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2017 Restoration Allocation & Default Flow Schedule

January 20, 2017

Introduction

The following transmits the 2017 Restoration Allocation and Default Flow Schedule to the Restoration Administrator for the San Joaquin River Restoration Program (SJRRP), consistent with the Restoration Flows Guidelines (RFG 1.0, December 2013). This Restoration Allocation and Default Flow Schedule provide the following:

- Forecasted water year Unimpaired Inflow: estimated flows that would occur absent regulation on the river. This value, also known as the "Natural River" or "Unimpaired Runoff" or "Full Natural," is utilized to identify the Restoration Year Type.
- Hydrograph Volumes: annual allocation hydrograph based on water year unimpaired inflow, utilizing the Method 3.1 with the Gamma pathway (RFG-Appendix C, Figure C-3) agreed to by the Parties in December 2008.
- Default Flow Schedule: the schedule of Restoration Flows in the absence of a recommendation from the Restoration Administrator.
- Additional Allocations: hypothetical Restoration Allocations that would result from 10%, 50%, 75%, and 90% probability of exceedance Unimpaired Inflow forecast.
- Unreleased Restoration Flows: amount of Restoration Flows not released due to channel capacity constraints and without delaying completion of Phase 1 improvements.
- Flow targets at Gravelly Ford: flows at the head of Reach 2, and estimated scheduled releases from Friant Dam adjusted for the assumed Holding Contract demands and losses in Exhibit B.
- Restoration Budget: volumes for the annual allocation, spring flexible flow, base flow, riparian recruitment, and fall flexible flow.
- Remaining Flexible Flow Volume: the volume of Restoration Flows released and the remaining volume available for flexible scheduling.
- Operational Constraints: flow release limitations based on downstream channel capacity, regulatory, or legal constraints.

Consistent with Paragraph 18 of the Settlement, the Restoration Administrator shall make recommendations to the Secretary of the Interior concerning the manner in which the hydrographs shall be implemented. As described in the RFGs, the Restoration Administrator is requested to recommend a flow schedule showing the use of the entire annual allocation during the upcoming Restoration Year, categorize all recommended flows by account, and recommend both an unconstrained and a capacity limited recommendation. If an unconstrained recommendation and a capacity limited recommendation are not provided by the Restoration Administrator, the Default Flow Schedule without constraints (Table 5a) and the Default Flow Schedule with constraints (Table 5b) will be used respectively.

Forecasted Unimpaired Inflow

Unimpaired Inflow represents the natural water production of a river basin, unaltered by upstream diversions, storage, or by export or import of water to or from other watersheds. The forecast of the Unimpaired Inflow determines the volume of Restoration Flows available for the Restoration Year (i.e. the Restoration Allocation). Information for forecasting the Unimpaired Inflow primarily includes:

- Reclamation estimate of Unimpaired Inflow (i.e. Natural River) into Millerton Lake to support the water supply allocation[1];
- The Department of Water Resources (DWR) Bulletin 120 latest update for water year 2017 San Joaquin River inflow to Millerton Lake Unimpaired Flow[3, 4], and/or the most current DWR Bulletin Water Supply Index (WSI)[5];
- The National Weather Service (NWS) Ensemble Streamflow Prediction (ESP) Water Supply Forecast (water year 2017) for the San Joaquin River at Millerton Lake[6].

Table 1 shows the water year 2017 (October 1, 2016 to September 30, 2017) observed and forecasted Unimpaired Inflows at Millerton Lake. This includes the DWR forecast expressed for the full water year and the NWS forecast with and without a 7-day smoothing function applied to remove the day-to-day variance in that forecast product. Figure 1a plots these values over the entire water year, while Figure 1b shows the most recent period in detail.

Table 1 — San Joaquin River Water Year Actuals and Forecasts at Millerton Lake

	Forecast Exceedance Percentile				
	90%	**75%**	**50%**	**25%**	**10%**
Accumulated "Full Natural" Unimpaired Inflow, January 18, 2017 [1]	553.1 TAF				
Accumulated Unimpaired Inflow as percent of average	313%				
Accumulated Unimpaired Inflow projected to end of water year [2]	—				
DWR, January 1, 2017 [3, 4, 5]	805 TAF	1,070 TAF	1,415 TAF	2,170 TAF	2,835 TAF
NWS, January 19, 2017 (Daily Value [6])	2,970 TAF	3,260 TAF	3,570 TAF	3,990 TAF	4,660 TAF
NWS, January 19, 2017 (7-day Smoothed Value [7])	2,884 TAF	3,142 TAF	3,492 TAF	4,030 TAF	4,581 TAF

[1] http://www.usbr.gov/mp/cvo/vungvari/milfln.pdf

[2] Projected value only presented from April through September; based on NWS average Unimpaired Inflow value of 1843 TAF

[3] http://cdec.water.ca.gov/cgi-progs/iodir?s=b120

[4] http://cdec.water.ca.gov/cgi-progs/iodir_ss/b120up

[5] http://cdec.water.ca.gov/cgi-progs/iodir/WSI.2017

[6] http://www.cnrfc.noaa.gov/water_resources_update.php?stn_id=FRAC1&stn_id2=FRAC1&product=WaterYear

[7] The NWS smoothed data uses a 7-day weighted moving average, where the most recent day (n) is given greater weight than each previous forecast day (n-1, 2, 3, etc.); this reduces noise stemming from ESP model input. The following formula us used: $((Forecast_n * 1) + (Forecast_{n-1} * 0.857) + (Forecast_{n-2} * 0.714) + (Forecast_{n-3} * 0.571) + (Forecast_{n-4} * 0.429) + (Forecast_{n-5} * 0.286) + (Forecast_{n-6} * 0.143)) / 4$

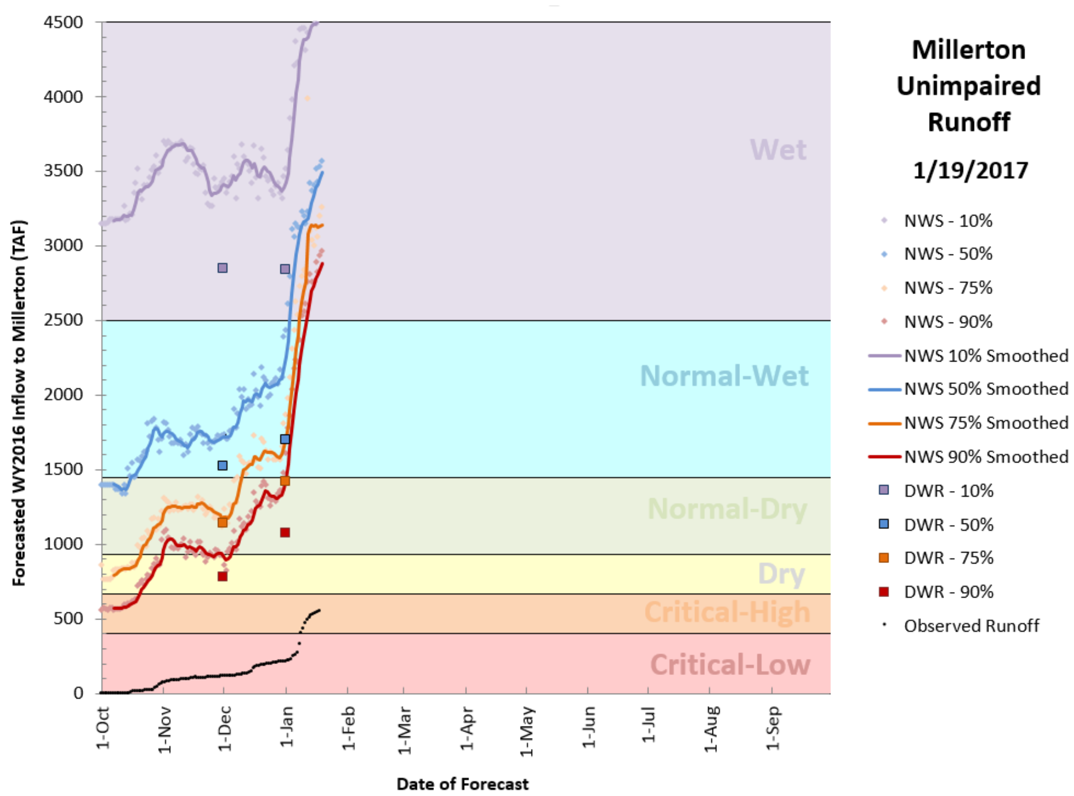

Figure 1a — Plot of Water Year 2017 forecasts, including both NWS Ensemble Streamflow Prediction Forecast and DWR Forecast

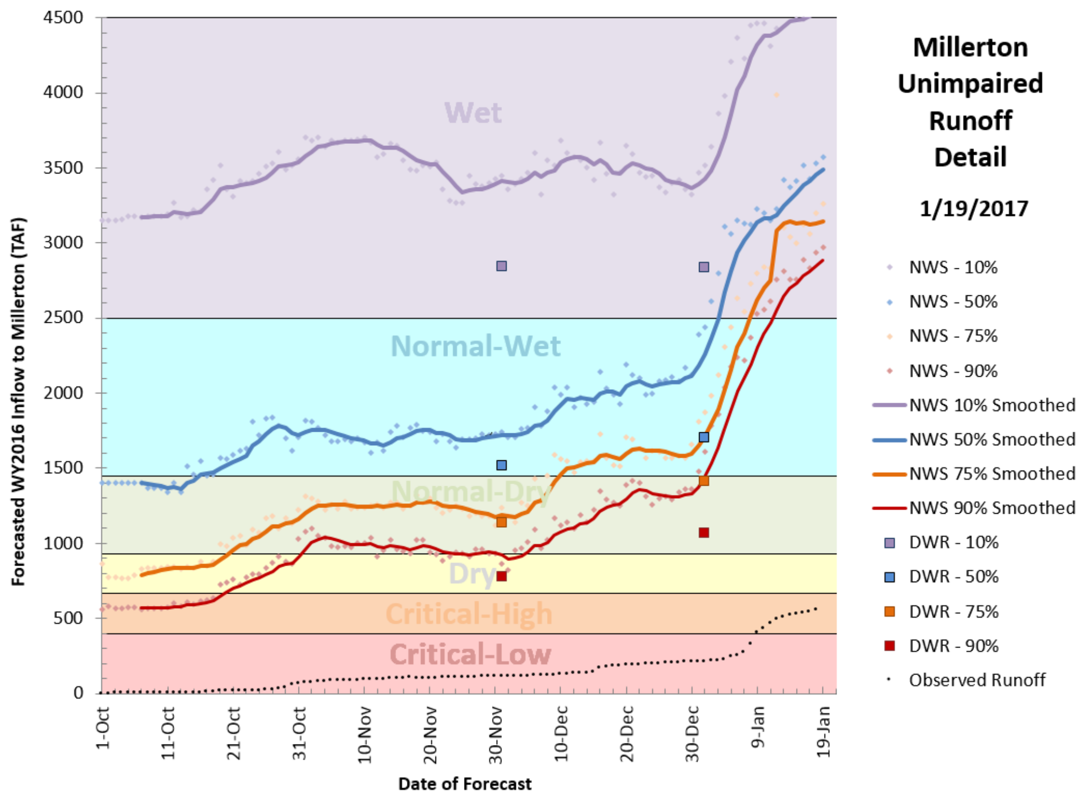

Figure 1b — Detail plot of most recent forecasts

Combining Forecasts

Staff from SJRRP and the South-Central California Area Office of Reclamation jointly track and discuss the accuracy of runoff forecasts. Based on the age of these forecasts, the short-term weather forecast, observed Unimpaired Inflow, and other available information, a hybrid forecast is generated. The weighting of the different components is regularly evaluated and determined using professional judgment and the best available information. For the current allocation, the DWR and NWS forecasts are combined with a 20/80 blending respectively. This results in the Hybrid Unimpaired Inflow Forecasts shown in Table 2.

Table 2 —Hybrid Unimpaired Inflow Forecast

	Forecast Probability of Exceedance using proposed blending				
	90%	**75**%	**50**%	**25**%	**10**%
Hybrid Unimpaired Inflow Forecast (TAF) using 20/80 blending	2,521	2,797	3,134	3,658	4,232

This 20/80 blending is justified based on the age of the January 1 DWR forecast (which omits the storm events experienced since the DWR forecast date), the accumulated runoff since January 1, and the limited field data used to develop the DWR forecast. Between January 1 and January 13, between 15” and 26” of precipitation fell in the San Joaquin watershed above Millerton Lake. Additionally, the NWS now predicts over 488 TAF of Unimpaired Inflow for the month of January, whereas the January 1 DWR forecast before the storm series predicted 90 TAF (both at the 50% exceedance probability). 324 TAF of Unimpaired Inflow was observed during the first half of the month, providing justification for the heavy weighting of the NWS forecast.

Another method for tracking the performance of the hybrid forecast is to plot observed Unimpaired Inflow against a 30-year average Unimpaired Inflow curve scaled to the 2017 water year 50% hybrid forecast. Such a plot is presented in Figure 3, and shows the trace of the observed runoff tracking well above the scaled Unimpaired Inflow for the 50% exceedance forecast. This visualization is a less reliable indicator of accuracy early in the water year or when there is an atypical distribution of rain vs. snow precipitation.

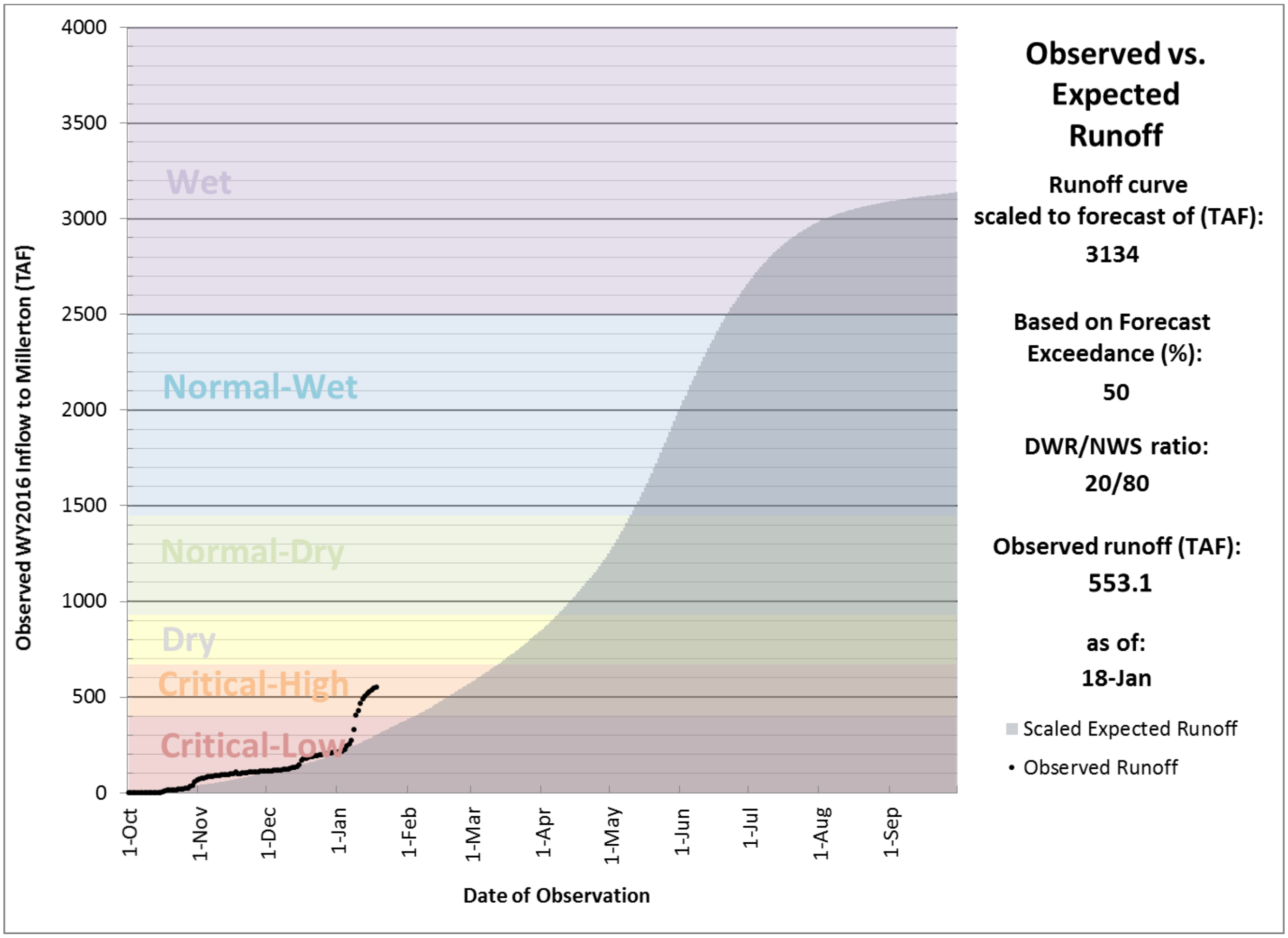

Figure 3 — Observed Unimpaired Inflow trace shown with average Unimpaired Inflow curve scaled to the hybrid forecast value

Restoration Allocation

As per the current Restoration Flow Guidelines, the 50% exceedance forecast is used in January under wet hydrologic conditions to set the Restoration Flow Allocation. This percent exceedance value was determined through the steps prescribed by RFG 1.0 and outlined in Table 3.

Table 3 — Allocation Determination Steps

Allocation Step	Result
1. 50% Exceedance Forecast compared to average Unimpaired Inflow	Above Average
2. Initial Pattern Year Type	Wet
3. Option 1D Percent Exceedance for this period	50%

Finally, applying the 20/80 forecast blending determined by Reclamation, and using the 50% exceedance forecast dictated by RFG 1.0, Reclamation calculates an **Unimpaired Inflow forecast of 3,134 TAF** and a **Wet Restoration Year Type**. This provides a **Restoration Allocation of 556.542 Thousand Acre-Feet (TAF)** as measured at Gravelly Ford (GRF). Combined with Holding Contracts on the San Joaquin River, this equates to a **Friant Dam Release of 673.488 TAF**. This allocation will likely be updated in mid-February and may be reduced depending on the then-current Unimpaired Inflow forecast. Other hypothetical allocations are presented in Table 4 as grayed values, and may be useful for contingency planning.

Table 4 — Restoration Year Type and Allocation for 2017 Restoration Year Shown with Other Hypothetical Values in Gray

	Forecast Probability of Exceedance using proposed blending				
	90%	75%	**50%**	25%	10%
Restoration Year Type	Wet	Wet	**Wet**	Wet	Wet
Hybrid Unimpaired Inflow Forecast (TAF)	2,521	2,795	**3,134**	3,658	4,232
Restoration Allocation at GRF (TAF)	556.542	556.542	**556.542**	556.542	556.542
Friant Dam Flow Releases (TAF)	673.488	673.488	**673.488**	673.488	673.488

Default Flow Schedule

The Default Flow Schedule, known as Exhibit B in the Settlement, identifies how Reclamation will schedule the Restoration Allocation for the current Restoration Year Type and Unimpaired Inflow volume absent a recommendation from the Restoration Administrator. The RFGs provides detail on how a Default Flow Schedule is derived from the allocation volume. This approved method of distributing water throughout the year is referred to as “Method 3.1 with the gamma pathway.”

Exhibit B Method 3.1 Default Hydrograph

Table 5a shows the Exhibit B Method 3.1 default hydrograph flows and corresponding Restoration Allocation volumes for the entire year absent channel capacity constraints, including total releases from Friant Dam and Restoration Flows releases in excess of Holding Contracts.

Table 5b shows the Exhibit B Method 3.1 default hydrograph volumes with operational constraints, primarily controlled by a 1,120 cfs channel capacity constraint in Reach 2B. This default hydrograph depicted in Table 5b will be implemented in the absence of a specific recommendation by the Restoration Administrator. Due to levee stability related channel capacity constraints in Reach 2B that constrain Friant Dam releases, Restoration Flows of **187.974 TAF** are generated that are not scheduled in the constrained Default Flow Schedule and would become Unreleased Restoration Flows (URFs) under the default hydrograph. Actual URF volumes will depend on the Restoration Administrator Recommendation and real-time assessment of groundwater seepage channel constraints.

Table 5a — Default Hydrograph

Flow Period	Friant Dam Release (cfs)	Holding Contracts[8] (cfs)	Flow Target at GRF (cfs)	Restoration Flow at GRF (cfs)	Friant Dam Release Volume (TAF)	Restoration Flow Volume at GRF (TAF)
Mar 1 – Mar 15	500	130	375	370	14.876	11.008
Mar 16 – Mar 31	1500	130	1375	1370	47.603	43.478
Apr 1 – Apr 15	2500	150	2355	2350	74.380	69.917
Apr 16 – Apr 30	4000	150	3855	3850	119.008	114.545
May 1 – Jun 30 [10]	2000	190	1815	1810	241.983	218.995
Jul 1 – Aug 31	350	230	125	120	43.041	14.757
Sep 1 – Sep 30	350	210	145	140	20.826	8.331
Oct 1 – Oct 31	350	160	195	190	21.521	11.683
Nov 1 – Nov 6	700	130	575	570	8.331	6.783
Nov 7 – Nov 10	700	130	575	570	5.554	4.522
Nov 11 – Dec 31	350	120	235	230	35.405	23.266
Jan 1 – Feb 28	350	100	255	250	40.959	29.256
				Totals	**673.488**	**556.542**

Table 5b — Default Hydrograph with Channel Constraints

Flow Period	Friant Dam Release (cfs)	Holding Contracts [8] (cfs)	Flow Target at GRF (cfs)	Restoration Flow at GRF (cfs)	Friant Dam Release Volume (TAF)	Restoration Flow Volume at GRF (TAF)	URF Volume [9] (TAF)
Mar 1 – Mar 15	500	130	375	370	14.876	11.008	0
Mar 16 – Mar 31	1390	130	1265	1260	44.112	39.987	3.491
Apr 1 – Apr 15	1390	150	1245	1240	41.355	36.893	33.025
Apr 16 – Apr 30	1390	150	1245	1240	41.355	36.893	77.653
May 1 – Jun 30 [10]	1390	190	1205	1200	168.179	145.190	73.805
Jul 1 – Aug 31	350	230	125	120	43.041	14.757	0
Sep 1 – Sep 30	350	210	145	140	20.826	8.331	0
Oct 1 – Oct 31	350	160	195	190	21.521	11.683	0
Nov 1 – Nov 6	700	130	575	570	8.331	6.783	0
Nov 7 – Nov 10	700	130	575	570	5.554	4.522	0
Nov 11 – Dec 31	350	120	235	230	35.405	23.266	0
Jan 1 – Feb 28	350	100	255	250	40.959	29.256	0
				Totals	**485.514**	**368.569**	**187.974** [9]

[8] In recent years, Holding Contract demands have been higher than assumed under Exhibit B of the Settlement, in which case, flows at Friant are increased to achieve the Gravelly Ford Flow Target.

[9] This estimate of URF volume is based solely on Reach 2B channel capacity. Other flow and seepage constraints throughout the restoration area may result in higher actual URFs.

[10] Riparian Recruitment releases in Wet Restoration Year Types are included in the May 1 – June 30 flow period

Exhibit B Restoration Flow Budget

Table 6 shows the components of the restoration budget for March 1, 2017, through February 28, 2017 (i.e. the Restoration Year). The base flow allocation, spring flexible flow, fall flexible flow, and riparian recruitment flow reflect the Exhibit B hydrograph for the Restoration Allocation. The estimated total release at Friant Dam consists of 116,945 acre-feet release for Holding Contracts in addition to the Restoration Flows as measured at Gravelly Ford. The volume for Restoration Flows as well as various accounting flow components will change with any subsequent Restoration Allocation.

Table 6 — Restoration Budget with Flow Accounts

Flow Period	Holding Contract Demand[11] (TAF)	Restoration Flow Accounting: Spring Flexible Flow (TAF)	Summer Base Flow (TAF)	Fall Flexible Flow (TAF)	Winter Base Flow (TAF)	Riparian Recruit-ment Flow (TAF)	Buffer Flow (TAF)	Flexible Buffer Flow (TAF)
Mar 1 – Mar 15	3.868	11.008	–	–	–	-–	1.488	–
Mar 16 – Mar 31	4.126	43.478	–	–	–	–	4.760	–
Apr 1 – Apr 15	4.463	69.917	–	–	–	–	7.438	–
Apr 16 – Apr 30	4.463	114.545	–	–	–	–	11.901	–
May 1 – May 28	10.552	0	8.886	–	–	199.636 within 60-90 days of flushing flow	24.198	Of which 5.000 may be applied Feb 1–May 28, or Oct 1–Nov 30
May 29 – Jun 30	12.436	–	10.472	–	–			
Jul 1 – Aug 31	28.284	–	14.757	–	–		4.304	
Sep 1 – Sep 30	12.496	–	8.331	0	–	–	2.083	
Oct 1 – Oct 31	9.838	–	–	11.683	–	–	2.152	Of which 7.081 may be applied Sep 2–Jan 28
Nov 1 – Nov 6	1.547	–	–	6.783	–	–	0.833	
Nov 7 – Nov 10	1.031	–	–	4.522	–	–	0.555	
Nov 11 – Nov 30	4.760	–	–	9.124	–	–	1.388	
Dec 1 – Dec 31	7.379	–	–	0	14.142	–	2.152	
Jan 1 – Jan 31	6.149	–	–	–	15.372	–	2.152	–
Feb 1 – Feb 28	5.554	0	–	–	13.884	–	1.944	–
	116.946[11]	**238.949**	**42.447**	**32.112**	**43.398**	**199.636**	**67.349**	
		556.542 (Restoration Flow Volume)						
	673.488[11] (Friant Dam Release Volume)							

[11] In recent years, Holding Contract demands have been higher than assumed under Exhibit B of the Settlement, in which case, flows at Friant Dam are increased to achieve the Gravelly Ford Flow Target, and associated Friant Dam Release Volume is greater.

Remaining Flexible Flow Volume

The amount of water remaining for flexible flow scheduling is the volume of flexible flow water released from Friant Dam in excess of releases required to meet Holding Contract demands, less past releases. Table 7 tracks these balances. The released to date volumes are derived from QA/QC daily average data when available, and partly from provisional data posted to CDEC, and thus may have future adjustments. This may affect the remaining flow volume as well.

Table 7 — Estimated Flexible Flow Volume Remaining and Released to Date

Flow Account	Yearly Allocation [12] (TAF)	Released to Date [13] (TAF)	Remaining Flow Volume [14] (TAF)
Spring Period (Mar 1 – Apr 30)	238.949	0	238.949
Riparian Recruitment	199.636	0	199.636
Summer Base Flows (May 1 – Sep 30)	42.447	0	42.447
Fall Period (Oct 1 – Nov 30)	32.112	0	32.112
Winter Base Flows (Dec 1 – Feb 28)	43.398	0	43.398
Buffer Flow	67.349	0	67.349
Purchased Water	0	0	0
	Total:	**0**	

[12] Flow Volumes assume no channel constraints, as this is the volume available for flexible rescheduling as per the Restoration Flow Guidelines

[13] As of 1/20/2017, no flows have been released for Restoration Year 2017

[14] Restoration Flow Guidelines limit the application of the calculated Remaining Flow Volume to certain times, and thus all of this volume may not be available for use.

Operational Constraints

Operating criteria, such as channel conveyance capacity, ramping rate constraints, scheduled maintenance, reservoir storage, contractual obligations, and downstream seepage concerns, may restrict the release of Restoration Flows. Table 8 summarizes known 2017 operational constraints.

Table 8 — Summary of Operational Constraints

Constraint	Period	Flow Limitation
Levee Stability	Currently in effect	1,120 cfs in Reach 2B
	Currently in effect	580 – 1,070 cfs in Eastside Bypass
Channel Conveyance / Seepage Limitation	Currently in effect	Approximately 300 cfs below Sack Dam / Reach 4A

The 2017 Restoration Year Channel Capacity Report identifies a maximum flow in Reach 2B of 1,120 cfs. This results in a maximum release from Friant Dam between 1,360 cfs and 1,490 cfs depending on the time of year. The 2017 Restoration Year Channel Capacity Report also identifies a maximum flow in the Middle Eastside Bypass of 580 to 1,070 cfs, depending on the configuration of the weirs at the Merced National Wildlife Refuge. Reclamation will coordinate with the Restoration Administrator through the biweekly Flow Scheduling conference calls and on an as-needed basis to update these constraints.

In addition, flows are limited to approximately 300 cfs below Sack Dam into Reach 4A due to groundwater seepage constraints as per the current Seepage Management Plan. The exact flow rate which can be accommodated through Reach 4A is dependent on groundwater levels and will be determined through Flow Bench Evaluations. Flows are expected to be constrained to approximately 300 cfs through the spring period below Sack Dam, with the possibility of approximately 500 cfs below Sack Dam later in 2017. If flows must be reduced at Sack Dam as compared to upstream flow rates, Reclamation will make arrangements to capture excess Restoration Flows at approved points of rediversion such as Mendota Pool, upstream of Sack Dam.

Reclamation will complete a Flow Bench Evaluation prior to any flow increases to verify the scheduled increase is not anticipated to cause groundwater levels to rise above thresholds. Should the requested flow increase trigger projected groundwater level rises above seepage thresholds, Reclamation will inform the Restoration Administrator of the current constraint. After two weeks at this constraint, or once groundwater levels have stabilized at this level, Reclamation will complete another Flow Bench Evaluation to determine if further increases in flow are permitted, and if so will allow increases in six inch stage increments, based on one-dimensional hydraulic modeling, to avoid potential groundwater seepage impacts.

Appendix A: Abbreviations, Acronyms, and Glossary

af	acre–feet
CALSIM	California Statewide Integrated Model
CCID	Central California Irrigation District
CDEC	California Data Exchange Center
cfs	cubic feet per second
CVP	Central Valley Project
Delta	Sacramento–San Joaquin Delta
DWR	California Department of Water Resources
ESP	Ensemble Streamflow Prediction
Exhibit B	Exhibit B of the Settlement depicting Default Flow Schedules
GRF	Gravelly Ford Flow Gauge
LSJLD	Lower San Joaquin Levee District
NWS	National Weather Service
QA/QC	Quality Assurance/Quality Control (i.e. finalized)
Reclamation	U.S. Department of the Interior, Bureau of Reclamation
Restoration Year	the cycle of Restoration Flows, March 1 through February 28/29
RFG	Restoration Flow Guidelines
RWA	SJRRP Reclaimed Water Account
Secretary	U.S. Secretary of the Interior
Settlement	Stipulation of Settlement in *NRDC, et al., v. Kirk Rodgers, et al.*
SJREC	San Joaquin River Exchange Contractors
SJRRP	San Joaquin River Restoration Program
SLCC	San Luis Canal Company
TAF	thousand acre–feet
URF	Unreleased Restoration Flows
WSI	DWR Water Supply Index
WY	water year, October 1 through September 30

Appendix B: History of Millerton Unimpaired Inflow

Table B — Water Year Totals in Thousand Acre-Feet

Water Year [1]	Unimpaired Inflow [2] (Natural River)	SJRRP Restoration Year Type [3]	Water Year [1]	Unimpaired Inflow [2] (Natural River)	SJRRP Restoration Year Type [3]	Water Year [1]	Unimpaired Inflow [2] (Natural River)	SJRRP Restoration Year Type [3]
1931	480.2	Critical-High	1961	647.428	Critical-High	1991	1,027.209	Normal-Dry
1932	2,047.4	Normal-Wet	1962	1,924.066	Normal-Wet	1992	807.759	Dry
1933	1,111.4	Normal-Dry	1963	1,945.266	Normal-Wet	1993	2,672.322	Wet
1934	691.5	Dry	1964	922.351	Dry	1994	824.097	Dry
1935	1,923.2	Normal-Wet	1965	2,271.191	Normal-Wet	1995	3,876.370	Wet
1936	1,853.3	Normal-Wet	1966	1,298.792	Normal-Dry	1996	2,200.707	Normal-Wet
1937	2,208.0	Normal-Wet	1967	3,233.097	Wet	1997	2,817.670	Wet
1938	3,688.4	Wet	1968	861.894	Dry	1998	3,160.759	Wet
1939	920.8	Dry	1969	4,040.864	Wet	1999	1,527.040	Normal-Wet
1940	1,880.6	Normal-Wet	1970	1,445.837	Normal-Dry	2000	1,735.653	Normal-Wet
1941	2,652.5	Wet	1971	1,416.812	Normal-Dry	2001	1,065.318	Normal-Dry
1942	2,254.0	Normal-Wet	1972	1,039.249	Normal-Dry	2002	1,171.457	Normal-Dry
1943	2,053.7	Normal-Wet	1973	2,047.585	Normal-Wet	2003	1,449.954	Normal-Dry
1944	1,265.4	Normal-Dry	1974	2,190.308	Normal-Wet	2004	1,130.823	Normal-Dry
1945	2,134.633	Normal-Wet	1975	1,795.922	Normal-Wet	2005	2,826.872	Wet
1946	1,727.115	Normal-Wet	1976	629.234	Critical-High	2006	3,180.816	Wet
1947	1,121.564	Normal-Dry	1977	361.253	Critical-Low	2007	684.333	Dry
1948	1,201.390	Normal-Dry	1978	3,402.805	Wet	2008	1,116.790	Normal-Dry
1949	1,167.008	Normal-Dry	1979	1,829.988	Normal-Wet	2009	1,455.379	Normal-Wet
1950	1,317.457	Normal-Dry	1980	2,973.169	Wet	2010	2,028.706	Normal-Wet
1951	1,827.254	Normal-Wet	1981	1,067.757	Normal-Dry	2011	3,304.824	Wet
1952	2,840.854	Wet	1982	3,317.171	Wet	2012	831.582	Dry
1953	1,226.830	Normal-Dry	1983	4,643.090	Wet	2013	856.626	Dry
1954	1,313.993	Normal-Dry	1984	2,042.750	Normal-Wet	2014	509.579	Critical-High
1955	1,161.161	Normal-Dry	1985	1,135.975	Normal-Dry	2015	327.410	Critical-Low
1956	2,959.812	Wet	1986	3,031.600	Wet	2016	1,300,986	Normal-Dry
1957	1,326.573	Normal-Dry	1987	756.853	Dry			
1958	2,631.392	Wet	1988	862.124	Dry			
1959	949.456	Normal-Dry	1989	939.168	Normal-Dry			
1960	826.021	Dry	1990	742.824	Dry			

[1] Water year is from Oct 1 through Sept 30, for example the 2010 water year began Oct 1, 2009.

[2] Also known as “Natural River” or “Unimpaired Inflow into Millerton” – This is the total runoff that would flow into Millerton Lake if there were no dams or diversions upstream. There was a lower level of precision prior to 1945.

[3] The six SJRRP Restoration Year Types are based on unimpaired inflow. Critical-Low= <400 TAF, Critical-High=400-669.999 TAF, Dry= 670-929.999 TAF, Normal-Dry 930-1449.999, Normal-Wet 1450-2500, Wet>2500