EXHIBIT 124

Walker River Decision Support Tool (version 2.0):
Quantifying the Impact of Retiring the Supplemental Pumping Associated with the National Fish & Wildlife Foundation Application No. 80700

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1. Reduced Retired Supplemental Pumping (RRSP) Scenario Application (80700)

In order to assess the impact of retiring the supplemental pumping associated with the NFWF Application No. 80700 water rights change, a modified Walker Basin DST scenario was performed where the baseline non-consumptive use portion of the supplemental pumping associated with the Application No. 80700 lands was retired (i.e. not pumped). The run, hereafter referred to as the Reduced Retired Supplemental Pumping (RRSP) 80700 scenario is intended to compare to UNR-DRI App. 80700 Scenario Report (NFWF Exh. 116). In NFWF Exh. 116, all of the supplemental pumping associated with the 80700 lands was retired.

The modeling framework and scenario process for the RRSP 80700 scenario is identical to what was presented in NFWF Exh. 116 except for the consumptive use portion of the supplemental pumping that occurred on the 80700 lands is allowed to remain active in the scenario. The RRSP 80700 pumped water is modeled as consumed entirely by crop evapotranspiration (ET) (i.e. no recharge or runoff occurs). The RRSP scenario utilizes the same baseline run that was presented in NFWF Exh. 116.

Scenario Methods

The supplemental pumping that occurred on the 80700 lands in the baseline DST run is a function of specific wells, places of use, and permits, as well as the surface delivery to the irrigated fields, the Farm Efficiency (FEF) parameter, the Net Irrigation Water Requirement (NIWR), and the 4 acre-foot per acre pumping limitation. Figure 1.1 shows the pumping wells that the 80700 lands have access to based on the Nevada Division of Water Resources (NDWR) groundwater Place Of Use (POU) dataset.

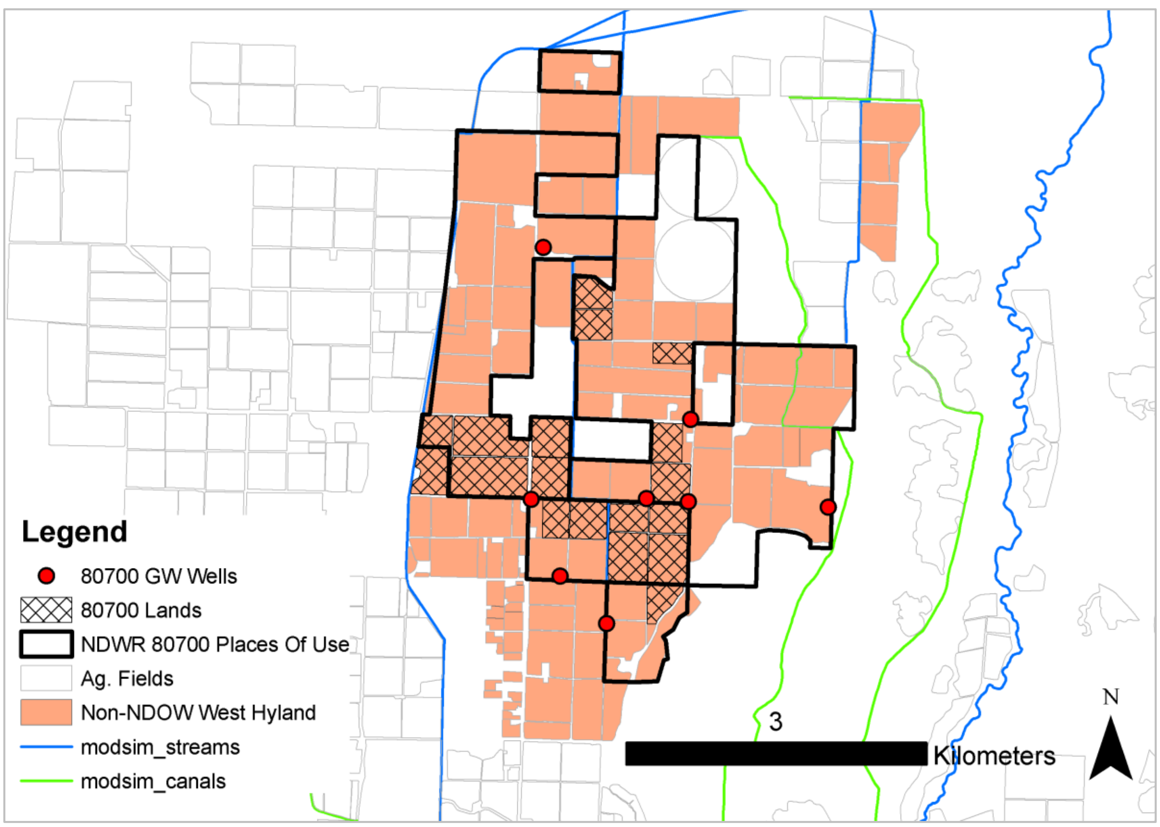

Figure 1.1 Non-NDOW West Hyland HRU, App. 80700 lands, NDWR Place of Use for 80700 Groundwater Pumping wells

Using the baseline water balance results and the NDWR permitting database, the RRSP 80700 scenario was implemented in the DST by 1) calculating the baseline supplemental pumping consumptive use associated with the 80700 lands (a total of 14,222 AF in Table 1.1), and 2) appending the calculated volume to the total pumping per well computed in the RRSP 80700 scenario for each time step. The baseline supplemental pumping is broken down into the consumptive and non-consumptive portions in Table 1.1, such that the sum of each row equals the total groundwater pumped and applied to the 80700 lands for that year. The non-retired pumping is equal to the *Crop ET* column of Table 1.1 and the retired pumping is equal to the sum of the *Recharge* and *Runoff* columns (12,612 AF) in Table 1.1.

Table 1.1 Breakdown of consumptive and non-consumptive portions of the Baseline 80700 Supplemental pumping

	Consumptive Use (AF)	Non-Consumptive Use (AF)	
Year	**Crop ET**	**Recharge**	**Runoff**
1996	797	495	212
1997	824	512	219
1998	354	220	94
1999	622	386	165
2000	854	530	227
2001	1,125	698	299
2002	1,224	760	326
2003	1,140	708	303
2004	1,164	723	310
2005	483	300	129
2006	387	240	103
2007	1,273	790	339
2008	1,273	790	339
2009	1,195	742	317
2010	905	562	241
2011	601	373	160
Total	**14,222**	**8,829**	**3,783**

MODFLOW is the only DST component that sees the non-retired pumping directly. The other two DST components incorporate the effect of the pumping on the system in the form of feedback from MODFLOW (i.e. stream/drain accretions and depletions).

The RRSP 80700 scenario was run to a convergence tolerance of 0.2 AF/Month over the same time period as the baseline (1996–2011). As in NFWF Exh. 116, the calibration parameter values were held constant for the scenario run and the MODSIM calibration gains and losses (refer to NFWF Exh. 116 for more information on calibration gains and losses) simulated in the baseline run are forced to occur in the scenario. Therefore, boundary condition inflows to the system are held constant between the two runs, and the scenario will simulate the net change in surface water availability, including changes in flow at key points, in aquifer response, and in water right calls.

The global water budgets for the Baseline, NFWF Exh. 116, and the RRSP 80700 scenario runs are shown in Appendix A - Table A.1 to Table A.3 respectively. The global water budget tables demonstrate that mass is conserved in each of the DST components.

Scenario Results

The Application No. 80700 water not diverted over the entire sixteen-year period (1996-2011) was 29,500 AF; this is the volume of water protected to the West Hyland diversion and allowed to flow downstream to Wabuska (Figure 1.2 and 1.3). The Application 80700 water in the RRSP 80700 scenario is equal to the Application 80700 water in NFWF Exh.116. Figure 1.2 is provided for reference to the results from NFWF Exh. 116. Note that the cumulative “type” of Application 80700 water (i.e., Storage, Flood, and Decree) is also indicated in the figure.

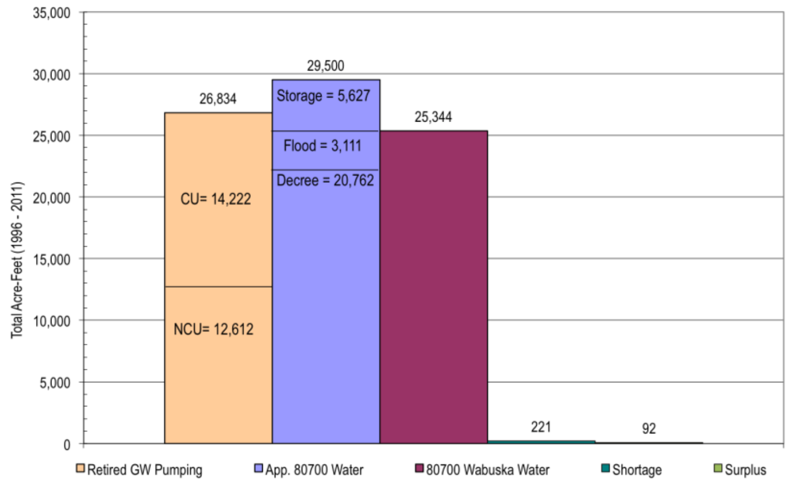

Figure 1.2 Summary of NFWF Exh.116 Scenario

Figure 1.2 shows the total supplemental pumping that was retired in NFWF Exh. 116 for the 80700 lands. The consumptive (14,222 AF) and non-consumptive portions (12,612 AF) are also indicated on the peach bar in Figure 1.2. Figure 1.3 shows the 12,612 AF of non-consumptive use from supplemental groundwater pumping that was retired in the RRSP 80700 scenario. The amount of the RRSP Application No. 80700 water that makes it to Wabuska (i.e., the 80700 Wabuska water) over the entire sixteen-year period (1996-2011) was 23,816 AF (80.7% of the Application 80700 water) and is shown as the maroon bar in Figure 1.3. The 80.7% does not consider system shortages or surpluses; it is the volume of RRSP 80700 Wabuska water relative to the total historical Application No. 80700 water.

Note that as with NFWF Exh. 116, in the RRSP Scenario the 80700 Wabuska water cannot easily be broken down into the Storage, Decree, and Floodwater types because the water is not protected between the point of non-diversion and Wabuska. Over the entire sixteen-year period, the shortages and surpluses in the scenario, were 945 AF and 11 AF, respectively. Shortages are defined here as deficits in water supply between the baseline and the scenario run for all the demands in the model, whereas surpluses are excess waters above the historical stream flow at Wabuska. Each is described in more detail in the Scenario Impacts section below.

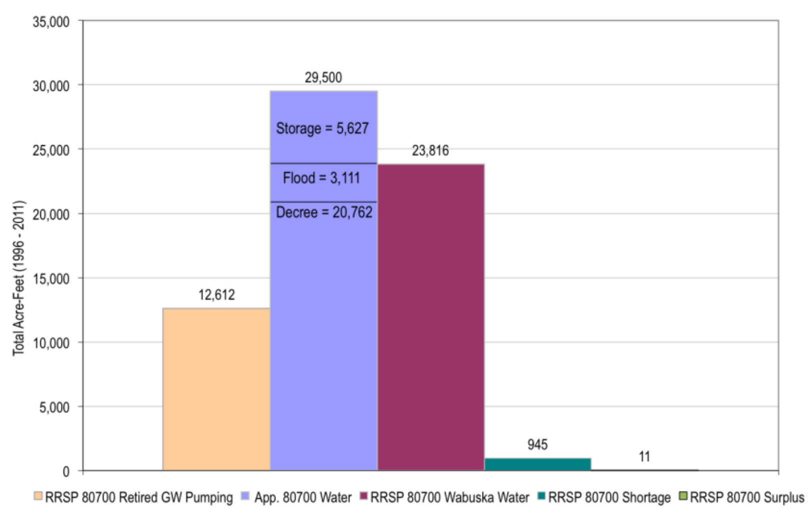

Figure 1.3 Summary of RRSP 80700 Scenario

The annual variation in each of the quantities shown in Figures 1.2 and 1.3 is shown in Figures 1.4 and 1.5. Figure 1.4 is provided for reference to NFWF Exh. 116.

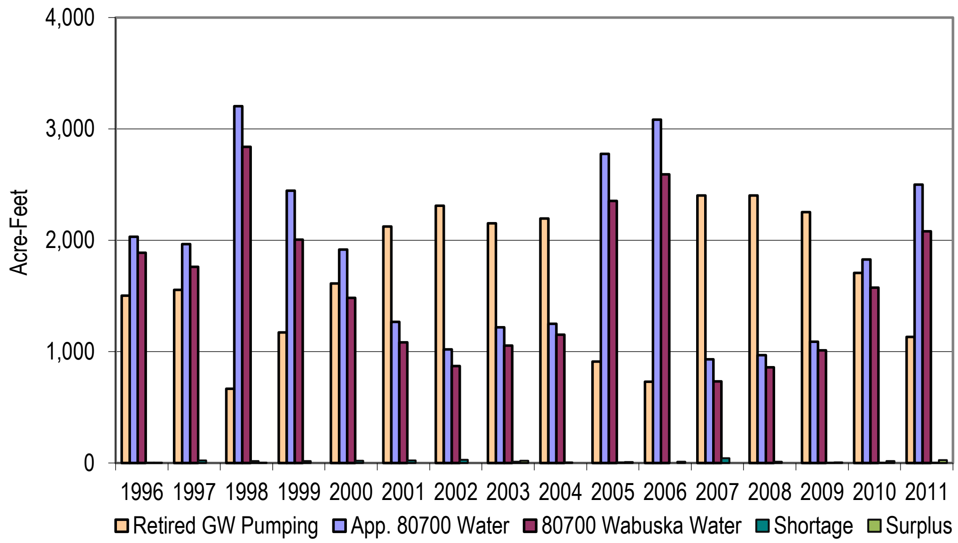

Figure 1.4 Annual summary for NFWF Exh. 116 App. No. 80700

The RRSP 80700 retired groundwater pumping non-consumptive use is greatest in the dry years and smallest in the wet years, whereas the Application 80700 water is largest in wet years and smallest in dry years (Figure 1.5). The ratio of the 80700 Wabuska water to the RRSP Application 80700 water varies from year to year with 1996 (92.7%) being the largest and 2007 (70.7%) being the smallest (Figure 1.5). The shortage generally increases throughout the run with the smallest shortage occurring in 1996 (75.9 AF) and the largest occurring in 2007 (134 AF) (Figure 1.5). There is a small amount (11 AF) of surplus over the entire simulation period (Figure 1.5).

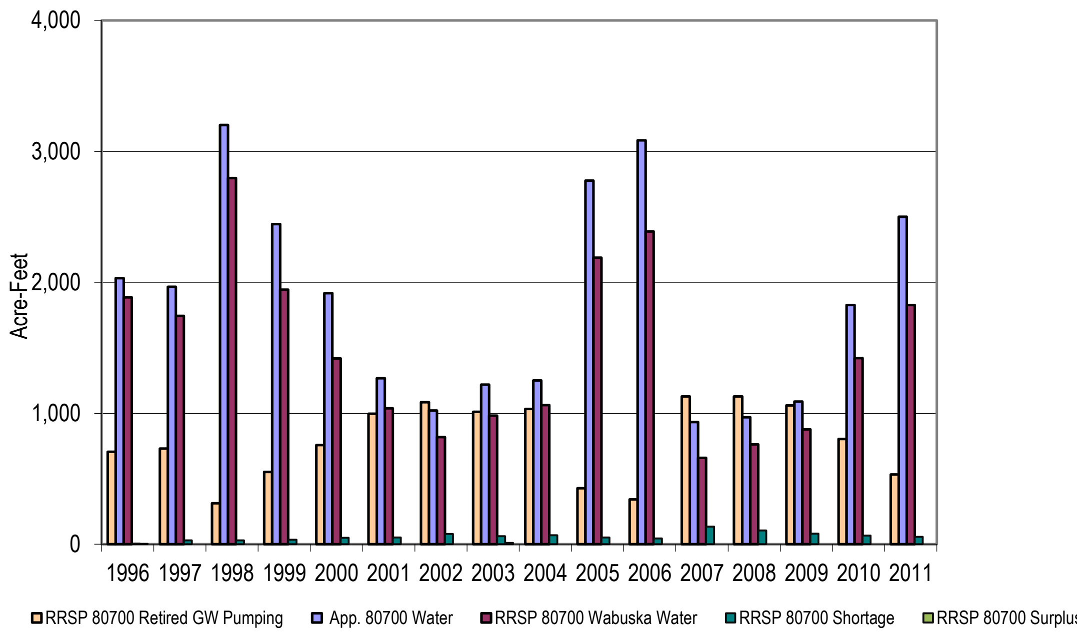

Figure 1.5 Annual summary for for RRSP 80700 scenario

The monthly variation in the Application 80700 water and 80700 Wabuska (NFWF Exh. 116 and RRSP) water is shown in Figure 1.6. Note that, as stated above in the Scenario Methods, the Application 80700 water includes Storage, Flood, and Decree Water whereas the dark blue line shown in Figure 1.6 shows the actual Application 80700 Decreed Water Right rate.

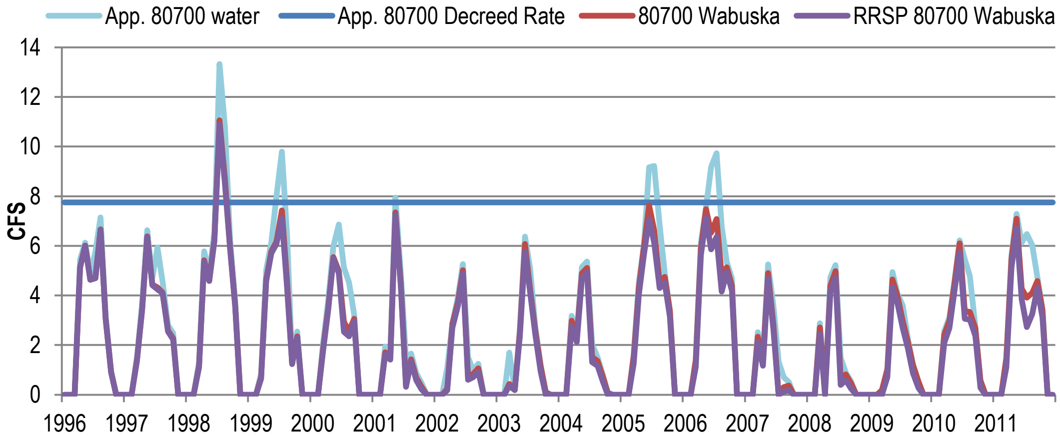

Figure 1.6 Monthly variations in the Application 80700 water and 80700 Wabuska water (Original and RRSP).

<u>Scenario Impacts</u>

Throughout the entire sixteen-year period of the scenario, there were no surface water delivery shortages to the West Hyland Ditch (i.e., the West Hyland areas not included in Application No. 80700 received the exact same delivery of surface water as in the baseline). There were changes with respect to the baseline to the surface and groundwater hydrology of the north-northwestern portion of Mason Valley as a result of the changes in irrigation conveyance and operations in the West Hyland ditch HRU. The changes are attributed to the non-diversion of the Application 80700 water and the retirement of the non-consumptive portion of the baseline pumping. As a result, there were changes to the accretions and depletions in the stream and drain system and water availability at the downstream end of the system. These changes resulted in shortages, or reductions in flows from the baseline, (Figure1.7) and minor surpluses (11 AF total) within the system that are directly related to the system responding to changes in surface and groundwater hydrology. The bulk of the shortages occur at the Wabuska gauge (83.1%) with the Pitchfork ditch (PF) comprising 11.8%, and the other ditches in Figure 1.7 making up the remaining 5.1%. Note that the legend in Figure 1.7 indicates the total volume and percent of the total shortage for each demand. Shortages at the Wabuska gauge occur exclusively in the non-irrigation part of the year.

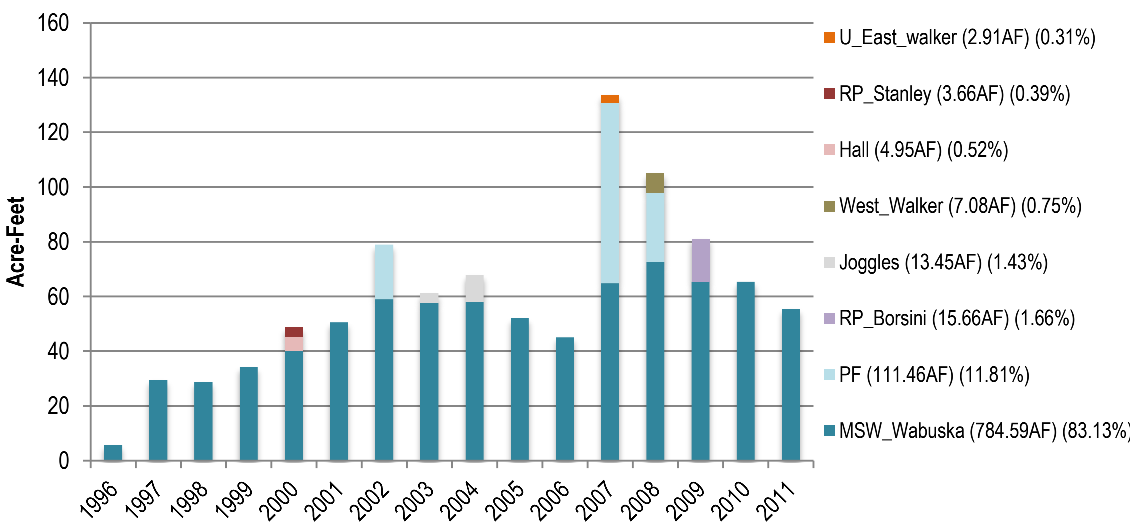

Figure 1.7 Shortage by demand for all years

Impact of RRSP 80700

The impact of retiring the supplemental pumping non-consumptive use in RRSP 80700 on the 80700 Wabuska water can be assessed by comparing the change in surface water availability in each scenario (i.e., NFWF Exh. 116 and RRSP) with respect to the baseline. A set of tables is provided below to quantify the changes (Table 1.2 and 1.3). The tables summarize the following components for the reach between the West Hyland point of non-diversion (i.e. the Yerington Weir) and the Wabuska gauge for each year of the simulation period.

- The change in flow at the Yerington Weir
- The change in reach diversions
- The change in stream-aquifer interaction
- The change in direct runoff to the river
- The change in drain return flows

In each table, the change in stream flow at the Wabuska gauge can be calculated by summing the components. With the exception of the change in reach diversions, which are calculated as *Baseline* minus *Scenario*, the values for each column are presented as the *Scenario* minus the *Baseline* value. Positive values represent additional flows or accretions into the reach and negative values indicate decreases in flow or additional depletions. Table 1.2 shows the reach summary for NFWF Exh. 116 with full retirement of the 80700 supplemental pumping and Table 1.3 shows an equivalent summary for the RRSP 80700 scenario. In Table 1.2, there is a net increase in flow at the weir of 137.6 AF and in Table 1.3 there is net increase in flow at the weir of 43.17 AF. The changes in flow at the weir are a function of changes in water table elevation upstream of the weir due to changes in pumping, and potential calls on upstream water rights due to downstream water shortages. The diversion changes are largely equivalent between the scenarios, however, there is one year (2000) in Table 1.3 where a demand in the reach was short, which could not be made up from a call on another demand. This is reflected in Table 1.3 as a slight reduction in runoff (0.5 AF). The primary factors influencing the change in Wabuska flow in both scenarios are the change in reach diversions, which is comprised primarily by the App. 80700 water not diverted, the change in river gain/loss, and the change in Wabuska drain return flows. The most notable difference between the two runs is that the river transportation losses in the RRSP 80700 run showed a 98% increase over the NFWF Exh. 116 scenario. Also, the drain flows reaching the river through the Wabuska drain in the 80700 RRSP run decreased by 12% from the Exh. 116 scenario. The reduction in drain flows is a result of decreases in runoff coming from the 80700 lands and is not correlated with the off-season shortages at Wabuska gauge. Figure 1.9 shows the annual change in transportation losses in the reach between the West Hyland point of non-diversion (i.e. the Yerington Weir) and the Wabuska gauge for each year of the simulation period. The red line corresponds to the NFWF Exh. 116 results where all the supplemental pumping associated with the 80700 lands was retired. The green line shows the equivalent results for the RRSP 80700 scenario. Negative values indicate an increase in transportation losses between the *Baseline* and *Scenario*.

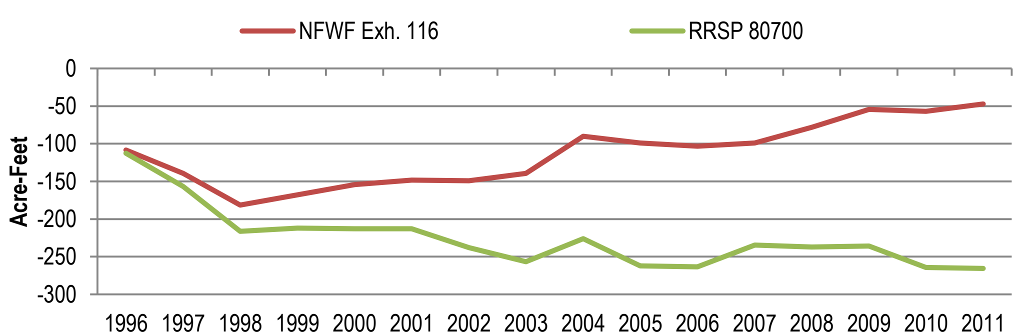

Figure 1.9 Comparison of change in transportation loss (NFWF Exh. 116 & RRSP 80700)

Table 1.2 Change in Reach Summary: NFWF Exh. 116 80700 scenario with pumping retired (Acre-Feet)

Year	Change in Weir Flow	Change Reach Diversions	Change in River Gain/Loss (-) = More Losses	Change in Direct Runoff to River	Change in Drain Return Flow	Exh. 116 Calculated Change in Wabuska Flow
1996	0.6	2,032.0	-108.4	0.0	-40.1	1,884.2
1997	0.0	1,966.5	-139.3	0.0	-88.8	1,738.3
1998	-1.6	3,202.7	-181.5	0.0	-197.4	2,822.1
1999	-0.8	2,445.7	-168.0	0.0	-290.7	1,986.3
2000	0.4	1,918.4	-154.3	0.0	-301.4	1,463.1
2001	2.2	1,267.0	-148.2	0.0	-61.3	1,059.7
2002	11.9	1,020.0	-149.3	0.0	-35.2	847.4
2003	15.3	1,218.7	-139.2	0.0	-32.3	1,062.5
2004	10.4	1,250.3	-90.2	0.0	-25.0	1,145.6
2005	11.1	2,776.6	-98.8	0.0	-335.6	2,353.3
2006	7.6	3,084.1	-103.2	0.0	-384.7	2,603.8
2007	31.4	932.5	-99.0	0.0	-141.6	723.3
2008	9.4	968.7	-78.0	0.0	-49.9	850.2
2009	11.7	1,089.7	-54.2	0.0	-31.5	1,015.7
2010	15.7	1,826.4	-56.7	0.0	-193.2	1,592.2
2011	12.2	2,501.2	-47.0	0.0	-360.1	2,106.3
Total	**137.6**	**29,500.5**	**-1,815.3**	**0.0**	**-2,568.8**	**25,254.0**

Table 1.3 Change in Reach Summary: RRSP 80700 scenario with baseline supplemental pumping consumptive use not-retired (Acre-Feet)

Year	Change in Weir Flow	Change Reach Diversions	Change in River Gain/Loss (-) = More Losses	Change in Direct Runoff to River	Change in Drain Return Flow	RRSP Calculated Change in Wabuska Flow
1996	0.32	2,032.0	-112.6	0.0	-40.0	1,879.7
1997	-2.03	1,966.5	-156.6	0.0	-93.3	1,714.5
1998	-3.62	3,202.7	-216.3	0.0	-214.7	2,768.2
1999	-3.66	2,445.7	-212.1	0.0	-320.8	1,909.2
2000	1.07	1,921.7	-212.8	-0.5	-330.0	1,379.5
2001	-3.32	1,267.0	-213.1	0.0	-63.5	987.2
2002	14.16	1,020.0	-238.0	0.0	-37.9	758.2
2003	7.26	1,218.7	-256.5	0.0	-35.2	934.3
2004	9.06	1,250.3	-225.9	0.0	-28.9	1,004.5
2005	-3.2	2,776.6	-262.3	0.0	-374.3	2,136.7
2006	-7.16	3,084.1	-263.5	0.0	-469.4	2,344.1
2007	43.11	932.5	-234.5	0.0	-145.8	595.3
2008	13.12	968.7	-237.3	0.0	-54.1	690.4
2009	-6.5	1,089.7	-235.9	0.0	-36.4	810.9
2010	-6.2	1,826.4	-264.3	0.0	-200.1	1,355.8
2011	-9.24	2,501.2	-265.4	0.0	-454.1	1,772.4
Total	**43.17**	**29,503.8**	**-3,607.1**	**-0.5**	**-2,898.5**	**23,040.8**

The total Application 80700 water not diverted is equal to 29,500 AF for both scenarios presented (Table 1.6). For each scenario, Table 1.4 utilizes information from Tables 1.2 and 1.3 to approximate the percent of the Application 80700 water that reaches Wabuska by factoring out the non-Wabuska shortages that could not be resolved by the DST. There were 43.5 AF of total non-Wabuska shortages in the NFWF Exh. 116 scenario which resulted in 85.5% of the Application 80700 water that reaches Wabuska. For the RRSP 80700 scenario, there were 159.2 AF of non-Wabuska shortages, which resulted in 77.6% of the Application 80700 water reaching Wabuska.

The difference in the percentages of Application 80700 water reaching Wabuska (85.5% minus 77.6%) reflects a total net gain in available water at Wabuska of 7.9% or 2,330 AF total, in the NFWF Exh. 116 scenario, due full retirement of the baseline supplemental pumping.

Table 1.4 Summary of Calculation of Net % 80700 Wabuska water

Scenario	App. 80700 water (AF)	Calculated Change in Wabuska Flow (AF)	Total Non-Wabuska Shortages (AF)	% Of the Application 80700 water at Wabuska
NFWF Exh. 116	29,500	25,254	43.5	85.5%
RRSP 80700	29,500	23,040	159.2	77.6%

Summary

The DST was modified from the baseline model run to simulate, as closely as possible, the proposed Application No. 80700 water rights transfer scenario over calendar years 1996 through 2011, while continuing the consumptive use portion of the baseline supplemental pumping associated with the 80700 lands. In this scenario, the pumped water (consumptive use portion only) was modeled as entirely consumed by crop ET. The results from the RRSP 80700 scenario were compared to the results from NFWF Exh. 116. Analysis of the results indicates that, the net benefit from full retirement of the 80700 supplemental pumping as in NFWF Exh. 116, produces a 7.9% gain in water available at Wabuska above the amount available in the RRSP 80700 scenario.

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2. Appendix A - DST Global Water Budget Tables

Table A.1 Global Baseline Calibration Water Budget in Acre Feet.

Note that components conserve mass and variables between components match (+/- 1 AF). There are two modeling issues that need to be included in the HRU Water Balance for the comparison between components to be made. In particular, (1) the Colony Canal and Smith Primary Groundwater HRUs do not return all of their runoff to the surface network. This was a concept implemented in the phase 1 Smith Valley MODFLOW model, which assumes 18% of the Smith Primary GW HRU, and 15% of Colony's runoff are transported to Artesia Lake and lost from the system to evaporation, and (2) there is a portion of the Stanley Ranch, which lies outside of the active MODFLOW boundary. The HRU water balance generates recharge for this area, but it is not written into the MODFLOW recharge file because there are no active cells for the area. Grey rows account for these discrepancies the water balance and other components.

			1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
MODSIM	Inflows	River Inflow	507,531	626,458	507,613	397,041	235,025	156,808	157,336	206,474	186,936	422,256	585,105	136,617	162,266	198,762	283,575	547,174
		Runoff	41,549	43,935	41,584	42,369	36,668	31,706	31,639	34,194	33,615	41,779	44,828	30,980	31,422	33,928	37,213	46,253
		Stream Accretions	45,775	59,517	55,182	58,808	50,246	38,495	32,803	32,731	32,548	43,302	53,908	37,382	30,855	30,968	35,278	48,969
	Outflows	Stream Depletions	103,593	71,240	65,536	58,322	52,438	55,330	60,601	62,802	62,663	66,533	67,826	56,909	62,950	65,091	63,764	70,150
		Diversions	263,229	264,545	242,997	266,351	203,255	122,734	120,600	157,227	136,229	272,002	288,586	99,071	111,016	153,091	206,773	290,389
		River Outflow	228,033	394,125	295,847	173,545	66,246	48,945	40,577	53,370	54,206	168,801	327,428	48,998	50,577	45,477	85,529	281,857
		Volumetric Error (%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HRU Water Balance	Inflows	Diversions	263,229	264,545	242,997	266,351	203,255	122,734	120,600	157,227	136,229	272,002	288,586	99,071	111,016	153,091	206,773	290,389
		GW Pumping	68,643	70,101	72,252	68,998	94,530	129,089	133,081	117,016	125,032	65,384	58,954	141,215	136,529	120,624	95,314	61,378
	Outflows	Ditch Leakage	39,484	39,682	36,450	39,953	30,488	18,410	18,090	23,584	20,434	40,800	43,288	14,861	16,652	22,964	31,016	43,558
		Crop ET	162,274	158,513	148,932	163,141	152,494	134,015	136,384	143,360	135,904	165,783	164,453	128,441	132,678	144,492	154,560	163,976
		Runoff	*41,549*	*43,935*	*41,584*	*42,369*	*36,668*	*31,705*	*31,639*	*34,194*	*33,615*	*41,779*	*44,828*	*30,980*	*31,422*	*33,928*	*37,213*	*46,253*
		Runoff Colony & Smith PGW	*3,859*	*3,691*	*3,737*	*3,787*	*3,381*	*2,952*	*2,951*	*3,228*	*2,976*	*3,870*	*3,970*	*2,832*	*2,821*	*3,130*	*3,434*	*4,097*
		Total WB Runoff	45,407	47,625	45,321	46,157	40,049	34,657	34,590	37,422	36,591	45,649	48,797	33,812	34,243	37,058	40,646	50,349
		Ag. Recharge	*84,669*	*88,796*	*84,507*	*86,058*	*74,729*	*64,726*	*64,604*	*69,858*	*68,310*	*85,118*	*90,983*	*63,163*	*63,961*	*69,191*	*75,833*	*93,875*
		Ag. Recharge - Stanley Ranch Zeroed	*37*	*30*	*39*	*40*	*25*	*15*	*13*	*19*	*22*	*36*	*19*	*9*	*10*	*9*	*31*	*9*
		Total WB Ag. Recharge	84,706	88,825	84,546	86,098	74,754	64,741	64,617	69,876	68,332	85,154	91,002	63,172	63,972	69,200	75,864	93,884
		Volumetric Error (%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MODFLOW (Smith & Mason)	Inflows	Storage	156,734	95,926	85,759	78,990	91,307	122,753	117,921	93,959	103,617	63,084	63,068	131,107	113,864	89,227	69,701	56,242
		Mtn. Block Recharge	19,050	18,998	18,998	18,998	19,050	18,998	18,998	18,998	19,050	18,998	18,998	18,998	19,050	18,998	18,998	18,998
		Ponds Recharge	2,168	1,701	1,438	1,252	1,150	1,120	1,135	1,142	1,140	1,084	997	981	1,041	1,073	1,068	1,011
		GW Interbasin Flow	760	688	734	760	803	824	824	812	815	767	738	810	804	788	767	721
		Ag. Recharge	84,669	88,796	84,507	86,058	74,729	64,726	64,604	69,858	68,310	85,118	90,983	63,163	63,961	69,191	75,833	93,875
		Ditch Leakage	39,484	39,682	36,449	39,953	30,488	18,410	18,090	23,584	20,434	40,800	43,288	14,861	16,652	22,964	31,016	43,558
		Stream Depletions	103,593	71,240	65,537	58,322	52,438	55,330	60,601	62,802	62,663	66,533	67,825	56,909	62,951	65,091	63,764	70,150
	Outflows	Stream Accretions	45,774	59,517	55,183	58,808	50,246	38,496	32,803	32,731	32,548	43,302	53,909	37,382	30,855	30,967	35,278	48,969
		Storage	241,361	132,203	108,524	96,915	65,710	56,607	60,015	66,025	63,071	110,154	112,274	49,641	54,858	60,992	75,321	115,951
		GW Interbasin Flow	575	716	786	848	893	937	961	982	999	1,037	1,079	1,062	1,077	1,066	1,073	1,102
		GW Pumping	68,643	70,101	72,252	68,998	94,530	129,089	133,081	117,016	125,032	65,384	58,954	141,215	136,529	120,624	95,314	61,378
		Non-Ag. ET	50,095	54,472	56,654	58,741	58,578	57,009	55,286	54,374	54,363	56,479	59,660	57,505	54,986	53,654	54,134	57,129
		Volumetric Error (%)	0.00	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

Table A.2 Global Exh.116 Ap. 80700 Water Budget in Acre Feet.

Note that components conserve mass and variables between components match (=/- 1 AF). There are two modeling issues that need to be included in the HRU Water Balance for the comparison between components to be made. In particular, (1) the Colony Canal and Smith Primary Groundwater HRUs do not return all of their runoff to the surface network. This was a concept implemented in the phase 1 Smith Valley MODFLOW model, which assumes 18% of the Smith Primary GW HRU, and 15% of Colony's runoff are transported to Artesia Lake and lost from the system to evaporation, and (2) there is a portion of the Stanley Ranch, which lies outside of the active MODFLOW boundary. The HRU water balance generates recharge for this area, but it is not written into the MODFLOW recharge file because there are no active cells for the area. Grey rows account for these discrepancies the water balance and other components.

			1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
MODSIM	**Inflows**	**River Inflow**	507,531	626,458	507,613	397,041	235,025	156,808	157,336	206,474	186,936	422,256	585,105	136,617	162,266	198,762	283,575	547,174
		Runoff	41,005	43,391	40,982	41,822	36,120	31,166	31,104	33,658	33,053	41,225	44,248	30,442	30,872	33,393	36,657	45,700
		Stream Accretions	45,774	59,486	55,143	58,768	50,225	38,478	32,784	32,713	32,553	43,317	53,917	37,374	30,852	30,972	35,295	48,980
	Outflows	**Stream Depletions**	103,196	70,893	65,275	58,194	52,324	54,980	60,224	62,404	62,210	66,417	67,735	56,608	62,517	64,633	63,459	70,002
		Diversions	261,197	262,578	239,794	263,905	201,337	121,467	119,574	156,008	134,979	269,226	285,502	98,104	110,045	152,001	204,946	287,888
		River Outflow	229,917	395,863	298,669	175,532	67,709	50,005	41,425	54,433	55,352	171,155	330,033	49,722	51,427	46,493	87,121	283,964
		Volumetric Error (%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HRU Water Balance	**Inflows**	**Diversions**	261,197	262,578	239,794	263,905	201,337	121,467	119,574	156,008	134,979	269,226	285,502	98,105	110,045	152,001	204,946	287,888
		GW Pumping	67,064	68,470	71,475	67,749	92,846	126,894	130,697	114,789	122,762	64,389	58,141	138,811	134,073	118,294	93,533	60,161
	Outflows	**Ditch Leakage**	39,180	39,387	35,969	39,586	30,200	18,220	17,936	23,401	20,247	40,384	42,825	14,716	16,507	22,800	30,742	43,183
		Crop ET	160,522	156,763	147,153	161,377	150,745	132,284	134,658	141,631	134,176	164,011	162,674	126,752	130,969	142,767	152,815	162,211
		Runoff	*41,005*	*43,391*	*40,982*	*41,822*	*36,120*	*31,166*	*31,104*	*33,658*	*33,053*	*41,225*	*44,248*	*30,442*	*30,872*	*33,393*	*36,657*	*45,700*
		Runoff Colony & Smith PGW	*3859*	*3691*	*3737*	*3788*	*3381*	*2951*	*2951*	*3228*	*2976*	*3870*	*3970*	*2832*	*2821*	*3130*	*3434*	*4096*
		Total WB Runoff	44,864	47,082	44,719	45,609	39,500	34,117	34,055	36,885	36,029	45,095	48,218	33,275	33,692	36,522	40,091	49,797
		Ag. Recharge	*83,659*	*87,787*	*83,389*	*85,041*	*73,711*	*63,723*	*63,609*	*68,861*	*67,267*	*84,089*	*89,906*	*62,165*	*62,939*	*68,196*	*74,801*	*92,848*
		Ag. Recharge - Stanley Ranch Zeroed	*37*	*30*	*39*	*40*	*25*	*15*	*13*	*19*	*22*	*36*	*19*	*9*	*10*	*9*	*32*	*9*
		Total WB Ag. Recharge	83,696	87,816	83,428	85,081	73,736	63,739	63,622	68,880	67,289	84,125	89,925	62,174	62,950	68,206	74,832	92,857
		Volumetric Error (%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MODFLOW (Smith & Mason)	**Inflows**	**Storage**	156,115	95,259	85,463	78,577	90,565	121,364	116,351	92,598	102,241	62,753	62,928	129,625	112,349	87,963	68,991	55,861
		Mtn. Block Recharge	19,050	18,998	18,998	18,998	19,050	18,998	18,998	18,998	19,050	18,998	18,998	18,998	19,050	18,998	18,998	18,998
		Ponds Recharge	2,168	1,701	1,438	1,252	1,151	1,120	1,134	1,141	1,138	1,082	996	980	1,039	1,071	1,066	1,008
		GW Interbasin Flow	760	688	734	760	803	824	824	812	815	767	738	810	804	788	767	721
		Ag. Recharge	83,659	87,787	83,389	85,041	73,711	63,723	63,610	68,861	67,267	84,089	89,906	62,165	62,939	68,196	74,801	92,848
		Ditch Leakage	39,179	39,387	35,969	39,586	30,200	18,220	17,936	23,401	20,247	40,384	42,825	14,716	16,507	22,800	30,742	43,183
		Stream Depletions	103,196	70,893	65,275	58,194	52,324	54,980	60,225	62,404	62,210	66,417	67,735	56,608	62,517	64,634	63,459	70,002
	Outflows	**Stream Accretions**	45,774	59,486	55,143	58,768	50,225	38,478	32,784	32,713	32,553	43,317	53,917	37,374	30,852	30,972	35,294	48,980
		Storage	240,668	131,692	107,387	96,532	65,492	56,108	59,521	65,500	62,440	109,351	111,370	49,204	54,293	60,524	74,825	115,216
		GW Interbasin Flow	573	712	783	846	891	933	956	977	993	1,034	1,077	1,057	1,071	1,060	1,068	1,099
		GW Pumping	67,064	68,470	71,475	67,749	92,846	126,894	130,697	114,789	122,762	64,389	58,141	138,811	134,073	118,294	93,533	60,161
		Non-Ag. ET	50,038	54,330	56,454	58,490	58,341	56,794	55,093	54,209	54,204	56,371	59,601	57,432	54,899	53,571	54,075	57,141
		Volumetric Error (%)	0.00	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

Table A.3 Global RRSP 80700 Scenario Water Budget in Acre Feet.

Note that components conserve mass and variables between components match (=/- 1 AF). There are two modeling issues that need to be included in the HRU Water Balance for the comparison between components to be made. In particular, (1) the Colony Canal and Smith Primary Groundwater HRUs do not return all of their runoff to the surface network. This was a concept implemented in the phase 1 Smith Valley MODFLOW model, which assumes 18% of the Smith Primary GW HRU, and 15% of Colony's runoff are transported to Artesia Lake and lost from the system to evaporation, and (2) there is a portion of the Stanley Ranch, which lies outside of the active MODFLOW boundary. The HRU water balance generates recharge for this area, but it is not written into the MODFLOW recharge file because there are no active cells for the area. Grey rows account for these discrepancies the water balance and other components.

			1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
MODSIM	Inflows	River Inflow	507,531	626,458	507,613	397,041	235,025	156,808	157,336	206,474	186,936	422,256	585,105	136,620	162,266	198,762	283,575	547,174
		Runoff	41,005	43,391	40,982	41,822	36,119	31,166	31,102	33,658	33,053	41,225	44,248	30,439	30,868	33,388	36,657	45,700
		Stream Accretions	45,773	59,481	55,133	58,749	50,207	38,463	32,766	32,693	32,525	43,270	53,845	37,335	30,812	30,934	35,242	48,913
	Outflows	Stream Depletions	103,200	70,912	65,320	58,253	52,398	55,038	60,308	62,515	62,334	66,586	67,924	56,728	62,666	64,811	63,643	70,270
		Diversions	261,197	262,578	239,794	263,905	201,328	121,467	119,560	156,004	134,969	269,226	285,502	98,073	110,014	151,985	204,946	287,888
		River Outflow	229,913	395,839	298,615	175,455	67,626	49,932	41,335	54,305	55,211	170,938	329,772	49,593	51,267	46,288	86,884	283,629
		Volumetric Error (%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HRU Water Balance	Inflows	Diversions	261,197	262,578	239,794	263,905	201,328	121,467	119,560	156,004	134,969	269,226	285,502	98,073	110,014	151,985	204,946	287,888
		Pumping	67,064	68,470	71,475	67,749	92,849	126,894	130,698	114,789	122,762	64,389	58,141	138,815	134,076	118,294	93,533	60,161
	Outflows	Ditch Leakage	39,180	39,387	35,969	39,586	30,199	18,220	17,934	23,401	20,245	40,384	42,825	14,711	16,502	22,798	30,742	43,183
		Crop ET	160,522	156,763	147,153	161,377	150,744	132,284	134,652	141,628	134,168	164,011	162,674	126,739	130,957	142,767	152,815	162,211
		Runoff	*41,005*	*43,391*	*40,982*	*41,822*	*36,119*	*31,166*	*31,102*	*33,658*	*33,053*	*41,225*	*44,248*	*30,439*	*30,868*	*33,388*	*36,657*	*45,700*
		Runoff Colony & Smith PGW	*3859*	*3691*	*3737*	*3788*	*3381*	*2951*	*2951*	*3228*	*2976*	*3870*	*3970*	*2832*	*2821*	*3130*	*3434*	*4096*
		Total WB Runoff	44,864	47,082	44,719	45,609	39,500	34,117	34,053	36,885	36,029	45,095	48,218	33,271	33,689	36,518	40,091	49,797
		Ag. Recharge	*83,659*	*87,787*	*83,389*	*85,041*	*73,710*	*63,723*	*63,606*	*68,861*	*67,267*	*84,089*	*89,906*	*62,158*	*62,932*	*68,188*	*74,801*	*92,848*
		Ag. Recharge - Stanley Ranch Zeroed	*37*	*30*	*39*	*40*	*25*	*15*	*13*	*19*	*22*	*36*	*19*	*9*	*10*	*9*	*32*	*9*
		Total WB Ag. Recharge	83,696	87,816	83,428	85,081	73,735	63,739	63,619	68,880	67,289	84,125	89,925	62,166	62,943	68,197	74,832	92,857
		Volumetric Error (%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MODFLOW (Smith & Mason)	Inflows	Storage	156,742	95,924	85,785	79,014	91,269	122,413	117,478	93,611	103,247	63,058	63,142	130,691	113,428	88,887	69,590	56,200
		Mtn. Block Recharge	19,050	18,998	18,998	18,998	19,050	18,998	18,998	18,998	19,050	18,998	18,998	18,998	19,050	18,998	18,998	18,998
		Ponds Recharge	*2,168*	*1,701*	*1,438*	*1,252*	*1,151*	*1,120*	*1,134*	*1,141*	*1,138*	*1,082*	*996*	*980*	*1,039*	*1,071*	*1,066*	*1,008*
		GW Interbasin Flow	*760*	*688*	*734*	*760*	*803*	*824*	*824*	*812*	*815*	*767*	*738*	*810*	*804*	*788*	*767*	*721*
		Ag. Recharge	83,659	87,787	83,389	85,041	73,710	63,723	63,606	68,861	67,267	84,089	89,906	62,158	62,932	68,188	74,801	92,848
		Ditch Leakage	39,179	39,387	35,969	39,586	30,199	18,220	17,934	23,401	20,245	40,384	42,825	14,711	16,502	22,798	30,742	43,183
	Outflows	Stream Depletions	103,200	70,912	65,320	58,253	52,398	55,038	60,308	62,516	62,335	66,586	67,923	56,729	62,666	64,812	63,643	70,271
		Stream Accretions	45,773	59,481	55,133	58,749	50,207	38,463	32,766	32,693	32,525	43,270	53,846	37,335	30,812	30,934	35,241	48,913
		Storage	240,508	131,596	107,498	96,564	65,596	56,270	59,685	65,687	62,647	109,653	111,781	49,467	54,559	60,752	75,081	115,674
		GW Interbasin Flow	573	712	783	845	890	932	955	976	992	1,032	1,076	1,055	1,070	1,059	1,066	1,097
		GW Pumping	67,861	69,294	71,829	68,371	93,703	128,019	131,923	115,929	123,926	64,872	58,528	140,088	135,350	119,489	94,438	60,762
		Non-Ag. ET	50,033	54,290	56,366	58,352	58,176	56,629	54,929	54,029	53,992	56,112	59,280	57,108	54,615	53,283	53,755	56,762
		Volumetric Error (%)	0.00	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01