Non-Binding Arbitration initiated March 21, 2013

pursuant to

Decree of May 19, 2003, 538 U.S. 720
Kansas v. Nebraska & Colorado
No. 126 Orig., U.S. Supreme Court

Report on the

Colorado Bonny Reservoir Accounting Proposal

Republican River Compact

Response to proposal prepared by State of Colorado, dated April 5, 2103

Prepared by

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Introduction

The purpose of this report is to present a response to the Colorado proposal for changing the accounting procedures to reflect future operations of Bonny Reservoir. The Colorado proposal is described in attachments to a letter dated April 5, 2013 from Dick Wolfe, Colorado Commissioner, RRCA to David Barfield and Brian Dunnigan, Kansas and Nebraska Commissioners, RRCA, respectively (Colorado DWR, 2013).

Background

Colorado has proposed changes to the RRCA accounting procedures to reflect new conditions associated with the operation of Bonny Reservoir. Under the proposal, accounting for the South Fork Subbasin would be done in three different ways depending on conditions in Bonny Reservoir. The three conditions are characterized as "Dry Bonny", "Small Bonny", and "Full Bonny". A so-called "Dry Bonny" condition is defined as a reservoir stage below an elevation of 3638.5 feet and presumably would not have any water in storage. A "Small Bonny" condition is defined as a reservoir elevation between 3638.5 feet and 3679.83 feet. The volume of stored water between these two extremes ranges from essentially zero at the low end to more than 54,500 acre-feet on the high end. A "Full Bonny" condition is defined as anything above the "Small Bonny" condition or more than 54,500 acre-feet of stored water.

Colorado proposes to adjust conditions used to represent Bonny Reservoir in the RRCA Groundwater Model based on which of the defined conditions fits the observed status of the reservoir under historical stream flow conditions. The status will be based on reservoir elevation data reported by the U. S. Bureau of Reclamation (USBR). The details of these adjustments are contained in the Colorado proposal and will not be repeated here.

As we understand Colorado's proposal, a "Dry Bonny" condition would assume no reservoir storage and no reservoir evaporation loss and would also assume that all inflows would pass through the reservoir structure without being re-regulated. This assumption would be made for both the historical or baseline run of the model with all State's pumping on and for the alternative model runs where one of the States pumping would be off. In other words, the presumption is that if inflows were passed downstream in the historical condition (not re-regulated), they would also pass downstream in the alternative condition in spite of higher inflows that might be occurring in the alternative model run.

The "Small Bonny" condition would assume that some water is being stored in the reservoir and that there would be some evaporation loss associated with the storage of water. The amount of evaporation loss will be computed based on the amount of water stored and the estimated surface area of the reservoir associated with that storage. Under the "Small Bonny" condition, the specification of conditions used to represent Bonny Reservoir in the RRCA Groundwater Model

will vary depending upon data obtained from the USBR. Some of these conditions are described in the proposal (Colorado DWR, 2013). The proposal does not describe how inflows to and outflows from the reservoir will be specified in the RRCA Groundwater Model under the "Small Bonny" condition.

Colorado has provided examples of how their proposal would be applied in the RRCA Groundwater Model under a "Dry Bonny" condition and under a "Full Bonny" condition. No examples have been provided to show how their proposal would be applied under a "Small Bonny" condition. Based on the deposition of Dr. Willem Schreuder taken on July 23, 2013, Kansas believes that under the "Small Bonny" condition, Colorado intends to treat the reservoir in the same fashion that it does under the "Full Bonny" condition except that the size of the reservoir footprint would be adjusted based on the reservoir stage information obtained from the USBR. Further, based on Dr. Schreuder's testimony, Kansas believes that, under the "Small Bonny" condition, inflows to the reservoir will not be routed downstream and that the inflow into the reach below the reservoir will be specified as the amount of flow from a toe drain located at the base of the reservoir. It is also presumed that the amount of inflow into the reach below the reservoir would be the same for both the historical or baseline run of the model with all State's pumping on and for the alternative model runs where one of the States pumping would be off. If Kansas understanding is correct, the "Small Bonny" condition would have the exact same specifications as the "Full Bonny" condition except for the size and water elevation specified for the reservoir and the amount of toe drain flow specified as inflow below the reservoir.

Calculation of Impacts with the Colorado Proposal

Colorado has provided to Kansas examples of how their proposal would be applied under a "Dry Bonny" condition and under a "Full Bonny" condition. The "Dry Bonny" condition has been referred to as a "No Bonny" condition in the materials provided by Colorado. The essence of this condition is the assumption that all inflows to the stream reach associated with Bonny Reservoir will be translated downstream as if the stream system were in the same condition that existed prior to the construction of Bonny Reservoir. As mentioned previously, Colorado did not provide examples of how a "Small Bonny" condition would be applied under their proposal. In 2011, Colorado did provide some examples of a "Small Bonny" scenario as part of discussions with Kansas. However, this scenario did not include the variations in reservoir conditions that are part of the current Colorado proposal.

A comparison of impacts calculated under the Colorado proposal for a "Dry Bonny" or "No Bonny" condition with impacts under a "Full Bonny" condition were provided by Colorado. The calculated impacts from pumping in Colorado, Kansas, and Nebraska are shown on Tables 1 through 3, respectively. The impacts shown on these tables represent calculations over a 40-year study period from 2010 to 2049. Hydrologic conditions from the historical period from 2000 to 2009 were repeated four times to create the assumed conditions for the 40-year study period.

The impacts shown on the tables are the computed beneficial consumptive use for groundwater (CBCUg) associated with pumping in each State at each of the different accounting points. Results such as these are used to determine total CBCUg for each State and to determine the computed water supply that is part of the water allocated to each State under the compact and the FSS.

Tables 1 through 3 show three columns under each accounting point; the impacts with Bonny Reservoir or "Full Bonny" (designated as WB), the impacts without Bonny Reservoir or "Dry Bonny" (designated as NB), and the difference between the two impacts (designated Del). The far right hand set of columns provides the total impact for each year of the study period and the last line of each table shows the average impacts over the 40-year study period.

The results compiled on Tables 1 through 3 show that the difference between a "Full Bonny" condition (WB) and a "Dry Bonny" condition (NB) under the Colorado proposal is significant. For Colorado, the "Dry Bonny" condition would reduce CBCUg by an average of over 8,500 acre feet per year over the study period from what it would be under the "Full Bonny" condition (Table 1). Similarly, for Kansas, the "Dry Bonny" condition would reduce Kansas' CBCUg by an average of over 2,400 acre feet per year (Table 2). For Nebraska, the "Dry Bonny" condition would create a relatively small difference from the "Full Bonny" condition, a reduction of about 250 acre feet per year on average (Table 3). The nature of the significant differences under the "Dry Bonny" condition is discussed further below.

Impact of the Colorado Proposal on Calculations of CBCUg without Bonny Reservoir

As shown on Tables 1 through 3, almost all of the differences in CBCUg between the two conditions are under the South Fork accounting point column and the Bonny (Reservoir) column. The reduction in CBCUg under the "Dry Bonny" condition is related principally to two factors, the elimination of the reservoir conditions to represent Bonny Reservoir and the passing of inflows originating above the reservoir into downstream reaches.

The first factor (elimination of the reservoir) accounts for about 3,100 acre feet per year of the total average reduction in Colorado CBCUg. When Bonny Reservoir is included, the CBCUg for Colorado associated with the reservoir averages about 1,700 acre feet per year (Table 1). This CBCUg is associated with depletions from the reservoir water body associated with Colorado pumping.

When the reservoir is not included in the model, the stream reach that constitutes the reservoir is considered to be as it was prior the reservoir. Under this condition, model calculations show that more stream water is lost from this reach when there is no pumping in Colorado than when there is pumping in Colorado (the historical condition). This is due to the fact, that when Colorado pumping is on, inflows to the reservoir are totally depleted for many of the years in the study period. When there is no inflow, there is no loss of water in the reservoir stream reach. When

Colorado pumping is off, inflows to the reservoir are significant and relatively continuous and some of the flow is lost in the reservoir stream reach. The difference between the two results produces a negative impact in the CBCUg calculations as shown on Table 1. This negative impact averages about 1,400 acre feet per year over the study period. As a result, the total effect of removing the reservoir is to change from a positive impact of 1,700 acre feet per year on average to a negative impact of 1,400 acre feet per year for a total change of about 3,100 acre feet per year.

The remainder of the reduction in Colorado CBCUg (about 5,600 acre feet per year on average) is related to losses in other portions of the South Fork stream network associated with passing inflows originating above the reservoir into downstream reaches. Table 4 has been compiled to illustrate how losses in the different downstream reaches impact calculations of CBCUg.

Table 4 shows the calculated differences in stream base flow associated with pumping in Colorado at seven different points along the South Fork stream network. These calculations are the calculated CBCUg for Colorado pumping at the different points along the South Fork strem network. The columns in left to right order are: 1) South Fork above Bonny, 2) Landsman Creek tributary, 3) South Fork above Bonny Reservoir, 4) South Fork at Bonny Reservoir outlet, 5) South Fork below Bonny Reservoir, 6) South Fork at Colorado-Kansas State line, and 7) South Fork at the confluence with the Republican River. In subsequent columns, the differences in CBCUg across each of five reaches are tabulated. The first reach is from the combination of points 1 and 2 above to point 3. The next three reaches are; point 3 to point 4, point 4 to point 5, point 5 to point 6, and point 6 to point 7.

As shown on Table 4, the differences in CBCUg for the reaches below the combination of the South Fork above Bonny and Landsman Creek tributary are almost all negative. This means that the CBCUg for Colorado above Bonny Reservoir is progressively reduced as one moves down the stream network to the confluence with the Republican River. This reduction in CBCUg is a result of the same process that was discussed above for the Bonny Reservoir reach. Losses are greater when Colorado does not pump and more base flow is in the stream network than when Colorado is pumping and little or no base flow is in the stream network.

Some of the reduction in Colorado CBCUg occurs above the Colorado-Kansas State line (about 2,700 acre feet per year on average) and some occurs between the State line and the confluence (about 3,200 acre feet per year on average). At the State line, the Colorado CBCUg averages about 8,600 acre feet per year over the study period. At the confluence with the Republican River, the Colorado CBCUg averages about 5,400 acre feet per year.

Reductions in CBCUg and Unallocated Residuals

The reductions in CBCUg discussed above are largely related to calculations of dry stream conditions in the RRCA Groundwater Model. When dry stream conditions are calculated in the

historical run of the model, no losses of base flow will occur. When one of the States' pumping is removed and the stream is calculated to have base flow, losses can occur that do not occur in the historical run of the model where pumping for all of States is included. These conditions can result in the calculation of a negative impact (negative CBCUg). As dry stream conditions become more extensive in the RRCA Groundwater Model, there is generally an increasing departure between the sum of the individual impacts (CBCUg) calculated for each State and the total impact that would be calculated if the pumping in all of the States were considered simultaneously. These departures represent a residual CBCUg that is not allocated under the calculation procedures outlined in the FSS. The departures are the result of non-linear behavior of the RRCA Groundwater Model which results in a situation where the sum of the individual impacts does not necessarily equal the whole.

In the case of the "Dry Bonny" condition under the Colorado proposal, the departures or unallocated depletions or CBCUg for the South Fork stream network described above are larger than when a "Full Bonny" condition is assumed. Under the "Dry Bonny" condition, the sum of the impacts for the South Fork stream network (including the Bonny reach) are about 3,800 acre feet per year less on average than the total impact over the 40-year study period used by Colorado. Under the "Full Bonny" condition, the comparable result for the South Fork stream network including Bonny Reservoir is about 700 acre feet per year less on average. These results demonstrate that under a "Dry Bonny" condition, unallocated depletions or residual CBCUg would be much more significant than under a "Full Bonny" condition.

Summary

The results described above provide some demonstration of how the Colorado proposal will impact calculations of CBCUg. Changing representation of Bonny Reservoir in the RRCA Groundwater Model from its current representation as a reservoir to its pre-reservoir condition as just another part of the South Fork stream network produces significant changes in the calculations of CBCUg. In particular, reductions in CBCUg caused by dry stream conditions along the South Fork stream network become significant both above and below the Colorado-Kansas State line when Bonny Reservoir is assumed to be in the "Dry Bonny" condition. Unallocated residual CBCUg for the South Fork stream network are also greater under the "Dry Bonny" condition.

Qualifications

This report was prepared by Steven P. Larson with assistance from Dr. Samuel P. Perkins and Dr. Alexandros Spiliotopoulos. I am a principal and the Executive Vice President of S.S. Papadopulos & Associates, Inc. (SSP&A), a firm that provides consulting services related to environmental and water-resource issues. My area of expertise is hydrology, with emphasis on groundwater hydrology.

I hold a Bachelor of Science in Civil Engineering from the University of Minnesota, conferred in 1969, and a Master of Science in Civil Engineering, also from the University of Minnesota, conferred in 1971. I am a member of the Association of Ground Water Scientists and Engineers (a division of the National Ground Water Association) and the American Institute of Hydrology. I am also certified as a Professional Hydrologist/Ground Water with the American Institute of Hydrology.

Prior to joining SSP&A in 1980, I was employed as a hydrologist with the Water Resources Division of the U.S. Geological Survey (USGS) for almost 9 years. During my tenure with the USGS, I conducted numerous hydrological studies on a variety of groundwater and surface water problems and conducted research into the development of mathematical models to simulate groundwater flow processes. This work included working on the project that ultimately led to the development of the program, MODFLOW, which was the program used to construct the RRCA Groundwater Model. I have spent the last 33 years with SSP&A conducting and managing projects related to a variety of environmental and water-resource issues. During my tenure at SSP&A, I have been involved in numerous projects covering a wide spectrum of technical, environmental, and legal issues including environmental impact evaluations, evaluations of water-resource development, water-rights permitting and adjudication, remedial investigations at CERCLA and other waste-disposal sites, feasibility studies, engineering evaluations/cost analyses, and remedial action plans.

I have also testified as an expert in numerous legal and administrative forums. These cases have included permit and licensing hearings, water-rights adjudications, arbitration hearings, interstate compact claims, toxic torts, liability claims, various legal actions under CERCLA, property damage claims, and insurance claims.

As part of my work for the State of Kansas on issues related to the Republican River, I served as an expert on modeling regarding development of the RRCA Groundwater Model. Further, I was a member of the Modeling Committee on behalf of the State of Kansas that was charged with development of the groundwater model. In that capacity, I actively participated in the technical efforts by the three states in development, calibration, and operation of the RRCA Groundwater Model. As a result of that work, I am very familiar with the groundwater Model, its structure, its capabilities, and the manner in which it is applied for use in the RRCA Accounting Procedures.

References

Colorado Depart of Water Resources (Colorado DWR). 2013. Resolution by the Republican River Compact Administration regarding modifications to the accounting procedures to reflect future operations of Bonny Dam and Reservoir. April 5, 2013.

Tables

Table 1. Colorado Pumping Impacts - NB=No Bonny, WB=With Bonny (acre-feet)

Year	Arikaree			Beaver			Buffalo			Driftwood			Frenchman			North Fork			Above Swanson			Swanson - Harlan			Harlan - Guide Rock			Guide Rock - Hardy			Medicine			Prairie Dog			Red Willow		
	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del
2010	1248	1248	0	0	0	0	386	386	0	0	0	0	1688	1688	0	16015	16016	1	-5268	-5284	-16	0	11	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2011	1754	1754	0	0	0	0	318	318	0	0	0	0	120	120	0	16297	16297	0	-5631	-5632	-1	-13	-13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2012	580	580	0	0	0	0	192	192	0	0	0	0	100	100	0	16251	16251	0	-6747	-6737	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2013	347	347	0	0	0	0	173	173	0	0	0	0	87	87	0	16673	16673	0	-1105	-1044	61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2014	414	414	0	0	0	0	200	200	0	0	0	0	84	85	1	16983	16983	0	-889	-821	68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2015	1022	1022	0	0	0	0	216	216	0	0	0	0	85	85	0	16996	16996	0	-2372	-2257	115	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2016	1268	1268	0	0	0	0	228	228	0	0	0	0	87	87	0	16953	16953	0	-3890	-3795	95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2017	1300	1300	0	0	0	0	244	244	0	0	0	0	92	93	1	17380	17380	0	-2507	-2307	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2018	1703	1703	0	0	0	0	281	281	0	0	0	0	96	96	0	17646	17646	0	-2888	-2687	201	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2019	4450	4450	0	0	0	0	409	409	0	0	0	0	106	105	-1	18542	18542	0	-1764	-1739	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2020	1552	1552	0	0	0	0	373	373	0	0	0	0	117	118	1	18593	18593	0	-7114	-6686	428	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2021	1877	1877	0	0	0	0	265	265	0	0	0	0	115	115	0	18867	18867	0	-6355	-6248	107	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2022	662	662	0	0	0	0	240	240	0	0	0	0	118	118	0	18751	18751	0	-7145	-7086	59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2023	417	417	0	0	0	0	226	226	0	0	0	0	126	126	0	19188	19188	0	-2669	-2557	112	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2024	477	477	0	0	0	0	247	247	0	0	0	0	136	136	0	19502	19502	0	-796	-704	92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2025	1158	1158	0	0	0	0	279	279	0	0	0	0	143	143	0	19560	19560	0	-2578	-2460	118	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2026	1363	1363	0	0	0	0	284	284	0	0	0	0	151	151	0	19423	19423	0	-4908	-4787	121	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2027	1411	1411	0	0	0	0	314	314	0	0	0	0	162	161	-1	19907	19907	0	-2909	-2715	194	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2028	1822	1822	0	0	0	0	360	360	0	0	0	0	171	170	-1	20181	20181	0	-3364	-3171	193	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2029	4783	4783	0	0	0	0	385	385	0	0	0	0	180	180	0	21095	21095	0	-1865	-1825	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2030	1962	1962	0	0	0	0	358	358	0	0	0	0	191	191	0	21057	21057	0	-9256	-8818	438	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2031	1979	1979	0	0	0	0	322	322	0	0	0	0	196	196	0	21326	21326	0	-6806	-6660	146	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2032	730	730	0	0	0	0	306	306	0	0	0	0	188	188	0	21158	21158	0	-7735	-7668	67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2033	480	480	0	0	0	0	321	321	0	0	0	0	145	145	0	21603	21603	0	-5314	-5238	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2034	544	544	0	0	0	0	334	334	0	0	0	0	106	106	0	21938	21938	0	-1060	-949	111	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2035	1273	1273	0	0	0	0	347	347	0	0	0	0	118	118	0	21996	21996	0	-2436	-2319	117	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2036	1442	1442	0	0	0	0	353	353	0	0	0	0	114	114	0	21797	21797	0	-6024	-5944	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2037	1509	1509	0	0	0	0	371	371	0	0	0	0	131	131	0	22308	22308	0	-3049	-2857	192	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2038	1930	1930	0	0	0	0	410	410	0	0	0	0	167	167	0	22591	22591	0	-3896	-3715	181	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2039	5047	5047	0	0	0	0	461	461	0	0	0	0	387	387	0	23500	23500	0	-1847	-1808	39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2040	2462	2462	0	0	0	0	439	439	0	0	0	0	306	306	0	23399	23399	0	-11284	-10911	373	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2041	2070	2070	0	0	0	0	404	404	0	0	0	0	203	203	0	23666	23666	0	-7302	-7112	190	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2042	790	790	0	0	0	0	354	354	0	0	0	0	146	146	0	23457	23457	0	-8804	-8735	69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2043	537	537	0	0	0	0	317	317	0	0	0	0	155	155	0	23911	23911	0	-9294	-9194	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2044	605	605	0	0	0	0	389	389	0	0	0	0	147	147	0	24249	24249	0	-2628	-2562	66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2045	1377	1377	0	0	0	0	473	473	0	0	0	0	157	157	0	24305	24305	0	-1887	-1730	157	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2046	1513	1513	0	0	0	0	435	435	0	0	0	0	157	157	0	24061	24061	0	-7361	-7294	67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2047	1596	1596	0	0	0	0	488	488	0	0	0	0	171	171	0	24590	24590	0	-3000	-2823	177	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2048	2027	2027	0	0	0	0	496	496	0	0	0	0	178	178	0	24879	24879	0	-4353	-4186	167	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2049	5195	5195	0	0	0	0	522	522	0	0	0	0	188	189	1	25776	25776	0	-1545	-1513	32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2010 2049	**1616**	**1616**	**0**	**0**	**0**	**0**	**338**	**338**	**0**	**0**	**0**	**0**	**187**	**187**	**0**	**20659**	**20659**	**0**	**-4441**	**-4314**	**127**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Year	Sappa			South Fork			Hugh Butler			Bonny			Keith Sebelius			Enders			Harlan			Harry Strunk			Swanson			Mainstem			Total		
	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del
2010	0	0	0	9567	4820	-4747	0	0	0	1305	-619	-1924	0	0	0	0	0	0	0	0	0	0	0	0	11	11	0	-5260	-5272	-12	25051	18368	-6683
2011	0	0	0	11076	4296	-6780	0	0	0	1365	-1082	-2447	0	0	0	0	0	0	0	0	0	0	0	0	12	12	0	-5644	-5645	-1	25394	16167	-9227
2012	0	0	0	9211	4106	-5105	0	0	0	1417	-1203	-2620	0	0	0	0	0	0	0	0	0	0	0	0	14	15	1	-6753	-6744	9	21120	13404	-7716
2013	0	0	0	10693	3798	-6895	0	0	0	1480	-1570	-3050	0	0	0	0	0	0	0	0	0	0	0	0	25	26	1	-1107	-1045	62	28463	18581	-9882
2014	0	0	0	11337	4189	-7148	0	0	0	1500	-1837	-3337	0	0	0	0	0	0	0	0	0	0	0	0	25	26	1	-890	-822	68	29723	19307	-10416
2015	0	0	0	14308	7363	-6945	0	0	0	1433	-1722	-3155	0	0	0	0	0	0	0	0	0	0	0	0	16	17	1	-2372	-2258	114	31777	21792	-9985
2016	0	0	0	11051	7083	-3968	0	0	0	1430	-1225	-2655	0	0	0	11	11	0	0	0	0	0	0	0	17	18	1	-3890	-3796	94	27222	20694	-6528
2017	0	0	0	11878	7584	-4294	0	0	0	1448	-1036	-2484	0	0	0	12	12	0	0	0	0	0	0	0	19	20	1	-2509	-2310	199	29935	23358	-6577
2018	0	0	0	14036	9057	-4979	0	0	0	1449	-2016	-3465	0	0	0	12	12	0	0	0	0	0	0	0	17	18	1	-2891	-2690	201	32426	24184	-8242
2019	0	0	0	17665	15614	-2051	0	0	0	1381	-927	-2308	0	0	0	13	13	0	0	0	0	0	0	0	14	16	2	-1770	-1745	25	40892	36559	-4333
2020	0	0	0	10456	9609	-847	0	0	0	1466	-581	-2047	0	0	0	14	14	0	0	0	0	0	0	0	14	16	2	-7117	-6685	432	25555	23095	-2460
2021	0	0	0	11757	4668	-7089	0	0	0	1538	-1074	-2612	0	0	0	15	15	0	0	0	0	0	0	0	16	17	1	-6356	-6248	108	28188	18595	-9593
2022	0	0	0	8956	3881	-5075	0	0	0	1584	-1172	-2756	0	0	0	16	16	0	0	0	0	0	0	0	20	20	0	-7145	-7087	58	23304	15531	-7773
2023	0	0	0	10661	3607	-7054	0	0	0	1646	-1542	-3188	0	0	0	17	17	0	0	0	0	0	0	0	33	33	0	-2669	-2557	112	29753	19625	-10128
2024	0	0	0	11217	4018	-7199	0	0	0	1666	-1874	-3540	0	0	0	19	19	0	0	0	0	0	0	0	31	32	1	-797	-706	91	32603	21956	-10647
2025	0	0	0	14725	7098	-7627	0	0	0	1597	-1757	-3354	0	0	0	20	20	0	0	0	0	0	0	0	23	23	0	-2580	-2461	119	35034	24171	-10863
2026	0	0	0	11456	6909	-4547	0	0	0	1593	-1246	-2839	0	0	0	21	21	0	0	0	0	0	0	0	22	23	1	-4909	-4788	121	29516	22252	-7264
2027	0	0	0	12183	7356	-4827	0	0	0	1611	-1065	-2676	0	0	0	22	22	0	0	0	0	0	0	0	23	24	1	-2912	-2717	195	32840	25533	-7307
2028	0	0	0	14298	8836	-5462	0	0	0	1611	-2076	-3687	0	0	0	24	24	0	0	0	0	0	0	0	21	23	2	-3366	-3173	193	35247	26293	-8954
2029	0	0	0	20248	16510	-3738	0	0	0	1566	-1626	-3192	0	0	0	25	25	0	0	0	0	0	0	0	18	20	2	-1868	-1828	40	46564	39675	-6889
2030	0	0	0	11292	11501	209	0	0	0	1625	-667	-2292	0	0	0	27	27	0	0	0	0	0	0	0	15	19	4	-9262	-8824	438	27405	25764	-1641
2031	0	0	0	11910	4497	-7413	0	0	0	1697	-1125	-2822	0	0	0	29	29	0	0	0	0	0	0	0	21	22	1	-6808	-6662	146	30818	20731	-10087
2032	0	0	0	8908	3727	-5181	0	0	0	1743	-1219	-2962	0	0	0	31	31	0	0	0	0	0	0	0	28	29	1	-7737	-7670	67	25509	17434	-8075
2033	0	0	0	10836	3477	-7359	0	0	0	1806	-1575	-3381	0	0	0	32	32	0	0	0	0	0	0	0	53	54	1	-5314	-5238	76	30122	19461	-10661
2034	0	0	0	11254	3945	-7309	0	0	0	1826	-1942	-3768	0	0	0	34	34	0	0	0	0	0	0	0	49	49	0	-1064	-953	111	35178	24213	-10965
2035	0	0	0	14467	6884	-7583	0	0	0	1756	-1859	-3615	0	0	0	37	37	0	0	0	0	0	0	0	34	35	1	-2438	-2322	116	37745	26665	-11080
2036	0	0	0	12107	6755	-5352	0	0	0	1749	-1286	-3035	0	0	0	39	39	0	0	0	0	0	0	0	31	32	1	-6027	-5947	80	31764	23457	-8307
2037	0	0	0	12456	7177	-5279	0	0	0	1767	-1121	-2888	0	0	0	42	42	0	0	0	0	0	0	0	31	32	1	-3055	-2863	192	35726	27754	-7972
2038	0	0	0	14557	8650	-5907	0	0	0	1767	-2154	-3921	0	0	0	45	45	0	0	0	0	0	0	0	27	29	2	-3900	-3720	180	37766	28119	-9647
2039	0	0	0	21569	16668	-4901	0	0	0	1727	-1702	-3429	0	0	0	48	48	0	0	0	0	0	0	0	24	26	2	-1852	-1813	39	51086	42800	-8286
2040	0	0	0	12219	11721	-498	0	0	0	1781	-769	-2550	0	0	0	51	51	0	0	0	0	0	0	0	20	22	2	-11287	-10914	373	29574	26902	-2672
2041	0	0	0	12057	4345	-7712	0	0	0	1848	-1189	-3037	0	0	0	54	54	0	0	0	0	0	0	0	27	29	2	-7306	-7116	190	33221	22663	-10558
2042	0	0	0	9059	3583	-5476	0	0	0	1895	-1250	-3145	0	0	0	57	57	0	0	0	0	0	0	0	39	41	2	-8807	-8738	69	27193	18643	-8550
2043	0	0	0	10994	3362	-7632	0	0	0	1958	-1598	-3556	0	0	0	60	60	0	0	0	0	0	0	0	58	60	2	-9293	-9193	100	28887	17801	-11086
2044	0	0	0	11470	3911	-7559	0	0	0	1979	-1981	-3960	0	0	0	63	63	0	0	0	0	0	0	0	74	75	1	-2628	-2562	66	36520	25068	-11452
2045	0	0	0	14162	6724	-7438	0	0	0	1907	-1964	-3871	0	0	0	67	67	0	0	0	0	0	0	0	52	53	1	-1897	-1739	158	40782	29631	-11151
2046	0	0	0	12201	6611	-5590	0	0	0	1899	-1334	-3233	0	0	0	70	70	0	0	0	0	0	0	0	40	41	1	-7366	-7299	67	33168	24414	-8754
2047	0	0	0	12874	7046	-5828	0	0	0	1916	-1181	-3097	0	0	0	74	74	0	0	0	0	0	0	0	40	40	0	-3010	-2833	177	38904	30157	-8747
2048	0	0	0	14848	8480	-6368	0	0	0	1916	-2237	-4153	0	0	0	77	77	0	0	0	0	0	0	0	33	34	1	-4361	-4194	167	40274	29922	-10352
2049	0	0	0	21911	16393	-5518	0	0	0	1874	-1744	-3618	0	0	0	81	81	0	0	0	0	0	0	0	30	33	3	-1554	-1523	31	54259	45156	-9103
2010 2049	**0**	**0**	**0**	**12698**	**7146**	**-5552**	**0**	**0**	**0**	**1663**	**-1428**	**-3091**	**0**	**0**	**0**	**31**	**31**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**27**	**29**	**2**	**-4444**	**-4317**	**127**	**32912**	**24397**	**-8515**

Table 2. Kansas Pumping Impacts - NB=No Bonny, WB=With Bonny (acre-feet)

Year	Arikaree			Beaver			Buffalo			Driftwood			Frenchman			North Fork			Above Swanson			Swanson - Harlan			Harlan - Guide Rock		
	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del
2010	68	68	0	6893	6893	0	0	0	0	0	0	0	0	0	0	0	0	0	-199	18	217	-1173	-1173	0	0	0	0
2011	157	157	0	5972	5972	0	0	0	0	0	0	0	0	0	0	0	0	0	13	212	199	48	48	0	0	0	0
2012	100	100	0	2807	2807	0	0	0	0	0	0	0	0	0	0	0	0	0	421	137	-284	344	344	0	0	0	0
2013	92	92	0	897	897	0	0	0	0	0	0	0	0	0	0	0	0	0	-317	88	405	-235	-235	0	0	0	0
2014	105	105	0	784	784	0	0	0	0	0	0	0	0	0	0	0	0	0	388	241	-147	0	0	0	0	0	0
2015	107	107	0	2143	2143	0	0	0	0	0	0	0	0	0	0	0	0	0	110	198	88	-34	-34	0	0	0	0
2016	77	77	0	3453	3453	0	0	0	0	0	0	0	0	0	0	0	0	0	244	296	52	-394	-394	0	0	0	0
2017	91	91	0	5503	5503	0	0	0	0	0	0	0	0	0	0	0	0	0	195	344	149	382	382	0	0	0	0
2018	86	86	0	7574	7574	0	0	0	0	0	0	0	0	0	0	0	0	0	146	313	167	154	154	0	0	0	0
2019	148	148	0	7925	7925	0	0	0	0	0	0	0	0	0	0	0	0	0	262	299	37	82	82	0	0	0	0
2020	63	63	0	7010	7010	0	0	0	0	0	0	0	0	0	0	0	0	0	-449	80	529	-1578	-1578	0	12	12	0
2021	153	153	0	6074	6074	0	0	0	0	0	0	0	0	0	0	0	0	0	299	335	36	63	62	-1	0	0	0
2022	98	98	0	2849	2849	0	0	0	0	0	0	0	0	0	0	0	0	0	194	136	-58	542	542	0	0	0	0
2023	90	90	0	916	916	0	0	0	0	0	0	0	0	0	0	0	0	0	-448	62	510	-276	-276	0	0	0	0
2024	100	100	0	803	803	0	0	0	0	0	0	0	0	0	0	0	0	0	216	176	-40	0	0	0	0	0	0
2025	106	106	0	2155	2155	0	0	0	0	0	0	0	0	0	0	0	0	0	177	243	66	-557	-557	0	0	0	0
2026	75	75	0	3460	3460	0	0	0	0	0	0	0	0	0	0	0	0	0	157	321	164	-1066	-1066	0	0	0	0
2027	90	90	0	5503	5503	0	0	0	0	0	0	0	0	0	0	0	0	0	223	348	125	792	793	1	0	0	0
2028	85	85	0	7537	7537	0	0	0	0	0	0	0	0	0	0	0	0	0	179	295	116	191	191	0	0	0	0
2029	148	148	0	8300	8300	0	0	0	0	0	0	0	0	0	0	0	0	0	186	254	68	81	81	0	0	0	0
2030	60	60	0	7206	7206	0	0	0	0	0	0	0	0	0	0	0	0	0	-447	205	652	-1700	-1700	0	13	13	0
2031	152	152	0	6134	6134	0	0	0	0	0	0	0	0	0	0	0	0	0	275	253	-22	-71	-71	0	10	11	1
2032	96	96	0	2834	2834	0	0	0	0	0	0	0	0	0	0	0	0	0	22	130	108	623	623	0	0	0	0
2033	86	86	0	907	907	0	0	0	0	0	0	0	0	0	0	0	0	0	-1633	-793	840	-274	-274	0	0	0	0
2034	96	96	0	789	789	0	0	0	0	0	0	0	0	0	0	0	0	0	213	392	179	0	0	0	0	0	0
2035	107	107	0	2138	2138	0	0	0	0	0	0	0	0	0	0	0	0	0	266	254	-12	-622	-622	0	10	0	-10
2036	73	73	0	3440	3440	0	0	0	0	0	0	0	0	0	0	0	0	0	126	291	165	-2223	-2223	0	10	10	0
2037	90	90	0	5484	5484	0	0	0	0	0	0	0	0	0	0	0	0	0	463	429	-34	1334	1333	-1	0	0	0
2038	85	85	0	7506	7506	0	0	0	0	0	0	0	0	0	0	0	0	0	77	258	181	253	253	0	0	0	0
2039	148	148	0	8579	8579	0	0	0	0	0	0	0	0	0	0	0	0	0	157	242	85	70	70	0	10	10	0
2040	56	56	0	7374	7374	0	0	0	0	0	0	0	0	0	0	0	0	0	-305	255	560	-1769	-1769	0	14	14	0
2041	154	154	0	6142	6142	0	0	0	0	0	0	0	0	0	0	0	0	0	232	195	-37	-199	-199	0	11	11	0
2042	93	93	0	2821	2821	0	0	0	0	0	0	0	0	0	0	0	0	0	-484	-113	371	651	651	0	0	0	0
2043	83	83	0	899	899	0	0	0	0	0	0	0	0	0	0	0	0	0	-3699	-827	2872	-273	-273	0	10	10	0
2044	93	93	0	776	776	0	0	0	0	0	0	0	0	0	0	0	0	0	-581	-533	48	0	0	0	0	0	0
2045	107	107	0	2123	2123	0	0	0	0	0	0	0	0	0	0	0	0	0	511	282	-229	-668	-668	0	10	10	0
2046	72	72	0	3429	3429	0	0	0	0	0	0	0	0	0	0	0	0	0	-124	257	381	-2442	-2443	-1	11	10	-1
2047	89	89	0	5473	5473	0	0	0	0	0	0	0	0	0	0	0	0	0	792	568	-224	1411	1411	0	0	0	0
2048	86	86	0	7479	7479	0	0	0	0	0	0	0	0	0	0	0	0	0	-20	216	236	369	369	0	0	0	0
2049	149	149	0	8816	8816	0	0	0	0	0	0	0	0	0	0	0	0	0	333	259	-74	71	71	0	11	11	0
2010 2049	**100**	**100**	**0**	**4472**	**4472**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**-45**	**165**	**210**	**-202**	**-202**	**0**	**3**	**3**	**0**

Year	Guide Rock - Hardy			Medicine			Prairie Dog			Red Willow			Rock			Sappa			South Fork			Hugh Butler			Bonny		
	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del
2010	245	245	0	0	0	0	3513	3513	0	0	0	0	0	0	0	2482	2482	0	2343	1810	-533	0	0	0	10	0	-10
2011	44	44	0	0	0	0	5026	5026	0	0	0	0	0	0	0	1540	1540	0	7155	3213	-3942	0	0	0	11	0	-11
2012	54	54	0	0	0	0	3139	3139	0	0	0	0	0	0	0	266	266	0	4672	1578	-3094	0	0	0	12	0	-12
2013	56	56	0	0	0	0	1690	1690	0	0	0	0	0	0	0	-661	-661	0	4911	1189	-3722	0	0	0	13	0	-13
2014	69	69	0	0	0	0	1873	1873	0	0	0	0	0	0	0	-784	-784	0	5441	1858	-3583	0	0	0	14	0	-14
2015	63	62	-1	0	0	0	5841	5841	0	0	0	0	0	0	0	-1700	-1700	0	7814	3951	-3863	0	0	0	14	0	-14
2016	53	53	0	0	0	0	5564	5564	0	0	0	0	0	0	0	-1038	-1038	0	4631	2911	-1720	0	0	0	15	0	-15
2017	68	68	0	0	0	0	5816	5816	0	0	0	0	0	0	0	820	820	0	5733	3505	-2228	0	0	0	16	0	-16
2018	41	41	0	0	0	0	12547	12547	0	0	0	0	0	0	0	3471	3471	0	6006	3932	-2074	0	0	0	18	0	-18
2019	54	54	0	0	0	0	10357	10357	0	0	0	0	0	0	0	4056	4056	0	8187	8004	-183	0	0	0	19	0	-19
2020	245	245	0	0	0	0	3776	3776	0	0	0	0	0	0	0	2529	2529	0	2320	3654	1334	0	0	0	20	0	-20
2021	44	44	0	0	0	0	5432	5432	0	0	0	0	0	0	0	1794	1794	0	6870	2999	-3871	0	0	0	21	0	-21
2022	54	54	0	0	0	0	3403	3403	0	0	0	0	0	0	0	399	399	0	4494	1406	-3088	0	0	0	22	0	-22
2023	56	56	0	0	0	0	1914	1914	0	0	0	0	0	0	0	-641	-641	0	4539	1007	-3532	0	0	0	23	0	-23
2024	69	69	0	0	0	0	2143	2143	0	0	0	0	0	0	0	-803	-803	0	5149	1642	-3507	0	0	0	24	0	-24
2025	62	62	0	0	0	0	6159	6159	0	0	0	0	0	0	0	-1598	-1598	0	8162	3738	-4424	0	0	0	26	0	-26
2026	53	53	0	0	0	0	5912	5912	0	0	0	0	0	0	0	-781	-781	0	4943	2775	-2168	0	0	0	27	0	-27
2027	68	68	0	0	0	0	6190	6190	0	0	0	0	0	0	0	1051	1051	0	5986	3337	-2649	0	0	0	28	0	-28
2028	41	41	0	0	0	0	12749	12749	0	0	0	0	0	0	0	3627	3627	0	6191	3757	-2434	0	0	0	29	0	-29
2029	54	54	0	0	0	0	10481	10481	0	0	0	0	0	0	0	3991	3991	0	8575	7636	-939	0	0	0	31	0	-31
2030	245	245	0	0	0	0	3970	3970	0	0	0	0	0	0	0	2589	2589	0	2340	4157	1817	0	0	0	32	0	-32
2031	44	44	0	0	0	0	5723	5723	0	0	0	0	0	0	0	1887	1887	0	6628	2824	-3804	0	0	0	33	0	-33
2032	53	53	0	0	0	0	3591	3591	0	0	0	0	0	0	0	478	478	0	4334	1277	-3057	0	0	0	35	0	-35
2033	56	56	0	0	0	0	2091	2091	0	0	0	0	0	0	0	-633	-633	0	4212	862	-3350	0	0	0	36	0	-36
2034	69	69	0	0	0	0	2358	2358	0	0	0	0	0	0	0	-789	-789	0	4895	1492	-3403	0	0	0	38	0	-38
2035	62	62	0	0	0	0	6438	6438	0	0	0	0	0	0	0	-1517	-1517	0	7919	3559	-4360	0	0	0	39	-11	-50
2036	53	53	0	0	0	0	6164	6164	0	0	0	0	0	0	0	-633	-633	0	5529	2653	-2876	0	0	0	40	0	-40
2037	68	68	0	0	0	0	6501	6501	0	0	0	0	0	0	0	1193	1193	0	6214	3205	-3009	0	0	0	42	0	-42
2038	40	40	0	0	0	0	12976	12976	0	0	0	0	0	0	0	3715	3715	0	6388	3619	-2769	0	0	0	43	-11	-54
2039	54	54	0	0	0	0	10646	10646	0	0	0	0	0	0	0	4004	4004	0	8956	7469	-1487	0	0	0	45	0	-45
2040	245	245	0	0	0	0	4127	4127	0	0	0	0	0	0	0	2672	2672	0	2352	3601	1249	0	0	0	46	0	-46
2041	44	44	0	0	0	0	5964	5964	0	0	0	0	0	0	0	1983	1983	0	6389	2604	-3785	0	0	0	48	0	-48
2042	54	54	0	0	0	0	3744	3744	0	0	0	0	0	0	0	542	542	0	4179	1164	-3015	0	0	0	49	0	-49
2043	56	56	0	0	0	0	2246	2246	0	0	0	0	0	0	0	-626	-626	0	3779	740	-3039	0	0	0	51	0	-51
2044	69	69	0	0	0	0	2554	2554	0	0	0	0	0	0	0	-776	-776	0	4660	1356	-3304	0	0	0	52	0	-52
2045	62	62	0	0	0	0	6670	6670	0	0	0	0	0	0	0	-1456	-1456	0	7691	3407	-4284	0	0	0	54	-21	-75
2046	53	53	0	0	0	0	6389	6389	0	0	0	0	0	0	0	-520	-520	0	5596	2555	-3041	0	0	0	56	0	-56
2047	68	68	0	0	0	0	6768	6768	0	0	0	0	0	0	0	1305	1305	0	6558	3086	-3472	0	0	0	57	-12	-69
2048	40	40	0	0	0	0	13155	13155	0	0	0	0	0	0	0	3780	3780	0	6626	3498	-3128	0	0	0	59	-16	-75
2049	53	53	0	0	0	0	10846	10846	0	0	0	0	0	0	0	4043	4043	0	9331	7317	-2014	0	0	0	61	-12	-73
2010 2049	**74**	**74**	**0**	**0**	**0**	**0**	**5911**	**5911**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**981**	**981**	**0**	**5717**	**3108**	**-2609**	**0**	**0**	**0**	**32**	**-2**	**-34**

Year	Keith Sebelius			Enders			Harlan			Harry Strunk			Swanson			Mainstem			Total		
	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del
2010	490	490	0	0	0	0	131	131	0	0	0	0	0	0	0	-1117	-900	217	14817	14492	-325
2011	432	432	0	0	0	0	102	102	0	0	0	0	0	0	0	113	313	200	20513	16759	-3754
2012	555	555	0	0	0	0	85	85	0	0	0	0	0	0	0	827	543	-284	12473	9077	-3396
2013	581	581	0	0	0	0	84	84	0	0	0	0	0	0	0	-489	-84	405	7127	3792	-3335
2014	535	535	0	0	0	0	81	81	0	0	0	0	0	0	0	465	318	-147	8523	4772	-3751
2015	547	547	0	0	0	0	78	78	0	0	0	0	0	0	0	148	234	86	14999	11203	-3796
2016	566	566	0	0	0	0	79	79	0	0	0	0	0	0	0	-89	-36	53	13266	11580	-1686
2017	561	561	0	0	0	0	79	79	0	0	0	0	0	0	0	653	802	149	19279	17180	-2099
2018	533	533	0	0	0	0	142	142	0	0	0	0	0	0	0	332	499	167	30714	28786	-1928
2019	476	476	0	0	0	0	165	165	0	0	0	0	0	0	0	406	443	37	31747	31584	-163
2020	517	517	0	0	0	0	137	137	0	0	0	0	0	0	0	-1770	-1241	529	14608	16453	1845
2021	458	458	0	0	0	0	107	107	0	0	0	0	0	0	0	416	451	35	21331	17472	-3859
2022	582	582	0	0	0	0	90	90	0	0	0	0	0	0	0	798	740	-58	12743	9568	-3175
2023	609	609	0	0	0	0	89	89	0	0	0	0	0	0	0	-659	-149	510	6893	3837	-3056
2024	563	563	0	0	0	0	89	89	0	0	0	0	0	0	0	294	254	-40	8374	4792	-3582
2025	575	575	0	0	0	0	89	89	0	0	0	0	0	0	0	-308	-243	65	15376	10982	-4394
2026	593	593	0	0	0	0	89	89	0	0	0	0	0	0	0	-847	-683	164	13480	11444	-2036
2027	589	589	0	0	0	0	88	88	0	0	0	0	0	0	0	1090	1216	126	20623	18065	-2558
2028	561	561	0	0	0	0	155	155	0	0	0	0	0	0	0	403	518	115	31347	28990	-2357
2029	503	503	0	0	0	0	168	168	0	0	0	0	0	0	0	330	399	69	32535	31630	-905
2030	544	544	0	0	0	0	139	139	0	0	0	0	0	0	0	-1888	-1236	652	14998	17439	2441
2031	484	484	0	0	0	0	109	109	0	0	0	0	0	0	0	258	236	-22	21418	17551	-3867
2032	608	608	0	0	0	0	92	92	0	0	0	0	0	0	0	707	815	108	12788	9794	-2994
2033	634	634	0	0	0	0	91	91	0	0	0	0	25	0	-25	-1841	-1002	839	5612	3041	-2571
2034	589	589	0	0	0	0	95	95	0	0	0	0	20	0	-20	291	471	180	8385	5109	-3276
2035	601	601	0	0	0	0	96	96	0	0	0	0	14	0	-14	-284	-296	-12	15556	11126	-4430
2036	619	619	0	0	0	0	95	95	0	0	0	0	11	0	-11	-2033	-1868	165	13310	10551	-2759
2037	614	614	0	0	0	0	92	92	0	0	0	0	10	0	-10	1872	1838	-34	22116	19018	-3098
2038	586	586	0	0	0	0	167	167	0	0	0	0	0	0	0	361	542	181	31841	29193	-2648
2039	528	528	0	0	0	0	169	169	0	0	0	0	0	0	0	291	376	85	33380	31925	-1455
2040	569	569	0	0	0	0	140	140	0	0	0	0	0	0	0	-1814	-1255	559	15532	17295	1763
2041	509	509	0	0	0	0	111	111	0	0	0	0	0	0	0	88	51	-37	21399	17517	-3882
2042	632	632	0	0	0	0	94	94	0	0	0	0	16	0	-16	230	601	371	12404	9701	-2703
2043	658	658	0	0	0	0	92	92	0	0	0	0	0	0	0	-3906	-1034	2872	3289	3069	-220
2044	613	613	0	0	0	0	99	99	0	0	0	0	32	17	-15	-502	-455	47	7606	4282	-3324
2045	625	625	0	0	0	0	102	102	0	0	0	0	23	13	-10	-85	-314	-229	15857	11259	-4598
2046	643	643	0	0	0	0	100	100	0	0	0	0	13	0	-13	-2503	-2123	380	13279	10549	-2730
2047	638	638	0	0	0	0	101	101	0	0	0	0	13	0	-13	2279	2055	-224	23286	19515	-3771
2048	609	609	0	0	0	0	177	177	0	0	0	0	0	0	0	379	616	237	32365	29396	-2969
2049	552	552	0	0	0	0	170	170	0	0	0	0	10	0	-10	468	394	-74	34450	32286	-2164
2010 2049	**567**	**567**	**0**	**0**	**0**	**0**	**111**	**111**	**0**	**0**	**0**	**0**	**4**	**0**	**-4**	**-165**	**45**	**210**	**17740**	**15301**	**-2439**

Table 3. Nebraska Pumping Impacts - NB=No Bonny, WB=With Bonny (acre-feet)

Year	Arikaree			Beaver			Buffalo			Driftwood			Frenchman			North Fork			Above Swanson			Swanson - Harlan			Harlan - Guide Rock			Guide Rock - Hardy		
	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del
2010	126	126	0	5309	5309	0	3417	3417	0	1185	1185	0	77748	77748	0	978	978	0	9785	9784	-1	35347	35347	0	28926	28926	0	2503	2503	0
2011	320	320	0	5116	5116	0	3602	3602	0	1234	1234	0	80533	80533	0	1023	1023	0	11608	11608	0	42668	42669	1	28101	28101	0	2695	2695	0
2012	335	335	0	2946	2946	0	3602	3602	0	1278	1278	0	75800	75799	-1	1065	1065	0	10962	10946	-16	23476	23475	-1	29761	29761	0	2633	2633	0
2013	514	514	0	1465	1465	0	3650	3650	0	1397	1397	0	81465	81464	-1	1125	1125	0	18173	18151	-22	28954	28950	-4	31211	31211	0	3346	3346	0
2014	423	423	0	1816	1816	0	3675	3675	0	1479	1479	0	85962	85962	0	1177	1177	0	15323	15316	-7	35624	35622	-2	32675	32675	0	3224	3224	0
2015	242	242	0	3022	3022	0	3741	3741	0	1483	1483	0	80212	80212	0	1219	1219	0	11744	11728	-16	40778	40779	1	32616	32616	0	3728	3727	-1
2016	122	122	0	3710	3710	0	3722	3722	0	1426	1426	0	74594	74594	0	1252	1252	0	9166	9130	-36	40093	40091	-2	30253	30253	0	3140	3140	0
2017	111	111	0	4964	4964	0	3743	3743	0	1362	1362	0	77253	77253	0	1293	1293	0	10352	10374	22	51227	51226	-1	29999	29999	0	3054	3054	0
2018	124	124	0	6485	6485	0	3783	3783	0	1299	1299	0	78165	78164	-1	1326	1326	0	9805	9832	27	51126	51123	-3	28903	28903	0	2409	2409	0
2019	154	154	0	6225	6225	0	3879	3879	0	1218	1218	0	81309	81309	0	1352	1352	0	10831	10875	44	59639	59639	0	28785	28785	0	2314	2314	0
2020	125	126	1	5277	5277	0	3924	3924	0	1201	1201	0	79293	79293	0	1379	1379	0	8361	8394	33	44028	44029	1	33138	33138	0	2590	2590	0
2021	318	318	0	5083	5083	0	3934	3934	0	1251	1251	0	81835	81837	2	1426	1426	0	11371	11439	68	45288	45292	4	32306	32307	1	2805	2805	0
2022	336	336	0	2938	2938	0	3887	3887	0	1295	1295	0	75961	75960	-1	1468	1468	0	10818	10843	25	26640	26637	-3	33812	33812	0	2711	2711	0
2023	510	510	0	1475	1475	0	3899	3899	0	1413	1413	0	81326	81325	-1	1532	1532	0	17760	17769	9	31013	31011	-2	35225	35225	0	3420	3421	1
2024	422	422	0	1727	1727	0	3942	3942	0	1495	1495	0	86106	86106	0	1587	1587	0	16045	16057	12	37436	37436	0	36700	36700	0	3316	3316	0
2025	246	246	0	2917	2917	0	4030	4030	0	1500	1500	0	80482	80482	0	1630	1630	0	12173	12166	-7	43194	43193	-1	36596	36595	-1	3807	3806	-1
2026	124	124	0	3613	3613	0	4001	4001	0	1444	1444	0	74581	74580	-1	1661	1661	0	8864	8858	-6	43065	43064	-1	34188	34188	0	3228	3228	0
2027	113	113	0	4861	4861	0	4039	4039	0	1383	1383	0	78235	78234	-1	1706	1706	0	10617	10627	10	54383	54381	-2	34012	34012	0	3174	3174	0
2028	126	126	0	6355	6355	0	4114	4114	0	1325	1325	0	78904	78903	-1	1740	1740	0	10000	10015	15	54218	54215	-3	32904	32904	0	2523	2523	0
2029	157	157	0	6473	6473	0	4221	4221	0	1245	1245	0	83156	83156	0	1766	1766	0	11533	11587	54	61289	61289	0	32621	32621	0	2377	2377	0
2030	124	124	0	5370	5370	0	4226	4226	0	1228	1228	0	79835	79834	-1	1791	1791	0	6859	6869	10	46720	46719	-1	36931	36931	0	2675	2675	0
2031	316	316	0	5068	5068	0	4186	4186	0	1278	1278	0	82032	82033	1	1840	1840	0	11505	11603	98	48463	48467	4	36084	36084	0	2905	2906	1
2032	336	336	0	2930	2930	0	4114	4114	0	1320	1320	0	76035	76035	0	1878	1878	0	10568	10593	25	29570	29569	-1	37410	37409	-1	2781	2781	0
2033	502	502	0	1498	1498	0	4138	4138	0	1435	1435	0	80540	80541	1	1946	1946	0	16245	16211	-34	33682	33684	2	38806	38806	0	3491	3491	0
2034	422	422	0	1703	1703	0	4186	4186	0	1518	1518	0	86498	86498	0	2002	2002	0	16538	16558	20	38927	38927	0	40303	40303	0	3398	3398	0
2035	251	251	0	2882	2882	0	4262	4262	0	1523	1523	0	80649	80649	0	2045	2045	0	12960	12978	18	44859	44859	0	40132	40132	0	3876	3876	0
2036	126	126	0	3581	3581	0	4230	4230	0	1468	1468	0	74691	74692	1	2074	2074	0	8495	8456	-39	44838	44840	2	37678	37678	0	3308	3308	0
2037	116	116	0	4828	4828	0	4277	4277	0	1409	1409	0	79075	79074	-1	2123	2123	0	11145	11165	20	57549	57545	-4	37560	37560	0	3272	3272	0
2038	128	128	0	6315	6315	0	4347	4347	0	1354	1354	0	79299	79299	0	2158	2158	0	10149	10165	16	57339	57336	-3	36572	36573	1	2610	2610	0
2039	162	162	0	6718	6718	0	4478	4478	0	1279	1279	0	83798	83799	1	2183	2183	0	12351	12419	68	63841	63842	1	36132	36131	-1	2428	2427	-1
2040	121	121	0	5495	5495	0	4468	4468	0	1263	1263	0	80469	80469	0	2205	2205	0	5509	5428	-81	48549	48550	1	40344	40344	0	2738	2738	0
2041	315	315	0	5066	5066	0	4404	4404	0	1311	1311	0	82248	82249	1	2255	2255	0	11640	11773	133	51094	51098	4	39527	39527	0	2982	2983	1
2042	336	336	0	2957	2957	0	4291	4291	0	1349	1349	0	76128	76127	-1	2290	2290	0	9928	9943	15	32073	32071	-2	40676	40676	0	2833	2833	0
2043	494	494	0	1532	1532	0	4275	4275	0	1463	1463	0	80010	80010	0	2360	2360	0	13307	13271	-36	36056	36058	2	41964	41964	0	3548	3548	0
2044	421	421	0	1700	1700	0	4379	4379	0	1546	1546	0	86665	86664	-1	2419	2419	0	15619	15583	-36	40518	40516	-2	43457	43457	0	3460	3460	0
2045	256	256	0	2857	2857	0	4526	4526	0	1551	1551	0	81164	81164	0	2461	2461	0	14131	14197	66	46105	46104	-1	43228	43228	0	3931	3931	0
2046	127	127	0	3562	3562	0	4445	4445	0	1496	1496	0	74875	74875	0	2488	2488	0	7821	7779	-42	46410	46411	1	40763	40763	0	3365	3365	0
2047	120	120	0	4807	4807	0	4529	4529	0	1438	1438	0	79716	79715	-1	2541	2541	0	11788	11803	15	60238	60235	-3	41005	41005	0	3338	3338	0
2048	129	129	0	6279	6279	0	4588	4588	0	1384	1384	0	79724	79723	-1	2577	2577	0	10312	10310	-2	60065	60060	-5	40075	40075	0	2676	2676	0
2049	167	167	0	6935	6935	0	4688	4688	0	1312	1312	0	84145	84145	0	2601	2601	0	13324	13388	64	66087	66085	-2	39451	39451	0	2459	2459	0
2010 2049	**247**	**247**	**0**	**4096**	**4096**	**0**	**4096**	**4096**	**0**	**1370**	**1370**	**0**	**80012**	**80012**	**0**	**1798**	**1798**	**0**	**11637**	**11649**	**12**	**45061**	**45061**	**0**	**35770**	**35770**	**0**	**3026**	**3026**	**0**

Year	Medicine			Prairie Dog			Red Willow			Rock			Sappa			South Fork			Hugh Butler			Bonny			Keith Sebelius			Enders			Harlan			Harry Strunk			Swanson			Mainstem			Total		
	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del	WB	NB	Del
2010	20127	20127	0	0	0	0	6969	6969	0	4362	4362	0	2751	2751	0	719	718	-1	2020	2020	0	0	0	0	0	0	0	4545	4545	0	1022	1022	0	312	312	0	254	254	0	76560	76560	0	208407	208406	-1
2011	21311	21311	0	0	0	0	7422	7422	0	4400	4400	0	2304	2304	0	681	681	0	2016	2016	0	0	0	0	0	0	0	4703	4703	0	878	878	0	322	322	0	273	273	0	85071	85072	1	221210	221211	1
2012	22160	22160	0	0	0	0	6032	6032	0	4434	4434	0	1313	1313	0	821	731	-90	2169	2169	0	0	0	0	0	0	0	4843	4843	0	956	956	0	333	333	0	311	311	0	66831	66814	-17	195228	195120	-108
2013	23556	23556	0	0	0	0	6842	6842	0	4509	4509	0	867	867	0	1000	873	-127	2175	2175	0	0	0	0	0	0	0	5151	5151	0	959	959	0	470	470	0	510	510	0	81683	81657	-26	217337	217182	-155
2014	23879	23879	0	0	0	0	7180	7180	0	4624	4624	0	853	853	0	836	664	-172	2184	2184	0	0	0	0	0	0	0	5236	5236	0	861	861	0	415	415	0	517	517	0	86846	86837	-9	227966	227784	-182
2015	24248	24248	0	0	0	0	7340	7340	0	4778	4778	0	949	949	0	1777	613	-1164	2113	2113	0	0	0	0	0	0	0	5346	5346	0	950	950	0	371	371	0	450	450	0	88866	88850	-16	226287	225106	-1181
2016	22523	22523	0	0	0	0	6730	6730	0	4827	4827	0	1252	1252	0	1159	583	-576	2044	2044	0	0	0	0	0	0	0	5309	5309	0	911	911	0	346	346	0	403	402	-1	82652	82615	-37	212983	212370	-613
2017	22848	22848	0	0	0	0	8433	8433	0	4934	4934	0	1975	1975	0	1107	586	-521	2054	2054	0	0	0	0	0	0	0	5285	5285	0	888	888	0	341	341	0	358	358	0	94633	94653	20	231581	231081	-500
2018	22319	22319	0	63	63	0	8636	8636	0	5067	5067	0	3841	3841	0	1063	606	-457	2054	2054	0	0	0	0	0	0	0	5261	5261	0	883	883	0	336	336	0	338	339	1	92243	92268	25	233287	232855	-432
2019	22165	22165	0	27	27	0	9235	9235	0	5267	5267	0	3881	3881	0	1360	1114	-246	2062	2062	0	0	0	0	0	0	0	5178	5178	0	860	860	0	332	332	0	267	268	1	101568	101612	44	246339	246138	-201
2020	23251	23251	0	13	13	0	8280	8280	0	5291	5291	0	2682	2682	0	783	1424	641	2393	2393	0	0	0	0	0	0	0	5181	5181	0	1128	1128	0	337	337	0	276	277	1	88117	88151	34	228930	229606	676
2021	24322	24322	0	0	0	0	8226	8226	0	5209	5209	0	2471	2471	0	723	725	2	2382	2382	0	0	0	0	0	0	0	5326	5326	0	984	984	0	348	348	0	296	296	0	91771	91843	72	235904	235980	76
2022	24907	24907	0	0	0	0	6587	6587	0	5104	5104	0	1448	1448	0	755	756	1	2529	2529	0	0	0	0	0	0	0	5455	5455	0	1064	1064	0	359	359	0	334	334	0	73981	74002	21	208407	208430	23
2023	26279	26279	0	0	0	0	7347	7347	0	5113	5113	0	967	967	0	965	967	2	2529	2529	0	0	0	0	0	0	0	5752	5752	0	1069	1069	0	497	497	0	535	536	1	87418	87426	8	228626	228635	9
2024	26590	26590	0	0	0	0	7695	7695	0	5226	5226	0	950	950	0	713	713	0	2534	2534	0	0	0	0	0	0	0	5830	5830	0	977	977	0	443	443	0	544	544	0	93497	93508	11	240279	240291	12
2025	26141	26141	0	0	0	0	7904	7904	0	5383	5383	0	1040	1040	0	1850	645	-1205	2457	2457	0	0	0	0	0	0	0	5929	5929	0	1070	1070	0	398	398	0	478	478	0	95770	95761	-9	239224	238010	-1214
2026	25131	25131	0	0	0	0	7213	7213	0	5425	5425	0	1358	1358	0	1366	649	-717	2383	2383	0	0	0	0	0	0	0	5882	5882	0	1030	1030	0	374	374	0	429	430	1	89345	89337	-8	225362	224636	-726
2027	25652	25652	0	0	0	0	9047	9047	0	5537	5537	0	2120	2120	0	1185	616	-569	2388	2388	0	0	0	0	0	0	0	5850	5850	0	1006	1006	0	369	369	0	385	385	0	102186	102194	8	246063	245501	-562
2028	25192	25192	0	45	45	0	9349	9349	0	5672	5672	0	3972	3972	0	1093	636	-457	2385	2385	0	0	0	0	0	0	0	5820	5820	0	999	999	0	365	365	0	364	365	1	99645	99657	12	247465	247020	-445
2029	24960	24960	0	41	41	0	10001	10001	0	5871	5871	0	3785	3785	0	1426	888	-538	2387	2387	0	0	0	0	0	0	0	5728	5728	0	977	977	0	361	361	0	291	292	1	107821	107874	53	260667	260182	-485
2030	25936	25936	0	16	16	0	8990	8990	0	5889	5889	0	2699	2699	0	829	1847	1018	2714	2714	0	0	0	0	0	0	0	5726	5726	0	1244	1244	0	366	366	0	298	300	2	93185	93195	10	240467	241495	1028
2031	26949	26949	0	0	0	0	8846	8846	0	5797	5797	0	2537	2537	0	752	754	2	2698	2698	0	0	0	0	0	0	0	5862	5862	0	1100	1100	0	377	377	0	318	319	1	98958	99060	102	248914	249021	107
2032	27311	27311	0	0	0	0	7058	7058	0	5662	5662	0	1534	1534	0	801	804	3	2841	2841	0	0	0	0	0	0	0	5985	5985	0	1179	1179	0	389	389	0	360	360	0	80328	80352	24	220061	220087	26
2033	28713	28713	0	0	0	0	7811	7811	0	5695	5695	0	1027	1027	0	1036	1038	2	2837	2837	0	0	0	0	0	0	0	6276	6276	0	1183	1183	0	527	527	0	575	575	0	92224	92193	-31	237964	237936	-28
2034	29027	29027	0	0	0	0	8195	8195	0	5790	5790	0	1010	1010	0	812	818	6	2839	2839	0	0	0	0	0	0	0	6349	6349	0	1094	1094	0	473	473	0	581	582	1	99166	99186	20	251667	251692	25
2035	28537	28537	0	0	0	0	8411	8411	0	5907	5907	0	1099	1099	0	1208	680	-528	2756	2756	0	0	0	0	0	0	0	6441	6441	0	1188	1188	0	429	429	0	508	507	-1	101828	101845	17	249925	249414	-511
2036	27425	27425	0	0	0	0	7674	7674	0	5930	5930	0	1437	1437	0	1810	703	-1107	2679	2679	0	0	0	0	0	0	0	6390	6390	0	1148	1148	0	404	404	0	457	457	0	94319	94283	-36	235845	234701	-1144
2037	28062	28062	0	0	0	0	9602	9602	0	6053	6053	0	2222	2222	0	1260	654	-606	2680	2680	0	0	0	0	0	0	0	6354	6354	0	1121	1121	0	399	399	0	414	414	0	109526	109542	16	259523	258931	-592
2038	27552	27552	0	45	45	0	9918	9918	0	6180	6180	0	4053	4053	0	1139	666	-473	2673	2673	0	0	0	0	0	0	0	6321	6321	0	1115	1115	0	395	395	0	392	392	0	106671	106682	11	260056	259594	-462
2039	27263	27263	0	77	77	0	10604	10604	0	6373	6373	0	3780	3780	0	1489	783	-706	2671	2671	0	0	0	0	0	0	0	6225	6225	0	1093	1093	0	391	391	0	319	319	0	114751	114820	69	273654	273018	-636
2040	28153	28153	0	27	27	0	9545	9545	0	6383	6383	0	2744	2744	0	860	2038	1178	2995	2995	0	0	0	0	0	0	0	6220	6220	0	1359	1359	0	397	397	0	322	323	1	97140	97061	-79	250166	251266	1100
2041	29133	29133	0	0	0	0	9346	9346	0	6284	6284	0	2612	2612	0	788	793	5	2975	2975	0	0	0	0	0	0	0	6351	6351	0	1213	1213	0	408	408	0	345	346	1	105244	105381	137	260299	260444	145
2042	29356	29356	0	0	0	0	7457	7457	0	6157	6157	0	1601	1601	0	856	859	3	3113	3113	0	0	0	0	0	0	0	6470	6470	0	1292	1292	0	420	420	0	392	393	1	85510	85523	13	229973	229991	18
2043	30796	30796	0	0	0	0	8250	8250	0	6184	6184	0	1071	1071	0	1095	1098	3	3106	3106	0	0	0	0	0	0	0	6758	6758	0	1295	1295	0	558	558	0	601	602	1	94875	94841	-34	244723	244693	-30
2044	31088	31088	0	0	0	0	8661	8661	0	6253	6253	0	1055	1055	0	920	925	5	3105	3105	0	0	0	0	0	0	0	6829	6829	0	1207	1207	0	504	504	0	626	627	1	103054	103016	-38	260434	260400	-34
2045	30561	30561	0	0	0	0	8857	8857	0	6370	6370	0	1146	1146	0	759	759	0	3018	3018	0	0	0	0	0	0	0	6918	6918	0	1301	1301	0	460	460	0	545	545	0	107395	107459	64	260144	260208	64
2046	29379	29379	0	0	0	0	8090	8090	0	6362	6362	0	1501	1501	0	1691	751	-940	2937	2937	0	0	0	0	0	0	0	6864	6864	0	1259	1259	0	435	435	0	486	486	0	98359	98318	-41	244358	243378	-980
2047	30063	30063	0	0	0	0	10095	10095	0	6478	6478	0	2307	2307	0	1492	729	-763	2935	2935	0	0	0	0	0	0	0	6826	6826	0	1230	1230	0	430	430	0	442	442	0	116368	116381	13	271817	271065	-752
2048	29513	29513	0	62	62	0	10404	10404	0	6586	6586	0	4112	4112	0	1232	708	-524	2925	2925	0	0	0	0	0	0	0	6793	6793	0	1224	1224	0	426	426	0	419	419	0	113128	113120	-8	271507	270973	-534
2049	29180	29180	0	107	107	0	11116	11116	0	6790	6790	0	3805	3805	0	1555	774	-781	2919	2919	0	0	0	0	0	0	0	6693	6693	0	1208	1208	0	422	422	0	346	348	2	121321	121383	62	285311	284593	-718
2010 2049	**26268**	**26268**	**0**	**13**	**13**	**0**	**8384**	**8384**	**0**	**5603**	**5603**	**0**	**2103**	**2103**	**0**	**1094**	**834**	**-260**	**2566**	**2566**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5906**	**5906**	**0**	**1088**	**1088**	**0**	**400**	**400**	**0**	**408**	**409**	**1**	**95496**	**95508**	**12**	**240959**	**240711**	**-248**

Table 4: Colorado CBCUg at various points on the South Fork stream network under the "No Bonny" condition.

Year	South Fork above Bonny Reservoir	Landsman Creek (above Bonny Reservoir)	South Fork inflow to Bonny Reservoir	South Fork at Bonny Reservoir Outlet	South Fork below Bonny Reservoir	South Fork at CO-KS State Line	South Fork at Confluence with RR		Difference Reach 1	Difference Reach 2	Difference Reach 3	Difference Reach 4	Difference Reach 5	Total Difference
2010	8,151	592	8,371	7,752	7,658	6,052	3,735		(372)	(619)	(94)	(1,606)	(2,317)	(5,008)
2011	10,395	261	10,787	9,705	9,659	9,189	3,299		132	(1,082)	(47)	(470)	(5,890)	(7,357)
2012	8,315	11	7,977	6,774	6,687	5,438	2,467		(349)	(1,203)	(87)	(1,249)	(2,971)	(5,859)
2013	9,886	-	9,606	8,036	7,916	6,437	1,828		(280)	(1,570)	(120)	(1,479)	(4,609)	(8,058)
2014	10,470	-	10,083	8,246	8,163	6,615	1,882		(387)	(1,837)	(83)	(1,548)	(4,734)	(8,589)
2015	12,131	19	11,806	10,084	10,006	8,954	5,219		(345)	(1,722)	(77)	(1,052)	(3,735)	(6,931)
2016	9,493	23	9,181	7,955	7,884	6,601	5,451		(335)	(1,225)	(72)	(1,282)	(1,151)	(4,065)
2017	10,218	37	10,036	9,000	8,944	8,239	6,273		(218)	(1,036)	(56)	(705)	(1,965)	(3,981)
2018	12,522	30	12,270	10,254	10,153	9,202	6,658		(282)	(2,016)	(101)	(951)	(2,543)	(5,894)
2019	14,928	571	16,156	15,230	15,230	16,528	15,345		658	(927)	0	1,298	(1,183)	(154)
2020	8,899	610	9,184	8,603	8,526	7,852	8,625		(326)	(581)	(77)	(674)	773	(885)
2021	11,016	287	11,009	9,935	9,883	9,275	3,249		(293)	(1,074)	(52)	(608)	(6,026)	(8,053)
2022	8,410	20	8,126	6,953	6,843	5,486	2,294		(304)	(1,172)	(110)	(1,357)	(3,192)	(6,136)
2023	9,988	-	9,758	8,216	8,082	6,486	1,701		(230)	(1,542)	(134)	(1,596)	(4,785)	(8,286)
2024	10,577	-	10,242	8,368	8,282	6,635	1,723		(335)	(1,874)	(86)	(1,647)	(4,912)	(8,854)
2025	12,239	31	11,981	10,223	10,143	8,988	4,970		(289)	(1,757)	(81)	(1,154)	(4,018)	(7,299)
2026	9,594	32	9,314	8,068	7,994	6,619	5,276		(312)	(1,246)	(74)	(1,375)	(1,342)	(4,350)
2027	10,324	50	10,193	9,128	9,058	8,271	6,041		(180)	(1,065)	(69)	(787)	(2,230)	(4,332)
2028	12,627	41	12,446	10,370	10,270	9,227	6,437		(222)	(2,076)	(100)	(1,043)	(2,789)	(6,231)
2029	17,280	604	18,023	16,396	16,382	16,658	15,008		139	(1,626)	(14)	276	(1,651)	(2,876)
2030	9,609	623	9,961	9,294	9,237	9,607	10,507		(270)	(667)	(57)	370	899	275
2031	11,116	302	11,157	10,032	9,979	9,295	3,058		(261)	(1,125)	(53)	(684)	(6,237)	(8,360)
2032	8,501	27	8,262	7,043	6,928	5,503	2,127		(267)	(1,219)	(115)	(1,426)	(3,376)	(6,401)
2033	10,086	0	9,887	8,312	8,182	6,502	1,573		(199)	(1,575)	(130)	(1,680)	(4,929)	(8,513)
2034	10,682	-	10,380	8,438	8,351	6,638	1,614		(302)	(1,942)	(86)	(1,713)	(5,024)	(9,068)
2035	12,341	38	12,166	10,307	10,225	9,000	4,731		(213)	(1,859)	(82)	(1,226)	(4,269)	(7,648)
2036	9,687	39	9,428	8,142	8,067	6,628	5,095		(298)	(1,286)	(75)	(1,439)	(1,532)	(4,631)
2037	10,423	58	10,337	9,216	9,137	8,292	5,834		(143)	(1,121)	(79)	(845)	(2,458)	(4,647)
2038	12,730	49	12,613	10,459	10,360	9,248	6,231		(166)	(2,154)	(99)	(1,112)	(3,017)	(6,549)
2039	18,374	624	18,790	17,089	17,012	16,708	14,683		(208)	(1,702)	(77)	(305)	(2,025)	(4,315)
2040	10,421	630	11,132	10,363	10,354	10,083	11,024		81	(769)	(9)	(270)	941	(27)
2041	11,210	311	11,295	10,106	10,052	9,358	2,876		(226)	(1,189)	(54)	(694)	(6,482)	(8,644)
2042	8,587	31	8,366	7,117	7,006	5,548	1,971		(251)	(1,250)	(111)	(1,458)	(3,576)	(6,646)
2043	10,177	1	9,986	8,388	8,260	6,539	1,443		(193)	(1,598)	(128)	(1,721)	(5,096)	(8,735)
2044	10,775	-	10,474	8,493	8,406	6,652	1,543		(301)	(1,981)	(87)	(1,755)	(5,109)	(9,232)
2045	12,435	42	12,341	10,377	10,294	9,021	4,541		(135)	(1,964)	(83)	(1,273)	(4,480)	(7,935)
2046	9,774	43	9,539	8,206	8,130	6,649	4,923		(278)	(1,334)	(76)	(1,481)	(1,725)	(4,895)
2047	10,515	63	10,473	9,291	9,204	8,318	5,672		(105)	(1,181)	(87)	(886)	(2,646)	(4,905)
2048	12,820	53	12,765	10,528	10,430	9,265	6,037		(108)	(2,237)	(98)	(1,165)	(3,228)	(6,836)
2049	18,499	635	18,931	17,187	17,104	16,754	14,364		(202)	(1,744)	(82)	(350)	(2,391)	(4,770)
Average 2010-2049	**11,156**	**170**	**11,121**	**9,692**	**9,612**	**8,609**	**5,433**		**(204)**	**(1,429)**	**(80)**	**(1,003)**	**(3,176)**	**(5,892)**