SNWA WATER BUDGET

THIS SECTION SUMMARIZES THE DISTRIBUTION OF AVAILABLE RESOURCES AND FORECASTED DEMANDS BY SNWA MEMBER AGENCY OVER THE SHORT-TERM PLANNING HORIZON.

INTRODUCTION

This Water Budget was prepared with technical input from SNWA's member agencies. The Water Budget differs from the Water Resource Plan (Chapters 1-5) by presenting a more detailed accounting of water resources available to individual SNWA member agencies over the short-term (4-year) planning horizon. It also includes a forecast of water demands by SNWA purveyor member for each of their respective service areas.

Collectively, SNWA's member agencies provide potable water, wastewater treatment service and reuse water to nearly 2.2 million residents in Southern Nevada. As detailed below, "Purveyor Members" (*) are responsible for delivering potable water supplies and "Wastewater Purveyors" (†) are responsible for treating wastewater for direct and/or indirect water reuse:

- Big Bend Water District (BBWD)*
- City of Boulder City (BC)*†
- City of Henderson (COH)*†
- City of Las Vegas (LV)†
- City of North Las Vegas (NLV)*†
- Clark County Water Reclamation District (CCWRD)†
- Las Vegas Valley Water District (LVVWD)*

The Water Budget includes eight primary tables and four supplementary tables that detail various aspects of water supply and demand, providing both historical (actual) water demand, water resources and facility use data, as well as short-term forecasts.

WATER BUDGET TABLES

Table 1: Provides a summary of actual and forecasted water use by each SNWA member agency. Water use includes delivery of potable water supplies (groundwater, Colorado River and recovery of artificial recharge), as well as non-potable supplies (direct reuse). The total water delivery forecast for all SNWA member agencies ranges between approximately 515,000 and 547,000 AFY over the short-term planning horizon. This falls within the projected upper and lower demand range as described in Chapter 4.

Table 2: Provides a summary of resources available to SNWA member agencies under normal Colorado River operating conditions and is based on various agreements and/or permits. Total resources include approximately 536,000 AFY of potable and non-potable supplies. Short-term resources (such as unused Nevada Colorado River water, banked water and intentionally created surpluses) are identified in Table 2, but these resources are not allocated by SNWA member agency.

Table 3: Provides a summary of actual and forecast facility usage by SNWA member agency for diversion of Colorado River water and groundwater production by facility. For the short-term planning horizon, the total forecasted Colorado River facility uses for all SNWA purveyor diversions range from approximately 459,000 to 490,000 AFY; total forecasted groundwater facility uses is approximately 46,000 AFY for the same timeframe.

Table 4: Provides a summary of actual and forecast facility usage by facility, by SNWA member agency as well as by other Colorado River and groundwater users. Facilities include Colorado River facilities—BBWD system, SNWS, BWC system and U.S. Bureau of Reclamation (USBR) raw water system—and groundwater facilities (groundwater recovery and artificial recharge wells). For the short-term planning horizon, total forecasted Colorado River diversions range between approximately 465,000 and 496,000 AFY. The short-term forecast for groundwater and artificial recharge recovery facilities is approximately 75,000 AFY. This includes use by LVVWD, NLV, Nellis

AFB and private/permitted wells across the Las Vegas Valley groundwater basin.

Table 5: Provides a summary of actual and forecasted potable water use by SNWA water purveyor, including Colorado River water, groundwater and artificial recharge, as provided under various water supply agreements and/or permits. The total forecasted potable water usage for all SNWA purveyors ranges from approximately 500,000 to 531,000 AFY over the short-term planning horizon. As needed, short-term resources identified in Table 2 will be used to meet demands through 2021.

Table 6: Provides a summary of actual and forecasted wastewater supplies, as well as reuse of highly-treated wastewater effluent. Various types of use include direct reuse, disposal to groundwater and returns to surface water. The vast majority of reuse in Southern Nevada occurs through indirect reuse, where highly treated effluent is returned to the Colorado River for return-flow credits. This expands the availability and use of SNWA's Colorado River supplies. The forecasted return to surface water during the short-term planning horizon ranges from approximately 197,000 to 211,000 AFY. Surface water returns are different than return-flow credits which are discussed in Table 8.

Table 7: Provides a summary of actual and forecasted reuse amounts by SNWA member agency over the short-term planning horizon. This table identifies reuse limits or "thresholds" established under the SNWA Cooperative Agreement and describes how they are managed.

Table 8: Provides a summary of actual and forecasted Colorado River diversions by SNWA purveyor member and other Nevada contract holders, as well as the actual and forecasted amount of return-flow credits. These forecasts are used to show the projected consumptive use of Colorado River resources over the short-term planning horizon. With no artificial recharge the forecasted consumptive use of Colorado River supplies during the short-term planning horizon ranges from approximately 242,000 to 258,000 AFY.

Supplementary Tables A-D: These tables provide detailed calculations used to project return-flow credits and system loss.

CHAPTER SUMMARY

The 2018 Water Budget projects consumptive use of Nevada's Colorado River allocation to range between approximately 242,000 and 258,000 AFY during the short-term planning horizon (2018-2021). SNWA plans to store the balance of available resources for future use as temporary resources (see Chapter 4) and/or leave a portion of this available resource in Lake Mead to help bolster Lake Mead water levels from continued declines associated with ongoing drought:

- 2018 plans include storing up to 13,500 AF of Nevada's unused Colorado River apportionment in the Arizona Water Bank.
- The balance of Nevada's unused apportionment will remain in Lake Mead, helping to reduce the magnitude of lake level declines.
- For 2018-2021, SNWA plans to store approximately 32,000 AFY in Lake Mead through the creation of Tributary Conservation ICS.

The actual amount of water stored from year to year may change depending upon the water use and resource availability. While a shortage declaration may affect the availability of Colorado River water for storage and future recovery, it is not expected to impact SNWA's ability to meet near-term forecasted demands.

Even with an imposed shortage, forecasted Colorado River water use through 2021 is well below the largest shortage reduction that could be imposed under the existing guidelines (staged consumptive use reductions range from 13,000 to 20,000 AFY). As detailed in the 2018 Plan, SNWA has sufficient resources to meet the region's short- and long-term water resource needs under a wide range of supply and demand conditions, including shortage. If needed, SNWA will use temporary or banked resources to meet customer demands or for operational flexibility

SNWA member agencies are expected to continue the utilization of reuse supplies for direct, non-potable applications. The estimated amount of direct reuse ranges from approximately 14,900 to 16,300 AFY during the short-term planning horizon. The 1991 SNWA Cooperative Agreement allows for up to 21,800 AFY of direct reuse.

Las Vegas Valley and Lake Mead

Table 1: Customer Water Use, AFY (a)

POTABLE CUSTOMER USE	2016	2017	2018	2019	2020	2021
Groundwater (b)						
LVVWD	40,756	40,859	40,760	40,760	40,760	40,760
NLV	1,835	2,246	5,235	5,250	5,250	5,250
Total	**42,591**	**43,105**	**45,995**	**46,010**	**46,010**	**46,010**
Colorado River						
Deliveries						
BBWD	3,884	4,043	4,008	4,250	4,425	4,478
BC (c)	10,650	10,527	10,696	10,736	10,736	10,744
COH (c)	79,045	84,556	86,210	86,790	88,731	90,594
LVVWD	292,584	302,453	301,278	308,333	314,932	319,877
NLV	50,602	52,256	51,706	54,047	56,953	59,251
Total	436,765	453,835	453,898	464,156	475,777	484,944
AR Recovery						
BBWD	0	0	0	0	0	0
BC	0	0	0	0	0	0
COH	0	0	0	0	0	0
LVVWD	0	0	0	0	0	0
NLV	0	0	0	0	0	0
Total	0	0	0	0	0	0
Colorado River Use (Deliveries + AR Recovery)						
BBWD	3,884	4,043	4,008	4,250	4,425	4,478
BC (c)	10,650	10,527	10,696	10,736	10,736	10,744
COH (c)	79,045	84,556	86,210	86,790	88,731	90,594
LVVWD	292,584	302,453	301,278	308,333	314,932	319,877
NLV	50,602	52,256	51,706	54,047	56,953	59,251
Total	**436,765**	**453,835**	**453,898**	**464,156**	**475,777**	**484,944**
Total Potable Customer Use (All Sources)						
BBWD	3,884	4,043	4,008	4,250	4,425	4,478
BC (c)	10,650	10,527	10,696	10,736	10,736	10,744
COH (c)	79,045	84,556	86,210	86,790	88,731	90,594
LVVWD	333,340	343,312	342,038	349,093	355,692	360,637
NLV	52,437	54,502	56,941	59,297	62,203	64,501
Total Potable Customer Use	**479,356**	**496,940**	**499,893**	**510,166**	**521,787**	**530,954**
NON-POTABLE CUSTOMER USE						
Direct Reuse						
BC	680	278	736	552	559	559
CCWRD - LVV (d)	3,984	3,363	3,000	3,000	3,000	3,000
CCWRD - Laughlin	0	0	0	0	0	0
COH	7,638	7,041	7,000	7,000	7,000	7,000
LV (d)	4,392	4,235	4,200	4,200	4,200	4,200
NLV	0	0	0	1,500	1,500	1,500
Total Non-Potable Customer Use	**16,694**	**14,917**	**14,936**	**16,252**	**16,259**	**16,259**
TOTAL CUSTOMER USE (ALL SOURCES)						
BBWD	3,884	4,043	4,008	4,250	4,425	4,478
BC (c)	11,330	10,805	11,432	11,288	11,295	11,303
CCWRD: LVV (d)	3,984	3,363	3,000	3,000	3,000	3,000
CCWRD: Laughlin	0	0	0	0	0	0
COH (c)	86,683	91,597	93,210	93,790	95,731	97,594
LV (d)	4,392	4,235	4,200	4,200	4,200	4,200
LVVWD	333,340	343,312	342,038	349,093	355,692	360,637
NLV	52,437	54,502	56,941	60,797	63,703	66,001
Total	**496,050**	**511,857**	**514,829**	**526,418**	**538,046**	**547,213**

NOTES

(a) Source (2016-2021): SNWA member agencies (Customer).

(b) Groundwater production includes applicable in-lieu recovery.

(c) A portion of water usage is met with raw water.

(d) CCWRD and LV provide sewer service to their respective service areas; both are located in the LVVWD service area.

Table 2: Available Resources, AFY

	SNWS Delivery Contract (a)	SNWA Delivery Contract (b)	SNWA Delivery Contract (c)	Other Delivery Contracts (d)	Total Colorado River Water	Ground-water	Total Potable Resource	Total Non-Potable Resource (e)	Total Long-Term Resource (f)	Total Short-Term Resource
BBWD	0	5,352	0.0	10,000	15,352.0	0	15,352.0	0	15,352.0	
BC	8,918	3,948	0.0	5,876	18,742.0	0	18,742.0	0	18,742.0	
CCWRD (h) (i)	0	0	0.0	0	0.0	0	0.0	11,100	11,100.0	
COH	27,021	19,858	2,137.5	15,878	64,894.5	0	64,894.5	7,500	72,394.5	
LV (h)	0	0	0.0	0	0.0	0	0.0	2,000	2,000.0	
LVVWD	232,426	78,799	362.5	15,407	326,994.5	40,760	367,754.5	0	367,754.5	
NLV	26,635	15,043	0.0	0	41,678.0	6,201	47,879.0	1,200	49,079.0	
Total	**295,000**	**123,000**	**2,500**	**47,161**	**467,661**	**46,961**	**514,622**	**21,800**	**536,422**	(g)

NOTES

(a) Contract 7-07-03-W0004 between SNWA and the Department of the Interior ("Federal SNWS Water Delivery Contract" or "SNWS Delivery Contract"). Quantities for individual purveyors are outlined in Section 8(b) of the SNWA Cooperative Agreement.

(b) In Contract 2-07-30-W0266 between SNWA and the Department of the Interior ("SNWA Water Delivery Contract"), Sections 4(a)(1) and (2) give SNWA the right to use any remaining, uncontracted Nevada apportionment and water available because of reduction, expiration or termination of individual entitlements within Nevada. Section 8(c) of the SNWA Cooperative Agreement (amended January 1, 1996) apportions among the purveyors 123,000 AFY of Colorado River water made available to SNWA under Sections 4(a)(1) and (2).

(c) Allocated 2,500 AFY pursuant to Section 8(d) of the SNWA Cooperative Agreement and the November 17, 1994 Water Supply Agreement.

(d) Other delivery contracts: 2-07-30-W0269 (BBWD), 14-06-300-978 (BC), 0-07-30-W0246 (COH) and 14-06-300-2130 (LVVWD).

(e) Maximum 21,800 AFY reuse per SNWA Cooperative Agreement; safeguards return-flows to the Colorado River for return-flow credit. If reuse is greater than quantities outlined in the agreement and if the excess reuse results in a reduction of return-flow credits (which in turn reduces other purveyors' Colorado River water supplies), then the excess reuse quantity is reduced from the potable purveyor in whose service area the reuse provider resides.

(f) Expected to be available in perpetuity.

(g) Short-term resource includes: unused Colorado River apportionments, Intentionally Created Surplus stored in Lake Mead and banked water. It may include flood control and domestic surpluses of Colorado River water made available to Nevada on a year-by-year basis by the Secretary of the Interior. Short-term resources have not been allocated by SNWA member agency. As shown in Table 8, Nevada Colorado River consumptive use is sufficient to meet demands through 2021. Tables 5 and 7 provide additional details on forecasted use of potable and non-potabe water resources by SNWA member agency. When needed, water supplies will be allocated to the SNWA member agencies pursuant to 8(g) of the 1995 Amended Cooperative Agreement.

(h) CCWRD-LVV and LV sewer service areas are within the LVVWD water service area. If reuse demands for CCWRD-LVV or LV are greater than the reuse in the SNWA Cooperative Agreement and if they reduce return-flow credits (which in turn reduces other purveyors' Colorado River water supplies), then the excess reuse quantity is subtracted from LVVWD's potable water resource.

(i) Maximum reuse for CCWRD includes reuse for CCWRD in Laughlin and in the LVV.

Table 3: Customer Facility Use, AFY (a)

COLORADO RIVER FACILITY USE (b)	2016	2017	2018	2019	2020	2021
BBWD System	3,884	4,043	4,008	4,250	4,425	4,478
BC						
SNWS	10,650	10,527	10,696	10,736	10,736	10,744
USBR System (Raw Water)	0	0	0	0	0	0
Total	**10,650**	**10,527**	**10,696**	**10,736**	**10,736**	**10,744**
COH						
SNWS	66,057	71,167	75,664	73,790	75,731	77,594
BWC System						
Potable	10,763	9,805	7,672	10,000	10,000	10,000
Raw	2,225	3,584	2,874	3,000	3,000	3,000
Total	12,988	13,389	10,546	13,000	13,000	13,000
Total	**79,045**	**84,556**	**86,210**	**86,790**	**88,731**	**90,594**
LVVWD (SNWS)						
Customer Use (No AR Recovery)	292,584	302,453	301,278	308,333	314,932	319,877
AR						
Current Year Banking Operations (c)	0	0	0	0	0	0
Other (d)	0	0	0	0	0	0
Total AR	0	0	0	0	0	0
Total	**292,584**	**302,453**	**301,278**	**308,333**	**314,932**	**319,877**
NLV (SNWS)						
Customer Use (No AR Recovery)	50,602	52,256	51,706	54,047	56,953	59,251
AR	0	0	0	0	0	0
Total	**50,602**	**52,256**	**51,706**	**54,047**	**56,953**	**59,251**
Total Colorado River Customer Facility Use (b)	**436,765**	**453,835**	**453,898**	**464,156**	**475,777**	**484,944**
AR	0	0	0	0	0	0
Total	436,765	453,835	453,898	464,156	475,777	484,944
SNWS System Loss (e)	7,888	4,988	5,022	5,109	5,239	5,343
Total Colorado River Customer Facility Use	**444,653**	**458,823**	**458,920**	**469,265**	**481,016**	**490,287**
GROUNDWATER FACILITY USE (f)						
LVVWD						
Groundwater Production (g)	40,756	40,859	40,760	40,760	40,760	40,760
AR Pumpage (AR Recovery)						
Banking Operations	0	0	0	0	0	0
Recovery for Customers	0	0	0	0	0	0
Total AR Pumpage	0	0	0	0	0	0
Total	**40,756**	**40,859**	**40,760**	**40,760**	**40,760**	**40,760**
NLV						
Groundwater Production (g)	1,835	2,246	5,235	5,250	5,250	5,250
Total AR Pumpage	0	0	0	0	0	0
Total	1,835	2,246	5,235	5,250	5,250	5,250
Total Groundwater Customer Facility Use	**42,591**	**43,105**	**45,995**	**46,010**	**46,010**	**46,010**

NOTES

(a) Source (2016-2021): SNWA member agencies.

(b) Includes AR, but no AR recovery.

(c) Recharge recovered during current year for system management.

(d) Recharge for SNWA customers and Las Vegas Valley Groundwater Management Program.

(e) SNWS system loss, see Supplementary Table D.

(f) Includes AR recovery.

(g) Groundwater production includes applicable in-lieu recovery. LVVWD and NLV do not plan to recover in-lieu groundwater.

Table 4: Usage by Facility, AFY (a)

COLORADO RIVER FACILITIES USE (b)	2016	2017	2018	2019	2020	2021
BBWD System	3,884	4,043	4,008	4,250	4,425	4,478
BWC System						
COH	12,988	13,389	10,546	13,000	13,000	13,000
BWC Complex (b)	4,982	4,451	4,717	4,717	4,717	4,717
Total	17,970	17,840	15,263	17,717	17,717	17,717
BWC System Loss (c)	-576	-768	119	138	138	138
Total BWC	17,394	17,072	15,382	17,855	17,855	17,855
SNWS						
BC	10,650	10,527	10,696	10,736	10,736	10,744
COH	66,057	71,167	75,664	73,790	75,731	77,594
LVVWD	292,584	302,453	301,278	308,333	314,932	319,877
Nellis AFB (b)	1,269	1,159	1,214	1,214	1,214	1,214
NLV	50,602	52,256	51,706	54,047	56,953	59,251
Total	421,162	437,562	440,558	448,120	459,566	468,680
SNWS System Loss (c)	7,888	4,988	5,022	5,109	5,239	5,343
Total SNWS	429,050	442,550	445,580	453,229	464,805	474,023
USBR System (Raw Water)						
BC	0	0	0	0	0	0
Total Colorado River Diversions	**450,328**	**463,665**	**464,970**	**475,334**	**487,085**	**496,356**
GROUNDWATER FACILITIES USAGE (d)						
SNWA Customers						
Groundwater Production						
LVVWD	40,756	40,859	40,760	40,760	40,760	40,760
NLV	1,835	2,246	5,235	5,250	5,250	5,250
Total	42,591	43,105	45,995	46,010	46,010	46,010
AR Production (AR Recovery)						
LVVWD	0	0	0	0	0	0
NLV	0	0	0	0	0	0
Total	0	0	0	0	0	0
Total SNWA Customer Pumpage	**42,591**	**43,105**	**45,995**	**46,010**	**46,010**	**46,010**
Other LVV Production						
Nellis AFB (e)	473	522	498	498	498	498
Private/Permitted Wells (e)	28,218	28,801	28,510	28,510	28,510	28,510
Total	28,691	29,323	29,008	29,008	29,008	29,008
Total Groundwater Production	**71,282**	**72,428**	**75,003**	**75,018**	**75,018**	**75,018**
Total Groundwater Production/AR Recovery	**71,282**	**72,428**	**75,003**	**75,018**	**75,018**	**75,018**

NOTES

(a) Source (2016-2021): SNWA member agencies.

(b) Source (2016-2017): Colorado River Commission. Source (2018+): Average 2016-2017.

(c) SNWS and BWC system loss, see Supplementary D.

(d) Total production includes direct customer usage and AR/in-lieu recovery.

(e) Source (2016-2017): Nevada Division of Water Resources. Source (2018+): Average 2016-2017.

Table 5: SNWA Customer Use by Source
(Potable Includes Artificial Recharge), AFY

USE BY SOURCE - POTABLE	2016	2017	2018	2019	2020	2021	Available
BBWD							
Groundwater Rights	0	0	0	0	0	0	0
Federal Delivery Contract (a)	0	0	0	0	0	0	0
SNWA Delivery Contract (b)	0	0	0	0	0	0	5,352
Other Contracts (c)	3,884	4,043	4,008	4,250	4,425	4,478	10,000
Short-Term Resource	0	0	0	0	0	0	(d)
Total	3,884	4,043	4,008	4,250	4,425	4,478	
BC							
Groundwater Rights	0	0	0	0	0	0	0
Federal Delivery Contract (a)	4,774	4,651	4,820	4,860	4,860	4,868	8,918
SNWA Delivery Contract (b)	0	0	0	0	0	0	3,948
Other Contracts (c)	5,876	5,876	5,876	5,876	5,876	5,876	5,876
Short-Term Resource	0	0	0	0	0	0	(d)
Total	10,650	10,527	10,696	10,736	10,736	10,744	
COH							
Groundwater Rights	0	0	0	0	0	0	0
Federal Delivery Contract (a)	27,021	27,021	27,021	27,021	27,021	27,021	27,021
SNWA Delivery Contract (b)	19,858	19,858	19,858	19,858	19,858	19,858	19,858
SNWA Delivery Contract (e)	2,138	2,138	2,138	2,138	2,138	2,138	2,137.5
Other Contracts (c)	15,878	15,878	15,878	15,878	15,878	15,878	15,878
Short-Term Resource	14,151	19,662	21,316	21,896	23,837	25,700	(d)
Total	79,045	84,556	86,210	86,790	88,731	90,594	
LVVWD (f)							
Groundwater Rights	40,756	40,760	40,760	40,760	40,760	40,760	40,760
Federal Delivery Contract (a)	232,426	232,426	232,426	232,426	232,426	232,426	232,426
SNWA Delivery Contract (b)	44,751	54,620	53,445	60,500	67,099	72,044	78,799
SNWA Delivery Contract (e)	0	0	0	0	0	0	362.5
Other Contracts (c)	15,407	15,407	15,407	15,407	15,407	15,407	15,407
Short-Term Resource	0	99	0	0	0	0	(d)
Total	333,340	343,312	342,038	349,093	355,692	360,637	
NLV (f)							
Groundwater Rights	1,835	2,246	5,235	5,250	5,250	5,250	6,201
Federal Delivery Contract (a)	26,635	26,635	26,635	26,635	26,635	26,635	26,635
SNWA Delivery Contract (b)	15,043	15,043	15,043	15,043	15,043	15,043	15,043
Other Contracts (c)	0	0	0	0	0	0	0
Short-Term Resource	8,924	10,578	10,028	12,369	15,275	17,573	(d)
Total	52,437	54,502	56,941	59,297	62,203	64,501	
TOTAL USE BY SOURCE - POTABLE							
Groundwater Rights	42,591	43,006	45,995	46,010	46,010	46,010	46,961
Colorado River Water (Includes AR)							
Federal Delivery Contract (a)	290,856	290,733	290,902	290,942	290,942	290,950	295,000
SNWA Delivery Contract (b)	79,652	89,521	88,346	95,401	102,000	106,945	123,000
SNWA Delivery Contract (e)	2,138	2,138	2,138	2,138	2,138	2,138	2,500
Other Contracts (c)	41,045	41,204	41,169	41,411	41,586	41,639	47,161
Short-Term Resource	23,075	30,339	31,344	34,265	39,112	43,273	(d)
Total	436,765	453,934	453,898	464,156	475,777	484,944	
Total Potable Use	**479,356**	**496,940**	**499,893**	**510,166**	**521,787**	**530,954**	

NOTES

(a) Section 8(b) water in the SNWA Cooperative Agreement (295,000 AFY).

(b) Section 8(c) water in the SNWA Cooperative Agreement. This estimate corresponds with Table 2.

(c) Other contracts as described in Table 2.

(d) Includes Section 8(b) or 8(c) water that is unused by another individual SNWA purveyor and "short-term resource" described in Table 2.

(e) Section 8(d) water in the SNWA Cooperative Agreement.

Table 6: Wastewater and Uses of Wastewater, AFY (a)

WASTEWATER EFFLUENT	2016	2017	2018	2019	2020	2021
LVV						
BWC Discharge (b)	4,429	3,444	3,937	3,937	3,937	3,937
LV (c)	50,046	49,364	50,391	51,279	52,184	53,106
CCWRD - LVV	104,772	108,150	110,700	113,400	116,200	119,100
COH	24,674	24,715	25,629	26,189	26,721	27,226
NLV	19,207	19,769	20,164	22,068	22,479	22,898
Total	203,128	205,442	210,821	216,873	221,521	226,267
BC	1,213	1,162	1,104	1,113	1,122	1,122
CCWRD - Laughlin	2,097	2,035	2,260	2,320	2,370	2,430
Total Wastewater Effluent	**206,438**	**208,639**	**214,185**	**220,306**	**225,013**	**229,819**
USES OF WASTEWATER EFFLUENT						
LVV						
Direct Reuse (Reclaimed Water)						
LV	4,392	4,235	4,200	4,200	4,200	4,200
CCWRD - LVV	3,984	3,363	3,000	3,000	3,000	3,000
COH	7,638	7,041	7,000	7,000	7,000	7,000
NLV	0	0	0	1,500	1,500	1,500
Total	16,014	14,639	14,200	15,700	15,700	15,700
Disposal to Groundwater						
LV	0	0	0	0	0	0
CCWRD - LVV	0	0	0	0	0	0
COH	1,673	1,779	1,500	1,500	1,500	1,500
NLV	0	0	0	0	0	0
Total	1,673	1,779	1,500	1,500	1,500	1,500
Returns to Surface Water						
BWC Discharge	4,429	3,444	3,937	3,937	3,937	3,937
LV (c)	45,654	45,129	46,191	47,079	47,984	48,906
CCWRD - LVV	100,788	104,787	107,700	110,400	113,200	116,100
COH	15,363	15,895	17,129	17,689	18,221	18,726
NLV	19,207	19,769	20,164	20,568	20,979	21,398
Total	185,441	189,024	195,121	199,673	204,321	209,067
BC						
Direct Reuse (Reclaimed Water)	680	278	736	552	559	559
Disposal to Groundwater	533	884	368	561	563	563
Returns to Surface Water	0	0	0	0	0	0
Total	1,213	1,162	1,104	1,113	1,122	1,122
CCWRD - Laughlin						
Direct Reuse (Reclaimed Water)	0	0	0	0	0	0
Disposal to Groundwater	0	0	0	0	0	0
Returns to Surface Water	2,097	2,035	2,260	2,320	2,370	2,430
Total	2,097	2,035	2,260	2,320	2,370	2,430
Total Direct Reuse (Reclaimed Water)	**16,694**	**14,917**	**14,936**	**16,252**	**16,259**	**16,259**
Total Disposal to Groundwater	**2,206**	**2,663**	**1,868**	**2,061**	**2,063**	**2,063**
Total Returns to Surface Water	**187,538**	**191,059**	**197,381**	**201,993**	**206,691**	**211,497**
WASTEWATER FOR REUSE (DIRECT AND INDIRECT)						
LVV						
BWC Discharge	4,429	3,444	3,937	3,937	3,937	3,937
LV (c)	50,046	49,364	50,391	51,279	52,184	53,106
CCWRD - LVV	104,772	108,150	110,700	113,400	116,200	119,100
COH	23,001	22,936	24,129	24,689	25,221	25,726
NLV	19,207	19,769	20,164	22,068	22,479	22,898
Total	**201,455**	**203,663**	**209,321**	**215,373**	**220,021**	**224,767**

NOTES

(a) Source (2016-2021): SNWA customers.

(b) Source (2016-2017): Colorado River Commission. Source (2018+): Average 2016-2017.

(c) Las Vegas flows exclude dewatering flows to Las Vegas Wash at the Water Pollution Control Facility.

Table 7: Wastewater Reuse and Reuse Threshold, AFY (a)

REUSE BY SNWA PURVEYOR (a)	2016	2017	2018	2019	2020	2021	Section 9 Threshold	
BC	---	---	---	---	---	---	(b)	
LV (c)	4,392	4,235	4,200	4,200	4,200	4,200	2,000	
CCWRD								
LVV (c)	3,984	3,363	3,000	3,000	3,000	3,000	10,550	(e)
Laughlin (d)	0	0	0	0	0	0	550	(e)
Total	3,984	3,363	3,000	3,000	3,000	3,000	11,100	
COH	7,638	7,041	7,000	7,000	7,000	7,000	7,500	
NLV	0	0	0	1,500	1,500	1,500	1,200	
REUSE GREATER THAN SECTION 9 THRESHOLD (f)								
BC	---	---	---	---	---	---	(b)	
LV	2,392	2,235	2,200	2,200	2,200	2,200		
CCWRD								
LVV	0	0	0	0	0	0		
Laughlin	0	0	0	0	0	0		
Total	0	0	0	0	0	0		
COH	138	0	0	0	0	0		
NLV	0	0	0	300	300	300		

If a purveyor reuses more than its reuse threshold, then its corresponding potable supply of 8(c) water (purveyor portion of 123,000 AFY) is reduced by an amount that will assure deliveries to other purveyors will not be less (g). Even though the reuse of some purveyors is projected to be greater than the quantified threshold, there is also projected to be potable water available such that all projected demands will be met. Therefore, no purveyor's potable supply has been reduced in the accompanying tables.

NOTES

(a) Source (2016-2021): SNWA member agencies.

(b) Not applicable to BC (Section 9c of SNWA Cooperative Agreement).

(c) LVVWD is the water provider in the LVVWD service area, and LV and CCWRD are the sewer services and reuse providers. If LV and CCWRD combined reuse is greater than its combined threshold, and the other purveyors' deliveries are less as a result, then LVVWD's Section 8(c) potable resource is reduced correspondingly.

(d) BBWD is the potable water provider in the Laughlin area, and CCWRD is the sewer services and reuse provider. If CCWRD reuse is greater than its threshold, and other purveyors' deliveries are less as a result, then BBWD's Section 8(c) potable resource is reduced correspondingly.

(e) There are no individual thresholds for CCWRD-LVV and CCWRD-Laughlin in the SNWA Cooperative Agreement. Thresholds in this table are used for planning purposes to determine whether the amount over the threshold comes out of LVVWD or BBWD.

(f) Source: Section 9 of the SNWA Cooperative Agreement.

(g) Source: Section 9(b) of the SNWA Cooperative Agreement states: "If in any year a Member uses or authorizes the use of Reuse Water in excess of the amount specified in sub article 9(a) [refers to the purveyor portions of 21,800 AFY], then the allocation made by or pursuant to sub article 8(c) [123,000] to the Purveyor Members that serves such Member shall be reduced by an amount that will assure that deliveries to the other Purveyor Members of water (i) allocated to such other Purveyor Members pursuant to this Agreement, or (ii) to which such other Purveyor Members have a right pursuant to separate contracts with the United States will not be less than they would have been in the absence of such excess use of Reuse Water." In other words, if excess reuse causes a reduction in return-flow credits, which in turn causes a reduction in other purveyor's Colorado River supplies, the excess reuse quantity is subtracted from the potable purveyors in whose service area the reuse provider resides.

(h) Policy Regarding Out-of-Valley Water Use (see Appendix 4), adopted by SNWA Board of Directors in May 2017. Sets forth guiding principles for the efficient and beneficial use of water resources outside the areas currently served by SNWA member agency wastewater systems.

Table 8: Nevada Colorado River Diversions, Return-Flow Credits and Consumptive Use, AFY (a)

COLORADO RIVER	2016	2017	2018	2019	2020	2021	Available Resource
SNWA Customer Use (a) (b)							
BBWD	3,884	4,043	4,008	4,250	4,425	4,478	
BC	10,650	10,527	10,696	10,736	10,736	10,744	
COH	79,045	84,556	86,210	86,790	88,731	90,594	
LVVWD	292,584	302,453	301,278	308,333	314,932	319,877	
NLV	50,602	52,256	51,706	54,047	56,953	59,251	
Total	436,765	453,835	453,898	464,156	475,777	484,944	
SNWA Net AR (a) (c) (d)							
LVVWD	0	0	0	0	0	0	
NLV	0	0	0	0	0	0	
Total	0	0	0	0	0	0	
SNWA Customer Colorado River Use							
BBWD	3,884	4,043	4,008	4,250	4,425	4,478	
BC	10,650	10,527	10,696	10,736	10,736	10,744	
COH	79,045	84,556	86,210	86,790	88,731	90,594	
LVVWD	292,584	302,453	301,278	308,333	314,932	319,877	
NLV	50,602	52,256	51,706	54,047	56,953	59,251	
Total Use	436,765	453,835	453,898	464,156	475,777	484,944	
Total System Loss (e)	7,312	4,220	5,141	5,247	5,377	5,481	
Total	**444,077**	**458,055**	**459,039**	**469,403**	**481,154**	**490,425**	
Other Colorado River Users (f) (g)							
BWC Complex	4,982	4,451	4,717	4,717	4,717	4,717	8,208
FMIR	4,998	4,643	4,821	4,821	4,821	4,821	12,534
Nellis AFB	1,269	1,159	1,214	1,214	1,214	1,214	4,000
LMNRA at Lake Mead	348	335	342	342	342	342	2,000
LMNRA at Lake Mohave	163	151	157	157	157	157	
Pabco	914	914	914	914	914	914	928
Secretarial Reservation	61	68	65	65	65	65	300
Nevada Division of Wildlife	622	495	559	559	559	559	(h)
Small Water Users	0	0	0	0	0	0	
Total	13,357	12,216	12,789	12,789	12,789	12,789	
Total Nevada Colorado River Diversions	**457,434**	**470,271**	**471,828**	**482,192**	**493,943**	**503,214**	
NEVADA RETURN-FLOW CREDITS							
LVV (f) (i)	214,727	222,768	225,011	230,118	235,403	240,655	
Laughlin (a) (f)	2,097	2,035	2,260	2,320	2,370	2,430	
Secretarial Reservation (f) (g)	22	25	24	24	24	24	
Nevada Division of Wildlife (f) (g)	613	486	550	550	550	550	
Unmeasured Returns (f) (g)	1,649	1,532	1,607	1,607	1,607	1,607	
Total	219,108	226,846	229,452	234,619	239,954	245,266	
NEVADA CONSUMPTIVE USE							
Consumptive Use with AR (j)	238,326	243,425	242,376	247,573	253,989	257,948	
Net AR (c)	0	0	0	0	0	0	
Consumptive Use with No AR (k)	238,326	243,425	242,376	247,573	253,989	257,948	

NOTES

(a) Source: SNWA member agencies, see Table 1 and Table 3.

(b) Includes AR recovery for Customers.

(c) AR less recovery, excludes in-lieu recharge.

(d) Includes recharge for carryover banking operations.

(e) Source (2018+): Supplementary Table D.

(f) Source (2016-2017): USBR.

(g) Source (2018+): Average 2016 to 2017.

(h) Available resource assumed as consumptive use of 25 AFY.

(i) Source (2018+): Supplementary Table A, line 18.

(j) Excludes interstate banking.

(k) May be subject to final USBR accounting.

Supplementary A: Return-Flow Credit (USBR Method) and Nevada Consumptive Use Adjusted for Intentionally Created Surplus and Interstate Banking

	TOTAL COLORADO RIVER DELIVERIES ABOVE HOOVER DAM	2016	2017	2018	2019	2020	2021
1.	Total Colorado River Water Diverted Above Hoover Dam	448,389	461,434	462,842	472,964	484,540	493,758
2.	Gauged Flow of Las Vegas Wash Below Lake Las Vegas	224,874	229,560	231,259	236,366	241,651	246,903
3.	Precipitation Runoff (Estimated)	11,147	7,792	7,248	7,248	7,248	7,248
4.	Imported Groundwater and Surface Water	0	0	0	0	0	0
5.	2% of Imported Groundwater and Surface Water	0	0	0	0	0	0
6.	Effluent Reaching Lake Mead From LVV M&I Groundwater Pumping	0	0	0	0	0	0
7.	Total Las Vegas Wash Adjusted Gauge Flow (2-3-5-6)	213,727	221,768	224,011	229,118	234,403	239,655
8.	Total Other NV Flow to Lake Mead Above Hoover Dam	635	511	574	574	574	574
9.	Colorado River Bypassing Gauge, Less Phreatophyte Use	1,000	1,000	1,000	1,000	1,000	1,000
10.	Total Flow to Colorado River Above Hoover Dam (7+8+9)	215,362	223,279	225,585	230,692	235,977	241,229
11.	Consumptive Use Above Hoover Dam (1-10)	233,027	238,155	237,257	242,272	248,563	252,529
	BELOW HOOVER DAM						
12.	Total Colorado River Water Diverted Below Hoover Dam	9,045	8,837	8,986	9,228	9,403	9,456
13.	Total Flow to Colorado River Below Hoover Dam	3,746	3,567	3,867	3,927	3,977	4,037
14.	Consumptive Use Below Hoover Dam (12-13)	5,299	5,270	5,119	5,301	5,426	5,419
	SUMMARY						
15.	Total NV Colorado River Diversions (1+12)	457,434	470,271	471,828	482,192	493,943	503,214
16.	Total NV Return-Flow Credit (10+13)	219,108	226,846	229,452	234,619	239,954	245,266
17.	Total NV Consumptive Use Before Interstate Banking (15-16) (b)	238,326	243,425	242,376	247,573	253,989	257,948
18.	Total LVV RFC (7+9)	214,727	222,768	225,011	230,118	235,403	240,655
	NEVADA CONSUMPTIVE USE WITH ICS, INTERSTATE BANKING						
19.	NV Basic Apportionment	300,000	300,000	300,000	300,000	300,000	300,000
20.	ICS Creation (b)	23,823	30,802	32,000	32,000	32,000	32,000
21.	Overrun Payback	0	0	0	0	0	0
22.	ICS Delivery	0	0	0	0	0	0
23.	Yearly ICS Volume Banked in Lake Mead	(23,823)	(30,802)	(32,000)	(32,000)	(32,000)	(32,000)
24.	Total Available NV Colorado River Water (19+20-21+22+23)	300,000	300,000	300,000	300,000	300,000	300,000
25.	Total NV Colorado River Consumptive Use (c)	238,326	243,425	242,376	247,573	253,989	257,948
26.	NV Unused Apportionment	61,674	56,575	57,624	52,427	46,011	42,052
27.	NV Unused Apportionment to Banking and/ or MOU (d) (f)	(61,674)	(56,575)	TBD	TBD	TBD	TBD
28.	NV Underrun/(Overrun) (26+27) (c)	0	0	TBD	TBD	TBD	TBD

NOTES

(a) If LVV M&I groundwater rights exceed 47,340 AFY, then lines 6 and 9 above will be recalculated based on the USBR method as referenced in December 5, 2007 letter.

(b) Total Tributary Conservation and Imported ICS after 5% deduction for system benefit. Excludes Pilot System Conservation Agreement volume of 7,688 AF in 2016.

(c) May be subject to final USBR accounting. Some differences may be due to revisions, differences among various data sources and rounding.

(d) May include banking in LVV and interstate banking in California and Arizona.

(e) Under the 2014 Memorandum of Understanding (MOU) for Pilot Drought Response and by the end of 2016, SNWA created in excess of 45,000 AF of Protection Volume by reducing its off-stream storage of Colorado River water.

(f) SNWA's plan for 2018 anticipates interstate banking up to 13,500 AF in Arizona.

Supplementary B: Projection of Accrual and Gauge Flows (Used in Return-Flow Credit Calculation), AFY

ESTIMATE ACCRUALS	2013	2014	2015	2016	2017
a. Measured Wash Flow at Gauge (a)	215,007	217,997	223,913	224,874	229,560
b. Effluent to Wash (b)	(180,582)	(182,559)	(183,468)	(185,441)	(189,024)
c. Stormwater (a)	(8,106)	(3,808)	(6,704)	(11,147)	(7,792)
Total (Accruals) (c)	26,319	31,630	33,741	28,286	32,744
Ratio of Accruals/LVV Customer Use					
a. Accruals	26,319	31,630	33,741	28,286	32,744
b. Total LVV Customer Use (b)					
1. LVV Customer Use (d)	481,620	493,932	493,651	499,764	517,303
2. LVV Total System Loss	4,529	4,353	5,865	7,312	4,220
3. Total	486,149	498,285	499,516	507,076	521,523
c. Accruals / Total LVV Use (%)	5.41%	6.35%	6.75%	5.58%	6.28%

PROJECTED FUTURE ACCRUALS	2018	2019	2020	2021
a. Total LVV Use (b)				
1. LVV Use (d)	520,128	530,119	541,565	550,671
2. LVV Total System Loss	5,141	5,247	5,377	5,481
3. Total	525,269	535,366	546,942	556,152
5.50% * Total LVV Use (e)	28,890	29,445	30,082	30,588

PROJECTED FUTURE GAUGE FLOWS	2018	2019	2020	2021
a. Effluent to Wash (b)	195,121	199,673	204,321	209,067
b. Stormwater (Median 2008 - 2017)	7,248	7,248	7,248	7,248
c. Accruals	28,890	29,445	30,082	30,588
d. Estimated Wash Flows at Gauge	231,259	236,366	241,651	246,903
Measured and Estimated Gauge Flows	231,259	236,366	241,651	246,903

NOTES

(a) Source (2013-2017): Year-End Return-Flow Credit Data (CRC).

(b) From Appendix 3.

(c) Accruals, calculations and projections correspond with LVV Return-Flow Credit methodology adopted December 5, 2007.

(d) Includes AR recovery.

(e) Median corresponds with the period 2008 to 2017 and is intended to represent the gauge at Las Vegas Wash below Lake Las Vegas, established June 28, 2002.

Supplementary C: Las Vegas Valley Water Usage and Wastewater Flows (Used in Return-Flow Credit Calculation), AFY

LVV CUSTOMER USE	2013	2014	2015	2016	2017	2018	2019	2020	2021	Resources Available
Colorado River Diversion (No AR / AR Recovery)(a)										
SNWA Purveyors										
COH	75,864	79,916	78,386	79,045	84,556	86,210	86,790	88,731	90,594	
LVVWD	279,917	282,638	286,677	292,584	302,453	301,278	308,333	314,932	319,877	
NLV	45,292	46,325	47,240	50,602	52,256	51,706	54,047	56,953	59,251	
Total	401,073	408,879	412,303	422,231	439,265	439,194	449,170	460,616	469,722	
Other LVV Users										
BWC Complex (b)	5,366	6,188	5,253	4,982	4,451	4,717	4,717	4,717	4,717	
Nellis AFB (b)	1,084	1,101	895	1,269	1,159	1,214	1,214	1,214	1,214	
Total	6,450	7,289	6,148	6,251	5,610	5,931	5,931	5,931	5,931	
Total System Loss	4,529	4,353	5,865	7,312	4,220	5,141	5,247	5,377	5,481	
Total	**412,052**	**420,521**	**424,316**	**435,794**	**449,095**	**450,266**	**460,348**	**471,924**	**481,134**	
AR / In-Lieu Recovery (c)										
SNWA Purveyors										
LVVWD	0	0	0	0	0	0	0	0	0	
NLV	0	0	0	0	0	0	0	0	0	
Total	0	0	0	0	0	0	0	0	0	
Groundwater Use										
SNWA Purveyors (a)										
LVVWD	44,199	44,550	40,523	40,756	40,859	40,760	40,760	40,760	40,760	40,760
NLV	4,459	4,793	5,283	1,835	2,246	5,235	5,250	5,250	5,250	6,201
Total	48,658	49,343	45,806	42,591	43,105	45,995	46,010	46,010	46,010	46,961
Other LVV Users										
Nellis AFB (b)	793	786	802	473	522	498	498	498	498	4,946
Private Wells (d)	24,646	27,635	28,592	28,218	28,801	28,510	28,510	28,510	28,510	
Total	25,439	28,421	29,394	28,691	29,323	29,008	29,008	29,008	29,008	
Total	**74,097**	**77,764**	**75,200**	**71,282**	**72,428**	**75,003**	**75,018**	**75,018**	**75,018**	
LVV Total Use (e)	486,149	498,285	499,516	507,076	521,523	525,269	535,366	546,942	556,152	
LVV Total Use (f)	**481,620**	**493,932**	**493,651**	**499,764**	**517,303**	**520,128**	**530,119**	**541,565**	**550,671**	
LVV WASTEWATER FLOW TO LAS VEGAS WASH										
Effluent	196,437	200,337	199,279	201,455	203,663	209,321	215,373	220,021	224,767	
Direct Reuse	15,855	17,778	15,811	16,014	14,639	14,200	15,700	15,700	15,700	
Effluent to Wash	180,582	182,559	183,468	185,441	189,024	195,121	199,673	204,321	209,067	

NOTES

(a) Source (2013 - 2017): Actual; Source (2018+): SNWA member agencies.

(b) Source (2013 - 2017): Actual; Source (2018+): Table 8.

(c) Includes recovery for banking operations and for purveyor members.

(d) Source (2013 - 2017): Nevada Division of Water Resources. Source (2018+): Table 4.

Supplementary D: Colorado River Usage (Customer + Artificial Recharge) by System and Estimates of SNWS System Loss, AFY

COLORADO RIVER DELIVERIES BY SYSTEM	2013	2014	2015	2016	2017	2018	2019	2020	2021
BBWD	4,134	4,078	3,854	3,884	4,043	4,008	4,250	4,425	4,478
BC									
SNWS	10,354	10,818	10,339	10,650	10,527	10,696	10,736	10,736	10,744
USBR System	-	-	-	-	-	-	-	-	-
Total	10,354	10,818	10,339	10,650	10,527	10,696	10,736	10,736	10,744
COH									
SNWS	60,234	64,979	65,242	66,057	71,167	75,664	73,790	75,731	77,594
BWC System	15,630	14,937	13,144	12,988	13,389	10,546	13,000	13,000	13,000
Total	75,864	79,916	78,386	79,045	84,556	86,210	86,790	88,731	90,594
LVVWD (SNWS)	279,917	282,638	286,677	292,584	302,453	301,278	308,333	314,932	319,877
NLV	45,292	46,325	47,240	50,602	52,256	51,706	54,047	56,953	59,251
Systems with Multiple Users									
BWC System:									
COH	15,630	14,937	13,144	12,988	13,389	10,546	13,000	13,000	13,000
BWC Complex	5,366	6,188	5,253	4,982	4,451	4,717	4,717	4,717	4,717
Total	20,996	21,125	18,397	17,970	17,840	15,263	17,717	17,717	17,717
SNWS (At Turnouts)									
BC	10,354	10,818	10,339	10,650	10,527	10,696	10,736	10,736	10,744
COH	60,234	64,979	65,242	66,057	71,167	75,664	73,790	75,731	77,594
LVVWD	279,917	282,638	286,677	292,584	302,453	301,278	308,333	314,932	319,877
Nellis AFB	1,084	1,101	895	1,269	1,159	1,214	1,214	1,214	1,214
NLV	45,292	46,325	47,240	50,602	52,256	51,706	54,047	56,953	59,251
Total	396,881	405,861	410,393	421,162	437,562	440,558	448,120	459,566	468,680
Estimate of BWC System Loss									
BWC Diversions at Intake (b)	21,146	21,302	18,651	17,394	17,072				
BWC Deliveries at Turnout	20,996	21,125	18,397	17,970	17,840				
Loss (Intake-Turnout) (c)	150	177	254	-576	-768				
Loss Percentage (%)	0.71%	0.84%	1.38%	(c)	(c)				
Median Reasonable Loss % (c)(d)					0.78%				
Replace Unreasonable Loss, Project:									
0.78% * BWC Diversion at Turnout (d)						119	138	138	138
Estimate of SNWS System Loss									
SNWS Diversions at Intake (e)	401,260	410,037	416,004	429,050	442,550				
SNWS Deliveries at Turnout	396,881	405,861	410,393	421,162	437,562				
Loss (Intake-Turnout) (c)	4,379	4,176	5,611	7,888	4,988				
Loss Percentage (%)	1.10%	1.03%	1.37%	1.87%	1.14%				
Median Reasonable Loss % (c)(d)					1.14%				
Replace Unreasonable Loss, Project:									
1.14% * SNWS Deliveries at Turnout (d)	4,379	4,176	5,611	7,888	4,988	5,022	5,109	5,239	5,343
Estimate of Total System Loss	**4,529**	**4,353**	**5,865**	**7,312**	**4,220**	**5,141**	**5,247**	**5,377**	**5,481**

NOTES

(a) Includes AR, but no AR recovery. AR is part of the Colorado River diversion. AR recovery is not.

(b) Source: "Colorado River Accounting and Water Use Report: Arizona, California, and Nevada," USBR.

(c) Loss figures are sometimes negative or very small due to meter imprecision and other factors.

(d) Median corresponds with the period of 2013-2017.

(e) Source: "Colorado River Water Diverted for Use in Southern Nevada, "Colorado River Commission.