

WY 2021 DSM2 Model Runs Record

WY 2021 DSM2 Model Runs Record

10/27/2020 Meeting – 1/19/2021 Meeting – No DSM2 model runs	2
1/26/2021 Meeting.....	3
1/29/2021 Meeting.....	20
2/2/2021 Meeting.....	37
2/9/2021 Meeting.....	66
2/16/2021 Meeting – No DSM2 model runs	84
2/23/2021 Meeting.....	85
3/2/2021 Meeting.....	102
3/9/2021 Meeting.....	119
3/16/2021 Meeting.....	137
3/23/2021 Meeting.....	159
3/30/2021 Meeting.....	179
4/6/2021 Meeting.....	198
4/13/2021 Meeting.....	218
4/20/2021 Meeting.....	238
4/27/2021 Meeting.....	258
5/4/2021 Meeting.....	278
5/11/2021 Meeting.....	285
5/18/2021 Meeting.....	315
5/25/2021 Meeting.....	323
6/1/2021 Meeting – No DSM2 model runs	331
6/8/2021 Meeting.....	332

WY 2021 DSM2 Model Runs Record

10/27/2020 Meeting – 1/19/2021 Meeting – No DSM2 model runs

No DSM2 model runs

WY 2021 DSM2 Model Runs Record

1/26/2021 Meeting

Hydraulic footprint information

DWR baseline forecast	1/19/2021 to 2/8/2021
CVO updated baseline and Scenarios	1/25/2021
CVO OMR action taking place	1/27/2021 to 2/1/2021
DSM2 modeling results valid	1/27/2021 to 2/2/2021

DSM2 modeling for January 27 through February 1 presents a challenge due to the expected storm events. This week the model runs represent configurations for two conditions: dry and wet. The dry scenario (-2,500 cfs) targets the low and the wet scenario (-5,000 cfs) targets the high range of OMR. Since the change in hydrology is expected to be significant, the hydrology is inconsistent between the two scenarios: Vernalis and Freeport flow are much drier in the dry scenario vs the wet scenario.

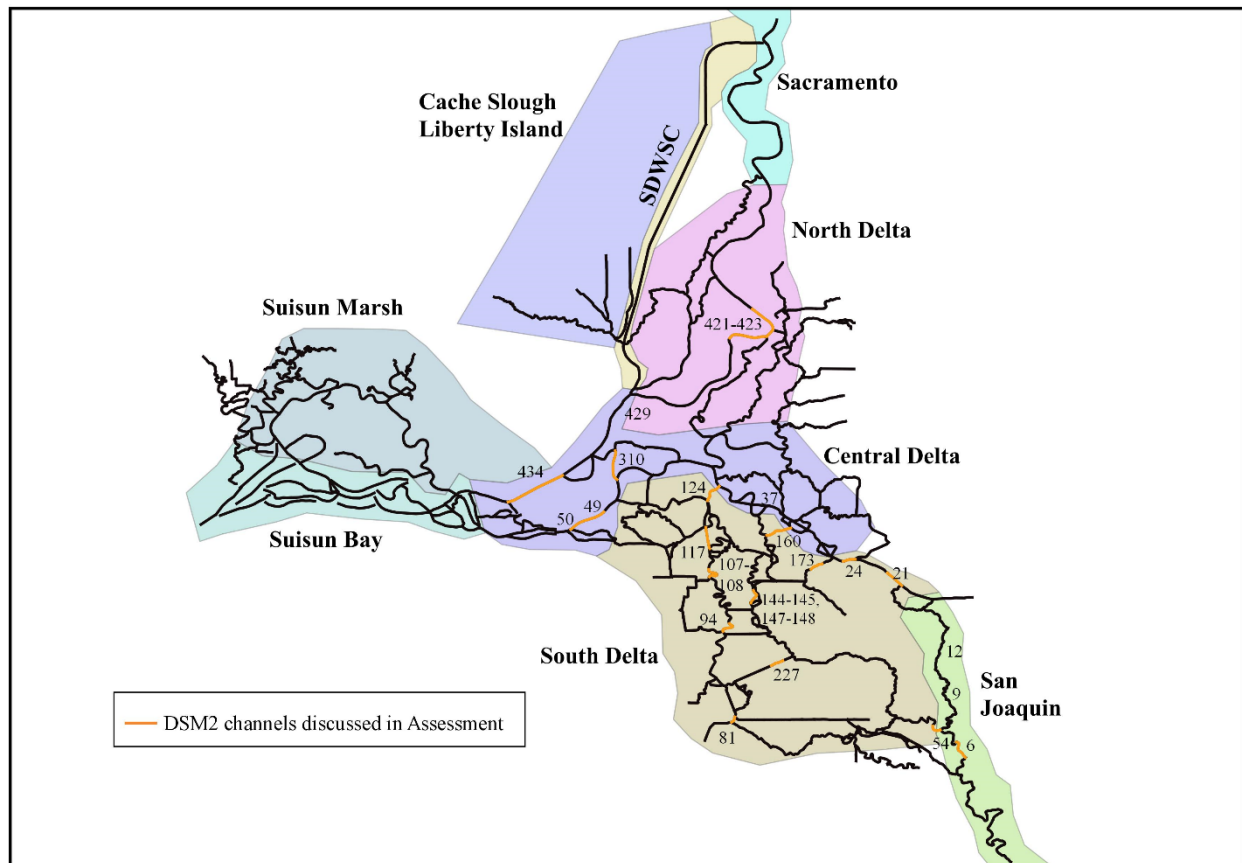
This week two scenario OMR operations were assessed, outlined here:

Baseline:	-2,600 cfs
Scenario 1:	-2,500 cfs (decreasing pumping from baseline, hereafter referred to as Scenario 1)
Scenario 2:	-5,000 cfs (increasing pumping from baseline, hereafter referred to as Scenario 2)

Each scenario's OMR value was compared with the baseline OMR value. A measure of similarity between scenarios were reported using the Kolmogorov-Smirnov (KS) statistic, test, or distance. This is a method to quantify how similar two empirical cumulative distribution functions (ECDFs) are to each other. The KS-statistic is bounded between 0 (very similar / equal) and 1 (very dissimilar / not equal), shown in ECDF plots for modeled flow and velocity. In the context of this analysis, a single parameter (daily OMR values) is modified between scenarios allowing for appropriate comparisons. The KS-statistic is an indicator of how much of an effect changing OMR via export diversion rates would have on hydrodynamics at that area in the Delta. Results from modeling efforts are examined at 28 Delta channel node locations.

WY 2021 DSM2 Model Runs Record

Figure B1. Highlighted DSM2 channels by Delta Strata.



WY 2021 DSM2 Model Runs Record

Description of channel location, by Delta Strata region. Not all listed channels have model results presented in every weekly Proposed Action Assessment.

DSM2 Channel	Description
North Delta into Interior and Central Delta	
CHAN049	San Joaquin River at Sherman Island
CHAN310	Three-Mile Slough
CHAN421	Sacramento River at Delta Cross Channel
CHAN422	Sacramento River at Delta Cross Channel
CHAN423	Sacramento River at Delta Cross Channel
CHAN434	Sacramento River at Sherman Island
San Joaquin River and Central Delta into South Delta	
CHAN006	San Joaquin River at Head of Old River (HOR)
CHAN021	San Joaquin River downstream from confluence with Calaveras River
CHAN024	San Joaquin River upstream of Turner Cut
CHAN054	Old River at confluence with San Joaquin River (HOR)
CHAN107	Old River north of Rock Slough
CHAN117	Old River south of Franks Tract
CHAN124	Old River between Franks Tract and San Joaquin River
CHAN160	Columbia Cut
CHAN173	Turner Cut
South Delta into Facilities	
CHAN148	Middle River
CHAN227	Victoria Canal
CHAN081	Grant Line Canal
CHAN094	Old River

Entrainment in Delta Strata Regions

North Delta into Interior and Central Delta

It is unlikely that listed salmonids will experience changes to rearing, foraging, sheltering or migrating related to modeled OMR conditions this week (Channels 49 and 434).

San Joaquin River and Central Delta into South Delta

Listed salmonids may be present, but recent surveys suggest that most are still holding upstream. Changes in velocity related to modeled OMR conditions this week may be undetectable by fish that are rearing or foraging but may increase transit rates for those that are present and migrating in the area (Channels 6, 21, 107, 124, and 160).

South Delta into facilities

Modeled hydrodynamic effects related to modeled OMR conditions this week suggest changes to migrating salmonid transit times (Channels 81, 94, and 148). For example, transit times would be delayed for salmonids coming from the north; whereas, transit times would be faster for salmonids moving from the head of Old River to the export facilities.

WY 2021 DSM2 Model Runs Record

DSM2 model results

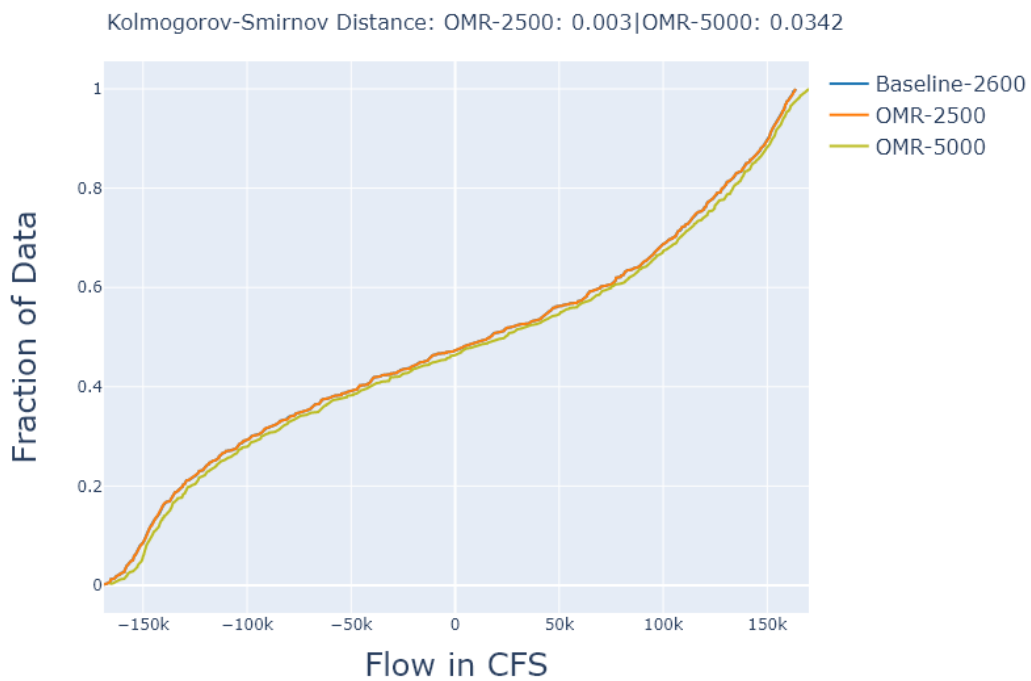
Figures

The following captions apply to the figures below:

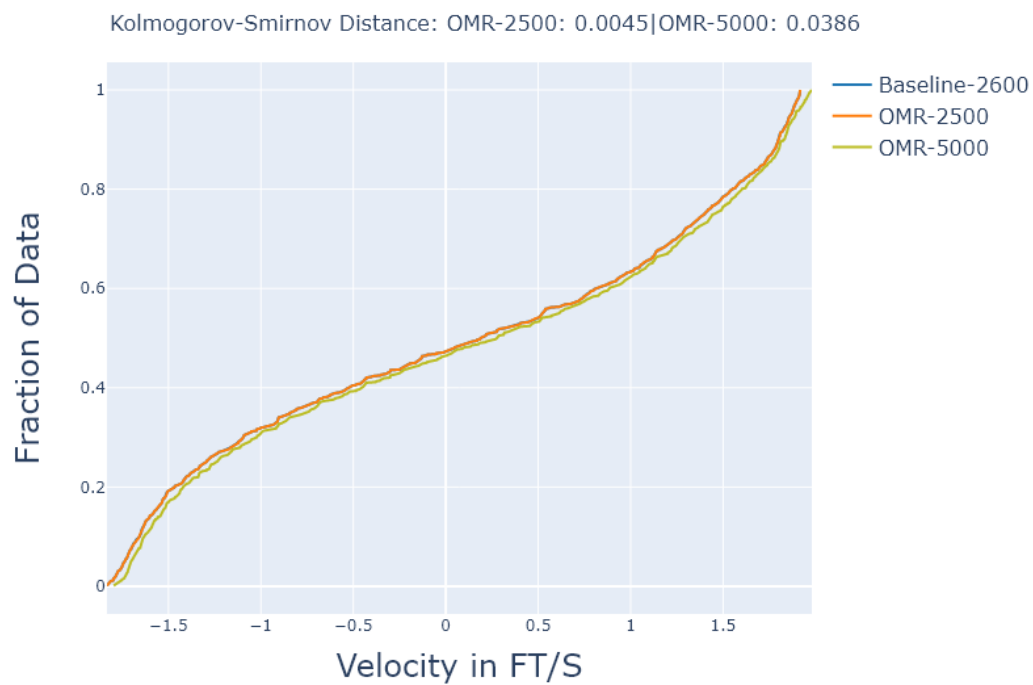
- (a) Empirical Cumulative Distribution Function (ECDF) plot: Baseline vs Scenario 1 OMR and Scenario 2 OMR. X-axis represents flow (cfs) and y-axis represents percentage of 15-minute time-step flow values. For Baseline, Scenario 1, and Scenario 2 values refer to “Hydraulic Footprint Information” in the section above.
- (b) ECDF plot: Baseline vs Scenario 1 OMR and Scenario 2 OMR. X-axis represents velocity (cfs) and y-axis represents percentage of 15-minute time-step velocity values. For Baseline, Scenario 1, and Scenario 2 values refer to “Hydraulic Footprint Information” in the section above.

WY 2021 DSM2 Model Runs Record

Figure B2: Sacramento River at Sherman Island (CHAN434)



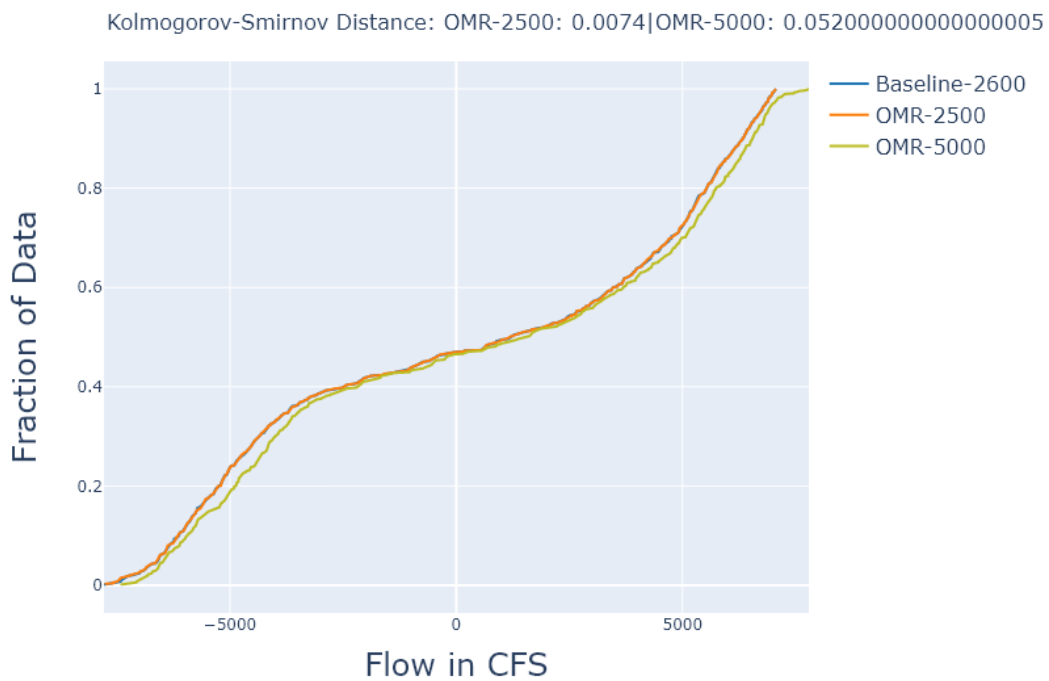
(a)



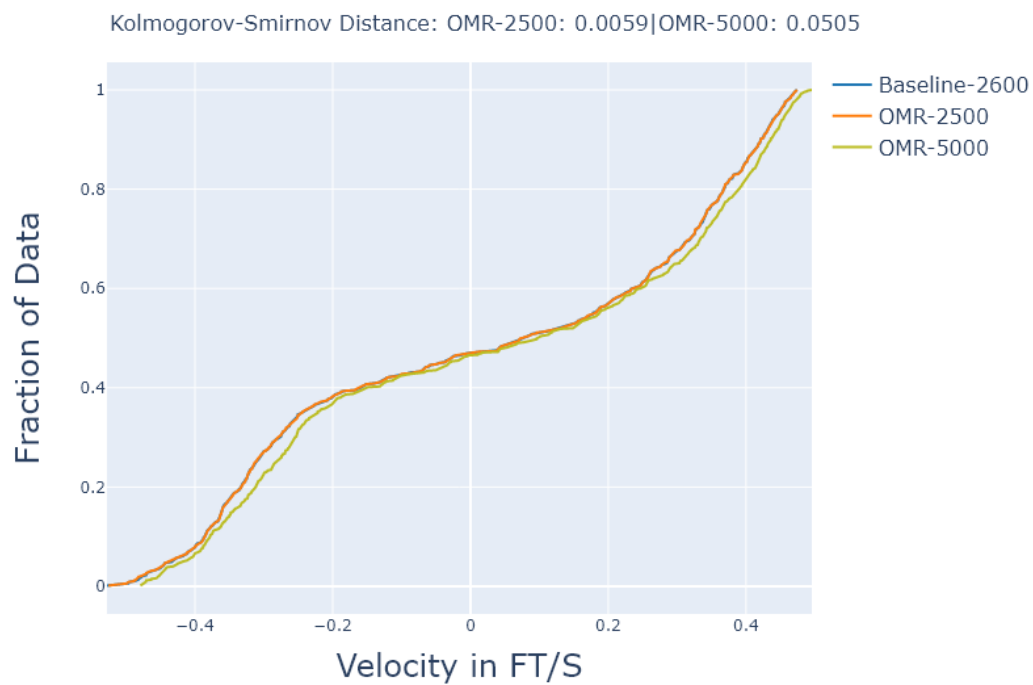
(b)

WY 2021 DSM2 Model Runs Record

Figure B3: San Joaquin River downstream of confluence with Calaveras River (CHAN021)



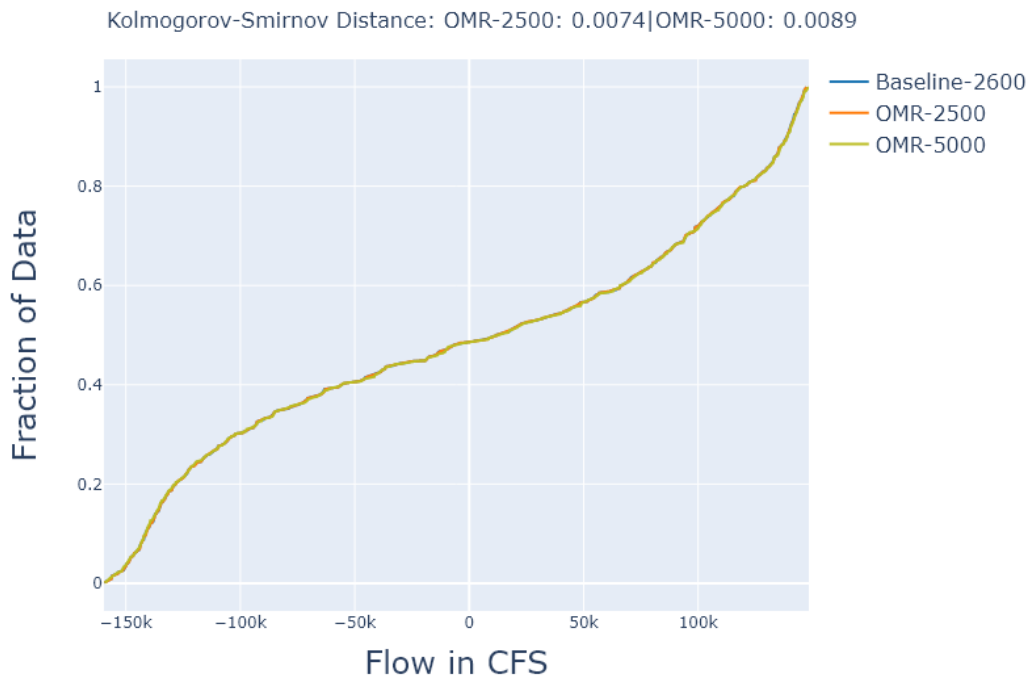
(a)



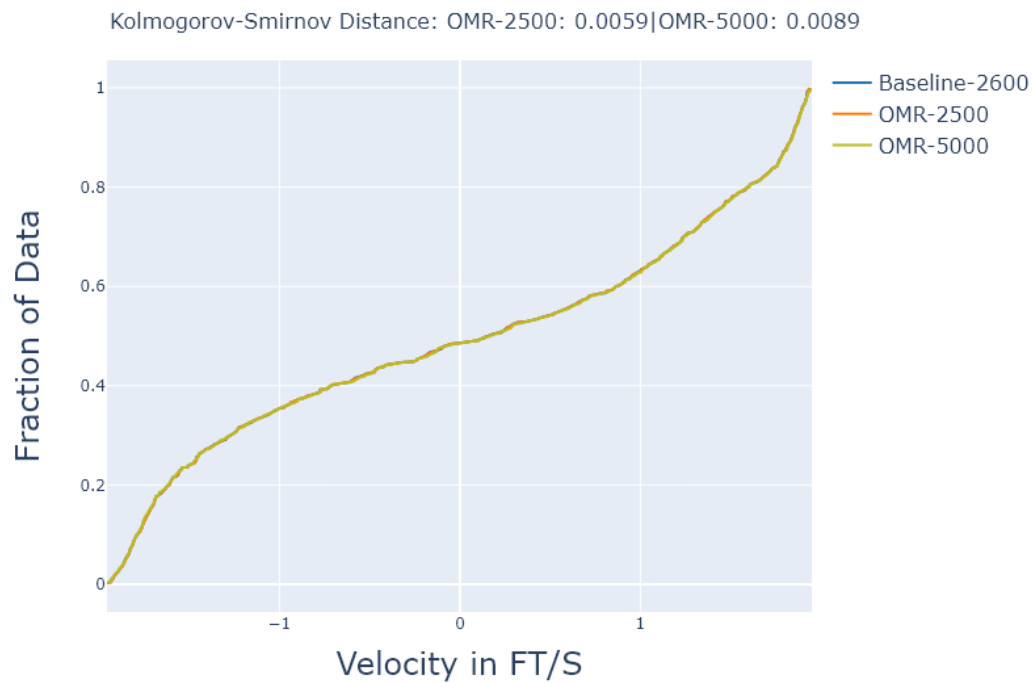
(b)

WY 2021 DSM2 Model Runs Record

Figure B4: San Joaquin River at Sherman Island (CHAN049)



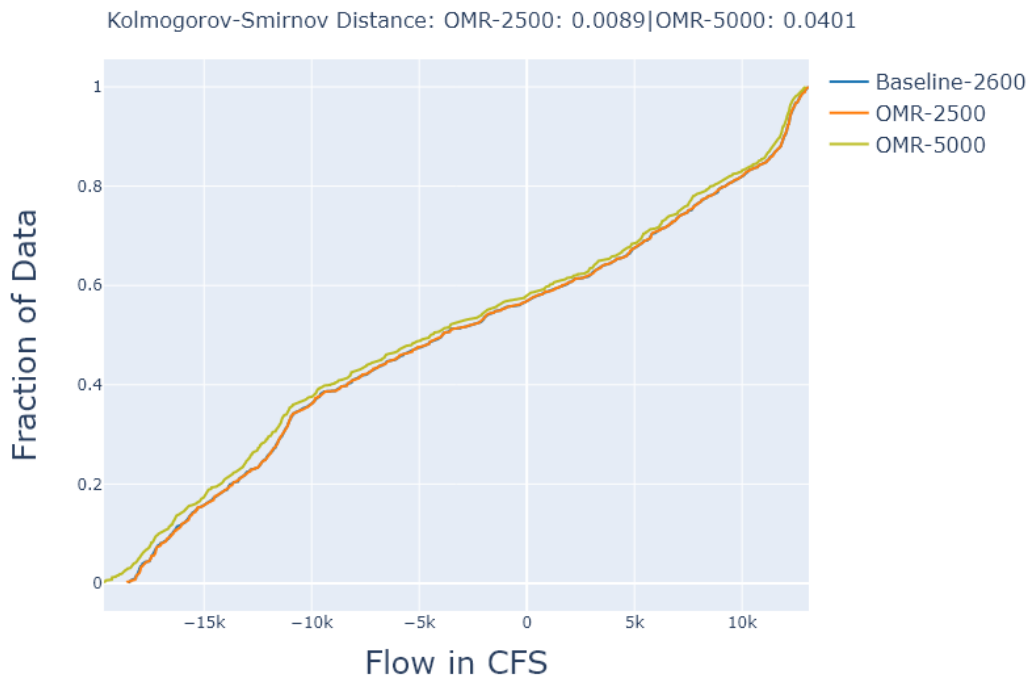
(a)



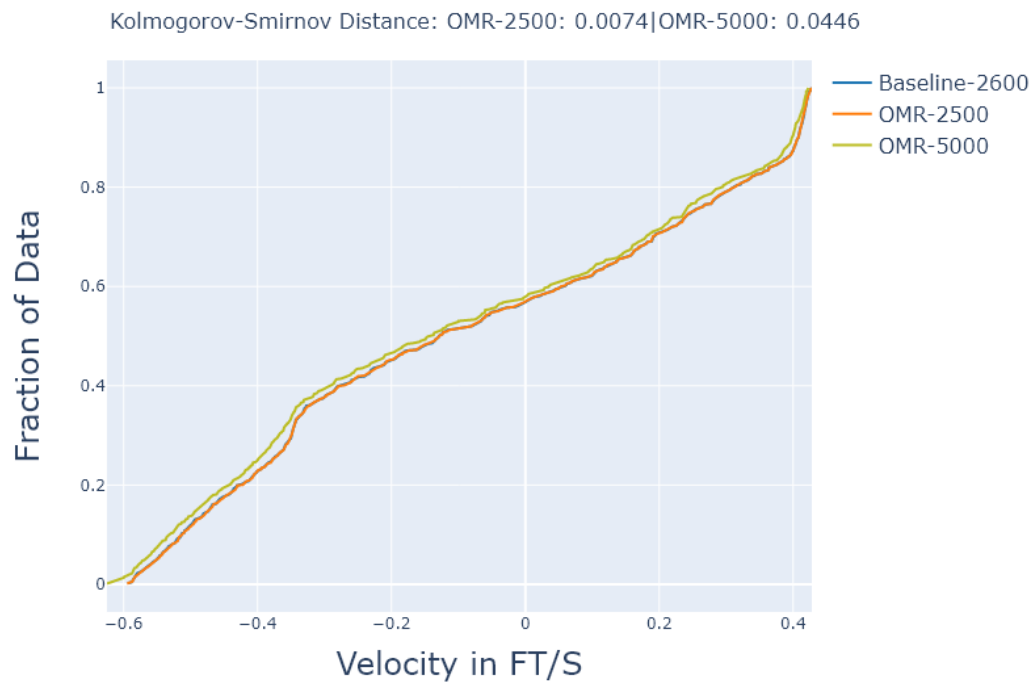
(b)

WY 2021 DSM2 Model Runs Record

Figure B5: Old River between Franks Tract and San Joaquin River (CHAN124)



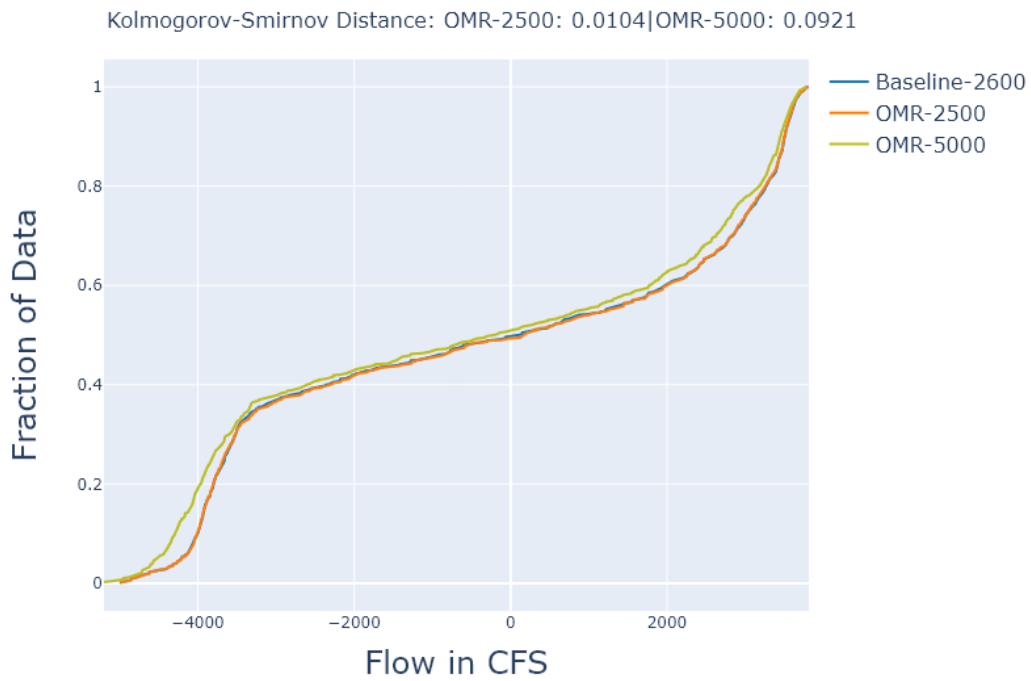
(a)



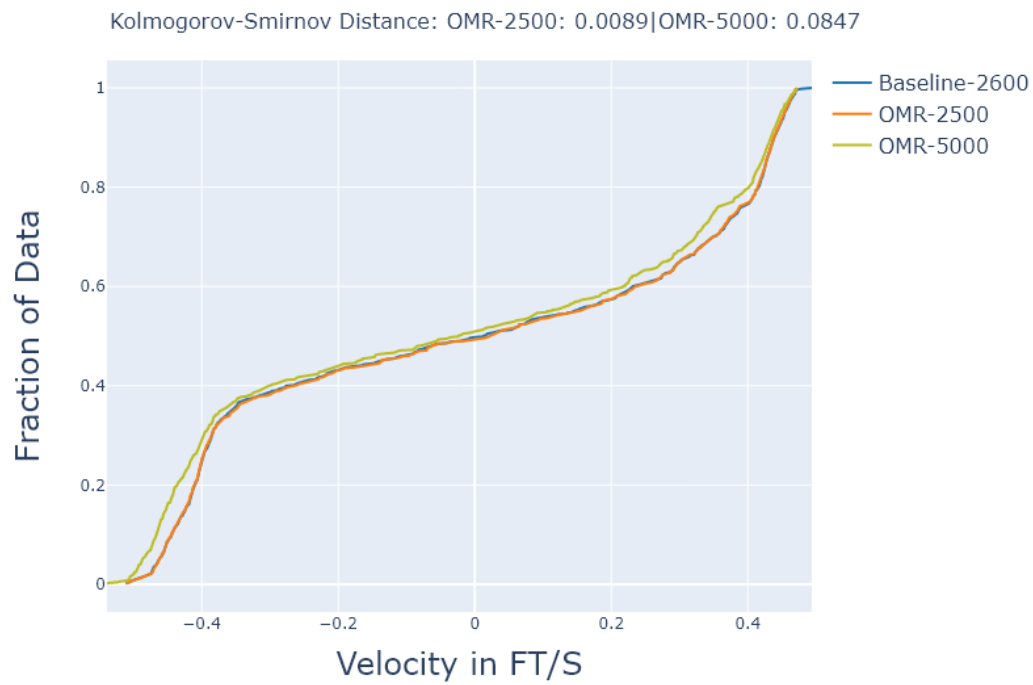
(b)

WY 2021 DSM2 Model Runs Record

Figure B6: Lower San Joaquin River at Columbia Cut (CHAN160)



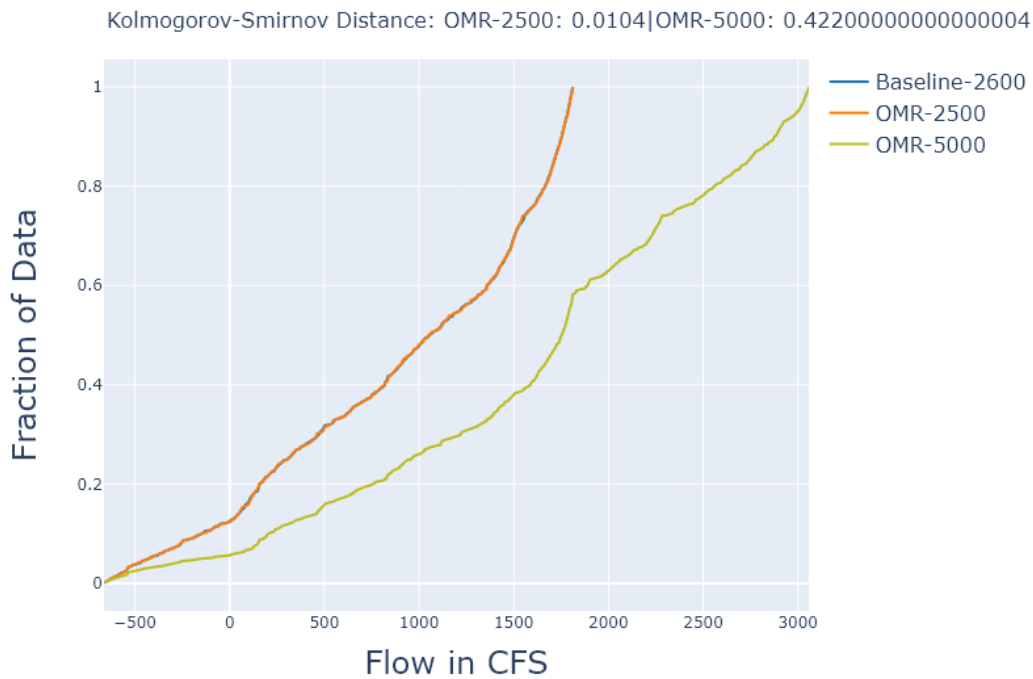
(a)



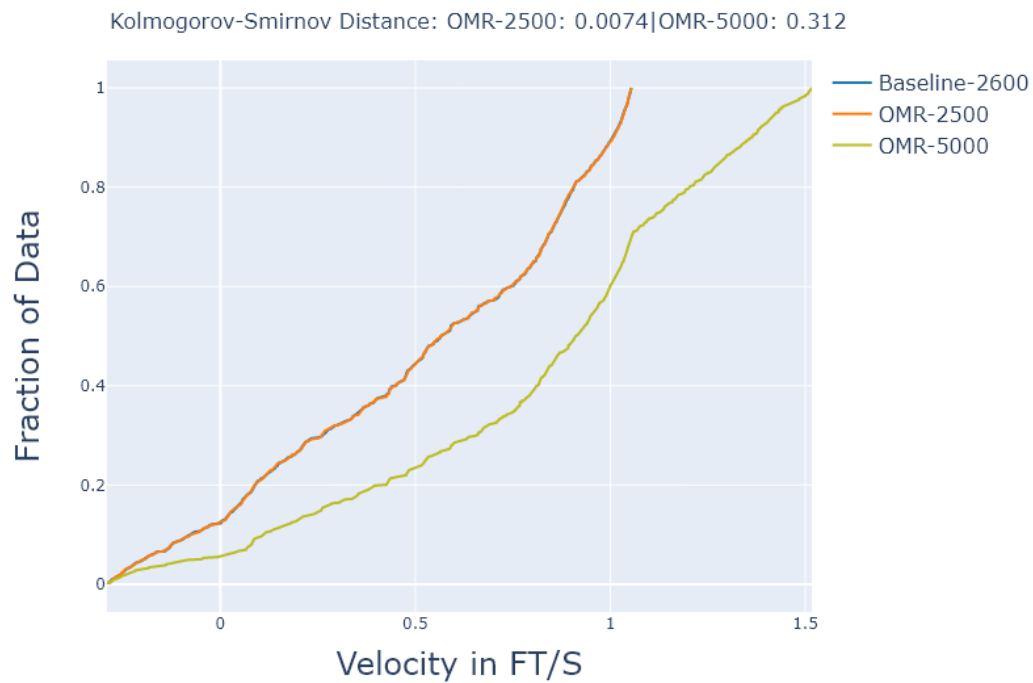
(b)

WY 2021 DSM2 Model Runs Record

Figure B7: Slightly upstream of Head of Old River (CHAN006)



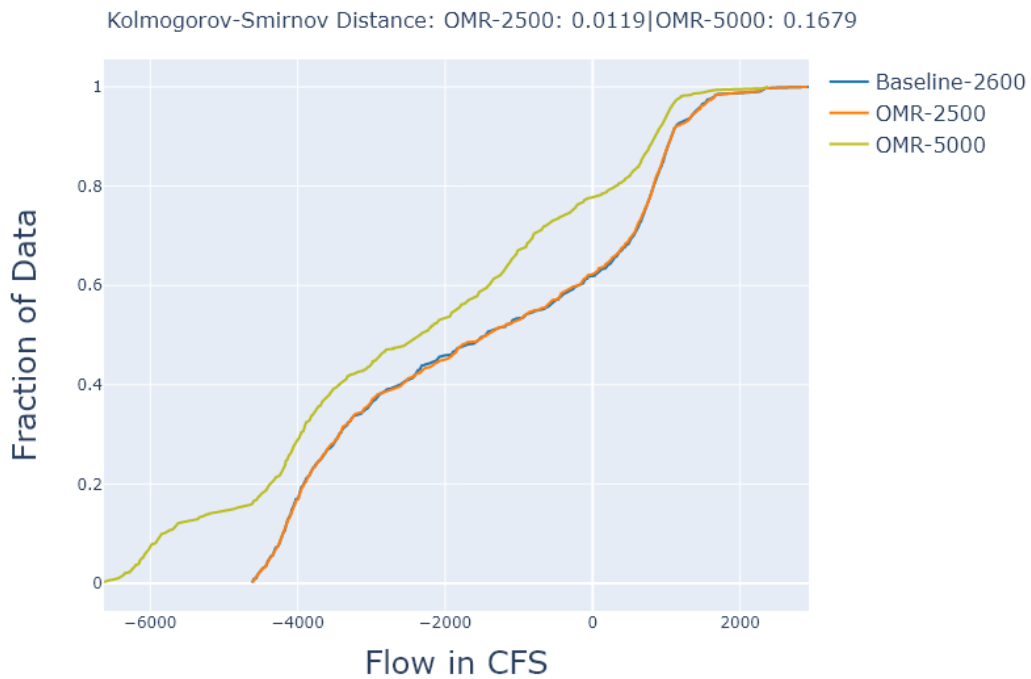
(a)



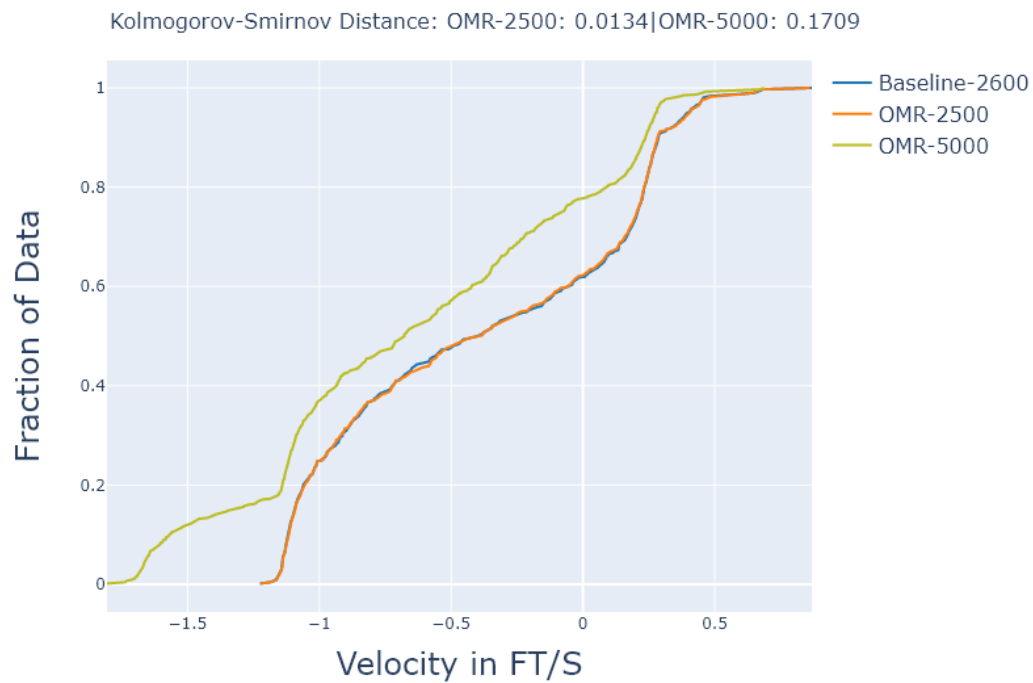
(b)

WY 2021 DSM2 Model Runs Record

Figure B8: Old River adjacent to Grant Line Canal (CHAN081)



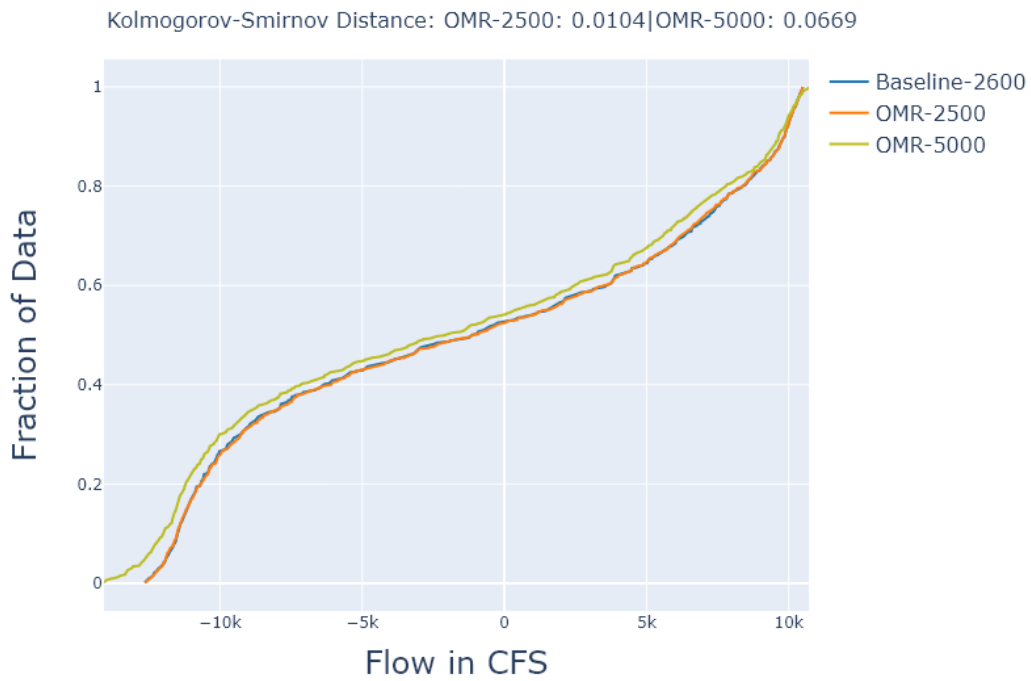
(a)



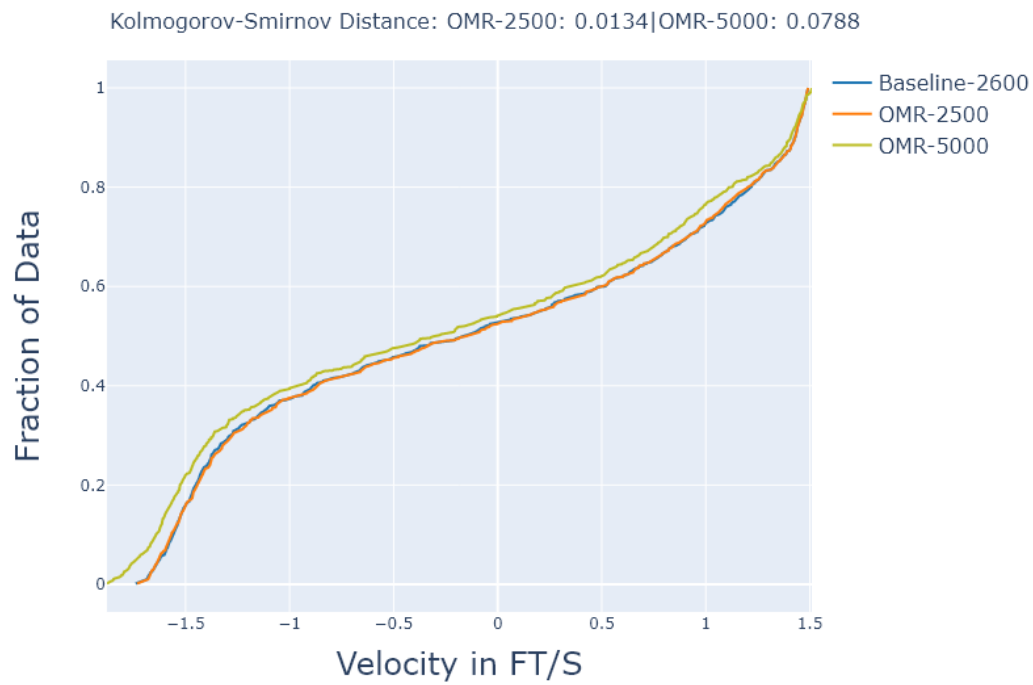
(b)

WY 2021 DSM2 Model Runs Record

Figure B9: South Delta along Old River (CHAN094)



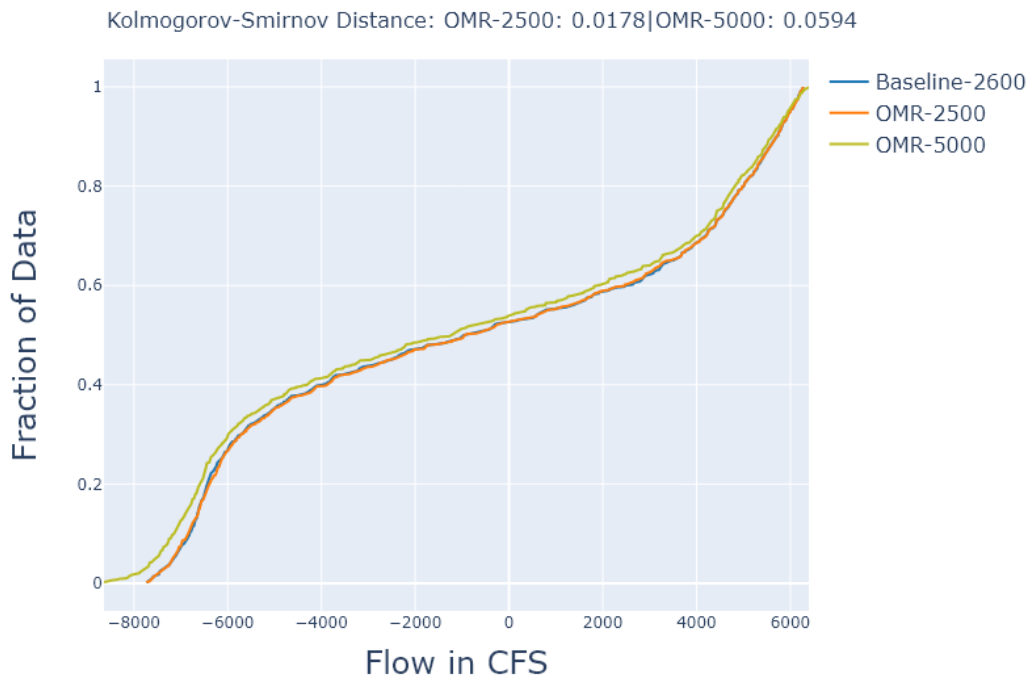
(a)



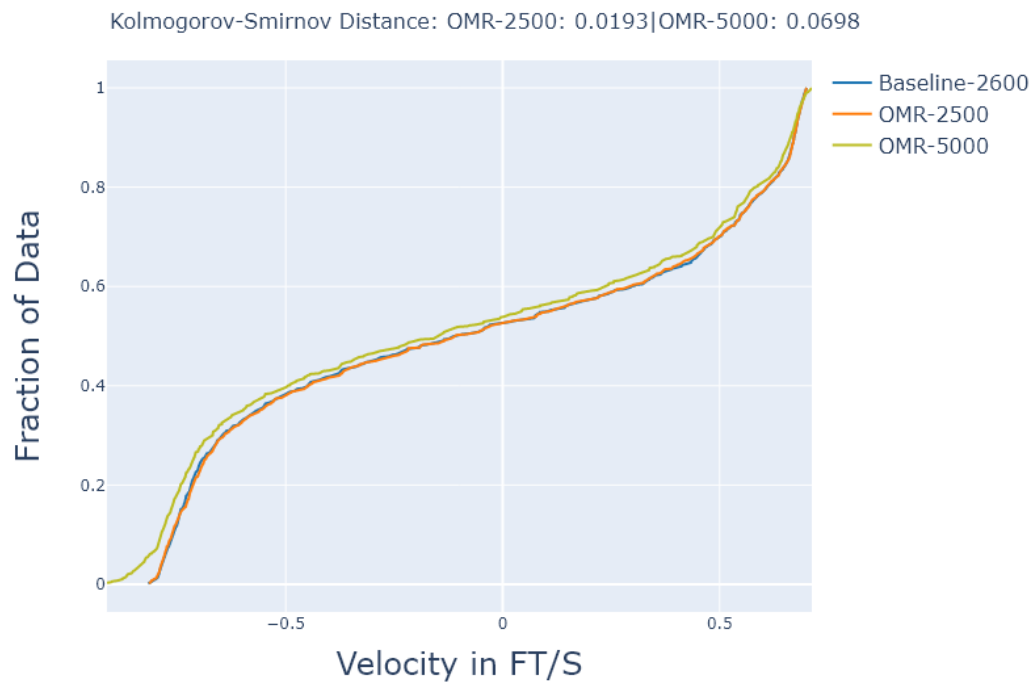
(b)

WY 2021 DSM2 Model Runs Record

Figure B10: South Delta along Middle River (CHAN148)



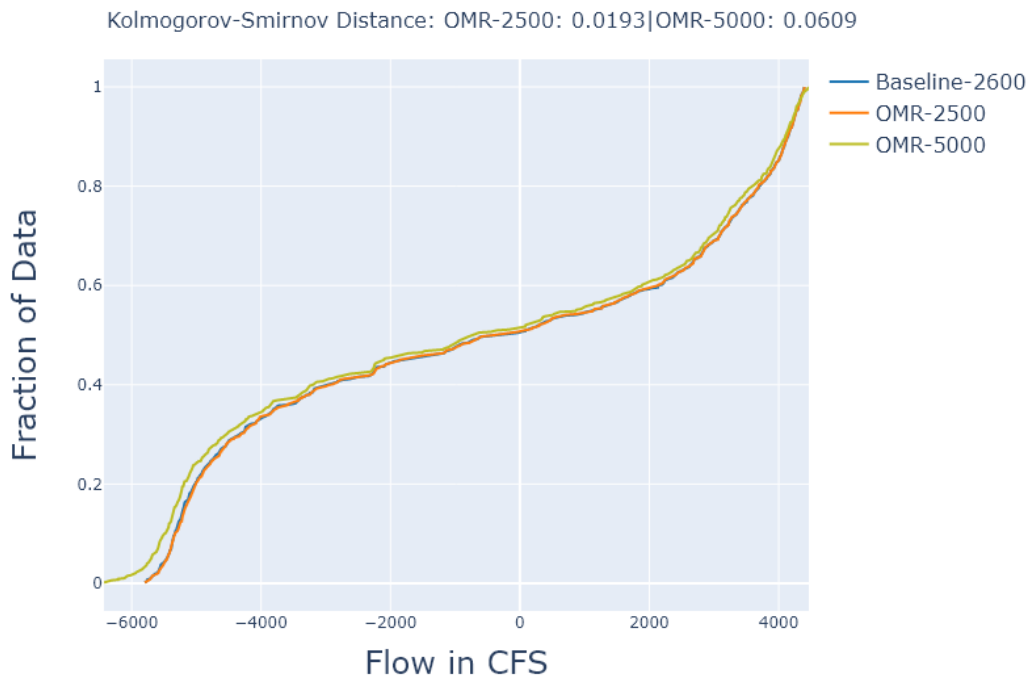
(a)



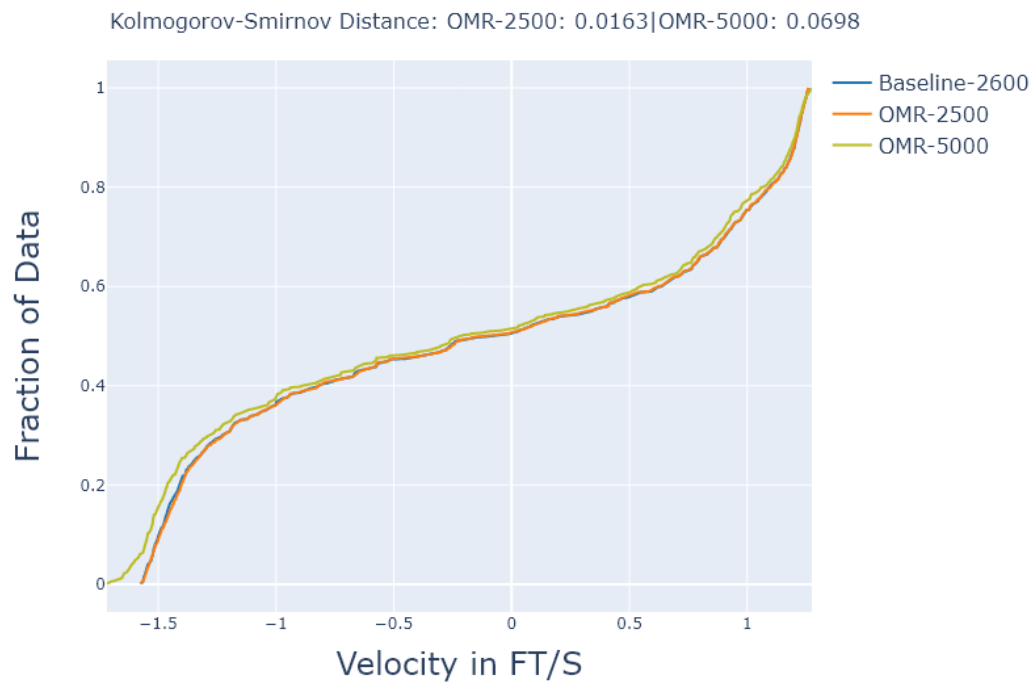
(b)

WY 2021 DSM2 Model Runs Record

Figure B11: South Delta along Middle River (CHAN107)



(a)



(b)

WY 2021 DSM2 Model Runs Record

Summary Tables

Table 1. Reported KS-statistic values for each scenario's OMR value compared with baseline OMR value. For Baseline, Scenario 1, and Scenario 2 values refer to "Hydraulic Footprint Information" in the section above.

DSM2 Channel	Flow (cfs): Scenario 1 OMR	Flow (cfs): Scenario 2 OMR	Velocity (ft/s): Scenario 1 OMR	Velocity (ft/s): Scenario 2 OMR
6	0.0	0.4	0.0	0.3
21	0.0	0.1	0.0	0.1
49	0.0	0.0	0.0	0.0
81	0.0	0.2	0.0	0.2
94	0.0	0.1	0.0	0.1
107	0.0	0.1	0.0	0.1
124	0.0	0.0	0.0	0.0
148	0.0	0.1	0.0	0.1
160	0.0	0.1	0.0	0.1
434	0.0	0.0	0.0	0.0

Table 2. Summary of minimum, maximum, mean, and percent positive flows (cfs) and velocities (ft/s) by DSM2 channel for OMR scenarios over a 6-day time period. For Baseline, Scenario 1, and Scenario 2 values refer to “Hydraulic Footprint Information” in the section above.

Scenario (cfs)	DSM2 Channel	Flow Min.	Flow Max.	Flow Mean	Flow % Positive	Velocity Min.	Velocity Max.	Velocity Mean	Velocity % Positive
Baseline	6	-663.4	1811.9	926.1	88	-0.3	1.1	0.5	87.8
Scenario 1	6	-662.8	1813.7	926.2	88	-0.3	1.1	0.5	87.5
Scenario 2	6	-663.3	3057.6	1632.8	95	-0.3	1.5	0.8	94.5
Baseline	21	-7784.8	7060.7	299.2	53	-0.5	0.5	0.0	53.1
Scenario 1	21	-7763.2	7062.7	298.8	53	-0.5	0.5	0.0	53.1
Scenario 2	21	-7421.1	7790.4	561.4	53	-0.5	0.5	0.0	53.5
Baseline	49	-159572.4	147245.1	310.2	51	-2.0	1.9	0.0	51.4
Scenario 1	49	-159334.1	147267.9	334.7	51	-2.0	1.9	0.0	51.4
Scenario 2	49	-159300.9	148350.6	472.7	52	-2.0	2.0	0.0	51.6
Baseline	81	-4618.1	2931.3	-1468.6	38	-1.2	0.9	-0.4	38.2
Scenario 1	81	-4621.3	2913.3	-1469.8	38	-1.2	0.9	-0.4	37.9
Scenario 2	81	-6627.6	2383.6	-2336.4	22	-1.8	0.7	-0.6	22.3
Baseline	94	-12645.4	10497.3	-1212.1	47	-1.7	1.5	-0.1	47.3
Scenario 1	94	-12644.5	10500.0	-1194.4	48	-1.7	1.5	-0.1	47.6
Scenario 2	94	-14080.2	10705.9	-1803.6	46	-1.9	1.5	-0.2	45.9
Baseline	107	-5796.7	4397.0	-546.6	49	-1.6	1.3	-0.1	49.5
Scenario 1	107	-5797.7	4398.1	-542.9	49	-1.6	1.3	-0.1	49.3
Scenario 2	107	-6428.3	4464.9	-705.6	49	-1.7	1.3	-0.2	48.7
Baseline	124	-18509.6	13096.6	-2763.2	43	-0.6	0.4	-0.1	43.1
Scenario 1	124	-18581.7	13100.2	-2756.8	43	-0.6	0.4	-0.1	43.1
Scenario 2	124	-19648.7	12959.2	-3275.9	42	-0.6	0.4	-0.1	42.2
Baseline	148	-7726.9	6272.1	-714.1	48	-0.8	0.7	-0.1	47.6
Scenario 1	148	-7731.7	6277.6	-706.3	47	-0.8	0.7	-0.1	47.4
Scenario 2	148	-8638.8	6393.8	-990.7	46	-0.9	0.7	-0.1	46.2
Baseline	160	-5000.6	3812.4	-250.0	50	-0.5	0.5	0.0	50.2
Scenario 1	160	-4996.5	3813.6	-241.6	51	-0.5	0.5	0.0	50.7

Scenario (cfs)	DSM2 Channel	Flow Min.	Flow Max.	Flow Mean	Flow % Positive	Velocity Min.	Velocity Max.	Velocity Mean	Velocity % Positive
Scenario 2	160	-5200.7	3776.0	-428.8	49	-0.5	0.5	0.0	49.3
Baseline	434	-168793.6	163604.3	4797.9	53	-1.8	1.9	0.1	52.6
Scenario 1	434	-168786.8	163642.2	4805.1	53	-1.8	1.9	0.1	52.6
Scenario 2	434	-165605.2	169971.9	9275.9	54	-1.8	2.0	0.2	53.6

1/29/2021 Meeting

Hydraulic footprint information

DWR baseline forecast	1/19/2021 to 2/8/2021
CVO updated baseline and Scenarios	1/25/2021
CVO OMR action taking place	1/27/2021 to 2/1/2021
DSM2 modeling results valid	1/27/2021 to 2/2/2021

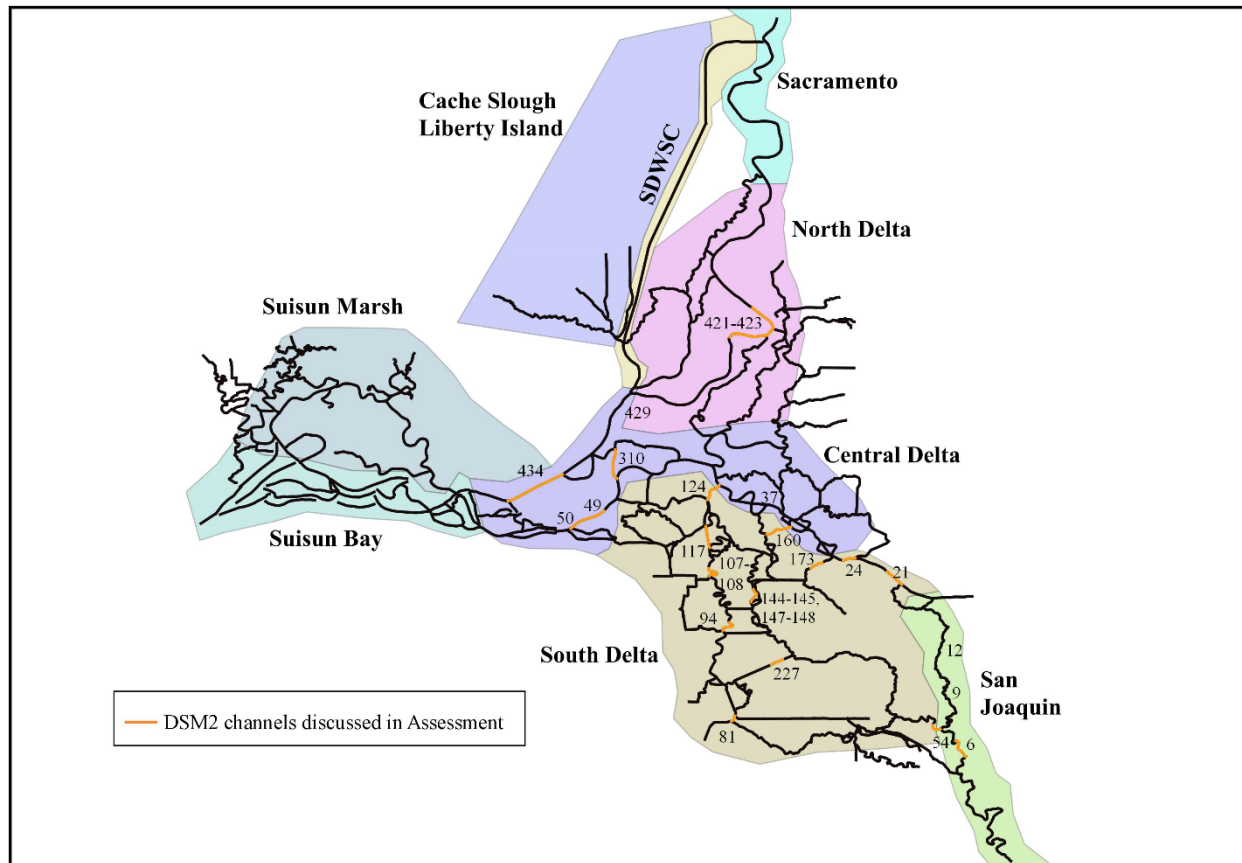
DSM2 modeling for January 27 through February 1 presents a challenge due to the expected storm events. This week the model runs represent configurations for two conditions: dry and wet. The dry scenario (-2,500 cfs) targets the low and the wet scenario (-5,000 cfs) targets the high range of OMR. Since the change in hydrology is expected to be significant, the hydrology is inconsistent between the two scenarios: Vernalis and Freeport flow are much drier in the dry scenario vs the wet scenario.

This week two scenario OMR operations were assessed, outlined here:

Baseline:	-2,600 cfs
Scenario 1:	-2,500 cfs (decreasing pumping from baseline, hereafter referred to as Scenario 1)
Scenario 2:	-5,000 cfs (increasing pumping from baseline, hereafter referred to as Scenario 2)

Each scenario's OMR value was compared with the baseline OMR value. A measure of similarity between scenarios were reported using the Kolmogorov-Smirnov (KS) statistic, test, or distance. This is a method to quantify how similar two empirical cumulative distribution functions (ECDFs) are to each other. The KS-statistic is bounded between 0 (very similar / equal) and 1 (very dissimilar / not equal), shown in ECDF plots for modeled flow and velocity. In the context of this analysis, a single parameter (daily OMR values) is modified between scenarios allowing for appropriate comparisons. The KS-statistic is an indicator of how much of an effect changing OMR via export diversion rates would have on hydrodynamics at that area in the Delta. Results from modeling efforts are examined at 28 Delta channel node locations.

Figure B1. Highlighted DSM2 channels by Delta Strata.



Description of channel location, by Delta Strata region. Not all listed channels have model results presented in every weekly Proposed Action Assessment.

DSM2 Channel	Description
North Delta into Interior and Central Delta	
CHAN049	San Joaquin River at Sherman Island
CHAN310	Three-Mile Slough
CHAN421	Sacramento River at Delta Cross Channel
CHAN422	Sacramento River at Delta Cross Channel
CHAN423	Sacramento River at Delta Cross Channel
CHAN434	Sacramento River at Sherman Island
San Joaquin River and Central Delta into South Delta	
CHAN006	San Joaquin River at Head of Old River (HOR)
CHAN021	San Joaquin River downstream from confluence with Calaveras River
CHAN024	San Joaquin River upstream of Turner Cut
CHAN054	Old River at confluence with San Joaquin River (HOR)
CHAN107	Old River north of Rock Slough
CHAN117	Old River south of Franks Tract
CHAN124	Old River between Franks Tract and San Joaquin River
CHAN160	Columbia Cut
CHAN173	Turner Cut
South Delta into Facilities	
CHAN148	Middle River
CHAN227	Victoria Canal
CHAN081	Grant Line Canal
CHAN094	Old River

Entrainment in Delta Strata Regions

North Delta into Interior and Central Delta

It is unlikely that listed salmonids will experience changes to rearing, foraging, sheltering or migrating related to modeled OMR conditions this week (Channels 49 and 434).

San Joaquin River and Central Delta into South Delta

Listed salmonids may be present, but recent surveys suggest that most are still holding upstream. Changes in velocity related to modeled OMR conditions this week may be undetectable by fish that are rearing or foraging but may increase transit rates for those that are present and migrating in the area (Channels 6, 21, 107, 124, and 160).

South Delta into facilities

Modeled hydrodynamic effects related to modeled OMR conditions this week suggest changes to migrating salmonid transit times (Channels 81, 94, and 148). For example, transit times would be delayed for salmonids coming from the north; whereas, transit times would be faster for salmonids moving from the head of Old River to the export facilities.

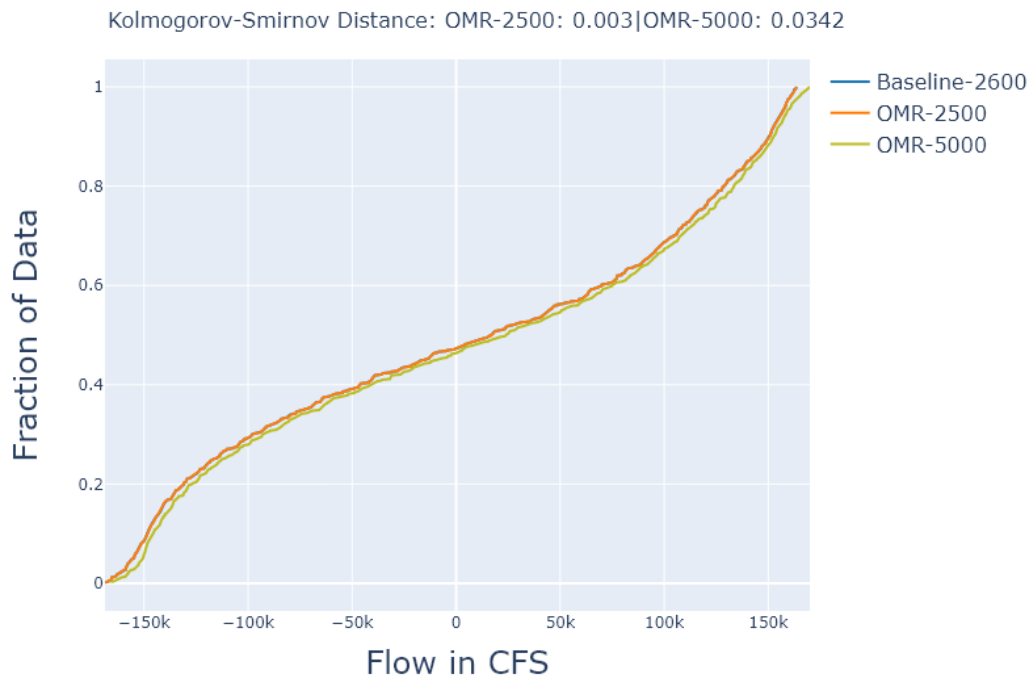
DSM2 model results

Figures

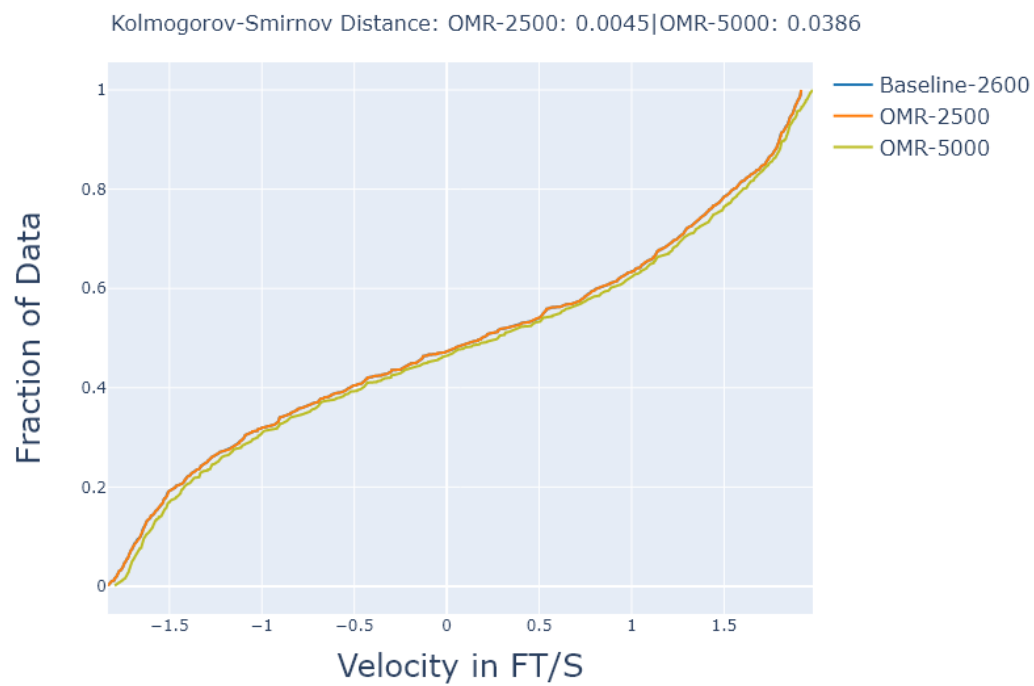
The following captions apply to the figures below:

- (a) Empirical Cumulative Distribution Function (ECDF) plot: Baseline vs Scenario 1 OMR and Scenario 2 OMR. X-axis represents flow (cfs) and y-axis represents percentage of 15-minute time-step flow values. For Baseline, Scenario 1, and Scenario 2 values refer to “Hydraulic Footprint Information” in the section above.
- (b) ECDF plot: Baseline vs Scenario 1 OMR and Scenario 2 OMR. X-axis represents velocity (cfs) and y-axis represents percentage of 15-minute time-step velocity values. For Baseline, Scenario 1, and Scenario 2 values refer to “Hydraulic Footprint Information” in the section above.

Figure B2: Sacramento River at Sherman Island (CHAN434)

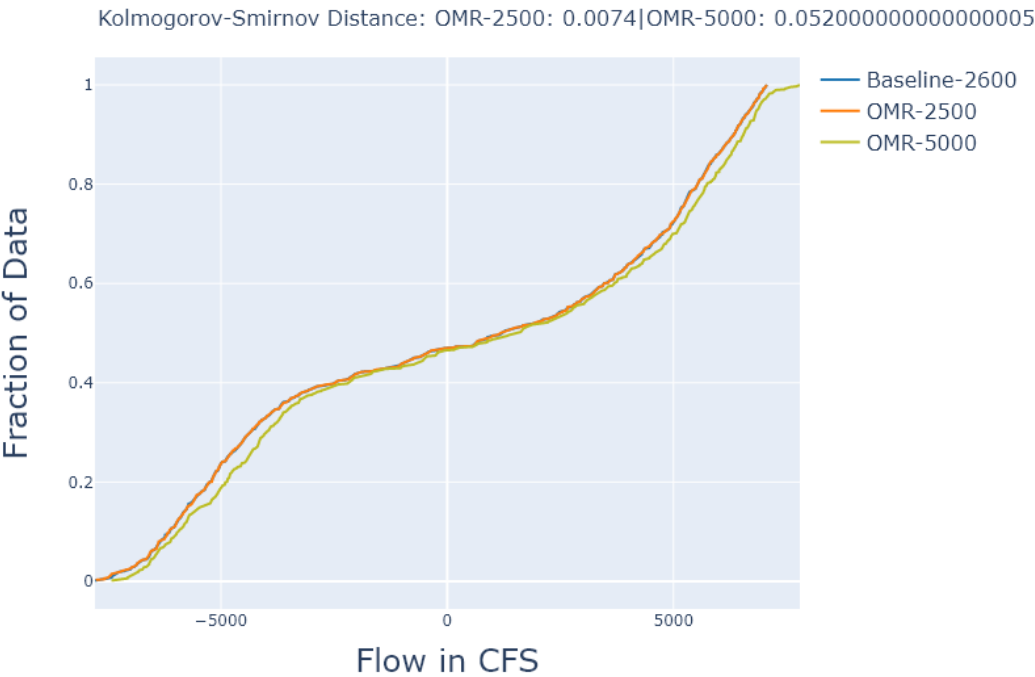


(a)

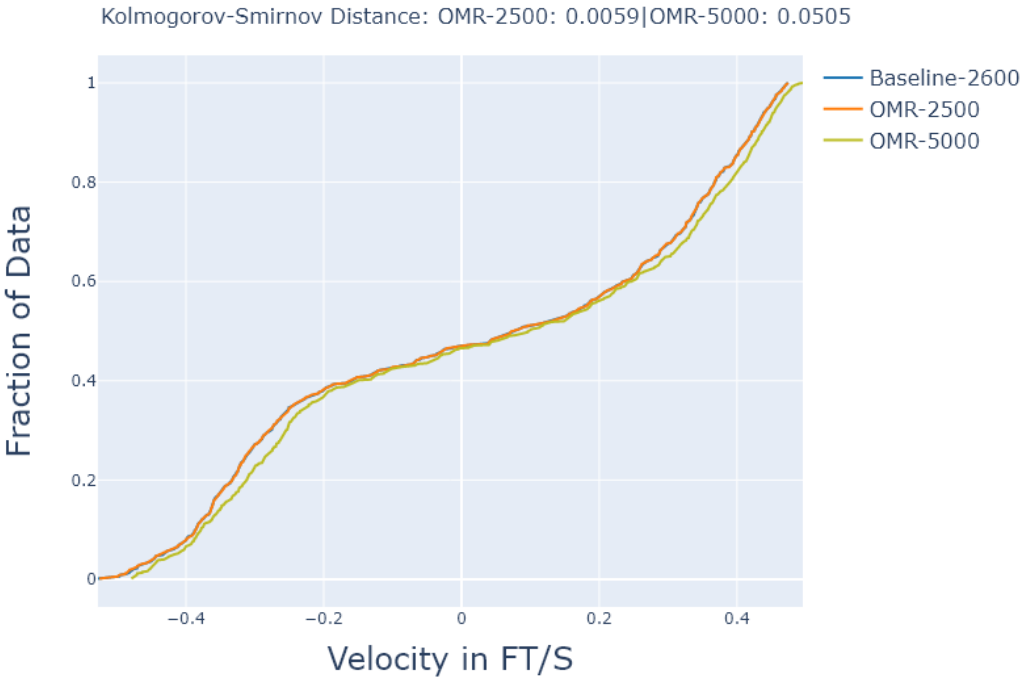


(b)

Figure B3: San Joaquin River downstream of confluence with Calaveras River (CHAN021)

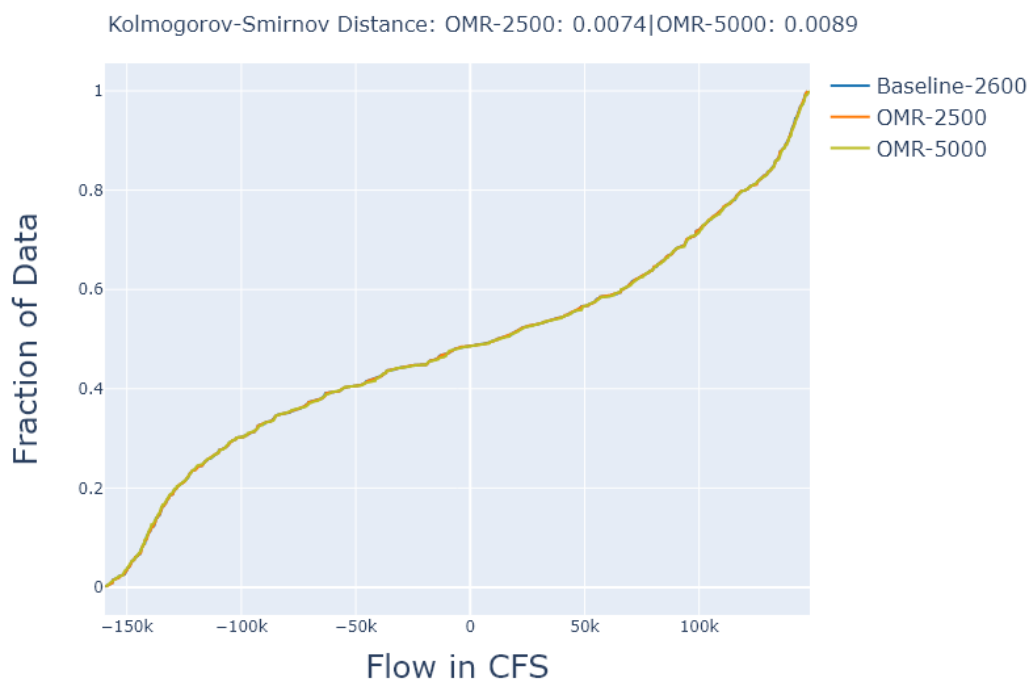


(a)

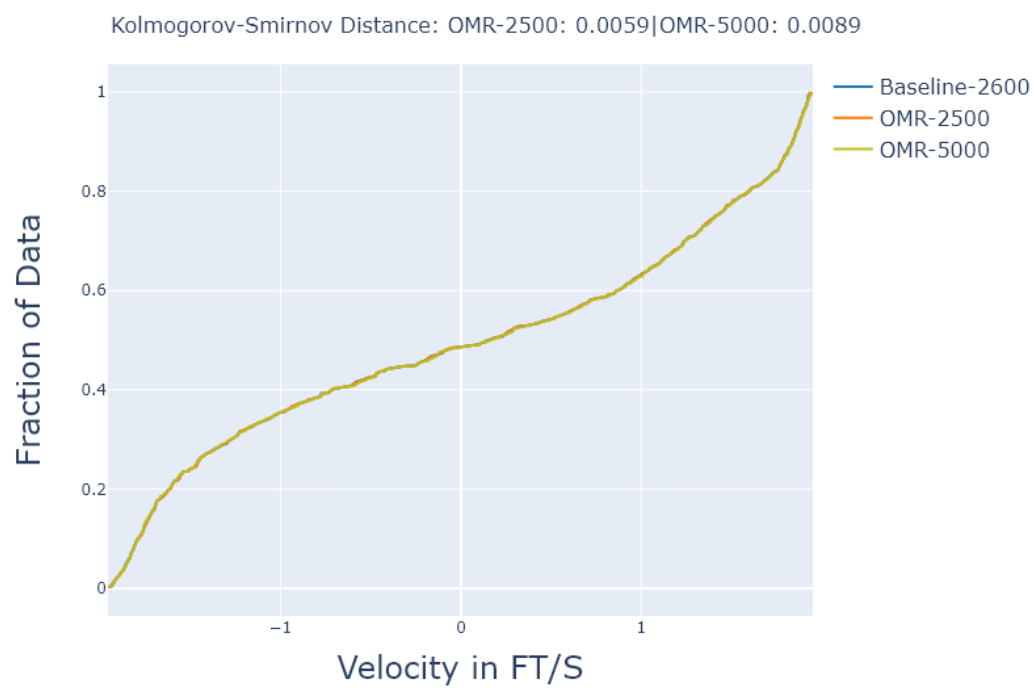


(b)

Figure B4: San Joaquin River at Sherman Island (CHAN049)

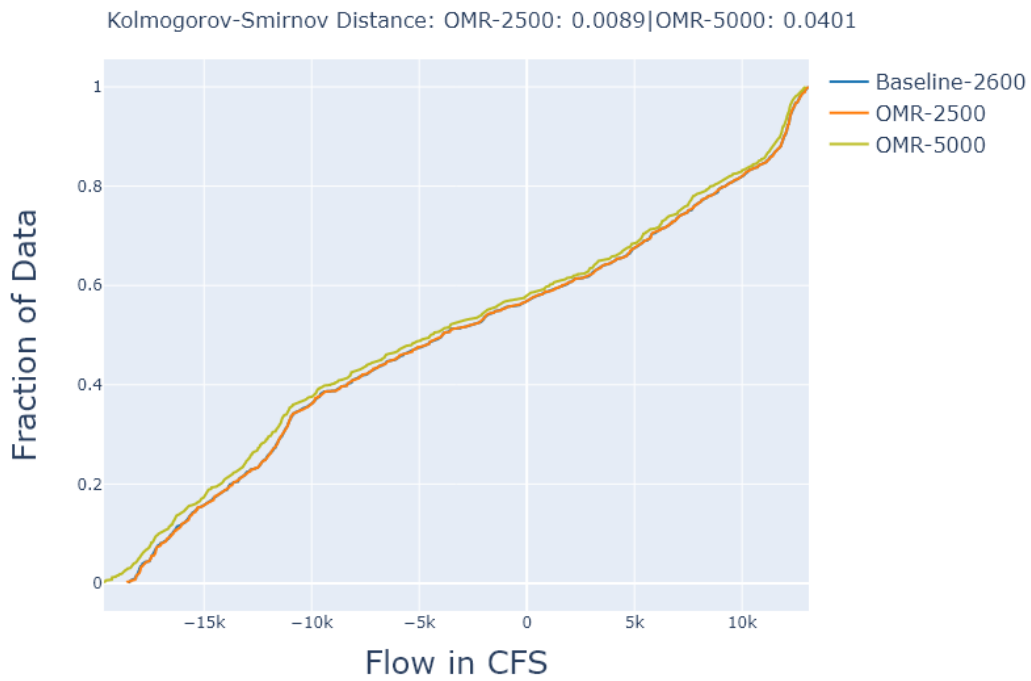


(a)

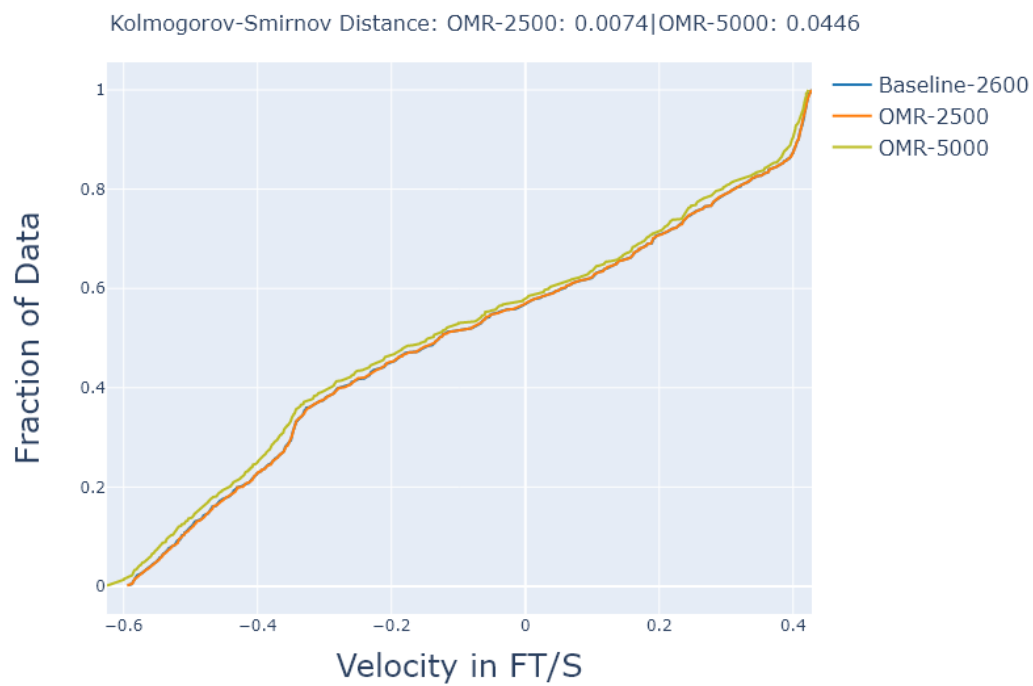


(b)

Figure B5: Old River between Franks Tract and San Joaquin River (CHAN124)

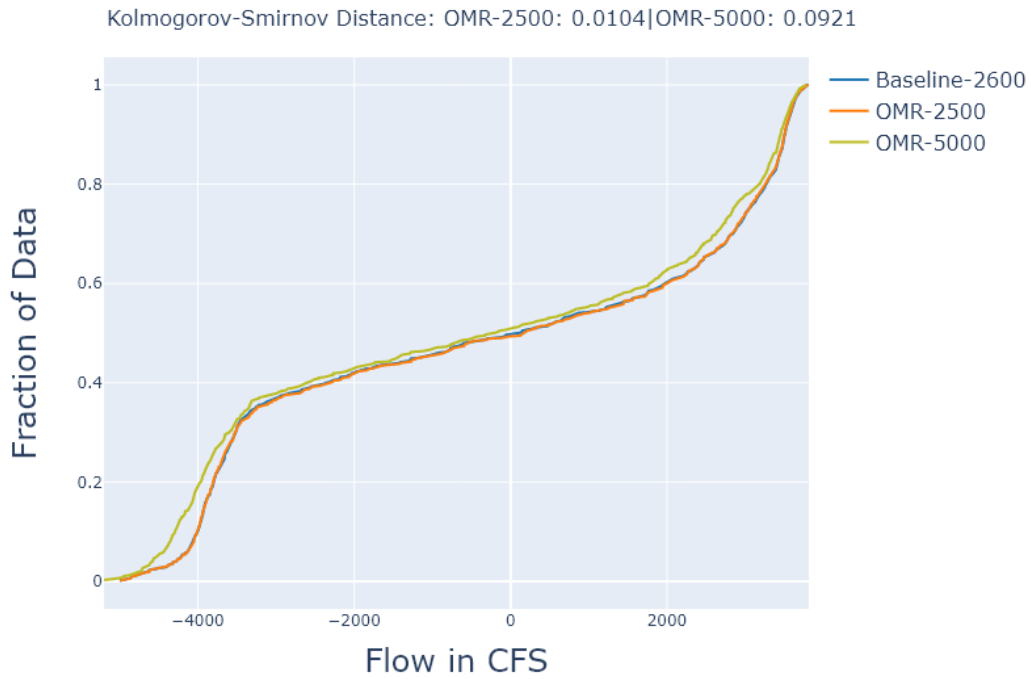


(a)

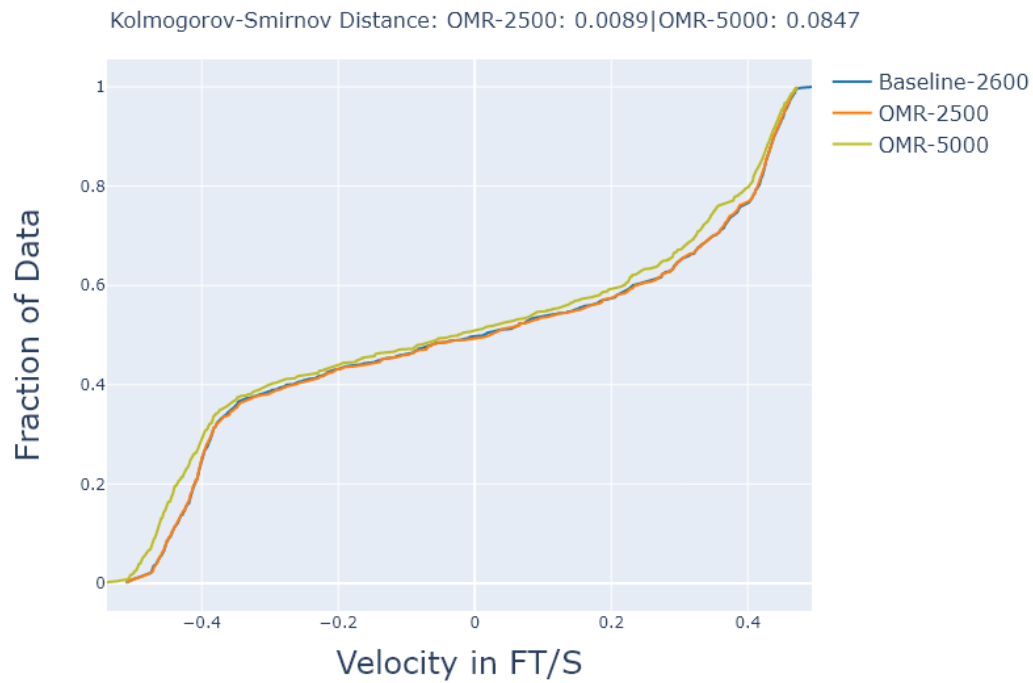


(b)

Figure B6: Lower San Joaquin River at Columbia Cut (CHAN160)

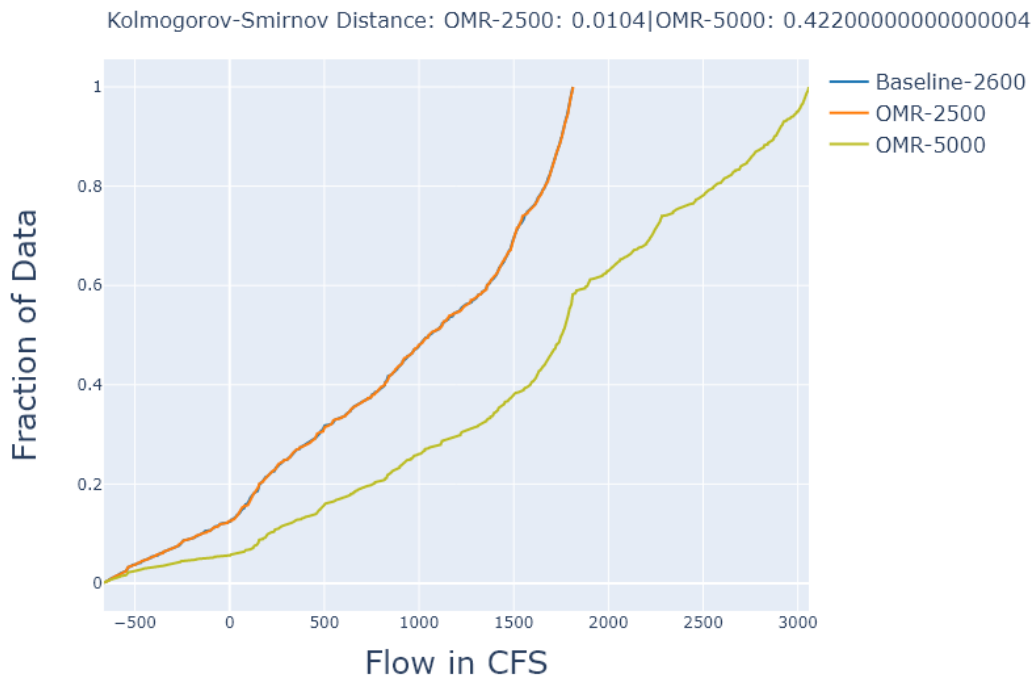


(a)

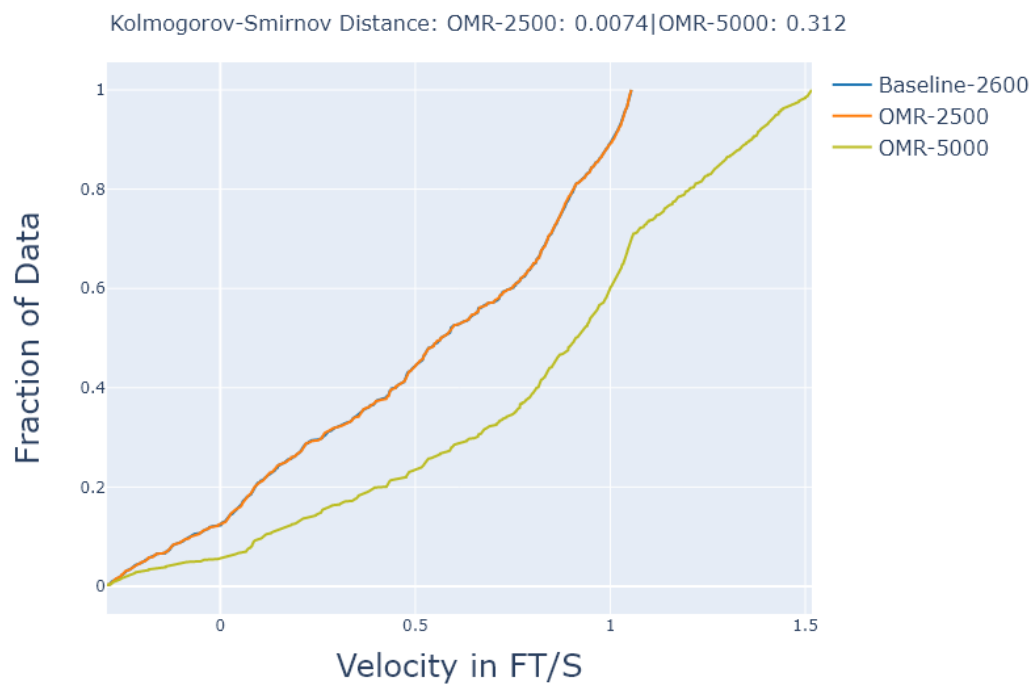


(b)

Figure B7: Slightly upstream of Head of Old River (CHAN006)

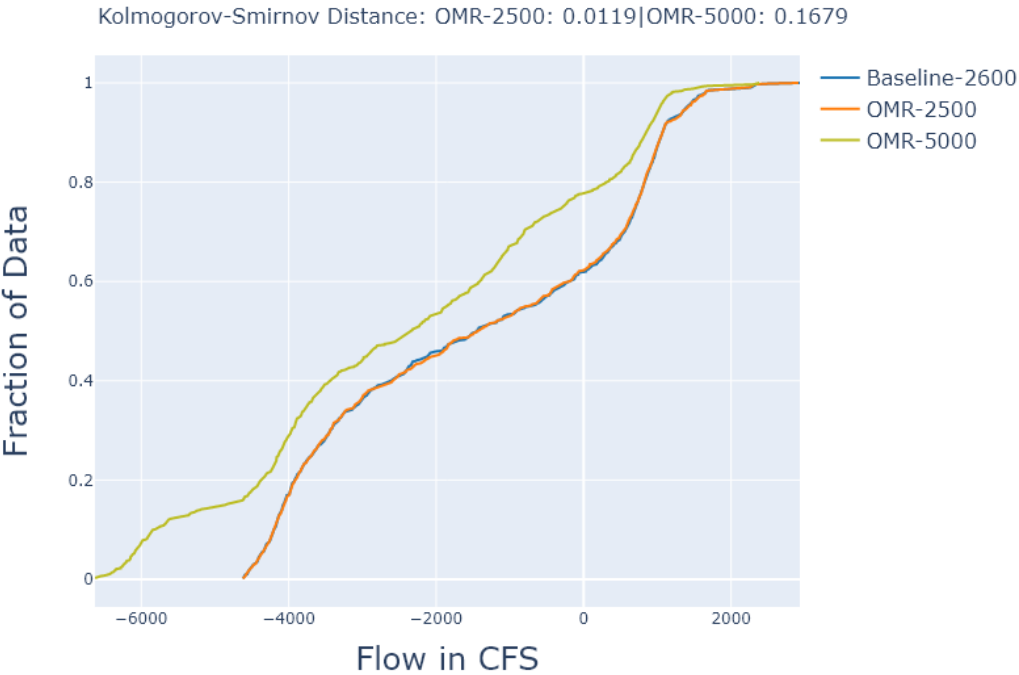


(a)

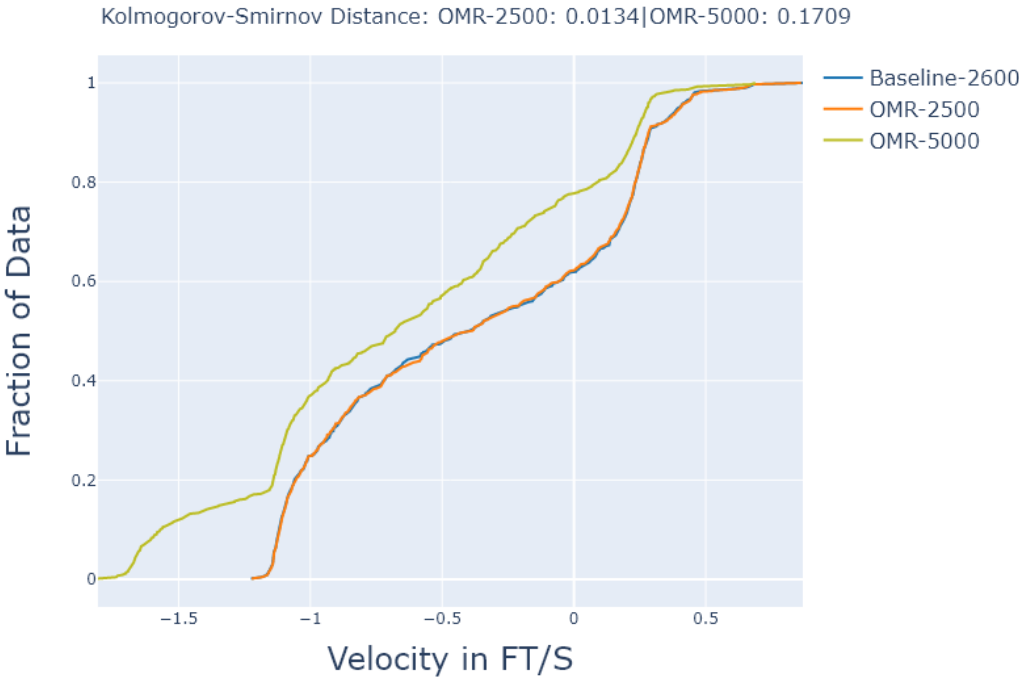


(b)

Figure B8: Old River adjacent to Grant Line Canal (CHAN081)

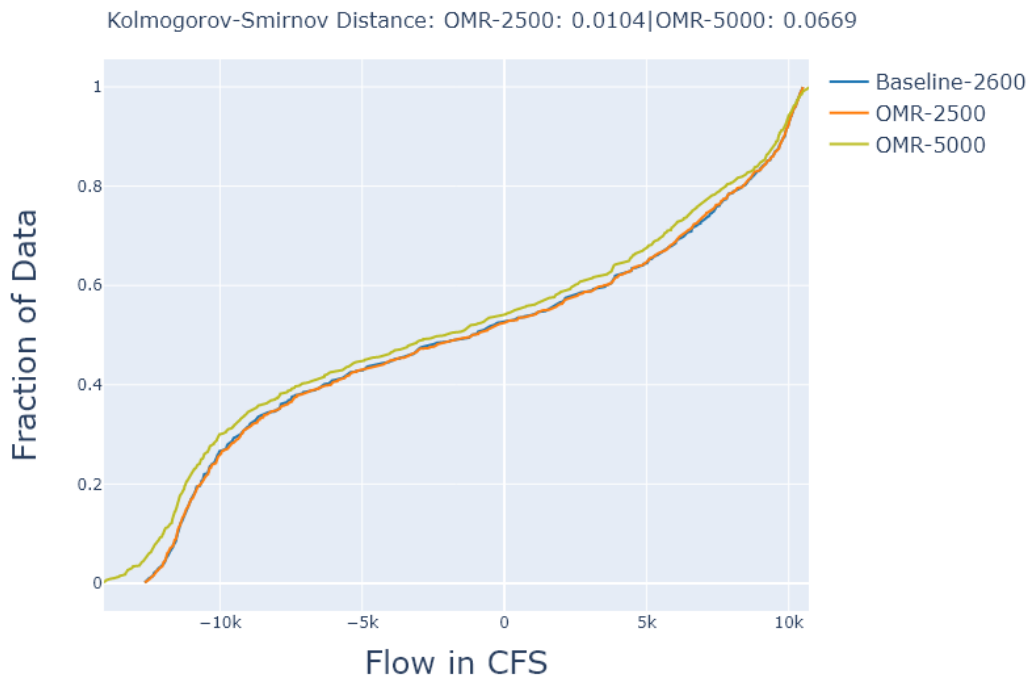


(a)

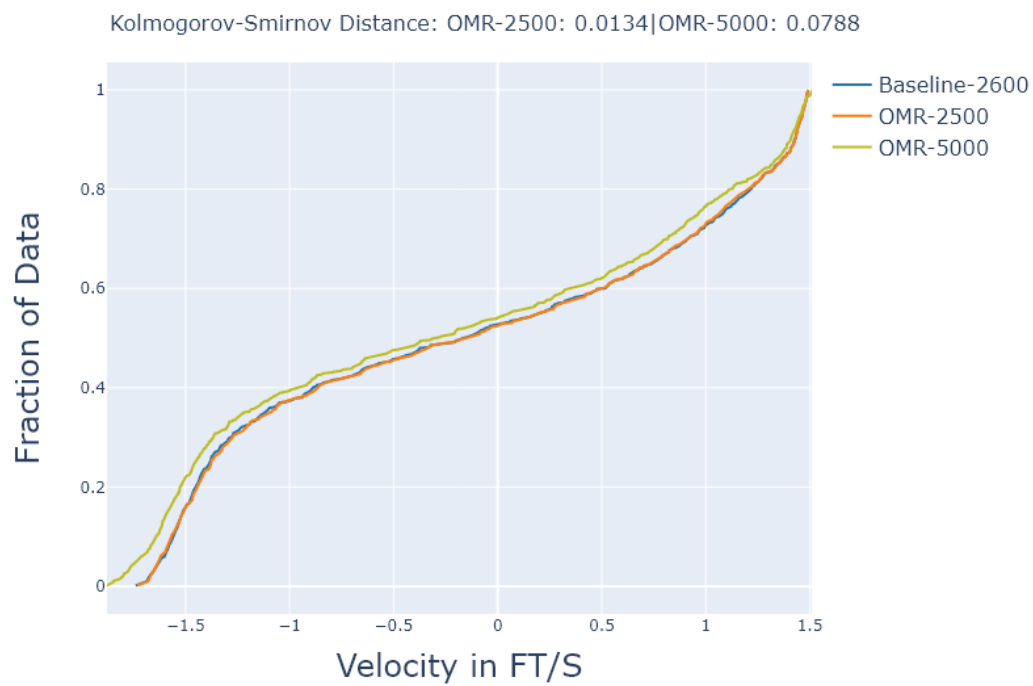


(b)

Figure B9: South Delta along Old River (CHAN094)

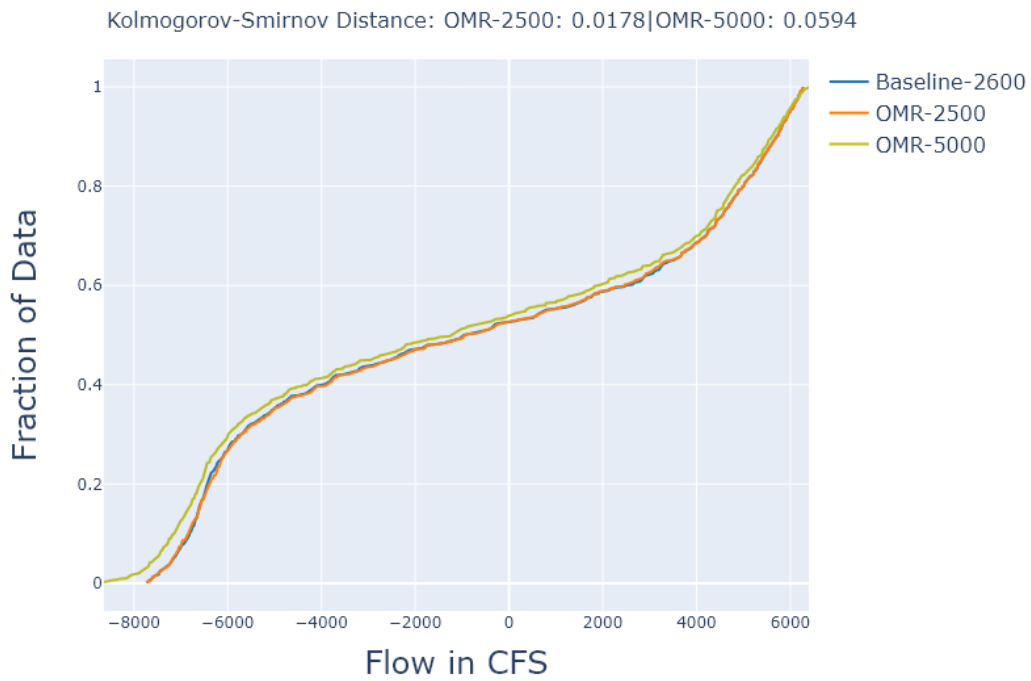


(a)

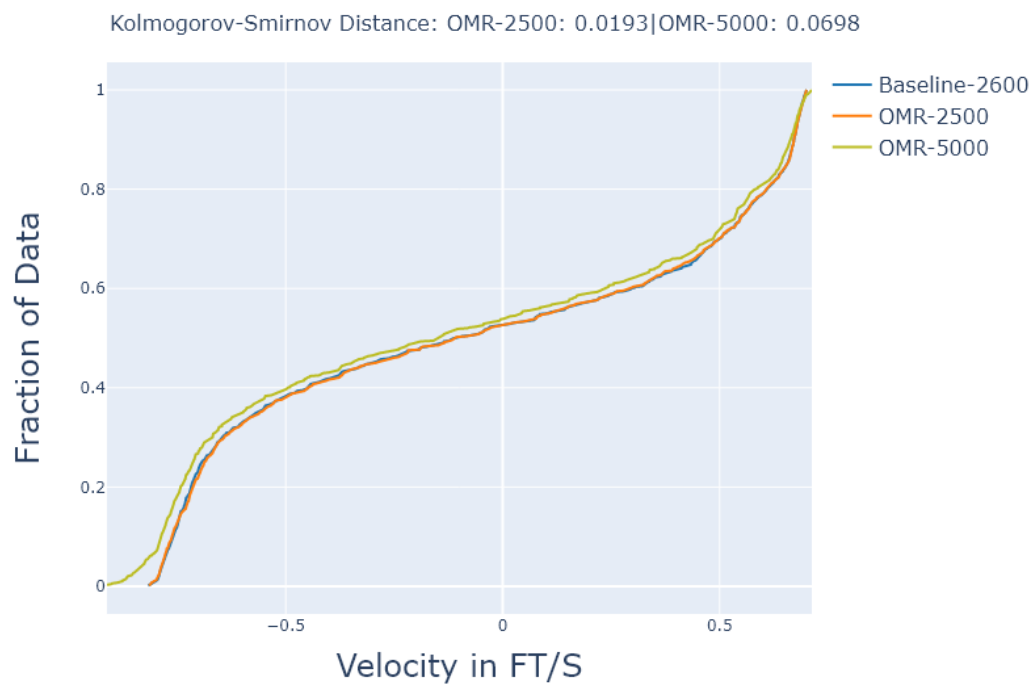


(b)

Figure B10: South Delta along Middle River (CHAN148)

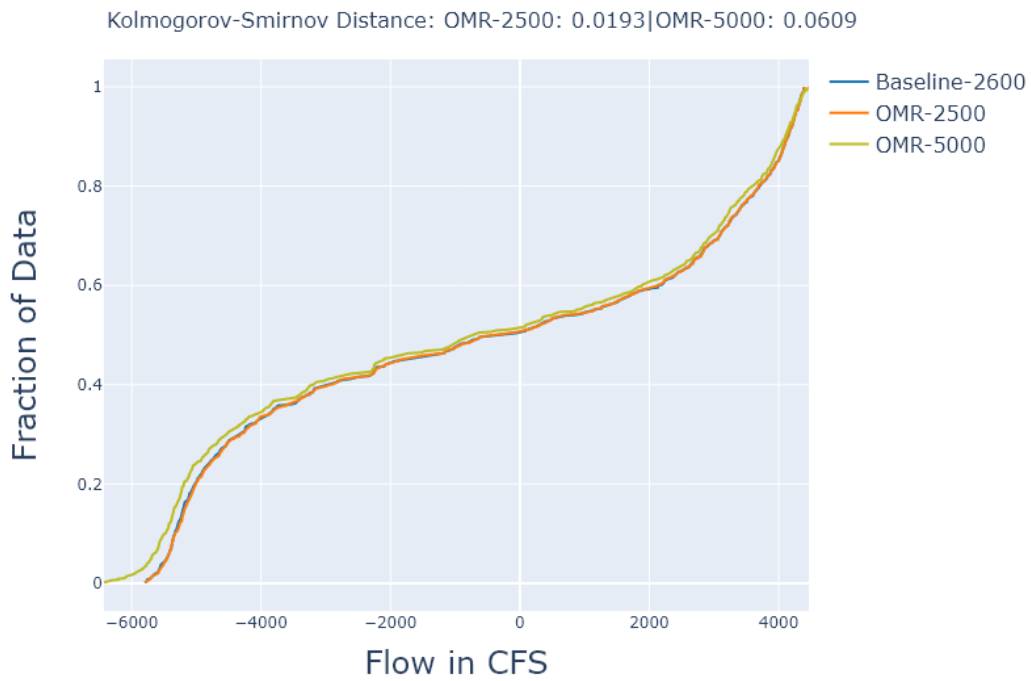


(a)

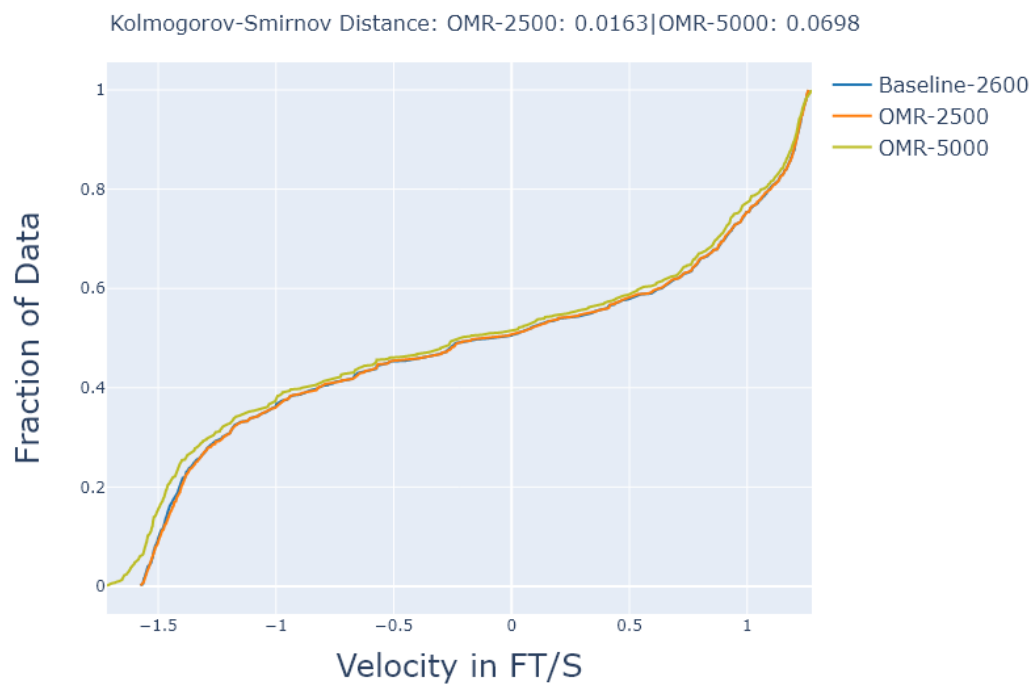


(b)

Figure B11: South Delta along Middle River (CHAN107)



(a)



(b)

Summary Tables

Table 1. Reported KS-statistic values for each scenario's OMR value compared with baseline OMR value. For Baseline, Scenario 1, and Scenario 2 values refer to "Hydraulic Footprint Information" in the section above.

DSM2 Channel	Flow (cfs): Scenario 1 OMR	Flow (cfs): Scenario 2 OMR	Velocity (ft/s): Scenario 1 OMR	Velocity (ft/s): Scenario 2 OMR
6	0.0	0.4	0.0	0.3
21	0.0	0.1	0.0	0.1
49	0.0	0.0	0.0	0.0
81	0.0	0.2	0.0	0.2
94	0.0	0.1	0.0	0.1
107	0.0	0.1	0.0	0.1
124	0.0	0.0	0.0	0.0
148	0.0	0.1	0.0	0.1
160	0.0	0.1	0.0	0.1
434	0.0	0.0	0.0	0.0

Table 2. Summary of minimum, maximum, mean, and percent positive flows (cfs) and velocities (ft/s) by DSM2 channel for OMR scenarios over a 6-day time period. For Baseline, Scenario 1, and Scenario 2 values refer to “Hydraulic Footprint Information” in the section above.

Scenario (cfs)	DSM2 Channel	Flow Min.	Flow Max.	Flow Mean	Flow % Positive	Velocity Min.	Velocity Max.	Velocity Mean	Velocity % Positive
Baseline	6	-663.4	1811.9	926.1	88	-0.3	1.1	0.5	87.8
Scenario 1	6	-662.8	1813.7	926.2	88	-0.3	1.1	0.5	87.5
Scenario 2	6	-663.3	3057.6	1632.8	95	-0.3	1.5	0.8	94.5
Baseline	21	-7784.8	7060.7	299.2	53	-0.5	0.5	0.0	53.1
Scenario 1	21	-7763.2	7062.7	298.8	53	-0.5	0.5	0.0	53.1
Scenario 2	21	-7421.1	7790.4	561.4	53	-0.5	0.5	0.0	53.5
Baseline	49	-159572.4	147245.1	310.2	51	-2.0	1.9	0.0	51.4
Scenario 1	49	-159334.1	147267.9	334.7	51	-2.0	1.9	0.0	51.4
Scenario 2	49	-159300.9	148350.6	472.7	52	-2.0	2.0	0.0	51.6
Baseline	81	-4618.1	2931.3	-1468.6	38	-1.2	0.9	-0.4	38.2
Scenario 1	81	-4621.3	2913.3	-1469.8	38	-1.2	0.9	-0.4	37.9
Scenario 2	81	-6627.6	2383.6	-2336.4	22	-1.8	0.7	-0.6	22.3
Baseline	94	-12645.4	10497.3	-1212.1	47	-1.7	1.5	-0.1	47.3
Scenario 1	94	-12644.5	10500.0	-1194.4	48	-1.7	1.5	-0.1	47.6
Scenario 2	94	-14080.2	10705.9	-1803.6	46	-1.9	1.5	-0.2	45.9
Baseline	107	-5796.7	4397.0	-546.6	49	-1.6	1.3	-0.1	49.5
Scenario 1	107	-5797.7	4398.1	-542.9	49	-1.6	1.3	-0.1	49.3
Scenario 2	107	-6428.3	4464.9	-705.6	49	-1.7	1.3	-0.2	48.7
Baseline	124	-18509.6	13096.6	-2763.2	43	-0.6	0.4	-0.1	43.1
Scenario 1	124	-18581.7	13100.2	-2756.8	43	-0.6	0.4	-0.1	43.1
Scenario 2	124	-19648.7	12959.2	-3275.9	42	-0.6	0.4	-0.1	42.2
Baseline	148	-7726.9	6272.1	-714.1	48	-0.8	0.7	-0.1	47.6
Scenario 1	148	-7731.7	6277.6	-706.3	47	-0.8	0.7	-0.1	47.4
Scenario 2	148	-8638.8	6393.8	-990.7	46	-0.9	0.7	-0.1	46.2
Baseline	160	-5000.6	3812.4	-250.0	50	-0.5	0.5	0.0	50.2
Scenario 1	160	-4996.5	3813.6	-241.6	51	-0.5	0.5	0.0	50.7

Scenario (cfs)	DSM2 Channel	Flow Min.	Flow Max.	Flow Mean	Flow % Positive	Velocity Min.	Velocity Max.	Velocity Mean	Velocity % Positive
Scenario 2	160	-5200.7	3776.0	-428.8	49	-0.5	0.5	0.0	49.3
Baseline	434	-168793.6	163604.3	4797.9	53	-1.8	1.9	0.1	52.6
Scenario 1	434	-168786.8	163642.2	4805.1	53	-1.8	1.9	0.1	52.6
Scenario 2	434	-165605.2	169971.9	9275.9	54	-1.8	2.0	0.2	53.6

2/2/2021 Meeting

Objective

Weekly modeling efforts are conducted to examine the effects of varying OMR conditions on the behavior of salmonids present in the Delta in a one-week “look ahead” or outlook. Members of the Salmon Monitoring Team (SaMT) use DSM2 modeling results to help answer how changing pumping regimes translates to differences in flows and velocities modeled at various channel locations within the Delta and what impact modeled environmental parameters have on rearing, foraging, migrating, and holding salmonids.

Each series of runs consists of three OMR conditions: minimum and maximum scenarios bounded by expected OMR index values for that week (Ops Outlook, Table 1) and a baseline which represents an anticipated operational value. Assumptions are made to best estimate future hydrologic characteristics. These inputs are more confident for the future one, two, and three-day timeframes; days four through six have lower confidence. Model scenarios hold hydrology inputs between runs constant and adjust Delta export pumping rates to compare between scenario OMR index values. Although hydrologic ensembles could be used, a single value or deterministic projection is used for efficiency.

SaMT members use weekly DSM2 model results from a range of scenarios as part of a suite of tools to help assess distribution and changes to behavior of salmonids providing WOMT with advice on changes to operations. At each channel location over a six-day action period, environmental parameters are examined: modeled flow and velocity general statistics (e.g., magnitude, range, percent positive), differences in modeled flow and velocity values compared with the baseline scenario, etc. That information, in conjunction with channel location (e.g., close to the Delta pumping facilities, closer to areas with higher tidal influence, etc.) and other environmental considerations (e.g., tidal cycle, upcoming storms, etc.), is then interpreted from a biological perspective. SaMT explores the possible effects to salmonids of changing OMR index scenarios, assuming each of those potential operations could be that week’s controlling factor, which feeds into advice to WOMT.

Conditions / Assumptions

<i>Hydraulic footprint information</i>	
DWR Baseline forecast range	1/26/2021 to 2/15/2021
CVO updated Baseline and Scenarios	2/1/2021
DSM2 modeling results range	2/2/2021 to 2/8/2021
<i>OMR index value scenarios</i>	
Baseline	-2,500 cfs
Scenario 1	-2,000 cfs (decreasing from Baseline; Δ 500 cfs)
Scenario 2	-3,000 cfs (increasing from Baseline; Δ 500 cfs)
<i>Changes between scenarios</i>	
Hydrology	No
Delta Exports	Yes
<i>Common assumptions</i>	
DSM2 run results based on the following assumptions	<ol style="list-style-type: none"> 1. CCFB Gates are operating to Priority 2 throughout the forecast period. 2. The Delta Cross Channel gates are closed throughout the forecast period. 3. Suisun Marsh salinity control flashboards are in, and 2 of the Suisun Marsh Salinity Control gates are in tidal operation and 1 gate is closed for maintenance. 4. San Joaquin River flow at Vernalis is at 2,100 cfs at the beginning of the forecast period and is estimated to decrease to 1,000 cfs by the end of the forecast period. 5. Sacramento River flow at Freeport is at 11,300 cfs at the beginning of the forecast period and is expected to increase to 10,550 cfs by the end of the forecast period.
<i>Additional considerations</i>	
Additional considerations for this week's DSM2 run	No special considerations.

DSM2 model results: summary tables

Table 1. Reported Kolmogorov-Smirnov (KS) statistic values for each scenario's OMR value compared with baseline OMR value. For Baseline, Scenario 1, and Scenario 2 values refer to "Hydraulic Footprint Information" in the conditions / assumptions section above. The KS-statistic quantifies a comparison between two empirical cumulative distribution functions (ECDFs): 0 (very similar / equal) and 1 (very dissimilar / not equal).

DSM2 Channel	Flow (cfs): Scenario 1 OMR	Flow (cfs): Scenario 2 OMR	Velocity (ft/s): Scenario 1 OMR	Velocity (ft/s): Scenario 2 OMR
6	0.02	0.03	0.01	0.01
21	0.01	0.02	0.02	0.02
49	0.01	0.01	0.01	0.01
81	0.08	0.06	0.10	0.06
94	0.03	0.04	0.03	0.04
107	0.02	0.03	0.02	0.03
124	0.01	0.02	0.01	0.02
148	0.03	0.03	0.03	0.04
160	0.03	0.04	0.03	0.04
434	0.00	0.01	0.00	0.01

Table 2. Summary of minimum, maximum, mean, and percent positive flows (cfs) and velocities (ft/s) by DSM2 channel for OMR scenarios over a 6-day time period. For Baseline, Scenario 1, and Scenario 2 values refer to “Hydraulic Footprint Information” in the conditions / assumptions section above.

Scenario (cfs)	DSM2 Channel	Flow Min.	Flow Max.	Flow Mean	Flow % Positive	Velocity Min.	Velocity Max.	Velocity Mean	Velocity % Positive
Baseline	6	-446	2826	1846	99	-0.19	1.44	0.93	99
Scenario 1	6	-468	2826	1845	99	-0.2	1.44	0.92	99
Scenario 2	6	-388	2819	1846	99	-0.17	1.44	0.93	99
Baseline	21	-7197	7126	850	56	-0.49	0.47	0.06	56
Scenario 1	21	-7197	7146	872	56	-0.49	0.47	0.06	56
Scenario 2	21	-7172	7090	822	56	-0.48	0.47	0.06	56
Baseline	49	-160756	145239	3878	53	-2.02	1.91	0.08	53
Scenario 1	49	-160684	145687	4208	53	-2.02	1.92	0.08	53
Scenario 2	49	-160968	144652	3370	53	-2.02	1.91	0.07	53
Baseline	81	-5741	2633	-1563	38	-1.52	0.76	-0.42	38
Scenario 1	81	-5146	2631	-1403	41	-1.41	0.76	-0.37	41
Scenario 2	81	-5903	2422	-1625	36	-1.55	0.7	-0.44	36
Baseline	94	-15128	10470	-837	51	-1.96	1.46	-0.08	51
Scenario 1	94	-14649	10610	-616	51	-1.94	1.48	-0.05	51
Scenario 2	94	-15333	10345	-1167	50	-1.99	1.45	-0.12	50
Baseline	107	-6376	4385	-411	52	-1.72	1.24	-0.09	52
Scenario 1	107	-6361	4431	-351	52	-1.71	1.25	-0.08	52
Scenario 2	107	-6412	4329	-502	51	-1.73	1.23	-0.12	51
Baseline	124	-19965	12498	-2463	46	-0.62	0.42	-0.07	46
Scenario 1	124	-19940	12561	-2357	46	-0.62	0.42	-0.07	46
Scenario 2	124	-20050	12424	-2626	45	-0.63	0.41	-0.07	45
Baseline	148	-8921	6302	-525	51	-0.92	0.7	-0.04	51
Scenario 1	148	-8732	6394	-421	52	-0.91	0.7	-0.03	52
Scenario 2	148	-8996	6180	-681	51	-0.93	0.69	-0.06	51
Baseline	160	-5032	3632	-151	52	-0.51	0.47	0.01	52

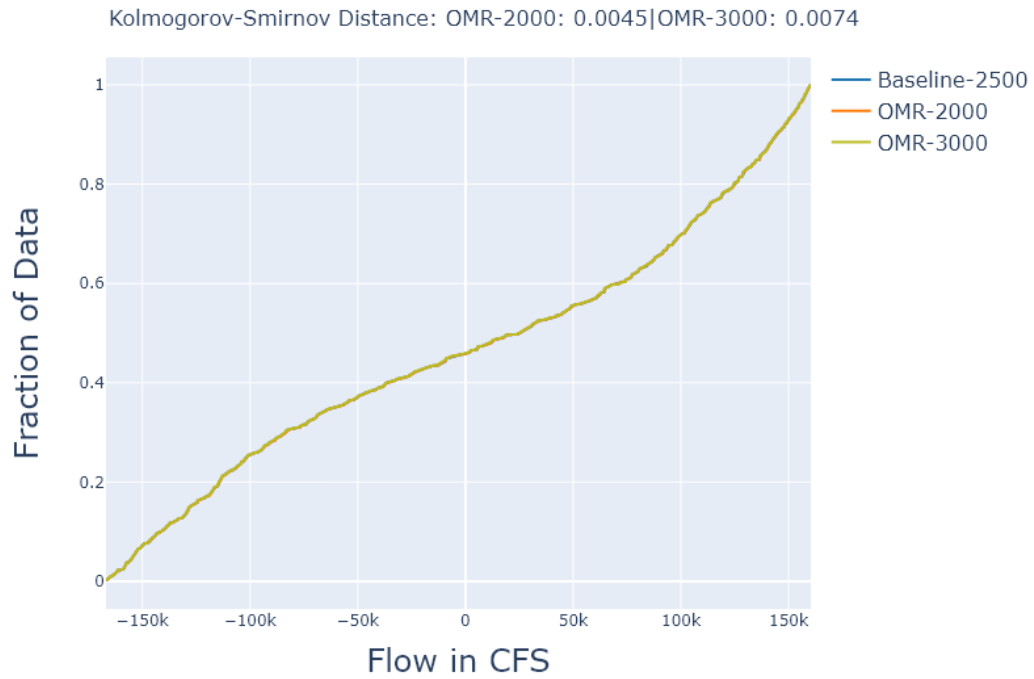
Scenario (cfs)	DSM2 Channel	Flow Min.	Flow Max.	Flow Mean	Flow % Positive	Velocity Min.	Velocity Max.	Velocity Mean	Velocity % Positive
Scenario 1	160	-4892	3661	-105	53	-0.5	0.47	0.01	53
Scenario 2	160	-5143	3615	-218	52	-0.52	0.47	0	52
Baseline	434	-166845	160199	9114	54	-1.87	1.87	0.14	54
Scenario 1	434	-166844	160322	9196	54	-1.87	1.87	0.14	54
Scenario 2	434	-166907	160121	8977	54	-1.87	1.87	0.14	54

DSM2 model results: figures

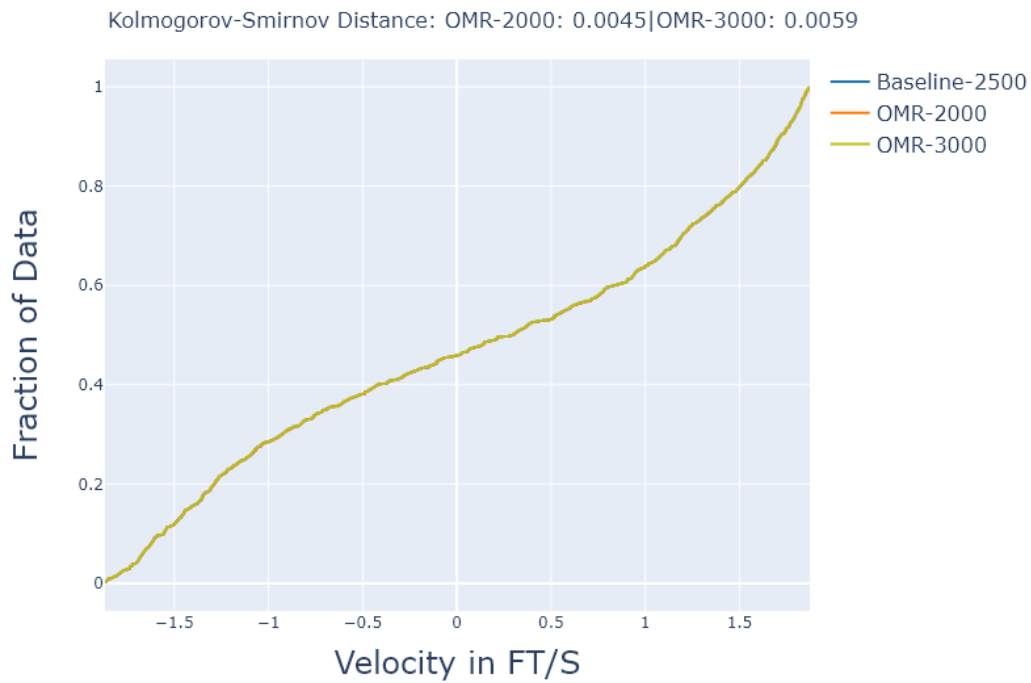
The following captions apply to the Empirical Cumulative Distribution Function (ECDF) and time-series plots for flow and velocity in selected locations (see Figure A11 and Table 3 for channel location information) below:

- (a) ECDF plot: Baseline vs Scenario 1 OMR and Scenario 2 OMR. X-axis represents flow (cfs) and y-axis represents percentage of 15-minute time-step flow values. For Baseline, Scenario 1, and Scenario 2 values refer to “Hydraulic Footprint Information” in the section above. Reported Kolmogorov-Smirnov (KS) statistic values are found in Table 1.
- (b) ECDF plot: Baseline vs Scenario 1 OMR and Scenario 2 OMR. X-axis represents velocity (cfs) and y-axis represents percentage of 15-minute time-step velocity values. For Baseline, Scenario 1, and Scenario 2 values refer to “Hydraulic Footprint Information” in the section above. Reported Kolmogorov-Smirnov (KS) statistic values are found in Table 1.
- (c) Time-series plot (1-day aggregated): Baseline vs Scenario 1 OMR and Scenario 2 OMR. X-axis represents daily time steps and y-axis represents flow (cfs) values. For Baseline, Scenario 1, and Scenario 2 values refer to “Hydraulic Footprint Information” in the section above. Reported summary statistics (minimum, maximum, etc.) are found in Table 2.
- (d) Time-series plot (1-day aggregated): Baseline vs Scenario 1 OMR and Scenario 2 OMR. X-axis represents daily time steps and y-axis represents velocity (cfs) values. For Baseline, Scenario 1, and Scenario 2 values refer to “Hydraulic Footprint Information” in the section above. Reported summary statistics (minimum, maximum, etc.) are found in Table 2.

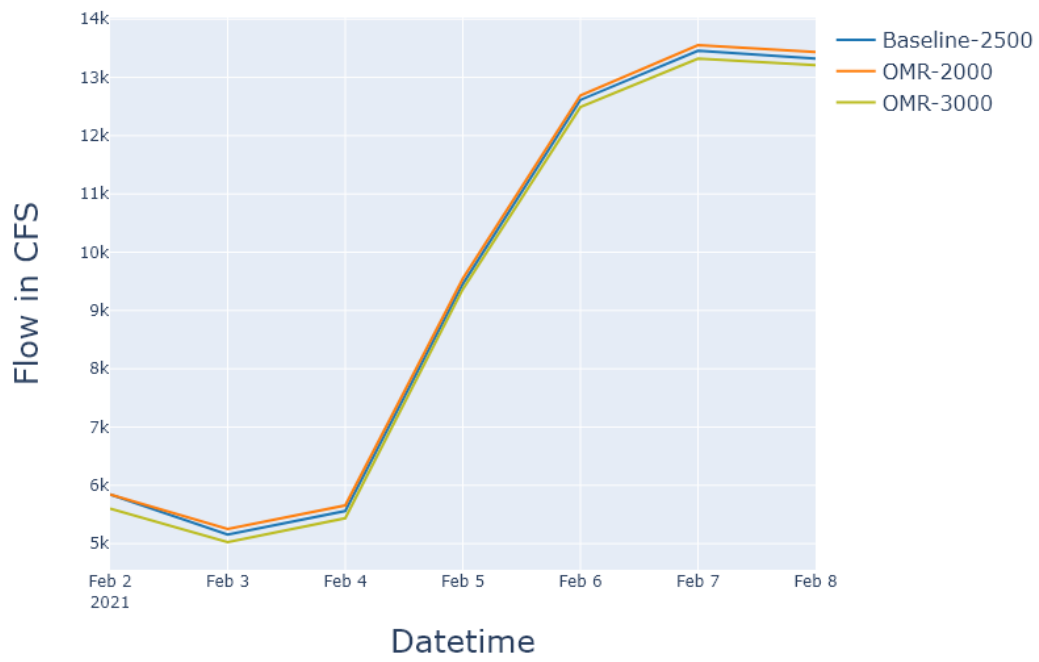
Figure A1: Sacramento River at Sherman Island (CHAN434)



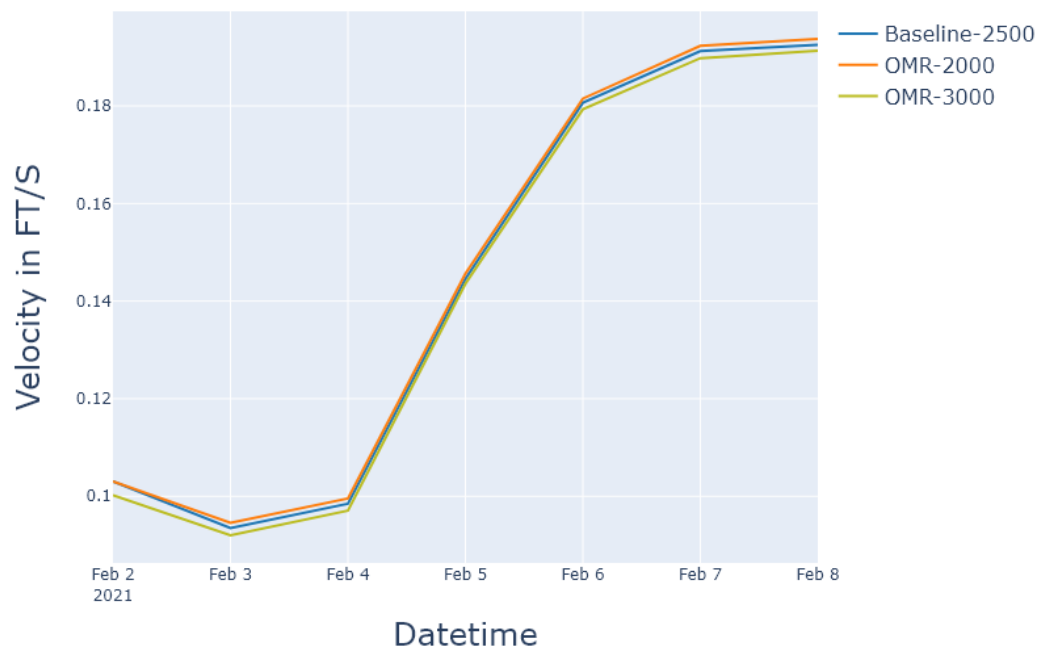
(a)



(b)

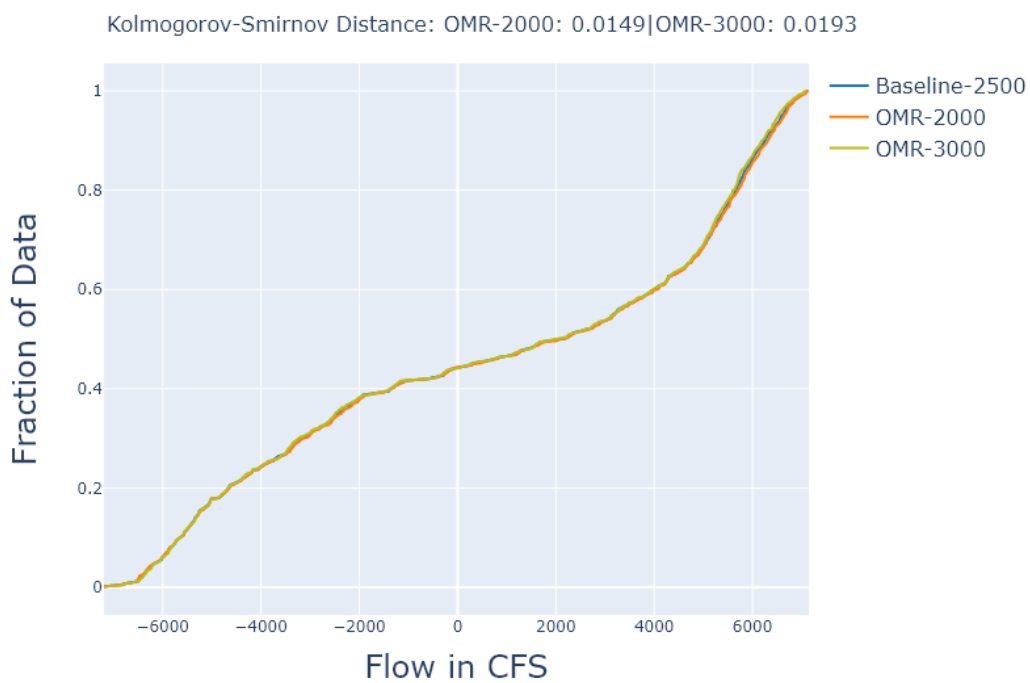


(c)

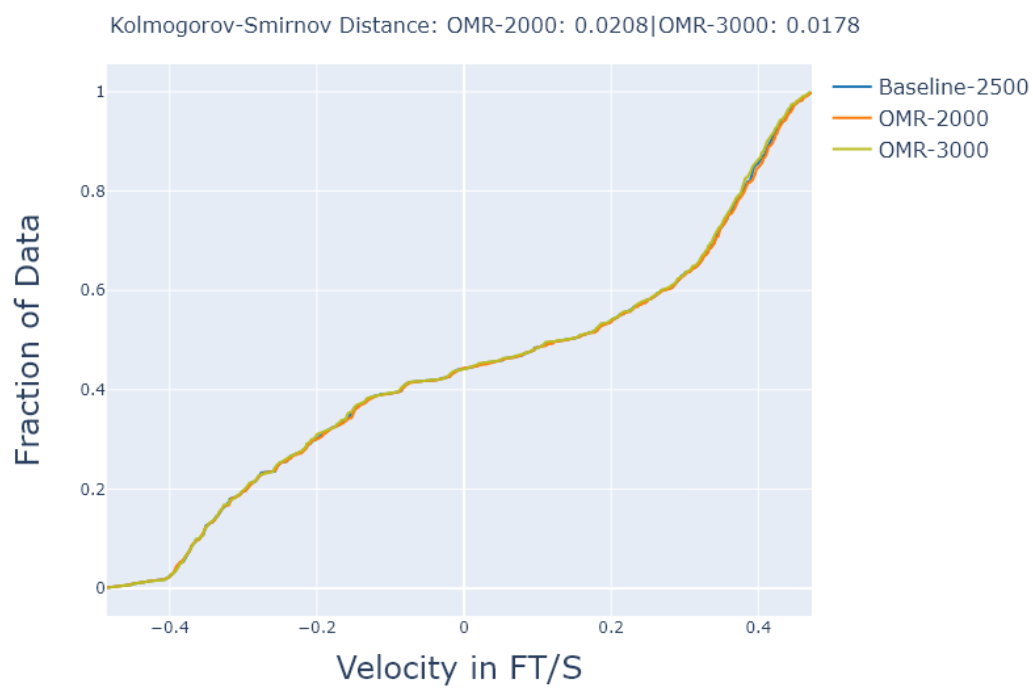


(d)

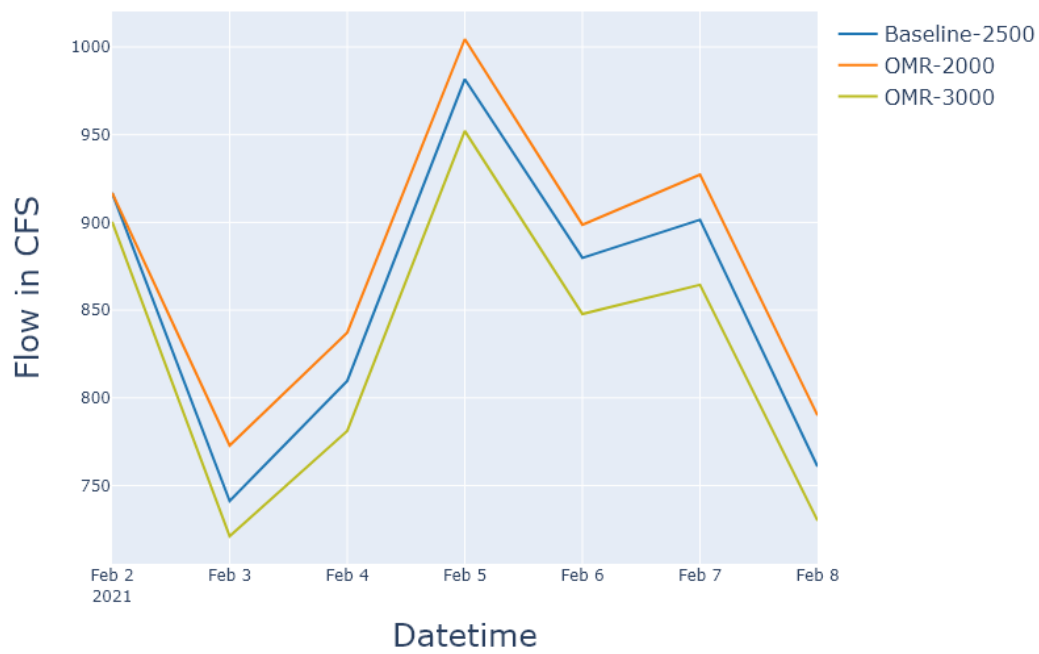
Figure A2: San Joaquin River downstream of confluence with Calaveras River (CHAN021)



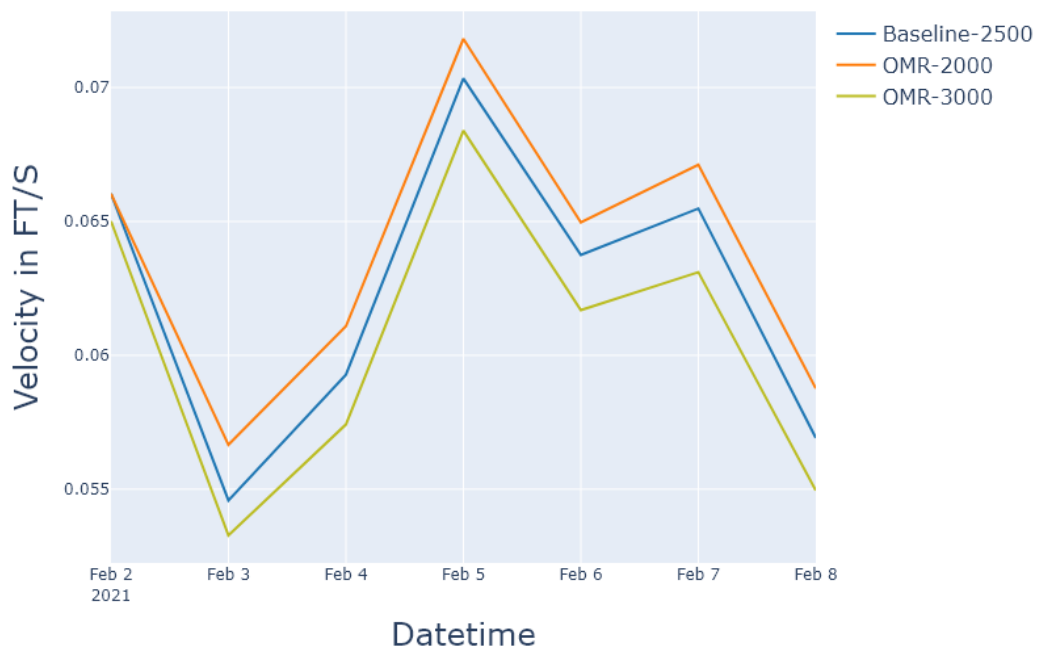
(a)



(b)

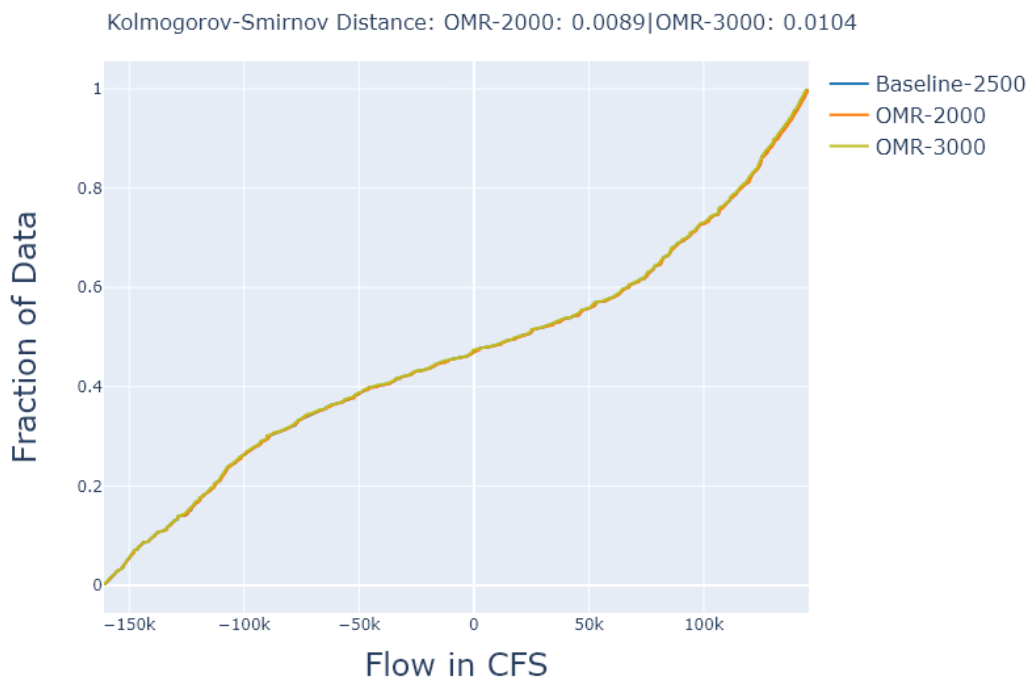


(c)

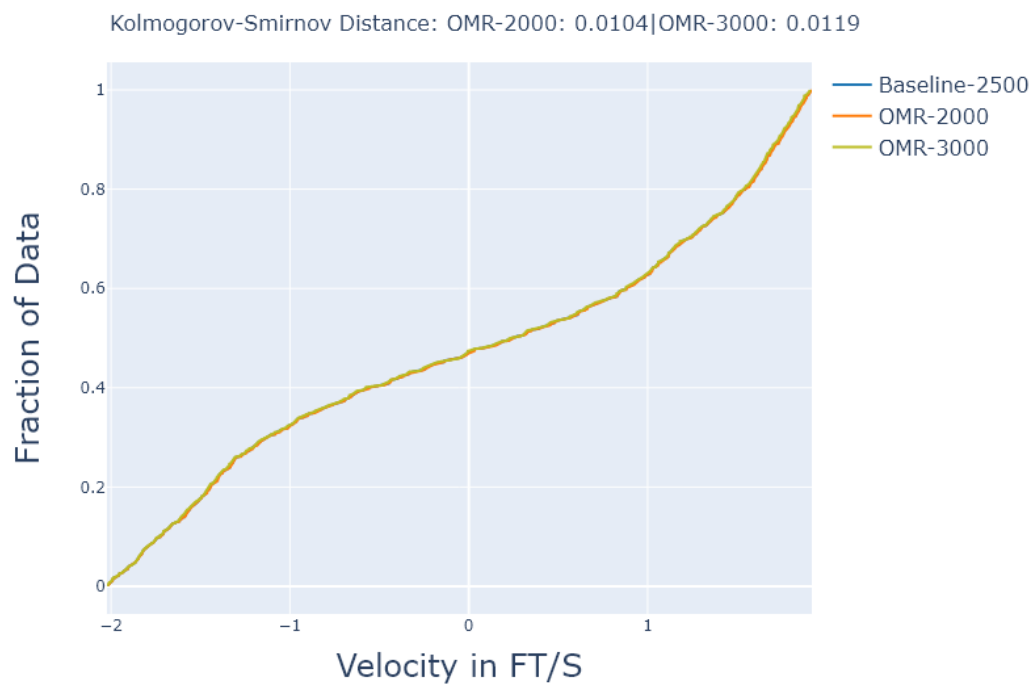


(d)

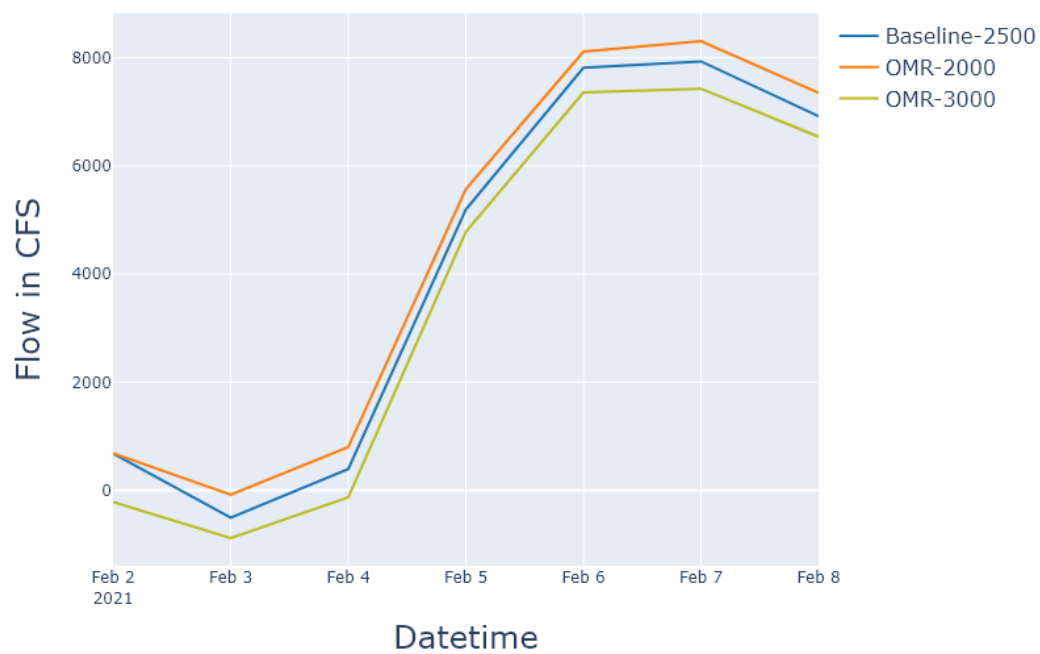
Figure A3: San Joaquin River at Sherman Island (CHAN049)



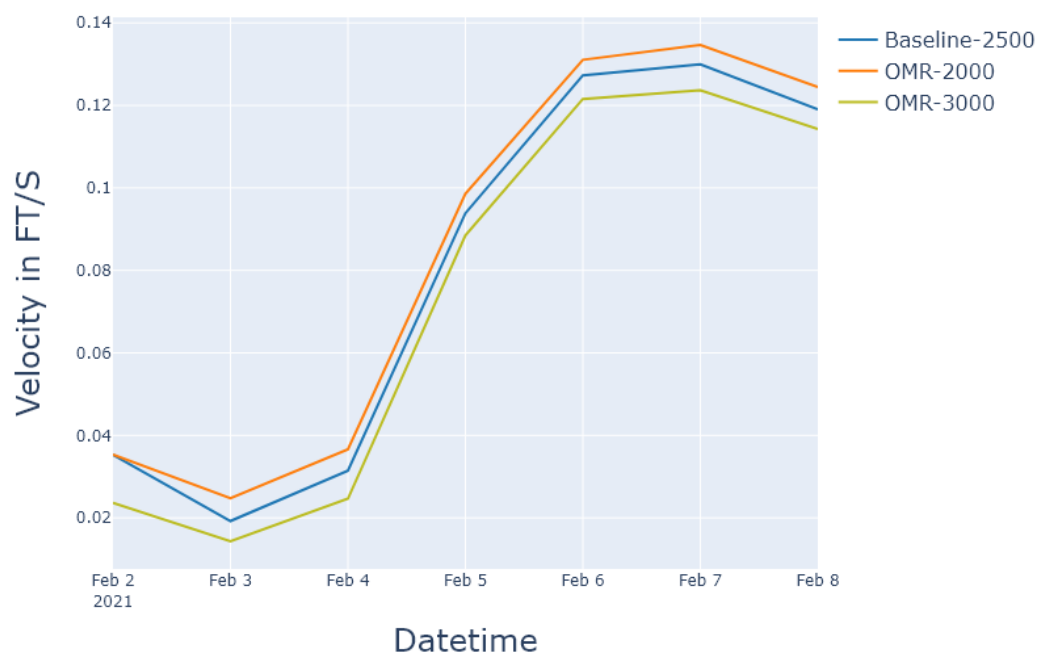
(a)



(b)

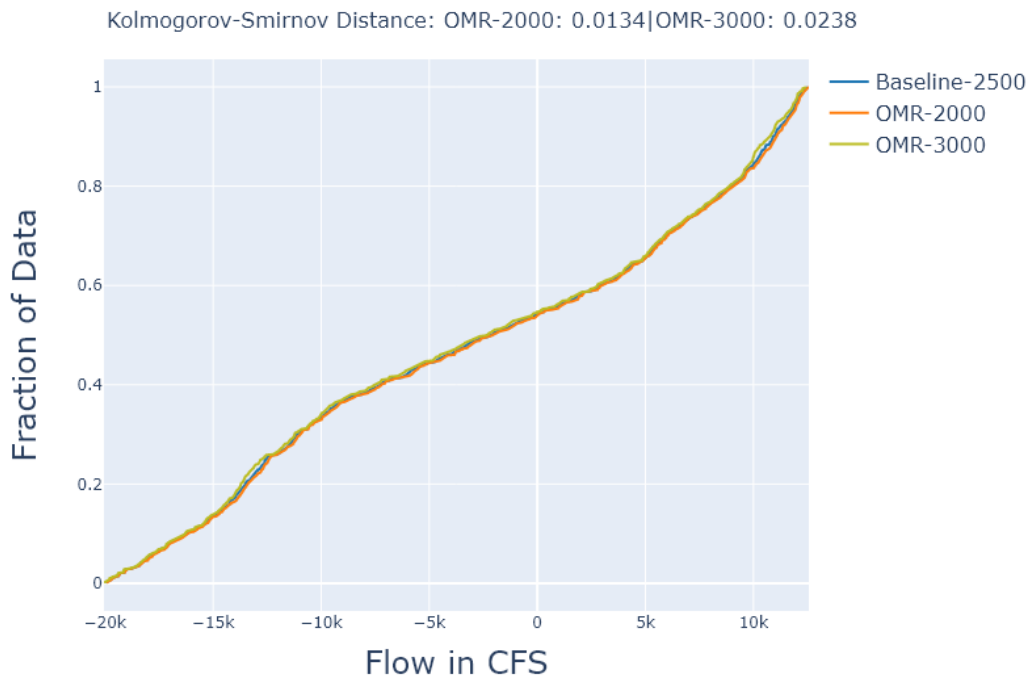


(c)

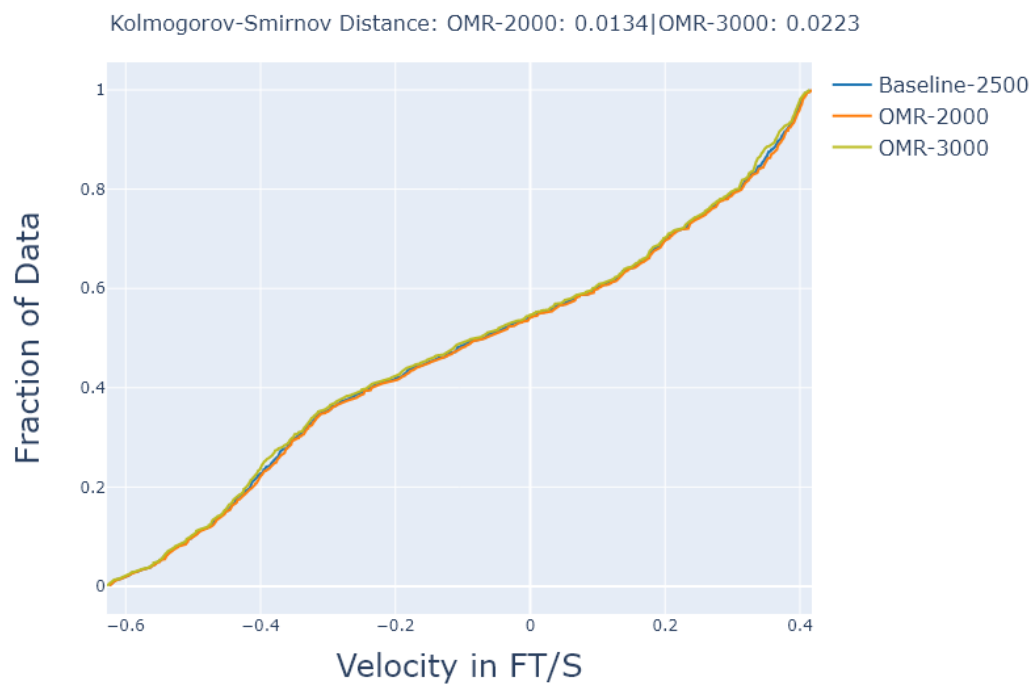


(d)

Figure A4: Old River between Franks Tract and San Joaquin River (CHAN124)



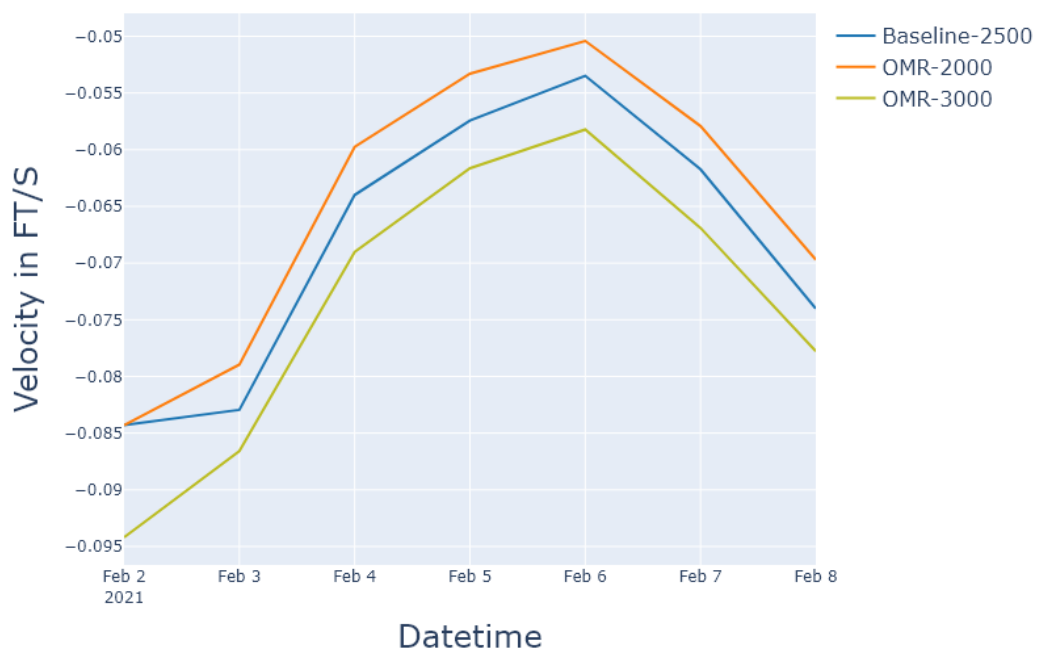
(a)



(b)

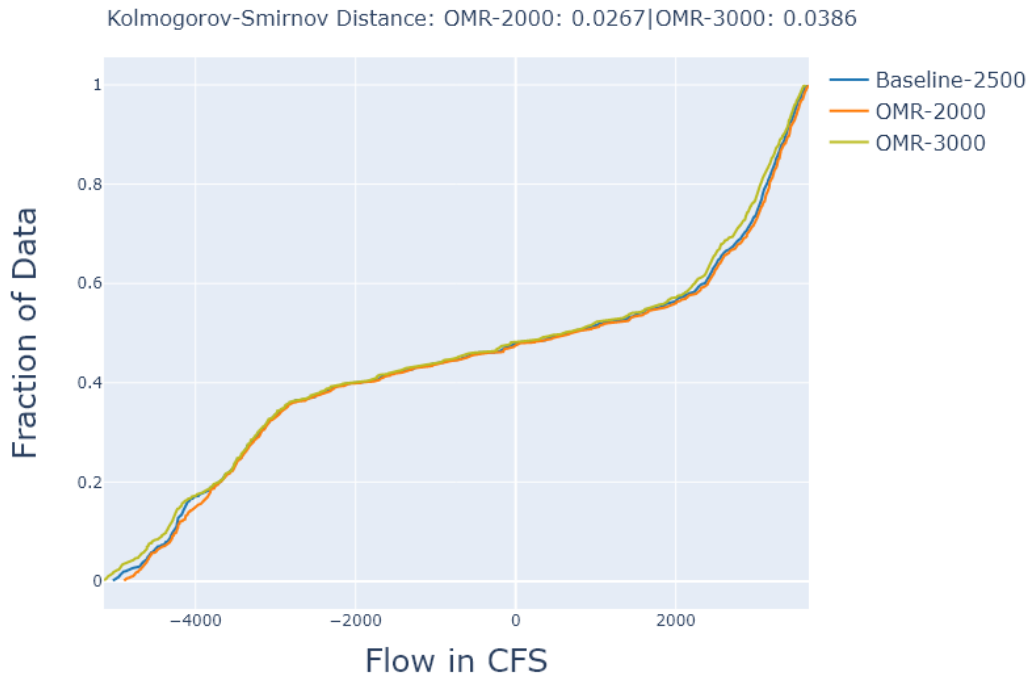


(c)

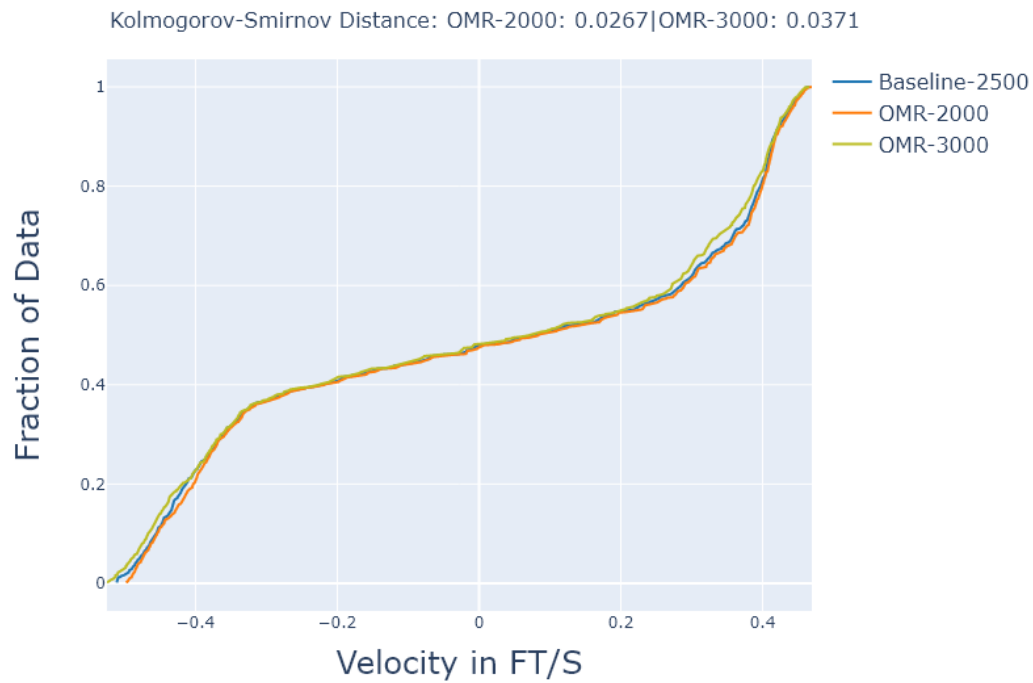


(d)

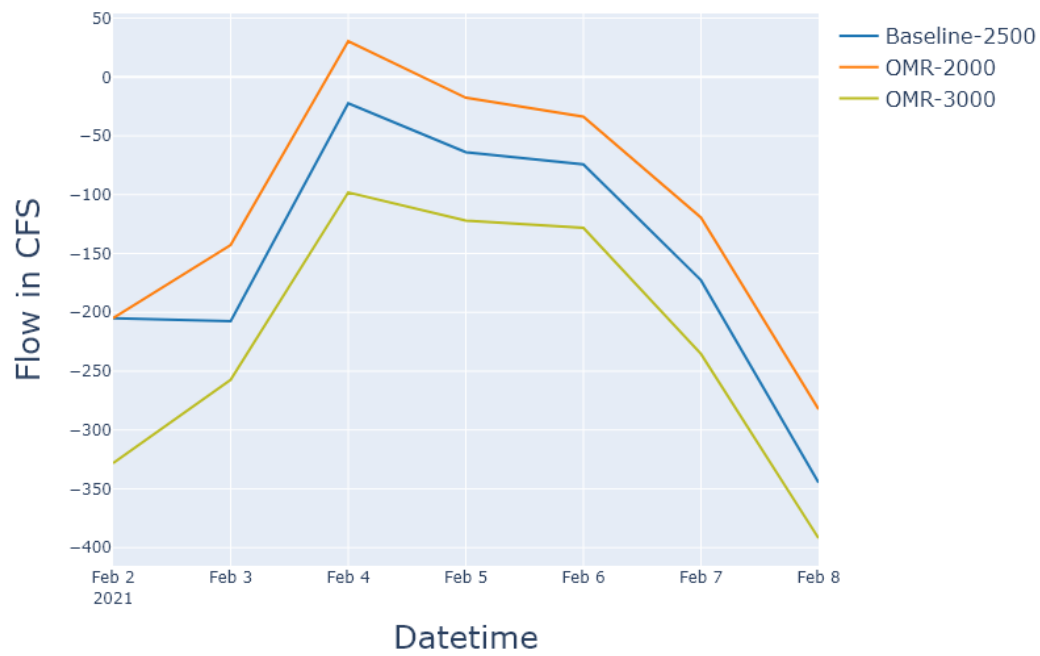
Figure A5: Lower San Joaquin River at Columbia Cut (CHAN160)



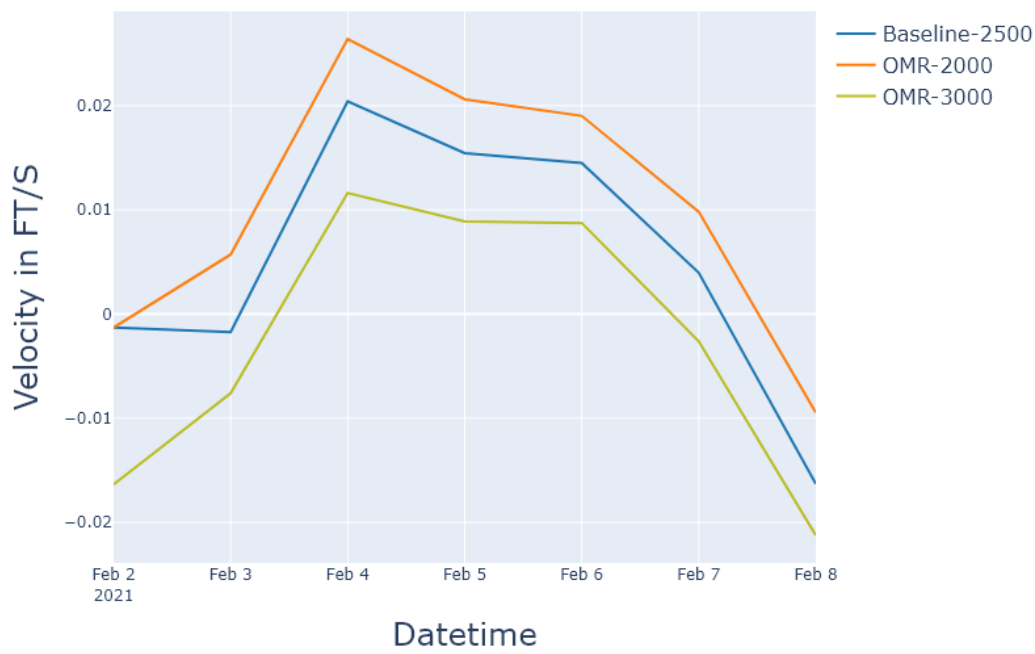
(a)



(b)

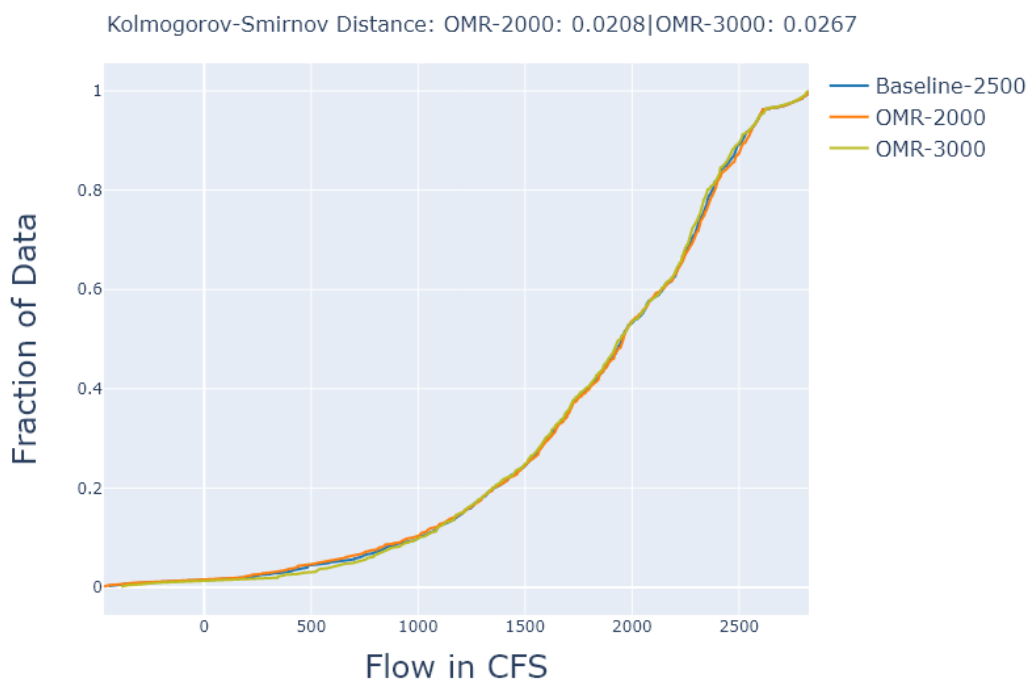


(c)

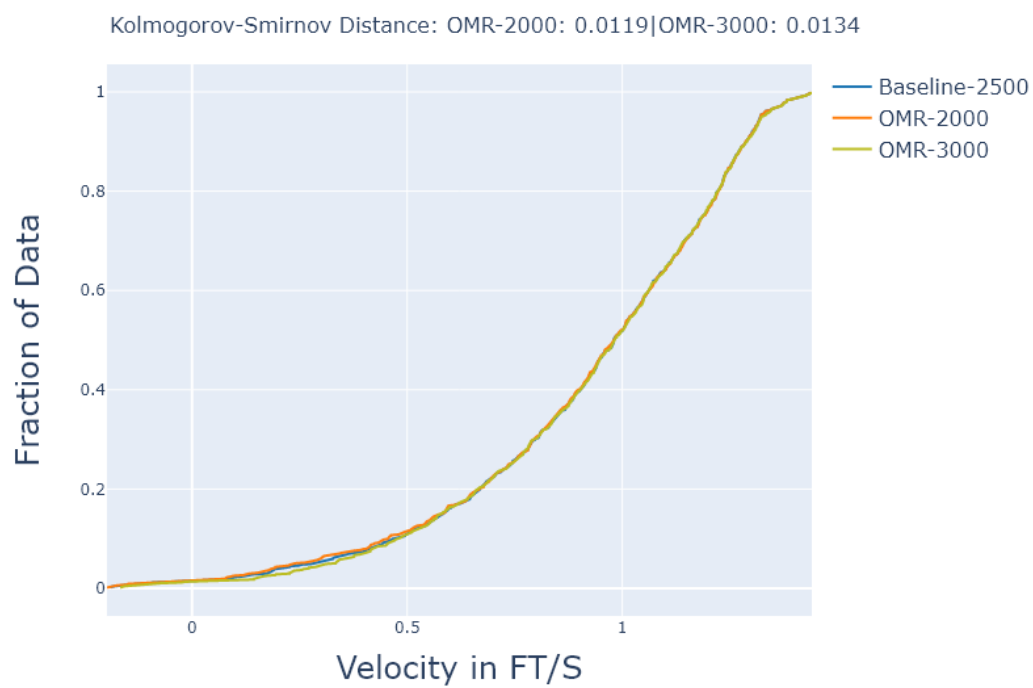


(d)

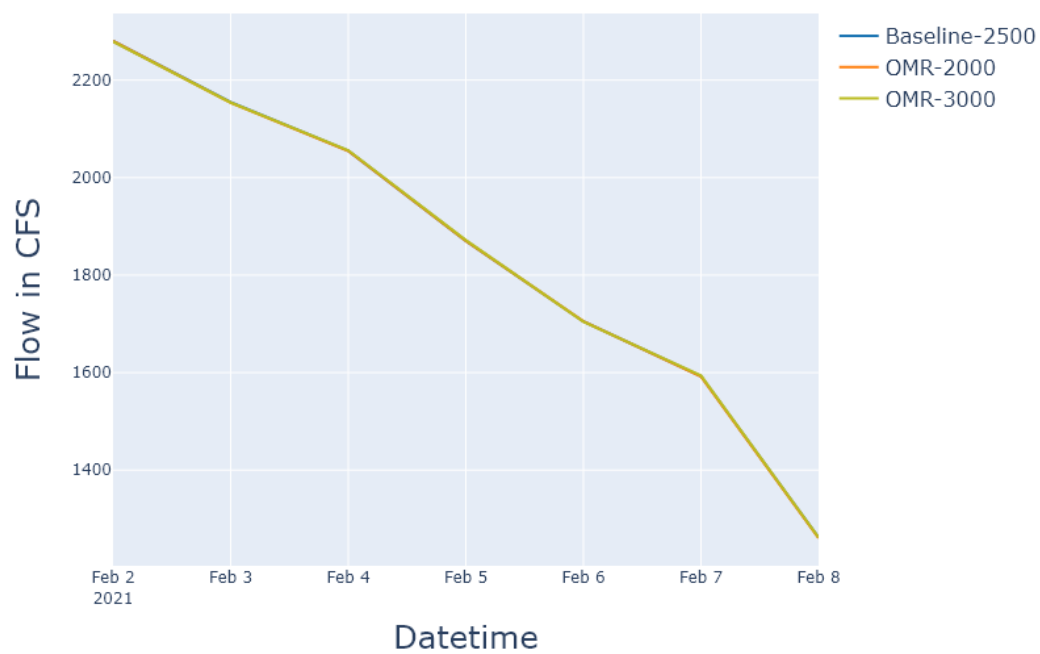
Figure A6: Slightly upstream of Head of Old River (CHAN006)



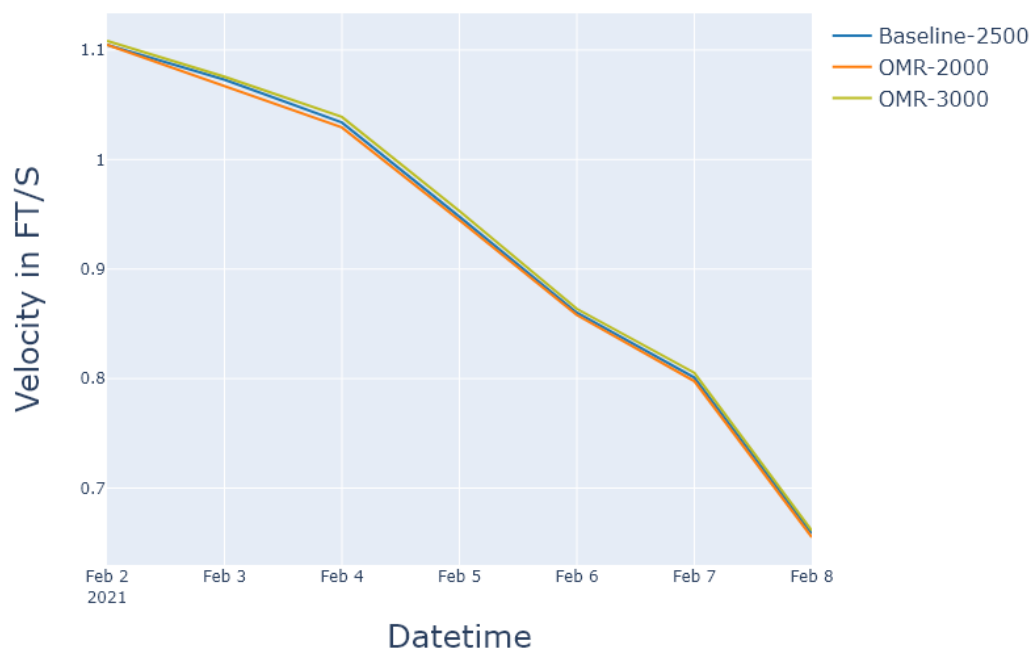
(a)



(b)

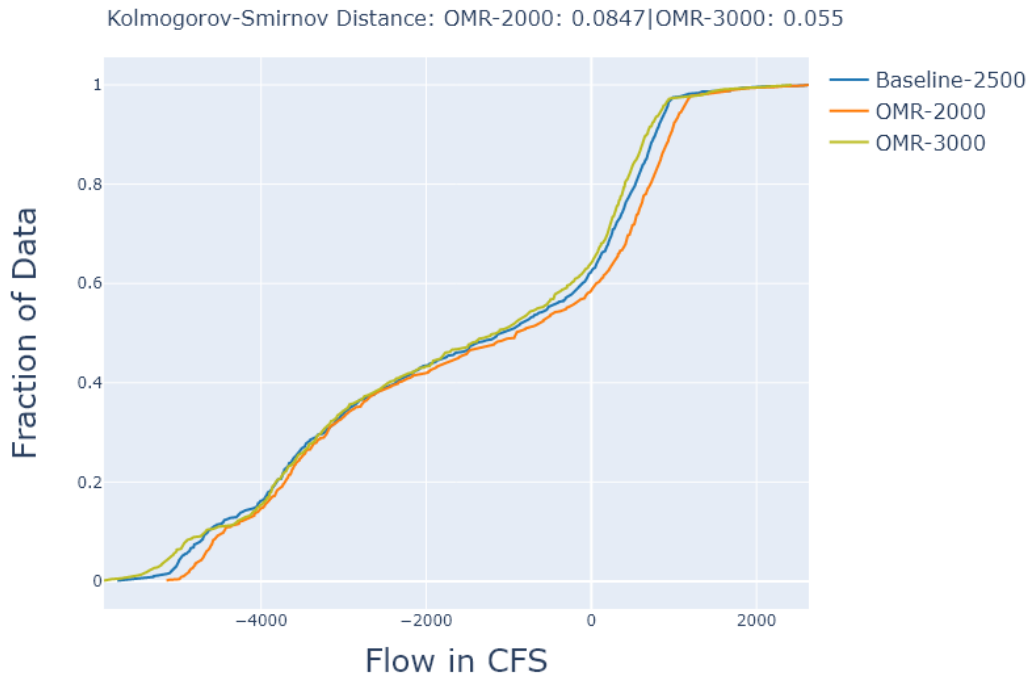


(c)

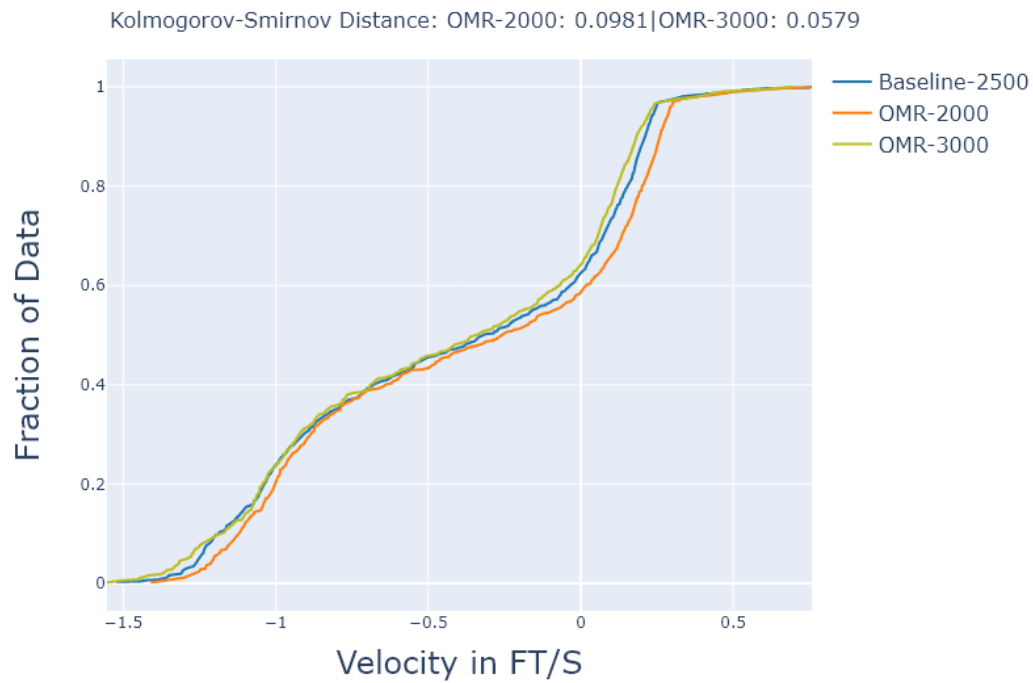


(d)

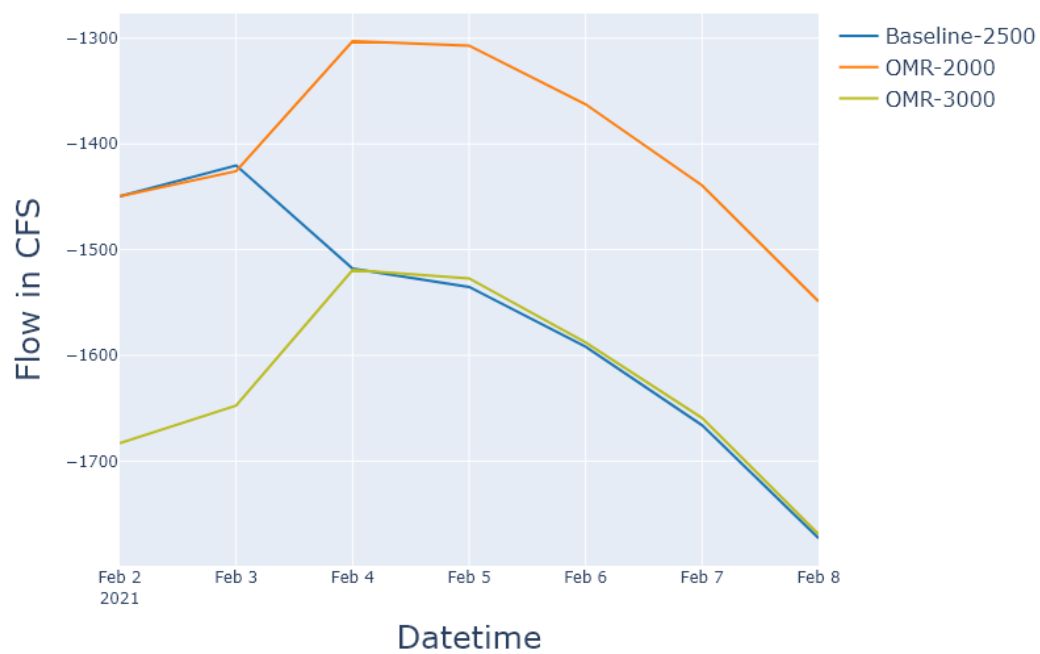
Figure A7: Old River adjacent to Grant Line Canal (CHAN081)



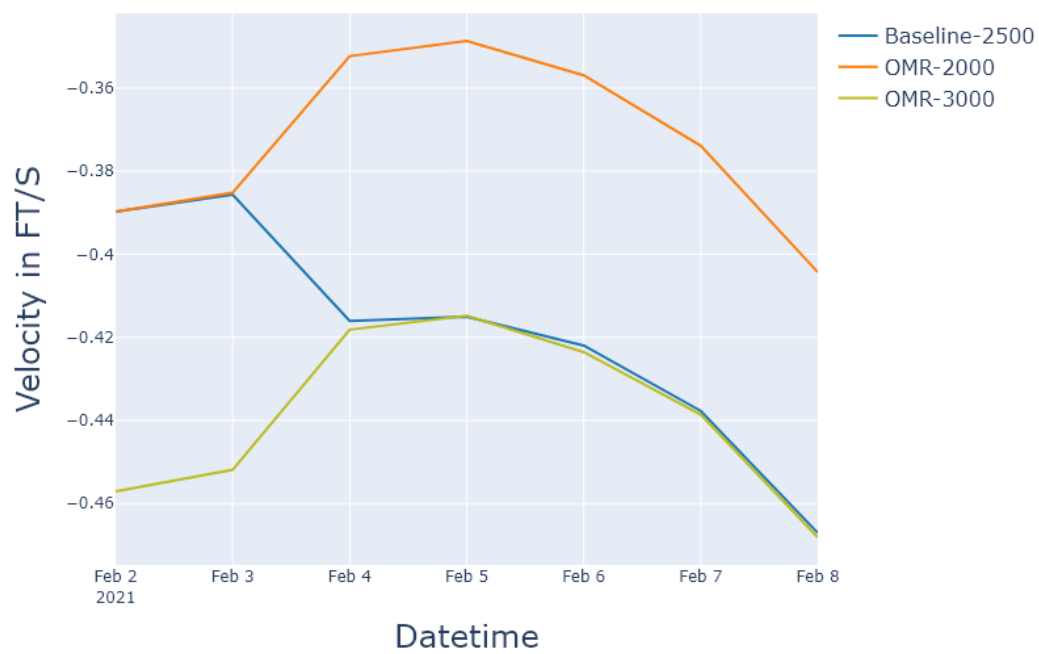
(a)



(b)

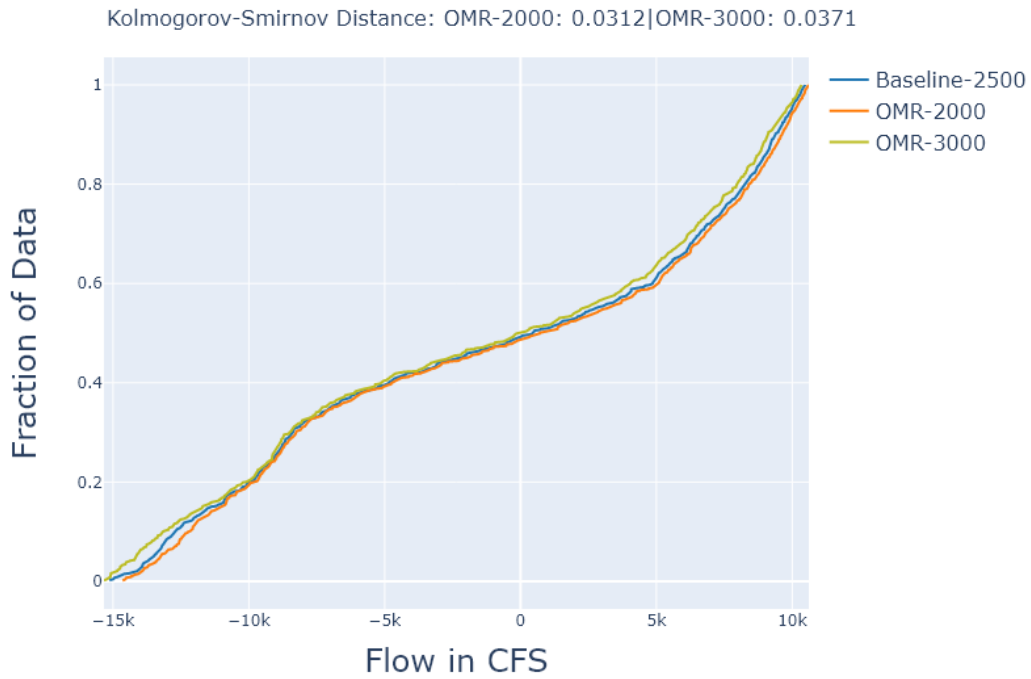


(c)

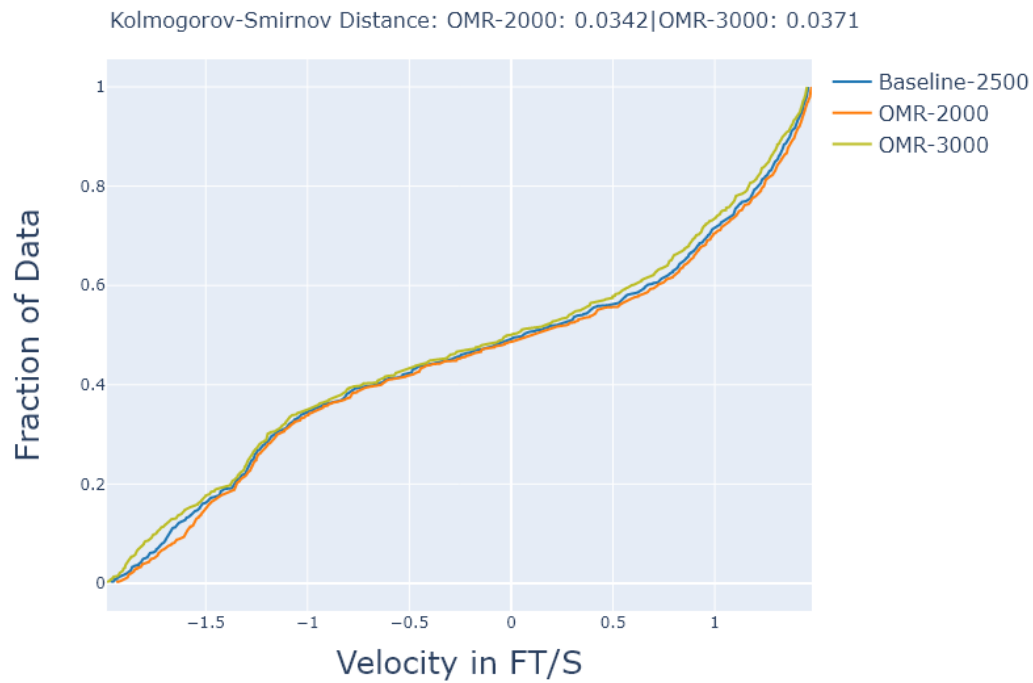


(d)

Figure A8: South Delta along Old River (CHAN094)



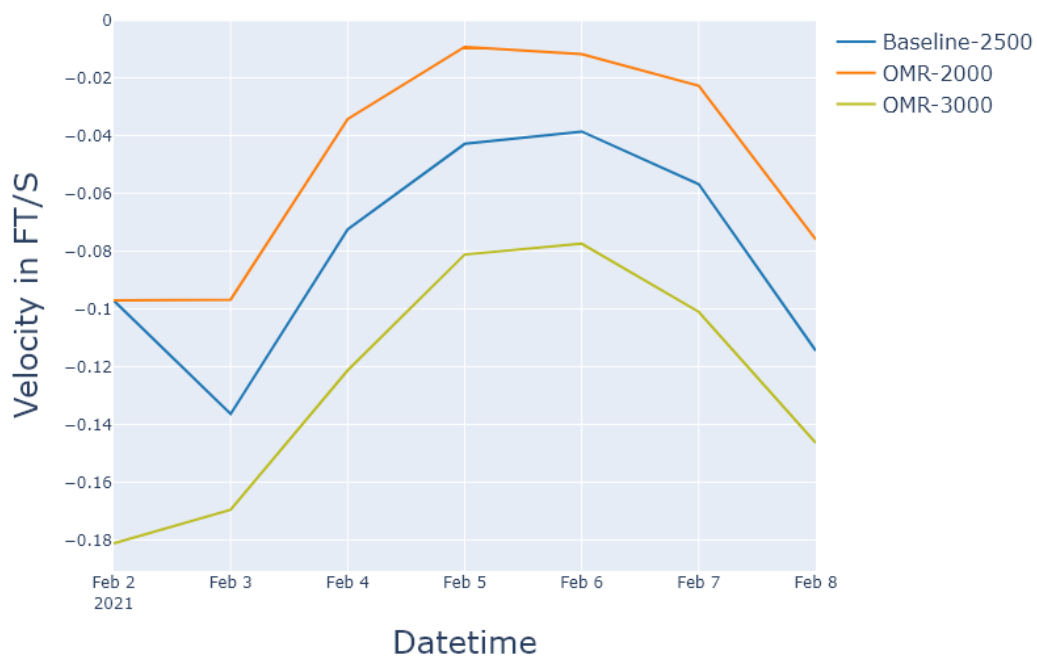
(a)



(b)

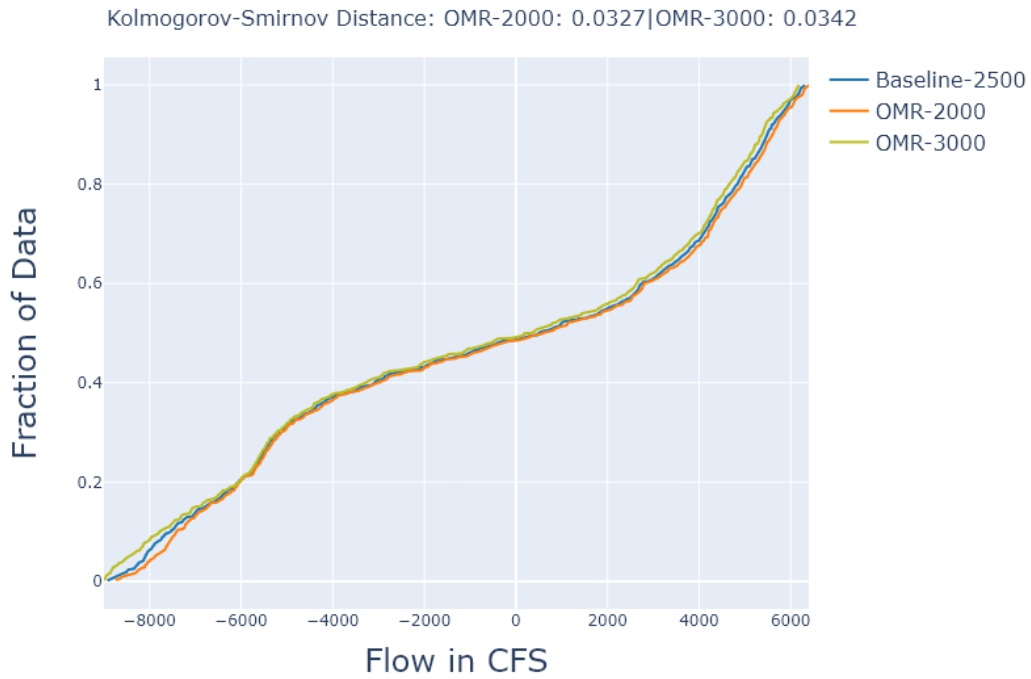


(c)

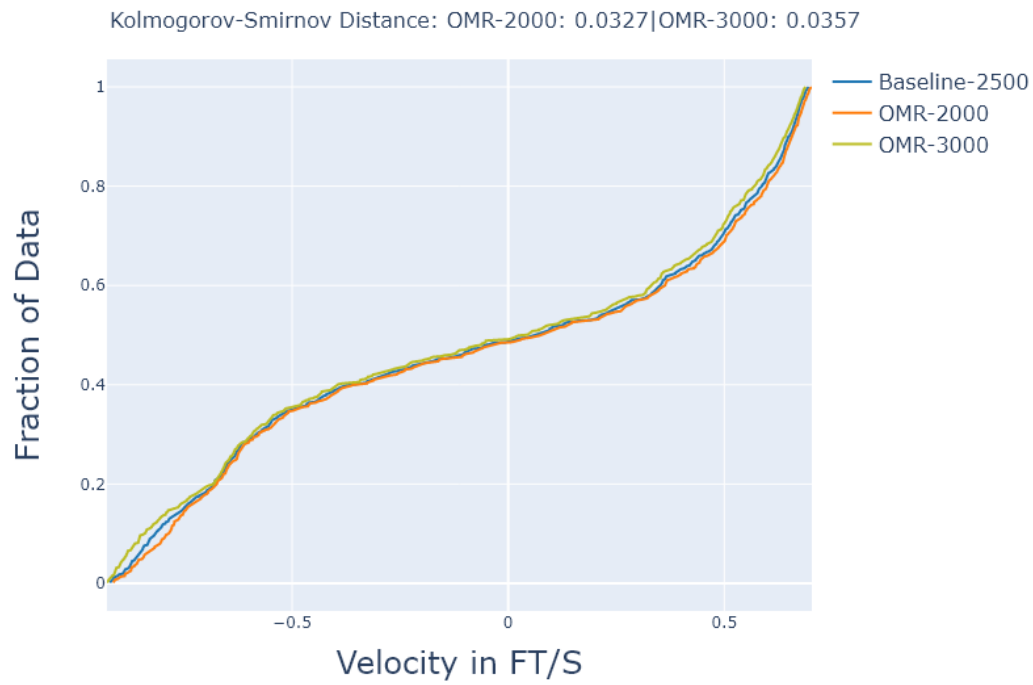


(d)

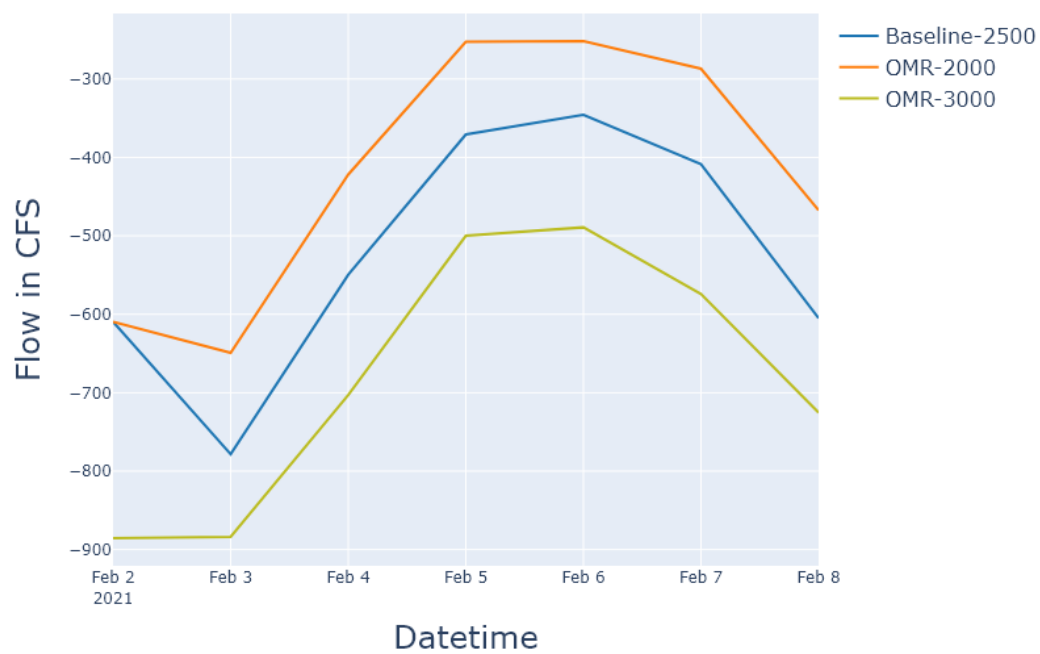
Figure A9: South Delta along Middle River (CHAN148)



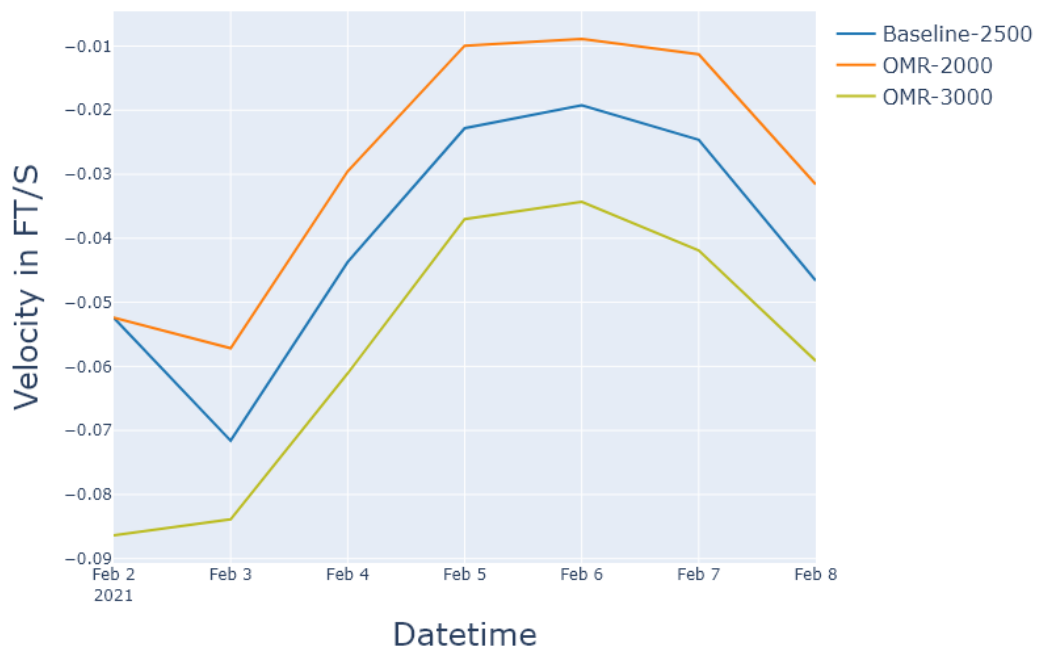
(a)



(b)

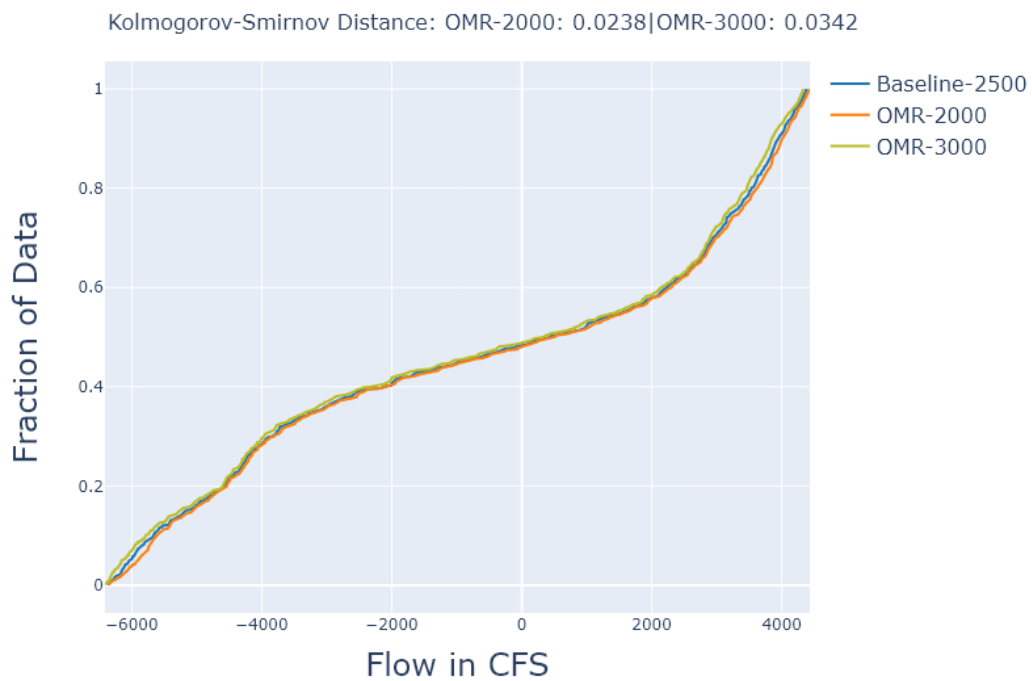


(c)

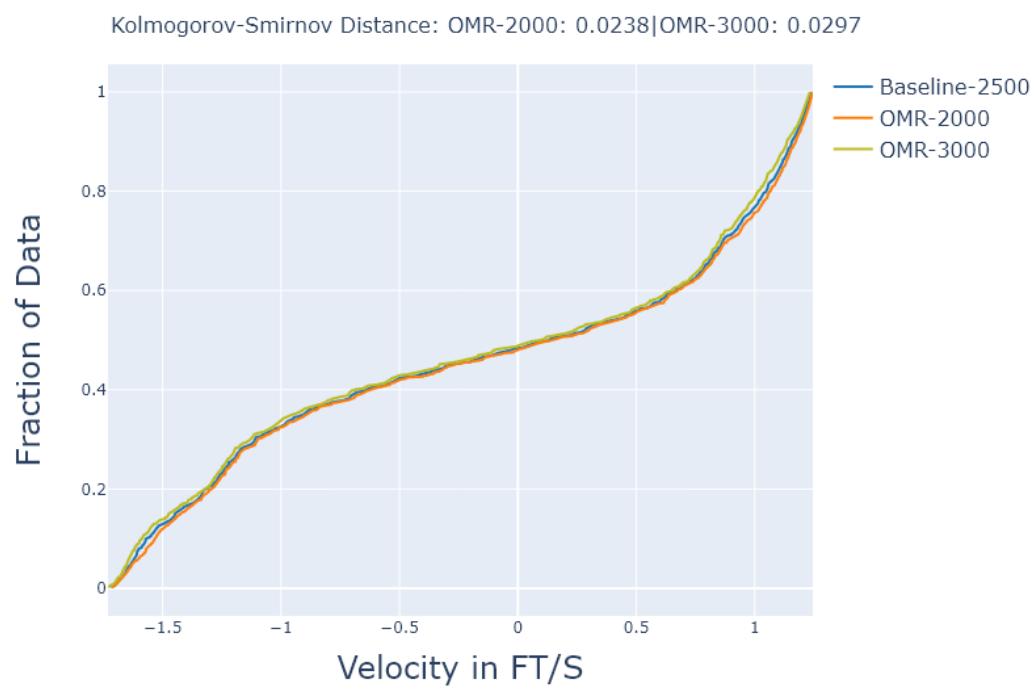


(d)

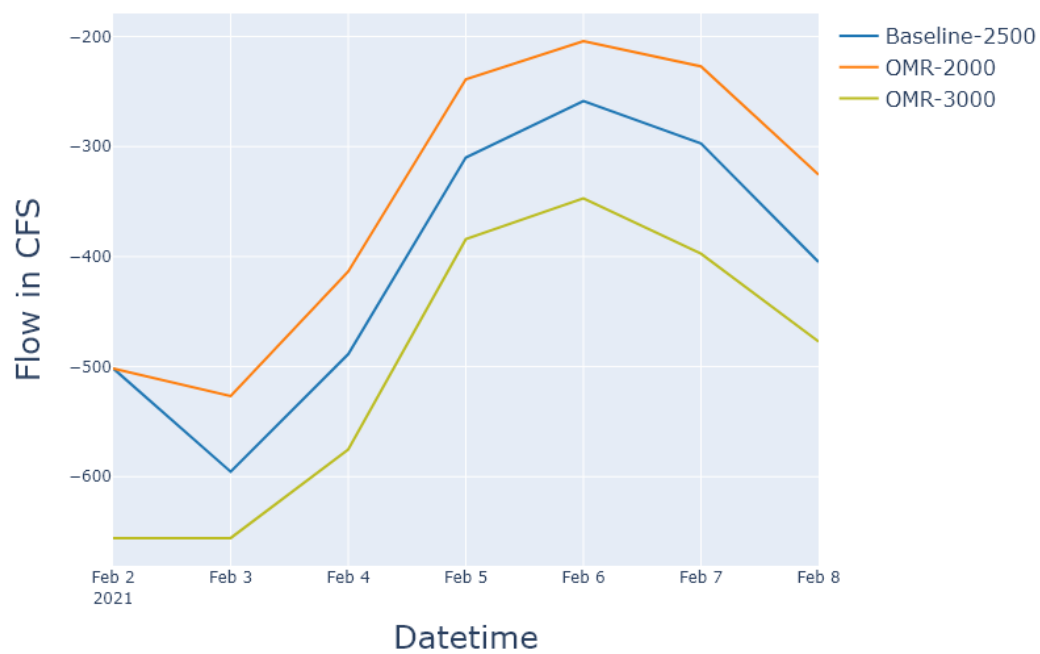
Figure A10: South Delta along Middle River (CHAN107)



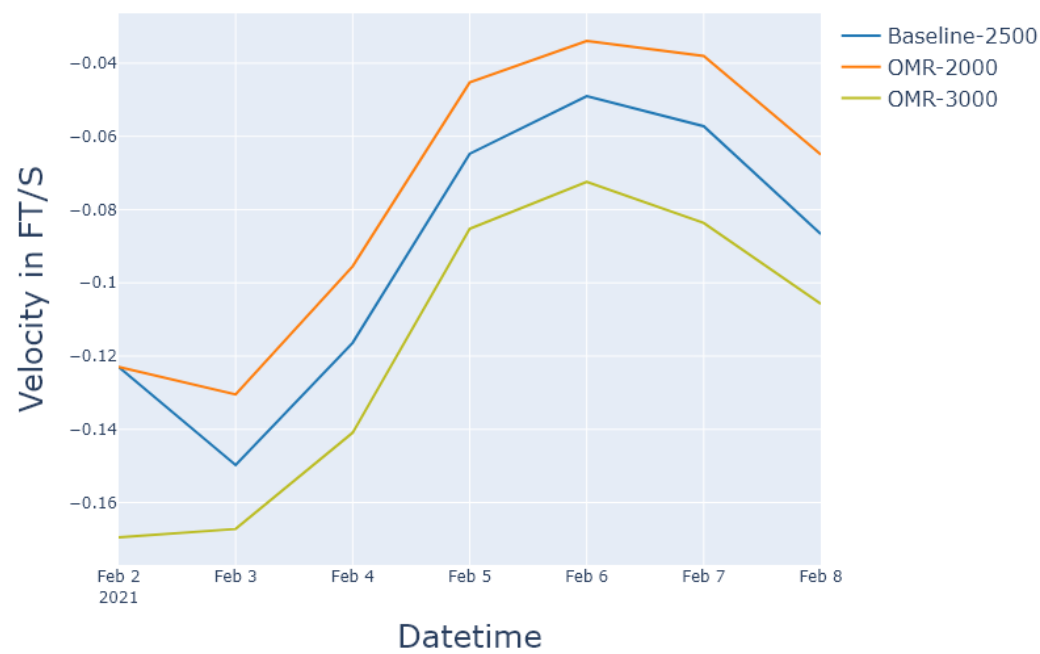
(a)



(b)



(c)



(d)

DSM2 model interpretation entrainment in Delta strata regions

North Delta into Interior and Central Delta

Channels: 49 and 434

It is unlikely that listed salmonids will experience changes to rearing, foraging, sheltering or migrating related to modeled OMR conditions this week (Channels 49 and 434).

San Joaquin River and Central Delta into South Delta

Channels: 6, 21, 107, 124, and 160

Listed salmonids are present, but recent surveys suggest low densities. Changes in velocity related to modeled OMR conditions this week may be undetectable by fish that are rearing or foraging but may increase transit rates for those that are present and migrating in the area (Channels 6, 21, 107, 124, and 160).

South Delta into facilities

Channels: 81, 94, and 148

Modeled hydrodynamic effects related to modeled OMR conditions this week suggest no changes to migrating salmonid transit times (Channels 81, 94, and 148). For example, transit times would be delayed for salmonids coming from the north; whereas, transit times would be faster for salmonids moving from the head of Old River to the export facilities.

DSM2 channel locations information

Figure A11. Highlighted DSM2 channels by Delta Strata.

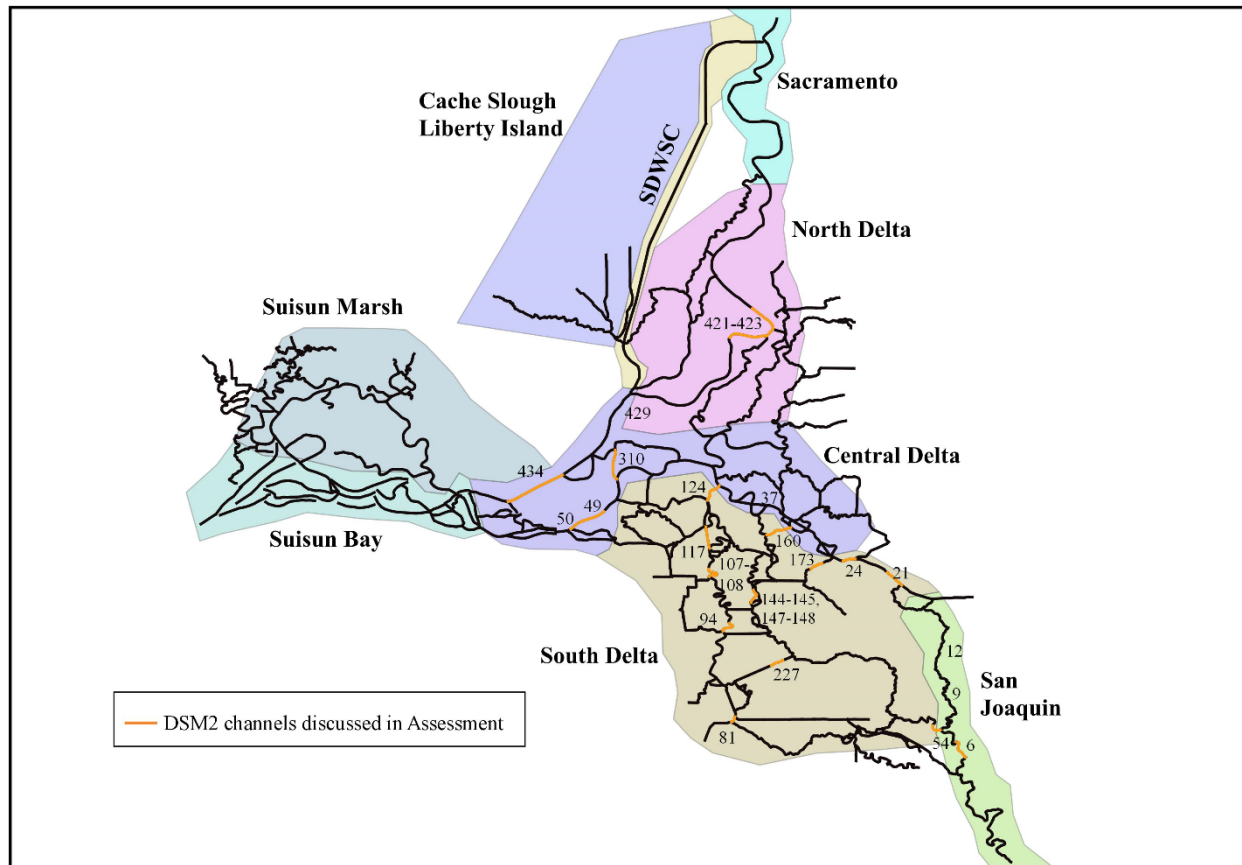


Table 3. Description of channel location, by Delta Strata region. Not all listed channels have model results presented in every weekly Proposed Action Assessment.

DSM2 Channel	Description
North Delta into Interior and Central Delta	
CHAN049	San Joaquin River at Sherman Island
CHAN310	Three-Mile Slough
CHAN421	Sacramento River at Delta Cross Channel
CHAN422	Sacramento River at Delta Cross Channel
CHAN423	Sacramento River at Delta Cross Channel
CHAN434	Sacramento River at Sherman Island
San Joaquin River and Central Delta into South Delta	
CHAN006	San Joaquin River at Head of Old River (HOR)
CHAN021	San Joaquin River downstream from confluence with Calaveras River
CHAN024	San Joaquin River upstream of Turner Cut
CHAN054	Old River at confluence with San Joaquin River (HOR)
CHAN107	Old River north of Rock Slough
CHAN117	Old River south of Franks Tract
CHAN124	Old River between Franks Tract and San Joaquin River
CHAN160	Columbia Cut
CHAN173	Turner Cut
South Delta into Facilities	
CHAN148	Middle River
CHAN227	Victoria Canal
CHAN081	Grant Line Canal
CHAN094	Old River

2/9/2021 Meeting

Background

<i>Process</i>	
Weekly process	<ul style="list-style-type: none"> • DSM2 model runs use a historic and forecasted hydrological input dataset with no assumptions provided by DWR Thursdays and updated by Reclamation Mondays. • Input File updated Monday after initial distribution from DWR for removal of forecasted in lieu of historic input. • Reclamation provides scenarios based on expected OMR index values for the upcoming week. • DSM2 model runs produced Monday and distributed to SaMT members.
<i>Hydraulic footprint information</i>	
Baseline and Scenarios updated	2/8/2021
DSM2 modeling results range	2/9/2021 to 2/15/2021
<i>OMR index value scenarios</i>	
Baseline	-3,500 cfs
Scenario 1	-3,000 cfs (decreasing from Baseline; Δ 500 cfs)
Scenario 2	-5,000 cfs (increasing from Baseline; Δ 1,500 cfs)
<i>Changes between scenarios</i>	
Hydrology	Yes (see special considerations below)
Delta Exports	Yes
<i>Common assumptions</i>	
DSM2 run results based on the following assumptions	<ul style="list-style-type: none"> • CCFB Gates are operating to Priority 2 throughout the forecast period. • The Delta Cross Channel gates are closed throughout the forecast period. • Suisun Marsh salinity control flashboards are in, and 2 of the Suisun Marsh Salinity Control gates are in tidal operation and 1 gate is closed for maintenance. • San Joaquin River flow at Vernalis is at 1,325 cfs at the beginning of the forecast period and is estimated to increase to 1,400 cfs by the end of the forecast period in both wet and dry hydrology. (Figure A1) • Sacramento River flow at Freeport is at 10,500 cfs at the beginning of the forecast period and is expected to stay around 10,500 cfs in dry hydrology scenario and increase to 13,100 cfs in wet hydrology scenario by the end of the forecast period. (Figure A1)
<i>Additional information</i>	
Considerations for current DSM2 model run	This week's DSM2 model runs have two hydrology conditions. As such, distribution between model runs (Baseline vs. Scenario 1 and Baseline vs. Scenario 2) cannot be compared. Scenario 2 (-5,000 cfs) assumes a wetter hydrology while Scenario 1 (-3,000 cfs) and Baseline (-3,500 cfs) assume the same drier hydrology.
Caveats	<ul style="list-style-type: none"> • Time-step: DSM2 generates results at 15-minute time-steps. Visualizations of DSM2 model run results are aggregated over daily time-steps. Operations function on a more granular scale than daily time-step. • Salmonid behavior: DSM2 provides flow fields which salmonids may encounter but salmonids are not neutrally buoyant particles. Models which incorporate behavior from acoustic tagged salmonids are being developed for South Delta (ePTM, ecoPTM).

DSM2 model results: summary tables

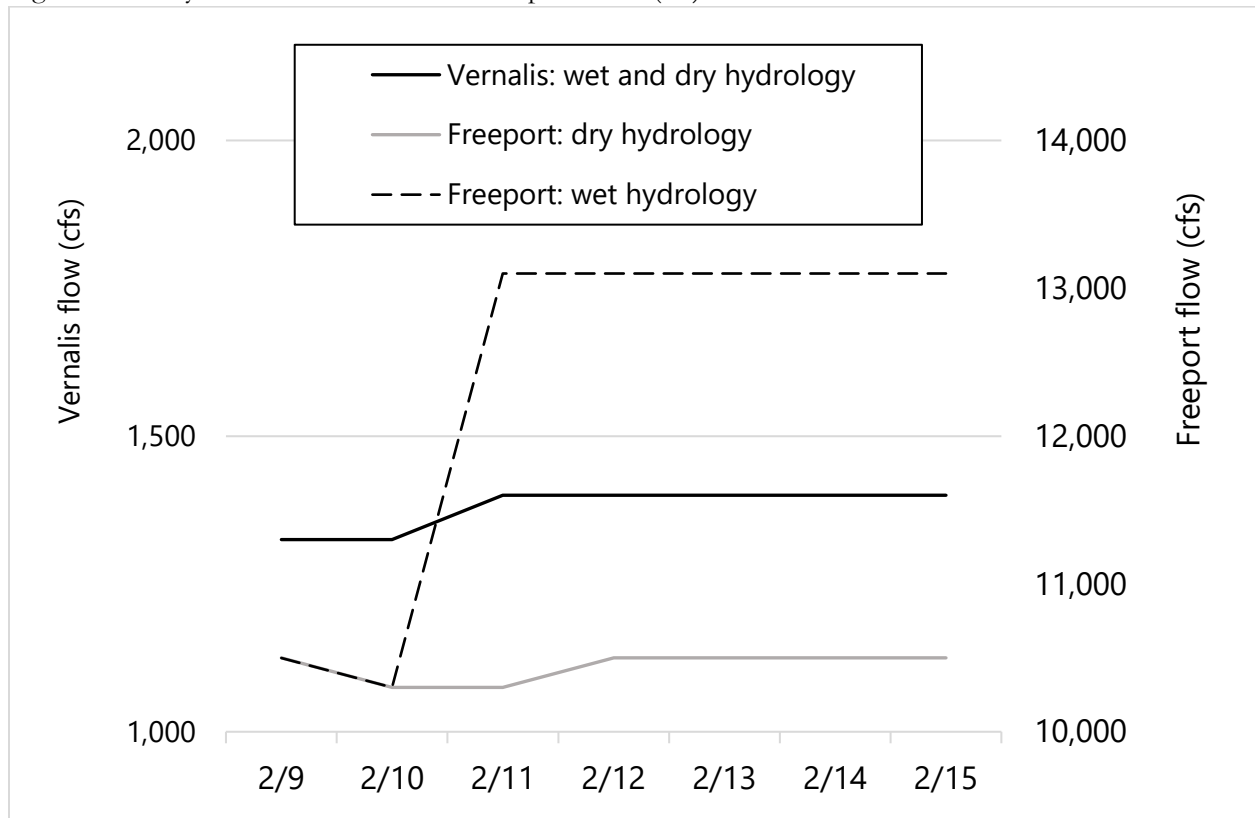
Table A1. Summary of minimum, maximum, mean, and percent positive flows (cfs) and velocities (ft/s) by DSM2 channel for OMR scenarios over a 6-day time period. For Baseline, Scenario 1, and Scenario 2 values refer to “Hydraulic Footprint Information” in the conditions / assumptions section above.

Scenario (cfs)	DSM2 Channel	Flow Min.	Flow Max.	Flow Mean	Flow % Positive	Velocity Min.	Velocity Max.	Velocity Mean	Velocity % Positive
Baseline	6	122	2160	1453	100	0.05	1.21	0.76	100
Scenario 1	6	27	2172	1451	100	0.01	1.21	0.76	100
Scenario 2	6	27	2174	1455	100	0.01	1.21	0.77	100
Baseline	21	-7504	7082	459	54	-0.50	0.47	0.04	54
Scenario 1	21	-7504	7123	484	54	-0.50	0.48	0.04	54
Scenario 2	21	-7532	7123	445	54	-0.50	0.48	0.04	54
Baseline	49	-159821	144842	871	53	-1.97	1.92	0.04	53
Scenario 1	49	-159775	145389	1222	53	-1.97	1.92	0.05	53
Scenario 2	49	-159714	145389	688	52	-1.97	1.92	0.04	52
Baseline	81	-6116	2333	-1743	32	-1.57	0.68	-0.47	32
Scenario 1	81	-5110	2250	-1748	34	-1.40	0.65	-0.47	34
Scenario 2	81	-5608	2475	-1734	32	-1.51	0.72	-0.47	32
Baseline	94	-15506	10284	-1776	47	-1.96	1.47	-0.21	47
Scenario 1	94	-13920	10369	-1526	48	-1.82	1.47	-0.18	48
Scenario 2	94	-15071	10369	-2142	47	-1.96	1.47	-0.27	47
Baseline	107	-6455	4313	-705	49	-1.70	1.24	-0.18	49
Scenario 1	107	-6371	4347	-634	49	-1.69	1.25	-0.16	49
Scenario 2	107	-6388	4347	-792	49	-1.71	1.25	-0.20	49
Baseline	124	-19233	12499	-3171	43	-0.61	0.42	-0.09	43
Scenario 1	124	-19211	12564	-3049	43	-0.61	0.42	-0.09	43
Scenario 2	124	-19305	12564	-3373	43	-0.61	0.42	-0.10	43
Baseline	148	-9127	6062	-986	47	-0.93	0.69	-0.09	47
Scenario 1	148	-8612	6168	-868	48	-0.90	0.69	-0.08	48

Scenario (cfs)	DSM2 Channel	Flow Min.	Flow Max.	Flow Mean	Flow % Positive	Velocity Min.	Velocity Max.	Velocity Mean	Velocity % Positive
Scenario 2	148	-8891	6168	-1145	47	-0.93	0.69	-0.11	47
Baseline	160	-5456	3629	-389	51	-0.55	0.48	-0.02	51
Scenario 1	160	-4980	3643	-342	51	-0.51	0.48	-0.02	51
Scenario 2	160	-4988	3643	-478	51	-0.52	0.48	-0.03	51
Baseline	434	-168282	160540	7575	54	-1.83	1.89	0.13	54
Scenario 1	434	-168278	160581	7668	54	-1.83	1.89	0.13	54
Scenario 2	434	-166735	162219	8958	54	-1.82	1.90	0.14	54

DSM2 model results: figures

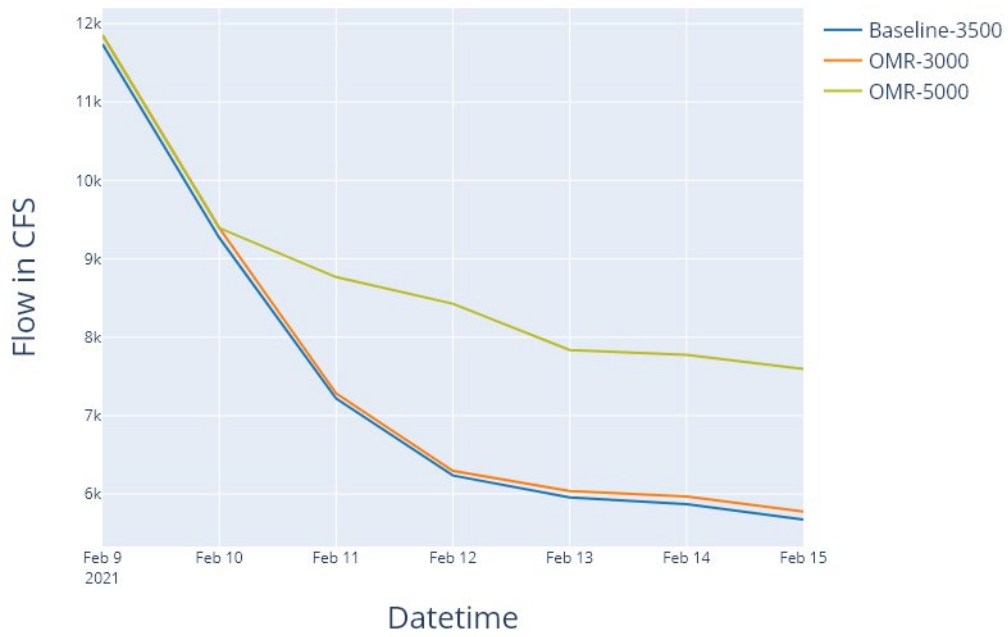
Figure A1. Daily forecasted Vernalis and Freeport flows (cfs)



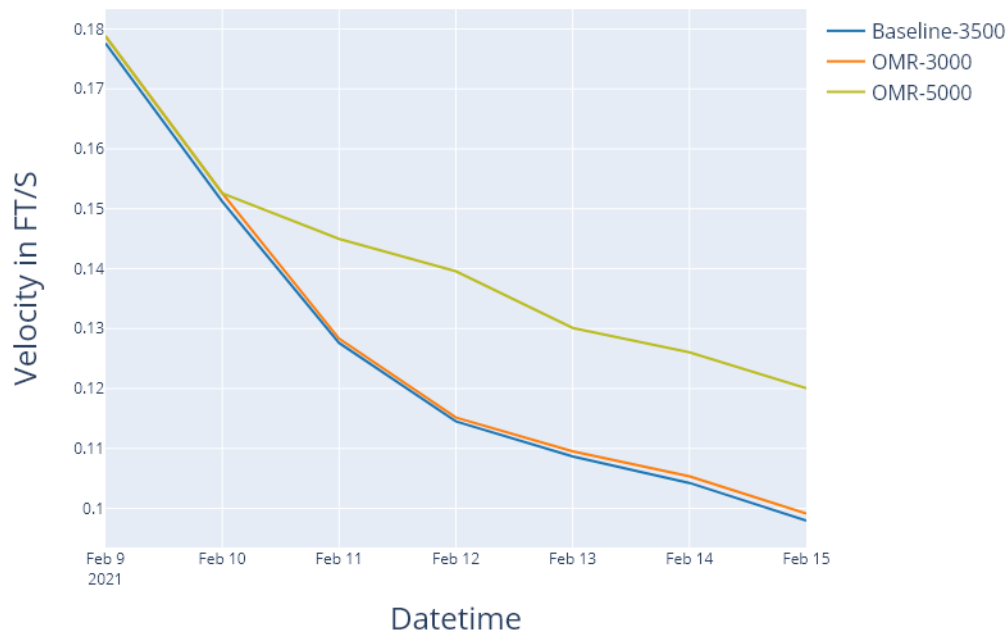
The following captions apply to the time-series plots for flow and velocity in selected locations (see Figure A11 and Table A2 for channel location information) below:

- (e) Time-series plot (1-day aggregated): Baseline, Scenario 1 OMR, and Scenario 2 OMR. X-axis represents daily time steps and y-axis represents flow (cfs) values. For Baseline, Scenario 1, and Scenario 2 values refer to “Hydraulic Footprint Information” in the section above. Reported summary statistics (minimum, maximum, etc.) are found in Table A1.
- (f) Time-series plot (1-day aggregated): Baseline, Scenario 1 OMR, and Scenario 2 OMR. X-axis represents daily time steps and y-axis represents velocity (cfs) values. For Baseline, Scenario 1, and Scenario 2 values refer to “Hydraulic Footprint Information” in the section above. Reported summary statistics (minimum, maximum, etc.) are found in Table A1.

Figure A2: Sacramento River at Sherman Island (CHAN434)



(a)

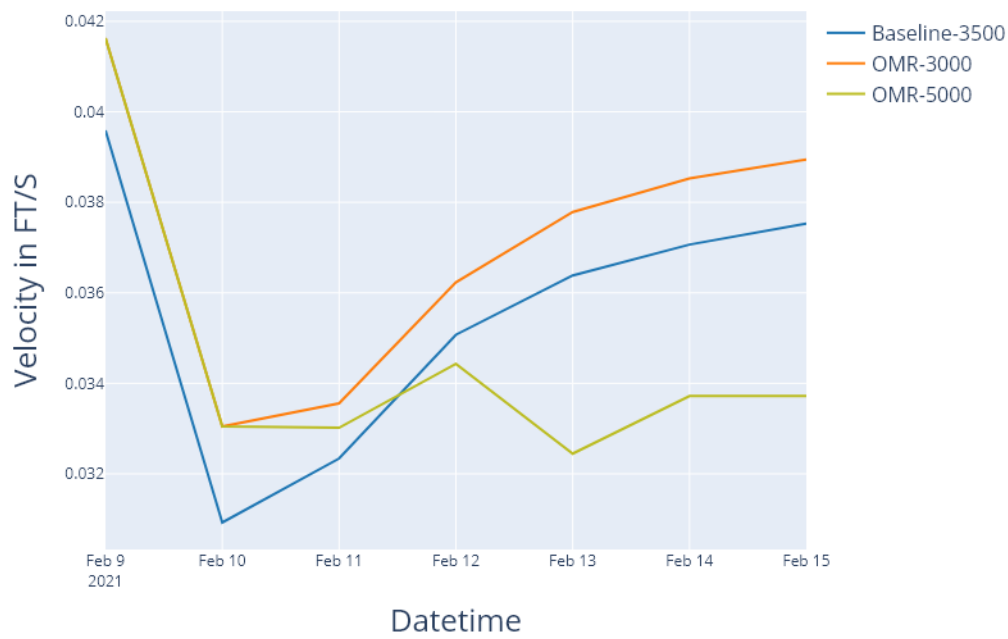


(b)

Figure A3: San Joaquin River downstream of confluence with Calaveras River (CHAN021)

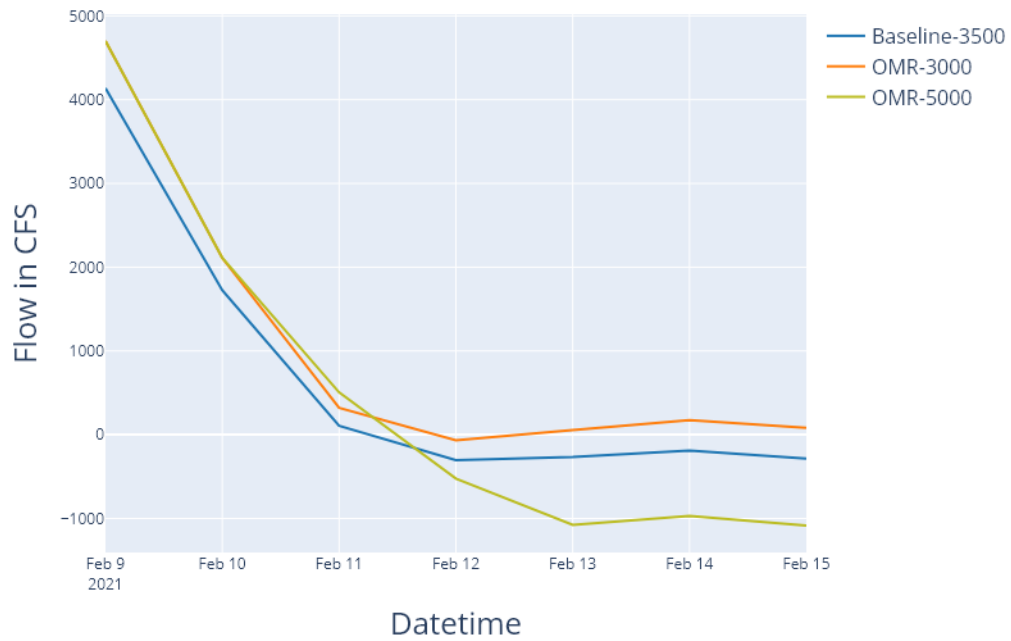


(a)

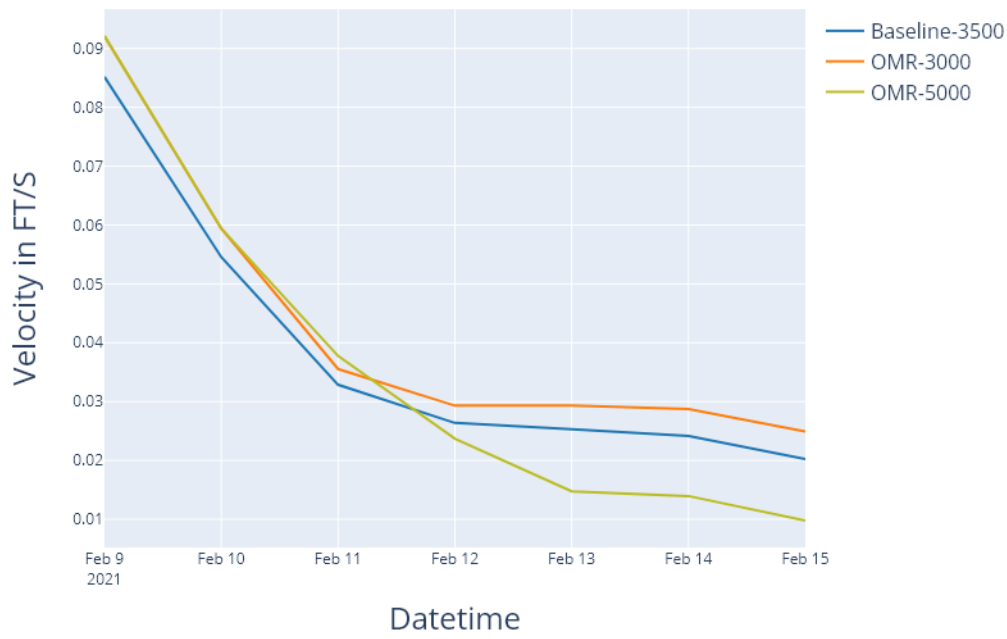


(b)

Figure A4: San Joaquin River at Sherman Island (CHAN049)

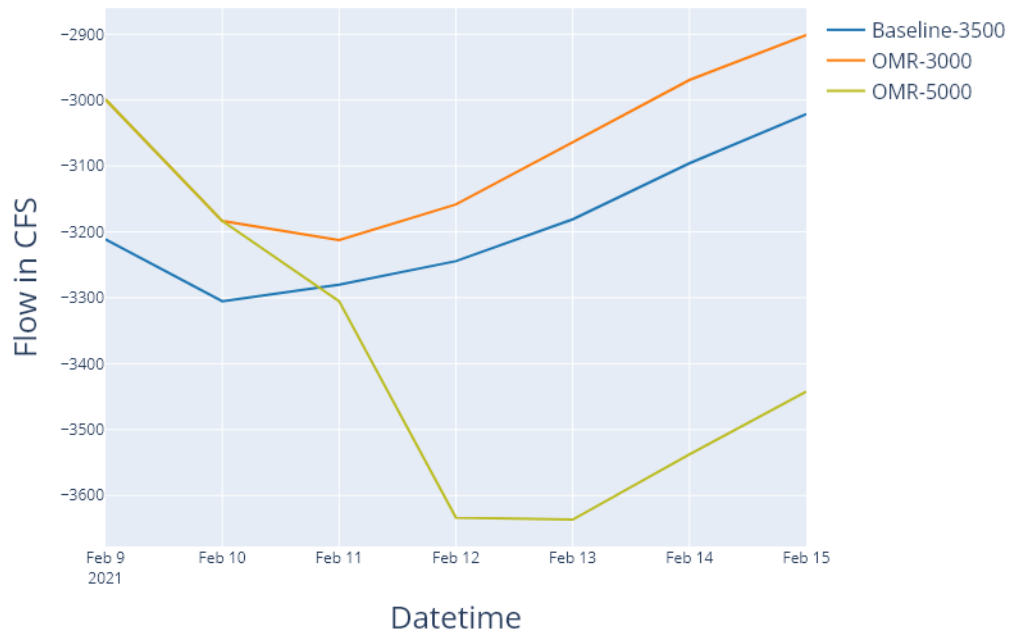


(a)

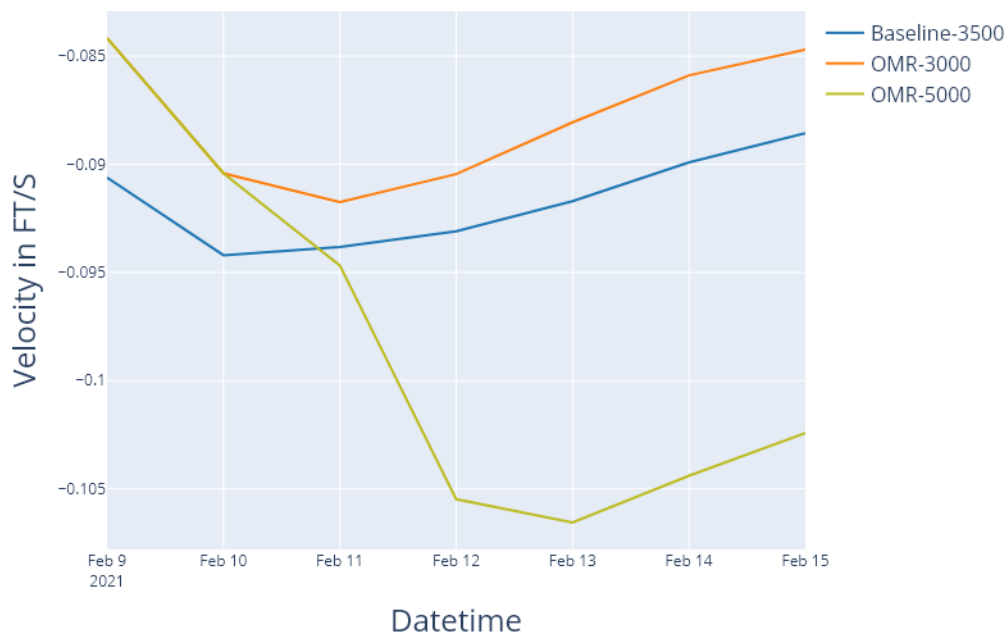


(b)

Figure A5: Old River between Franks Tract and San Joaquin River (CHAN124)



(a)



(b)

Figure A6: Lower San Joaquin River at Columbia Cut (CHAN160)

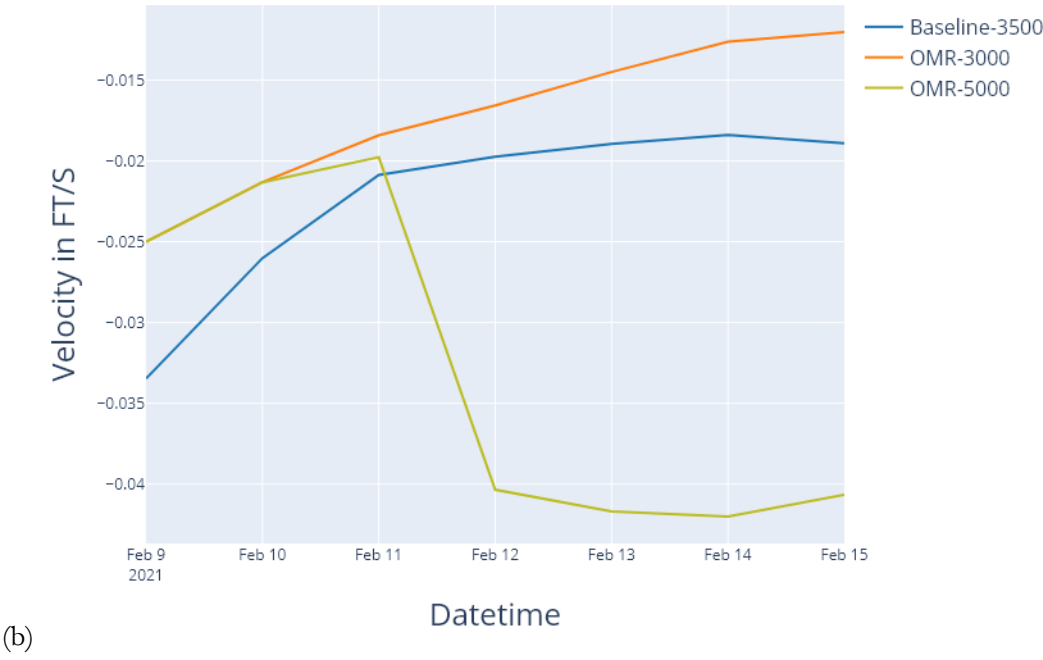
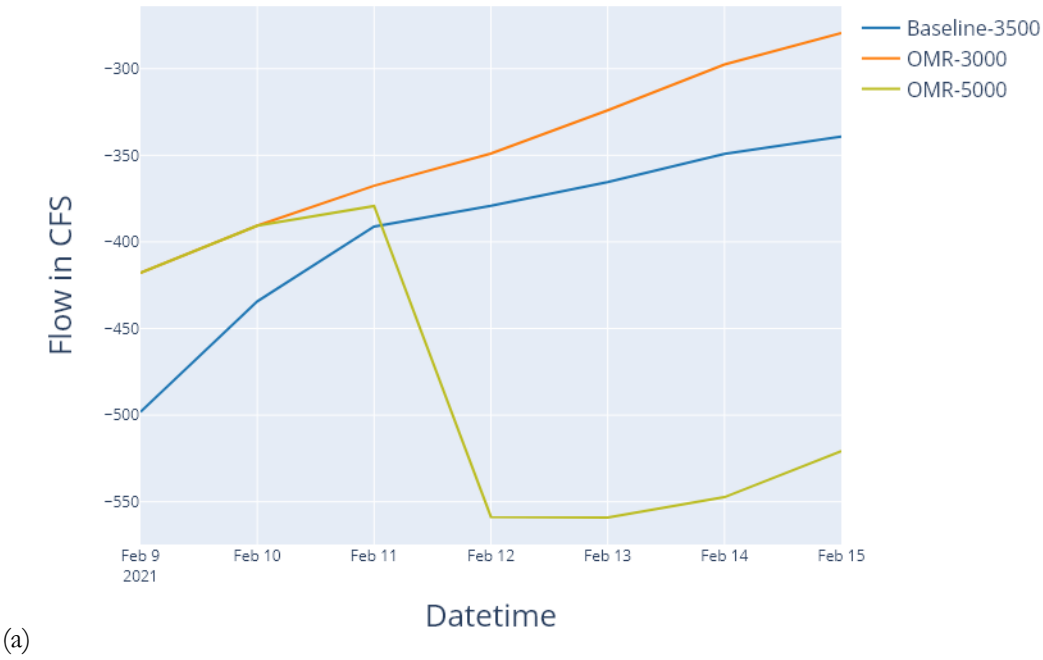
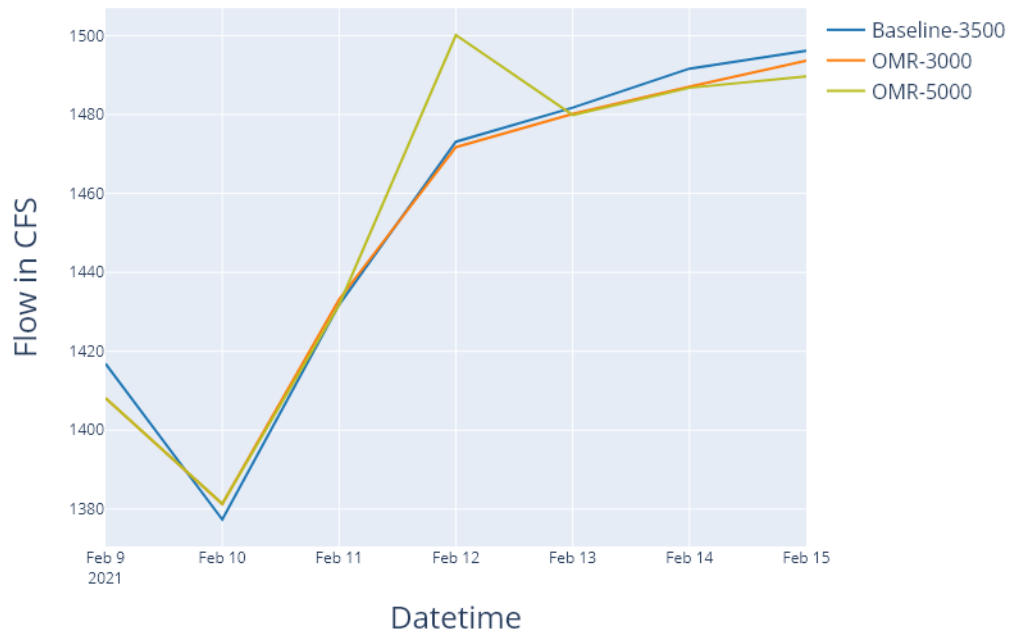
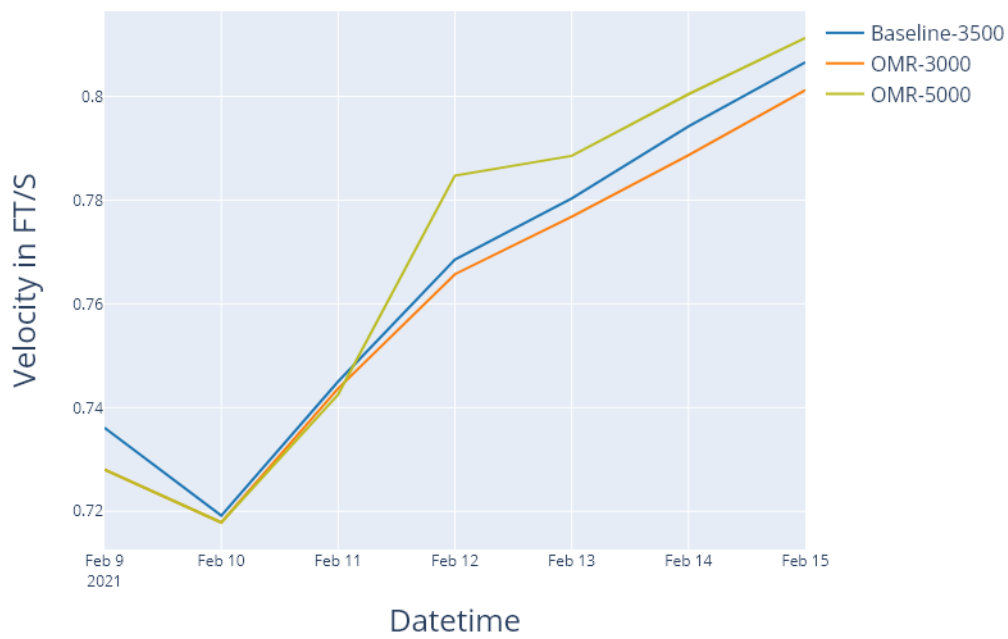


Figure A7: Slightly upstream of Head of Old River (CHAN006)

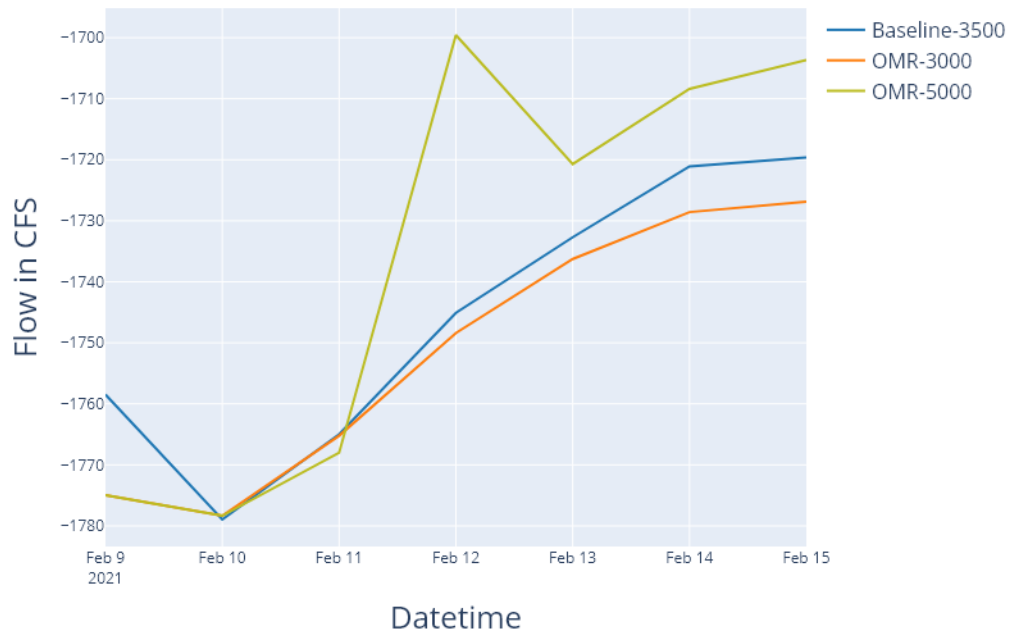


(a)

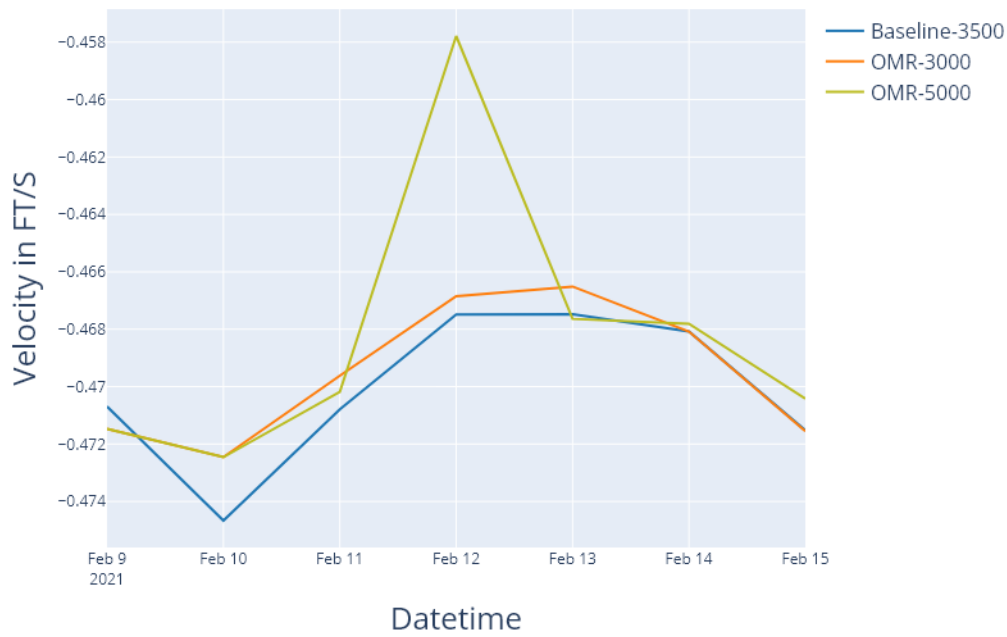


(b)

Figure A8: Old River adjacent to Grant Line Canal (CHAN081 – Old River between Grantline and CVP)

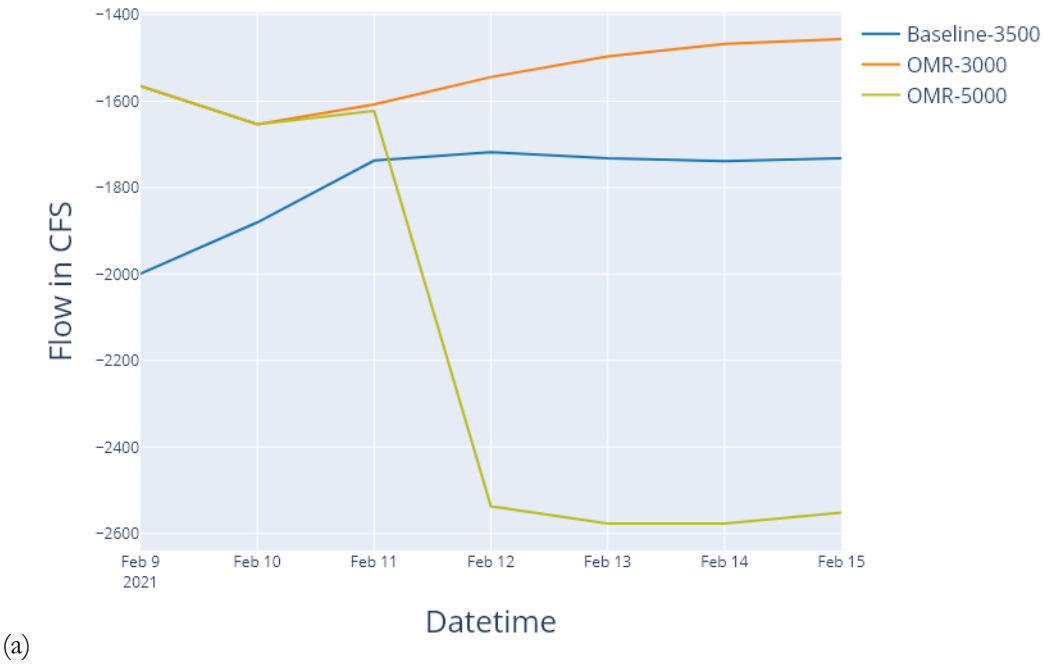


(a)

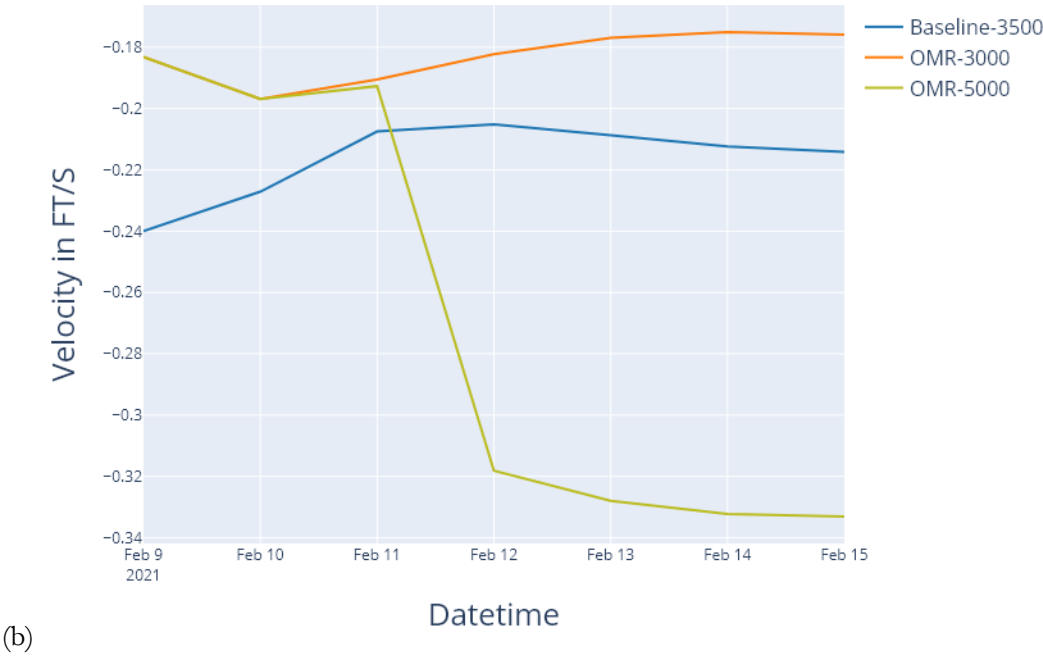


(b)

Figure A9: South Delta along Old River (CHAN094 – Old River/HW4)

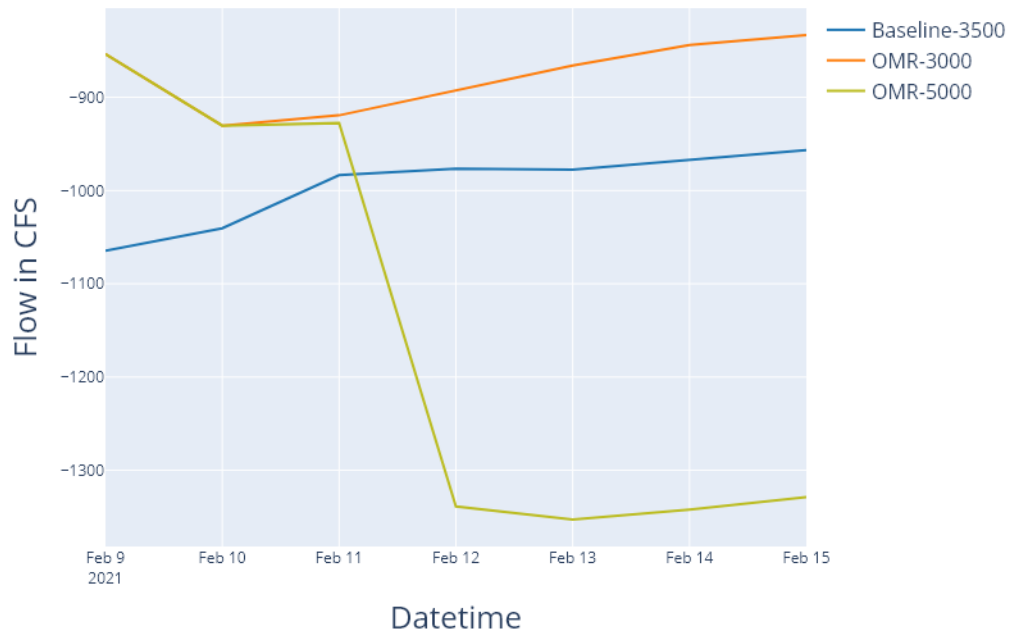


(a)

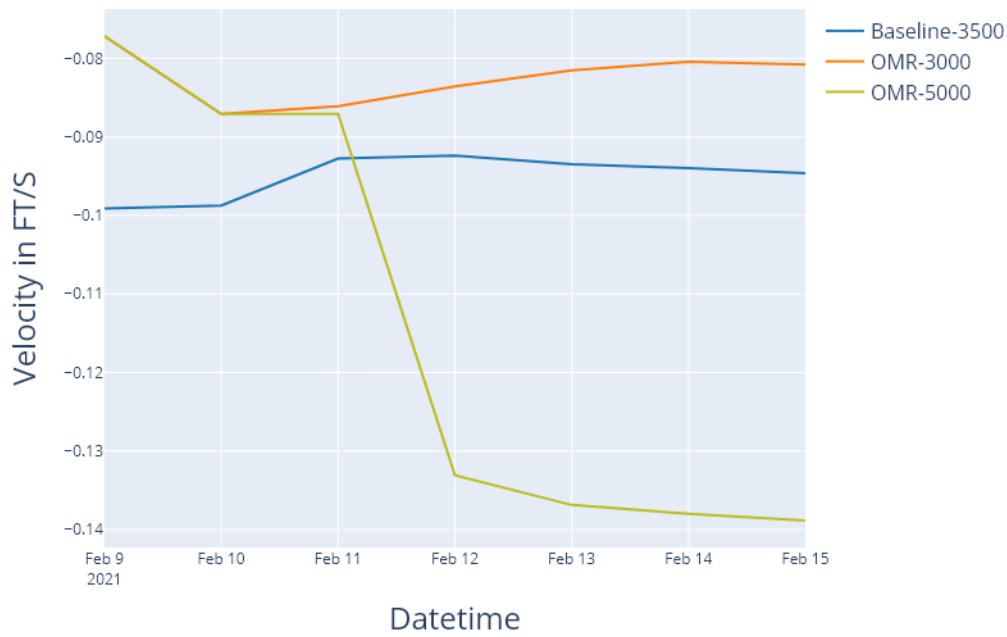


(b)

Figure A10: South Delta along Middle River (CHAN148 – Middle River/ Woodward Cut)

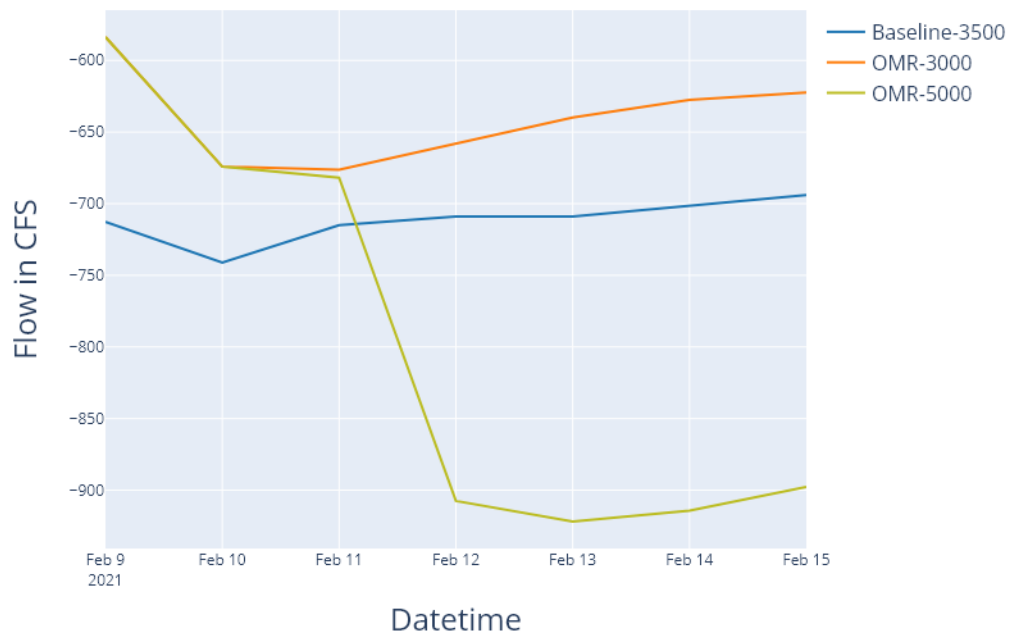


(a)

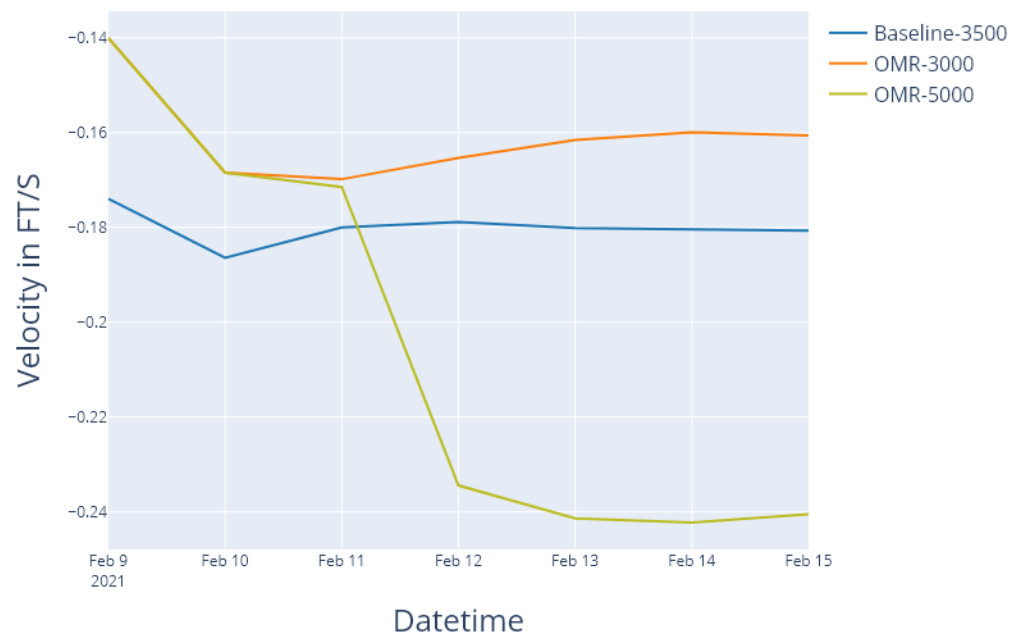


(b)

Figure A11: South Delta along Middle River (CHAN107 – Old River-Bacon Isl.)



(a)
(b)



DSM2 model interpretation entrainment in Delta strata regions

North Delta into Interior and Central Delta

Channels: 49 and 434

It is unlikely that listed salmonids will experience changes to rearing, foraging, sheltering or migrating related to modeled OMR conditions this week (Channels 49 and 434).

San Joaquin River and Central Delta into South Delta

Channels: 6, 21, 107, 124, and 160

Listed salmonids are present, but recent surveys suggest low densities. Changes in velocity related to modeled OMR conditions this week may be detectable by fish that are rearing or foraging but may increase transit rates for those that are present and migrating in the area (Channels 6, 21, 107, 124, and 160).

South Delta into facilities

Channels: 81, 94, and 148

Modeled hydrodynamic effects related to modeled OMR conditions this week suggest changes to migrating salmonid transit times (Channels 81, 94, and 148). For example, transit times would be delayed for salmonids coming from the north; whereas, transit times would be faster for salmonids moving from the head of Old River to the export facilities. However transit times for fish not entrained into the facilities would be prolonged for fish moving through the Old /Middle river corridors from the south.

DSM2 channel locations information

Figure A12. Highlighted DSM2 channels by Delta Strata.

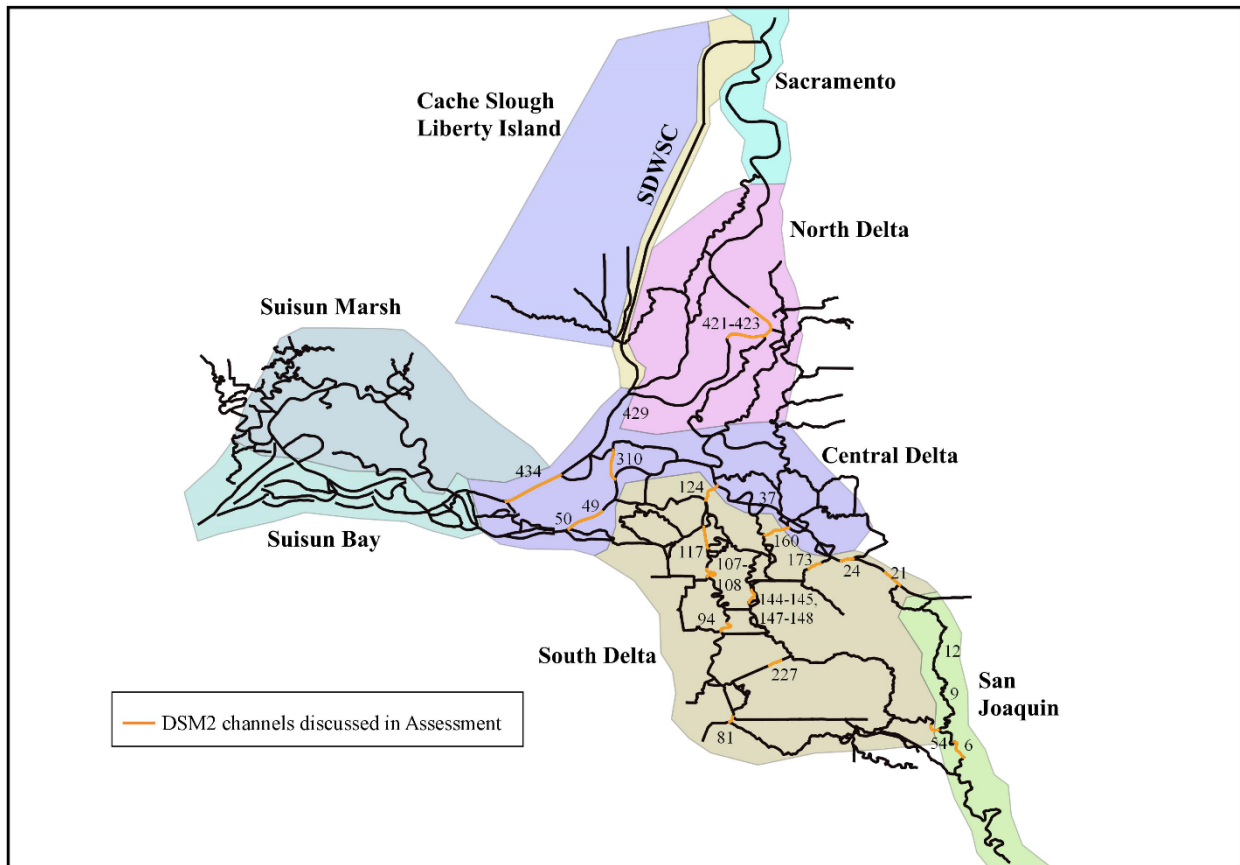


Table A2. Description of channel location, by Delta Strata region. Not all listed channels have model results presented in every weekly Proposed Action Assessment.

DSM2 Channel	Description
North Delta into Interior and Central Delta	
CHAN049	San Joaquin River at Sherman Island
CHAN310	Three-Mile Slough
CHAN421	Sacramento River at Delta Cross Channel
CHAN422	Sacramento River at Delta Cross Channel
CHAN423	Sacramento River at Delta Cross Channel
CHAN434	Sacramento River at Sherman Island
San Joaquin River and Central Delta into South Delta	
CHAN006	San Joaquin River at Head of Old River (HOR)
CHAN021	San Joaquin River downstream from confluence with Calaveras River
CHAN024	San Joaquin River upstream of Turner Cut
CHAN054	Old River at confluence with San Joaquin River (HOR)
CHAN107	Old River north of Rock Slough
CHAN117	Old River south of Franks Tract
CHAN124	Old River between Franks Tract and San Joaquin River
CHAN160	Columbia Cut
CHAN173	Turner Cut
South Delta into Facilities	
CHAN148	Middle River
CHAN227	Victoria Canal
CHAN081	Grant Line Canal
CHAN094	Old River

2/16/2021 Meeting – No DSM2 model runs

No DSM2 model runs

2/23/2021 Meeting

Background

<i>Process</i>	
Weekly process	<ul style="list-style-type: none"> • DSM2 model runs use a historic and forecasted hydrological input dataset with no assumptions provided by DWR Thursdays and updated by Reclamation Mondays. • Input File updated Monday after initial distribution from DWR for removal of forecasted in lieu of historic input. • Reclamation provides scenarios based on expected OMR index values for the upcoming week. • DSM2 model runs produced Monday and distributed to SaMT members.
<i>Hydraulic footprint information</i>	
Baseline and Scenarios updated	2/22/2021
DSM2 modeling results range	2/23/2021 to 3/1/2021
<i>OMR index value scenarios</i>	
Baseline	-3,000 cfs
Scenario 1	-2,500 cfs (decreasing from Baseline; Δ 500 cfs)
Scenario 2	NA (see special considerations below)
<i>Changes between scenarios</i>	
Hydrology	No (see special considerations below)
Delta Exports	Yes
<i>Common assumptions</i>	
DSM2 run results based on the following assumptions	<ul style="list-style-type: none"> • CCFB Gates are operating to Priority 2 throughout the forecast period. • The Delta Cross Channel gates are closed throughout the forecast period. • Suisun Marsh salinity control flashboards are in, and 2 of the Suisun Marsh Salinity Control gates are in tidal operation and 1 gate is closed for maintenance. • San Joaquin River flow at Vernalis is at 1,270 cfs at the beginning of the forecast period and is estimated to decrease to 1,150 cfs by the end of the forecast period. (Figure A1) • Sacramento River flow at Freeport is at 9,950 cfs at the beginning of the forecast period and is expected to decrease to 9,900 cfs by the end of the forecast period. (Figure A1). • Clifton Court Forebay and Tracy Pumping Plant pumping is shown for model runs in Figure A2a-A2b.
<i>Additional information</i>	
Considerations for current DSM2 model run	This week there no Scenario 2 was modeled. The more negative expected OMR Index Value (see Operations Outlook document) of -4,500 cfs could not be reached without a change in hydrology.
Caveats	<ul style="list-style-type: none"> • Time-step: DSM2 generates results at 15-minute time-steps. Visualizations of DSM2 model run results are aggregated over daily time-steps. Operations function on a more granular scale than daily time-step. • Salmonid behavior: DSM2 provides flow fields which salmonids may encounter but salmonids are not neutrally buoyant particles. Models which incorporate behavior from acoustic tagged salmonids are being developed for South Delta (ePTM, ecoPTM).

DSM2 model results: summary tables

Table A1. Summary of minimum, maximum, mean, and percent positive flows (cfs) and velocities (ft/s) by DSM2 channel for OMR scenarios over a 6-day time period. For Baseline, Scenario 1, and Scenario 2 values refer to “Hydraulic Footprint Information” in the conditions / assumptions section above.

Scenario (cfs)	DSM2 Channel	Flow Min.	Flow Max.	Flow Mean	Flow % Positive	Velocity Min.	Velocity Max.	Velocity Mean	Velocity % Positive
Baseline	6	-118.0	2043.6	1250.5	98	-0.1	1.2	0.7	98
Scenario 1	6	-166.7	2043.6	1249.7	97	-0.1	1.2	0.7	97
Baseline	21	-7845.4	6942.9	444.3	54	-0.5	0.5	0.0	54
Scenario 1	21	-7860.8	7034.0	465.0	55	-0.5	0.5	0.0	55
Baseline	49	-166043.4	144426.6	1849.2	53	-2.1	1.9	0.1	53
Scenario 1	49	-165551.5	145086.9	2251.7	53	-2.1	1.9	0.1	53
Baseline	81	-5199.7	2421.6	-1806.9	31	-1.5	0.7	-0.5	31
Scenario 1	81	-5283.0	3030.8	-1352.5	35	-1.5	0.9	-0.4	35
Baseline	94	-13943.6	10226.6	-1519.6	48	-1.9	1.5	-0.2	48
Scenario 1	94	-13730.6	10545.8	-1238.4	48	-1.9	1.5	-0.1	48
Baseline	107	-6449.9	4278.4	-612.2	49	-1.7	1.2	-0.2	49
Scenario 1	107	-5983.3	4370.0	-537.4	50	-1.7	1.3	-0.1	50
Baseline	124	-19976.4	12722.5	-2971.8	44	-0.6	0.4	-0.1	44
Scenario 1	124	-19508.7	12904.0	-2838.5	44	-0.6	0.4	-0.1	44
Baseline	148	-8548.2	6088.6	-844.3	48	-0.9	0.7	-0.1	48
Scenario 1	148	-7994.1	6250.8	-713.8	49	-0.9	0.7	-0.1	49
Baseline	160	-5077.9	3674.6	-350.0	50	-0.5	0.5	0.0	50
Scenario 1	160	-5006.5	3759.1	-288.5	51	-0.5	0.5	0.0	51
Baseline	434	-175769.1	163849.0	8013.3	53	-1.9	1.9	0.1	53
Scenario 1	434	-175676.8	164041.7	8111.7	54	-1.9	1.9	0.1	54

DSM2 model results: figures

Figure A1. Daily forecasted Vernalis and Freeport flows (cfs)

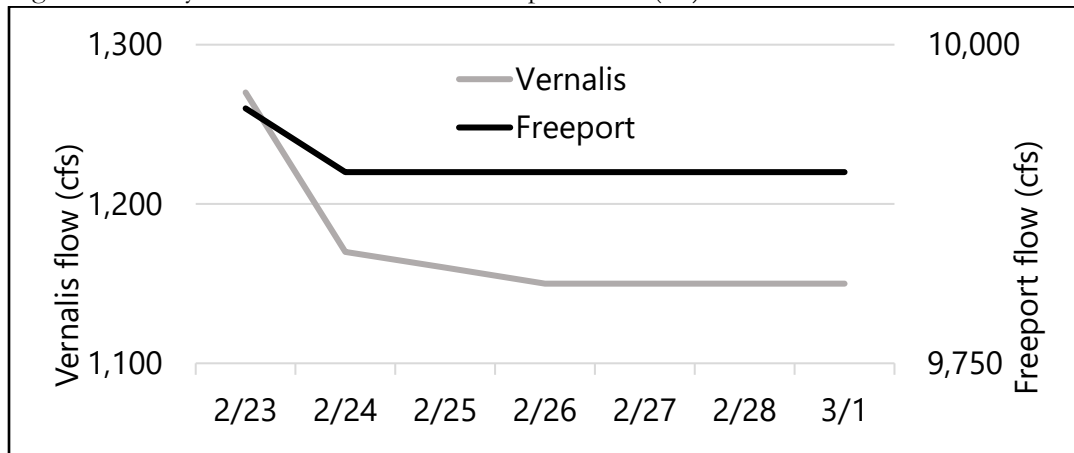


Figure A2a. Daily forecasted pumping: Jones and Banks (cfs), Baseline

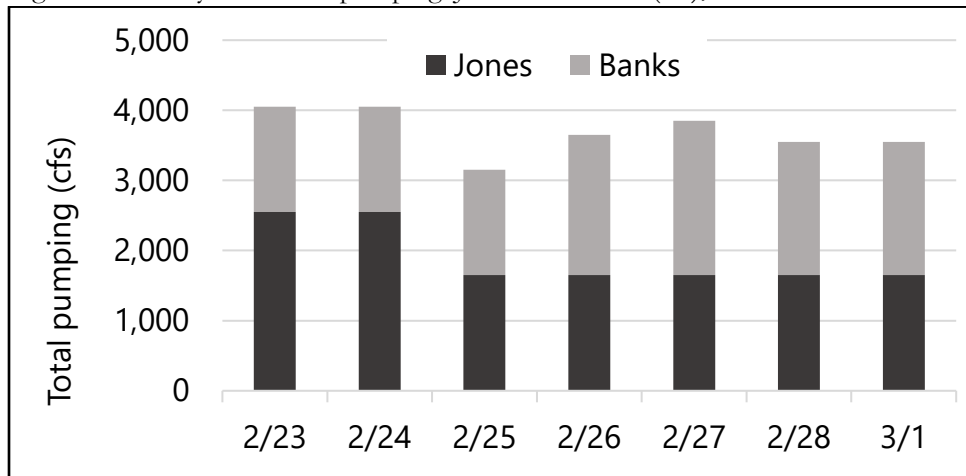
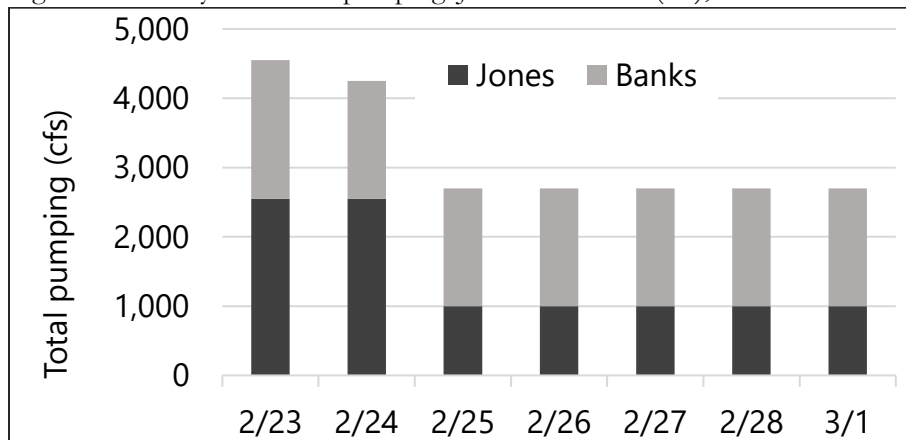


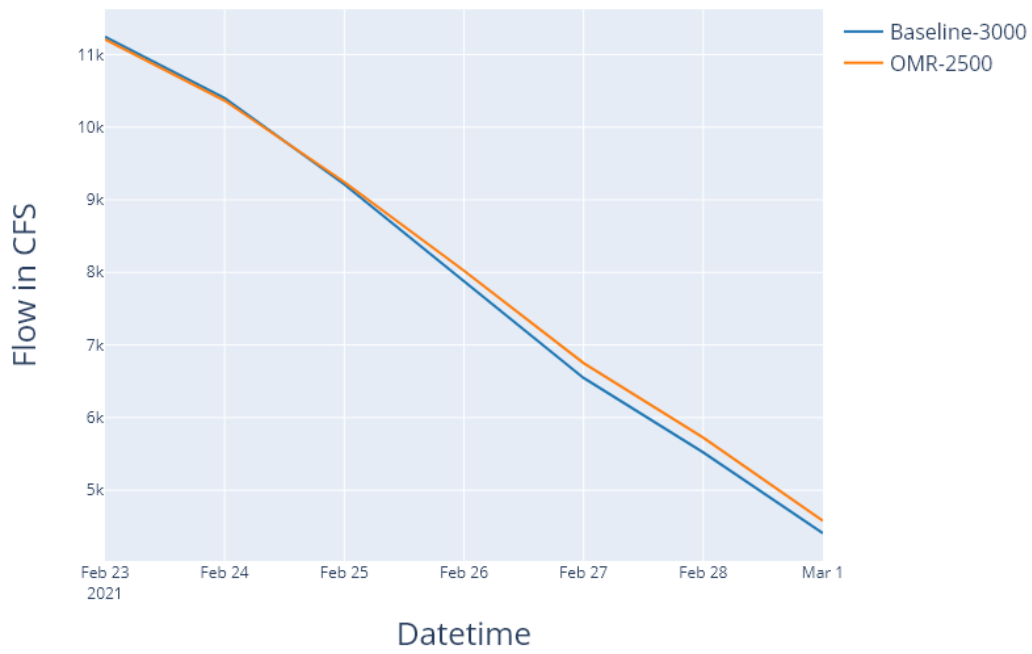
Figure A2b. Daily forecasted pumping: Jones and Banks (cfs), Scenario 1



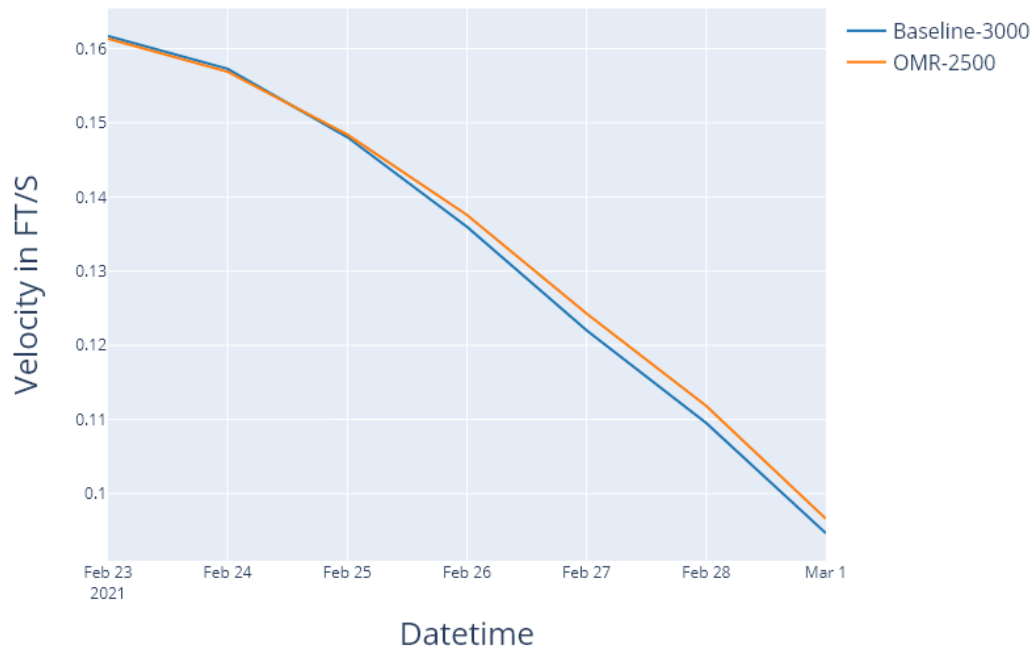
The following captions apply to the time-series plots for flow and velocity in selected locations (see Figure A13 and Table A2 for channel location information) below:

- (g) Time-series plot (1-day aggregated): Baseline, Scenario 1 OMR, and Scenario 2 OMR. X-axis represents daily time steps and y-axis represents flow (cfs) values. For Baseline, Scenario 1, and Scenario 2 values refer to “Hydraulic Footprint Information” in the section above. Reported summary statistics (minimum, maximum, etc.) are found in Table A1.
- (h) Time-series plot (1-day aggregated): Baseline, Scenario 1 OMR, and Scenario 2 OMR. X-axis represents daily time steps and y-axis represents velocity (cfs) values. For Baseline, Scenario 1, and Scenario 2 values refer to “Hydraulic Footprint Information” in the section above. Reported summary statistics (minimum, maximum, etc.) are found in Table A1.

Figure A3: Sacramento River at Sherman Island (CHAN434)

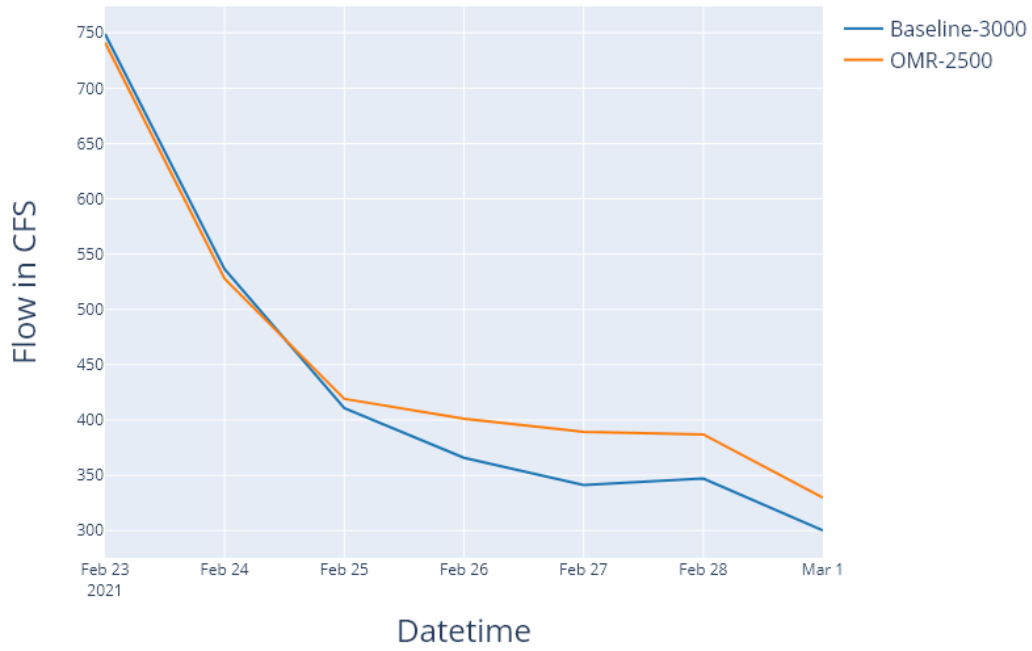


(a)

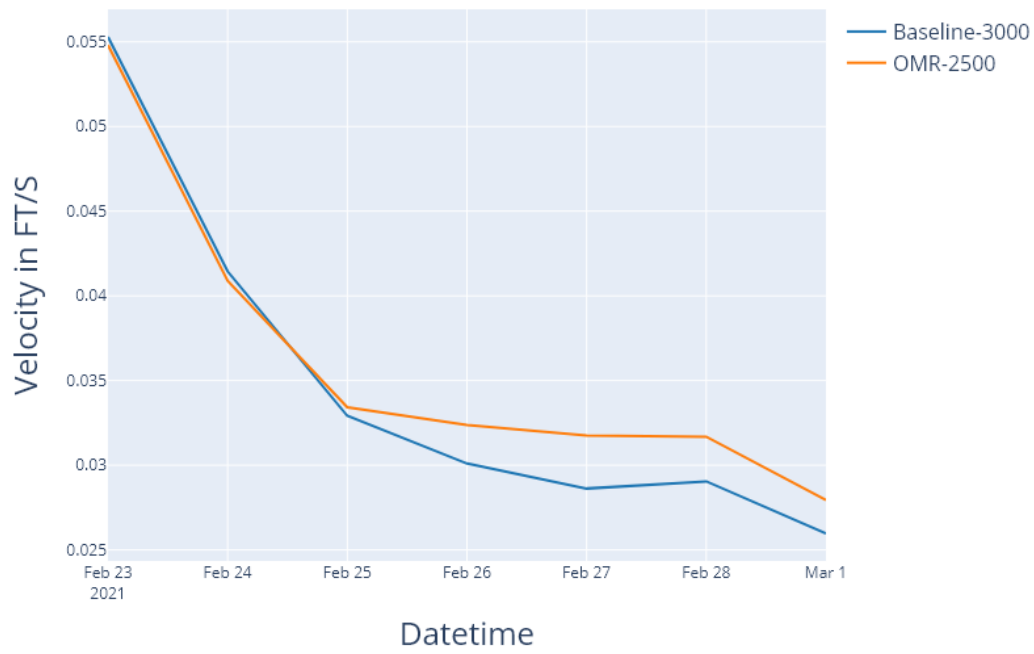


(b)

Figure A4: San Joaquin River downstream of confluence with Calaveras River (CHAN021)

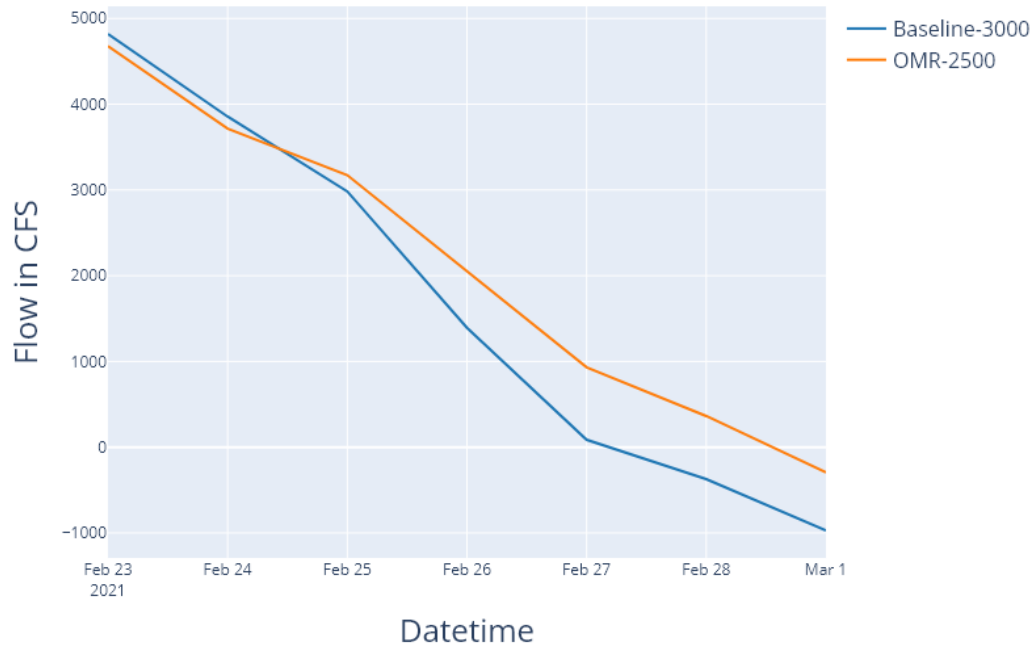


(a)

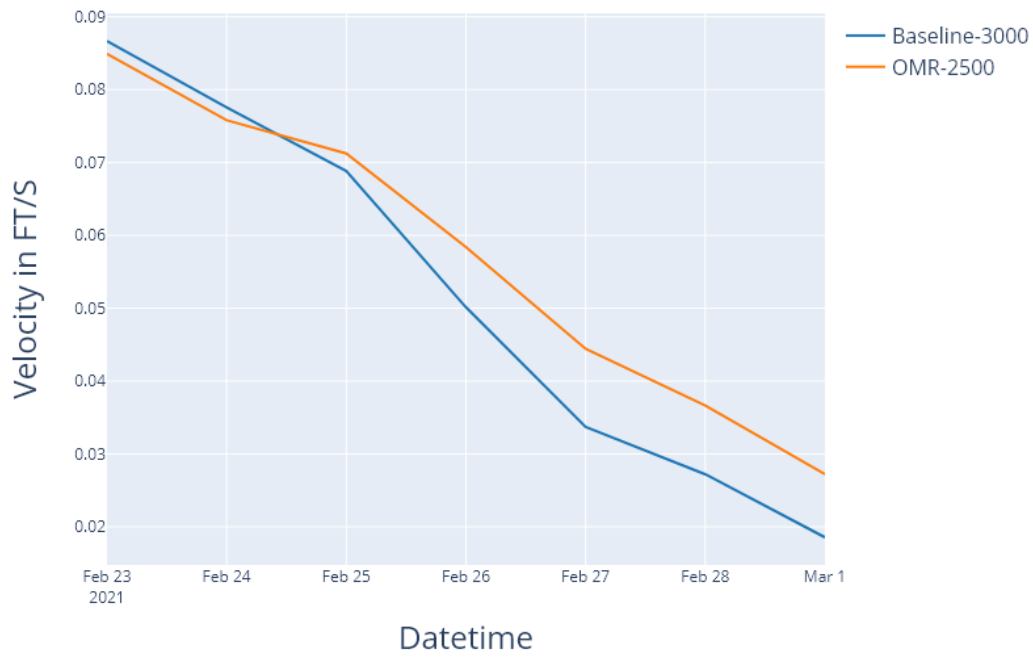


(b)

Figure A5: San Joaquin River at Sherman Island (CHAN049)

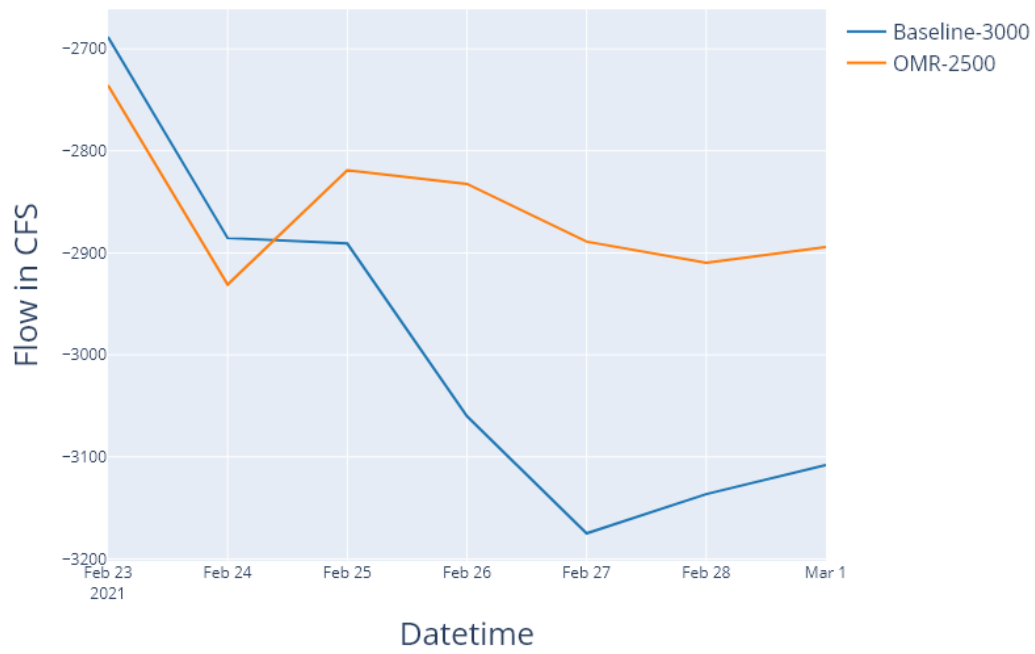


(a)

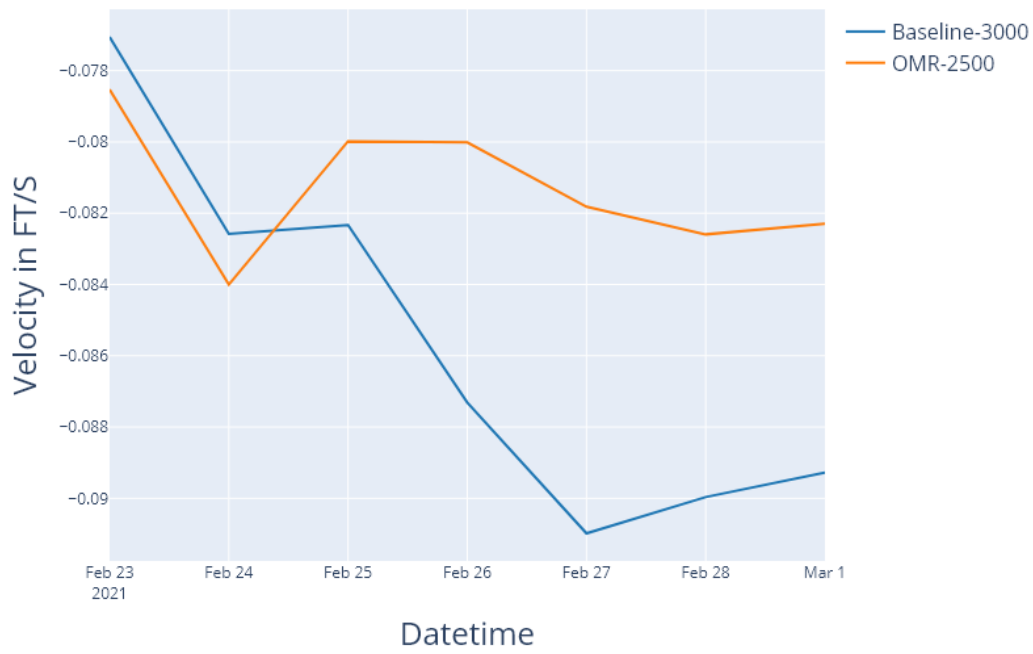


(b)

Figure A6: Old River between Franks Tract and San Joaquin River (CHAN124)



(a)



(b)

Figure A7: Lower San Joaquin River at Columbia Cut (CHAN160)

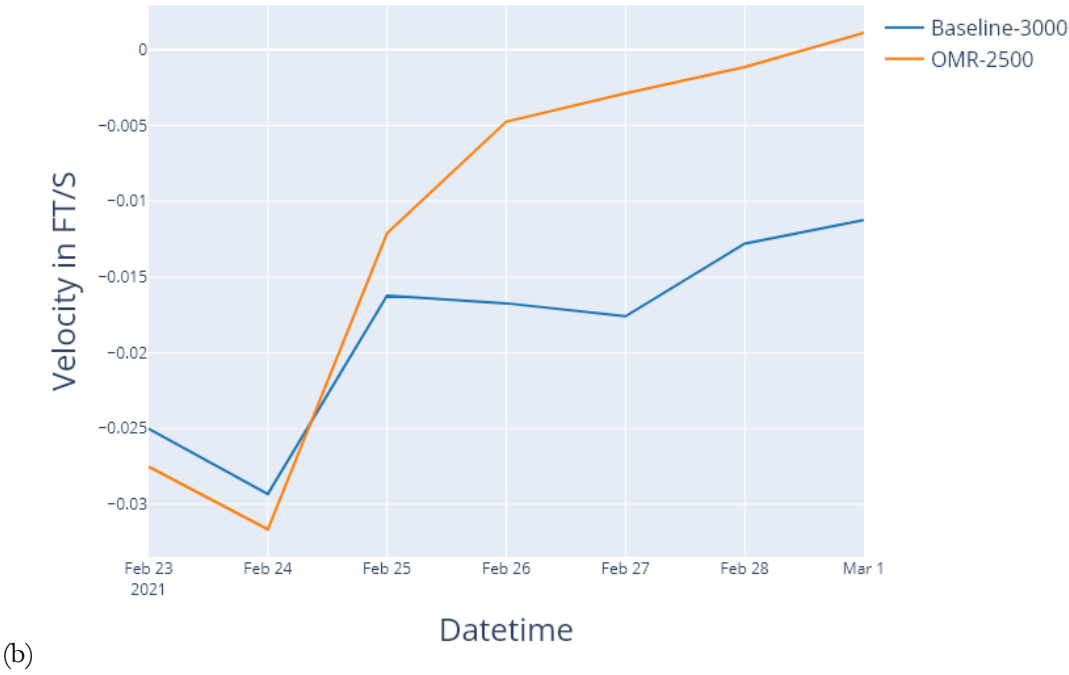
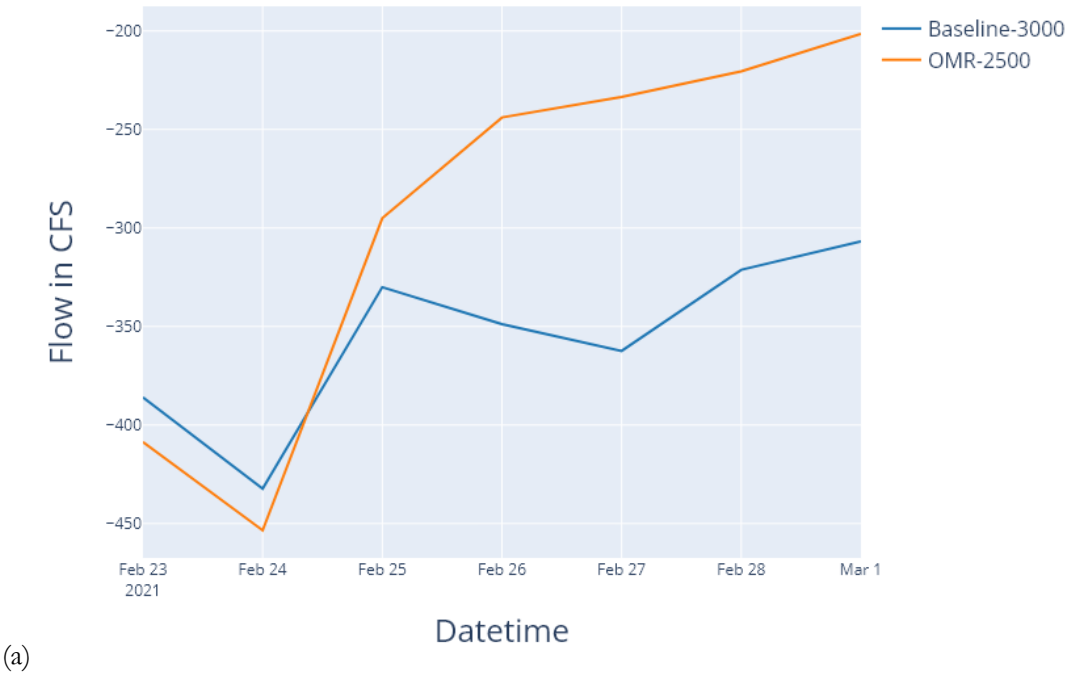
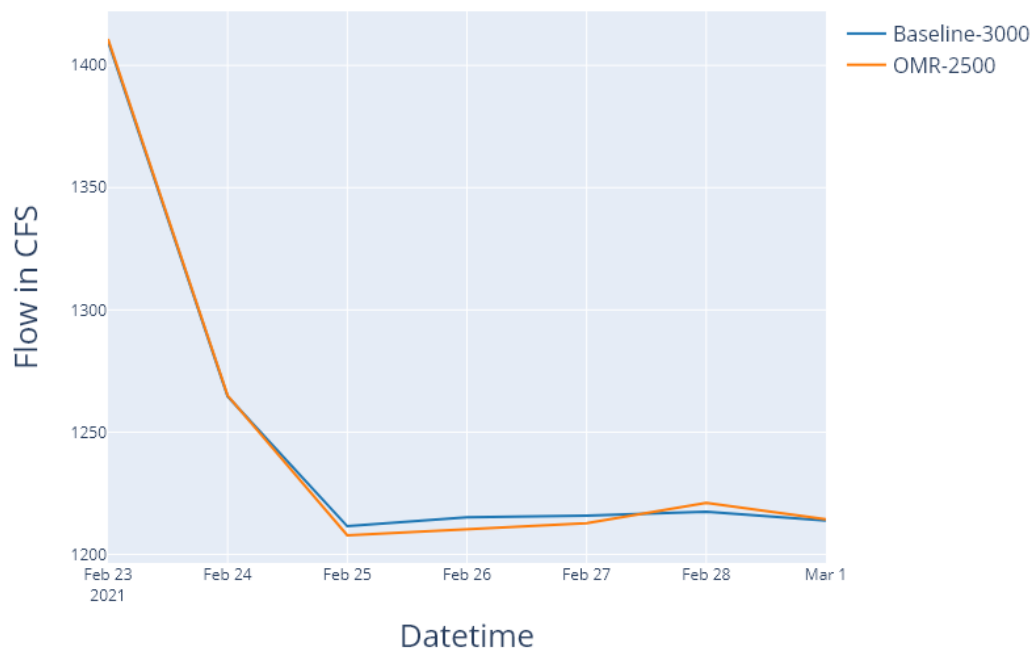
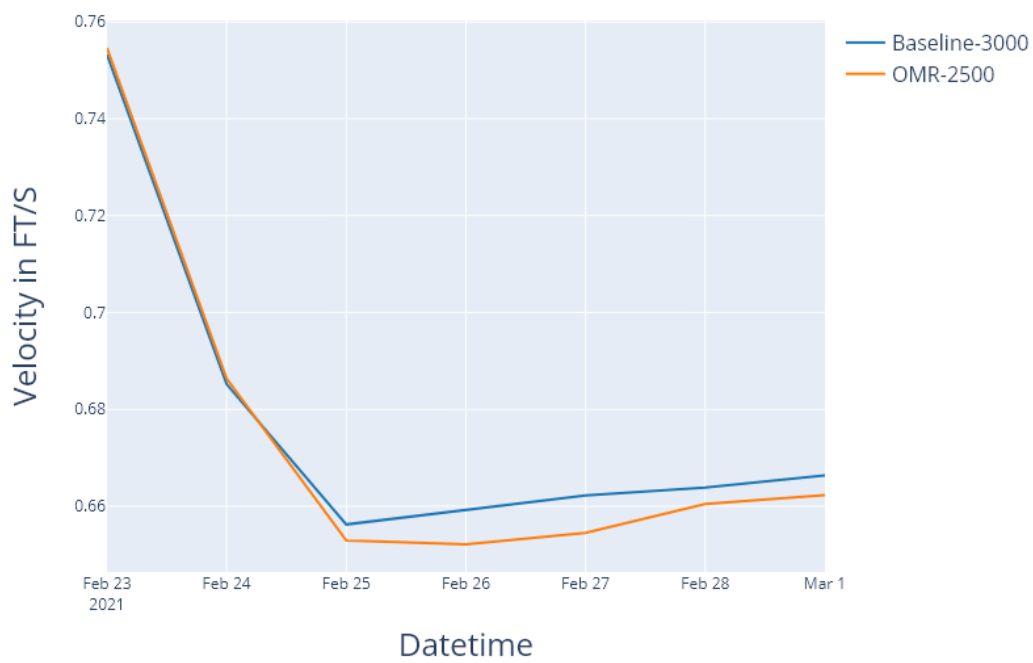


Figure A8: Slightly upstream of Head of Old River (CHAN006)

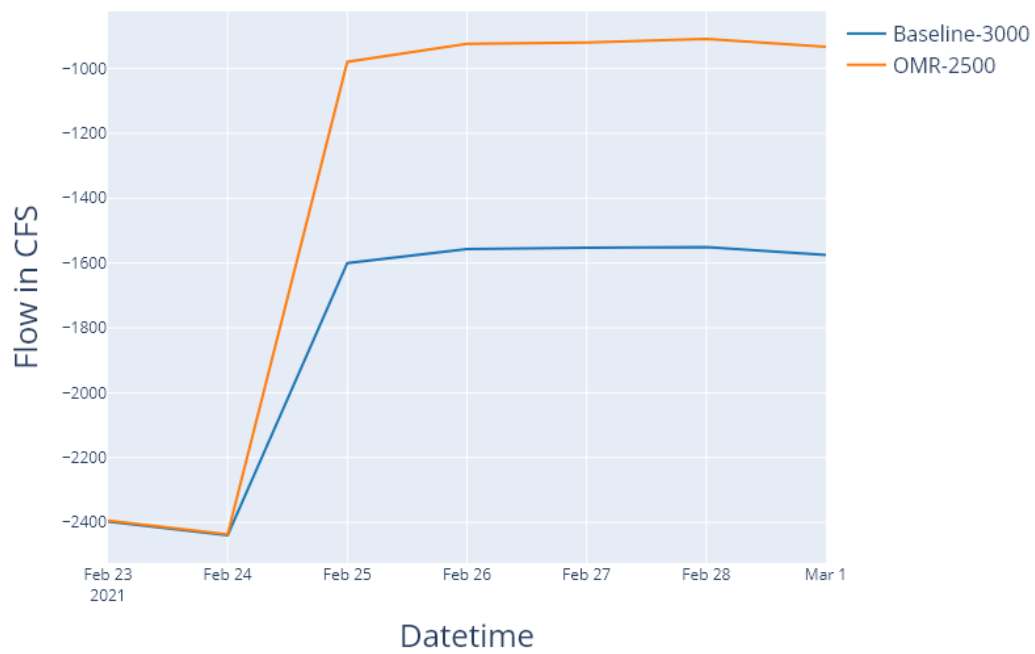


(a)

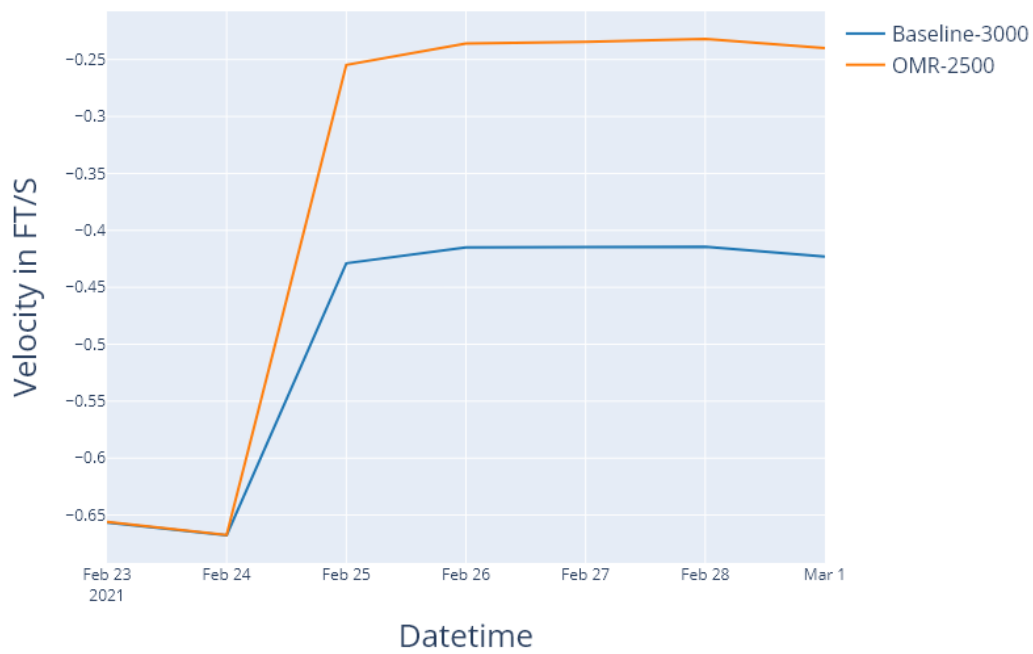


(b)

Figure A9: Old River adjacent to Grant Line Canal (CHAN081 – Old River between Grantline and CVP)

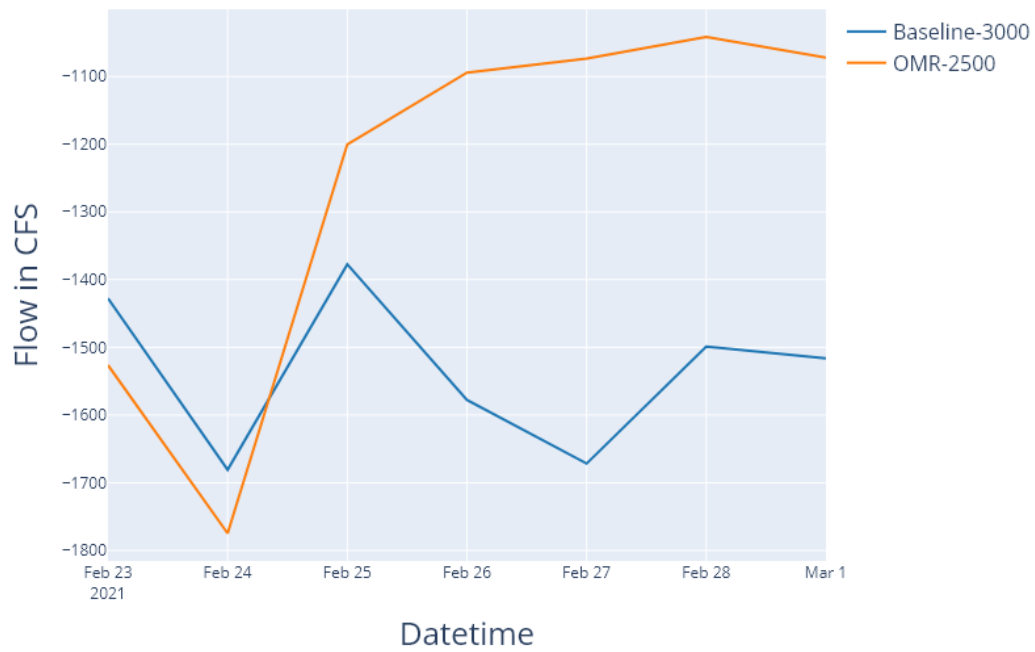


(a)

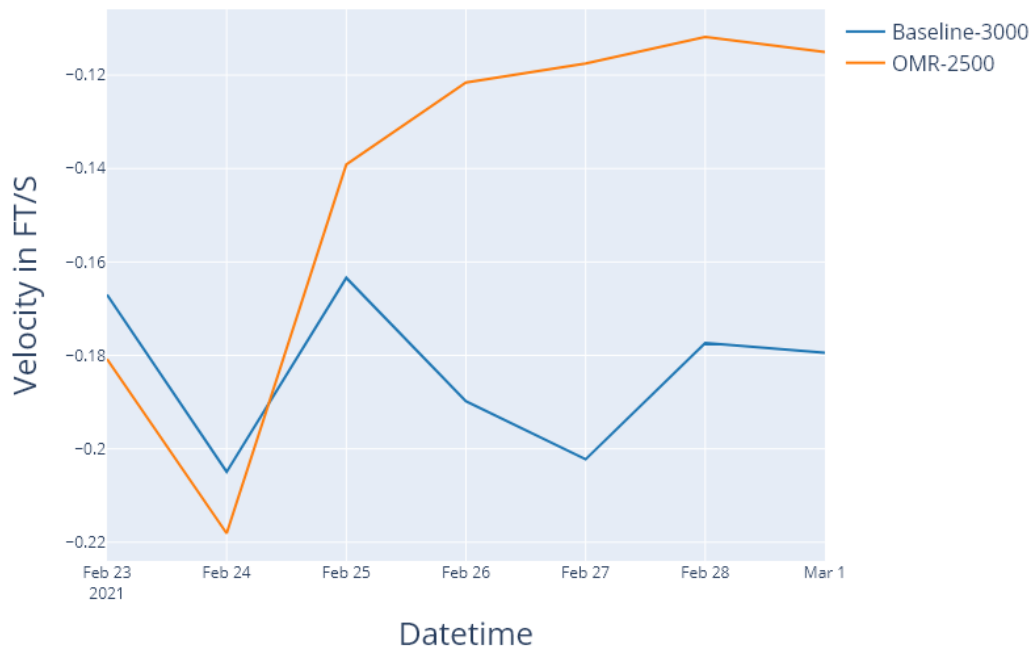


(b)

Figure A10: South Delta along Old River (CHAN094 – Old River/HW4)

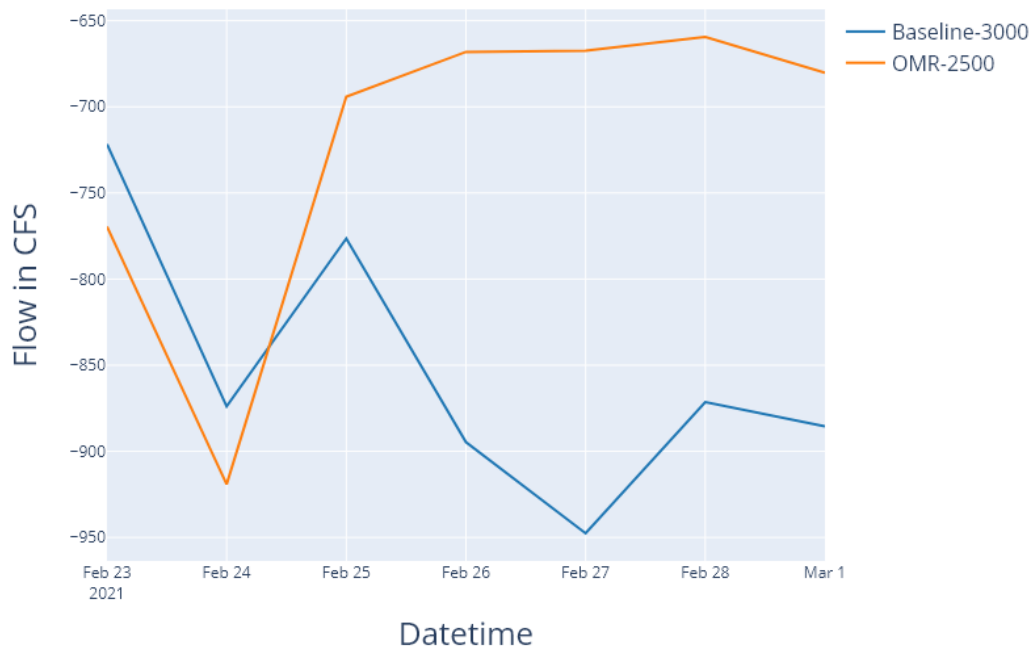


(a)

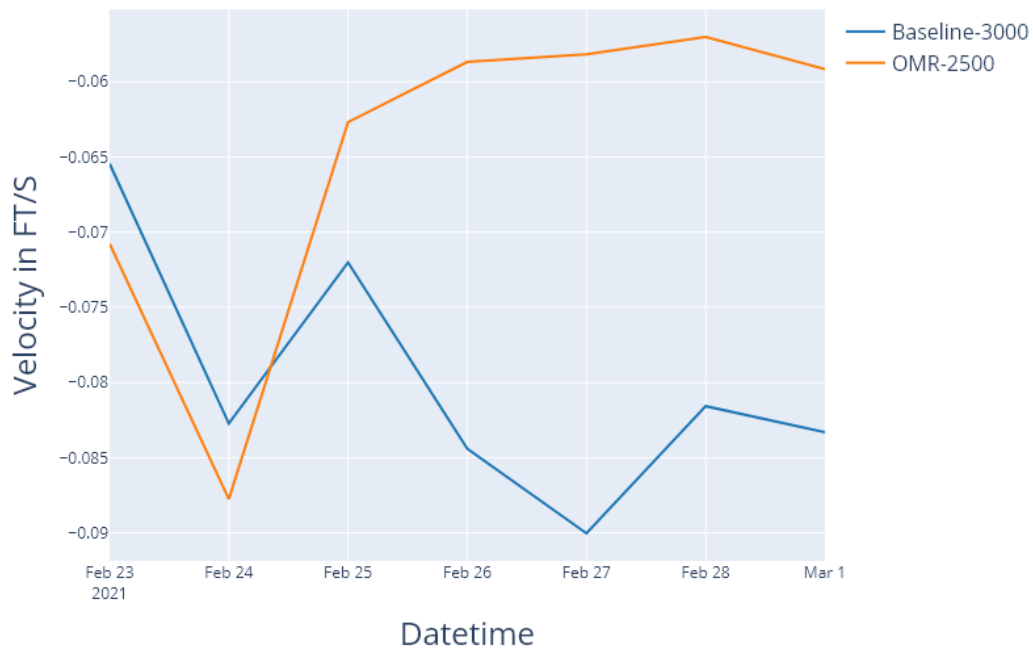


(b)

Figure A11: South Delta along Middle River (CHAN148 – Middle River/ Woodward Cut)

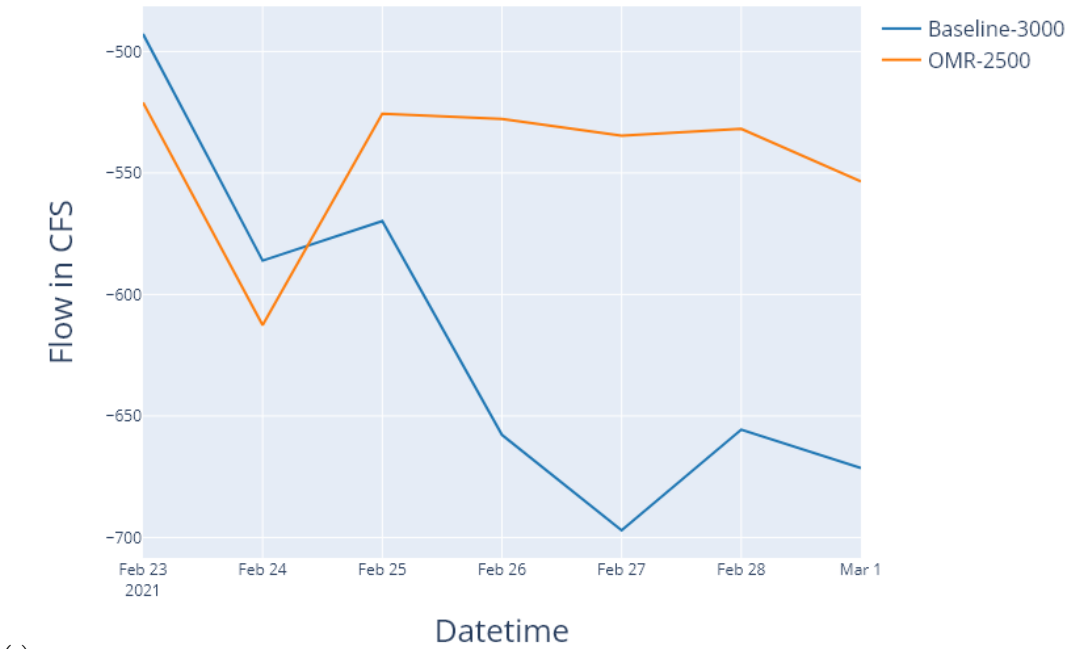


(a)

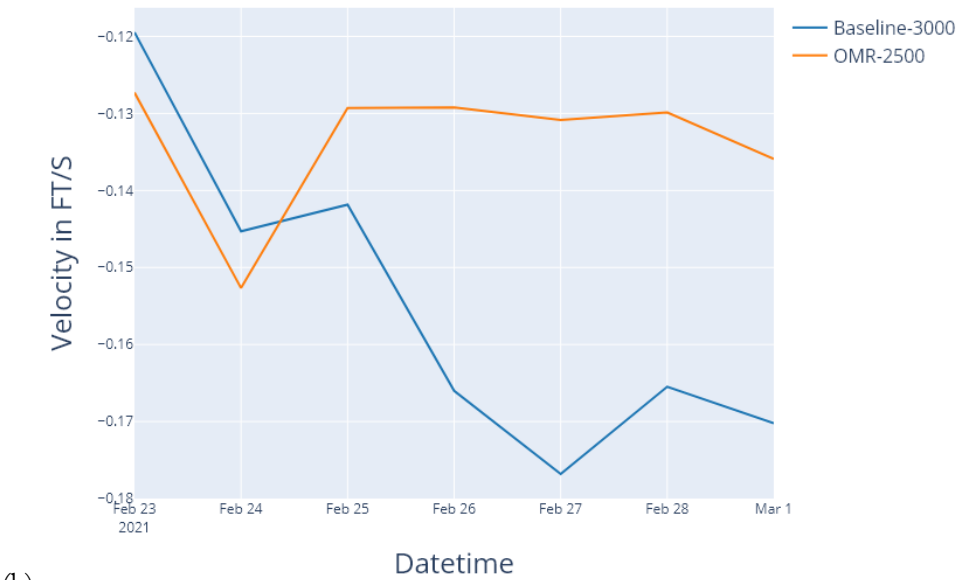


(b)

Figure A12: South Delta along Middle River (CHAN107 – Old River-Bacon Isl.)



(a)



(b)

DSM2 model interpretation entrainment in Delta strata regions

North Delta into Interior and Central Delta

Channels: 49 and 434

No measurable changes to flow and velocity related to modeled OMR conditions are anticipated. It is unlikely that listed salmonids would experience behavioral changes related to modeled OMR conditions this week.

San Joaquin River and Central Delta into South Delta

Channels: 6, 21, 107, 124, and 160

There may be measurable changes to flow and velocity related to modeled OMR conditions but they are likely to be negligible (<500cfs). Based on recent survey data, listed salmonids are present. Hydrological changes may be detectable by fish. Cumulative net flows within the channels of the South Delta are negative in magnitude. Fish moving from the San Joaquin mainstem would have an increased transit time towards the western Delta.

South Delta into facilities

Channels: 81, 94, and 148

There may be measurable changes to flow and velocity related to modeled OMR conditions but they are likely to be negligible (<500cfs). Based on recent survey data, listed salmonids are present. Hydrological changes may be detectable by fish. Cumulative net flows within the channels of the South Delta are negative in magnitude. Fish moving from the San Joaquin mainstem into the head of Old River would have a decreased transit time towards the fish salvage facilities.

DSM2 channel locations information

Figure A13. Highlighted DSM2 channels by Delta Strata.

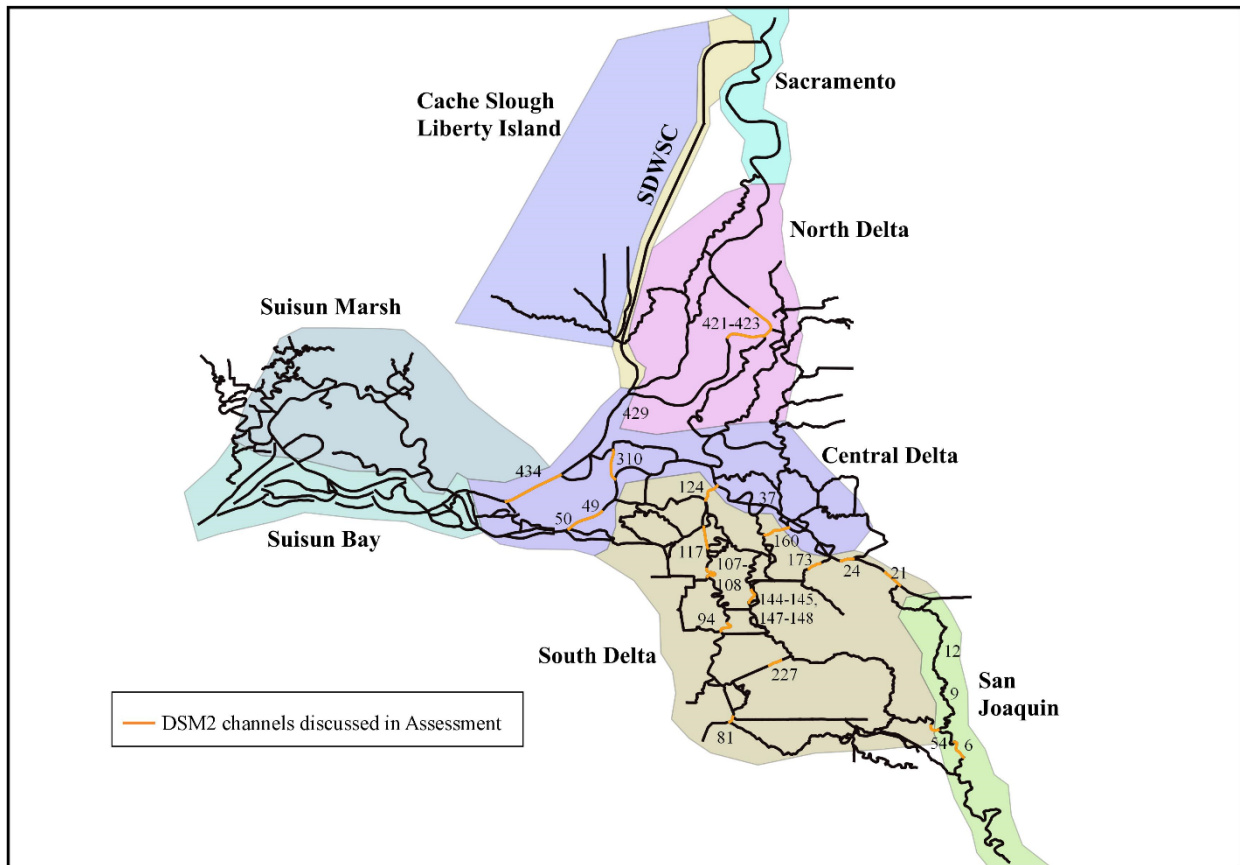


Table A2. Description of channel location, by Delta Strata region. Not all listed channels have model results presented in every weekly Proposed Action Assessment.

DSM2 Channel	Description
North Delta into Interior and Central Delta	
CHAN049	San Joaquin River at Sherman Island
CHAN310	Three-Mile Slough
CHAN421	Sacramento River at Delta Cross Channel
CHAN422	Sacramento River at Delta Cross Channel
CHAN423	Sacramento River at Delta Cross Channel
CHAN434	Sacramento River at Sherman Island
San Joaquin River and Central Delta into South Delta	
CHAN006	San Joaquin River at Head of Old River (HOR)
CHAN021	San Joaquin River downstream from confluence with Calaveras River
CHAN024	San Joaquin River upstream of Turner Cut
CHAN054	Old River at confluence with San Joaquin River (HOR)
CHAN107	Old River north of Rock Slough
CHAN117	Old River south of Franks Tract
CHAN124	Old River between Franks Tract and San Joaquin River
CHAN160	Columbia Cut
CHAN173	Turner Cut
South Delta into Facilities	
CHAN148	Middle River
CHAN227	Victoria Canal
CHAN081	Grant Line Canal
CHAN094	Old River

3/2/2021 Meeting

Background

<i>Process</i>	
Weekly process	<ul style="list-style-type: none"> • DSM2 model runs use a historic and forecasted hydrological input dataset with no assumptions provided by DWR Thursdays and updated by Reclamation Mondays. • Input File updated Monday after initial distribution from DWR for removal of forecasted in lieu of historic input. • Reclamation provides scenarios based on expected OMR index values for the upcoming week. • DSM2 model runs produced Monday and distributed to SaMT members.
<i>Hydraulic footprint information</i>	
Baseline and Scenarios updated	3/01/2021
DSM2 modeling results range	3/02/2021 to 3/8/2021
<i>OMR index value scenarios</i>	
Baseline	-1,100 cfs
Scenario 1	-500 cfs (decreasing from Baseline; Δ 600 cfs)
Scenario 2	NA (see special considerations below)
<i>Changes between scenarios</i>	
Hydrology	No (see special considerations below)
Delta Exports	Yes
<i>Common assumptions</i>	
DSM2 run results based on the following assumptions	<ul style="list-style-type: none"> • CCFB Gates are operating to Priority 2 throughout the forecast period. • The Delta Cross Channel gates are closed throughout the forecast period. • Suisun Marsh salinity control flashboards are in, and 2 of the Suisun Marsh Salinity Control gates are in tidal operation and 1 gate is closed for maintenance. • San Joaquin River flow at Vernalis is at 1,040 cfs at the beginning of the forecast period and is estimated to decrease to 910 cfs by the end of the forecast period. (Figure A1) • Sacramento River flow at Freeport is at 8,100 cfs at the beginning of the forecast period and is expected to increase to 8,300 cfs by the end of the forecast period. (Figure A1). • Clifton Court Forebay and Tracy Pumping Plant pumping is shown for model runs in Figure A2a-A2b.
<i>Additional information</i>	
Considerations for current DSM2 model run	This week there no Scenario 2 was modeled. The more negative expected OMR Index Value (see Operations Outlook document) of -2,500 cfs could not be reached without a change in hydrology.
Caveats	<ul style="list-style-type: none"> • Time-step: DSM2 generates results at 15-minute time-steps. Visualizations of DSM2 model run results are aggregated over daily time-steps. Operations function on a more granular scale than daily time-step. • Salmonid behavior: DSM2 provides flow fields which salmonids may encounter but salmonids are not neutrally buoyant particles. Models which incorporate behavior from acoustic tagged salmonids are being developed for South Delta (ePTM, ecoPTM).

DSM2 model results: summary tables

Table A1. Summary of minimum, maximum, mean, and percent positive flows (cfs) and velocities (ft/s) by DSM2 channel for OMR scenarios over a 6-day time period. For scenario values refer to “Hydraulic Footprint Information” in the conditions / assumptions section above.

Scenario (cfs)	DSM2 Channel	Flow Min.	Flow Max.	Flow Mean	Flow % Positive	Velocity Min.	Velocity Max.	Velocity Mean	Velocity % Positive
Baseline	6	-496.0	1777.5	1013.0	90	-0.2	1.1	0.6	90
Scenario 1	6	-515.6	1780.7	1012.8	90	-0.2	1.1	0.6	90
Baseline	21	-7748.4	6569.3	424.5	55	-0.5	0.4	0.0	55
Scenario 1	21	-7828.2	6579.2	437.6	55	-0.5	0.4	0.0	55
Baseline	49	-159680.9	138078.0	1774.6	52	-2.0	1.8	0.1	52
Scenario 1	49	-159337.0	138347.5	2221.8	52	-2.0	1.8	0.1	52
Baseline	81	-3730.5	3328.9	-690.4	46	-1.0	1.0	-0.2	46
Scenario 1	81	-3350.6	3664.8	-294.2	51	-0.9	1.1	-0.1	51
Baseline	94	-12138.8	10190.5	-248.1	51	-1.6	1.5	0.0	51
Scenario 1	94	-11961.5	10342.9	71.7	52	-1.6	1.5	0.1	52
Baseline	107	-5621.5	4224.1	-273.2	51	-1.6	1.2	-0.1	51
Scenario 1	107	-5566.4	4262.9	-191.9	52	-1.5	1.2	0.0	52
Baseline	124	-18963.8	12248.6	-1983.5	46	-0.6	0.4	-0.1	46
Scenario 1	124	-18812.1	12310.1	-1835.2	46	-0.6	0.4	-0.1	46
Baseline	148	-7267.3	6053.1	-259.3	51	-0.8	0.7	0.0	51
Scenario 1	148	-7198.9	6125.3	-121.4	51	-0.8	0.7	0.0	51
Baseline	160	-4525.3	3570.7	18.0	52	-0.5	0.5	0.0	52
Scenario 1	160	-4492.3	3603.4	100.6	54	-0.5	0.5	0.0	54
Baseline	434	-168974.7	152903.3	4172.4	52	-1.9	1.8	0.1	52
Scenario 1	434	-168928.5	153036.9	4283.7	52	-1.9	1.8	0.1	52

DSM2 model results: figures

Figure A1. Daily forecasted Vernalis and Freeport flows (cfs)

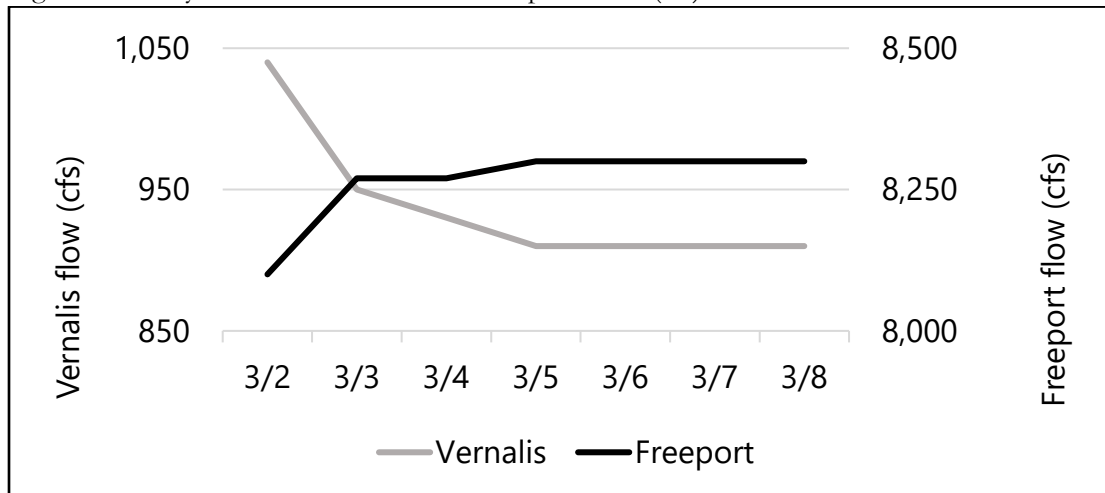


Figure A2a. Daily forecasted pumping: Jones and Banks (cfs), Baseline

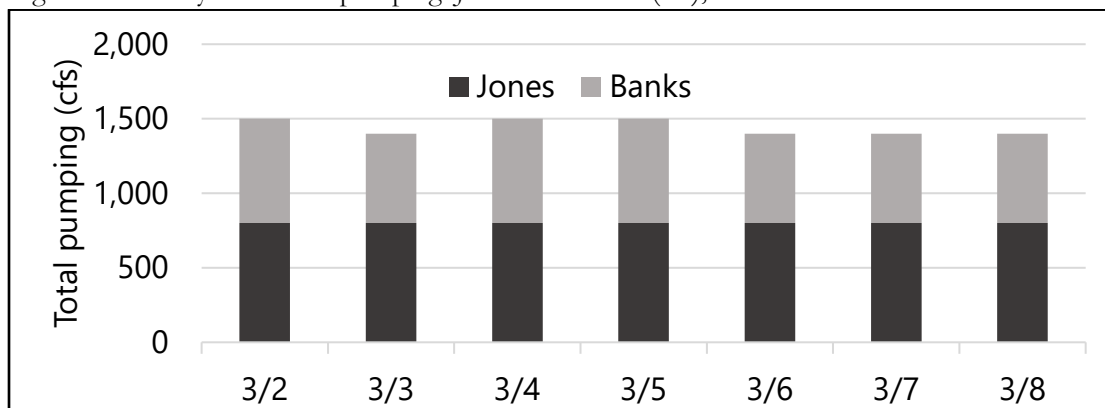
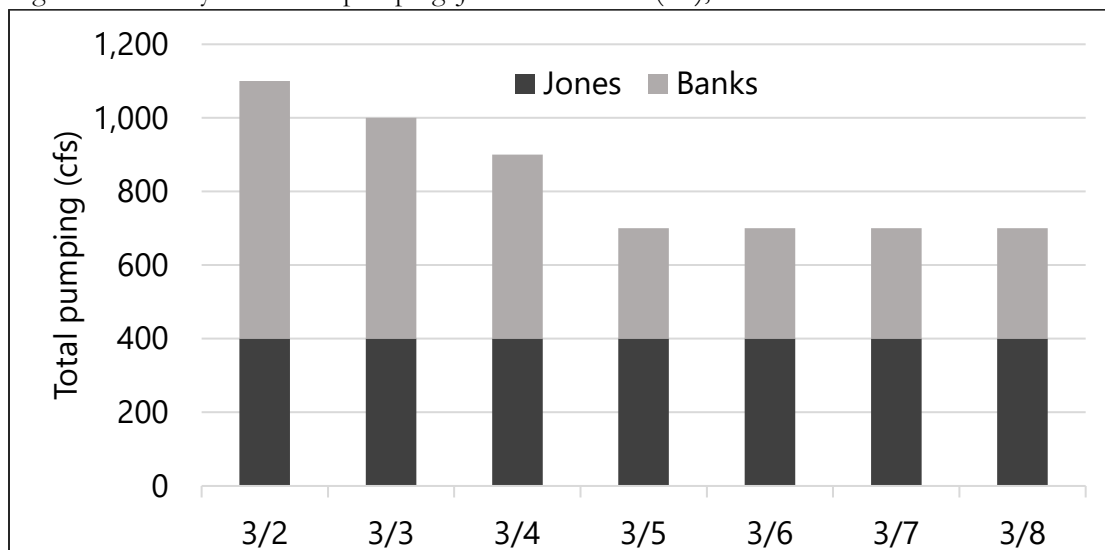


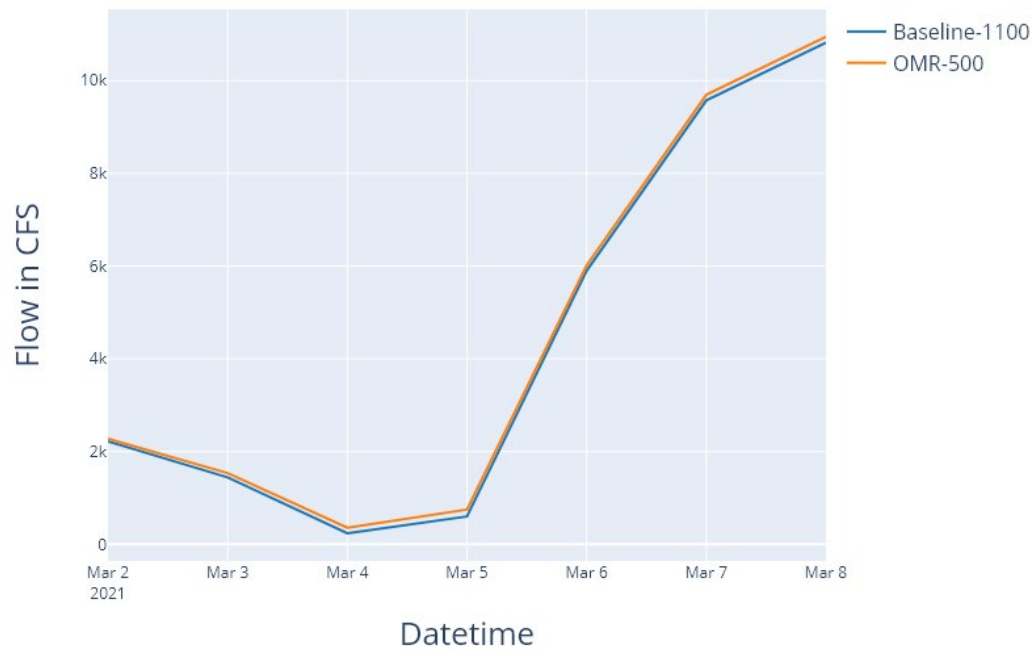
Figure A2b. Daily forecasted pumping: Jones and Banks (cfs), Scenario 1



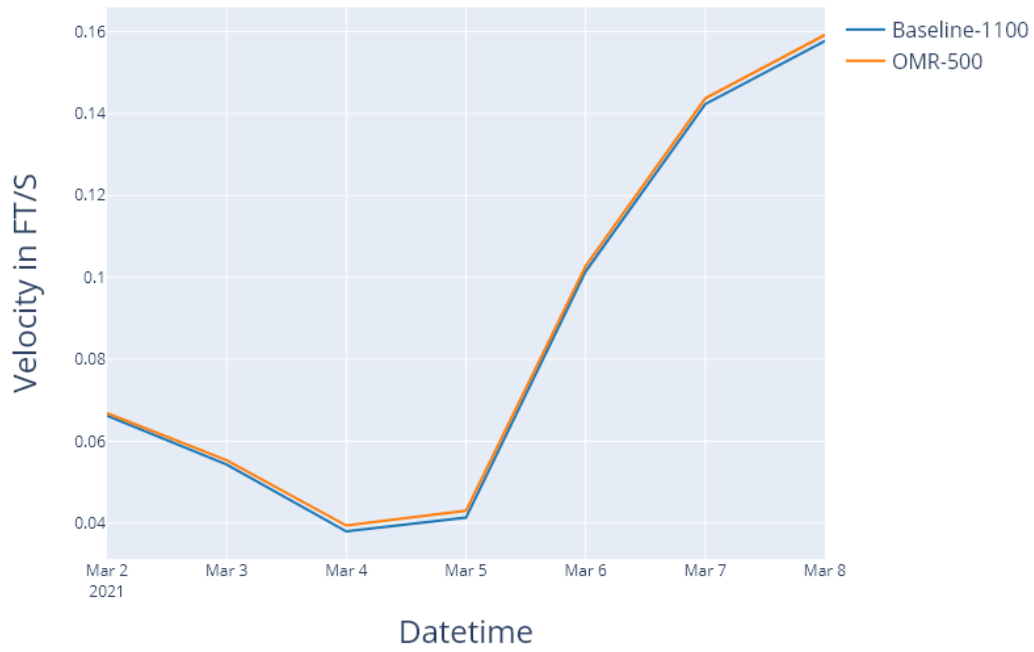
The following captions apply to the time-series plots for flow and velocity in selected locations (see Figure A13 and Table A2 for channel location information) below:

- (i) Time-series plot (1-day aggregated): Baseline, Scenario 1 OMR, and Scenario 2 OMR. X-axis represents daily time steps and y-axis represents flow (cfs) values. For Baseline, Scenario 1, and Scenario 2 values refer to “Hydraulic Footprint Information” in the section above. Reported summary statistics (minimum, maximum, etc.) are found in Table A1.
- (j) Time-series plot (1-day aggregated): Baseline, Scenario 1 OMR, and Scenario 2 OMR. X-axis represents daily time steps and y-axis represents velocity (cfs) values. For Baseline, Scenario 1, and Scenario 2 values refer to “Hydraulic Footprint Information” in the section above. Reported summary statistics (minimum, maximum, etc.) are found in Table A1.

Figure A3: Sacramento River at Sherman Island (CHAN434)



(a)

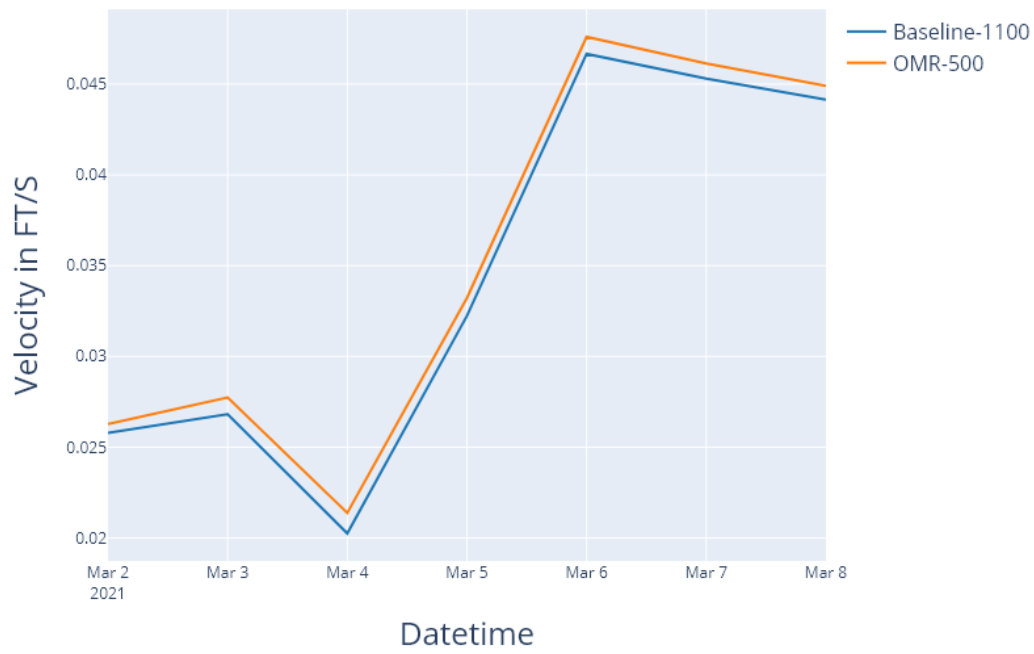


(b)

Figure A4: San Joaquin River downstream of confluence with Calaveras River (CHAN021)



(a)

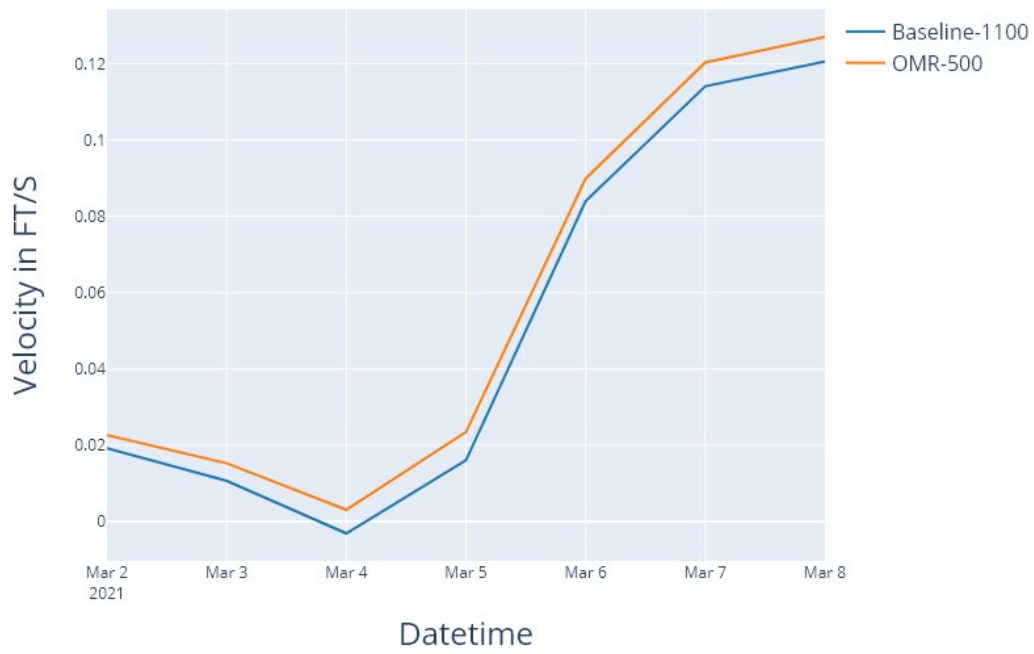


(b)

Figure A5: San Joaquin River at Sherman Island (CHAN049)

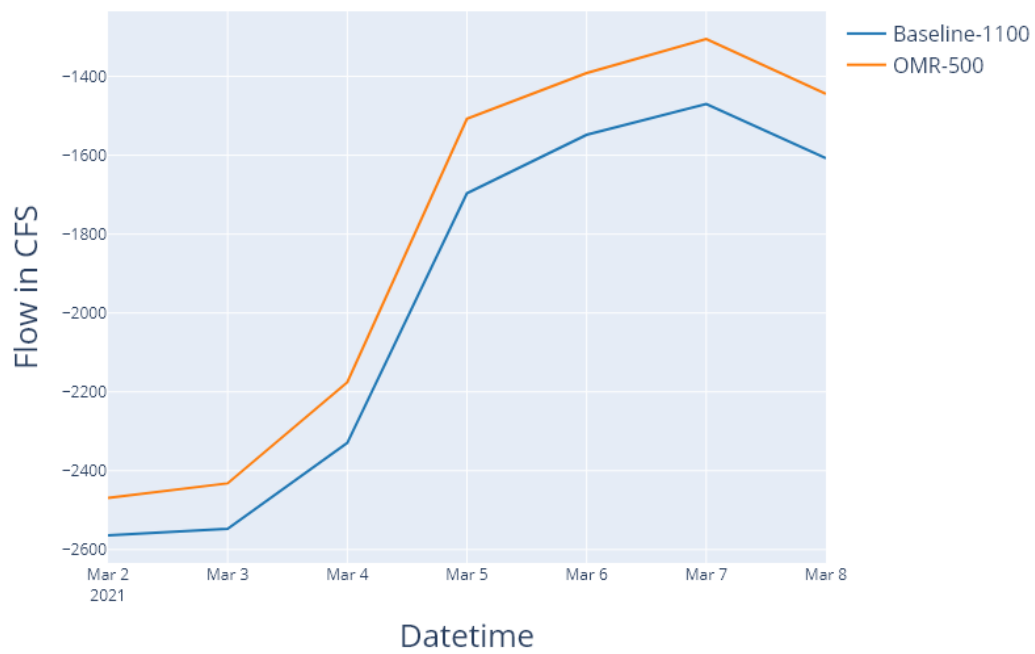


(a)

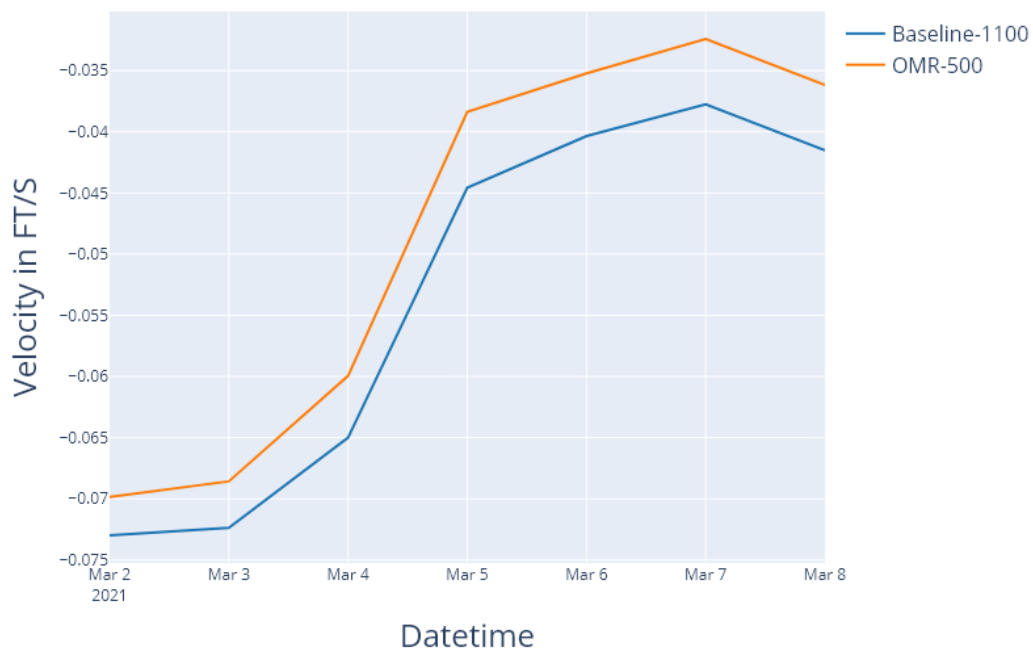


(b)

Figure A6: Old River between Franks Tract and San Joaquin River (CHAN124)



(a)

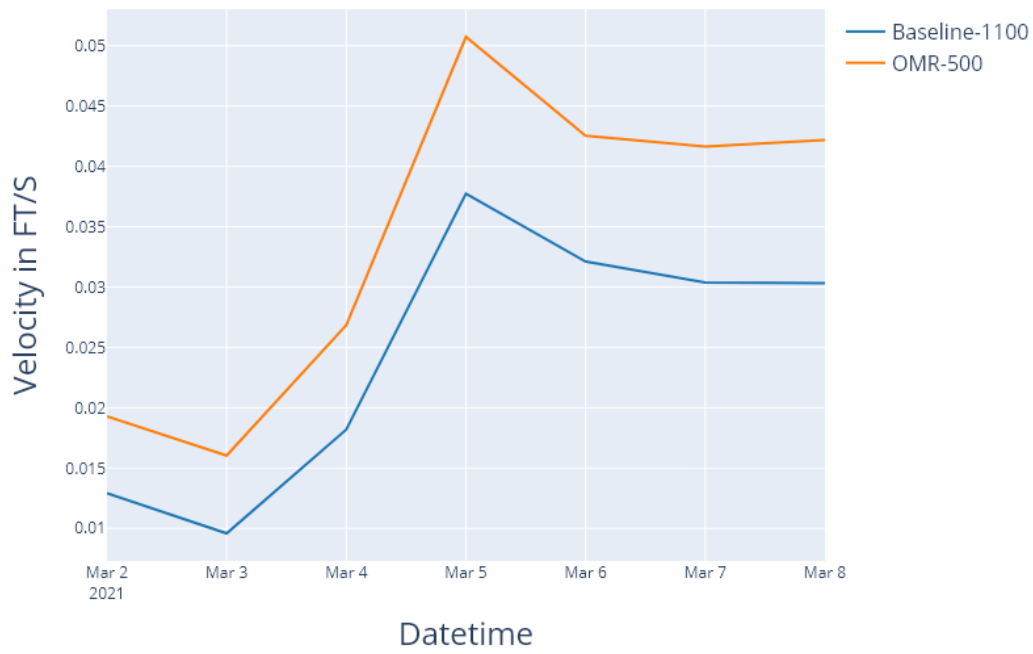


(b)

Figure A7: Lower San Joaquin River at Columbia Cut (CHAN160)

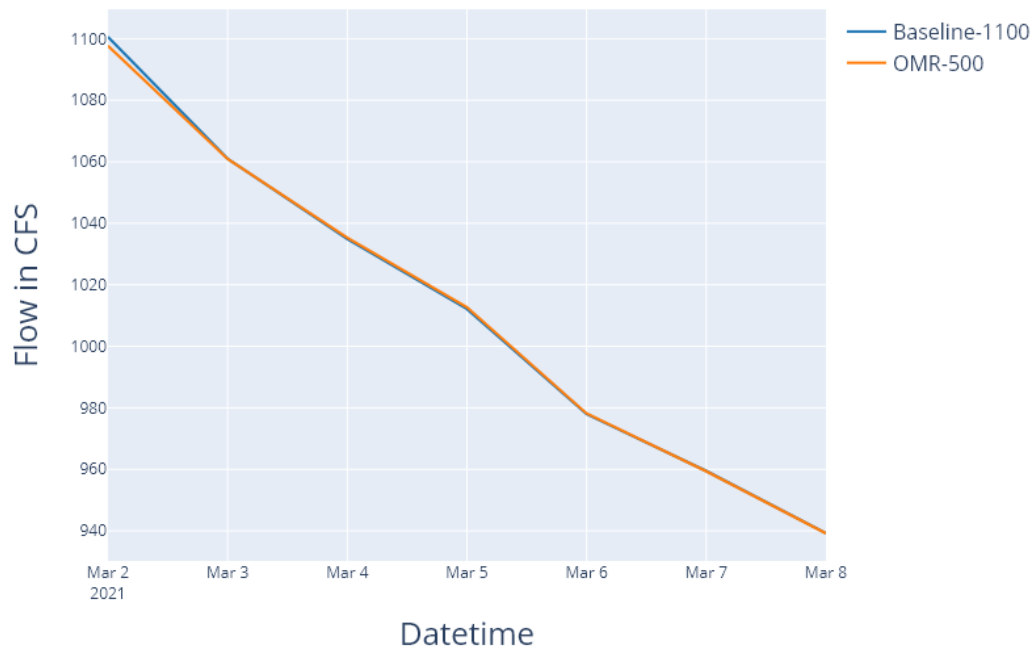


(a)

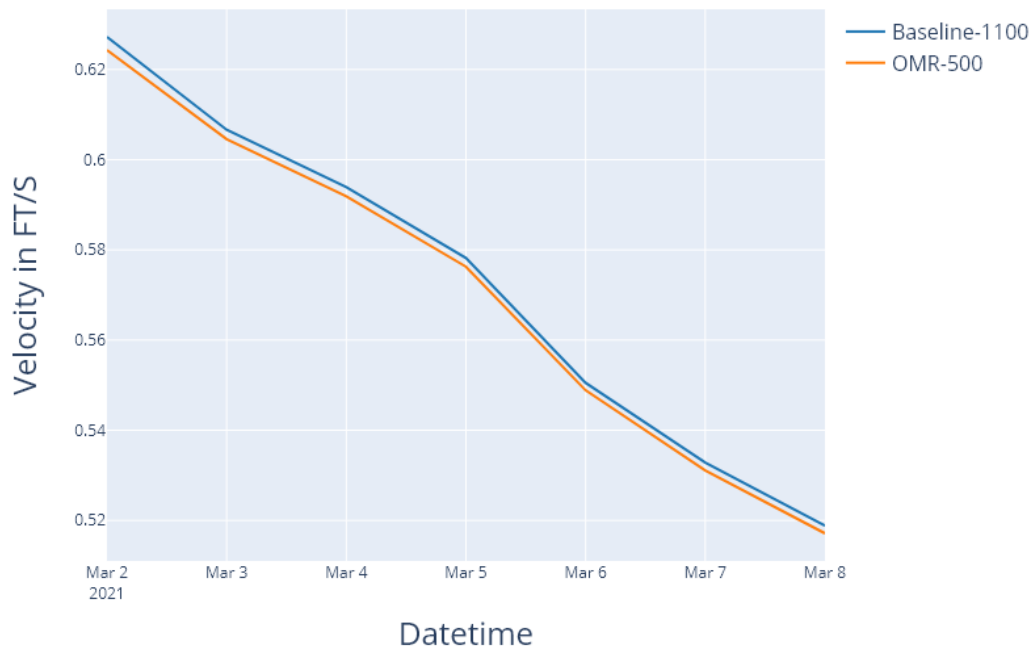


(b)

Figure A8: Slightly upstream of Head of Old River (CHAN006)

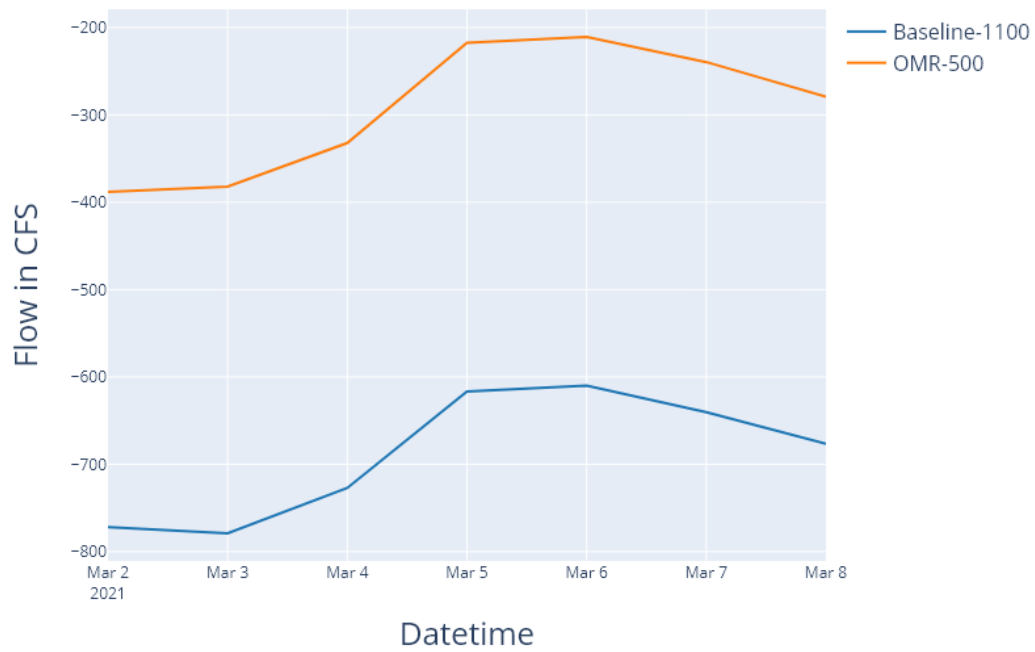


(a)

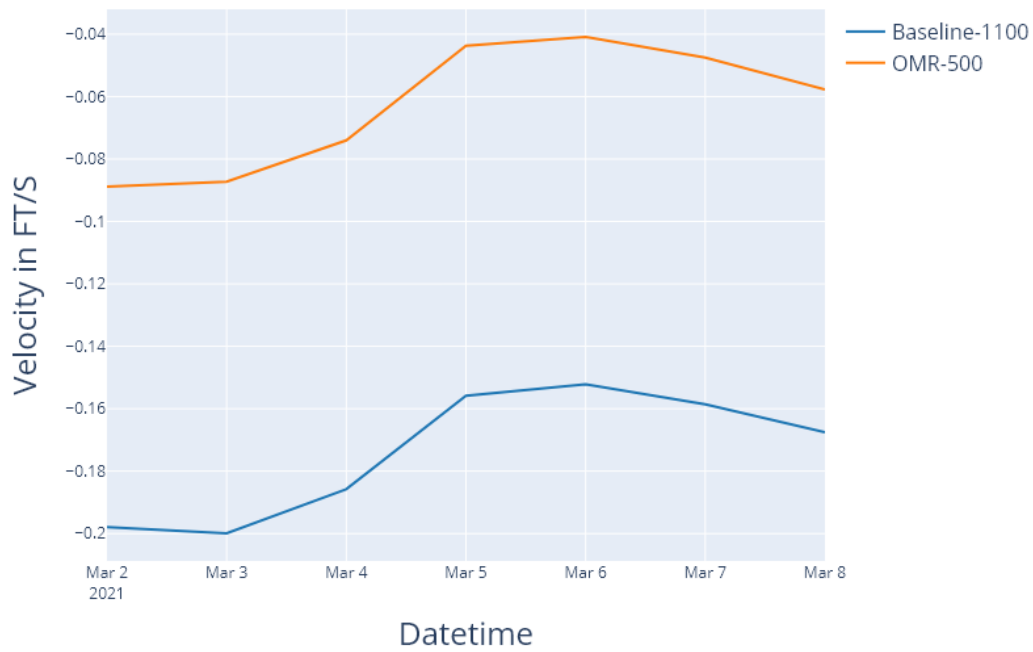


(b)

Figure A9: Old River adjacent to Grant Line Canal (CHAN081 – Old River between Grant Line and CVP)



(a)

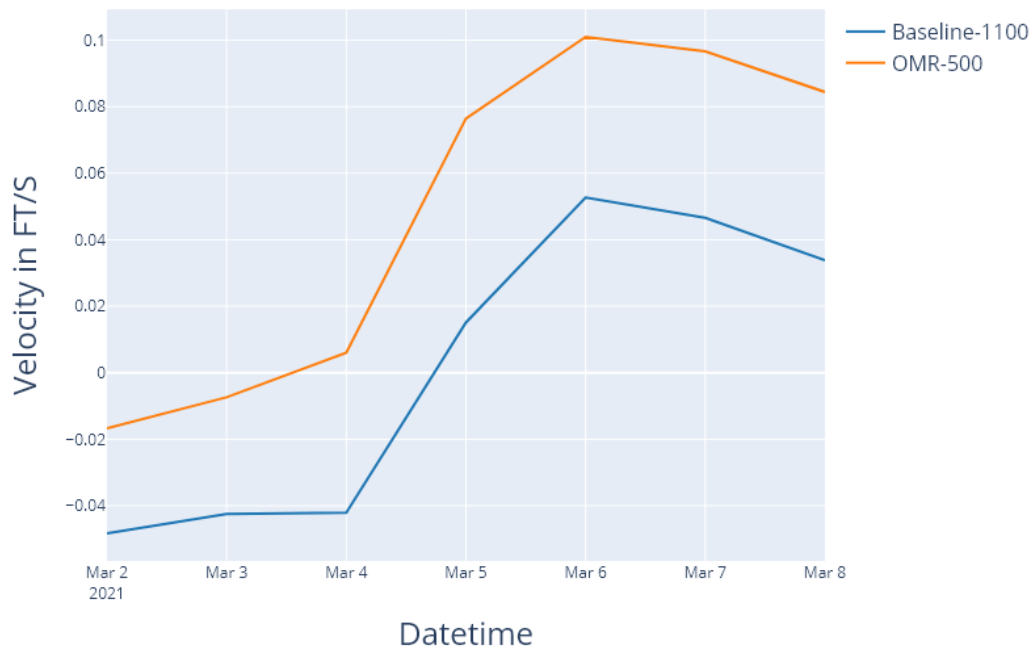


(b)

Figure A10: South Delta along Old River (CHAN094 – Old River/HW4)



(a)

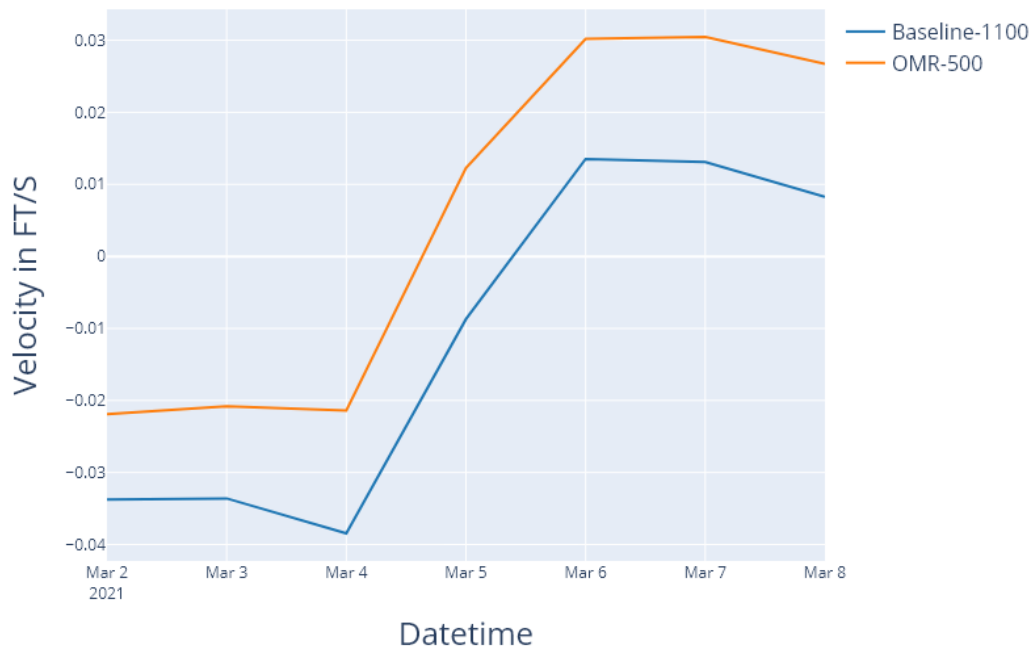


(b)

Figure A11: South Delta along Middle River (CHAN148 – Middle River/ Woodward Cut)

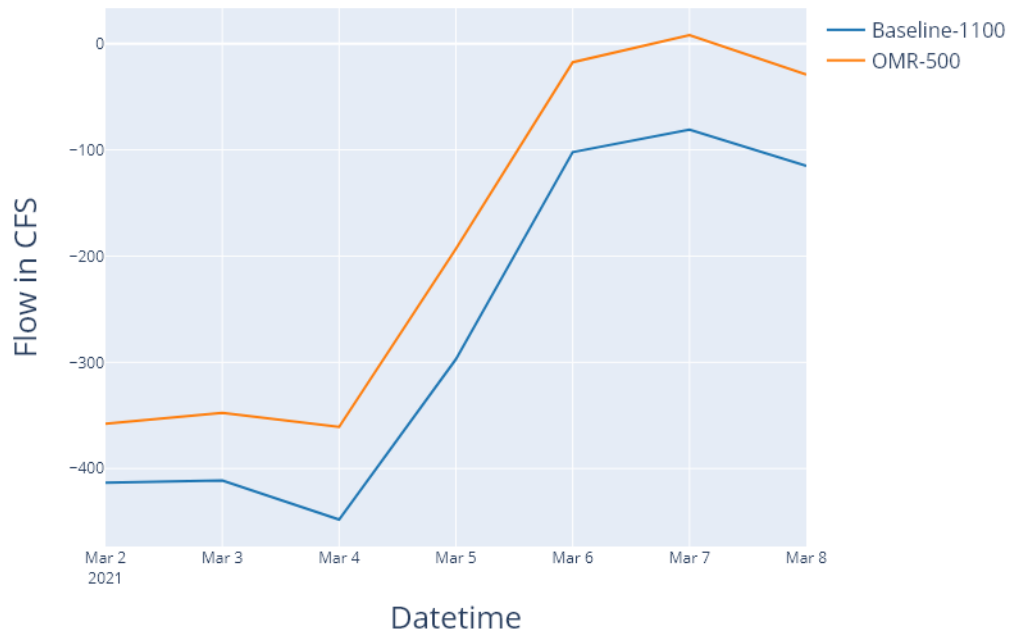


(a)

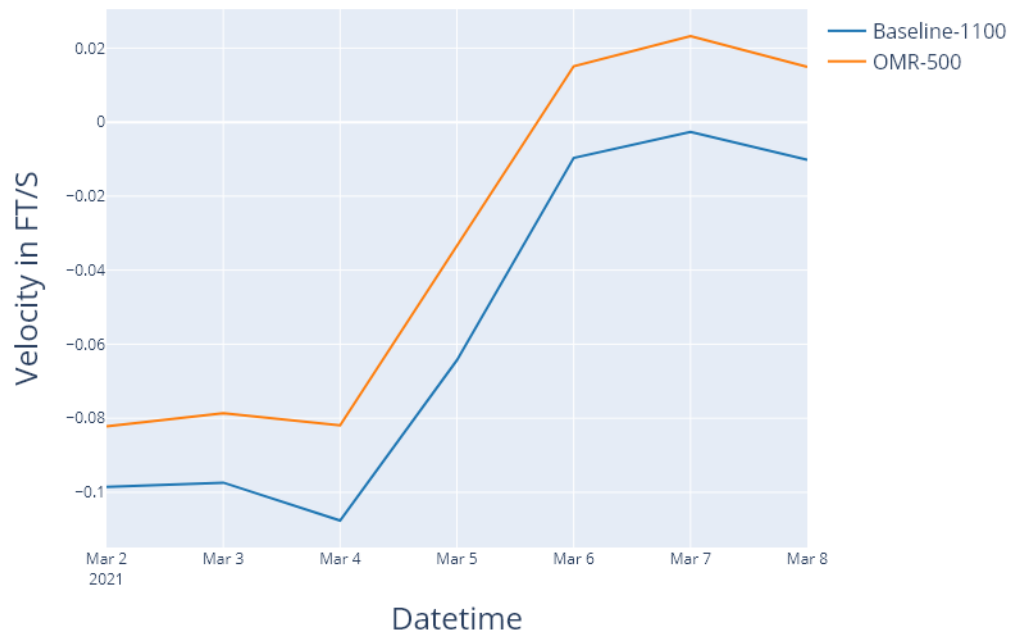


(b)

Figure A12: South Delta along Middle River (CHAN107 – Old River-Bacon Isl.)



(a)



(b)

DSM2 model interpretation entrainment in Delta strata regions

North Delta into Interior and Central Delta

Channels: 49 and 434

No measurable changes to flow and velocity related to modeled OMR conditions are anticipated. It is unlikely that listed salmonids would experience behavioral changes related to modeled OMR conditions this week.

San Joaquin River and Central Delta into South Delta

Channels: 6, 21, 107, 124, and 160

There may be measurable changes to flow and velocity related to modeled OMR conditions, but they are likely to be negligible (<500cfs). Based on recent survey data, listed salmonids are present. Hydrological changes may be detectable by fish. Cumulative net flows within the channels of the South Delta are negative in magnitude. Fish moving from the San Joaquin mainstem would have an increased transit time towards the western Delta.

South Delta into facilities

Channels: 81, 94, and 148

There may be measurable changes to flow and velocity related to modeled OMR conditions, but they are likely to be negligible (<500cfs). Based on recent survey data, listed salmonids are present. Hydrological changes may be detectable by fish. Cumulative net flows within the channels of the South Delta are negative in magnitude. Fish moving from the San Joaquin mainstem into the head of Old River would have a decreased transit time towards the fish salvage facilities.

DSM2 channel locations information

Figure A13. Highlighted DSM2 channels by Delta Strata.

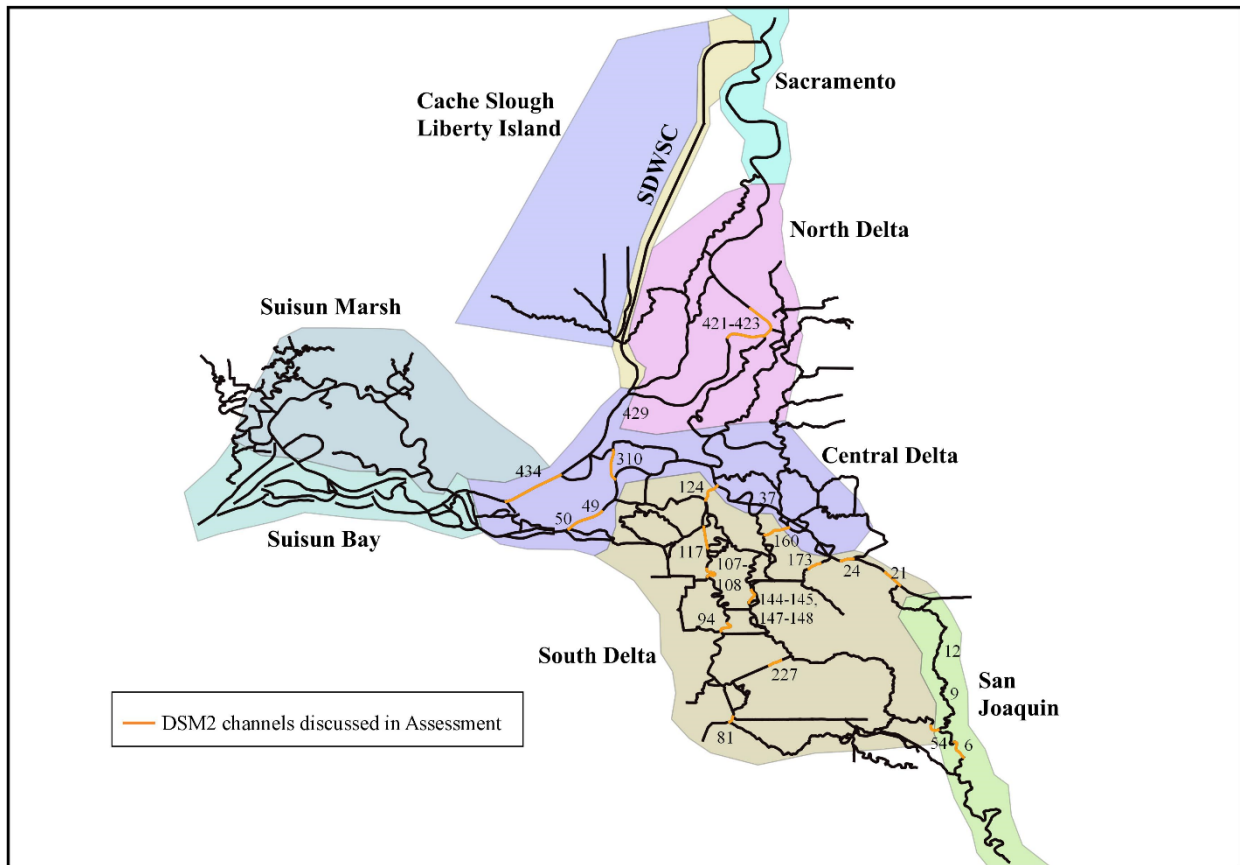


Table A2. Description of channel location, by Delta Strata region. Not all listed channels have model results presented in every weekly Proposed Action Assessment.

DSM2 Channel	Description
North Delta into Interior and Central Delta	
CHAN049	San Joaquin River at Sherman Island
CHAN310	Three-Mile Slough
CHAN421	Sacramento River at Delta Cross Channel
CHAN422	Sacramento River at Delta Cross Channel
CHAN423	Sacramento River at Delta Cross Channel
CHAN434	Sacramento River at Sherman Island
San Joaquin River and Central Delta into South Delta	
CHAN006	San Joaquin River at Head of Old River (HOR)
CHAN021	San Joaquin River downstream from confluence with Calaveras River
CHAN024	San Joaquin River upstream of Turner Cut
CHAN054	Old River at confluence with San Joaquin River (HOR)
CHAN107	Old River north of Rock Slough
CHAN117	Old River south of Franks Tract
CHAN124	Old River between Franks Tract and San Joaquin River
CHAN160	Columbia Cut
CHAN173	Turner Cut
South Delta into Facilities	
CHAN148	Middle River
CHAN227	Victoria Canal
CHAN081	Grant Line Canal
CHAN094	Old River

3/9/2021 Meeting

Background

<i>Process</i>	
Weekly process	<ul style="list-style-type: none"> • DSM2 model runs use a historic and forecasted hydrological input dataset with no assumptions provided by DWR Thursdays and updated by Reclamation Mondays. • Input File updated Monday after initial distribution from DWR for removal of forecasted in lieu of historic input. • Reclamation provides scenarios based on expected OMR index values for the upcoming week. • DSM2 model runs produced Monday and distributed to SaMT members.
<i>Hydraulic footprint information</i>	
Baseline and Scenarios updated	3/08/2021
DSM2 modeling results range	3/09/2021 to 3/15/2021
<i>OMR index value scenarios</i>	
Baseline	-3,300 cfs
Scenario 1	-500 cfs (decreasing from Baseline; Δ 2,800 cfs)
Scenario 2	NA (see special considerations below)
<i>Changes between scenarios</i>	
Hydrology	No (see special considerations below)
Delta Exports	Yes
<i>Common assumptions</i>	
DSM2 run results based on the following assumptions	<ul style="list-style-type: none"> • CCFB Gates are operating to Priority 2 throughout the forecast period. • The Delta Cross Channel gates are closed throughout the forecast period. • Suisun Marsh salinity control flashboards are in, and 2 of the Suisun Marsh Salinity Control gates are in tidal operation and 1 gate is closed for maintenance. • San Joaquin River flow at Vernalis is at 1,130 cfs at the beginning of the forecast period and is estimated to remain at 1,130 cfs by the end of the forecast period with a slight fluctuation between 3/10/2021 and 3/12/2021. (Figure A1) • Sacramento River flow at Freeport is at 8,227 cfs at the beginning of the forecast period and is expected to increase to 9,527 cfs by the end of the forecast period. (Figure A1). • Clifton Court Forebay and Tracy Pumping Plant pumping is shown for model runs in Figure A2a-A2b.
<i>Additional information</i>	
Considerations for current DSM2 model run	This week there no Scenario 2 was modeled. The second expected OMR Index Value (see Operations Outlook document) could not be reached without a change in hydrology.
Caveats	<ul style="list-style-type: none"> • Time-step: DSM2 generates results at 15-minute time-steps. Visualizations of DSM2 model run results are aggregated over daily time-steps. Operations function on a more granular scale than daily time-step. • Salmonid behavior: DSM2 provides flow fields which salmonids may encounter but salmonids are not neutrally buoyant particles. Models which incorporate behavior from acoustic tagged salmonids are being developed for South Delta (ePTM, ecoPTM).

DSM2 model results: summary tables

Table A1. Summary of minimum, maximum, mean, and percent positive flows (cfs) and velocities (ft/s) by DSM2 channel for OMR scenarios over a 6-day time period. For scenario values refer to “Hydraulic Footprint Information” in the conditions / assumptions section above.

Scenario (cfs)	DSM2 Channel	Flow Min.	Flow Max.	Flow Mean	Flow % Positive	Velocity Min.	Velocity Max.	Velocity Mean	Velocity % Positive
Baseline	6	-65.2	1885.3	1171.6	99	0.0	1.1	0.7	99
Scenario 1	6	-118.9	1909.3	1170.3	98	-0.1	1.1	0.6	98
Baseline	21	-7550.9	6599.9	359.4	54	-0.5	0.5	0.0	54
Scenario 1	21	-7581.1	6666.0	478.2	55	-0.5	0.5	0.0	55
Baseline	49	-154268.0	136609.5	1679.0	53	-2.0	1.8	0.1	53
Scenario 1	49	-153164.2	138548.2	3813.6	53	-1.9	1.8	0.1	53
Baseline	81	-5539.5	2291.1	-1515.9	42	-1.6	0.7	-0.4	42
Scenario 1	81	-3273.4	2399.3	-348.7	52	-0.9	0.8	-0.1	52
Baseline	94	-15040.0	9943.2	-1589.5	50	-2.1	1.5	-0.2	50
Scenario 1	94	-12192.1	10211.3	-151.1	52	-1.7	1.5	0.0	52
Baseline	107	-6328.3	4120.9	-644.3	51	-1.8	1.2	-0.2	51
Scenario 1	107	-5798.6	4208.3	-243.9	53	-1.7	1.2	-0.1	53
Baseline	124	-19642.5	12038.4	-2858.4	45	-0.6	0.4	-0.1	45
Scenario 1	124	-19249.9	12344.0	-2150.9	47	-0.6	0.4	-0.1	47
Baseline	148	-8601.6	5847.8	-850.0	51	-0.9	0.7	-0.1	51
Scenario 1	148	-7324.5	6002.6	-189.2	53	-0.8	0.7	0.0	53
Baseline	160	-4769.4	3506.4	-299.7	52	-0.5	0.5	0.0	52
Scenario 1	160	-4494.4	3661.7	-3.5	53	-0.5	0.5	0.0	53
Baseline	434	-163732.7	152434.1	7251.5	54	-1.9	1.8	0.1	54
Scenario 1	434	-163348.6	152890.4	7814.0	54	-1.8	1.8	0.1	54

DSM2 model results: figures

Figure A1. Daily forecasted Vernalis and Freeport flows (cfs)

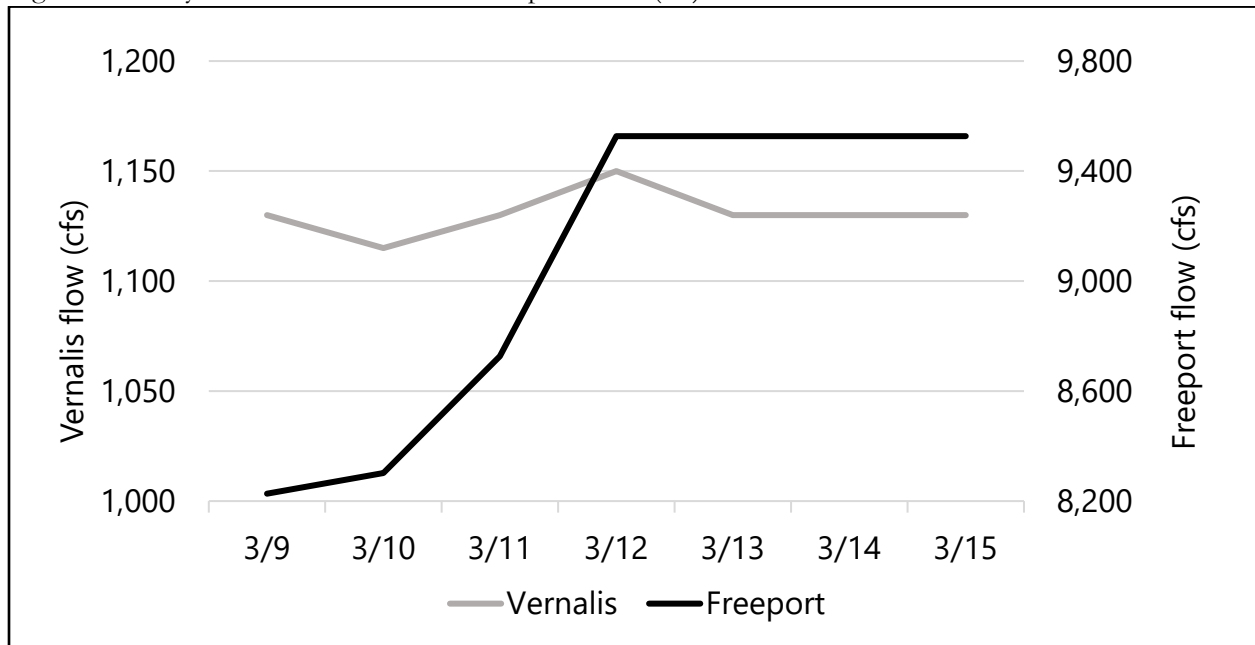


Figure A2a. Daily forecasted pumping: Jones and Banks (cfs), Baseline

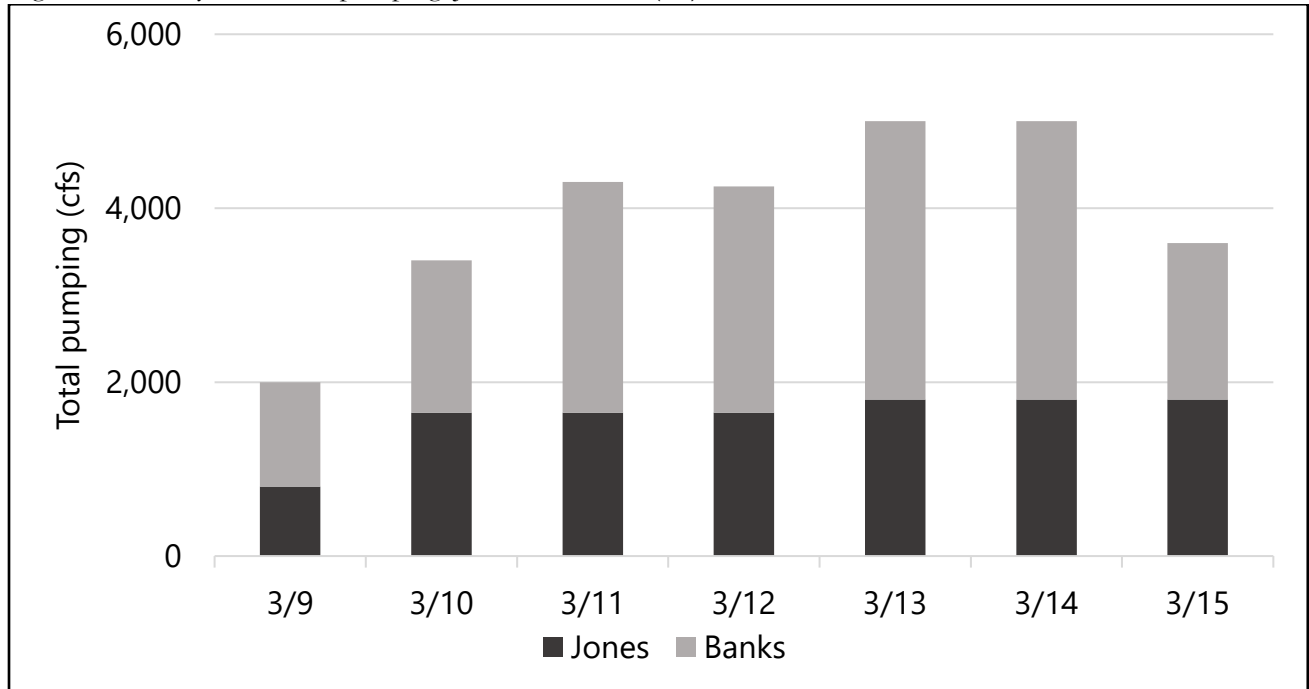
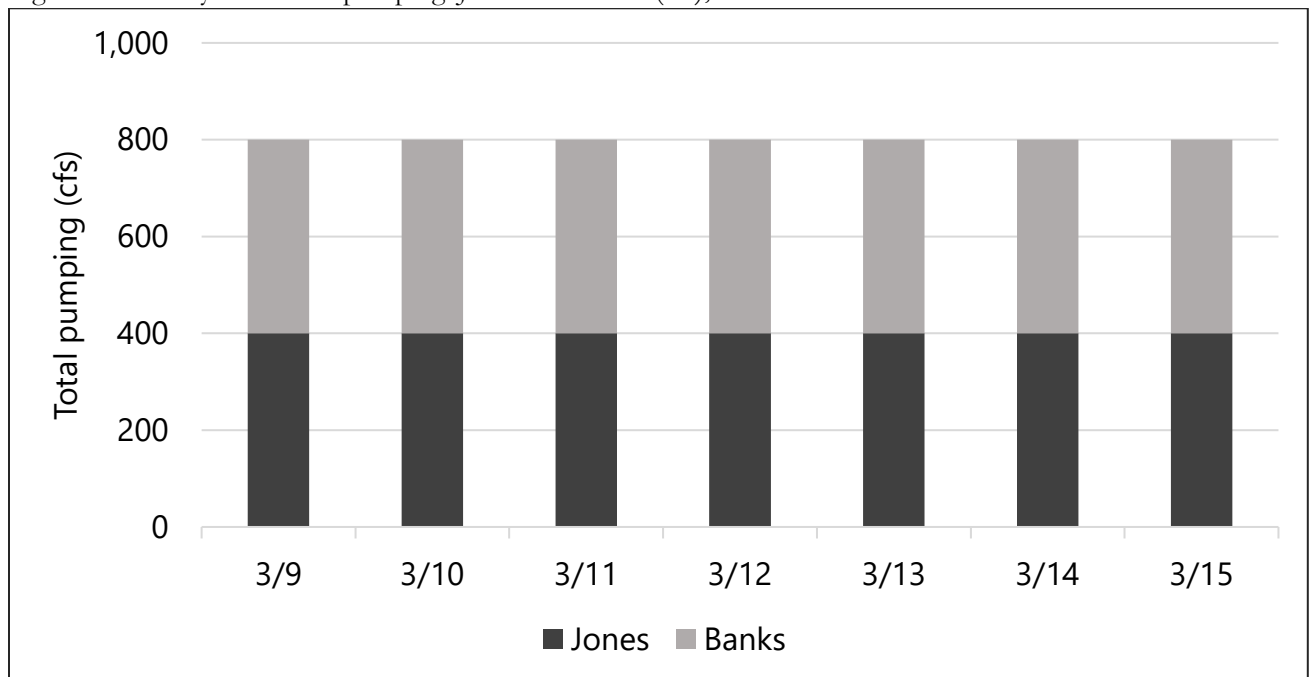


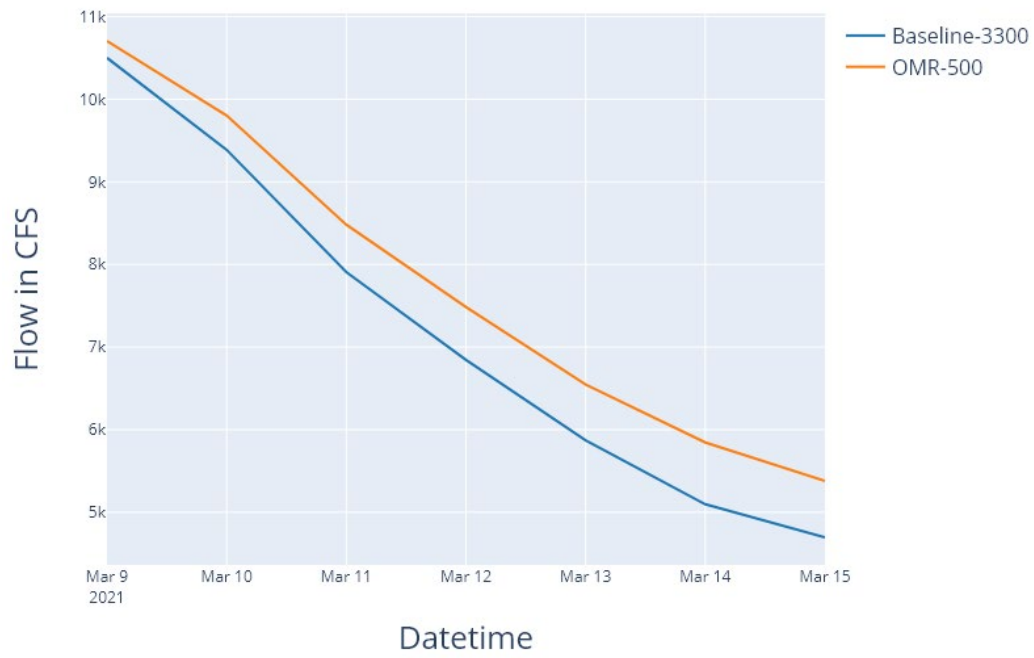
Figure A2b. Daily forecasted pumping: Jones and Banks (cfs), Scenario 1



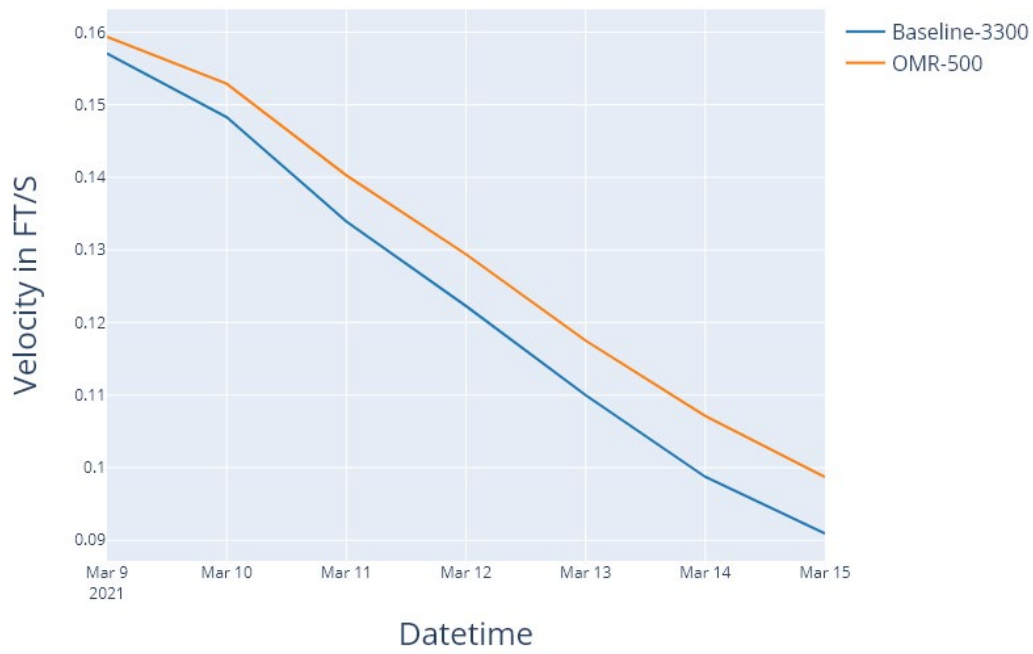
The following captions apply to the time-series plots for flow and velocity in selected locations (see Figure A13 and Table A2 for channel location information) below:

- (k) Time-series plot (1-day aggregated): Baseline, Scenario 1 OMR, and Scenario 2 OMR. X-axis represents daily time steps and y-axis represents flow (cfs) values. For Baseline, Scenario 1, and Scenario 2 values refer to “Hydraulic Footprint Information” in the section above. Reported summary statistics (minimum, maximum, etc.) are found in Table A1.
- (l) Time-series plot (1-day aggregated): Baseline, Scenario 1 OMR, and Scenario 2 OMR. X-axis represents daily time steps and y-axis represents velocity (cfs) values. For Baseline, Scenario 1, and Scenario 2 values refer to “Hydraulic Footprint Information” in the section above. Reported summary statistics (minimum, maximum, etc.) are found in Table A1.

Figure A3: Sacramento River at Sherman Island (CHAN434)

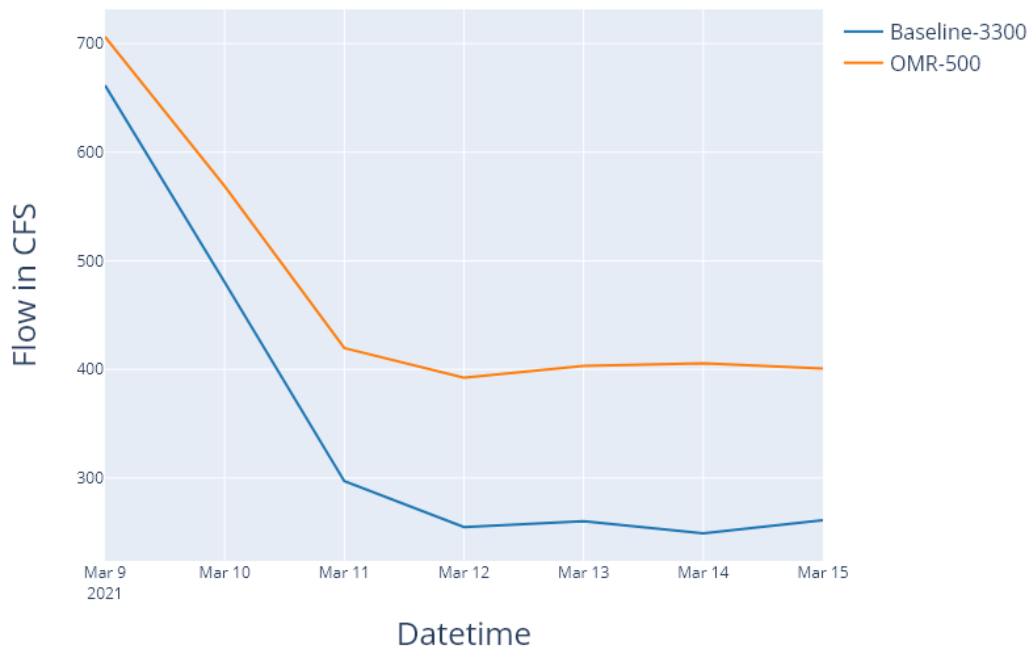


(a)

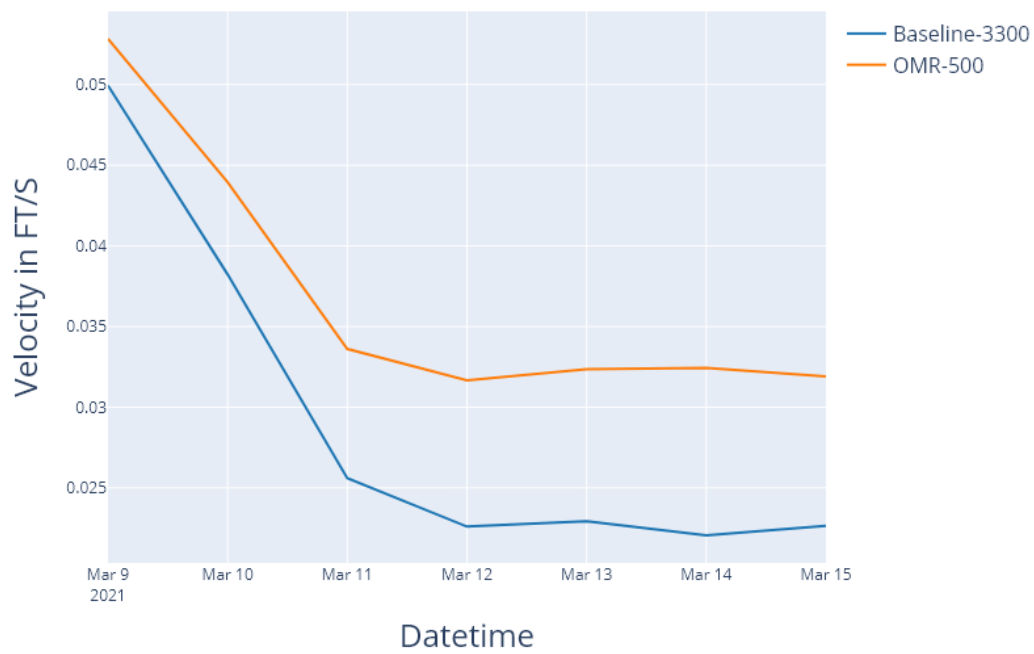


(b)

Figure A4: San Joaquin River downstream of confluence with Calaveras River (CHAN021)

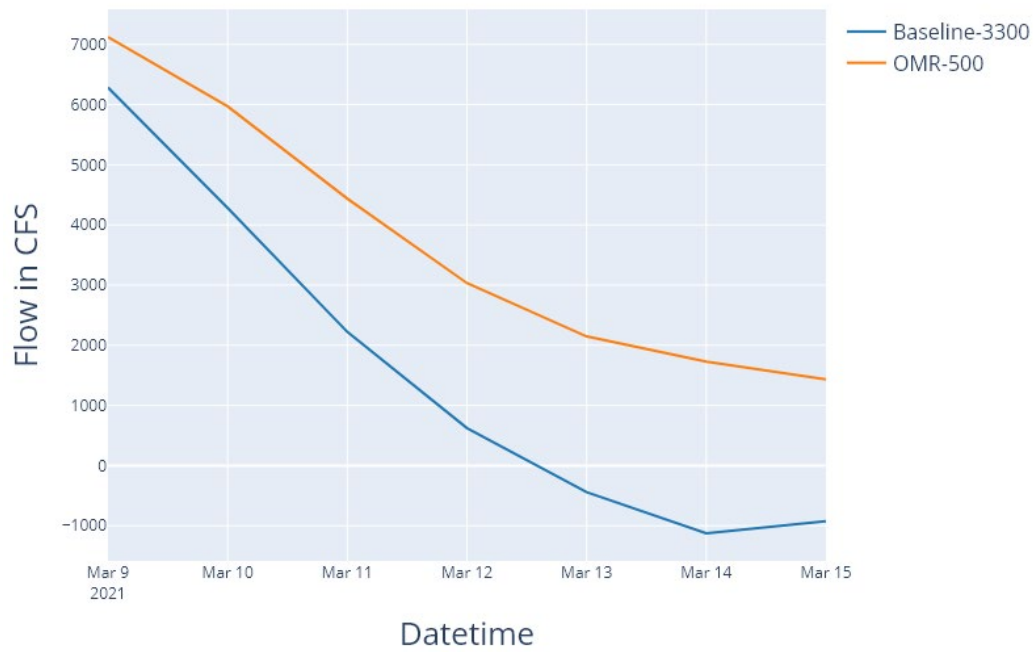


(a)

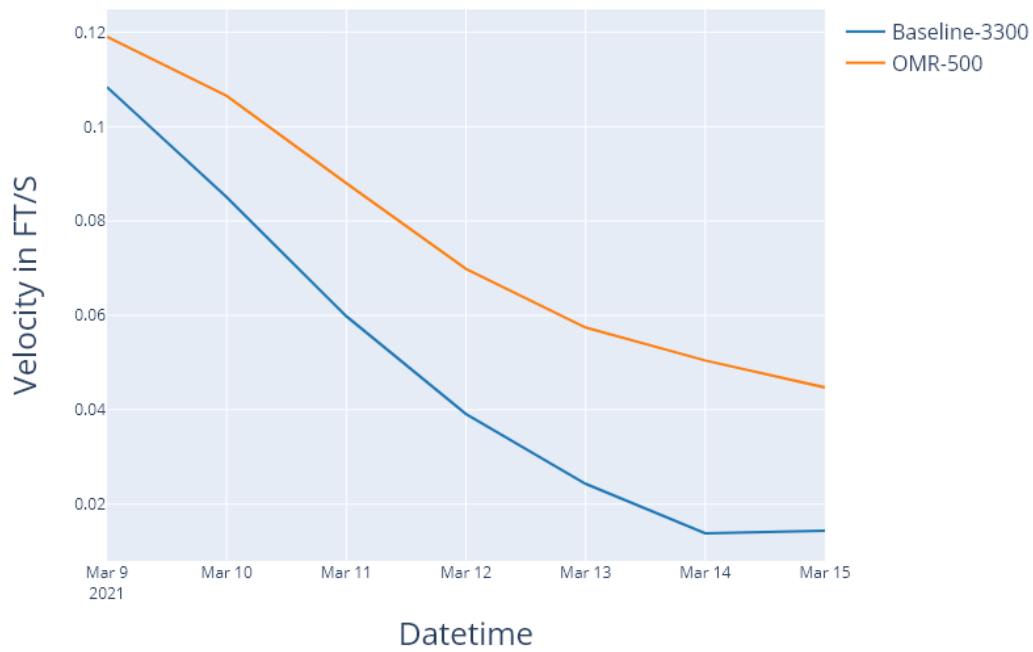


(b)

Figure A5: San Joaquin River at Sherman Island (CHAN049)

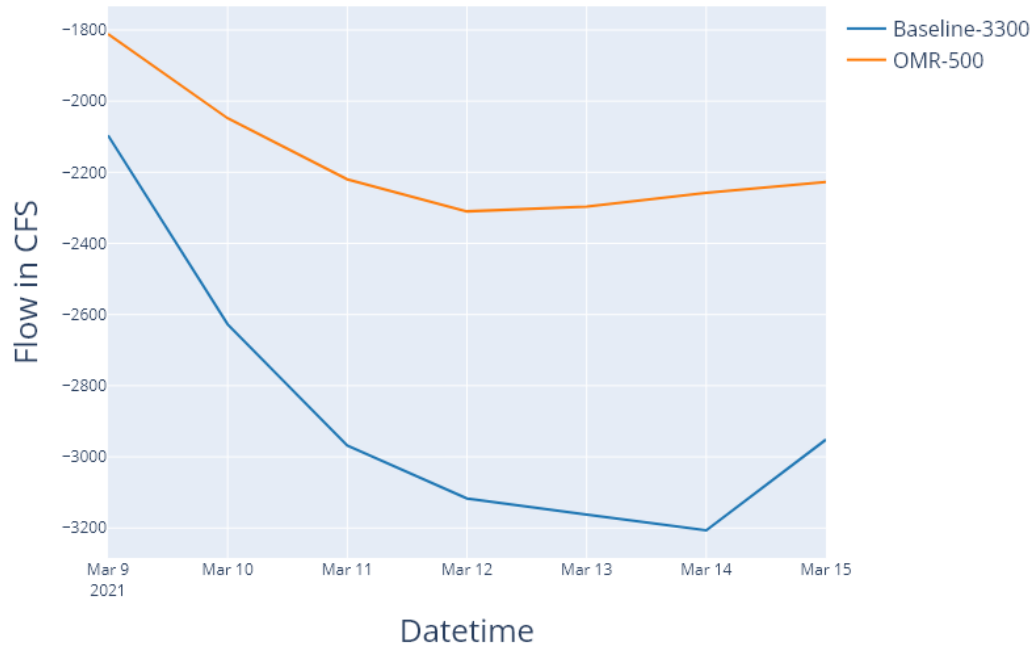


(a)

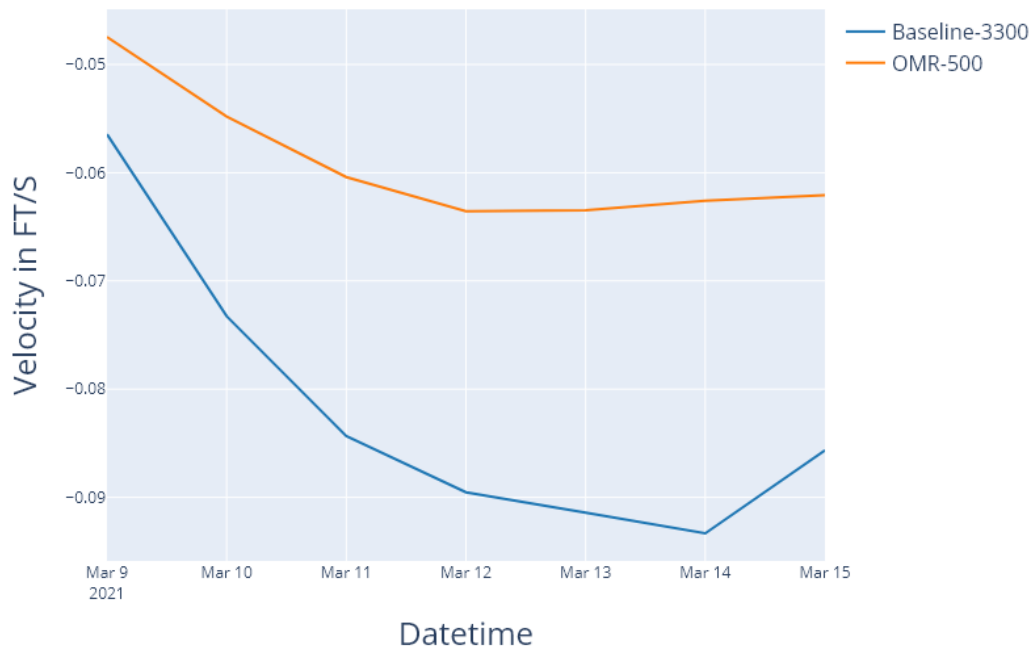


(b)

Figure A6: Old River between Franks Tract and San Joaquin River (CHAN124)

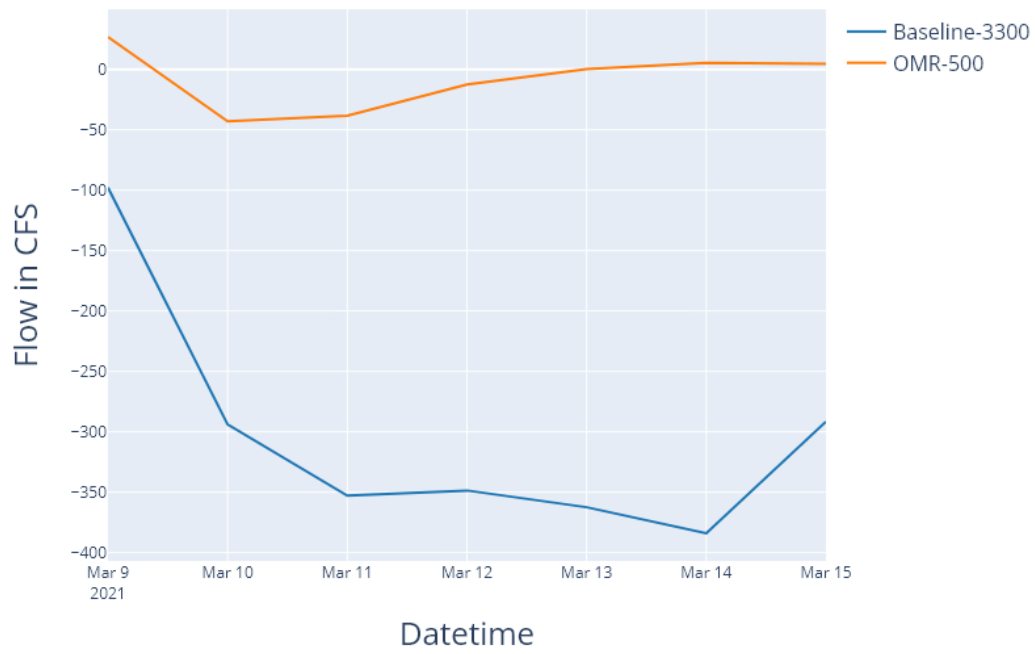


(a)

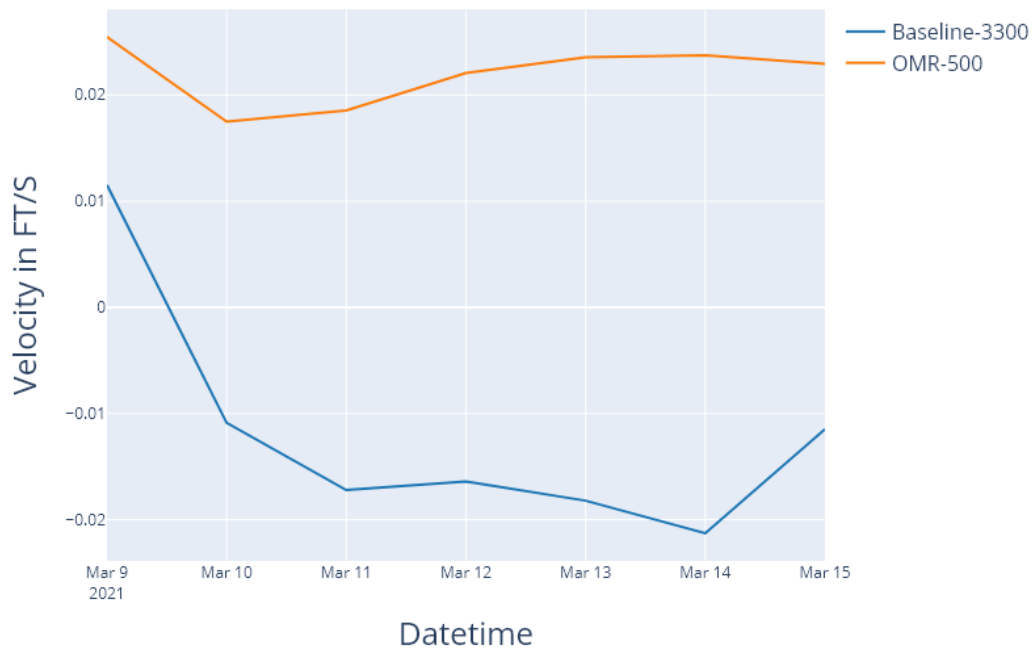


(b)

Figure A7: Lower San Joaquin River at Columbia Cut (CHAN160)



(a)

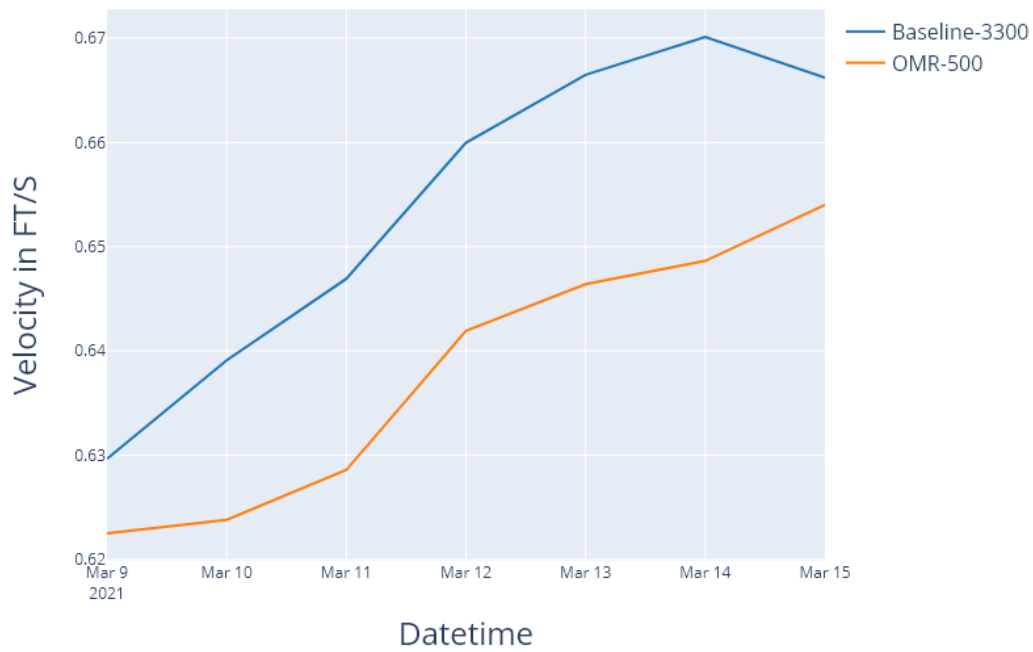


(b)

Figure A8: Slightly upstream of Head of Old River (CHAN006)

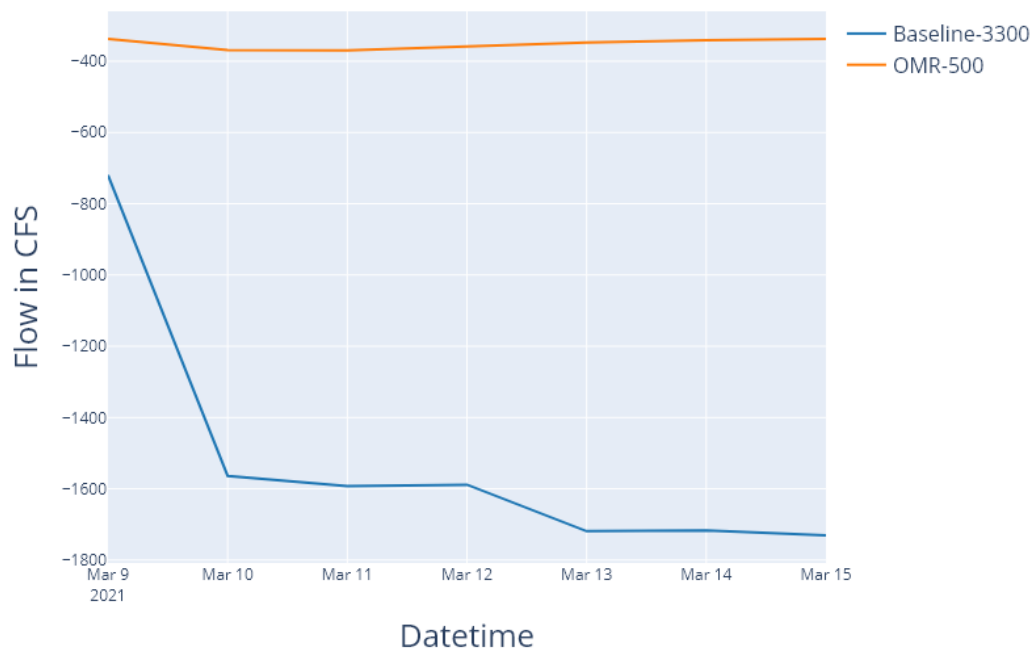


(a)

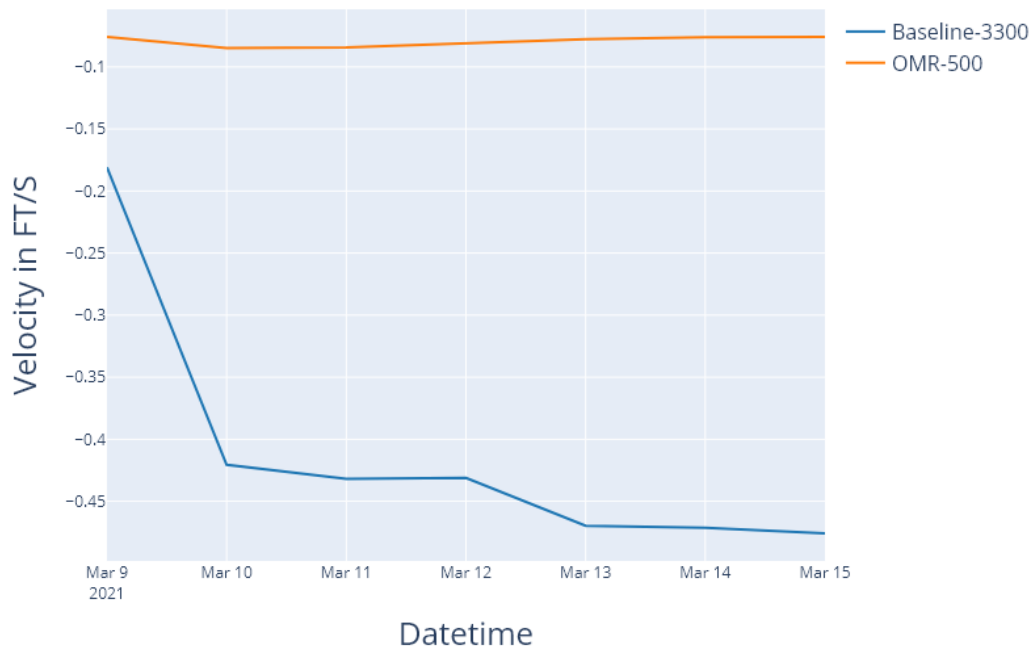


(b)

Figure A9: Old River adjacent to Grant Line Canal (CHAN081 – Old River between Grant Line and CVP)

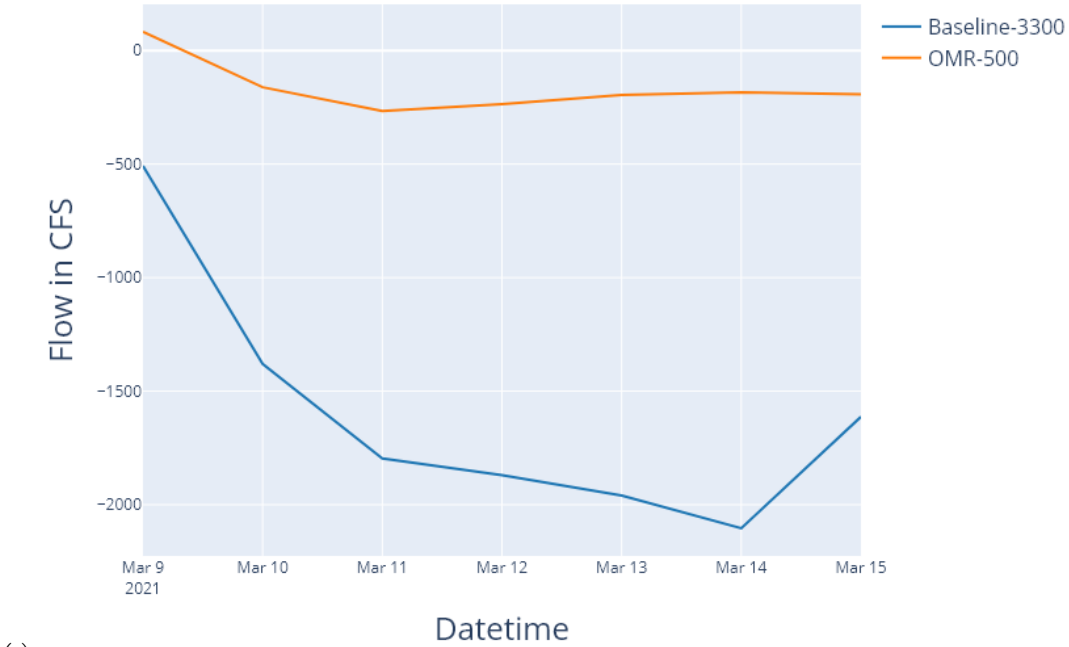


(a)

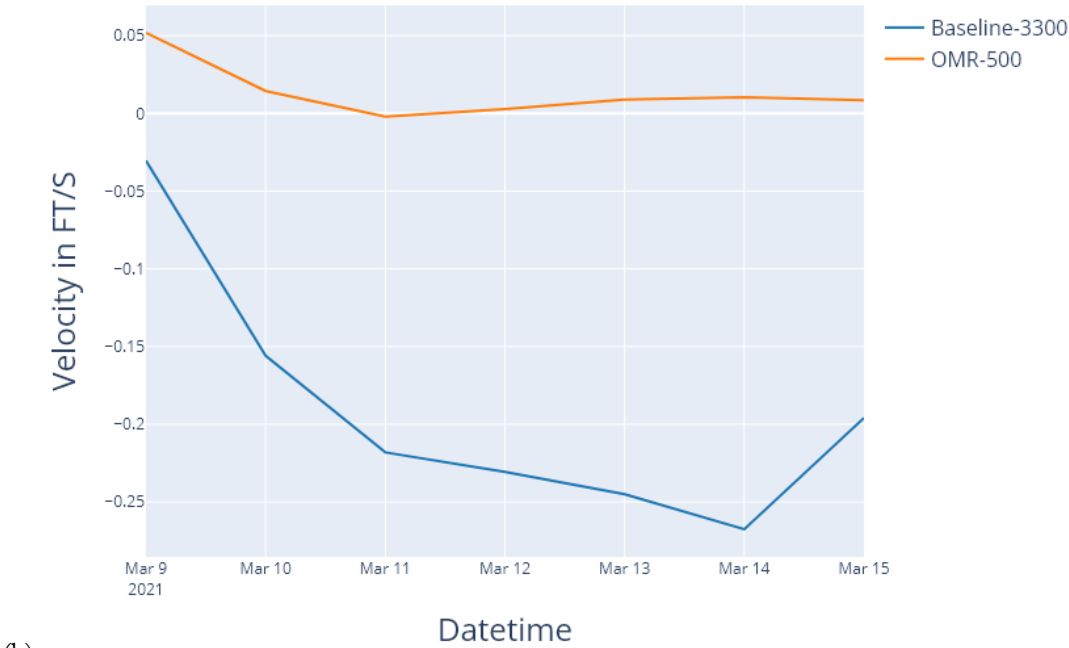


(b)

Figure A10: South Delta along Old River (CHAN094 – Old River/HW4)

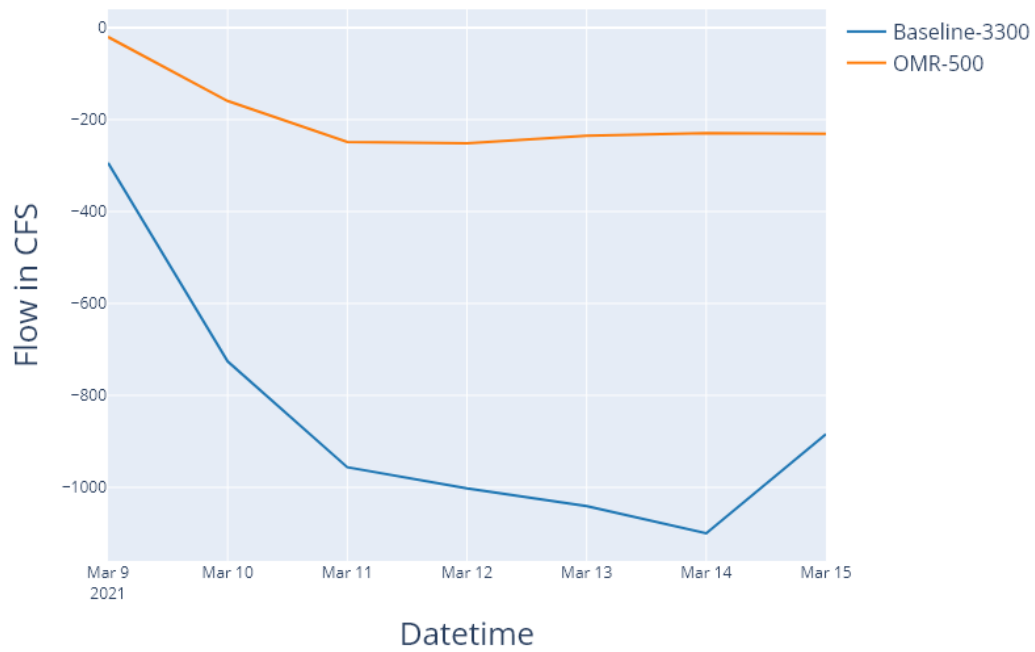


(a)

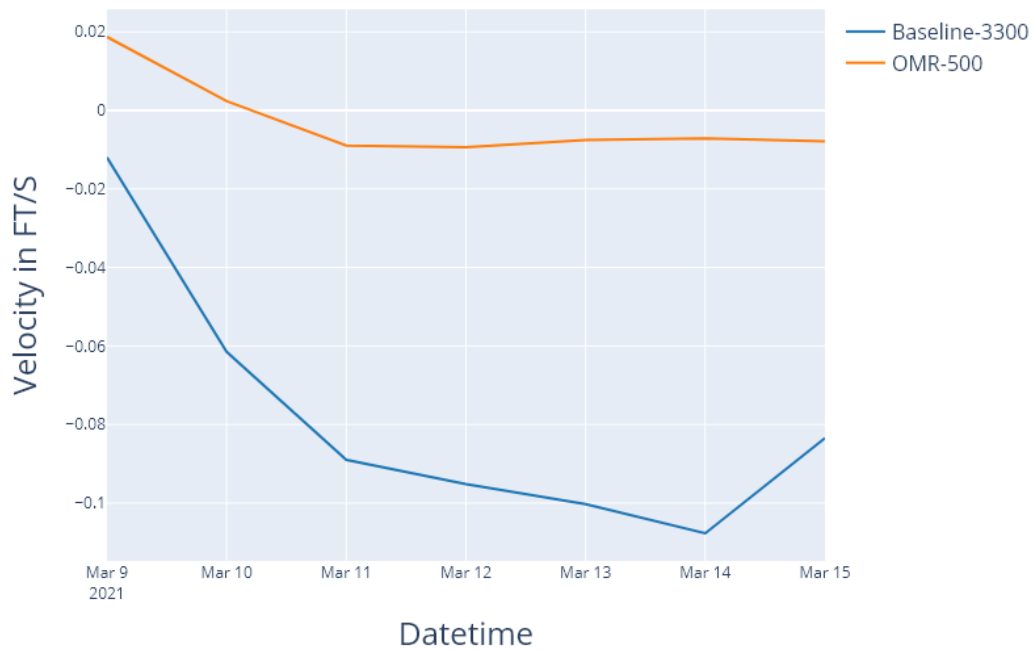


(b)

Figure A11: South Delta along Middle River (CHAN148 – Middle River/ Woodward Cut)

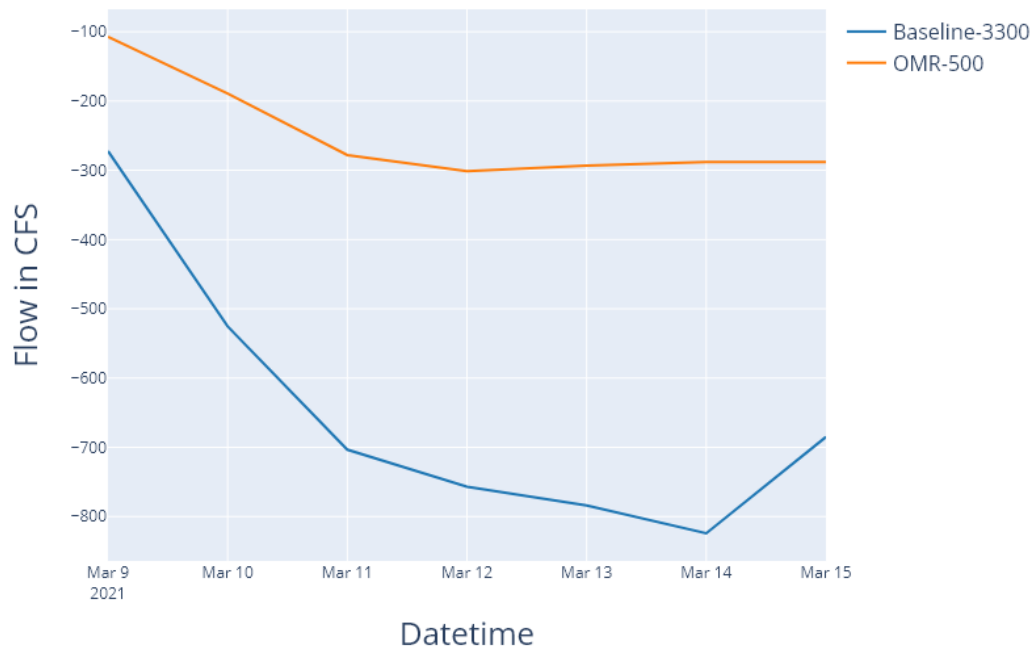


(a)

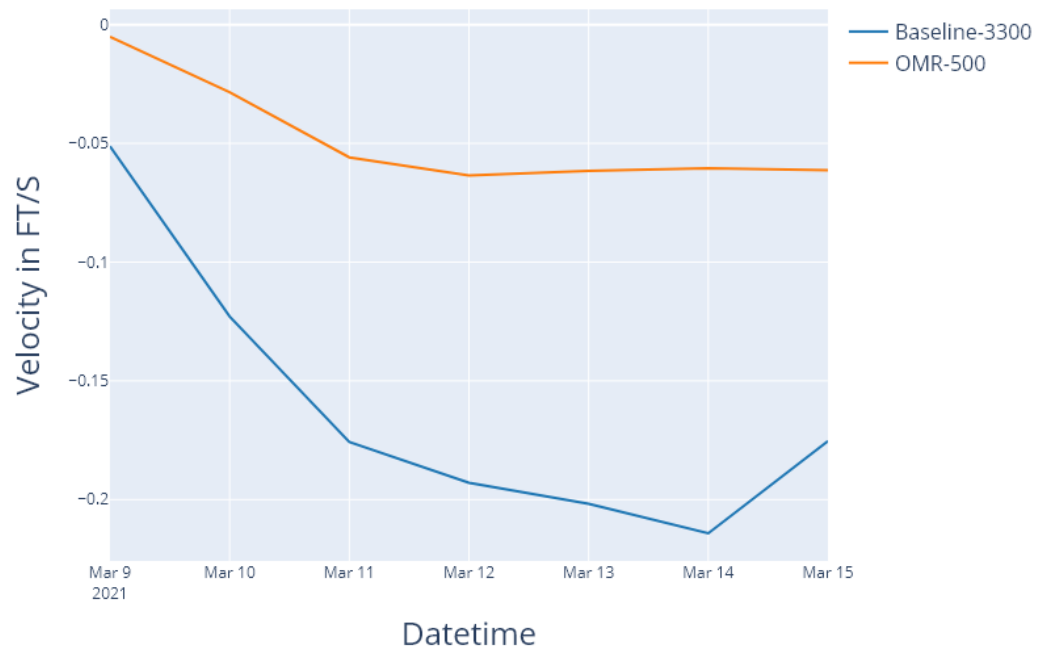


(b)

Figure A12: South Delta along Middle River (CHAN107 – Old River-Bacon Isl.)



(a)



(b)

DSM2 model interpretation entrainment in Delta strata regions

North Delta into Interior and Central Delta

Channels: 49 and 434

Slight measurable changes to flow and velocity related to modeled OMR conditions are anticipated. It is unlikely that listed salmonids would experience behavioral changes related to modeled OMR conditions this week. Despite low exports the zone of influence has expanded further south due to the low hydrology.

San Joaquin River and Central Delta into South Delta

Channels: 6, 21, 107, 124, and 160

There will be measurable changes to flow and velocity related to modeled OMR conditions. Based on recent survey data, listed salmonids are present. Hydrological changes may be detectable by fish. Cumulative net flows within the channels of the South Delta are negative in magnitude. Fish moving from the San Joaquin mainstem would have an increased transit time towards the western Delta. Despite low exports the zone of influence has expanded further north due to the low hydrology.

South Delta into facilities

Channels: 81, 94, and 148

There will be measurable changes to flow and velocity related to modeled OMR conditions. Based on recent survey data, listed salmonids are present. Hydrological changes may be detectable by fish. Cumulative net flows within the channels of the South Delta are negative in magnitude. Fish moving from the San Joaquin mainstem into the head of Old River would have a decreased transit time towards the fish salvage facilities.

DSM2 channel locations information

Figure A13. Highlighted DSM2 channels by Delta Strata.

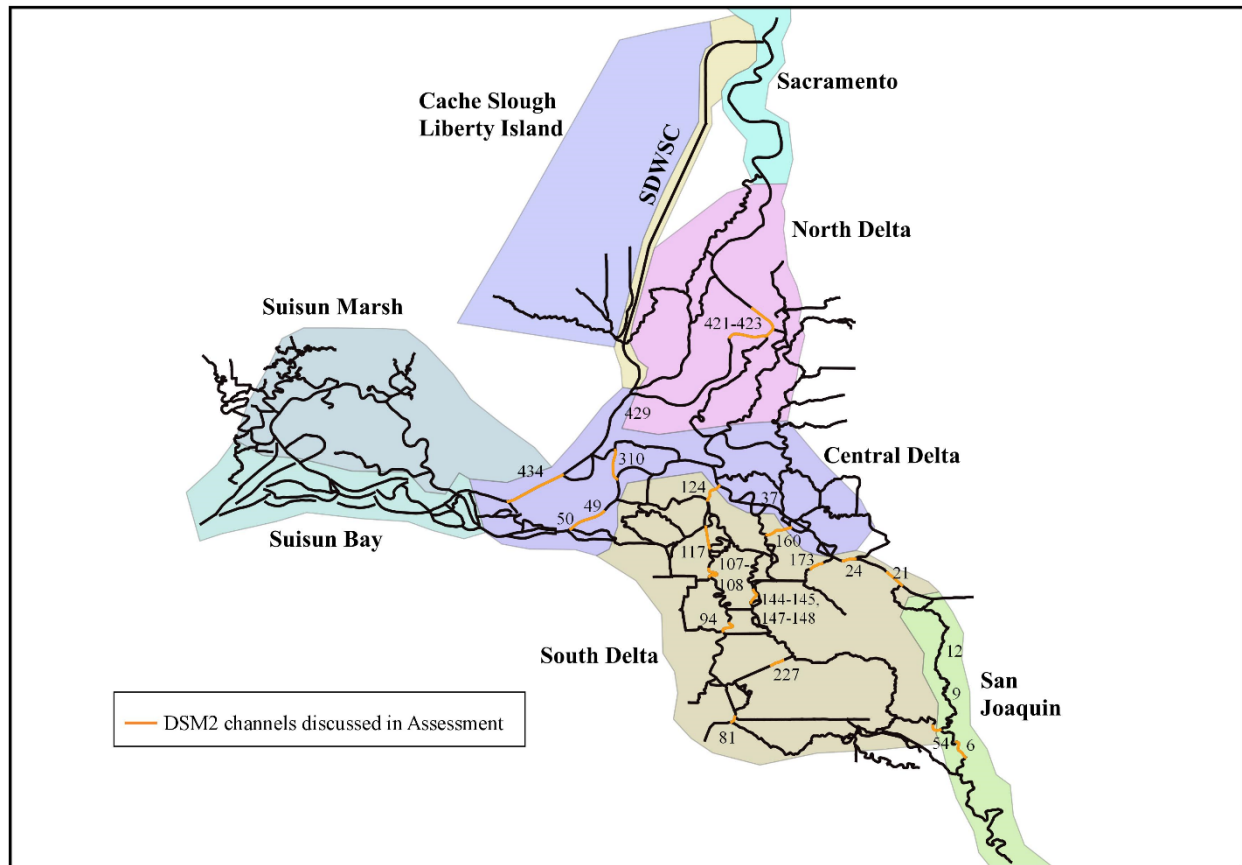


Table A2. Description of channel location, by Delta Strata region. Not all listed channels have model results presented in every weekly Proposed Action Assessment.

DSM2 Channel	Description
North Delta into Interior and Central Delta	
CHAN049	San Joaquin River at Sherman Island
CHAN310	Three-Mile Slough
CHAN421	Sacramento River at Delta Cross Channel
CHAN422	Sacramento River at Delta Cross Channel
CHAN423	Sacramento River at Delta Cross Channel
CHAN434	Sacramento River at Sherman Island
San Joaquin River and Central Delta into South Delta	
CHAN006	San Joaquin River at Head of Old River (HOR)
CHAN021	San Joaquin River downstream from confluence with Calaveras River
CHAN024	San Joaquin River upstream of Turner Cut
CHAN054	Old River at confluence with San Joaquin River (HOR)
CHAN107	Old River north of Rock Slough
CHAN117	Old River south of Franks Tract
CHAN124	Old River between Franks Tract and San Joaquin River
CHAN160	Columbia Cut
CHAN173	Turner Cut
South Delta into Facilities	
CHAN148	Middle River
CHAN227	Victoria Canal
CHAN081	Grant Line Canal
CHAN094	Old River

3/16/2021 Meeting

Background

<i>Process</i>	
Weekly process	<ul style="list-style-type: none"> • DSM2 model runs use a historic and forecasted hydrological input dataset with no assumptions provided by DWR Thursdays and updated by Reclamation Mondays. • Input File updated Monday after initial distribution from DWR for removal of forecasted in lieu of historic input. • Reclamation provides scenarios based on expected OMR index values for the upcoming week. • DSM2 model runs produced Monday and distributed to SaMT members.
<i>Hydraulic footprint information</i>	
Baseline and Scenarios updated	3/15/2021
DSM2 modeling results range	3/16/2021 to 3/22/2021
<i>OMR index value scenarios</i>	
Baseline	-2,400 cfs
Scenario 1	-800 cfs (decreasing from Baseline; Δ 1,600 cfs)
Scenario 2	-2,550 cfs (increasing from Baseline; Δ 150 cfs)
<i>Changes between scenarios</i>	
Hydrology	No
Delta Exports	Yes
<i>Common assumptions</i>	
DSM2 run results based on the following assumptions	<ul style="list-style-type: none"> • CCFB Gates are operating to Priority 2 throughout the forecast period. • The Delta Cross Channel gates are closed throughout the forecast period. • Suisun Marsh salinity control flashboards are in, and 2 of the Suisun Marsh Salinity Control gates are in tidal operation and 1 gate is closed for maintenance. • San Joaquin River flow at Vernalis is at 1,142 cfs at the beginning of the forecast period and is estimated to decrease to 970 cfs by the end of the forecast period. (Figure A1) • Sacramento River flow at Freeport is at 10,150 cfs at the beginning of the forecast period and is expected to decrease to 9,850 cfs by the end of the forecast period. (Figure A1). • Clifton Court Forebay and Tracy Pumping Plant pumping is shown for model runs in Figure A2a-A2c.
<i>Additional information</i>	
Considerations for current DSM2 model run	No special considerations for this week's DSM2 model runs.
Caveats	<ul style="list-style-type: none"> • Time-step: DSM2 generates results at 15-minute time-steps. Visualizations of DSM2 model run results are aggregated over daily time-steps. Operations function on a more granular scale than daily time-step. • Salmonid behavior: DSM2 provides flow fields which salmonids may encounter but salmonids are not neutrally buoyant particles. Models which incorporate behavior from acoustic tagged salmonids are being developed for South Delta (ePTM, ecoPTM).

DSM2 model results: summary tables

Table A1. Summary of minimum, maximum, mean, and percent positive flows (cfs) and velocities (ft/s) by DSM2 channel for OMR scenarios over a 6-day time period. For scenario values refer to “Hydraulic Footprint Information” in the conditions / assumptions section above.

Scenario (cfs)	DSM2 Channel	Flow Min.	Flow Max.	Flow Mean	Flow % Positive	Velocity Min.	Velocity Max.	Velocity Mean	Velocity % Positive
Baseline	6	-49.9	1786.5	1090.4	99	0.0	1.1	0.6	99
Scenario 2	6	-57.1	1786.4	1090.3	98	0.0	1.1	0.6	98
Scenario 1	6	-230.8	1799.8	1089.7	95	-0.1	1.1	0.6	95
Baseline	21	-6998.9	6135.7	365.5	53	-0.5	0.4	0.0	53
Scenario 2	21	-6999.2	6135.0	363.0	53	-0.5	0.4	0.0	53
Scenario 1	21	-6988.9	6208.0	439.2	53	-0.5	0.4	0.0	53
Baseline	49	-145769.0	128129.9	135.1	51	-1.8	1.7	0.0	51
Scenario 2	49	-145770.4	128087.4	91.0	51	-1.8	1.7	0.0	51
Scenario 1	49	-145739.0	129077.3	1342.8	52	-1.8	1.7	0.0	52
Baseline	81	-4864.4	2236.8	-849.4	46	-1.3	0.7	-0.2	46
Scenario 2	81	-5014.6	2509.3	-849.6	45	-1.3	0.7	-0.2	45
Scenario 1	81	-3619.8	1909.2	-688.8	48	-1.0	0.6	-0.2	48
Baseline	94	-13766.9	9342.3	-989.8	50	-1.9	1.4	-0.1	50
Scenario 2	94	-13985.0	9341.2	-1022.7	49	-1.9	1.4	-0.1	49
Scenario 1	94	-11918.1	9502.6	-185.7	52	-1.6	1.4	0.0	52
Baseline	107	-5833.3	3897.9	-489.7	50	-1.6	1.1	-0.1	50
Scenario 2	107	-5854.9	3897.4	-497.8	50	-1.6	1.1	-0.1	50
Scenario 1	107	-5593.8	3963.0	-256.5	51	-1.6	1.2	-0.1	51
Baseline	124	-18129.6	11278.7	-2364.7	44	-0.6	0.4	-0.1	44
Scenario 2	124	-18135.2	11277.7	-2378.1	44	-0.6	0.4	-0.1	44
Scenario 1	124	-18007.9	11368.8	-1960.2	45	-0.6	0.4	-0.1	45
Baseline	148	-7892.8	5551.0	-582.7	51	-0.9	0.6	-0.1	51
Scenario 2	148	-7996.9	5550.1	-595.6	50	-0.9	0.6	-0.1	50
Scenario 1	148	-7184.6	5639.1	-210.9	51	-0.8	0.7	0.0	51

Scenario (cfs)	DSM2 Channel	Flow Min.	Flow Max.	Flow Mean	Flow % Positive	Velocity Min.	Velocity Max.	Velocity Mean	Velocity % Positive
Baseline	160	-4360.6	3450.3	-140.5	52	-0.5	0.5	0.0	52
Scenario 2	160	-4413.1	3450.3	-148.7	52	-0.5	0.5	0.0	52
Scenario 1	160	-4353.7	3450.3	15.0	53	-0.5	0.5	0.0	53
Baseline	434	-153577.3	145757.2	5038.6	52	-1.7	1.7	0.1	52
Scenario 2	434	-153577.3	145755.4	5025.7	52	-1.7	1.7	0.1	52
Scenario 1	434	-153577.3	145828.0	5365.0	52	-1.7	1.7	0.1	52

Table A2. Summary of KS statistic values (comparison of distribution of each scenario model results with baseline; KS statistic closer to 1 distributions are dissimilar and closer to 0 distributions are similar). For scenario values refer to “Hydraulic Footprint Information” in the conditions / assumptions section above.

DSM2 Channel	Flow: Baseline vs Scenario 1	Flow: Baseline vs Scenario 2	Velocity: Baseline vs Scenario 1	Velocity: Baseline vs Scenario 2
6	0.12	0.02	0.04	0.01
21	0.05	0.01	0.05	0.01
49	0.03	0.01	0.03	0.01
81	0.10	0.02	0.13	0.02
94	0.11	0.02	0.12	0.03
107	0.08	0.03	0.08	0.02
124	0.05	0.01	0.05	0.01
148	0.10	0.02	0.11	0.03
160	0.08	0.01	0.09	0.02
434	0.01	0.00	0.01	0.00

DSM2 model results: figures

Figure A1. Daily forecasted Vernalis and Freeport flows (cfs)

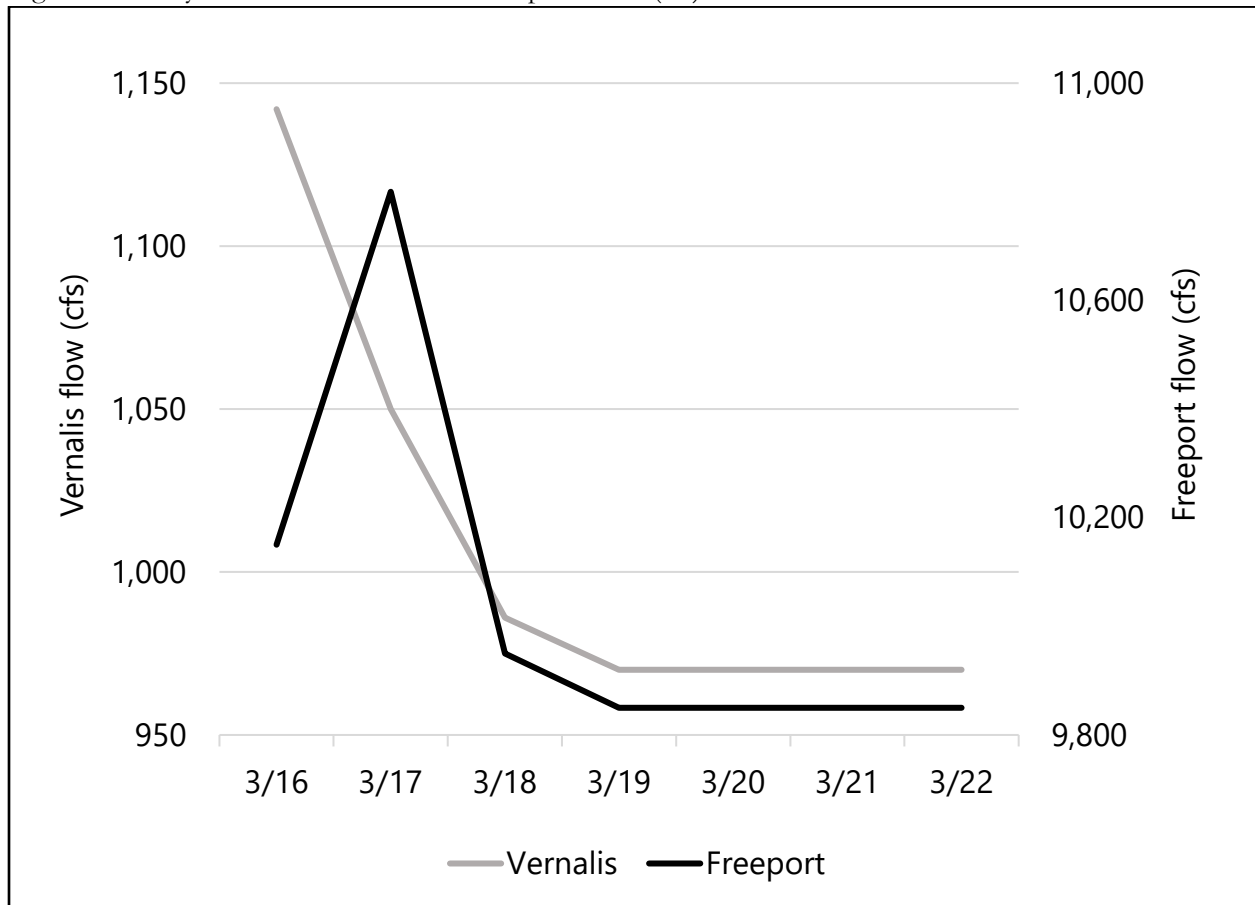


Figure A2a. Daily forecasted pumping: Jones and Banks (cfs), Baseline

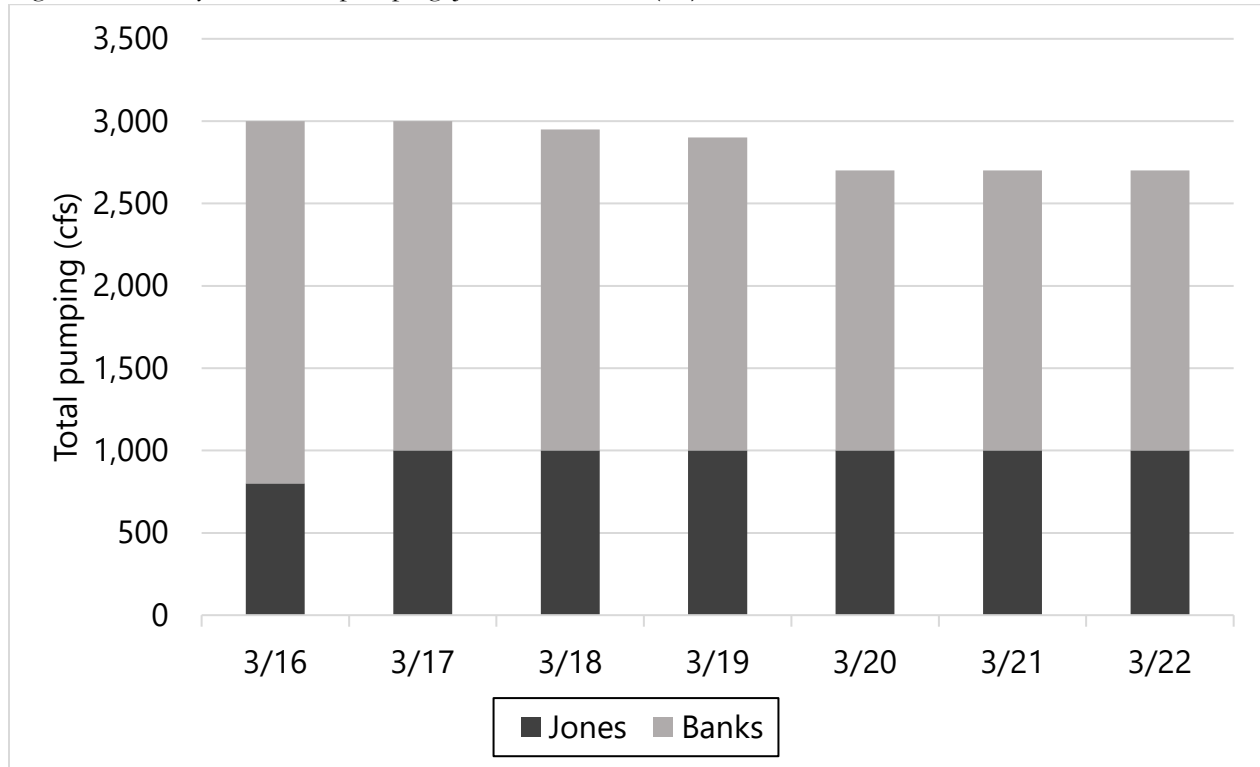


Figure A2b. Daily forecasted pumping: Jones and Banks (cfs), Scenario 1

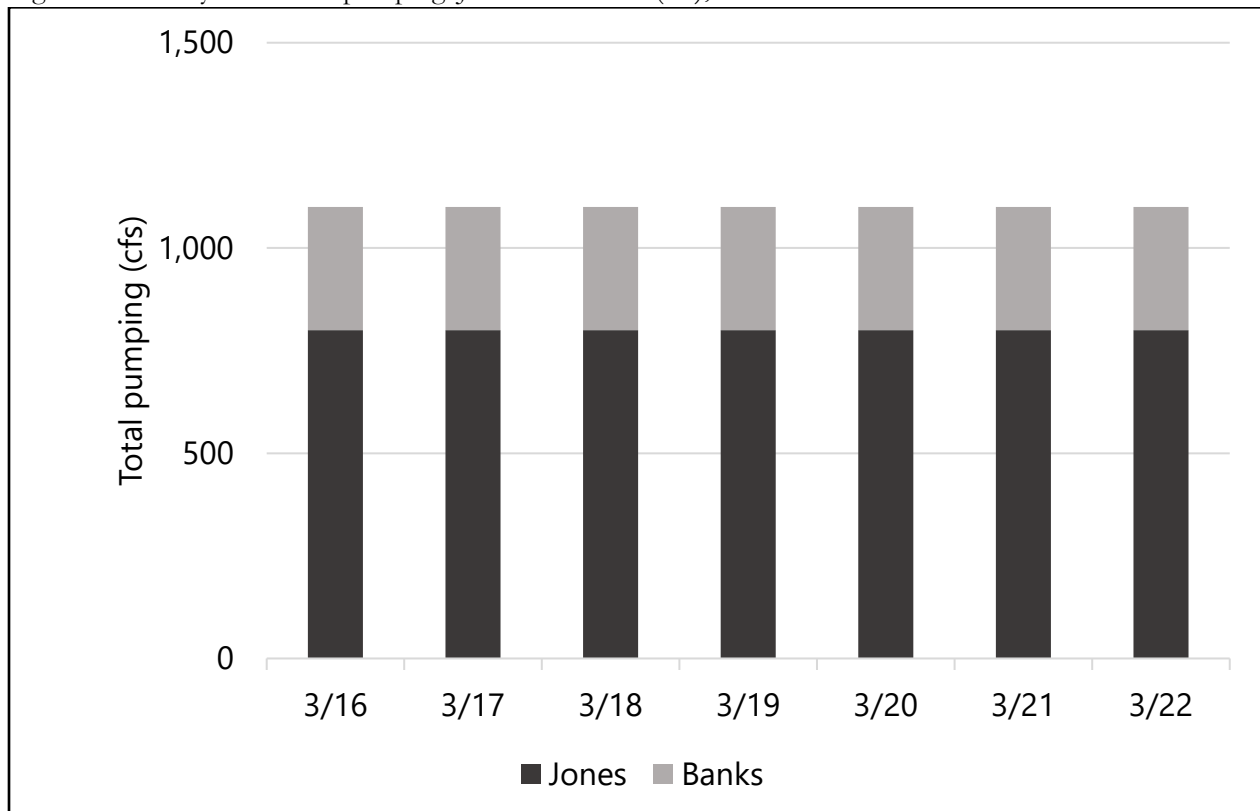


Figure A2c. Daily forecasted pumping: Jones and Banks (cfs), Scenario 2

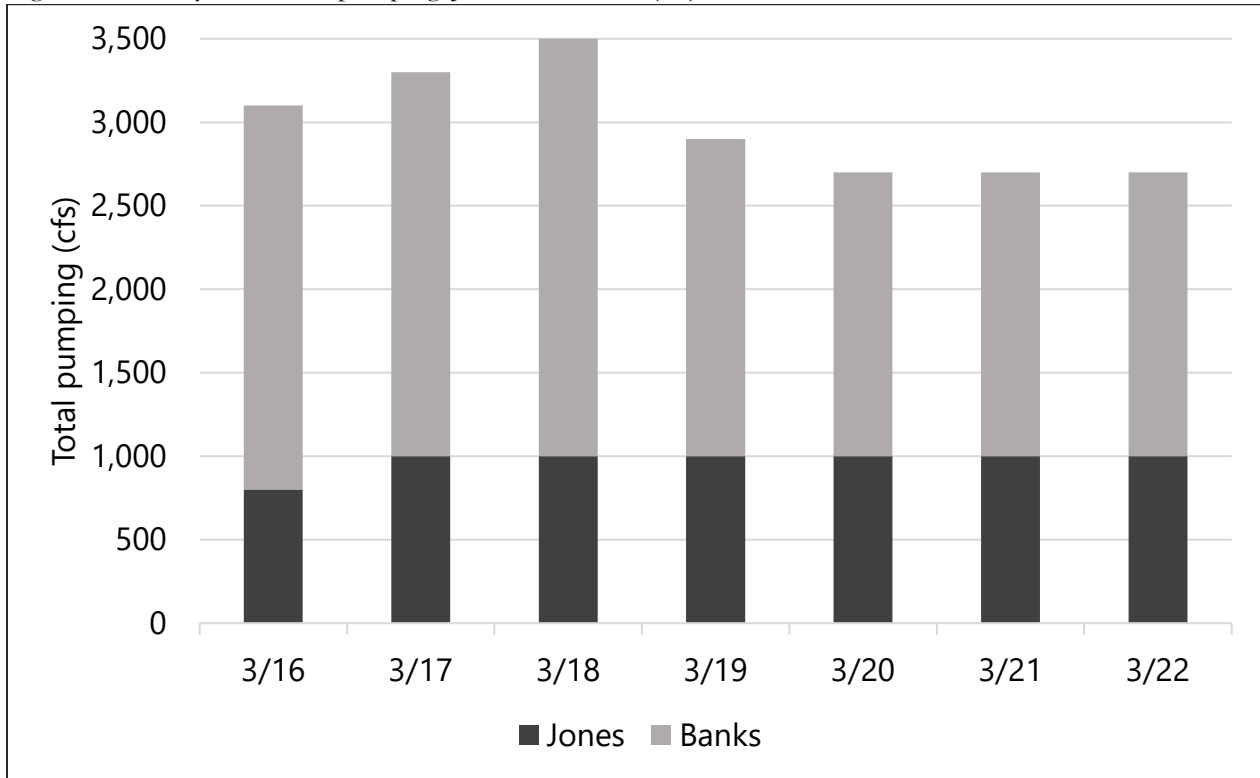
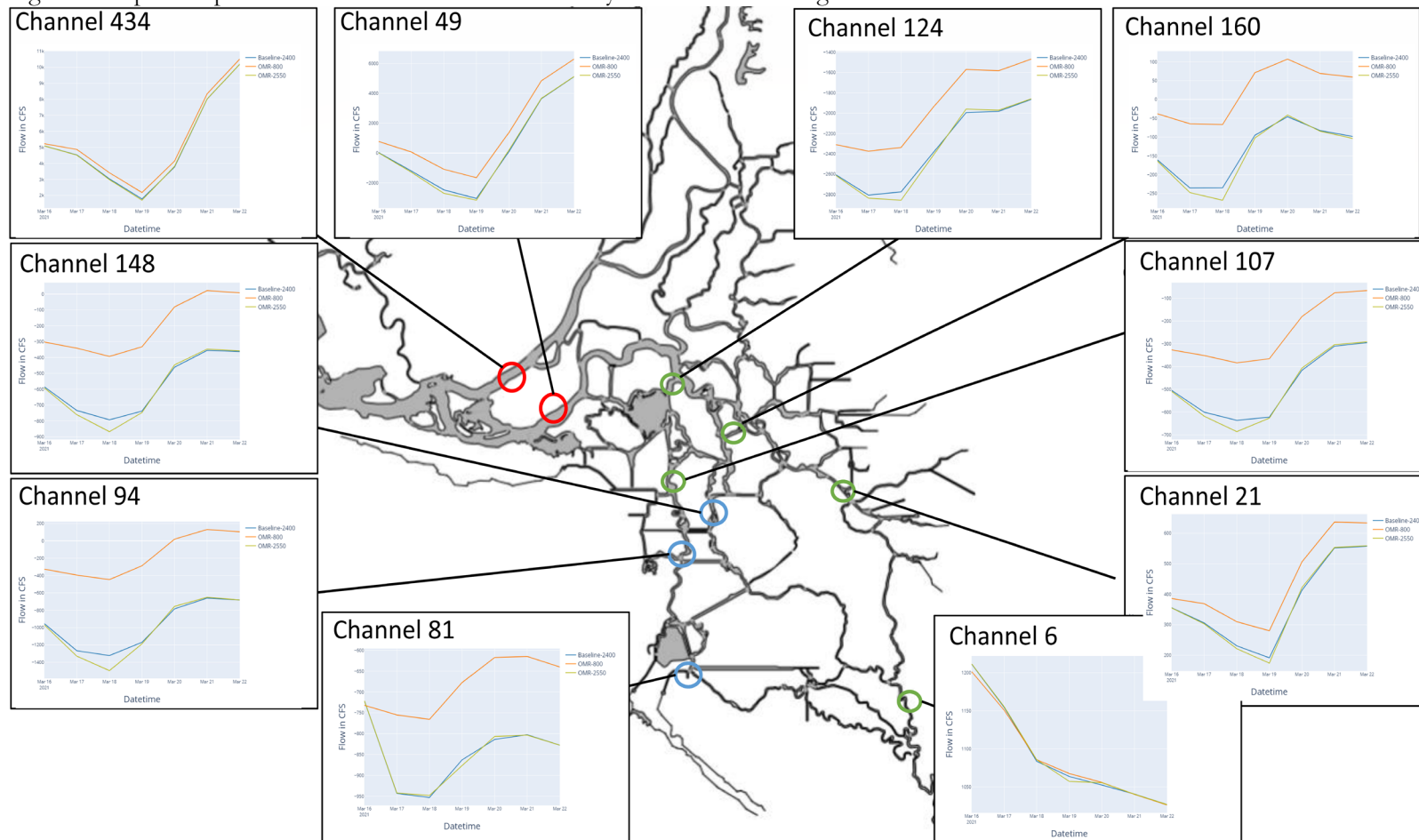


Figure A3: Spatial representation of DSM2 modeled flow by channel. Refer to figures A4 to A13 for more detail.



The following captions apply to the time-series plots for flow and velocity in selected locations (see Figure A14 and Table A3 for channel location information) below:

- (m) Time-series plot (1-day aggregated): Baseline, Scenario 1 OMR, and Scenario 2 OMR. X-axis represents daily time steps and y-axis represents flow (cfs) values. For Baseline, Scenario 1, and Scenario 2 values refer to “Hydraulic Footprint Information” in the section above. Reported summary statistics (minimum, maximum, etc.) are found in Table A1.
- (n) Time-series plot (1-day aggregated): Baseline, Scenario 1 OMR, and Scenario 2 OMR. X-axis represents daily time steps and y-axis represents velocity (cfs) values. For Baseline, Scenario 1, and Scenario 2 values refer to “Hydraulic Footprint Information” in the section above. Reported summary statistics (minimum, maximum, etc.) are found in Table A1.

Figure A4: Sacramento River at Sherman Island (CHAN434)
(a)



(b)

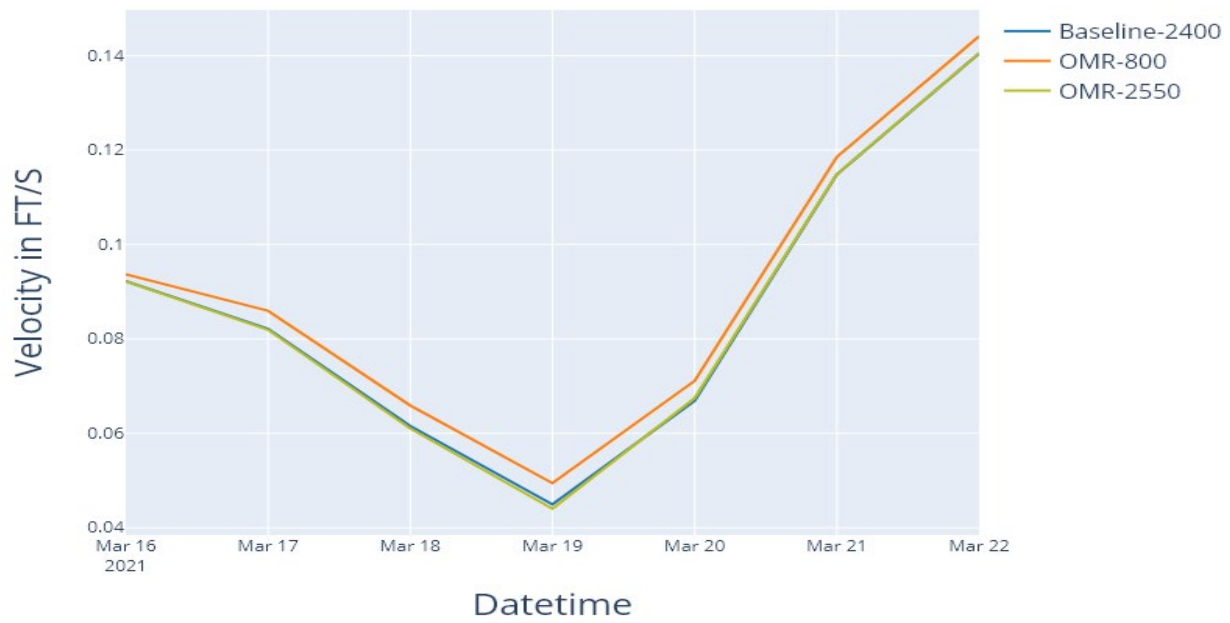


Figure A5: San Joaquin River downstream of confluence with Calaveras River (CHAN021)
(a)



(b)

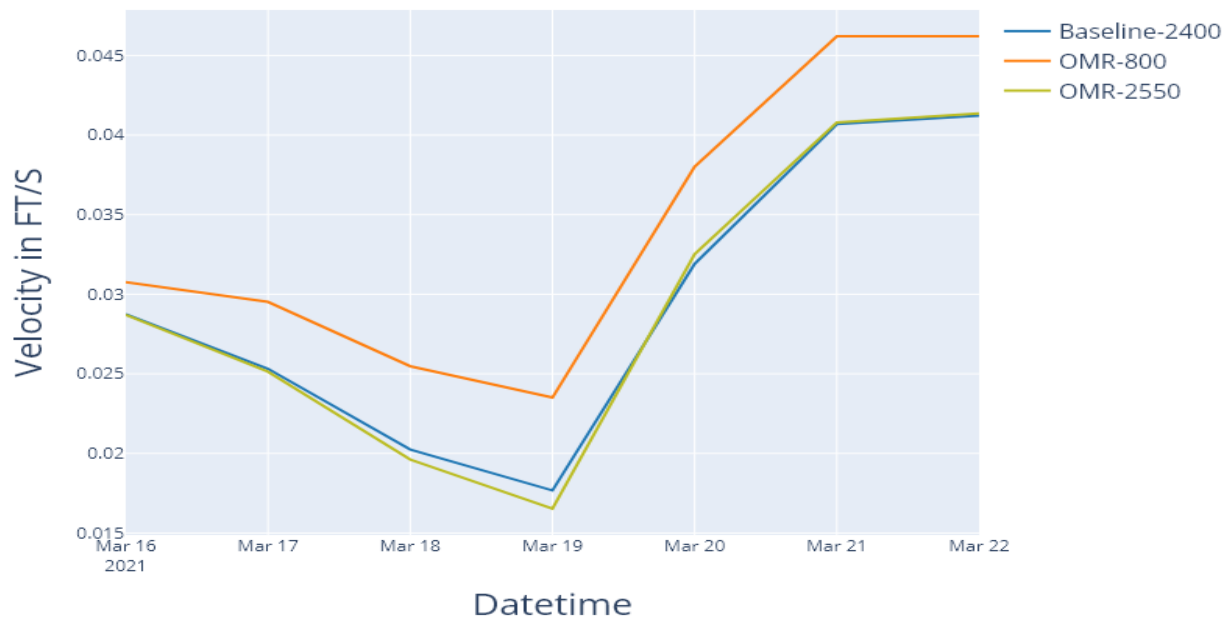


Figure A6: San Joaquin River at Sherman Island (CHAN049)
(a)



(b)

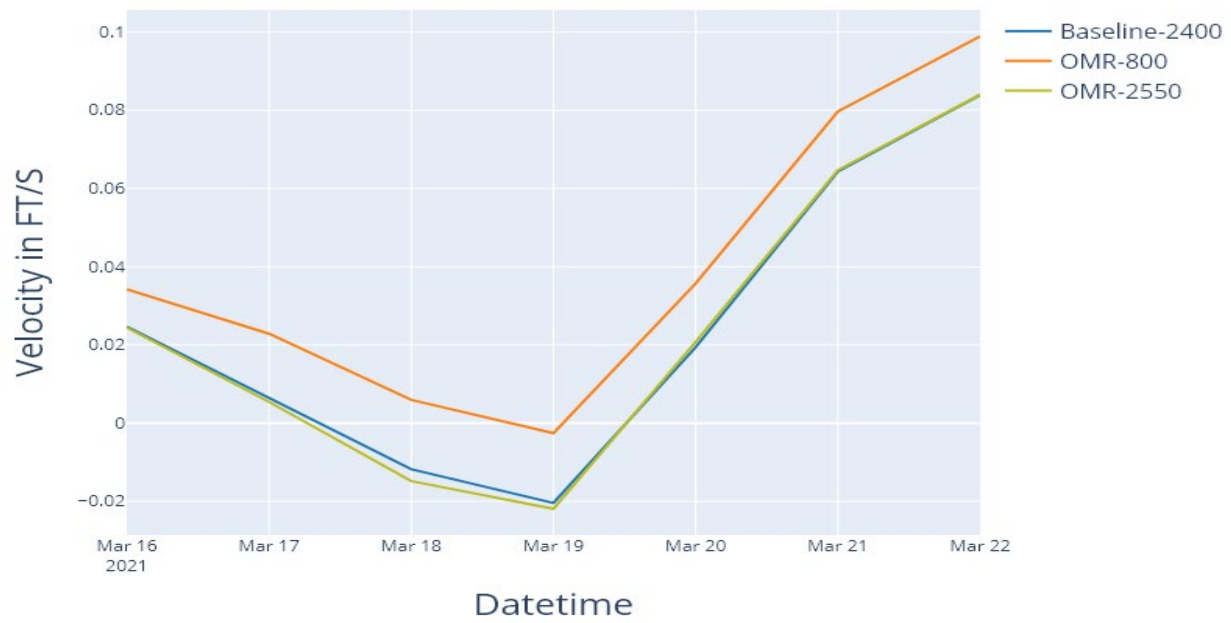
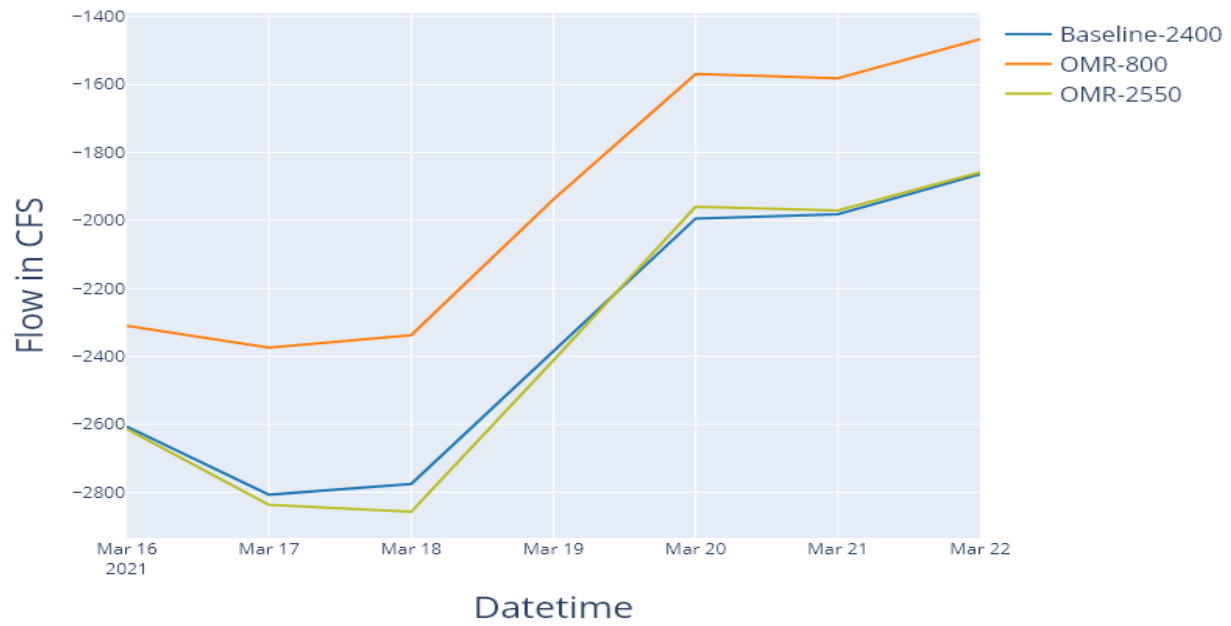


Figure A7: Old River between Franks Tract and San Joaquin River (CHAN124)
(a)



(b)

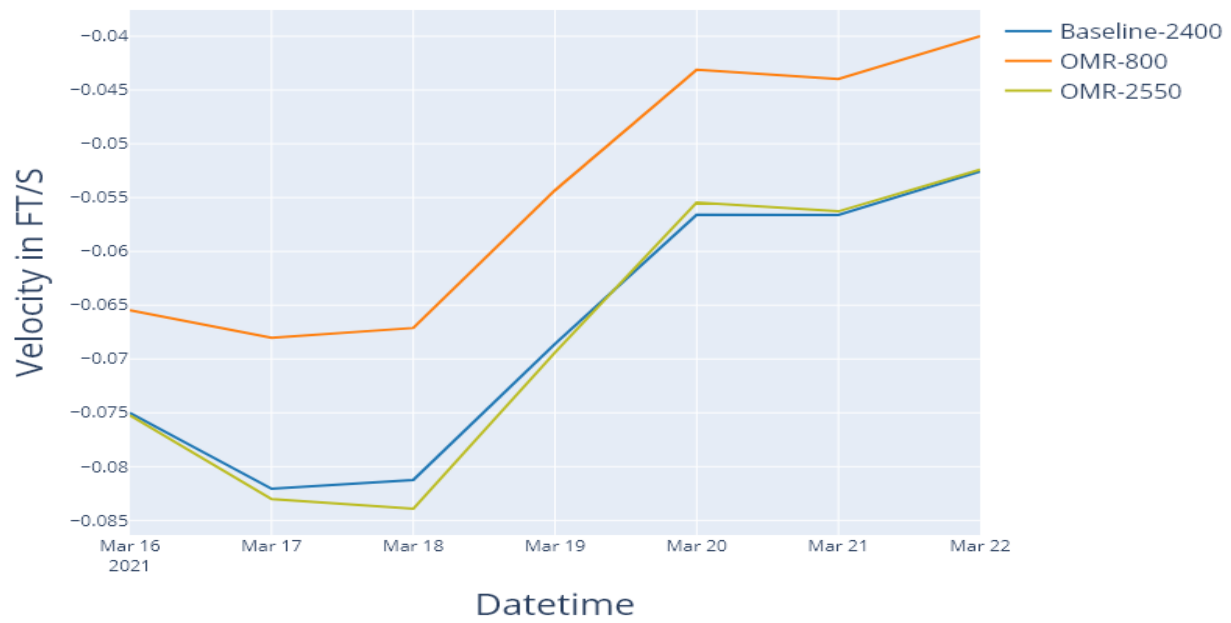


Figure A8: Lower San Joaquin River at Columbia Cut (CHAN160)
(a)



(b)

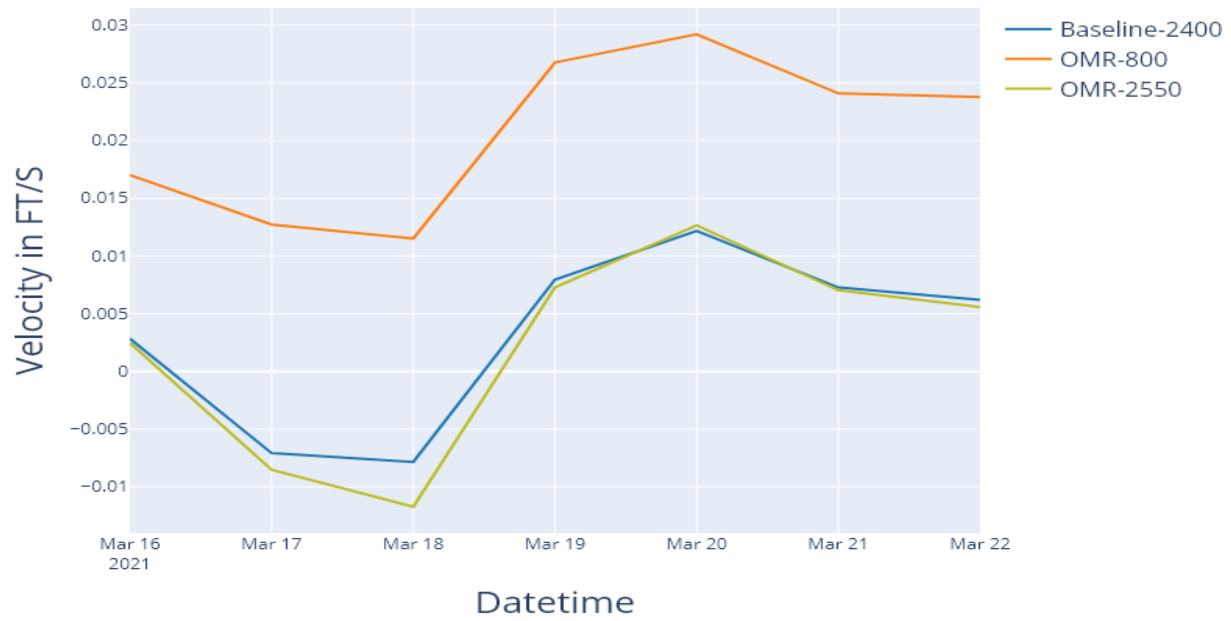
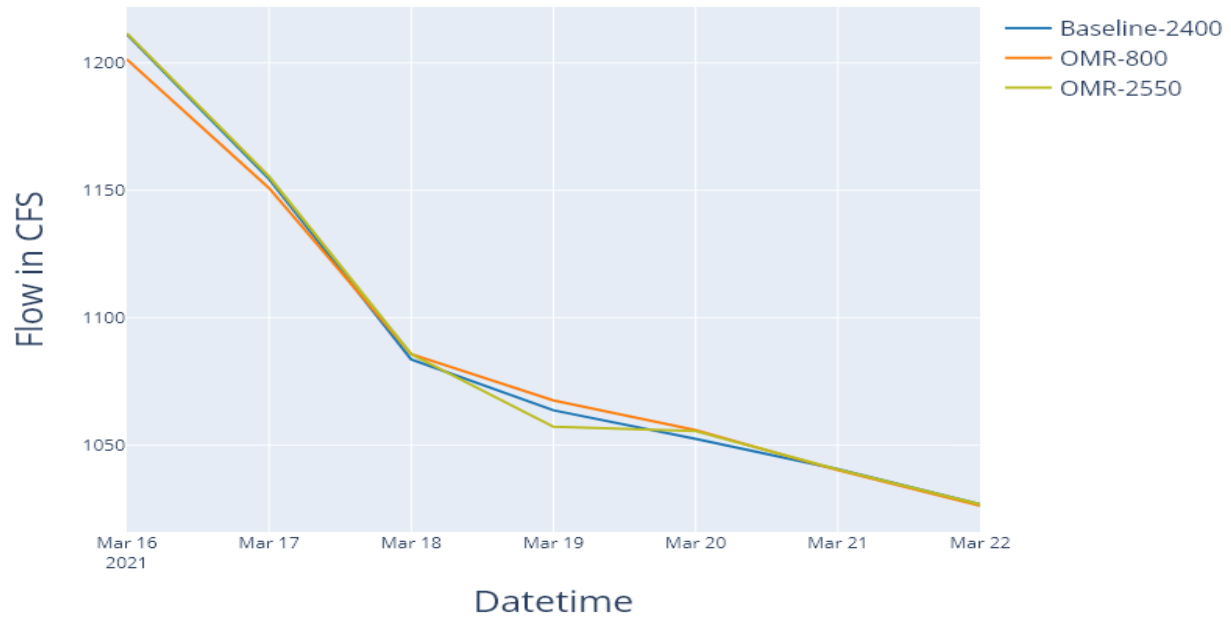


Figure A9: Slightly upstream of Head of Old River (CHAN006)
(a)



(b)

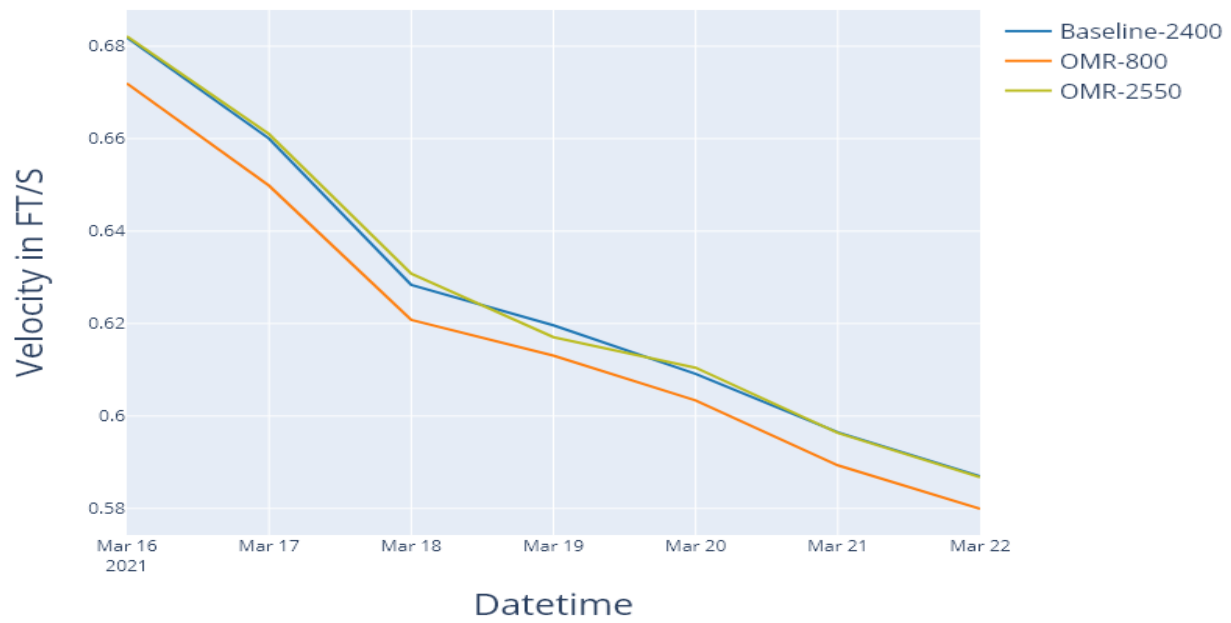
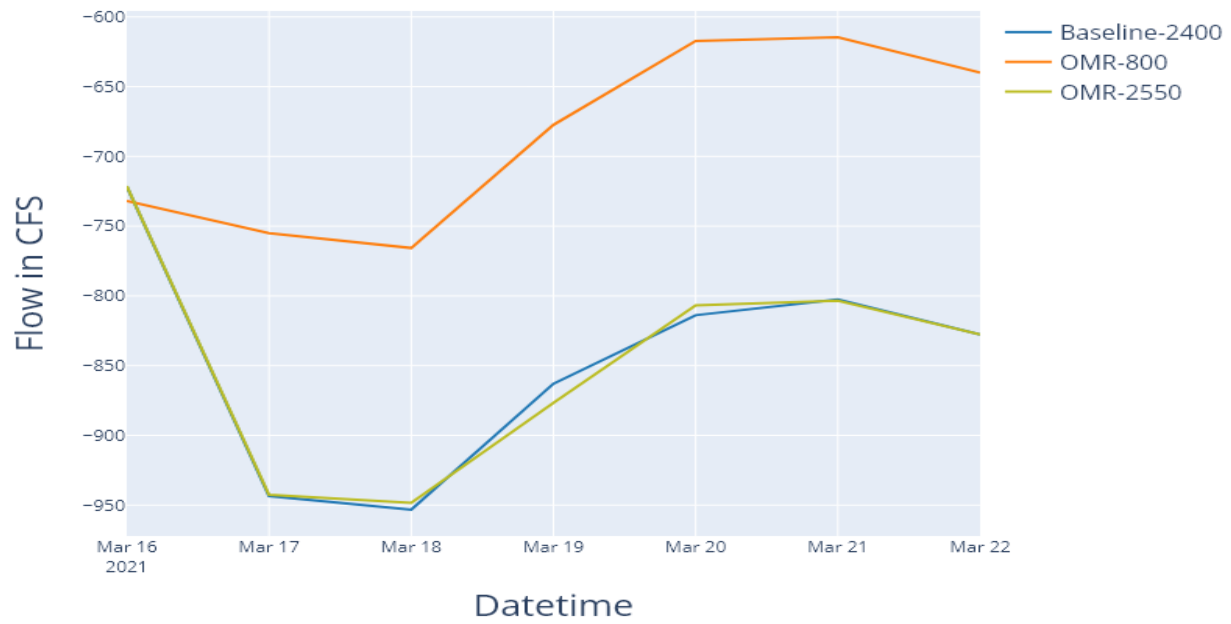


Figure A10: Old River adjacent to Grant Line Canal (CHAN081 – Old River between Grant Line and CVP)
(a)



(b)

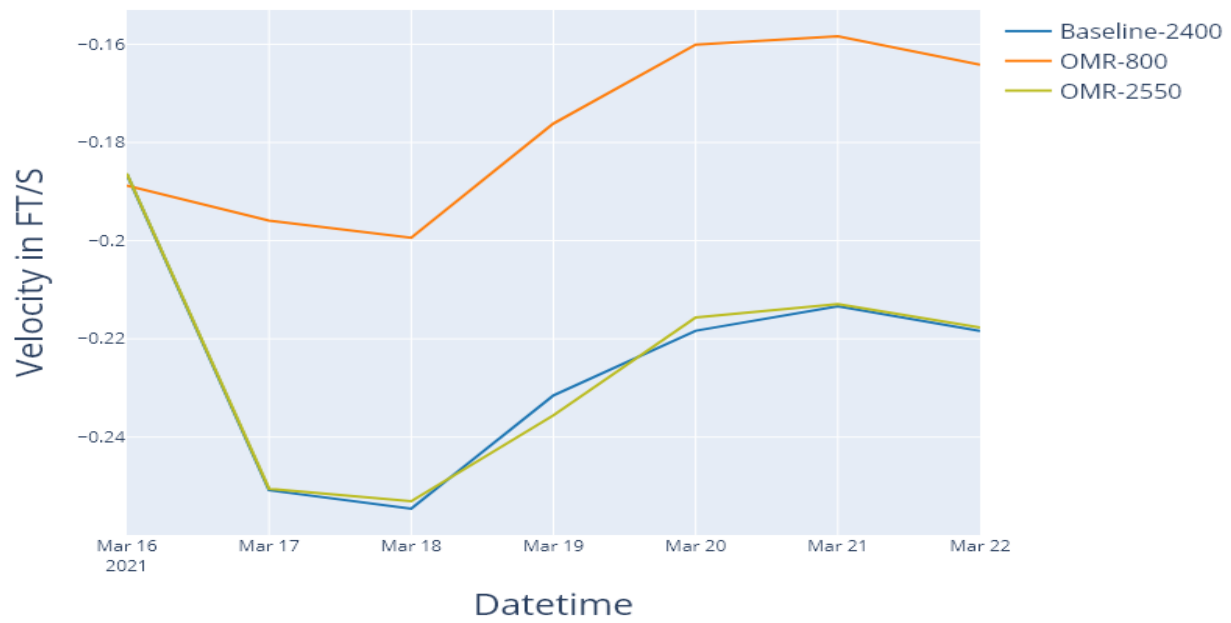
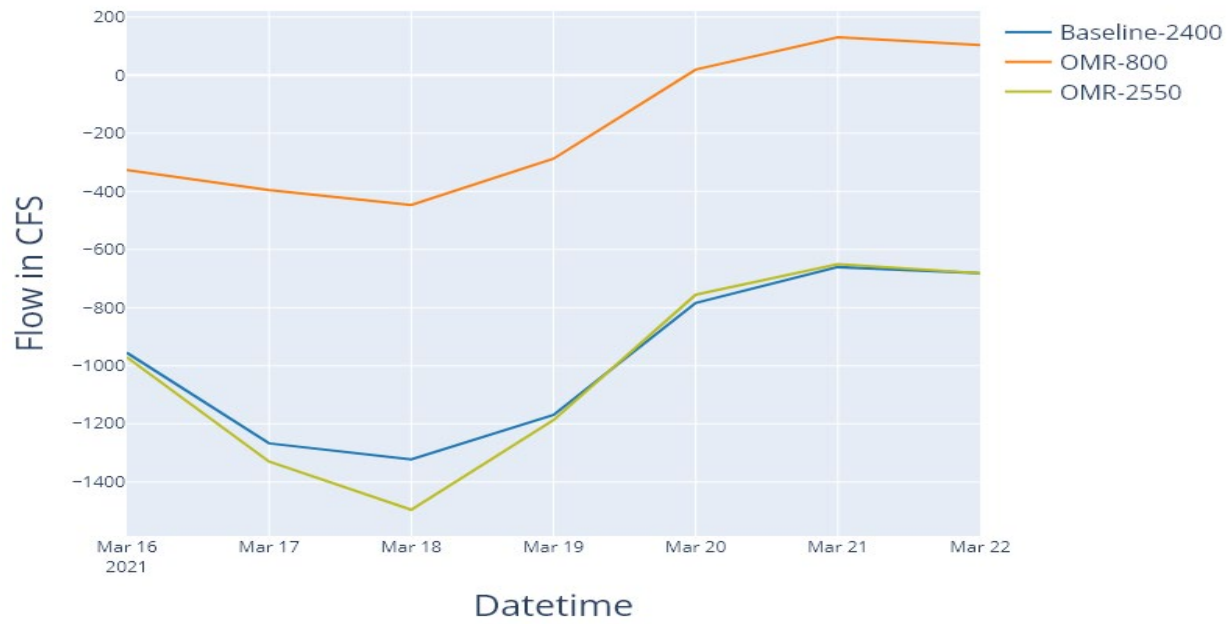


Figure A11: South Delta along Old River (CHAN094 – Old River/HW4)
(a)



(b)

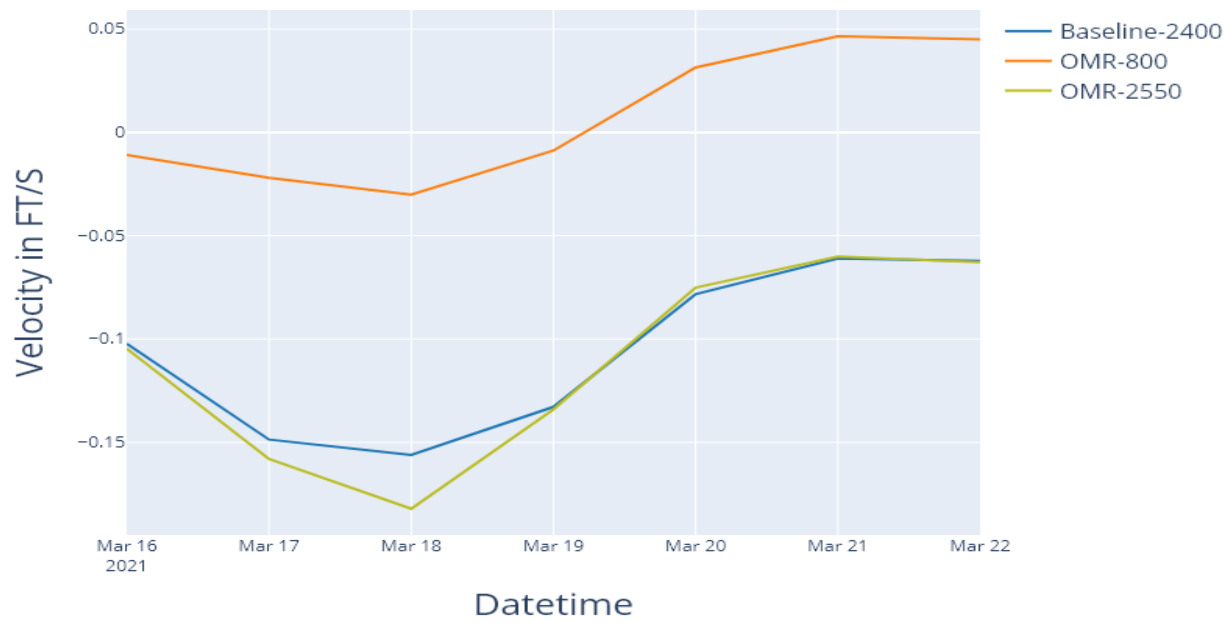


Figure A12: South Delta along Middle River (CHAN148 – Middle River/ Woodward Cut)
(a)



(b)

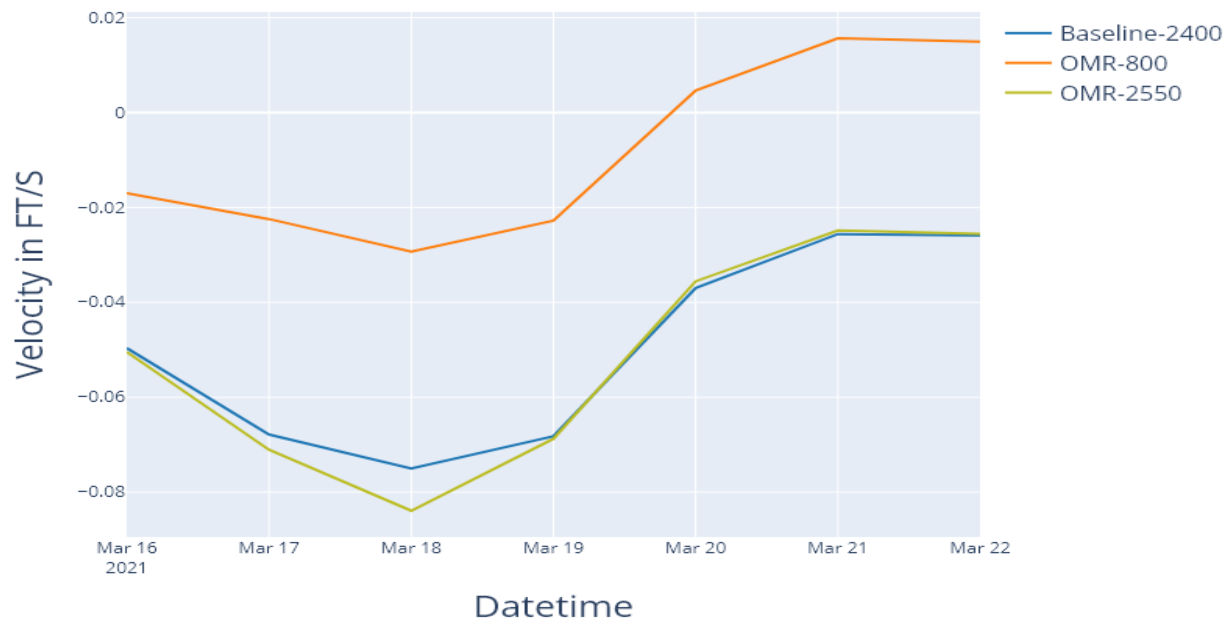
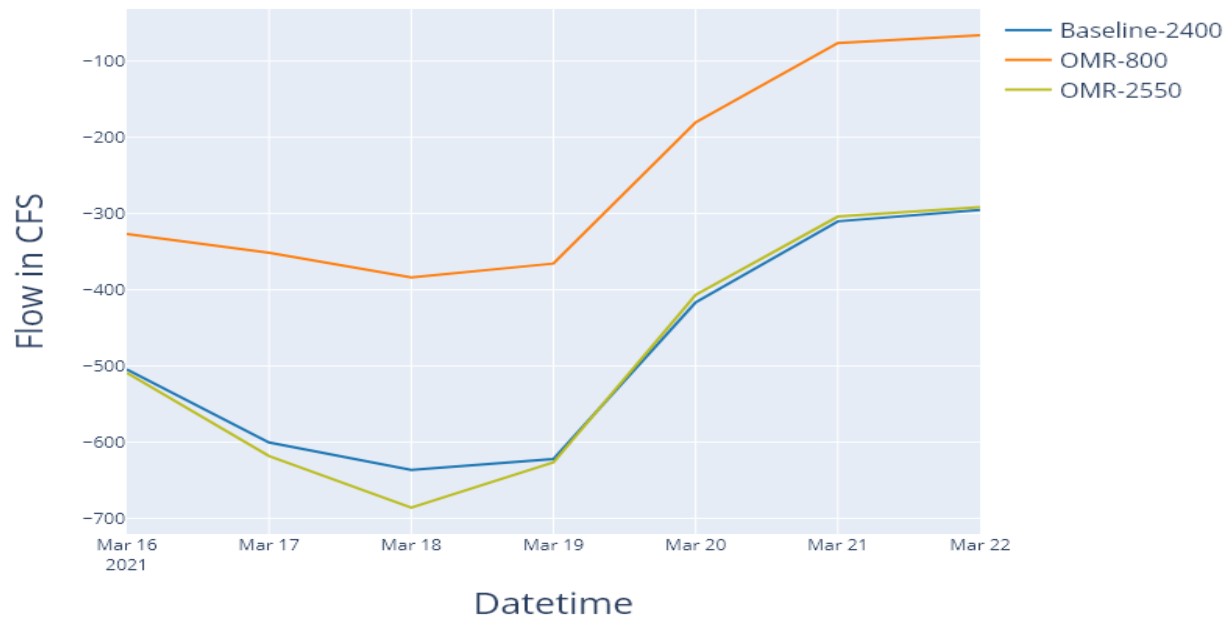
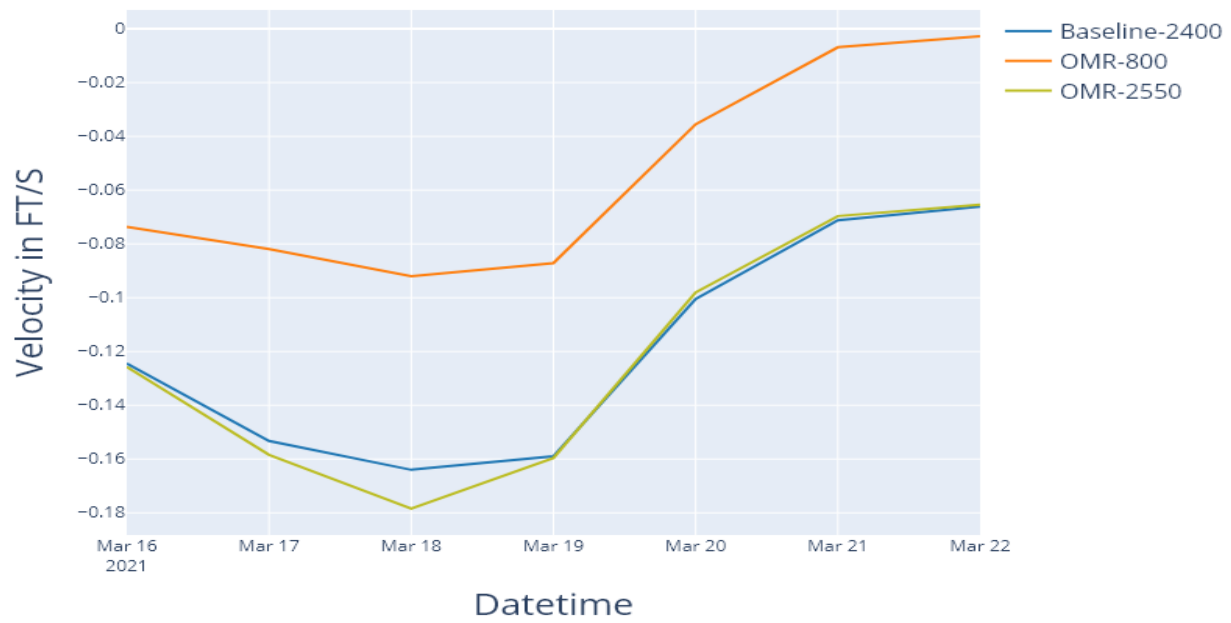


Figure A13: South Delta along Middle River (CHAN107 – Old River-Bacon Isl.)
(a)



(b)



DSM2 model interpretation entrainment in Delta strata regions

North Delta into Interior and Central Delta

Channels: 49 and 434

Low to slight measurable changes to flow and velocity related to modeled OMR conditions are anticipated. It is unlikely that listed salmonids would experience behavioral changes related to modeled OMR conditions this week. Despite low exports the zone of influence has expanded further south due to the low hydrology.

San Joaquin River and Central Delta into South Delta

Channels: 6, 21, 107, 124, and 160

There will be measurable changes to flow and velocity related to modeled OMR conditions. Based on recent survey data, listed salmonids are present. Hydrological changes may be detectable by fish. Cumulative net flows within the channels of the South Delta are negative in magnitude. Fish moving from the San Joaquin mainstem would have an increased transit time towards the western Delta. Despite low exports the zone of influence has expanded further north due to the low hydrology.

South Delta into facilities

Channels: 81, 94, and 148

There will be measurable changes to flow and velocity related to modeled OMR conditions. Based on recent survey data, listed salmonids are present. Hydrological changes may be detectable by fish. Cumulative net flows within the channels of the South Delta are negative in magnitude. Fish moving from the San Joaquin mainstem into the head of Old River would have a decreased transit time towards the fish salvage facilities.

DSM2 channel locations information

Figure A14. Highlighted DSM2 channels by Delta Strata.

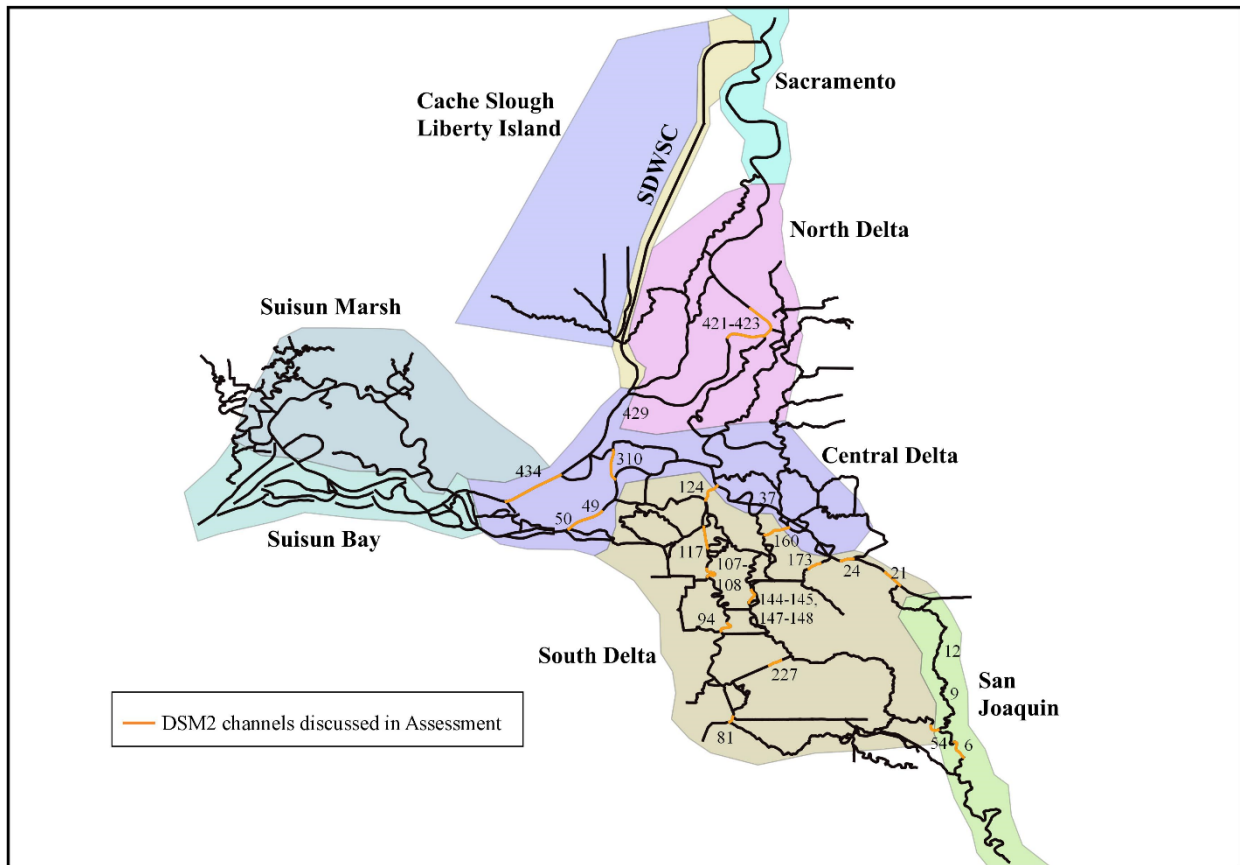


Table A3. Description of channel location, by Delta Strata region. Not all listed channels have model results presented in every weekly Proposed Action Assessment.

DSM2 Channel	Description
North Delta into Interior and Central Delta	
CHAN049	San Joaquin River at Sherman Island
CHAN310	Three-Mile Slough
CHAN421	Sacramento River at Delta Cross Channel
CHAN422	Sacramento River at Delta Cross Channel
CHAN423	Sacramento River at Delta Cross Channel
CHAN434	Sacramento River at Sherman Island
San Joaquin River and Central Delta into South Delta	
CHAN006	San Joaquin River at Head of Old River (HOR)
CHAN021	San Joaquin River downstream from confluence with Calaveras River
CHAN024	San Joaquin River upstream of Turner Cut
CHAN054	Old River at confluence with San Joaquin River (HOR)
CHAN107	Old River north of Rock Slough
CHAN117	Old River south of Franks Tract
CHAN124	Old River between Franks Tract and San Joaquin River
CHAN160	Columbia Cut
CHAN173	Turner Cut
South Delta into Facilities	
CHAN148	Middle River
CHAN227	Victoria Canal
CHAN081	Grant Line Canal
CHAN094	Old River

3/23/2021 Meeting

Background

<i>Process</i>	
Weekly process	<ul style="list-style-type: none"> • DSM2 model runs use a historic and forecasted hydrological input dataset with no assumptions provided by DWR Thursdays and updated by Reclamation Mondays. • Input File updated Monday after initial distribution from DWR for removal of forecasted in lieu of historic input. • Reclamation provides scenarios based on expected OMR index values for the upcoming week. • DSM2 model runs produced Monday and distributed to SaMT members.
<i>Hydraulic footprint information</i>	
Baseline and Scenarios updated	3/22/2021
DSM2 modeling results range	3/23/2021 – 3/29/2021
<i>OMR index value scenarios</i>	
Baseline	-2,900 cfs
Scenario 1	-900 cfs (decreasing from Baseline; Δ 2,000 cfs)
Scenario 2	N/A
<i>Changes between scenarios</i>	
Hydrology	No (see special considerations section below)
Delta Exports	Yes
<i>Common assumptions</i>	
DSM2 run results based on the following assumptions	<ul style="list-style-type: none"> • CCFB Gates are operating to Priority 2 throughout the forecast period. • The Delta Cross Channel gates are closed throughout the forecast period. • Suisun Marsh salinity control flashboards are in, and 2 of the Suisun Marsh Salinity Control gates are in tidal operation and 1 gate is closed for maintenance. • San Joaquin River flow at Vernalis is at 980 cfs at the beginning of the forecast period and is estimated to decrease to 890 cfs by the end of the forecast period. (Figure A1) • Sacramento River flow at Freeport is at 11,189 cfs at the beginning of the forecast period and is expected to decrease to 9,000 cfs by the end of the forecast period. (Figure A1). • Clifton Court Forebay and Tracy Pumping Plant pumping is shown for model runs in Figure A2a-A2b.
<i>Additional information</i>	
Considerations for current DSM2 model run	This week there was no Scenario 2 modeled. The more negative expected OMR Index Value (see Operations Outlook document) could not be reached without a change in hydrology.
Caveats	<ul style="list-style-type: none"> • Time-step: DSM2 generates results at 15-minute time-steps. Visualizations of DSM2 model run results are aggregated over daily time-steps. Operations function on a more granular scale than daily time-step. • Salmonid behavior: DSM2 provides flow fields which salmonids may encounter but salmonids are not neutrally buoyant particles. Models which incorporate behavior from acoustic tagged salmonids are being developed for South Delta (ePTM, ecoPTM).

DSM2 model results: summary tables

Table A1. Summary of minimum, maximum, mean, and percent positive flows (cfs) and velocities (ft/s) by DSM2 channel for OMR scenarios over a 6-day time period. For scenario values refer to “Hydraulic Footprint Information” in the conditions / assumptions section above.

Scenario (cfs)	DSM2 Channel	Flow Min.	Flow Max.	Flow Mean	Flow % Positive	Velocity Min.	Velocity Max.	Velocity Mean	Velocity % Positive
Baseline	6	-241.4	1639.1	965.1	94	-0.1	1.1	0.6	94
Scenario 1	6	-288.8	1699.9	964.9	91	-0.1	1.1	0.6	91
Baseline	21	-8209.8	6648.3	333.8	55	-0.6	0.4	0.0	55
Scenario 1	21	-8211.5	6714.5	417.2	55	-0.6	0.4	0.0	55
Baseline	49	-161491.9	137439.9	3321.4	53	-2.0	1.8	0.1	53
Scenario 1	49	-161320.3	138358.8	4772.4	54	-2.0	1.8	0.1	54
Baseline	81	-5309.8	2461.9	-1191.9	44	-1.5	0.8	-0.3	44
Scenario 1	81	-3786.4	2690.1	-759.1	48	-1.1	0.8	-0.2	48
Baseline	94	-14700.7	9672.8	-1240.2	50	-2.0	1.4	-0.1	50
Scenario 1	94	-12693.1	9870.3	-271.2	52	-1.7	1.5	0.0	52
Baseline	107	-6550.0	4040.3	-526.3	52	-1.8	1.2	-0.1	52
Scenario 1	107	-6058.0	4127.8	-253.2	53	-1.7	1.2	-0.1	53
Baseline	124	-20449.0	12247.1	-2683.7	45	-0.6	0.4	-0.1	45
Scenario 1	124	-20037.8	12397.0	-2203.7	46	-0.6	0.4	-0.1	46
Baseline	148	-8640.7	5719.3	-684.0	52	-1.0	0.7	-0.1	52
Scenario 1	148	-7502.1	5854.5	-239.5	53	-0.9	0.7	0.0	53
Baseline	160	-4806.4	3694.3	-232.0	52	-0.5	0.5	0.0	52
Scenario 1	160	-4741.6	3715.7	-33.0	53	-0.5	0.5	0.0	53
Baseline	434	-174334.8	157821.6	8881.5	55	-1.9	1.9	0.1	55
Scenario 1	434	-174126.3	158081.4	9270.3	55	-1.9	1.9	0.2	55

DSM2 model results: figures

Figure A1. Daily forecasted Vernalis and Freeport flows (cfs)

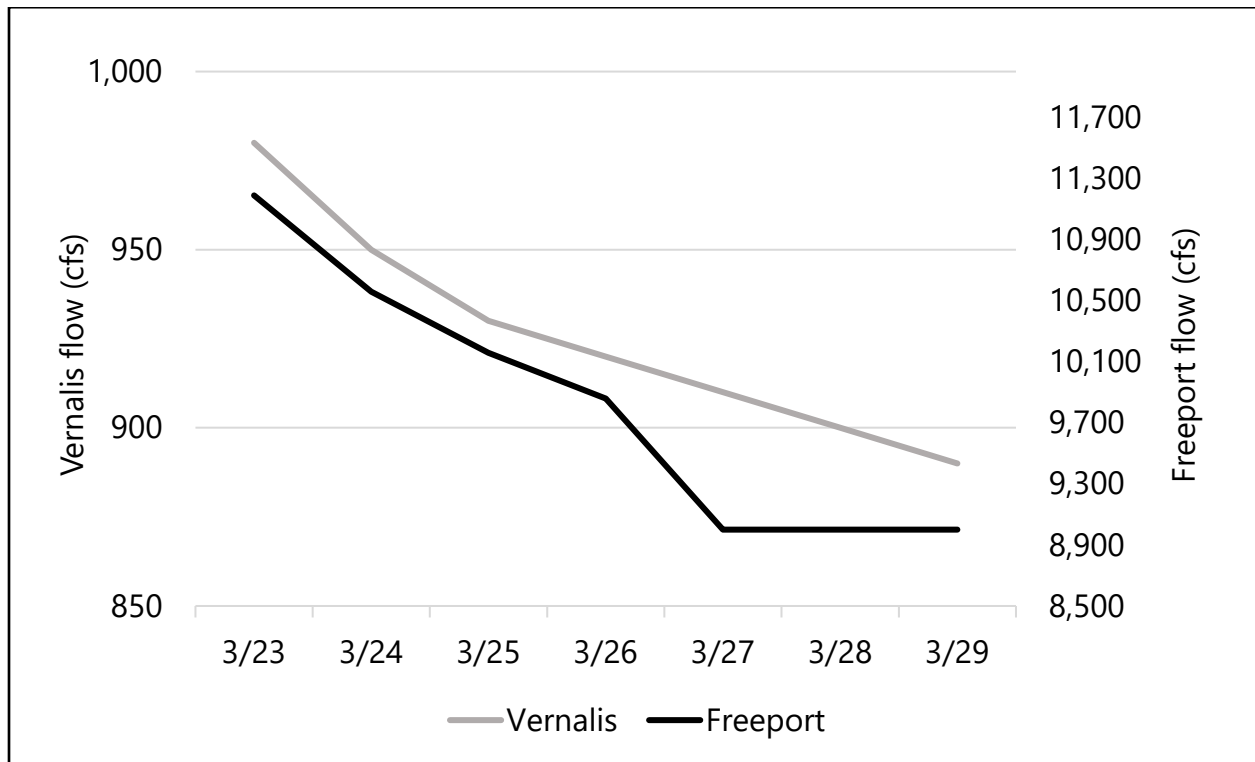


Figure A2a. Daily forecasted pumping: Jones and Banks (cfs), Baseline

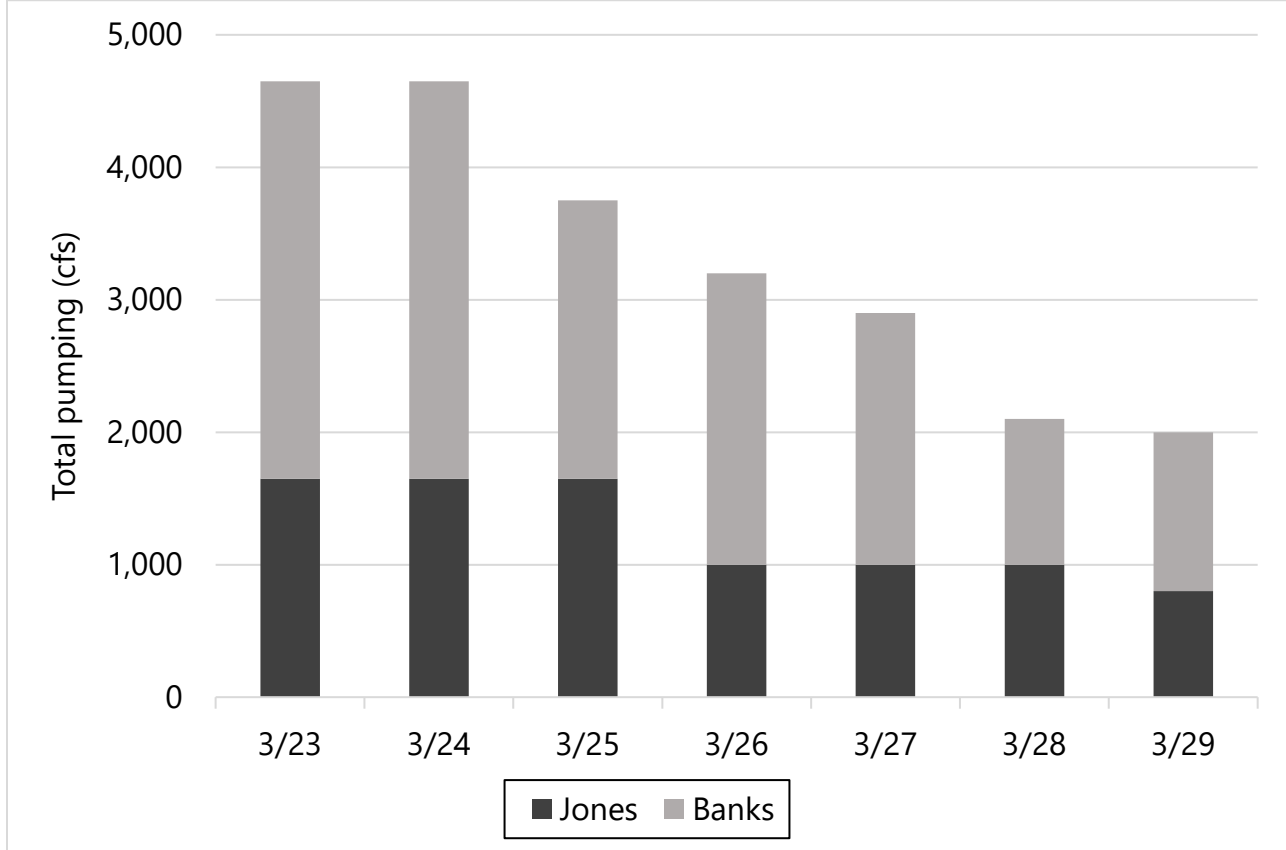


Figure A2b. Daily forecasted pumping: Jones and Banks (cfs), Scenario 1

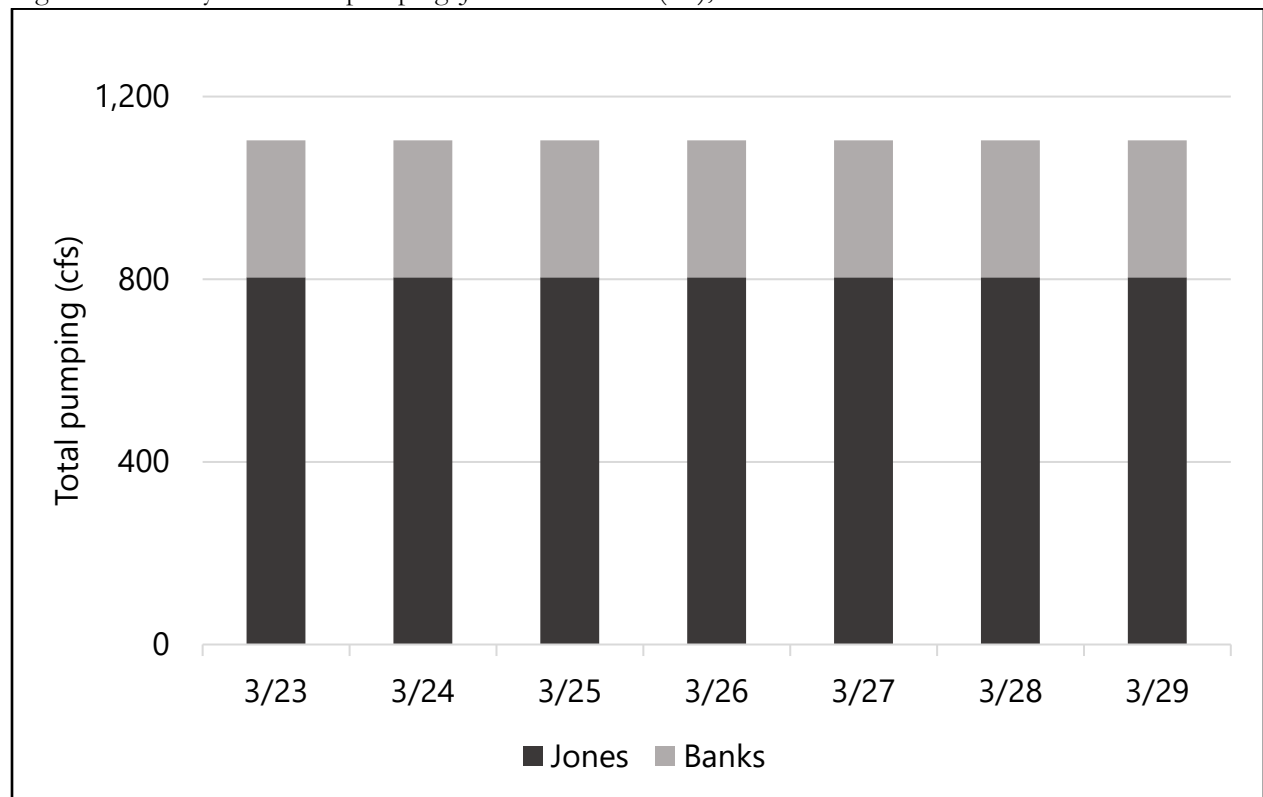
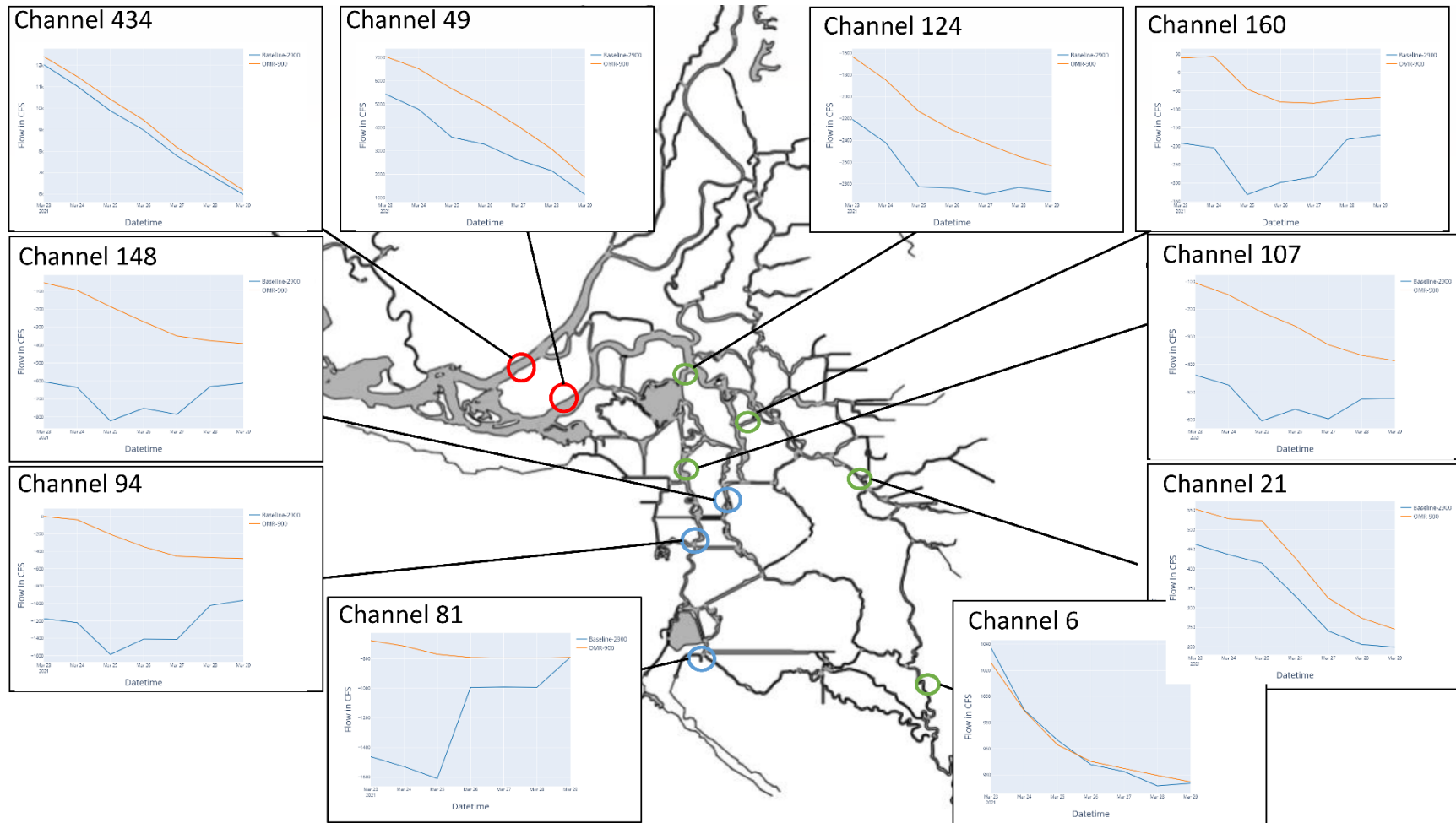


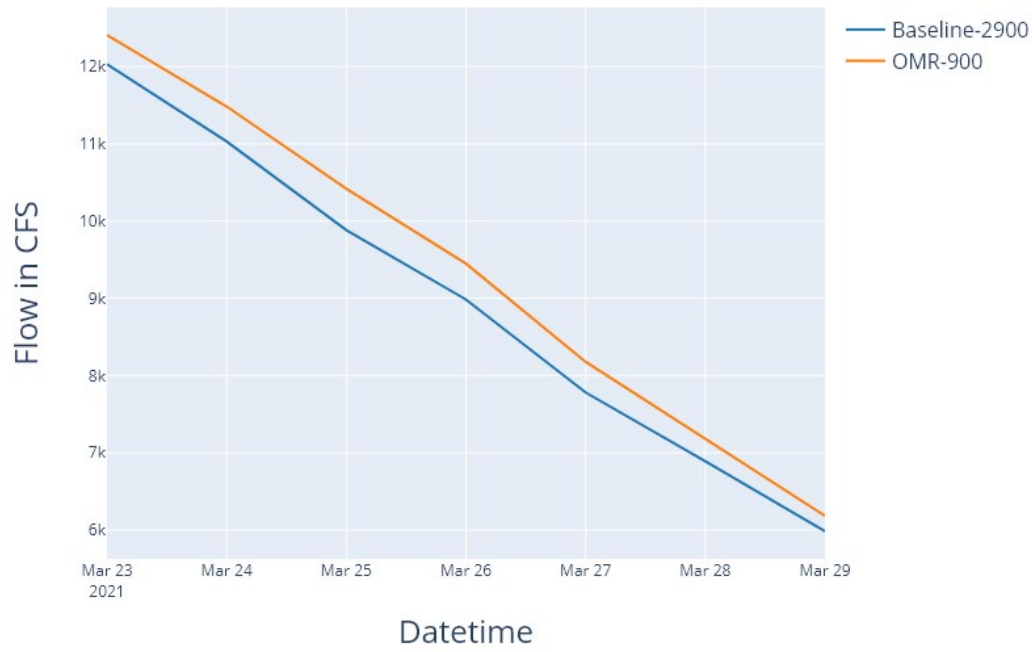
Figure A3: Spatial representation of DSM2 modeled flow by channel. Refer to figures A4 to A13 for more detail.



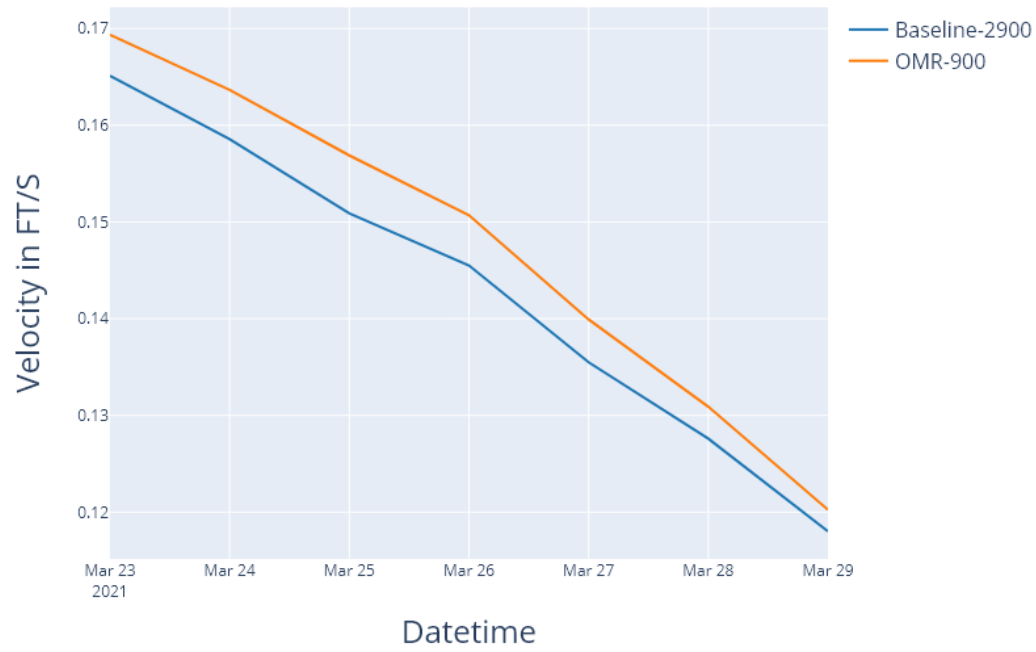
The following captions apply to the time-series plots for flow and velocity in selected locations (see Figure A14 and Table A3 for channel location information) below:

- (o) Time-series plot (1-day aggregated): Baseline, Scenario 1 OMR, and Scenario 2 OMR. X-axis represents daily time steps and y-axis represents flow (cfs) values. For Baseline, Scenario 1, and Scenario 2 values refer to “Hydraulic Footprint Information” in the section above. Reported summary statistics (minimum, maximum, etc.) are found in Table A1.
- (p) Time-series plot (1-day aggregated): Baseline, Scenario 1 OMR, and Scenario 2 OMR. X-axis represents daily time steps and y-axis represents velocity (cfs) values. For Baseline, Scenario 1, and Scenario 2 values refer to “Hydraulic Footprint Information” in the section above. Reported summary statistics (minimum, maximum, etc.) are found in Table A1.

Figure A4: Sacramento River at Sherman Island (CHAN434)

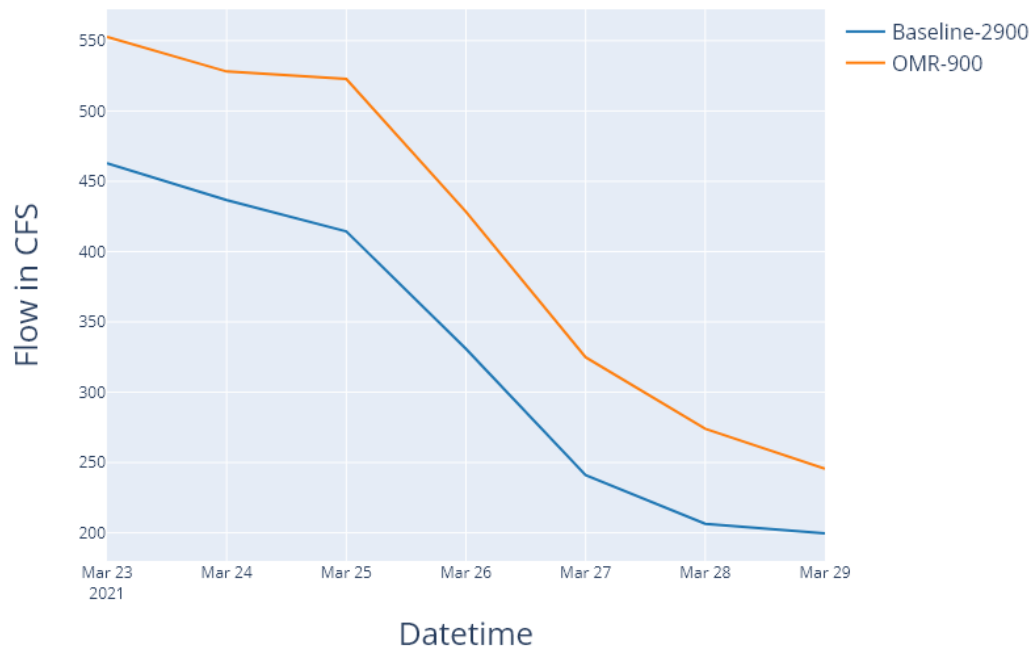


(a)

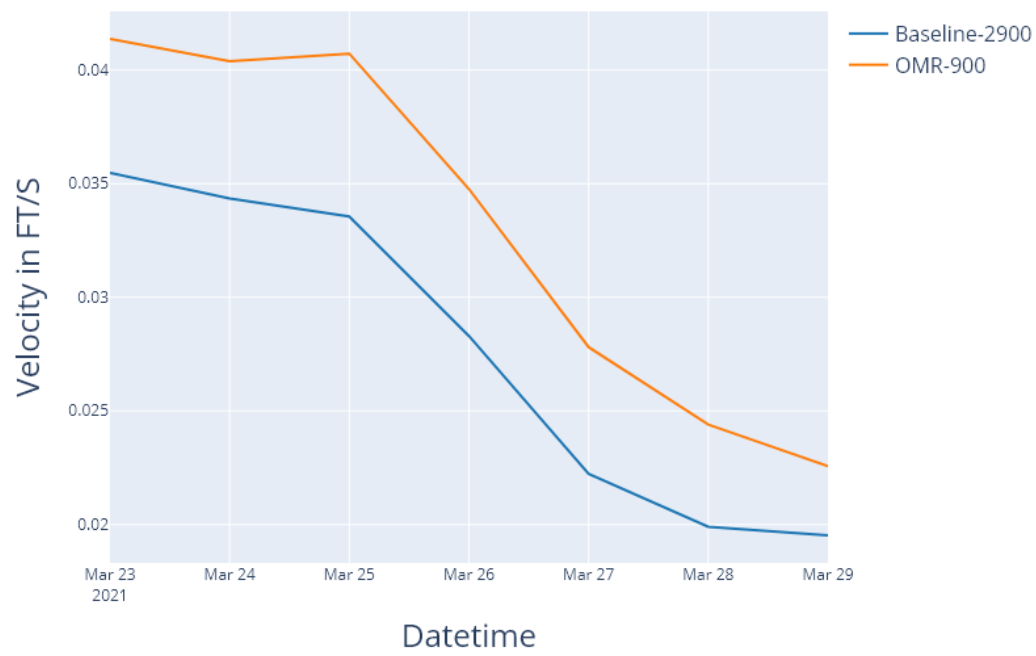


(b)

Figure A5: San Joaquin River downstream of confluence with Calaveras River (CHAN021)

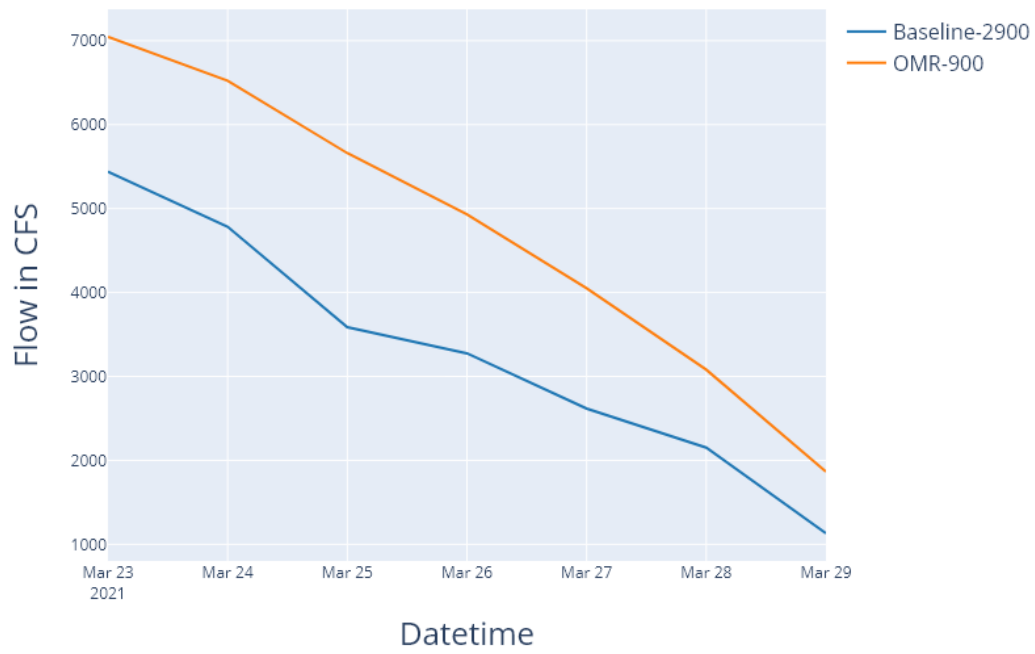


(a)

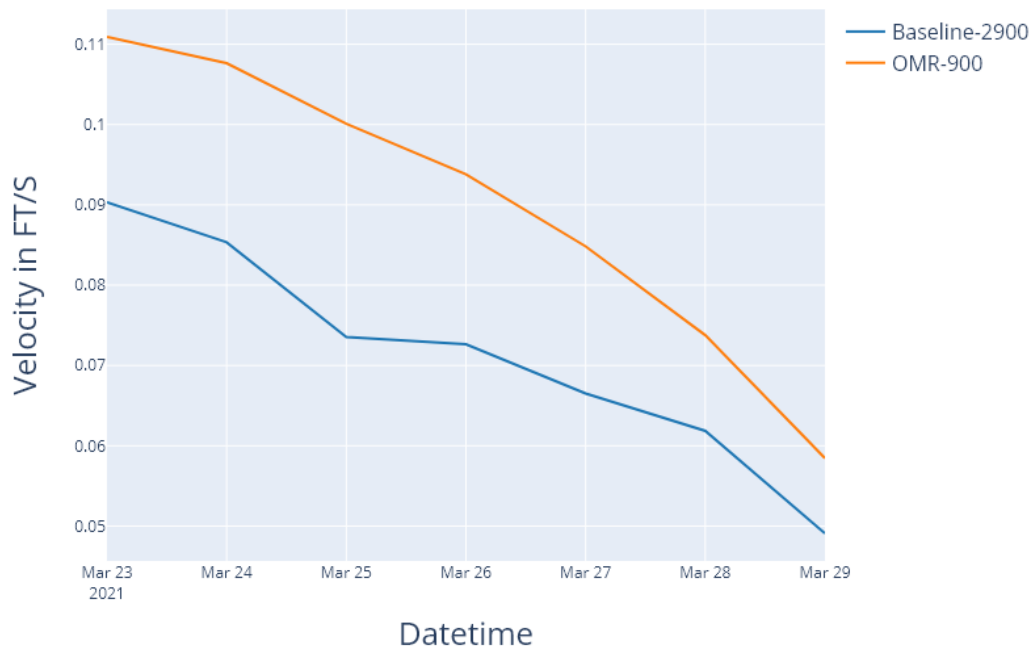


(b)

Figure A6: San Joaquin River at Sherman Island (CHAN049)

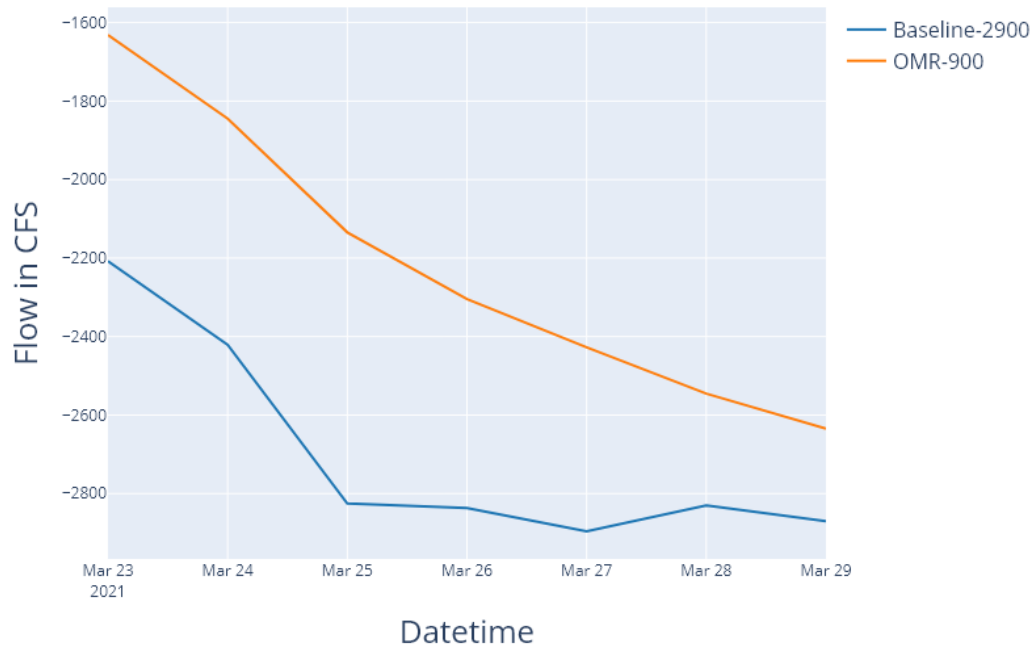


(a)

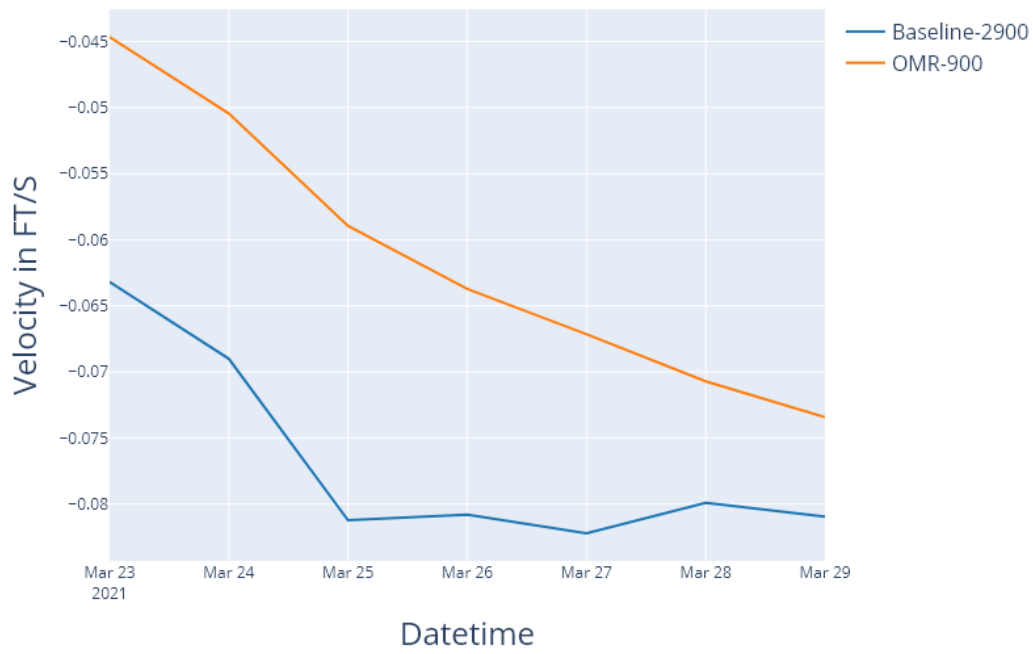


(b)

Figure A7: Old River between Franks Tract and San Joaquin River (CHAN124)

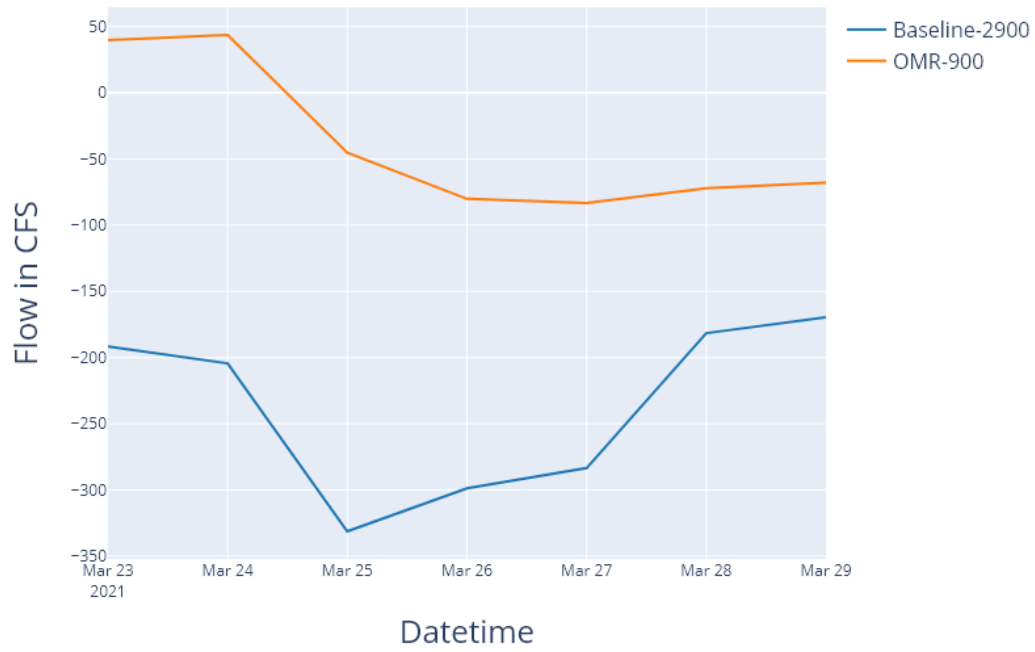


(a)

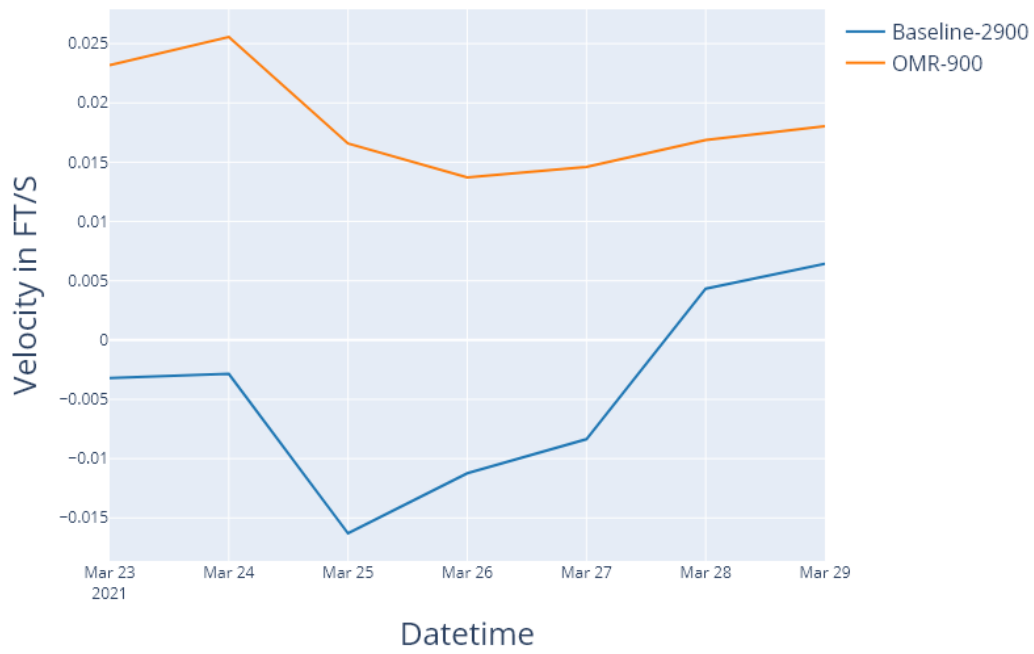


(b)

Figure A8: Lower San Joaquin River at Columbia Cut (CHAN160)

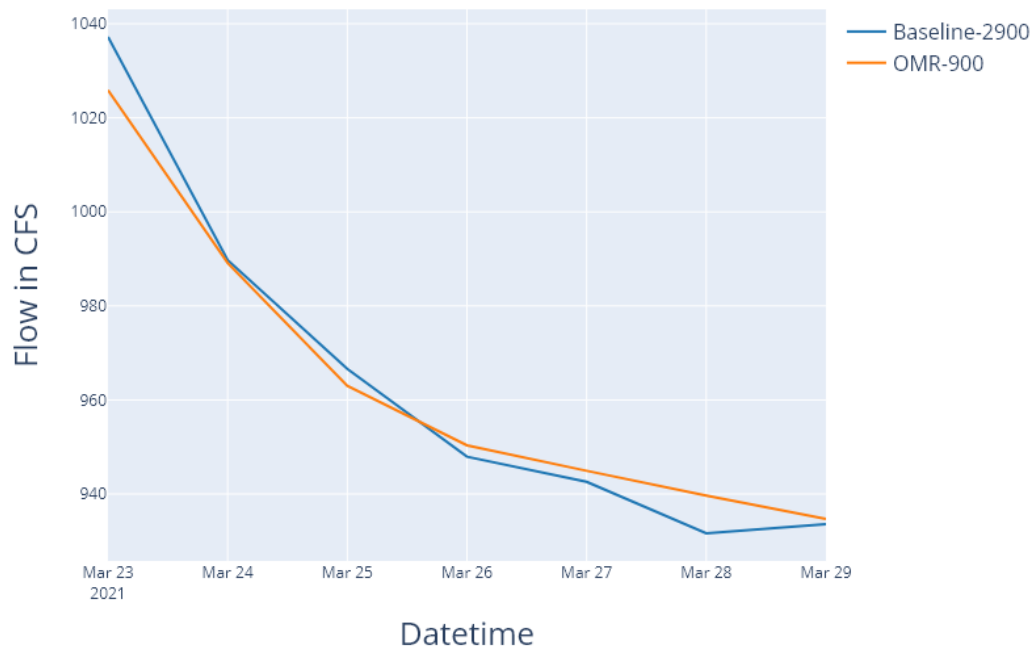


(a)

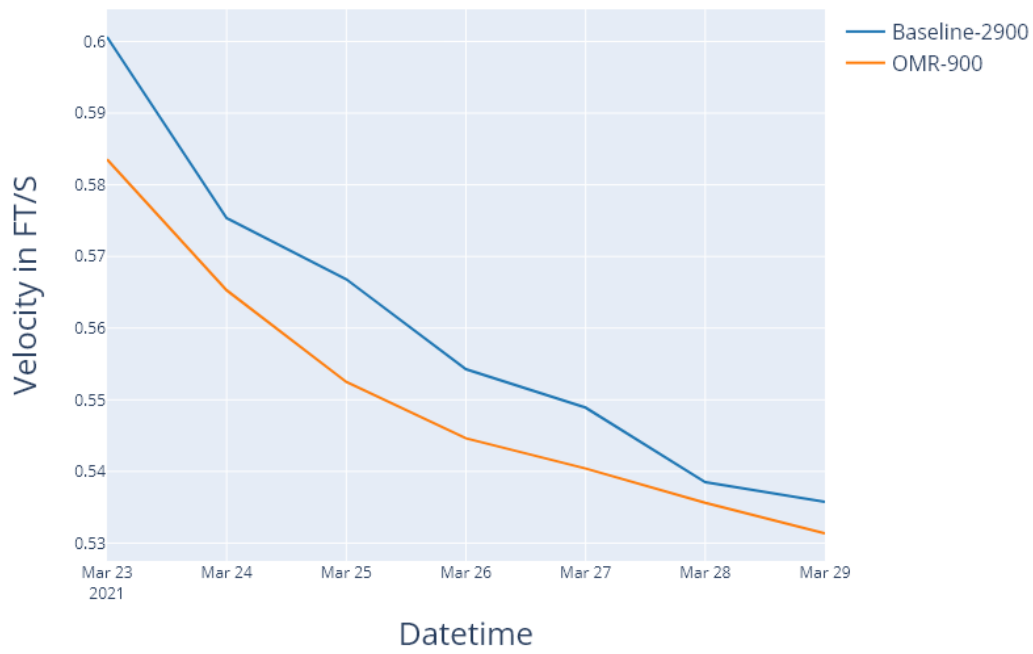


(b)

Figure A9: Slightly upstream of Head of Old River (CHAN006)

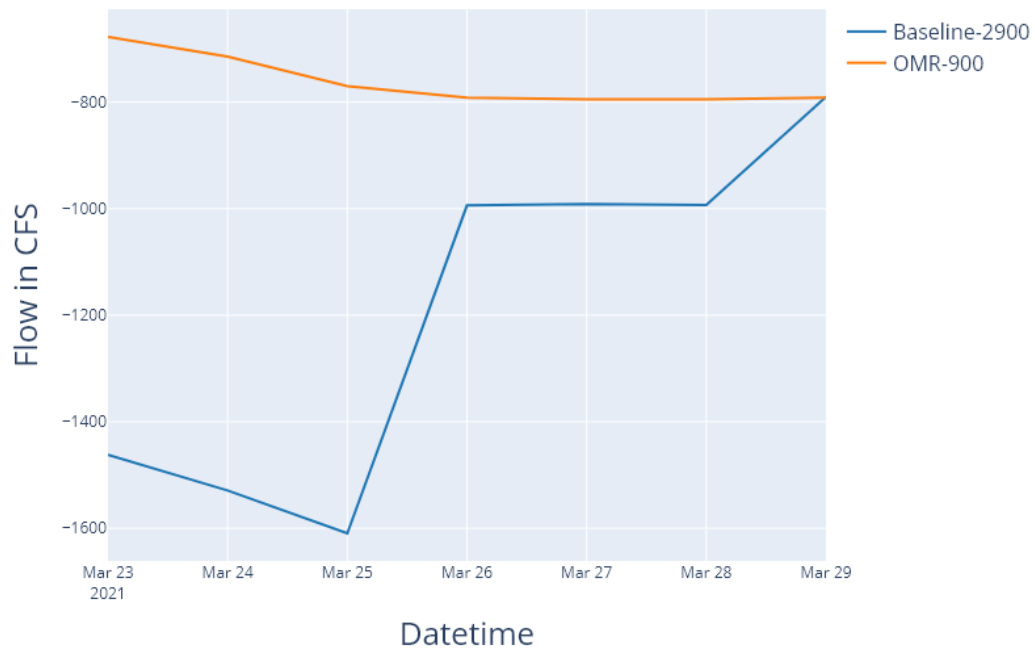


(a)

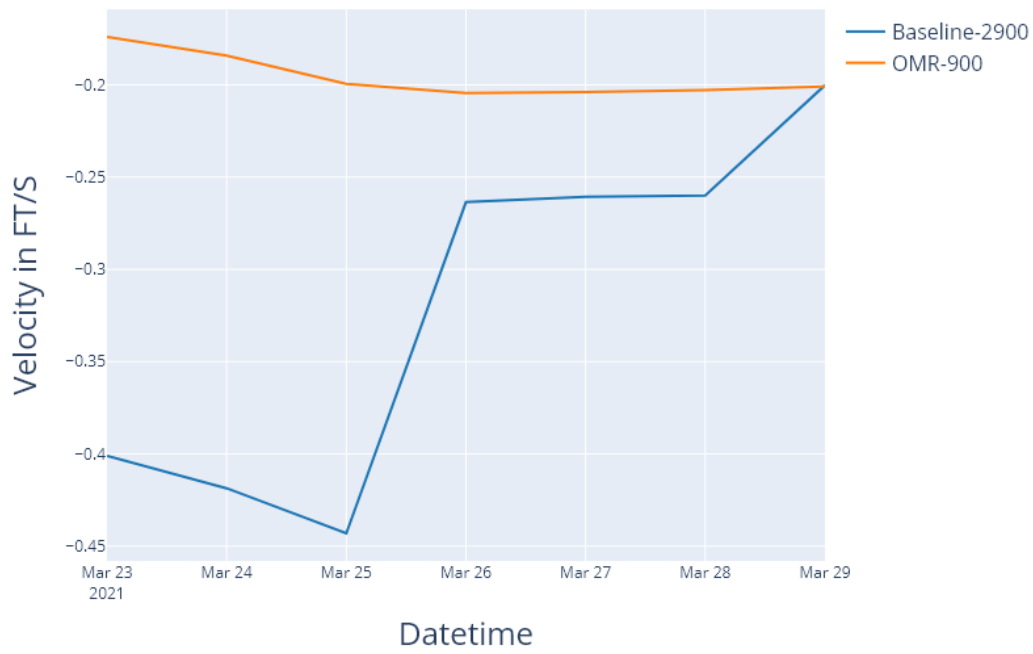


(b)

Figure A10: Old River adjacent to Grant Line Canal (CHAN081 – Old River between Grant Line and CVP)

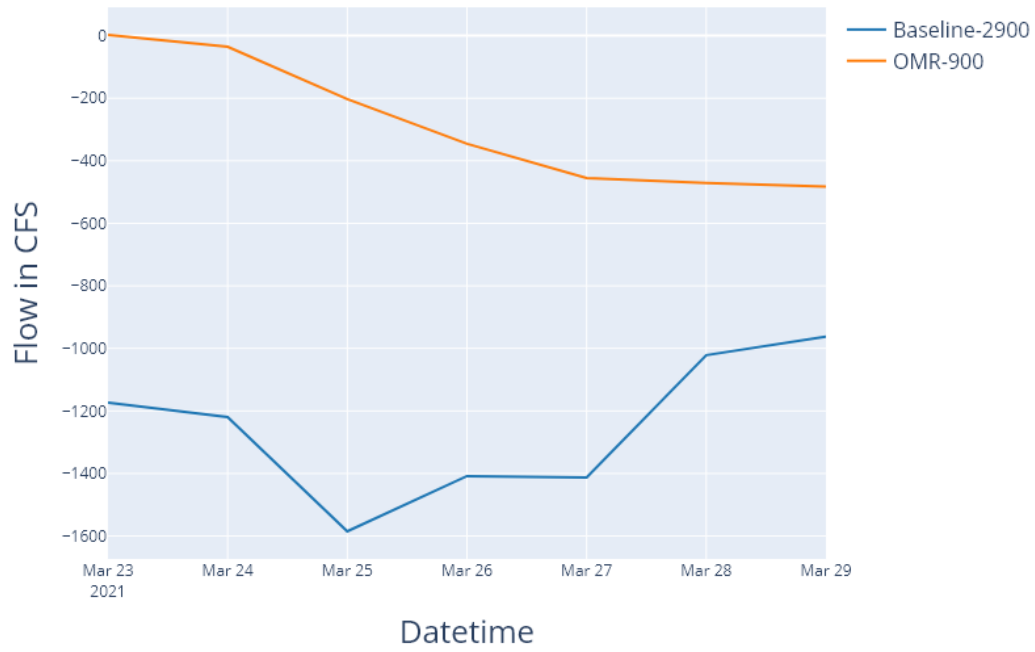


(a)

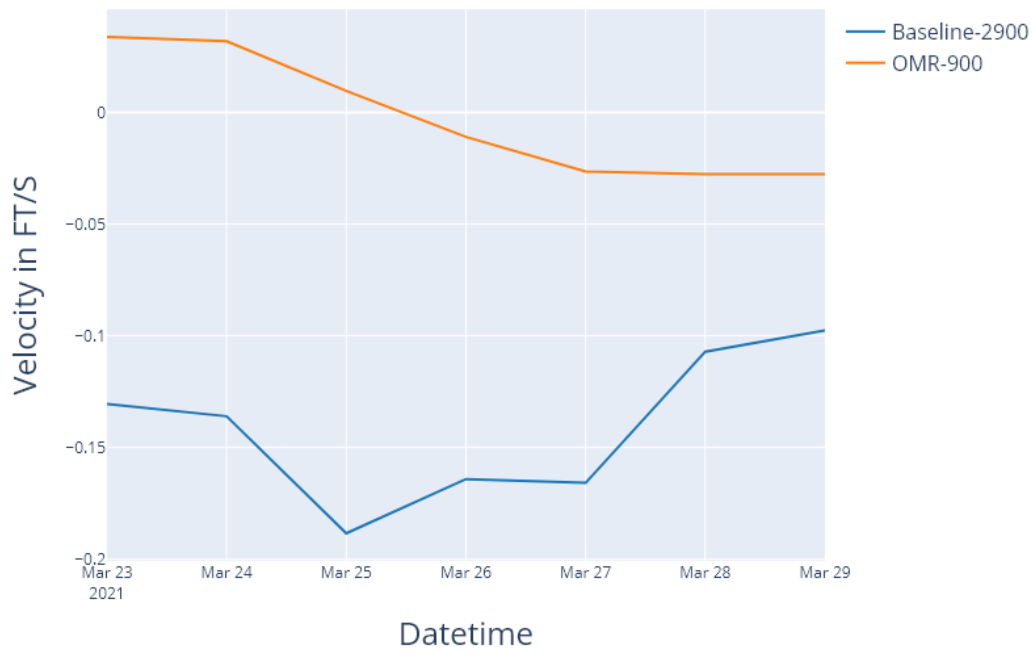


(b)

Figure A11: South Delta along Old River (CHAN094 – Old River/HW4)

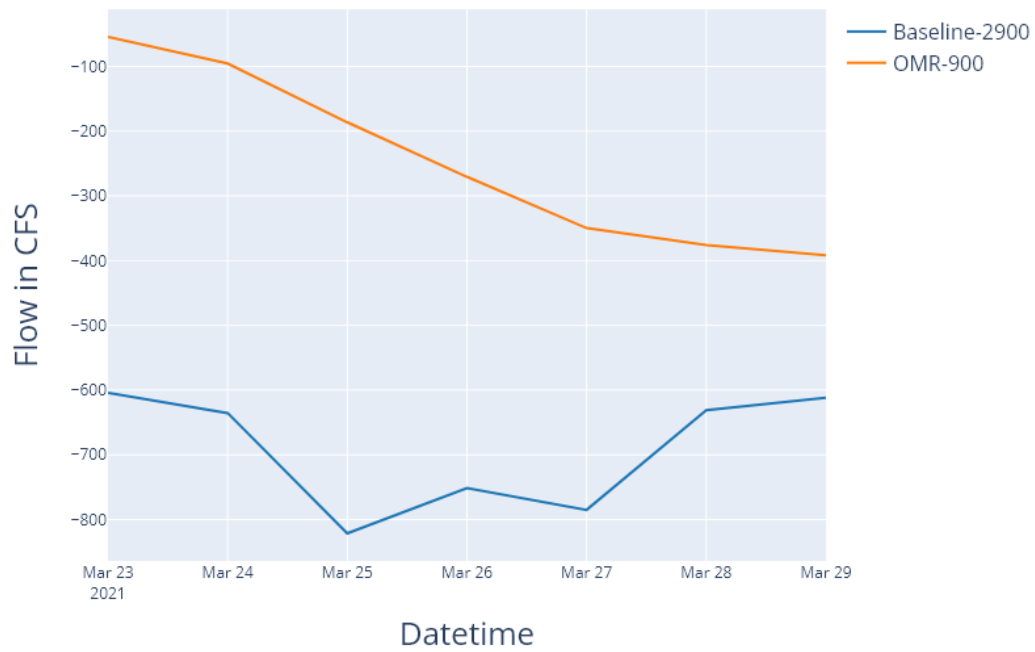


(a)

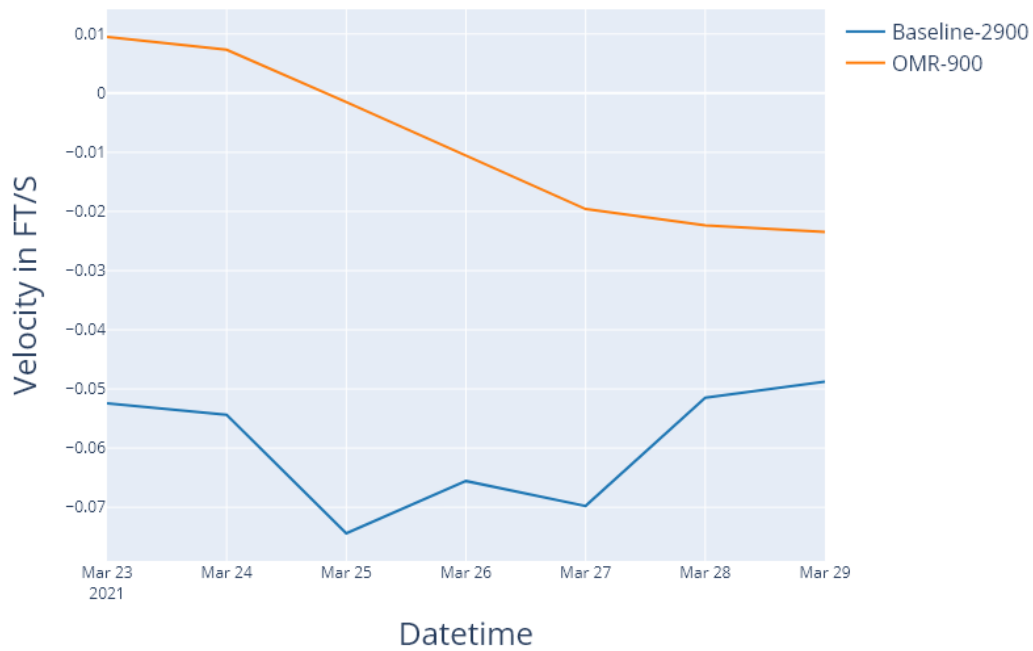


(b)

Figure A12: South Delta along Middle River (CHAN148 – Middle River/ Woodward Cut)

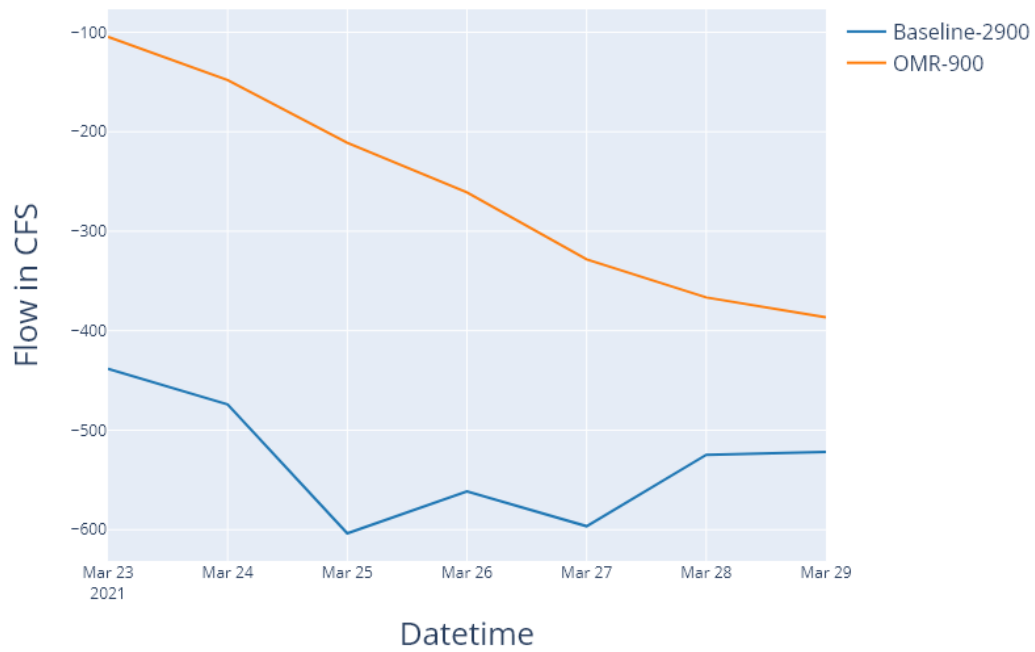


(a)

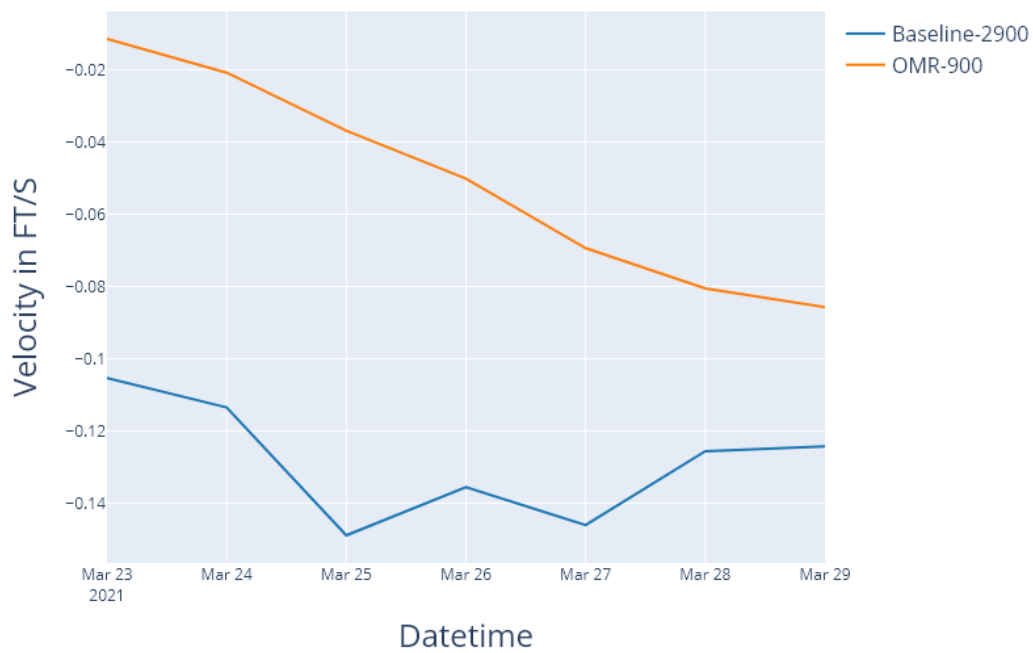


(b)

Figure A13: South Delta along Middle River (CHAN107 – Old River-Bacon Isl.)



(a)



(b)

DSM2 model interpretation entrainment in Delta strata regions

North Delta into Interior and Central Delta

Channels: 49 and 434

Low to slight measurable changes to flow and velocity related to modeled OMR conditions are anticipated. It is unlikely that listed salmonids would experience behavioral changes related to modeled OMR conditions this week. Despite low exports the zone of influence has expanded further south due to the low hydrology.

San Joaquin River and Central Delta into South Delta

Channels: 6, 21, 107, 124, and 160

There will be measurable changes to flow and velocity related to modeled OMR conditions. Based on recent survey data, listed salmonids are present. Hydrological changes may be detectable by fish. Cumulative net flows within the channels of the South Delta are negative in magnitude. Fish moving from the San Joaquin mainstem would have an increased transit time towards the western Delta. Despite low exports the zone of influence has expanded further north due to the low hydrology.

South Delta into facilities

Channels: 81, 94, and 148

There will be measurable changes to flow and velocity related to modeled OMR conditions. Based on recent survey data, listed salmonids are present. Hydrological changes may be detectable by fish. Cumulative net flows within the channels of the South Delta are still negative in magnitude but becoming less so towards the second half of the forecast period. Fish moving from the San Joaquin mainstem into the head of Old River would have a decreased transit time towards the fish salvage facilities.

DSM2 channel locations information

Figure A14. Highlighted DSM2 channels by Delta Strata.

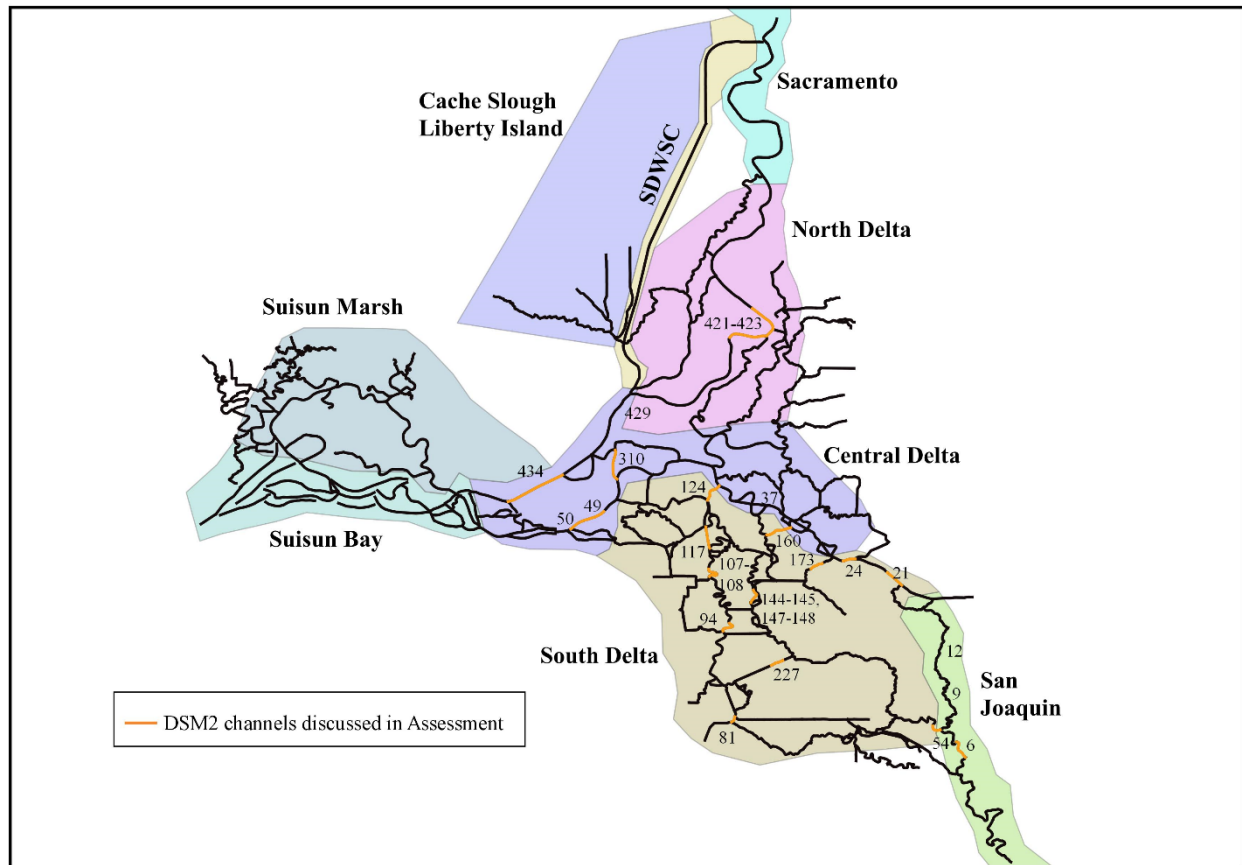


Table A3. Description of channel location, by Delta Strata region. Not all listed channels have model results presented in every weekly Proposed Action Assessment.

DSM2 Channel	Description
North Delta into Interior and Central Delta	
CHAN049	San Joaquin River at Sherman Island
CHAN310	Three-Mile Slough
CHAN421	Sacramento River at Delta Cross Channel
CHAN422	Sacramento River at Delta Cross Channel
CHAN423	Sacramento River at Delta Cross Channel
CHAN434	Sacramento River at Sherman Island
San Joaquin River and Central Delta into South Delta	
CHAN006	San Joaquin River at Head of Old River (HOR)
CHAN021	San Joaquin River downstream from confluence with Calaveras River
CHAN024	San Joaquin River upstream of Turner Cut
CHAN054	Old River at confluence with San Joaquin River (HOR)
CHAN107	Old River north of Rock Slough
CHAN117	Old River south of Franks Tract
CHAN124	Old River between Franks Tract and San Joaquin River
CHAN160	Columbia Cut
CHAN173	Turner Cut
South Delta into Facilities	
CHAN148	Middle River
CHAN227	Victoria Canal
CHAN081	Grant Line Canal
CHAN094	Old River

3/30/2021 Meeting

Background

<i>Process</i>	
Weekly process	<ul style="list-style-type: none"> • DSM2 model runs use a historic and forecasted hydrological input dataset with no assumptions provided by DWR Thursdays and updated by Reclamation Mondays. • Input File updated Monday after initial distribution from DWR for removal of forecasted in lieu of historic input. • Reclamation provides scenarios based on expected OMR index values for the upcoming week. • DSM2 model runs produced Monday and distributed to SaMT members.
<i>Hydraulic footprint information</i>	
Baseline and Scenarios updated	3/29/2021
DSM2 modeling results range	3/30/2021 – 4/5/2021
<i>OMR index value scenarios</i>	
Baseline	-940 cfs
Scenario 1	-860 cfs (decreasing from Baseline; Δ 80 cfs)
Scenario 2	N/A
<i>Changes between scenarios</i>	
Hydrology	No (see special considerations section below)
Delta Exports	Yes
<i>Common assumptions</i>	
DSM2 run results based on the following assumptions	<ul style="list-style-type: none"> • CCFB Gates are operating to Priority 1 throughout the forecast period. • The Delta Cross Channel gates are closed throughout the forecast period. • Suisun Marsh salinity control flashboards are in, and 2 of the Suisun Marsh Salinity Control gates are in tidal operation and 1 gate is closed for maintenance. • Sacramento River flow at Freeport is at 8,596 cfs at the beginning of the forecast period and is expected to decrease to 8,396 cfs by the end of the forecast period. (Figure A1a). • San Joaquin River flow at Vernalis is at 1,025 cfs at the beginning of the forecast period and is estimated to increase to 1,080 cfs by the end of the forecast period. (Figure A1b). • Clifton Court Forebay and Tracy Pumping Plant pumping is shown for model runs in Figure A2a-A2d.
<i>Additional information</i>	
Considerations for current DSM2 model run	This week there was no Scenario 2 modeled. The more negative expected OMR Index Value (see Operations Outlook document) could not be reached without a change in hydrology.
Caveats	<ul style="list-style-type: none"> • Time-step: DSM2 generates results at 15-minute time-steps. Visualizations of DSM2 model run results are aggregated over daily time-steps. Operations function on a more granular scale than daily time-step. • Salmonid behavior: DSM2 provides flow fields which salmonids may encounter but salmonids are not neutrally buoyant particles. Models which incorporate behavior from acoustic tagged salmonids are being developed for South Delta (ePTM, ecoPTM).

DSM2 model results: summary tables

Table A1. Summary of minimum, maximum, mean, and percent positive flows (cfs) and velocities (ft/s) by DSM2 channel for OMR scenarios over a 6-day time period. For scenario values refer to “Hydraulic Footprint Information” in the conditions / assumptions section above.

Scenario (cfs)	DSM2 Channel	Flow Min.	Flow Max.	Flow Mean	Flow % Positive	Velocity Min.	Velocity Max.	Velocity Mean	Velocity % Positive
Baseline	6	-376.2	1849.2	1001.4	92	-0.2	1.1	0.6	92
Scenario 1	6	-376.2	1849.2	1001.4	92	-0.2	1.1	0.6	92
Baseline	21	-8307.7	6847.6	356.8	55	-0.6	0.5	0.0	55
Scenario 1	21	-8308.0	6889.3	359.5	55	-0.6	0.5	0.0	55
Baseline	49	-166297.6	143662.4	1480.6	53	-2.1	1.9	0.1	53
Scenario 1	49	-166288.0	143729.9	1514.9	53	-2.1	1.9	0.1	53
Baseline	81	-4044.4	2006.8	-773.1	48	-1.1	0.6	-0.2	48
Scenario 1	81	-3997.0	2006.8	-773.1	48	-1.0	0.6	-0.2	48
Baseline	94	-13775.4	10271.7	-378.2	52	-1.9	1.5	0.0	52
Scenario 1	94	-13257.4	10283.4	-355.8	52	-1.8	1.5	0.0	52
Baseline	107	-6432.2	4273.9	-325.0	52	-1.8	1.2	-0.1	52
Scenario 1	107	-6263.1	4281.3	-318.5	52	-1.7	1.2	-0.1	52
Baseline	124	-20220.6	12847.9	-2249.3	46	-0.6	0.4	-0.1	46
Scenario 1	124	-20196.1	12854.6	-2238.3	46	-0.6	0.4	-0.1	46
Baseline	148	-8388.8	6087.1	-317.7	52	-0.9	0.7	0.0	52
Scenario 1	148	-7860.6	6094.6	-306.9	52	-0.9	0.7	0.0	52
Baseline	160	-4909.1	3733.5	-26.3	53	-0.5	0.5	0.0	53
Scenario 1	160	-4900.0	3743.5	-21.8	53	-0.5	0.5	0.0	53
Baseline	434	-178844.5	161713.9	5139.2	53	-2.0	1.9	0.1	53
Scenario 1	434	-178837.8	161761.2	5149.1	53	-2.0	1.9	0.1	53

DSM2 model results: figures

Figure A1a-b. Daily forecasted Freeport and Vernalis flows (cfs)

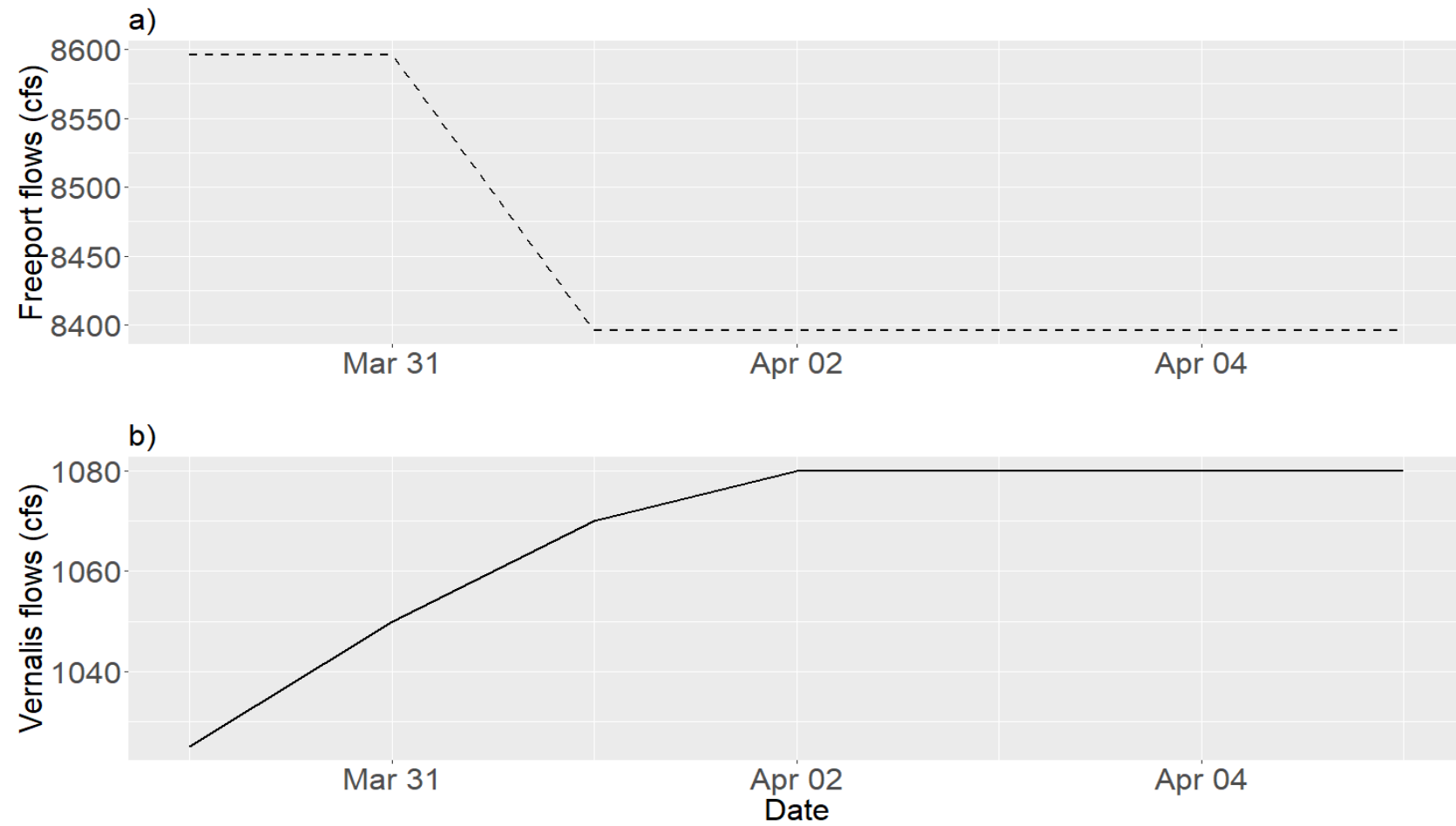


Figure A2a-d. Daily forecasted pumping: Jones and Banks (cfs): Baseline and Scenario 1.

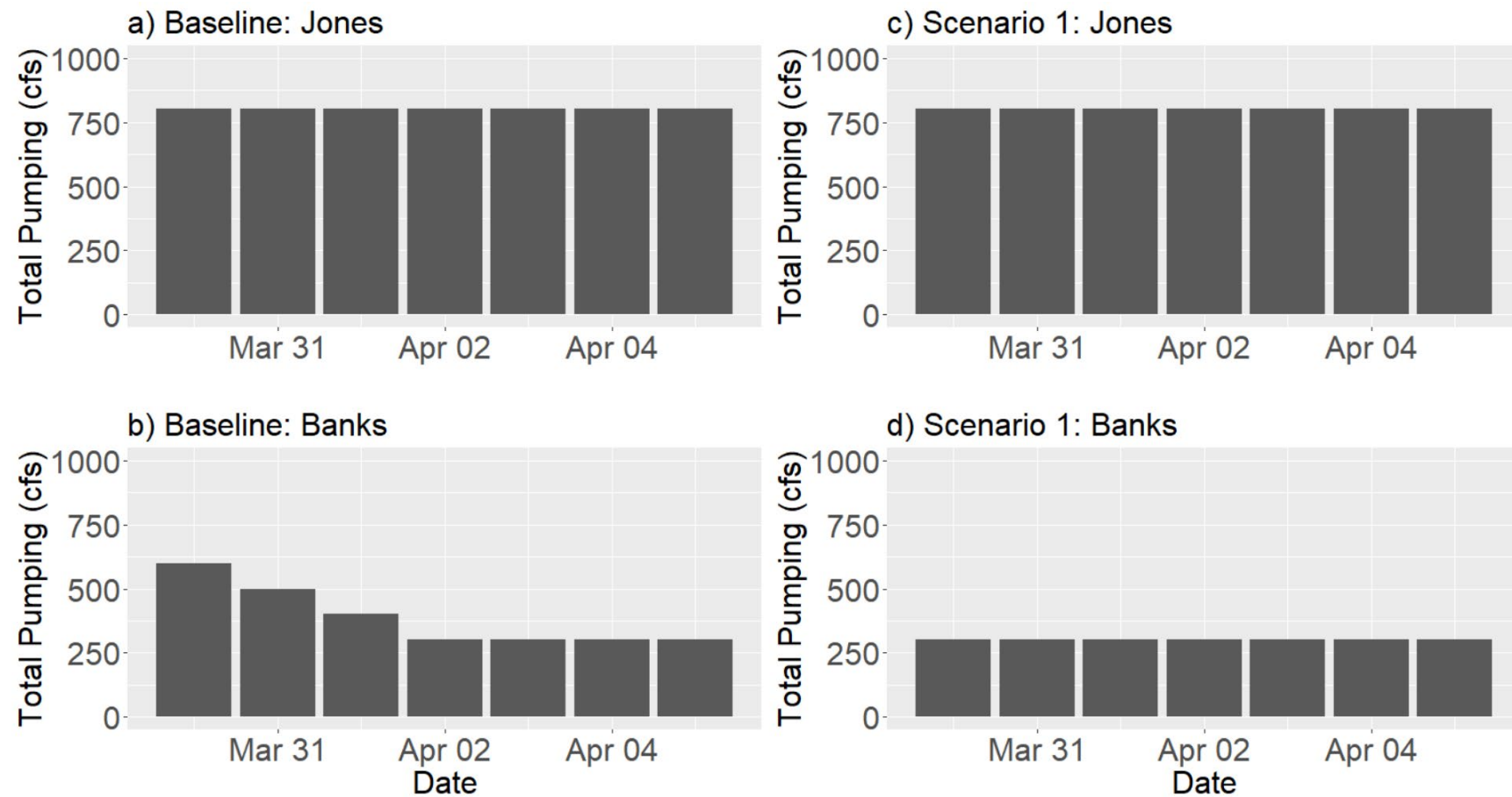
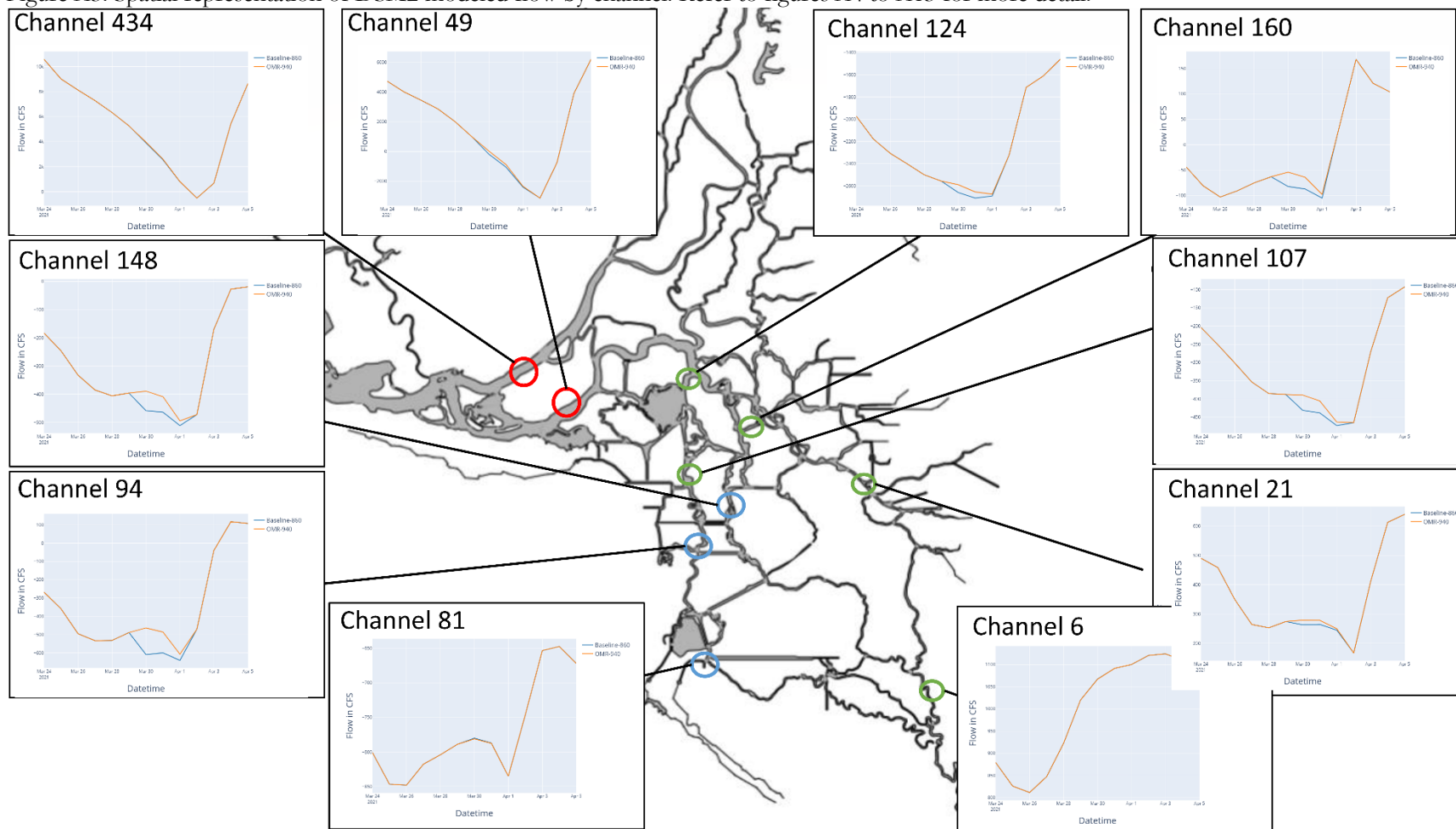


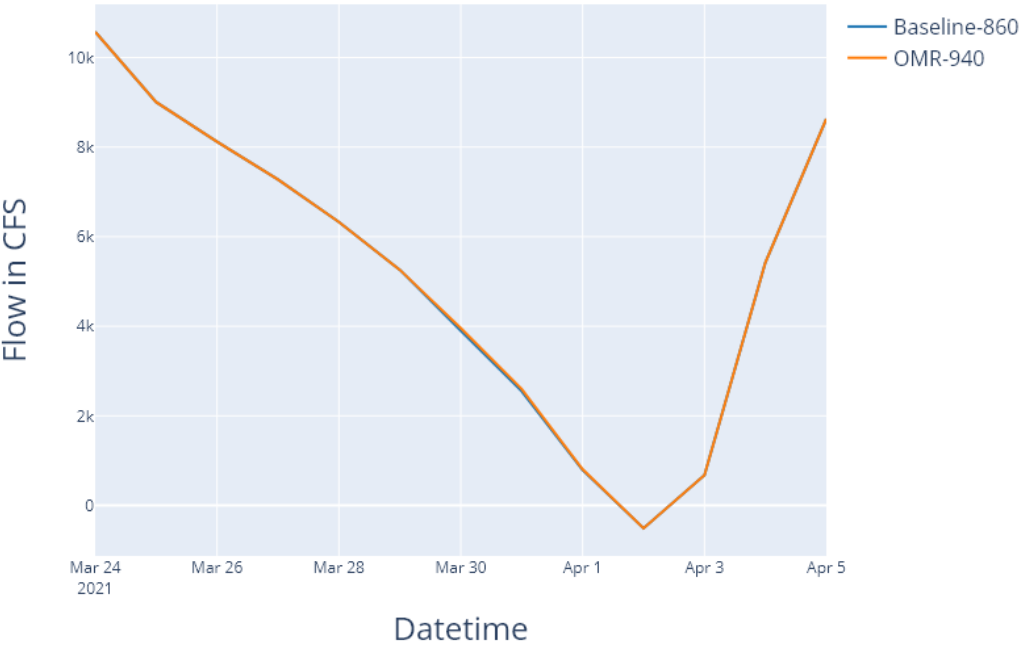
Figure A3: Spatial representation of DSM2 modeled flow by channel. Refer to figures A4 to A13 for more detail.



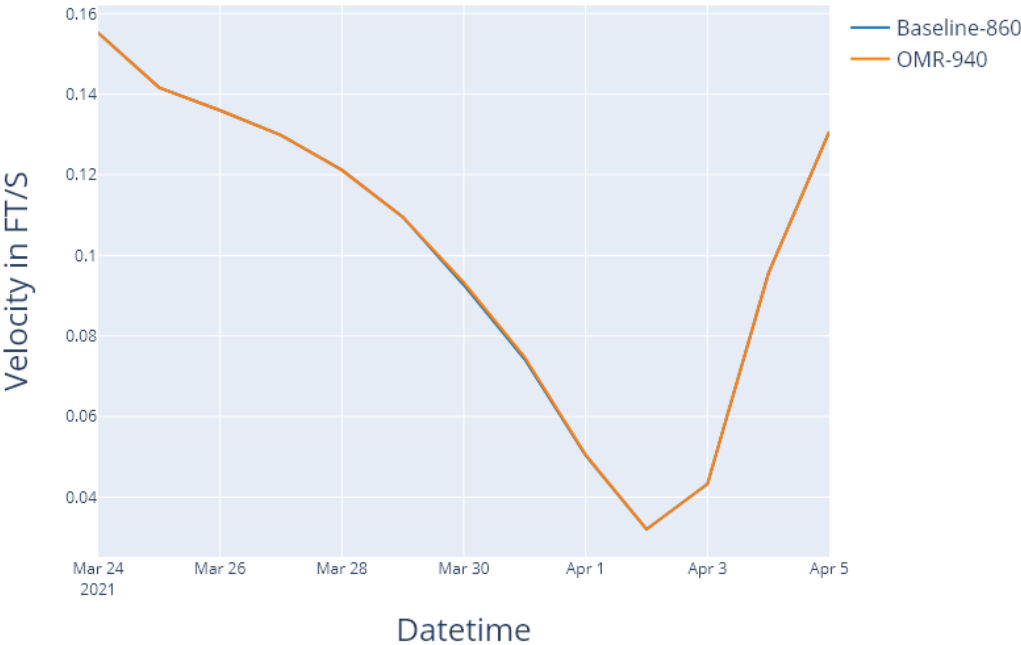
The following captions apply to the time-series plots for flow and velocity in selected locations (see Figure A14 and Table A3 for channel location information) below:

- (q) Time-series plot (1-day aggregated): Baseline, Scenario 1 OMR, and Scenario 2 OMR. X-axis represents daily time steps and y-axis represents flow (cfs) values. For Baseline, Scenario 1, and Scenario 2 values refer to “Hydraulic Footprint Information” in the section above. Reported summary statistics (minimum, maximum, etc.) are found in Table A1.
- (r) Time-series plot (1-day aggregated): Baseline, Scenario 1 OMR, and Scenario 2 OMR. X-axis represents daily time steps and y-axis represents velocity (cfs) values. For Baseline, Scenario 1, and Scenario 2 values refer to “Hydraulic Footprint Information” in the section above. Reported summary statistics (minimum, maximum, etc.) are found in Table A1.

Figure A4: Sacramento River at Sherman Island (CHAN434)

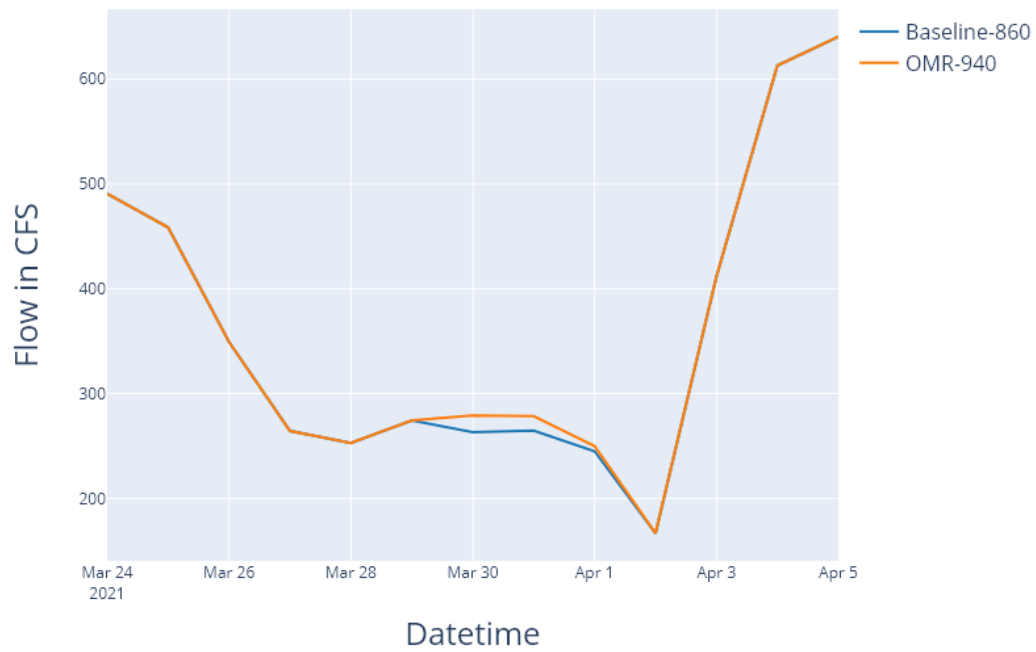


(a)

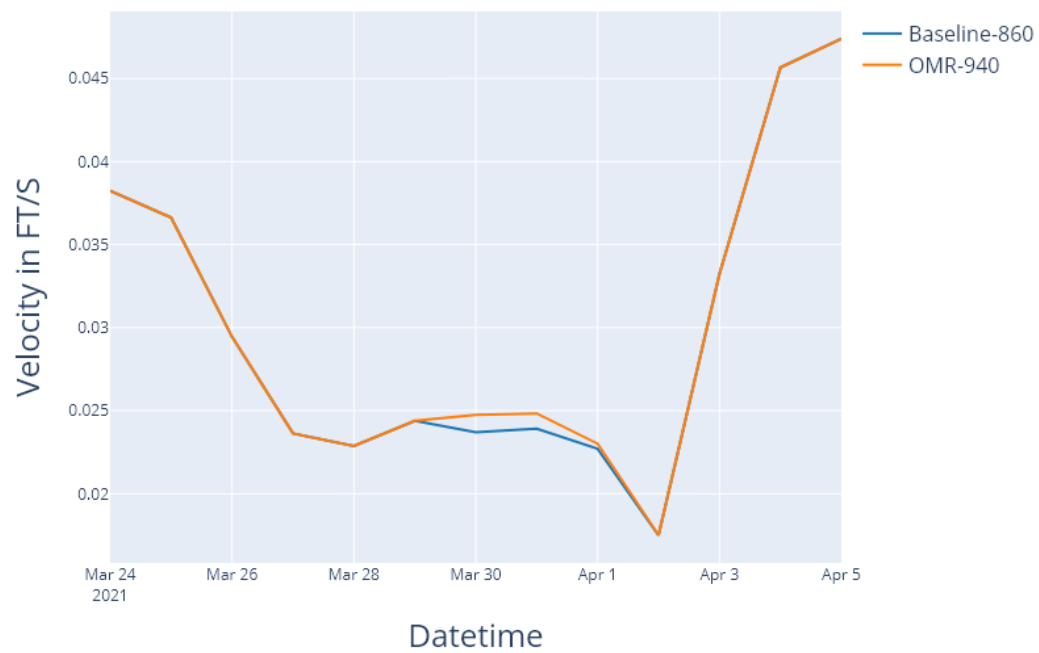


(b)

Figure A5: San Joaquin River downstream of confluence with Calaveras River (CHAN021)

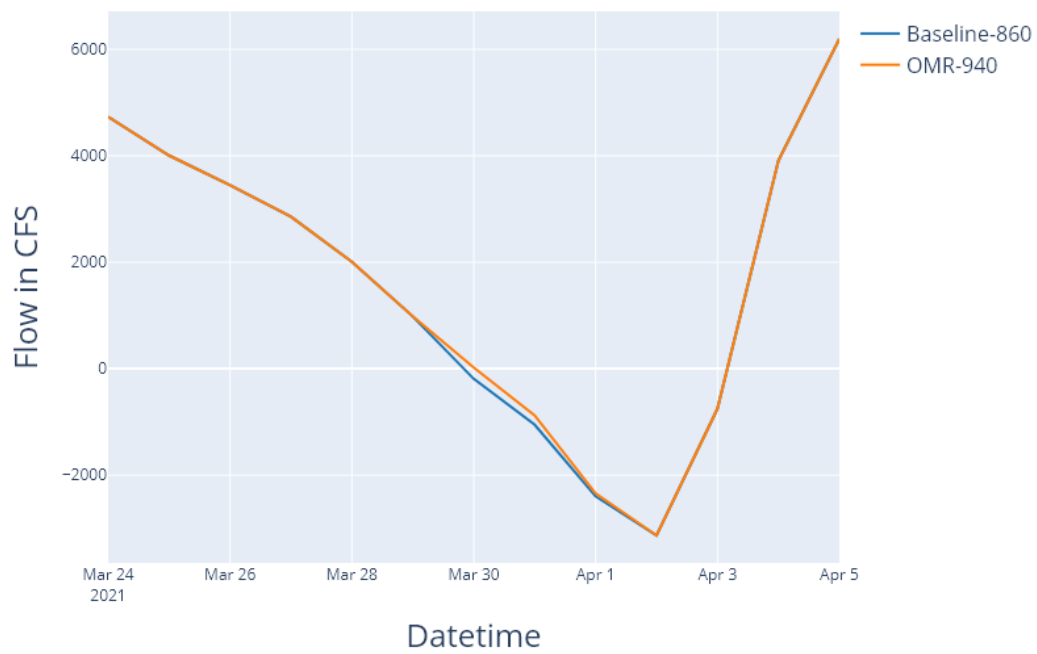


(a)

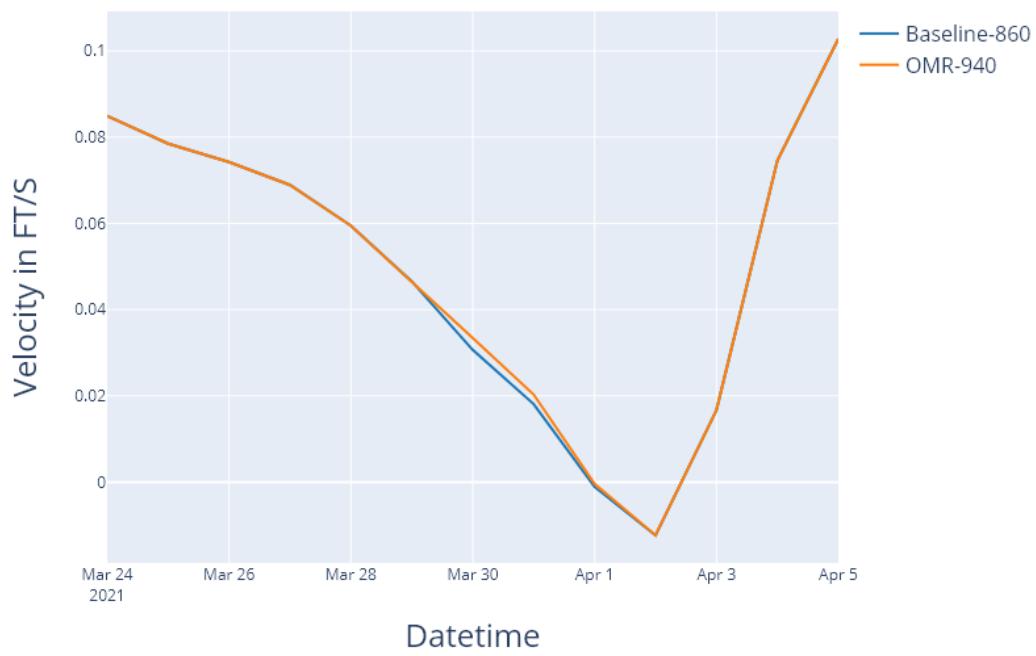


(b)

Figure A6: San Joaquin River at Sherman Island (CHAN049)

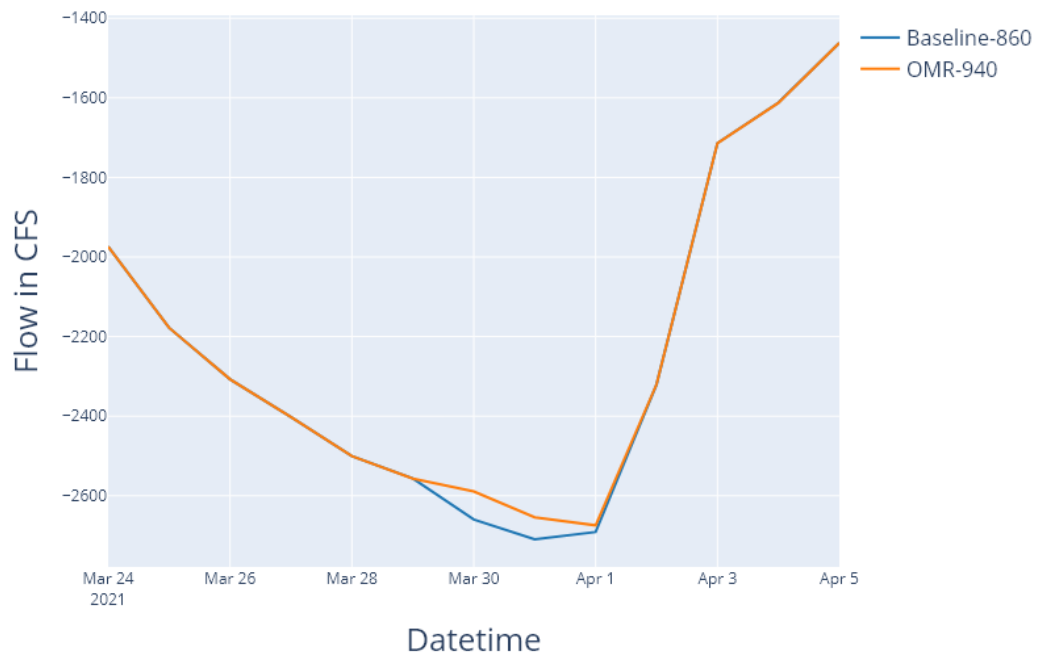


(a)

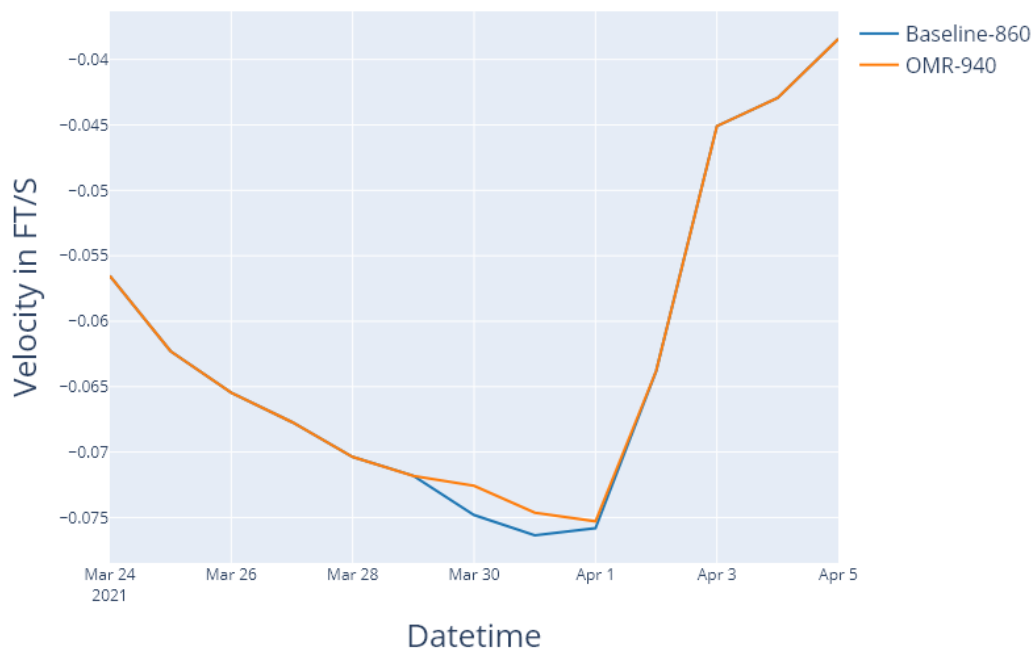


(b)

Figure A7: Old River between Franks Tract and San Joaquin River (CHAN124)

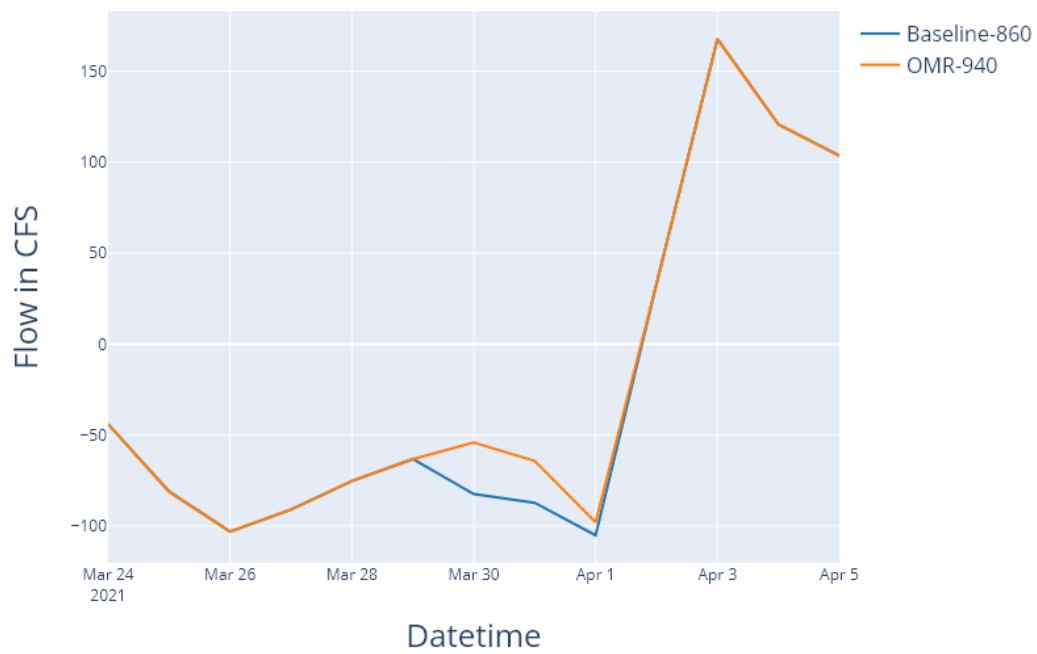


(a)

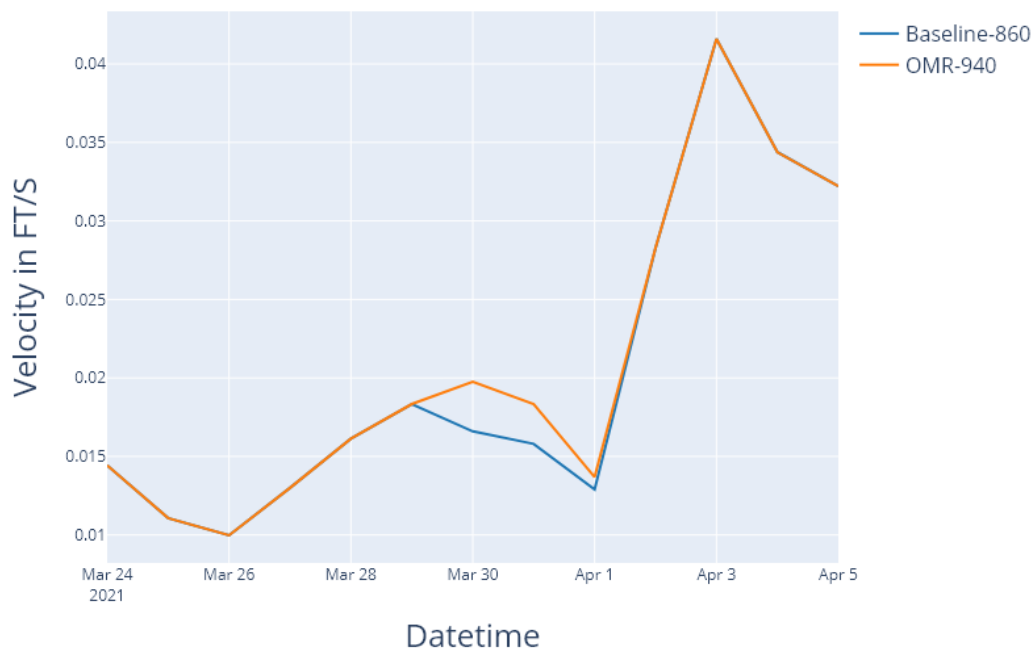


(b)

Figure A8: Lower San Joaquin River at Columbia Cut (CHAN160)

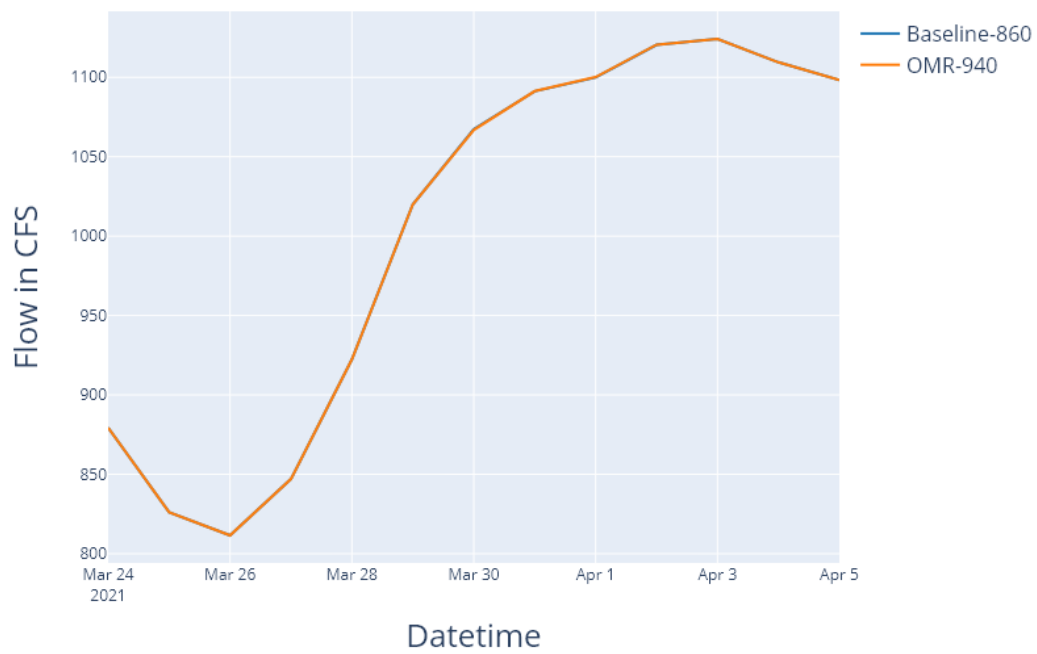


(a)

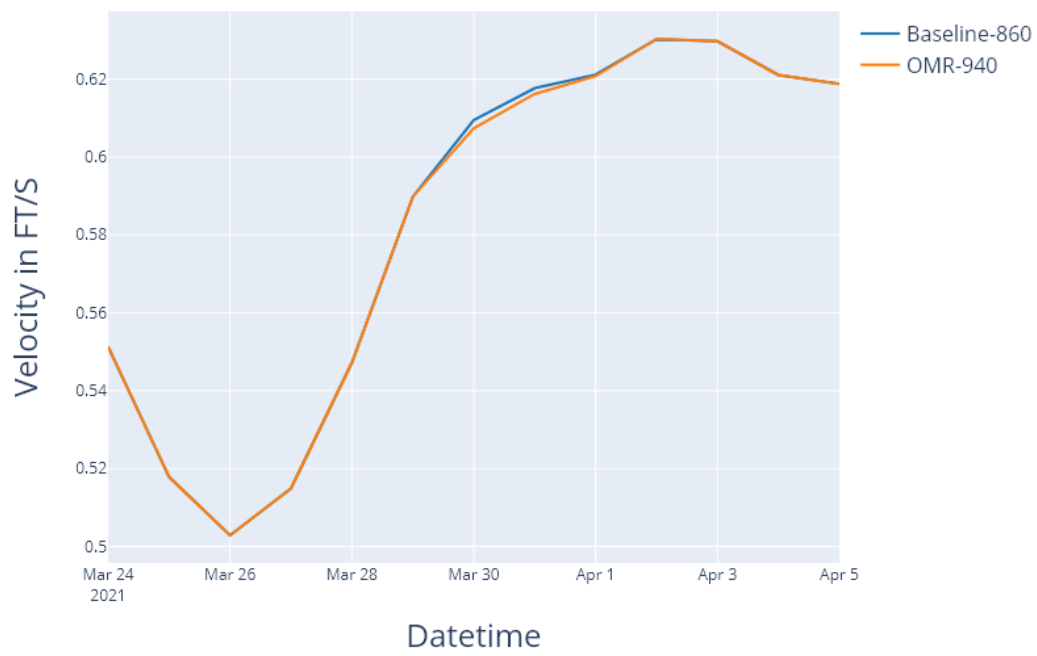


(b)

Figure A9: Slightly upstream of Head of Old River (CHAN006)

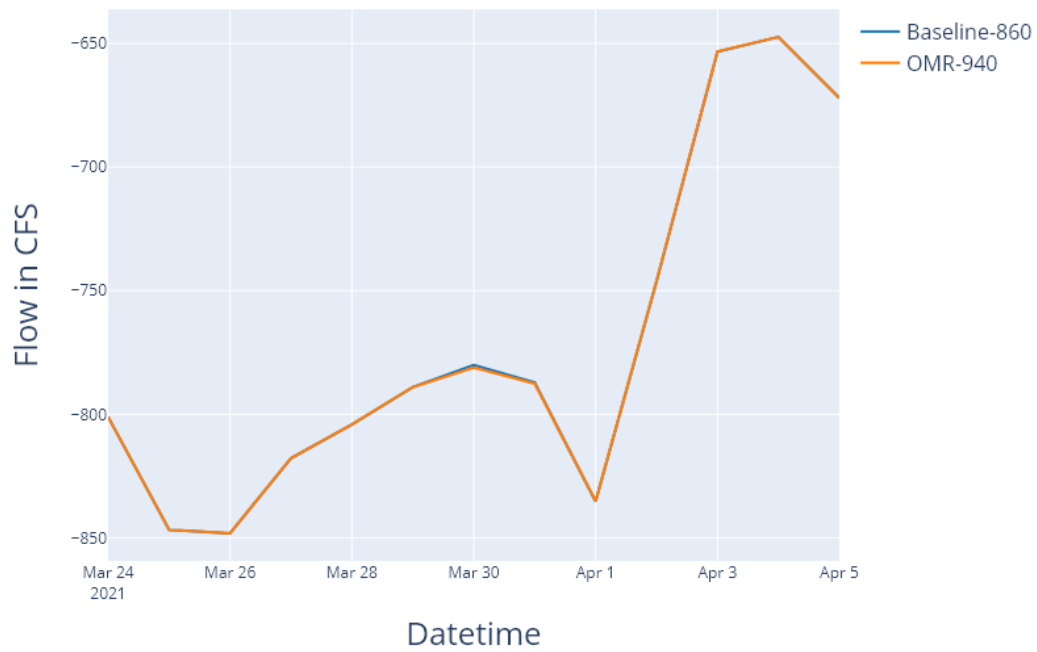


(a)

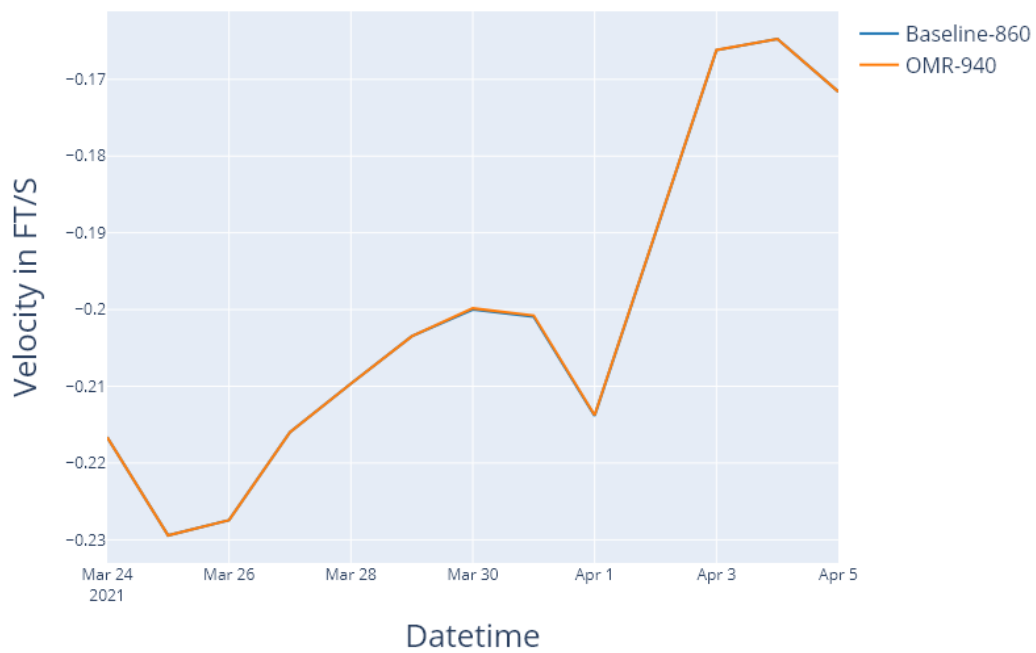


(b)

Figure A10: Old River adjacent to Grant Line Canal (CHAN081 – Old River between Grant Line and CVP)

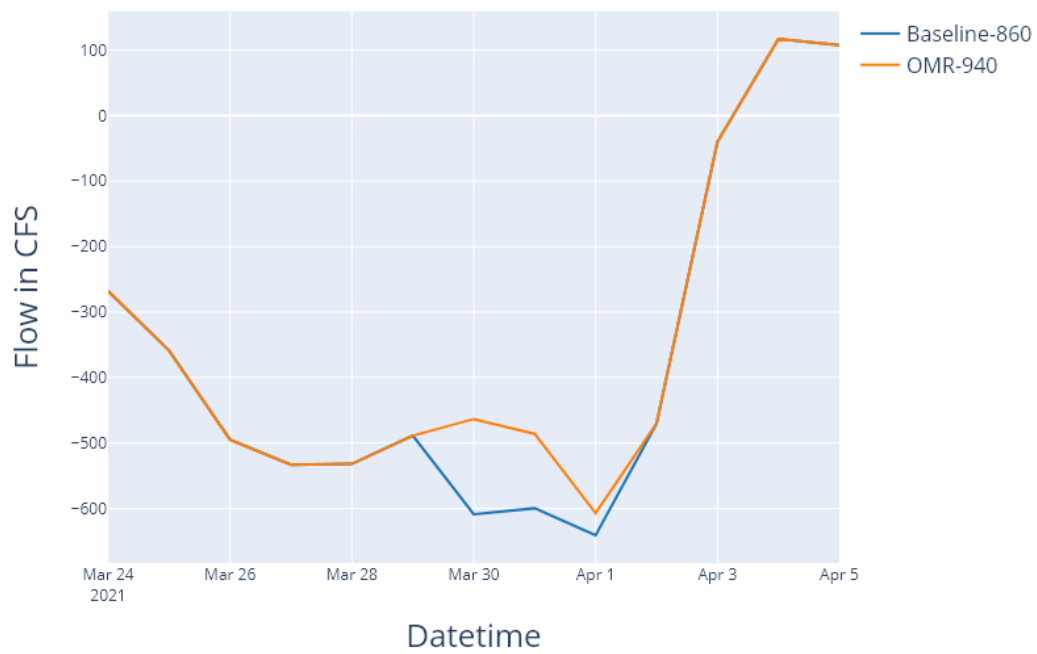


(a)

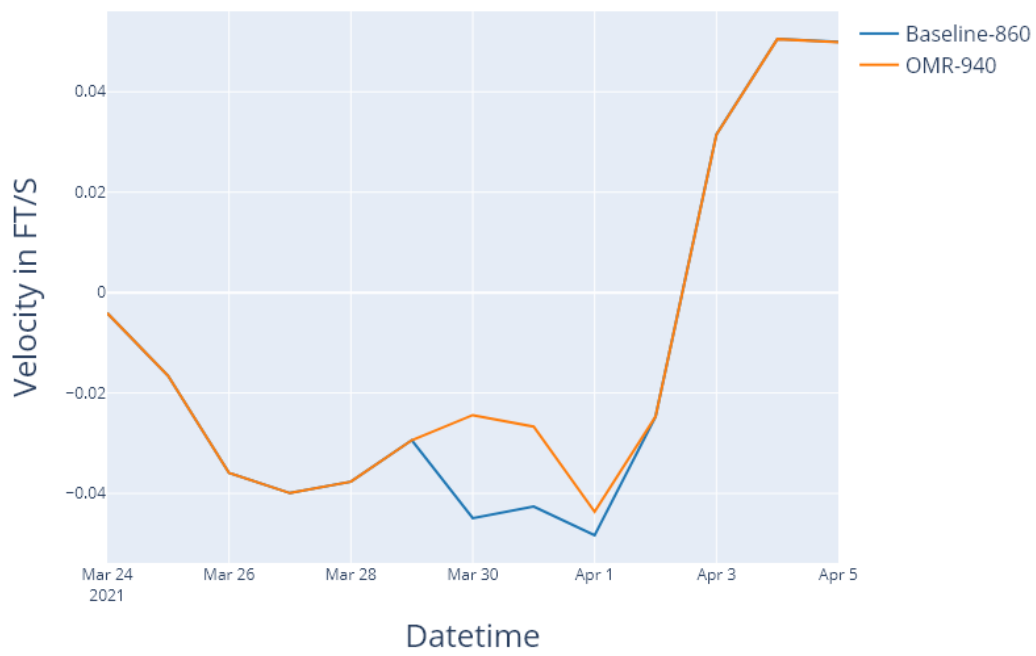


(b)

Figure A11: South Delta along Old River (CHAN094 – Old River/HW4)

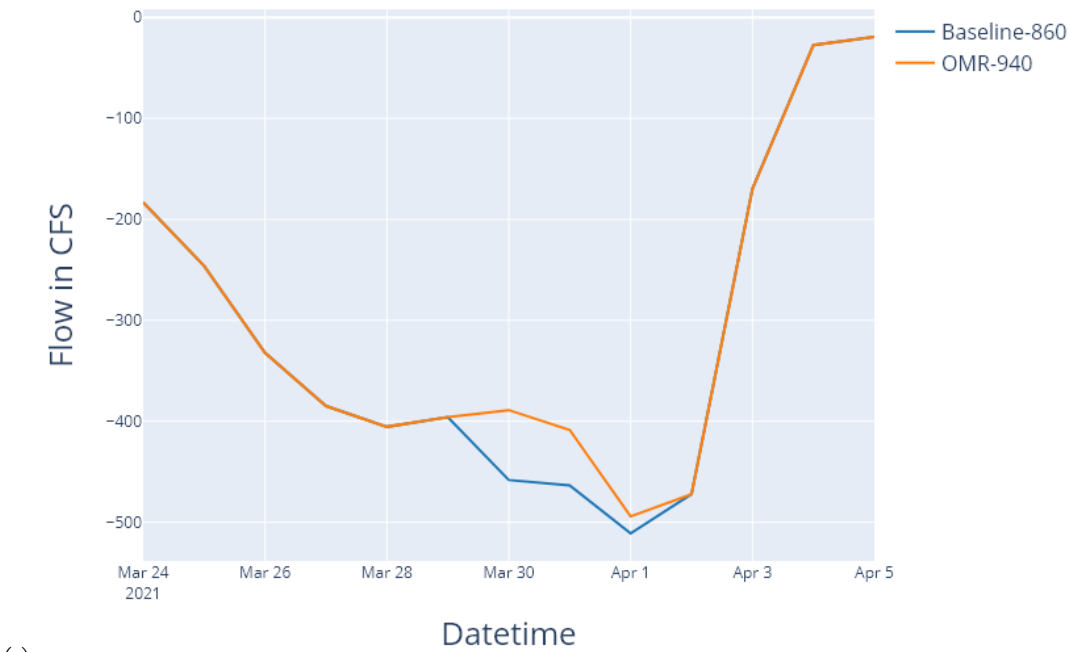


(a)

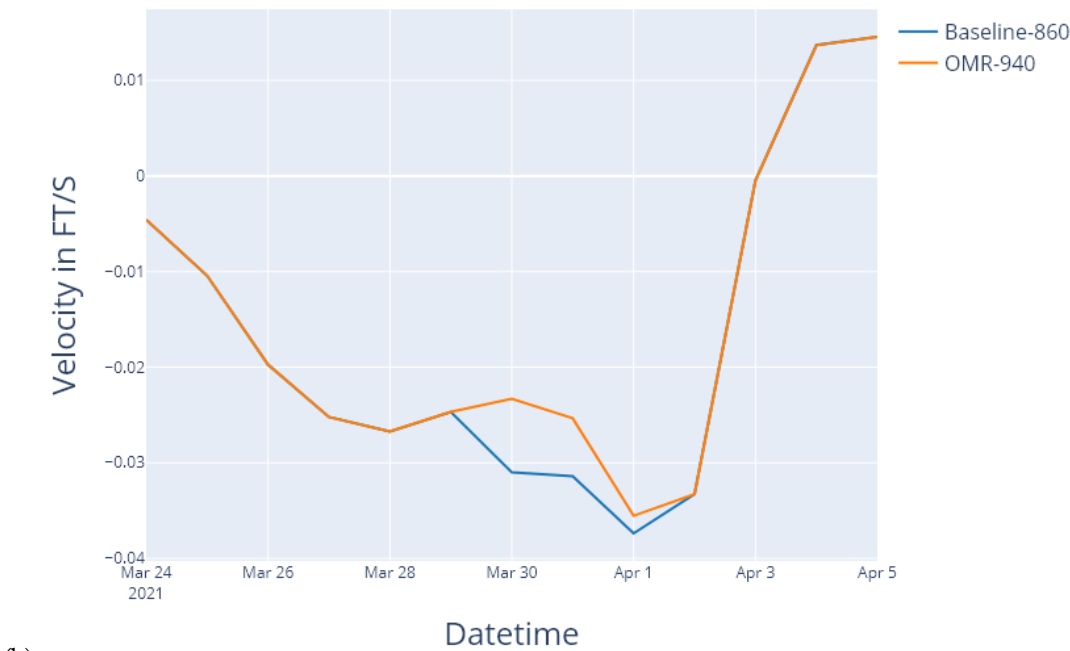


(b)

Figure A12: South Delta along Middle River (CHAN148 – Middle River/ Woodward Cut)

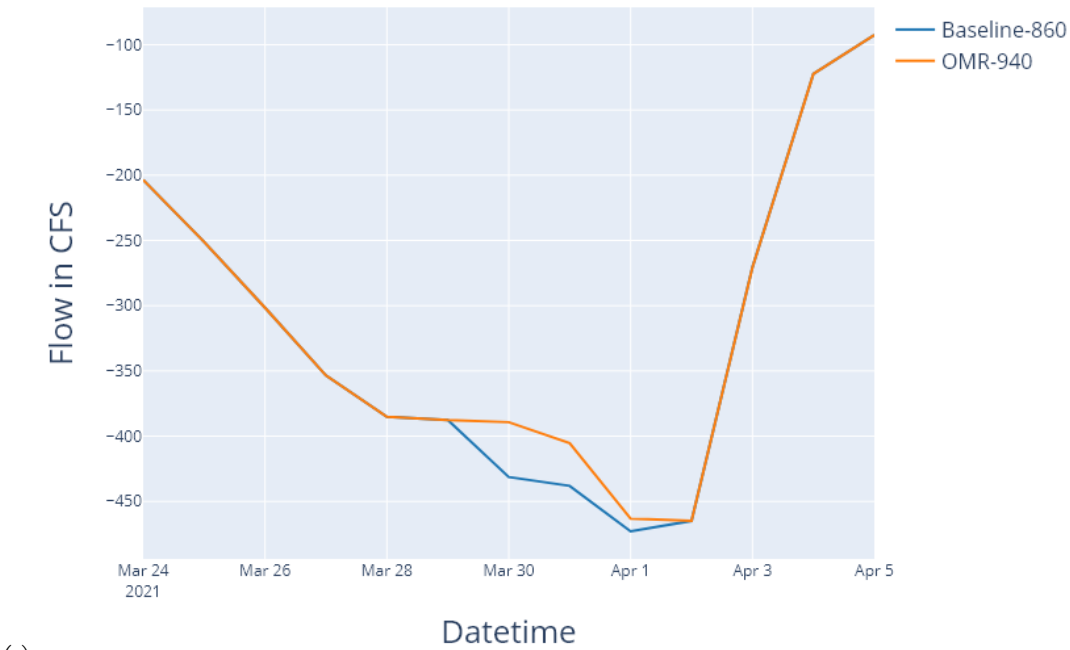


(a)

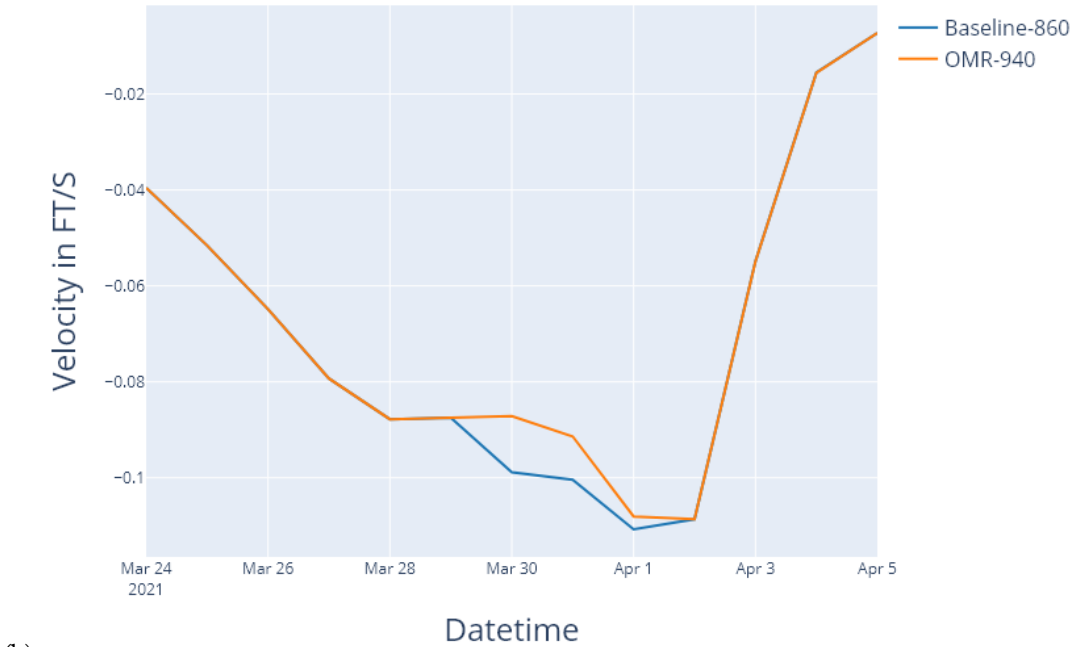


(b)

Figure A13: South Delta along Middle River (CHAN107 – Old River-Bacon Isl.)



(a)



(b)

DSM2 model interpretation entrainment in Delta strata regions

North Delta into Interior and Central Delta

Channels: 49 and 434

Low measurable changes to flow and velocity related to modeled OMR conditions are anticipated. It is unlikely that listed salmonids would experience behavioral changes related to modeled OMR conditions this week. Despite low exports the zone of influence has expanded further south due to the low hydrology.

San Joaquin River and Central Delta into South Delta

Channels: 6, 21, 107, 124, and 160

There will be low measurable changes to flow and velocity related to modeled OMR conditions. Based on recent survey data, listed salmonids are present. It's unlikely that hydrological changes will be detectable by fish. Cumulative net flows within the channels of the South Delta are negative in magnitude. Fish moving from the San Joaquin mainstem would have an increased transit time towards the western Delta in the first half of the simulation and a decreased transit time in the second half of the simulation due to Vernalis flows. Despite low exports the zone of influence has expanded further north due to the low hydrology.

South Delta into facilities

Channels: 81, 94, and 148

There will be low measurable changes to flow and velocity related to modeled OMR conditions. Based on recent survey data, listed salmonids are present. It's unlikely that hydrological changes will be detectable by fish. Cumulative net flows within the channels of the South Delta are still negative in magnitude but becoming less so towards the second half of the forecast period. Fish moving from the San Joaquin mainstem into the head of Old River would have a decreased transit time towards the fish salvage facilities in the first half of the simulation and an increased transit time in the second half of the simulation due to Vernalis flows and decreased export rates (more evident in the baseline scenario).

DSM2 channel locations information

Figure A14. Highlighted DSM2 channels by Delta Strata.

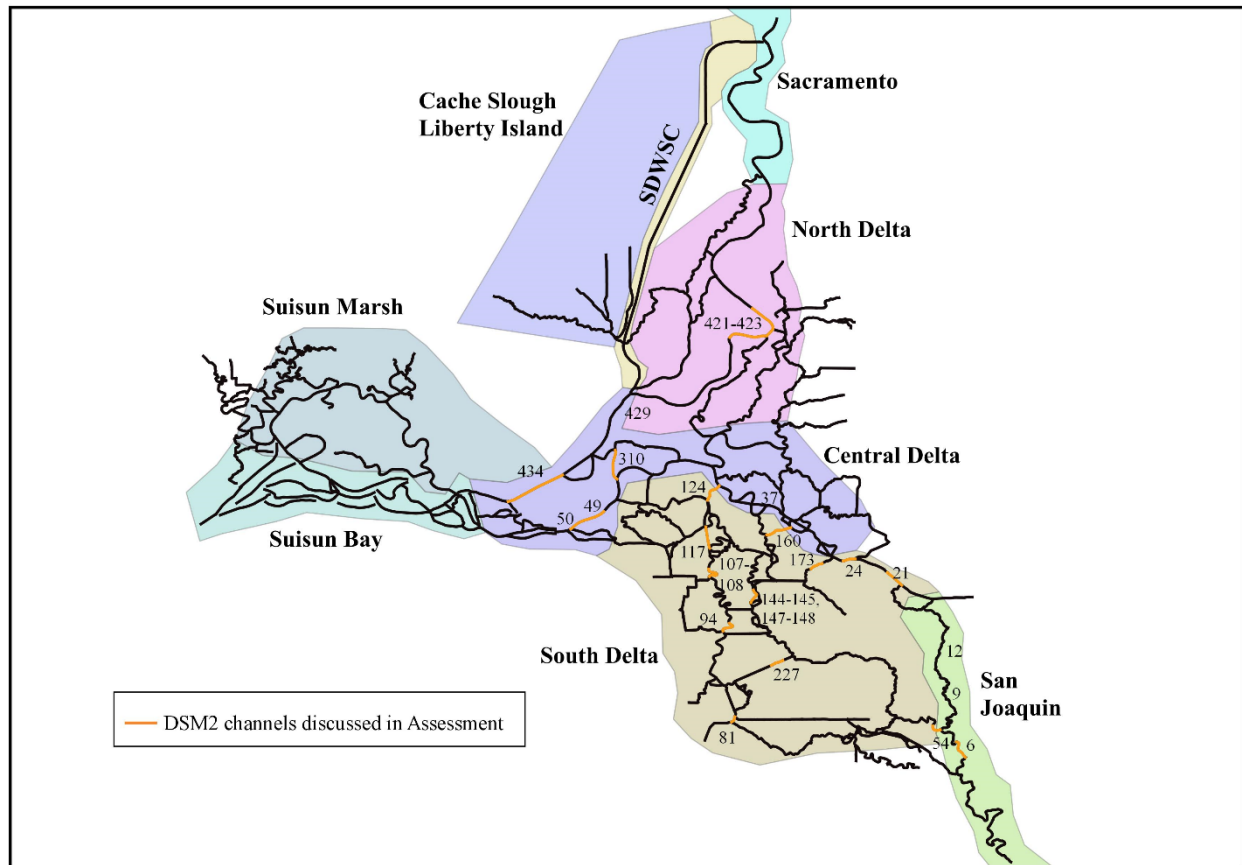


Table A3. Description of channel location, by Delta Strata region. Not all listed channels have model results presented in every weekly Proposed Action Assessment.

DSM2 Channel	Description
North Delta into Interior and Central Delta	
CHAN049	San Joaquin River at Sherman Island
CHAN310	Three-Mile Slough
CHAN421	Sacramento River at Delta Cross Channel
CHAN422	Sacramento River at Delta Cross Channel
CHAN423	Sacramento River at Delta Cross Channel
CHAN434	Sacramento River at Sherman Island
San Joaquin River and Central Delta into South Delta	
CHAN006	San Joaquin River at Head of Old River (HOR)
CHAN021	San Joaquin River downstream from confluence with Calaveras River
CHAN024	San Joaquin River upstream of Turner Cut
CHAN054	Old River at confluence with San Joaquin River (HOR)
CHAN107	Old River north of Rock Slough
CHAN117	Old River south of Franks Tract
CHAN124	Old River between Franks Tract and San Joaquin River
CHAN160	Columbia Cut
CHAN173	Turner Cut
South Delta into Facilities	
CHAN148	Middle River
CHAN227	Victoria Canal
CHAN081	Grant Line Canal
CHAN094	Old River

4/6/2021 Meeting
Background

<i>Process</i>	
Weekly process	<ul style="list-style-type: none"> • DSM2 model runs use a historic and forecasted hydrological input dataset with no assumptions provided by DWR Thursdays and updated by Reclamation Mondays. • Input File updated Monday after initial distribution from DWR for removal of forecasted in lieu of historic input. • Reclamation provides scenarios based on expected OMR index values for the upcoming week. • DSM2 model runs produced Monday and distributed to SaMT members.
<i>Hydraulic footprint information</i>	
Baseline and Scenarios updated	4/5/2021
DSM2 modeling results range	4/6/2021 – 4/12/2021
<i>OMR index value scenarios</i>	
Baseline	-900 cfs
Scenario 1	-600 cfs (decreasing from Baseline; Δ 300 cfs)
Scenario 2	N/A
<i>Changes between scenarios</i>	
Hydrology	No (see special considerations section below)
Delta Exports	Yes
<i>Common assumptions</i>	
DSM2 run results based on the following assumptions	<ul style="list-style-type: none"> • CCFB Gates are operating to Priority 1 throughout the forecast period. • The Delta Cross Channel gates are closed throughout the forecast period. • Suisun Marsh salinity control flashboards are in, and 2 of the Suisun Marsh Salinity Control gates are in tidal operation and 1 gate is closed for maintenance. • Sacramento River flow at Freeport is at 8,984 cfs at the beginning of the forecast period and is expected to decrease to 8,184 cfs by the end of the forecast period. (Figure A1a). • San Joaquin River flow at Vernalis is at 850 cfs at the beginning of the forecast period and is estimated to decrease to 780 cfs by the end of the forecast period. (Figure A1b). • Clifton Court Forebay and Tracy Pumping Plant pumping is shown for model runs in Figure A2a-A2d.

4/6/2021 Meeting

Background (continued)

<i>Additional information</i>	
Considerations for current DSM2 model run	This week there was no Scenario 2 modeled. The more negative expected OMR Index Value (see Operations Outlook document) could not be reached without a change in hydrology.
Caveats	<ul style="list-style-type: none">• Time-step: DSM2 generates results at 15-minute time-steps. Visualizations of DSM2 model run results are aggregated over daily timesteps. Operations function on a more granular scale than daily time-step.
	<ul style="list-style-type: none">• Salmonid behavior: DSM2 provides flow fields which salmonids may encounter but salmonids are not neutrally buoyant particles. Models which incorporate behavior from acoustic tagged salmonids are being developed for South Delta (ePTM, ecoPTM).

DSM2 model results: summary tables

Table A1. Summary of minimum, maximum, mean, and percent positive flows (cfs) and velocities (ft/s) by DSM2 channel for OMR scenarios over a 6day time period. For scenario values refer to “Hydraulic Footprint Information” in the conditions / assumptions section above.

Scenario (cfs)	DSM2 Channel	Flow Min.	Flow Max.	Flow Mean	Flow % Positive	Velocity Min.	Velocity Max.	Velocity Mean	Velocity % Positive
Baseline	6	-452.0	1535.5	818.6	85	-0.2	1.0	0.5	85
Scenario 1	6	-452.6	1550.8	818.6	84	-0.2	1.0	0.5	84
Baseline	21	-7550.6	6380.2	333.7	55	-0.5	0.4	0.0	55
Scenario 1	21	-7548.5	6388.4	347.2	55	-0.5	0.4	0.0	55
Baseline	49	-154681.9	133728.8	3879.1	54	-2.0	1.8	0.1	54
Scenario 1	49	-154573.2	133736.4	4100.9	54	-2.0	1.8	0.1	54
Baseline	81	-3848.0	2039.5	-467.7	50	-1.1	0.6	-0.1	50
Scenario 1	81	-3495.2	1942.4	-412.6	51	-1.0	0.6	-0.1	51
Baseline	94	-12966.2	9614.2	-314.4	52	-1.8	1.4	0.0	52
Scenario 1	94	-12852.5	9615.7	-165.5	53	-1.8	1.4	0.0	53
Baseline	107	-5703.5	4014.5	-273.1	53	-1.6	1.2	-0.1	53
Scenario 1	107	-5697.5	4015.1	-231.0	53	-1.6	1.2	0.0	53
Baseline	124	-18750.7	12091.4	-2029.8	47	-0.6	0.4	-0.1	47
Scenario 1	124	-18729.5	12092.2	-1956.5	47	-0.6	0.4	-0.1	47
Baseline	148	-7594.6	5699.1	-260.8	53	-0.8	0.7	0.0	53
Scenario 1	148	-7587.5	5700.1	-192.6	53	-0.8	0.7	0.0	53

Scenario (cfs)	DSM2 Channel	Flow Min.	Flow Max.	Flow Mean	Flow % Positive	Velocity Min.	Velocity Max.	Velocity Mean	Velocity % Positive
Baseline	160	-4558.2	3554.5	-8.9	54	-0.5	0.5	0.0	54
Scenario 1	160	-4529.3	3555.9	21.0	54	-0.5	0.5	0.0	54
Baseline	434	-163958.9	151019.8	7589.4	55	-1.9	1.8	0.1	55
Scenario 1	434	-163888.8	151022.0	7651.8	55	-1.9	1.8	0.1	55

DSM2 model results: figures

Figure A1a-b. Daily forecasted Freeport and Vernalis flows (cfs)

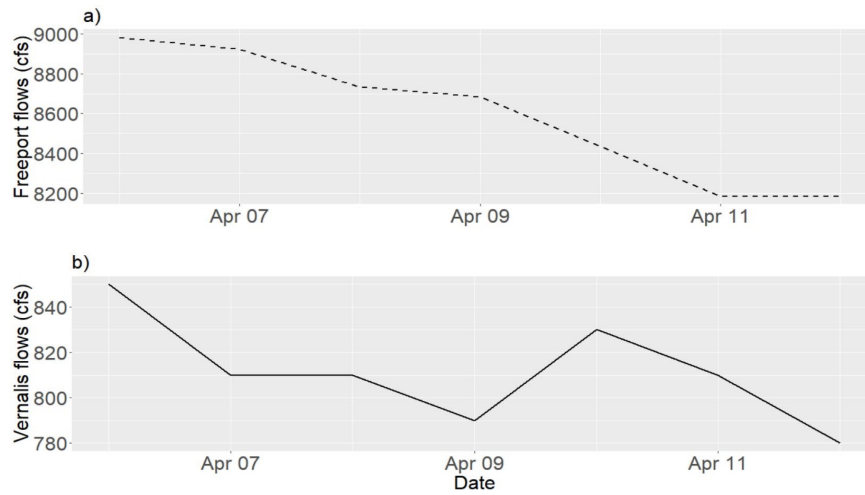


Figure A2a-d. Daily forecasted pumping: Jones and Banks (cfs): Baseline and Scenario 1.

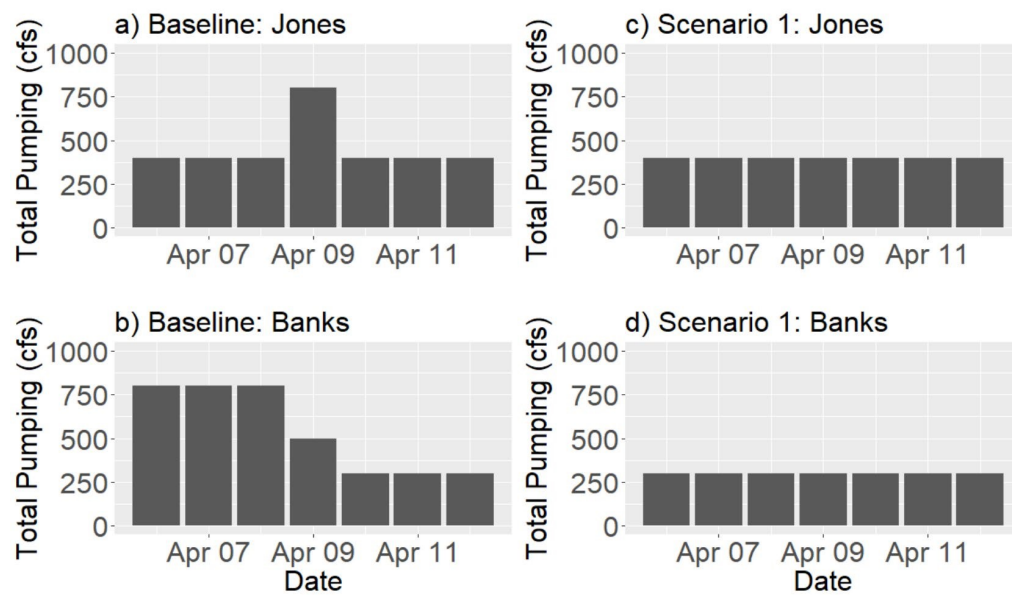
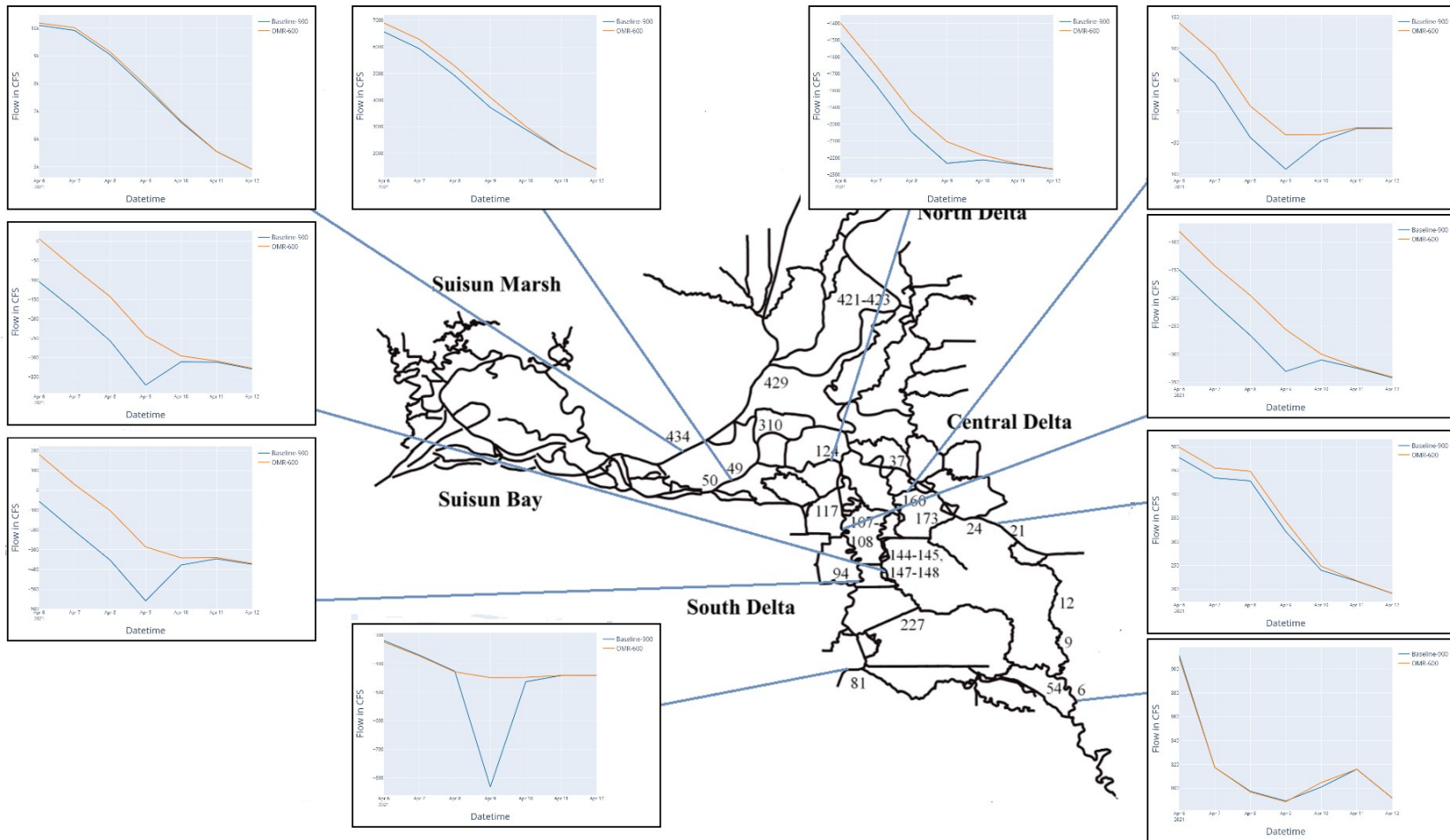


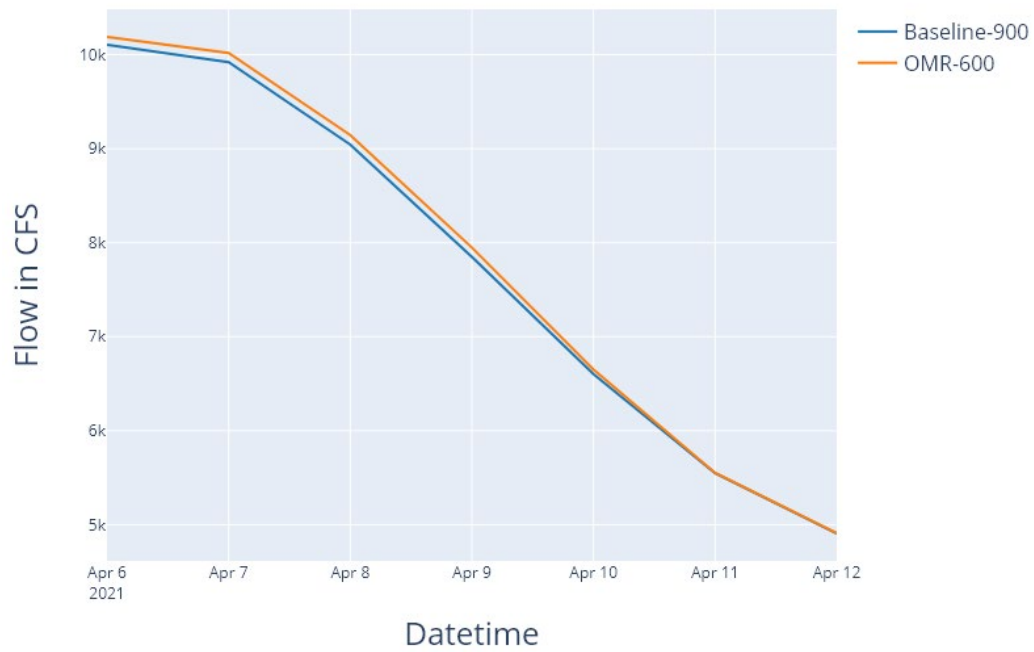
Figure A3: Spatial representation of DSM2 modeled flow by channel. Refer to figures A4 to A13 for more detail.



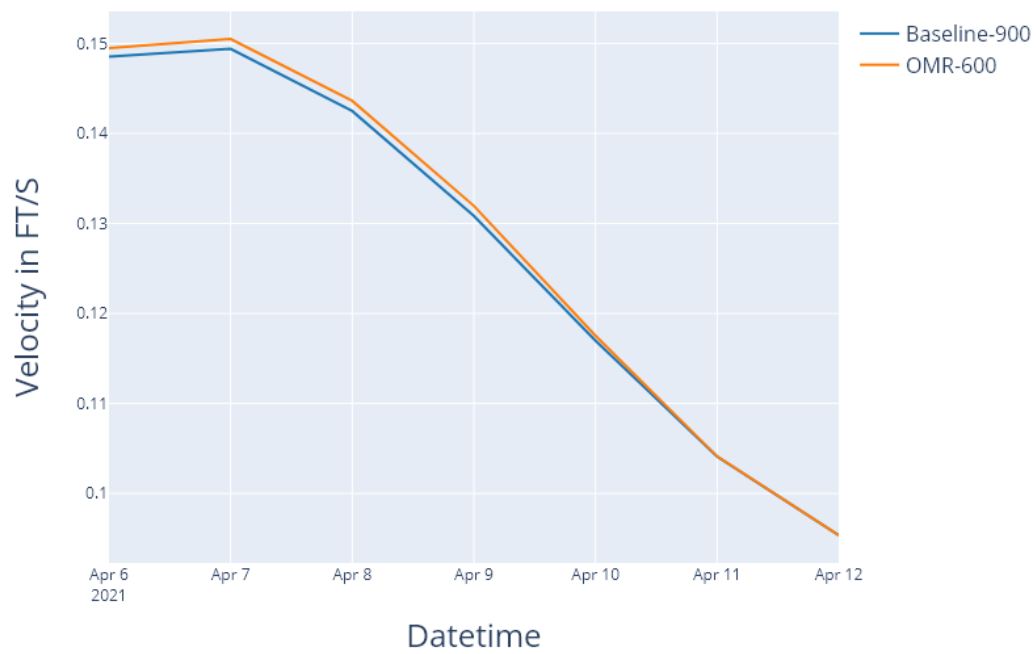
The following captions apply to the time-series plots for flow and velocity in selected locations (see Figure A14 and Table A3 for channel location information) below:

- (a) Time-series plot (1-day aggregated): Baseline, Scenario 1 OMR, and Scenario 2 OMR. X-axis represents daily time steps and y-axis represents flow (cfs) values. For Baseline, Scenario 1, and Scenario 2 values refer to “Hydraulic Footprint Information” in the section above. Reported summary statistics (minimum, maximum, etc.) are found in Table A1.
- (b) Time-series plot (1-day aggregated): Baseline, Scenario 1 OMR, and Scenario 2 OMR. X-axis represents daily time steps and y-axis represents velocity (cfs) values. For Baseline, Scenario 1, and Scenario 2 values refer to “Hydraulic Footprint Information” in the section above. Reported summary statistics (minimum, maximum, etc.) are found in Table A1.

Figure A4: Sacramento River at Sherman Island (CHAN434)

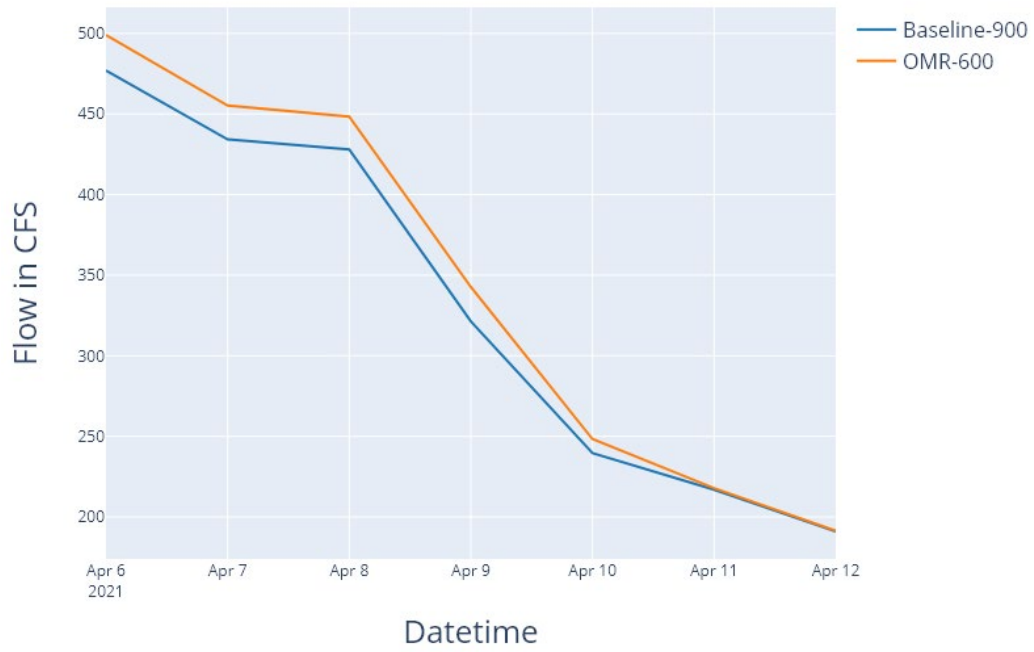


(a)

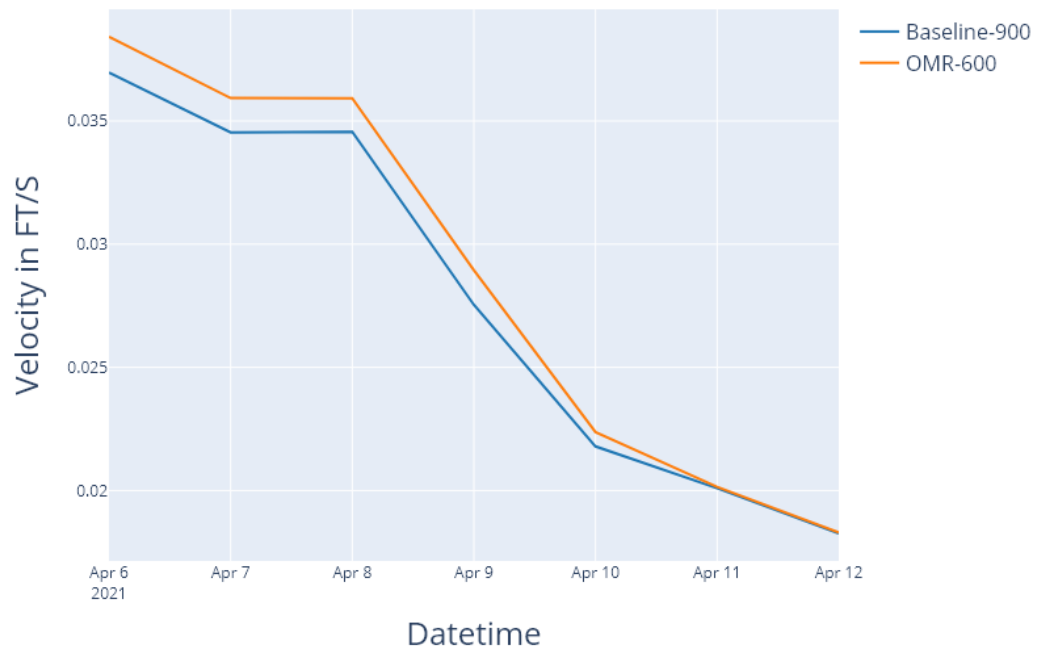


(b)

Figure A5: San Joaquin River downstream of confluence with Calaveras River (CHAN021)

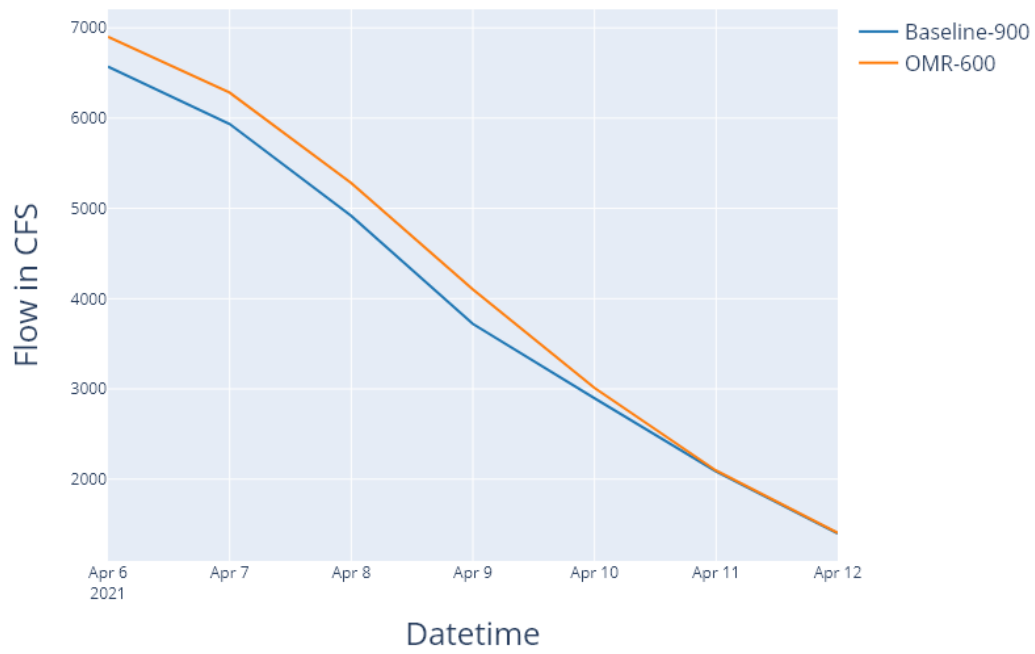


(a)

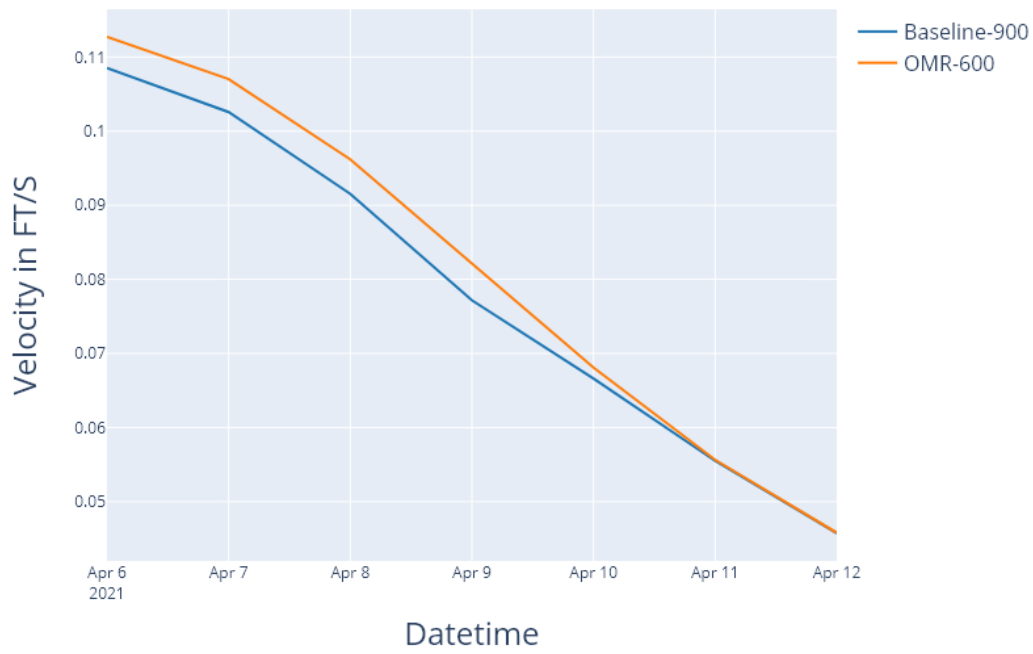


(b)

Figure A6: San Joaquin River at Sherman Island (CHAN049)

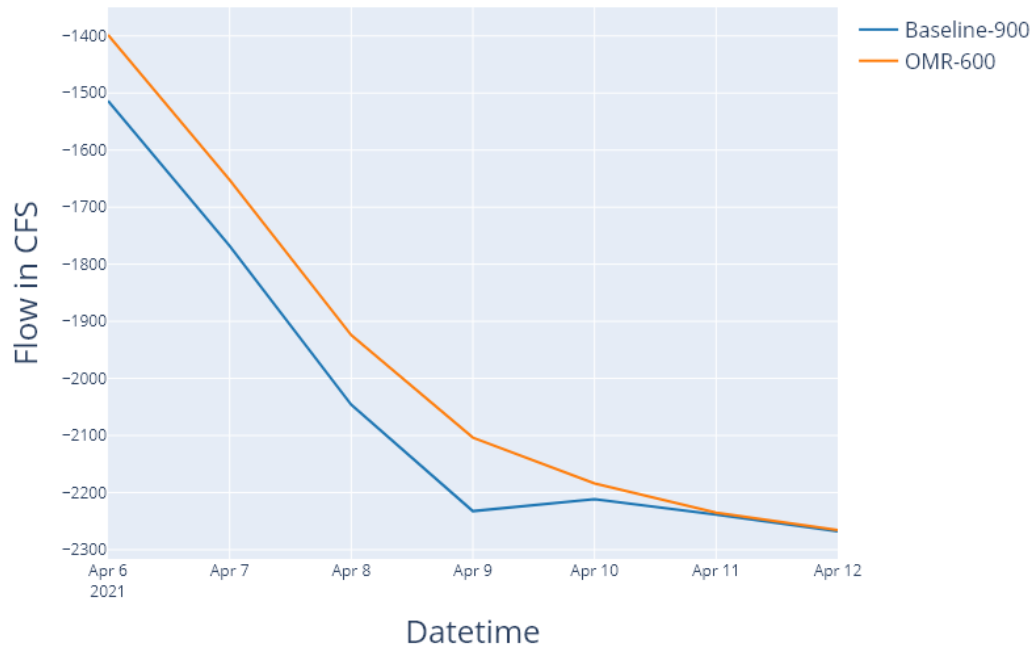


(a)

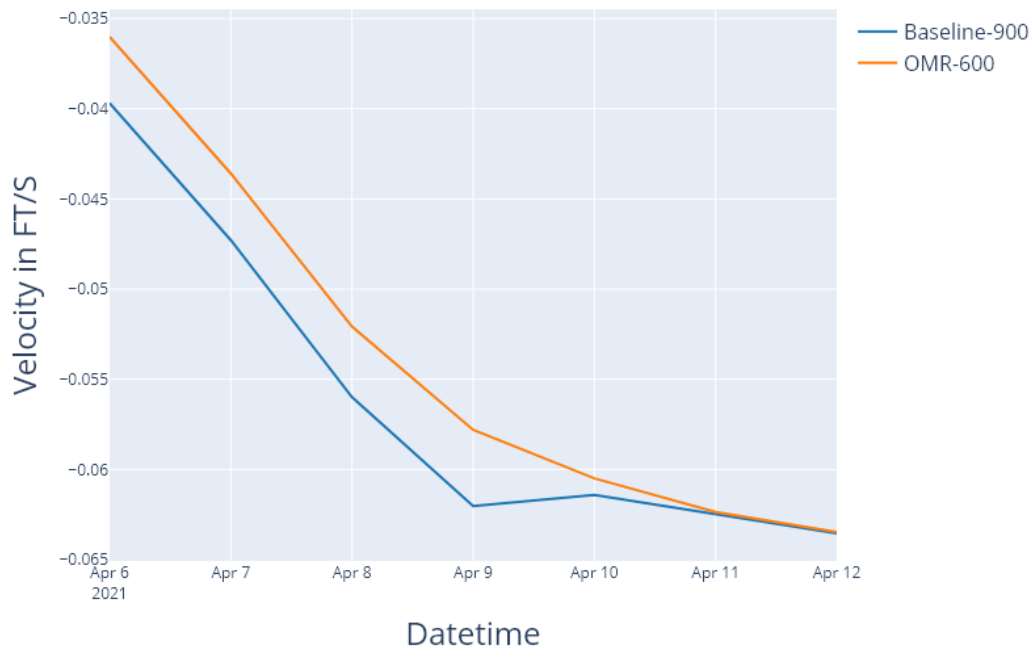


(b)

Figure A7: Old River between Franks Tract and San Joaquin River (CHAN124)

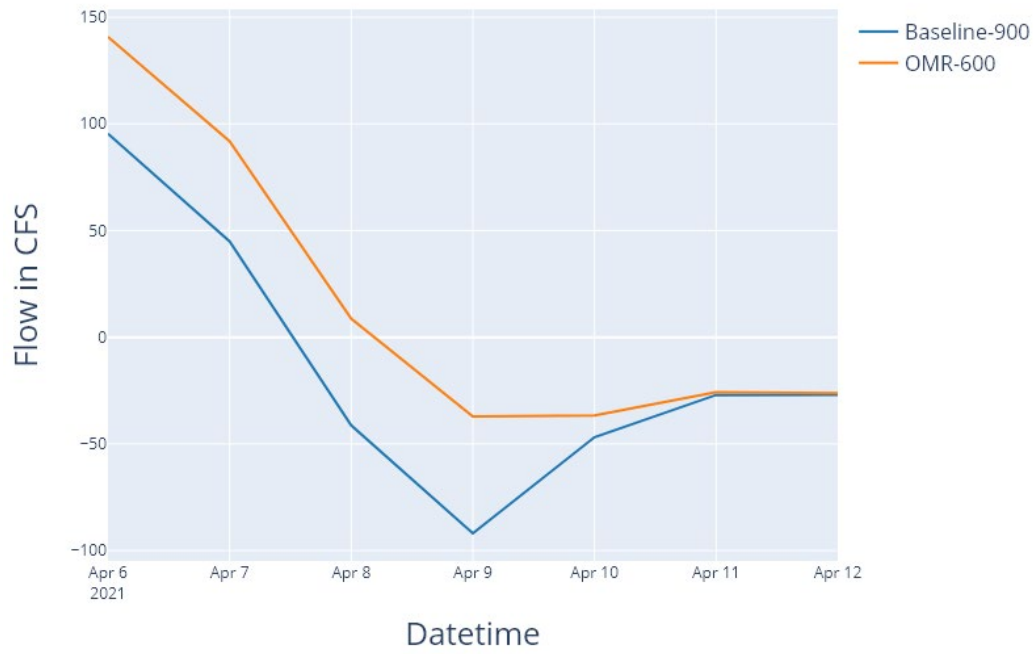


(a)

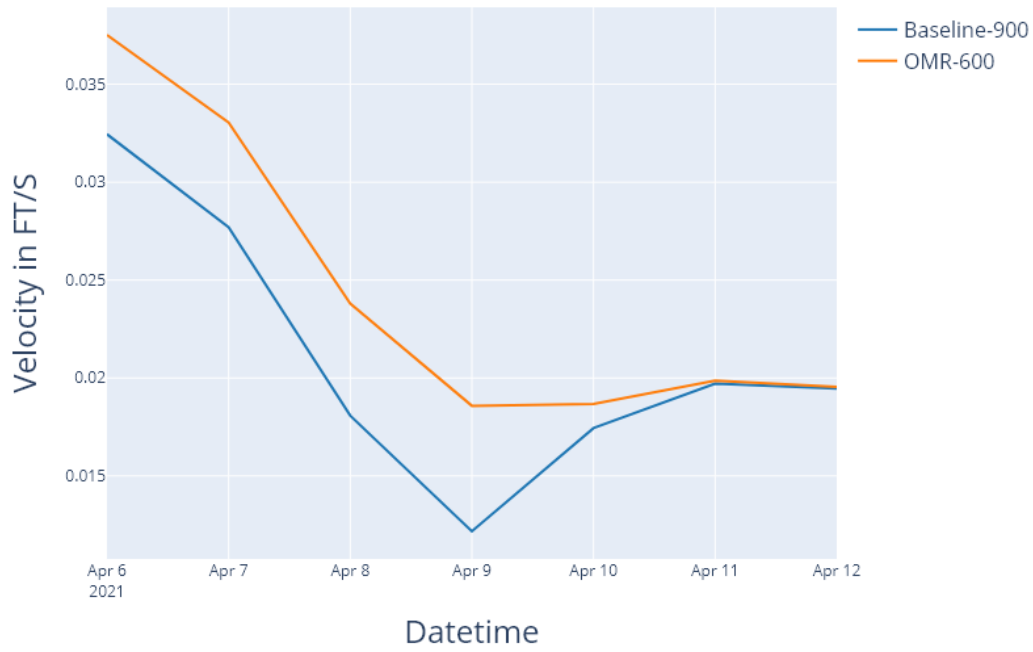


(b)

Figure A8: Lower San Joaquin River at Columbia Cut (CHAN160)

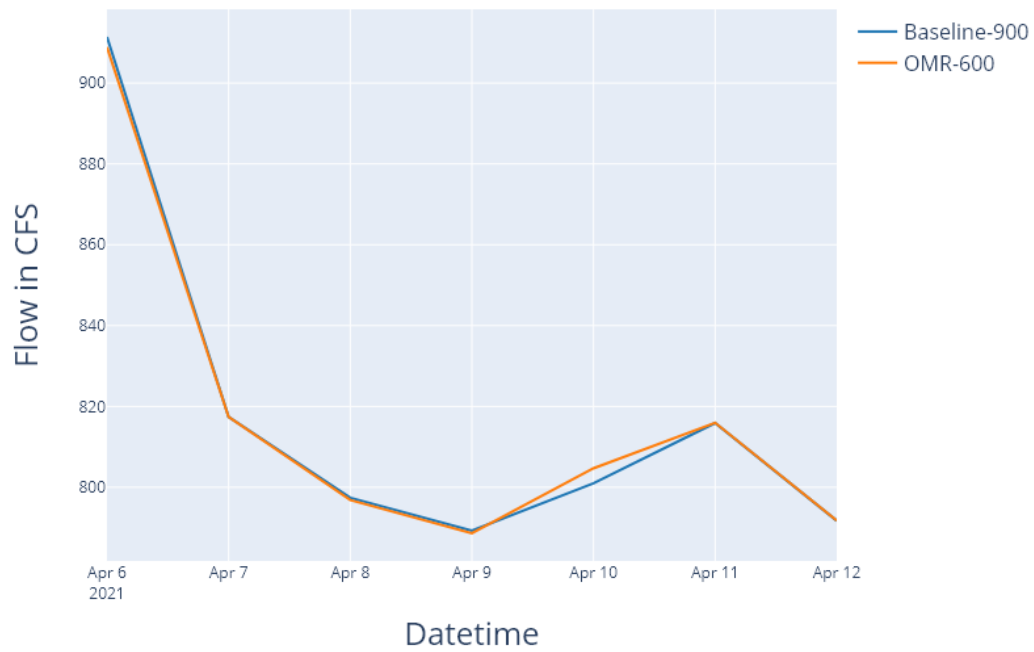


(a)

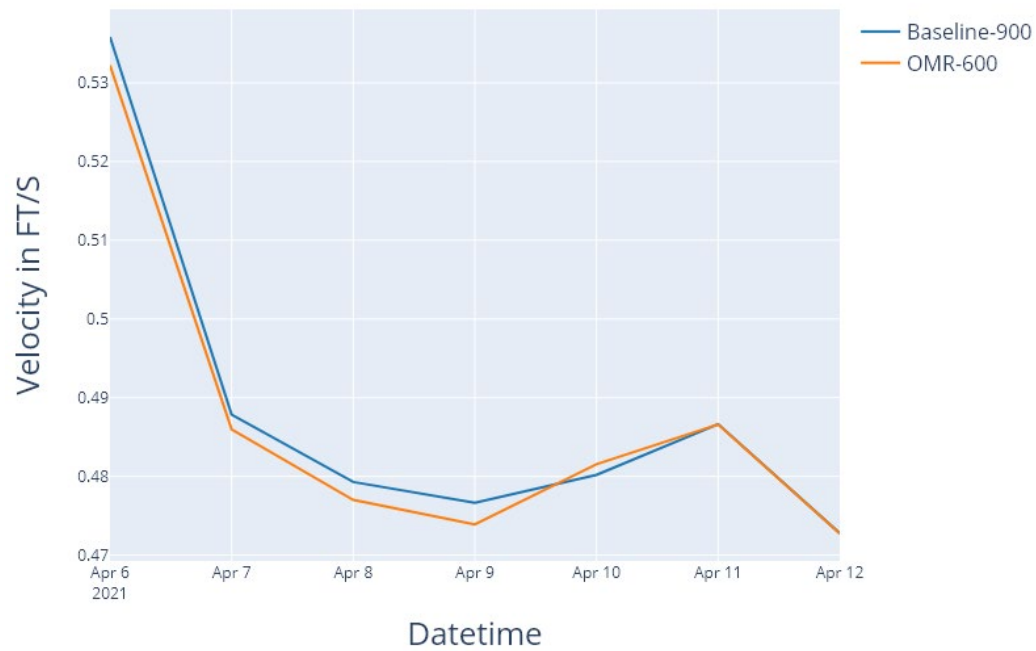


(b)

Figure A9: Slightly upstream of Head of Old River (CHAN006)

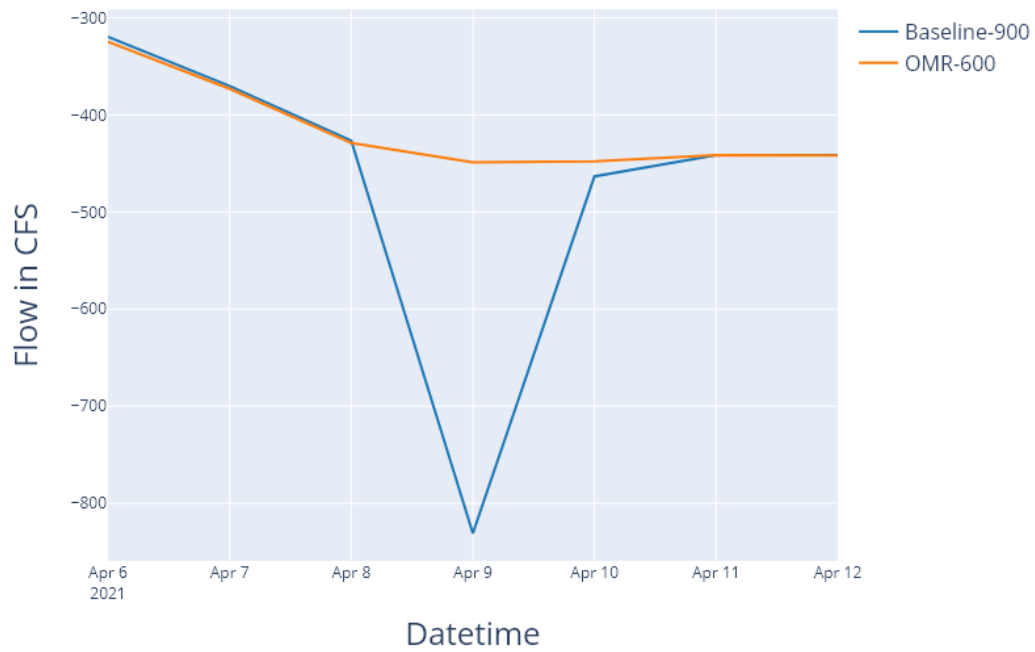


(a)

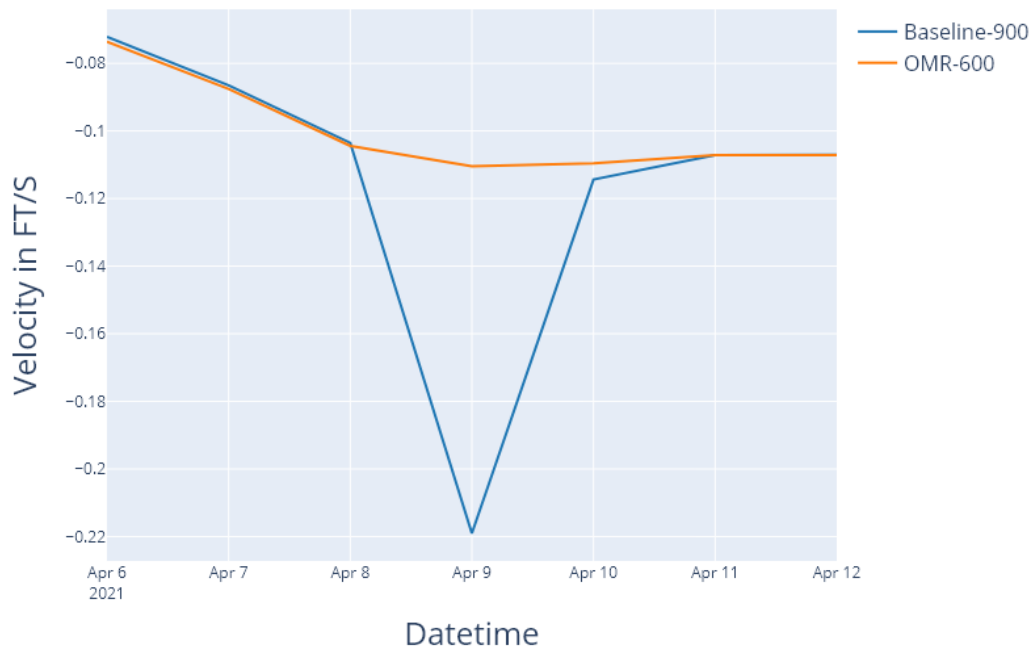


(b)

Figure A10: Old River adjacent to Grant Line Canal (CHAN081 – Old River between Grant Line and CVP)



(a)

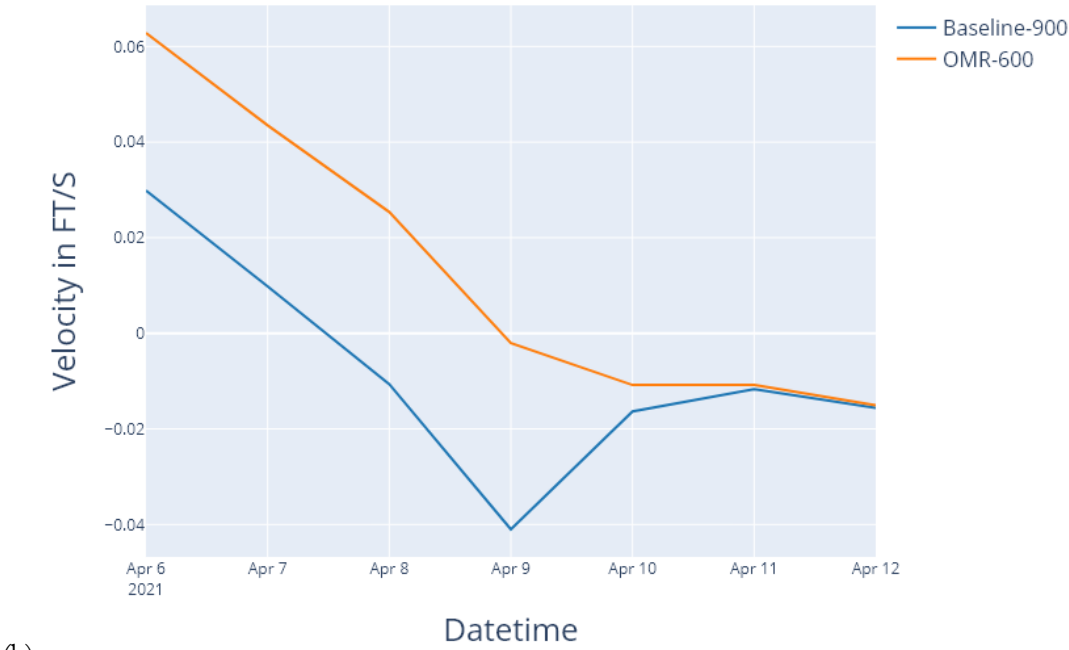


(b)

Figure A11: South Delta along Old River (CHAN094 – Old River/HW4)

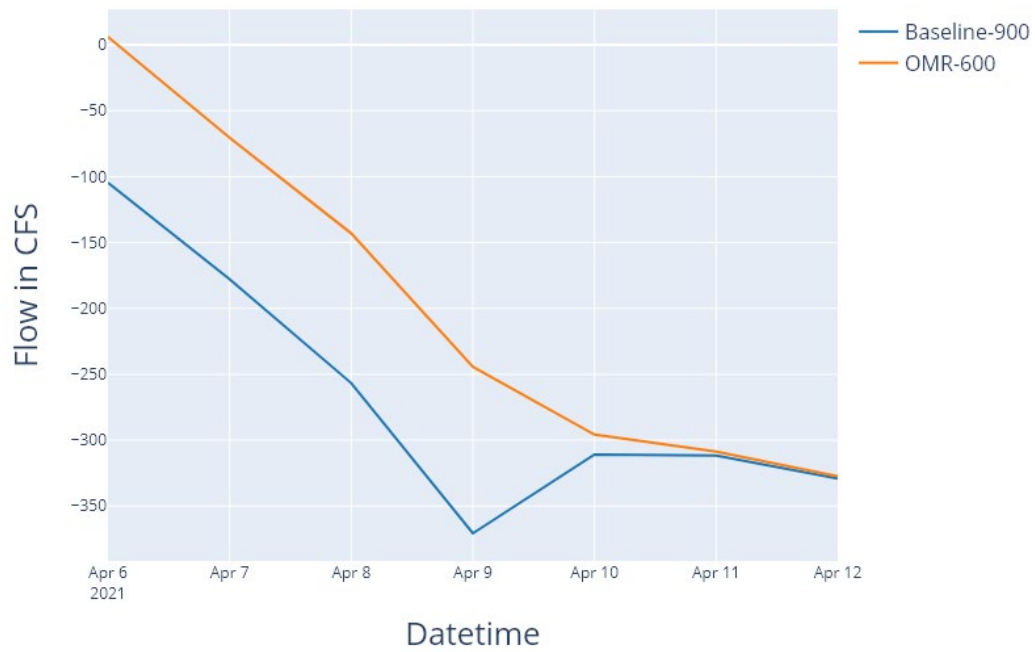


(a)



(b)

Figure A12: South Delta along Middle River (CHAN148 – Middle River/ Woodward Cut)

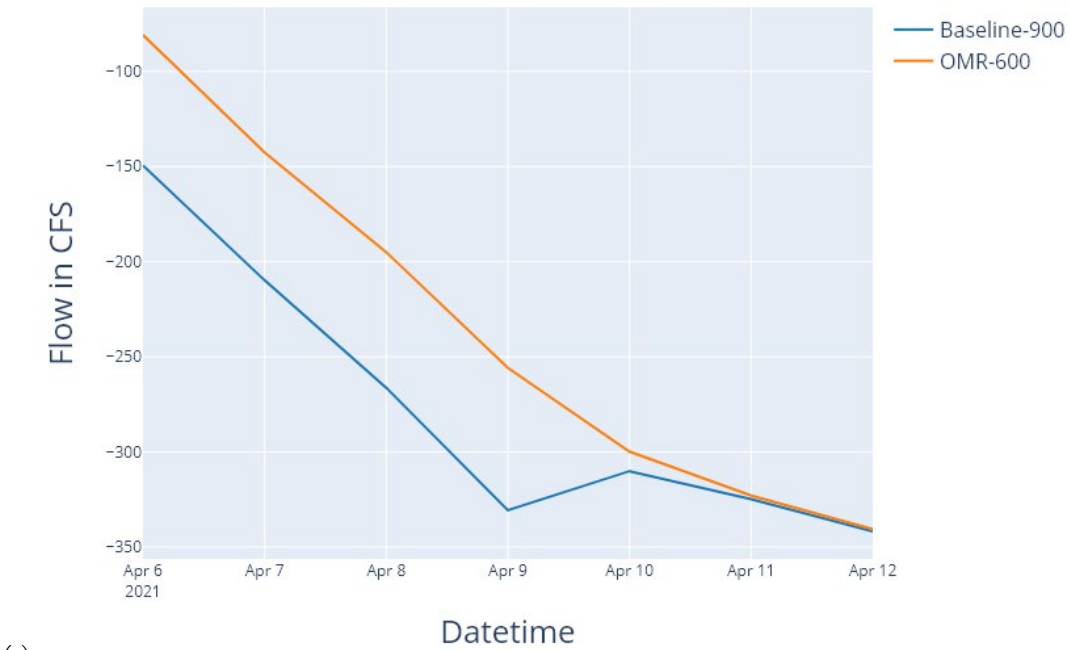


(a)

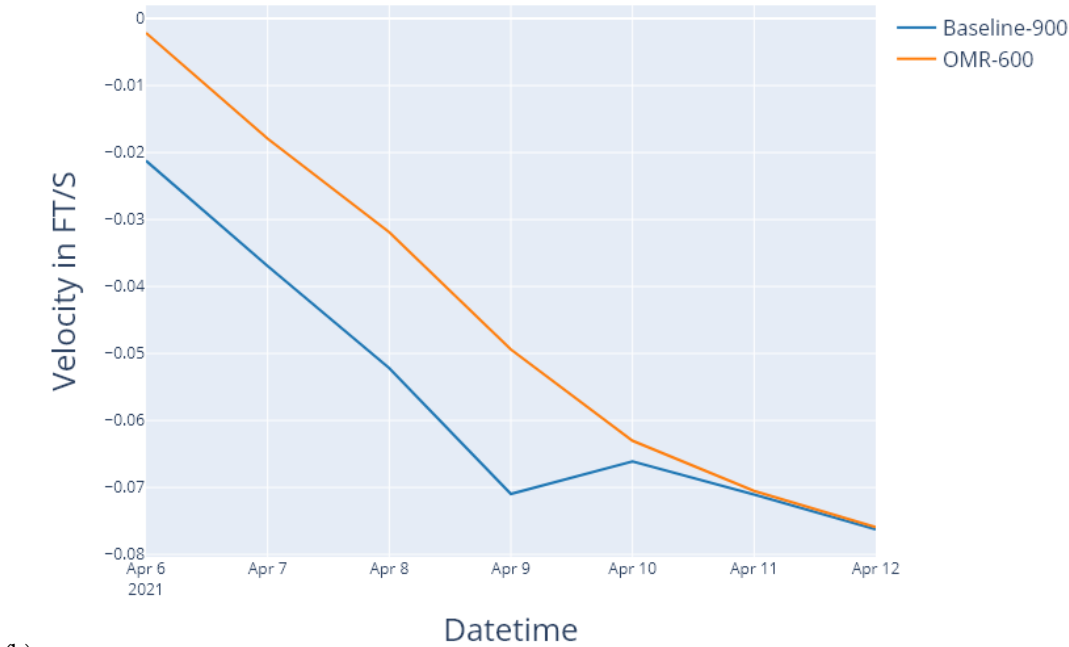


(b)

Figure A13: South Delta along Middle River (CHAN107 – Old River-Bacon Isl.)



(a)



(b)

DSM2 model interpretation entrainment in Delta strata regions

North Delta into Interior and Central Delta

Channels: 49 and 434

Low measurable changes to flow and velocity related to modeled OMR conditions are anticipated. It is unlikely that listed salmonids would experience behavioral changes related to modeled OMR conditions this week. Despite low exports the zone of influence has expanded further south due to the low hydrology.

San Joaquin River and Central Delta into South Delta

Channels: 6, 21, 107, 124, and 160

There will be low measurable changes to flow and velocity related to modeled OMR conditions. Based on recent survey data, listed salmonids are present. It's unlikely that hydrological changes will be detectable by fish. Cumulative net flows within the channels of the South Delta are negative in magnitude. Despite low exports the zone of influence has expanded further north due to the low hydrology.

South Delta into facilities

Channels: 81, 94, and 148

There will be low measurable changes to flow and velocity related to modeled OMR conditions. Based on recent survey data, listed salmonids are present. It's unlikely that hydrological changes will be detectable by fish. Cumulative net flows within the channels of the South Delta are still negative in magnitude but becoming less so towards the second half of the forecast period. Fish moving from the San Joaquin mainstem into the head of Old River would have a decreased transit time towards the fish salvage facilities in the first half of the simulation and an increased transit time in the second half of the simulation due to Vernalis flows and decreased export rates (more evident in the baseline scenario).

DSM2 channel locations information

Figure A14. Highlighted DSM2 channels by Delta Strata.

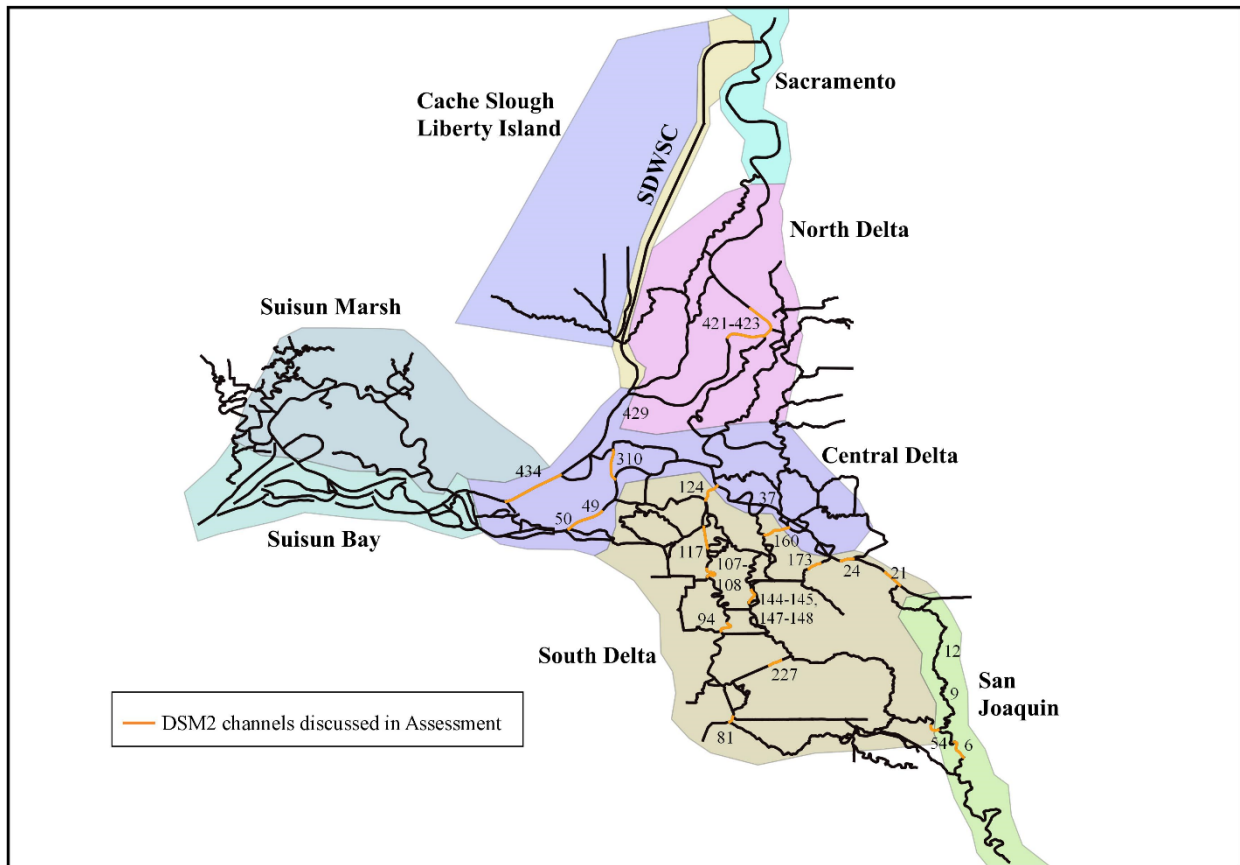


Table A3. Description of channel location, by Delta Strata region. Not all listed channels have model results presented in every weekly Proposed Action Assessment.

DSM2 Channel	Description
North Delta into Interior and Central Delta	
CHAN049	San Joaquin River at Sherman Island
CHAN310	Three-Mile Slough
CHAN421	Sacramento River at Delta Cross Channel
CHAN422	Sacramento River at Delta Cross Channel
CHAN423	Sacramento River at Delta Cross Channel
CHAN434	Sacramento River at Sherman Island
San Joaquin River and Central Delta into South Delta	
CHAN006	San Joaquin River at Head of Old River (HOR)
CHAN021	San Joaquin River downstream from confluence with Calaveras River
CHAN024	San Joaquin River upstream of Turner Cut
CHAN054	Old River at confluence with San Joaquin River (HOR)
CHAN107	Old River north of Rock Slough
CHAN117	Old River south of Franks Tract
CHAN124	Old River between Franks Tract and San Joaquin River
CHAN160	Columbia Cut
CHAN173	Turner Cut
South Delta into Facilities	
CHAN148	Middle River
CHAN227	Victoria Canal
CHAN081	Grant Line Canal
CHAN094	Old River

4/13/2021 Meeting

Background

<i>Process</i>	
Weekly process	<ul style="list-style-type: none"> • DSM2 model runs use a historic and forecasted hydrological input dataset with no assumptions provided by DWR Thursdays and updated by Reclamation Mondays. • Input File updated Monday after initial distribution from DWR for removal of forecasted in lieu of historic input. • Reclamation provides scenarios based on expected OMR index values for the upcoming week. • DSM2 model runs produced Monday and distributed to SaMT members.
<i>Hydraulic footprint information</i>	
Baseline and Scenarios updated	4/12/2021
DSM2 modeling results range	4/13/2021 – 4/19/2021
<i>OMR index value scenarios</i>	
Baseline	-1,100 cfs
Scenario 1	-900 cfs (decreasing from Baseline; Δ 200 cfs)
Scenario 2	N/A
<i>Changes between scenarios</i>	
Hydrology	No (see special considerations section below)
Delta Exports	Yes
<i>Common assumptions</i>	
DSM2 run results based on the following assumptions	<ul style="list-style-type: none"> • CCFB Gates are operating to Priority 1 throughout the forecast period. • The Delta Cross Channel gates are closed throughout the forecast period. • Suisun Marsh salinity control flashboards are in, and 2 of the Suisun Marsh Salinity Control gates are in tidal operation and 1 gate is closed for maintenance. • Sacramento River flow at Freeport is at 8,784 cfs at the beginning of the forecast period and is expected to increase slightly before decreasing to 7,884 cfs by the end of the forecast period. (Figure A1a). • San Joaquin River flow at Vernalis is at 1,283 cfs at the beginning of the forecast period and is estimated to increase to 2,138 cfs by the end of the forecast period. (Figure A1b). There is a forecasted decrease to 770 cfs on 4/17 and a forecasted increase up to 2,769 cfs on 4/18 before the end of the period. • Clifton Court Forebay and Tracy Pumping Plant pumping is shown for model runs in Figure A2a-A2d.

4/13/2021 Meeting

Background (continued)

<i>Additional information</i>	
Considerations for current DSM2 model run	This week there was no Scenario 2 modeled. The more negative expected OMR Index Value (see Operations Outlook document) could not be reached without a change in hydrology.
Caveats	<ul style="list-style-type: none">• Time-step: DSM2 generates results at 15-minute time-steps. Visualizations of DSM2 model run results are aggregated over daily timesteps. Operations function on a more granular scale than daily time-step.▪ Salmonid behavior: DSM2 provides flow fields which salmonids may encounter but salmonids are not neutrally buoyant particles. Models which incorporate behavior from acoustic tagged salmonids are being developed for South Delta (ePTM, ecoPTM).

DSM2 model results: summary tables

Table A1. Summary of minimum, maximum, mean, and percent positive flows (cfs) and velocities (ft/s) by DSM2 channel for OMR scenarios over a 6 day time period. For scenario values refer to “Hydraulic Footprint Information” in the conditions / assumptions section above.

Scenario (cfs)	DSM2 Channel	Flow Min.	Flow Max.	Flow Mean	Flow % Positive	Velocity Min.	Velocity Max.	Velocity Mean	Velocity % Positive
Baseline	6	-217.6	3065.2	1475.5	97	-0.1	1.6	0.8	97
Scenario 1	6	-222.5	3063.7	1475.4	97	-0.1	1.6	0.8	97
Baseline	21	-7243.0	6713.2	468.3	53	-0.5	0.4	0.0	53
Scenario 1	21	-7243.0	6725.6	477.8	53	-0.5	0.4	0.0	53
Baseline	49	-149746.3	135880.4	-54.4	50	-1.9	1.8	0.0	50
Scenario 1	49	-149746.0	136187.7	70.3	50	-1.9	1.8	0.0	50
Baseline	81	-3926.5	2219.7	-737.9	48	-1.1	0.6	-0.2	48
Scenario 1	81	-3761.1	2234.5	-738.9	48	-1.0	0.7	-0.2	48
Baseline	94	-13070.6	9893.8	-446.1	50	-1.8	1.4	0.0	50
Scenario 1	94	-12361.8	9959.8	-363.5	50	-1.7	1.4	0.0	50
Baseline	107	-5926.9	4108.7	-360.6	50	-1.6	1.2	-0.1	50
Scenario 1	107	-5840.0	4130.3	-336.7	50	-1.6	1.2	-0.1	50
Baseline	124	-18439.7	12112.5	-2214.3	44	-0.6	0.4	-0.1	44
Scenario 1	124	-18424.3	12132.8	-2174.5	44	-0.6	0.4	-0.1	44
Baseline	148	-7887.4	5847.9	-357.3	51	-0.9	0.7	0.0	51
Scenario 1	148	-7419.3	5872.9	-317.2	51	-0.8	0.7	0.0	51

Scenario (cfs)	DSM2 Channel	Flow Min.	Flow Max.	Flow Mean	Flow % Positive	Velocity Min.	Velocity Max.	Velocity Mean	Velocity % Positive
Baseline	160	-4558.2	3554.5	-8.9	54	-0.5	0.5	0.0	54
Scenario 1	160	-4529.3	3555.9	21.0	54	-0.5	0.5	0.0	54
Baseline	434	-163958.9	151019.8	7589.4	55	-1.9	1.8	0.1	55
Scenario 1	434	-163888.8	151022.0	7651.8	55	-1.9	1.8	0.1	55

DSM2 model results: figures

Figure A1a-b. Daily forecasted Freeport and Vernalis flows (cfs)

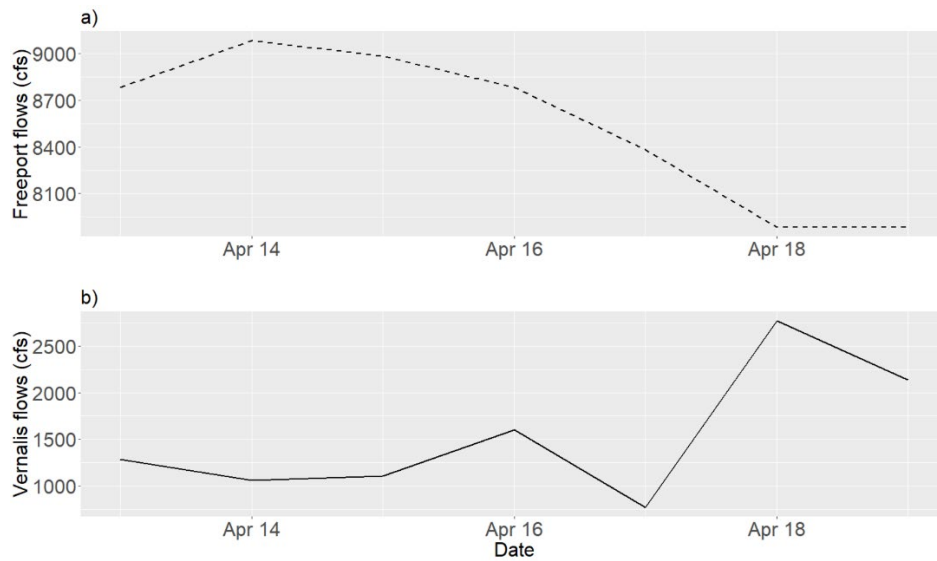


Figure A2a-d. Daily forecasted pumping: Jones and Banks (cfs): Baseline and Scenario 1.

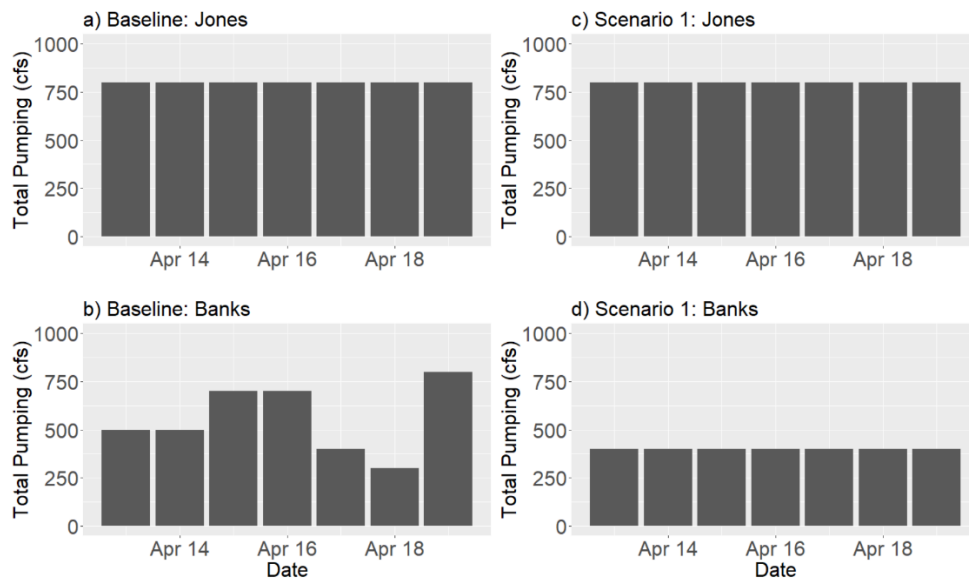
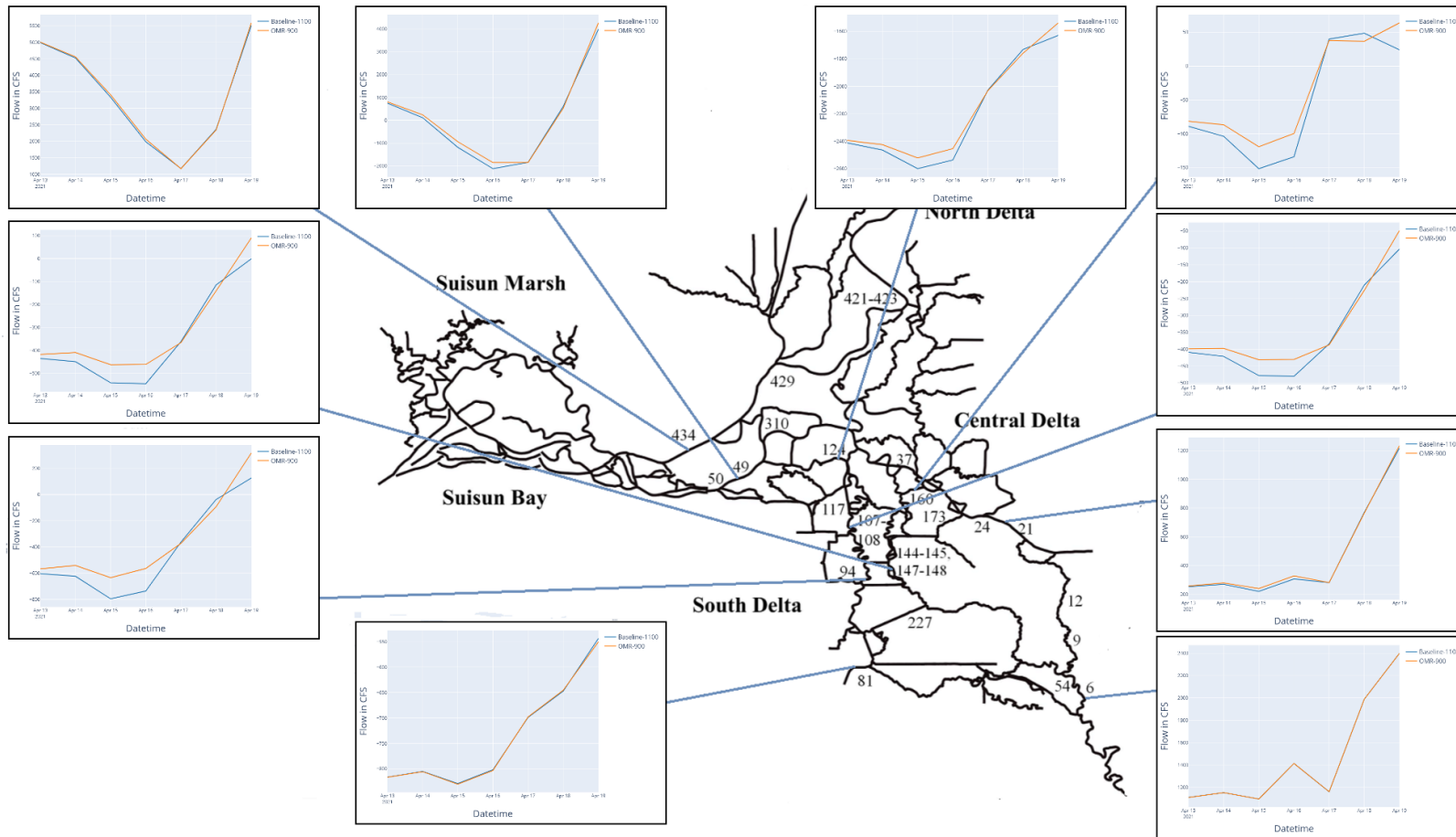


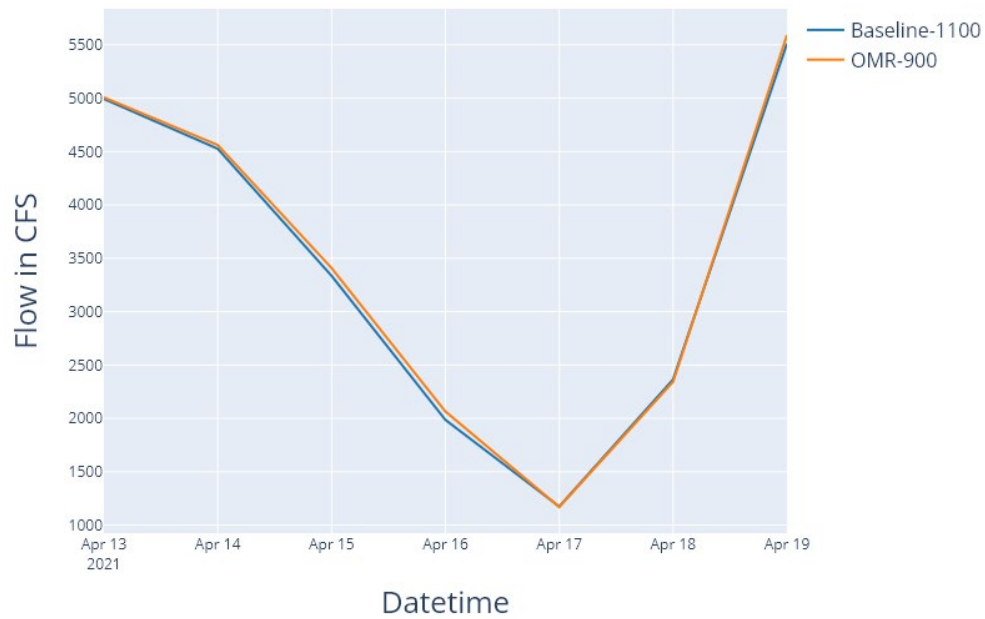
Figure A3: Spatial representation of DSM2 modeled flow by channel. Refer to figures A4 to A13 for more detail.



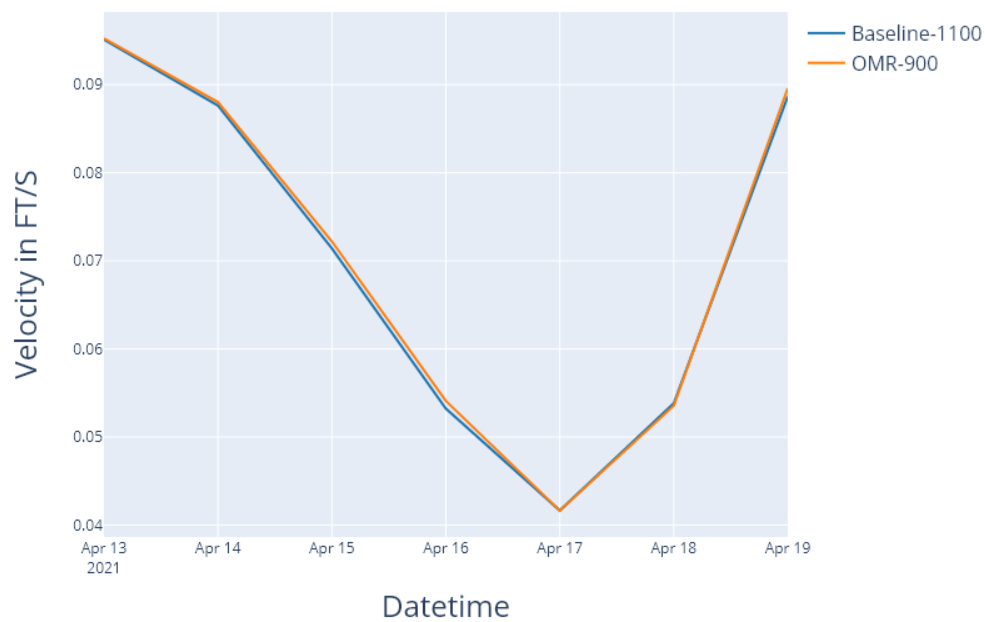
The following captions apply to the time-series plots for flow and velocity in selected locations (see Figure A14 and Table A3 for channel location information) below:

- (c) Time-series plot (1-day aggregated): Baseline, Scenario 1 OMR, and Scenario 2 OMR. X-axis represents daily time steps and y-axis represents flow (cfs) values. For Baseline, Scenario 1, and Scenario 2 values refer to “Hydraulic Footprint Information” in the section above. Reported summary statistics (minimum, maximum, etc.) are found in Table A1.
- (d) Time-series plot (1-day aggregated): Baseline, Scenario 1 OMR, and Scenario 2 OMR. X-axis represents daily time steps and y-axis represents velocity (cfs) values. For Baseline, Scenario 1, and Scenario 2 values refer to “Hydraulic Footprint Information” in the section above. Reported summary statistics (minimum, maximum, etc.) are found in Table A1.

Figure A4: Sacramento River at Sherman Island (CHAN434)



a.



b.

Figure A5: San Joaquin River downstream of confluence with Calaveras River (CHAN021)

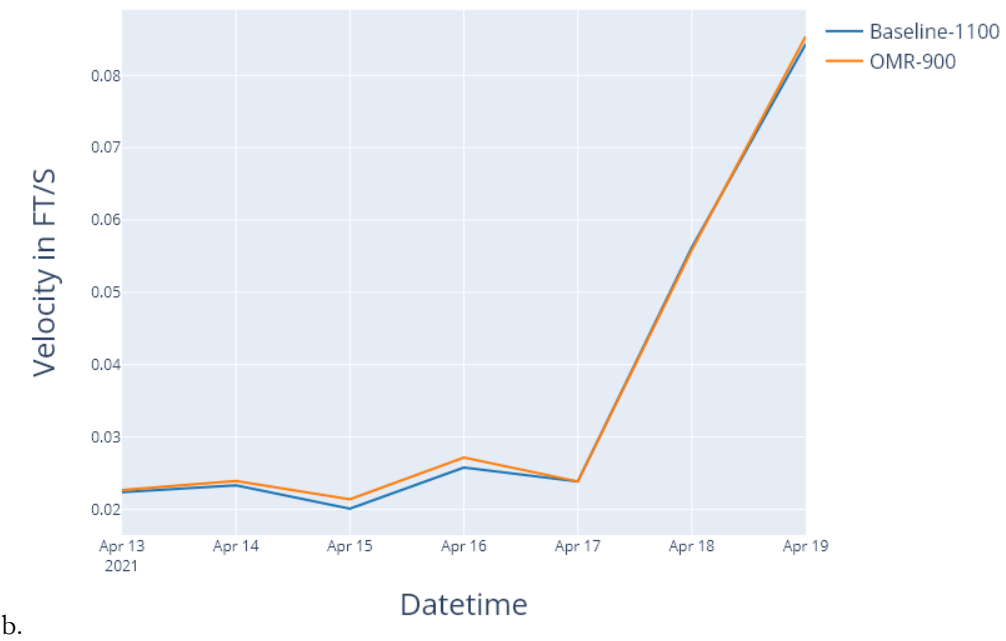
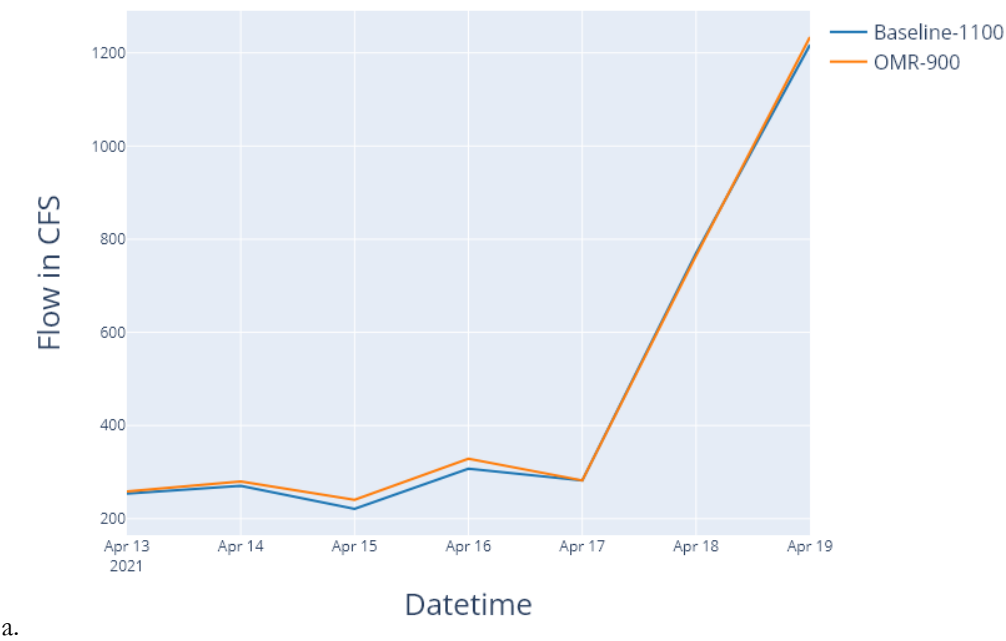


Figure A6: San Joaquin River at Sherman Island (CHAN049)

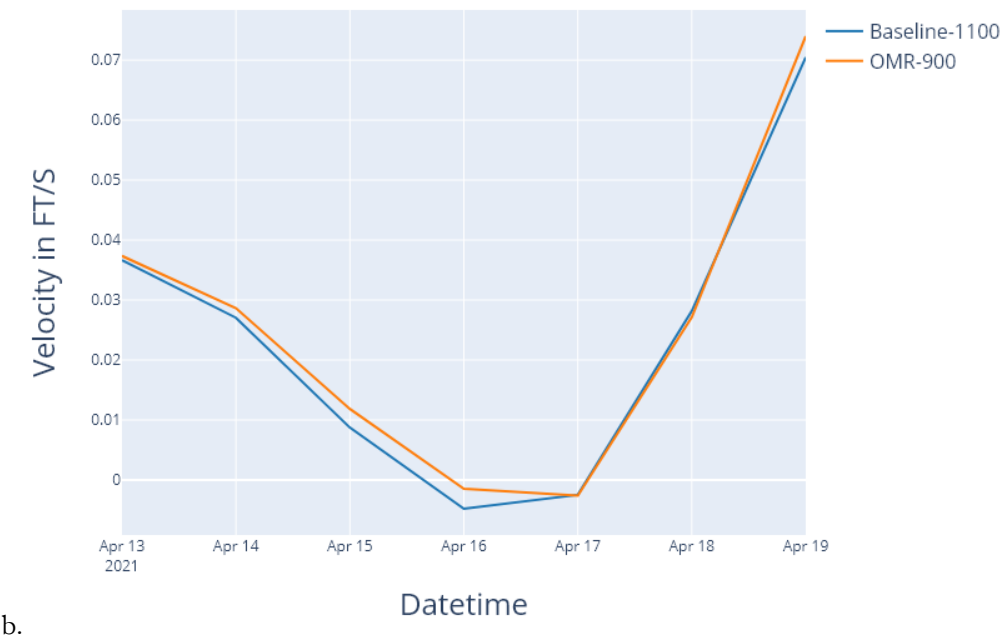
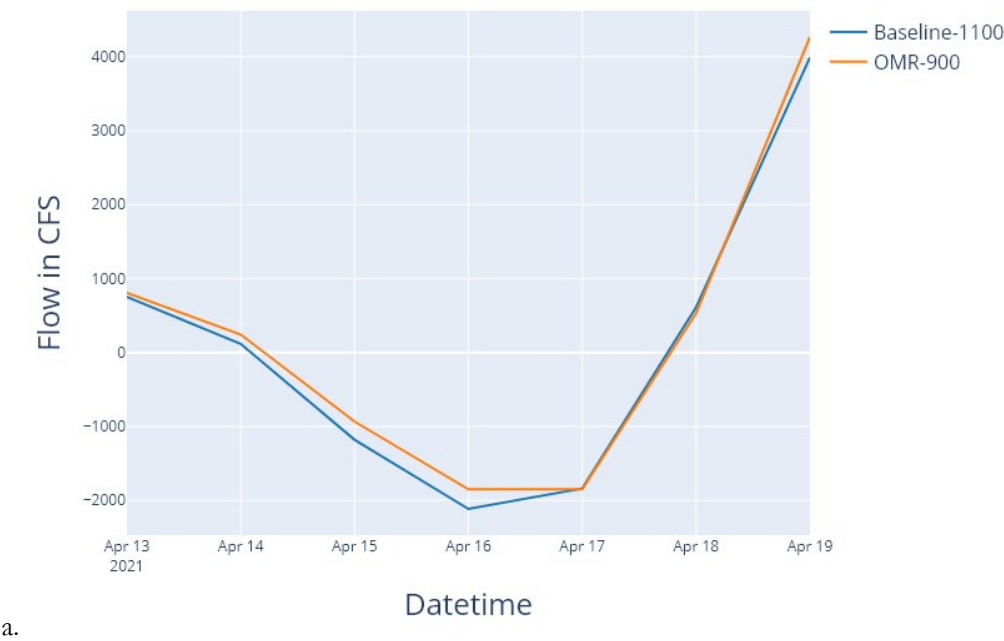
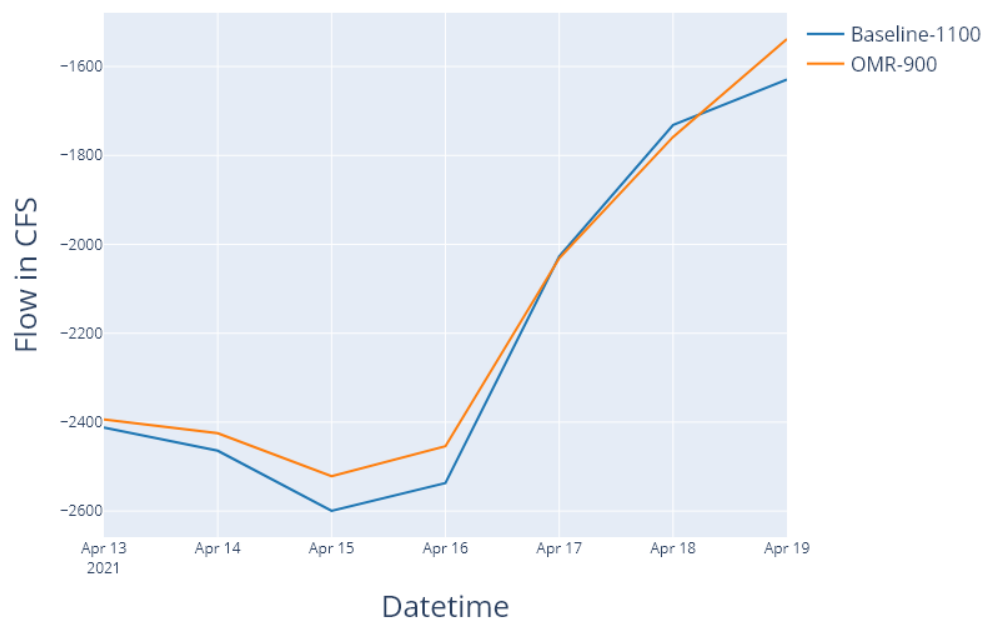
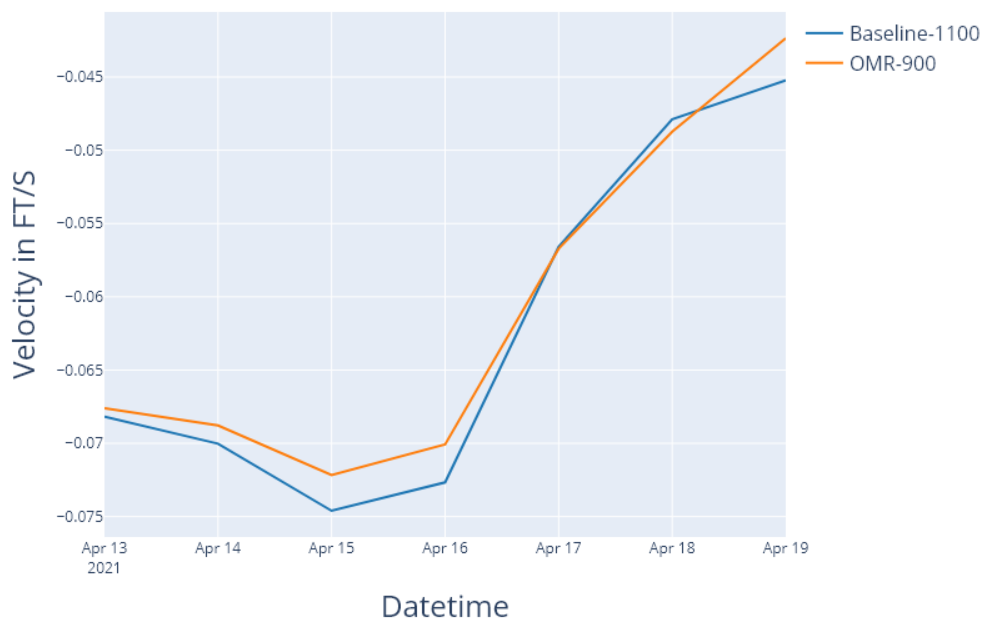


Figure A7: Old River between Franks Tract and San Joaquin River (CHAN124)



a.

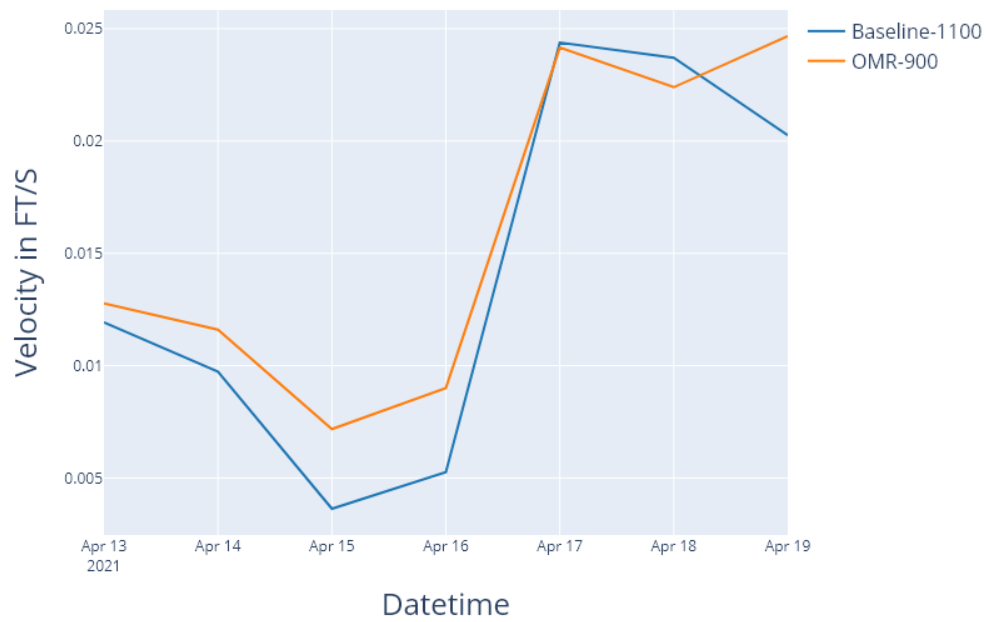


b.

Figure A8: Lower San Joaquin River at Columbia Cut (CHAN160)



a.



b.

Figure A9: Slightly upstream of Head of Old River (CHAN006)

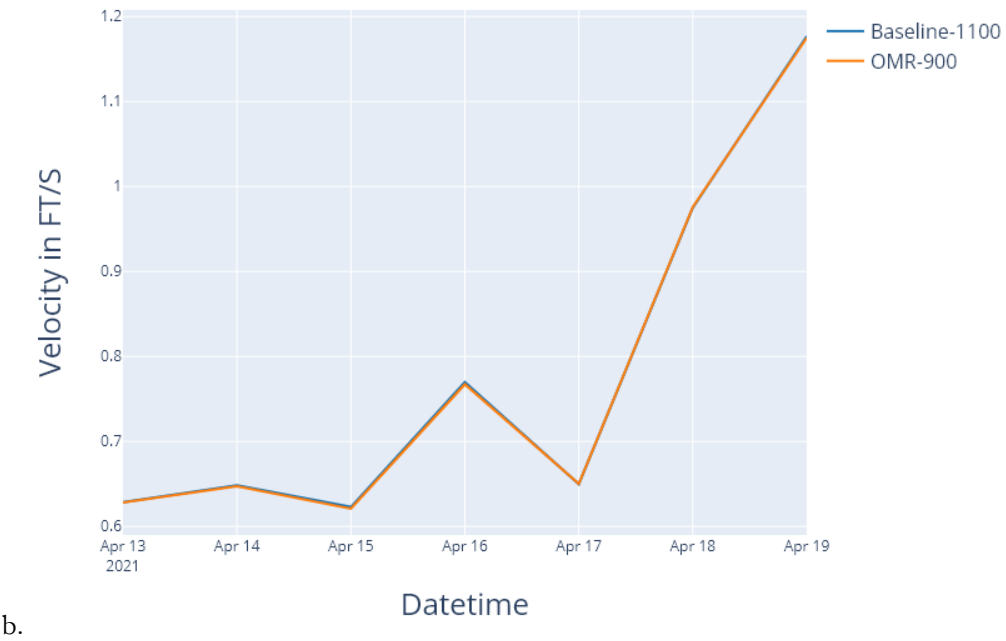
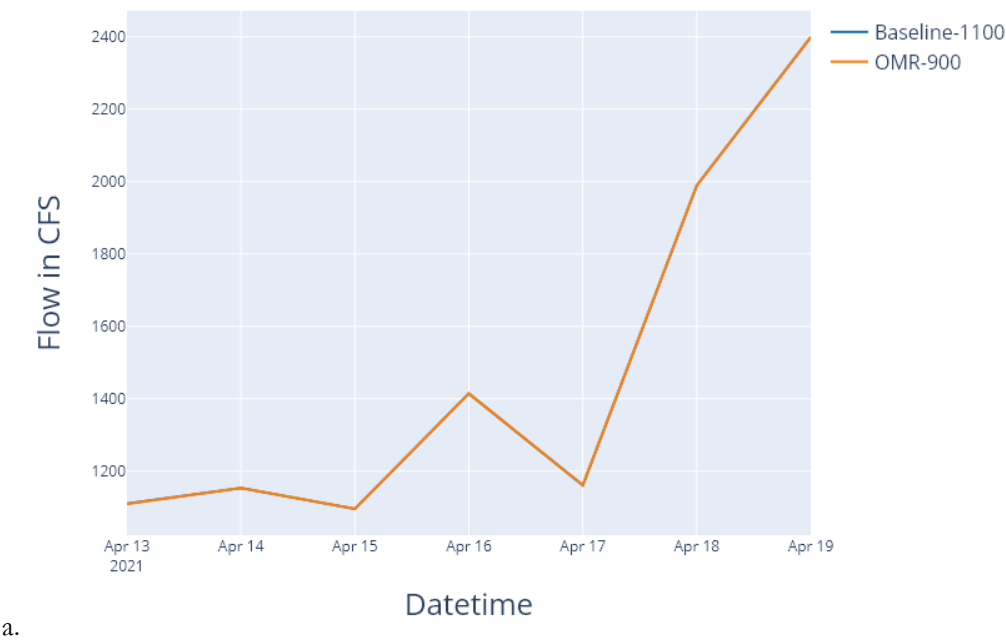
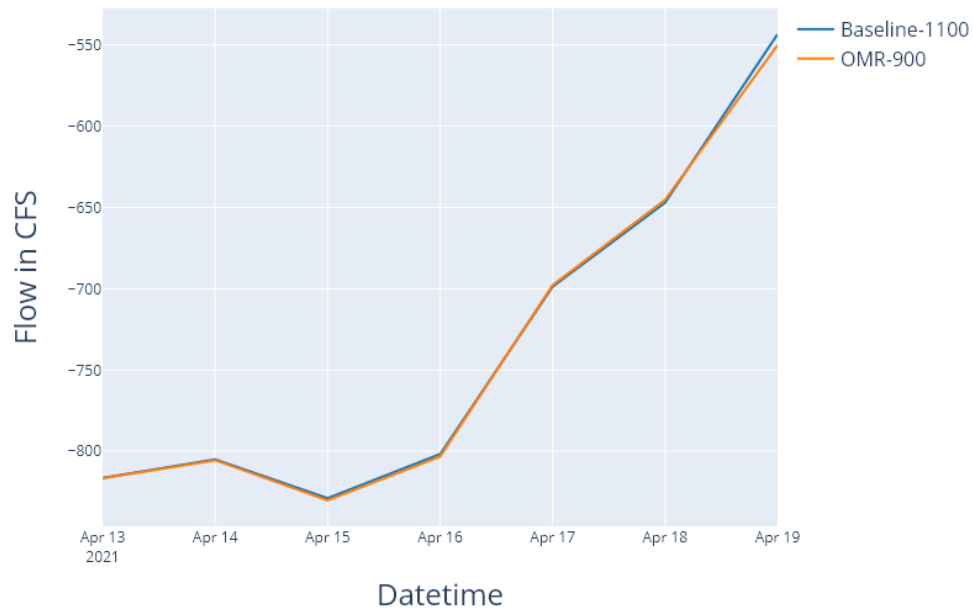
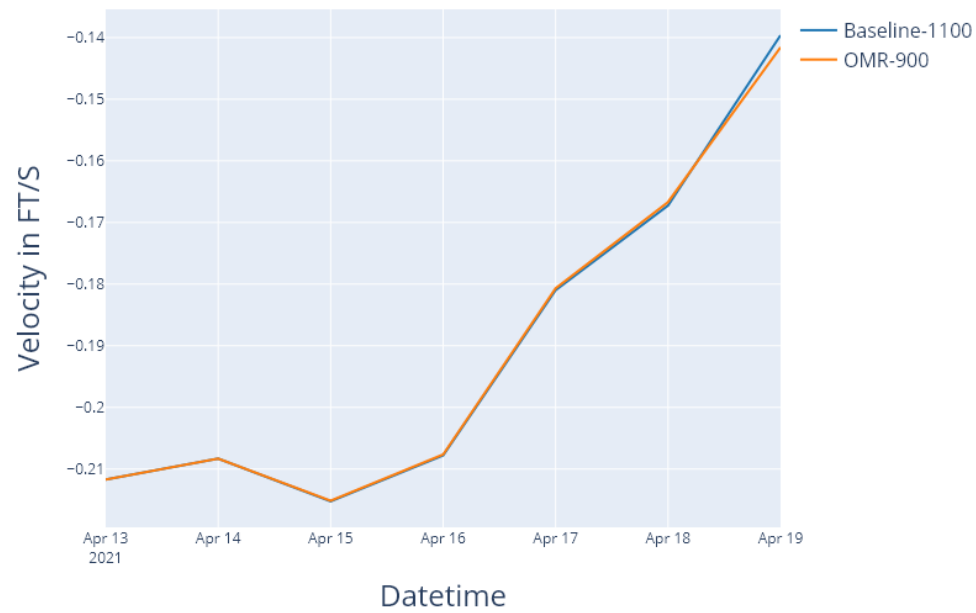


Figure A10: Old River adjacent to Grant Line Canal (CHAN081 – Old River between Grant Line and CVP)

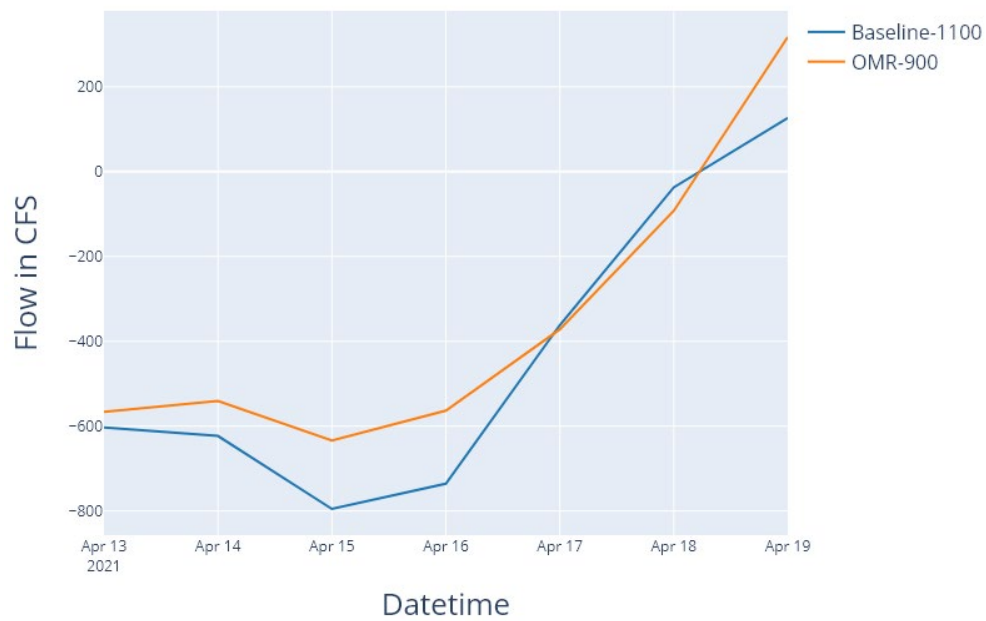


a.

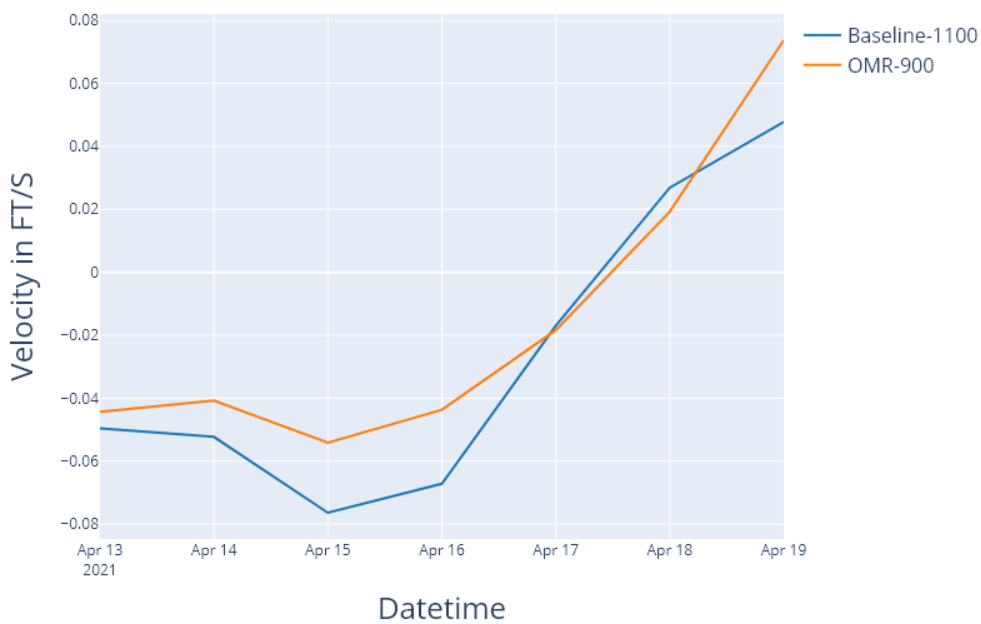


b.

Figure A11: South Delta along Old River (CHAN094 – Old River/HW4)



a.

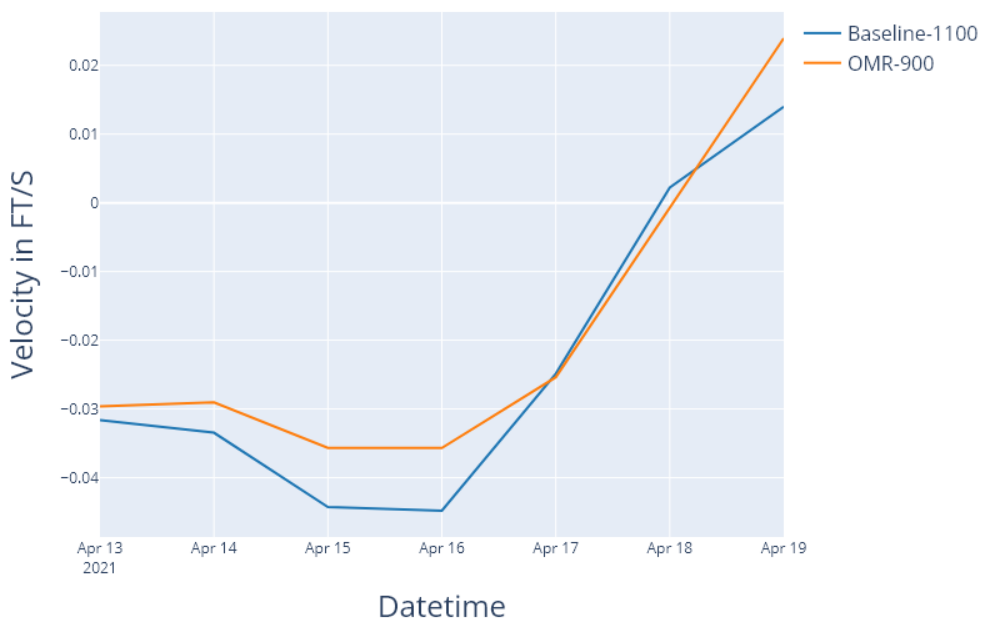


b.

Figure A12: South Delta along Middle River (CHAN148 – Middle River/ Woodward Cut)

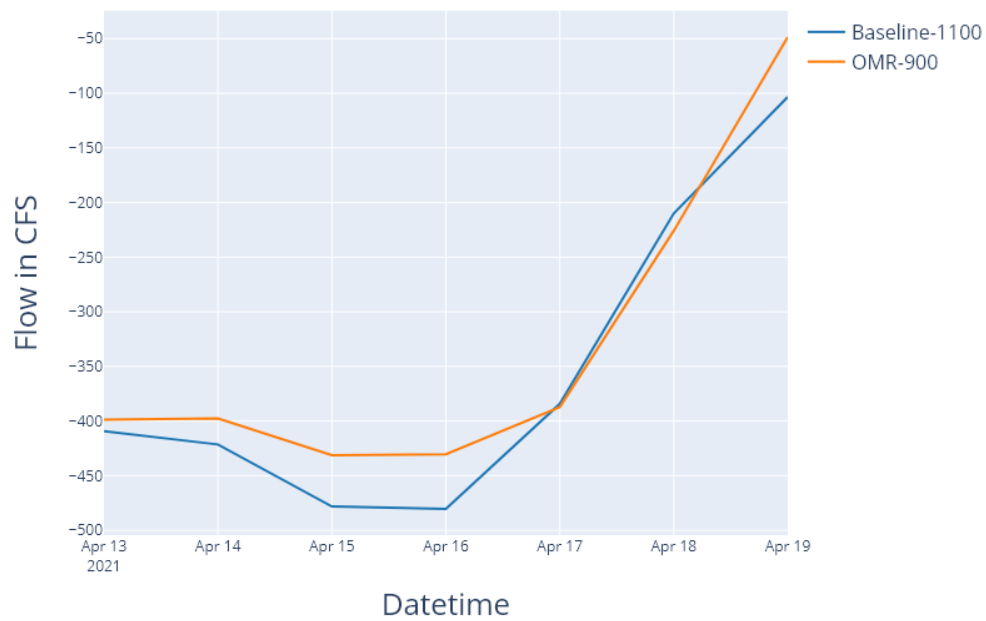


a.

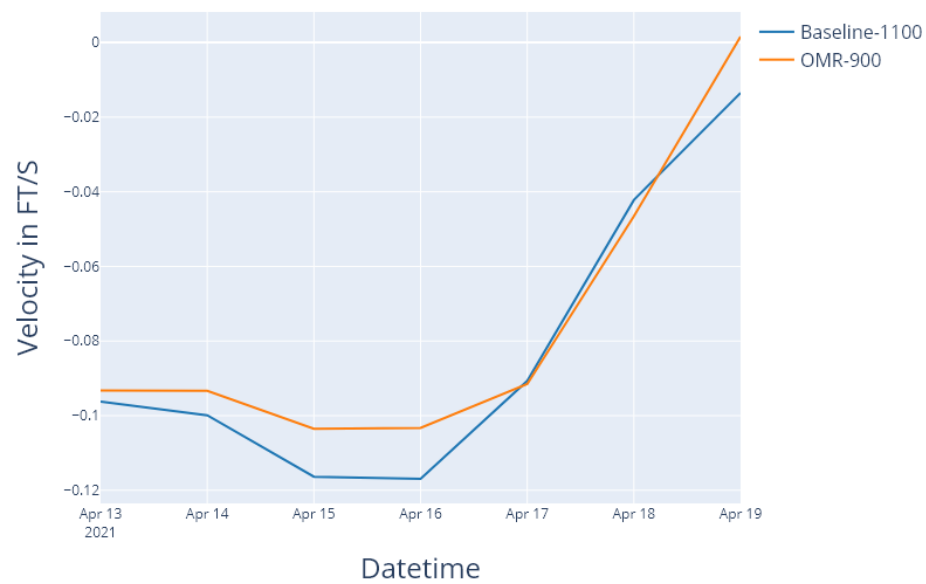


b.

Figure A13: South Delta along Middle River (CHAN107 – Old River-Bacon Isl.)



a.



b.

DSM2 model interpretation entrainment in Delta strata regions

North Delta into Interior and Central Delta

Channels: 49 and 434

No measurable changes to flow and velocity between modeled OMR scenarios are anticipated. It is unlikely that listed salmonids would experience behavioral changes between modeled OMR scenarios this week. Despite low exports the zone of influence has expanded further south due to the low hydrology.

San Joaquin River and Central Delta into South Delta

Channels: 6, 21, 107, 124, and 160

There may be low measurable changes to flow and velocity between modeled OMR scenarios. Based on recent survey data, listed salmonids are present. It's unlikely that hydrological changes will be detectable by fish. Cumulative net flows within the channels of the South Delta are negative in magnitude.

South Delta into facilities

Channels: 81, 94, and 148

There may be low measurable changes to flow and velocity between modeled OMR scenarios. Based on recent survey data, listed salmonids are present. It's unlikely that hydrological changes will be detectable by fish. Cumulative net flows within the channels of the South Delta are positive in magnitude and fish moving from the San Joaquin mainstem into the head of Old River will have an increased transit time towards the fish salvage facilities in the second half of the simulation due to Vernalis flows.

DSM2 channel locations information

Figure A14. Highlighted DSM2 channels by Delta Strata.

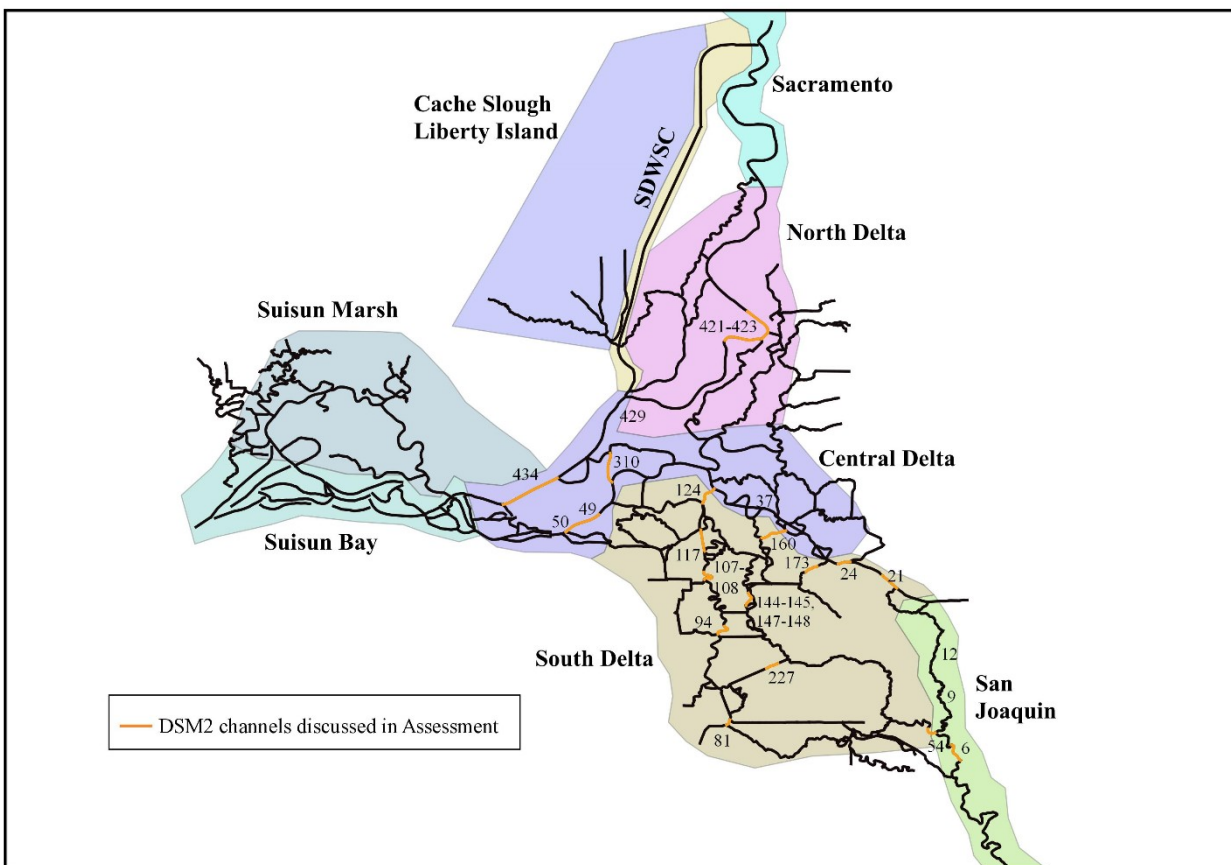


Table A3. Description of channel location, by Delta Strata region. Not all listed channels have model results presented in every weekly Proposed Action Assessment.

DSM2 Channel	Description
North Delta into Interior and Central Delta	
CHAN049	San Joaquin River at Sherman Island
CHAN310	Three-Mile Slough
CHAN421	Sacramento River at Delta Cross Channel
CHAN422	Sacramento River at Delta Cross Channel
CHAN423	Sacramento River at Delta Cross Channel
CHAN434	Sacramento River at Sherman Island
San Joaquin River and Central Delta into South Delta	
CHAN006	San Joaquin River at Head of Old River (HOR)
CHAN021	San Joaquin River downstream from confluence with Calaveras River
CHAN024	San Joaquin River upstream of Turner Cut
CHAN054	Old River at confluence with San Joaquin River (HOR)
CHAN107	Old River north of Rock Slough
CHAN117	Old River south of Franks Tract
CHAN124	Old River between Franks Tract and San Joaquin River
CHAN160	Columbia Cut
CHAN173	Turner Cut
South Delta into Facilities	
CHAN148	Middle River
CHAN227	Victoria Canal
CHAN081	Grant Line Canal
CHAN094	Old River

4/20/2021 Meeting

Background

<i>Process</i>	
Weekly process	DSM2 model runs use a historic and forecasted hydrological input dataset with no assumptions provided by DWR Thursdays and updated by Reclamation Mondays. Input File updated Monday after initial distribution from DWR for removal of forecasted in lieu of historic input. Reclamation provides scenarios based on expected OMR index values for the upcoming week. DSM2 model runs produced Monday and distributed to SaMT members.
<i>Hydraulic footprint information</i>	
Baseline and Scenarios updated	4/19/2021
DSM2 modeling results range	4/20/2021 – 4/26/2021
<i>OMR index value scenarios</i>	
Baseline	-900 cfs
Scenario 1	-500 cfs (decreasing from Baseline; Δ 400 cfs)
Scenario 2	N/A
<i>Changes between scenarios</i>	
Hydrology	No (see special considerations section below)
Delta Exports	Yes
<i>Common assumptions</i>	
DSM2 run results based on the following assumptions	CCFB Gates are operating to Priority 1 throughout the forecast period. The Delta Cross Channel gates are closed throughout the forecast period. Suisun Marsh salinity control flashboards are in, and 2 of the Suisun Marsh Salinity Control gates are in tidal operation and 1 gate is closed for maintenance. Sacramento River flow at Freeport is expected to remain at 7,550 cfs through the forecast period (Figure A1a). San Joaquin River flow at Vernalis is at 2,000 cfs at the beginning of the forecast period and is estimated to decrease to 1,025 cfs (Figure A1b). Clifton Court Forebay and Tracy Pumping Plant pumping is shown for model runs in Figure A2a-A2d.

4/20/2021 Meeting

Background (continued)

<i>Additional information</i>	
Considerations for current DSM2 model run	This week there was no Scenario 2 modeled. The more negative expected OMR Index Value (see Operations Outlook document) could not be reached without a change in hydrology.
Caveats	<ul style="list-style-type: none">• Time-step: DSM2 generates results at 15-minute time-steps. Visualizations of DSM2 model run results are aggregated over daily timesteps. Operations function on a more granular scale than daily time-step. Salmonid behavior: DSM2 provides flow fields which salmonids may encounter but salmonids are not neutrally buoyant particles. Models which incorporate behavior from acoustic tagged salmonids are being developed for South Delta (ePTM, ecoPTM).

DSM2 model results: summary tables

Table A1. Summary of minimum, maximum, mean, and percent positive flows (cfs) and velocities (ft/s) by DSM2 channel for OMR scenarios over a 6 day time period. For scenario values refer to “Hydraulic Footprint Information” in the conditions / assumptions section above.

Scenario (cfs)	DSM2 Channel	Flow Min.	Flow Max.	Flow Mean	Flow % Positive	Velocity Min.	Velocity Max.	Velocity Mean	Velocity % Positive
Baseline	6	-616.7	2415.6	1345.2	96	-0.3	1.4	0.7	96
Scenario 1	6	-642.8	2416.3	1345.1	95	-0.3	1.4	0.7	95
Baseline	21	-8108.6	6666.6	687.5	56	-0.5	0.4	0.1	56
Scenario 1	21	-8105.2	6730.1	696.9	56	-0.5	0.5	0.1	56
Baseline	49	-162703.2	140890.5	3854.8	54	-2.0	1.9	0.1	54
Scenario 1	49	-162635.3	141216.0	4092.8	54	-2.0	1.9	0.1	54
Baseline	81	-3951.9	2021.0	-733.4	48	-1.1	0.6	-0.2	48
Scenario 1	81	-3839.0	1593.8	-733.8	48	-1.0	0.4	-0.2	48
Baseline	94	-13484.0	9862.1	-130.4	53	-1.8	1.4	0.0	53
Scenario 1	94	-12662.0	9920.7	31.5	53	-1.7	1.5	0.0	53
Baseline	107	-6025.3	4138.3	-208.4	53	-1.6	1.2	0.0	53
Scenario 1	107	-5881.7	4160.4	-163.2	53	-1.6	1.2	0.0	53
Baseline	124	-19355.4	12725.1	-1798.8	47	-0.6	0.4	-0.1	47
Scenario 1	124	-19339.9	12762.3	-1716.5	47	-0.6	0.4	-0.1	47
Baseline	148	-8083.5	5857.6	-171.7	52	-0.9	0.7	0.0	52
Scenario 1	148	-7563.5	5889.6	-96.8	53	-0.8	0.7	0.0	53

Scenario (cfs)	DSM2 Channel	Flow Min.	Flow Max.	Flow Mean	Flow % Positive	Velocity Min.	Velocity Max.	Velocity Mean	Velocity % Positive
Baseline	160	-4785.4	3722.3	9.5	53	-0.5	0.5	0.0	53
Scenario 1	160	-4785.7	3726.1	46.8	54	-0.5	0.5	0.0	54
Baseline	434	-174322.7	159133.8	6416.1	54	-1.9	1.9	0.1	54
Scenario 1	434	-174281.7	159172.5	6481.1	54	-1.9	1.9	0.1	54

DSM2 model results: figures

Figure A1a-b. Daily forecasted Freeport and Vernalis flows (cfs)

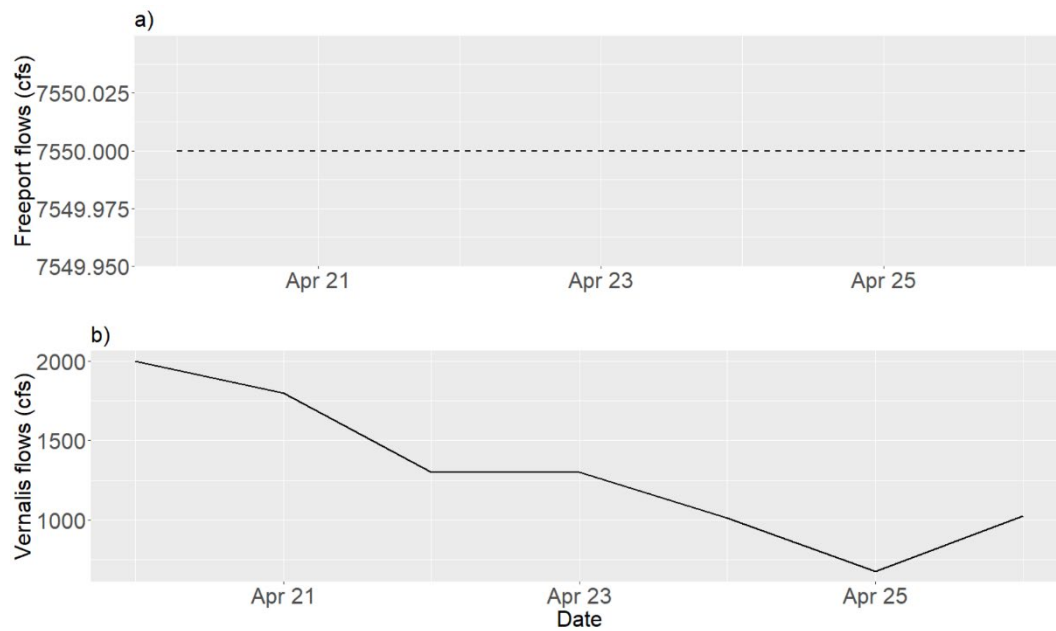


Figure A2a-d. Daily forecasted pumping: Jones and Banks (cfs): Baseline and Scenario 1.

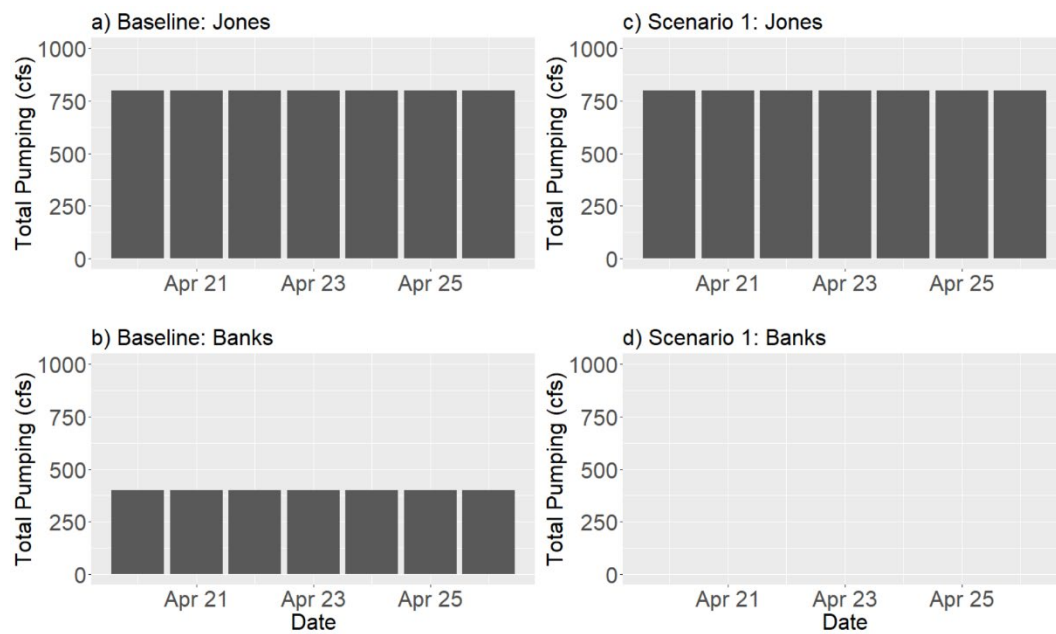
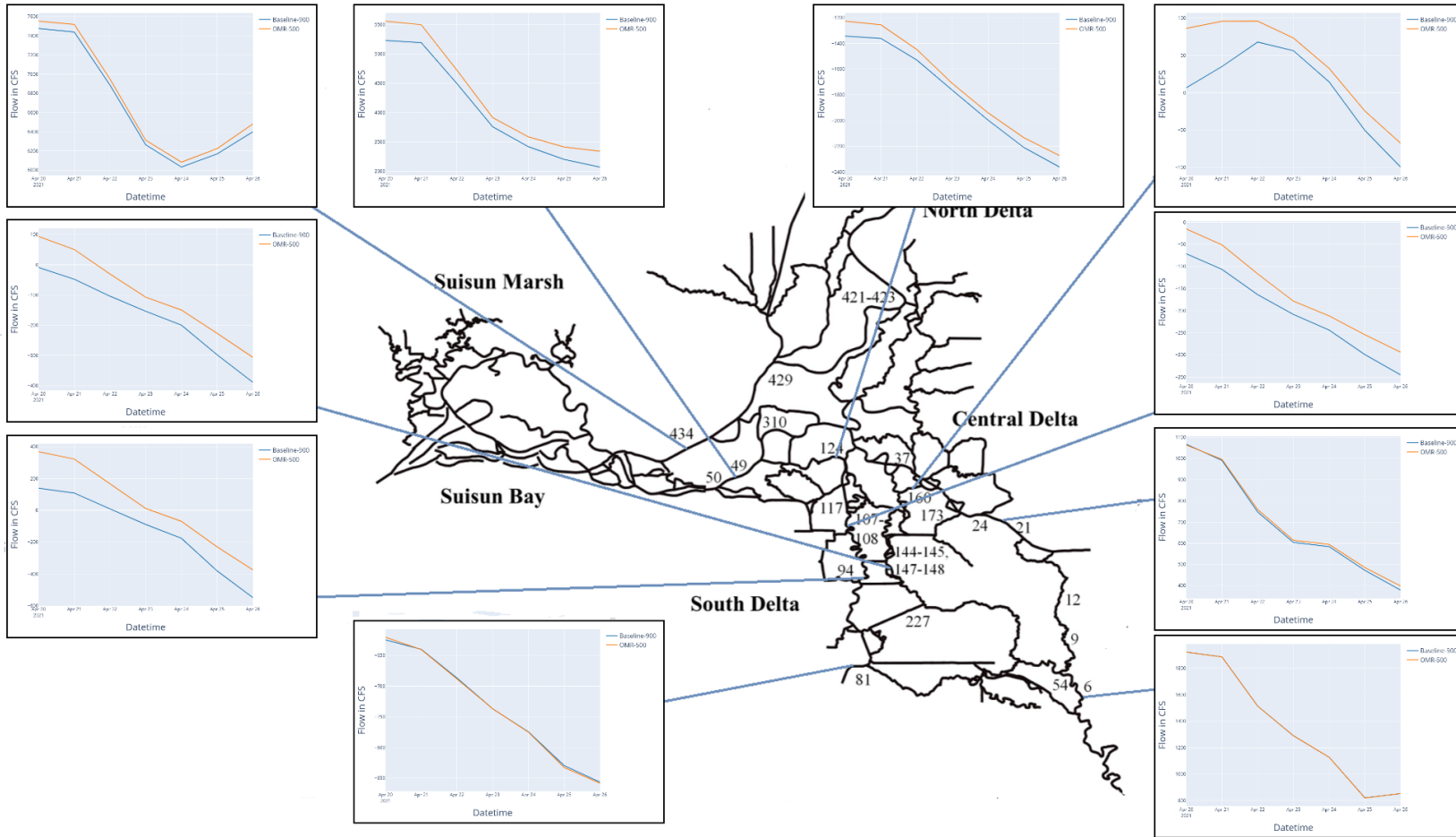


Figure A3: Spatial representation of DSM2 modeled flow by channel. Refer to figures A4 to A13 for more detail.

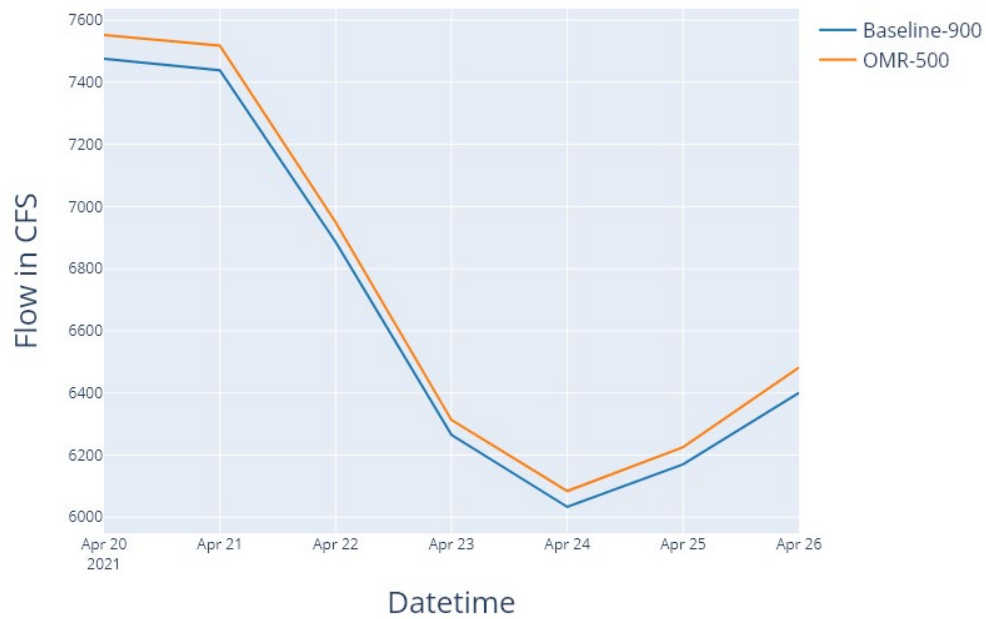


The following captions apply to the time-series plots for flow and velocity in selected locations (see Figure A14 and Table A3 for channel location information) below:

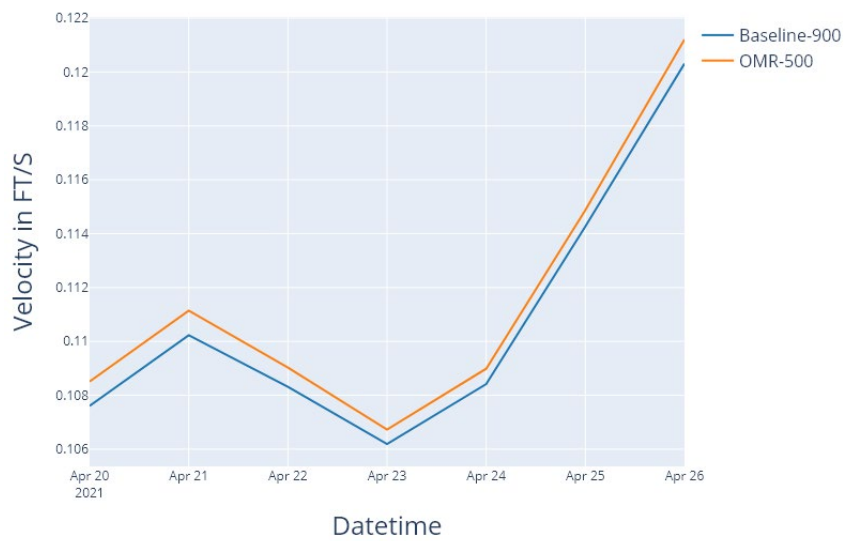
Time-series plot (1-day aggregated): Baseline, Scenario 1 OMR, and Scenario 2 OMR. X-axis represents daily time steps and y-axis represents flow (cfs) values. For Baseline, Scenario 1, and Scenario 2 values refer to “Hydraulic Footprint Information” in the section above. Reported summary statistics (minimum, maximum, etc.) are found in Table A1.

Time-series plot (1-day aggregated): Baseline, Scenario 1 OMR, and Scenario 2 OMR. X-axis represents daily time steps and y-axis represents velocity (cfs) values. For Baseline, Scenario 1, and Scenario 2 values refer to “Hydraulic Footprint Information” in the section above. Reported summary statistics (minimum, maximum, etc.) are found in Table A1.

Figure A4: Sacramento River at Sherman Island (CHAN434)



a.



b.

Figure A5: San Joaquin River downstream of confluence with Calaveras River (CHAN021)

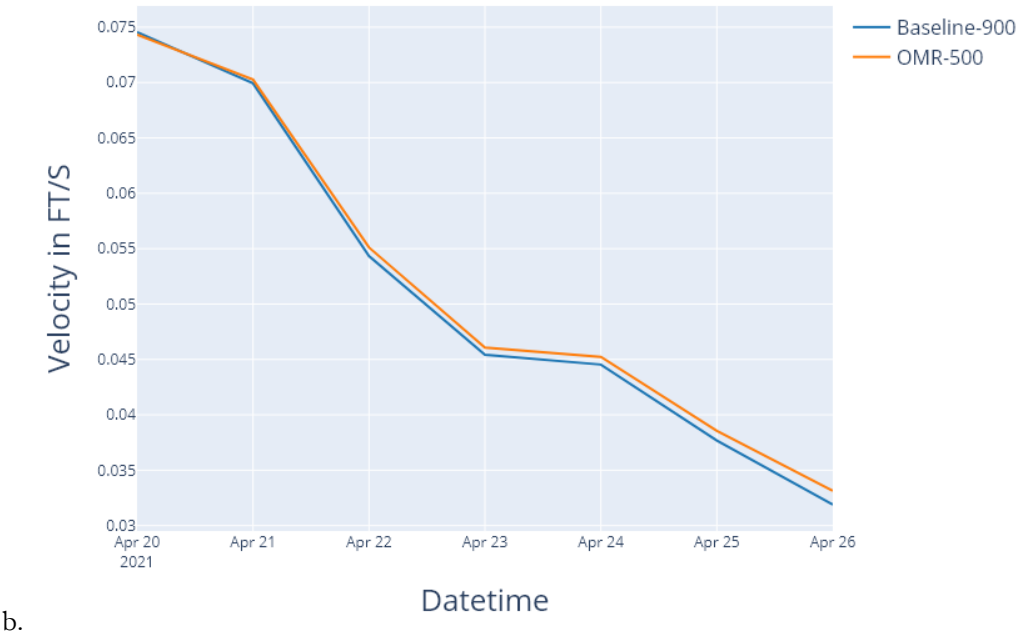
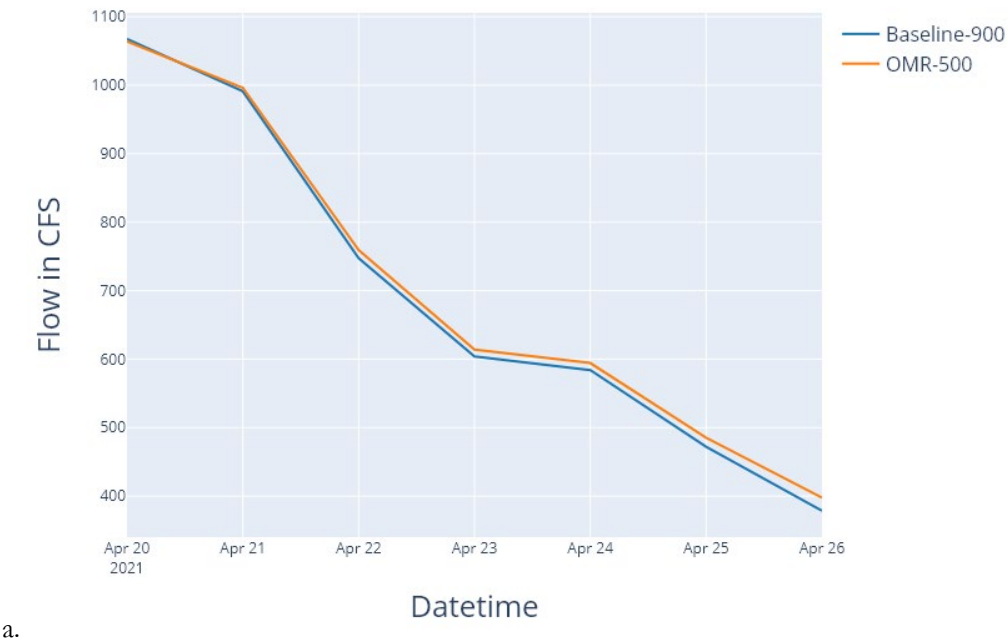
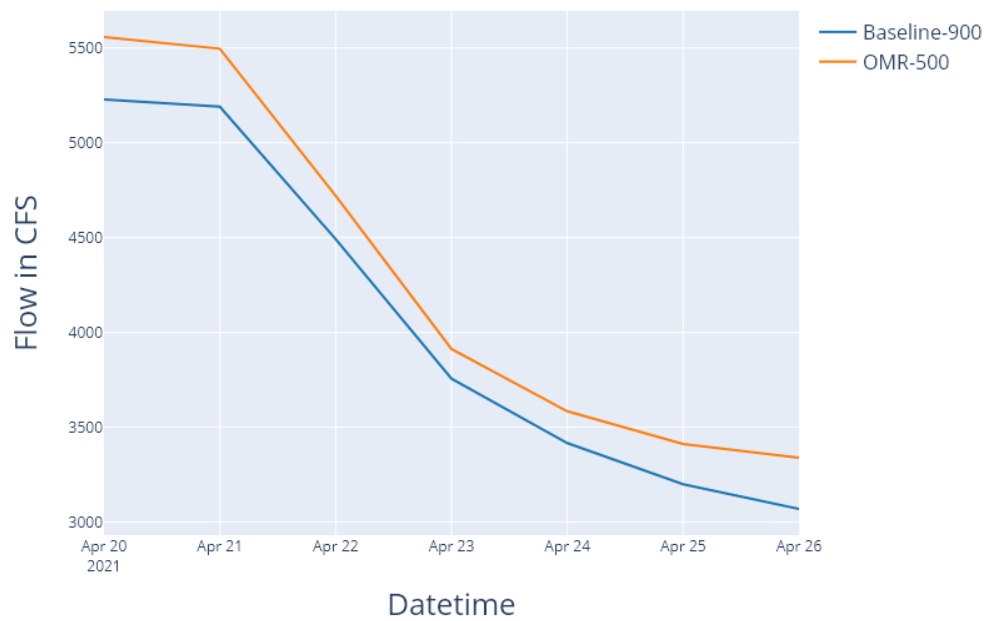
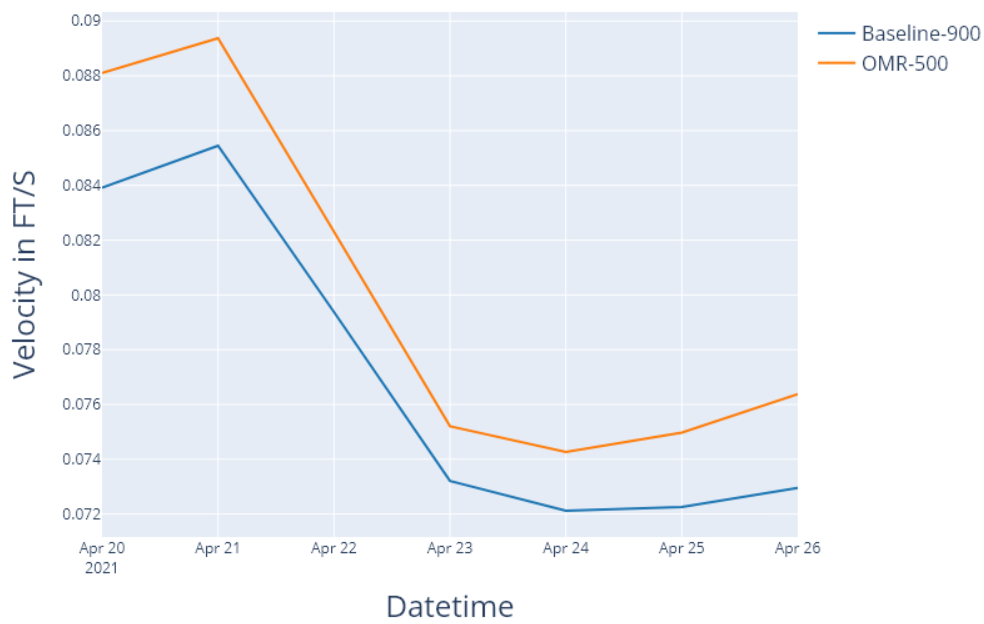


Figure A6: San Joaquin River at Sherman Island (CHAN049)

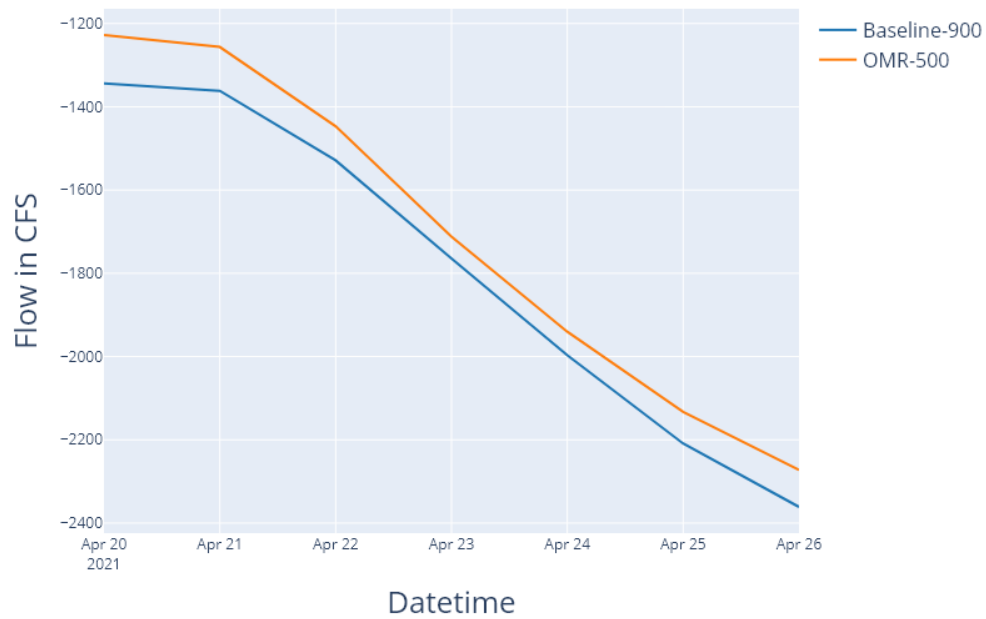


a.

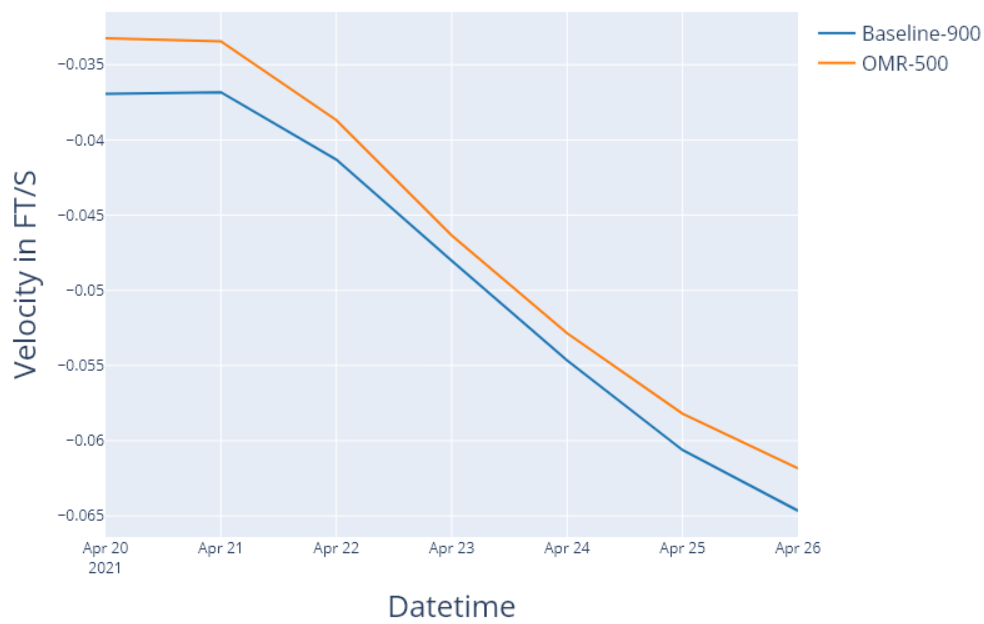


b.

Figure A7: Old River between Franks Tract and San Joaquin River (CHAN124)

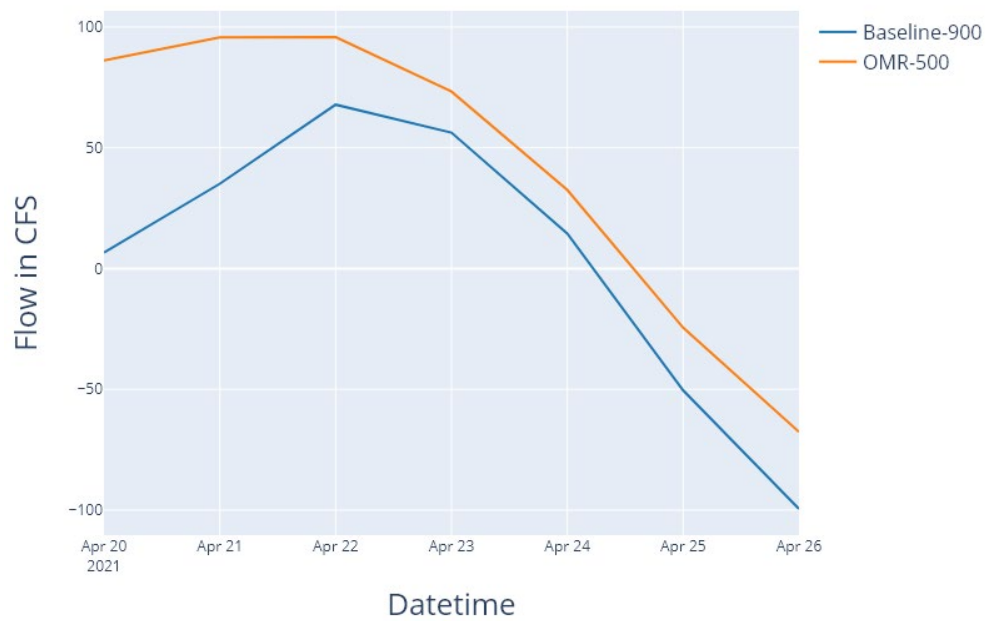


a.

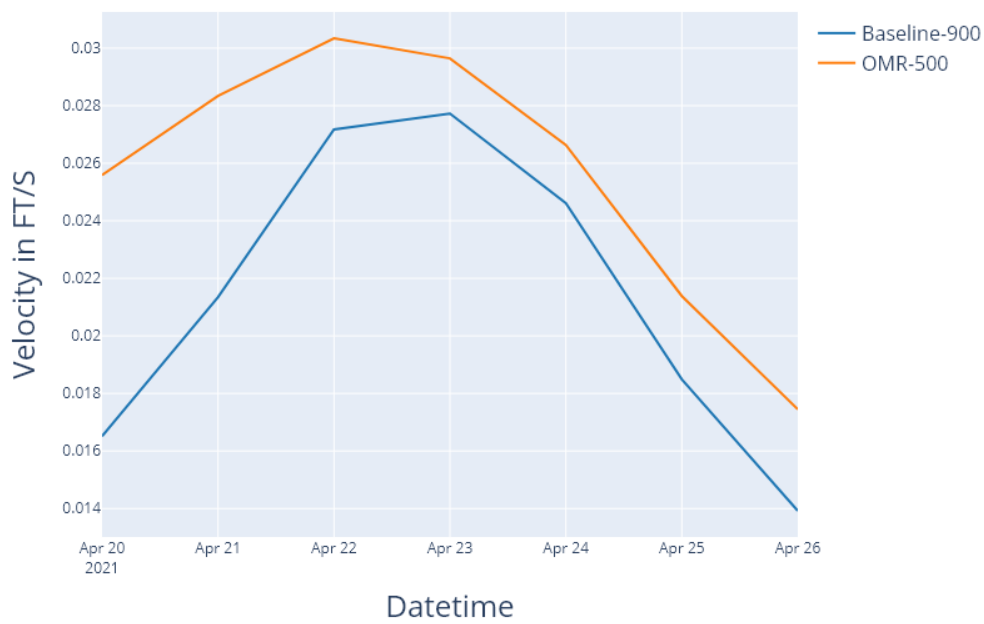


b.

Figure A8: Lower San Joaquin River at Columbia Cut (CHAN160)

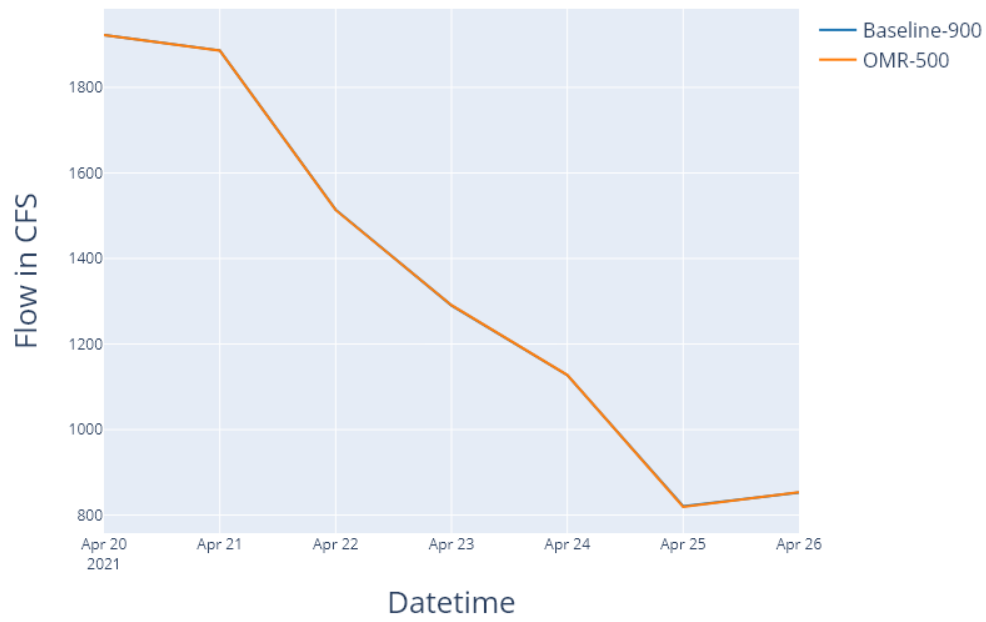


a.

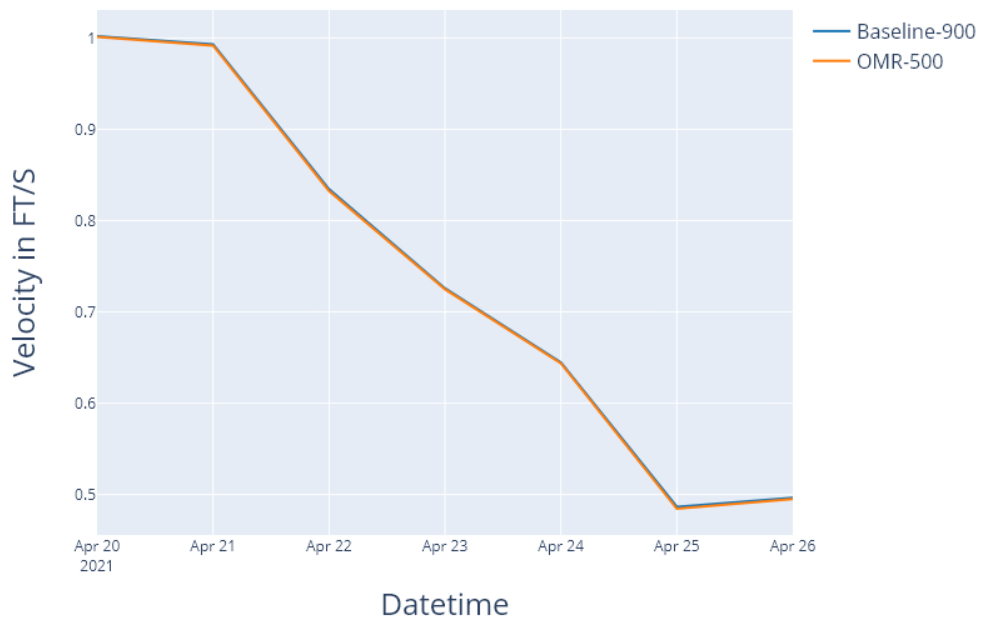


b.

Figure A9: Slightly upstream of Head of Old River (CHAN006)

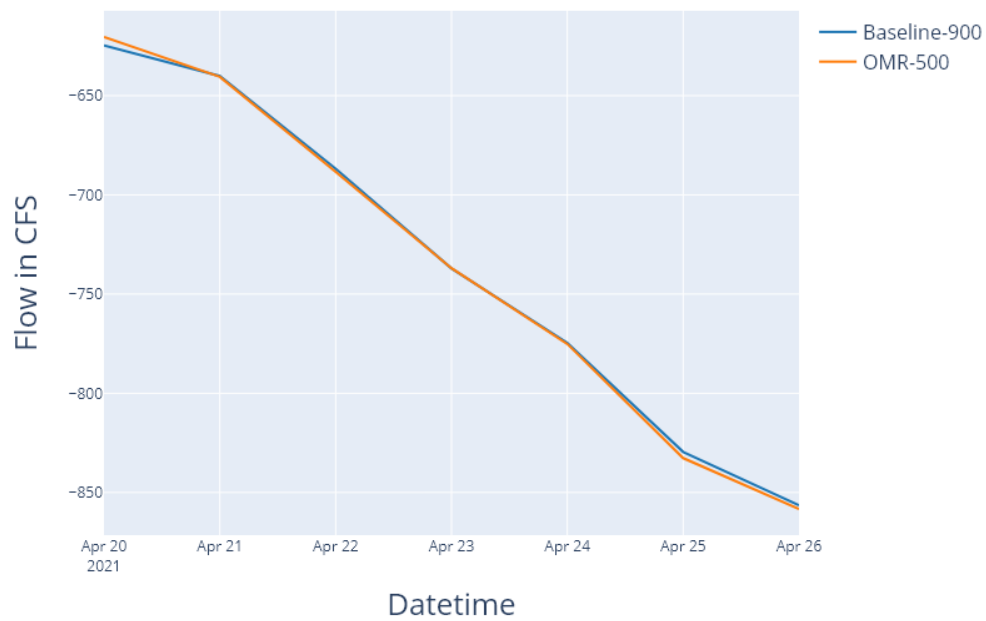


a.

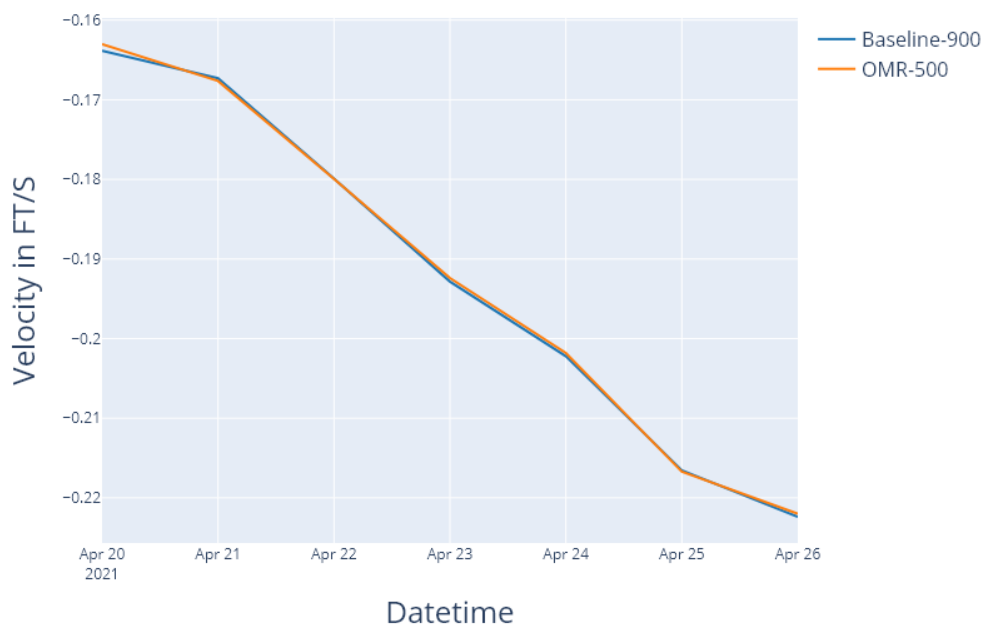


b.

Figure A10: Old River adjacent to Grant Line Canal (CHAN081 – Old River between Grant Line and CVP)

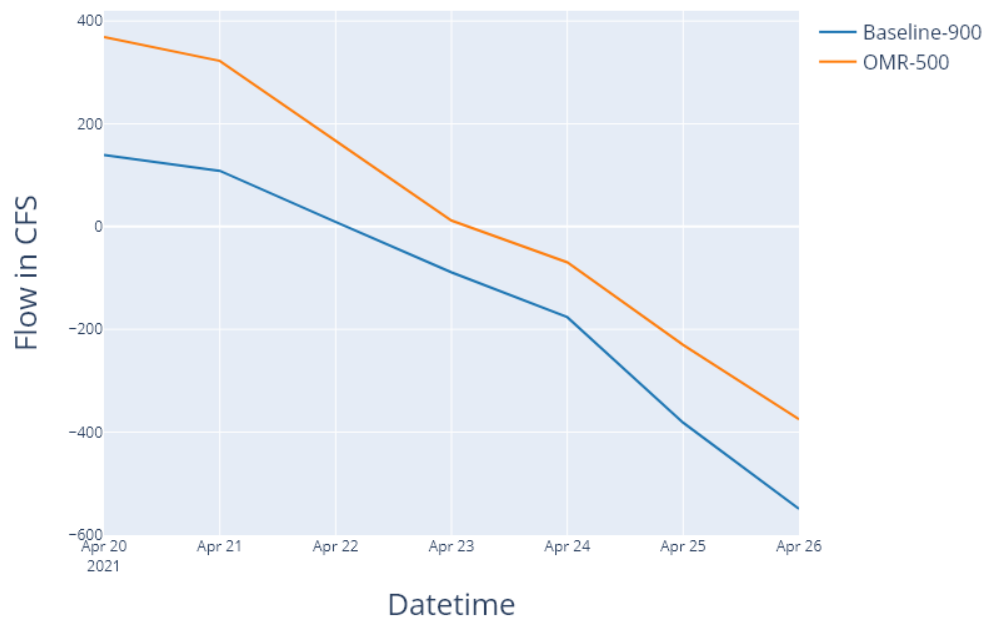


a.

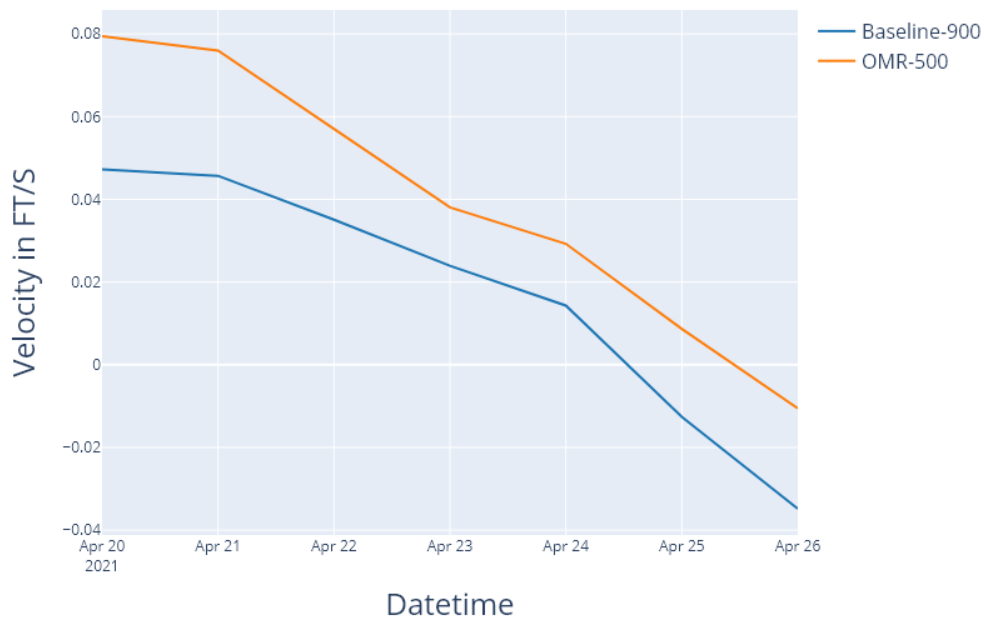


b.

Figure A11: South Delta along Old River (CHAN094 – Old River/HW4)

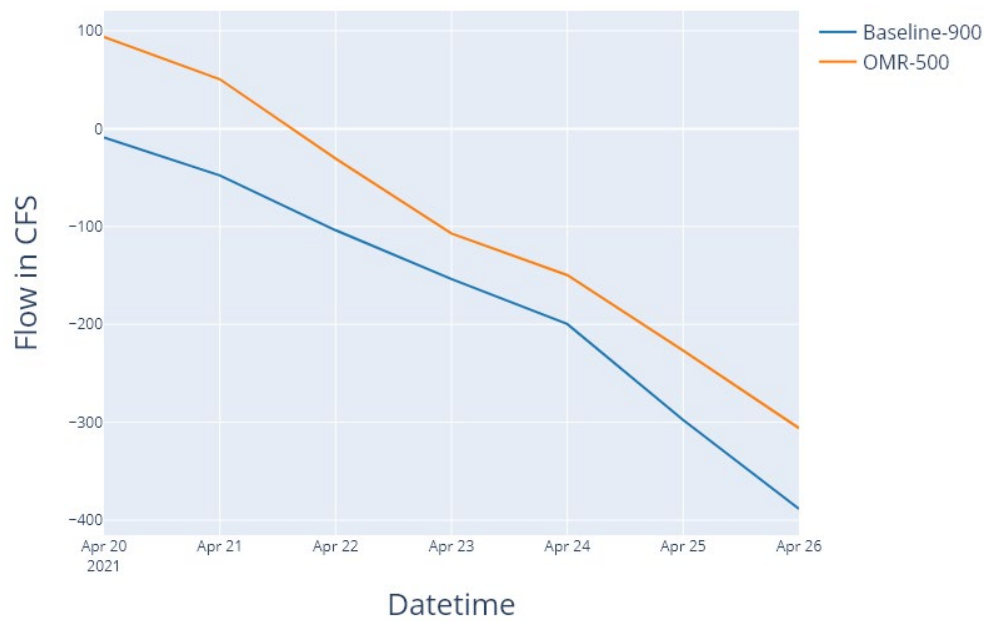


a.

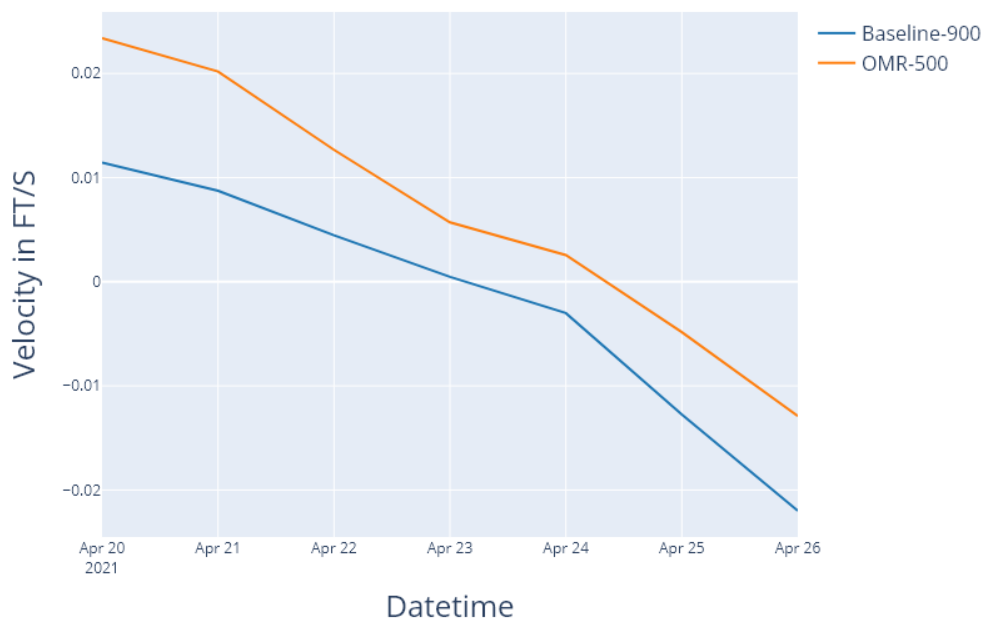


b.

Figure A12: South Delta along Middle River (CHAN148 – Middle River/ Woodward Cut)

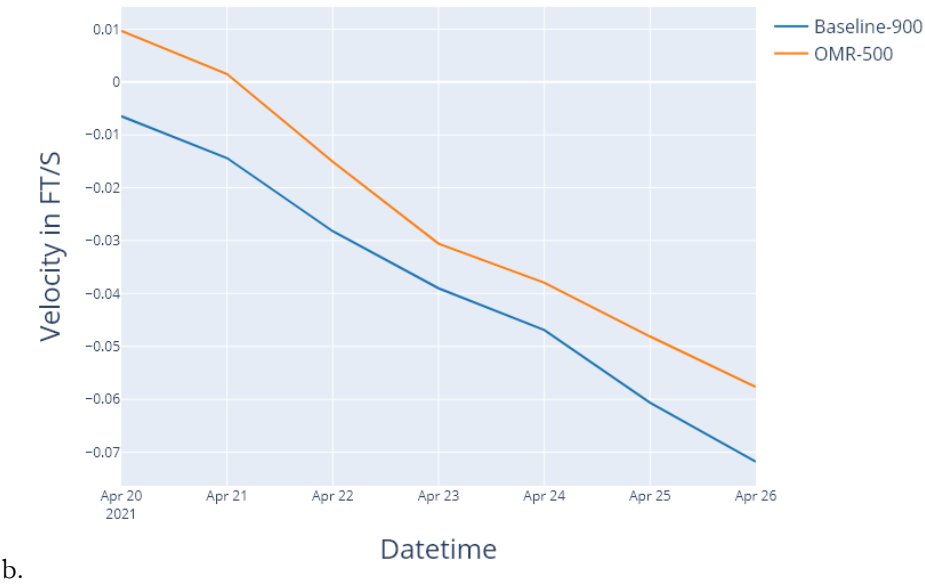
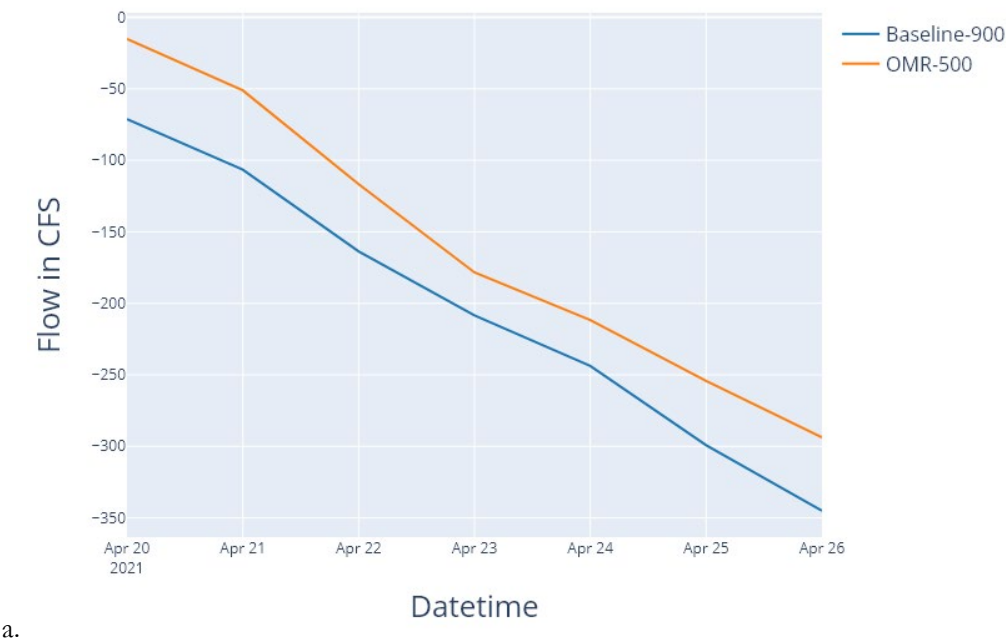


a.



b.

Figure A13: South Delta along Middle River (CHAN107 – Old River-Bacon Isl.)



DSM2 model interpretation entrainment in Delta strata regions

North Delta into Interior and Central Delta

Channels: 49 and 434

No to low measurable changes to flow and velocity between modeled OMR scenarios are anticipated. It is unlikely that listed salmonids would experience behavioral changes between modeled OMR scenarios this week. Despite low exports the zone of influence has expanded further south due to the low hydrology.

San Joaquin River and Central Delta into South Delta

Channels: 6, 21, 107, 124, and 160

No to low measurable changes to flow and velocity between modeled OMR scenarios are anticipated. Based on recent survey data, listed salmonids are present. It's unlikely that hydrological changes will be detectable by fish. Cumulative net flows within the channels of the South Delta are negative in magnitude.

South Delta into facilities

Channels: 81, 94, and 148

No to low measurable changes to flow and velocity between modeled OMR scenarios are anticipated. Based on recent survey data, listed salmonids are present. It's unlikely that hydrological changes will be detectable by fish. Cumulative net flows within the channels of the South Delta are positive in magnitude and fish moving from the San Joaquin mainstem into the head of Old River will have an increased transit time towards the fish salvage facilities in the second half of the simulation due to Vernalis flows.

DSM2 channel locations information

Figure A14. Highlighted DSM2 channels by Delta Strata.

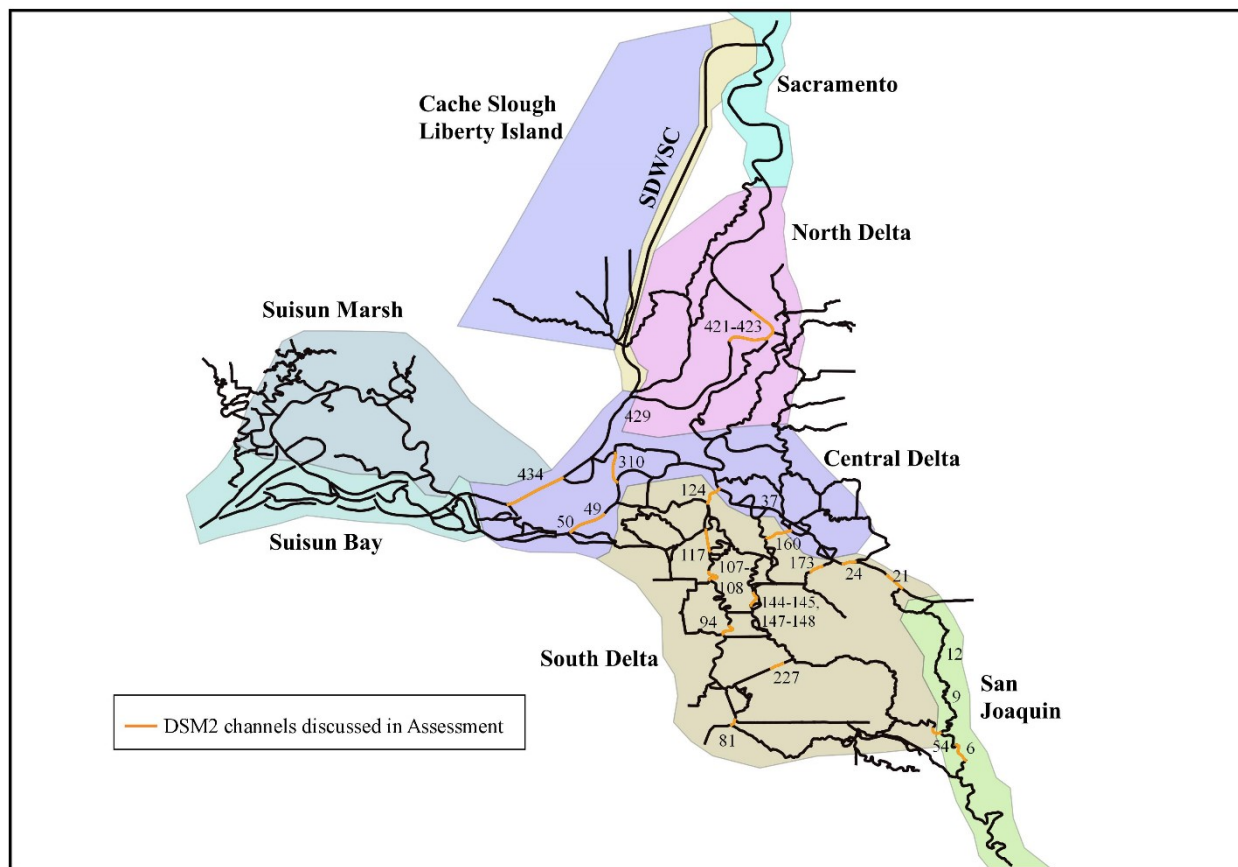


Table A3. Description of channel location, by Delta Strata region. Not all listed channels have model results presented in every weekly Proposed Action Assessment.

DSM2 Channel	Description
North Delta into Interior and Central Delta	
CHAN049	San Joaquin River at Sherman Island
CHAN310	Three-Mile Slough
CHAN421	Sacramento River at Delta Cross Channel
CHAN422	Sacramento River at Delta Cross Channel
CHAN423	Sacramento River at Delta Cross Channel
CHAN434	Sacramento River at Sherman Island
San Joaquin River and Central Delta into South Delta	
CHAN006	San Joaquin River at Head of Old River (HOR)
CHAN021	San Joaquin River downstream from confluence with Calaveras River
CHAN024	San Joaquin River upstream of Turner Cut
CHAN054	Old River at confluence with San Joaquin River (HOR)
CHAN107	Old River north of Rock Slough
CHAN117	Old River south of Franks Tract
CHAN124	Old River between Franks Tract and San Joaquin River
CHAN160	Columbia Cut
CHAN173	Turner Cut
South Delta into Facilities	
CHAN148	Middle River
CHAN227	Victoria Canal
CHAN081	Grant Line Canal
CHAN094	Old River

4/27/2021 Meeting

Background

<i>Process</i>	
Weekly process	<ul style="list-style-type: none"> • DSM2 model runs use a historic and forecasted hydrological input dataset with no assumptions provided by DWR Thursdays and updated by Reclamation Mondays. • Input File updated Monday after initial distribution from DWR for removal of forecasted in lieu of historic input. • Reclamation provides scenarios based on expected OMR index values for the upcoming week. • DSM2 model runs produced Monday and distributed to SaMT members.
<i>Hydraulic footprint information</i>	
Baseline and Scenarios updated	4/26/2021
DSM2 modeling results range	4/27/2021 – 5/3/2021
<i>OMR index value scenarios</i>	
Baseline	-1200 cfs
Scenario 1	-1100 cfs (decreasing from Baseline; Δ 100 cfs)
Scenario 2	N/A
<i>Changes between scenarios</i>	
Hydrology	No (see special considerations section below)
Delta Exports	Yes

4/27/2021 Meeting

Background (continued)

<i>Common assumptions</i>	
DSM2 run results based on the following assumptions	<ul style="list-style-type: none"> • CCFB Gates are operating to Priority 1 throughout the forecast period. • The Delta Cross Channel gates are closed throughout the forecast period. • Suisun Marsh salinity control flashboards are in, and 2 of the Suisun Marsh Salinity Control gates are in tidal operation and 1 gate is closed for maintenance. • Sacramento River flow at Freeport is expected to at 6,696 cfs at the beginning of the forecast and estimated to decrease to 5,650 cfs (Figure A1a). • San Joaquin River flow at Vernalis is at 1,120 cfs at the beginning of the forecast period and is estimated to decrease to 700 cfs (Figure A1b). <p>Clifton Court Forebay and Tracy Pumping Plant pumping is shown for model runs in Figure A2a-A2d.</p>
<i>Additional information</i>	
Considerations for current DSM2 model run	This week there was no Scenario 2 modeled. The more negative expected OMR Index Value (see Operations Outlook document) could not be reached without a change in hydrology.
Caveats	<ul style="list-style-type: none"> • Time-step: DSM2 generates results at 15-minute time-steps. Visualizations of DSM2 model run results are aggregated over daily timesteps. Operations function on a more granular scale than daily time-step. ▪ Salmonid behavior: DSM2 provides flow fields which salmonids may encounter but salmonids are not neutrally buoyant particles. Models which incorporate behavior from acoustic tagged salmonids are being developed for South Delta (ePTM, ecoPTM).

DSM2 model results: summary tables

Table A1. Summary of minimum, maximum, mean, and percent positive flows (cfs) and velocities (ft/s) by DSM2 channel for OMR scenarios over a 6 day time period. For scenario values refer to “Hydraulic Footprint Information” in the conditions / assumptions section above.

Scenario (cfs)	DSM2 Channel	Flow Min.	Flow Max.	Flow Mean	Flow % Positive	Velocity Min.	Velocity Max.	Velocity Mean	Velocity % Positive
Baseline	6	-757.2	1952.9	950.0	87	-0.3	1.1	0.5	87
Scenario 1	6	-815.3	1952.9	949.8	87	-0.4	1.1	0.5	87
Baseline	21	-8174.5	7183.6	302.0	53	-0.5	0.5	0.0	53
Scenario 1	21	-8174.5	7183.6	308.6	53	-0.5	0.5	0.0	53
Baseline	49	-166789.3	149457.6	-670.7	52	-2.1	2.0	0.0	52
Scenario 1	49	-166789.3	149457.6	-579.8	52	-2.1	2.0	0.0	52
Baseline	81	-4502.4	1862.1	-809.6	47	-1.2	0.5	-0.2	47
Scenario 1	81	-4302.9	1862.1	-811.3	47	-1.1	0.5	-0.2	47
Baseline	94	-14416.3	10773.9	-627.0	51	-1.9	1.5	-0.1	51
Scenario 1	94	-14416.3	10773.9	-568.5	51	-1.9	1.5	0.0	51
Baseline	107	-6372.0	4473.3	-442.8	51	-1.7	1.3	-0.1	51
Scenario 1	107	-6372.0	4473.3	-424.5	51	-1.7	1.3	-0.1	51
Baseline	124	-19530.5	13406.9	-2339.1	45	-0.6	0.4	-0.1	45
Scenario 1	124	-19530.5	13406.9	-2307.5	45	-0.6	0.4	-0.1	45
Baseline	148	-8750.7	6409.5	-480.7	51	-0.9	0.7	0.0	51
Scenario 1	148	-8750.7	6409.5	-451.8	51	-0.9	0.7	0.0	51

Scenario (cfs)	DSM2 Channel	Flow Min.	Flow Max.	Flow Mean	Flow % Positive	Velocity Min.	Velocity Max.	Velocity Mean	Velocity % Positive
Baseline	160	-5052.3	3907.3	-45.6	52	-0.5	0.5	0.0	52
Scenario 1	160	-5052.3	3907.3	-35.5	52	-0.5	0.5	0.0	52
Baseline	434	-179678.5	165946.3	1648.4	52	-2.0	1.9	0.1	52
Scenario 1	434	-179678.5	165946.3	1673.7	52	-2.0	1.9	0.1	52

DSM2 model results: figures

Figure A1a-b. Daily forecasted Freeport and Vernalis flows (cfs)

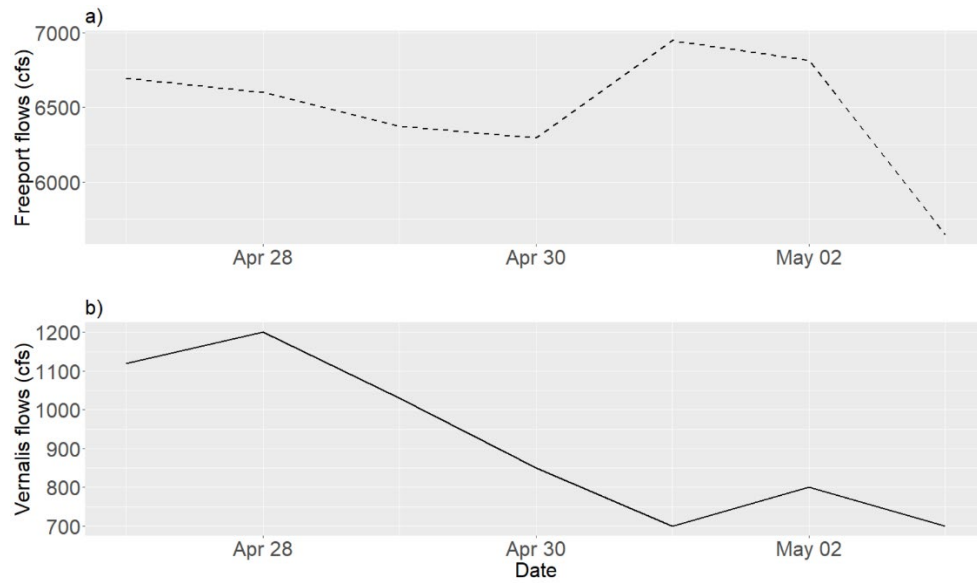


Figure A2a-d. Daily forecasted pumping: Jones and Banks (cfs): Baseline and Scenario 1.

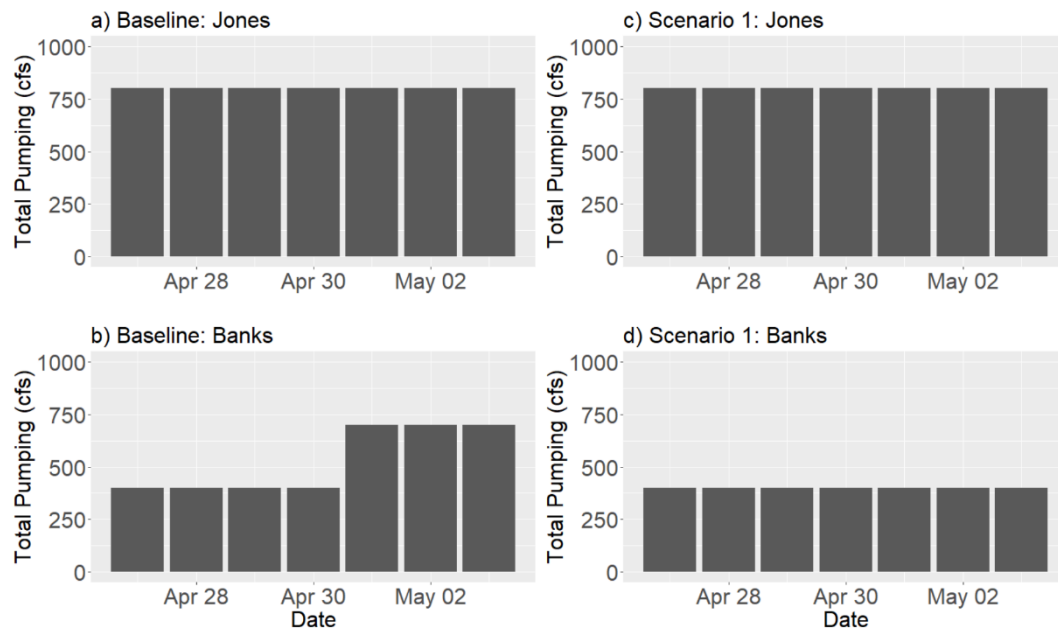
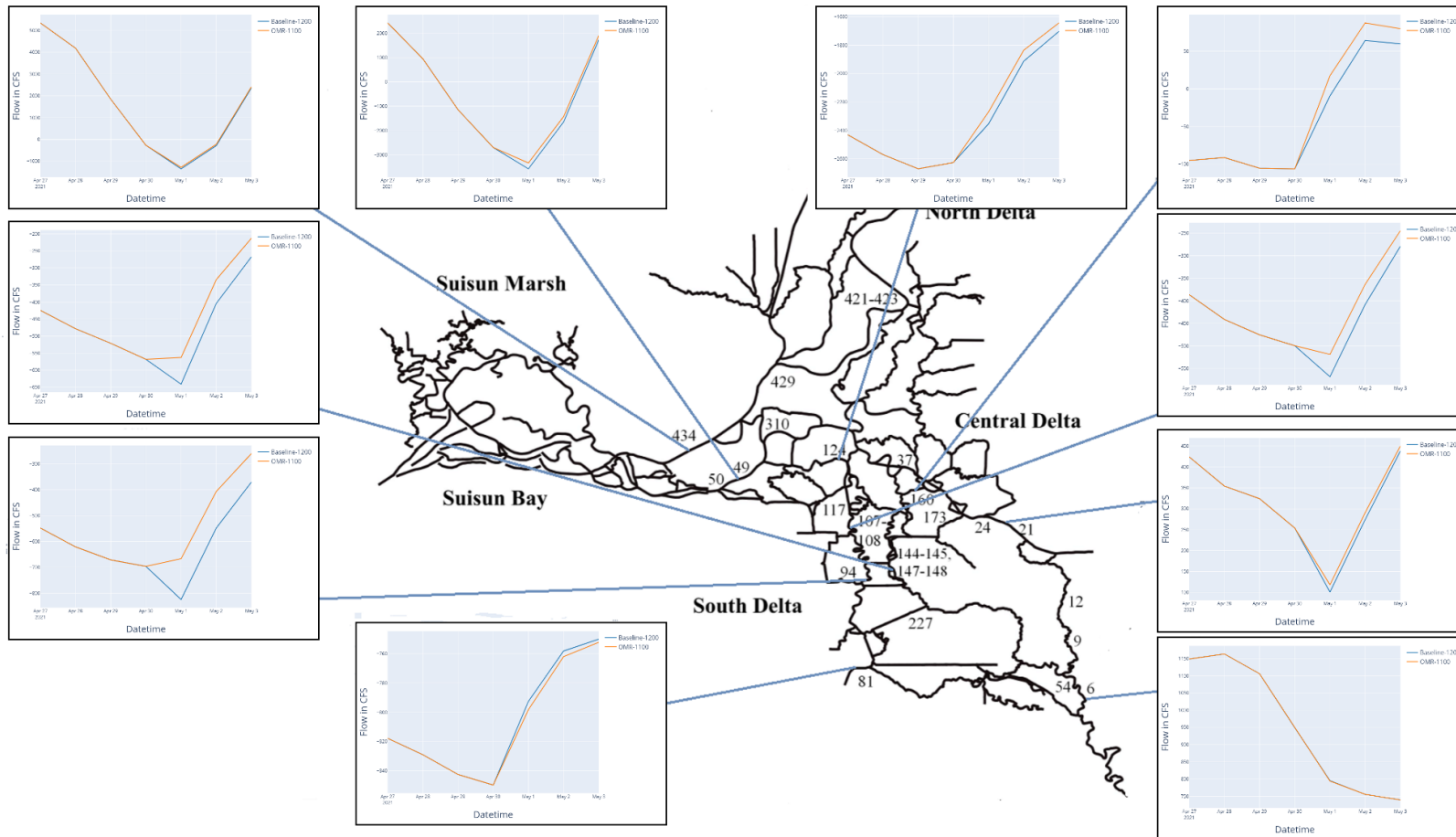


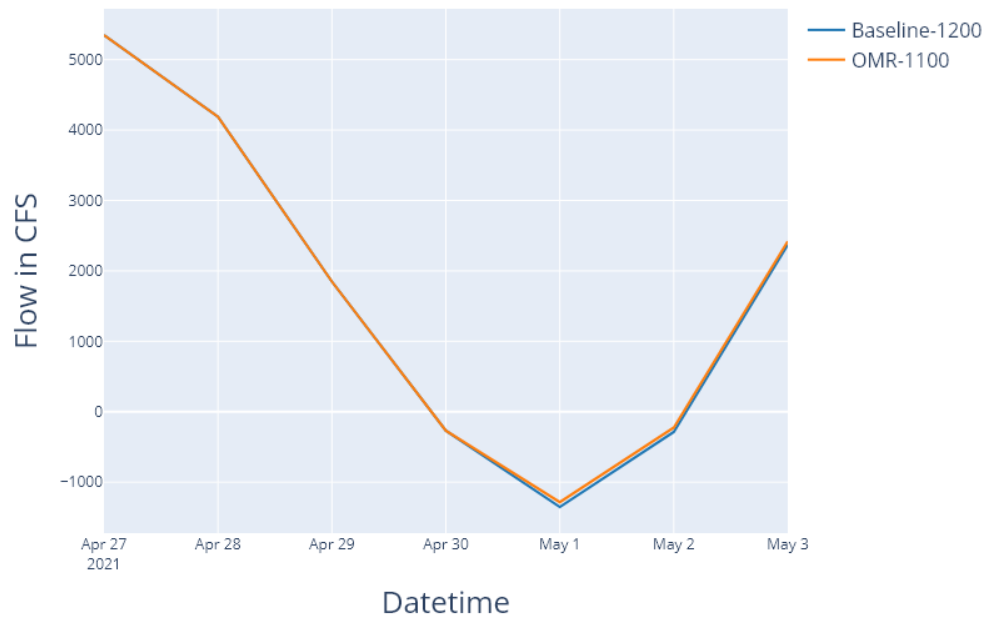
Figure A3: Spatial representation of DSM2 modeled flow by channel. Refer to figures A4 to A13 for more detail.



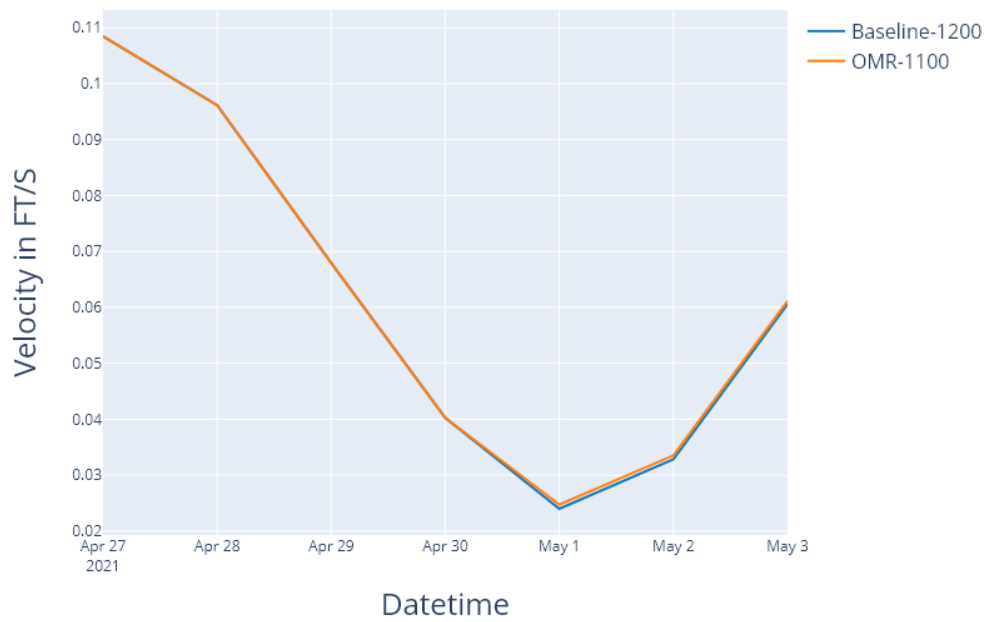
The following captions apply to the time-series plots for flow and velocity in selected locations (see Figure A14 and Table A3 for channel location information) below:

- (e) Time-series plot (1-day aggregated): Baseline, Scenario 1 OMR, and Scenario 2 OMR. X-axis represents daily time steps and y-axis represents flow (cfs) values. For Baseline, Scenario 1, and Scenario 2 values refer to “Hydraulic Footprint Information” in the section above. Reported summary statistics (minimum, maximum, etc.) are found in Table A1.
- (f) Time-series plot (1-day aggregated): Baseline, Scenario 1 OMR, and Scenario 2 OMR. X-axis represents daily time steps and y-axis represents velocity (cfs) values. For Baseline, Scenario 1, and Scenario 2 values refer to “Hydraulic Footprint Information” in the section above. Reported summary statistics (minimum, maximum, etc.) are found in Table A1.

Figure A4: Sacramento River at Sherman Island (CHAN434)

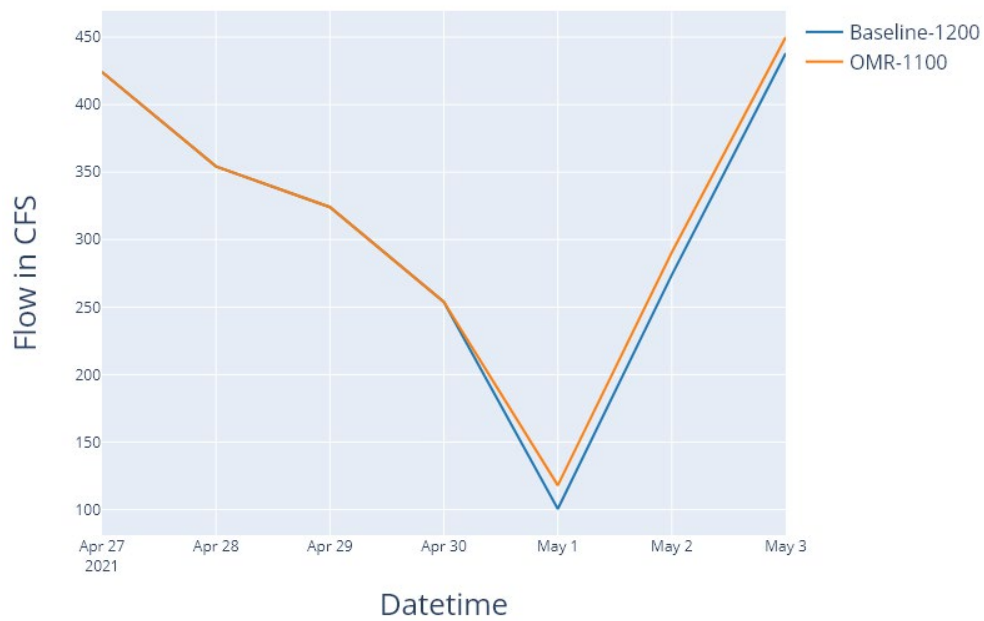


a.

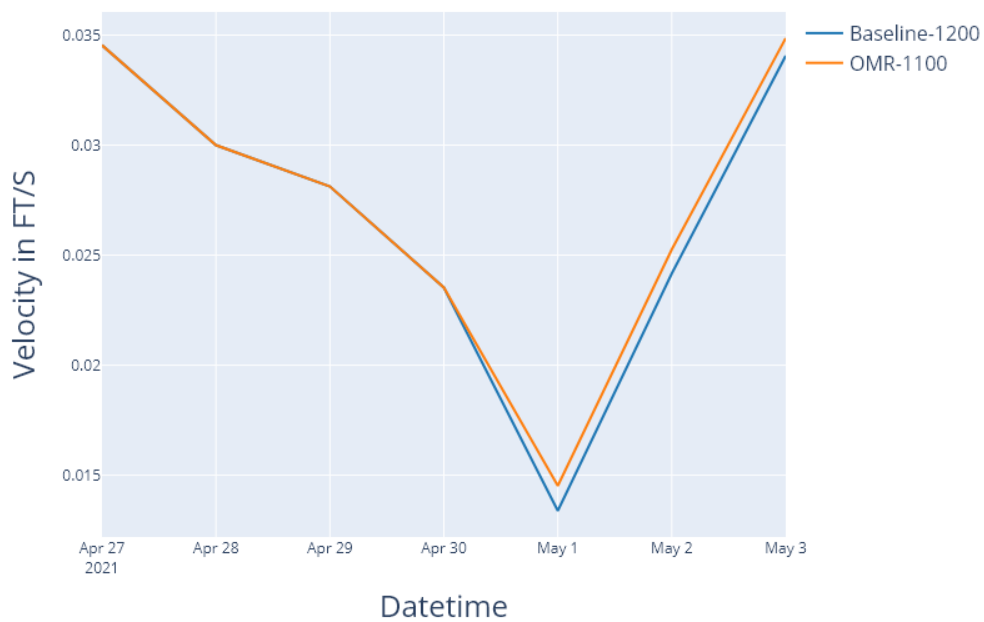


b.

Figure A5: San Joaquin River downstream of confluence with Calaveras River (CHAN021)



a.



b.

Figure A6: San Joaquin River at Sherman Island (CHAN049)

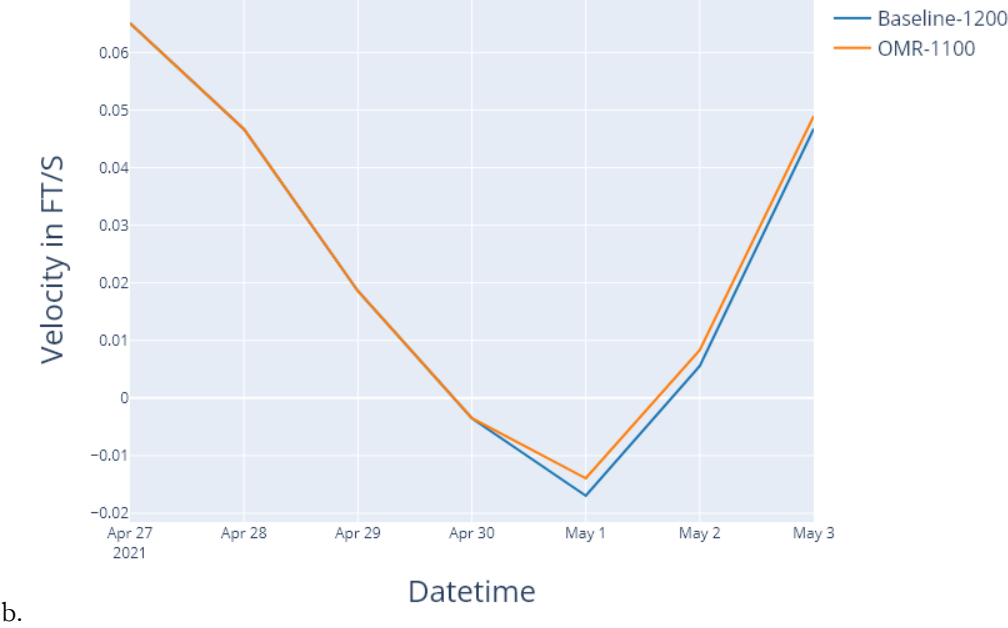
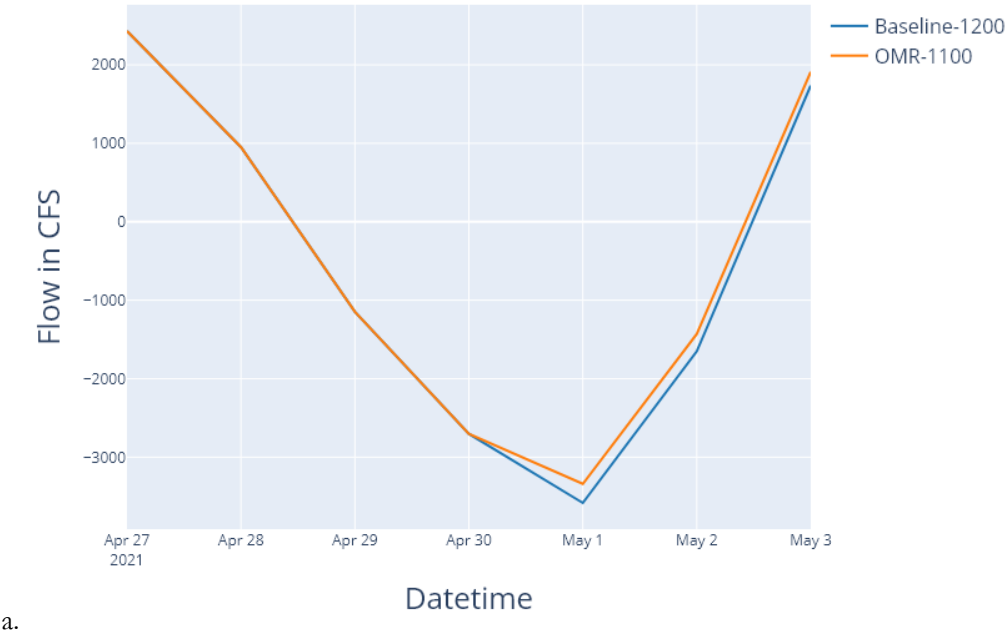
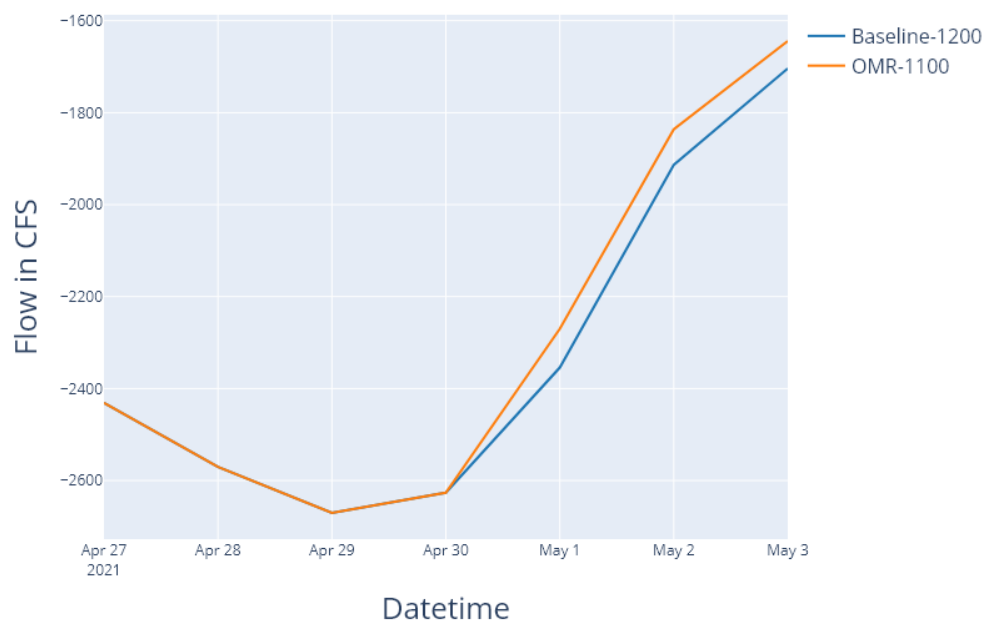
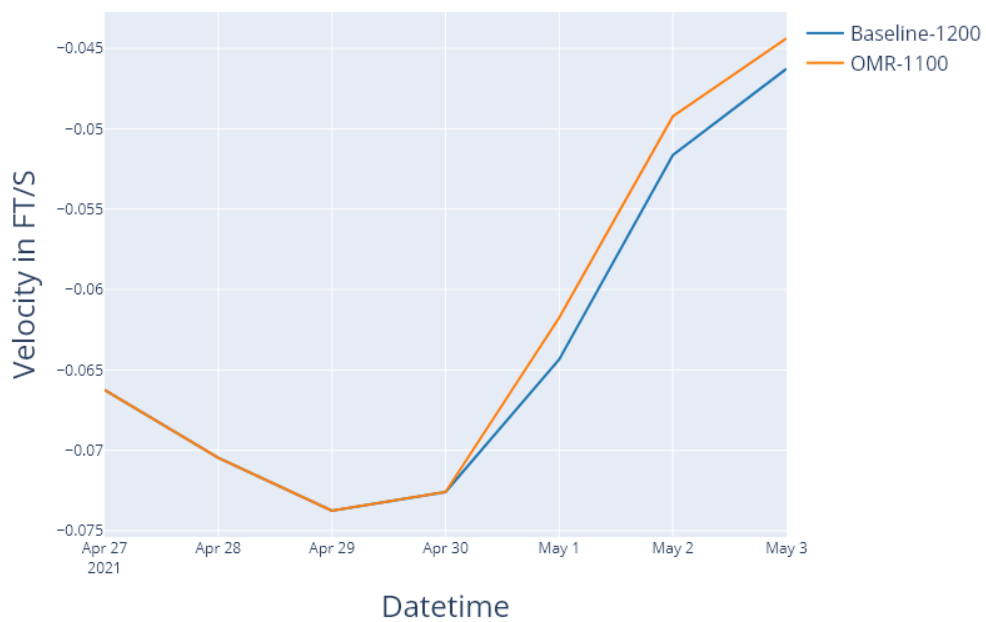


Figure A7: Old River between Franks Tract and San Joaquin River (CHAN124)

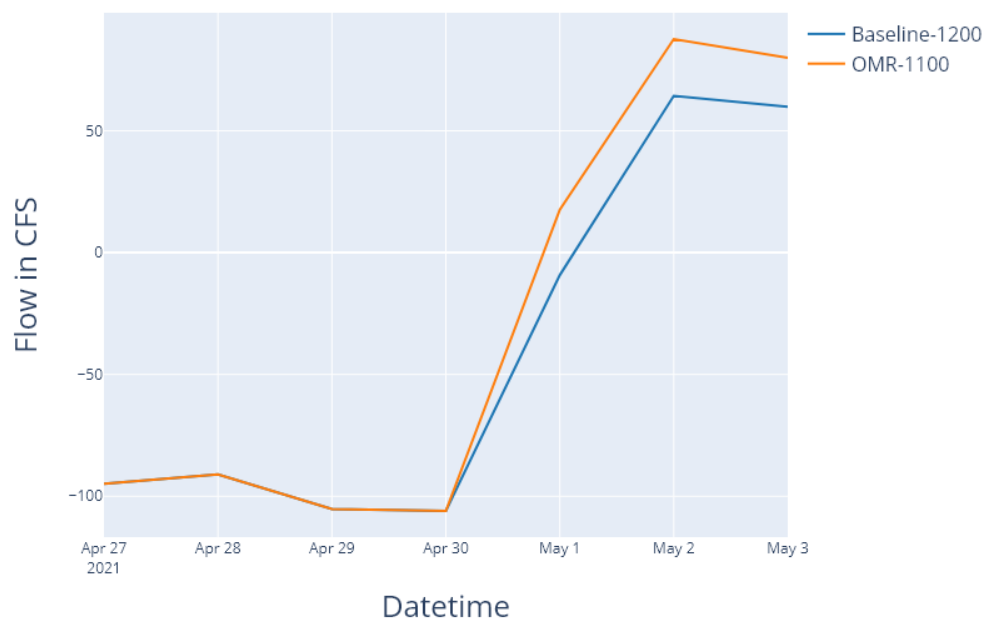


a.

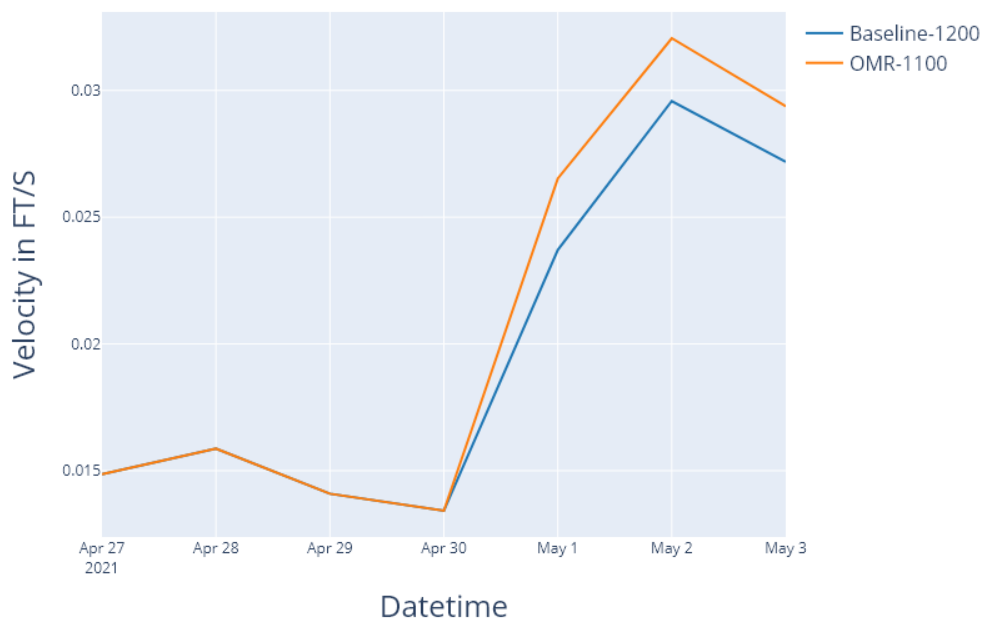


b.

Figure A8: Lower San Joaquin River at Columbia Cut (CHAN160)



a.



b.

Figure A9: Slightly upstream of Head of Old River (CHAN006)

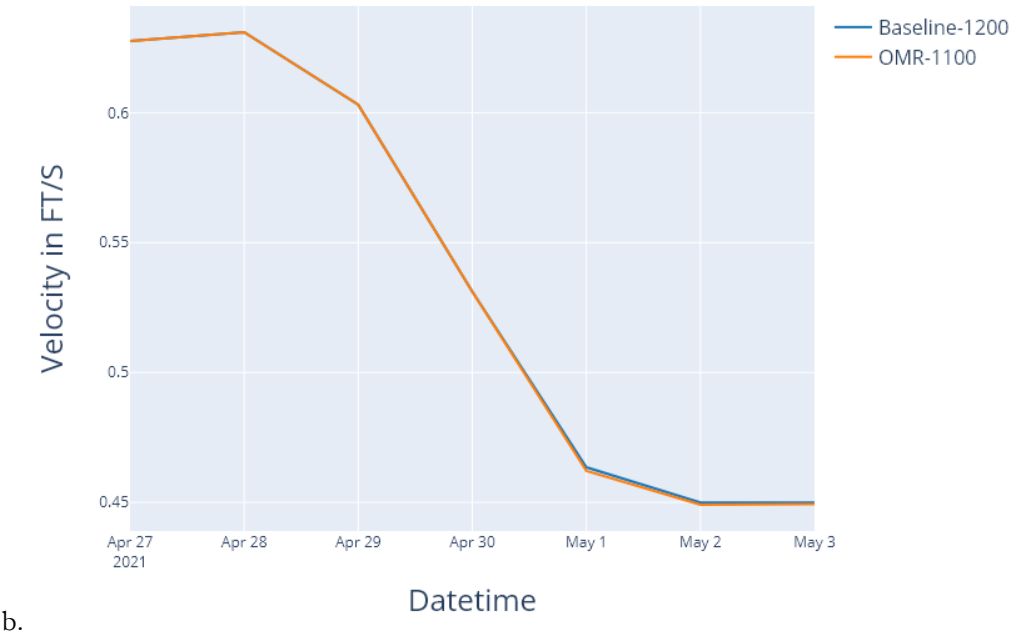
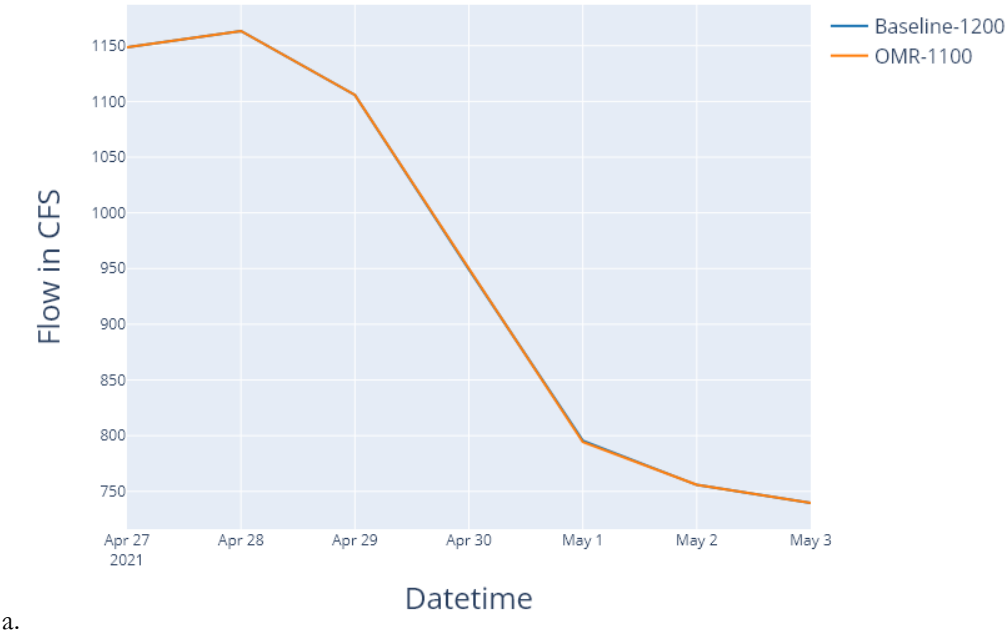
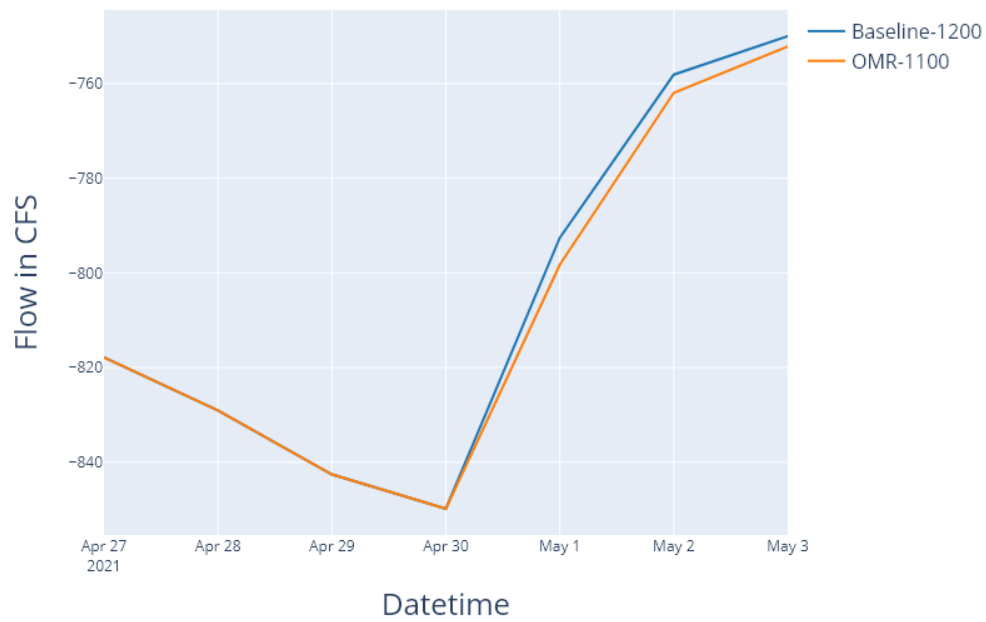
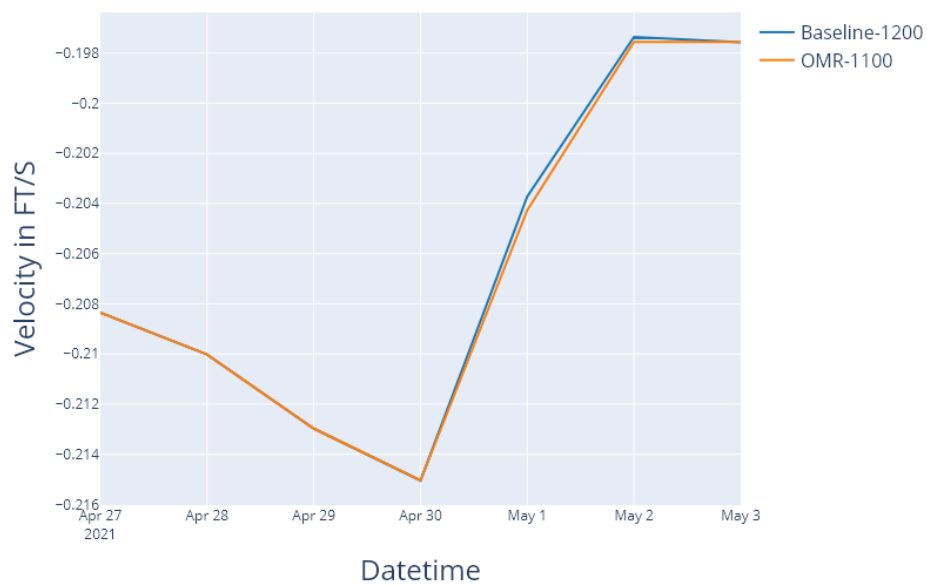


Figure A10: Old River adjacent to Grant Line Canal (CHAN081 – Old River between Grant Line and CVP)



a.



b.

Figure A11: South Delta along Old River (CHAN094 – Old River/HW4)

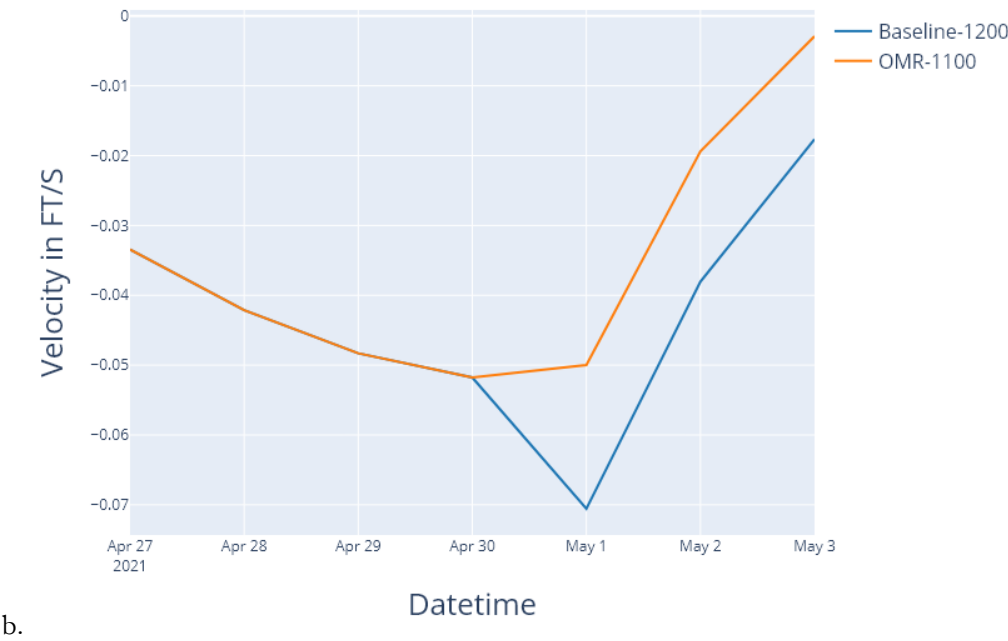
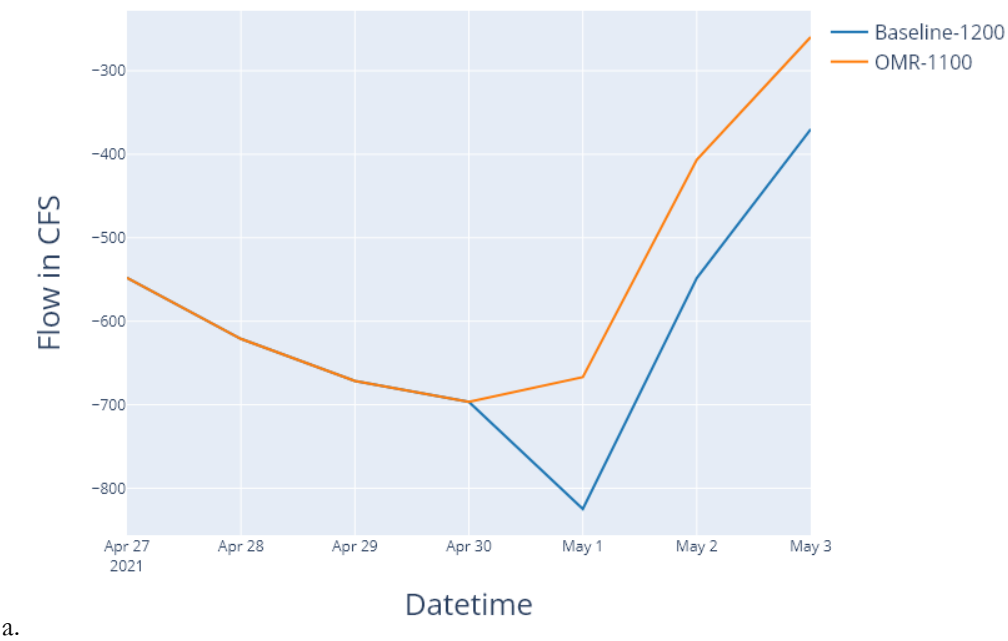


Figure A12: South Delta along Middle River (CHAN148 – Middle River/ Woodward Cut)

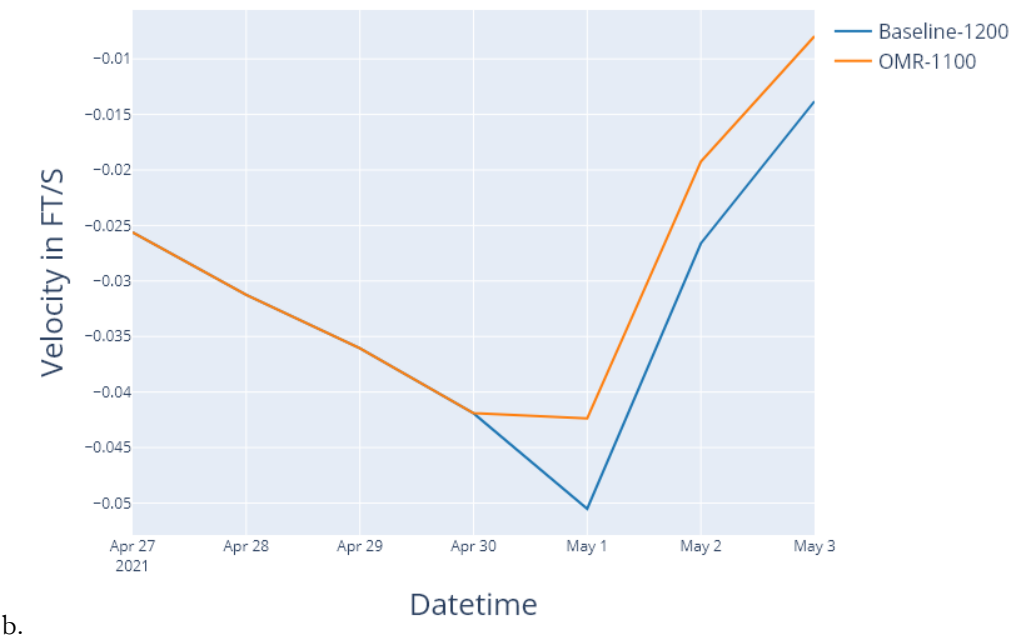
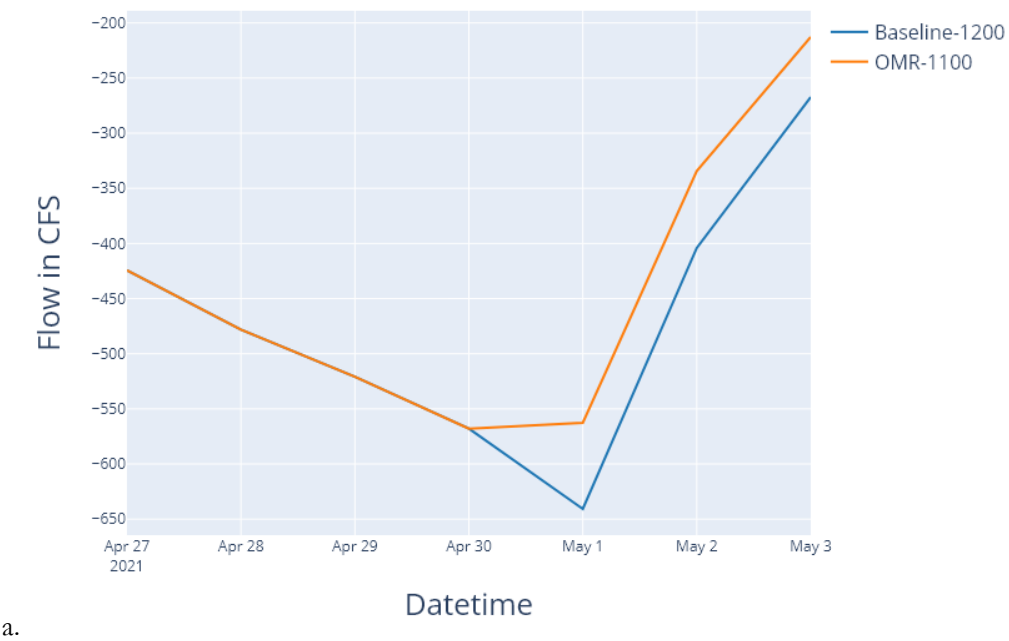
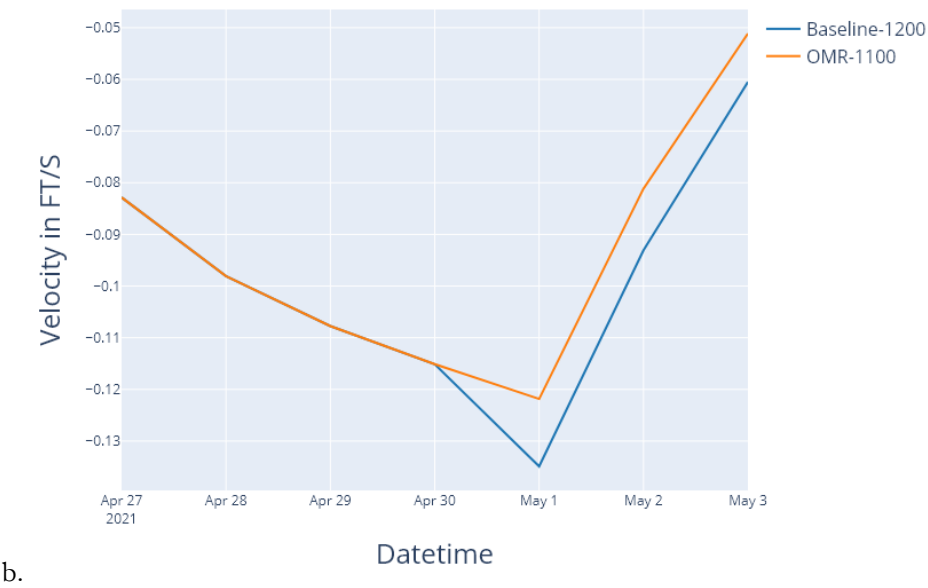
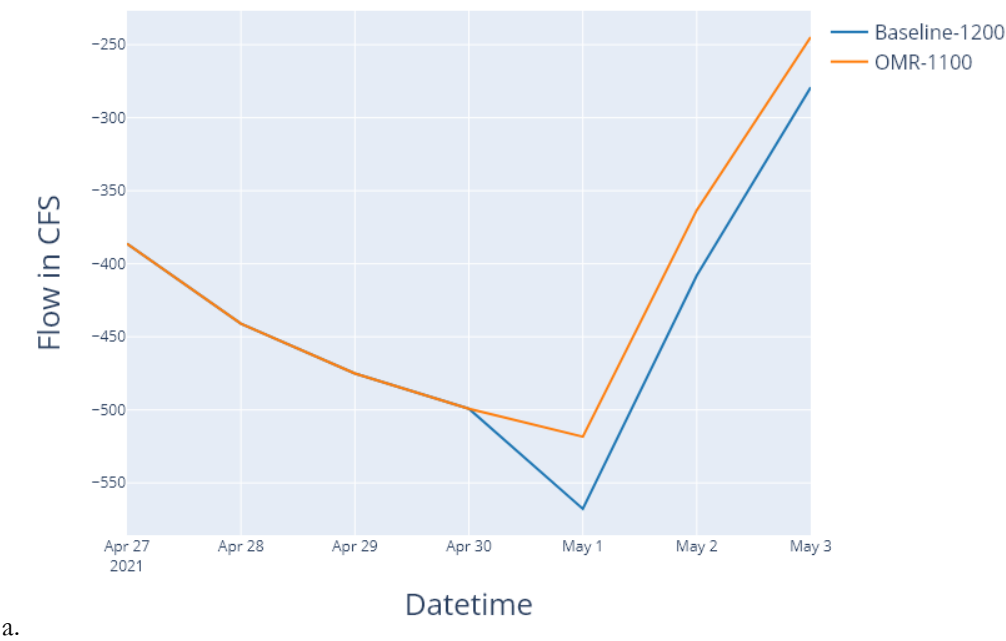


Figure A13: South Delta along Middle River (CHAN107 – Old River-Bacon Isl.)



DSM2 model interpretation entrainment in Delta strata regions

North Delta into Interior and Central Delta

Channels: 49 and 434

No to low measurable changes to flow and velocity between modeled OMR scenarios are anticipated. It is unlikely that listed salmonids would experience behavioral changes between modeled OMR scenarios this week. Despite low exports the zone of influence has expanded further south due to the low hydrology.

San Joaquin River and Central Delta into South Delta

Channels: 6, 21, 107, 124, and 160

No to low measurable changes to flow and velocity between modeled OMR scenarios are anticipated. Based on recent survey data, listed salmonids are present. It's unlikely that hydrological changes will be detectable by fish. Cumulative net flows within the channels of the South Delta are negative in magnitude.

South Delta into facilities

Channels: 81, 94, and 148

No to low measurable changes to flow and velocity between modeled OMR scenarios are anticipated. Based on recent survey data, listed salmonids are present. It's unlikely that hydrological changes will be detectable by fish. Cumulative net flows within the channels of the South Delta are positive in magnitude and fish moving from the San Joaquin mainstem into the head of Old River will have an increased transit time towards the fish salvage facilities in the second half of the simulation due to Vernalis flows.

DSM2 channel locations information

Figure A14. Highlighted DSM2 channels by Delta Strata.

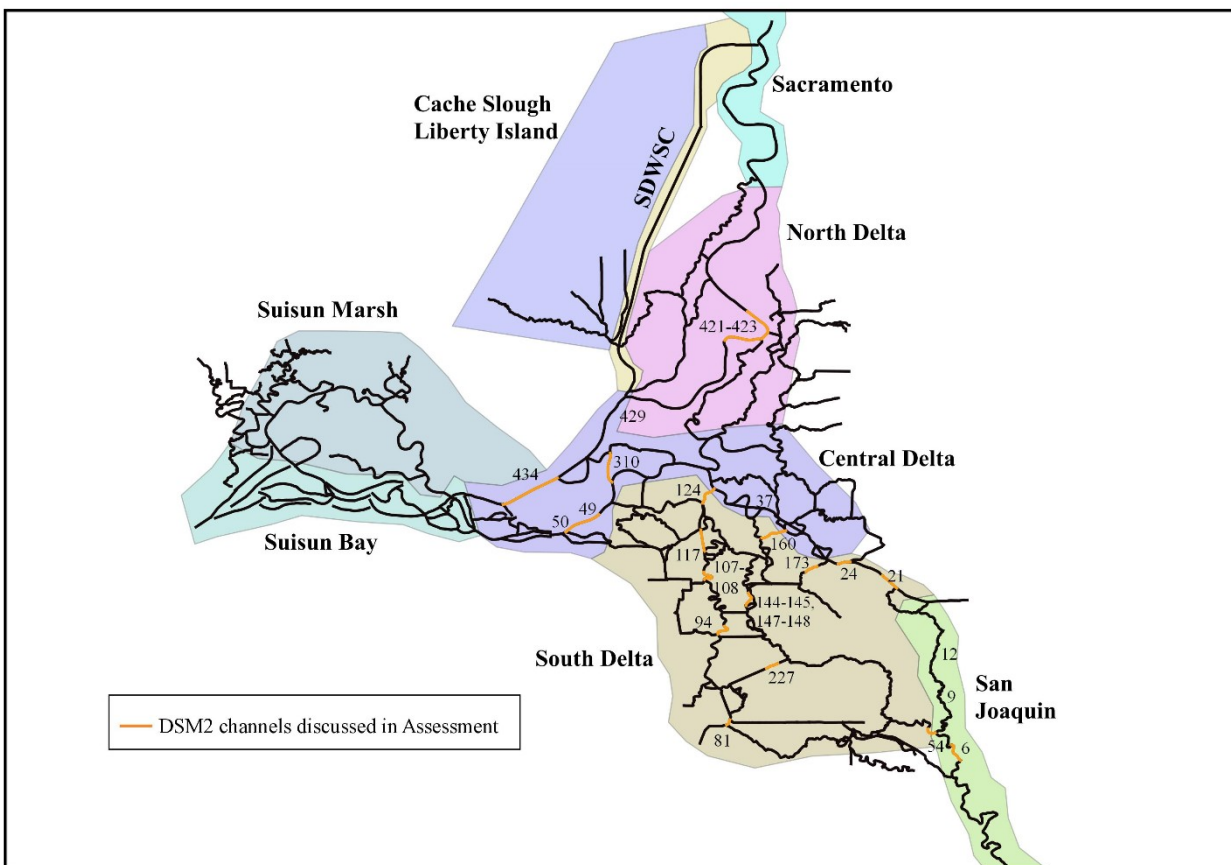


Table A3. Description of channel location, by Delta Strata region. Not all listed channels have model results presented in every weekly Proposed Action Assessment.

DSM2 Channel	Description
North Delta into Interior and Central Delta	
CHAN049	San Joaquin River at Sherman Island
CHAN310	Three-Mile Slough
CHAN421	Sacramento River at Delta Cross Channel
CHAN422	Sacramento River at Delta Cross Channel
CHAN423	Sacramento River at Delta Cross Channel
CHAN434	Sacramento River at Sherman Island
San Joaquin River and Central Delta into South Delta	
CHAN006	San Joaquin River at Head of Old River (HOR)
CHAN021	San Joaquin River downstream from confluence with Calaveras River
CHAN024	San Joaquin River upstream of Turner Cut
CHAN054	Old River at confluence with San Joaquin River (HOR)
CHAN107	Old River north of Rock Slough
CHAN117	Old River south of Franks Tract
CHAN124	Old River between Franks Tract and San Joaquin River
CHAN160	Columbia Cut
CHAN173	Turner Cut
South Delta into Facilities	
CHAN148	Middle River
CHAN227	Victoria Canal
CHAN081	Grant Line Canal
CHAN094	Old River

5/4/2021 Meeting

Background

<i>Process</i>	
Weekly process	<ul style="list-style-type: none"> • DSM2 model runs use a historic and forecasted hydrological input dataset with no assumptions provided by DWR Thursdays and updated by Reclamation Mondays. • Input File updated Monday after initial distribution from DWR for removal of forecasted in lieu of historic input. • Reclamation provides scenarios based on expected OMR index values for the upcoming week. • DSM2 model runs produced Monday and distributed to SaMT members.
<i>Hydraulic footprint information</i>	
Baseline and Scenarios updated	5/3/2021
DSM2 modeling results range	5/4/2021 – 5/10/2021
<i>OMR index value scenarios</i>	
Baseline	-1,400 cfs
Scenario 1	N/A
Scenario 2	N/A
<i>Changes between scenarios</i>	
Hydrology	No (see special considerations section below)
Delta Exports	Yes
<i>Common assumptions</i>	

5/4/2021 Meeting

Background (continued)

<i>Common assumptions</i>	
DSM2 run results based on the following assumptions	<ul style="list-style-type: none"> • CCFB Gates are operating to Priority 1 throughout the forecast period. • The Delta Cross Channel gates are closed throughout the forecast period. • Suisun Marsh salinity control flashboards are in, and 2 of the Suisun Marsh Salinity Control gates are in tidal operation and 1 gate is closed for maintenance. • Sacramento River flow at Freeport is expected to remain constant at 5,150 cfs throughout the forecast period (Figure A1a). • San Joaquin River flow at Vernalis is at 600 cfs at the beginning of the forecast period and is estimated to decrease to 325 cfs (Figure A1b). <p>Clifton Court Forebay and Tracy Pumping Plant pumping is shown for model runs in Figure A2.</p>
<i>Additional information</i>	
Considerations for current DSM2 model run	This week there was no Scenario 1 or Scenario 2 modeled. The more negative expected OMR Index Value (see Operations Outlook document) could not be reached without a change in hydrology.
Caveats	<ul style="list-style-type: none"> • Time-step: DSM2 generates results at 15-minute time-steps. Visualizations of DSM2 model run results are aggregated over daily timesteps. Operations function on a more granular scale than daily time-step. ▪ Salmonid behavior: DSM2 provides flow fields which salmonids may encounter but salmonids are not neutrally buoyant particles. Models which incorporate behavior from acoustic tagged salmonids are being developed for South Delta (ePTM, ecoPTM).

DSM2 model results: figures

Figure A1a-b. Daily forecasted Freeport and Vernalis flows (cfs)

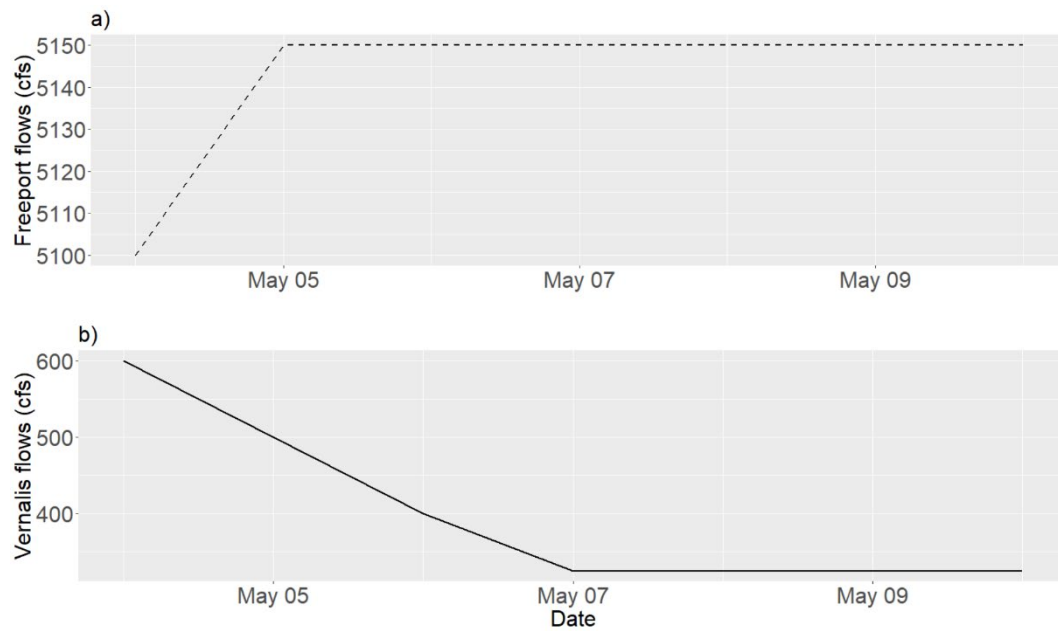
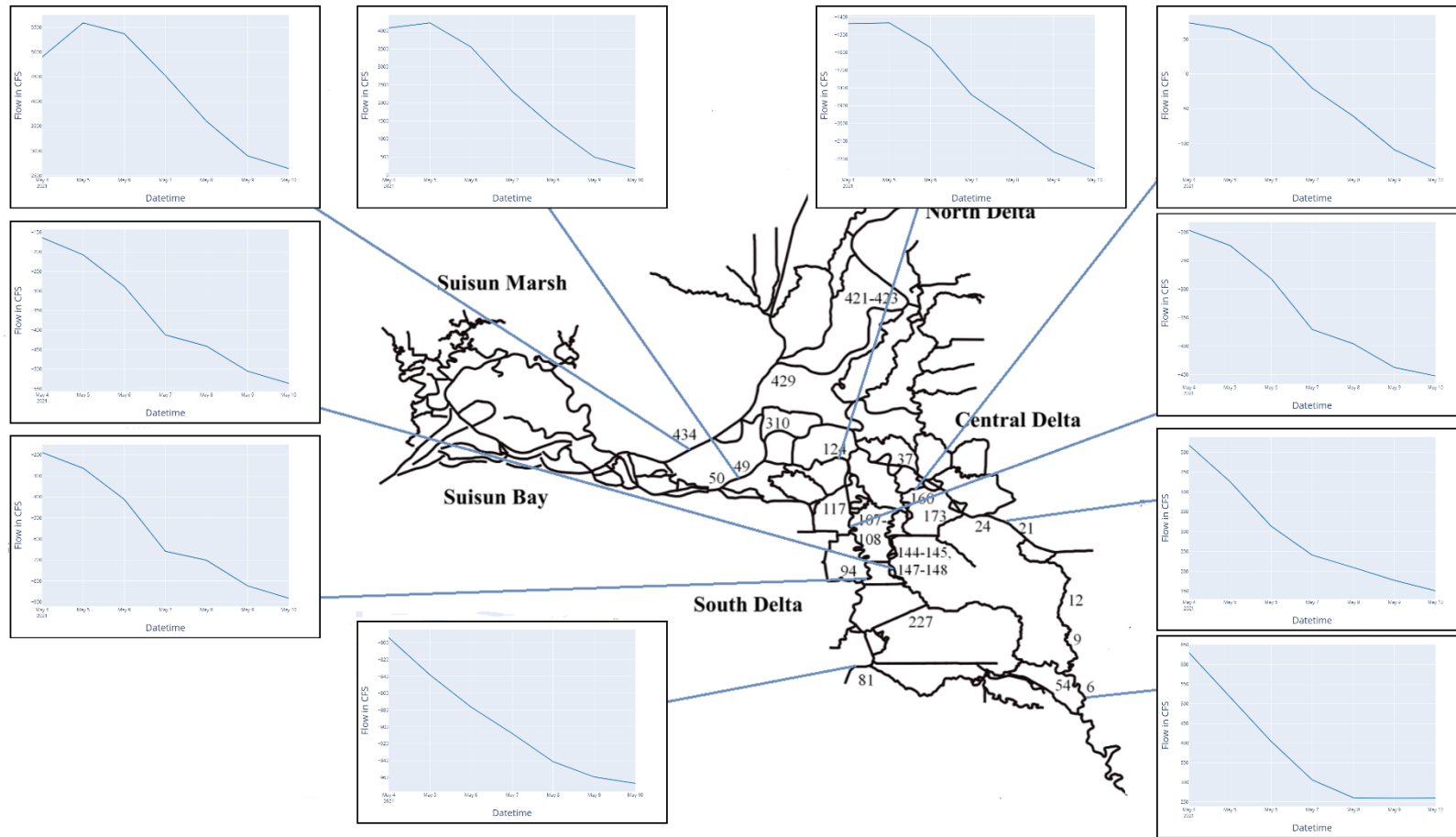


Figure A2. Daily forecasted pumping: Jones and Banks (cfs): Baseline.



Figure A3: Spatial representation of DSM2 modeled flow by channel. Refer to figures A4 to A13 for more detail.



DSM2 model interpretation entrainment in Delta strata regions

North Delta into Interior and Central Delta & San Joaquin River and Central Delta into South Delta & South Delta into facilities

Channels: 6, 21, 49, 434, 107, 124, 160, 81, 94, and 148

Based on recent survey data, listed salmonids are present. Cumulative net flows throughout the system are positive in magnitude at the beginning of the forecast period and then decreasing during the second half of the forecast period. Fish moving from the San Joaquin mainstem into the head of Old River will not experience an increased transit time towards the fish salvage facilities.

DSM2 channel locations information

Figure A4. Highlighted DSM2 channels by Delta Strata.

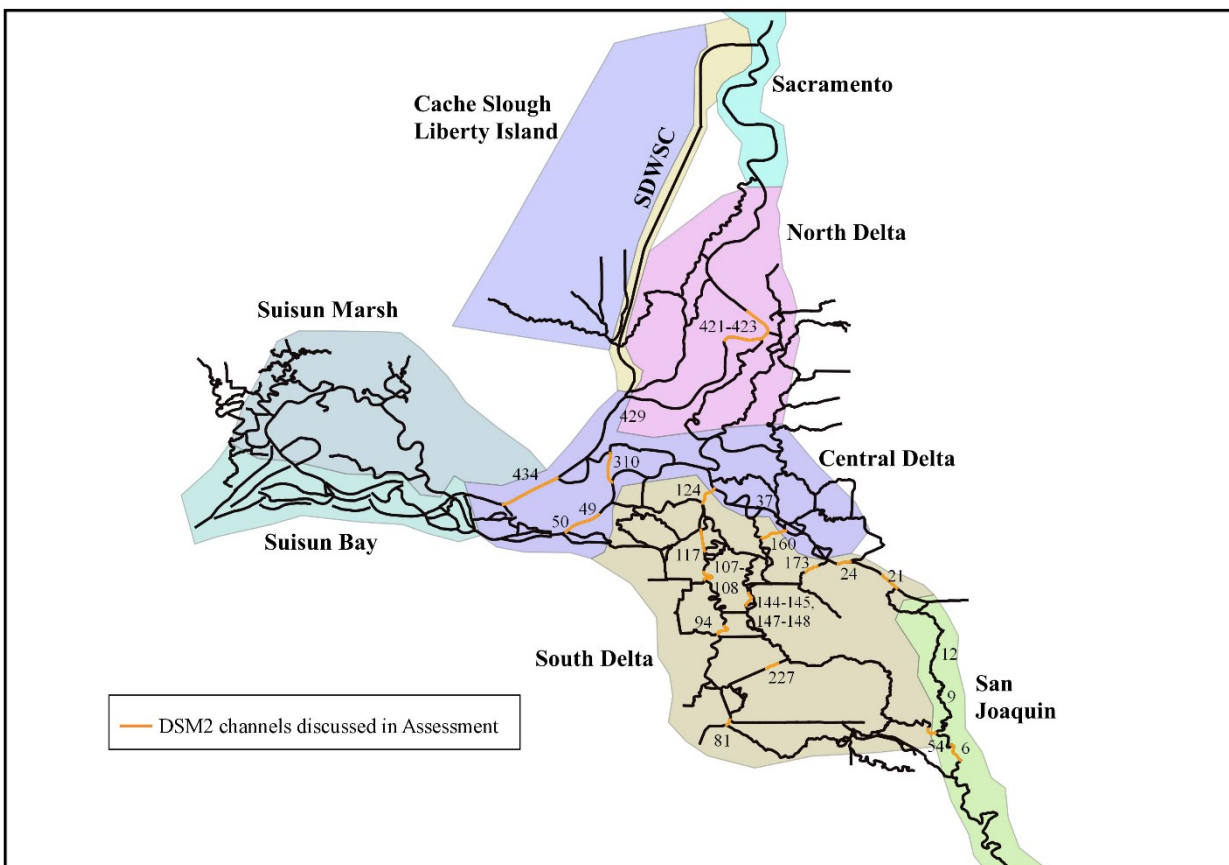


Table A1. Description of channel location, by Delta Strata region. Not all listed channels have model results presented in every weekly Proposed Action Assessment.

DSM2 Channel	Description
North Delta into Interior and Central Delta	
CHAN049	San Joaquin River at Sherman Island
CHAN310	Three-Mile Slough
CHAN421	Sacramento River at Delta Cross Channel
CHAN422	Sacramento River at Delta Cross Channel
CHAN423	Sacramento River at Delta Cross Channel
CHAN434	Sacramento River at Sherman Island
San Joaquin River and Central Delta into South Delta	
CHAN006	San Joaquin River at Head of Old River (HOR)
CHAN021	San Joaquin River downstream from confluence with Calaveras River
CHAN024	San Joaquin River upstream of Turner Cut
CHAN054	Old River at confluence with San Joaquin River (HOR)
CHAN107	Old River north of Rock Slough
CHAN117	Old River south of Franks Tract
CHAN124	Old River between Franks Tract and San Joaquin River
CHAN160	Columbia Cut
CHAN173	Turner Cut
South Delta into Facilities	
CHAN148	Middle River
CHAN227	Victoria Canal
CHAN081	Grant Line Canal
CHAN094	Old River

5/11/2021 Meeting

Background

<i>Process</i>	
Weekly process	<ul style="list-style-type: none"> • DSM2 model runs use a historic and forecasted hydrological input dataset with no assumptions provided by DWR Thursdays and updated by Reclamation Mondays. • Input File updated Monday after initial distribution from DWR for removal of forecasted in lieu of historic input. • Reclamation provides scenarios based on expected OMR index values for the upcoming week. • DSM2 model runs produced Monday and distributed to SaMT members.
<i>Hydraulic footprint information</i>	
Baseline and Scenarios updated	5/10/2021
DSM2 modeling results range	5/11/2021 – 5/11/2021
<i>OMR index value scenarios</i>	
Baseline	-900 cfs
Scenario 1	-700 (decreasing from Baseline; Δ 200 cfs)
Scenario 2	N/A
<i>Changes between scenarios</i>	
Hydrology	No (see special considerations section below)
Delta Exports	Yes
<i>Common assumptions</i>	
DSM2 run results based on the following assumptions	<ul style="list-style-type: none"> • CCFB Gates are operating to Priority 1 throughout the forecast period. • The Delta Cross Channel gates will open from 1000 hours May 21 through 1000 hours May 24. • Suisun Marsh salinity control flashboards are in, and 2 of the Suisun Marsh Salinity Control gates are in tidal operation and 1 gate is closed for maintenance. • The Middle River ag. Barrier will be closed on May 9 with culvert flap-gates in tidal operation. • Sacramento River flow at Freeport is expected to increase from 6,200 cfs to 6,700 cfs during the forecast period (Figure A1a). • San Joaquin River flow at Vernalis is at 721 cfs at the beginning of the forecast period and is estimated to increase to 1,750 cfs (Figure A1b). <p>Clifton Court Forebay and Tracy Pumping Plant pumping is shown for model runs in Figure A2.</p>

5/11/2021 Meeting

Background (continued)

<i>Additional information</i>	
Considerations for current DSM2 model run	<ul style="list-style-type: none">• This week there was no Scenario 2 modeled. The more negative expected OMR Index Value (see Operations Outlook document) could not be reached without a change in hydrology.• Actual SWP maintenance outage: not captured accurately, no mechanism to separate both Banks and CCF individually.
Caveats	<ul style="list-style-type: none">• Time-step: DSM2 generates results at 15-minute time-steps. Visualizations of DSM2 model run results are aggregated over daily timesteps. Operations function on a more granular scale than daily time-step.▪ Salmonid behavior: DSM2 provides flow fields which salmonids may encounter but salmonids are not neutrally buoyant particles. Models which incorporate behavior from acoustic tagged salmonids are being developed for South Delta (ePTM, ecoPTM).

DSM2 model results: figures

Figure A1a-b. Daily forecasted Freeport and Vernalis flows (cfs)

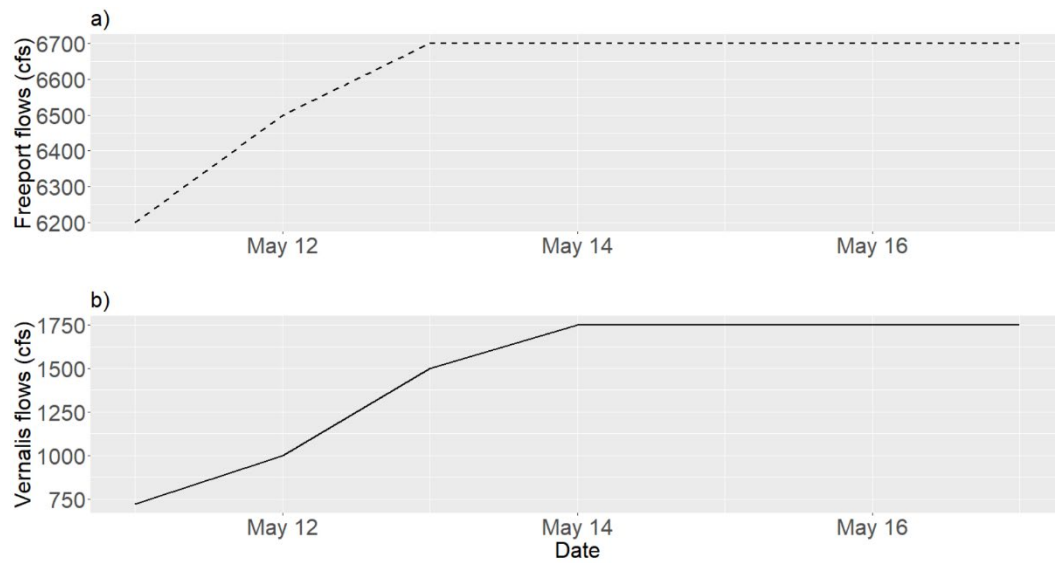
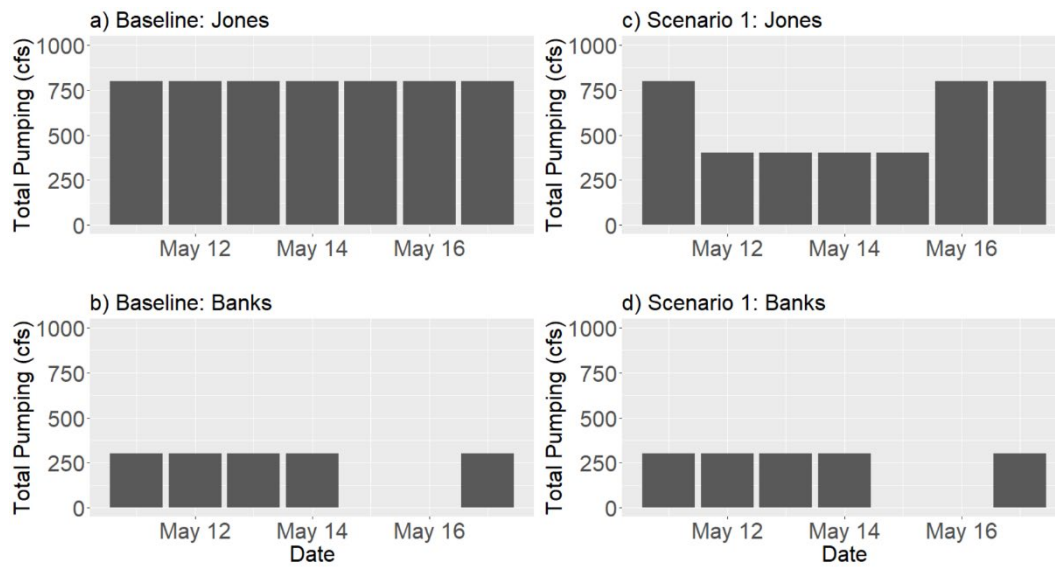


Figure A2. Daily forecasted pumping: Jones and Banks (cfs): Baseline and Scenario 1.



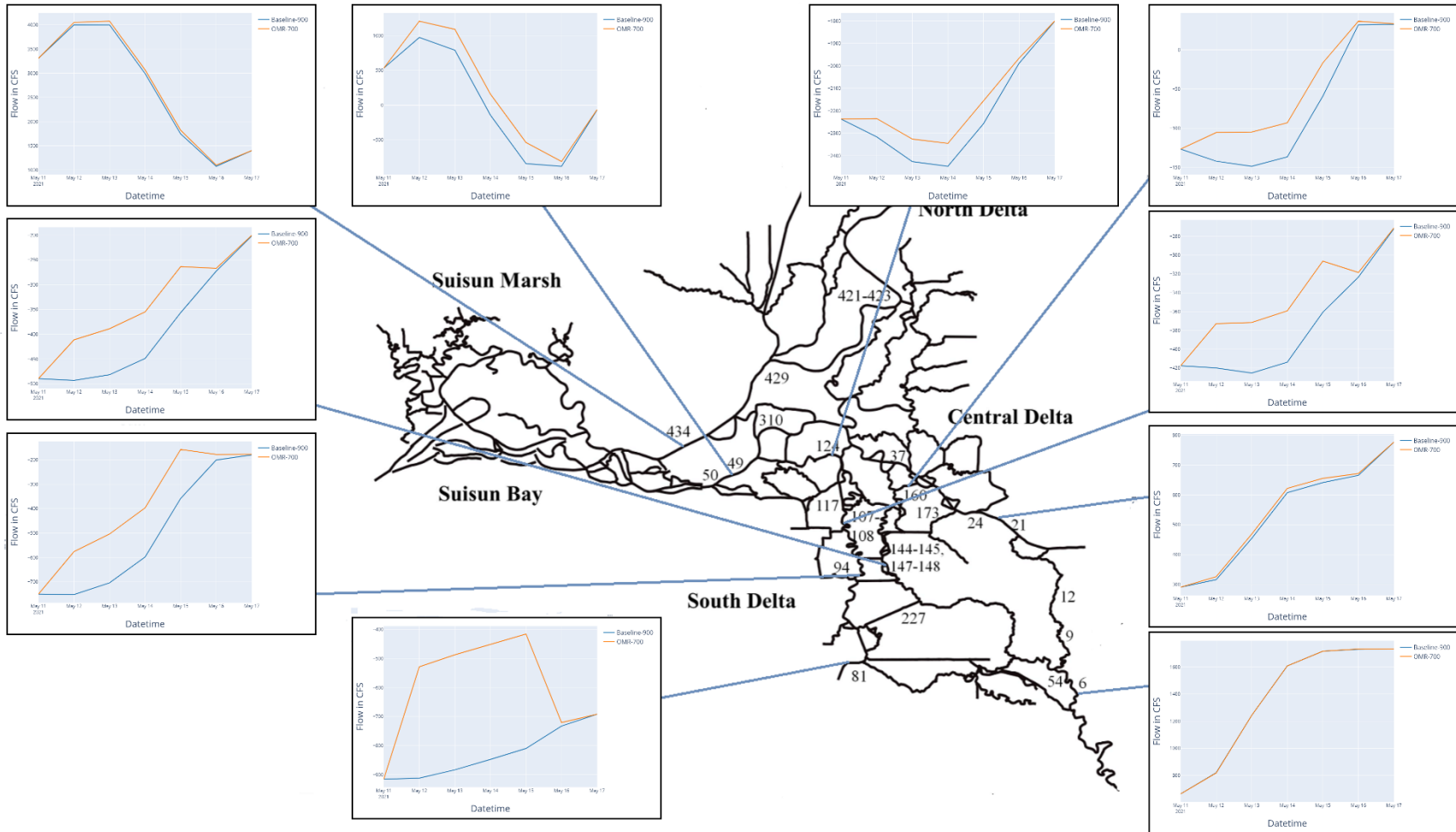
DSM2 model results: summary tables

Table A1. Summary of minimum, maximum, mean, and percent positive flows (cfs) and velocities (ft/s) by DSM2 channel for OMR scenarios over a 6 day time period. For scenario values refer to “Hydraulic Footprint Information” in the conditions / assumptions section above.

Scenario (cfs)	DSM2 Channel	Flow Min.	Flow Max.	Flow Mean	Flow % Positive	Velocity Min.	Velocity Max.	Velocity Mean	Velocity % Positive
Baseline	6	-725	2352	1359	93	-0.4	1.3	0.7	93
Scenario 1	6	-725	2355	1359	93	-0.4	1.3	0.7	93
Baseline	21	-7010	6819	534	52	-0.5	0.5	0.0	52
Scenario 1	21	-7010	6831	543	52	-0.5	0.5	0.0	52
Baseline	49	-138542	139088	85	50	-1.7	1.8	0.0	50
Scenario 1	49	-138542	139283	258	50	-1.7	1.8	0.0	50
Baseline	81	-3771	1807	-830	46	-1.0	0.5	-0.2	46
Scenario 1	81	-3727	2176	-605	48	-1.0	0.6	-0.2	48
Baseline	94	-12191	10322	-515	49	-1.6	1.5	0.0	49
Scenario 1	94	-12191	10467	-400	50	-1.6	1.5	0.0	50
Baseline	107	-5555	4280	-378	49	-1.5	1.2	-0.1	49
Scenario 1	107	-5529	4313	-347	50	-1.5	1.2	-0.1	50
Baseline	124	-16383	12364	-2223	43	-0.5	0.4	-0.1	43
Scenario 1	124	-16383	12418	-2164	43	-0.5	0.4	-0.1	43
Baseline	148	-7468	6145	-396	50	-0.8	0.7	0.0	50
Scenario 1	148	-7447	6212	-343	50	-0.8	0.7	0.0	50

Scenario (cfs)	DSM2 Channel	Flow Min.	Flow Max.	Flow Mean	Flow % Positive	Velocity Min.	Velocity Max.	Velocity Mean	Velocity % Positive
Baseline	160	-4383	3549	-83	51	-0.5	0.5	0.0	51
Scenario 1	160	-4383	3578	-59	51	-0.5	0.5	0.0	51
Baseline	434	-146962	151685	2725	51	-1.7	1.8	0.1	51
Scenario 1	434	-146962	151712	2769	51	-1.7	1.8	0.1	51

Figure A3: Spatial representation of DSM2 modeled flow by channel. Refer to figures A4 to A13 for more detail.



The following captions apply to the time-series plots for flow and velocity in selected locations (see Figure A14 and Table A3 for channel location information) below:

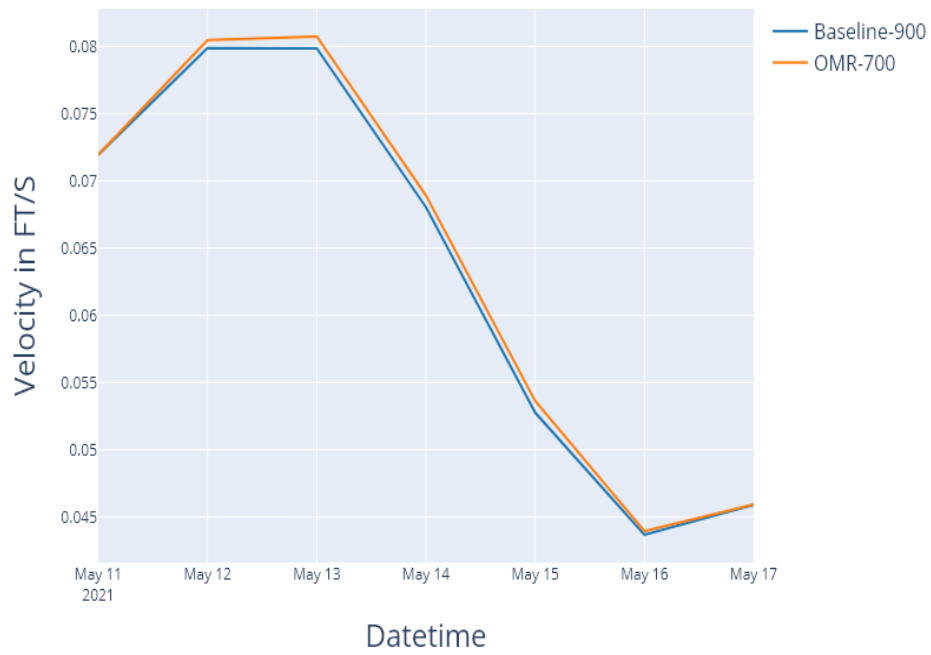
- (g) Time-series plot (1-day aggregated): Baseline, Scenario 1 OMR, and Scenario 2 OMR. X-axis represents daily time steps and y-axis represents flow (cfs) values. For Baseline, Scenario 1, and Scenario 2 values refer to “Hydraulic Footprint Information” in the section above. Reported summary statistics (minimum, maximum, etc.) are found in Table A1.
- (h) Time-series plot (1-day aggregated): Baseline, Scenario 1 OMR, and Scenario 2 OMR. X-axis represents daily time steps and y-axis represents velocity (cfs) values. For Baseline, Scenario 1, and Scenario 2 values refer to “Hydraulic Footprint Information” in the section above. Reported summary statistics (minimum, maximum, etc.) are found in Table A1.

Figures here

Figure A4: Sacramento River at Sherman Island (CHAN434)

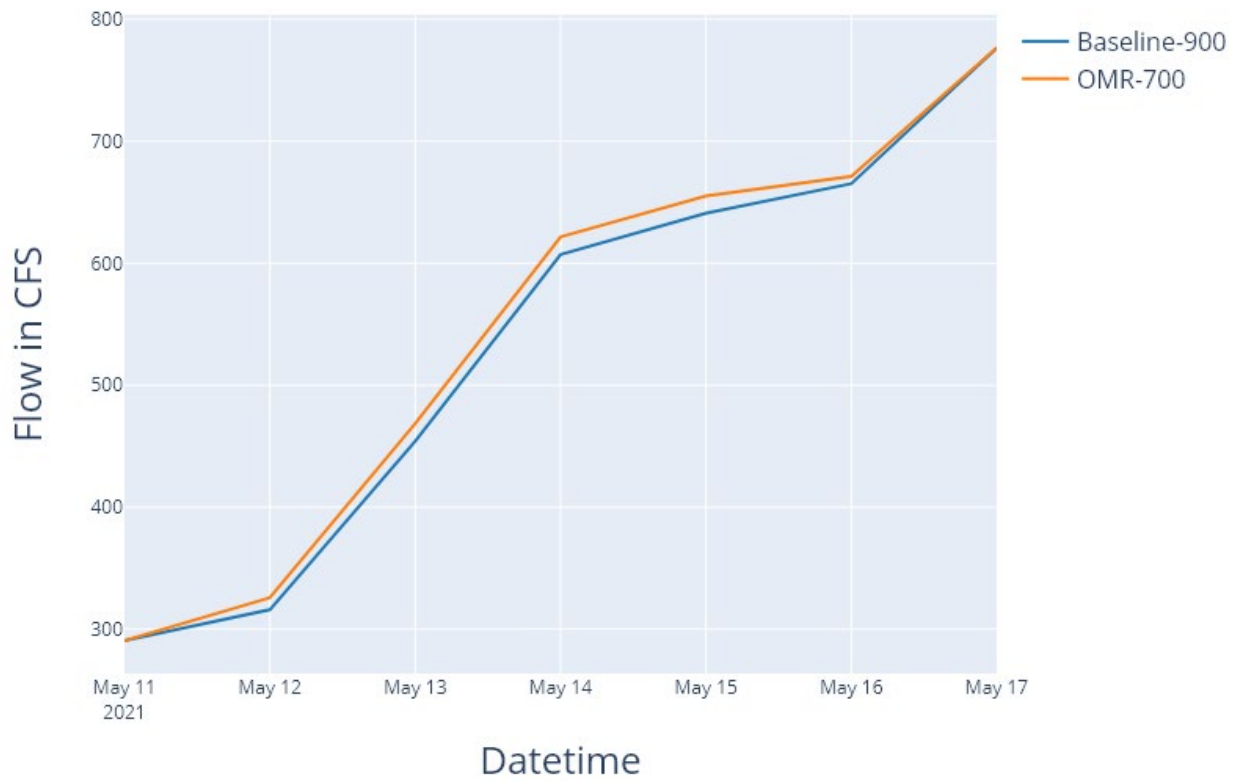


a.

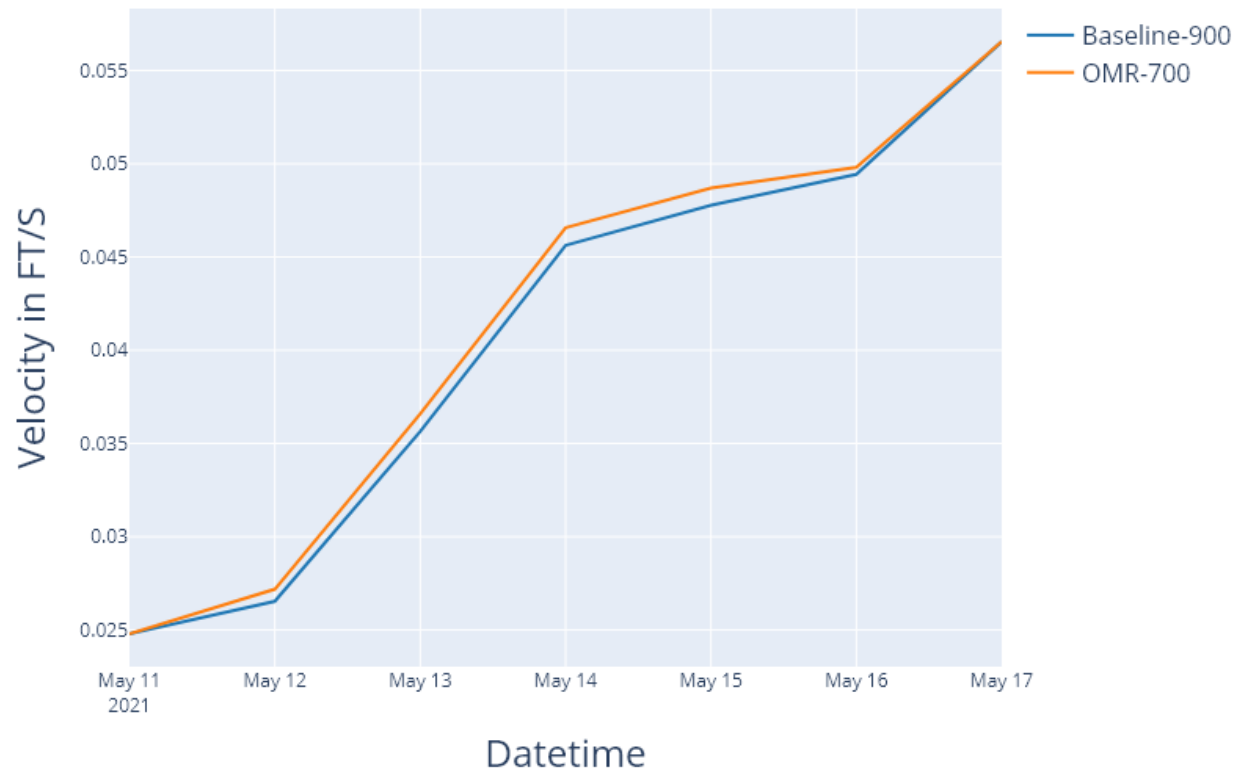


b.

Figure A5: San Joaquin River downstream of confluence with Calaveras River (CHAN021)



a.

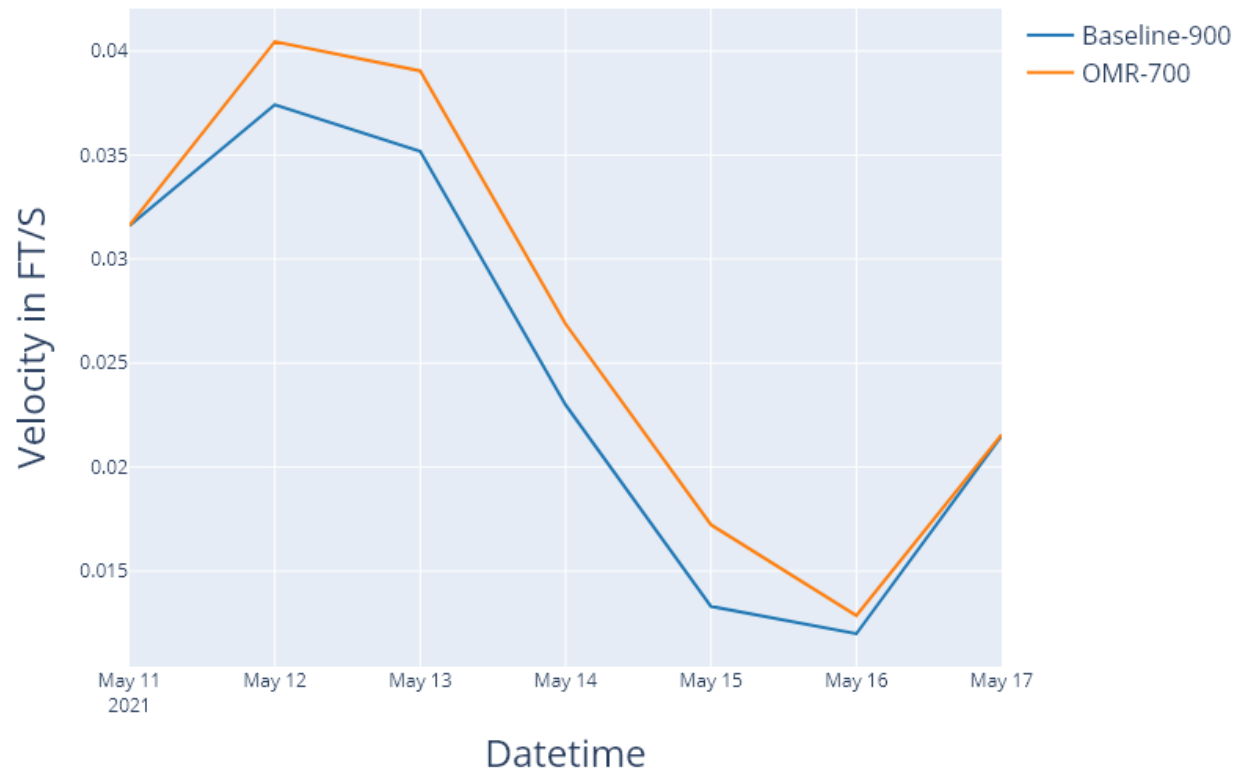


b.

Figure A6: San Joaquin River at Sherman Island (CHAN049)

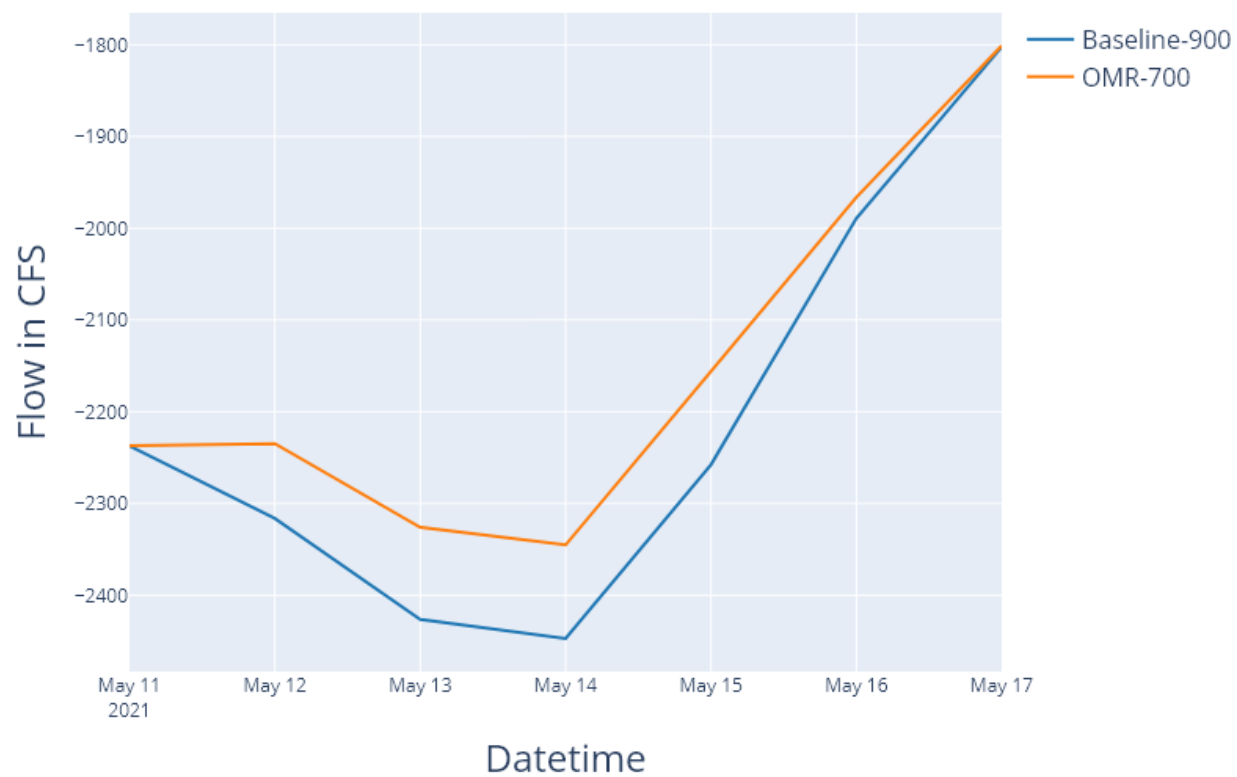


a.

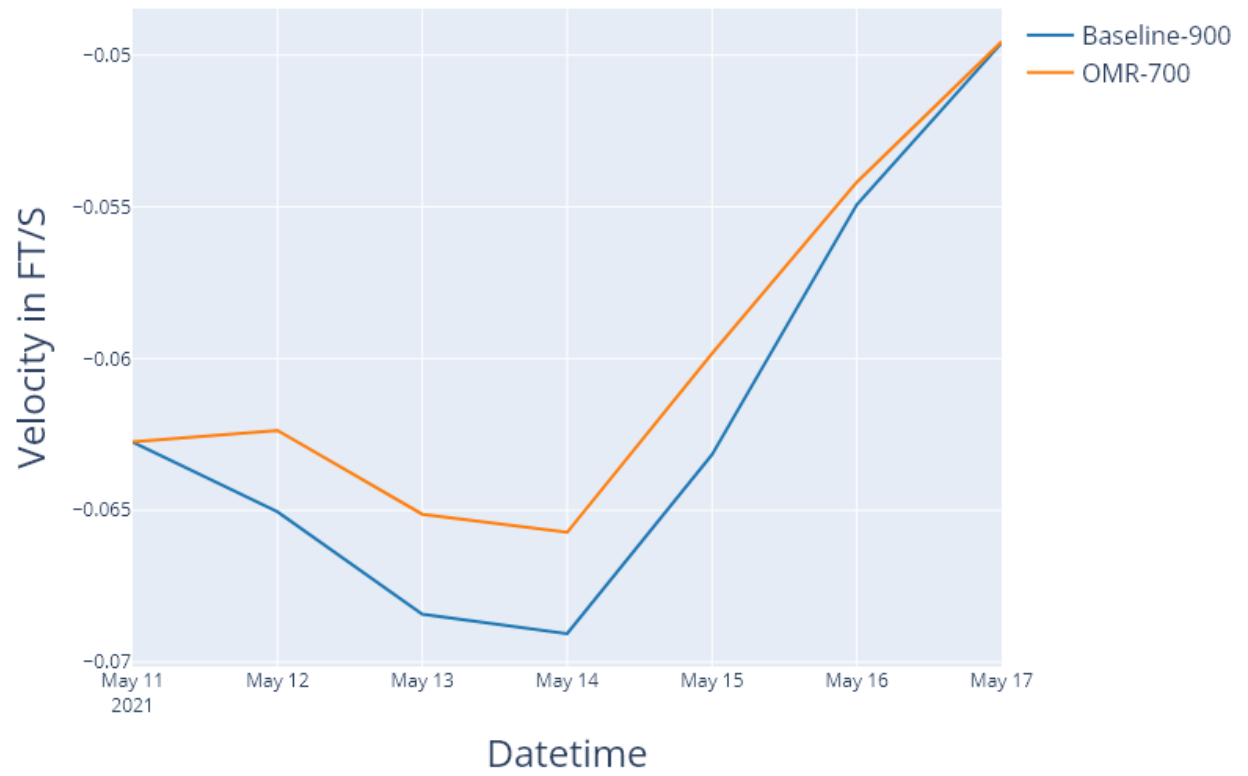


b.

Figure A7: Old River between Franks Tract and San Joaquin River (CHAN124)

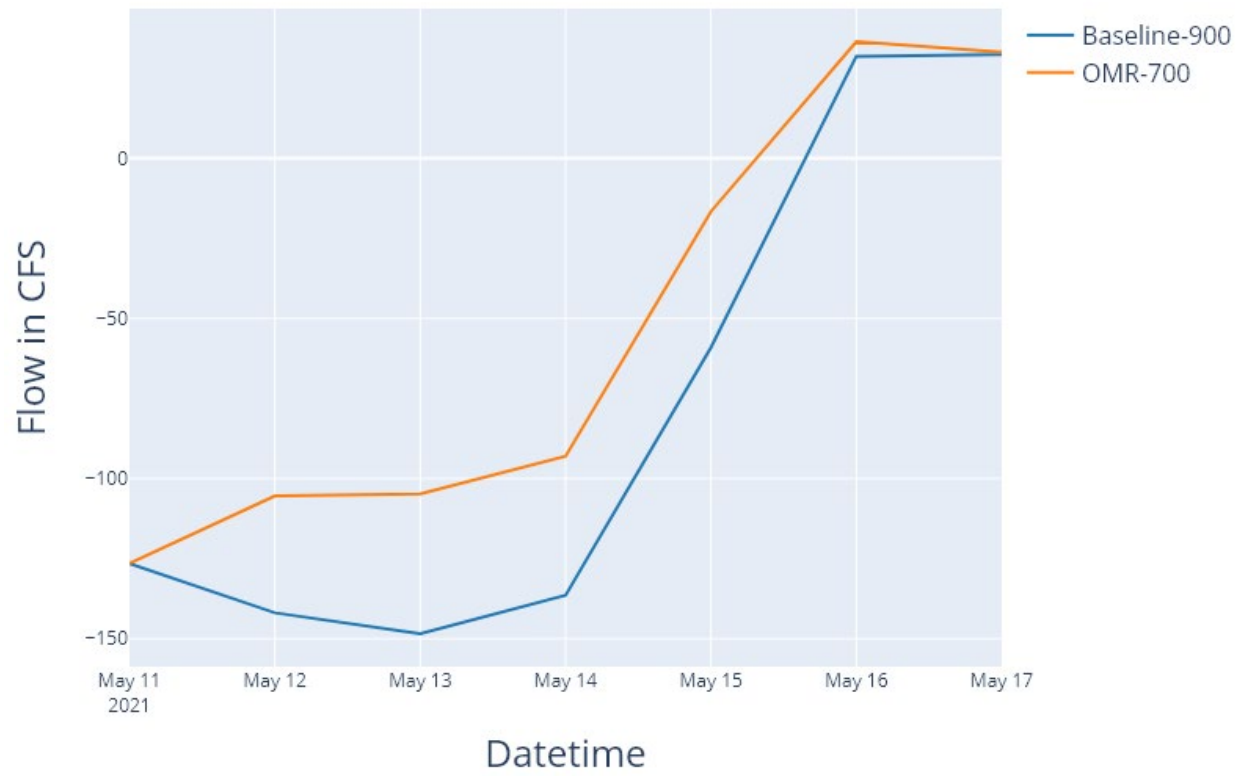


a.

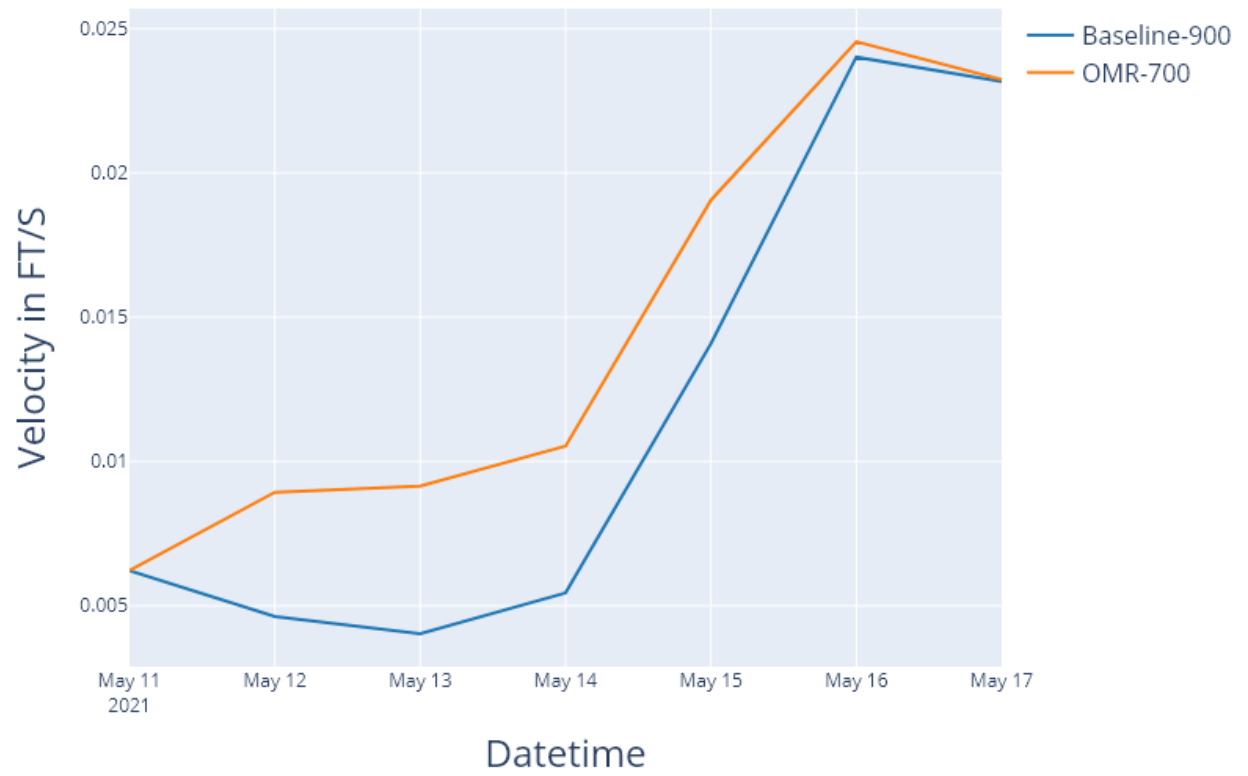


b.

Figure A8: Lower San Joaquin River at Columbia Cut (CHAN160)

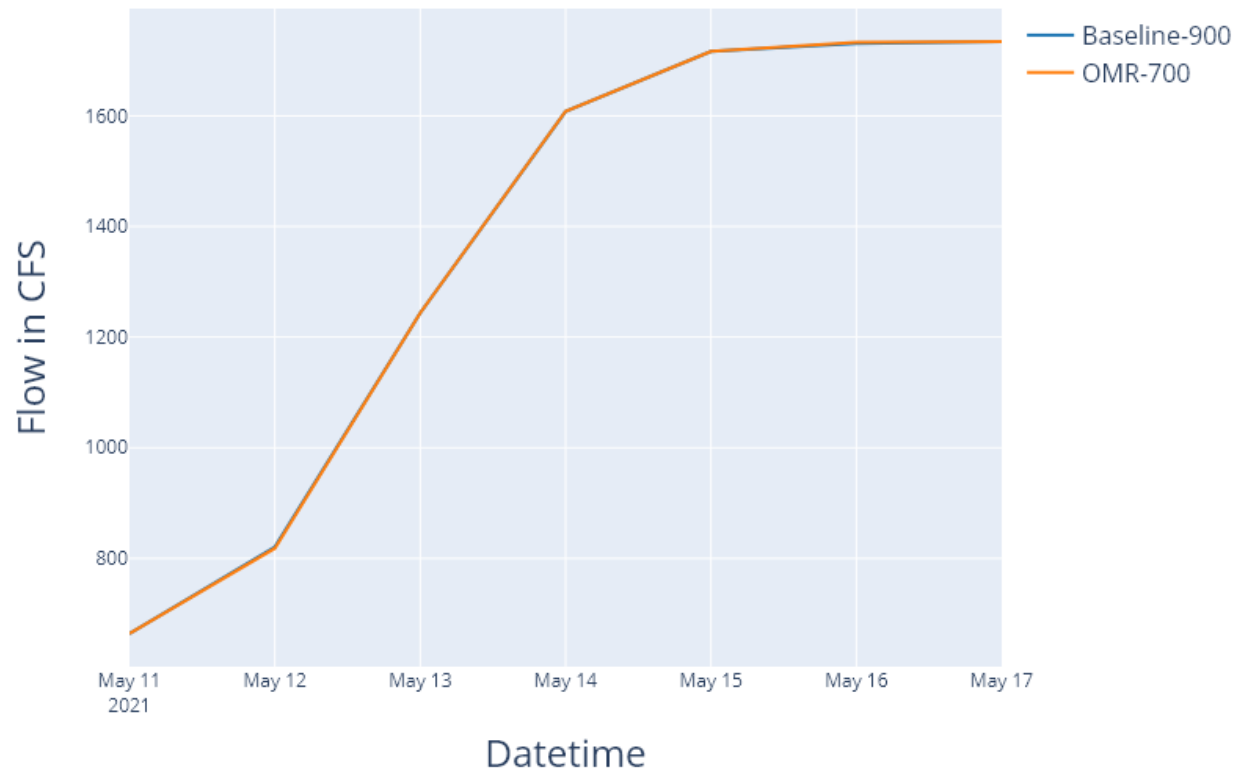


a.

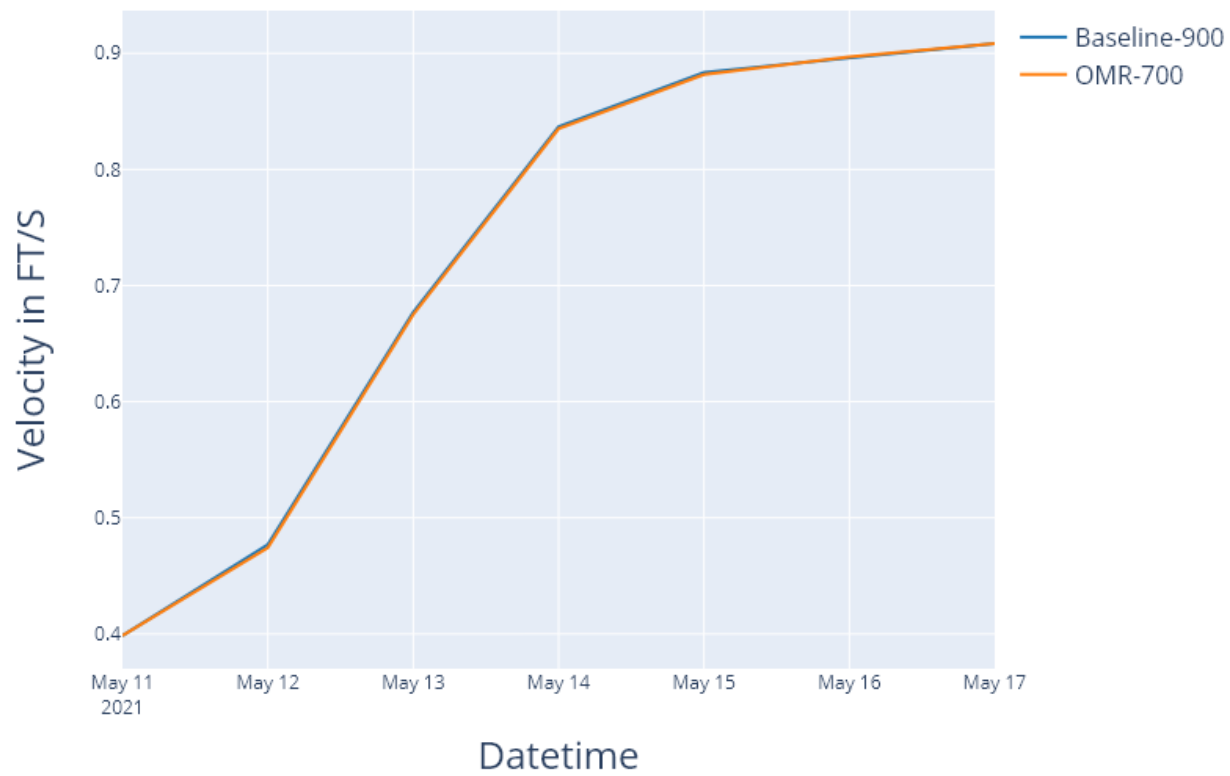


b.

Figure A9: Slightly upstream of Head of Old River (CHAN006)



a.



b.

Figure A10: Old River adjacent to Grant Line Canal (CHAN081 – Old River between Grant Line and CVP)

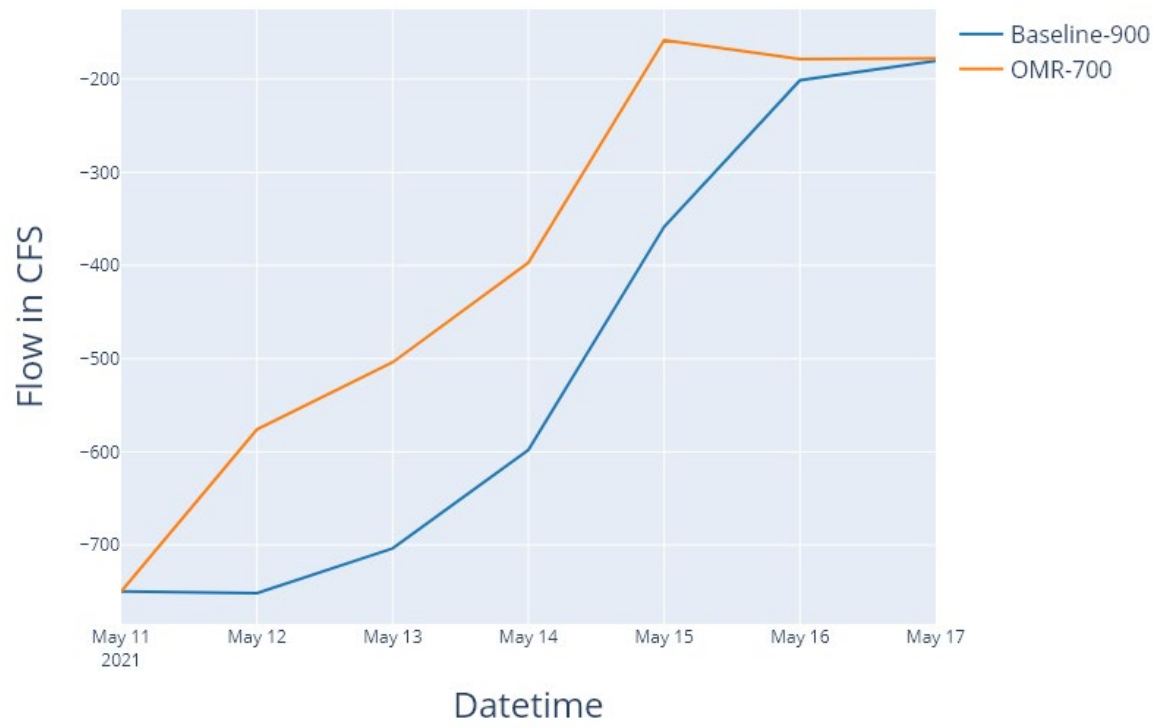
a. b.



b.



Figure A11: South Delta along Old River (CHAN094 – Old River/HW4)



a.

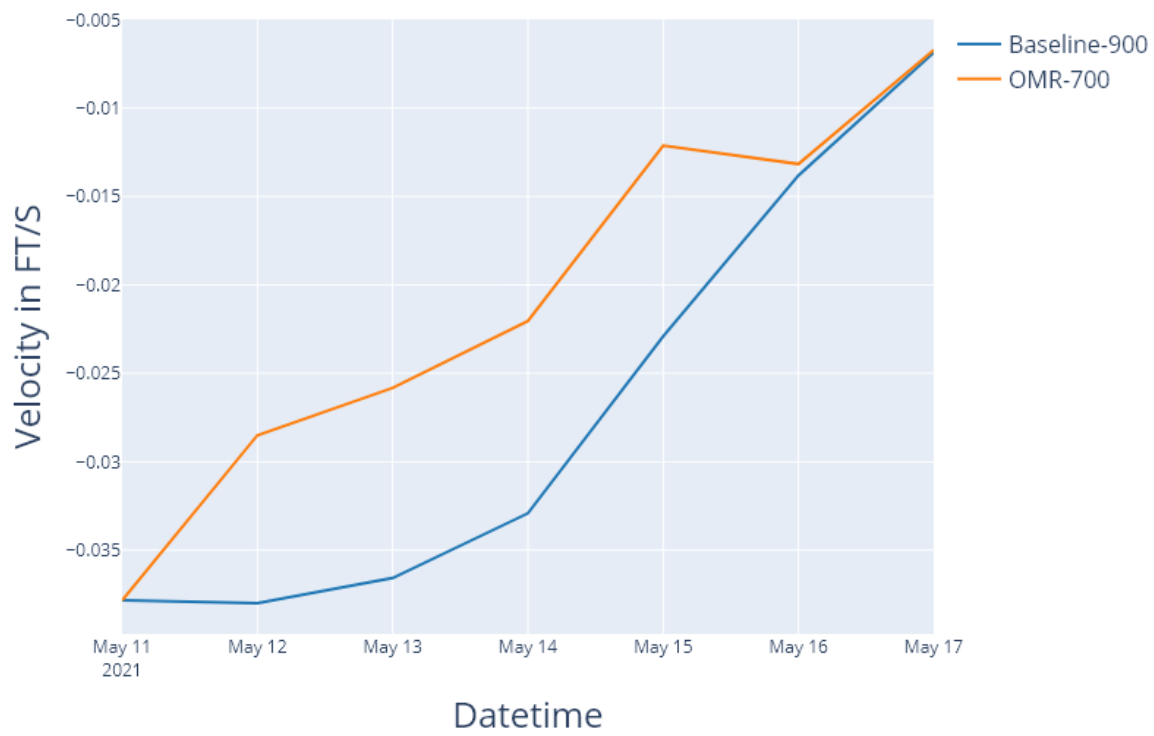


b.

Figure A12: South Delta along Middle River (CHAN148 – Middle River/ Woodward Cut)

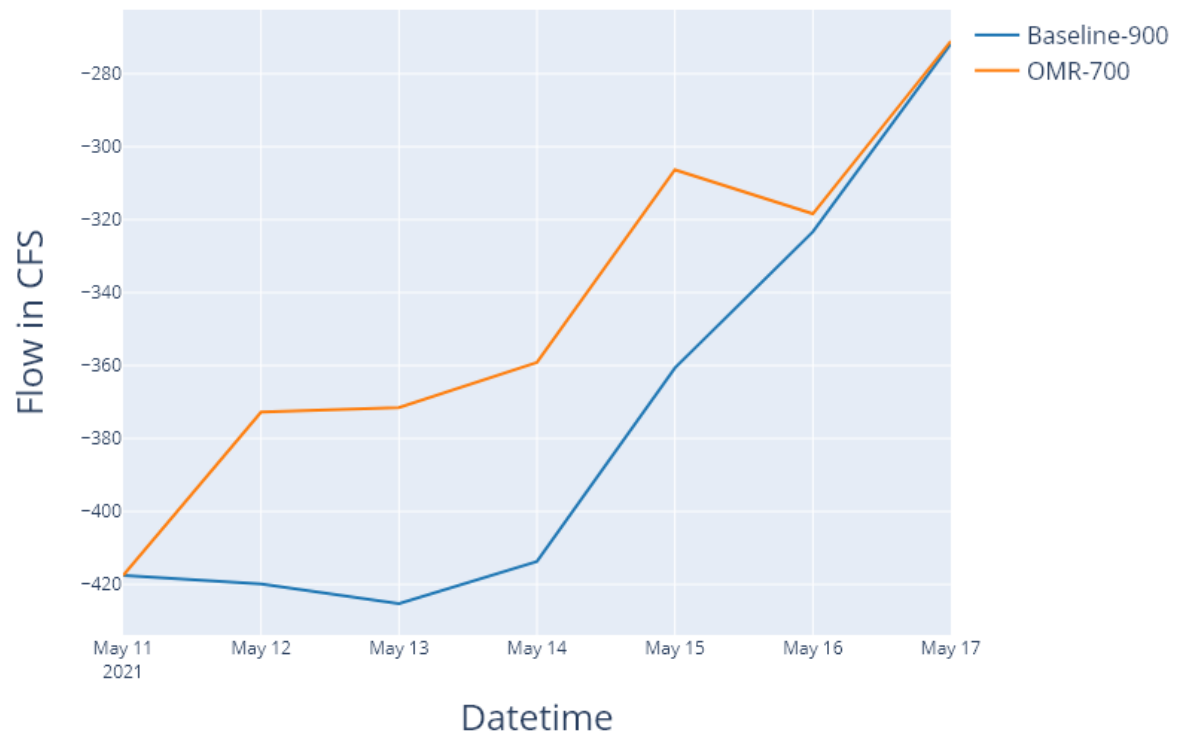


a.

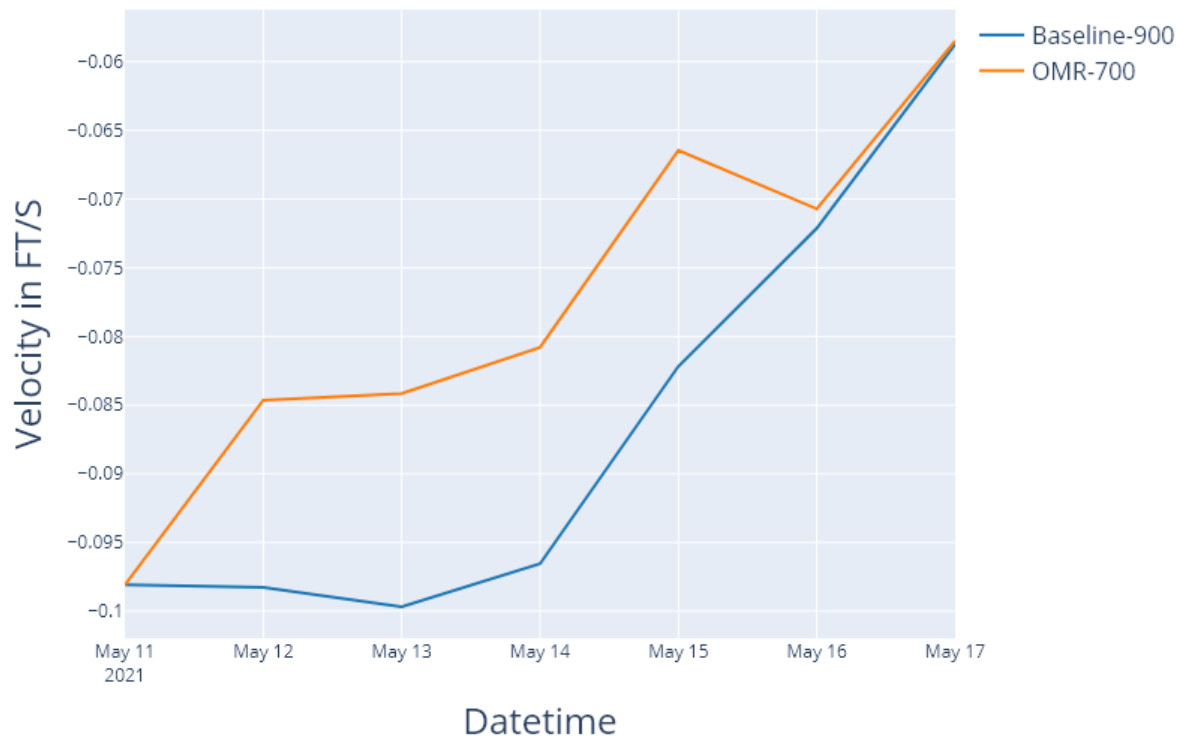


b.

Figure A13: South Delta along Middle River (CHAN107 – Old River-Bacon Isl.)



a.



b.

DSM2 model interpretation entrainment in Delta strata regions

North Delta into Interior and Central Delta

Channels: 49 and 434

No to low measurable changes to flow and velocity between modeled OMR scenarios are anticipated. It is unlikely that listed salmonids would experience behavioral changes between modeled OMR scenarios this week. Cumulative net flows will be positive in magnitude becoming more negative towards the end of the modeled period coincident with neap tides.

San Joaquin River and Central Delta into South Delta

Channels: 6, 21, 107, 124, and 160

No to low measurable changes to flow and velocity between modeled OMR scenarios are anticipated. Based on recent survey data, listed salmonids are present. It's unlikely that hydrological changes will be detectable by fish. Cumulative net flows will be positive in magnitude due to Goodwin releases. Fish moving through the San Joaquin may experience decreased transit times.

South Delta into facilities

Channels: 81, 94, and 148

Low measurable changes to flow and velocity between modeled OMR scenarios are anticipated largely driven by differences in pumping rates between scenarios. Based on recent survey data, listed salmonids are present. It's unlikely that hydrological changes will be detectable by fish. Cumulative net flows within the channels of the South Delta are positive in magnitude and fish moving from the San Joaquin mainstem into the head of Old River will have a decreased transit time towards the fish salvage facilities.

DSM2 channel locations information

Figure A14. Highlighted DSM2 channels by Delta Strata.

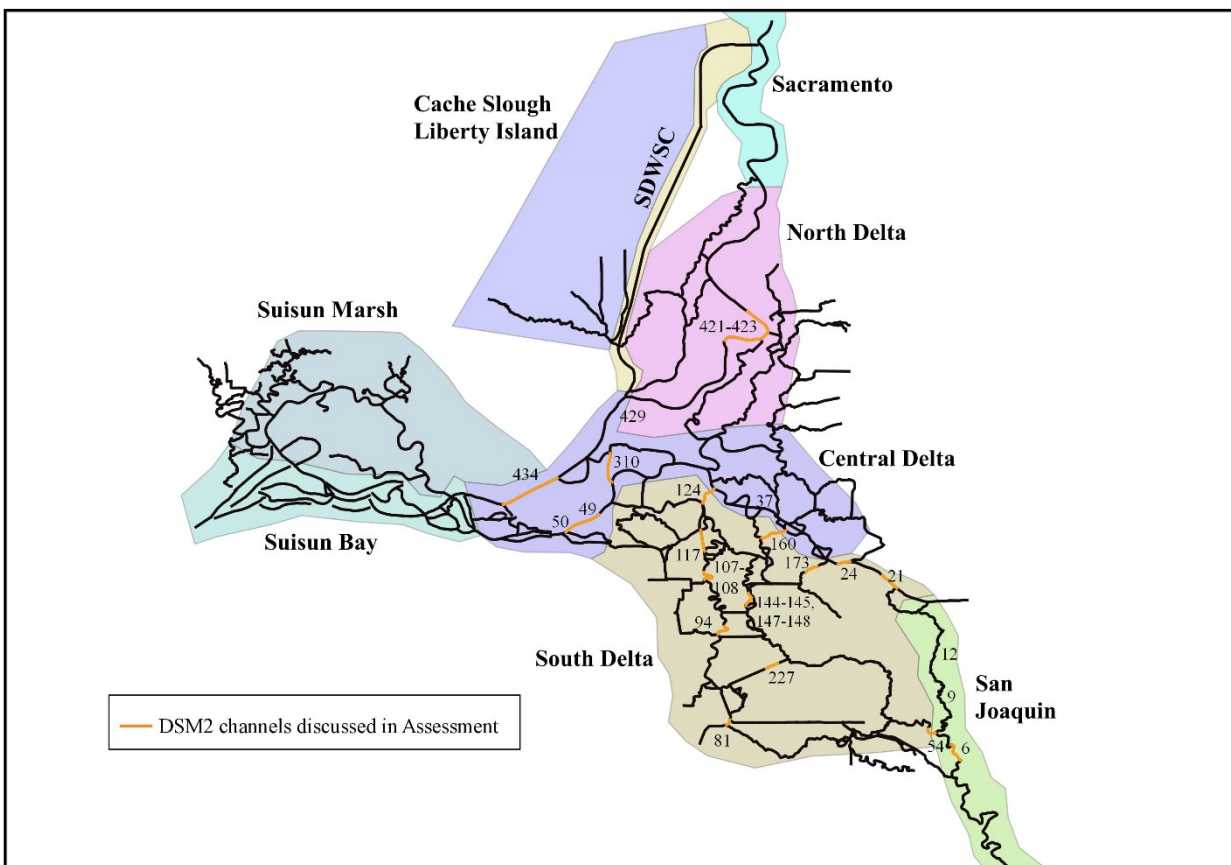


Table A2. Description of channel location, by Delta Strata region. Not all listed channels have model results presented in every weekly Proposed Action Assessment.

DSM2 Channel	Description
North Delta into Interior and Central Delta	
CHAN049	San Joaquin River at Sherman Island
CHAN310	Three-Mile Slough
CHAN421	Sacramento River at Delta Cross Channel
CHAN422	Sacramento River at Delta Cross Channel
CHAN423	Sacramento River at Delta Cross Channel
CHAN434	Sacramento River at Sherman Island
San Joaquin River and Central Delta into South Delta	
CHAN006	San Joaquin River at Head of Old River (HOR)
CHAN021	San Joaquin River downstream from confluence with Calaveras River
CHAN024	San Joaquin River upstream of Turner Cut
CHAN054	Old River at confluence with San Joaquin River (HOR)
CHAN107	Old River north of Rock Slough
CHAN117	Old River south of Franks Tract
CHAN124	Old River between Franks Tract and San Joaquin River
CHAN160	Columbia Cut
CHAN173	Turner Cut
South Delta into Facilities	
CHAN148	Middle River
CHAN227	Victoria Canal
CHAN081	Grant Line Canal
CHAN094	Old River

5/18/2021 Meeting

Background

<i>Process</i>	
Weekly process	<ul style="list-style-type: none"> • DSM2 model runs use a historic and forecasted hydrological input dataset with no assumptions provided by DWR Thursdays and updated by Reclamation Mondays. • Input File updated Monday after initial distribution from DWR for removal of forecasted in lieu of historic input. • Reclamation provides scenarios based on expected OMR index values for the upcoming week. • DSM2 model runs produced Monday and distributed to SaMT members.
<i>Hydraulic footprint information</i>	
Baseline and Scenarios updated	5/17/2021
DSM2 modeling results range	5/18/2021 – 5/25/2021
<i>OMR index value scenarios</i>	
Baseline	-1,200 cfs
Scenario 1	N/A
Scenario 2	N/A
<i>Changes between scenarios</i>	
Hydrology	No (see special considerations section below)
Delta Exports	Yes

5/18/2021 Meeting

Background (continued)

<i>Common assumptions</i>	
DSM2 run results based on the following assumptions	<ul style="list-style-type: none"> • CCFB Gates are operating to Priority 1 throughout the forecast period. • The Delta Cross Channel gates are currently closed by will be open during the weekends beginning May 28. • Suisun Marsh salinity control flashboards are in, and 1 of the Suisun Marsh Salinity Control gates are in tidal operation and remaining 2 gated are closed for maintenance. • The Middle River ag. barrier is scheduled to be closed with all the culvert flap-gates in tidal operation by May 15. • The Old River at Tracy ag. barrier is scheduled to be closed with all the culvert flap-gates in tidal operation by May 29. • The Grant Line Canal ag. barrier is scheduled to be closed with all the culvert flap-gates in tidal operation by May 29. • Sacramento River flow at Freeport is expected to decrease from 6,879 cfs to 6,629 cfs before slightly increasing to remain at 6,829 cfs during the latter portion of the forecast period (Figure A1a). • San Joaquin River flow at Vernalis is at 1,000 cfs at the beginning of the forecast period and is estimated to decrease to 800 cfs (Figure A1b). <p>Clifton Court Forebay and Tracy Pumping Plant pumping is shown for model runs in Figure A2.</p>
<i>Additional information</i>	
Considerations for current DSM2 model run	<ul style="list-style-type: none"> • This week there was no Scenario 1 or Scenario 2 modeled. The more negative expected OMR Index Value (see Operations Outlook document) could not be reached without a change in hydrology.
Caveats	<ul style="list-style-type: none"> • Time-step: DSM2 generates results at 15-minute time-steps. Visualizations of DSM2 model run results are aggregated over daily timesteps. Operations function on a more granular scale than daily time-step. ▪ Salmonid behavior: DSM2 provides flow fields which salmonids may encounter but salmonids are not neutrally buoyant particles. Models which incorporate behavior from acoustic tagged salmonids are being developed for South Delta (ePTM, ecoPTM).

DSM2 model results: figures

Figure A1a-b. Daily forecasted Freeport and Vernalis flows (cfs)

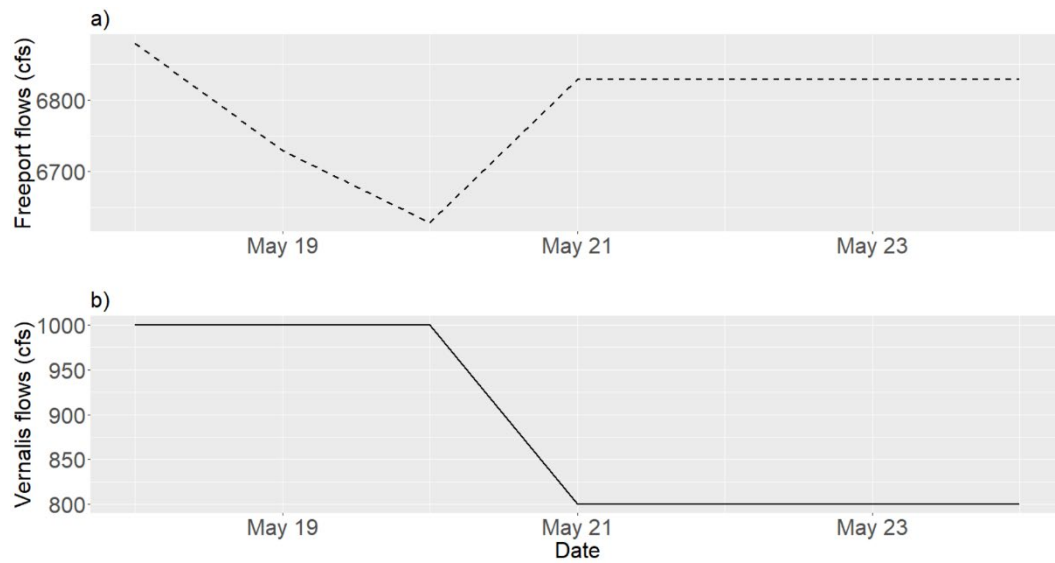
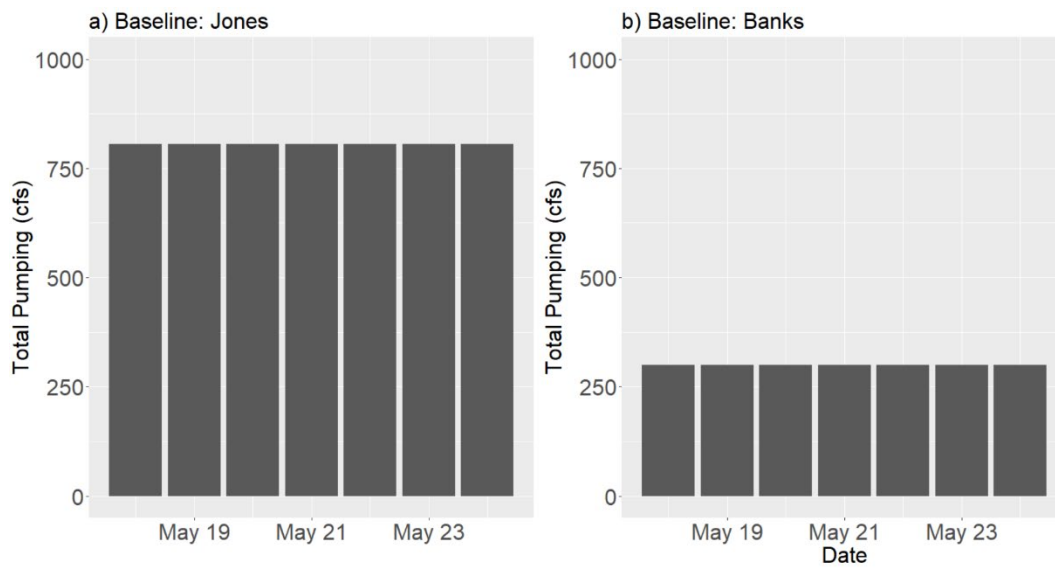


Figure A2. Daily forecasted pumping: Jones and Banks (cfs): Baseline.

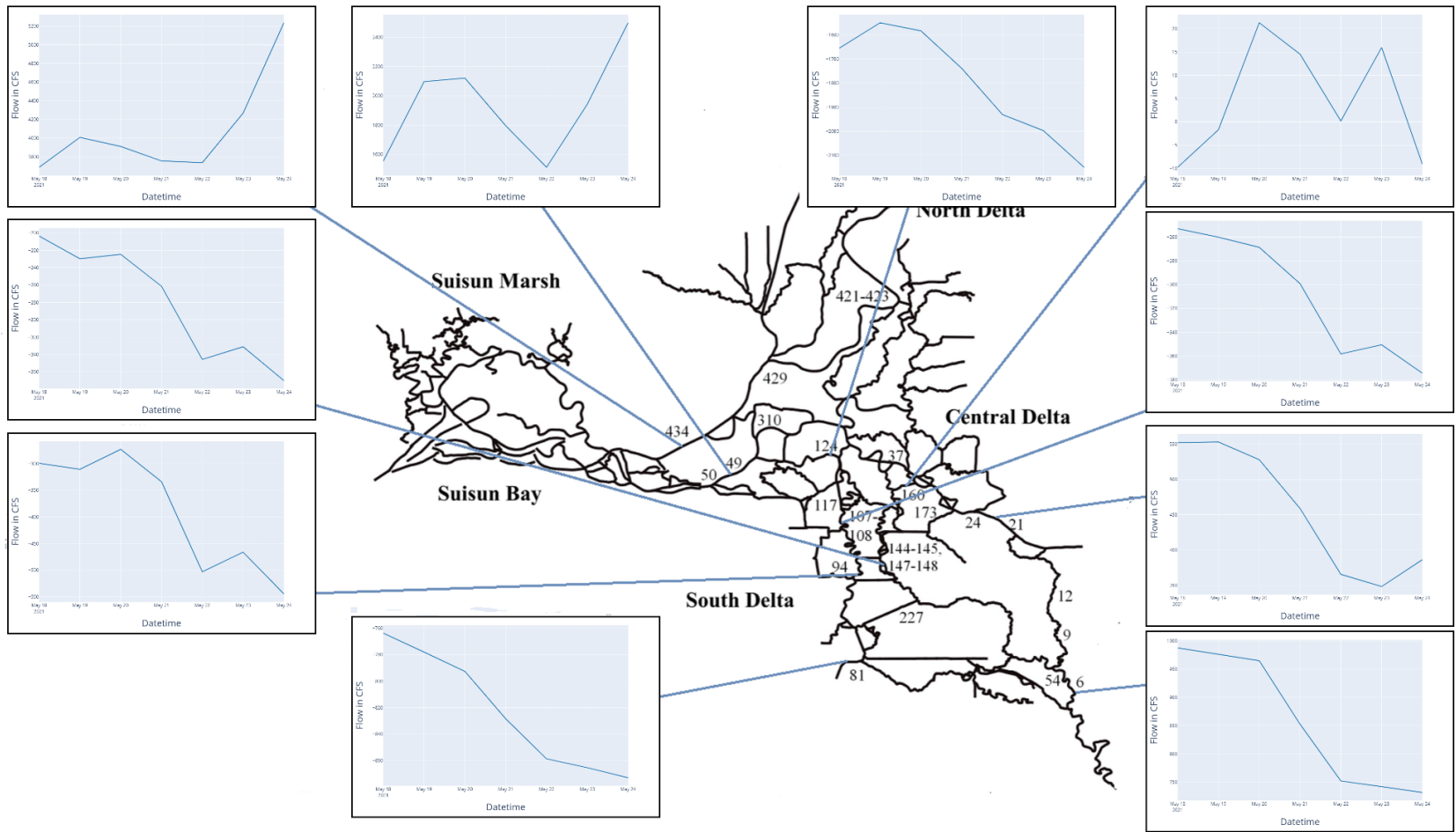


DSM2 model results: summary tables

Table A1. Summary of minimum, maximum, mean, and percent positive flows (cfs) and velocities (ft/s) by DSM2 channel for OMR scenarios over a 6 day time period. For scenario values refer to “Hydraulic Footprint Information” in the conditions / assumptions section above.

Scenario (cfs)	DSM2 Channel	Flow Min.	Flow Max.	Flow Mean	Flow % Positive	Velocity Min.	Velocity Max.	Velocity Mean	Velocity % Positive
Baseline	6	-689.6	1651.6	858.9	90	-0.3	1.1	0.5	90
Baseline	21	-8245.1	6641.1	444.8	55	-0.5	0.5	0.0	55
Baseline	49	-169390.1	141906.1	1677.0	53	-2.1	1.9	0.0	53
Baseline	81	-4306.5	1579.2	-825.2	47	-1.2	0.4	-0.2	47
Baseline	94	-14130.6	9878.9	-404.5	51	-1.8	1.4	0.0	51
Baseline	107	-6177.4	4140.5	-317.0	52	-1.7	1.2	-0.1	52
Baseline	124	-19400.4	12736.3	-1821.2	47	-0.6	0.4	-0.1	47
Baseline	148	-8378.0	5893.3	-290.5	52	-0.9	0.7	0.0	52
Baseline	160	-4878.5	3683.9	0.9	54	-0.5	0.5	0.0	54
Baseline	434	-183190.6	158994.0	3811.5	53	-2.0	1.9	0.1	53

Figure 10 is a map of the Suisun Marsh and Delta region, showing flow rates at various locations. The map includes labels for Suisun Marsh, Suisun Bay, North Delta, Central Delta, and South Delta. Flow rates are indicated by numbers at specific locations: 421-423, 429, 434, 310, 124, 37, 160, 173, 24, 21, 12, 9, 54, 6, 81, 227, 94, 108, 144-145, 147-148, 117, 187, 49, 50, and 12. Surrounding the map are ten line graphs showing flow in CFS over time (May 18, 2021, to May 24, 2021) for different locations. The graphs show varying trends, with some showing a sharp increase and others a decrease.



DSM2 model interpretation entrainment in Delta strata regions

North Delta into Interior and Central Delta & San Joaquin River and Central Delta into South Delta & South Delta into facilities

Channels: 6, 21, 49, 434, 107, 124, 160, 81, 94, and 148

- survey data shows listed salmonids present
- north Delta net flows become more positive in magnitude as the forecast period progresses
- other channels net flows become more negative in magnitude.
- May 20th = lowest FPT flow & beginning of decrease in VNS
- More negative OMR flows = decreased transit time for fish coming from the San Joaquin via head of Old River (related to channels close to facilities)
- tidal influence
- ag barrier presence will slow fish passage (downstream past the location of the ag barriers through the South Delta channels)

DSM2 channel locations information

Figure A4. Highlighted DSM2 channels by Delta Strata.

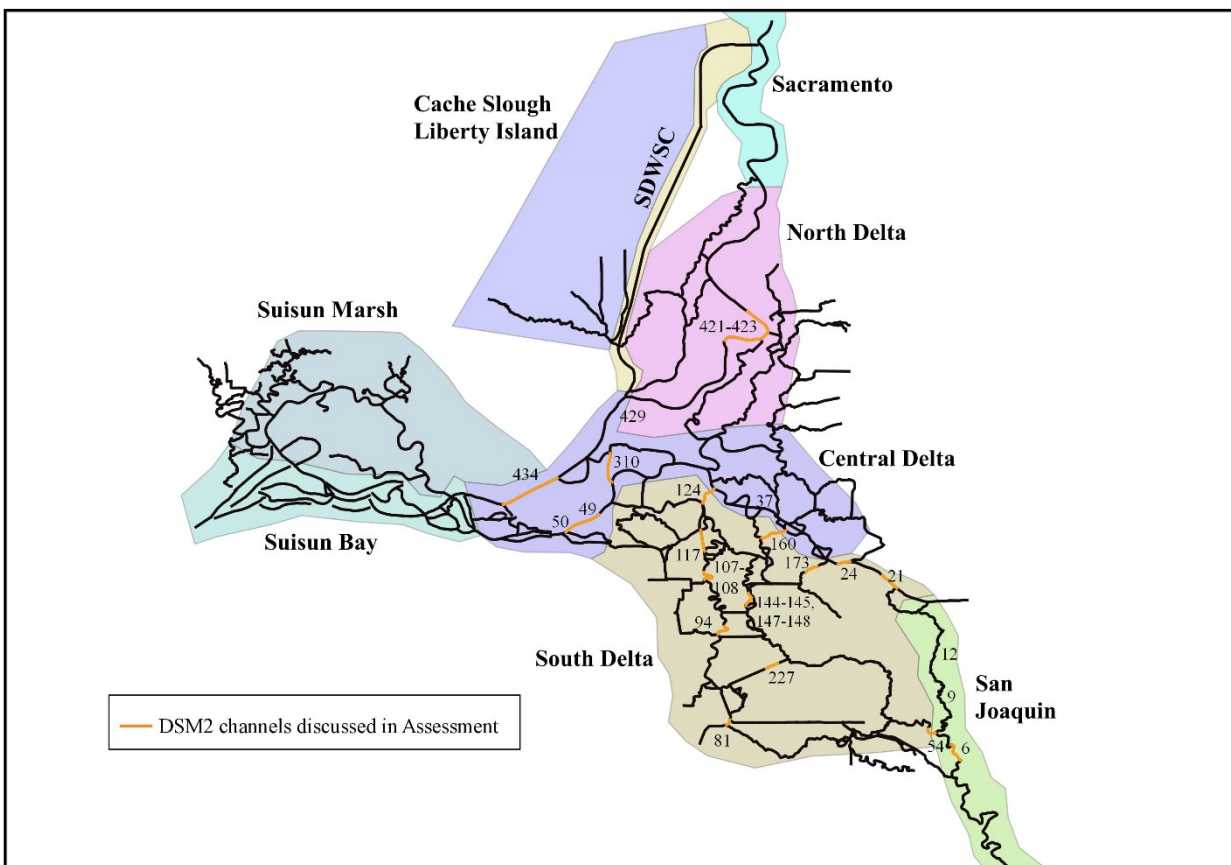


Table A2. Description of channel location, by Delta Strata region. Not all listed channels have model results presented in every weekly Proposed Action Assessment.

DSM2 Channel	Description
North Delta into Interior and Central Delta	
CHAN049	San Joaquin River at Sherman Island
CHAN310	Three-Mile Slough
CHAN421	Sacramento River at Delta Cross Channel
CHAN422	Sacramento River at Delta Cross Channel
CHAN423	Sacramento River at Delta Cross Channel
CHAN434	Sacramento River at Sherman Island
San Joaquin River and Central Delta into South Delta	
CHAN006	San Joaquin River at Head of Old River (HOR)
CHAN021	San Joaquin River downstream from confluence with Calaveras River
CHAN024	San Joaquin River upstream of Turner Cut
CHAN054	Old River at confluence with San Joaquin River (HOR)
CHAN107	Old River north of Rock Slough
CHAN117	Old River south of Franks Tract
CHAN124	Old River between Franks Tract and San Joaquin River
CHAN160	Columbia Cut
CHAN173	Turner Cut
South Delta into Facilities	
CHAN148	Middle River
CHAN227	Victoria Canal
CHAN081	Grant Line Canal
CHAN094	Old River

5/25/2021 Meeting

Background

<i>Process</i>	
Weekly process	<ul style="list-style-type: none"> • DSM2 model runs use a historic and forecasted hydrological input dataset with no assumptions provided by DWR Thursdays and updated by Reclamation Mondays. • Input File updated Monday after initial distribution from DWR for removal of forecasted in lieu of historic input. • Reclamation provides scenarios based on expected OMR index values for the upcoming week. • DSM2 model runs produced Monday and distributed to SaMT members.
<i>Hydraulic footprint information</i>	
Baseline and Scenarios updated	5/24/2021
DSM2 modeling results range	5/25/2021 – 6/1/2021
<i>OMR index value scenarios</i>	
Baseline	-1,340 cfs
Scenario 1	N/A
Scenario 2	N/A
<i>Changes between scenarios</i>	
Hydrology	No (see special considerations section below)
Delta Exports	Yes

5/25/2021 Meeting

Background (continued)

<i>Common assumptions</i>	
DSM2 run results based on the following assumptions	<ul style="list-style-type: none"> • CCFB Gates are operating to Priority 1 throughout the forecast period. • The Delta Cross Channel gates are closed, open during May 28 – June 1, open again during June 4 – 7, then open from June 11. • Suisun Marsh salinity control flashboards are in, and 2 of the Suisun Marsh Salinity Control gates are in tidal operation and 1 gated is closed for maintenance. • The Middle River ag. barrier is scheduled to be closed with all the culvert flap-gates in tidal operation by May 15. • The Old River at Tracy ag. barrier is scheduled to be closed with all the culvert flap-gates in tidal operation by May 27. • The Grant Line Canal ag. barrier is scheduled to be closed with all the culvert flap-gates in tidal operation by May 27. • Sacramento River flow at Freeport is expected to decrease from 8,000 cfs to 6,500 cfs during the latter portion of the forecast period (Figure A1a). • San Joaquin River flow at Vernalis is constant at 710 cfs during the forecast period (Figure A1b). <p>Clifton Court Forebay and Tracy Pumping Plant pumping is shown for model runs in Figure A2.</p>
<i>Additional information</i>	
Considerations for current DSM2 model run	<ul style="list-style-type: none"> • This week there was no Scenario 1 or Scenario 2 modeled. The more negative expected OMR Index Value (see Operations Outlook document) could not be reached without a change in hydrology.
Caveats	<ul style="list-style-type: none"> • Time-step: DSM2 generates results at 15-minute time-steps. Visualizations of DSM2 model run results are aggregated over daily timesteps. Operations function on a more granular scale than daily time-step. ▪ Salmonid behavior: DSM2 provides flow fields which salmonids may encounter but salmonids are not neutrally buoyant particles. Models which incorporate behavior from acoustic tagged salmonids are being developed for South Delta (ePTM, ecoPTM).

DSM2 model results: figures

Figure A1a-b. Daily forecasted Freeport and Vernalis flows (cfs)

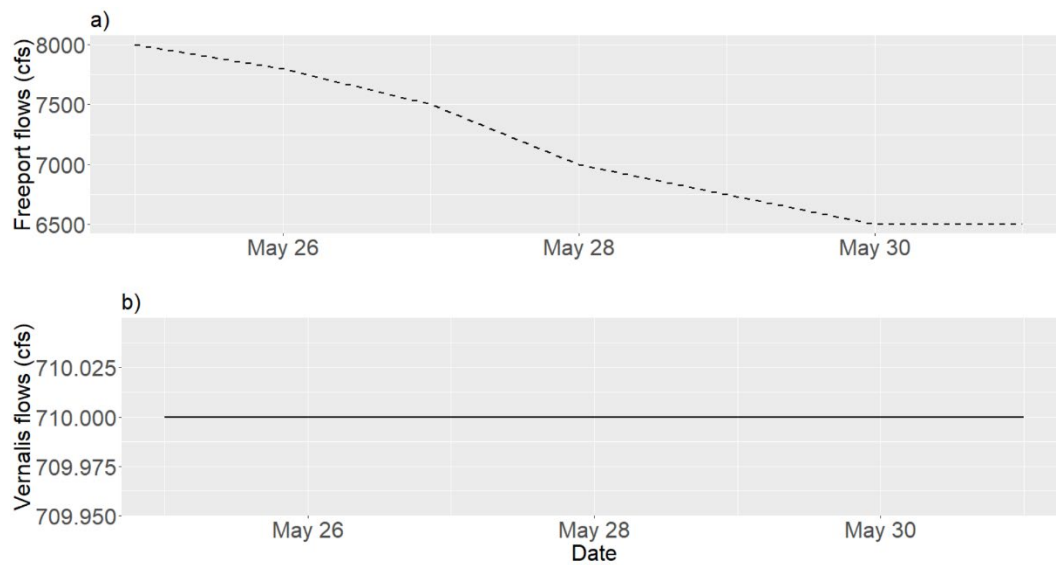
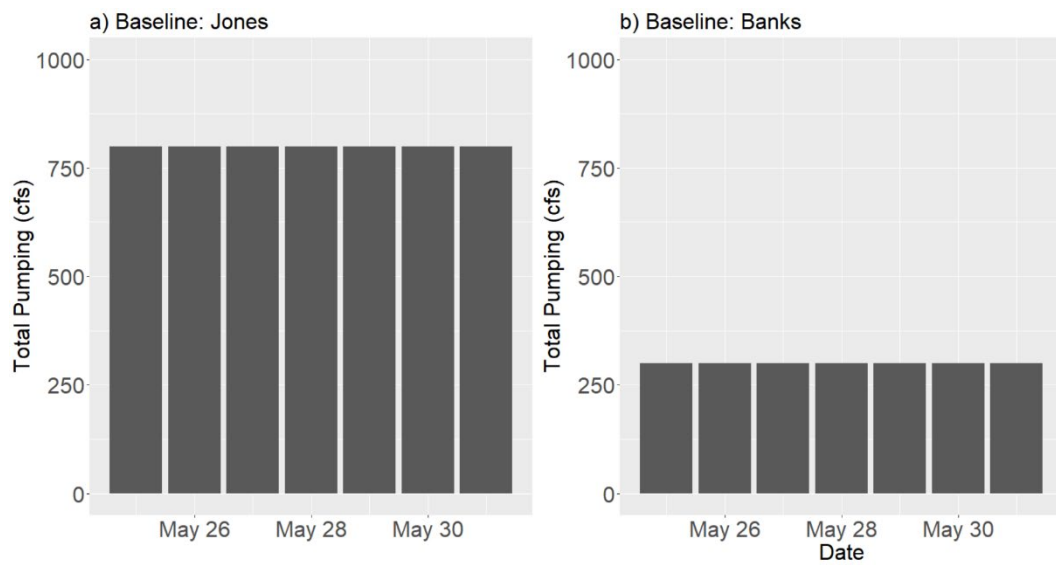


Figure A2. Daily forecasted pumping: Jones and Banks (cfs): Baseline.

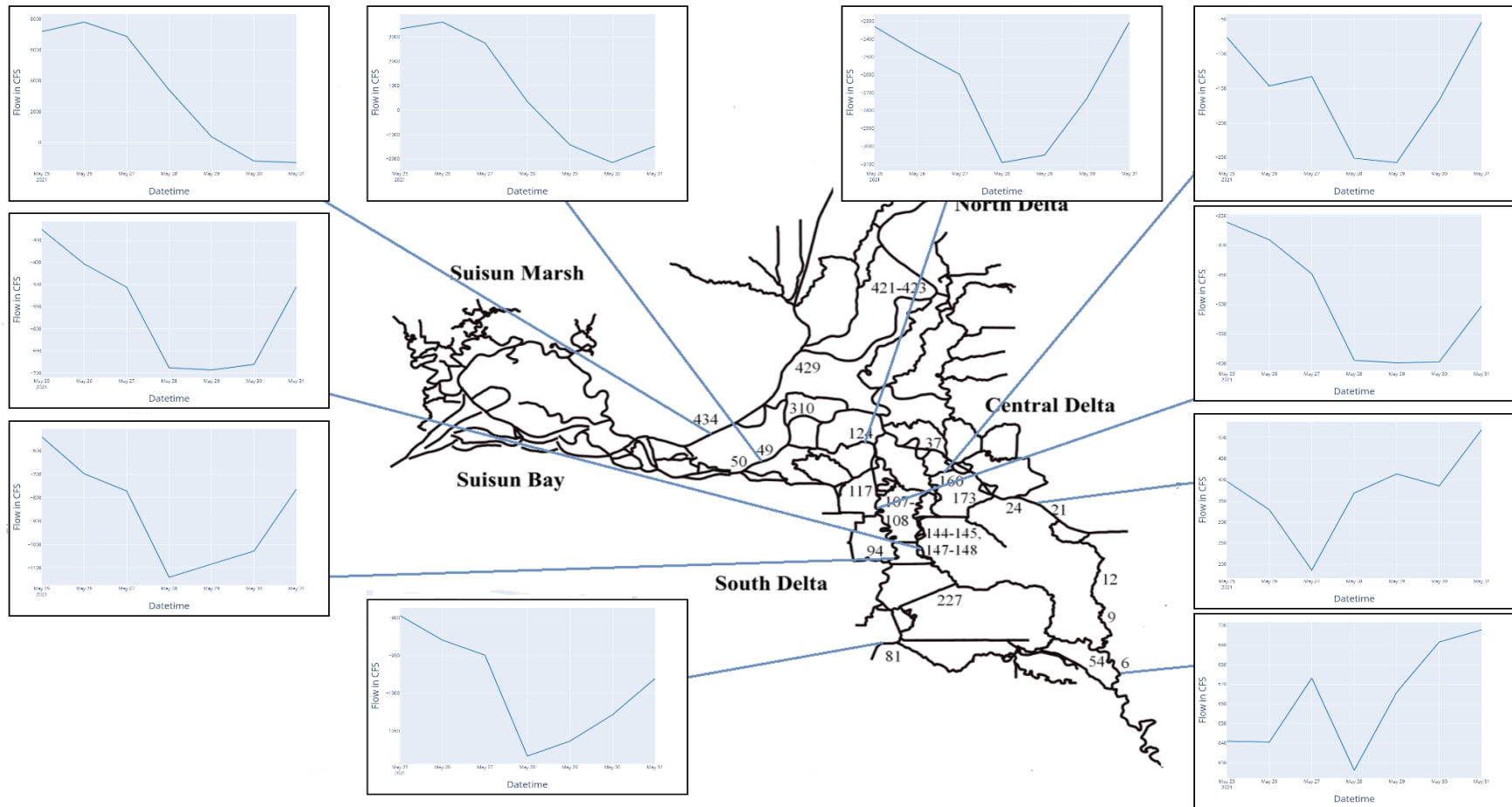


DSM2 model results: summary tables

Table A1. Summary of minimum, maximum, mean, and percent positive flows (cfs) and velocities (ft/s) by DSM2 channel for OMR scenarios over a 6 day time period. For scenario values refer to “Hydraulic Footprint Information” in the conditions / assumptions section above.

Scenario (cfs)	DSM2 Channel	Flow Min.	Flow Max.	Flow Mean	Flow % Positive	Velocity Min.	Velocity Max.	Velocity Mean	Velocity % Positive
Baseline	6	-1215.0	1705.8	661.4	82	-0.5	1.0	0.4	82
Baseline	21	-8209.5	7333.9	371.0	53	-0.5	0.5	0.0	53
Baseline	49	-169723.9	154940.5	796.1	52	-2.1	2.0	0.0	52
Baseline	81	-4328.9	1873.3	-991.7	28	-1.1	0.5	-0.3	28
Baseline	94	-14247.9	10885.4	-866.2	50	-1.8	1.5	-0.1	50
Baseline	107	-6695.4	4665.0	-498.5	51	-1.8	1.3	-0.1	51
Baseline	124	-20141.9	14094.5	-2662.6	45	-0.7	0.5	-0.1	45
Baseline	148	-8807.6	6692.7	-558.9	51	-0.9	0.7	0.0	51
Baseline	160	-5257.6	4121.2	-160.0	51	-0.5	0.5	0.0	51
Baseline	434	-181083.5	172254.2	3440.4	52	-2.0	2.0	0.1	52

Figure A3: Spatial representation of DSM2 modeled flow by channel.



DSM2 model interpretation entrainment in Delta strata regions

North Delta into Interior and Central Delta & San Joaquin River and Central Delta into South Delta & South Delta into facilities

Channels: 6, 21, 49, 434, 107, 124, 160, 81, 94, and 148

Survey data shows listed salmonids present

North Delta net flows become more negative in magnitude as the forecast period progresses

Other channels net flows become more positive in magnitude.

More positive OMR flows mean an increased transit time for fish coming from the San Joaquin via head of Old River (related to channels close to facilities)

Tidal influence: spring tide should peak on 5/27/2021 or 5/28/2021

Ag barrier presence will slow fish passage (downstream past the location of the ag barriers through the South Delta channels)

DSM2 channel locations information

Figure A4. Highlighted DSM2 channels by Delta Strata.

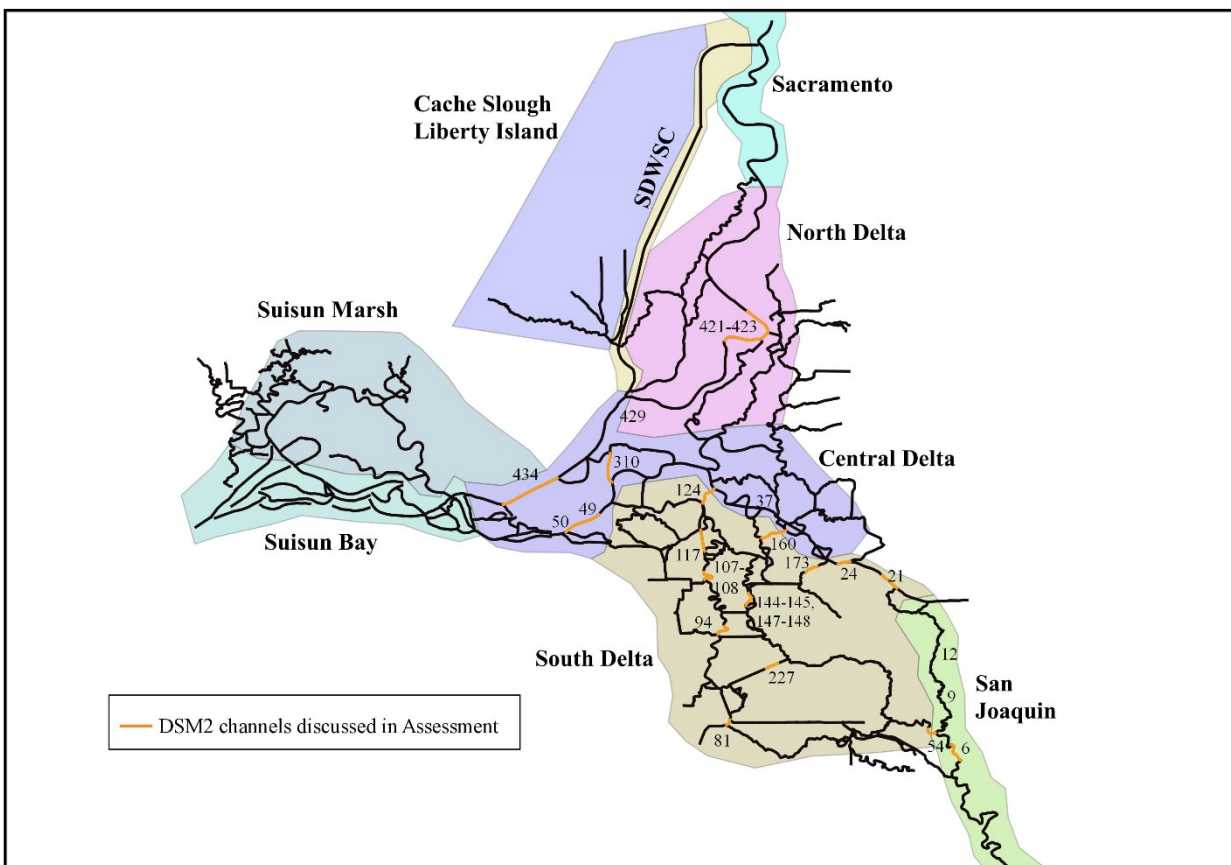


Table A2. Description of channel location, by Delta Strata region. Not all listed channels have model results presented in every weekly Proposed Action Assessment.

DSM2 Channel	Description
North Delta into Interior and Central Delta	
CHAN049	San Joaquin River at Sherman Island
CHAN310	Three-Mile Slough
CHAN421	Sacramento River at Delta Cross Channel
CHAN422	Sacramento River at Delta Cross Channel
CHAN423	Sacramento River at Delta Cross Channel
CHAN434	Sacramento River at Sherman Island
San Joaquin River and Central Delta into South Delta	
CHAN006	San Joaquin River at Head of Old River (HOR)
CHAN021	San Joaquin River downstream from confluence with Calaveras River
CHAN024	San Joaquin River upstream of Turner Cut
CHAN054	Old River at confluence with San Joaquin River (HOR)
CHAN107	Old River north of Rock Slough
CHAN117	Old River south of Franks Tract
CHAN124	Old River between Franks Tract and San Joaquin River
CHAN160	Columbia Cut
CHAN173	Turner Cut
South Delta into Facilities	
CHAN148	Middle River
CHAN227	Victoria Canal
CHAN081	Grant Line Canal
CHAN094	Old River

6/1/2021 Meeting – No DSM2 model runs

No DSM2 model runs

6/8/2021 Meeting

Background

<i>Process</i>	
Weekly process	<ul style="list-style-type: none"> • DSM2 model runs use a historic and forecasted hydrological input dataset with no assumptions provided by DWR Thursdays and updated by Reclamation Mondays. • Input File updated Monday after initial distribution from DWR for removal of forecasted in lieu of historic input. • Reclamation provides scenarios based on expected OMR index values for the upcoming week. • DSM2 model runs produced Monday and distributed to SaMT members.
<i>Hydraulic footprint information</i>	
Baseline and Scenarios updated	6/7/2021
DSM2 modeling results range	6/8/2021 – 6/15/2021
<i>OMR index value scenarios</i>	
Baseline	-1,200 cfs
Scenario 1	N/A
Scenario 2	N/A
<i>Changes between scenarios</i>	
Hydrology	No (see special considerations section below)
Delta Exports	Yes

6/8/2021 Meeting

Background (continued)

<i>Common assumptions</i>	
DSM2 run results based on the following assumptions	<ul style="list-style-type: none"> • CCFB Gates are operating to Priority 1 throughout the forecast period. • The Delta Cross Channel gates are closed, open during May 28 – June 1, open again during June 4 – 7, then closed. • Suisun Marsh salinity control flashboards are out, and 2 of the Suisun Marsh Salinity Control gates are in open position and 1 gated is closed for maintenance as of June 3. • The Middle River ag. barrier was closed May 15 with all the culvert flap-gates in tidal operation. • The Old River at Tracy ag. barrier was closed May 27 with all the culvert flap-gates in tidal operation as of June 1. • The Grant Line Canal ag. barrier was closed May 27 with all culvert flap-gates in tidal operation as of June 1. • Sacramento River flow at Freeport is expected to increase from 5,267 cfs to 5,645 cfs during the latter portion of the forecast period (Figure A1a). • San Joaquin River flow at Vernalis is expected to increase from 625 cfs to 786 cfs during the forecast period (Figure A1b). <p>Clifton Court Forebay and Tracy Pumping Plant pumping is shown for model runs in Figure A2.</p>
<i>Additional information</i>	
Considerations for current DSM2 model run	<ul style="list-style-type: none"> • This week there was no Scenario 1 or Scenario 2 modeled. The more negative expected OMR Index Value (see Operations Outlook document) could not be reached without a change in hydrology.
Caveats	<ul style="list-style-type: none"> • Time-step: DSM2 generates results at 15-minute time-steps. Visualizations of DSM2 model run results are aggregated over daily timesteps. Operations function on a more granular scale than daily time-step. ▪ Salmonid behavior: DSM2 provides flow fields which salmonids may encounter but salmonids are not neutrally buoyant particles. Models which incorporate behavior from acoustic tagged salmonids are being developed for South Delta (ePTM, ecoPTM).

DSM2 model results: figures

Figure A1a-b. Daily forecasted Freeport and Vernalis flows (cfs)

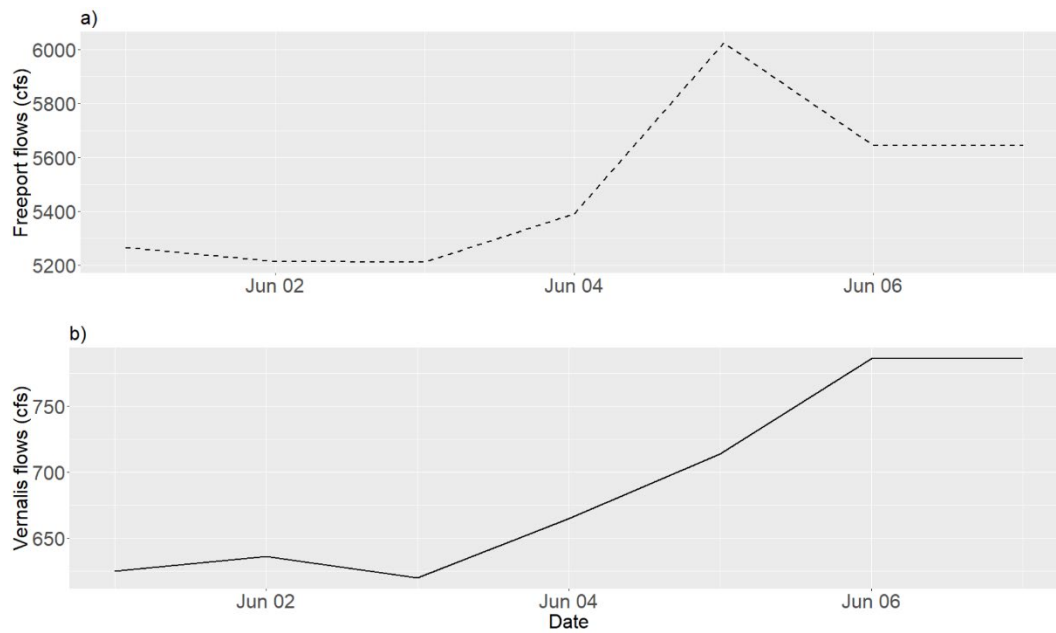
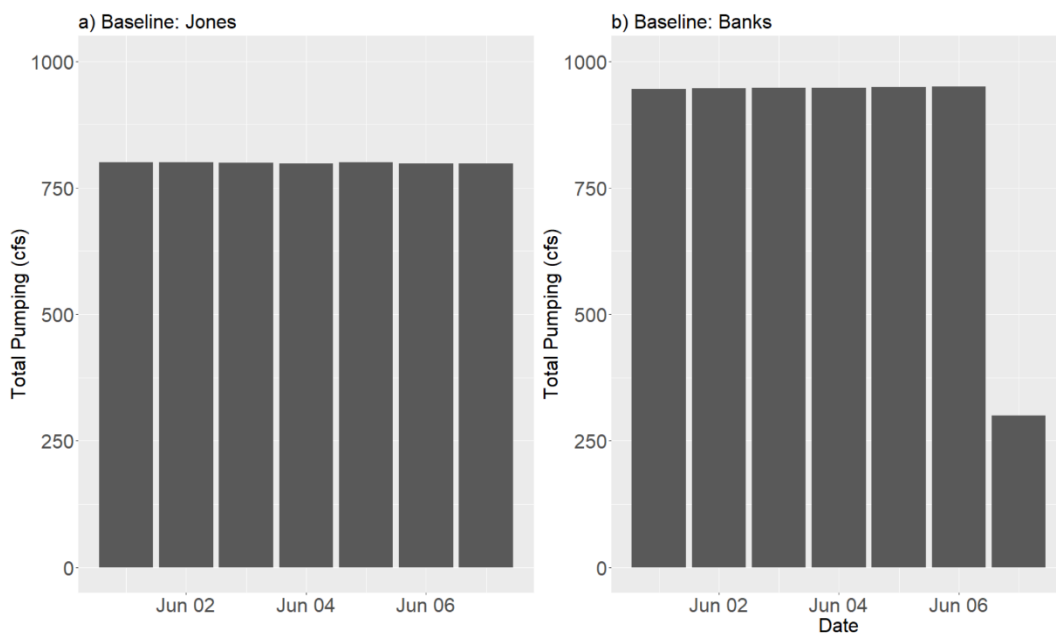


Figure A2. Daily forecasted pumping: Jones and Banks (cfs): Baseline.

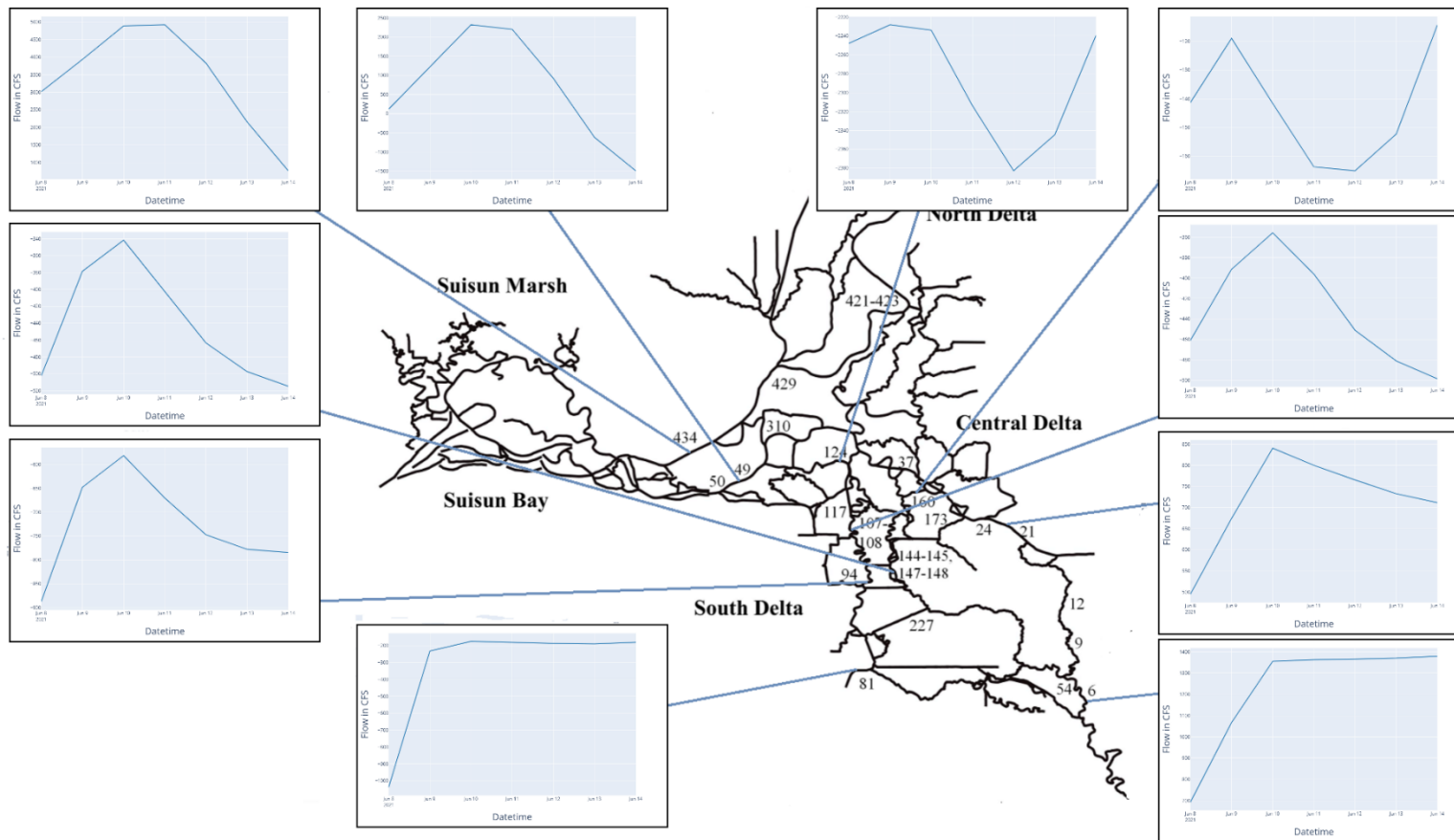


DSM2 model results: summary tables

Table A1. Summary of minimum, maximum, mean, and percent positive flows (cfs) and velocities (ft/s) by DSM2 channel for OMR scenarios over a 6 day time period. For scenario values refer to “Hydraulic Footprint Information” in the conditions / assumptions section above.

Scenario (cfs)	DSM2 Channel	Flow Min.	Flow Max.	Flow Mean	Flow % Positive	Velocity Min.	Velocity Max.	Velocity Mean	Velocity % Positive
Baseline	6	-283.33	1893.8	1226.67	97.03	-0.13	0.95	0.62	97.03
Baseline	21	-6339.9	6809.7	722.89	53.05	-0.43	0.45	0.05	53.05
Baseline	49	-140408	143451.1	783.38	50.67	-1.81	1.87	0.04	50.67
Baseline	81	-2955.11	1274.15	-311.3	41.75	-0.78	0.33	-0.08	41.75
Baseline	94	-13094.5	9767.33	-720.09	50.37	-1.68	1.32	-0.07	50.37
Baseline	107	-5802.46	4447.56	-428.42	50.37	-1.54	1.21	-0.1	50.37
Baseline	124	-17841.2	12979.35	-2280.14	43.68	-0.58	0.42	-0.06	43.68
Baseline	148	-7959.39	6398.1	-436.14	50.67	-0.82	0.69	-0.03	50.67
Baseline	160	-4112.88	3741.79	-142.75	50.67	-0.47	0.43	0	50.67
Baseline	434	-151353	154883.8	3473.91	52.15	-1.73	1.81	0.07	52.15

Figure A3: Spatial representation of DSM2 modeled flow by channel.



DSM2 model interpretation entrainment in Delta strata regions

North Delta into Interior and Central Delta & San Joaquin River and Central Delta into South Delta & South Delta into facilities

Channels: 6, 21, 49, 434, 107, 124, 160, 81, 94, and 148

- Survey data shows few listed salmonids present
- OMR Management season has off-ramped for salmonids.
- North Delta net flows become more negative in magnitude as the forecast period progresses
- Other channels net flows become more positive in magnitude.
- More positive OMR flows mean an increased transit time for fish coming from the San Joaquin via head of Old River (related to channels close to facilities)
- Ag barrier presence will slow fish passage (downstream past the location of the ag barriers through the South Delta channels)

DSM2 channel locations information

Figure A4. Highlighted DSM2 channels by Delta Strata.

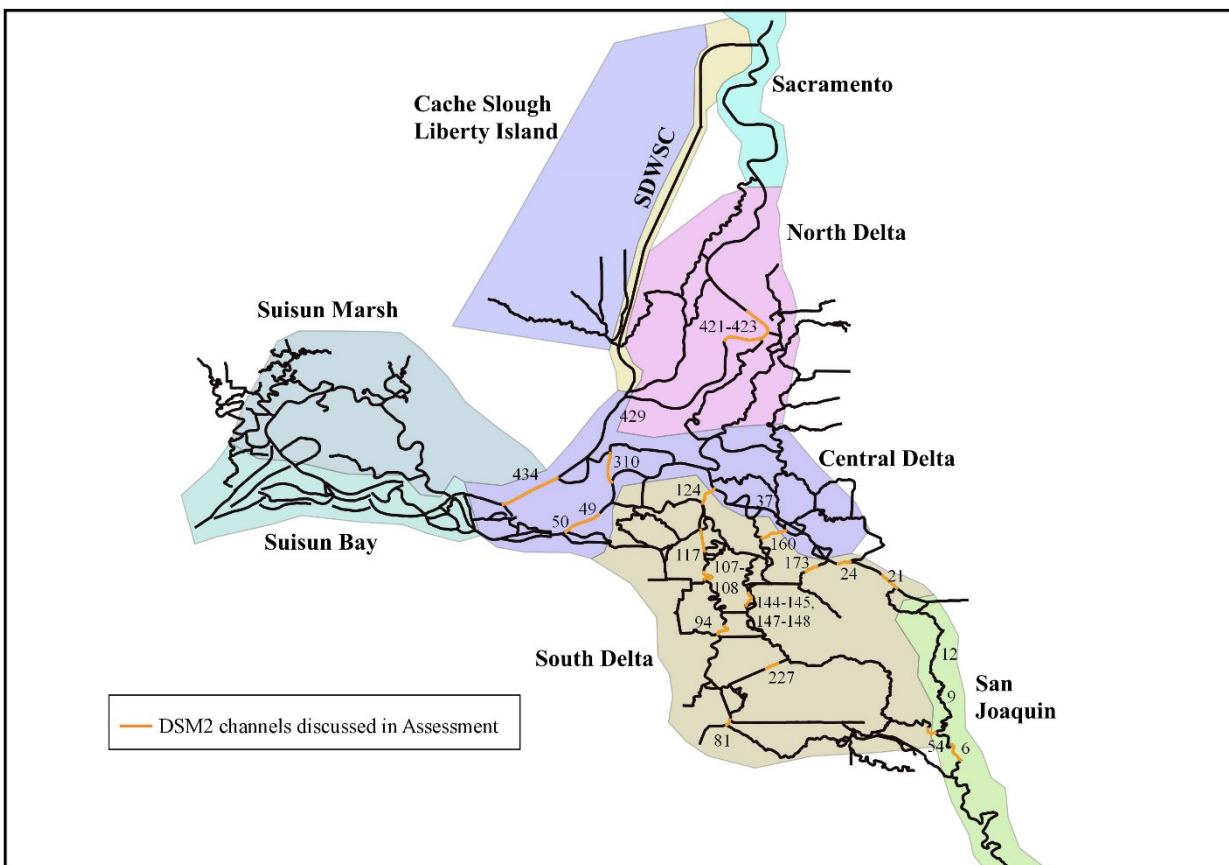


Table A2. Description of channel location, by Delta Strata region. Not all listed channels have model results presented in every weekly Proposed Action Assessment.

DSM2 Channel	Description
North Delta into Interior and Central Delta	
CHAN049	San Joaquin River at Sherman Island
CHAN310	Three-Mile Slough
CHAN421	Sacramento River at Delta Cross Channel
CHAN422	Sacramento River at Delta Cross Channel
CHAN423	Sacramento River at Delta Cross Channel
CHAN434	Sacramento River at Sherman Island
San Joaquin River and Central Delta into South Delta	
CHAN006	San Joaquin River at Head of Old River (HOR)
CHAN021	San Joaquin River downstream from confluence with Calaveras River
CHAN024	San Joaquin River upstream of Turner Cut
CHAN054	Old River at confluence with San Joaquin River (HOR)
CHAN107	Old River north of Rock Slough
CHAN117	Old River south of Franks Tract
CHAN124	Old River between Franks Tract and San Joaquin River
CHAN160	Columbia Cut
CHAN173	Turner Cut
South Delta into Facilities	
CHAN148	Middle River
CHAN227	Victoria Canal
CHAN081	Grant Line Canal
CHAN094	Old River