

Appendix 4A

**Attachment 10: CalSim Model
Updates Between DEIR and FEIR**

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This appendix is entirely new for the Final Environmental Impact Report (FEIR) and was not included as part of the Draft Environmental Impact Report (DEIR). Therefore, it is not provided in strikethrough or underline format.

4A-10.1 Introduction

The CalSim model is the best available tool and industry standard for simulating the State Water Project and the Central Valley Project operations.

The CalSim 3 model typically goes through periods of intense development and refinement and then a milestone study and report memorialize a reference study from which CalSim-based analyses are developed. This reference study is memorialized in the Delivery Capability Report (DCR) and becomes the reference for other analyses, until it is updated.

The 2023 DCR was finalized between issuance of the DEIR and completion of the FEIR. The California Department of Water Resources (DWR) incorporated the updates included in the 2023 DCR for the FEIR CalSim modeling. These updates do not change the conclusions or significance determinations in this EIR. These updates also would not change DWR's conclusions related to covered species from the incidental take permit application submitted November 1, 2023. Thus, the modeling from both the FEIR and the DEIR is appropriate for these analytical purposes.

These updates represent model refinements to reflect facility assumptions, hydrologic conditions, and actions proposed in the project description.

These updates can be generally lumped into updates made globally to all scenarios and updates made specifically to the Baseline or Proposed Project. Those updates are listed below:

4A-10.2 CalSim 3 Updates Common to Both the Baseline and the Proposed Project

- ET Fix—addressed an inconsistency found in the land use assumptions for CalSim
- Historical Hydrology—adjusts historical hydrology to reflect variability observed 1992 to 2021 (recent 30-year period)
- Delta Cross Channel—model code update to allow opening DCC for water quality
- HYDROFORECAST Dynamic Link Library—updates representation of water year type forecasting within the model

- Other miscellaneous updates
 - Updates for implementation of the Old and Middle River (OMR) tables
 - Switches added—allows switching on or off assumptions
 - Dynamic Yuba Transfers
 - Dos Amigos Capacity Sharing—allows use of other project’s unused share of pumping
 - Oroville Bathymetry—updated to reflect reduction in total storage
 - Skeleton model code needed for cumulative analysis (e.g., Shasta PA)

4A-10.3 CalSim 3 Updates to the Baseline Model

- OMR table—updated table based on updated salvage/ survey data

4A-10.4 CalSim 3 Updates to the Proposed Project Model

- OMR table—updated to be consistent with latest OMR actions
- Delta Export Healthy Rivers and Landscapes Program (formerly Voluntary Agreements) export reductions—updated April exceedance forecast (from 90% to 75%) to be consistent with Healthy Rivers and Landscapes Program Export Accounting
- VA Outflow Accounting—implemented protection of VA water quality improvement

4A-10.5 Comparison between DEIR and FEIR CalSim 3 Results

The hydrology updates to the CalSim 3 model for the FEIR resulted in noticeable changes to flows (Figures 1 through 3, Tables 1 through 12). However, the incremental changes between the Baseline Conditions and the Proposed Project were minimal and tended to result in the following using the FEIR modeling:

- Approximately 14 thousand acre-feet (taf) less State Water Project Exports (Figure 1, Tables 1 through 3)
- Approximately 14 taf more Delta Outflow (Figure 2, Tables 4 through 6)
- An average of approximately 18 cubic feet per second (cfs) or annual sum of 12 taf more positive OMR (Figures 3 and 4, Table 7 through 12)

4A-10.6 Conclusions and Relevance to the FEIR Analyses

Although the comparison of the models used to support analyses in the DEIR and FEIR showed noticeable differences from each other, the relative differences between the Baseline Conditions scenario and Proposed Project scenario used in the FEIR were similar to the relative differences between the Baseline Conditions scenario and Proposed Project scenario used in the DEIR. Therefore, the impact conclusions for water quality and aquatic biological resources in the FEIR are the same as the DEIR.

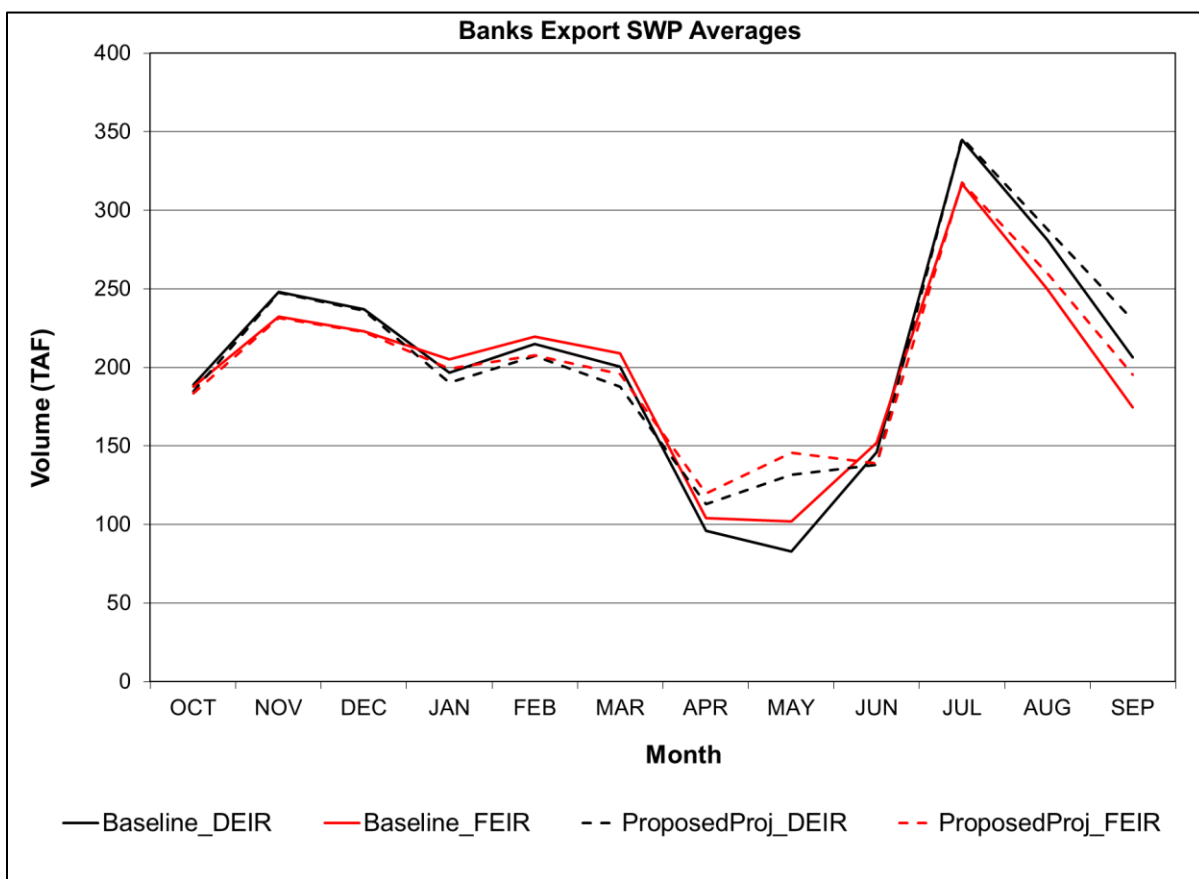


Figure 4A-10-1. State Water Project Exports under the Proposed Project and Baseline Conditions for the DEIR and FEIR.

Table 4A-10-1. Differences in State Water Project Exports under the Proposed Project and Baseline Conditions (Proposed Project minus Baseline Conditions) using CalSim 3 model for the DEIR

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual Sum
All years	-4	0	-1	-6	-8	-13	17	49	-8	1	7	24	57
Wet	-9	0	-2	-5	3	7	11	78	-6	1	20	66	165
Above Normal	-6	-4	2	-4	-20	-27	47	54	-13	9	12	61	112
Below Normal	-4	0	9	-7	-9	-40	29	61	-9	-5	-5	-11	9
Dry	1	0	-12	-2	-14	-16	3	19	-10	6	0	-3	-28
Critical	-1	0	0	-16	-8	1	9	15	-5	-3	1	0	-6

Table 4A-10-2. Differences in State Water Project Exports under the Proposed Project and Baseline Conditions (Proposed Project minus Baseline Conditions) using CalSim 3 model for the FEIR

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual Sum
All years	-4	-1	0	-6	-12	-13	16	44	-13	1	10	21	43
Wet	-8	-3	1	-5	-4	15	27	56	-20	0	22	63	144
Above Normal	-13	-1	5	-6	-18	-27	33	67	-20	12	17	54	103
Below Normal	-9	1	1	-8	-18	-44	25	68	-11	-9	6	-17	-15
Dry	6	2	-9	-4	-11	-31	-8	20	-17	10	2	-2	-43
Critical	0	-2	2	-6	-16	-2	6	12	5	-3	0	0	-5

Table 4A-10-3. Differences between FEIR and DEIR CalSim 3 modeling of differences between State Water Project Exports under the Proposed Project and Baseline Conditions (FEIR Export Differences minus DEIR Export Differences)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual Sum
All years	0	-1	1	1	-4	-1	-1	-5	-5	0	3	-3	-14
Wet	1	-4	3	0	-8	8	15	-22	-13	-1	2	-3	-21
Above Normal	-7	4	2	-2	1	0	-14	12	-7	3	4	-7	-9
Below Normal	-5	0	-8	-1	-9	-3	-4	7	-2	-4	11	-6	-24
Dry	5	2	4	-3	3	-15	-11	1	-7	3	2	1	-15
Critical	1	-3	2	10	-9	-3	-3	-3	10	0	-1	-1	1

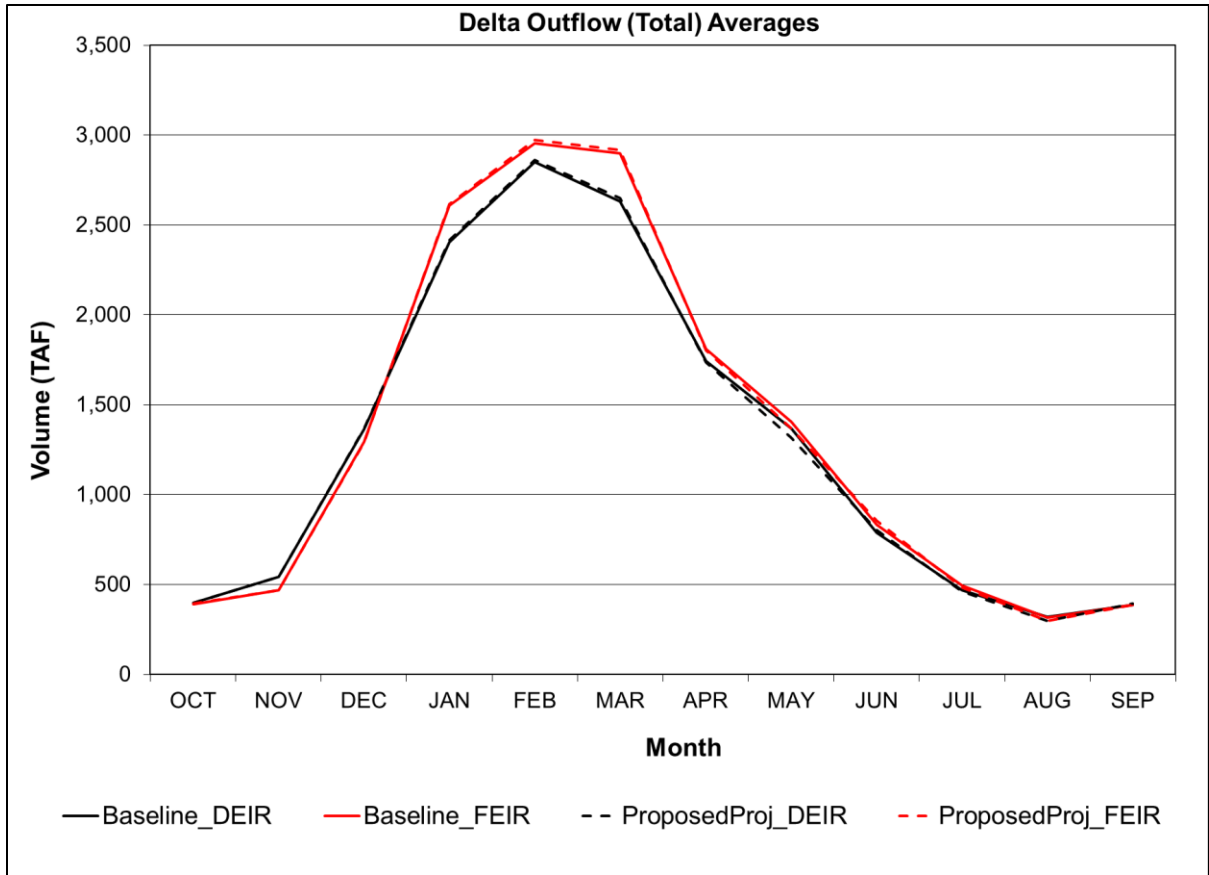


Figure 4A-10-2. Delta Outflow under the Proposed Project and Baseline Conditions for the DEIR and FEIR.

Table 4A-10-4. Differences in Delta Outflow under the Proposed Project and Baseline Conditions (Proposed Project minus Baseline Conditions) using CalSim 3 model for the DEIR

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual Sum
All years	2	0	1	13	11	19	-8	-49	14	-9	-21	6	-20
Wet	4	-1	-2	14	-5	-8	-14	-86	18	-5	-23	-8	-117
Above Normal	5	8	-14	11	17	28	-23	-57	27	-26	-48	49	-24
Below Normal	0	-7	7	15	1	47	-6	-67	23	-12	-16	7	-8
Dry	2	1	-1	2	29	38	9	-4	2	-10	-21	9	56
Critical	1	2	13	29	24	-2	-9	-13	0	0	-1	0	45

Table 4A-10-5. Differences in Delta Outflow under the Proposed Project and Baseline Conditions (Proposed Project minus Baseline Conditions) using CalSim 3 model for the FEIR

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual Sum
All years	2	0	0	6	18	19	-7	-39	23	-12	-16	0	-5
Wet	1	1	-2	8	9	-18	-27	-56	36	-8	-22	-14	-92
Above Normal	10	-5	-13	10	18	40	-22	-56	45	-28	-44	53	8
Below Normal	5	-3	7	6	19	58	1	-70	28	-24	-2	-7	18
Dry	-2	0	3	2	25	44	25	-1	8	-9	-20	7	81
Critical	2	4	-4	3	23	4	-7	-11	0	0	0	0	15

Table 4A-10-6. Differences between FEIR and DEIR CalSim 3 modeling of differences between Delta Outflow under the Proposed Project and Baseline Conditions (FEIR Delta Outflow Differences minus DEIR Delta Outflow Differences)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual Sum
All years	-1	1	-2	-8	7	1	1	10	9	-3	5	-6	14
Wet	-4	3	0	-6	13	-10	-13	31	18	-3	1	-6	25
Above Normal	5	-13	1	-1	2	12	2	1	18	-2	3	5	32
Below Normal	5	4	0	-8	18	11	7	-3	5	-12	14	-14	26
Dry	-4	-1	4	0	-4	6	17	3	6	1	2	-2	26
Critical	1	2	-17	-26	0	5	1	2	0	0	1	0	-31

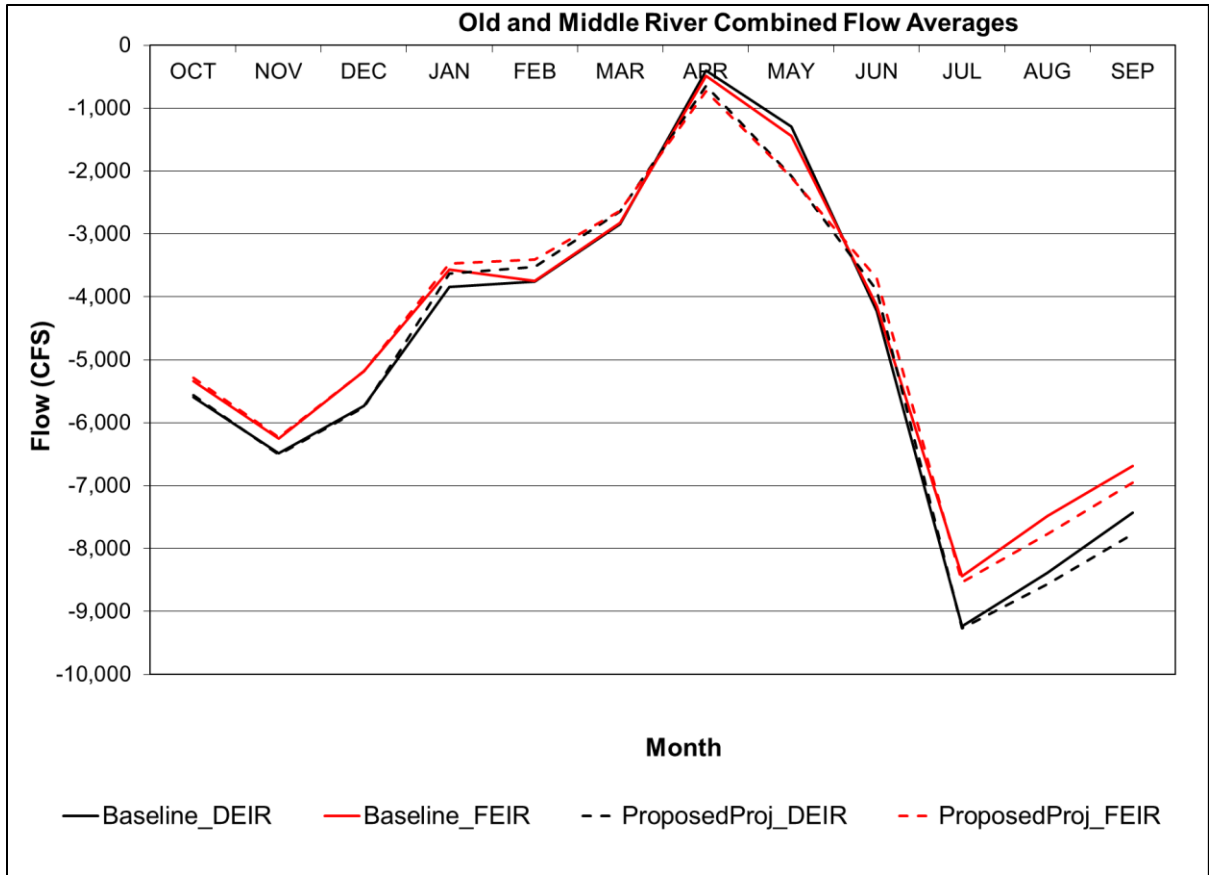


Figure 4A-10-3. Old and Middle River flows (cfs) under the Proposed Project and Baseline Conditions for the DEIR and FEIR.

Table 4A-10-7. Differences in Old and Middle River Flows (cfs) under the Proposed Project and Baseline Conditions (Proposed Project minus Baseline Conditions) using CalSim 3 model for the DEIR

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual Sum
All years	36	-16	-25	210	238	200	-248	-787	328	-34	-175	-342	-51
Wet	119	-61	-43	189	-45	-106	-187	-1275	248	-33	-297	-1033	-210
Above Normal	2	44	-267	141	363	343	-577	-1032	465	-198	-235	-827	-148
Below Normal	-40	40	-89	175	266	576	-470	-921	406	59	-25	158	11
Dry	57	-46	182	165	561	297	-47	-275	460	-84	-207	120	99
Critical	-24	-9	-23	408	204	48	-122	-229	99	26	-61	-5	26

Table 4A-10-8. Differences in Old and Middle River Flows (cfs) under the Proposed Project and Baseline Conditions (Proposed Project minus Baseline Conditions) using CalSim 3 model for the FEIR

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual Sum
All years	52	22	0	101	338	194	-242	-651	431	-91	-293	-263	-34
Wet	91	60	-35	118	77	-276	-409	-826	546	-76	-376	-968	-173
Above Normal	229	13	-136	173	385	360	-494	-1012	701	-387	-491	-642	-108
Below Normal	183	-20	-8	175	449	639	-381	-1002	536	45	-394	406	52
Dry	-163	-25	139	5	558	485	127	-309	475	-219	-222	91	79
Critical	-3	59	-21	63	400	115	-94	-172	-77	28	-17	24	25

Table 4A-10-9. Differences between FEIR and DEIR CalSim 3 modeling of differences between Old and Middle River Flows (cfs) under the Proposed Project and Baseline Conditions (FEIR OMR Differences minus DEIR OMR Differences)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual Sum
All years	15	38	25	-110	100	-5	6	135	103	-58	-118	79	18
Wet	-28	121	8	-71	123	-171	-222	450	298	-43	-80	65	37
Above Normal	227	-31	130	31	22	18	83	20	236	-189	-256	185	40
Below Normal	223	-61	82	-1	183	64	89	-81	130	-15	-369	247	41
Dry	-220	21	-43	-159	-3	188	174	-34	14	-135	-15	-29	-20
Critical	22	68	3	-344	197	67	28	57	-176	2	44	29	0

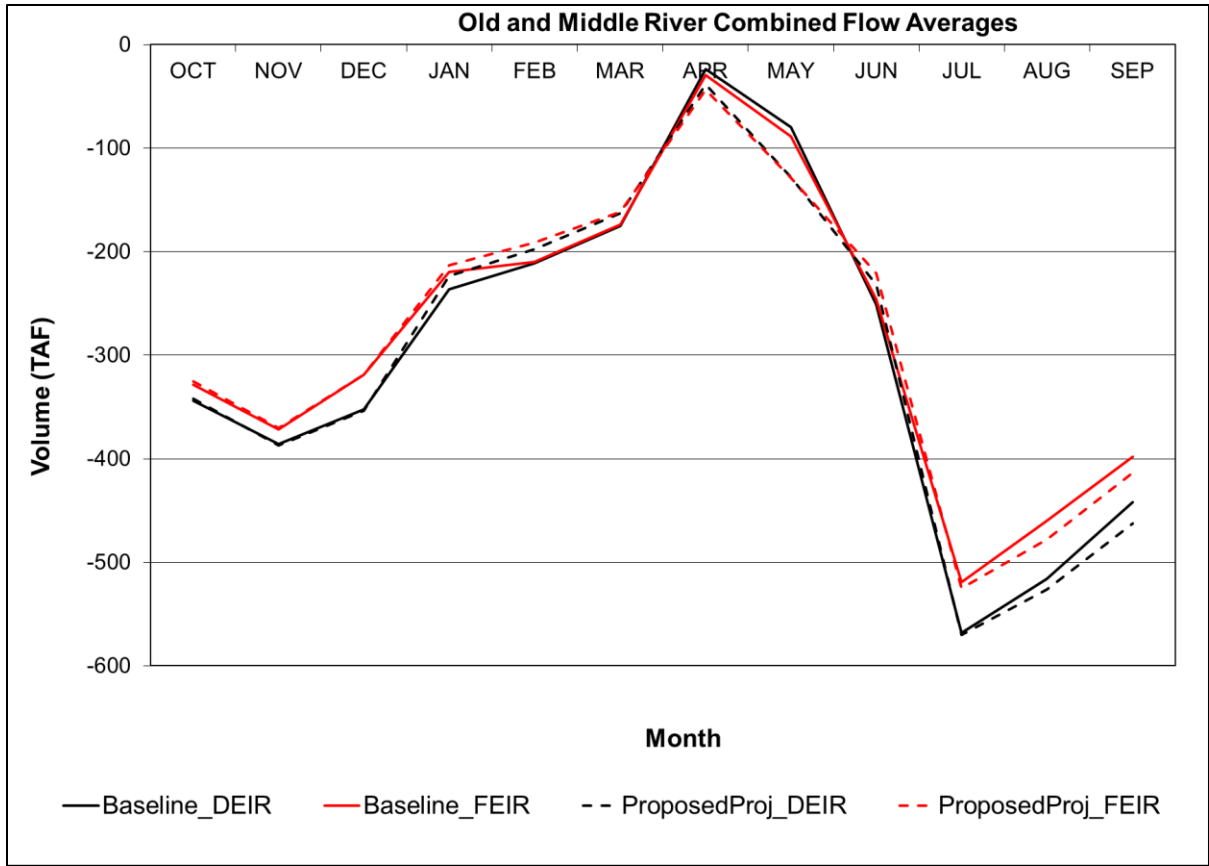


Figure 4A-10-4. Old and Middle River flows (taf) under the Proposed Project and Baseline Conditions for the DEIR and FEIR.

Table 4A-10-10. Differences in Old and Middle River Flows (taf) under the Proposed Project and Baseline Conditions (Proposed Project minus Baseline Conditions) using CalSim 3 model for the DEIR

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual Sum
All years	2	-1	-2	13	13	12	-15	-48	20	-2	-11	-20	-38
Wet	7	-4	-3	12	-3	-6	-11	-78	15	-2	-18	-61	-153
Above Normal	0	3	-16	9	21	21	-34	-63	28	-12	-14	-49	-109
Below Normal	-2	2	-5	11	15	35	-28	-57	24	4	-2	9	7
Dry	4	-3	11	10	32	18	-3	-17	27	-5	-13	7	69
Critical	-2	-1	-1	25	12	3	-7	-14	6	2	-4	0	18

Table 4A-10-11. Differences in Old and Middle River Flows (taf) under the Proposed Project and Baseline Conditions (Proposed Project minus Baseline Conditions) using CalSim 3 model for the FEIR

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual Sum
All years	3	1	0	6	19	12	-14	-40	26	-6	-18	-16	-26
Wet	6	4	-2	7	4	-17	-24	-51	32	-5	-23	-58	-126
Above Normal	14	1	-8	11	21	22	-29	-62	42	-24	-30	-38	-81
Below Normal	11	-1	0	11	25	39	-23	-62	32	3	-24	24	35
Dry	-10	-1	9	0	31	30	8	-19	28	-13	-14	5	54
Critical	0	3	-1	4	22	7	-6	-11	-5	2	-1	1	17

Table 4A-10-12. Differences between FEIR and DEIR CalSim 3 modeling of differences between Old and Middle River Flows (taf) under the Proposed Project and Baseline Conditions (FEIR OMR Differences minus DEIR OMR Differences)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual Sum
All years	1	2	2	-7	5	0	0	8	6	-4	-7	5	12
Wet	-2	7	0	-4	7	-10	-13	28	18	-3	-5	4	26
Above Normal	14	-2	8	2	1	1	5	1	14	-12	-16	11	28
Below Normal	14	-4	5	0	10	4	5	-5	8	-1	-23	15	28
Dry	-14	1	-3	-10	0	12	10	-2	1	-8	-1	-2	-15
Critical	1	4	0	-21	11	4	2	3	-10	0	3	2	-1