MODEL SIMULATION REPORT FOR SCENARIO 2

BASELINE OPERATIONS: CURRENT OPERATIONS PVP ON EEL RIVER AND CURRENT OPS ON RUSSIAN RIVER, compared with

SCENARIO 2: POTTER VALLEY PROJECT (PVP) with RUN OF THE RIVER ON EEL RIVER AND FISH FLOW EIR and FIRO OPERATIONS ON RUSSIAN RIVER

Table SC2-1. Summary of modeling scenarios evaluated by the Water Supply Work Group. Modeling results for scenarios bounded in red are summarized in this document.

Modeling Scenarios Updated 4/16/19		**Russian River & Lake Mendocino Alternatives**		
		Current Operations	Lake Mendocino FIRO (Hybrid) with Fish Flow EIR Operations	Raise Coyote Valley Dam+++
Potter Valley Project Alternatives	Current Operations	Baseline: Existing Climate (n=1)		
		Baseline FC: Future Climate (n=4)		
	PVP Revised Operations	Scenario 4: Existing Climate (n=1)		
	Run-of-the-River		Scenario 2: Existing Climate (n=1)	
			Scenario 2FC: Future Climate (n=4)	
	PVP Decommission	Scenario 1: Existing Climate (n=1)	Scenario 3: Existing Climate (n=1)	Scenario 5: Preliminary analysis with Existing Climate (includes two sub-scenarios)

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1. SUMMARY OF ASSUMPTIONS

Primary model assumptions for each scenario are summarized in Table SC2-2 and highlight key assumptions that differ. Summary of modeled scenarios and assumptions.

Table SC2-2. Summary of modeled scenarios and assumptions.

Model	Assumptions	Baseline Operations	Scenario 2 PVP Run of River
PVP ResSim	Plot Legend	PVP Current Operations	Run of River
	Operations	RPA/Current Operations	No Scott Dam/Run of River Diversions
	Year Storage Capacity	2016	N/A
	Max PVP Tunnel Capacity	170	300
	Hydrology	Historical-Cardno	Historical-Cardno
Russian River ResSim	Plot Legend	Current Operations	Hyb FIRO + Fish Flow EIR
	Minimum Flows	BO TUC/D1610	Fish Flow EIR
	Hydrologic Index	D1610	Fish Flow EIR
	LM Year Storage Capacity	2001	2001
	Calpella Reach Loss	~8,600 acre-ft	~8,600 acre-ft
	Calpella Reach Source	Natural flows/Tunnel Div	Natural Flows/Tunnel Div
	Upper River Losses	Fish Flow EIR	Fish Flow EIR
	Hydrology	Historical-USGS BCM	Historical-USGS BCM
Both	Simulation Period	WY 1911 - 2017	WY 1911 - 2017

Baseline Operations Model Assumptions

Baseline Conditions

- *Current Operations on the Russian River remain in place.*
- *Current Operations on the Eel River remain in place.*

Eel River:

- Current minimum flow released based on 2002 Biological Opinion RPA flows
- Historical Cardno hydrology for Lake Pillsbury inflow (no climate change)
- Cardno 2018 estimates of daily unimpaired tributary accretion between E-2 and E-11
- 2017 Block Water hydrograph released from slide gate, triggered when E-11 flows drop below 250 cfs after April 1
- Maximum PVP diversion capacity = 170 cfs to best represent historical➔simulated volumetric mass balance for discretionary power generation diversions (full capacity is 300 cfs; current derated capacity is 240 cfs)
- Regression equation used for the timing of Scott Dam gate closure
- Drought, Maintenance, and Testing flow variances excluded
- Storage based on Lake Pillsbury 2016 bathymetric survey (water supply storage capacity is 76,876 ac-ft)
- Based on the model verification, the PVP model may exhibit some bias in accretions between Scott Dam and Cape Horn dam in the spring of some years due to downstream gage error- this translates into over/under estimate of flows below Van Arsdale (E-11) that is consistently applied to all scenarios
- Van Arsdale storage used to meet RPA flows

- Buffers for mininum instream flows range from 5 cfs to 20 cfs below E-11 (Van Arsdale), depending on magnitude of the minimum instream flow. Flow buffer for meeting minimum instream flows on the East Fork Russian River at the E-16 PVP diversion are always 5 cfs. These flow buffers are for all scenarios where applicable.
- Calpella reach demands, which includes PVID demands, are approximately 8,600 acre-feet annually.

Russian River:

- Flow source to Lake Mendocino = Unimpaired Flows + modeled PVP diversions – Calpella reach loss
- Historic unimpaired flows computed using USGS Basin Characterization Model.
- Storage based on Lake Mendocino 2001 bathymetric survey (water supply storage capacity is 111,000 ac-ft).
- Minimum flow releases to the East Branch Russian River below Potter Valley Powerhouse and below Lake Mendocino based on the 2008 Biological Opinon RPA and 1986 Decision 1610.
- Minimum flood control releases based on existing ACOE rule curve (no Forecast Information Reservoir Operations [FIRO].
- Hydrologic index used for minimum flow releases based on 1986 Decision 1610 (inflow to Lake Pillsbury rather than Lake Mendocino)
- Assumptions for losses in the East Branch Russian River include 8,600 ac-ft loss from E-16 to Calpella and none from Calpella to Lake Mendocino
- Buffer for minimum instream flows below Lake Mendocino range from 5 cfs to 20 cfs, depending on the time of year and river reach, and are consistently used for all scenarios

Differences between Model Assumptions for Baseline and Scenario 2

Eel River, same as Baseline, except:

- Zero storage capacity at Lake Pillsbury (Scott Dam is removed); Cape Horn dam remains in the model
- No Block Water hydrographs released because Scott Dam is removed
- Maximum PVP diversion capacity applied is 300 cfs, which assumes full tunnel capacity can be used. Assumes major infrastructure improvements would be made to the diversion facility to increase PVID diversion capacity
- The PVP diversion flows can range from 30 cfs - 300 cfs when occurring. PVP diversions occur when flows at Cape Horn Dam are greater than [E-11 minimum flow] + [5 cfs buffer] + [30 cfs diversion threshold]. They are equal to [Flows at Cape Horn Dam] – [E-11 minimum flow] –[5 cfs buffer] or 300 cfs, whichever is less.

Russian River, same as Baseline, except:

- Potter Valley Irrigation District (PVID) water needs partially met by increased seasonal PVP diversion capacity of 300 cfs
- Rule set applied to PVID diversions: PVID water needs not met by seasonal PVP diversions and local runoff are provided via pumpback from Lake Mendocino up to 15,320 ac-ft, ranging from 0 cfs to 70 cfs between April 15 and October 15 (based on 2016 PVID reported total demand). If Lake Mendocino storage is less than 15,000 ac-ft, the model does not allow pumpback to occur.
- Russian River flows are based on the Fish Flow EIR, which includes different flow ranges as compared to the D1610 flow regime. The difference in D1610 and Fish Flow EIR flow regimes varies by month and water year condition, ranging from a difference of 0 cfs to 80 cfs. The greatest differences occur in the wettest year types during summer months. Both flow regimes have a floor of 25 cfs.
- Maximum conservation storage of Lake Mendocino is assumed to be equal to the flood pool encroachment (FIRO guide curve) that was approved for the water year 2019 FIRO major deviation to the Water Control Manual, which allows for additional winter and fall water supply storage (68,400 -80,050 ac-ft) (Figure SC2-1). Modeling does not simulate forecast based operations therefore storage levels, releases and downstream flows could differ from the simulation results.

Scenario 2:
PVP Run of River

- *Russian River Operations utilize the Fish Flow EIR instead of D1610*
- *Scott Dam is removed and PVP diversions to the Russian River are limited to Run of River.*
- *The PVP diversion remains at the Cape Horn Dam location.*
- *The PVP diversion does not occur during low flow periods (e.g. summer and fall).*
- *The maximum PVP diversion amount is increased from 170 cfs up to 300 cfs.*

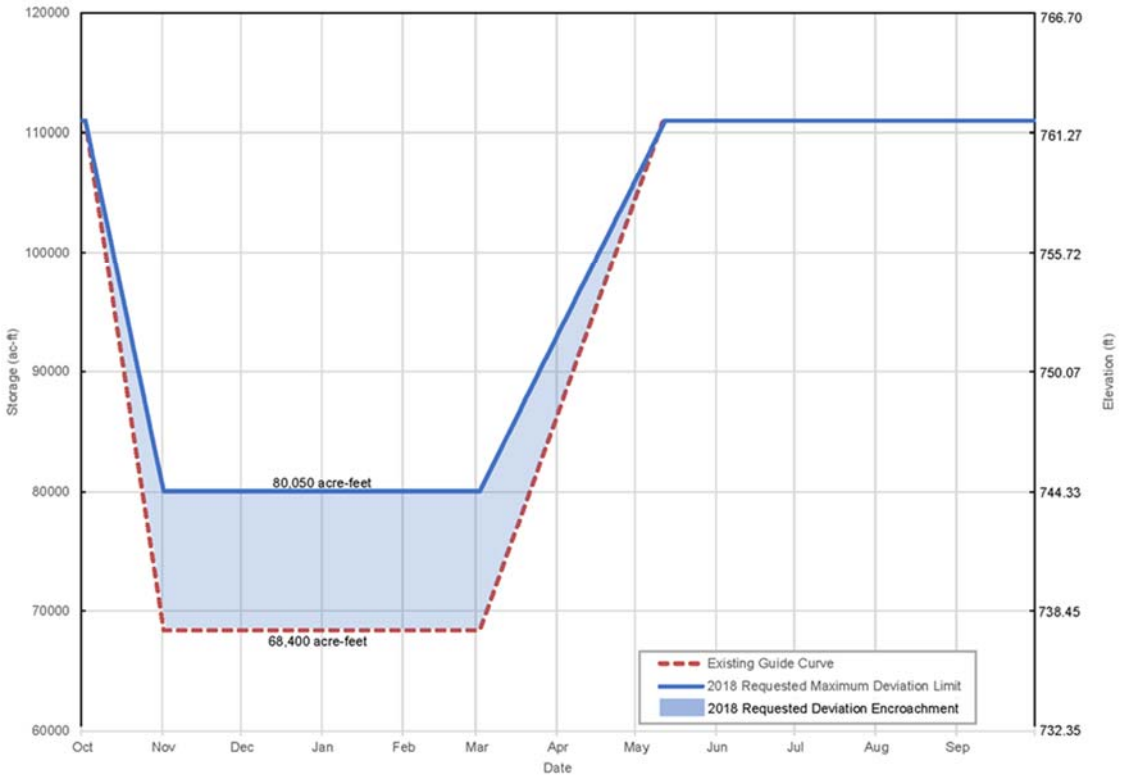

Figure SC2-1. The existing FIRO rule curve is adjusted to allow additional storage by raising the winter (November 1 through March 1) storage maximum from 68,400 ac-ft to 80,050 ac-ft.

Example Hydrographs Comparing Flow Management Results

Example hydrographs have been provided for a recent dry year (WY 2015) and a recent wet year (WY 2017), as examples of how flows are predicted to change under a Run of River Scenario, compared to baseline operations at Cape Horn Dam (E-11, Figure SC2-2 and Figure SC2-3), the Potter Valley diversion (E-16, Figure SC2-4 and Figure SC2-5), Lake Mendocino storage (Figure SC2-6 and Figure SC2-7), and the Russian River at Cloverdale (Figure SC2-8 and Figure SC2-9).

Cape Horn Dam (E-11). The Eel River hydrograph for Scenario 2 in a dry water year is similar to baseline, although flows are lower in the spring without Lake Pillsbury storage to support baseline operations flows. Flows are slightly higher during the summer and early fall period because unimpaired flows are higher than the minimum baseline operations flows under the "Very Dry" classification (Figure SC2-2). Under wetter conditions, the two hydrographs are also similar except flows in Scenario 2 are lower (by up to 10 cfs) beginning in August and extending through the end of October due to the loss of storage above Scott Dam (Figure SC2-3). In general, winter baseflows are slightly lower due to higher PVP diversions. Meanwhile, the peak flows are typically higher in Scenario 2 due to the removal of Scott Dam (no reservoir attenuation). Unimpaired flows commence once the PVP diversion ends, which varies by water year condition, and extends into or through October, depending on the hydrologic conditions of any given year (Figure SC2-2 and Figure SC2-3).

PVP Diversion (E-16). The duration of the PVP diversion operates is less under Scenario 2 but the magnitude of the diversion is higher (maximum of capacity of 300 cfs, which presumes the fish screen infrastructure has been strengthened to withstand greater loading). Diversions would occur less frequently and shorter in duration in dry water years compared to wetter water years (Figure SC2-4 and Figure SC2-5).

Lake Mendocino. During drier water years, the model predicts Scenario 2 storage in Lake Mendocino to be consistently higher than baseline operations in the spring and summer as a result of the increased diversion capacity during winter months and reduced flow released due to the Fish Flow EIR (Figure SC2-6). In all year types, simulated flood control releases occur when storage levels reach the FIRO guide curve at 80,000 ac-ft to approximate the water supply benefit of FIRO. These flood control releases do not simulate forecast based operations which could result in different storage levels and downstream flows than simulation results. Once precipitation resumes and PVP diversions also resume, Scenario 2 can achieve higher storage levels allowed with the FIRO guide curve, until the PVP diversion is halted in mid-summer (Figure SC2-7) due to low flows above Cape Horn Dam. During the summer and fall, the storage in Scenario 2 is depleted more rapidly compared to baseline due to no dry season PVP diversions, despite the lower releases prescribed in the Fish Flow EIR.

Russian River at Cloverdale. During dry water years, Scenario 2 flows at Cloverdale are consistently lower than baseline operations, although the hydrograph shows a similar flow pattern. Peak flow events are similar under both scenarios and are a result of flood releases from Lake Mendocino and/or tributary accretion (Figure SC2-8 and Figure SC2-9). Run of River Scenario flows are also lower during wetter water years (Figure SC2-9). From early March through May, spring releases into the Russian River at Cloverdale are slightly higher than baseflow operations because Lake Mendocino is reaching and exceeding the rule curve for balancing water storage with flood control, and thus additional water is being released downstream during this period. Independent of water year type, lower baseflows during the summer and fall result from lower minimum instream flow requirements in the Fish Flow EIR that range from 0 cfs to 80 cfs lower than baseline operations minimum flow requirements, not because there is less water availability.

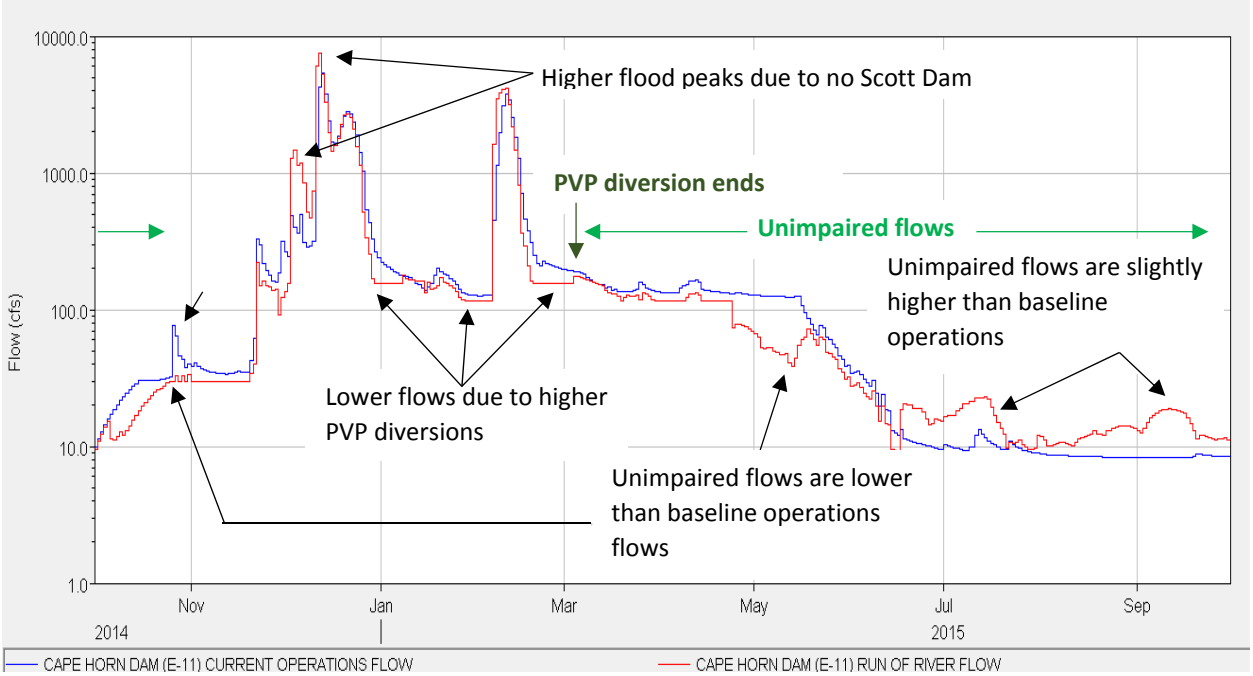

Figure SC2-2. Model results for Eel River flow below Cape Horn Dam (E-11) comparing baseline operations and Scenario 2 using log scale. Water Year 2015 is shown as an example of a drier water year type.

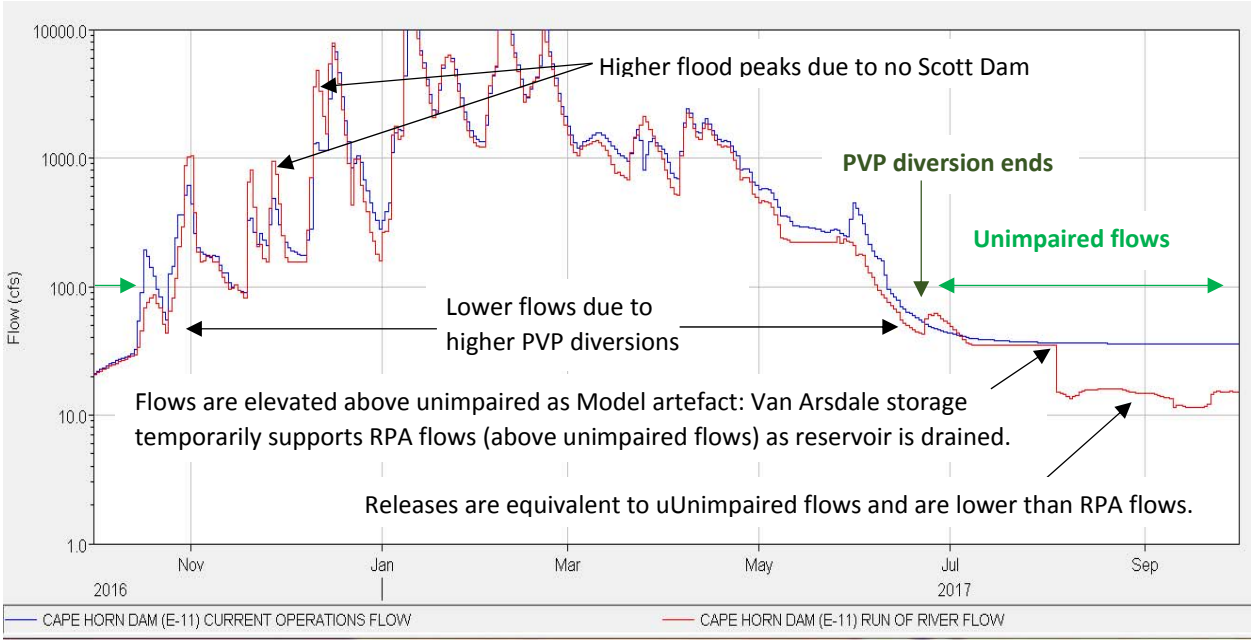

Figure SC2-3. Model results for Eel River flow below Cape Horn Dam (E-11) comparing baseline operations and Scenario 2 using log scale. Water Year 2017 is shown as an example of a wetter water year type.

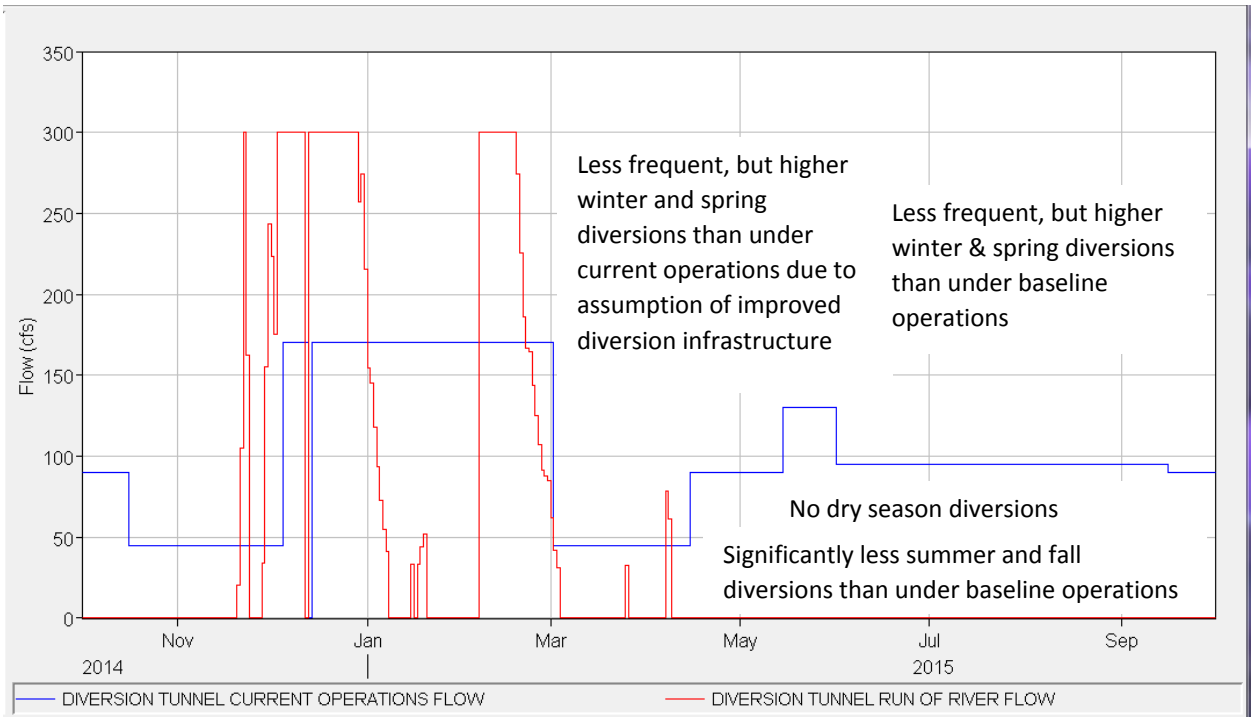

Figure SC2-4. Model results for the Potter Valley diversion (E-16) comparing baseline operations and Scenario 2. Water Year 2015 is shown as an example of a drier water year type.

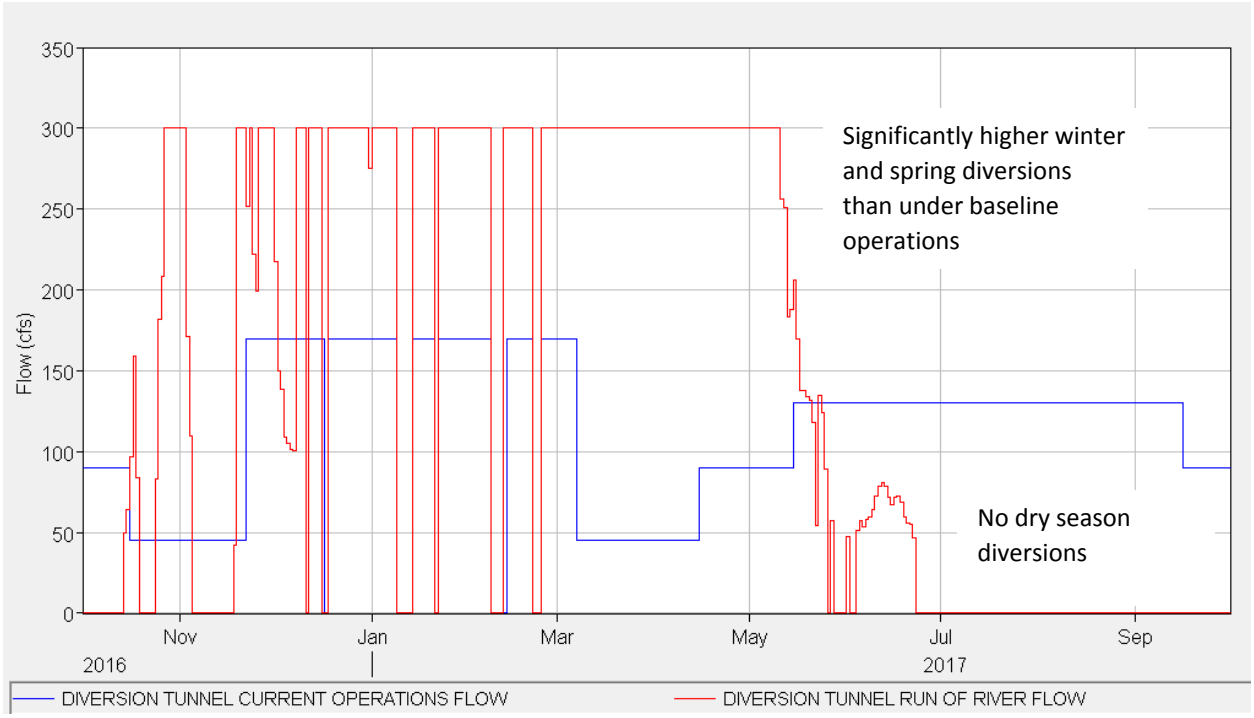

Figure SC2-5. Model results for the Potter Valley diversion (E-16) comparing baseline operations and Scenario 2. Water Year 2017 is shown as an example of a wetter water year type.

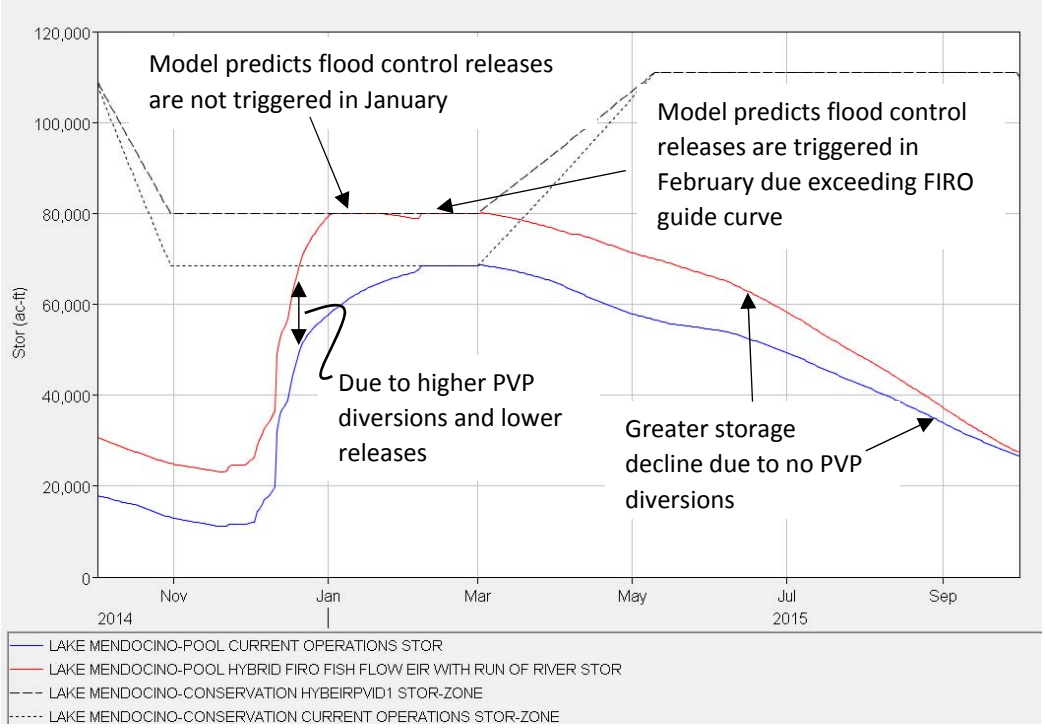

Figure SC2-6. Model results for Lake Mendocino storage comparing baseline operations and Scenario 2. Water Year 2015 is shown as an example of a drier water year type.

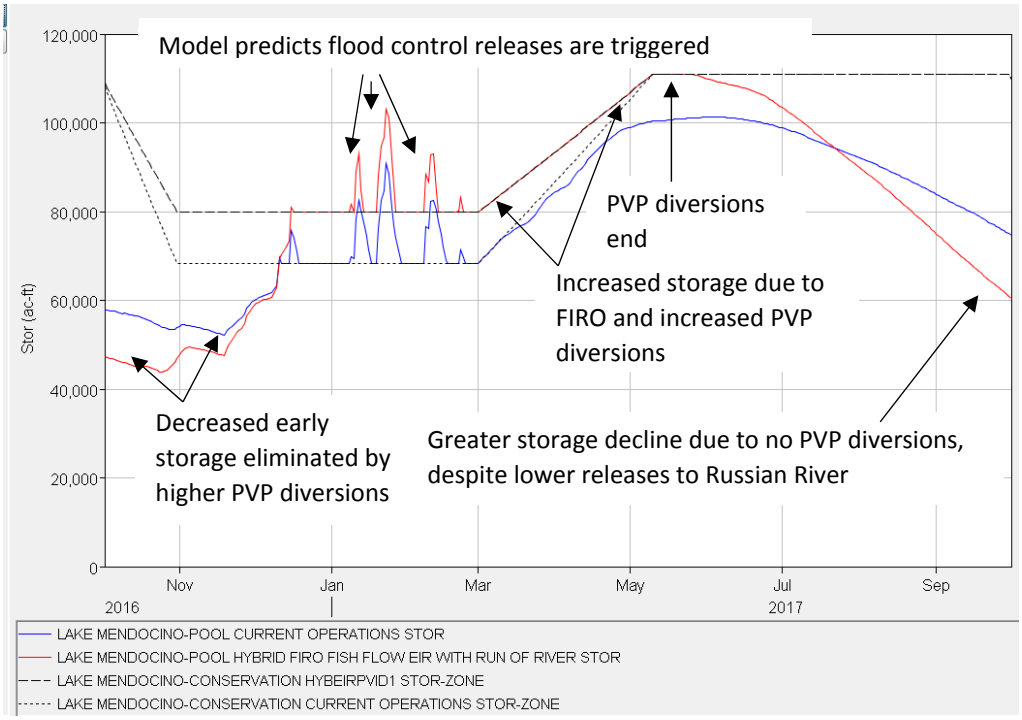

Figure SC2-7. Model results for Lake Mendocino storage comparing baseline operations and Scenario 2. Water Year 2017 is shown as an example of a wetter water year type.

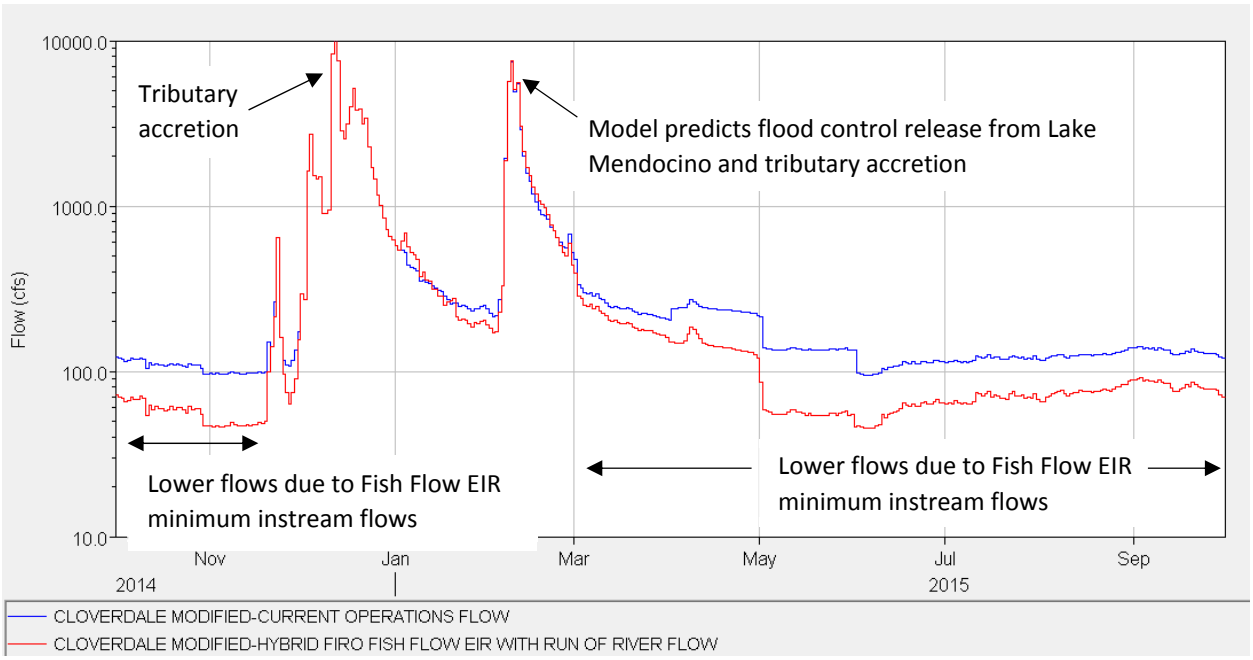

Figure SC2-8. Model results for Russian River flow at Cloverdale comparing baseline operations and Scenario 2 using log scale. Water Year 2015 is shown as an example of a drier water year type.

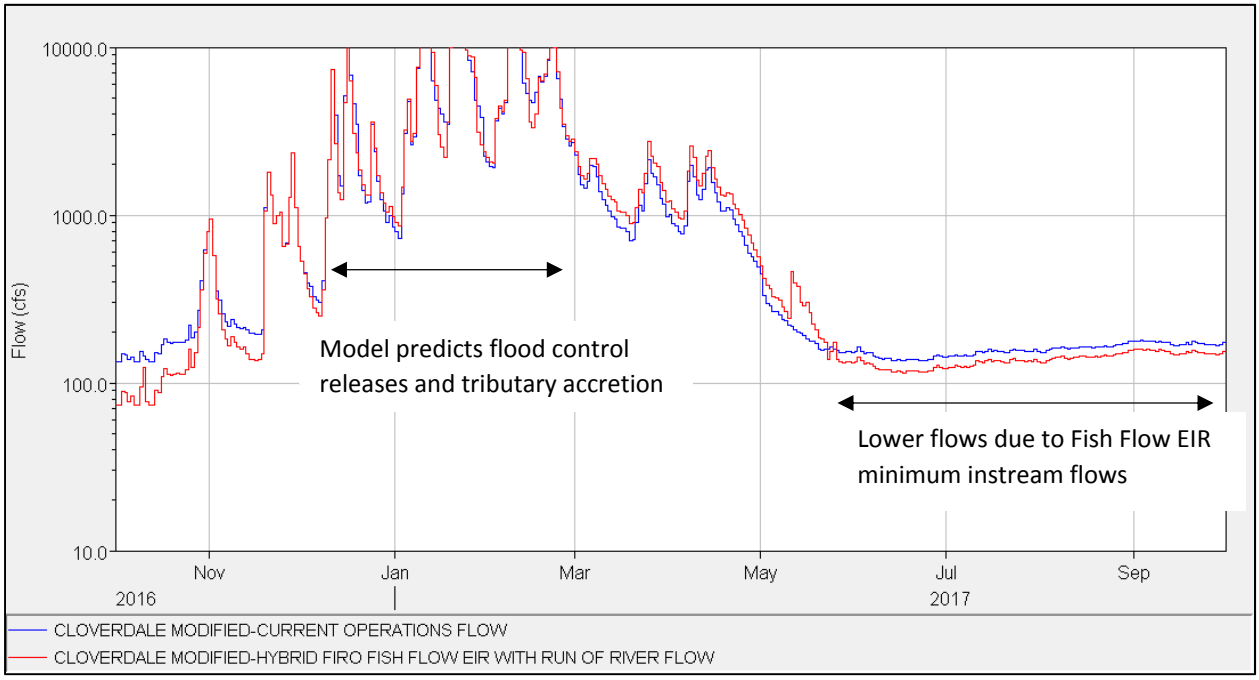

Figure SC2-9. Model results for Russian River flow at Cloverdale comparing baseline operations and Scenario 2 using log scale. Water Year 2017 is shown as an example of a wetter water year type.

2. KEY METRICS

Table SC2-3. Summary of Eel River performance metrics for the WY 1911-2017 period of record (107 years).

Model Junction	Evaluation Metric	Baseline Operations	Scenario 2: PVP Run of the River	Scenario 2 Percent Change from Baseline Operations Scenario
Lake Pillsbury	Average Annual Inflow (ac-ft)	411,870	411,870	0%
	Standard Deviation of Average Annual Inflow (ac-ft)	234,731	234,731	0%
	Relative Standard Deviation (%)	57%	57%	0%
	Minimum Average Annual Inflow (ac-ft)	30,447	30,447	0%
	Average Overall Storage (ac-ft)	50,858	N/A[1]	N/A[1]
	Average Low Point of Annual Storage (March - February) (ac-ft)	24,829	N/A[1]	N/A[1]
	Relative Standard Deviation (%)	32%	N/A[1]	N/A[1]
	Standard Deviation of Low Point of Annual Storage (ac-ft)	8,005	N/A[1]	N/A[1]
	Number of Years Below 35,000 ac-ft Storage from August-October[2]	65	N/A[1]	N/A[1]
	Number of Years Below 9,700 ac-ft Storage from August-October	6	N/A[1]	N/A[1]
	Number of years depleted or reached dead pool	5	0	-100%
Below Scott Dam (E-2)	Average June-September flows (cfs)	153	51	-67%
	Minimum Weekly June-September flows (cfs)	0[3]	0[3]	0[3]
	Standard Deviation of Minimum Weekly June-September flows (cfs)	61	80	32%
	Relative Standard Deviation (%)	239%	256%	0%
	Average October-December flows (cfs)	397	425	7%
	Minimum Weekly October-December flows (cfs)	0[3]	0[3]	0[3]
	Standard Deviation of Minimum Weekly October-December flows (cfs)	950	1,088	15%
	Relative Standard Deviation (%)	619%	2126%	243%
	Average Water Year Volumes (ac-ft)	404,161	408,889	1%
	Standard Deviation of Average water year volumes (ac-ft)	230,136	234,895	2%
	Relative Standard Deviation (%)	57.9%	57.4%	0.9%
Below Cape Horn Dam (E-11)	Average June-September flows (cfs)	43	35	-20%
	Minimum Weekly June-September flows (cfs)	0[3]	0[3]	0[3]
	Standard Deviation of Minimum Weekly June-September flows (cfs)	67	50	-26%
	Relative Standard Deviation (%)	18%	11%	-36%
	Average October-December flows (cfs)	373	436	17%
	Minimum Weekly October-December flows (cfs)	0**	0**	0**
	Standard Deviation of Minimum Weekly October-December flows (cfs)	1,091	1,201	10%
	Relative Standard Deviation (%)	2525%	3461%	37%
	Average Water Year Volumes (ac-ft)	413,281	413,505	0%
	Standard Deviation of Average water year volumes (ac-ft)	274,001	264,522	-3%
	Relative Standard Deviation (%)	66%	64%	-4%

1 N/A because Lake Pillsbury is removed.

2 Metric can be triggered by one day (e.g. October 30), although the reservoir does not typically refill once it is dry.

3 In 1924, the local flows reach 0 cfs from mid-July through mid-October in both baseline operations (reservoir too deplete to meet baseline operations flows) and unimpaired conditions. Additionally, Lake Pillsbury was depilated from late August to late October in 1924.

Table SC2-4. Summary of Russian River performance metrics for the WY 1911-2017 period of record (107 years).

Model Junction	Evaluation Metric	Baseline Operations	Scenario 2: PVP Run of the River	Scenario 2 Percent Change from Baseline Operations Scenario
Lake Mendocino	Average Annual Inflow (ac-ft)	173,380	178,999	3%
	Standard Deviation of Average Annual Inflow (ac-ft)	67,567	80,752	20%
	Relative Standard Deviation (%)	39%	45%	16%
	Minimum Average Annual Inflow (ac-ft) [1](1977)	21,099	12,933	-39%
	Average Overall Storage (ac-ft)	66,659	76,650	15%
	Average Low Point of Annual Storage (March-February) (ac-ft)	45,034	45,088	0%
	Standard Deviation of Low Point of Annual Storage (ac-ft)	16,508	12,462	-25%
	Relative Standard Deviation (%)	37%	28%	-25%
	Number of Years Below 2,100 ac-ft Storage at Any Time During the Year (1977)	1	1	0%
Russian River at Cloverdale	Average June-September flows (cfs)	147	132	-10%
	Minimum Weekly June-September flows (cfs)	0**	0**	0**
	Standard Deviation of Minimum Weekly June-September flows (cfs)	25	48	88%
	Relative Standard Deviation (%)	0%	0%	0%
Russian River at Healdsburg	Average October-December flows (cfs)	1,075	1,009	-6%
	Minimum Weekly October-December flows (cfs)	0**	0**	0**
	Standard Deviation of Minimum Weekly October-December flows (cfs)	2,396	2,404	0%
	Relative Standard Deviation (%)	0%	0%	0%
	Average water year volumes (ac-ft)	906,151	910,998	1%
	Standard Deviation of Average water year volumes (ac-ft)	507,077	523,372	3%
	Relative Standard Deviation (%)	56%	57%	3%

Table SC2-5. Summary of PVID performance metrics for the WY 1911-2017 period of record (107 years).

Model Junction	Evaluation Metric	Baseline Operations	Scenario 2: PVP Run of the River	Scenario 2 Percent Change from Baseline Operations Scenario
Diverted to Potter Valley via Tunnel (E-16)	Average Water Year Volumes (ac-ft)	78,077	82,785	6%
	Standard Deviation of Average water year volumes (ac-ft)	14,615	28,045	92%
	Relative Standard Deviation (%)	19%	34%	81%
	Minimum Water Year Volume (ac-ft)	24,377	8,699	-64%
PVID pumpback from Lake Mendocino (May-Oct)	Average Water Year Volumes (ac-ft)	N/A[1]	15,027	N/A[1]
	Standard Deviation of Average water year volumes (ac-ft)	N/A[1]	867	N/A[1]
	Relative Standard Deviation (%)	N/A[1]	6%	N/A[1]
	Minimum Water Year Volume (ac-ft)	N/A[1]	6,347	N/A[1]
PVID water supply deficiencies [2] (<15,140 ac-ft)	90th Percentile Deficiency Volumes (ac-ft)	0	0	0%
	Maximum May -Oct Deficiency Volume (ac-ft)	5,996	8,793	47%
	Number of years May-Oct PVID delivery less than 15,140 ac-ft	2	2	0%

1 N/A because no PVID pumpback in baseline operation

2 PVID water supply includes PVP diversions and pumpback from Lake Mendocino when present

3. OVERVIEW OF RESULTS

This summary of results compares Scenario 2 (PVP Run of River) to baseline operations, highlighting differences in flow and water storage availability at key locations in both the Eel River and Russian River basin.

Eel River Results (Below Scott Dam and Below Cape Horn Dam)

- Scott Dam storage and Eel River flows at E-2 are the same as the Decommissioning Scenario (Scenario 1). Flows immediately below Scott Dam will be unimpaired and thus would not be managed via storage in Lake Pillsbury. Flows would no longer be stored in Lake Pillsbury during winter months, to be released during drier parts of the year.
- Flows below Scott Dam for Scenario 2 would generally be higher in winter, spring, and late fall; flows will be lower during summer and early fall months, compared to baseline operations, dipping as low as 10 cfs in September under median conditions.
- Flow below Cape Horn Dam flows are slightly lower than Scenario 1 in winter months due to an increased PVP diversion (most typically 130 cfs), then very similar in spring and summer months once the PVP diversion ends due to low flow conditions. Daily flow results for Cape Horn Dam are similar to Scott Dam (higher winter, spring and late fall flows and lower summer and early fall flows), although the magnitude of the difference between baseline operations and the Run of River Scenario is smaller (< 10 cfs), especially during low flow periods.
- Comparative monthly results for January Scott Dam flows are similar to baseline operations during the wettest exceedance types; during median and greater exceedance conditions, Scenario 2 flows are 170 cfs – 300 cfs greater than baseline conditions. During dry exceedance conditions, Scenario 2 flows are 100 cfs and greater less than baseline conditions. During March and April, Scenario 2 flows at Scott Dam are higher (<10 cfs - >300 cfs, depending on exceedance condition) than baseline operations. Beginning in May and continuing through December, flows at Scott Dam are lower than baseline operations (< 10 cfs – 200 cfs, depending on exceedance condition). The difference between the two scenarios is greatest (approximately 120 cfs) spanning June through October and is largely independent of water year conditions.
- Flows below Cape Horn Dam are similar to baseline operations from January through March, although they can be as much as approximately 100 cfs lower during drying exceedance conditions. From April through June, Scenario 2 flows are slightly lower than baseline operations (< 10 cfs – 170 cfs, depending on exceedance condition). Beginning in July and continuing through October, flows at Cape Horn Dam are nearly identical baseline operations because baseline operations RPA flows are close to unimpaired during summer months. During November and December, Scenario 2 flows are sometimes below baseline operations flows (< 10 cfs – approximately 100 cfs), depending on precipitation conditions.

Potter Valley Diversion Results

- PVP diversions increase during winter and spring months (January through April or May, depending on water year conditions) from 170 cfs to 300 cfs. Based on water year conditions, and most typically in May or June, the PVP diversion ceases until water availability increases with precipitation, most commonly in November or December. When the PVP diversion is shut off, flows on the Eel River and upper Eel River are unimpaired.

- The East Branch Russian River has limited natural flow during the dry season to support irrigation and other uses. PVID would need to be able to store local runoff to supplement pumpback from Lake Mendocino and the existing canal system may not be sufficient to distribute local runoff to potential storage locations.

Russian River Results

- Calpella demand of approximately 8,600 ac-ft/years is applied in model, but simulated depletion ranges from 3,900 ac-ft to 9,200 ac-ft, due to low unimpaired flows during the irrigation season and restricted PVID pumpback when Lake Mendocino storage drops below 15,000 ac-ft.
- Calpella flows are higher than baseline operations from January through the ceasing of PVP diversion in late spring (exact date dependent on Eel River unimpaired flow conditions). Flows at Calpella are projected to decrease below baseline operations after the PVP diversion ceases. During median and drier conditions, flows under Scenario 2 reach 0 cfs October through November, until precipition returns in late fall, at which point flows again increase over baseline.
- Inflows to Lake Mendocino are higher than baseline operatios from January through the ceasing of the expanded PVP diversion in late spring (exact date dependent on Eel River unimpaired flow conditions). Thereafter, Lake Mendocino inflows are projected to decrease after the PVP diversion ceases for the year. During median and drier conditions, inflow under the Run of River Scenario decreaes to 0 cfs October through November, until precipition returns in late fall, at which point inflow will increase over baseline.
- Storage in Lake Mendocino will have higher storage during wetter years compared to dryer years. For drier year types, maximum storage in Lake Mendocino will be greater than baseline operations. During wetter year types, storage tends to be lower than baseline operations during fall months due to cessation of PVP diversions in summer and fall.
- Releases from Lake Mendocino will be adjusted to account for the lower minimum instream flows required in the Fish Flow EIR (ranging from 0 cfs to 80 cfs, depending on month and water year type).
- Along the Russian River downstream of Lake Mendocino (Forks, Hopland, Cloverdale, and Healdsburg), Scenario 2 flows may be slightly higher than baseline operations in January and February during wetter water years because of flood control operations from Lake Mendocino. This margin increases in March and April during wetter conditions; during dryer conditions, baseline operation flows may be higher than Scenario 2 flows. Beginning in May and lasting for the balance of the year (exact date depending on water year condition), Scenario 2 Russian River flows will be lower than baseline operations because Fish Flow EIR minimum instream flows are lower than D1610 flows.

APPENDIX OF DETAILED RESULTS COMPARING BASELINE OPERATIONS AND SCENARIO 2