrigation District during the time period each year when irrigation releases are being made from Harlan County Lake. For any year in which no irrigation releases were made from Harlan County Lake, the annual net evaporation charged to Kansas and Nebraska will be based on the average of the above calculation for the most recent three years in which irrigation releases from Harlan County Lake were made. In the event Nebraska chooses to substitute supply for the Superior Canal from Nebraska's allocation below Guide Rock in Water-Short Year Administration years, the amount of the substitute supply will be included in the calculation of the split as if it had been diverted to the Superior Canal at Guide Rock.

(2) Evaporation Computations for Bureau of Reclamation Reservoirs

The Bureau of Reclamation computes the amount of evaporation loss on a monthly basis at Reclamation reservoirs. The following procedure is utilized in calculating the loss in Acre-feet.

An evaporation pan reading is taken each day at the dam site. This measurement is the amount of water lost from the pan over a 24-hour period in inches. The evaporation pan reading is adjusted for any precipitation recorded during the 24-hour period. Instructions for

determining the daily pan evaporation are found in the "National Weather Service Observing Handbook No. 2 – Substation Observations." All dams located in the Kansas River Basin with the exception of Bonny Dam are National Weather Service Cooperative Observers. The daily evaporation pan readings are totaled at the end of each month and converted to a "free water surface" (FWS) evaporation, also referred to as "lake" evaporation. The FWS evaporation is determined by multiplying the observed pan evaporation by a coefficient of .70 at each of the reservoirs. This coefficient can be affected by several factors including water and air temperatures. The National Oceanic and Atmospheric Administration (NOAA) has published technical reports describing the determination of pan coefficients. The coefficient used is taken from the "NOAA Technical Report NWS 33, Map of coefficients to convert class A pan evaporation to free water surface evaporation". This coefficient is used for the months of April through October when evaporation pan readings are recorded at the dams. The monthly FWS evaporation is then multiplied by the average surface area of the reservoir during the month in acres. Dividing this value by twelve will result in the amount of water lost to evaporation in Acre-feet during the month.

During the winter months when the evaporation pan readings are not taken, monthly evaporation tables based on the percent of ice cover are used. The tables used were developed by the Corps of Engineers and were based on historical average evaporation rates. A separate table was developed for each of the reservoirs. The monthly evaporation rates are multiplied by the .70 coefficient for pan to free water surface adjustment, divided by twelve to convert inches to feet and multiplied by the average reservoir surface area during the month in acres to obtain the total monthly evaporation loss in Acre-feet.

To obtain the net evaporation, the monthly precipitation on the lake is subtracted from the monthly gross evaporation. The monthly precipitation is calculated by multiplying the sum of the month's daily precipitation in inches by the average of the end of the month lake surface area for the previous month and the end of the month lake surface area for the current month in acres and dividing the result by 12 to obtain the precipitation for the month in acre feet.

f) Non-Federal Reservoir Evaporation:

For Non-Federal Reservoirs with a storage capacity less than 200 Acre-feet, the presumptive average annual surface area is 25% of the area at the principal spillway elevation. Net evaporation for each such Non-Federal Reservoir will be calculated by multiplying the presumptive average annual surface area by the net evaporation from the nearest climate and evaporation station to the Non-Federal Reservoir. A State may provide actual data in lieu of the presumptive criteria.

Net evaporation from Non-Federal Reservoirs with 200 Acre-feet of storage or greater will be calculated by multiplying the average annual surface area (obtained from the area-capacity survey) and the net evaporation from the nearest evaporation and climate station to the reservoir. If the average annual surface area is not available, the Non-Federal Reservoirs with 200 Acre-feet of storage or greater will be presumed to be full at the principal spillway elevation.

B. Specific Formulas for Each Sub-basin and the Main Stem

All calculations shall be based on the calendar year and shall be rounded to the nearest 10 Acre-feet using the conventional rounding formula of rounding up for all numbers equal to five or higher and otherwise rounding down.

Abbreviations:
~~AWSCNFASWAWS~~ = ~~Augmentation Water Supply Credit~~CNF Augmentation Water Supply Credit
CBCU = Computed Beneficial Consumptive Use
CWS = Computed Water Supply
D = Non-Federal Canal Diversions for Irrigation
Ev = Evaporation from Federal Reservoirs
EvNFR = Evaporation from Non-Federal Reservoirs
FF = Flood Flow
GW = Groundwater Computed Beneficial Consumptive Use (includes irrigation and non-irrigation uses)
IWS = Imported Water Supply Credit from Nebraska
M&I = Non-Irrigation Surface Water Diversions (Municipal and Industrial)
P = Small Individual Surface Water Pump Diversions for Irrigation
RF = Return Flow
VWS = Virgin Water Supply
c = Colorado
k = Kansas

n	= Nebraska
ΔS	= Change in Federal Reservoir Storage
%	= Average system efficiency for individual pumps in the Sub-basin
% BRF	= Percent of Diversion from Bureau Canals that returns to the stream
###	= Value expected to be zero

3. North Fork of Republican River in Colorado [2]

CBCU Colorado	= 0.6 x Haigler Canal Diversion Colorado + 0.6 x Dc + % x Pc + 0.5 x M&Ic + EvNFRc + GWc
CBCU Kansas	= GWk
CBCU Nebraska	= 0.6 x Haigler Canal Diversion Nebraska + GWn
	Note: The diversion for Haigler Canal is split between Colorado and Nebraska based on the percentage of land irrigated in each state
VWS	= North Fork of the Republican River at the State Line, Stn. No. 06823000 + CBCUc + CBCUk + CBCUn + Nebraska Haigler Canal RF– IWS ~~AWS~~CNFAWS
	Note: The Nebraska Haigler Canal RF returns to the Main Stem
CWS	= VWS - FF
Allocation Colorado	= 0.224 x CWS
Allocation Nebraska	= 0.246 x CWS
Unallocated	= 0.53 x CWS

4. Arikaree River [2]

[2] The RRCA will investigate whether return flows from the Haigler Canal diversion in Colorado may return to the Arikaree River, not the North Fork of the Republican River, as indicated in the formulas. If there are return flows from the Haigler Canal to the Arikaree River, these formulas will be changed to recognize those returns.

CBCU Colorado	= 0.6 x Dc + % x Pc + 0.5 x M&Ic + EvNFRc + GWc
CBCU Kansas	= 0.6 x Dk + % x Pk + 0.5 x M&Ik + EvNFRk + GWk
CBCU Nebraska	= 0.6 x Dn + % x Pn + 0.5 x M&In + EvNFRn + GWn
VWS	= Arikaree Gage at Haigler Stn. No. 06821500 + CBCUc + CBCUk + CBCUn – IWS
CWS	= VWS - FF
Allocation Colorado	= 0.785 x CWS
Allocation Kansas	= 0.051 x CWS
Allocation Nebraska	= 0.168 x CWS
Unallocated	=-0.004 x CWS

5. Buffalo Creek

CBCU Colorado	= 0.6 x Dc + % x Pc + 0.5 x M&In + EvNFRc + GWc
CBCU Kansas	= GWk
CBCU Nebraska	= 0.6 x Dn + % x Pn + 0.5 x M&In + EvNFRn + GWn
VWS	= Buffalo Creek near Haigler Gage Stn. No. 06823500 + CBCUc + CBCUk + CBCUn – IWS
CWS	= VWS - FF
Allocation Nebraska	= 0.330 x CWS
Unallocated	= 0.670 x CWS

6. Rock Creek

CBCU Colorado	= GWc
CBCU Kansas	= GWk

CBCU Nebraska	= 0.6 x Dn + % x Pn + 0.5 x M&In + EvNFRn + GWn
VWS	= Rock Creek at Parks Gage Stn. No. 06824000 + CBCUc + CBCUk + CBCUn – IWS
CWS	= VWS - FF
Allocation Nebraska	= 0.400 x CWS
Unallocated	= 0.600 x CWS

7. South Fork Republican River

CBCU Colorado	= 0.6 x Hale Ditch Diversion + 0.6 x Dc + % x Pc + 0.5 x M&Ic + EvNFRc + Bonny Reservoir Ev + GWc
CBCU Kansas	= 0.6 x Dk + % x Pk + 0.5 x M&Ik + EvNFRk + GWk
CBCU Nebraska	= 0.6 x Dn + % x Pn + 0.5 x M&In + EvNFRn + GWn
VWS	= South Fork Republican River near Benkelman Gage Stn. No. 06827500 + CBCUc + CBCUk + CBCUn + ΔS Bonny Reservoir – IWS
CWS	= VWS - ΔS Bonny Reservoir - FF
Allocation Colorado	= 0.444 x CWS
Allocation Kansas	= 0.402 x CWS
Allocation Nebraska	= 0.014 x CWS
Unallocated	= 0.140 x CWS

8. Frenchman Creek in Nebraska

CBCU Colorado	= GWc
CBCU Kansas	= GWk

CBCU Nebraska	= Culbertson Canal Diversions x (1-%BRF) + Culbertson Extension x (1-%BRF) + 0.6 x Champion Canal Diversion + 0.6 x Riverside Canal Diversion + 0.6 x Dn + % x Pn + 0.5 x M&In + EvNFRn + Enders Reservoir Ev + GWn
VWS	= Frenchman Creek in Culbertson, Nebraska Gage Stn. No. 06835500 + CBCUc + CBCUk + CBCUn + 0.17 x Culbertson Diversion RF + Culbertson Extension RF + ΔS Enders Reservoir – IWS Note: 17% of the Culbertson Diversion RF and 100% of the Culbertson Extension RF return to the Main Stem
CWS	= VWS - ΔS Enders Reservoir – FF
Allocation Nebraska	= 0.536 x CWS
Unallocated	= 0.464 x CWS

9. Driftwood Creek

CBCU Colorado	= GWc
CBCU Kansas	= 0.6 x Dk + % x Pk + 0.5 x M&Ik + EvNFRk + GWk
CBCU Nebraska	= 0.6 x Dn + % x Pn + 0.5 x M&In + EvNFRn + GWn
VWS	= Driftwood Creek near McCook Gage Stn. No. 06836500 + CBCUc + CBCUk + CBCUn – 0.24 x Meeker Driftwood Canal RF - IWS Note: 24 % of the Meeker Driftwood Canal RF returns to Driftwood Creek
CWS	= VWS – FF
Allocation Kansas	= 0.069 x CWS
Allocation Nebraska	= 0.164 x CWS
Unallocated	= 0.767 x CWS

10. Red Willow Creek in Nebraska

CBCU Colorado	= GWc
CBCU Kansas	= GWk
CBCU Nebraska	= 0.1 x Red Willow Canal CBCU + 0.6 x Dn + % x Pn + 0.5 x M&In + EvNFRn + 0.1 x Hugh Butler Lake Ev + GWn Note: Red Willow Canal CBCU = Red Willow Canal Diversion x (1- % BRF) 90% of the Red Willow Canal CBCU and 90% of Hugh Butler Lake Ev charged to Nebraska's CBCU in the Main Stem
VWS	= Red Willow Creek near Red Willow Gage Stn. No. 06838000 + CBCUc + CBCUk + CBCUn + 0.9 x Red Willow Canal CBCU + 0.9 x Hugh Butler Lake Ev + 0.9 xRed Willow Canal RF + ΔS Hugh Butler Lake – IWS Note: 90% of the Red Willow Canal RF returns to the Main Stem
CWS	= VWS - ΔS Hugh Butler Lake - FF
Allocation Nebraska	= 0.192 x CWS
Unallocated	= 0.808 x CWS

11. Medicine Creek

CBCU Colorado	= GWc
CBCU Kansas	= GWk
CBCU Nebraska	= 0.6 x Dn above and below gage + % x Pn above and below gage + 0.5 x M&In above and below gage + EvNFRn above and below gage + GWn

	Note: Harry Strunk Lake Ev charged to Nebraska's CBCU in the Main Stem. CU from Harry Strunk releases in the Cambridge Canal is charged to the Main stem (no adjustment to the VWS formula is needed as this water shows up in the Medicine Creek gage).
VWS	= Medicine Creek below Harry Strunk Lake Gage Stn. No. 06842500 + CBCUc + CBCUk + CBCUn – 0.6 x Dn below gage - % x Pn below gage – 0.5 * M&In below gage - EvNFRn below gage + Harry Strunk Lake Ev + ΔS Harry Strunk Lake– IWS Note: The CBCU surface water terms for Nebraska which occur below the gage are added in the VWS for the Main Stem
CWS	= VWS - ΔS Harry Strunk Lake - FF
Allocation Nebraska	= 0.091 x CWS
Unallocated	= 0.909 x CWS

12. Beaver Creek

CBCU Colorado	= 0.6 x Dc + % x Pc + 0.5 x M&Ic + EvNFRc + GWc
CBCU Kansas	= 0.6 x Dk + % x Pk + 0.5 x M&Ik + EvNFRk + GWk
CBCU Nebraska	= 0.6 x Dn above and below gage + % x Pn above and below gage + 0.5 x M&In above and below gage + EvNFRn above and below gage + GWn
VWS	= Beaver Creek near Beaver City gage Stn. No. 06847000 + BCUc + CBCUk + CBCUn – 0.6 x Dn below gage - % x Pn below gage – 0.5 * M&In below gage - EvNFRn below gage – IWS Note: The CBCU surface water terms for Nebraska which occur below the gage are added in the VWS for the Main Stem

CWS	= VWS – FF
Allocation Colorado	= 0.200 x CWS
Allocation Kansas	= 0.388 x CWS
Allocation Nebraska	= 0.406 x CWS
Unallocated	= 0.006 x CWS

13. Sappa Creek

CBCU Colorado	= GWc
CBCU Kansas	= 0.6 x Dk + % x Pk + 0.5 x M&Ik + EvNFRk + GWk
CBCU Nebraska	= 0.6 x Dn above and below gage + % x Pn above and below gage + 0.5 x M&In above and below gage + EvNFRn above and below gage + GWn
VWS	= Sappa Creek near Stamford gage Stn. No. 06847500 – Beaver Creek near Beaver City gage Stn. No. 06847000 + CBCUc + CBCUk + CBCUn – 0.6 x Dn below gage - % x Pn below gage – 0.5 * M&In below gage - EvNFRn below gage – IWS Note: The CBCU surface water terms for Nebraska which occur below the gage are added in the VWS for the Main Stem
CWS	= VWS - FF
Allocation Kansas	= 0.411 x CWS
Allocation Nebraska	= 0.411 x CWS
Unallocated	= 0.178 x CWS

14. Prairie Dog Creek

CBCU Colorado	= GWc
CBCU Kansas	= Almena Canal Diversion x (1-%BRF) + 0.6 x Dk + % x Pk + 0.5 x M&Ik + EvNFRk + Keith Sebelius Lake Ev + GWk
CBCU Nebraska	= 0.6 x Dn below gage + % x Pn below gage + 0.5 x M&In below gage + EvNFRn + GWn below gage
VWS	= Prairie Dog Creek near Woodruff, Kansas USGS Stn. No. 06848500 + CBCUc + CBCUk + CBCUn - 0.6 x Dn below gage - % x Pn below gage - 0.5 x M&In below gage - EvNFRn below gage + AS Keith Sebelius Lake – IWS Note: The CBCU surface water terms for Nebraska which occur below the gage are added in the VWS for the Main Stem
CWS	= VWS- AS Keith Sebelius Lake - FF
Allocation Kansas	= 0.457 x CSW
Allocation Nebraska	= 0.076 x CWS
Unallocated	= 0.467 x CWS

15. The North Fork of the Republican River in Nebraska and the Main Stem of the Republican River between the junction of the North Fork and the Arikaree River and the Republican River near Hardy

CBCU Colorado	= GWc
CBCU Kansas	= (Deliveries from the Courtland Canal to Kansas above Lovewell) x (1-%BRF) + Amount of transportation loss of Courtland Canal deliveries to Lovewell that does not return to the river, charged to Kansas + (Diversions of Republican River water from Lovewell Reservoir by the Courtland Canal below Lovewell) x (1-%BRF) + 0.6 x Dk

+ % x Pk
+ 0.5 x M&Ik
+ EvNFRk
+ Harlan County Lake Ev charged to Kansas
+ Lovewell Reservoir Ev charged to the Republican River
+ GWk

CBCU Nebraska =
Deliveries from Courtland Canal to Nebraska lands x (1- %BRF)
+ Superior Canal x (1- %BRF)
+ Franklin Pump Canal x (1- %BRF)
+ Franklin Canal x (1- %BRF)
+ Naponee Canal x (1- %BRF)
+ Cambridge Canal x (1- %BRF)
+ Bartley Canal x (1- %BRF)
+ Meeker-Driftwood Canal x (1- %BRF)
+ 0.9 x Red Willow Canal CBCU
+ 0.6 x Dn
+ % x Pn
+ 0.5 x M&In
+ EvNFRn
+ 0.9 x Hugh Butler Lake Ev
+ Harry Strunk Lake Ev
+ Swanson Lake Ev
+ Harlan County Lake Ev charged to Nebraska
+ GWn

Notes:
The allocation of transportation losses in the Courtland Canal above Lovewell between Kansas and Nebraska shall be done by the Bureau of Reclamation and reported in their "Courtland Canal Above Lovewell" spreadsheet. Deliveries and losses associated with deliveries to both Nebraska and Kansas above Lovewell shall be reflected in the Bureau's Monthly Water District reports. Losses associated with delivering water to Lovewell shall be separately computed.

Amount of transportation loss of the Courtland Canal deliveries to Lovewell that does not return to the river, charged to Kansas shall be 18% of the Bureau's estimate of losses associated with these deliveries.

Red Willow Canal CBCU = Red Willow Canal Diversion x (1- % BRF)

10% of the Red Willow Canal CBCU is charged to Nebraska's CBCU in Red Willow Creek sub-basin

10% of Hugh Butler Lake Ev is charged to Nebraska's CBCU in the Red Willow Creek sub-basin

None of the Harry Strunk Lake EV is charged to Nebraska's CBCU in the Medicine Creek sub-basin

VWS =

Republican River near Hardy Gage Stn. No. 06853500
- North Fork of the Republican River at the State Line, Stn. No. 06823000
- Arikaree Gage at Haigler Stn. No. 06821500
- Buffalo Creek near Haigler Gage Stn. No. 06823500
- Rock Creek at Parks Gage Stn. No. 06824000
-South Fork Republican River near Benkelman Gage Stn. No. 06827500
- Frenchman Creek in Culbertson Stn. No. 06835500
- Driftwood Creek near McCook Gage Stn. No. 06836500
- Red Willow Creek near Red Willow Gage Stn. No. 06838000
- Medicine Creek below Harry Strunk Lake Gage Stn. No. 06842500
- Sappa Creek near Stamford Gage Stn. No. 06847500
- Prairie Dog Creek near Woodruff, Kansas Stn. No. 68-485000

+ CBCUc
+ CBCUn

+ 0.6 x Dk
+ % x Pk
+ 0.5 x M&Ik
+ EvNFRk
+ Harlan County Lake Ev charged to Kansas
+Amount of transportation loss of the Courtland Canal above the Stateline that does not return to the river, charged to Kansas

- 0.9 x Red Willow Canal CBCU
- 0.9 x Hugh Butler Ev
- Harry Strunk Ev

+ 0.6 x Dn below Medicine Creek gage
+ % x Pn below Medicine Creek gage
+ 0.5 * M&In below Medicine Creek gage
+ EvNFRn below Medicine Creek gage

+ 0.6 x Dn below Beaver Creek gage
+ % x Pn below Beaver Creek gage
+ 0.5 * M&In below Beaver Creek gage
+ EvNFRn below Beaver Creek gage

+ 0.6 x Dn below Sappa Creek gage
+ % x Pn below Sappa Creek gage
+ 0.5 * M&In below Sappa Creek gage
+ EvNFRn below Sappa Creek gage

+ 0.6 x Dn below Prairie Dog Creek gage
+ % x Pn below Prairie Dog Creek gage
+ 0.5 * M&In below Prairie Dog Creek gage
+ EvNFRn below Prairie Dog Creek gage

+ Change in Storage Harlan County Lake
+ Change in Storage Swanson Lake

- Nebraska Haigler Canal RF
- 0.17 x Culbertson Canal RF
- Culbertson Canal Extension RF to Main Stem
+ 0.24 x Meeker Driftwood Canal RF which returns to Driftwood Creek
- 0.9 x Red Willow Canal RF

+ Courtland Canal at Kansas-Nebraska State Line Gage Stn No. 06852500
- Courtland Canal RF in Kansas above Lovewell Reservoir

-IWS

Notes:

None of the Nebraska Haigler Canal RF returns to the North Fork of the Republican River

83% of the Culbertson Diversion RF and none of the Culbertson Extension RF return to Frenchman Creek

24 % of the Meeker Driftwood Canal RF returns to Driftwood Creek.

10% of the Red Willow Canal RF returns to Red Willow Creek

Courtland Canal RF in Kansas above Lovewell Reservoir = 0.015 x (Courtland Canal at Kansas-Nebraska State Line Gage Stn No. 06852500)

CWS	= VWS - Change in Storage Harlan County Lake - Change in Storage Swanson Lake - FF
Allocation Kansas	= 0.511 x CWS
Allocation Nebraska	= 0.489 x CWS

V. Annual Data/ Information Requirements, Reporting, and Verification

The following information for the previous calendar year shall be provided to the members of the RRCA Engineering Committee by April 15th of each year, unless otherwise specified.

All information shall be provided in electronic format, if available.

Each State agrees to provide all information from their respective State that is needed for the RRCA Groundwater Model and RRCA Accounting Procedures and Reporting Requirements, including but not limited to the following:

A. Annual Reporting

1. Surface water diversions and irrigated acreage:

Each State will tabulate the canal, ditch, and other surface water diversions that are required by RRCA annual compact accounting and the RRCA Groundwater Model on a monthly format (or a procedure to distribute annual data to a monthly basis)

and will forward the surface water diversions to the other States. This will include available diversion, wasteway, and farm delivery data for canals diverting from the Platte River that contribute to Imported Water Supply into the Basin. Each State will provide the water right number, type of use, system type, location, diversion amount, and acres irrigated.

2. Groundwater pumping and irrigated acreage:

Each State will tabulate and provide all groundwater well pumping estimates that are required for the RRCA Groundwater Model to the other States.

Colorado – will provide an estimate of pumping based on a county format that is based upon system type, Crop Irrigation Requirement (CIR), irrigated acreage, crop distribution, and irrigation efficiencies. Colorado will require installation of a totalizing flow meter, installation of an hours meter with a measurement of the pumping rate, or determination of a power conversion coefficient for 10% of the active wells in the Basin by December 31, 2005. Colorado will also provide an annual tabulation for each groundwater well that measures groundwater pumping by a totalizing flow meter, hours meter or power conversion coefficient that includes: the groundwater well permit number, location, reported hours, use, and irrigated acreage.

Kansas - will provide an annual tabulation by each groundwater well that includes: water right number, groundwater pumping determined by a meter on each well (or group of wells in a manifold system) or by reported hours of use and rate; location; system type (gravity, sprinkler, LEPA, drip, etc.); and irrigated acreage. Crop distribution will be provided on a county basis.

Nebraska – will provide an annual tabulation through the representative Natural Resource District (NRD) in Nebraska that includes: the well registration number or other ID number; groundwater pumping determined by a meter on each well (or group of wells in a manifold system) or by reported hours of use and rate; wells will be identified by; location; system type (gravity, sprinkler, LEPA, drip, etc.); and irrigated acreage. Crop distribution will be provided on a county basis.

3. Climate information:

Each State will tabulate and provide precipitation, temperature, relative humidity or dew point, and solar radiation for the following climate stations:

State	Identification	Name
Colorado		
Colorado	C050109	Akron 4 E

Colorado	C051121	Burlington
Colorado	C054413	Julesburg
Colorado	C059243	Wray
Kansas	C140439	Atwood 2 SW
Kansas	C141699	Colby 1SW
Kansas	C143153	Goodland
Kansas	C143837	Hoxie
Kansas	C145856	Norton 9 SSE
Kansas	C145906	Oberlin1 E
Kansas	C147093	Saint Francis
Kansas	C148495	Wakeeny
Nebraska	C250640	Beaver City
Nebraska	C250810	Bertrand
Nebraska	C252065	Culbertson
Nebraska	C252690	Elwood 8 S
Nebraska	C253365	Gothenburg
Nebraska	C253735	Hebron
Nebraska	C253910	Holdredge
Nebraska	C254110	Imperial
Nebraska	C255090	Madrid
Nebraska	C255310	McCook
Nebraska	C255565	Minden
Nebraska	C256480	Palisade
Nebraska	C256585	Paxton
Nebraska	C257070	Red Cloud
Nebraska	C258255	Stratton
Nebraska	C258320	Superior
Nebraska	C258735	Upland
Nebraska	C259020	Wauneta 3 NW

4. Crop Irrigation Requirements:

Each State will tabulate and provide estimates of crop irrigation requirement information on a county format. Each State will provide the percentage of the crop irrigation requirement met by pumping; the percentage of groundwater irrigated lands served by sprinkler or flood irrigation systems, the crop irrigation requirement; crop distribution; crop coefficients; gain in soil moisture from winter and spring precipitation, net crop irrigation requirement; and/or other information necessary to compute a soil/water balance.

5. Streamflow Records from State-Maintained Gaging Records:

Streamflow gaging records from the following State maintained gages will be provided:

Station No	Name
00126700	Republican River near Trenton
06831500	Frenchman Creek near Imperial
06832500	Frenchman Creek near Enders
06835000	Stinking Water Creek near Palisade
06837300	Red Willow Creek above Hugh Butler Lake
06837500	Red Willow Creek near McCook
06841000	Medicine Creek above Harry Strunk Lake
06842500	Medicine Creek below Harry Strunk Lake
06844000	Muddy Creek at Arapahoe
06844210	Turkey Creek at Edison
06847000	Beaver Creek near Beaver City
	Republican River at Riverton
06851500	Thompson Creek at Riverton
06852000	Elm Creek at Amboy
	Republican River at the Superior-Courtland Diversion Dam

6. Platte River Reservoirs:

The State of Nebraska will provide the end-of-month contents, inflow data, outflow data, area-capacity data, and monthly net evaporation, if available, from Johnson Lake; Elwood Reservoir; Sutherland Reservoir; Maloney Reservoir; and Jeffrey Lake.

7. Water Administration Notification:

The State of Nebraska will provide the following information that describes the protection of reservoir releases from Harlan County Lake and for the administration of water rights junior in priority to February 26, 1948:

Date of notification to Nebraska water right owners to curtail their diversions, the amount of curtailment, and length of time for curtailment.
The number of notices sent.
The number of diversions curtailed and amount of curtailment in the Harlan County Lake to Guide Rock reach of the Republican River.

8. Moratorium:

Each State will provide a description of all new Wells constructed in the Basin Upstream of Guide Rock including the owner, location (legal description), depth and diameter or dimension of the constructed water well, casing and screen information, static water level, yield of the water well in gallons per minute or gallons per hour, and intended use of the water well.

Designation whether the Well is a:

a. Test hole;

b. Dewatering Well with an intended use of one year or less;

c. Well designed and constructed to pump fifty gallons per minute or less;

d. Replacement Water Well, including a description of the Well that is replaced providing the information described above for new Wells and a description of the historic use of the Well that is replaced;

e. Well necessary to alleviate an emergency situation involving provision of water for human consumption, including a brief description of the nature of the emergency situation and the amount of water intended to be pumped by and the length of time of operation of the new Well;

f. Transfer Well, including a description of the Well that is transferred providing the information described above for new Wells and a description of the Historic Consumptive Use of the Well that is transferred;

g. Well for municipal and/or industrial expansion of use;

Wells in the Basin in Northwest Kansas or Colorado. Kansas and Colorado will provide the information described above for new Wells along with copies of any other information that is required to be filed with either State of local agencies under the laws, statutes, rules and regulations in existence as of April 30, 2002, and;

Any changes in State law in the previous year relating to existing Moratorium.

9. Non-Federal Reservoirs:

Each State will conduct an inventory of Non Federal Reservoirs by December 31, 2004, for inclusion in the annual Compact Accounting. The inventory shall include the following information: the location, capacity (in Acre-feet) and area (in acres)

at the principal spillway elevation of each Non-Federal Reservoir. The States will annually provide any updates to the initial inventory of Non-Federal Reservoirs, including enlargements that are constructed in the previous year.

Owners/operators of Non-Federal Reservoirs with 200 Acre-feet of storage capacity or greater at the principal spillway elevation will be required to provide an area-capacity survey from State-approved plans or prepared by a licensed professional engineer or land surveyor.

10. Augmentation Plan:

Each State will provide a description of the wells, measuring devices, conveyance structure(s), and other infrastructure to describe the physical characteristics, water diversions, and consumptive use associated with each augmentation plan. The States will provide any updates to the plan on an annual basis.

B. RRCA Groundwater Model Data Input Files

1. Monthly groundwater pumping, surface water recharge, groundwater recharge, and precipitation recharge provided by county and indexed to the one square mile cell size.

2. Potential Evapotranspiration rate is set as a uniform rate for all phreatophyte vegetative classes – the amount is X at Y climate stations and is interpolated spatially using kriging.

C. Inputs to RRCA Accounting

1. Surface Water Information

a. Streamflow gaging station records: obtained as preliminary USGS or Nebraska streamflow records, with adjustments to reflect a calendar year, at the following locations:

Arikaree River at Haigler, Nebraska
North Fork Republican River at Colorado-Nebraska state line
Buffalo Creek near Haigler, Nebraska
Rock Creek at Parks, Nebraska
South Fork Republican River near Benkelman, Nebraska
Frenchman Creek at Culbertson, Nebraska
Red Willow Creek near Red Willow, Nebraska

Medicine Creek below Harry Strunk Lake, Nebraska*
Beaver Creek near Beaver City, Nebraska*
Sappa Creek near Stamford, Nebraska
Prairie Dog Creek near Woodruff, Kansas
Courtland Canal at Nebraska-Kansas state line
Republican River near Hardy, Nebraska
Republican River at Superior-Courtland Diversion Dam near Guide Rock,
Nebraska (new)*

b. Federal reservoir information: obtained from the United States Bureau of Reclamation:

Daily free water surface evaporation, storage, precipitation, reservoir release information, and updated area-capacity tables.
Federal Reservoirs:
Bonny Reservoir
Swanson Lake
Harry Strunk Lake
Hugh Butler Lake
Enders Reservoir
Keith Sebelius Lake
Harlan County Lake
Lovewell Reservoir

c. Non-federal reservoirs obtained by each state: an updated inventory of reservoirs that includes the location, surface area (acres), and capacity (in Acre-feet), of each non-federal reservoir with storage capacity of fifteen (15) Acre-feet or greater at the principal spillway elevation. Supporting data to substantiate the average surface water areas that are different than the presumptive average annual surface area may be tendered by the offering State.

d. Diversions and related data from USBR

Irrigation diversions by canal, ditch, and pumping station that irrigate more than two (2) acres
Diversions for non-irrigation uses greater than 50 Acre-feet
Farm Deliveries
Wasteway measurements
Irrigated acres

e. Diversions and related data – from each respective State

Irrigation diversions by canal, ditch, and pumping station that irrigate more than two (2) acres
Diversions for non-irrigation uses greater than 50 Acre-feet
Wasteway measurements, if available

2. Groundwater Information

(From the RRCA Groundwater model as output files as needed for the accounting procedures)

a. Imported water - mound credits in amount and time that occur in defined streamflow points/reaches of measurement or compliance – ex: gaging stations near confluence or state lines

b. Groundwater depletions to streamflow (above points of measurement or compliance – ex: gaging stations near confluence or state lines)

3. Summary

The aforementioned data will be aggregated by Sub-basin as needed for RRCA accounting.

D. Verification

1. Documentation to be Available for Inspection Upon Request

a. Well permits/ registrations database
b. Copies of well permits/ registrations issued in calendar year
c. Copies of surface water right permits or decrees
d. Change in water right/ transfer historic use analyses
e. Canal, ditch, or other surface water diversion records
f. Canal, ditch, or other surface water measurements
g. Reservoir storage and release records
h. Irrigated acreage
i. CNF Augmentation Plan well pumping and augmentation delivery records

2. Site Inspection

a. Accompanied – reasonable and mutually acceptable schedule among representative state and/or federal officials.

b. Unaccompanied – inspection parties shall comply with all laws and regulations of the State in which the site inspection occurs.

Table 1: Annual Virgin and Computed Water Supply, Allocations and Computed Beneficial Consumptive Uses by State, Main Stem and Sub-basin

Designated Drainage Basin	Col. 1: Virgin Water Supply	Col. 2: Computed Water Supply	Col. 3: Allocations				Col. 4. Computed Beneficial Consumptive Use		
			Colorado	Nebraska	Kansas	Unallocated	Colorado	Nebraska	Kansas
North Fork in Colorado									
Arikaree									
Buffalo									
Rock									
South Fork of Republican River									
Frenchman									
Driftwood									
Red Willow									
Medicine									
Beaver									
Sappa									
Prairie Dog									
North Fork of Republican River in Nebraska and Main Stem									
Total All Basins									
North Fork Of Republican River in Nebraska and Mainstem Including Unallocated Water									
Total									

Table 2: Original Compact Virgin Water Supply and Allocations

Designated Drainage Basin	Virgin Water Supply	Colorado Allocation	% of Total Drainage Basin Supply	Kansas Allocation	% of Total Drainage Basin Supply	Nebraska Allocation	% of Total Drainage Basin Supply	Unallo-cated	% of Total Drainage Basin Supply
North Fork - CO	44,700	10,000	22.4			11,000	24.6	23,700	53.0
Arikaree River	19,610	15,400	78.5	1,000	5.1	3,300	16.8	-90	-0.4
Buffalo Creek	7,890					2,600	33.0	5,290	67.0
Rock Creek	11,000					4,400	40.0	6,600	60.0
South Fork	57,200	25,400	44.4	23,000	40.2	800	1.4	8,000	14.0
Frenchman Creek	98,500					52,800	53.6	45,700	46.4
Driftwood Creek	7,300			500	6.9	1,200	16.4	5,600	76.7
Red Willow Creek	21,900					4,200	19.2	17,700	80.8
Medicine Creek	50,800					4,600	9.1	46,200	90.9
Beaver Creek	16,500	3,300	20.0	6,400	38.8	6,700	40.6	100	0.6
Sappa Creek	21,400			8,800	41.1	8,800	41.1	3,800	17.8
Prairie Dog Creek	27,600			12,600	45.7	2,100	7.6	12,900	46.7
Sub-total Tributaries	384,400							175,500	
Main Stem + Blackwood Creek	94,500								
Main Stem + Unallocated	270,000			138,000	51.1	132,000	48.9		
Total	478,900	54,100		190,300		234,500			

Table 3A: Table to Be Used to Calculate Colorado's Five-Year Running Average Allocation and Computed Beneficial Consumptive Use for Determining Compact Compliance

Colorado				
	Col. 1	Col. 2	Col. 3	Col. 4
Year	Allocation	Computed Beneficial Consumptive	Imported Water Supply Credit and/or ~~Augmentation Water Supply Credit~~CNF Augmentation Water Supply Credit	Difference between Allocation and the Computed Beneficial Consumptive Use offset by Imported Water Supply Credit and/or ~~Augmentation Water Supply Credit~~CNF Augmentation Water Supply Credit Col 1 – (Col 2- Col 3)
Year t= -4				
Year t= -3				
Year t= -2				
Year t= -1				
Current Year t= 0				
Average				

Table 3B. Table to Be Used to Calculate Kansas's Five-Year Running Average Allocation and Computed Beneficial Consumptive Use for Determining Compact Compliance

Kansas				
	Col. 1	Col. 2	Col. 3	Col. 4
Year	Allocation	Computed Beneficial Consumptive	Imported Water Supply Credit	Difference between Allocation and the Computed Beneficial Consumptive Use offset by Imported Water Supply Credit Col 1 – (Col 2- Col 3)
Year t= -4				
Year t= -3				
Year t= -2				
Year t= -1				

Current Year t= 0				
Average				

Table 3C. Table to Be Used to Calculate Nebraska's Five-Year Running Average Allocation and Computed Beneficial Consumptive Use for Determining Compact Compliance

Nebraska				
	Col. 1	Col. 2	Col. 3	Col. 4
Year	Allocation	Computed Beneficial Consumptive	Imported Water Supply Credit	Difference between Allocation and the Computed Beneficial Consumptive Use offset by Imported Water Supply Credit Col 1 – (Col 2- Col 3)
Year T= -4				
Year T= -3				
Year T= -2				
Year T= -1				
Current Year T= 0				
Average				

Table 4A: Colorado Compliance with the Sub-basin Non-impairment Requirement

	Col 1	Col 2	Col 3	Col 4	Col 5	Col 6
Sub-basin	Colorado Sub-basin Allocation (5-year running average)	Unallocated Supply (5-year running average)	Credits from Imported Water Supply and/or CNF Augmentation Water Supply (5-year running average)	Total Supply Available = Col 1+ Col 2 + Col 3 (5-year running average)	Colorado Computed Beneficial Consumptive Use (5-year running average)	Difference Between Available Supply and Computed Beneficial Consumptive Use = Col 4 – Col 5 (5-year running average)
North Fork Republican River Colorado						
Arikaree River						
South Fork Republican River						
Beaver Creek						

Table 4B: Kansas Compliance with the Sub-basin Non-impairment Requirement

	Col 1	Col 2	Col 3	Col 4	Col 5	Col 6	Col 7
Sub-basin	Kansas Sub-basin Allocation (5-year running average)	Unallocated Supply (5-year running average)	Unused Allocation from Colorado (5-year running average)	Credits from Imported Water Supply (5-year running average)	Total Supply Available = Col 1+ Col 2+ Col 3 + Col 4 (5-year running average)	Kansas Computed Beneficial Consumptive Use (5-year running average)	Difference Between Available Supply and Computed Beneficial Consumptive Use = Col 5 – Col 6 (5-year running average)
Arikaree River							
South Fork Republican River							
Driftwood Creek							
Beaver Creek							
Sappa Creek							
Prairie Dog Creek							

Table 5A: Colorado Compliance During Water-Short Year Administration

Colorado				
	Col. 1	Col. 2	Col. 3	Col 4
Year	Allocation minus Allocation for Beaver Creek	Computed Beneficial Consumptive minus Computed Beneficial Consumptive Use for Beaver Creek	Imported Water Supply Credit and/or ~~Augmentation Water Supply Credit~~CNP Augmentation Water Supply Credit excluding Beaver Creek	Difference between Allocation and the Computed Beneficial Consumptive Use offset by Imported Water Supply Credit and/or ~~Augmentation Water Supply Credit~~CNP Augmentation Water Supply Credit for All Basins Except Beaver Creek Col 1 – (Col 2 – Col 3)
Year T= -4				
Year T= -3				
Year T= -2				
Year T= -1				
Current Year T= 0				
Average				

Table 5B: Kansas Compliance During Water-Short Year Administration

Kansas						
Year	Allocation			Computed Beneficial Consumptive Use`	Imported Water Supply Credit	Difference Between Allocation and the Computed Beneficial Consumptive Use offset by Imported Water Supply Credit
Column	1	2	3	4	5	6
	Sum Sub-basins	Kansas's Share of the Unallocated Supply	Total Col 1 + Col 2			Col 3 – (Col 4 – Col 5)
Previous Year						
Current Year						

Average						

Table 5C: Nebraska Compliance During Water-Short Year Administration

Nebraska								
Year	Allocation			Computed Beneficial Consumptive Use			Imported Water Supply Credit	Difference Between Allocation and the Computed Beneficial Consumptive Use offset by Imported Water Supply Credit Above Guide Rock
Column	Col 1	Col 2	Col 3	Col 4	Col 5	Col 6	Col 7	Col 8
	State Wide Allocation	Allocation below Guide Rock	State Wide Allocation above Guide Rock	State Wide CBCU	CBCU below Guide Rock	State Wide CBCU above Guide Rock	Credits above Guide Rock	Col 3 – (Col 6 – Col 7)
Previous Year								
Current Year								
Average								

Table 5D: Nebraska Compliance Under a Alternative Water-Short Year Administration Plan

Year	Allocation			Computed Beneficial Consumptive Use			Imported Water Supply Credit	Difference Between Allocation and the Computed Beneficial Consumptive Use offset by Imported Water Supply Credit Above Guide Rock
Column	Col 1	Col 2	Col 3	Col 4	Col 5	Col 6	Col 7	Col 8
	State Wide Allocation	Allocation below Guide Rock	State Wide Allocation above Guide Rock	State Wide CBCU	CBCU below Guide Rock	State Wide CBCU above Guide Rock	Credits above Guide Rock	Col 3 – (Col 6- Col 7)
Year = -2								
Year = -1								
Current Year								
Three-Year Average								
Sum of Previous Two-year Difference								
Expected Decrease in CBCU Under Plan								

Table 5E: Nebraska Tributary Compliance During Water-Short Year Administration

Year	Sum of Nebraska Sub-basin Allocations	Sum of Nebraska's Share of Sub-basin Unallocated Supplies	Total Available Water Supply for Nebraska	Computed Beneficial Consumptive Use	Imported Water Supply Credit	Difference between Allocation And the Computed Beneficial Consumptive Use offset by Imported Water Supply Credit
	Col 1	Col 2	`Col 3	Col 4	Col 5	Col 6
Previous Year						Col 3 -(Col 4-Col 5)
Current Year						
Average						

Figure 1

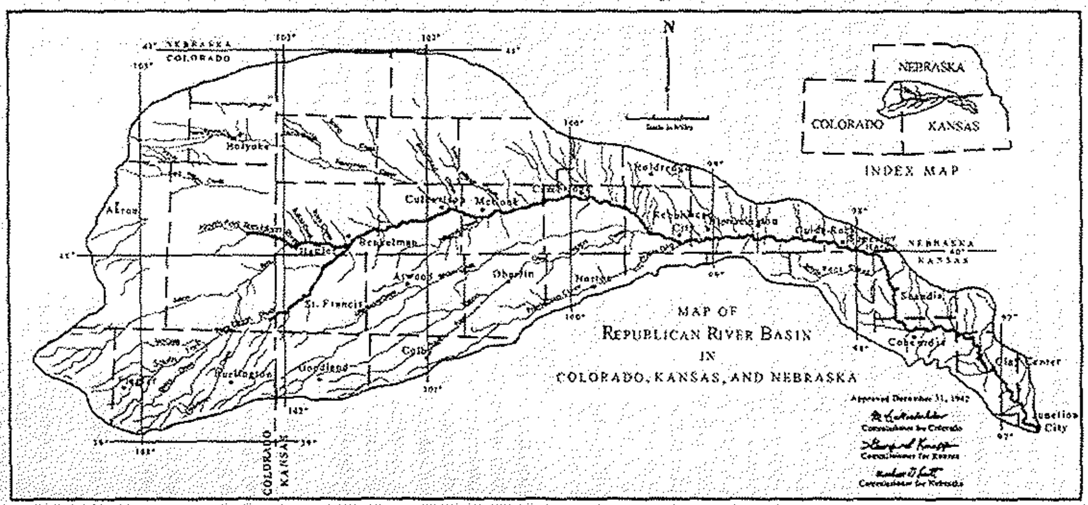
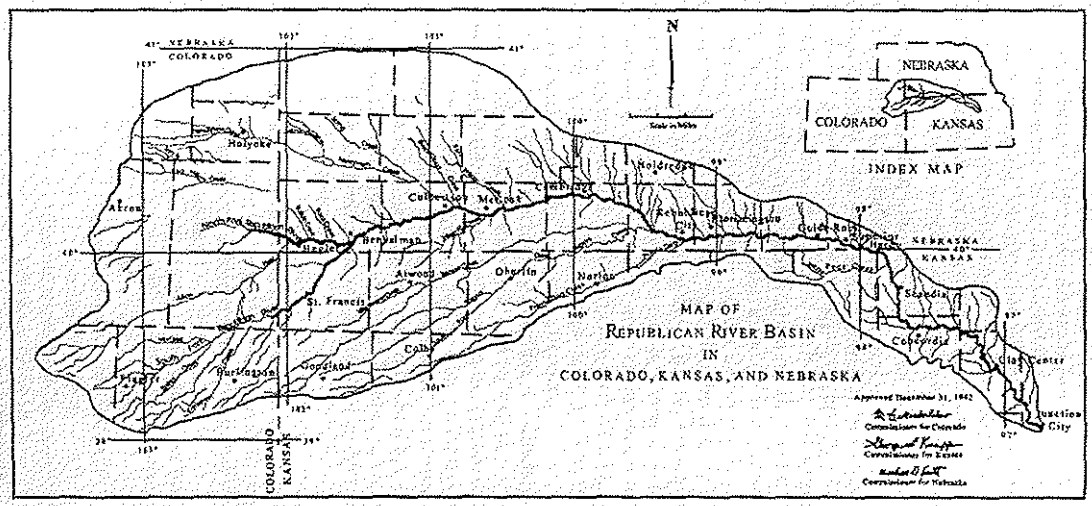
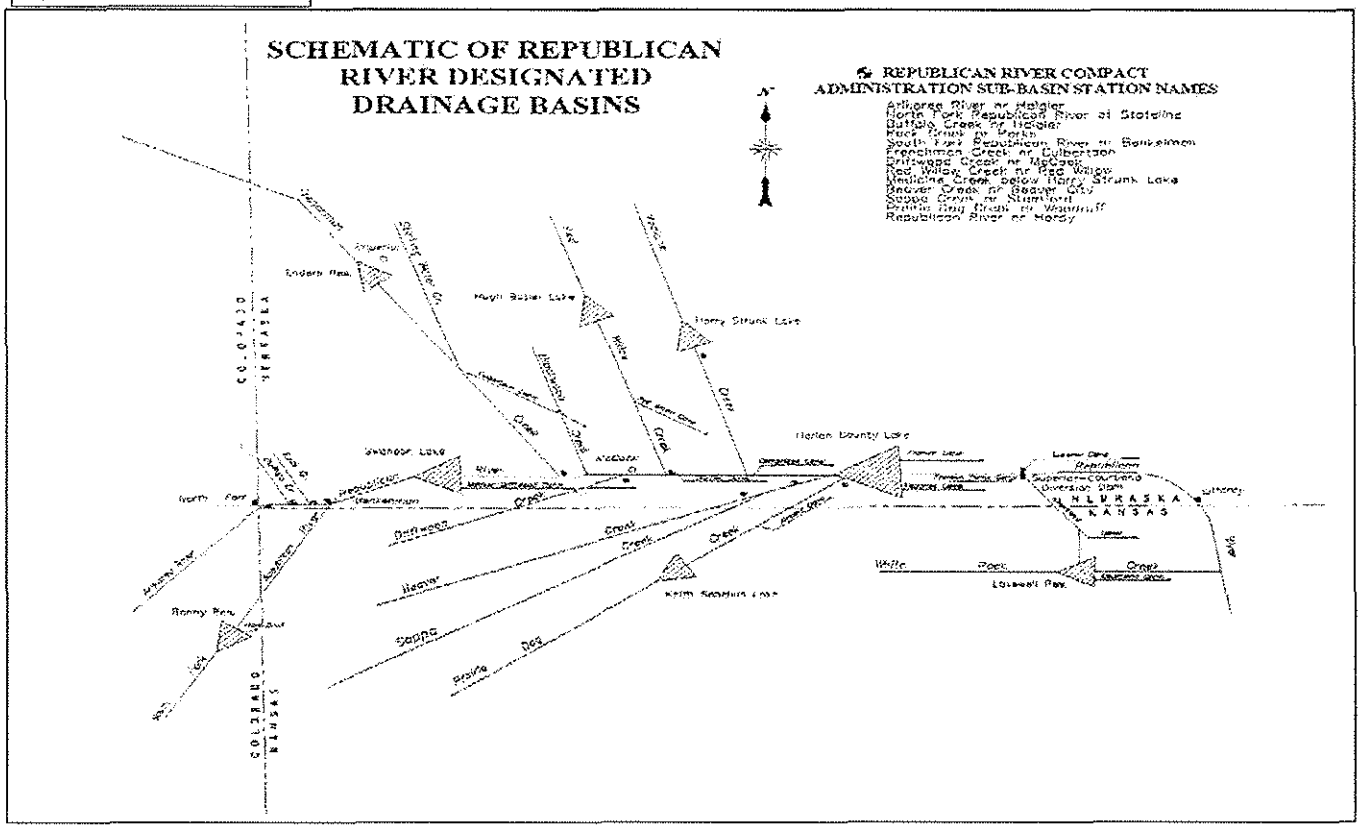

N
NEBRASKA
COLORADO
KANSAS
INDEX MAP
MAP OF
REPUBLICAN RIVER BASIN
IN
COLORADO, KANSAS, AND NEBRASKA
Holyoke
Akron
Culbertson
McCook
Benkelman
St. Francis
Atwood
Oberlin
Norton
Goodland
Colby
Burlington
Concordia
Clay Center
Junction City
COLORADO
KANSAS

Figure 1



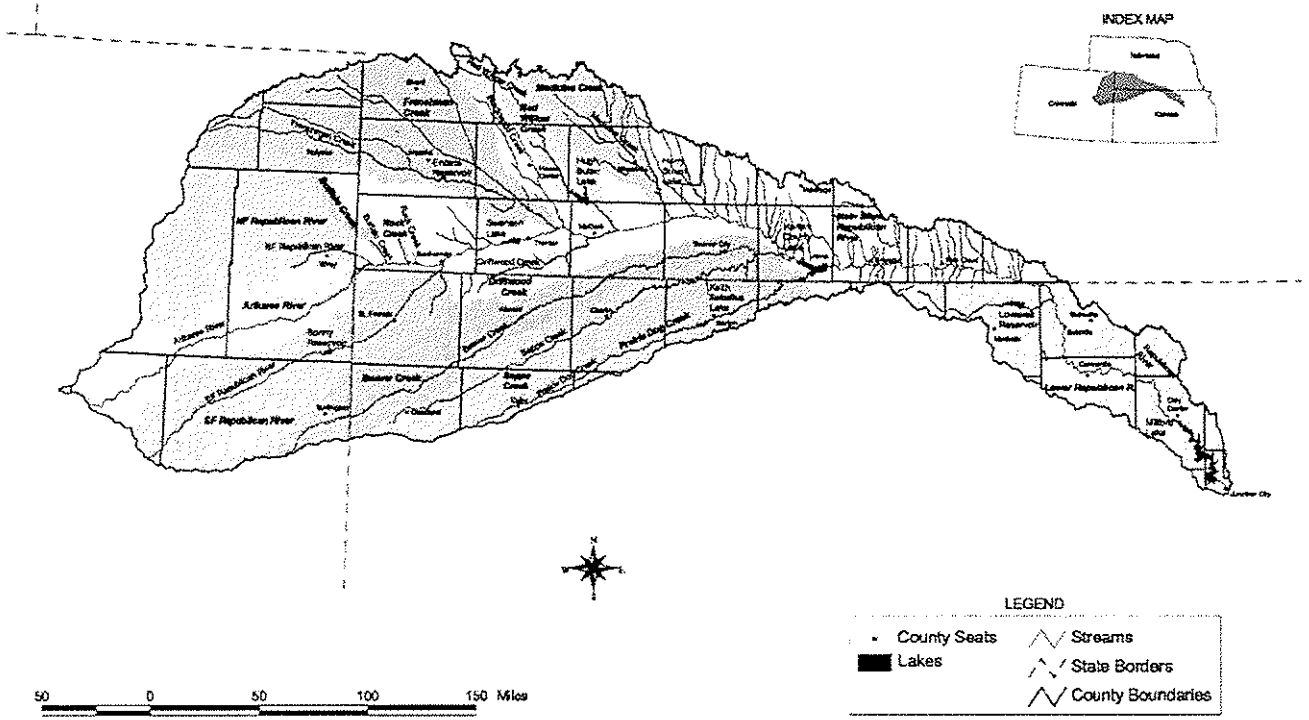
Basin Map Attached to Compact that Shows the Streams and the Basin Boundaries

Figure 2



Line Diagram of Designated Drainage Basins Showing Federal Reservoirs and Sub-basin Gaging Stations

Update of Figure 3 - Map Showing Sub-basins, Streams, and the Basin Boundaries
RRCA Accounting Procedures and Reporting Requirements
January 12, 2005



Map Showing Sub-basins, Streams, and the Basin Boundaries

Attachment 1: Sub-basin Flood Flow Thresholds

Sub-basin	Sub-basin Flood Flow Threshold Acre-feet per Year[3]
Arikaree River	16,400
North Fork of Republican River	33,900
Buffalo Creek	4,800
Rock Creek	9,800
South Fork of Republican River	30,400
Frenchman Creek	51,900
Driftwood Creek	9,400
Red Willow Creek	15,100
Medicine Creek	55,100
Beaver Creek	13,900
Sappa Creek	26,900
Prairie Dog	15,700

[3] Flows considered to be Flood Flows are flows in excess of the 94% flow based on a flood frequency analysis for the years 1971-2000. The Gaged Flows are measured after depletions by Beneficial Consumptive Use and change in reservoir storage. For the purpose of compliance with III.B.1, the Gaged Flows shall not include ~~Augmentation Water Supply Credit~~CNF Augmentation Water Supply Credits delivered in any calendar year.

Attachment 2: Description of the Consensus Plan for Harlan County Lake

The Consensus Plan for operating Harlan County Lake was conceived after extended discussions and negotiations between Reclamation and the Corps. The agreement shaped at these meetings provides for sharing the decreasing water supply into Harlan County Lake. The agreement provides a consistent procedure for: updating the reservoir elevation/storage relationship, sharing the reduced inflow and summer evaporation, and providing a January forecast of irrigation water available for the following summer.

During the interagency discussions the two agencies found agreement in the following areas:

- The operating plan would be based on current sediment accumulation in the irrigation pool and other zones of the project.
- Evaporation from the lake affects all the various lake uses in proportion to the amount of water in storage for each use.
- During drought conditions, some water for irrigation could be withdrawn from the sediment pool.
- Water shortage would be shared between the different beneficial uses of the project, including fish, wildlife, recreation and irrigation.

To incorporate these areas of agreement into an operation plan for Harlan County Lake, a mutually acceptable procedure addressing each of these items was negotiated and accepted by both agencies.

1. Sediment Accumulation.

The most recent sedimentation survey for Harlan County project was conducted in 1988, 37 years after lake began operation. Surveys were also performed in 1962 and 1972; however, conclusions reached after the 1988 survey indicate that the previous calculations are unreliable. The 1988 survey indicates that, since closure of the dam in 1951, the accumulated sediment is distributed in each of the designated pools as follows:

Flood Pool	2,387 Acre-feet
Irrigation Pool	4,853 Acre-feet
Sedimentation Pool	33,527 Acre-feet

To insure that the irrigation pool retained 150,000 Acre-feet of storage, the bottom of the irrigation pool was lowered to 1,932.4 feet, msl, after the 1988 survey.

To estimate sediment accumulation in the lake since 1988, we assumed similar conditions have occurred at the project during the past 11 years. Assuming a consistent rate of deposition since 1988, the irrigation pool has trapped an additional 1,430 Acre-feet.

A similar calculation of the flood control pool indicates that the flood control pool has captured an additional 704 Acre-feet for a total of 3,090 Acre-feet since construction.

The lake elevations separating the different pools must be adjusted to maintain a 150,000-acre-foot irrigation pool and a 500,000-acre-foot flood control pool. Adjusting these elevations results in the following new elevations for the respective pools (using the 1988 capacity tables).

Top of Irrigation Pool	1,945.70 feet, msl
Top of Sediment Pool	1,931.75 feet, msl

Due to the variability of sediment deposition, we have determined that the elevation capacity relationship should be updated to reflect current conditions. We will complete a new sedimentation survey of Harlan County Lake this summer, and new area capacity tables should be available by early next year. The new tables may alter the pool elevations achieved in the Consensus Plan for Harlan County Lake.

2. Summer Evaporation.

Evaporation from a lake is affected by many factors including vapor pressure, wind, solar radiation, and salinity of the water. Total water loss from the lake through evaporation is also affected by the size of the lake. When the lake is lower, the surface area is smaller and less water loss occurs. Evaporation at Harlan County Lake has been estimated since the lake's construction using a Weather Service Class A pan which is 4 feet in diameter and 10 inches deep. We and Reclamation have jointly reviewed this information and assumed future conditions to determine an equitable method of distributing the evaporation loss from the project between irrigation and the other purposes.

During those years when the irrigation purpose expected a summer water yield of 119,000 Acre-feet or more, it was determined that an adequate water supply existed and no sharing of evaporation was necessary. Therefore, evaporation evaluation focused on the lower pool elevations when water was scarce. Times of water shortage would also generally be times of higher evaporation rates from the lake.

Reclamation and we agreed that evaporation from the lake during the summer (June through September) would be distributed between the irrigation and sediment pools based on their relative percentage of the total storage at the time of evaporation. If the sediment pool held 75 percent of the total storage, it would be charged 75 percent of the evaporation. If the sediment pool held 50 percent of the total storage, it would be charged 50 percent of the evaporation. At the bottom of the irrigation pool (1,931.75 feet, msl) all of the evaporation would be charged to the sediment pool.

Due to downstream water rights for summer inflow, neither the irrigation nor the sediment pool is credited with summer inflow to the lake. The summer inflows would be assumed passed through the lake to satisfy the water right holders. Therefore, Reclamation and we did not distribute the summer inflow between the project purposes.

As a result of numerous lake operation model computer runs by Reclamation, it became apparent that total evaporation from the project during the summer averaged about 25,000 Acre-feet during times of lower lake elevations. These same models showed that about 20 percent of the evaporation should be charged to the irrigation pool, based on percentage in storage during the summer months. About 20 percent of the total lake storage is in the irrigation pool when the lake is at elevation 1,935.0 feet, msl. As a result of the joint study, Reclamation and we agreed that the irrigation pool would be credited with 20,000 Acre-feet of water during times of drought to share the summer evaporation loss.

Reclamation and we further agreed that the sediment pool would be assumed full each year. In essence, if the actual pool elevation were below 1,931.75 feet, msl, in January, the irrigation pool would contain a negative storage for the purpose of calculating available water for irrigation, regardless of the prior year's summer evaporation from sediment storage.

3. Irrigation withdrawal from sediment storage.

During drought conditions, occasional withdrawal of water from the sediment pool for irrigation is necessary. Such action is contemplated in the Field Working Agreement and the Harlan County Lake Regulation Manual: "Until such time as sediment fully occupies the allocated reserve capacity, it will be used for irrigation and various conservation purposes, including public health, recreation, and fish and wildlife preservation."

To implement this concept into an operation plan for Harlan County Lake, Reclamation and we agreed to estimate the net spring inflow to Harlan County Lake. The estimated inflow would be used by the Reclamation to provide a firm projection of water available for irrigation during the next season.

Since the construction of Harlan County Lake, inflows to the lake have been depleted by upstream irrigation wells and farming practices. Reclamation has recently completed an in-depth study of these depleted flows as a part of their contract renewal process. The study concluded that if the current conditions had existed in the basin since 1931, the average spring inflow to the project would have been 57,600 Acre-feet of water. The study further concluded that the evaporation would have been 8,800 Acre-feet of water during the same period. Reclamation and we agreed to use these values to calculate the net inflow to the project under the current conditions.

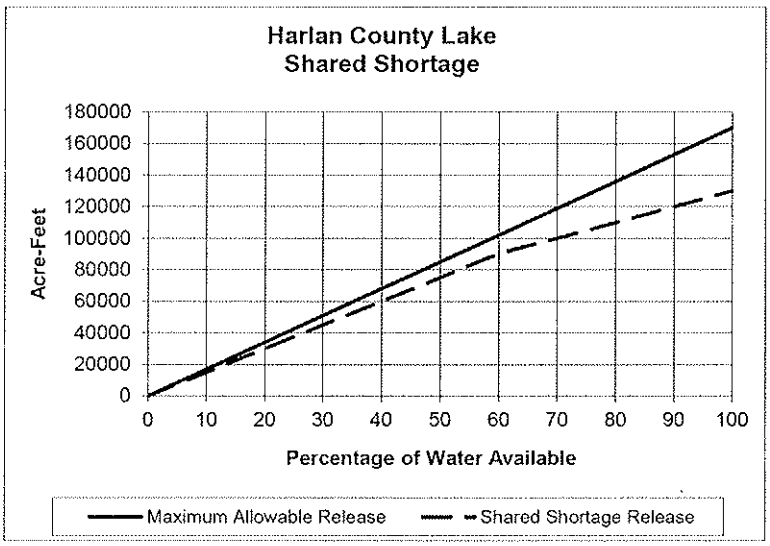
In addition, both agencies also recognized that the inflow to the project could continue to decrease with further upstream well development and water conservation farming. Due to these

concerns, Reclamation and we determined that the previous 5-year inflow values would be averaged each year and compared to 57,600 Acre-feet. The inflow estimate for Harlan County Lake would be the smaller of these two values.

The estimated inflow amount would be used in January of each year to forecast the amount of water stored in the lake at the beginning of the irrigation season. Based on this forecast, the irrigation districts would be provided a firm estimate of the amount of water available for the next season. The actual storage in the lake on May 31 would be reviewed each year. When the actual water in storage is less than the January forecast, Reclamation may draw water from sediment storage to make up the difference.

4. Water Shortage Sharing.

A final component of the agreement involves a procedure for sharing the water available during times of shortage. Under the shared shortage procedure, the irrigation purpose of the project would remove less water then otherwise allowed and alleviate some of the adverse effects to the other purposes. The procedure would also extend the water supply during times of drought by "banking" some water for the next irrigation season. The following graph illustrates the shared shortage releases.



5. Calculation of Irrigation Water Available

Each January, the Reclamation would provide the Bostwick irrigation districts a firm estimate of the quantity of water available for the following season. The firm estimate of water available for irrigation would be calculated by using the following equation and shared shortage adjustment:

Storage + Summer Sediment Pool Evaporation + Inflow – Spring Evaporation=Maximum Irrigation Water Available

The variables in the equation are defined as:

- Maximum Irrigation Water Available. Maximum irrigation supply from Harlan County Lake for that irrigation season.
- Storage. Actual storage in the irrigation pool at the end of December. The sediment pool is assumed full. If the pool elevation is below the top of the sediment pool, a negative irrigation storage value would be used.
- Inflow. The inflow would be the smaller of the past 5-year average inflow to the project from January through May, or 57,600 Acre-feet.
- Spring Evaporation. Evaporation from the project would be 8,800 Acre-feet which is the average January through May evaporation.
- Summer Sediment Pool Evaporation. Summer evaporation from the sediment pool during June through September would be 20,000 Acre-feet. This is an estimate based on lower pool elevations, which characterize the times when it would be critical to the computations.

6. Shared Shortage Adjustment

To ensure that an equitable distribution of the available water occurs during short-term drought conditions, and provide for a "banking" procedure to increase the water stored for subsequent years, a shared shortage plan would be implemented. The maximum water available for irrigation according to the above equation would be reduced according to the following table. Linear interpolation of values will occur between table values.

Shared Shortage Adjustment Table

Irrigation Water Available (Acre-feet)	Irrigation Water Released (Acre-feet)
0	0
17,000	15,000
34,000	30,000
51,000	45,000
68,000	60,000

85,000	75,000
102,000	90,000
119,000	100,000
136,000	110,000
153,000	120,000
170,000	130,000

7. Annual Shutoff Elevation for Harlan County Lake

The annual shutoff elevation for Harlan County Lake would be estimated each January and finally established each June.

The annual shutoff elevation for irrigation releases will be estimated by Reclamation each January in the following manner:

1. Estimate the May 31 Irrigation Water Storage (IWS) (Maximum 150,000 Acre-feet) by taking the December 31 irrigation pool storage plus the January-May inflow estimate (57,600 Acre-feet or the average inflow for the last 5-year period, whichever is less) minus the January-May evaporation estimate (8,800 Acre-feet).
2. Calculate the estimated Irrigation Water Available, including all summer evaporation, by adding the Estimated Irrigation Water Storage (from item 1) to the estimated sediment pool summer evaporation (20,000 AF).
3. Use the above Shared Shortage Adjustment Table to determine the acceptable Irrigation Water Release from the Irrigation Water Available.
4. Subtract the Irrigation Water Release (from item 3) from the Estimated IWS (from item 1). The elevation of the lake corresponding to the resulting irrigation storage is the Estimated Shutoff Elevation. The shutoff elevation will not be below the bottom of the irrigation pool if over 119,000 AF of water is supplied to the districts, nor below 1,927.0 feet, msl. If the shutoff elevation is below the irrigation pool, the maximum irrigation release is 119,000 AF.

The annual shutoff elevation for irrigation releases would be finalized each June in accordance with the following procedure:

1. Compare the estimated May 31 IWS with the actual May 31 IWS.
2. If the actual end of May IWS is less than the estimated May IWS, lower the shutoff elevation to account for the reduced storage.
3. If the actual end of May IWS is equal to or greater than the estimated end of May IWS, the estimated shutoff elevation is the annual shutoff elevation.
4. The shutoff elevation will never be below elevation1,927.0 feet, msl, and will not be below the bottom of the irrigation pool if more than 119,000 Acre-feet of water is supplied to the districts.

Attachment 3: Inflows to Harlan County Lake 1993 Level of Development

BASELINE RUN - 1993 LEVEL INFLOW TO HARLAN COUNTY RESERVOIR

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1931	10.2	10.8	13.4	5.0	18.8	15.8	4.3	1.8	1.8	0.0	0.1	0.1	82.1
1932	6.8	16.6	18.5	4.6	3.8	47.6	3.8	2.8	4.8	0.0	0.0	0.4	109.7
1933	0.4	0.0	3.9	30.2	31.0	5.4	1.8	0.0	10.4	0.0	2.6	5.5	91.2
1934	2.1	0.0	3.2	1.8	0.7	7.3	0.8	0.0	1.3	0.0	2.2	0.0	19.4
1935	0.3	0.1	0.7	4.2	0.8	389.3	6.1	19.1	26.1	2.4	5.2	0.9	455.2
1936	0.3	0.0	11.9	0.0	35.9	4.7	0.4	0.0	1.8	0.0	1.6	3.8	60.4
1937	4.8	12.9	6.0	2.5	0.0	12.6	6.3	6.9	2.4	0.0	0.0	12.4	66.8
1938	9.9	7.8	8.7	10.4	18.7	8.6	7.3	7.8	4.9	0.2	0.0	4.7	89.0
1939	2.7	7.5	9.6	12.2	6.6	13.3	5.0	4.1	0.0	0.0	0.0	0.0	61.0
1940	0.0	0.0	12.2	5.2	4.6	23.7	2.8	3.2	0.0	3.6	0.0	1.4	56.7
1941	0.0	10.6	10.6	7.7	17.2	67.1	28.9	19.7	14.9	8.3	6.7	7.1	198.8
1942	3.3	10.6	0.5	34.1	30.8	83.9	11.7	10.9	36.5	3.1	8.7	0.3	234.4
1943	1.2	11.2	14.6	31.4	4.7	28.3	4.8	0.3	0.9	0.0	0.0	11.8	109.2
1944	0.1	4.3	9.0	43.1	31.9	63.9	26.6	15.4	0.5	0.3	3.0	4.5	202.6
1945	4.3	7.8	5.7	9.5	4.1	53.5	5.0	0.9	1.5	5.0	6.0	6.3	109.6
1946	5.9	11.2	9.3	4.9	7.0	3.1	1.6	11.4	28.1	129.9	25.0	12.1	249.5
1947	1.1	3.2	10.4	8.2	11.9	195.4	22.3	5.9	2.9	0.2	0.3	0.3	262.1
1948	6.2	9.8	24.1	5.4	0.2	39.8	13.5	6.8	4.2	0.0	0.1	0.1	110.2
1949	2.0	1.5	25.2	16.3	49.0	57.4	9.2	5.5	2.1	3.0	2.8	0.3	174.3
1950	0.3	5.7	10.8	10.9	28.9	10.1	12.7	9.3	7.8	7.2	3.8	3.1	110.6
1951	3.8	3.4	7.1	5.3	42.0	39.9	42.1	10.1	36.0	15.5	14.8	8.9	228.9
1952	16.4	21.4	26.3	23.8	34.6	4.0	9.3	3.1	1.5	11.7	4.3	0.1	156.5
1953	1.8	4.6	5.3	3.3	15.1	9.5	1.8	0.2	0.0	0.0	2.8	0.1	44.5
1954	1.0	6.8	1.9	3.2	7.1	2.4	0.0	1.2	0.0	0.0	0.0	0.0	23.6
1955	0.0	4.0	6.3	4.8	2.9	6.4	2.7	0.0	1.4	0.0	0.0	0.0	28.5
1956	1.6	3.4	2.9	2.4	1.3	1.5	0.0	0.6	0.0	0.0	0.0	0.0	13.7
1957	0.0	4.1	6.2	12.8	3.5	62.4	21.3	1.2	2.0	3.4	4.5	4.7	126.1
1958	0.8	3.0	14.2	14.0	18.7	1.3	3.4	2.2	0.0	0.4	0.0	0.6	58.6
1959	1.9	15.4	16.4	8.5	13.6	4.2	1.4	1.2	0.0	4.3	1.0	4.5	72.4
1960	1.4	12.3	71.4	23.9	21.7	53.7	14.1	3.2	0.0	0.0	0.2	2.8	204.7
1961	2.3	6.4	7.7	7.4	26.5	24.0	7.2	4.9	0.0	2.3	4.8	1.7	95.2

Attachment 3: Inflows to Harlan County Lake 1993 Level of Development

BASELINE RUN - 1993 LEVEL INFLOW TO HARLAN COUNTY RESERVOIR

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1962	4.5	9.1	16.2	9.9	14.4	42.6	41.6	21.1	2.3	8.7	8.3	5.7	184.4
1963	3.4	18.2	18.2	15.0	12.7	14.7	3.4	6.1	8.7	0.8	5.3	1.8	108.3
1964	5.4	7.6	8.3	8.4	9.9	11.9	7.2	6.5	2.4	1.9	1.4	2.3	73.2
1965	6.0	8.1	11.1	12.8	32.8	40.0	22.9	6.5	37.2	53.7	19.5	11.0	261.6
1966	8.9	21.4	15.7	11.4	12.0	34.7	12.4	2.5	3.5	5.4	6.8	5.7	140.4
1967	7.2	11.5	11.5	12.9	9.1	75.3	43.7	15.3	4.4	7.3	6.9	5.4	210.5
1968	3.9	10.2	8.5	11.6	10.8	12.5	3.1	2.7	1.6	2.0	4.3	3.4	74.6
1969	4.2	10.8	24.5	15.1	18.9	17.5	17.0	12.6	16.6	9.2	11.8	9.9	168.1
1970	3.5	8.7	8.5	10.5	11.1	7.7	4.6	3.2	0.5	3.3	4.7	4.5	70.8
1971	4.1	10.3	12.4	12.8	18.3	7.2	8.4	6.2	1.9	4.2	7.3	7.1	100.2
1972	5.5	8.1	9.2	8.3	14.8	8.5	6.5	4.4	0.1	2.9	7.6	4.1	80.0
1973	11.4	14.2	19.0	16.2	17.4	20.9	9.1	1.9	8.4	19.6	11.9	13.2	163.2
1974	13.2	13.4	12.0	14.3	15.4	17.2	5.5	0.0	0.0	0.0	4.9	5.5	101.4
1975	7.2	8.2	13.6	14.8	12.0	48.1	11.6	7.4	0.1	3.0	6.2	7.3	139.5
1976	7.0	10.2	10.1	16.0	12.1	3.5	2.2	1.8	0.9	1.0	3.2	3.1	71.1
1977	4.4	9.6	12.9	21.2	31.5	12.1	5.9	1.9	10.6	4.1	5.5	5.3	125.0
1978	5.0	6.5	20.6	12.9	11.8	3.8	0.0	1.0	0.0	0.0	0.3	1.6	63.5
1979	1.3	7.6	21.5	18.8	15.9	5.4	10.4	10.6	1.6	0.9	3.6	6.2	103.8
1980	5.7	9.3	11.6	15.2	10.4	2.1	2.5	0.0	0.0	0.0	2.5	2.2	61.5
1981	5.5	6.0	11.6	14.9	22.5	6.4	11.5	16.3	4.3	2.5	6.7	6.2	114.4
1982	5.3	12.5	17.9	14.3	26.8	27.1	8.9	2.7	0.0	6.5	6.3	15.5	143.8
1983	6.5	9.7	27.2	16.4	41.4	74.2	10.7	7.6	3.8	3.1	6.7	5.2	212.5
1984	6.8	14.6	17.2	32.9	40.6	15.5	8.1	4.5	0.0	5.5	4.8	6.2	156.7
1985	6.9	14.1	13.6	11.9	27.4	9.9	10.0	2.0	6.0	8.5	5.6	5.8	121.7
1986	9.1	9.4	12.2	11.7	34.3	13.0	13.5	4.6	3.3	5.9	5.4	7.1	129.5
1987	5.9	9.2	19.7	24.1	24.3	11.7	19.0	5.7	2.3	2.7	8.2	7.0	139.8
1988	6.2	13.7	11.6	15.2	15.2	7.0	17.9	10.4	0.6	2.0	5.9	5.4	111.1
1989	5.4	5.9	10.5	9.1	11.4	11.8	14.0	6.2	0.2	3.1	3.1	3.5	84.2
1990	6.6	7.7	13.2	9.7	15.5	1.4	4.3	10.7	0.6	3.2	2.0	2.7	77.6
1991	2.4	8.0	9.0	10.6	15.2	3.9	1.9	0.5	0.0	0.0	2.7	4.8	59.0
1992	8.0	8.8	12.7	8.5	4.5	6.1	6.5	9.4	2.4	6.9	6.7	5.2	85.7
1993	5.2	14.4	71.6	22.7	21.0	17.0	68.0	37.5	23.3	16.8	30.1	17.7	345.3

Avg	4.5	8.8	14.1	13.0	17.2	30.6	11.0	6.2	5.4	6.3	5.0	4.7	126.8

Attachment 4: Evaporation Loss Harlan County Lake 1993 Level of Development

BASELINE - 1993 LEVEL FLOWS - HARLAN COUNTY EVAPORATION

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1931	0.7	0.9	1.6	2.9	4.2	7.4	6.9	5.2	2.7	2.1	1.2	0.4	36.2
1932	0.6	0.8	1.5	2.7	4.1	5.0	6.8	5.0	2.7	2.1	1.2	0.4	32.9
1933	0.6	0.8	1.4	2.5	3.8	7.8	6.1	4.2	2.7	2.1	1.2	0.4	33.6
1934	0.6	0.8	1.4	2.4	4.5	6.5	8.0	6.2	2.7	2.0	1.2	0.4	36.7
1935	0.6	0.8	1.3	2.3	2.2	3.6	9.7	6.2	3.1	2.5	1.4	0.5	34.2
1936	0.7	0.9	1.6	2.9	5.5	6.8	8.7	6.5	2.7	2.1	1.2	0.4	40.0
1937	0.6	0.8	1.4	2.5	3.6	4.0	6.2	6.5	2.7	2.1	1.2	0.4	32.0
1938	0.6	0.9	1.5	2.7	3.4	4.9	6.5	5.7	2.7	2.1	1.2	0.4	32.6
1939	0.6	0.8	1.4	2.6	4.3	4.9	6.8	4.6	2.7	2.1	1.2	0.4	32.4
1940	0.6	0.8	1.4	2.4	3.5	5.0	6.5	4.6	2.7	2.1	1.2	0.4	31.2
1941	0.6	0.8	1.4	2.5	3.9	4.2	6.7	5.3	2.8	2.1	1.3	0.5	32.1
1942	0.6	0.9	1.5	2.8	4.0	5.2	8.3	5.1	3.2	2.5	1.5	0.5	36.1
1943	0.7	1.0	1.8	3.2	4.3	5.7	7.9	6.3	2.7	2.1	1.2	0.4	37.3
1944	0.6	0.8	1.4	2.7	4.2	5.3	7.0	5.8	3.5	2.6	1.5	0.5	35.9
1945	0.7	1.0	1.8	3.1	3.8	3.0	6.7	5.7	2.9	2.2	1.3	0.5	32.7
1946	0.6	0.9	1.6	2.8	3.5	5.1	5.6	4.4	2.9	2.7	1.8	0.6	32.5
1947	1.0	1.5	2.9	3.2	3.4	-1.2	5.8	5.3	3.7	1.7	0.5	0.1	27.9
1948	0.8	0.7	1.5	3.6	3.1	2.4	4.2	4.7	3.0	2.7	0.8	0.3	27.8
1949	0.1	0.9	0.7	1.8	1.1	0.7	6.5	4.1	3.1	1.7	1.5	0.4	22.6
1950	0.7	0.1	0.8	2.8	2.0	5.6	0.8	2.8	4.5	2.3	1.6	0.6	24.6
1951	0.5	0.2	2.1	0.7	-0.1	1.9	3.5	4.1	0.4	3.1	2.2	0.9	19.5
1952	1.1	1.2	1.9	2.5	5.2	6.2	1.5	3.4	3.6	2.9	1.1	-0.1	30.5
1953	0.5	1.0	1.5	2.9	4.7	4.5	4.6	6.6	5.3	3.3	0.1	0.0	35.0
1954	0.7	0.6	2.2	3.6	0.3	4.9	6.7	1.6	3.6	1.6	1.5	0.6	27.9
1955	0.5	1.0	2.1	4.6	3.4	-0.5	7.3	6.9	2.7	2.6	1.4	0.4	32.4
1956	0.6	1.1	1.9	2.8	3.9	4.5	5.0	3.7	4.7	3.7	1.3	0.5	33.7
1957	0.7	1.0	1.3	0.5	-0.6	-1.1	6.1	3.7	2.3	1.7	1.2	0.4	17.2
1958	0.7	0.1	1.0	0.6	2.3	4.4	1.0	1.9	3.3	3.3	1.0	0.6	20.2
1959	0.4	1.0	1.1	2.1	1.0	3.5	5.0	4.8	2.3	0.7	1.5	0.6	24.0
1960	0.1	0.7	2.0	2.7	0.9	0.1	4.9	3.6	3.9	2.0	1.3	0.4	22.6
1961	0.9	1.0	1.4	2.7	-1.1	0.6	5.1	2.9	1.2	2.4	0.7	0.1	17.9

Attachment 4: Evaporation Loss Harlan County Lake 1993 Level of Development

BASELINE - 1993 LEVEL FLOWS - HARLAN COUNTY EVAPORATION

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1962	0.6	0.6	0.9	3.7	3.4	1.5	0.3	1.6	2.0	2.0	1.7	0.3	18.6
1963	0.7	1.4	1.3	4.5	4.6	6.3	6.1	3.1	-0.8	2.7	1.5	0.4	31.8
1964	0.8	0.8	1.7	3.2	5.6	1.2	6.9	3.0	3.0	3.3	1.2	0.6	31.3
1965	0.4	0.7	1.2	2.8	1.5	-0.5	2.0	2.8	-3.9	1.7	2.1	0.4	11.2
1966	0.9	0.8	2.9	2.7	7.5	2.8	5.8	3.7	2.7	2.8	1.5	0.4	34.5
1967	0.7	1.2	2.5	3.0	2.0	-2.9	1.6	4.5	3.5	2.0	1.6	0.4	20.1
1968	0.9	1.2	2.8	2.6	3.2	4.9	4.7	1.8	2.3	0.7	1.2	0.2	26.5
1969	0.4	0.6	2.4	3.3	0.1	3.8	-0.7	2.9	2.2	-1.0	1.5	0.4	15.9
1970	0.7	1.4	2.3	2.8	4.7	4.4	6.5	5.9	0.9	1.0	1.5	0.7	32.8
1971	0.7	0.2	2.0	2.9	0.7	5.1	3.4	4.5	1.4	1.5	0.2	0.5	23.1
1972	0.8	1.3	2.0	1.7	1.1	0.0	3.3	1.8	2.1	1.7	-0.4	0.1	15.5
1973	0.5	1.1	-0.7	2.5	3.4	6.7	-1.7	4.2	-3.0	0.2	0.2	0.2	13.6
1974	0.7	1.5	2.6	1.5	3.7	2.5	9.1	2.6	3.4	1.4	1.1	0.3	30.4
1975	0.7	0.7	2.0	2.1	0.8	1.1	4.3	2.7	3.0	3.4	0.7	0.6	22.1
1976	0.8	1.2	1.7	0.7	1.5	5.0	5.9	5.7	-0.2	1.4	1.4	0.7	25.8
1977	0.7	1.3	0.2	1.1	0.0	4.6	4.0	0.6	2.0	1.6	1.0	0.4	17.5
1978	0.5	0.7	1.2	3.4	3.9	6.2	7.1	4.5	4.5	3.0	1.1	0.5	36.6
1979	0.5	0.6	1.1	3.9	4.4	4.6	3.5	5.1	4.1	2.8	1.4	0.7	32.7
1980	0.5	0.6	1.2	3.4	3.7	4.7	6.8	6.0	3.9	2.7	1.3	0.6	35.4
1981	0.5	0.6	1.2	3.8	3.2	4.8	4.2	3.7	2.9	1.7	1.3	0.7	28.6
1982	0.5	0.7	1.2	3.9	3.8	3.9	5.1	3.8	2.9	2.2	1.4	0.8	30.2
1983	0.5	0.7	1.4	2.9	4.2	5.3	8.6	7.2	4.6	1.8	1.5	0.6	39.3
1984	0.6	0.8	1.4	2.9	4.2	5.8	7.2	5.7	4.7	1.4	1.4	0.7	36.8
1985	0.5	0.7	1.3	2.3	4.0	4.5	5.6	3.5	3.8	1.5	1.5	0.7	29.9
1986	0.6	0.7	1.3	2.8	4.4	5.8	6.7	4.0	2.7	1.3	1.4	0.7	32.4
1987	0.5	0.8	1.3	3.1	4.2	6.2	6.9	3.5	3.1	2.2	1.4	0.7	33.9
1988	0.5	0.7	1.3	3.5	4.9	6.6	4.6	4.8	3.5	2.2	1.4	0.7	34.7
1989	0.5	0.7	1.2	4.2	4.5	4.4	4.8	3.6	3.0	2.5	1.4	0.7	31.5
1990	0.5	0.7	1.2	3.0	3.5	5.6	6.4	4.0	5.0	3.4	1.4	0.6	35.3
1991	0.5	0.7	1.2	2.8	3.3	5.5	6.0	5.0	5.1	3.2	1.3	0.6	35.2
1992	0.6	0.7	1.2	1.8	3.2	2.2	4.1	3.5	4.2	2.9	1.9	1.0	27.3

1993	0.6	0.5	1.0	2.2	3.1	4.6	4.2	4.9	4.5	4.4	3.1	1.2	34.3
Avg	0.6	0.8	1.5	2.7	3.2	3.9	5.3	4.3	2.8	2.2	1.3	0.5	29.1

Trigger Calculations Based on Harlan County Lake Irrigation Supply	Units-1000 Acre-feet	Irrigation Trigger	119.0	Assume that during irrigation release season HCL Inflow = Evaporation Loss
		Total Irrigation Supply	130.0	
		Bottom Irrigation	164.1	
		Evaporation Adjust	20.0	

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
1993 Level AVE inflow	6.3	5	4.7	4.5	8.8	14.1	13.0	17.2	30.6	11.0	6.2	5.4	126.8
1993 Level AVE evap	2.2	1.3	0.5	0.6	0.8	1.5	2.7	3.2	3.9	5.3	4.3	2.8	29.1
(1931-93)													
Avg. Inflow Last 5 Years	10.8	13.0	12.3	12.9	16.6	22.4	19.4	18.1	14.8	16.5	11.0	4.7	172.6

Attachment 5: Projected Water Supply Spread Sheet Calculations

Year 2001-2002 Oct - Jun Trigger and Irrigation Supply Calculation									
Calculation Month	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Previous EOM Content	236.5	235.9	238.6	242.9	248.1	255.1	263.8	269.6	276.2
Inflow to May 31	73.6	67.3	62.3	57.6	53.1	44.3	30.2	17.2	0.0
Last 5 Yrs Avg Inflow to May 31	125.6	114.8	101.7	89.5	76.6	59.9	37.5	18.1	0.0
Evap to May 31	12.8	10.6	9.3	8.8	8.2	7.4	5.9	3.2	0.0
Est. Cont May 31	297.3	292.6	291.6	291.7	293.0	292.0	288.1	283.6	276.2
Est. Elevation May 31	1944.44	1944.08	1944.00	1944.01	1944.11	1944.03	1943.72	1943.37	1942.77
Max. Irrigation Available	153.2	148.5	147.5	147.6	148.9	147.9	144.0	139.5	132.1
Irrigation Release Est.	120.1	117.4	116.8	116.8	118.1	117.1	116.8	116.8	116.8
Trigger - Yes/No	NO	YES	YES	YES	YES	YES	YES	YES	YES
130 kAF Irrigation Supply - Yes/No	NO	NO	NO	NO	NO	NO	NO	NO	NO

Attachment 5: Projected Water Supply Spread Sheet Calculations

Year 2002 Jul - Sep Final Trigger and Total Irrigation Supply Calculation				
Calculation Month		Jul	Aug	Sep
Previous EOM Irrigation Release Est.		116.8	116.0	109.7
Previous Month Inflow		5.5	0.5	1.3
Previous Month Evap		6.3	6.8	6.6
Irrigation Release Estimate		116.0	109.7	104.4
Final Trigger - Yes/No		YES		
130 kAF Irrigation Supply - Yes/No		NO	NO	NO

Attachment 6: Computing Water Supplies and Consumptive Use Above Guide Rock

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
Total Main Stem VWS	Hardy gage	Superior-Courtland Diversion Dam Gage	Courtland Canal Diversions	Superior Canal Diversions	Courtland Canal Returns	Superior Canal Returns	Total Bostwick Returns Below Guide Rock	NE CBCU Below Guide Rock	KS CBCU Below Guide Rock	Total CBCU Below Guide Rock	Gain Guide Rock to Hardy	VWS Guide Rock to Hardy	Main Stem Virgin Water Supply Above Guide Rock	Nebraska Main Stem Allocation Above Hardy	Kansas Main Stem Allocation Above Hardy	Nebraska Guide Rock to Hardy Allocation	Kansas Guide Rock to Hardy Allocation
							Col F+ Col G			Col I + Col J	+ Col B - Col C+ Col K - Col H	+ Col L + Col K	Col A - Col M	.489 x Col N	.511 x Col N	.489 x Col M	.511 x Col M

Attachment 7: Calculations of Return Flows from Bureau of Reclamation Canals

Col 1	Col 2	Col 3	Col 4	Col 5	Col 6	Col 7	Col 8	Col 9	Col 10	Col 11
Canal	Canal Diversion	Spill to Waste-way	Field Deliveries	Canal Loss	Average Field Loss Factor	Field Loss	Total Loss from District	Percent Field and Canal Loss That Returns to the Stream	Total Return to Stream from Canal and Field Loss	Return as Percent of Canal Diversion
Name Canal	Headgate Diversion	Sum of measured spills to river	Sum of deliveries to the field	+Col 2 - Col 4	1 -Weighted Average Efficiency of Application System for the District*	Col 4 x Col 6	Col 5 + Col 7	Estimated Percent Loss*	Columns 8 x Col 9	Col 10/Col 2
Example	100	5	60	40	30%	18	58	82%	48	48%
Culbertson					30%					
Culbertson Extension					30%					
Meeker-Driftwood					30%					
Red Willow					30%					
Bartley					30%					
Cambridge					30%					
Naponne					35%					
Franklin					35%					
Franklin Pump					35%					
Almena					30%					
Superior					31%					
Nebraska Courtland					23%					
Courtland Canal Above Lovewell (KS)					23%					
Courtland Canal Below Lovewell					23%					

*The average field efficiencies for each district and percent loss that returns to the stream may be reviewed and, if necessary, changed by the RRCA to improve the accuracy of the estimates.

Exhibit 3

RRWCD Compact Compliance Wells						4-Jan-2013
Permit #		RRWCD submitted & GWC published (af/yr)	Corrected amount (af/yr)	Sand Hills approved for export (af/yr)	To be approved by GWC (af/yr)	Comments
		first publication				
12567-FP		201		N/A	0	Located in Central Yuma GWMD
12589-FP		376	297	372	297	Acres corrected from 309 ac to 200 ac
12967-FP	same well	345		333	333	
16920-FP		0			0	
13509-FP	same well	254		273	244	
16075-FP		30			29	
13511-FP		192		173	173	
13513-FP	same well	258		257	220	
16074-FP		44			37	
13522-FP		204		189	189	
13813-FP	same well	174		203	171	
16923-FP		32			32	
13814-FP		334		323	323	
13815-FP		291		311	291	Sand Hills approved more than hisorical amount
13856-FP	same well	241		249	241	
16067-FP		8			8	
13857-FP		229		217	217	
13858-FP		228		206	206	
13859-FP	same well	228		260	220	
16069-FP		42			40	
14018-FP		252		234	234	
14019-FP		217		206	206	
14022-FP		289		255	255	
14023-FP		219		197	197	
14024-FP		141		129	129	
14027-FP		251		237	237	
14028-FP		218		202	202	
14121-FP		437		420	420	
14122-FP		215		204	204	
14396-FP		192		180	180	
14397-FP		192		184	184	
14398-FP		240		230	230	
14600-FP		197		187	187	
14718-FP		526		526	526	
14719-FP		455		424	424	
14753-FP		310		267	267	
15285-FP		161		140	140	
18011-FP		431		421	421	
18012-FP	same well	221		317	218	
19000-FP		101			99	
18013-FP		350	291	350	291	Acres corrected from 250 ac to 228 ac
18014-FP		259		247	247	
18015-FP		549		497	497	
18017-FP	same well	180.5		353	177	
19001-FP		180.5			177	
18018-FP		230		218	218	
18019-FP		173		163	163	
18780-FP		192		192	192	
18781-FP		216		206	206	
18783-FP		273		273	273	
18966-FP		172		172	172	
19005-FP		178		174	174	
19372-FP		218		211	211	
20896-FP		169		168	168	
21476-FP		144		139	139	
subtotal		12,259	12,121	11,689	11,535	
		second publication				
14033-FP		279		279	279	
19004-FP		141		141	141	
23222-FP		230	168	230	168	Pumping corrected to permitted amount
4319-FP	same well	75		75	75	
4922-FP		0			0	
20198-FP		194		194	194	
20196-FP		249		249	249	
subtotal		1,168	1,106	1,168	1,106	
Total		13,427	13,227	12,857	12,641	

Exhibit 4

Modeling the Colorado Compliance Pipeline in the RRCA Groundwater Model

Modeling the Colorado Compliance Pipeline (the "CCP") in the RRCA Groundwater Model (the "Model") consists of two parts. The first involves fifteen wells that will be pumped via a collector system and storage tank into the pipeline (the "CCP Wells"). The water rights for these wells were changed from existing irrigation wells that will be retired. The historic consumptive use from those wells has been transferred to the CCP Wells. The second part involves the surface water outflow from the pipeline.

Modeling of Well Pumping

The irrigation wells that were acquired as part of the CCP will be removed from the irrigation well data set used to represent irrigation wells in the Republican River Basin in Colorado. Because the irrigation wells will no longer be pumped, they will not be included when calculating pumping and return flows from agricultural wells.

Instead, production for each CCP Well will be recorded and supplied as monthly input values by well based on actual production of each well. The pumping of each well will be considered to be fully consumptive and the appropriate volume added to the Republican River Pre-Processor ("rrpp") pumping input files (".pmp" files) for each month. Since there are no irrigation return flows associated with these wells, nothing will be added to the ".rcg" files.

Those pumping values for the CCP Wells will be ON in all of the model simulations except the simulation with pumping in Colorado turned OFF. Therefore, the impacts of the CCP Wells on baseflow will be evaluated as part of the evaluation of other Colorado pumping. No changes are required to "rrpp" to simulate the CCP Wells.

Only the consumptive use of the retired irrigation wells is transferred to the CCP Wells. It was previously demonstrated that due to the distance between the wells and the North Fork of the Republican River, the changes in the timing of the pumping results in no net increase in depletions of baseflow in the Republican River.

Modeling of Pipeline Outflow

The outflow of the CCP will be added to the stream network for all the Model simulations.

The MODFLOW stream package requires that the stream network be specified in such a way that the flows in the stream network can be solved from the top to the bottom of the system. The outflow from the CCP must be added to the stream network as a tributary to Segment 153. In order to do so, a new segment must be created in the stream network with a segment number less than 153. To avoid renumbering all of the segments in the stream network and the corresponding change required to the accounting that would occur as a result of renumbering all the segments, a change will be made to the stream network that avoids renumbering.

Muddy Creek in Nebraska is represented as Segments 122 and 125. The model cells representing Segment 122 will be added to Segment 125, and the routing updated so that the flow from Segments 33 and 66 that previously went to Segment 122 will go to Segment 125 instead.

Segment 122 will then be re-purposed to represent the outflow from the CCP. The new Segment 122 will have a single cell with a stream conductance of zero. The monthly CCP outflow volume will be set as the inflow to Segment 122. The stream routing will be updated so that the outflow from Segments 122 and 130 will go to Segment 153. The result will be that the inflow into Segment 153 will be the sum of the simulated baseflow in the North Fork of the Republican River at the Colorado-Nebraska State Line and the CCP outflow.

The monthly CCP outflow volume will be added to all simulations. The outflow will therefore cancel out in all the $CBCU_G$ terms it would potentially be included. Therefore no changes are required to the acct program used to summarize the groundwater model results for the accounting spreadsheets.

A change to the "mkstr" program will be required in order to add the CCP outflow to the stream package file for every month. The existing Model version 12s.str stream template file will be updated to reflect the change to Segments 122 and 125 and changes to the routing of segments 63, 66, 122 and 130. A new version of the "mkstr" program called "mkstr2" will be used to read monthly CPP volumes from the file "flow.dbf" and add it to Segment 122.

Changes to Procedures

The CCP Wells and CCP outflow will be processed along with the annual updates to the Model and the CCP data supplied along with the backup information for other components of the Colorado data.

The Model will be updated to Version 12s3 to reflect changes in the stream network required to add the outflow from the CCP to the stream network. Version 12s3 will use the updated "mkstr2" program that will require an additional "flow.dbf" input file to specify the monthly CCP outflow volume. No changes are required to the other programs used to run the Model.

The CCP will require no changes to the "acct" program that summarizes the Model results for incorporation into the accounting spreadsheets. Changes to the accounting spreadsheets to account for the Augmentation Water Supply resulting from the CCP are described elsewhere.

Exhibit B

Arbitration Time Frame Designation

Colorado v. Kansas & Nebraska

Colorado Compact Compliance Pipeline

Colorado Formally Submits Resolution to RRCA	4/5/2013
RRCA Special Meeting and Vote on Resolution	5/5/2013
If Necessary…	
Colorado Formally Submits the Issue to Arbitration	5/5/2013
Nebraska and Kansas May Amend the Scope of the Dispute	5/15/2013
States Submit Lists of Proposed Arbitrators	5/15/2013
States Meet and Confer Regarding Arbitrator Selection	5/25/2013
CDR Selects Arbitrator (*if necessary)*	5/25/2013
Initial Conference with Mediator; Set Schedule for Arbitration	6/1/2013
Final Day of Arbitration Hearings	9/29/2013
Arbitrator Issues Written Decision	11/28/2013

Exhibit 1

REVISED APPLICATION FOR APPROVAL OF AN AUGMENTATION PLAN AND RELATED ACCOUNTING PROCEDURES UNDER SUBSECTION III.B.I.K. OF THE FINAL SETTLEMENT STIPULATION IN KANSAS V. NEBRASKA AND COLORADO, NO. 126, ORIGINAL

For

The Colorado Compact Compliance Pipeline

Submitted by

The State of Colorado
And
The Republican River Water Conservation District, acting by and through its Water Activity Enterprise

April 5, 2013

Exhibit 1

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Exhibit 1

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Exhibit 1

TABLE OF CONTENTS

1.0 INTRODUCTION 1

1.1. The Republican River Compact and the Final Settlement Stipulation in *Kansas v. Nebraska and Colorado* 1

1.2. Subsection III.B.1.k of the FSS 2

1.3. The Republican River Water Conservation District 2

1.4. The Ground Water Rights for the CCP and the Compact Compliance Wells 3

1.5. The Arbitrator's Final Decision 4

1.6. Project Sponsor of the Colorado CCP – The Republican River Water Conservation District, acting by and through its Water Activity Enterprise. 4

2.0 PROPOSED AUGMENTATION PLAN AND RELATED ACCOUNTING PROCEDURES 5

2.1. Groundwater Water Rights Acquired for the CCP 5

2.1.1. The Historical Consumptive Use of the Groundwater Rights 5

2.1.2. Additional Terms and Conditions on Pumping from the Compact Compliance Wells 7

2.2. Proposed Augmentation Plan and Related Accounting Procedures 8

2.3. Operation of the Compact Compliance Pipeline 8

2.4. Proposed Revisions to the RRCA Accounting Procedures and Terms and Conditions for Operation of the CCP 10

3.0 NEED FOR THE CCP 11

4.0 CLARIFICATIONS AND REVISIONS TO ADDRESS THE ARBITRATOR'S 2010 FINAL DECISION 12

5.0 Responses to Kansas' Objections Noted in Arbitrator's Final Decision 13

5.1. Kansas' Objection Number 1: The Colorado Proposal Did Not Include the Augmentation Water in the RRCA Groundwater Model 13

5.2. Kansas' Objection Number 2: The North Fork Credits Should be Limited to Protect Kansas' Allocation in the South Fork Sub-basin 13

5.3. Kansas' Objection Number 3: The Operational Limits in Colorado's Proposal Are Insufficient 14

5.4. Kansas' Objection Number 4: The Colorado Resolution Lacked "Temporal Limits" 15

Exhibit 1

5.5. Kansas' Objection Number 5: Colorado's Proposed Changes for the RRCA Accounting Procedures Were Incomplete and Required Further Review 16

5.6. Kansas' Objection Number 6: Colorado's Proposed "Catch-Up" Provisions Were Unreasonable 16

5.7. Kansas' Objection Number 7: Colorado's Proposed Expansion of its Augmentation Plan Was Unreasonable and Must Be Separately Approved by the RRCA 17

5.8. Kansas' Objection Number 8: Colorado and Nebraska's Refusal to Disclose the Terms of a Stipulated Agreement was Unreasonable and Required that the CCP be rejected 17

5.9. Revised Colorado Resolution 18

6.0 ENGINEERING ANALYSIS FOR THE COLORADO COMPACT COMPLIANCE PIPELINE 18

6.1. Water Quality 18

6.2. Colorado CCP Design and Construction 19

7.0 REQUEST FOR APPROVAL 20

Exhibit 1

LIST OF TABLES (follow text)

Table 1: Rights to Designated Groundwater for the Colorado Compliance Pipeline

Table 2: Comparison of stream water quality in the North Fork to the ground water quality in the Ogallala Formation.

LIST OF FIGURES (follow Tables)

Figure 1: General Location Map

Figure 2: Map of Republican River Water Conservation District and Groundwater Management District Boundaries

Figure 3: General Location Map Cure Farms Compact Compliance Wells

Figure 4: Location of Compact Compliance Wells and Historically Irrigated Lands Dried up for the Compact Compliance Pipeline

Figure 5: Amount Colorado Exceed Compact Allocation

Figure 6: Components of Historical Consumptive Use in Colorado

Figure 7: Projected Compact Compliance under Current Pumping and No Pumping Conditions

Figure 8: Projected Compact Compliance with Compact Compliance Pipeline in Operation

LIST OF APPENDICES (follow Figures)

Appendix A: Sand Hills Groundwater Management District Order Approving Export

Appendix B: Joint Notice of Stipulation

1.0 INTRODUCTION

In March 2008, the State of Colorado submitted an application to the Republican River Compact Administration (RRCA) requesting approval of an augmentation plan and revisions to the RRCA Accounting Procedures pursuant to Subsection III.B.1.k of the Final Settlement Stipulation (FSS) for a pipeline project to deliver groundwater to the North Fork of the Republican River (the "Colorado CCP" or "CCP"). The purpose of the project was to offset stream depletions so that Colorado can comply with its Compact Allocations.

In 2009, Colorado submitted two resolutions to the RRCA to approve an augmentation plan and proposed revisions to the RRCA Accounting Procedures. The RRCA did not approve the resolution, and Colorado then invoked non-binding arbitration pursuant to the FSS to resolve the dispute. An arbitrator was selected, and Colorado resolved Nebraska's concerns with the CCP prior to the arbitration hearing.

On October 7, 2010, Arbitrator Martha Pagel issued a Final Decision on the Colorado CCP Dispute which addressed deficiencies that Kansas had raised concerning the Colorado CCP. The Arbitrator concluded that Kansas had not unreasonably withheld its consent to the CCP proposal; however, the Arbitrator concluded that with certain clarifications and revisions she recommended in the Decision, the CCP proposal would provide a reasonable and necessary approach for meeting Colorado's Compact obligations that should be approved by the RRCA.

This revised application for approval of an augmentation plan and related accounting procedures for the Colorado CCP is based on the agreement between Colorado and Nebraska, the Arbitrator's Final Decision, and subsequent discussions with Kansas.

1.1. The Republican River Compact and the Final Settlement Stipulation in *Kansas v. Nebraska and Colorado*

Colorado, Kansas, and Nebraska entered into the Republican River Compact (Compact), which became operative in 1943, to allocate the waters of the Republican River Basin. The Compact allocates water for beneficial consumptive use to each State derived from the computed average annual virgin water supply for designated drainage basins (sub-basins).

In 1959, pursuant to Article IX of the Compact, the RRCA was formed to administer the Compact. Each State appoints one member to the RRCA, but the RRCA requires unanimity to take any action.

Following the formation of the RRCA, the States debated whether the Compact included ground water in the water supply allocated for beneficial consumptive use. The States were unable to resolve this dispute, and in 1997 Kansas filed a motion with the U.S. Supreme Court for leave to file a bill of complaint against Nebraska claiming that Nebraska was violating the Compact by permitting excessive pumping of groundwater. In January 1999, the U.S. Supreme Court granted Kansas' motion. Although Kansas made no claims against Colorado in its initial complaint, Colorado was named a party to the suit because it is a signatory to the Compact.

A special master was appointed, and settlement negotiations resulted in a Final Settlement Stipulation (FSS). In the FSS, the States agreed to (1) dismissal of all claims against each other with respect to activities or conditions occurring before December 15, 2002; (2) a moratorium on the construction of all new wells in the basin upstream of Guide Rock, Nebraska, with certain exceptions listed in the FSS; (3) the development of a groundwater model to determine stream flow depletions caused by well pumping and the credit for water imported into the basin; (4) revised accounting procedures to determine Compact compliance; and (5) a procedure to resolve disputes relating to Compact administration. The U.S. Supreme Court approved the FSS in 2003.

1.2. Subsection III.B.1.k of the FSS

Subsection III.B.1.k of the FSS provides that the moratorium on the construction of new wells in the basin upstream of Guide Rock, Nebraska, does not apply to wells acquired or constructed for the purpose of offsetting stream depletions in order to comply with a State's Compact Allocations. Subsection III.B.1.k includes a proviso that such wells "shall not cause any new net depletion to stream flow either annually or long-term." It further states:

> The determination of net depletions from these Wells will be computed by the RRCA Groundwater Model and included in the State's Computed Beneficial Consumptive Use. Augmentation plans and related accounting procedures submitted under this Subsection III.B.1.k. shall be approved by the RRCA.

1.3. The Republican River Water Conservation District

In 2004, the Republican River Water Conservation District ("RRWCD" or "District") was created to assist Colorado in complying with Compact. The RRWCD is located in northeastern Colorado and includes all of Yuma and Phillips Counties and

those portions of Kit Carson, Lincoln, Logan, Sedgwick, and Washington Counties that overlie the Ogallala aquifer. Figure 2 is a map showing the boundaries of the RRWCD and local groundwater management districts, as well as the approximate location of the pipeline. Currently, with the exception of approximately 200 acres irrigated by surface water, virtually all the irrigated acreage in the RRWCD is irrigated with groundwater from the Ogallala aquifer.

The RRWCD established a water activity enterprise (the RRWCD WAE) as authorized by Colorado statute and imposed a water use fee on the diversion of water in the District to raise revenues to assist Colorado in complying with the Compact. The RRWCD WAE has used revenues from use fees to retire approximately 48,000 acres that were historically irrigated with groundwater in the District. In addition, revenues have been used to purchase and lease surface water rights in the District to reduce beneficial consumptive use in Colorado by approximately 3,000 acre-feet per year.

1.4. The Ground Water Rights for the CCP and the Compact Compliance Wells

In 2009, the RRWCD WAE purchased groundwater rights that will be diverted for the CCP. These ground water rights are located north of the North Fork of the Republican River in Colorado and have an aggregate historical consumptive use of approximately 13,000 acre-feet per year. The RRWCD WAE also acquired easements for fifteen well sites, collector pipelines, a storage tank, and a main transmission pipeline, and acquired a parcel of land for an outlet structure on the North Fork of the Republican River for the CCP. In 2012, construction of the CCP was completed.

The groundwater rights acquired by the RRWCD WAE for the CCP were historically used for irrigation in the Republican River Basin in Colorado. The RRWCD WAE applied to change the use of these groundwater rights and to consolidate them at eight existing wells (Compact Compliance Wells) to be used to pump groundwater from the Ogallala aquifer to the North Fork of the Republican River. An additional seven existing wells will be alternate points of diversion that can be brought into production in the future as needed. The location of the CCP, including the Compact Compliance Wells, is shown in Figure 4.

The historical consumptive use of the groundwater rights that will be diverted at the Compact Compliance Wells is discussed in Section 2.1.1.

The 15 Compact Compliance Wells have a pumping capacity between 1,500 to 1,800 gallons per minute per well. New motors, pumps and a valve vault with control and measurement valves have been installed at each well. PVC collector pipelines connect the wells to a 140,000 gallon storage tank. Water will be delivered from the storage tank to the North Fork of the Republican River by gravity through 12 miles of 42" to 30" diameter pipe at rates up to 40 cfs. At the outlet structure near the river, water will be discharged through a multiple-orifice valve located in a partially buried concrete outlet structure, which dissipates the pressure head before the water is discharged into a rip-rap lined outlet channel and then enters the river.

Surge control and flow measurement have been provided at the outlet structure, along with a measurement flume located in the outlet channel. The CCP is initially capable of delivering 15,000 acre-feet per year. However, the capacity of the CCP can be increased to 25,000 acre-feet per year in the future if additional wells are connected to the system and additional groundwater rights are acquired.

1.5. The Arbitrator's Final Decision

In the Final Decision, the Arbitrator concluded that Kansas had not unreasonably withheld its consent to the CCP proposal with respect to five of the factual issues. At a minimum, the Arbitrator concluded that the CCP proposal was deficient in its current form because it did not adequately incorporate into a single, integrated proposal all of the operational details and limits Colorado had described and relied upon at the trial. However, the Arbitrator concluded that with certain clarifications and revisions recommended in the Decision, the CCP proposal "represents an appropriate and necessary augmentation plan that should be approved by the RRCA." (Colorado Compact Compliance Pipeline Dispute, Arbitrator's Final Decision (October 7, 2010) at 4)

Following the Arbitrator's Final Decision, Colorado and Kansas have conducted additional discussions in an effort to resolve Kansas' concerns regarding the Colorado CCP. This revised application incorporates the operational details and limits Colorado described and relied upon at the 2010 arbitration trial, as well as modifications based on the Arbitrator's Final Decision and subsequent discussions with Kansas.

1.6. Project Sponsor of the Colorado CCP – The Republican River Water Conservation District, acting by and through its Water Activity Enterprise

The RRWCD encompasses approximately 7,761 square miles or about 7.5% of Colorado's 104,247 square miles. A map of the RRWCD boundaries is shown in Figure

2. The RRWCD is managed and controlled by a 15-member board of directors comprised of one member appointed by the county commissioners of each of the seven counties wholly or partially within the RRWCD, one member appointed by the boards of the seven ground water management districts within the RRWCD, and one member appointed by the Colorado Ground Water Commission ("CGWC").

The RRWCD Board of Directors has imposed use fees on the diversion of water within the District. In 2008, the use fee on the diversion of water for irrigation use was increased to $14.50 per assessed irrigated acre to pay for the Colorado CCP. There are approximately 500,500 assessed irrigated acres within the RRWCD subject to the use fee, and use fees generate approximately $7.3 million per year to repay the CWCB loan for the Colorado CCP and for other expenses.

The RRWCD WAE uses a portion of the revenues collected from use fees to purchase and/or lease surface water rights to reduce Colorado's beneficial consumptive use and to provide local cost-sharing for federal programs designed to retire irrigated acreage in the basin, including the Republican River Conservation Reserve Enhancement Program (CREP) and the Environmental Quality Improvement Program (EQIP). To date, approximately 48,000 irrigated acres have been voluntarily retired in the basin under CREP and EQIP, or approximately ten percent (10%) of the irrigated acreage in the basin. RRWCD WAE has submitted to the US. Department of Agriculture for its approval an amendment to the Republican River CREP designed to retire an additional 30,000 irrigated acres. The RRWCD WAE has committed to provide local cost-sharing for the amendment. CREP is an important part of the RRWCD's efforts to implement conservation measures in the basin to reduce ground water pumping in Colorado to assist in meeting Colorado's compact obligations. However, reduction of ground water pumping in Colorado alone is not sufficient for Colorado to comply with its Compact obligations. Therefore, the RRWCD has constructed the Colorado CCP.

2.0 PROPOSED AUGMENTATION PLAN AND RELATED ACCOUNTING PROCEDURES

2.1. Groundwater Water Rights Acquired for the CCP

2.1.1. The Historical Consumptive Use of the Groundwater Rights

A change of use and a change of well location of ground water rights permitted under the Colorado Ground Water Management Act requires approval of the CGWC.

The procedures for changing the use of existing rights to designated ground water based on historical consumptive use are established in the CGWC's rules and regulations.

In 2008, the RRWCD WAE applied to the CGWC to change the use of the ground water rights acquired for the CCP and to consolidate them at fifteen existing wells (Compact Compliance Wells) to be used to offset stream depletions in order to comply with Colorado's Compact Allocations, with provision for limited use to revegetate the lands historically irrigated by the ground water rights. Initially, only eight of the wells will be used to pump ground water for the Colorado CCP, and seven wells will serve as backup if additional well capacity is needed. The locations of the 15 wells are shown in Figure 4 (wells A2 through A8, and B5 are the initial wells; wells numbered A1 and B1 through 4, B6, and B7 are the backup wells).

The lands historically irrigated by the ground water rights for the CCP are shown in Figure 3. The average annual historical consumptive use was determined for the period 1998-2007 from historical cropping records, pumping estimated from power consumption records and a power coefficient that converts the kilowatt-hours to acre-feet pumped, irrigated acreage, and climate records. The crop irrigation requirement was determined using the same procedures used in the RRCA Accounting Procedures.

Nebraska and Kansas previously reviewed the average annual historical consumptive use calculations for the groundwater rights to be used in the CCP. Nebraska provided comments and Colorado revised the average annual historical consumptive use amounts based on Nebraska's comments. The Colorado Division of Water Resources also provided comments, resulting in additional changes to average annual historical consumptive use amounts. The Compact Compliance Wells will cause no new net depletions because pumping will be limited to the historical consumptive use of the existing rights.

The final average annual historical consumptive use amounts of the groundwater rights that were acquired for the CCP have now been determined by the CGWC pursuant to its rules and regulations, which are shown in Table 1. The CGWC's rules and regulations limit withdrawals under the groundwater rights that were acquired for the CCP to the historical consumptive use of the groundwater rights, subject to banking provisions in the rules. Colorado has incorporated these limits and the provision for banking in the proposed resolution.

In areas where a ground water management district (GWMD) has been formed, the board of directors of the GWMD can prohibit the use of ground water outside the boundaries of the GWMD. All but one of the ground water rights acquired for the CCP are located within the Sandhills GWMD, and the RRWCD WAE filed an application with the Sandhills GWMD for approval to export ground water from the Sandhills GWMD, and the Sandhills GWMD has approved the export, subject to terms and conditions contained in its order. A copy of the order is attached as Appendix A.

One ground water right acquired by the RRWCD WAE for the CCP is located in the Central Yuma GWMD, but the RRWCD WAE has not requested approval of the Central Yuma GWMD for export at this time and this right is not included in the proposed augmentation plan at this time.

2.1.2. Additional Terms and Conditions on Pumping from the Compact Compliance Wells

The Colorado State Engineer has adopted rules and regulations for the Republican River Basin in Colorado that require measurement of ground water withdrawals. Totalizing flow meters have been installed on the Compact Compliance Wells in compliance with the State Engineer's rules and regulations, and pumping from the Compact Compliance Wells will be measured in accordance with those rules and regulations and will be provided to the Division of Water Resources for inclusion in the RRCA Groundwater Model in accordance with Subsection III.B.1.k of the FSS. Terms and conditions requiring measurement of withdrawals by totalizing flow meters and including the pumping in the RRCA Groundwater Model are incorporated into the proposed resolution to approve the augmentation plan and revised RRCA Accounting Procedures for the CCP.

As a term and condition of the change of the groundwater rights to the Compact Compliance Wells, the RRWCD WAE agreed that diversions from any individual Compact Compliance Well shall be limited to no more than 2,500 acre-feet per year. This limit was included here and in the proposed resolution to address concerns that the future drawdowns under the CCP operations might be significantly different than the historical drawdowns.

Colorado proposes that banking of ground water be permitted in accordance with the CGWC's rules and regulations; however, the banking reserve would not override the provisions for calculating the Projected Delivery or the minimum annual delivery of 4,000 acre-feet in the proposed resolution. Under the CGWC's rules and regulations,

the RRWCD WAE can be authorized to use a three-year banking reserve, which would allow the RRWCD WAE to initiate a banking reserve for consumptive use water that is not pumped, subject to limits in the CGWC's rules and regulations. The amount of water in the banking reserve is then available for withdrawals in future years, but the banking reserve is limited to an amount equal to three times the difference between the maximum annual permitted appropriation and the average annual historical withdrawal.

For the CCP groundwater rights, the banking reserve would be limited to 30,996 acre-feet (23,391 ac-ft – 13,059 ac-ft x 3), but the amount that could be withdrawn in any year is limited to the maximum annual appropriation of 23,391 acre-feet per year. However, the physical limitations of the pipeline and wells itself provide for a maximum ability to divert 25,000 acre-feet per year. Further, while that much could be theoretically withdrawn from the banking reserve in any year, Colorado agrees that the Augmentation Water Supply Credit will be limited as set forth in paragraph 3 of the resolution.

2.2. Proposed Augmentation Plan and Related Accounting Procedures

Groundwater pumped by the Compact Compliance Wells will be delivered through collector pipelines to a storage tank and then by a main pipeline to the North Fork of the Republican River a short distance upstream from the streamflow gage at the Colorado-Nebraska state line (USGS gaging station number 06823000, North Fork Republican River at the Colorado-Nebraska State Line). The locations of the Compact Compliance Wells, the collector pipelines, and the main pipeline are shown in Figure 4.

Colorado's proposed revisions to the RRCA Accounting Procedures for the CCP provide that the discharges from the CCP will be measured at the outfall structure and subtracted from the gaged flow of the North Fork of the Republican River to calculate the Augmentation Water Supply Credit to the North Fork of the Republican River in Colorado. The proposed revisions to the RRCA Accounting Procedures further provide that the amount of the discharge to the North Fork of the Republican River from the CCP will be the Augmentation Water Supply Credit for the purpose of offsetting stream depletions to the North Fork of the Republican River to comply with Colorado's Compact Allocations.

2.3. Operation of the Compact Compliance Pipeline

Based on the delivery schedule agreed to with Nebraska and discussions with Kansas, the CCP will be operated as follows:

1. Accounting for deliveries will start January 1 of each year.
2. Colorado will begin deliveries on January 1 and will make a minimum annual delivery of 4,000 acre-feet during the months of January through March.
3. Colorado will calculate and provide notice to the Kansas and Nebraska RRCA Members by April 1, of the Projected Delivery as provided in the Colorado resolution. Unless Colorado determines by April 1 that it will not be able to deliver additional required augmentation water in October through December, Colorado shall stop deliveries at the end of March. If Colorado anticipates that deliveries in the months of November and December will not be sufficient for Compact compliance, Colorado will maximize deliveries first in January, then sequentially in the months of February, March, and April. Deliveries will be made in May only if there is reason to believe that additional deliveries in the months of October through December will not be sufficient for Compact compliance.
4. No later than September 1st, Colorado will gather provisional hydrologic data for the months of January through August of the same year and will estimate the amount of deliveries needed for Compact compliance for the remainder of the year after accounting for the deliveries earlier in the year. Colorado will then maximize any additional water deliveries first in the month of December, then sequentially in November, and October.

Because the final accounting for determining Compact compliance is not done until after the compact year is completed and because Colorado's allocations and computed beneficial consumptive use are dependent upon such factors as runoff, the amount of pumping, precipitation, and crop evapotranspiration, Colorado cannot know the precise amount of augmentation water that will needed in any given year. However, because Compact accounting is done on a five-year running average, Colorado will know the accounting for the previous four years and will know whether there is a deficit in the prior four years that will need to be made up in the coming year in addition to the delivery required for the coming year.

Colorado has agreed to make a minimum annual delivery of 4,000 acre-feet from the CCP and, assuming there is no deficit to be made up, will deliver the 4,000 acre-feet in January, February, and March. Colorado will then collect preliminary data for Compact accounting for the current year and, by no later than September 1, will update the projected delivery required for the remainder of the year. If additional deliveries are required, Colorado will then schedule them in October, November, and December. If there is a deficit to be made up, Colorado will determine if additional deliveries need to be made in April or May in addition to deliveries that will be made in October, November, and December. In the first years of operation, Colorado will have a large deficit; however, deliveries are limited by the historical consumptive use of the groundwater rights for the CCP. Thus, the maximum amount of water that Colorado

could deliver in the first four years of operation of the CCP is approximately 13,000 acre-feet per year, or a maximum of 52,000 over the four year period. Even assuming these deliveries resulted in Colorado having no deficit at the beginning of the fifth year, Colorado would still be obligated to deliver a minimum of 4,000 acre-feet in the fifth year. By September 1, most of the irrigation pumping during the year is completed and preliminary data are available for the portion of the year that is most critical in determining beneficial consumptive use. Thus, no later than September 1, Colorado can update the earlier Projected Delivery and produce a better estimate of the Projected Delivery that will be required for the year, and this method of operating the CCP and the minimum delivery of 4,000 acre-feet per year are intended to avoid large over or under deliveries in any given year. The provision for a minimum delivery of 4,000 acre-feet per year is also designed to address concerns that Colorado would make large over-deliveries in wet years and no deliveries in dry years.

As with the operation of any facility of this size, operational and structural problems could prevent the CCP from operating in the precise manner described above, but Colorado has agreed to consult with Nebraska prior to December 31st of the year preceding the scheduled deliveries and Colorado and the RRWCD WAE together have agreed to consult with Nebraska as needed to coordinate the timing and volume of deliveries to the North Fork of the Republican River.

2.4. Proposed Revisions to the RRCA Accounting Procedures and Terms and Conditions for Operation of the CCP

Colorado's proposed revisions to the RRCA Accounting Procedures are attached to the proposed RRCA resolution. For the CCP, Colorado proposes that the Computed Beneficial Consumptive Use of the Compact Compliance Wells, specifically the ground water impacts of these wells upon the stream system, will be determined by use of the RRCA Groundwater Model as the difference in streamflows using two runs of the model, as specified Section III.D.1 of the RRCA Accounting Procedures and Reporting Requirements. Terms and conditions on pumping from the Compact Compliance Wells are discussed in Sections 2.1.1 and 2.1.2.

The ground water pumped by the Compact Compliance Wells will be delivered to a storage tank by collector pipelines and then delivered by the main transmission pipeline to the North Fork of the Republican River through an outfall structure located a short distance upstream from the streamflow gage at the Colorado-Nebraska state line (USGS gaging station number 06823000, North Fork Republican River at the Colorado-

Nebraska State Line). Discharges from the Colorado CCP will be measured by a Parshall flume at the outlet structure.

Colorado's proposed revisions to the RRCA Accounting Procedures provide that these discharges will be subtracted from the gaged flow of the North Fork of the Republican River to calculate the Annual Virgin Water Supply and that the discharges to the North Fork of the Republican River from the Colorado CCP will be credited against depletions in the North Fork sub-basin for purposes of demonstrating sub-basin compliance with Compact Allocations. Likewise, Colorado's proposed revisions to the RRCA Accounting Procedures provide that these discharges will be the Augmentation Credit for the purpose of offsetting stream depletions to comply with the State of Colorado's Compact Allocations and shall be counted as a credit/offset against the Computed Beneficial Consumptive use of water allocated to Colorado.

3.0 NEED FOR THE CCP

Although the RRCA has not approved the final accounting for all of these years, the approximate amount that Colorado exceeded its Compact allocations for the years 2003-2008 is shown in Figure 5. Figure 6 shows the components of Colorado's average annual computed beneficial consumptive use for the years 2003-2007. As shown in Figure 6, stream depletions from groundwater pumping are the largest component of Colorado's average annual computed beneficial consumptive use.

Figure 7 shows a projection of the annual amounts Colorado's statewide Compact allocation is exceeded for two scenarios, with current pumping and eliminating all pumping. As shown in the graph, Colorado's computed beneficial consumptive use exceeds Colorado's Statewide Compact allocations 25 years in the future even when all pumping is eliminated.

Figure 8 shows how Colorado can achieve Compact compliance with the CCP. In addition to the CCP deliveries, Figure 8 shows the effect of other actions Colorado and the RRWCD WAE have or could take to assist with Compact compliance. The projection of the amounts Colorado's Compact allocation is exceeded with current pumping is the same as shown on Figure 7. The annual bars on Figure 8 show the effects of 1) the elimination of beneficial consumptive use from irrigation with surface water rights, 2) draining Bonny Reservoir to eliminate the beneficial consumptive use resulting from evaporation of water stored in the reservoir and seepage losses to the Ogallala Aquifer, and 3) the operation of the CCP. Colorado can achieve Compact

compliance under the projection made for this scenario with the combination of actions shown in Figure 8. However, as shown in Figure 7, Colorado cannot achieve Compact compliance in the next 25 years without the CCP, absent a dramatic change in the hydrology of the basin in Colorado.

The State of Colorado exceeded its compact allocation by approximately 11,000 ac-ft/yr for period of 2003-2007. In order to comply with Colorado's Compact Allocations, the RRWCD WAE has purchased ground water rights that were historically used for irrigation in the Republican River Basin in Colorado and has constructed the Colorado CCP to deliver ground water pumped under these rights to the North Fork of the Republican River through an outlet structure located a short distance upstream from the Colorado-Kansas State line. This is the stream gage location where the Virgin Water Supply of the North Fork and Colorado stream depletions on the North Fork are calculated under the RRCA Accounting Procedures.

The Compact Compliance Wells are located in the area of the Ogallala Aquifer in Colorado that has the greatest saturated thickness. The wells typically have 250 to 300 feet of saturated thickness. The well field is also located in the sand hills region of Colorado, which has the highest recharge rates of any location in the Republican River Basin in Colorado. The location of the Compact Compliance Wells was selected to ensure a long-term water supply as water levels decline.

4.0 CLARIFICATIONS AND REVISIONS TO ADDRESS THE ARBITRATOR'S 2010 FINAL DECISION

During the 2010 arbitration, Kansas raised eight deficiencies in the Colorado CCP proposal ("Colorado's Proposal"), which were addressed by the Arbitrator in the Final Decision. The objections were: (1) the augmentation water to be delivered to the North Fork of the Republican River was not included in the RRCA ("Republican River Compact Administration") Groundwater Model; (2) the Colorado Proposal did not address Colorado's failure to meet the sub-basin non-impairment requirement in the South Fork sub-basin; (3) the limitations set forth in the Colorado Resolution were insufficient to require augmentation deliveries on a reliable basis and left those deliveries to Colorado's discretion; (4) the Colorado Proposal lacked "temporal limits"; (5) the States had not conducted a detailed review of Colorado's proposed changes to the RRCA Accounting Procedures; (6) Colorado's "catch-up" provisions were inadequate; (7) Colorado had not explained the reasons for adding language to the Resolution that would allow future augmentation deliveries to increase to 25,000 acre-

feet per year; and (8) Colorado and Nebraska had refused to disclose the terms of their stipulated agreement.

The following sections respond to the Arbitrator's rulings.

5.0 Responses to Kansas' Objections Noted in Arbitrator's Final Decision

5.1. Kansas' Objection Number 1: The Colorado Proposal Did Not Include the Augmentation Water in the RRCA Groundwater Model

Kansas' first objection to Colorado's Proposal was that the augmentation water to be delivered to the North Fork of the Republican River was not included in the RRCA Groundwater Model.

The States were in agreement that pumping from the Compact Compliance Wells would be included in the RRCA Groundwater Model to determine the net depletions from these wells, but disagreed on whether the RRCA Groundwater Model should be informed of the water delivered from the CCP. The Arbitrator reviewed Kansas' and Colorado's positions and noted that the expert evidence provided by Kansas had demonstrated that use of the CCP would result in an increase in negative pumping impacts and had raised a related issue regarding the treatment of transit losses between the point of discharge and Swanson Reservoir. The Arbitrator concluded that it was reasonable for Kansas to insist that such impacts be considered in calculating the amount of augmentation credit, whether by use of the RRCA Groundwater Model or through some other approach.

Based on further discussion with Kansas, Colorado proposes that Colorado be given 100% credit for CCP deliveries as an offset to stream depletions to the North Fork of the Republican River, provided the deliveries are in compliance with the other terms and conditions of the resolution, and that the CCP deliveries be included in all runs of the RRCA Groundwater Model (including the "Colorado Pumping" and the "No Colorado Pumping" runs used to determine stream depletions), as shown in the proposed revisions to the RRCA Accounting Procedures.

5.2. Kansas' Objection Number 2: The North Fork Credits Should be Limited to Protect Kansas' Allocation in the South Fork Sub-basin

Kansas' second objection to Colorado's Proposal was that it would allow Colorado to replace its South Fork overuse on the North Fork for purposes of determining Compact compliance with sub-basin allocations.

The Arbitrator concluded that, at a minimum, the CCP proposal as presented for the arbitration did not clearly describe the specific limitation Colorado acknowledged was intended with respect to providing sub-basin credit only in the North Fork sub-basin and that the proposal should be clarified. She also recommended that the amount of augmentation credit approved for the North Fork, and subsequently applied to the determination of Statewide compliance, should be reasonably tied to the amount of estimated overuse in the North Fork.

Colorado's proposed revisions to the RRCA Accounting Procedures have clarified that augmentation deliveries to the North Fork from the Pipeline will be credited only against stream depletions in the North Fork sub-basin in Table 4A of the RRCA Accounting Procedures and will not be credited against stream depletions in the South Fork of the Republican River. (Table 4A is used to determine Colorado's compliance with the sub-basin non-impairment requirement.)

Kansas also objected to Colorado's CCP Proposal because it did not address the sub-basin non-impairment requirement on the South Fork of the Republican River. To address Kansas' concern about Colorado's compliance with the South Fork sub-basin non-impairment requirement, the Colorado State Engineer ordered Bonny Reservoir to be drained and has proposed revisions to the RRCA Groundwater Model accounting for Bonny Reservoir. That proposal and a resolution are before the RRCA contemporaneously with the CCP proposal and resolution.

5.3. Kansas' Objection Number 3: The Operational Limits in Colorado's Proposal Are Insufficient

Kansas' third objection to Colorado's Proposal was that the limitations set forth in the Colorado Resolution were insufficient to require such deliveries on a reliable basis and instead left those deliveries to Colorado's discretion.

The Arbitrator reviewed Kansas' concerns and Colorado's responses concerning operation of the CCP and concluded, at a minimum, that the specific additional operation details should be integrated into a single, unified CCP Proposal and that clarification was also needed regarding substantive standards and operational limits in response to the questions raised by Kansas.

Colorado has revised the Colorado Proposal regarding the operational details and limits for projected deliveries based on the Arbitrator's recommendations.

There was little or no disagreement between Kansas and Colorado on the basic procedure that would be used to estimate the projected Pipeline deliveries each year. The status of Colorado's compliance with its allocations in the prior four years would be considered and a projection would be made of the amount of the deliveries required for the current year. The status of Colorado's compliance over the prior four years will be more or less known at the beginning of the current year (although the final accounting for the prior four years will not have been completed). The more difficult problem is making a projection of the deliveries required for the current year because Colorado's allocations and computed beneficial consumptive use are not known at the beginning of the year and are determined by the hydrology during the year.

To address concerns that Colorado would over-deliver a large amount of augmentation water in one year and then little or no augmentation water in the succeeding four years, Colorado agreed to make a minimum annual delivery of 4,000 acre-feet. By April 1, Colorado will make a projection of deliveries for the year based on any deficit from the prior four years and the minimum annual delivery of 4,000 acre-feet. No later than September 1st, Colorado will gather provisional hydrologic data for the months of January through August of the year and will update the estimate of the amount of deliveries needed for Compact compliance for the remainder of the year after accounting for the deliveries earlier in the year. These operational details are incorporated into the revised Colorado resolution.

Colorado had proposed a limit on the augmentation water supply credit based on a "Projected Delivery." Colorado has revised how the Projected Delivery will be estimated consistent with the presentation during the 2010 arbitration.

5.4. Kansas' Objection Number 4: The Colorado Resolution Lacked "Temporal Limits"

Kansas objected to the Colorado CCP Proposal because it did not include "temporal limits". Kansas asserted that the Ogallala aquifer of eastern Colorado, which is the source of augmentation supply for the CCP, is finite and exhaustible and is not sustainable at current rates of water level declines. Colorado asserted that water level declines in the area would diminish in the future as irrigated lands at the edge of the aquifer went out of production and that the CCP would have an indefinite life span.

The Arbitrator reviewed both States' positions and concluded that some type of time limit or periodic review should be included and recommended that an initial

approval for a period of 20 years would be appropriate and should include provisions for on-going periodic review with assurances that the CCP may continue in operation unless there is a substantial change in basin conditions demonstrating the augmentation plan is not sustainable.

Colorado has incorporated the Arbitrator's recommendation for an initial 20-year approval after the CCP begins operation and periodic review every 20 years thereafter, with the provision that the CCP may continue in operation unless there is a substantial change in basin conditions demonstrating that the augmentation plan is not sustainable.

5.5. Kansas' Objection Number 5: Colorado's Proposed Changes for the RRCA Accounting Procedures Were Incomplete and Required Further Review

Kansas asserted that the States had not conducted a detailed review of Colorado's proposed changes to the RRCA Accounting Procedures.

The Arbitrator concluded that the specific changes Colorado had proposed to the RRCA Accounting Procedures were complete for the purposes of implementing the CCP Plan as proposed, but that further changes would be needed to incorporate recommended changes in order to allow for final approval.

Colorado has revised the proposed changes to the RRCA Accounting Procedures based on the Arbitrator's recommendations and further discussions with Kansas, and Kansas will have an opportunity to review them before action is taken by the RRCA on Colorado's proposed resolution.

5.6. Kansas' Objection Number 6: Colorado's Proposed "Catch-Up" Provisions Were Unreasonable

Kansas expressed concern that the "catch-up" provisions Colorado had proposed had not been the subject of any sustained discussion among the States prior to the arbitration and were not reasonable.

The Arbitrator concluded that there was nothing inherently wrong with the methodology Colorado had developed for determining projected deliveries and for making subsequent adjustments in the following year to reflect its actual compliance obligations, but said that the essence of Kansas' objection to the so-called "catch-up" provisions was its underlying concern about the potential for under- or over-deliveries under the augmentation plan. The Arbitrator concluded that the CCP proposal was deficient in its current form because it did not adequately incorporate into a single,

integrated proposal all of the operational details and limits that Colorado had described and relied upon at trial, including the "catch-up" provision.

Colorado has revised the Colorado resolution based on the Arbitrator's recommendations to include a required minimum delivery to address concerns regarding the potential for under- or over-deliveries under the augmentation plan.

5.7. Kansas' Objection Number 7: Colorado's Proposed Expansion of its Augmentation Plan Was Unreasonable and Must Be Separately Approved by the RRCA

Kansas expressed concern that the proposed Colorado resolution would allow its augmentation to increase to 25,000 acre-feet per year, which was far greater than the amount by which Colorado had exceeded its Compact Allocation. Kansas insisted that any plans to expand the water supply must be separately approved by the RRCA.

Paragraph 6 of the previously proposed Colorado resolution provided that Colorado could acquire additional groundwater rights to be pumped through the Compact Compliance Wells upon the terms and conditions of the resolution; however, it required Colorado to file a notice identifying the additional groundwater rights and gave RRCA members sixty days from the notice to object to the addition of groundwater rights. If there was an objection, the notice would be treated as an application for approval of an augmentation plan.

The Arbitrator concluded that the approach proposed by Colorado offered essentially the same procedural safeguard that Kansas asserted was lacking and that the Colorado plan was sufficient in this regard and no further changes were needed.

While the Arbitrator concluded that no further changes were needed, Colorado has revised its proposal regarding the addition of additional groundwater rights based on further discussions with Kansas (see Resolution, ¶ 11).

5.8. Kansas' Objection Number 8: Colorado and Nebraska's Refusal to Disclose the Terms of a Stipulated Agreement was Unreasonable and Required that the CCP be rejected

Kansas asserted that Colorado and Nebraska's refusal to disclose the terms of a stipulated agreement was unreasonable and required that the CCP be rejected.

The Arbitrator concluded that the refusal by Colorado and Nebraska to disclose the terms of the stipulated agreement did not mandate that the CCP proposal be rejected and that in the absence of a motion to compel production of the document, it

was not necessary to deal directly with this issue in the arbitration proceedings. This issue is now moot because the stipulated agreement has been produced to Kansas.

5.9. Revised Colorado Resolution

The revised resolution for the RRCA to approve the Colorado CCP is submitted contemporaneously to the RRCA with this Application.

6.0 ENGINEERING ANALYSIS FOR THE COLORADO COMPACT COMPLIANCE PIPELINE

At the present time, Colorado has estimated that at least 4,000 acre-feet of water per year needs to be supplied by the Colorado CCP to meet Colorado's Compact statewide allocation, and Colorado has agreed with Nebraska that it will make a minimum delivery of 4,000 acre-feet during the months of January through March. The other terms agreed to be Colorado and Nebraska are set forth in the Joint Notice of Stipulation filed in the arbitration before Martha Pagel, Arbitrator. A copy of the Joint Notice of Stipulation is attached as Appendix B.

The initial capacity of the main transmission pipeline is 3,000 acre-feet per month.

Second, to address Kansas' concern that the CCP proposal would allow Colorado to replace South Fork overuse with augmentation flow delivered to the North Fork for purposes of determining Compact compliance with sub-basin allocations, the Colorado State Engineer has ordered Bonny Reservoir to be drained to reduce Colorado's beneficial consumptive use in the South Fork sub-basin.

6.1. Water Quality

All of the streamflow in the North Fork of the Republican River, with the exception of occasional rainstorm events, is derived from ground water inflow from the Ogallala Aquifer. The Colorado CCP will deliver ground water from the Ogallala aquifer to the North Fork of the Republican River at an outlet structure a short distance upstream from the Colorado-Nebraska State line. Table 2 represents the ground water quality of the Ogallala aquifer relative to the water quality standards for the North Fork of the Republican River, as published by the Colorado Water Quality Control Commission. The water quality of the Ogallala Aquifer meets or exceeds drinking water standards. Thus, the water quality of ground water for the Republican River Compact Compliance

Pipeline is appropriate for delivery to the North Fork of the Republican River to offset stream depletions.

6.2. Colorado CCP Design and Construction

The RRWCD WAE contracted with GEI Consultants to prepare a preliminary feasibility study for the design of a compact compliance pipeline. The $50,000 study was completed in January of 2008. Based on the recommendations in the preliminary report, the RRWCD WAE contracted with GEI Consultants to proceed with the final design of the Colorado CCP. The final design was completed in 2008, and construction of the Colorado CCP was completed in 2012.

The well field to pump ground water consists of 8 wells numbered A2 through A8 and B5 as shown in Figure 4. The design of the Colorado CCP allows for an additional 7 wells numbered A1, and B2 through B4, B6, and B7 in Figure 4 to be connected as needed. The RRWCD has agreed that pumping from any individual Compact Compliance Wells will not exceed 2,500 acre-feet per year, and this limitation was incorporated into the Colorado Ground Water CGWC's approval of the change of the ground water rights.

Water pumped from the individual wells is collected in a series of collector pipelines that vary in size from 12" to 24." The water is then conveyed to a 140,000 gallon re-regulating storage tank. The storage tank provides reserve capacity allowing the main pipeline to operate for 11 minutes at two-thirds capacity with no inflow to the tank from the well field. The storage tank also provides protection of the main pipeline from surges and negative pressures that could develop if the main pipeline were connected directly to the well field collection system.

From the storage tank water flows by gravity through the main transmission pipeline approximately 12.7 miles to the North Fork of the Republican River. The alignment of the pipeline is shown on Figure 4.

Releases from the tank are regulated by a discharge valve located at the end of the transmission pipeline, and an electromagnetic flow meter is located just upstream of the discharge valve. The electromagnetic flow meter readings may be used in conjunction with turbine flow meters at each supply well to monitor the pipeline for leakage. A SCADA system is used to monitor and operate the wells and pipeline. The main transmission pipeline is designed so that additional wells may be added to the

project to increase the pipeline capacity to approximately 25,000 acre-feet per year. The pipeline is buried with minimum cover of three feet above the crown of the pipe. Access manholes, air release valves, and drain valves have been provided at appropriate locations along the pipeline.

The Colorado CCP was tested in 2012, and is currently functional and capable of delivering water; however, the water rights for the CCP are currently under lease for irrigation use. Therefore, deliveries will not begin until January 2014 at the earliest.

7.0 REQUEST FOR APPROVAL

The State of Colorado on behalf of the RRWCD WAE requests that the RRCA approve the revised augmentation plan and related accounting procedures for the Colorado CCP described above under Subsection III.B.1.k of the Final Settlement Stipulation. A proposed resolution for approval of the Colorado CCP that incorporates terms and conditions consistent with the State of Nebraska's approval of the Colorado CCP Project and revisions based on the Arbitrator's Final Decision and discussions with Kansas is submitted contemporaneously to the RRCA with this Application. Because Colorado's compliance with the sub-basin non-impairment requirement in the Final Settlement Stipulation (Art. IV.B) for the South Fork of the Republican River was raised by the State of Kansas as an issue during the 2010 arbitration, the Colorado State Engineer ordered Bonny Reservoir to be drained to reduce the beneficial consumptive use charged to Colorado under the RRCA Accounting Procedures so as not to impair the ability of Kansas to use its South Fork sub-basin allocation within the South Fork sub-basin. To properly reflect the change in operation of Bonny Dam and Reservoir, Colorado is separately submitting a proposed resolution to change the representation of Bonny Reservoir in the RRCA Groundwater Model.

Table 1

RRWCD Compact Compliance Wells						4-Jan-2013
Permit #		RRWCD submitted & GWC published (af/yr) first publication	Corrected amount (af/yr)	Sand Hills approved for export (af/yr)	To be approved by GWC (af/yr)	Comments
12567-FP		201		N/A	0	Located in Central Yuma GWMD
12589-FP		376	297	372	297	Acres corrected from 309 ac to 200 ac
12967-FP	same well	345		333	333	
16920-FP		0			0	
13509-FP	same well	254		273	244	
16075-FP		30			29	
13511-FP		192		173	173	
13513-FP	same well	258		257	220	
16074-FP		44			37	
13522-FP		204		189	189	
13813-FP	same well	174		203	171	
16923-FP		32			32	
13814-FP		334		323	323	
13815-FP		291		311	291	Sand Hills approved more than hisorical amount
13856-FP	same well	241		249	241	
16067-FP		8			8	
13857-FP		229		217	217	
13858-FP		228		206	206	
13859-FP	same well	228		260	220	
16069-FP		42			40	
14018-FP		252		234	234	
14019-FP		217		206	206	
14022-FP		289		255	255	
14023-FP		219		197	197	
14024-FP		141		129	129	
14027-FP		251		237	237	
14028-FP		218		202	202	
14121-FP		437		420	420	
14122-FP		215		204	204	
14396-FP		192		180	180	
14397-FP		192		184	184	
14398-FP		240		230	230	
14600-FP		197		187	187	
14718-FP		526		526	526	
14719-FP		455		424	424	
14753-FP		310		267	267	
15285-FP		161		140	140	
18011-FP		431		421	421	
18012-FP	same well	221		317	218	
19000-FP		101			99	
18013-FP		350	291	350	291	Acres corrected from 250 ac to 228 ac
18014-FP		259		247	247	
18015-FP		549		497	497	
18017-FP	same well	180.5		353	177	
19001-FP		180.5			177	
18018-FP		230		218	218	
18019-FP		173		163	163	
18780-FP		192		192	192	
18781-FP		216		206	206	
18783-FP		273		273	273	
18966-FP		172		172	172	
19005-FP		178		174	174	
19372-FP		218		211	211	
20896-FP		169		168	168	
21476-FP		144		139	139	
subtotal		12,259	12,121	11,689	11,535	
		second publication				
14033-FP		279		279	279	
19004-FP		141		141	141	
23222-FP		230	168	230	168	Pumping corrected to permitted amount
4319-FP	same well	75		75	75	
4922-FP		0			0	
20198-FP		194		194	194	
20196-FP		249		249	249	
subtotal		1,168	1,106	1,168	1,106	
Total		13,427	13,227	12,857	12,641	

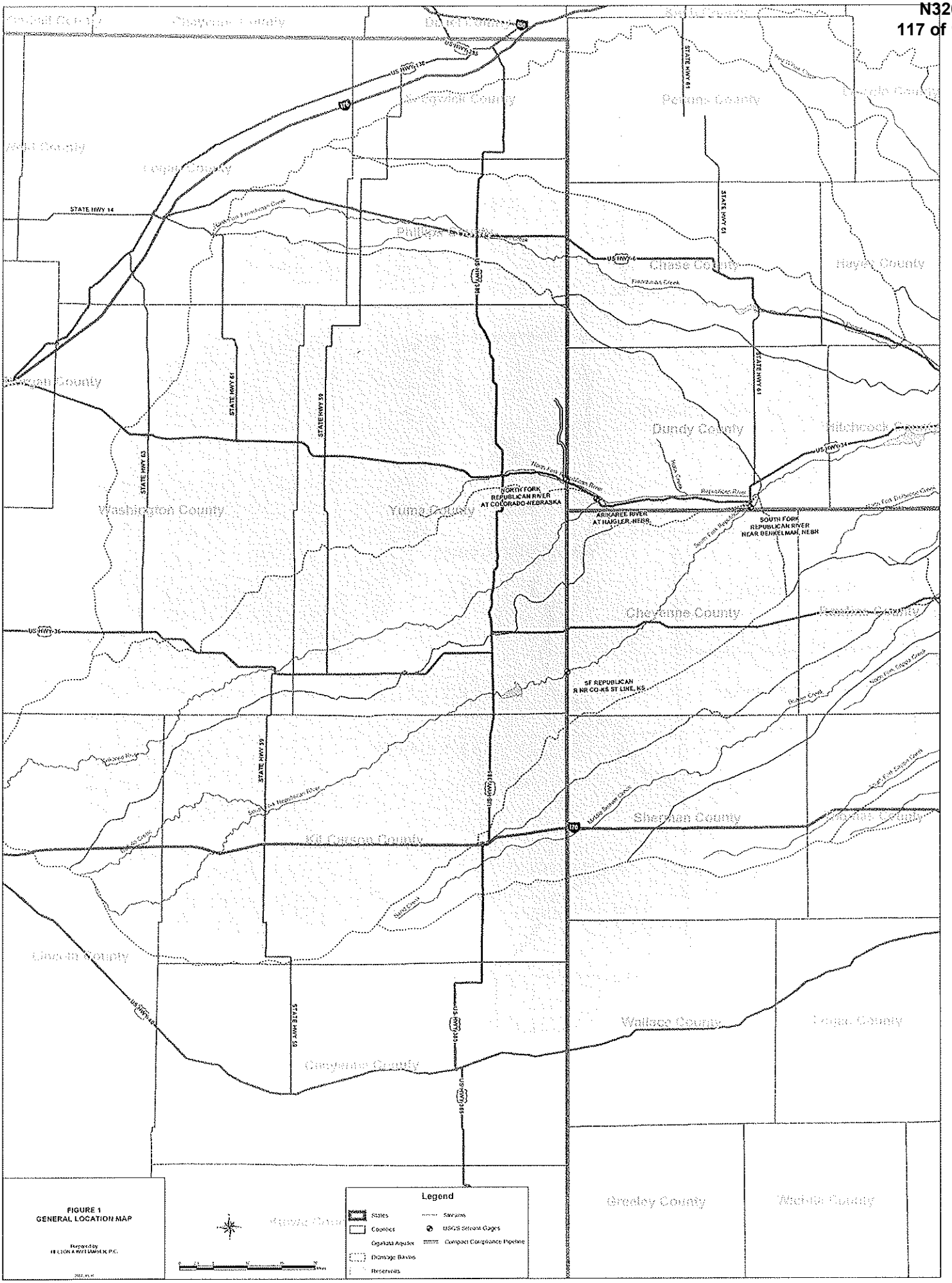
Table 2

Comparison of stream water quality in the North Fork to the ground water quality in the Ogallala Formation.

Surface Water Classification and Associated In-Stream or Drinking Water Standards [1]	
Classifications:	
Aquatic Life -- Cold Water 1	N/A
Recreation -- 1a	N/A
Water Supply – Agriculture	N/A
Physical and Biological Standards:	
Dissolved Oxygen = 6.0 mg/l	0.2 to 8.6 mg/l; 50% > 5.4 mg/l
pH = 6.5-9.0	7.0 – 7.9
Fecal coliforms = 200/100 ml	
E Coli = 126/100 ml	
Inorganic Standards:	
Ammonia (acute) = Table Value Standard (TVS)	
Ammonia (chronic) = 0.02 mg/l	0.01 to 0.244 mg/l; 50% < 0.015 mg/l
Chlorine (acute) = 0.019 mg/l	
Chlorine (chronic) = 0.011 mg/l	
Cyanide = 0.005 mg/l	
Sulfide = 0.002 mg/l	
Boron = 0.75 mg/l	Dissolved boron: 20 – 130 µg/l
Nitrate NO_2 = 0.05 mg/l	< 0.01 mg/l
Nitrate NO_3 =10 mg/l	1.1 to 8.9 mg/l
Chloride = 250 mg/l	1.4 to 29.5 mg/l
Sulfate = 250 mg/l	5.5 to 95.7 mg/l
Total Dissolved Solids = 500 mg/l	219 to 461 mg/l
Metal Standards:	
Arsenic (acute) = 50 µg/l (total recoverable)	Dissolved arsenic: <5-12 µg/l
Cadmium (acute) = TVS (trout)	
Cadmium (chronic) = TVS	
Trivalent Chromium (acute) = 50 µg/l (total)	
Hexavalent Chromium (acute/chronic) = TVS	
Copper (acute/chronic) = 1.3 mg/l	Dissolved copper: <5-35 µg/l
Iron (chronic) = 300 µg/l	Dissolved iron: <3-60 µg/l
Iron (chronic) =1000 µg/l (total recoverable)	
Lead (acute/chronic) = TVS (dissolved 15µg/l)	Dissolved lead <5 µg/l
Manganese (acute/chronic) = TVS (dissolved 50µg/l)	Dissolved manganese <3-40 µg/l
Manganese (chronic) = WS (dissolved)	
Mercury (chronic) = 0.01 µg/l (total)	
Nickel (acute/chronic) = TVS	
Selenium(acute/chronic) = TVS (dissolved 50 µg/l)	Dissolved selenium: <5 µg/l
Silver (acute) = TVS	
Zinc (acute/chronic) = TVS	Dissolved Zinc < 5-124 µg/l

Notes:

1. Stream classifications and water quality standards obtained from a report by David Litke, U.S. Geological Survey, and Historical Water-Quality Data for the High Plains Regional Ground-Water Study Area (1930 -- 1998) or from CDPHE/WQCC -- Colorado Primary Drinking Water Standards.
2. Blanks indicate data that were not reported in the reference.
3. Reported ground water quality data is from Litke, USGS (see Note 1).


Sedgwick County
Phillips County
Perkins County
Keith County
Logan County
Chase County
Hayes County
Washington County
Yuma County
Dundy County
Hitchcock County
Kit Carson County
Cheyenne County
Kimball County
Sherman County
Wallace County
Logan County
Greeley County
Wheeler County
Chase County
Custer County
Valley County
Garfield County
Loup County
Howard County
Greeley County
STATE HWY 14
STATE HWY 61
STATE HWY 59
STATE HWY 63
US HWY 34
US HWY 36
US HWY 385
US HWY 138
NORTH FORK REPUBLICAN RIVER AT COLORADO-NEBRASKA
ARIKAREE RIVER AT HAIGLER, NEBR
SOUTH FORK REPUBLICAN RIVER NEAR BENKELMAN, NEBR
SF REPUBLICAN R NR CO-KS ST LINE, KS
Frenchman Creek
Stinking Water Creek
Red Willow Creek
Middle Republican River
Middle Beaver Creek
Rock Creek
Sand Creek
Legend
States
Counties
Ogallala Aquifer
Drainage Basins
Reservoirs
Streams
USGS Stream Gages
Compact Compliance Pipeline
FIGURE 1
GENERAL LOCATION MAP
Prepared by
HDR ENGINEERING, P.C.

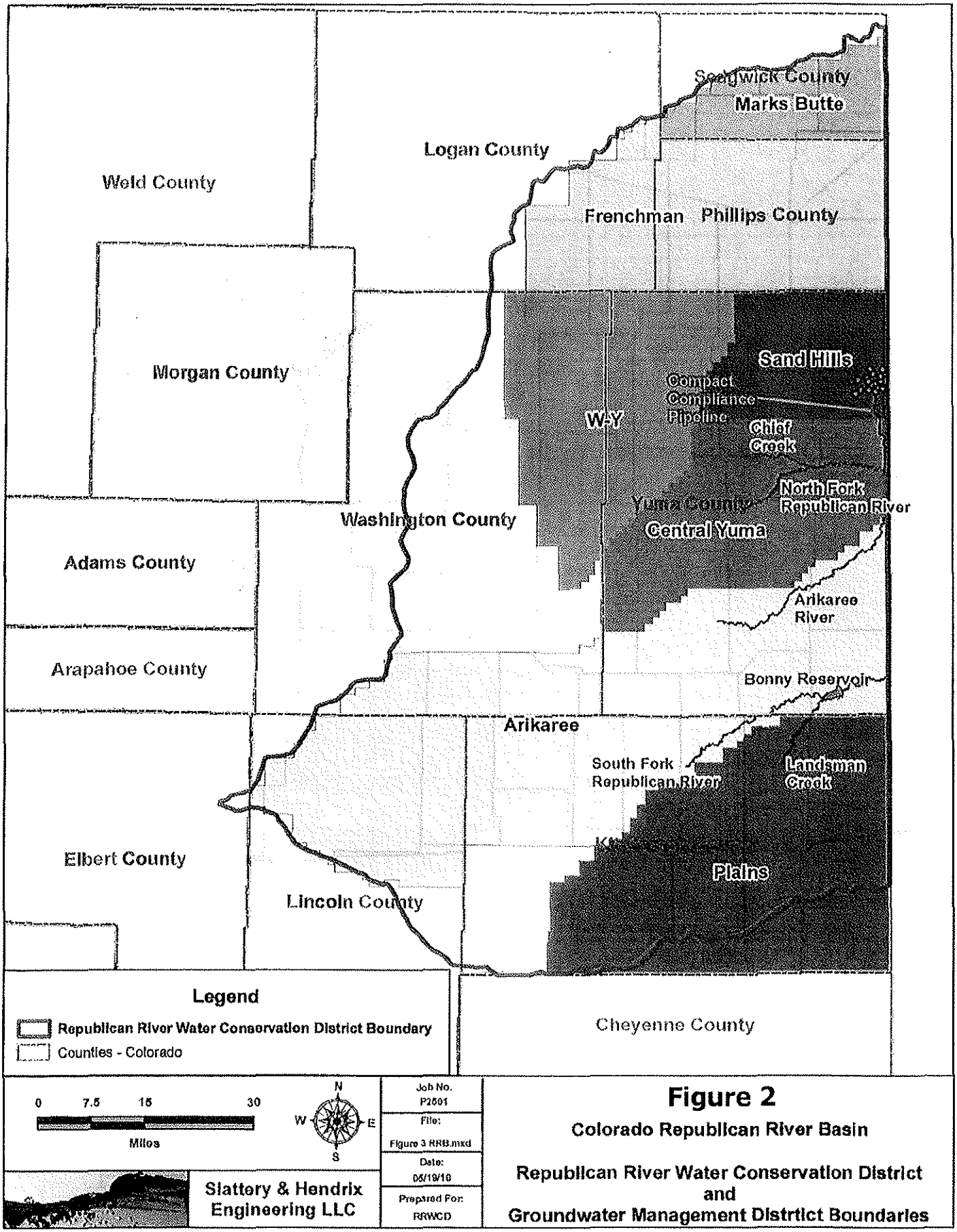
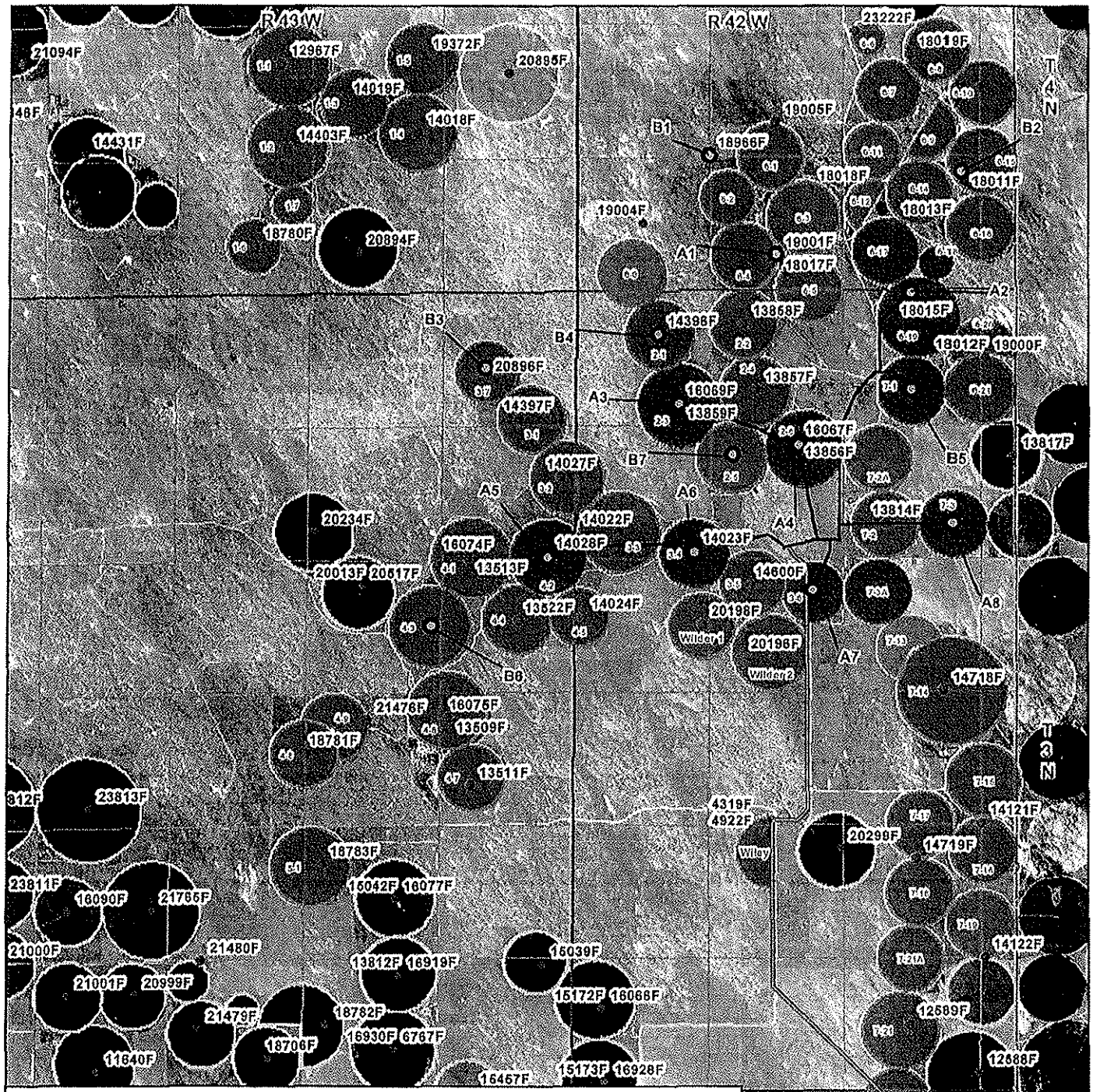


Figure 2

Colorado Republican River Basin

Republican River Water Conservation District
and
Groundwater Management Distrtict Boundaries



Legend

- Compact Compliance Wells
- Feeder Pipeline
- Main Pipeline
- Change of Use - Cure Property
- Formerly Irrigated by Active Compact Compliance Wells

0 0.5 1 2 Miles

N W E S

Job No.	R1601
File:	Cure Farms Lease.mxd
Date:	11/01/11
Prepared For:	RRWCD

Slattery & Hendrix Engineering LLC

Figure 3

General Location Map
Cure Farms
Compact Compliance Wells

Data Sources:
County Digital Raster Graphics from USDA;
Irrigated Acreage from Slattery & Hendrix Engineering LLC

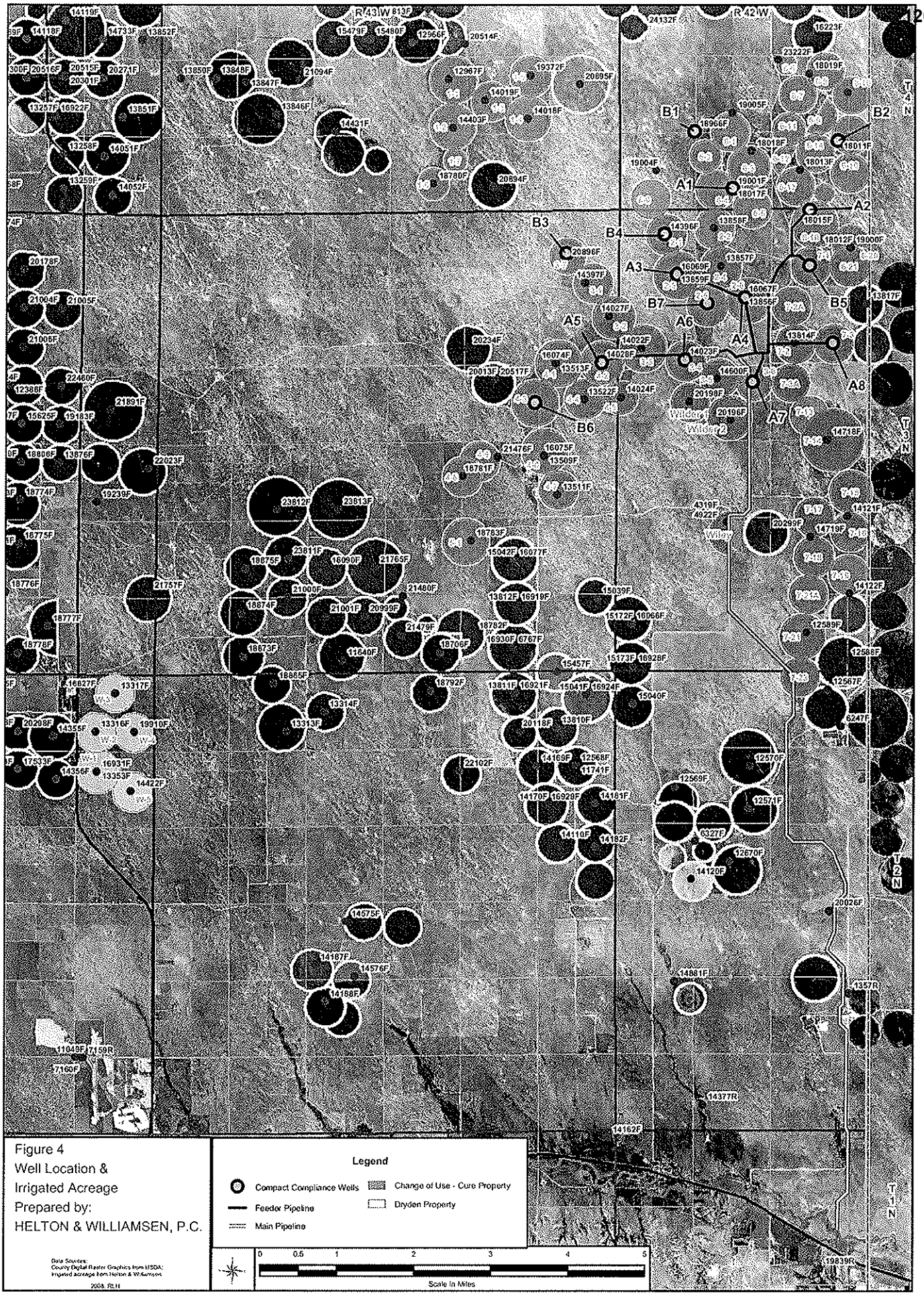


Figure 4
Well Location &
Irrigated Acreage
Prepared by:
HELTON & WILLIAMSEN, P.C.

Data Sources:
County Digital Raster Graphics from USDA;
Irrigated acreage from Helton & Williamsen

2008, RLH

Figure 5
Amount Colorado Exceeded Compact Allocation

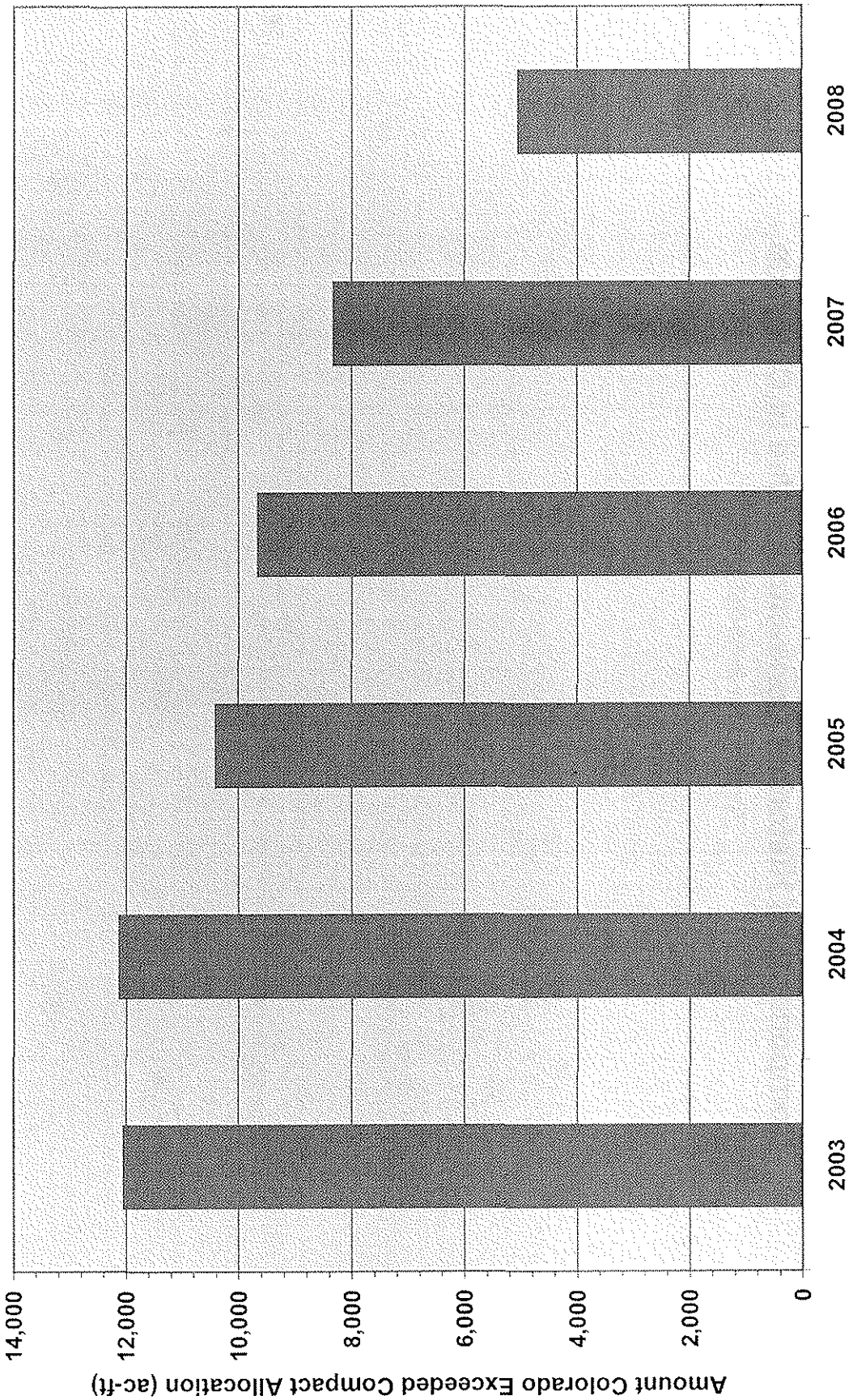


Figure 6
Components of Historical Consumptive Use In Colorado
(Average for 2003-2007)

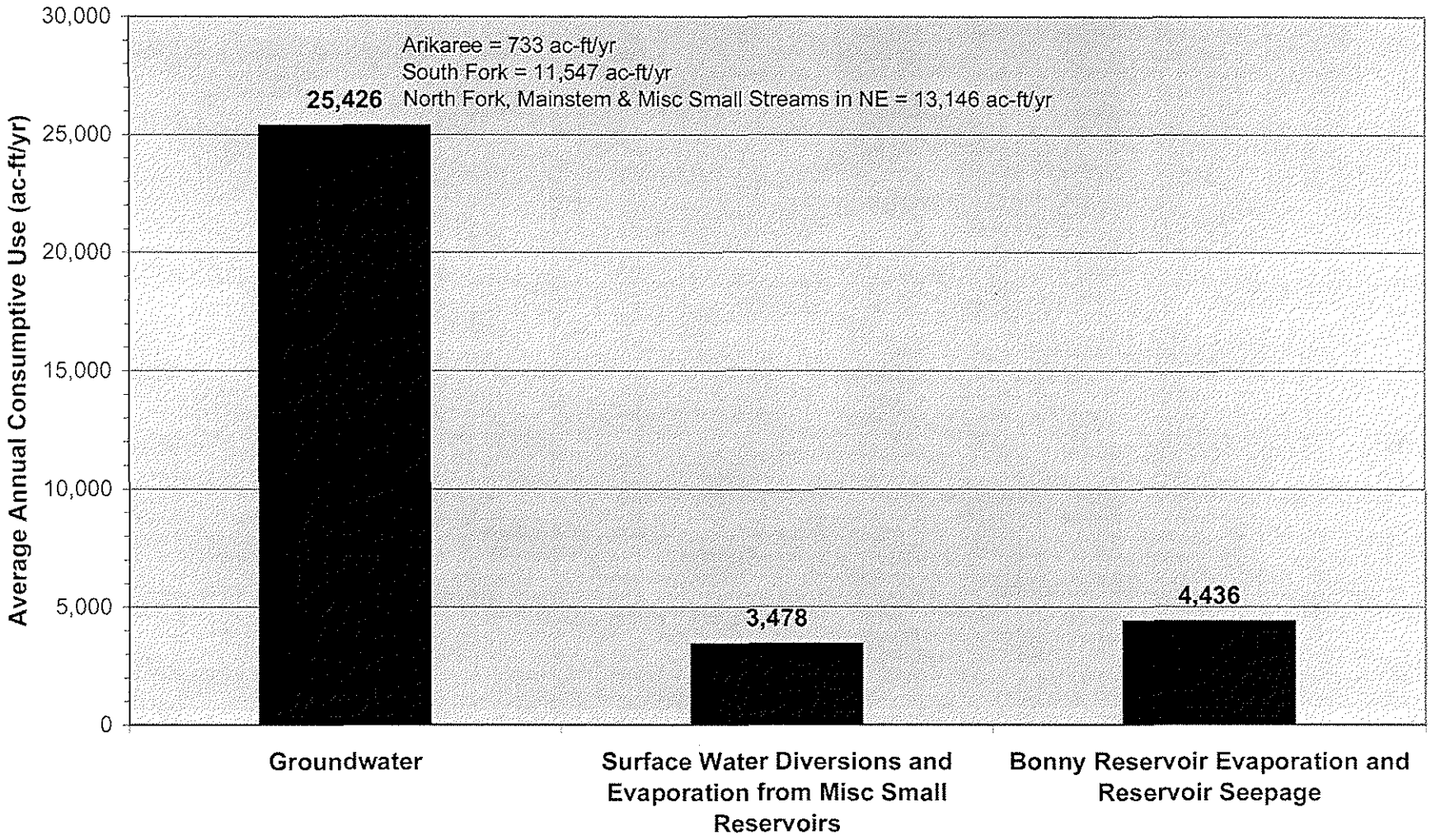
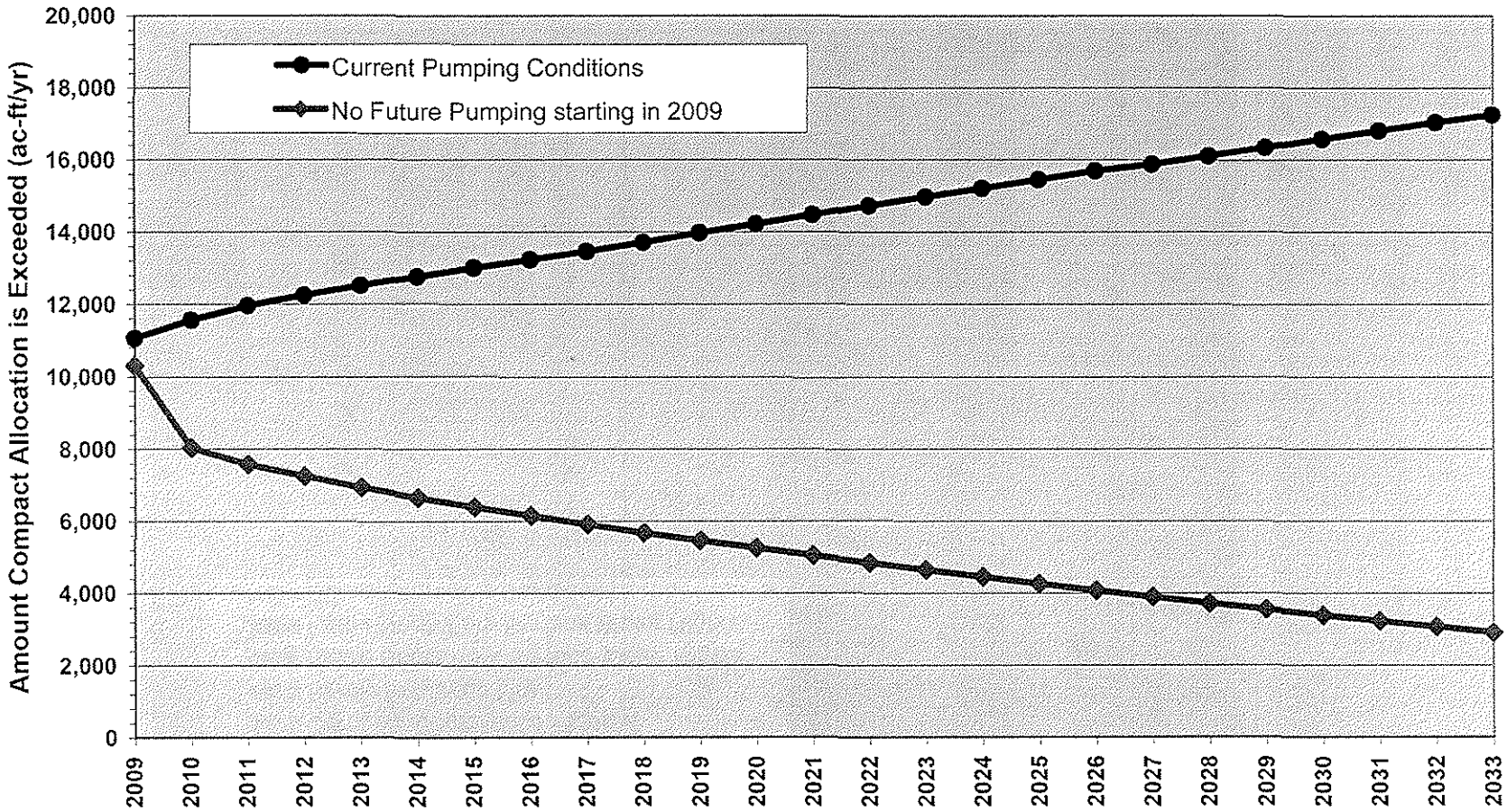


Figure 7

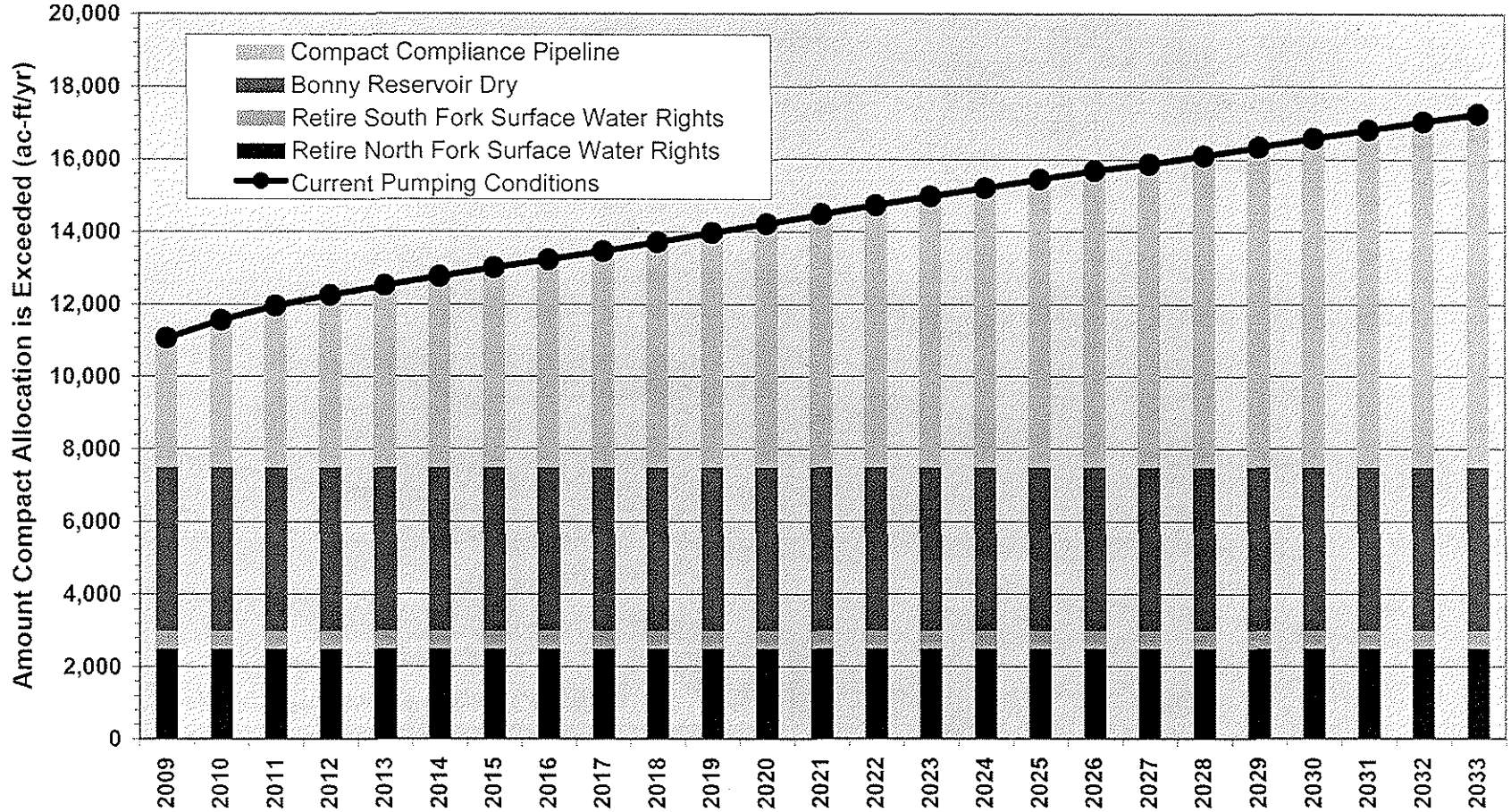
Projected Compact Compliance under Current Pumping and No Pumping Conditions



Note: The current pumping conditions projection assumes projected pumping conditions are equal to the average pumping for the 1999-2008 period and the precipitation recharge is equal to the 1918-2008 average. The amount the compact allocation is exceeded is based on the average value for the 2003-2007 period and does not reflect the 2,500 ac-ft/yr reduction in Colorado's consumptive use from the surface water rights purchased by Colorado.

Figure 8

Projected Compact Compliance with Compact Compliance Pipeline in Operation



Note: The current pumping conditions projection assumes projected pumping conditions are equal to the average pumping for the 1999-2008 period and the precipitation recharge is equal to the 1918-2008 average. The amount the compact allocation is exceeded under current pumping conditions is based on the average value for the 2003-2007 period and does not reflect the 2,500 ac-ft/yr reduction in Colorado's consumptive use from the surface water rights purchased by Colorado.

SANDHILLS GROUND WATER MANAGEMENT DISTRICT	
CONCERNING THE EXPORT APPLICATION OF THE REPUBLICAN RIVER WATER CONSERVATION DISTRICT, acting by and through its WATER ACTIVITY ENTERPRISE	

FINDINGS OF FACT, CONCLUSIONS OF LAW, AND DECISION

This matter came on for hearing on January 24, 2012, before the Board of Directors ("Board") of the Sandhills Ground Water Management District ("GWMD" or "District") on the application of the Republican River Water Conservation District, acting by and through its Water Activity Enterprise ("RRWCD"), to use ground water outside the boundaries of the Sandhills GWMD.

Having considered the application and the evidence presented, the Sandhills GWMD Board makes the following findings of fact, conclusions of law, and decision:

1. The RRWCD initially submitted a letter dated February 25, 2008, to the Board requesting authorization and approval to use ground water under specified ground water rights outside the boundaries of the District for the sole purpose of offsetting stream depletions to the Republican River and its tributaries in order to comply with the State of Colorado's allocations under the Republican River Compact ("Compact") and the Final Settlement Stipulation ("FSS") in *Kansas v. Nebraska and Colorado*, No. 126, Original (U.S. Supreme Court). RRWCD Exh. 1. The RRWCD requested a hearing on its request at the Board's earliest convenience. *Id.*

2. At that time of the initial request, the RRWCD had entered into an agreement to purchase ground water rights in the District, had applied for a $60 million loan from the Colorado Water Conservation Board ("CWCB") to purchase the ground water rights and to build a pipeline to deliver ground water from existing wells in the District to the North Fork of the Republican River ("Pipeline project") and had filed applications with the Colorado Ground Water Commission ("Commission") to change the use of the ground water rights to be purchased to Compact Compliance wells and had requested a variance from certain Commission Rules to consolidate the wells to reduce the cost of constructing and operating the Pipeline project. RRWCD Exh. 1.

3. The District is a ground water management district formed under the provisions of the Colorado Ground Water Management Act ("Act") and has the powers provided in the Act. § 37-90-101 through 135, C.R.S.

4. Section 37-90-130(2)(f), C.R.S., of the Act provides that the District has the authority to regulate the use, control, and conservation of the ground water of the District covered by any well permit, including the authority "[t]o prohibit, after affording an opportunity for a hearing before the board of the local district and presentation of evidence, the use of ground water outside the boundaries of the district where such use materially affects the rights acquired by permit by any owner or operator of land within the district."

5. At the time of the RRWCD's February 28, 2008 initial request, the Board had adopted Rules, Regulations, and Guidelines ("Rules"), which included a rule prohibiting removal of ground water from the District unless authority is first obtained from the Board after a hearing. District Rule 3. The Board did not hold a hearing on the RRWCD's initial export request at that time because the RRWCD did not know the credit that Colorado would receive for the Pipeline deliveries to offset stream depletions under the Compact, and the RRWCD agreed to postpone the hearing until more was known about this issue.

6. The States of Kansas, Nebraska, and Colorado entered into the FSS as of December 15, 2002, to resolve pending litigation in the U.S. Supreme Court regarding the Compact. RRWCD Exh. 7 at p. 4. The Special Master and the U.S. Supreme Court subsequently approved the FSS. *Kansas v. Nebraska and Colorado*, 538 U.S. 720 (2003). In Subsection III.A of the FSS, the States of Kansas, Nebraska, and Colorado adopted a moratorium on new wells, with certain exceptions set forth in subsection III.B of the FSS.

7. Subsection III.B.1.k of the FSS provides that the moratorium shall not apply to wells acquired or constructed by a State for the sole purpose of offsetting stream depletions in order to comply with its Compact allocations, provided that such wells shall not cause any new net depletion to stream flow either annually or long term. Subsection III.B.1.K further provides that augmentation plans and related accounting procedures under this subsection shall be approved by the Republican River Compact Administration ("RRCA") prior to implementation.

8. In March, 2008, the State of Colorado and the RRWCD submitted an application to the RRCA seeking approval of an augmentation plan and related changes to the RRCA Accounting Procedures for the Pipeline project, which provided that Colorado would receive 100% credit for Pipeline deliveries to the North Fork of the Republican River to offset stream depletions.

9. In August, 2009, Colorado submitted a proposed resolution to the RRCA to approve an augmentation plan and related changes to the RRCA Accounting Procedures for the Pipeline project.

10. At the RRCA annual meeting in August, 2009, the Kansas and Nebraska RRCA members voted against Colorado's proposed resolution, and Colorado initiated non-binding arbitration pursuant to the FSS. RRWCD Exh. 9 at 2.

11. Before the arbitration hearing, Colorado and Nebraska entered in to a stipulation in which Nebraska agreed to support Colorado's Pipeline resolution, subject to terms concerning the operation of the Pipeline project. RRWCD Exh. 8; RRWCD Exh. 9 at 2.

12. Following a hearing in July, 2010, the Arbitrator selected by the States issued a Final Decision on the Pipeline project dispute on October 7, 2010, in which the Arbitrator concluded that Kansas had not arbitrarily withheld its approval of the Pipeline project, but also concluded that the Pipeline project, in general, provided a reasonable and necessary approach for meeting Colorado's Compact obligations and, with the changes recommended in the Final Decision, stated that the Pipeline project should be approved. RRWCD Exh. 9 at pp. 21-22. Colorado and Kansas disagreed as to whether the RRCA ground water model should be used to calculate the credit that Colorado would receive for the Pipeline deliveries. The Arbitrator agreed that the expert evidence provided by Colorado was convincing in demonstrating that discharge from the Pipeline can and should be measured, rather than modeled, but concluded that the expert evidence provided by Kansas demonstrated that the Pipeline would result in an increase in "negative pumping impacts," and thereby provide a long-term additional benefit to Colorado to the detriment of Kansas. *Id.* at 10. The Arbitrator recognized possible options, and recommended a 10% reduction in credit for Pipeline deliveries as a reasonable reflection of the potential impact based on seasonal deliveries. *Id.* at 11.

13. Because of a concern that the Colorado Legislature would take the CWCB loan funds for the Pipeline project for other purposes because of budget shortfalls, the RRWCD Board of Directors proceeded with the purchase of the ground water rights for the Pipeline project, which was completed on June 19, 2009, RRWCD Exh. 10, and construction of the Pipeline project, which began in September, 2011. RRWCD Exh. 13.

14. In 2011, the Board proposed an additional rule to supplement the District's existing Rule 17, to add more detailed procedural requirements to clarify how export applications would be processed by the District.

15. On August 16, 2011, in accordance with proposed Rule 17A, the RRWCD submitted an application for export of water ("export application"), an engineering report prepared by Slattery & Hendrix Engineering LLC in support of the application, evaluations by the State Engineer's Office regarding the average annual historical withdrawals and depletions to the aquifer by the wells included in the Pipeline project, and legal and engineering information to support the export application. Exh. 1. The RRWCD also submitted proposed terms and conditions to prevent the export from materially injuring the District and water users within the District, and supplemental terms and conditions for the approval to export up to 500 acre feet of groundwater from eight Compact Compliance Wells and to deliver that water to the North Fork of the Republican River to test the Pipeline in 2012. RRWCD Exhs. 3 and 4.

16. On September 16, 2011, the RRWCD and the District entered into an agreement in which it was agreed that proposed Rule 17A would apply to the RRWCD's export request without the need for formal promulgation of the Rule, and the Board agreed, in full compliance with the procedural steps contained in proposed Rule 17A, to make reasonable efforts to expedite the time for holding a hearing and to issue a written decision on the export application in accordance with proposed Rule 17A and relevant statutes. Exh. 1.

17. After determining that the application was complete, the Board caused notice of the export application to be published in a newspaper with general circulation in Yuma County, Colorado, and allowed any person wishing to support or object to the approval of the application,

to provide other comments concerning the application, or to request party status, to do so in writing to be filed with the District no later than October 31, 2011, by a time specified in the notice. Exh. 2.

18. No objections to the export application were received. Support for the export application was filed by the Colorado Agriculture Preservation Association, the Central Yuma Groundwater Management District, the W-Y Ground Water Management District, the Boards of County Commissioners of Lincoln County, Kit Carson County, Yuma County, Washington County, Sedgwick County, Phillips County, and the Plains Ground Water Management District. The Frenchman Groundwater Management District and the Marks Butte Groundwater Management District requested party status for the export hearing. Bill Cure, on behalf of Cure Land, requested approval of the export application if 100% credit for water is obtained from the project under the Compact. Exhs. 4-16.

19. The Board then set the date for a hearing to be held on the export application for January 24, 2012, at the Wauneta Fire Hall, located north of Wray, Colorado and within the District, and caused notice of the hearing to be published in a newspaper of general circulation in Yuma County, Colorado. Exh. 3. The hearing took place on January 24, 2012, pursuant to the notice. The Board designated Michael D. Shimmin, Esq., to be the hearing officer to conduct the hearing, but the entire Board was present at the hearing and heard all of the evidence and comments presented. Testimony and documentary evidence was presented by three witnesses for the RRWCD, which is summarized below. All parties were allowed the chance for cross examination and to present testimony. Opportunity was also allowed for public comment by non-parties. A summary of the evidence and comments presented, and the Board's findings based on the evidence and comments follows.

20. The RRWCD is a water conservation district that was created by Colorado statute to assist the State of Colorado to comply with the Compact. § 37-50-101, -103, C.R.S.

21. The RRWCD has purchased ground water rights associated with a total of 62 well permits, of which 61 are located in the District as described in the engineering report, RRWCD Exh. 2 at 9, and has acquired easements for fifteen wells ("Compact Compliance Wells") in the District for the Pipeline project. The RRWCD has also acquired easements for the collector pipelines, a storage tank, the main pipeline, and the outfall structure.

22. The RRWCD proposes to pump the historical consumptive use of some or all of these groundwater rights from the Compact Compliance Wells into a pipeline and deliver that water into the North Fork of the Republican River near the Colorado/Nebraska state line as necessary to offset stream depletions in order to comply with Colorado's Compact allocations.

23. The RRCA has not approved an augmentation plan for the Pipeline project at this time, but Colorado has entered into a stipulation with Nebraska that gives Colorado full credit for Pipeline deliveries that are made in accordance with the stipulation, and Colorado is currently in discussions with Kansas concerning the credit that Colorado will receive for the Pipeline deliveries under the Compact.

24. At the hearing on the export application, the RRWCD provided testimony in support of the export application by: Dennis Coryell, President of the RRWCD Board of Directors; James E. Slattery, RRWCD engineer; and Dick Wolfe, the Colorado State Engineer.

25. Mr. Coryell testified about the history of the RRWCD, the RRWCD Board of Directors' efforts to assist Colorado to comply with the Compact by providing cost-sharing for federal conservation programs, why the RRWCD Board of Directors concluded that a Pipeline project was necessary to assist Colorado in achieving Compact compliance, and the feasibility study conducted by the RRWCD to select the location for the Pipeline project.

26. Mr. Slattery gave a presentation on the Pipeline project based on the engineering report submitted in support of the application and explained why the Pipeline project is necessary for Compact compliance and how the Pipeline project will be operated based on the stipulation between Colorado and Nebraska. He also explained the proposed terms and conditions for the export of ground water from the District.

27. Mr. Wolfe testified about the status of discussions with Kansas and answered questions from the Board about Colorado's efforts to obtain approval from Kansas for the Pipeline project.

28. The RRWCD offered 15 exhibits at the hearing, including the Joint Notice of Stipulation between Colorado and Nebraska (RRWCD Exh. 8), the Arbitrator's Final Decision on the Colorado Compact Compliance Pipeline Dispute (RRWCD Exh. 9), Corrected Resolution No. 08-06 of the RRWCD Board of Directors agreeing to limit pumping from the Compact Compliance Wells to a maximum of 2,500 acre-feet per year per well (RRWCD Exh. 11), answers to Export Questions that the Sandhills GWMD had submitted to the RRWCD before the hearing (RRWCD Exh. 14), and a letter dated September 6, 2011, from Keith Vander Horst, Designated Basin Team Leader, Colorado Ground Water Commission, explaining the actions of the Commission on the RRWCD's applications to change existing rights to designated ground water (RRWCD Exh. 15). These exhibits were admitted without objection.

29. The RRWCD has begun construction of the Pipeline and will need to divert up to 500 acre feet of groundwater from eight of the Compact Compliance Wells and to deliver that water into the North Fork of the Republican River near the Colorado/Nebraska State Line to test the Pipeline in 2012.

30. The RRWCD proposed the following terms and conditions on the approval of the export application pursuant to proposed Rule 17.A, which are found by the Board to be reasonable and appropriate, and they are incorporated into this Decision as binding terms and conditions on the future operation of the requested export and the Pipeline project:

1. The average annual historical consumptive use of the groundwater rights that may be diverted at the Compact Compliance Wells shall be as determined by the Colorado Ground Water Commission pursuant to its rules and regulations, provided that the average annual historical consumptive use of the groundwater rights listed on Table 3 of the Engineering Report prepared by Slattery & Hendrix Engineering LLC

dated August 17, 2011 (RRWCD Exh. 2), shall not exceed the average annual amounts shown in column (6) on Table 3 (Corrected Historical Consumptive Use). Annual diversions during any calendar year under the groundwater rights listed on Table 3 shall not exceed the total corrected annual historical consumptive use of the groundwater rights as shown in column (6) of Table 3, except as provided in paragraph 5 below. A copy of Table 3 is attached as Exhibit A and incorporated in these Findings.

2. Groundwater diversions from the Compact Compliance Wells shall be measured by totalizing flow meters, at the RRWCD's expense, in compliance with the Rules and Regulations Governing the Measurement of Ground Water Diversions located in the Republican River Basin and the RRWCD shall report annually or at other reasonable times to the State Engineer the readings of such measuring devices and the amounts pumped from the Compact Compliance Wells.

3. Diversions from the Compact Compliance Wells shall be limited to no more than 2,500 acre feet per year per well.

4. Discharges of groundwater to the North Fork of the Republican River from the Colorado Compact Compliance Pipeline will be measured at an outlet structure located approximately one-half mile from the Colorado-Nebraska State Line.

5. Banking of groundwater shall be permitted in accordance with the Rules and Regulations of the Colorado Ground Water Commission for the Management and Control of Designated Ground Water, as amended, but diversions from the Compact Compliance Wells shall be limited to the amount necessary to offset stream depletions in order to comply with Colorado's Allocations under the Republican River Compact in accordance with the terms of the Stipulation between the States of Colorado and Nebraska, as set forth in the Joint Notice of Stipulation between the States of Colorado and Nebraska submitted to Arbitrator Martha O. Pagel on May 17, 2010 ("Joint Notice of Stipulation") (RRWCD Exh. 8).

6. Deliveries to the North Fork of the Republican River from the Colorado Compact Compliance Pipeline will be in compliance with the terms of the Stipulation between the States of Colorado and Nebraska, as set forth in the Joint Notice of Stipulation.

31. Additionally, the Board anticipates that when the Commission issues its approval of the change of use for the ground water rights to be used in the Pipeline project and export, that all of the typical terms and conditions that are usually included in such approvals pursuant to Commission Rule 7 will be included in this one, and specifically including those administrative terms and conditions for which the District typically plays a role in monitoring and administration of the change of use approval. The Board finds that such terms and conditions

should be included in that approval, and should also be incorporated into this Decision, but because they have not yet been issued, the Board cannot review them at this time. Therefore, the Board retains jurisdiction over this Decision for the purpose of reviewing those terms and conditions for adequacy and for the purpose of adding any additional terms and conditions that the Board determines to be needed, but that are not adequately addressed in the Commission's change of use approval. The retained jurisdiction described in this paragraph may be exercised by the Board only if it determines that the terms and conditions contained in the Commission approval of the change of use for the ground water rights to be used in the Pipeline project and export are not adequate, and need to be supplemented by the District. If the Board makes this decision, it will give written notice to the parties of the additional terms and conditions that it believes are needed, and give the RRWCD 60 days to submit a response. The Board will consider any request for an additional hearing, and determine if an additional hearing is needed, or whether the existing record is adequate for a decision about additional terms and conditions.

32. The Board also adds the term and condition of requiring the RRWCD to submit to the District by April 1 of each year, a copy of the annual projections of the amount and timing for Pipeline project deliveries that are prepared in accordance with the stipulation with Nebraska. The RRWCD indicated during the hearing that this term and condition would be acceptable. See RRWCD Exh. 14, at page 6.

33. The RRWCD proposed the following supplemental terms and conditions for the approval of the export of up to 500 acre feet of ground water to be pumped from Wells A-2 through A-8 and B-5 (the "Wells"), as shown on Figure 1 attached to RRWCD Exh. 4, to test the Pipeline in 2012 and delivery of that water into the North Fork of the Republican River near the Colorado/Nebraska State Line. These are found by the Board to be reasonable and appropriate, and they are incorporated into this Decision as binding terms and conditions on the requested export of 500 acre feet to test the Pipeline in 2012.

1. In calendar year 2012, no diversions of ground water shall be made from Well A-2, except as needed by the RRWCD to test the Pipeline, and the fields described in paragraph 2 below will be fallowed in 2012.

2. During 2012, the following fields that are permitted under Permit No. 18015-FP to be irrigated with Well A-2 shall not be irrigated: Fields 6-17, 6-18, and 6-19 (totaling approximately 329 acres), as shown on Figure 1, which is attached as Exhibit B and incorporated in these Findings.

3. In calendar year 2012, diversions of groundwater may be made from Wells A-3 through A-8 and B-5 for irrigation and to test the Pipeline, subject to the supplemental terms and conditions herein. Groundwater diversions from the Wells shall be measured by totalizing flow meters and the RRWCD shall record and report to the State Engineer the readings from such meters before and after the Wells are pumped to test the Pipeline and the amounts pumped from the Wells to test the Pipeline.

4. Discharges of groundwater to the North Fork of the Republican River from the Colorado Compact Compliance Pipeline shall be measured at an

outlet structure located approximately one-half mile from the Colorado-Nebraska State Line.

5. No more than 500 acre feet of groundwater in total shall be diverted from the Wells and delivered into the North Fork of the Republican River near the Colorado/Nebraska State Line to test the Pipeline in 2012.

6. The approval by the Sandhills GWMD to allow the RRWCD to divert up to 500 acre-feet of groundwater from the Wells to test the Pipeline in 2012, in accordance with the terms and conditions provided herein, shall not impair the right to use the water rights in the future for irrigation.

7. The approval of the Sandhills GWMD for the diversion of up to 500 acre feet of groundwater from the Wells and the export of that groundwater for delivery into the North Fork of the Republican River near the Colorado/Nebraska State Line to test the Pipeline in 2012 shall not be a precedent for the approval of any other export of groundwater from the Sandhills GWMD.

34. Additionally, the Board anticipates that the Commission will issue its approval of the change of use for the ground water rights to be used in the Pipeline project and export before any water is used for Pipeline testing, and that all of the typical terms and conditions that are usually included in such approvals pursuant to Commission Rule 7 will be included in this one, and specifically including those administrative terms and conditions for which the District typically plays a role in monitoring and administration of the change of use approval. The Board finds that such terms and conditions should be included in that approval, and should also be incorporated into this Decision, but because they have not yet been issued, the Board cannot review them at this time. Therefore, the Board retains jurisdiction over this Decision for the purpose of reviewing those terms and conditions for adequacy and for the purpose of adding any additional terms and conditions that the Board determines to be needed, but that are not adequately addressed in the Commission's change of use approval. The retained jurisdiction described in this paragraph may be exercised by the Board only if it determines that the terms and conditions contained in the Commission approval of the change of use for the ground water rights to be used in the Pipeline project and export are not adequate, and need to be supplemented by the District. If the Board makes this decision, it will give written notice to the parties of the additional terms and conditions that it believes are needed, and give the RRWCD 60 days to submit a response. The Board will consider any request for an additional hearing, and determine if an additional hearing is needed, or whether the existing record is adequate for a decision about additional terms and conditions.

35. At the hearing, those who had submitted written comments or sought party status were given an opportunity to make any further statement to the Board; none objected to the export application or requested to comment further. The Central Yuma Groundwater Management District, which had sought party status, submitted a letter in support of the export application, which was marked as Exh. 8-A and accepted as part of the record.

36. The Board then allowed public comment on the export application. The only member of the public who spoke was Sue Jarrett. She stated that Mr. Rex Tracy had signed up to give public comment and asked that she be allowed to submit a written statement on his behalf opposing the export application on the basis that it will be of no benefit, which was marked and admitted as Exh. 18. Ms. Jarrett objected to the export application because she questioned the wisdom of continuing to pump ground water from the Ogallala aquifer to maintain the existing agricultural economy and the wisdom of pumping ground water into a surface stream. She submitted a written statement, which was marked and admitted as Exh. 19.

37. At the conclusion of the hearing, the RRWCD requested that the Board approve the export application to allow the RRWCD to export up to 500 acre-feet of ground water in 2012 to test the Pipeline based on the supplemental terms and conditions the RRWCD had submitted (RRWCD Exh. 4), which includes the condition that approval is not a precedent for the approval of any other export of ground water from the District.

38. The RRWCD also requested that the Board approve the export application based on the terms and conditions the RRWCD had submitted (RRWCD Exh. 3) if Colorado receives 100% credit for Pipeline deliveries that are consistent with the stipulation with Nebraska. The terms and conditions include the condition that Pipeline deliveries be made in compliance with the terms of the stipulation with Nebraska.

39. Lastly, the RRWCD asked that the Board reserve consideration of the export application until Colorado has completed discussions with Kansas on the credit Colorado will receive for Pipeline deliveries in the event the States can agree to a percentage credit for Pipeline deliveries that is less than 100%. While the RRWCD believes Colorado should receive 100% credit for Pipeline deliveries that are consistent with the stipulation with Nebraska, the RRWCD recognizes that the Arbitrator recommended 90% credit to address Kansas' concern that Pipeline deliveries would result in "negative pumping impacts" to the detriment of Kansas.

40. The evidence presented at the hearing demonstrated that the Pipeline project is needed for Colorado to comply with the Compact at current levels of well pumping in the Republican River basin in Colorado. The evidence further showed that even shutting down all wells in the basin in Colorado would not bring Colorado into Compact compliance for decades. The FSS allows for the use of wells to offset stream depletions, and the RRWCD Board of Directors carefully evaluated the feasibility of a Pipeline project before it proceeded with the project.

CONCLUSIONS OF LAW

41. The Board has authority to prohibit, after affording an opportunity for hearing before the Board and presentation of evidence, the use of ground water outside the boundaries of the District where such use materially affects the rights acquired by permit by any owner or operator of land within the District, and may, in the reasonable discretion of the Board, condition approval to use ground water outside the boundaries of the District where such conditions are necessary to prevent such use from materially affecting the rights acquired by permit by any owner or operator of land within the District. C.R.S. Section 37-90-137(2)(f).

42. The export application in this matter was filed with the District pursuant to its Rules and the Agreement between the District and the RRWCD. The Board has jurisdiction to make a decision on the export application pursuant to District Rule 3 and C.R.S. Section 37-90-137(2)(f).

43. Timely and adequate notice of the export application and the hearing on the export application was published in accordance with C.R.S. Section 37-90-112(1).

44. The RRWCD has complied with all procedural requirements of the District's Rules and the Agreement between the District and the RRWCD.

DECISION BY THE BOARD

NOW, THEREFORE, it is hereby the decision of the Board of Directors of the District as follows:

45. The Board approves the export of up to 500 acre-feet of ground water in 2012 to test the Pipeline, subject to the supplemental terms and conditions and retained jurisdiction set forth in paragraphs 33 and 34 above.

46. The Board also approves the export of ground water under the ground water rights for the 61 permits located in the District specified in Table 3 of the engineering report attached as Exhibit A and delivery of the ground water to the North Fork of the Republican River for the sole purpose of offsetting stream depletions that reach the Republican River after the date of this decision in order to comply with Colorado's allocations under the Compact and the FSS, on the condition that Colorado receives 100% credit for such deliveries that are in compliance with the stipulation between Colorado and Nebraska, and subject to the other terms and conditions and retained jurisdiction set forth herein.

47. However, the Board retains jurisdiction for further consideration of the export application until Colorado has completed discussions with Kansas on the credit that Colorado will receive for Pipeline deliveries under the Compact in the event the States can agree to a percentage credit for Pipeline deliveries that is less than 100% or Colorado again initiates non-binding arbitration to resolve the dispute over the credit that Colorado will receive and that process results in a credit of less than 100%. The retained jurisdiction described in this paragraph may be exercised upon the request of any party made by filing a written request with the District asking that further consideration of the export be given by the District, and may also be exercised by the Board itself, by giving notice to all parties that further consideration of the export will be given by the District. Any written request filed by a party other than the District shall specify the terms and conditions that the person seeks to have the Board review and shall specify any modification to the terms and conditions the person seeks to have made. A notice given by the Board that the District will initiate additional review under this retained jurisdiction will state the reasons why the additional review is sought. The RRWCD shall have the opportunity to submit a response within 60 days. The Board shall hold a hearing and allow presentation of evidence before making a modification to the terms and conditions under this paragraph.

48. The approval of the export of ground water as provided in paragraph 46 shall also be subject to the retained jurisdiction of the Board to review the adequacy of the other terms and conditions set forth herein and the necessity for additional terms and conditions on the export, no earlier than five years after the first Pipeline project deliveries are made consistent with this approval and no more often than every five years thereafter. RRWCD shall give notice to the District within 60 days after the first deliveries are made so that the initial five year date can be determined with certainty. Any person seeking to invoke the retained jurisdiction of the Board described in this paragraph shall file a request in writing and shall specify the terms and conditions that the person seeks to have the Board review and shall specify any modification to the terms and conditions the person seeks to have made. The Board itself may also initiate additional review under this paragraph by giving the parties written notice that the District will initiate additional review and stating the reasons why the additional review is sought. The RRWCD shall have the opportunity to submit a response within 60 days. Any person other than the District requesting to invoke the retained jurisdiction shall have the burden to show why any modification to the terms and conditions is necessary if the RRWCD disagrees with the proposed modification. The Board shall hold a hearing and allow presentation of evidence before making a modification to the terms and conditions under this paragraph.

49. Subject to the terms and conditions and the retained jurisdiction provisions set forth herein, which the District thinks are matters for potential future consideration and resolution, this Decision is intended by the District to be a final decision on all of the matters currently pending in this proceeding. More specifically, the Commission should regard this Decision as final pursuant to Commission Rule 7.7.4.1.

Dated: March 12, 2012.

BY THE BOARD OF DIRECTORS

President

Table 3
Rights to Designated Groundwater

Field Number	Permit #1	Permit #2	Acreage in Change of Use Form	Colorado Groundwater Commission Historical Consumptive Use (ac-ft/yr)	Corrected Historical Consumptive Use (ac-ft/yr)	Maximum Annual Volume of Appropriation (ac-ft)	Groundwater Commission Preliminary Approval Date
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1-1	12967-FP	16920-FP	194	345	333	493	3/19/2008
1-2	14403-FP		181	279	279	458	12/12/2008
1-3	14019-FP		133	217	206	338	3/19/2008
1-4	14018-FP		164	252	234	418	3/19/2008
1-5	19372-FP		136	218	211	340	3/19/2008
1-6 and 1-7	18780-FP		127	192	192	345	3/19/2008
Subtotal			**935**	**1,502**	**1,455**	**2,392**	
2-1	14396-FP		130	192	180	325	3/19/2008
2-2	13858-FP		133	228	206	333	3/19/2008
2-3	13859-FP	16069-FP	188	270	260	473	3/19/2008
2-4	13857-FP		147	229	217	365	3/19/2008
2-5	14398-FP		144	240	230	360	3/19/2008
2-6	13856-FP	16067-FP	164	249	249	413	3/19/2008
Subtotal			**906**	**1,408**	**1,342**	**2,269**	
3-1	14397-FP		127	192	184	315	3/19/2008
3-2	14027-FP		153	251	237	385	3/19/2008
3-3	14022-FP		180	289	255	450	3/19/2008
3-4	14023-FP		133	219	197	333	3/19/2008
3-5	14600-FP		124	197	187	315	3/19/2008
3-6	15285-FP		98	161	140	243	3/19/2008
3-7	20896-FP		107	169	168	265	3/19/2008
Subtotal			**922**	**1,479**	**1,369**	**2,306**	
4-1	13513-FP	16074-FP	186	302	257	468	3/19/2008
4-2	14028-FP		146	218	202	365	3/19/2008
4-3	14753-FP		185	310	267	463	3/19/2008
4-4	13522-FP		135	204	189	343	3/19/2008
4-5	14024-FP		93	141	129	235	3/19/2008
4-6	13509-FP	16075-FP	179	284	273	448	3/19/2008
4-7	13511-FP		123	192	173	310	3/19/2008
4-8	18781-FP		128	216	206	320	3/19/2008
4-9	21476-FP		88	144	139	220	3/19/2008
5-1	18783-FP		173	273	273	400	3/19/2008
Subtotal			**1,437**	**2,285**	**2,108**	**3,572**	
6-0	19004-FP		82	141	141	700	12/12/2008
6-1	19005-FP		124	178	174	335	3/19/2008
6-2	18966-FP		94	172	172	900	3/19/2008
6-3	18018-FP		148	230	218	400	3/19/2008
6-4,6-5	18017-FP	19001-FP	245	361	353	800	3/19/2008
6-6, 6-7	23222-FP		148	230	230	200	12/12/2008
6-8	18019-FP		107	173	163	400	3/19/2008
6-9, 6-10	18014-FP		176	259	247	400	3/19/2008
6-11,12,13,14	18013-FP		250	350	350	400	3/19/2008
6-15, 6-16	18011-FP		244	431	421	900	3/19/2008
6-17, 6-18, 6-19	18015-FP		329	549	497	900	3/19/2008
6-20, 6-21	18012-FP	19000-FP	208	322	317	582	3/19/2008
Subtotal			**2,155**	**3,397**	**3,283**	**6,917**	
7-1	13813-FP	16923-FP	126	206	203	400	3/19/2008
7-2, 7-2A	13814-FP		219	334	323	480	3/19/2008
7-3, 7-3a	13815-FP		197	291	311	480	3/19/2008
7-13, 7-14	14718-FP		358	526	526	800	3/19/2008

EXHIBIT A – to
SHGWMD Export Decision

Appendix A

Field Number	Permit #1	Permit #2	Acreage in Change of Use Form	Colorado Groundwater Commission Historical Consumptive Use (ac-ft/yr)	Corrected Historical Consumptive Use (ac-ft/yr)	Maximum Annual Volume of Appropriation (ac-ft)	Groundwater Commission Preliminary Approval Date
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
7-15, 7-16	14121-FP		285	437	420	800	3/19/2008
7-17, 7-18	14719-FP		263	455	424	800	3/19/2008
7-19 [a]	14122-FP		131	215	204	400	3/19/2008
7-21, 7-21A	12589-FP		251	376	372	560	3/19/2008
Subtotal			**1,831**	**2,840**	**2,782**	**4,720**	
Wiley	4319-FP	4922-FP	65	75	75	125	12/12/2008
Wilder1	20198-FP		124	194	194	325	12/12/2008
Wilder2	20196-FP		163	249	249	450	12/12/2008
Subtotal			**352**	**518**	**518**	**900**	
Total Submitted for SGWMD Approval			**8,537**	**13,430**	**12,858**	**23,076**	

One Parcel that is not included with the SGMD Application but this Parcel is included in CGWC review and preliminary Approval and is shown here for Comparison Purposes. The well that irrigates this parcel is located in the Central Yuma Groundwater Management District.						
7-23	12567-FP	126	201	201	315	3/19/2008
Total with Parcel 7-23		**8,664**	**13,630**	**13,059**	**23,391**	

a) Permit allows for irrigation of parcels 7-19 and 7-20. Only the portion of permit historically

Explanation of Columns

(1) Field Number as shown on Figure 4.

(2) Final permit for the Northern High Plains Designated Ground Water Basin. See permit for well location, priority date, and other information, including any allowable commingling with other permits.

(3) Second permit associated with the permit shown in column 2. Typically, these are permits for additional acreage, but see permit for details.

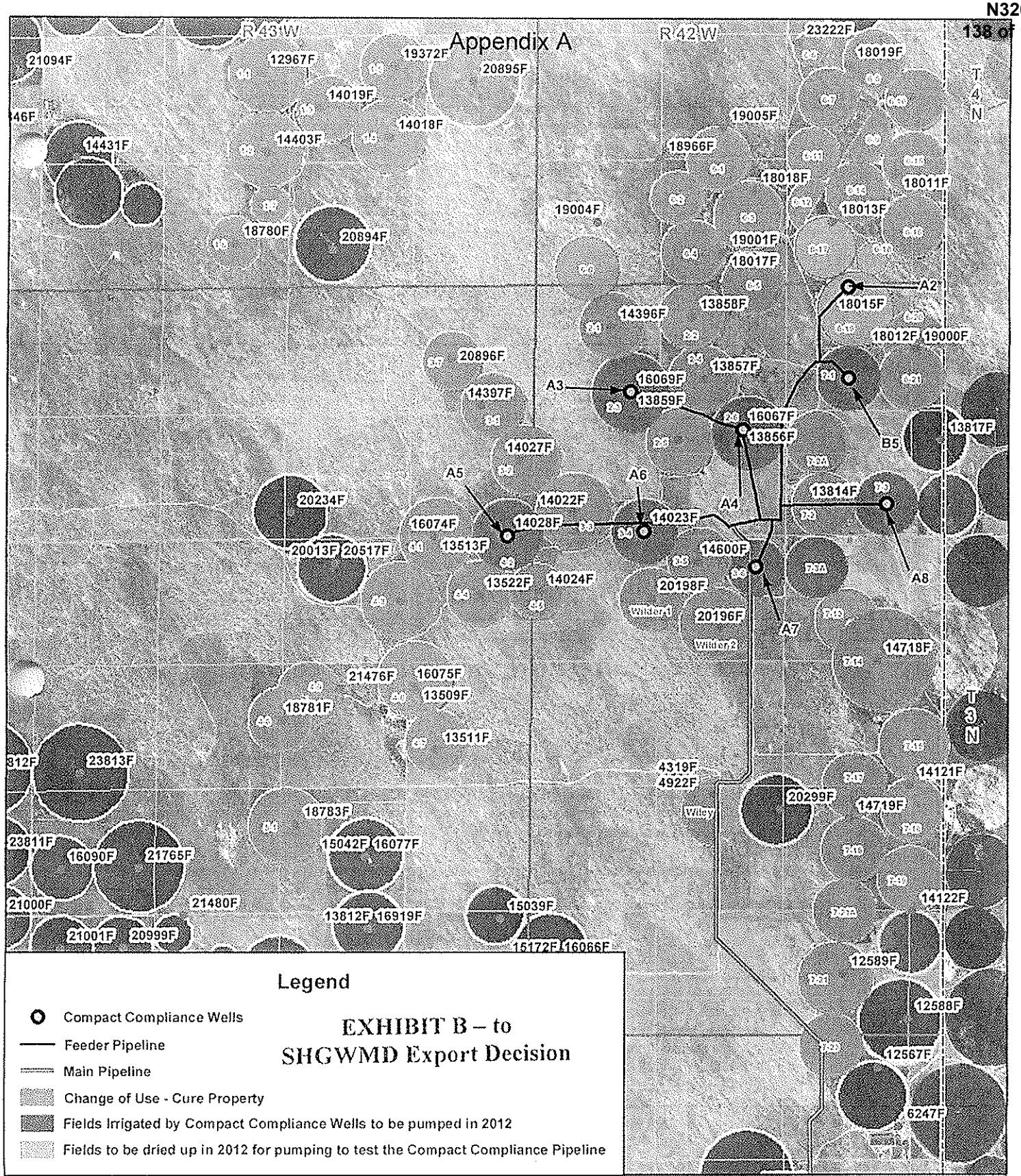
(4) Average acreage reported in change of use form submitted to the Colorado Groundwater Commission

(5) Historical consumptive use determined from irrigated acreage, crop records and power records. For permits in February 25, 2008 application the values are from the March 19, 2008 DWR Publication letter. For permits in October 22, 2008 submittal the values are from the December 8, 2008 DWR Publication letter.

(6) In April of 2008 Marc Groff, a consultant for the State of Nebraska, identified an error in the consumptive use calculations made in the February 25, 2008 submittal to the Colorado Groundwater Commission. This error was documented by the State of Colorado in a memorandum provided to the State of Nebraska and the State of Kansas entitled "Revisions to Crop Irrigation Requirement Use Estimates included in March 2008 RRCA Submittal for the Republican River Compact Compliance" dated May 18, 2008. This error was corrected and was not included in the October 22, 2008 submittal. The Consumptive Use values shown in Column 7 are the corrected February 25, 2008 values and the October 22, 2008

(7) Amount of annual permitted withdrawal determined from well permit. This information is used to set the water banking limitations by the Colorado Groundwater Commission.

Appendix A



Legend

- Compact Compliance Wells
- Feeder Pipeline
- Main Pipeline
- Change of Use - Cure Property
- Fields Irrigated by Compact Compliance Wells to be pumped in 2012
- Fields to be dried up in 2012 for pumping to test the Compact Compliance Pipeline

EXHIBIT B – to
SHGWMD Export Decision

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Miles

N W E S

Slattery & Hendrix Engineering LLC

Job No.	R1601
File:	Cure Farms Lease.mxd
Date:	12/23/11
Prepared For:	RRWCD

Figure 1

General Location Map
Cure Farms
Compact Compliance Wells

Data Sources:
County Digital Raster Graphics from USDA;
Irrigated Acreage from Slattery & Hendrix Engineering LLC

Appendix B

REPUBLICAN RIVER COMPACT ARBITRATION

COLORADO'S COMPACT COMPLIANCE PIPELINE ISSUE AND NEBRASKA'S CREDITING ISSUE

BEFORE MS. MARTHA PAGEL, ARBITRATOR

Pursuant to Section VII, Final Settlement Stipulation (December 15, 2002)

JOINT NOTICE OF STIPULATION

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Appendix B

The States of Colorado and Nebraska (the "Stipulating States") hereby notify the Arbitrator and the State of Kansas that the Stipulating States have resolved, as between the Stipulating States, all Issues presented in this Arbitration by both Nebraska and Colorado. In furtherance of the Stipulation, the States hereby inform the Arbitrator as follows:

1. Nebraska informs the Arbitrator that she supports Colorado's Compliance Pipeline (subject to the terms of the Stipulating States' agreement);
2. Nebraska withdraws the Additional Issues identified in her September 4, 2009 correspondence concerning the Colorado Compliance Pipeline (attached to the Colorado Compliance Pipeline Arbitration Agreement as Exhibit C);
3. Colorado informs the Arbitrator that she supports Nebraska's proposed resolution of the Nebraska Crediting Issue;
4. The States of Colorado and Nebraska have agreed to the following terms as part of the Stipulating States' agreement: Colorado and the RRWCD WAE shall deliver water to the North Fork of the Republican River to offset stream depletions in order to comply with Colorado's Compact Allocations as agreed upon by the two States not later than December 31 of the year preceding scheduled deliveries. Colorado and the RRWCD WAE together shall consult with Nebraska as needed to coordinate the timing and volume of deliveries to the North Fork of the Republican River. To the maximum extent possible, Colorado and the RRWCD WAE will make such deliveries per Nebraska's request consistent with the following delivery schedule:

Appendix B

a. For each year, except as provided in paragraph b, Colorado shall begin deliveries on January 1 and shall make the minimum annual delivery of 4,000 acre-feet provided for in the Colorado Resolution during the months of January through March. Colorado will calculate and provide notice of the Projected Delivery, as defined in the Colorado Resolution, to the Kansas and Nebraska RRCA Members by April 1 as provided in the Colorado Resolution. Unless Colorado determines by April 1 that it will not be able to deliver any remaining Projected Delivery in the months of October through December, Colorado shall stop deliveries at the end of March. If Colorado anticipates that deliveries in the months of November and December will not be sufficient for Compact compliance, Colorado shall maximize deliveries first in January, then sequentially in the months of February, March, and April. Only if there is reason to believe that additional deliveries in the months of October through December as described below in this paragraph will not be sufficient for Compact compliance will deliveries extend into the month of May. By September 1st, Colorado will gather provisional hydrologic data for the months of January through August of the year and shall estimate the amount of deliveries needed for Compact compliance for the remainder of the year after accounting for the deliveries earlier in the year. Colorado shall then maximize any

additional water deliveries first in the month of December, then sequentially in November, and October.

b. For the first year the Pipeline becomes operational, if the Pipeline becomes operational after January 1 and Colorado cannot make the minimum annual delivery of 4,000 acre-feet provided for in the Colorado Resolution during the months of January through March, Colorado and the RRWCD WAE together shall consult with Nebraska as needed to coordinate the timing and volume of deliveries to the North Fork of the Republican River and shall maximize deliveries prior to March 31 and in the months of October through December.

c. If the minimum annual delivery of 4,000 acre-feet provided for in the Colorado Resolution is modified by arbitrator's decision, RRCA action, or United States Supreme Court decision or by agreement of the States, the States agree to work together in good faith to agree upon a delivery schedule that, to the maximum extent possible, will make such deliveries per Nebraska's request consistent with the delivery schedule provided in paragraph a. In the event the States are unable to agree upon a delivery schedule pursuant to this Stipulation, and the dispute is not resolved, the States shall proceed in good faith to submit the dispute to mediation. Mediation is a process in which the parties meet with an impartial person who helps to resolve the dispute informally and confidentially. The parties to the dispute must agree

before any settlement is binding. The States will jointly appoint an acceptable mediator and will share equally in the cost of such mediation. The mediation, unless otherwise agreed, shall terminate in the event the dispute cannot be resolved within 30 calendar days of the date written notice requesting mediation is delivered by one State's RRCA Member to the other State's RRCA Member.

d. Unless otherwise requested by Nebraska, deliveries during the Irrigation Season, defined as being the months June through September, shall be avoided to the maximum extent possible and shall only be made as a last resort in order to satisfy the water deliveries called for under the Colorado Resolution; and,

5. The Stipulating States expressly reserve their right to prosecute their respective positions in this Arbitration to the fullest extent against all challenges by the State of Kansas, and nothing contained herein shall limit the Stipulating States' ability to defend any such challenge and participate in this Arbitration as set forth in Section VII of the Final Settlement Stipulation.

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Appendix B

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Exhibit 2

Republican River Compact Administration

ACCOUNTING PROCEDURES

AND

REPORTING REQUIREMENTS

Revised July 27, 2005

Updated November 7, 2008

Colorado Proposal
Updated April 5, 2013

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Table of Contents

I. Introduction 5
II. Definitions 5
III. Basic Formulas 10
A. Calculation of Annual Virgin Water Supply 11
1. Sub-basin calculation: 11
2. Main Stem Calculation: 12
3. Imported Water Supply Credit Calculation: 12
B. Calculation of Computed Water Supply 13
1. Flood Flows 13
C. Calculation of Annual Allocations 14
D. Calculation of Annual Computed Beneficial Consumptive Use 14
1. Groundwater 14
2. Surface Water 15
E. Calculation to Determine Compact Compliance Using Five-Year Running Averages 15
F. Calculations To Determine Colorado's and Kansas's Compliance with the Sub-basin Non-Impairment Requirement 16
G. Calculations To Determine Projected Water Supply 16
1. Procedures to Determine Water Short Years 16
2. Procedures to Determine 130,000 Acre Feet Projected Water Supply 17
H. Calculation of Computed Water Supply, Allocations and Computed Beneficial Consumptive Use Above and Below Guide Rock During Water-Short Administration Years 17
I. Calculation of Imported Water Supply Credits During Water-Short Year Administration Years. 18
1. Monthly Imported Water Supply Credits 18
2. Imported Water Supply Credits Above Harlan County Dam 19
3. Imported Water Supply Credits Between Harlan County Dam and Guide Rock During the Irrigation Season 19
4. Imported Water Supply Credits Between Harlan County Dam and Guide Rock During the Non-Irrigation Season 19
5. Other Credits 20
J. Calculations of Compact Compliance in Water-Short Year Administration Years 20
IV. Specific Formulas 21
A. Computed Beneficial Consumptive Use 21
1. Computed Beneficial Consumptive Use of Groundwater: 21
2. Computed Beneficial Consumptive Use of Surface Water: 21
a) Non-Federal Canals 21
b) Individual Surface Water Pumps 21
c) Federal Canals 22
d) Non-irrigation Uses 22
e) Evaporation from Federal Reservoirs 22
(1) Harlan County Lake, Evaporation Calculation 22
(2) Evaporation Computations for Bureau of Reclamation Reservoirs 24