

Riparian Recruitment Flow management on the Lower Tuolumne River

Goal:

Increase recruitment of cottonwoods and tree willows along the Lower Tuolumne River

Ramping Rates:

Change in water surface elevation (including groundwater) must be slower than the root growth rate as seedling roots follow the water table down. Slower is better.

Cottonwoods roots can grow at 2-2.5cm per day (Mahoney and Rood 1998, Stella and Battles 2010)

Willow roots can grow at 1 cm per day (Amlin and Rood 2002)

Ramping rates can be developed targeting 1cm per day and 2.5 cm per day giving an optimal and maximum rate change to accommodate riparian recruitment.

Daily flow changes will be higher at higher flows.

Timing:

Ramping should target the period from mid-May through July (or later).

Fremont cottonwood and narrowleaf willow seed dispersal from Stella and Battles (2010).

Species	Begin	Peak	End	Total Days
Fremont cottonwood	8-May	24-May	4-Jun	27 days
narrowleaf willow	1-Jun	21-Jun	11-Jul	40 days

Seeds stay viable up to 42days (+/-) after dispersal. Most die under 20 days. Cottonwood seeds don't like the hot days over 100 F. It is possible that we could see germination in late June but it's unlikely.

Stage/Discharge Relationships:

Gauges at La Grange and Modesto offer cross sections by which the change in water table vs the change in discharge can be determined. These cross sections may not adequately represent the rest of the river. Developing (or using) a 2-D Hydraulic Model would be useful.

Location:

The best geographic locations and target bank elevations to achieve recruitment will need to be assessed, as well as determining if these areas are already filled with vegetation. Developing (or using) a 2-D Hydraulic Model would be useful.

Developing a Plan:

John Bair at McBain Associates has lots of skill and knowledge on this topic and is available to develop a plan further if funding is available. These would cover optimal and minimum operations across water year types.

using custom time span

Tuolumne R BL Lagrange Dam NR Lagrange CA - 11289650

May 1, 2024 - July 11, 2024

Discharge, cubic feet per second

3030 ft³/s - May 25, 2024 04:45:00 AM PDT



FISHBIO Updates:

- Preparations for the Tuolumne River weir are underway. Weir installation is scheduled for September 9, 2024.
- Summer *O. mykiss* censuses from La Grange to Hickman Bridge were conducted July 15-25, 2024.
- Redd surveys are scheduled to begin October 1, 2024.
- 2024 FERC Reports are in-progress.

Table 1
SAN JOAQUIN VALLEY WATER YEAR HYDROLOGIC CLASSIFICATION
602020 INDEX

Table with columns for Year, Runoff (April-July and Oct-March), 60-20-20 Index, Tuolumne River Minimum Flow Requirement, SJWYT, FERC WYT, Base Flow Requirement, Spring Pulse Requirement, Fall Pulse Requirement, and Interpolation Requirement. Rows include years 14-20, 2021-2024 WY, and various percentiles (90%, 50%, 10%) for 1-May, 14-May, 21-May, 4-Jun, and 11-Jun.

Table 3
Tuolumne River Flow Schedule
 Based on DWR Values, 60-20-20 Index for 2024, Hydrologic Conditions
 Schedule For 2024-2025 Fish Flow Year

DATE		Number of DAYS	BASE FLOW ¹			PULSE FLOW ²			INTERPOLATION FLOW			Other Adjusted Flow			TOTAL FEREC FLOW	
From:	To:		CFS	AF	ACCUM. A.F.	CFS	AF	ACCUM. A.F.	CFS	AF	ACCUM. A.F.	CFS	AF	ACCUM. A.F.	CFS	ACCUM. A.F.
15-Apr-2024	Mon	15-Apr-2024	Mon	1	300	595	595	0	0	0	0	0	0	0	300	595
16-Apr-2024	Tue	16-Apr-2024	Tue	1	300	595	1,190	300	595	595	0	0	0	0	600	1,785
17-Apr-2024	Wed	17-Apr-2024	Wed	1	300	595	1,785	600	1,190	1,785	0	0	0	0	900	3,570
18-Apr-2024	Thu	18-Apr-2024	Thu	1	300	595	2,380	900	1,785	3,570	0	0	0	0	1,200	5,950
19-Apr-2024	Fri	19-Apr-2024	Fri	1	300	595	2,975	1,200	2,380	5,950	0	0	0	0	1,500	8,926
20-Apr-2024	Sat	20-Apr-2024	Sat	1	300	595	3,570	1,500	2,975	8,926	0	0	0	0	1,800	12,496
21-Apr-2024	Sun	21-Apr-2024	Sun	1	300	595	4,165	1,800	3,570	12,496	0	0	0	0	2,100	16,661
22-Apr-2024	Mon	22-Apr-2024	Mon	1	300	595	4,760	2,100	4,165	16,661	0	0	0	0	2,400	21,421
23-Apr-2024	Tue	23-Apr-2024	Tue	1	300	595	5,355	2,400	4,760	21,421	0	0	0	0	2,700	26,777
24-Apr-2024	Wed	24-Apr-2024	Wed	1	300	595	5,950	2,700	5,355	26,777	0	0	0	0	3,000	32,727
25-Apr-2024	Thu	25-Apr-2024	Thu	1	300	595	6,545	3,000	5,950	32,727	0	0	0	0	3,300	39,273
26-Apr-2024	Fri	26-Apr-2024	Fri	1	300	595	7,140	3,000	5,950	38,678	0	0	0	0	3,300	45,818
27-Apr-2024	Sat	27-Apr-2024	Sat	1	300	595	7,736	3,000	5,950	44,628	0	0	0	0	3,300	52,364
28-Apr-2024	Sun	28-Apr-2024	Sun	1	300	595	8,331	2,490	4,939	49,567	0	0	0	0	2,790	57,898
29-Apr-2024	Mon	29-Apr-2024	Mon	1	300	595	8,926	2,070	4,106	53,673	0	0	0	0	2,370	62,598
30-Apr-2024	Tue	30-Apr-2024	Tue	1	300	595	9,521	1,690	3,352	57,025	0	0	0	0	1,990	66,545
01-May-2024	Wed	01-May-2024	Wed	1	300	595	10,116	1,350	2,678	59,702	0	0	0	0	1,650	69,818
02-May-2024	Thu	02-May-2024	Thu	1	300	595	10,711	1,050	2,083	61,785	0	0	0	0	1,350	72,496
03-May-2024	Fri	03-May-2024	Fri	1	300	595	11,306	750	1,488	63,273	0	0	0	0	1,050	74,579
04-May-2024	Sat	04-May-2024	Sat	1	300	595	11,901	490	972	64,245	0	0	0	0	790	76,145
05-May-2024	Sun	05-May-2024	Sun	1	300	595	12,496	790	1,567	65,812	0	0	0	0	1,090	78,307
06-May-2024	Mon	06-May-2024	Mon	1	300	595	13,091	1,090	2,162	67,974	0	0	0	0	1,390	81,064
07-May-2024	Tue	07-May-2024	Tue	1	300	595	13,686	1,390	2,757	70,731	0	0	0	0	1,690	84,417
08-May-2024	Wed	08-May-2024	Wed	1	300	595	14,281	1,690	3,352	74,083	0	0	0	0	1,990	88,364
09-May-2024	Thu	09-May-2024	Thu	1	300	595	14,876	1,690	3,352	77,435	0	0	0	0	1,990	92,311
10-May-2024	Fri	10-May-2024	Fri	1	300	595	15,471	1,350	2,678	80,112	0	0	0	0	1,650	95,583
11-May-2024	Sat	11-May-2024	Sat	1	300	595	16,066	1,010	2,003	82,116	0	0	0	0	1,310	98,182
12-May-2024	Sun	12-May-2024	Sun	1	300	595	16,661	710	1,408	83,524	0	0	0	0	1,010	100,185
13-May-2024	Mon	13-May-2024	Mon	1	300	595	17,256	490	972	84,496	0	0	0	0	790	101,752
14-May-2024	Tue	14-May-2024	Tue	1	300	595	17,851	310	615	85,111	0	0	0	0	610	102,962
15-May-2024	Wed	15-May-2024	Wed	1	300	595	18,446	170	337	85,448	0	0	0	0	470	103,894
16-May-2024	Thu	16-May-2024	Thu	1	300	595	19,041	40	79	85,527	0	0	0	0	340	104,569
17-May-2024	Fri	17-May-2024	Fri	1	300	595	19,636	300	595	86,122	0	0	0	0	600	105,759
18-May-2024	Sat	18-May-2024	Sat	1	300	595	20,231	600	1,190	87,312	0	0	0	0	900	107,544
19-May-2024	Sun	19-May-2024	Sun	1	300	595	20,826	600	1,190	88,502	0	0	0	0	900	109,329
20-May-2024	Mon	20-May-2024	Mon	1	300	595	21,421	380	754	89,256	0	0	0	0	680	110,678
21-May-2024	Tue	21-May-2024	Tue	1	300	595	22,017	240	476	89,732	0	0	0	0	540	111,749
22-May-2024	Wed	22-May-2024	Wed	1	220	595	22,612	50	99	89,831	0	0	0	0	350	112,443
23-May-2024	Thu	23-May-2024	Thu	1	300	595	23,207	26	51	89,882	0	0	0	0	326	113,089
24-May-2024	Fri	24-May-2024	Fri	1	300	595	23,802	0	0	89,882	0	0	0	0	300	113,684
25-May-2024	Sat	25-May-2024	Sat	1	300	595	24,397	0	0	89,882	0	0	0	0	300	114,279
26-May-2024	Sun	26-May-2024	Sun	1	300	595	24,992	0	0	89,882	0	0	0	0	300	114,874
27-May-2024	Mon	27-May-2024	Mon	1	300	595	25,587	0	0	89,882	0	0	0	0	300	115,469
28-May-2024	Tue	28-May-2024	Tue	1	300	595	26,182	0	0	89,882	0	0	0	0	300	116,064
29-May-2024	Wed	29-May-2024	Wed	1	300	595	26,777	0	0	89,882	0	0	0	0	300	116,659
30-May-2024	Thu	30-May-2024	Thu	1	300	595	27,372	0	0	89,882	0	0	0	0	300	117,254
31-May-2024	Fri	31-May-2024	Fri	1	300	595	27,967	0	0	89,882	0	0	0	0	300	117,849
01-Jun-2024	Sat	01-Jun-2024	Sat	1	250	496	28,463	0	0	89,882	0	0	0	0	250	118,345
02-Jun-2024	Sun	02-Jun-2024	Sun	1	250	496	28,959	0	0	89,882	0	0	0	0	250	118,841
03-Jun-2024	Mon	03-Jun-2024	Mon	1	250	496	29,455	0	0	89,882	0	0	0	0	250	119,337
04-Jun-2024	Tue	04-Jun-2024	Tue	1	250	496	29,950	0	0	89,882	0	0	0	0	250	119,832
05-Jun-2024	Wed	05-Jun-2024	Wed	1	250	496	30,446	0	0	89,882	0	0	0	0	250	120,328
06-Jun-2024	Thu	06-Jun-2024	Thu	1	250	496	30,942	0	0	89,882	0	0	0	0	250	120,824
07-Jun-2024	Fri	07-Jun-2024	Fri	1	250	496	31,438	0	0	89,882	0	0	0	0	250	121,320
08-Jun-2024	Sat	30-Jun-2024	Sun	23	250	11,405	42,843	0	0	89,882	0	0	0	0	250	132,725
01-Jul-2024	Mon	31-Jul-2024	Wed	31	250	15,372	58,215	0	0	89,882	0	0	0	0	250	148,097
01-Aug-2024	Thu	31-Aug-2024	Sat	31	250	15,372	73,587	0	0	89,882	0	0	0	0	250	163,469
01-Sep-2024	Sun	30-Sep-2024	Mon	30	250	14,876	88,463	0	0	89,882	0	0	0	0	250	178,345
01-Oct-2024	Tue	01-Oct-2024	Tue	1	250	595	89,058	0	0	89,882	0	0	0	0	300	178,940

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From:	To:		CFS	AF	ACCUM. A.F.	CFS	AF	ACCUM. A.F.	CFS	AF	ACCUM. A.F.	CFS	AF	ACCUM. A.F.	CFS	ACCUM. A.F.		
02-Oct-2024	Wed	02-Oct-2024	Wed	1	300	595	89,653	0	0	89,882	0	0	0	0	0	0	300	179,535
03-Oct-2024	Thu	03-Oct-2024	Thu	1	300	595	90,248	0	0	89,882	0	0	0	0	0	0	300	180,130
04-Oct-2024	Fri	04-Oct-2024	Fri	1	300	595	90,843	0	0	89,882	0	0	0	0	0	0	300	180,725
05-Oct-2024	Sat	05-Oct-2024	Sat	1	300	595	91,438	0	0	89,882	0	0	0	0	0	0	300	181,320
06-Oct-2024	Sun	06-Oct-2024	Sun	1	300	595	92,033	0	0	89,882	0	0	0	0	0	0	300	181,915
07-Oct-2024	Mon	07-Oct-2024	Mon	1	300	595	92,628	0	0	89,882	0	0	0	0	0	0	300	182,510
08-Oct-2024	Tue	08-Oct-2024	Tue	1	300	595	93,223	0	0	89,882	0	0	0	0	0	0	300	183,105
09-Oct-2024	Wed	09-Oct-2024	Wed	1	300	595	93,818	0	0	89,882	0	0	0	0	0	0	300	183,700
10-Oct-2024	Thu	10-Oct-2024	Thu	1	300	595	94,413	0	0	89,882	0	0	0	0	0	0	300	184,295
11-Oct-2024	Fri	11-Oct-2024	Fri	1	300	595	95,008	0	0	89,882	0	0	0	0	0	0	300	184,890
12-Oct-2024	Sat	12-Oct-2024	Sat	1	300	595	95,603	0	0	89,882	0	0	0	0	0	0	300	185,485
13-Oct-2024	Sun	13-Oct-2024	Sun	1	300	595	96,198	0	0	89,882	0	0	0	0	0	0	300	186,080
14-Oct-2024	Mon	14-Oct-2024	Mon	1	300	595	96,793	0	0	89,882	0	0	0	0	0	0	300	186,675
15-Oct-2024	Tue	15-Oct-2024	Tue	1	300	595	97,388	0	0	89,882	0	0	0	0	0	0	300	187,270
16-Oct-2024	Wed	16-Oct-2024	Wed	1	300	595	97,983	375	744	90,626	0	0	0	0	0	0	675	188,609
17-Oct-2024	Thu	17-Oct-2024	Thu	1	300	595	98,579	700	1,388	92,014	0	0	0	0	0	0	1,000	190,593
18-Oct-2024	Fri	18-Oct-2024	Fri	1	300	595	99,174	325	645	92,659	0	0	0	0	0	0	625	191,832
19-Oct-2024	Sat	19-Oct-2024	Sat	1	300	595	99,769	0	0	92,659	0	0	0	0	0	0	300	192,427
20-Oct-2024	Sun	20-Oct-2024	Sun	1	300	595	100,364	0	0	92,659	0	0	0	0	0	0	300	193,022
21-Oct-2024	Mon	21-Oct-2024	Mon	1	300	595	100,959	0	0	92,659	0	0	0	0	0	0	300	193,618
22-Oct-2024	Tue	22-Oct-2024	Tue	1	300	595	101,554	450	893	93,551	0	0	0	0	0	0	750	195,105
23-Oct-2024	Wed	23-Oct-2024	Wed	1	300	595	102,149	800	1,587	95,138	0	0	0	0	0	0	1,100	197,287
24-Oct-2024	Thu	24-Oct-2024	Thu	1	300	595	102,744	350	694	95,832	0	0	0	0	0	0	650	198,576
25-Oct-2024	Fri	25-Oct-2024	Fri	1	300	595	103,339	0	0	95,832	0	0	0	0	0	0	300	199,171
26-Oct-2024	Sat	26-Oct-2024	Sat	1	300	595	103,934	0	0	95,832	0	0	0	0	0	0	300	199,766
27-Oct-2024	Sun	27-Oct-2024	Sun	1	300	595	104,529	0	0	95,832	0	0	0	0	0	0	300	200,361
28-Oct-2024	Mon	28-Oct-2024	Mon	1	300	595	105,124	0	0	95,832	0	0	0	0	0	0	300	200,956
29-Oct-2024	Tue	29-Oct-2024	Tue	1	300	595	105,719	0	0	95,832	0	0	0	0	0	0	300	201,551
30-Oct-2024	Wed	30-Oct-2024	Wed	1	300	595	106,314	0	0	95,832	0	0	0	0	0	0	300	202,146
31-Oct-2024	Thu	31-Oct-2024	Thu	1	300	595	106,909	0	0	95,832	0	0	0	0	0	0	300	202,741
01-Nov-2024	Fri	01-Nov-2024	Fri	1	300	595	107,504	0	0	95,832	0	0	0	0	0	0	300	203,337
02-Nov-2024	Sat	02-Nov-2024	Sat	1	300	595	108,099	0	0	95,832	0	0	0	0	0	0	300	203,932
03-Nov-2024	Sun	03-Nov-2024	Sun	1	300	595	108,694	0	0	95,832	0	0	0	0	0	0	300	204,527
04-Nov-2024	Mon	04-Nov-2024	Mon	1	300	595	109,289	0	0	95,832	0	0	0	0	0	0	300	205,122
05-Nov-2024	Tue	05-Nov-2024	Tue	1	300	595	109,884	0	0	95,832	0	0	0	0	0	0	300	205,717
06-Nov-2024	Wed	06-Nov-2024	Wed	1	300	595	110,479	0	0	95,832	0	0	0	0	0	0	300	206,312
07-Nov-2024	Thu	07-Nov-2024	Thu	1	300	595	111,074	0	0	95,832	0	0	0	0	0	0	300	206,907
08-Nov-2024	Fri	08-Nov-2024	Fri	1	300	595	111,669	0	0	95,832	0	0	0	0	0	0	300	207,502
09-Nov-2024	Sat	09-Nov-2024	Sat	1	300	595	112,264	0	0	95,832	0	0	0	0	0	0	300	208,097
10-Nov-2024	Sun	10-Nov-2024	Sun	1	300	595	112,859	0	0	95,832	0	0	0	0	0	0	300	208,692
11-Nov-2024	Mon	11-Nov-2024	Mon	1	300	595	113,455	0	0	95,832	0	0	0	0	0	0	300	209,287
12-Nov-2024	Tue	12-Nov-2024	Tue	1	300	595	114,050	0	0	95,832	0	0	0	0	0	0	300	209,882
13-Nov-2024	Wed	13-Nov-2024	Wed	1	300	595	114,645	0	0	95,832	0	0	0	0	0	0	300	210,477
14-Nov-2024	Thu	14-Nov-2024	Thu	1	300	595	115,240	0	0	95,832	0	0	0	0	0	0	300	211,072
15-Nov-2024	Fri	15-Nov-2024	Fri	1	300	595	115,835	0	0	95,832	0	0	0	0	0	0	300	211,667
16-Nov-2024	Sat	16-Nov-2024	Sat	1	300	595	116,430	0	0	95,832	0	0	0	0	0	0	300	212,262
17-Nov-2024	Sun	17-Nov-2024	Sun	1	300	595	117,025	0	0	95,832	0	0	0	0	0	0	300	212,857
18-Nov-2024	Mon	18-Nov-2024	Mon	1	300	595	117,620	0	0	95,832	0	0	0	0	0	0	300	213,452
19-Nov-2024	Tue	19-Nov-2024	Tue	1	300	595	118,215	0	0	95,832	0	0	0	0	0	0	300	214,047
20-Nov-2024	Wed	20-Nov-2024	Wed	1	300	595	118,810	0	0	95,832	0	0	0	0	0	0	300	214,642
21-Nov-2024	Thu	21-Nov-2024	Thu	1	300	595	119,405	0	0	95,832	0	0	0	0	0	0	300	215,237
22-Nov-2024	Fri	22-Nov-2024	Fri	1	300	595	120,000	0	0	95,832	0	0	0	0	0	0	300	215,832
23-Nov-2024	Sat	23-Nov-2024	Sat	1	300	595	120,595	0	0	95,832	0	0	0	0	0	0	300	216,427
24-Nov-2024	Sun	24-Nov-2024	Sun	1	300	595	121,190	0	0	95,832	0	0	0	0	0	0	300	217,022
25-Nov-2024	Mon	25-Nov-2024	Mon	1	300	595	121,785	0	0	95,832	0	0	0	0	0	0	300	217,618
26-Nov-2024	Tue	26-Nov-2024	Tue	1	300	595	122,380	0	0	95,832	0	0	0	0	0	0	300	218,213
27-Nov-2024	Wed	27-Nov-2024	Wed	1	300	595	122,975	0	0	95,832	0	0	0	0	0	0	300	218,808
28-Nov-2024	Thu	28-Nov-2024	Thu	1	300	595	123,570	0	0	95,832	0	0	0	0	0	0	300	219,403
29-Nov-2024	Fri	29-Nov-2024	Fri	1	300	595	124,165	0	0	95,832	0	0	0	0	0	0	300	219,998

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From:	To:		CFS	AF	ACCUM. A.F.	CFS	AF	ACCUM. A.F.	CFS	AF	ACCUM. A.F.	CFS	AF	ACCUM. A.F.	CFS	ACCUM. A.F.		
30-Nov-2024	Sat	30-Nov-2024	Sat	1	300	595	124,760	0	0	95,832	0	0	0	0	0	0	300	220,593
01-Dec-2024	Sun	01-Dec-2024	Sun	1	300	595	125,355	0	0	95,832	0	0	0	0	0	0	300	221,188
02-Dec-2024	Mon	02-Dec-2024	Mon	1	300	595	125,950	0	0	95,832	0	0	0	0	0	0	300	221,783
03-Dec-2024	Tue	03-Dec-2024	Tue	1	300	595	126,545	0	0	95,832	0	0	0	0	0	0	300	222,378
04-Dec-2024	Wed	04-Dec-2024	Wed	1	300	595	127,140	0	0	95,832	0	0	0	0	0	0	300	222,973
05-Dec-2024	Thu	05-Dec-2024	Thu	1	300	595	127,736	0	0	95,832	0	0	0	0	0	0	300	223,568
06-Dec-2024	Fri	06-Dec-2024	Fri	1	300	595	128,331	0	0	95,832	0	0	0	0	0	0	300	224,163
07-Dec-2024	Sat	07-Dec-2024	Sat	1	300	595	128,926	0	0	95,832	0	0	0	0	0	0	300	224,758
08-Dec-2024	Sun	08-Dec-2024	Sun	1	300	595	129,521	0	0	95,832	0	0	0	0	0	0	300	225,353
09-Dec-2024	Mon	09-Dec-2024	Mon	1	300	595	130,116	0	0	95,832	0	0	0	0	0	0	300	225,948
10-Dec-2024	Tue	10-Dec-2024	Tue	1	300	595	130,711	0	0	95,832	0	0	0	0	0	0	300	226,543
11-Dec-2024	Wed	11-Dec-2024	Wed	1	300	595	131,306	0	0	95,832	0	0	0	0	0	0	300	227,138
12-Dec-2024	Thu	12-Dec-2024	Thu	1	300	595	131,901	0	0	95,832	0	0	0	0	0	0	300	227,733
13-Dec-2024	Fri	13-Dec-2024	Fri	1	300	595	132,496	0	0	95,832	0	0	0	0	0	0	300	228,328
14-Dec-2024	Sat	14-Dec-2024	Sat	1	300	595	133,091	0	0	95,832	0	0	0	0	0	0	300	228,923
15-Dec-2024	Sun	15-Dec-2024	Sun	1	300	595	133,686	0	0	95,832	0	0	0	0	0	0	300	229,518
16-Dec-2024	Mon	16-Dec-2024	Mon	1	300	595	134,281	0	0	95,832	0	0	0	0	0	0	300	230,113
17-Dec-2024	Tue	17-Dec-2024	Tue	1	300	595	134,876	0	0	95,832	0	0	0	0	0	0	300	230,708
18-Dec-2024	Wed	18-Dec-2024	Wed	1	300	595	135,471	0	0	95,832	0	0	0	0	0	0	300	231,303
19-Dec-2024	Thu	19-Dec-2024	Thu	1	300	595	136,066	0	0	95,832	0	0	0	0	0	0	300	231,899
20-Dec-2024	Fri	20-Dec-2024	Fri	1	300	595	136,661	0	0	95,832	0	0	0	0	0	0	300	232,494
21-Dec-2024	Sat	21-Dec-2024	Sat	1	300	595	137,256	0	0	95,832	0	0	0	0	0	0	300	233,089
22-Dec-2024	Sun	22-Dec-2024	Sun	1	300	595	137,851	0	0	95,832	0	0	0	0	0	0	300	233,684
23-Dec-2024	Mon	23-Dec-2024	Mon	1	300	595	138,446	0	0	95,832	0	0	0	0	0	0	300	234,279
24-Dec-2024	Tue	24-Dec-2024	Tue	1	300	595	139,041	0	0	95,832	0	0	0	0	0	0	300	234,874
25-Dec-2024	Wed	25-Dec-2024	Wed	1	300	595	139,636	0	0	95,832	0	0	0	0	0	0	300	235,469
26-Dec-2024	Thu	26-Dec-2024	Thu	1	300	595	140,231	0	0	95,832	0	0	0	0	0	0	300	236,064
27-Dec-2024	Fri	27-Dec-2024	Fri	1	300	595	140,826	0	0	95,832	0	0	0	0	0	0	300	236,659
28-Dec-2024	Sat	28-Dec-2024	Sat	1	300	595	141,421	0	0	95,832	0	0	0	0	0	0	300	237,254
29-Dec-2024	Sun	29-Dec-2024	Sun	1	300	595	142,017	0	0	95,832	0	0	0	0	0	0	300	237,849
30-Dec-2024	Mon	30-Dec-2024	Mon	1	300	595	142,612	0	0	95,832	0	0	0	0	0	0	300	238,444
31-Dec-2024	Tue	31-Dec-2024	Tue	1	300	595	143,207	0	0	95,832	0	0	0	0	0	0	300	239,039
01-Jan-2025	Wed	01-Jan-2025	Wed	1	300	595	143,802	0	0	95,832	0	0	0	0	0	0	300	239,634
02-Jan-2025	Thu	02-Jan-2025	Thu	1	300	595	144,397	0	0	95,832	0	0	0	0	0	0	300	240,229
03-Jan-2025	Fri	03-Jan-2025	Fri	1	300	595	144,992	0	0	95,832	0	0	0	0	0	0	300	240,824
04-Jan-2025	Sat	04-Jan-2025	Sat	1	300	595	145,587	0	0	95,832	0	0	0	0	0	0	300	241,419
05-Jan-2025	Sun	05-Jan-2025	Sun	1	300	595	146,182	0	0	95,832	0	0	0	0	0	0	300	242,014
06-Jan-2025	Mon	06-Jan-2025	Mon	1	300	595	146,777	0	0	95,832	0	0	0	0	0	0	300	242,609
07-Jan-2025	Tue	07-Jan-2025	Tue	1	300	595	147,372	0	0	95,832	0	0	0	0	0	0	300	243,204
08-Jan-2025	Wed	08-Jan-2025	Wed	1	300	595	147,967	0	0	95,832	0	0	0	0	0	0	300	243,799
09-Jan-2025	Thu	09-Jan-2025	Thu	1	300	595	148,562	0	0	95,832	0	0	0	0	0	0	300	244,394
10-Jan-2025	Fri	10-Jan-2025	Fri	1	300	595	149,157	0	0	95,832	0	0	0	0	0	0	300	244,989
11-Jan-2025	Sat	11-Jan-2025	Sat	1	300	595	149,752	0	0	95,832	0	0	0	0	0	0	300	245,584
12-Jan-2025	Sun	12-Jan-2025	Sun	1	300	595	150,347	0	0	95,832	0	0	0	0	0	0	300	246,179
13-Jan-2025	Mon	13-Jan-2025	Mon	1	300	595	150,942	0	0	95,832	0	0	0	0	0	0	300	246,775
14-Jan-2025	Tue	14-Jan-2025	Tue	1	300	595	151,537	0	0	95,832	0	0	0	0	0	0	300	247,370
15-Jan-2025	Wed	15-Jan-2025	Wed	1	300	595	152,132	0	0	95,832	0	0	0	0	0	0	300	247,965
16-Jan-2025	Thu	16-Jan-2025	Thu	1	300	595	152,727	0	0	95,832	0	0	0	0	0	0	300	248,560
17-Jan-2025	Fri	17-Jan-2025	Fri	1	300	595	153,322	0	0	95,832	0	0	0	0	0	0	300	249,155
18-Jan-2025	Sat	18-Jan-2025	Sat	1	300	595	153,917	0	0	95,832	0	0	0	0	0	0	300	249,750
19-Jan-2025	Sun	19-Jan-2025	Sun	1	300	595	154,512	0	0	95,832	0	0	0	0	0	0	300	250,345
20-Jan-2025	Mon	20-Jan-2025	Mon	1	300	595	155,107	0	0	95,832	0	0	0	0	0	0	300	250,940
21-Jan-2025	Tue	21-Jan-2025	Tue	1	300	595	155,702	0	0	95,832	0	0	0	0	0	0	300	251,535
22-Jan-2025	Wed	22-Jan-2025	Wed	1	300	595	156,298	0	0	95,832	0	0	0	0	0	0	300	252,130
23-Jan-2025	Thu	23-Jan-2025	Thu	1	300	595	156,893	0	0	95,832	0	0	0	0	0	0	300	252,725
24-Jan-2025	Fri	24-Jan-2025	Fri	1	300	595	157,488	0	0	95,832	0	0	0	0	0	0	300	253,320
25-Jan-2025	Sat	25-Jan-2025	Sat	1	300	595	158,083	0	0	95,832	0	0	0	0	0	0	300	253,915
26-Jan-2025	Sun	26-Jan-2025	Sun	1	300	595	158,678	0	0	95,832	0	0	0	0	0	0	300	254,510
27-Jan-2025	Mon	27-Jan-2025	Mon	1	300	595	159,273	0	0	95,832	0	0	0	0	0	0	300	255,105

Table 3
Tuolumne River Flow Schedule
 Based on DWR Values, 60-20-20 Index for 2024, Hydrologic Conditions
 Schedule For 2024-2025 Fish Flow Year

DATE		Number of DAYS	BASE FLOW ¹			PULSE FLOW ²			INTERPOLATION FLOW			Other Adjusted Flow			TOTAL FEREC FLOW			
From:	To:		CFS	AF	ACCUM. A.F.	CFS	AF	ACCUM. A.F.	CFS	AF	ACCUM. A.F.	CFS	AF	ACCUM. A.F.	CFS	ACCUM. A.F.		
28-Jan-2025	Tue	28-Jan-2025	Tue	1	300	595	159,868	0	0	95,832	0	0	0	0	0	0	300	255,700
29-Jan-2025	Wed	29-Jan-2025	Wed	1	300	595	160,463	0	0	95,832	0	0	0	0	0	0	300	256,295
30-Jan-2025	Thu	30-Jan-2025	Thu	1	300	595	161,058	0	0	95,832	0	0	0	0	0	0	300	256,890
31-Jan-2025	Fri	31-Jan-2025	Fri	1	300	595	161,653	0	0	95,832	0	0	0	0	0	0	300	257,485
01-Feb-2025	Sat	01-Feb-2025	Sat	1	300	595	162,248	0	0	95,832	0	0	0	0	0	0	300	258,080
02-Feb-2025	Sun	02-Feb-2025	Sun	1	300	595	162,843	0	0	95,832	0	0	0	0	0	0	300	258,675
03-Feb-2025	Mon	03-Feb-2025	Mon	1	300	595	163,438	0	0	95,832	0	0	0	0	0	0	300	259,270
04-Feb-2025	Tue	04-Feb-2025	Tue	1	300	595	164,033	0	0	95,832	0	0	0	0	0	0	300	259,865
05-Feb-2025	Wed	05-Feb-2025	Wed	1	300	595	164,628	0	0	95,832	0	0	0	0	0	0	300	260,460
06-Feb-2025	Thu	06-Feb-2025	Thu	1	300	595	165,223	0	0	95,832	0	0	0	0	0	0	300	261,056
07-Feb-2025	Fri	07-Feb-2025	Fri	1	300	595	165,818	0	0	95,832	0	0	0	0	0	0	300	261,651
08-Feb-2025	Sat	08-Feb-2025	Sat	1	300	595	166,413	0	0	95,832	0	0	0	0	0	0	300	262,246
09-Feb-2025	Sun	09-Feb-2025	Sun	1	300	595	167,008	0	0	95,832	0	0	0	0	0	0	300	262,841
10-Feb-2025	Mon	10-Feb-2025	Mon	1	300	595	167,603	0	0	95,832	0	0	0	0	0	0	300	263,436
11-Feb-2025	Tue	11-Feb-2025	Tue	1	300	595	168,198	0	0	95,832	0	0	0	0	0	0	300	264,031
12-Feb-2025	Wed	12-Feb-2025	Wed	1	300	595	168,793	0	0	95,832	0	0	0	0	0	0	300	264,626
13-Feb-2025	Thu	13-Feb-2025	Thu	1	300	595	169,388	0	0	95,832	0	0	0	0	0	0	300	265,221
14-Feb-2025	Fri	14-Feb-2025	Fri	1	300	595	169,983	0	0	95,832	0	0	0	0	0	0	300	265,816
15-Feb-2025	Sat	15-Feb-2025	Sat	1	300	595	170,579	0	0	95,832	0	0	0	0	0	0	300	266,411
16-Feb-2025	Sun	16-Feb-2025	Sun	1	300	595	171,174	0	0	95,832	0	0	0	0	0	0	300	267,006
17-Feb-2025	Mon	17-Feb-2025	Mon	1	300	595	171,769	0	0	95,832	0	0	0	0	0	0	300	267,601
18-Feb-2025	Tue	18-Feb-2025	Tue	1	300	595	172,364	0	0	95,832	0	0	0	0	0	0	300	268,196
19-Feb-2025	Wed	19-Feb-2025	Wed	1	300	595	172,959	0	0	95,832	0	0	0	0	0	0	300	268,791
20-Feb-2025	Thu	20-Feb-2025	Thu	1	300	595	173,554	0	0	95,832	0	0	0	0	0	0	300	269,386
21-Feb-2025	Fri	21-Feb-2025	Fri	1	300	595	174,149	0	0	95,832	0	0	0	0	0	0	300	269,981
22-Feb-2025	Sat	22-Feb-2025	Sat	1	300	595	174,744	0	0	95,832	0	0	0	0	0	0	300	270,576
23-Feb-2025	Sun	23-Feb-2025	Sun	1	300	595	175,339	0	0	95,832	0	0	0	0	0	0	300	271,171
24-Feb-2025	Mon	24-Feb-2025	Mon	1	300	595	175,934	0	0	95,832	0	0	0	0	0	0	300	271,766
25-Feb-2025	Tue	25-Feb-2025	Tue	1	300	595	176,529	0	0	95,832	0	0	0	0	0	0	300	272,361
26-Feb-2025	Wed	26-Feb-2025	Wed	1	300	595	177,124	0	0	95,832	0	0	0	0	0	0	300	272,956
27-Feb-2025	Thu	27-Feb-2025	Thu	1	300	595	177,719	0	0	95,832	0	0	0	0	0	0	300	273,551
28-Feb-2025	Fri	28-Feb-2025	Fri	1	300	595	178,314	0	0	95,832	0	0	0	0	0	0	300	274,146
01-Mar-2025	Sat	01-Mar-2025	Sat	1	300	595	178,909	0	0	95,832	0	0	0	0	0	0	300	274,741
02-Mar-2025	Sun	02-Mar-2025	Sun	1	300	595	179,504	0	0	95,832	0	0	0	0	0	0	300	275,337
03-Mar-2025	Mon	03-Mar-2025	Mon	1	300	595	180,099	0	0	95,832	0	0	0	0	0	0	300	275,932
04-Mar-2025	Tue	04-Mar-2025	Tue	1	300	595	180,694	0	0	95,832	0	0	0	0	0	0	300	276,527
05-Mar-2025	Wed	05-Mar-2025	Wed	1	300	595	181,289	0	0	95,832	0	0	0	0	0	0	300	277,122
06-Mar-2025	Thu	06-Mar-2025	Thu	1	300	595	181,884	0	0	95,832	0	0	0	0	0	0	300	277,717
07-Mar-2025	Fri	07-Mar-2025	Fri	1	300	595	182,479	0	0	95,832	0	0	0	0	0	0	300	278,312
08-Mar-2025	Sat	08-Mar-2025	Sat	1	300	595	183,074	0	0	95,832	0	0	0	0	0	0	300	278,907
09-Mar-2025	Sun	09-Mar-2025	Sun	1	300	595	183,669	0	0	95,832	0	0	0	0	0	0	300	279,502
10-Mar-2025	Mon	10-Mar-2025	Mon	1	300	595	184,264	0	0	95,832	0	0	0	0	0	0	300	280,097
11-Mar-2025	Tue	11-Mar-2025	Tue	1	300	595	184,859	0	0	95,832	0	0	0	0	0	0	300	280,692
12-Mar-2025	Wed	12-Mar-2025	Wed	1	300	595	185,455	0	0	95,832	0	0	0	0	0	0	300	281,287
13-Mar-2025	Thu	13-Mar-2025	Thu	1	300	595	186,050	0	0	95,832	0	0	0	0	0	0	300	281,882
14-Mar-2025	Fri	14-Mar-2025	Fri	1	300	595	186,645	0	0	95,832	0	0	0	0	0	0	300	282,477
15-Mar-2025	Sat	15-Mar-2025	Sat	1	300	595	187,240	0	0	95,832	0	0	0	0	0	0	300	283,072
16-Mar-2025	Sun	16-Mar-2025	Sun	1	300	595	187,835	0	0	95,832	0	0	0	0	0	0	300	283,667
17-Mar-2025	Mon	17-Mar-2025	Mon	1	300	595	188,430	0	0	95,832	0	0	0	0	0	0	300	284,262
18-Mar-2025	Tue	18-Mar-2025	Tue	1	300	595	189,025	0	0	95,832	0	0	0	0	0	0	300	284,857
19-Mar-2025	Wed	19-Mar-2025	Wed	1	300	595	189,620	0	0	95,832	0	0	0	0	0	0	300	285,452
20-Mar-2025	Thu	20-Mar-2025	Thu	1	300	595	190,215	0	0	95,832	0	0	0	0	0	0	300	286,047
21-Mar-2025	Fri	21-Mar-2025	Fri	1	300	595	190,810	0	0	95,832	0	0	0	0	0	0	300	286,642
22-Mar-2025	Sat	22-Mar-2025	Sat	1	300	595	191,405	0	0	95,832	0	0	0	0	0	0	300	287,237
23-Mar-2025	Sun	23-Mar-2025	Sun	1	300	595	192,000	0	0	95,832	0	0	0	0	0	0	300	287,832
24-Mar-2025	Mon	24-Mar-2025	Mon	1	300	595	192,595	0	0	95,832	0	0	0	0	0	0	300	288,427
25-Mar-2025	Tue	25-Mar-2025	Tue	1	300	595	193,190	0	0	95,832	0	0	0	0	0	0	300	289,022
26-Mar-2025	Wed	26-Mar-2025	Wed	1	300	595	193,785	0	0	95,832	0	0	0	0	0	0	300	289,618
27-Mar-2025	Thu	27-Mar-2025	Thu	1	300	595	194,380	0	0	95,832	0	0	0	0	0	0	300	290,213

Table 3
Tuolumne River Flow Schedule
 Based on DWR Values, 60-20-20 Index for 2024, Hydrologic Conditions
 Schedule For 2024-2025 Fish Flow Year

DATE		Number of DAYS	BASE FLOW ¹			PULSE FLOW ²			INTERPOLATION FLOW			Other Adjusted Flow			TOTAL FEREC FLOW			
			From:	To:	CFS	AF	ACCUM. A.F.	CFS	AF	ACCUM. A.F.	CFS	AF	ACCUM. A.F.	CFS	AF	ACCUM. A.F.	CFS	ACCUM. A.F. ³
28-Mar-2025	Fri	28-Mar-2025	Fri	1	300	595	194,975	0	0	95,832	0	0	0	0	0	0	300	290,808
29-Mar-2025	Sat	29-Mar-2025	Sat	1	300	595	195,570	0	0	95,832	0	0	0	0	0	0	300	291,403
30-Mar-2025	Sun	30-Mar-2025	Sun	1	300	595	196,165	0	0	95,832	0	0	0	0	0	0	300	291,998
31-Mar-2025	Mon	31-Mar-2025	Mon	1	300	595	196,760	0	0	95,832	0	0	0	0	0	0	300	292,593
01-Apr-2025	Tue	01-Apr-2025	Tue	1	300	595	197,355	0	0	95,832	0	0	0	0	0	0	300	293,188
02-Apr-2025	Wed	02-Apr-2025	Wed	1	300	595	197,950	0	0	95,832	0	0	0	0	0	0	300	293,783
03-Apr-2025	Thu	03-Apr-2025	Thu	1	300	595	198,545	0	0	95,832	0	0	0	0	0	0	300	294,378
04-Apr-2025	Fri	04-Apr-2025	Fri	1	300	595	199,140	0	0	95,832	0	0	0	0	0	0	300	294,973
05-Apr-2025	Sat	05-Apr-2025	Sat	1	300	595	199,736	0	0	95,832	0	0	0	0	0	0	300	295,568
06-Apr-2025	Sun	06-Apr-2025	Sun	1	300	595	200,331	0	0	95,832	0	0	0	0	0	0	300	296,163
07-Apr-2025	Mon	07-Apr-2025	Mon	1	300	595	200,926	0	0	95,832	0	0	0	0	0	0	300	296,758
08-Apr-2025	Tue	08-Apr-2025	Tue	1	300	595	201,521	0	0	95,832	0	0	0	0	0	0	300	297,353
09-Apr-2025	Wed	09-Apr-2025	Wed	1	300	595	202,116	0	0	95,832	0	0	0	0	0	0	300	297,948
10-Apr-2025	Thu	10-Apr-2025	Thu	1	300	595	202,711	0	0	95,832	0	0	0	0	0	0	300	298,543
11-Apr-2025	Fri	11-Apr-2025	Fri	1	300	595	203,306	0	0	95,832	0	0	0	0	0	0	300	299,138
12-Apr-2025	Sat	12-Apr-2025	Sat	1	300	595	203,901	0	0	95,832	0	0	0	0	0	0	300	299,733
13-Apr-2025	Sun	13-Apr-2025	Sun	1	300	595	204,496	0	0	95,832	0	0	0	0	0	0	300	300,328
14-Apr-2025	Mon	14-Apr-2025	Mon	1	300	595	205,091	0	0	95,832	0	0	0	0	0	0	300	300,923
No. of days				365														

1 cfs day = 1.983471 acre-feet (af)

- Total accumulation amount pertains to 2024-2025 Fish Year only.
- The pulse flows are a target that represents a daily average target. The actual operational data will be adjusted to attain the annual requirement. Based on an hourly calculation schedule for the target flows. This represents a daily average.

Case	60-20-20 Index		Base Total		Pulse Total		Interpolation Total		Adjustment Total		FERC Total
90%	3,485,506	60-20-20 Index	205,091		95,832		-				300,923
		Scheduled Above	205,091		95,832		-		-		300,923
		Difference	0		(0)		-		-		(0)