Verifying an Extension of the Historical Simulation

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10/16/2020

Verify Input Hydrology

Check Boundary Conditions

- Sacramento River inflow
- San Joaquin River Inflow
- Sacramento River + Yolo Bypass Inflow
- Banks pumping
- Jones pumping

Get observed data

Preferably get the Sacramento and San Joaquin River inflows and Banks and Jones pumping from DAYFLOW. If DAYFLOW isn't complete, get remainder daily average flow from CDEC. It needs to be independent of the DSM2 set-up.

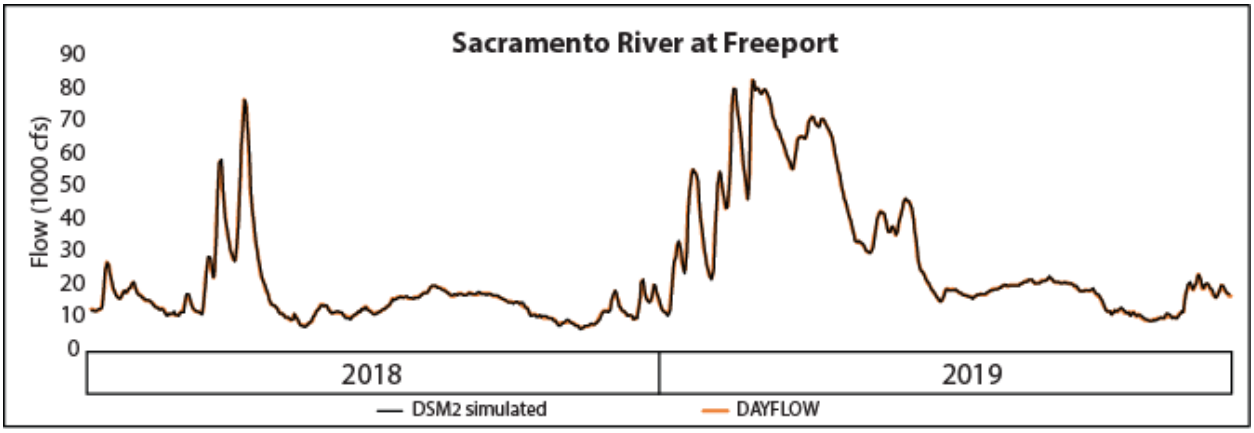
Get reported flow at SRV (Rio Vista) and generate daily average flow.

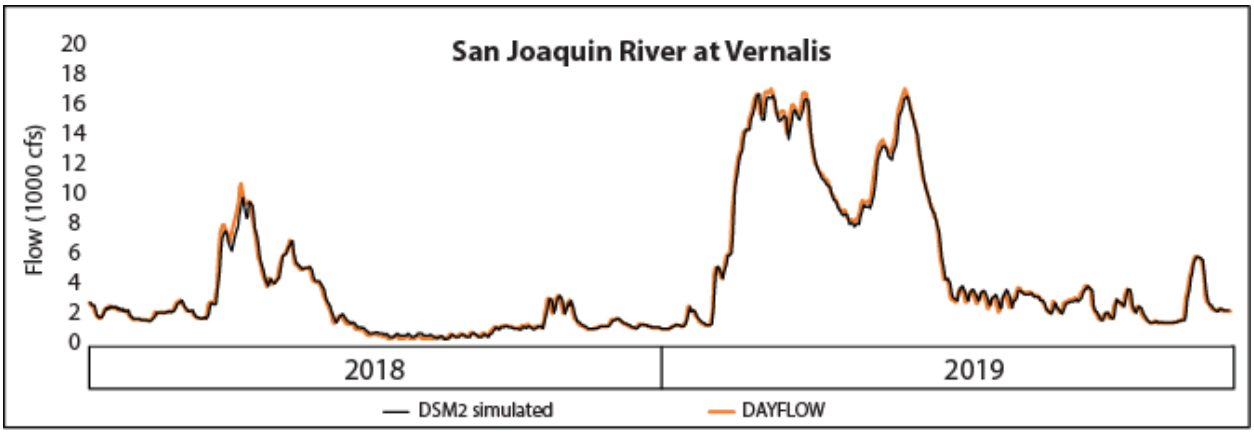
Generate daily average flow from DSM2 simulation at:

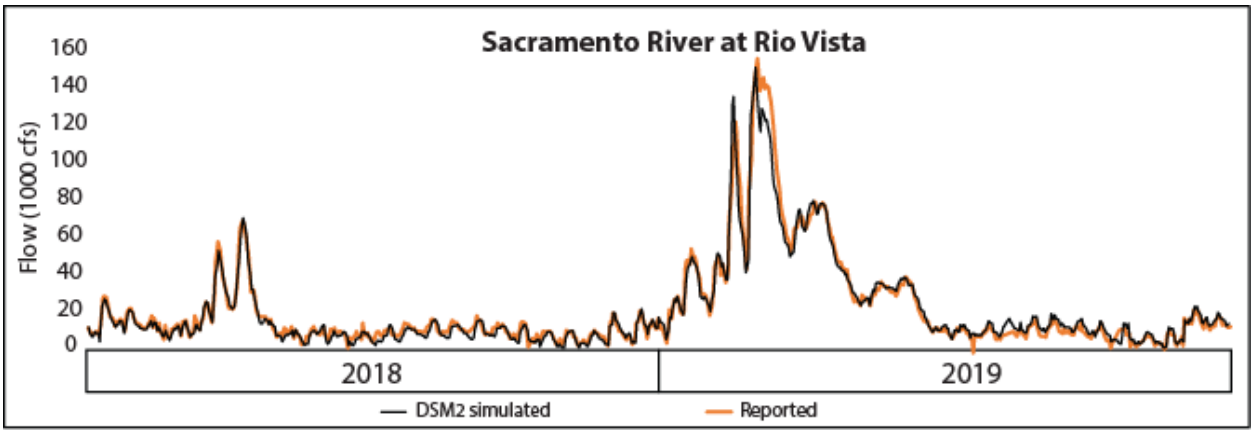
VCU, ORI, OH4, OBD, GLC, RSAC101, RSAN115, RSAC155

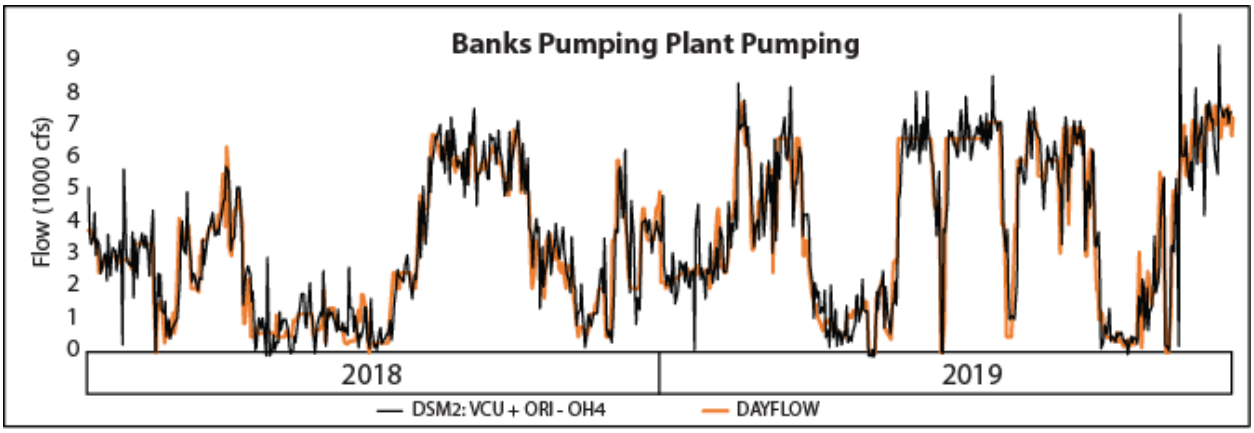
Compare daily average observed flows to DSM2-simulated flows at boundaries

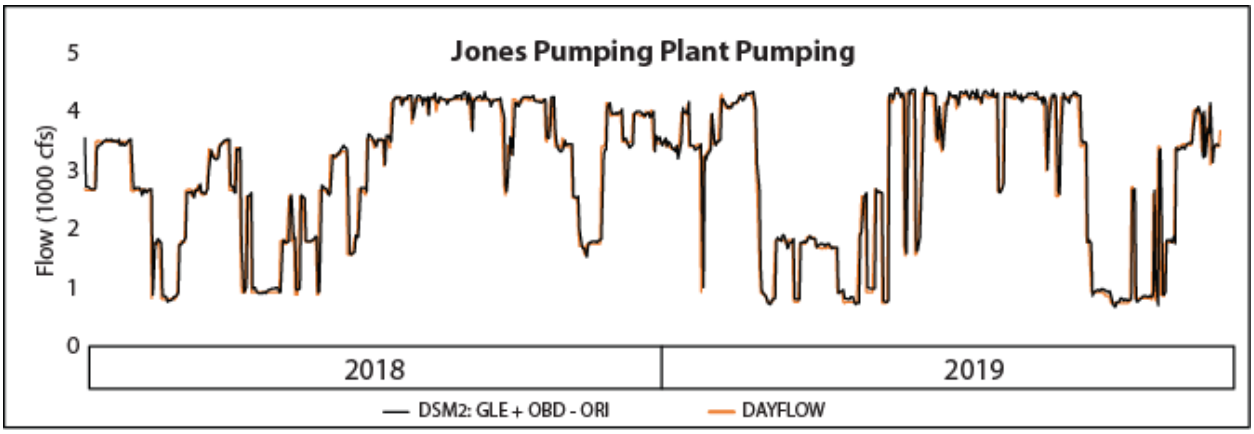
Observed	Simulated
Sac River Inflow	RSAC155
SJR Inflow	RSAN112
SRV	RSAC101 (note: if observed and simulated flow at Rio Vista matches, the Yolo Bypass inflow is probably fine.)
Banks Pumping	VCU + ORI – OH4
Jones Pumping	OBD + GLC – ORI
Banks + Jones	VCU + OBD + GLC – OH4

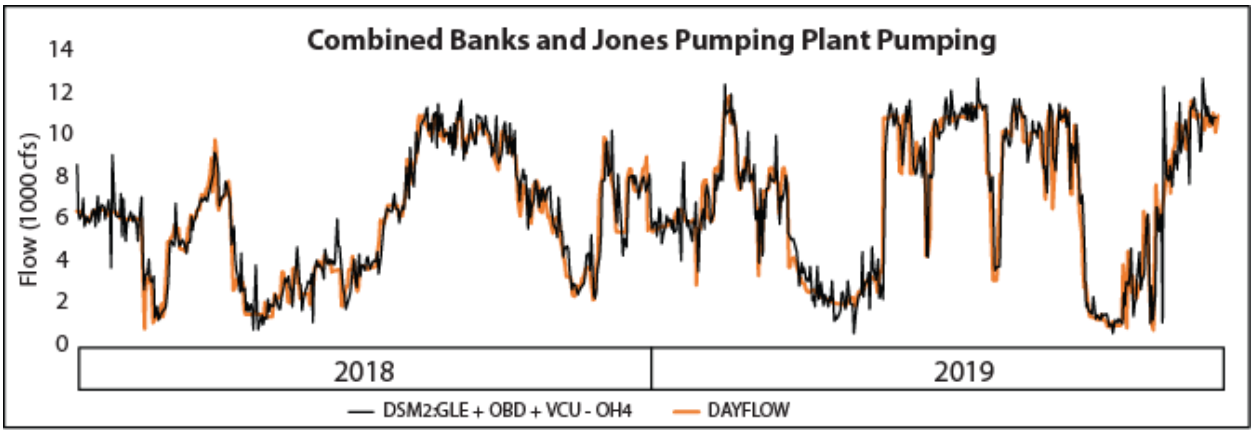

Sacramento River at Freeport
Flow (1000 cfs)
90
80
70
60
50
40
30
20
10
0
2018
2019
DSM2 simulated
DAYFLOW


San Joaquin River at Vernalis
Flow (1000 cfs)
20
18
16
14
12
10
8
6
4
2
0
2018
2019
DSM2 simulated
DAYFLOW


Sacramento River at Rio Vista
Flow (1000 cfs)
160
140
120
100
80
60
40
20
0
2018
2019
DSM2 simulated
Reported


Banks Pumping Plant Pumping
Flow (1000 cfs)
9
8
7
6
5
4
3
2
1
0
2018
2019
DSM2: VCU + ORI - OH4
DAYFLOW

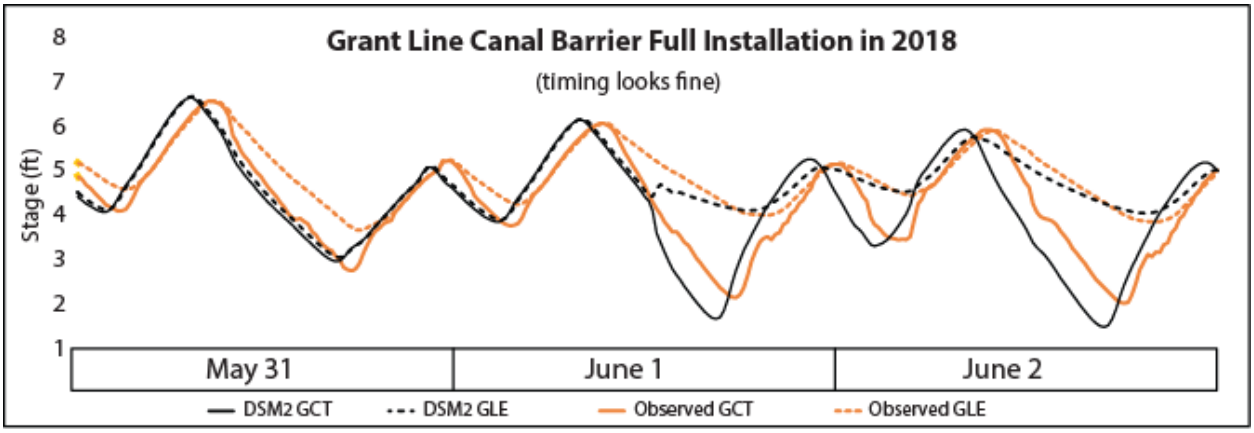

Jones Pumping Plant Pumping
Flow (1000 cfs)
5
4
3
2
1
0
2018
2019
DSM2: GLE + OBD - ORI
DAYFLOW

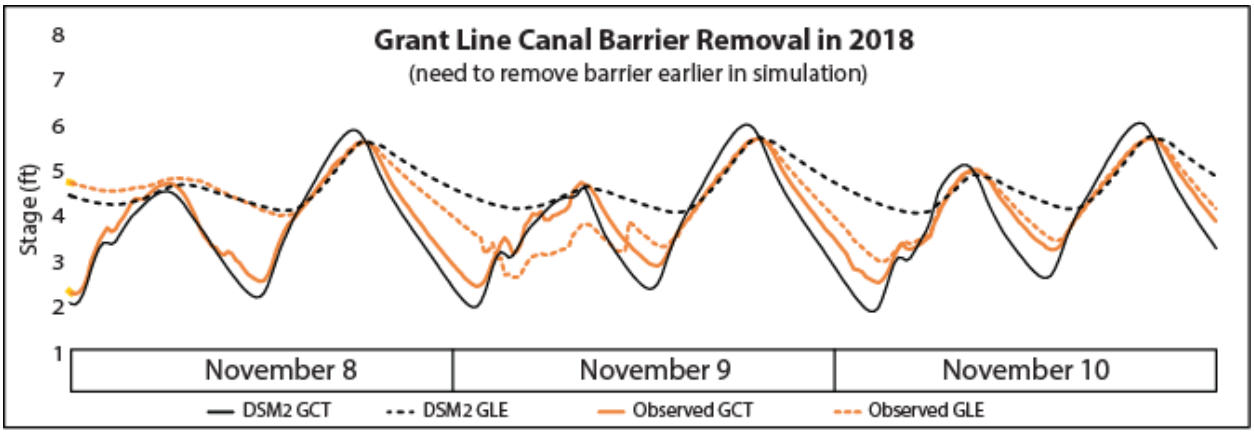

Combined Banks and Jones Pumping Plant Pumping
Flow (1000 cfs)
14
12
10
8
6
4
2
0
2018
2019
DSM2:GLE + OBD + VCU - OH4
DAYFLOW

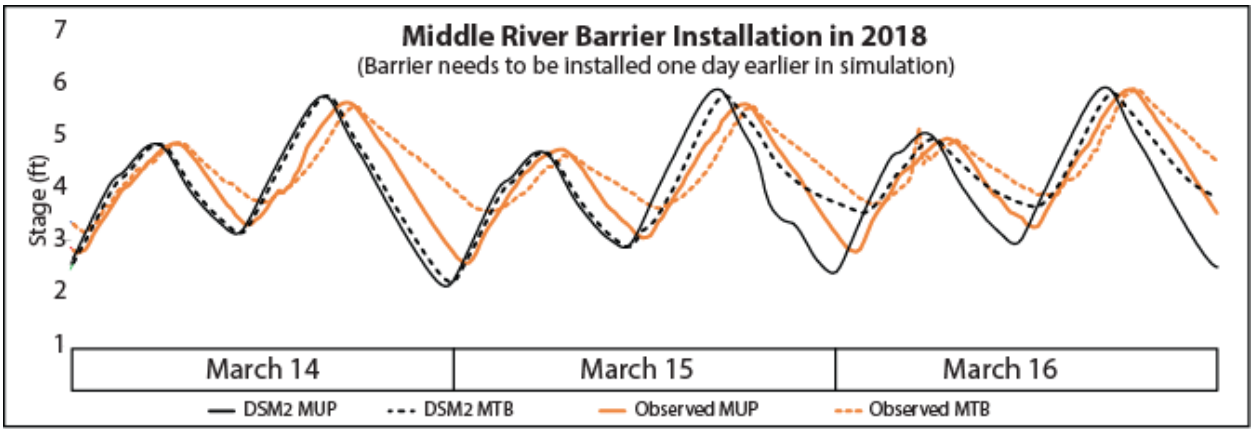
Verify timing of installation and removal of temporary barriers and operation of Montezuma Control Structure and Delta Cross Channel Gates

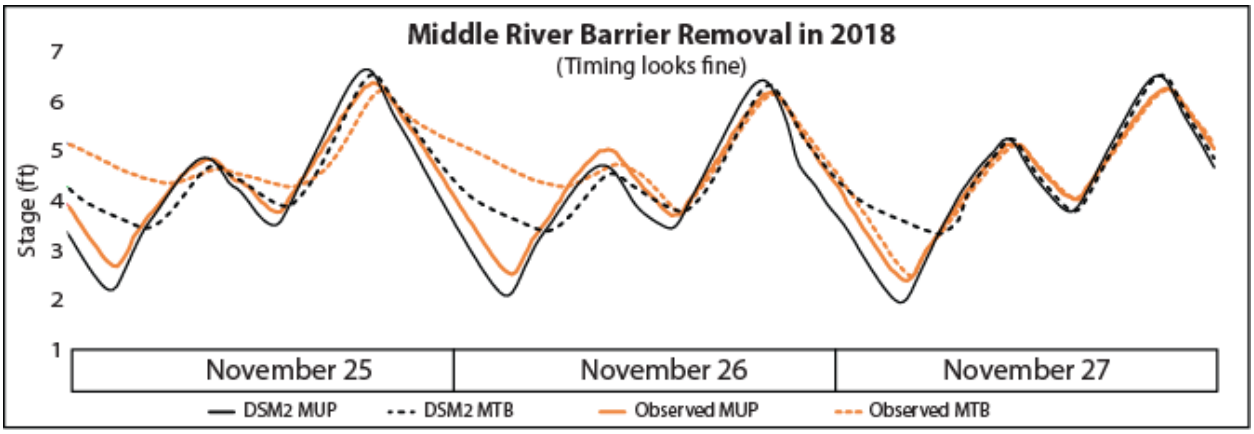
1. Create a dss file with the observed and simulated 15-minute data. Compare observed and simulated stages just upstream and downstream of each barrier site. This would already have been done with observed data in establishing the timings by looking at observed stages. Now repeat the analysis in order to confirm that you got the operation timing correct.

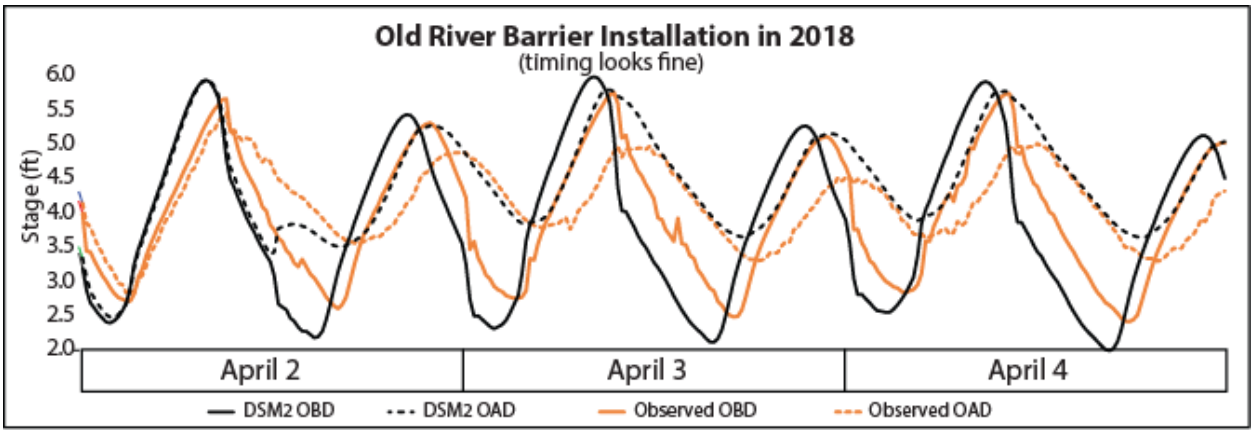
Barrier	Stations to use to check
Middle River	MUP and (MAB or MTB)
Grant Line Canal	GCT and GLE
Old River	OBD and (OAD or ODM)
Old River at Head	OH1 and SJL

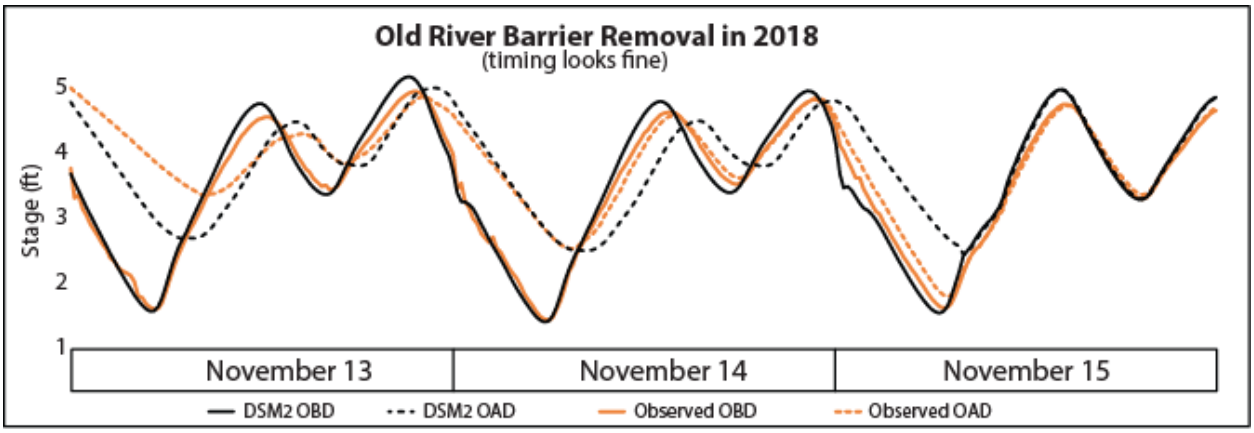


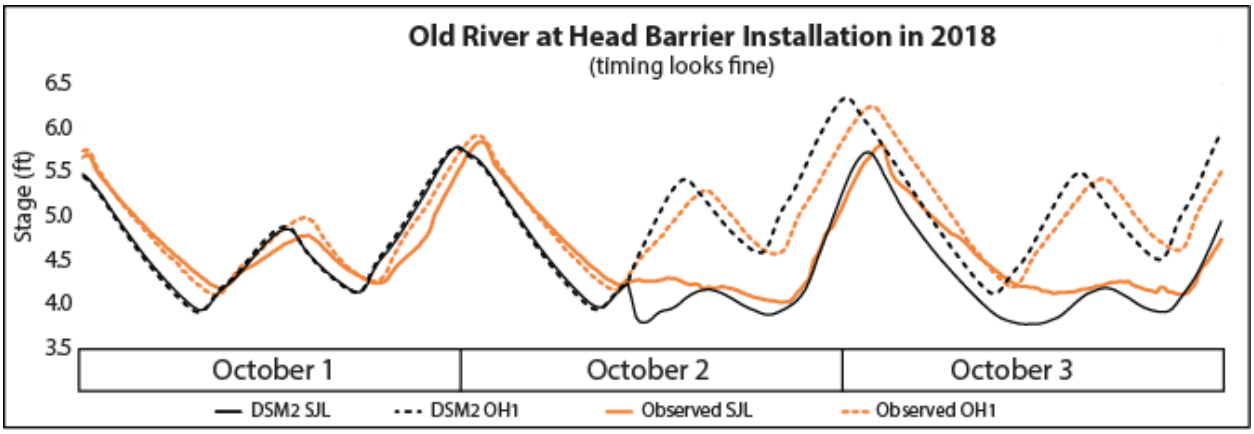


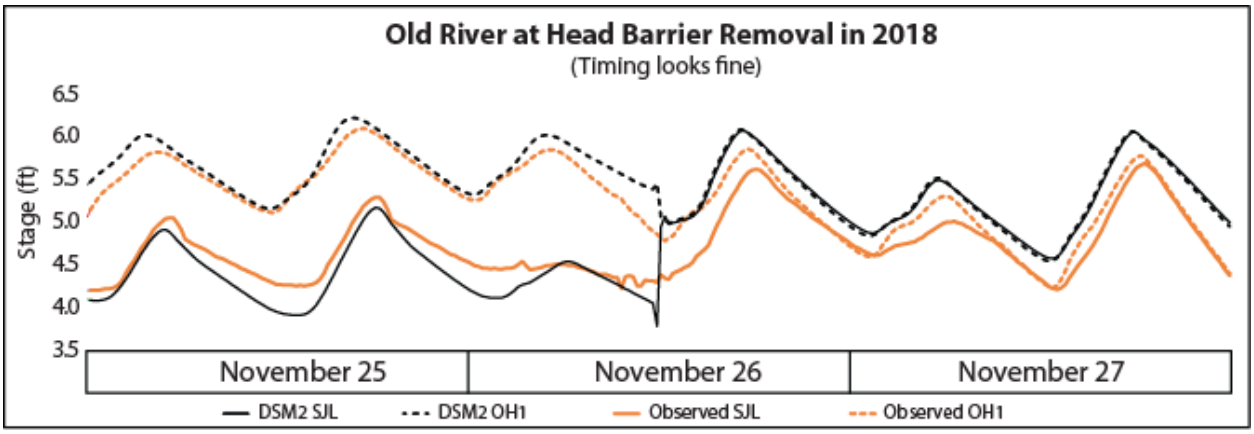

Middle River Barrier Installation in 2018
(Barrier needs to be installed one day earlier in simulation)
Stage (ft)
7
6
5
4
3
2
1
March 14
March 15
March 16
DSM2 MUP
DSM2 MTB
Observed MUP
Observed MTB


Middle River Barrier Removal in 2018
(Timing looks fine)
Stage (ft)
7
6
5
4
3
2
1
November 25
November 26
November 27
DSM2 MUP
DSM2 MTB
Observed MUP
Observed MTB


Old River Barrier Installation in 2018
(timing looks fine)
Stage (ft)
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
April 2
April 3
April 4
DSM2 OBD
DSM2 OAD
Observed OBD
Observed OAD

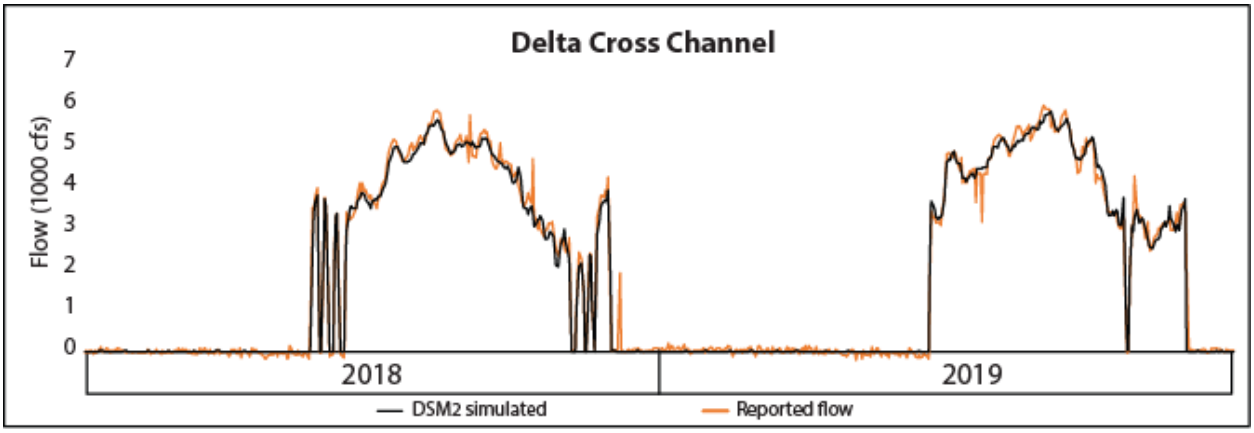

Old River Barrier Removal in 2018
(timing looks fine)
Stage (ft)
5
4
3
2
1
November 13
November 14
November 15
DSM2 OBD
DSM2 OAD
Observed OBD
Observed OAD

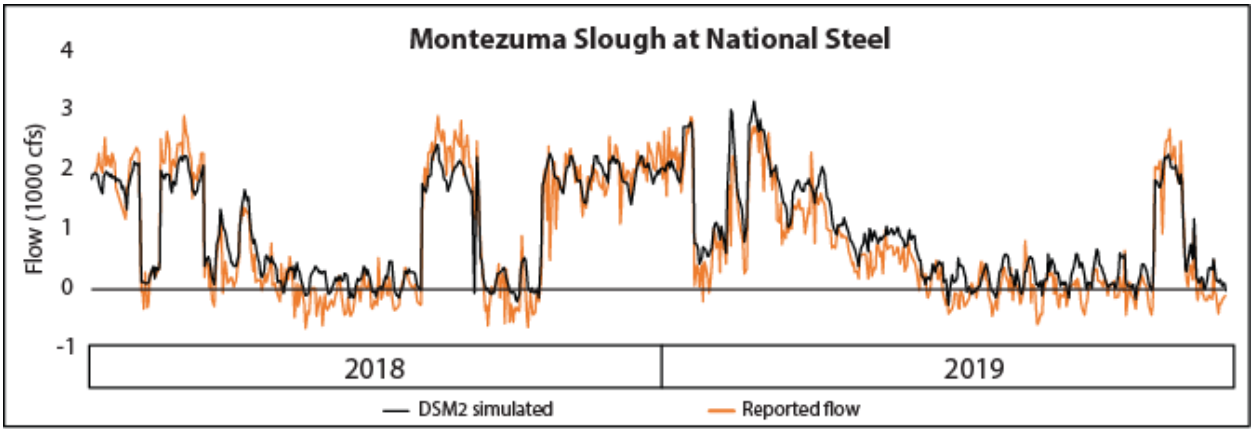

Old River at Head Barrier Installation in 2018
(timing looks fine)
Stage (ft)
6.5
6.0
5.5
5.0
4.5
4.0
3.5
October 1
October 2
October 3
DSM2 SJL
DSM2 OH1
Observed SJL
Observed OH1


Old River at Head Barrier Removal in 2018
(Timing looks fine)
Stage (ft)
6.5
6.0
5.5
5.0
4.5
4.0
3.5
November 25
November 26
November 27
DSM2 SJL
DSM2 OH1
Observed SJL
Observed OH1

2. Compare internal daily average flows affected by gate operations

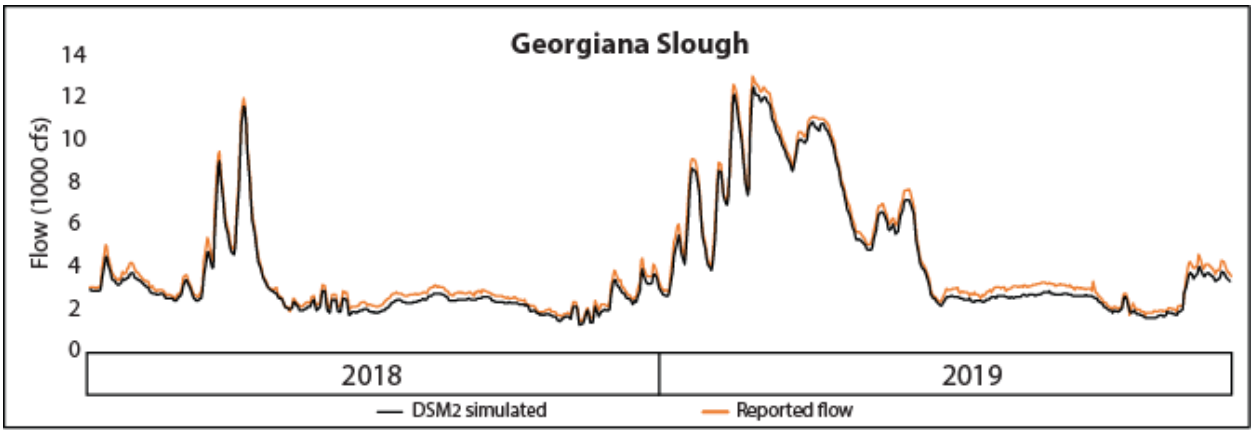
Observed	Simulated
DLC	DLC (Delta Cross Channel)
NSL	SLMZU025 (Montezuma Slough at National Steel

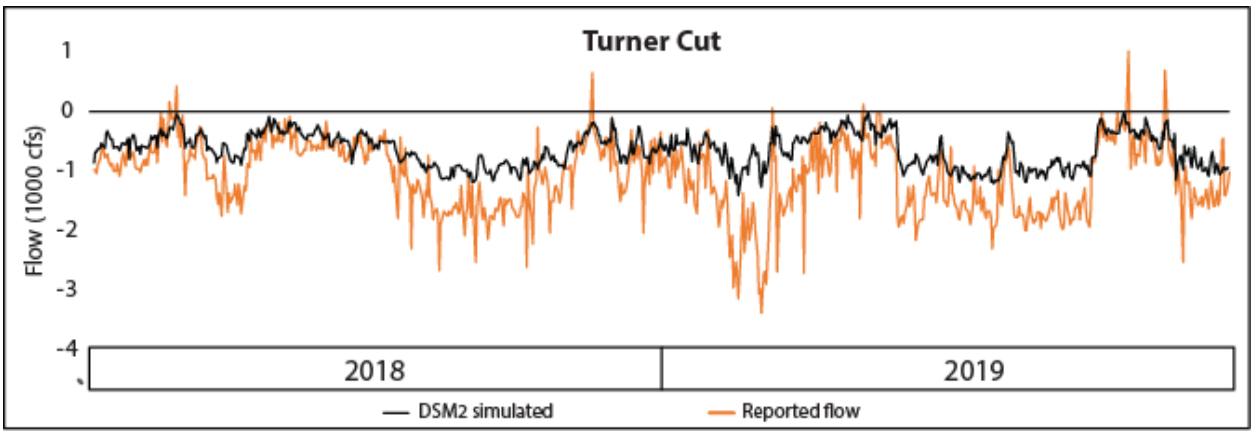


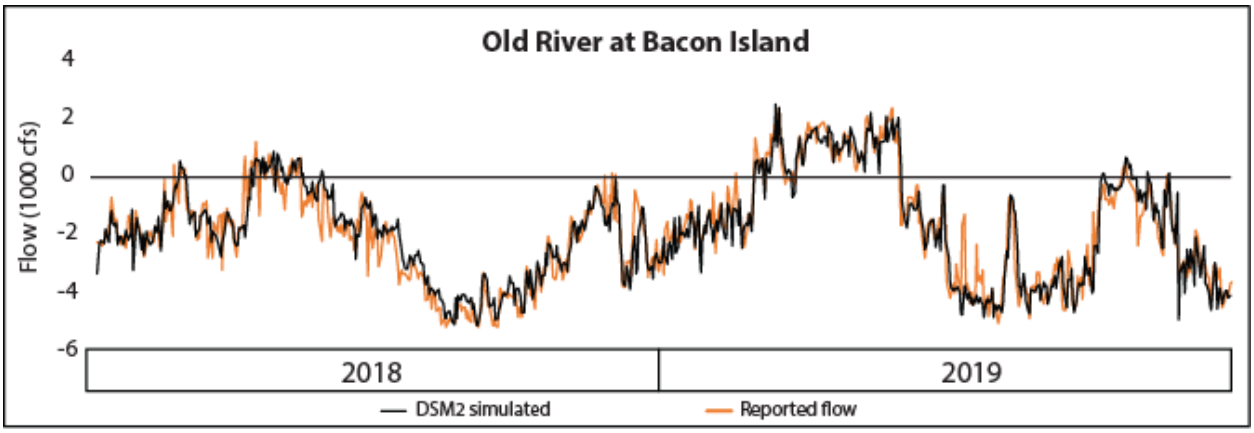


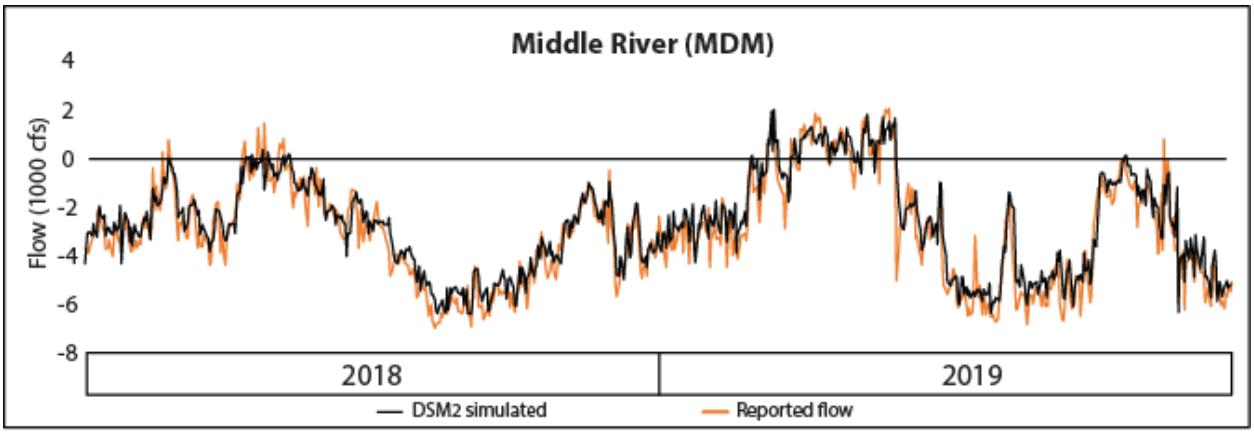
Check key internal flows for overall circulation of Delta waters

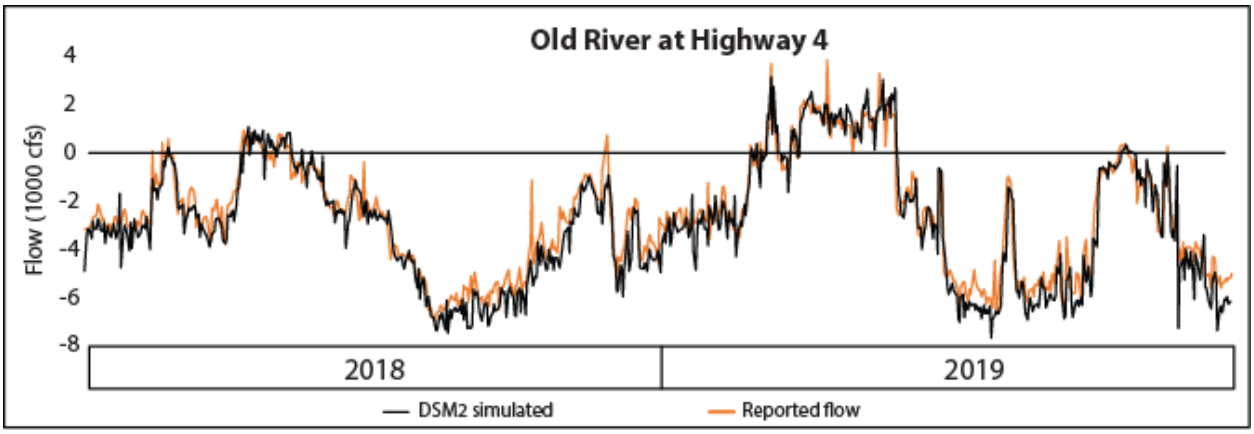
Observed	Simulated
GSS	GSS
TRN	TRN
OBI	OBI (ROLD024)
MDM	Subtract RMID015-145 from RMID015-144
OH4	OH4 (ROL034)
VCU	VCU
OH1	OH1
OLD	OLD
GLE	GLE

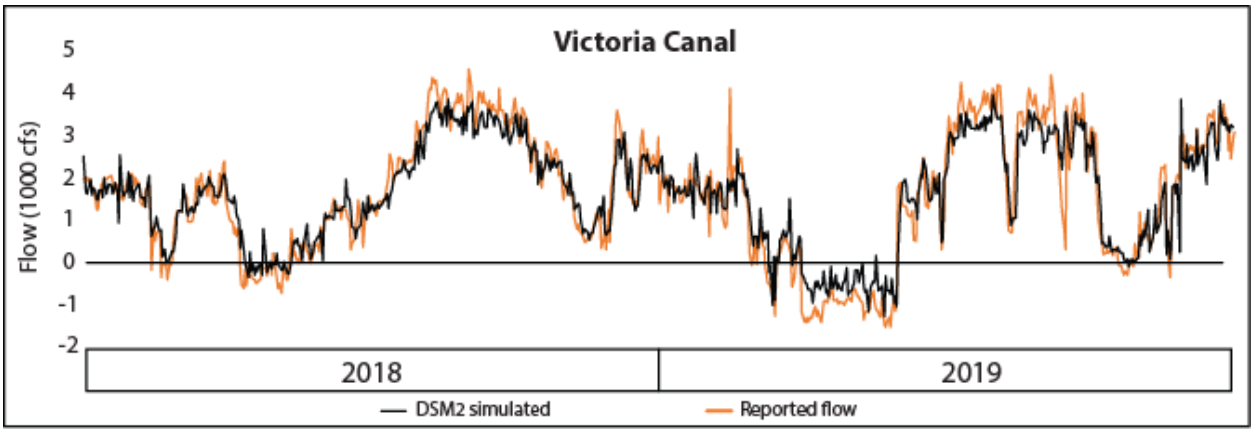


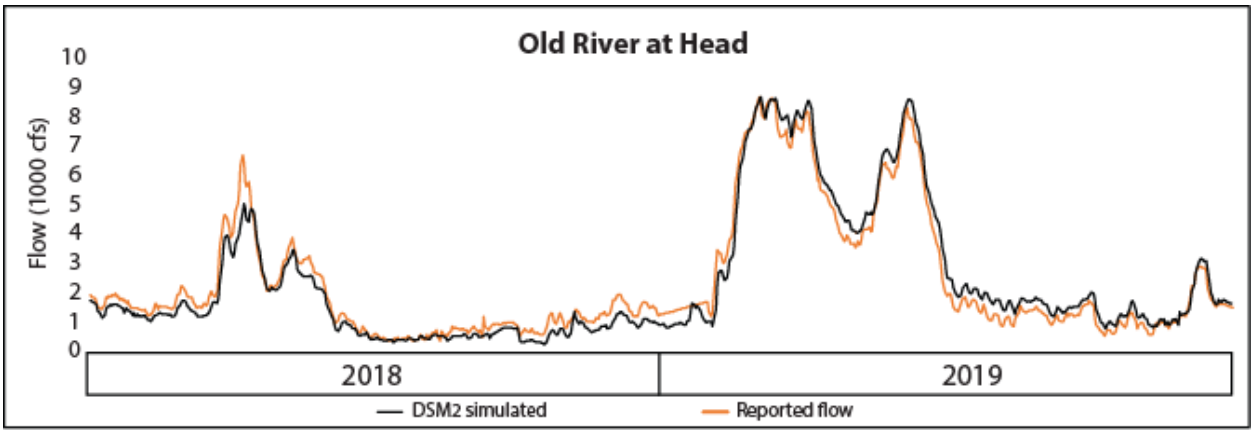


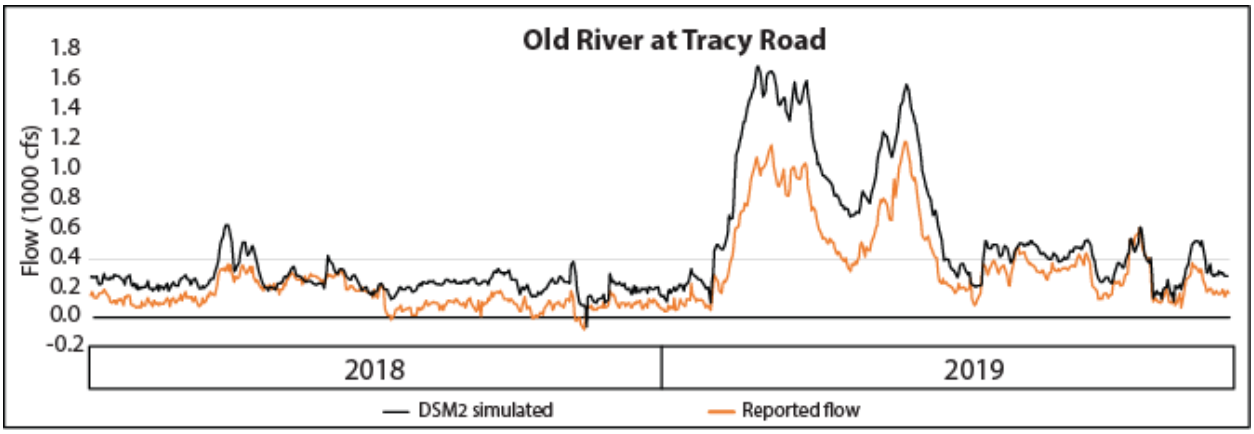

Old River at Bacon Island
Flow (1000 cfs)
4
2
0
-2
-4
-6
2018
2019
DSM2 simulated
Reported flow

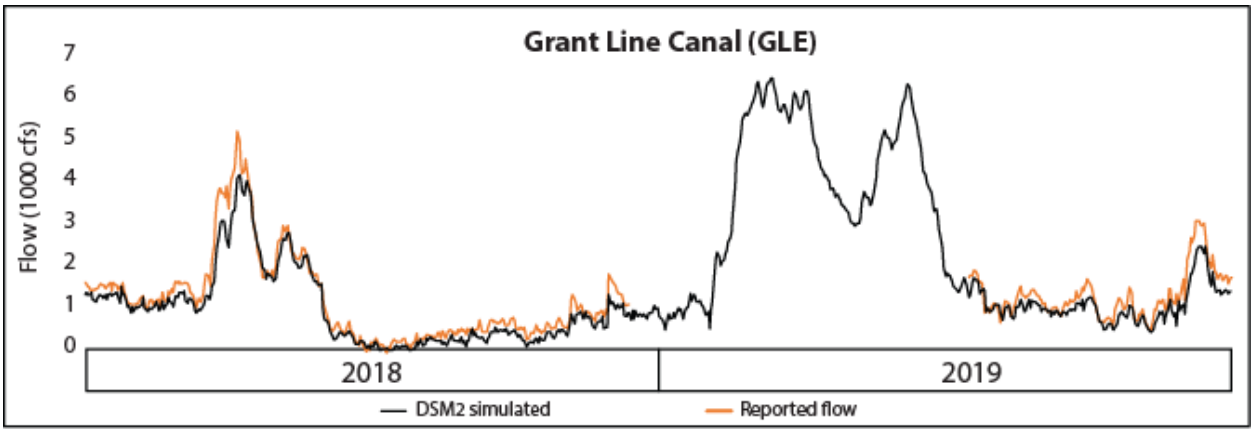

Middle River (MDM)
Flow (1000 cfs)
4
2
0
-2
-4
-6
-8
2018
2019
DSM2 simulated
Reported flow


Old River at Highway 4
Flow (1000 cfs)
4
2
0
-2
-4
-6
-8
2018
2019
DSM2 simulated
Reported flow


Victoria Canal
Flow (1000 cfs)
5
4
3
2
1
0
-1
-2
2018
2019
DSM2 simulated
Reported flow


Old River at Head
Flow (1000 cfs)
10
9
8
7
6
5
4
3
2
1
0
2018
2019
DSM2 simulated
Reported flow

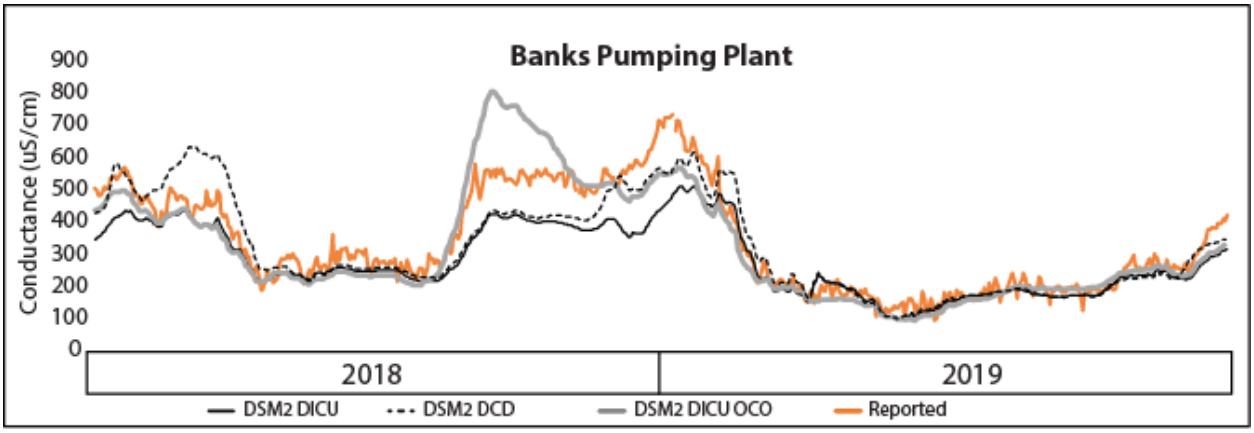

Old River at Tracy Road
Flow (1000 cfs)
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-0.2
2018
2019
DSM2 simulated
Reported flow

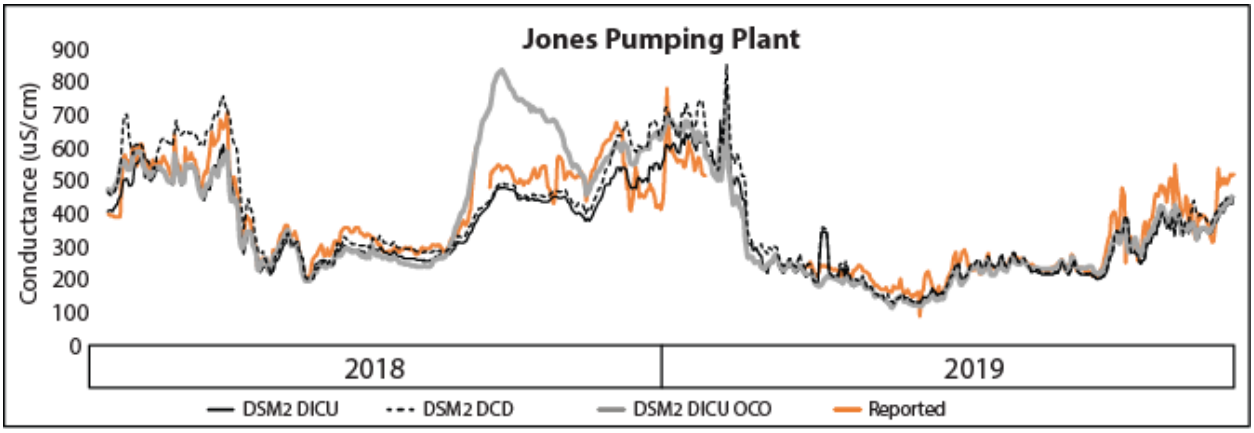

Grant Line Canal (GLE)
Flow (1000 cfs)
7
6
5
4
3
2
1
0
2018
2019
DSM2 simulated
Reported flow

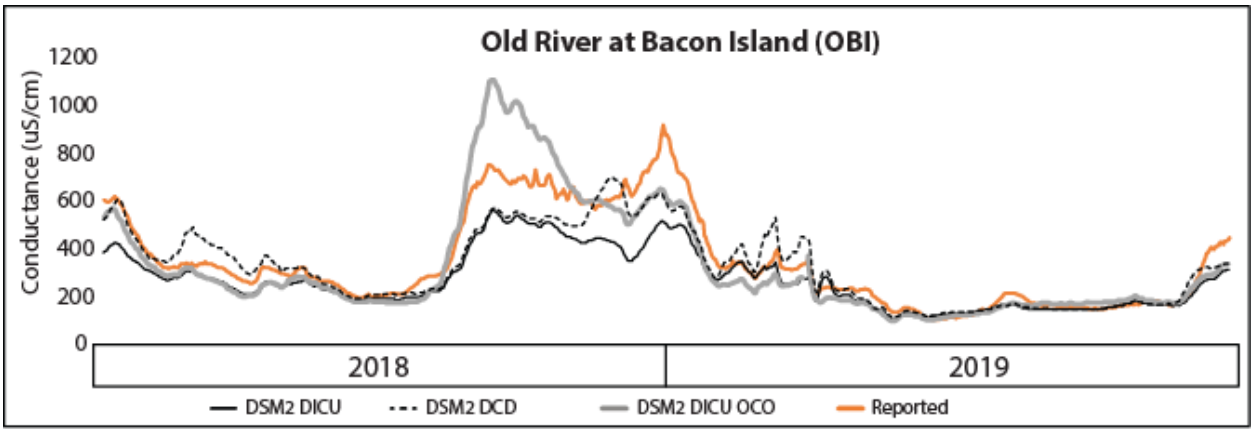
Verifying EC

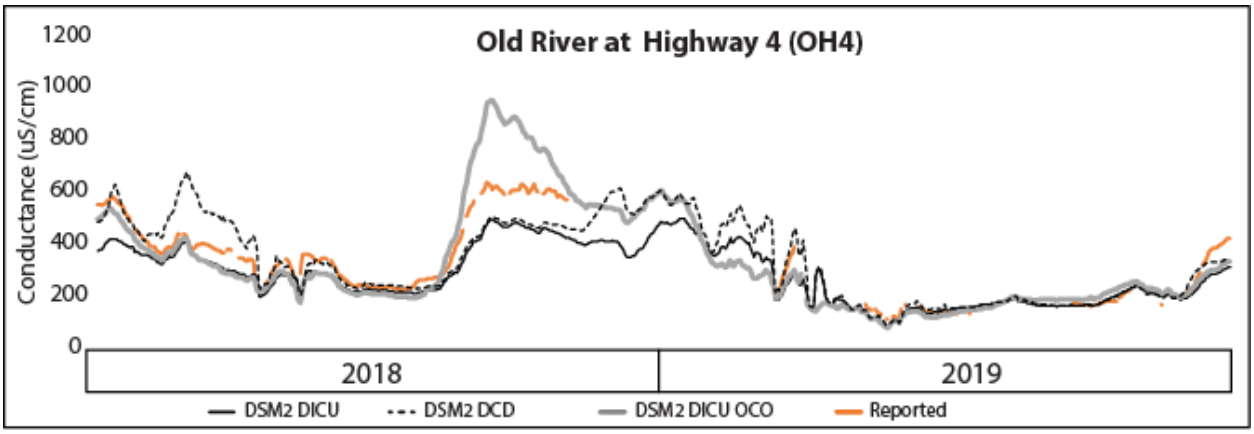
1. Get OCO's monthly updated EC estimates at: Banks, Jones, OH4, OBI to compare to Delta Modeling Section's historical simulation and reported EC.

Observed	Simulated
BANKS	BANKS
JONES	JONES
OBI	ROLD024
OH4	ROLD034



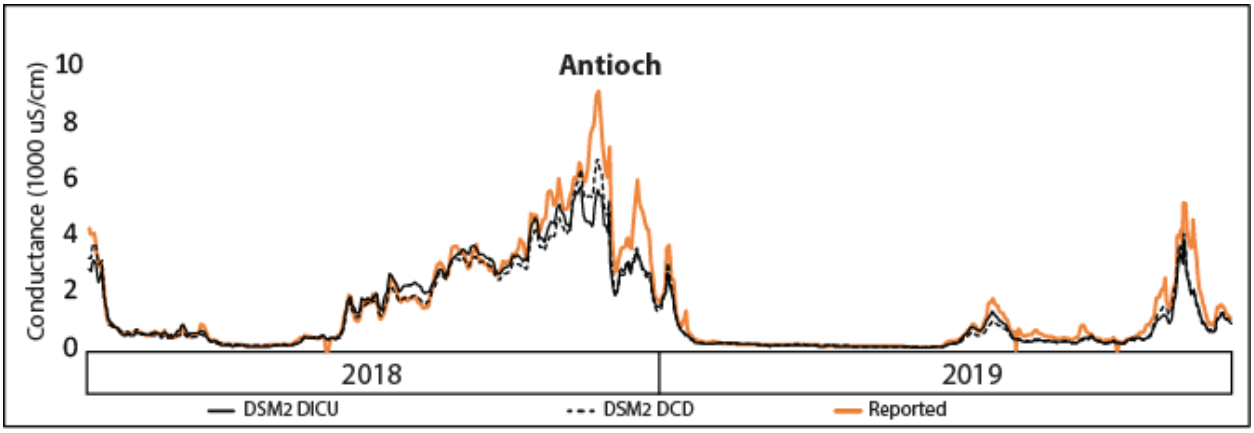


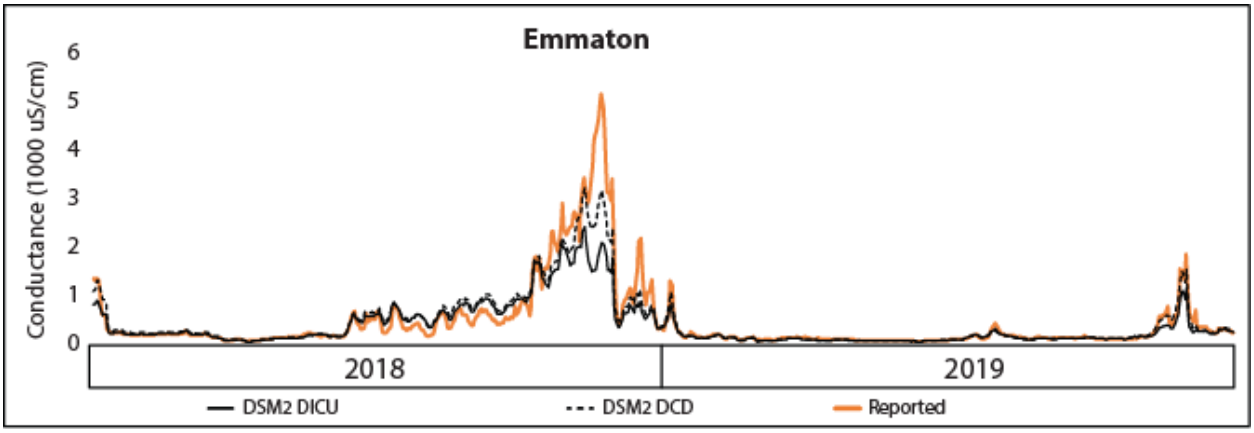

Old River at Bacon Island (OBI)
Conductance (uS/cm)
1200
1000
800
600
400
200
0
2018
2019
DSM2 DICU
DSM2 DCD
DSM2 DICU OCO
Reported

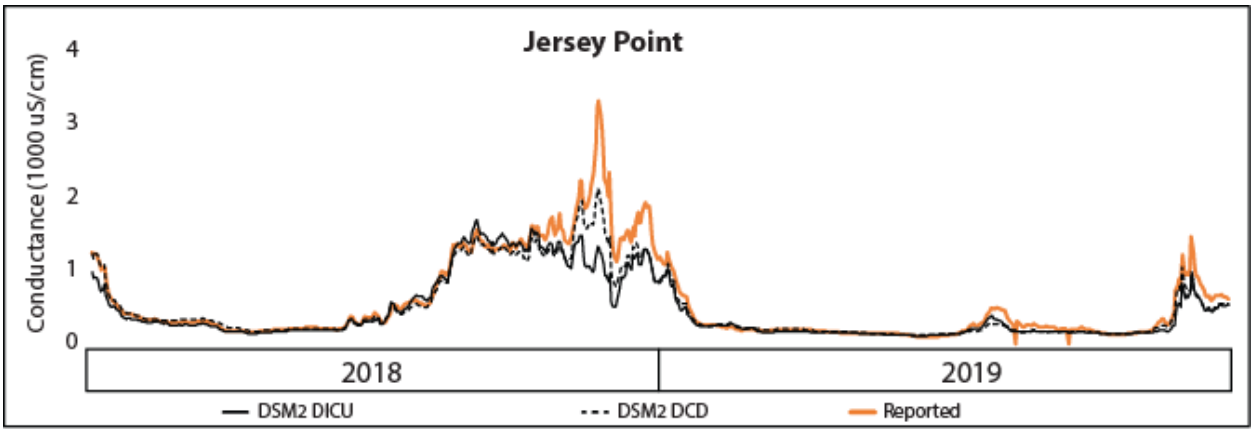

Old River at Highway 4 (OH4)
Conductance (uS/cm)
1200
1000
800
600
400
200
0
2018
2019
DSM2 DICU
DSM2 DCD
DSM2 DICU OCO
Reported

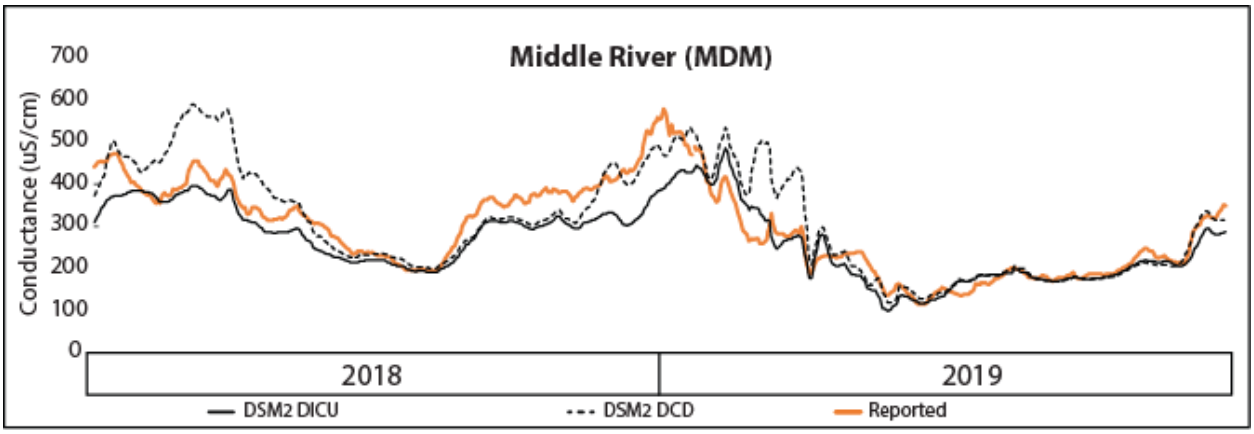
2. Compare observed EC to simulated EC at other key locations

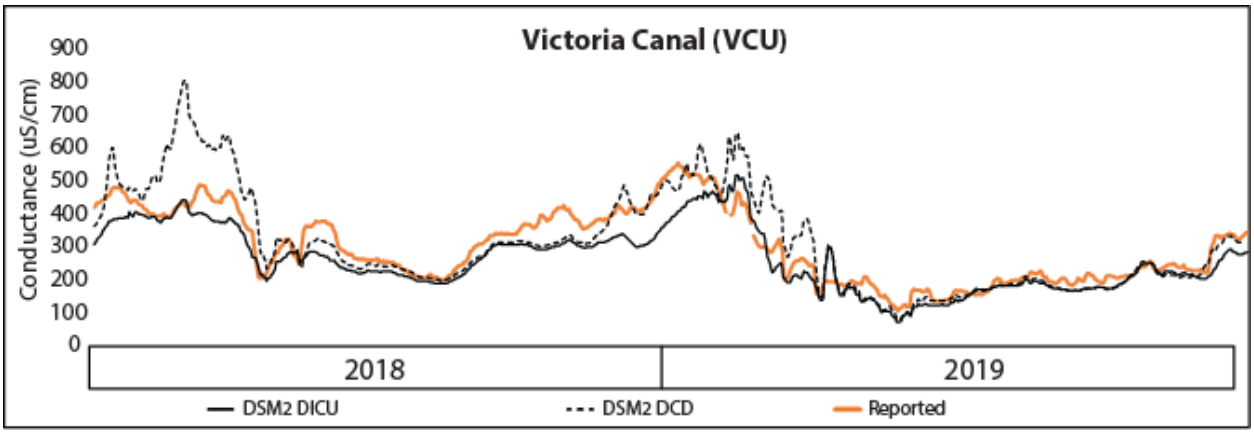
Observed	Simulated
ANH	ANH (RSAN007)
EMM	EMM (RSAC092)
JER	RSAN018
MDM	RMID015
VCU	CHVCT000
OH1	ROLD074
OLD	ROLD059

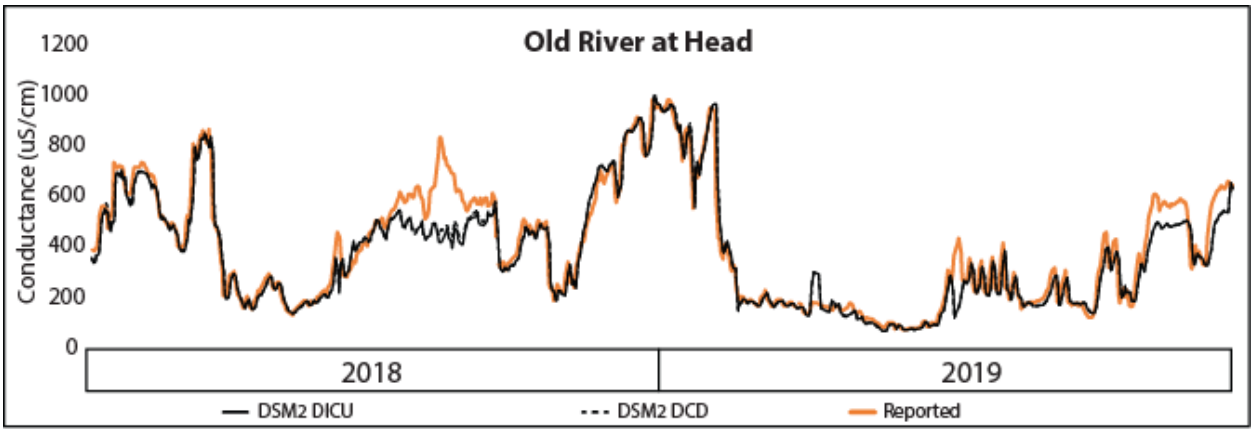


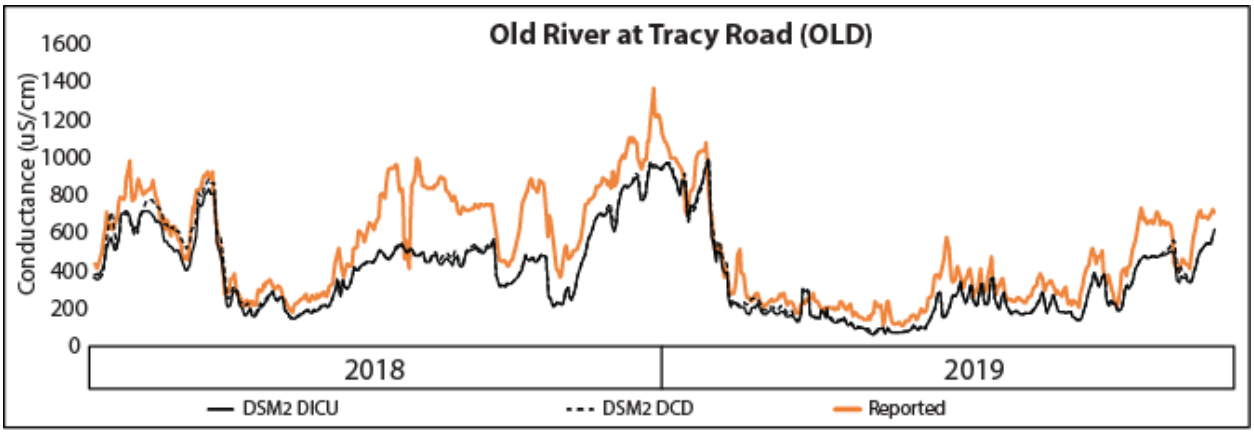



Jersey Point
Conductance (1000 uS/cm)
4
3
2
1
0
2018
2019
DSM2 DICU
DSM2 DCD
Reported


Middle River (MDM)
Conductance (uS/cm)
700
600
500
400
300
200
100
0
2018
2019
DSM2 DICU
DSM2 DCD
Reported


Victoria Canal (VCU)
Conductance (uS/cm)
900
800
700
600
500
400
300
200
100
0
2018
2019
DSM2 DICU
DSM2 DCD
Reported


Old River at Head
Conductance (uS/cm)
1200
1000
800
600
400
200
0
2018
2019
DSM2 DICU
DSM2 DCD
Reported


Old River at Tracy Road (OLD)
Conductance (uS/cm)
1600
1400
1200
1000
800
600
400
200
0
2018
2019
DSM2 DICU
DSM2 DCD
Reported