Unexplained Gaps in waterflow data reporting March 2014 CDEC website

Review of flow under-reporting for
*Freeport
*Sutter Slough
*Steamboat Slough
*Georgiana Slough
*Below Georgiana Slough
(DCC closed)

http://cdec.water.ca.gov/cgi-progs/nearbymap?staid=FPT

Data compiled by N. Suard, Esq.

Summary: USACE should question the wisdom of approval of barriers or other flow modification actions in the Delta when correct flow data is not available as reported online at CDEC

March 15 to 30, 2014 review shows important gaps in flow reporting online at CDED website that may indicate under-reporting of both flow and experiments in process on Steamboat and Sutter Slough, and under-reporting of diversions through Georgiana Slough.

Since there was unreported flow or gaps in data at each of the CDEC monitoring stations of the North Delta reviewed, one should question if there are also gaps in data and reporting for the earlier months. Is there actually more flow on the waterways than reported or do the gaps hide experiments on flow?

REVIEW OF CDEC FLOW DATA TO DETERMINE ACTUAL PERCENT OF FLOW GOES INTO EACH TRIBUTARY OF SACRAMENTO RIVER SHOWS DWR PRESUMPTION OF SPLITS IS WRONG

Data website: http://cdec.water.ca.gov/cgi-progs/nearbymap?staid=FPT and the other stations   AND ALSO EXPOSES IMPORTANT GAPS IN FLOW DATA REPORTING

	Freeport	Sutter	Steamboat	Georgiana	Below Georgiana
3/21/2014 6:00	4780	578	-2490	3200	-4580
3/21/2014 6:15	3620	263	-2650	3120	-5080
3/21/2014 6:30	2260	-81	-2800	3040	-5450
3/21/2014 6:45	1490	-369	-2830	2840	-5660
3/21/2014 7:00	965	-486	-2820	2910	-5690
3/21/2014 7:15	526	-634	-2790	2670	-5910
3/21/2014 7:30	171	-871	-2830	2960	-6060
3/21/2014 7:45	-190	-1010	-2840	2740	-6090
3/21/2014 8:00	-828	-1030	-2790	2480	-5980
3/21/2014 8:15	-1020	-1120	-2600	2030	-5840
3/21/2014 8:30	-1110	-1110	-2290	2260	-5340
3/21/2014 8:45	-933	-1060	-1990	2110	-4660
3/21/2014 9:00	-1120	-973	-1520	1940	-3850
3/21/2014 9:15	-943	-787	-876	1700	-2890
3/21/2014 9:30	-478	-500	-68	1500	-1700
3/21/2014 9:45	-9	-126	822	1310	62
3/21/2014 10:00	831	397	1740	945	1550
3/21/2014 10:15	2320	942	2210	871	3060
3/21/2014 10:30	4440	1330	2720	904	4380
3/21/2014 10:45	6260	1600	3030	1130	5290
3/21/2014 11:00	8050	2050	3310	1350	6090

Comparison of flows at same time period show how DWR presumption of flow splits between the tributaries of the lower Sacramento River is *wrong* .   Decisions regarding barriers should not be based on incomplete flow data by DWR. Note how much flow there is on Georgiana while there is no outflow on Sutter and also below Georgiana. Is this because Georgiana is deeper than the other waterways so that gravity flow draws more fresh Sacramento River water into the Mokelumne/San Joaquin river system for export?

Did DWR already alter flows in the water collum by adding berms or barriers below visible water levels on Steamboat Slough adjacent to the bridge, east side and on the Sacramento River just below Georgiana Slough?

*example   Note how the outflow numbers do not make sense at times How can there be 6260 at Freeport less 5786 diverted into Sutter, Steamboat and Georgiana, yet still leave 6090 of flow on the Sacramento River below Georgiana?

Missing flow data for the time period of March 15 to March 30 2014 for the CDEC stations reviewed:
note that every station reviewed showed gaps in data, but at different times and days:

Freeport data gaps: 3/20 between 10:45 to 12 noon; 3/26 between 10:45 to 12 noon; 3/26 between 12:45 to 14:00; 3/28 between 10?45 to 12 noon.
     (note the 3/26 gap represents sudden flow change from 8,210 cfs to -1760 in just three hour span-not a natural tide timeframe. Look at the data gaps from downstream gages)

Sutter Slough data gaps: 3/18 between 8:15 to 9:30; 3/29 between 19:15 to 20:30

Steamboat Slough data gaps: 3/16 between 14:00 to 15:15; 3/20 between 11:00 to 12:15; 3/26 between 11:00 to 12:15; 3/26 between 13:00 to 14:15; 3/27 between 19:00 to 20:15.

Georgiana Slough data gaps: 3/16 between 17:15 to 18:30; 3/18 between 8:15 to 9:30.

Below Georgiana Slough on the Sacramento River: 3/18 between 8:15 to 9:30; 3/28 between 13:15 to 14:30.

4/8/2014
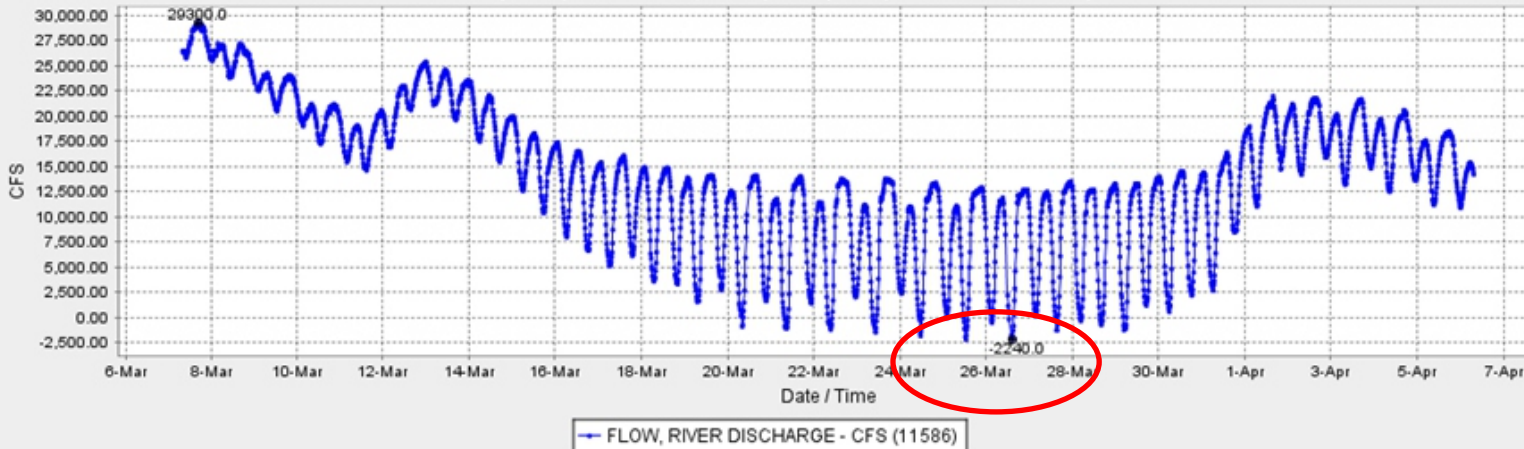Data compiled by N. Suard, Esq Snug Harbor Resorts, LLC

The process used to discover missing data:
1. Go to online CDEC site for the monitoring station to be reviewed.
2. Define a time frame such as 30 days and click on the button to show the flow graphic.
3. Below the graphic look for the link that provides the data in time series of 15 minute increments, not the daily averages or total flows.
4. Copy the flow data and timing from the cdec and paste into an excel spread sheet.
5. Next to the timing per hour and day, create a complete baseline day & 15 minute interval collum. Compare the baseline collum to the data from CDEC and the times there are data gaps will be easier to find.
6. Move the CDEC data to the correct 15 minute increments compared to the baseline to specify the exact timing of the gaps in data per each day reviewed.

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HOME | QUERY TOOLS | PRECIPITATION | RIVER FORECAST | RIVER STAGES | RESERVOIRS | SNOW | STATIONS | WEATHER

SACRAMENTO RIVER AT FREEPORT (FPT)
Date from 03/07/2014 07:37 through 04/06/2014 07:37 Duration : 29 days
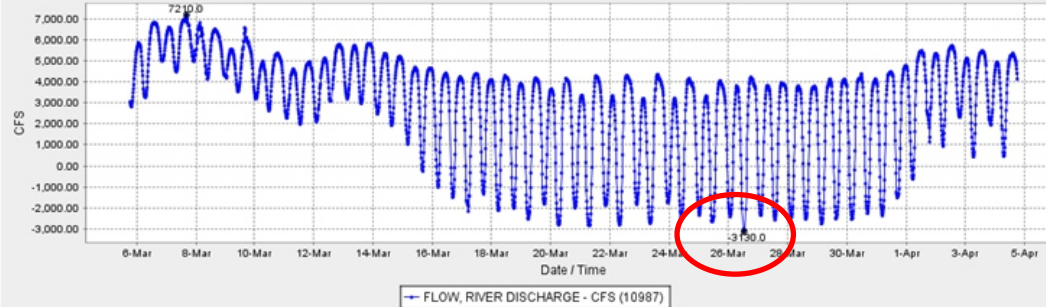Max of period : (03/07/2014 16:15, 29300.0) Min of period: (03/26/2014 14:30, -2240.0)

— FLOW, RIVER DISCHARGE - CFS (11586)

Generated on Sun Apr 06 07:37:57 PDT 2014

Plot all FPT Sensors | Real-Time FPT Data | FPT Data | Daily FPT Data | Show FPT Ma

Plot from ending date: 04/06/2014 07:37   Span: 30   days   Get custom

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Department of Water Resources
CALIFORNIA DATA EXCHANGE CENTER

HOME | QUERY TOOLS | PRECIPITATION | RIVER FORECAST | RIVER STAGES | RESERVOIRS | SNOW | STATIONS | WEATHER

STEAMBOAT SLOUGH BTW SAC R AND SUTTER SL (SSS)
Date from 03/05/2014 18:10 through 04/04/2014 18:10 Duration : 29 days
Max of period : (03/07/2014 16:00, 7210.0) Min of period: (03/26/2014 12:30, -3130.0)

— FLOW, RIVER DISCHARGE - CFS (10987)

Generated on Sun Apr 06 18:11:11 PDT 2014

Plot all SSS Sensors | Real-Time SSS Data | SSS Data | Daily SSS Data | Show SSS Map | SSS Info

Plot from ending date: 04/04/2014 18:10   Span: 30   days   Get custom plot

Example: Data gap on 3/26/14 for Freeport and Steamboat Slough

From 10:45 to 12 noon Sacramento River flow drops over 6000 cfs, from 8210 to 2180. Flows continue to drop to -1760 in just a 3 hour time. This indicates all flow on the Sacramento River at Freeport had been cut off

Impact to Steamboat Slough from flow cut-off is hidden due to gap in data reporting. What does show is that Steamboat Slough was already not receiving freshwater inflow, and the cutoff of flow created a more drastic low tide at this time. Impact to Sutter Slough shows less drastic low water impact.

2014FLOW-updated.xlsx   Section of review of flow data from CDEC which exposed missing data and experimental flow timing:

A	B	C	D FREEPORT	F	G SUTTER H	I	STEAMBOAT K	L	M GEORGIANA O
1100		3/26/2014 9:45	3/26/2014 9:45	11300	3/26/2014 9:45	2190	3/26/2014 9:45	1200	3/26/2014 9:45	3370	3/2
1101		3/26/2014 10:00	3/26/2014 10:00	10500	3/26/2014 10:00	1910	3/26/2014 10:00	510	3/26/2014 10:00	3180	3/26
1102		3/26/2014 10:15	3/26/2014 10:15	10100	3/26/2014 10:15	1610	3/26/2014 10:15	-129	3/26/2014 10:15	2990	3/26
1103		3/26/2014 10:30	3/26/2014 10:30	9260	3/26/2014 10:30	1420	3/26/2014 10:30	-842	3/26/2014 10:30	2830	3/26
1104		3/26/2014 10:45	3/26/2014 10:45	8210	3/26/2014 10:45	1200	3/26/2014 10:45	-1770	3/26/2014 10:45	3050	3/26
1105	11:00 AM	3/26/2014 11:00	MISSING	DATA	3/26/2014 11:00	1190	3/26/2014 11:00	-2030	3/26/2014 11:00	2960	3/26
1106		3/26/2014 11:15	MISSING	DATA	3/26/2014 11:15	966	MISSING	DATA	3/26/2014 11:15	3100	3/26
1107		3/26/2014 11:30	MISSING	DATA	3/26/2014 11:30	714	MISSING	DATA	3/26/2014 11:30	3010	3/26
1108		3/26/2014 11:45	MISSING	DATA	3/26/2014 11:45	240	MISSING	DATA	3/26/2014 11:45	2840	3/26
1109	NOON	3/26/2014 12:00	3/26/2014 12:00	2180	3/26/2014 12:00	-7	MISSING	DATA	3/26/2014 12:00	2750	3/26
1110		3/26/2014 12:15	3/26/2014 12:15	1140	3/26/2014 12:15	-242	3/26/2014 12:15	-3000	3/26/2014 12:15	2620	3/26
1111		3/26/2014 12:30	3/26/2014 12:30	613	3/26/2014 12:30	-408	3/26/2014 12:30	-3130	3/26/2014 12:30	2480	3/26
1112		3/26/2014 12:45	3/26/2014 12:45	-188	3/26/2014 12:45	-658	3/26/2014 12:45	-3040	3/26/2014 12:45	2410	3/26
1113	1:00 PM	3/26/2014 13:00	MISSING	DATA	3/26/2014 13:00	-931	3/26/2014 13:00	-3050	3/26/2014 13:00	2320	3/26
1114		3/26/2014 13:15	MISSING	DATA	3/26/2014 13:15	-1040	MISSING	DATA	3/26/2014 13:15	2220	3/26
1115		3/26/2014 13:30	MISSING	DATA	3/26/2014 13:30	-1230	MISSING	DATA	3/26/2014 13:30	2110	3/26
1116		3/26/2014 13:45	MISSING	DATA	3/26/2014 13:45	-1260	MISSING	DATA	3/26/2014 13:45	1890	3/26
1117	2:00 PM	3/26/2014 14:00	3/26/2014 14:00	-1760	3/26/2014 14:00	-1310	MISSING	DATA	3/26/2014 14:00	1830	3/26
1118		3/26/2014 14:15	3/26/2014 14:15	-1950	3/26/2014 14:15	-1260	3/26/2014 14:15	-2070	3/26/2014 14:15	1620	3/26
1119		3/26/2014 14:30	3/26/2014 14:30	-2240	3/26/2014 14:30	-1120	3/26/2014 14:30	-1390	3/26/2014 14:30	1390	3/26
1120		3/26/2014 14:45	3/26/2014 14:45	-1880	3/26/2014 14:45	-959	3/26/2014 14:45	-588	3/26/2014 14:45	1130	3/26
1121	3:00 PM	3/26/2014 15:00	3/26/2014 15:00	-1320	3/26/2014 15:00	-635	3/26/2014 15:00	302	3/26/2014 15:00	732	3/26
1122		3/26/2014 15:15	3/26/2014 15:15	-855	3/26/2014 15:15	-194	3/26/2014 15:15	1260	3/26/2014 15:15	731	3/26

Sheet1 / Sheet2 / Sheet3

Example: Comparison of splits of flow between the different tributaries of the Sacramento River at Freeport and below: Why don't the flow numbers add up correctly and why are there gaps in the data flow reporting online? Consistent gaps in data results in under reporting of flow and diversion into Georgiana Slough, more likely than not. Consistent timing and pattern of data gaps indicate DWR or other agencies were conducting flow experiments on these waterways at the time the gaps occured but were obscured in the online reporting. (Red boxes added to show the gap areas-compare to screen prints showing what the same timing looks like online)

FREEPORT			SUTTER			STEAMBOAT			GEORGIANA			BELOW GEORGIANA	
D	E	F	G	H	I	J	K	L	M	N	O	P	Q
3/20/2014 8:45	-9		3/20/2014 8:45	-482		3/20/2014 8:45	-349		3/20/2014 8:45	1780		3/20/2014 8:45	-1690
3/20/2014 9:00	635		3/20/2014 9:00	-124		3/20/2014 9:00	570		3/20/2014 9:00	1450		3/20/2014 9:00	-71
3/20/2014 9:15	1470		3/20/2014 9:15	368		3/20/2014 9:15	1740		3/20/2014 9:15	1060		3/20/2014 9:15	1280
3/20/2014 9:30	2660		3/20/2014 9:30	901		3/20/2014 9:30	2270		3/20/2014 9:30	916		3/20/2014 9:30	3050
3/20/2014 9:45	4120		3/20/2014 9:45	1310		3/20/2014 9:45	2780		3/20/2014 9:45	1100		3/20/2014 9:45	4270
3/20/2014 10:00	5920		3/20/2014 10:00	1660		3/20/2014 10:00	3030		3/20/2014 10:00	1220		3/20/2014 10:00	5190
3/20/2014 10:15	7960		3/20/2014 10:15	2010		3/20/2014 10:15	3320		3/20/2014 10:15	1490		3/20/2014 10:15	6180
3/20/2014 10:30	9530		3/20/2014 10:30	2360		3/20/2014 10:30	3540		3/20/2014 10:30	1670		3/20/2014 10:30	7050
3/20/2014 10:45	10200		3/20/2014 10:45	2600		3/20/2014 10:45	3710		3/20/2014 10:45	1720		3/20/2014 10:45	7790
MISSING	DATA		3/20/2014 11:00	2850		3/20/2014 11:00	3870		3/20/2014 11:00	1720		3/20/2014 11:00	8150
MISSING	DATA		3/20/2014 11:15	3000		MISSING	DATA		3/20/2014 11:15	1760		3/20/2014 11:15	8400
MISSING	DATA		3/20/2014 11:30	3140		MISSING	DATA		3/20/2014 11:30	1810		3/20/2014 11:30	8600
MISSING	DATA		3/20/2014 11:45	3210		MISSING	DATA		3/20/2014 11:45	1910		3/20/2014 11:45	8720
3/20/2014 12:00	12900		3/20/2014 12:00	3330		MISSING	DATA		3/20/2014 12:00	2100		3/20/2014 12:00	8720
3/20/2014 12:15	13000		3/20/2014 12:15	3350		3/20/2014 12:15	4150		3/20/2014 12:15	2170		3/20/2014 12:15	8810
3/20/2014 12:30	13000		3/20/2014 12:30	3440		3/20/2014 12:30	4170		3/20/2014 12:30	2200		3/20/2014 12:30	8880
3/20/2014 12:45	12900		3/20/2014 12:45	3480		3/20/2014 12:45	4120		3/20/2014 12:45	2270		3/20/2014 12:45	8900
3/20/2014 13:00	13200		3/20/2014 13:00	3460		3/20/2014 13:00	4110		3/20/2014 13:00	2410		3/20/2014 13:00	8930
3/20/2014 13:15	13100		3/20/2014 13:15	3510		3/20/2014 13:15	4070		3/20/2014 13:15	2340		3/20/2014 13:15	9030
3/20/2014 13:30	13400		3/20/2014 13:30	3530		3/20/2014 13:30	4090		3/20/2014 13:30	2460		3/20/2014 13:30	9110
3/20/2014 13:45	13600		3/20/2014 13:45	3550		3/20/2014 13:45	4060		3/20/2014 13:45	2460		3/20/2014 13:45	9210
3/20/2014 14:00	13900		3/20/2014 14:00	3540		3/20/2014 14:00	4020		3/20/2014 14:00	2530		3/20/2014 14:00	9170
3/20/2014 14:15	13600		3/20/2014 14:15	3550		3/20/2014 14:15	4040		3/20/2014 14:15	2570		3/20/2014 14:15	9240

03/26/2014 06:00	9440
03/26/2014 06:15	10000
03/26/2014 06:30	9980
03/26/2014 06:45	10500
03/26/2014 07:00	10900
03/26/2014 07:15	11100
03/26/2014 07:30	11600
03/26/2014 07:45	11500
03/26/2014 08:00	11400
03/26/2014 08:15	11300
03/26/2014 08:30	11300
03/26/2014 08:45	11500
03/26/2014 09:00	11600
03/26/2014 09:15	11900
03/26/2014 09:30	11600
03/26/2014 09:45	11300
03/26/2014 10:00	10500
03/26/2014 10:15	10100
03/26/2014 10:30	9260
03/26/2014 10:45	8210
03/26/2014 12:00	2180
03/26/2014 12:15	1140
03/26/2014 12:30	613
03/26/2014 12:45	-188
03/26/2014 14:00	-1760
03/26/2014 14:15	-1950
03/26/2014 14:30	-2240
03/26/2014 14:45	-1880
03/26/2014 15:00	-1320
03/26/2014 15:15	-855
03/26/2014 15:30	271
03/26/2014 15:45	1670
03/26/2014 16:00	2860
03/26/2014 16:15	4590

Screen print from above CDEC site for
Freeport flows, accessed 4/4/14, 4/8/14 with
no changes by DWR.

Can you find the data gap?

03/26/2014 07:45	3660
03/26/2014 08:00	3640
03/26/2014 08:15	3520
03/26/2014 08:30	3260
03/26/2014 08:45	3040
03/26/2014 09:00	2720
03/26/2014 09:15	2270
03/26/2014 09:30	1740
03/26/2014 09:45	1200
03/26/2014 10:00	510
03/26/2014 10:15	-129
03/26/2014 10:30	-842
03/26/2014 10:45	-1770
03/26/2014 11:00	-2030
03/26/2014 12:15	-3000
03/26/2014 12:30	-3130
03/26/2014 12:45	-3040
03/26/2014 13:00	-3050
03/26/2014 14:15	-2070
03/26/2014 14:30	-1390
03/26/2014 14:45	-588
03/26/2014 15:00	302
03/26/2014 15:15	1260
03/26/2014 15:30	1890
03/26/2014 15:45	2430
03/26/2014 16:00	2860
03/26/2014 16:15	3290
03/26/2014 16:30	3560
03/26/2014 16:45	3690
03/26/2014 17:00	3890
03/26/2014 17:15	3990
03/26/2014 17:30	4120
03/26/2014 17:45	4140
03/26/2014 18:00	4100

Can you find the data gaps?

Example of data gaps for flow reporting at Steamboat Slough gage.

Accessed online 4/4/14, 4/8/14 with no changes shown between the dates as reported by CDEC

DWR Sites | Help Link | CA.gov |

Department of Water Resources
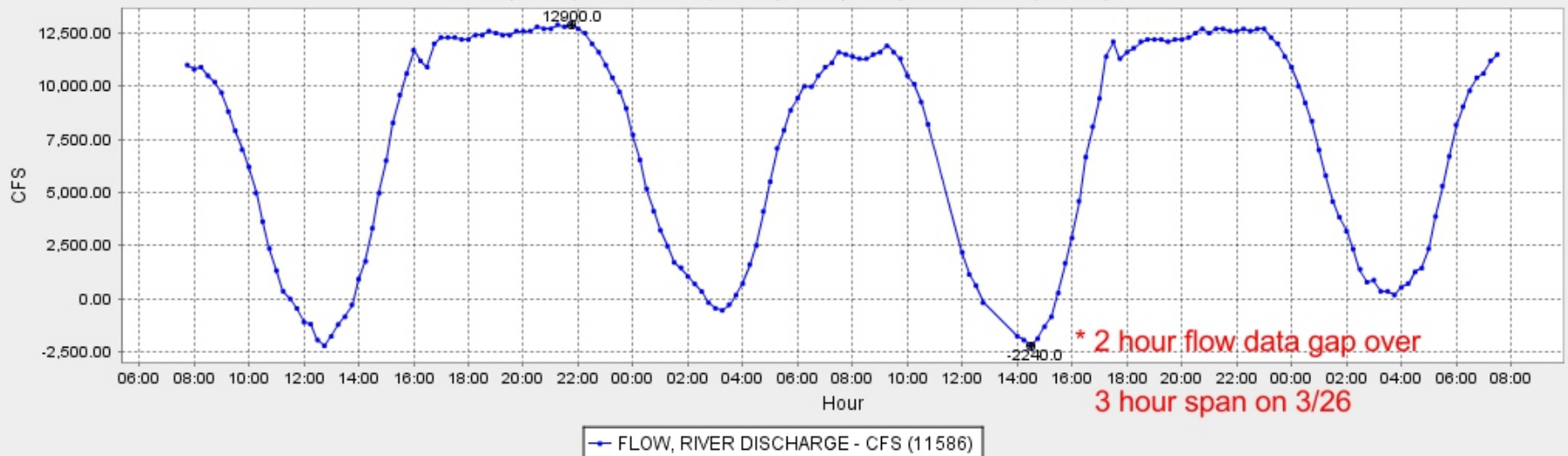**CALIFORNIA DATA EXCHANGE CENTER**
CA.gov

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HOME QUERY TOOLS PRECIPITATION RIVER FORECAST RIVER STAGES RESERVOIRS SNOW STATIONS WEATHER

SACRAMENTO RIVER AT FREEPORT (FPT)
Date from 03/25/2014 07:38 through 03/27/2014 07:38 Duration : 2 days
Max of period : (03/25/2014 21:45, 12900.0) Min of period: (03/26/2014 14:30, -2240.0)

* 2 hour flow data gap over
3 hour span on 3/26

FLOW, RIVER DISCHARGE - CFS (11586)

Generated on Tue Apr 08 07:39:18 PDT 2014

Plot all FPT Sensors | Real-Time FPT Data | FPT Data | Daily FPT Data | Show FPT Map | FPT Info

Plot from ending date: 03/27/2014 07:38   Span: 2   days   Get custom plot

CA.GOV
Department of Water Resources
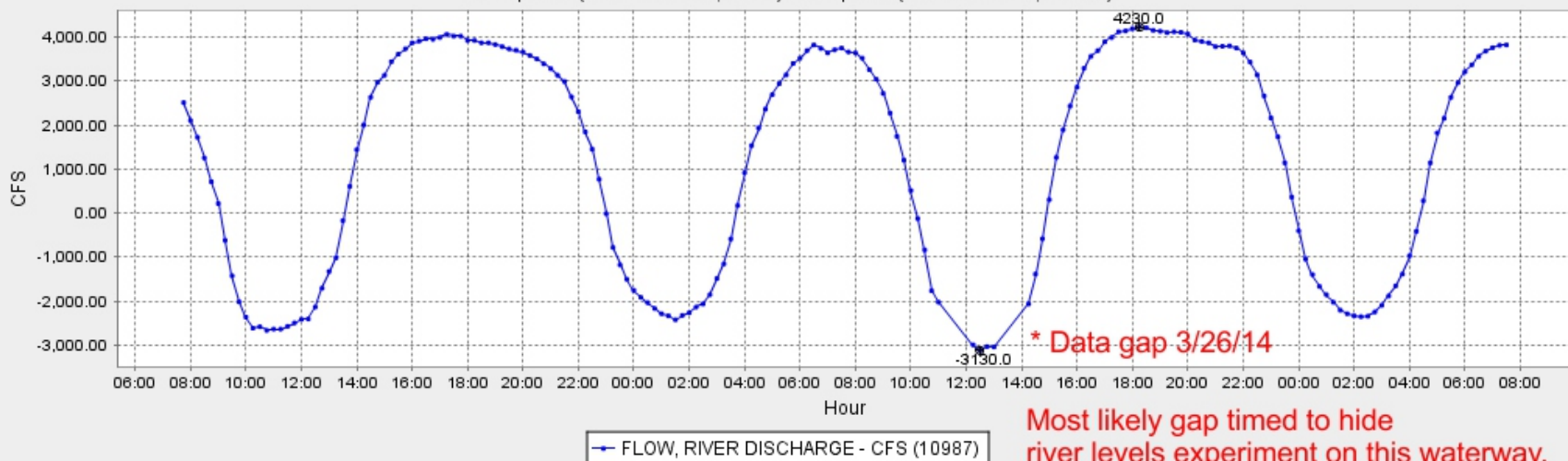**CALIFORNIA DATA EXCHANGE CENTER**

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HOME | QUERY TOOLS | PRECIPITATION | RIVER FORECAST | RIVER STAGES | RESERVOIRS | SNOW | STATIONS | WEATHER

STEAMBOAT SLOUGH BTW SAC R AND SUTTER SL (SSS)
Date from 03/25/2014 07:35 through 03/27/2014 07:35 Duration : 2 days
Max of period : (03/26/2014 18:15, 4230.0) Min of period: (03/26/2014 12:30, -3130.0)

* Data gap 3/26/14

FLOW, RIVER DISCHARGE - CFS (10987)

Most likely gap timed to hide
river levels experiment on this waterway.
2 one-hour gaps split by 1 hour reported
flow indicates this was not a monitor
equipment problem, especially when
combined with fact of timing of Freeport
data gap on the same date.

Generated on Tue Apr 08 07:37:40 PDT 2014

Plot all SSS Sensors | Real-Time SSS Data | SSS Data | Daily SSS Data | Show SSS Map | SSS Info

Plot from ending date: 03/27/2014 07:35   Span: 2   days   Get custom plot

Summary: USACE should question the wisdom of approval of barriers or other flow modification actions in the Delta when correct flow data is not available as reported online at CDEC

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3/21/2014 10:15	2320	942	2210	871	3060
3/21/2014 10:30	4440	1330	2720	904	4380
3/21/2014 10:45	6260	1600	3030	1130	5290
3/21/2014 11:00	8050	2050	3310	1350	6090

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Is this because Georgiana is deeper than the other waterways
so that gravity flow draws more fresh Sacramento River water
into the Mokelumne/San Joaquin river system for export?

*Did DWR already alter flows in the water collum by adding
berms or barriers below visible water levels on Steamboat
Slough adjacent to the bridge, east side and on the
Sacramento River just below Georgiana Slough?*

*example   Note how the outflow numbers do not make sense at times
How can there be 6260 at Freeport less 5786 diverted into
Sutter, Steamboat and Georgiana, yet still leave 6090 of flow
on the Sacramento River below Georgiana?

Missing flow data for the time period of March 15 to March 30 2014 for the CDEC stations reviewed:
note that every station reviewed showed gaps in data, but at different times and days:

Freeport data gaps: 3/20 between 10:45 to 12 noon; 3/26 between 10:45 to 12 noon; 3/26 between 12/45 to 14:00; 3/28 between 10?45 to 12 noon.
   (note the 3/26 gap represents sudden flow change from 8,210 cfs to -1760 in just three hour span-not a natural tide timeframe. Look at the data gaps from downstream gages)

Sutter Slough data gaps: 3/18 between 8:15 to 9:30; 3/29 between 19:15 to 20:30

Steamboat Slough data gaps: 3/16 between 14:00 to 15:15; 3/20 between 11:00 to 12:15; 3/26 between 11:00 to 12:15; 3/26 between 13:00 to 14:15; 3/27 between 19:00 to 20:15.

Georgiana Slough data gaps: 3/16 between 17:15 to 18:30; 3/18 between 8:15 to 9:30.

Below Georgiana Slough on the Sacramento River: 3/18 between 8:15 to 9:30; 3/28 between 13:15 to 14:30.

4/8/2014
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