

Smelt Working Group  
April 18, 2016

**Meeting Summary**

The Working Group described the risk of entrainment under the Service-provided advice framework. Under this framework the relative risk of entrainment for OMR flow ranges is discussed and assessed. For the current week, the risk of entrainment of larval and juvenile Delta Smelt for each of the flow ranges is characterized as follows:

- -1250 to -2000 cfs has a low to medium risk of entrainment,
- -2000 to -3500 cfs has a medium to high risk of entrainment,
- -3500 to -5000 cfs has a high risk of entrainment.

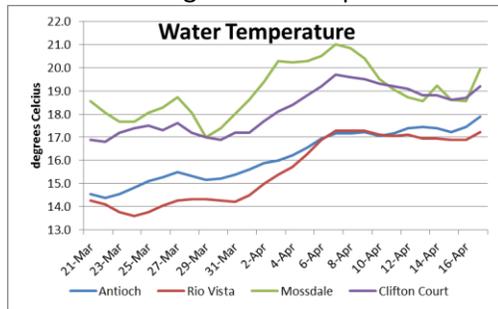
The Working Group is following guidance for entrainment protections from both Action 2 (adult Delta Smelt) and Action 3 (juvenile Delta Smelt). The Working Group will continue to monitor Delta Smelt survey and salvage data and Delta conditions, and will meet again on Monday, April 25, 2016 at 10 am.

**Reported Data**

1. Current environmental data

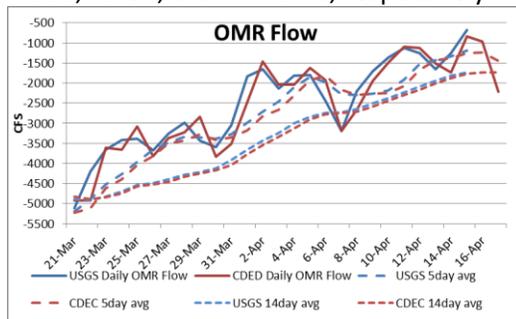
a. Temperature

3 station average water temperature is 18.4°C.



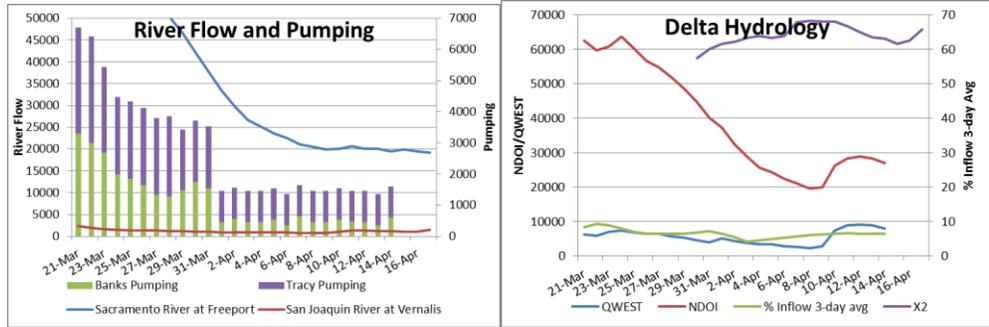
b. OMR flow

USGS OMR daily, 5-day, and 14-day average flows on April 15 are -686, -1194, and -1738 cfs, respectively. The CDEC OMR daily, 5-day, and 14-day average flows for April 17 were -2211, -1454, and -1742 cfs, respectively.

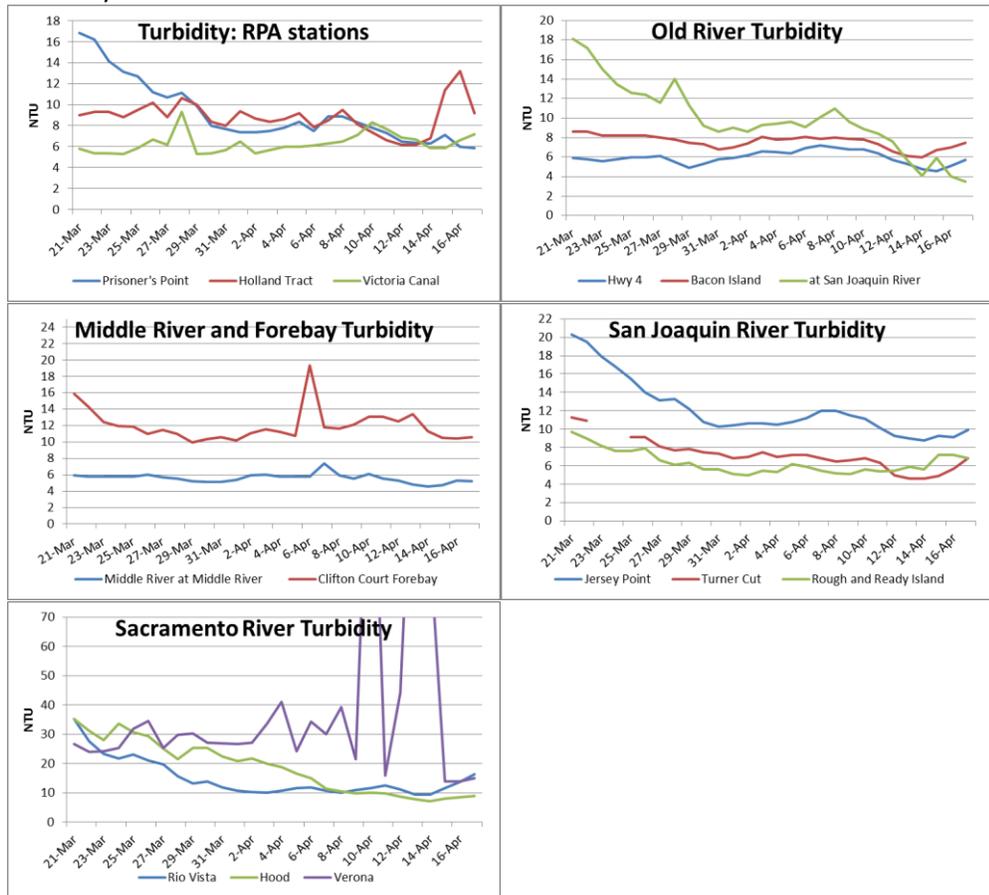


c. River Flows and pumping

Sacramento River at Freeport flow for April 17 was 19,137 cfs. San Joaquin River at Vernalis river flow for April 17 was 1526 cfs. X2 is at 68km. Combined exports are 1500 cfs today. Qwest for April 17 was 2598 cfs.



d. Turbidity



2. Delta fish monitoring

CDFW has released the 2015 FMWT indices:  
 The 2015 Delta Smelt annual FMWT index is 7.  
 The 2015 Longfin Smelt annual FMWT index is 4.  
 Both indices are the lowest on record (i.e. since 1967).

Spring Kodiak Trawl #4 was in the field the week of April 4. A total of 13 Delta Smelt adults were collected, all from station 719. Sizes ranged from 65 to 78 mm. SKT #5 is in the field the week of May 2.

20-mm Survey #3 was in the field last week. Sample processing is ongoing. So far, a total of 18 juvenile Delta Smelt were collected, ranging in size from 11 to 26 mm. Most fish were collected from station 719, with three fish collected downstream. 20-mm Survey #4 is in the field next week.

The Early Warning Survey began November 30 and ended on March 30.

### **3. Modeling**

PTM runs were distributed to the group including insertion points at Jersey Point, Prisoners Point, and San Joaquin River at Medford Island. OMR flows included -1250, -2000, -2500, -3000, -3500, and -5000 cfs.

### **4. Salvage**

No adult Delta Smelt salvage has occurred since February 22. The cumulative season total of salvaged adult Delta Smelt is 12, which represents 29% of the concern level of the WY 2016 adult Delta Smelt incidental take. Four juvenile Delta Smelt were salvaged on April 15, which represents 2% of the concern level of the WY 2016 juvenile Delta Smelt incidental take.

No adult Longfin Smelt have been observed in salvage sampling at either the federal or state Delta facilities during the current water year. Two juvenile Longfin Smelt were salvaged on March 9 at the SWP; eight juvenile Longfin Smelt were salvaged on March 11 at the CVP. Combined salvage of >20 mm Longfin Smelt is ten for the season.

Larval sampling has been conducted since March 1st at both the SWP and CVP. No larval Delta Smelt has been detected in the samples processed so far this season. Larval Longfin Smelt were detected at the SWP on March 16.

### **5. Expected Project Operations**

Jones pumping plant is pumping 1000 cfs today. The daily average intake to Clifton Court (CC) is 500 cfs. Combined pumping is 1500 cfs today. Pumping is constrained to 1500 cfs to comply with NMFS RPA IV.2.1. Combined pumping is expected to increase on Thursday to divert water being released by the Oakdale Irrigation District. Operators did not know the rate of pumping as yet for Thursday.

### **6. Delta Conditions Team**

DCT met on April 15, but no update was distributed to the SWG.

### **7. Assessment of Risk:**

#### BiOp Background

RPA Component 1, Action 2 states, "An action implemented using an adaptive process to tailor protection to changing environmental conditions after Action 1. As in Action 1, the intent is to protect pre-spawning adults from entrainment and, to the extent possible, from adverse hydrodynamic conditions." "The range of net daily OMR flows will be no more negative than -1,250 to -5,000 cfs. Depending on extant conditions specific OMR flows within this range are recommended by the Working Group from the onset of Action 2 through its termination..."

RPA Component 2, Action 3: "The objective of this RPA component (which corresponds to Action 3 in Attachment B), is to improve flow conditions in the Central and South Delta so that larval

and juvenile delta smelt can successfully rear in the Central Delta and move downstream when appropriate” (page 282).

The WY 2016 adult Delta Smelt incidental take (IT) is 56, as stated in the Service’s December 23, 2015 memo to the Bureau of Reclamation. The concern level is 42. The method to calculate the adult IT is described on p 386 of the 2008 BiOp, with the corrections described in both the February 22, 2013, and December 23, 2015 memos. The alternative approach that the Service presented to the 2015 independent review panel at the Long-term Operation Biological Opinions annual science review will be piloted this year.

The WY 2016 larval/juvenile Delta Smelt incidental take is 392, and the concern level is 261. The method to calculate the larval/juvenile IT is described on p 389, with revision provided in the February 22, 2013 Service memo to the Bureau of Reclamation.

#### 2015 Delta Smelt abundance

The four primary 2015 annual abundance indices for all Delta Smelt life stages are the lowest on record.

	2014	2015
SKT	30.1	13.8
20-mm	1.1	0.3
TNS	0.5	0.0
FMWT	9	7

#### Discussion

As discussed in previous notes, the Working Group continues to conclude that overall risk of entrainment of adult Delta Smelt into the south Delta continues to be low.

The Working Group assumes spawning occurred, and may still be occurring, in the lower San Joaquin River, as well as potentially in the Old River corridor. The Working Group has continuing concerns regarding larvae in the Old River corridor as well as the lower San Joaquin River, given the continued decline of catch in surveys this year. Delta Smelt catch data from the most recent field surveys (20-mm Survey #3 [week of April 11], and SKT #4 [week of April 4]) do not show a strong presence of Delta Smelt in the central and south Delta; all Delta Smelt catch from these two surveys were collected in the Sacramento River system. However, four juvenile Delta Smelt were salvaged on April 15, indicating a presence of juvenile Delta Smelt in the south Delta. The 5-day OMR flow for April 15 was -1198 cfs, which is more positive than is anticipated later in the week.

The SWG has stressed since early in the season, that Delta Smelt have been present not only in the lower San Joaquin, but also at times, in the south Delta. The confirmation of juvenile salvage on April 15 further indicates an elevated risk of entrainment. Members assume there are some number of fish in the south and central Delta. Even with detections in the 20-mm Survey #3 and the SKT #4 all in the Sacramento River system or downstream of the central Delta, members stressed their concern that the very low population abundance affects probability of detection, and, therefore, distribution cannot be determined with accuracy. Members indicated that a larger percentage of fish may be in the south and central Delta than would be assumed from field survey catch data.

Given the OMR flows that were occurring on and just prior to April 15 and the particle entrainment results from the modeling runs, members indicated a high risk of entrainment for OMR flows more negative than -2500 cfs.

The earlier life stages of Delta Smelt are at greater risk for entrainment, given that they behave more like a particle than older life stages. Older life stages have greater ability to control their position in the water column. Therefore, PTM runs were of particular importance in the assessment of entrainment risk.

The above discussion points influenced and contributed to all three flow ranges described below:

Advice Framework OMR Level Risk Ranking and Discussion—**Larval Delta Smelt**

- OMR flow of -1250 to -2000 cfs: There is a *low to medium* risk of entrainment under this flow range. Some members indicated the risk for this flow range should be *medium to high*. This is the most protective range for larval Delta Smelt.
  - Risk factors: lowest annual indices on record, low likelihood of detection.
  - Salvage: four salvaged April 15 (with a 5-day average OMR flow of -1198 cfs on that day), geographic influence of the pumps does not extend to central Delta under this OMR flow range
  - Unknowns: detection ability in salvage and trawl surveys has been severely reduced, given the record low abundance indexes.
  - Persistence of risk: expected to continue until at least April 25
- OMR flow of -2000 to -3500 cfs: There is a *medium to high* risk of entrainment under this flow range. Some members indicated the risk for this flow range should be *high*.
  - Risk Factors: lowest annual indices on record, low likelihood of detection
  - Salvage: four salvaged April 15, geographic influence of the pumps extends to the Old River corridor
  - Unknowns: detection ability in salvage and trawl surveys has been severely reduced, given the record low abundance indexes.
  - Persistence of Risk: expected to continue until at least April 25
- OMR flow of -3500 to -5000 cfs. There is a *high* risk of entrainment under this flow range.
  - Risk Factors: lowest annual indices on record, low likelihood of detection
  - Salvage: four salvaged April 15, geographic influence of the pumps extends to the lower San Joaquin River.
  - Unknowns: detection ability in salvage and trawl surveys has been severely reduced, given the record low abundance indexes.
  - Persistence of Risk: expected to continue until at least April 25

Advice Framework OMR Level Risk Ranking and Discussion—**Adult Delta Smelt**

- OMR flow of -1250 to -2000 cfs: There is a low risk of entrainment under this flow range. This is the most protective range for Delta Smelt.
  - Risk factors: lowest annual indices on record.

- Salvage: None since February 22, geographic influence of the pumps does not extend to central Delta under this flow range
- Unknowns: detection ability in salvage and trawl surveys has been severely reduced, given the record low abundance indexes; low Sacramento River catch densities (unable to assess percentage of population in the lower San Joaquin River).
- Persistence of risk: expected to continue through remainder of the season
- OMR flow of -2000 to -3500 cfs: There is a low risk of entrainment under this flow range, given conditions listed below:
  - Risk factors: lowest annual indices on record.
  - Salvage: none since February 22, geographic influence of the pumps not likely to extend to central Delta under this flow range
  - Unknowns: detection ability in salvage and trawl surveys has been severely reduced, given the record low abundance indexes, low Sacramento River catch densities (unable to assess percentage of population in the lower San Joaquin River).
  - Persistence of risk: expected to continue through remainder of the season.
- OMR flow of -3500 to -5000 cfs: There is a medium risk of entrainment under this flow range. Some members indicated this flow range had a high risk of entrainment.
  - Risk factors: lowest annual indices on record, reduced turbidity in the south Delta (although elevated turbidity at Prisoner's Point this morning coincided with the catch of a Delta Smelt at the same location).
  - Salvage: none since February 22, geographic influence of the pumps is likely to extend to central Delta under this flow range.
  - Unknowns: detection ability in salvage and trawl surveys has been severely reduced, given the record low abundance indexes, low Sacramento River catch densities (unable to assess percentage of population in the lower San Joaquin River).
  - Persistence of risk: expected to continue until spawning has completed

The Working Group will continue to monitor conditions and smelt distribution and will meet again on Monday, April 25, 2016.

## WEEKLY ADVICE FOR THE DEPARTMENT OF FISH AND WILDLIFE FOR LONGFIN SMELT

### **Advice for week of April 18, 2016:**

The Smelt Working Group does not have any advice for Longfin Smelt based on recent information.

The period of potential Barker Slough operations restriction is over for 2016 (see #5 below).

### **Basis for advice:**

The 2009 State Water Project 2081 for Longfin Smelt states that advice to WOMT and the DFW Director shall be based on:

1. Adult Salvage – total adult ( $\geq 80$  mm) Longfin Smelt salvage (SWP+CVP) for December through February  $> 5$  times the Fall Midwater Trawl Longfin Smelt annual abundance index.
2. Adult abundance, distribution or other information indicates that OMR flow advice is warranted.
3. Larva distribution in the Smelt Larva Survey or the 20-mm Survey finds Longfin Smelt larvae present at 8 of 12 central and south Delta sampling stations in 1 survey (809, 812, 815, 901, 902, 906, 910, 912, 914, 915, 918, 919; see Figure 1).
4. Larva catch per tow exceeds 15 Longfin Smelt larvae or juveniles in 4 or more of the 12 survey stations listed.
5. During the period January 15 through March 31 of a dry or critically dry water year only, advice for Barker Slough pumping plant operations may be warranted if larval Longfin Smelt are detected at station 716 and other information indicates risk of entrainment.

### **Discussion of Criteria**

1. No Longfin Smelt were salvaged during the week of April 11-17. No Longfin Smelt have been salvaged since mid-March. On March 9, 2016, the first Longfin Smelt was salvaged for the water year, a young-of-the-year ( $\geq 20$  mm); additional young-of-the-year were salvaged on March 11 for a total salvage of 10. Salvage of young-of-the-year does not count toward the adult salvage limit for advice. The **Longfin Smelt adult salvage threshold for advice is 20** based on a Fall Midwater Trawl abundance index of 4 for 2015 (see criterion in #1 above). No advice is warranted based on this criterion.
2. There is no new adult distribution information. No Bay Study sampling was conducted in April to date and no sampling was conducted in February or March. January Bay Study sampling detected no Longfin Smelt in the lower San Joaquin or Sacramento rivers. December Bay Study sampling collected no Longfin Smelt in the San Joaquin River. The December Fall Midwater Trawl sampled the region and did not detect Longfin Smelt in the San Joaquin River or the south Delta. Distribution information does not indicate advice is warranted based on this criterion.

3 & 4. The third 20-mm Survey was conducted during the week of April 11 and is partially processed (Table 1, Figure 1). No larvae were detected among the 12 criteria stations (Table 1, Figure 1). Neither the distribution (Basis for advice #3) nor the catch density (Basis for advice #4) criterion was achieved. Catches of Longfin Smelt larvae remain low, but have recently increased somewhat in Suisun Bay stations.

5. The Barker Slough criterion terminated for the water year on March 31.

**Current conditions:** The Sacramento River flow decreased to 19,376 cfs on April 17 and the San Joaquin River at Vernalis was 1,580 cfs. Also on April 17, Qwest was +2,598 cfs. Combined State and federal exports continue at about 1,500 cfs (health and safety minima) since April 1 to comply with NMFS criteria.

There is no new adult distribution information.

**Summary of Risk:** Risk of entrainment in the south Delta is very low due to consistent lack of detection in the central and south Delta criteria stations, recent strongly positive Qwest, and very low exports. Qwest declined rapidly late last week, but will likely remain positive into the near future. Beginning April 1, NMFS criteria limited south Delta exports to match San Joaquin River inflow. There is a decreasing likelihood of additional Longfin Smelt larvae hatching in the lower San Joaquin River, and larva numbers are likely to remain at zero (Table 1). April usually marks the end of the spawning and hatching seasons.

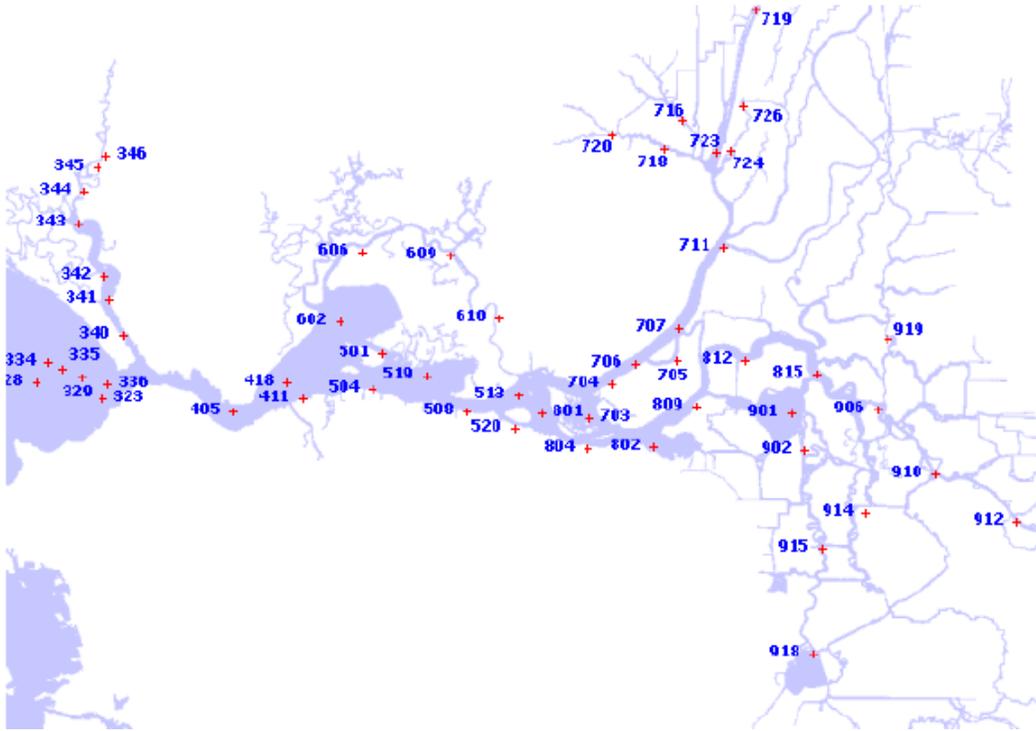
The Barker Slough concern period ended March 31.

Table 1. Longfin Smelt catch by station in the 20-mm Survey, #3. Sample processing is incomplete.

Year	Survey	Station	Date	# Tows Processed	Species	Total Catch	Min Length	Max Length	Avg Length
2016	3	323		0	Not Yet Processed	0			
2016	3	340		0	Not Yet Processed	0			
2016	3	342		0	Not Yet Processed	0			
2016	3	343		0	Not Yet Processed	0			
2016	3	344		0	Not Yet Processed	0			
2016	3	345		0	Not Yet Processed	0			
2016	3	346		0	Not Yet Processed	0			
2016	3	405		0	Not Yet Processed	0			
2016	3	411	12-Apr-16	1	Longfin Smelt	7	8	21	15.14
2016	3	418		0	Not Yet Processed	0			
2016	3	501	12-Apr-16	1	Longfin Smelt	11	13	27	18.36
2016	3	504	12-Apr-16	1	Longfin Smelt	24	13	33	26.13
2016	3	519	12-Apr-16	1	Longfin Smelt	3	16	20	17.67
2016	3	602		0	Not Yet Processed	0			
2016	3	606		0	Not Yet Processed	0			
2016	3	609		0	Not Yet Processed	0			
2016	3	610		0	Not Yet Processed	0			
2016	3	608	12-Apr-16	1	Longfin Smelt	12	21	29	25.75
2016	3	513	11-Apr-16	1	Longfin Smelt	82	8	23	17.08
2016	3	520	12-Apr-16	1	Longfin Smelt	18	11	25	18.00
2016	3	801	11-Apr-16	3	Longfin Smelt	16	12	20	16.50
2016	3	804	12-Apr-16	3	No Longfin Catch	0			
2016	3	703	12-Apr-16	3	Longfin Smelt	3	13	18	15.00
2016	3	704	11-Apr-16	1	No Longfin Catch	0			
2016	3	705	11-Apr-16	3	Longfin Smelt	2	12	15	13.50
2016	3	708	11-Apr-16	1	No Longfin Catch	0			
2016	3	707	11-Apr-16	1	No Longfin Catch	0			
2016	3	711	11-Apr-16	1	No Longfin Catch	0			
2016	3	716	13-Apr-16	1	No Longfin Catch	0			
2016	3	718	13-Apr-16	2	No Longfin Catch	0			
2016	3	719	13-Apr-16	1	No Longfin Catch	0			
2016	3	720	13-Apr-16	1	No Longfin Catch	0			
2016	3	723	13-Apr-16	3	No Longfin Catch	0			
2016	3	724		0	Not Yet Processed	0			
2016	3	726		0	Not Yet Processed	0			
2016	3	809	12-Apr-16	3	No Longfin Catch	0			
2016	3	812	12-Apr-16	3	No Longfin Catch	0			
2016	3	815	12-Apr-16	3	No Longfin Catch	0			
2016	3	901*	11-Apr-16	3	No Longfin Catch	0			
2016	3	902	11-Apr-16	3	No Longfin Catch	0			
2016	3	906	11-Apr-16	3	No Longfin Catch	0			
2016	3	910	11-Apr-16	3	No Longfin Catch	0			
2016	3	912	11-Apr-16	3	No Longfin Catch	0			
2016	3	914	11-Apr-16	3	No Longfin Catch	0			
2016	3	915*	11-Apr-16	3	No Longfin Catch	0			
2016	3	918	11-Apr-16	3	No Longfin Catch	0			
2016	3	919	12-Apr-16	3	No Longfin Catch	0			

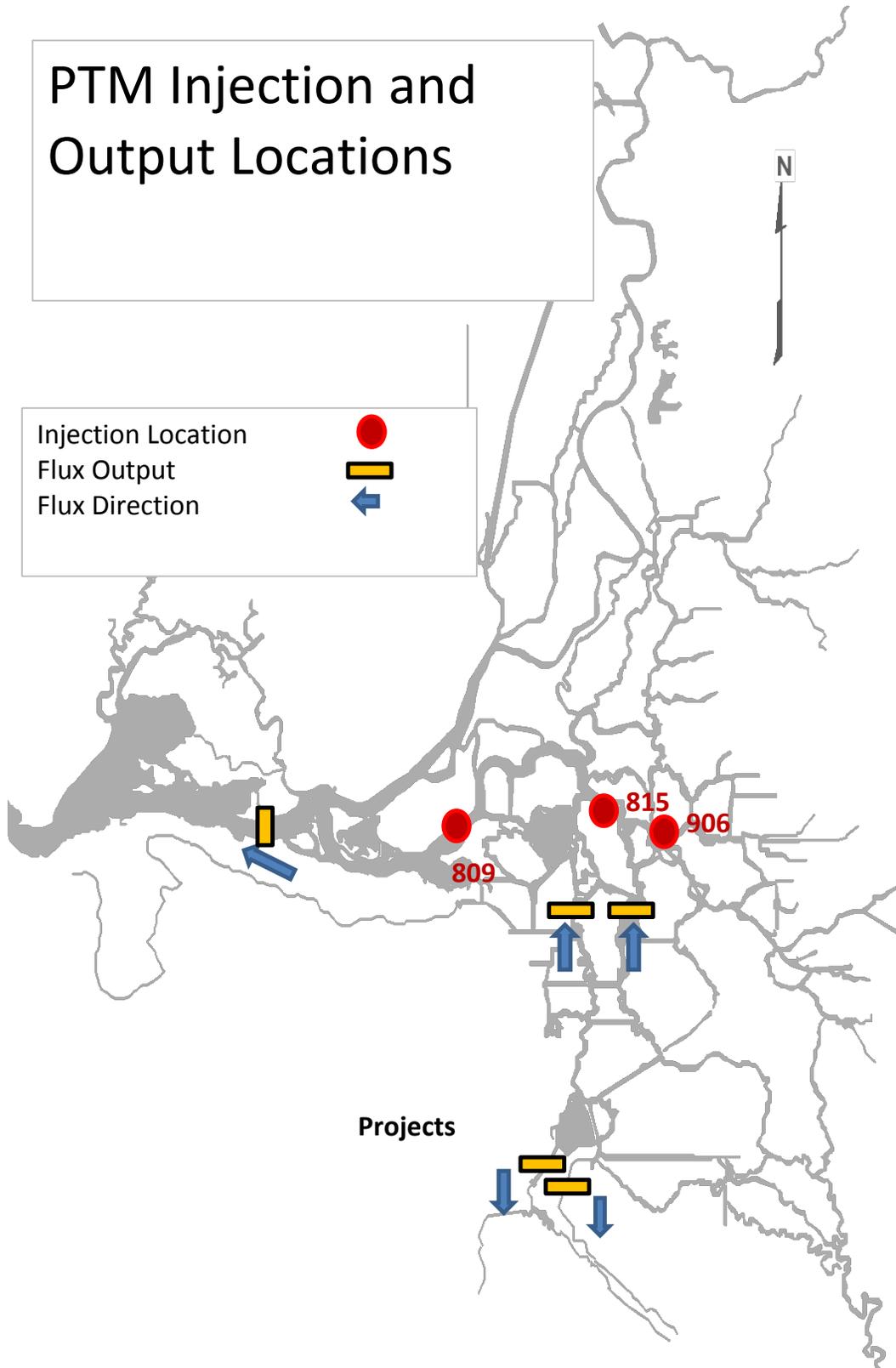
\*Reduced tow time  
Processing is complete through 4/15/2016

Figure 1. DFW's Smelt Larva Survey/20-mm Survey station locations.



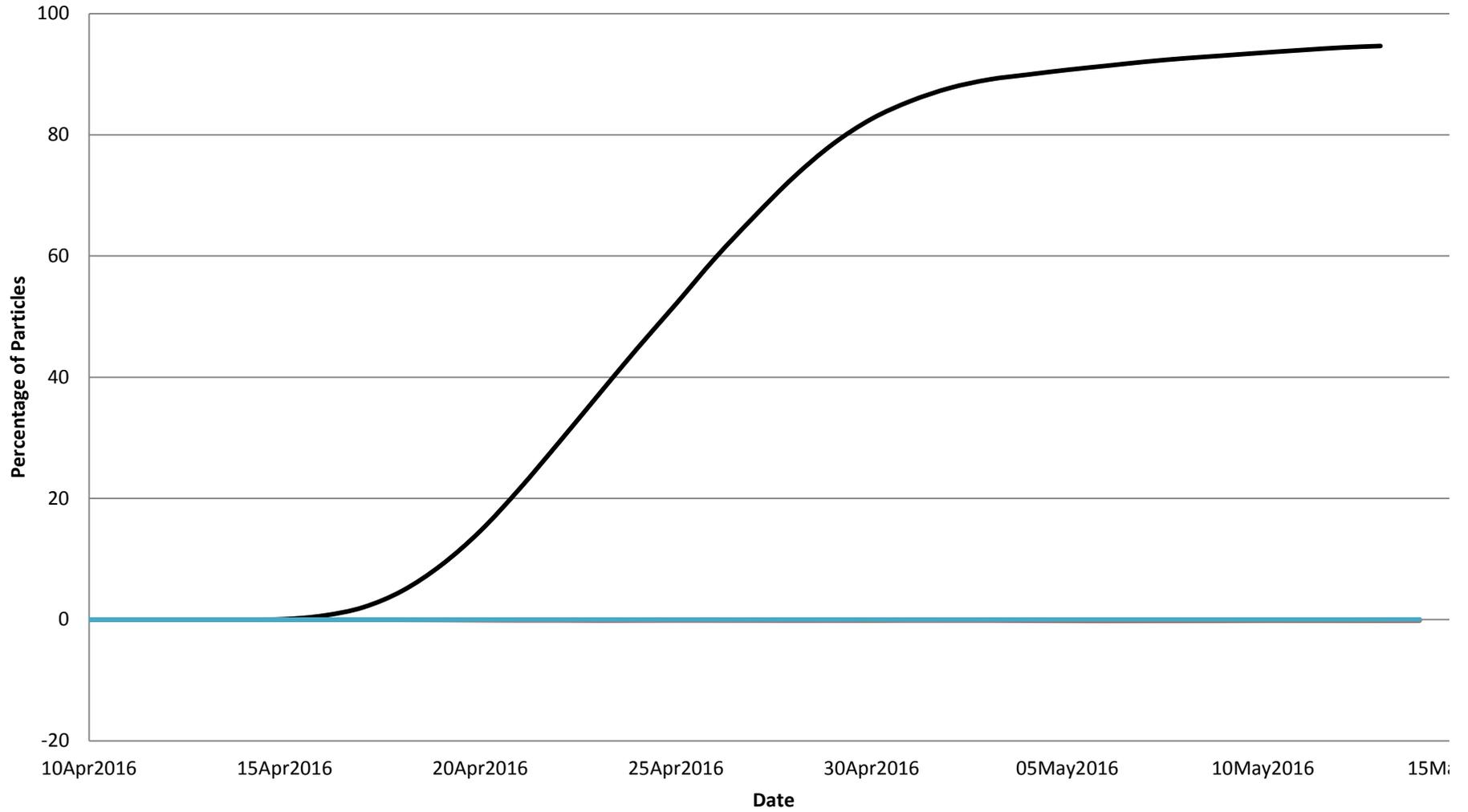
# PTM Injection and Output Locations

Injection Location  
Flux Output  
Flux Direction



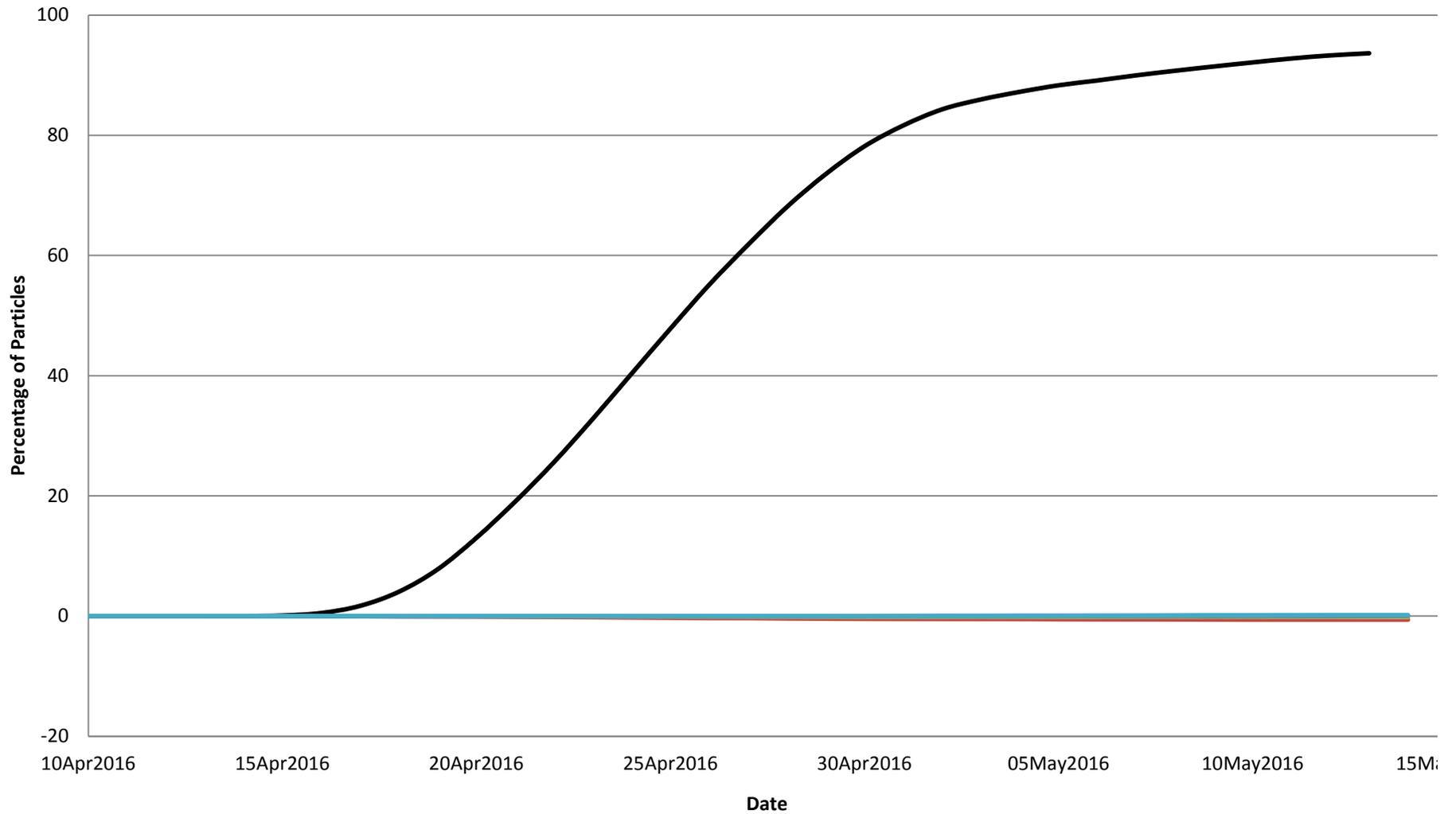
April 15, 2016

# Flux at OMR -1250 cfs Particles inserted at Jersey Point On April 13, 2016



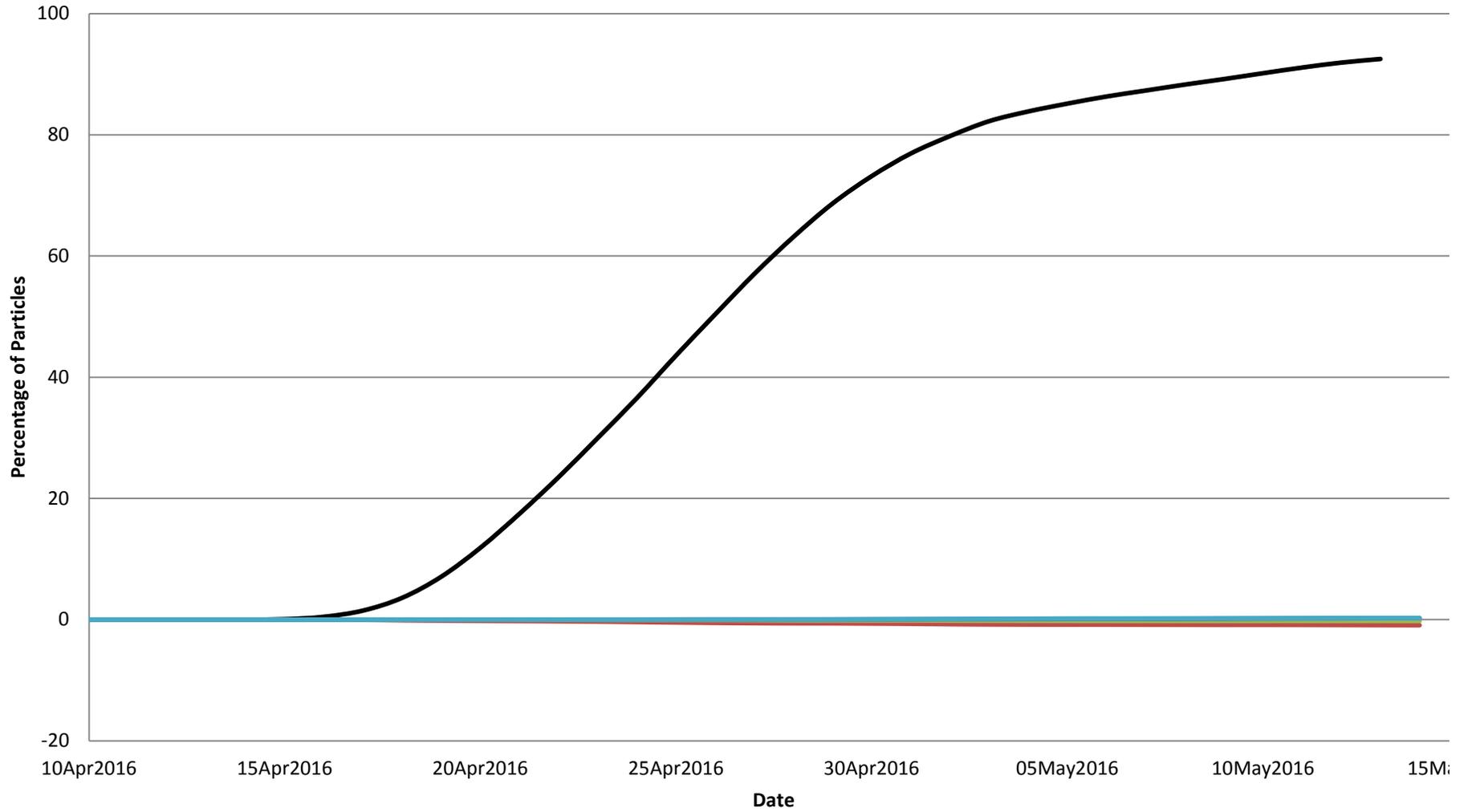
— Chipps — Old River adjacent to Holland Tract — Middle River adjacent to Bacon Island — SWP — CVP

# Flux at OMR -2000 cfs Particles inserted at Jersey Point on April 13, 2016



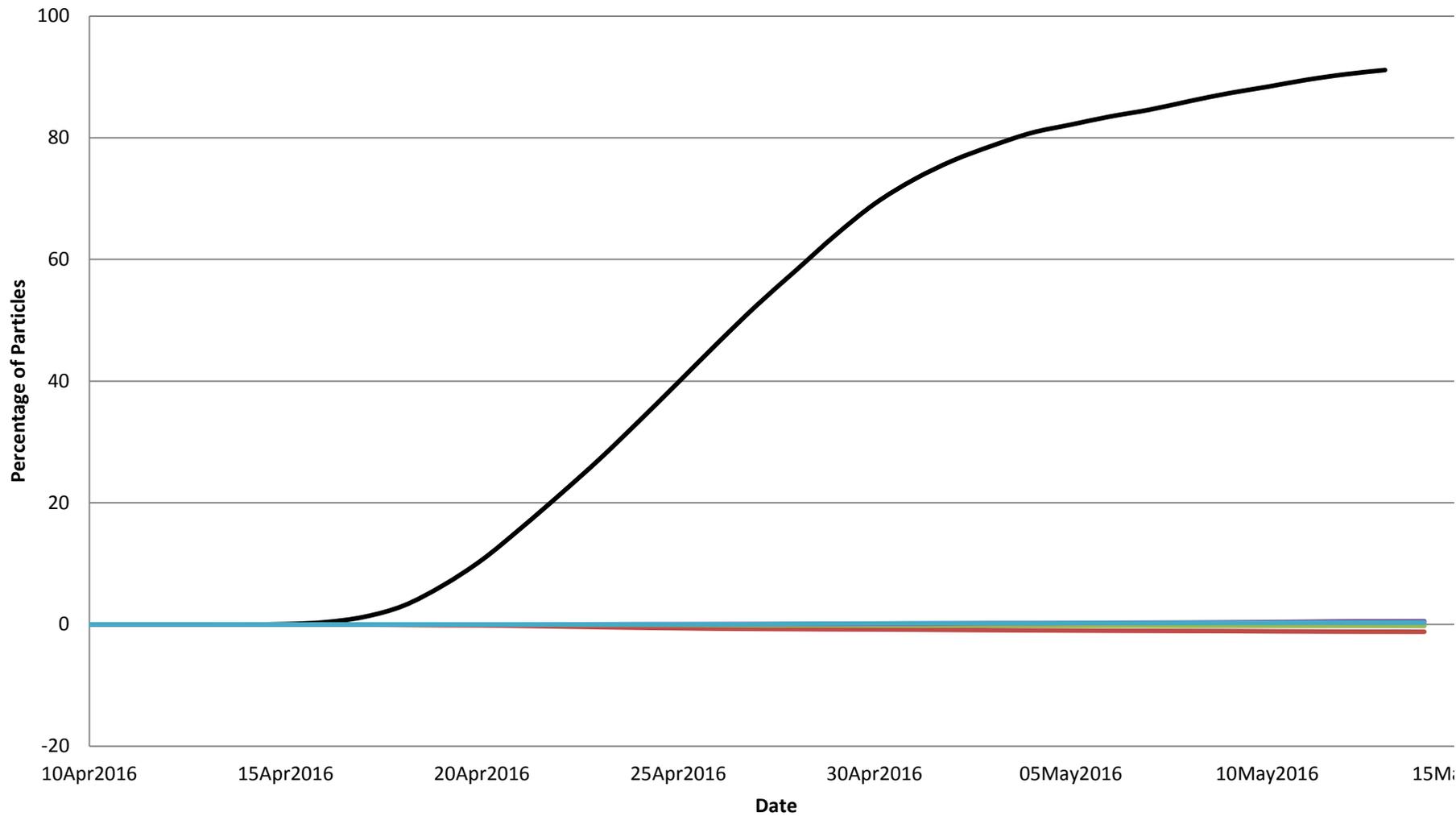
— Chipps — Old River adjacent to Holland Tract — Middle River adjacent to Bacon Island — SWP — CVP

# Flux at OMR -2500 cfs Particles inserted at Jersey Point On April 13, 2016



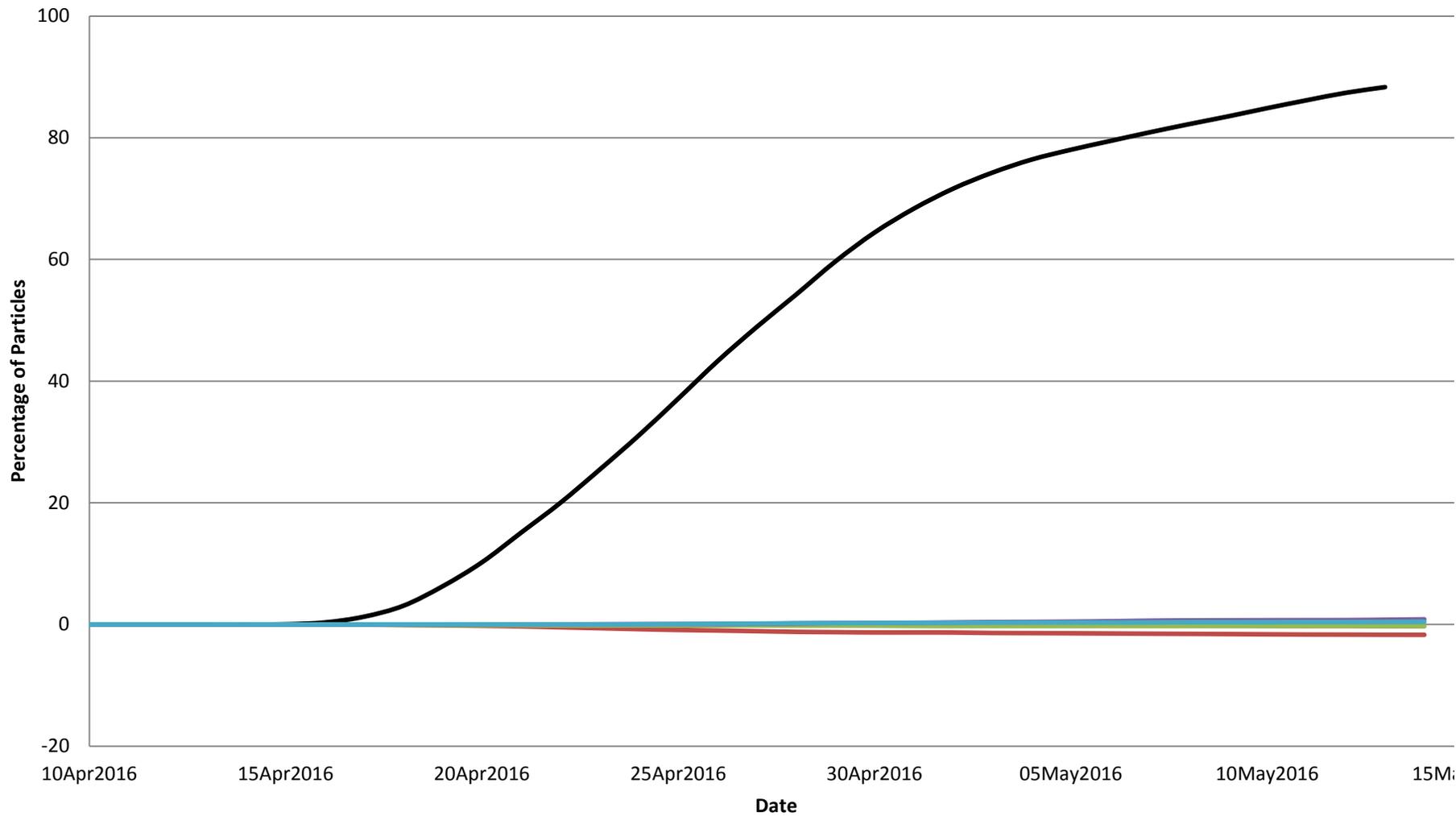
— Chipps — Old River adjacent to Holland Tract — Middle River adjacent to Bacon Island — SWP — CVP

# Flux at OMR -3000 cfs Particles inserted at Jersey Point on April 13, 2016



— Chipps — Old River adjacent to Holland Tract — Middle River adjacent to Bacon Island — SWP — CVP

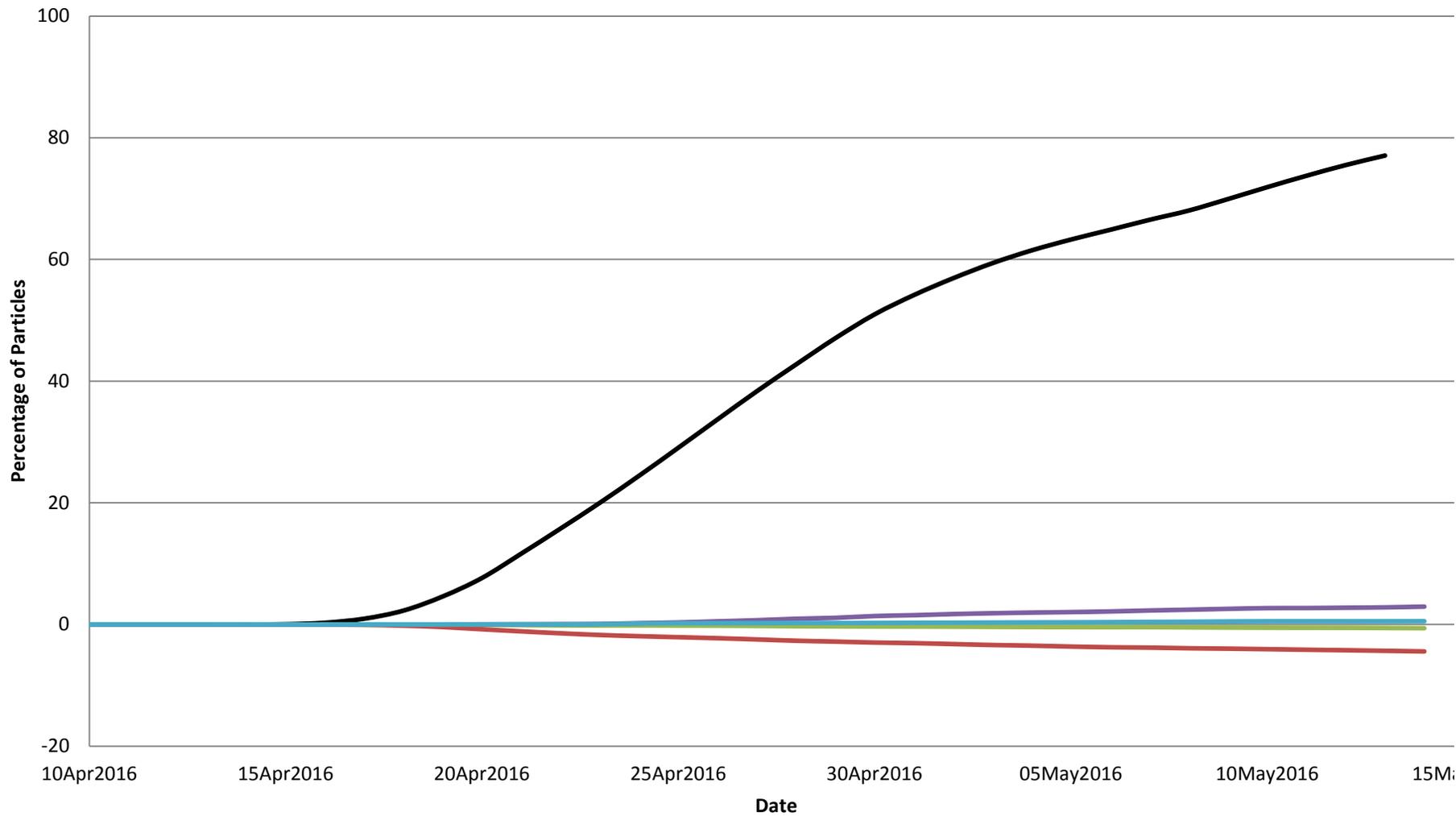
# Flux at OMR -3500 cfs Particles inserted at Jersey Point on April 13, 2016



— Chipps — Old River adjacent to Holland Tract — Middle River adjacent to Bacon Island — SWP — CVP

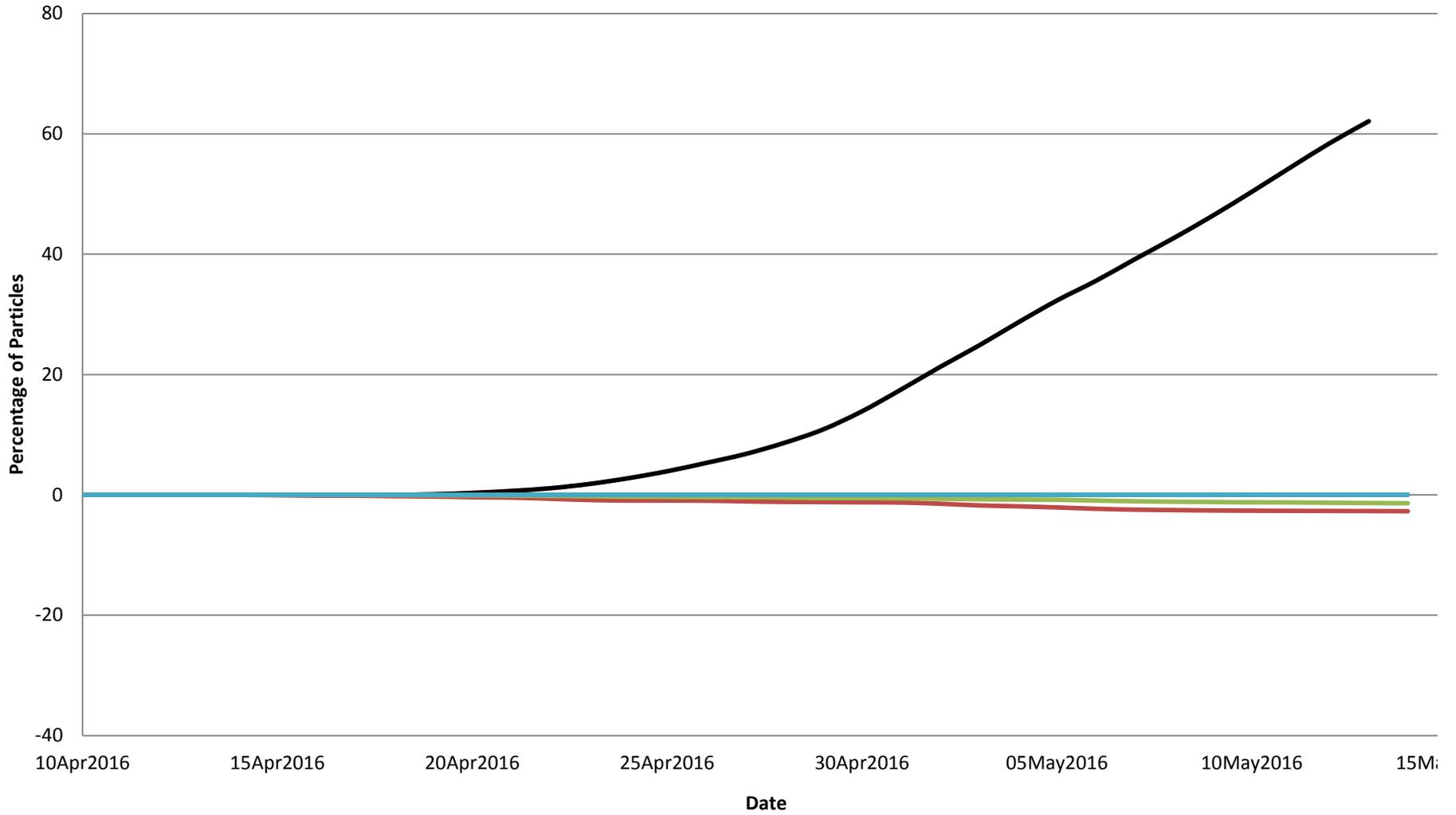
# Flux at OMR -5000 cfs

## Particles inserted at Jersey Point on April 13, 2016



— Chipps — Old River adjacent to Holland Tract — Middle River adjacent to Bacon Island — SWP — CVP

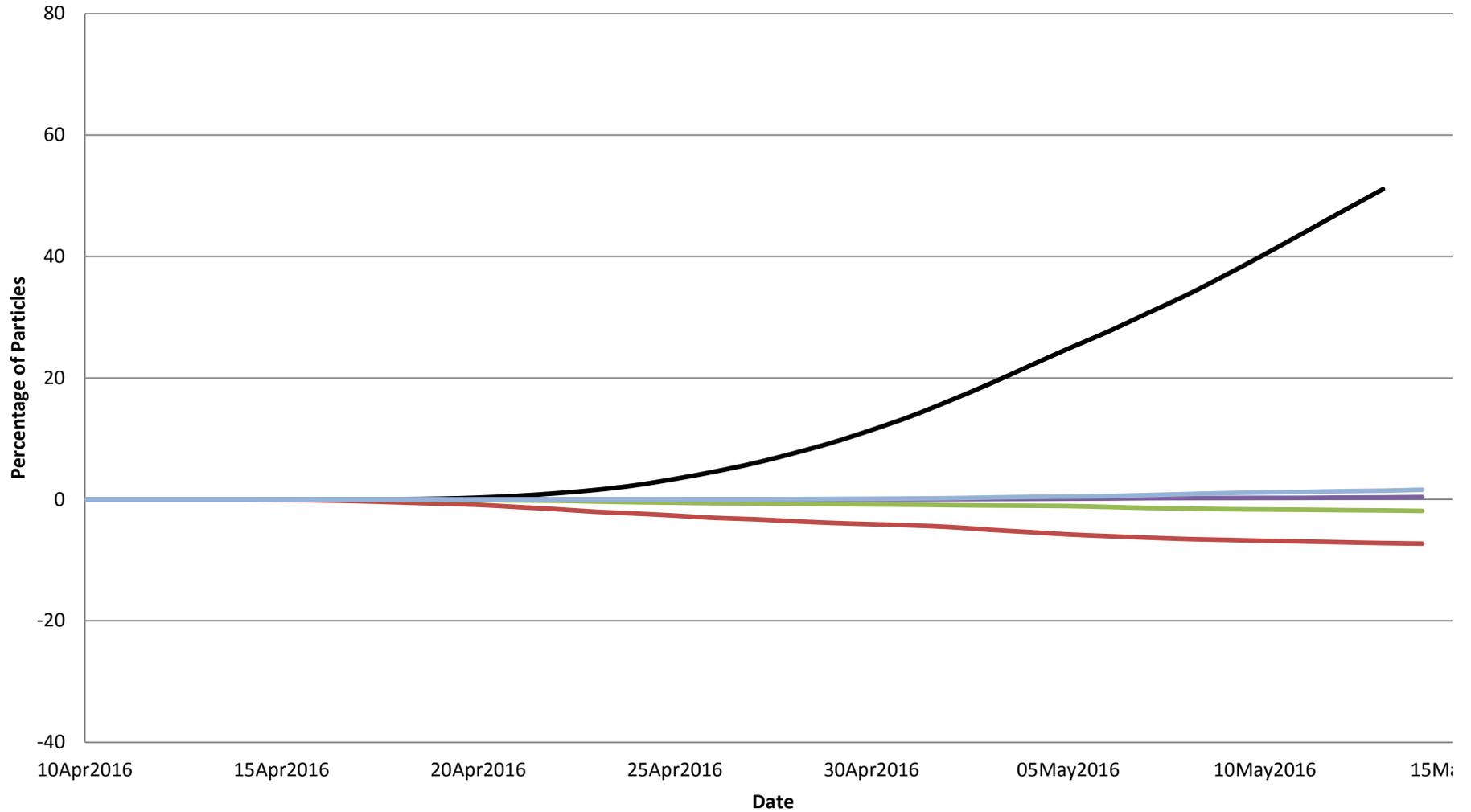
# Flux at OMR -1250 cfs Particles inserted at Prisoner's Point on April 13, 2016



— Chipps — Old River adjacent to Holland Tract — Middle River adjacent to Bacon Island — SWP — CVP

# Flux at OMR -2000 cfs

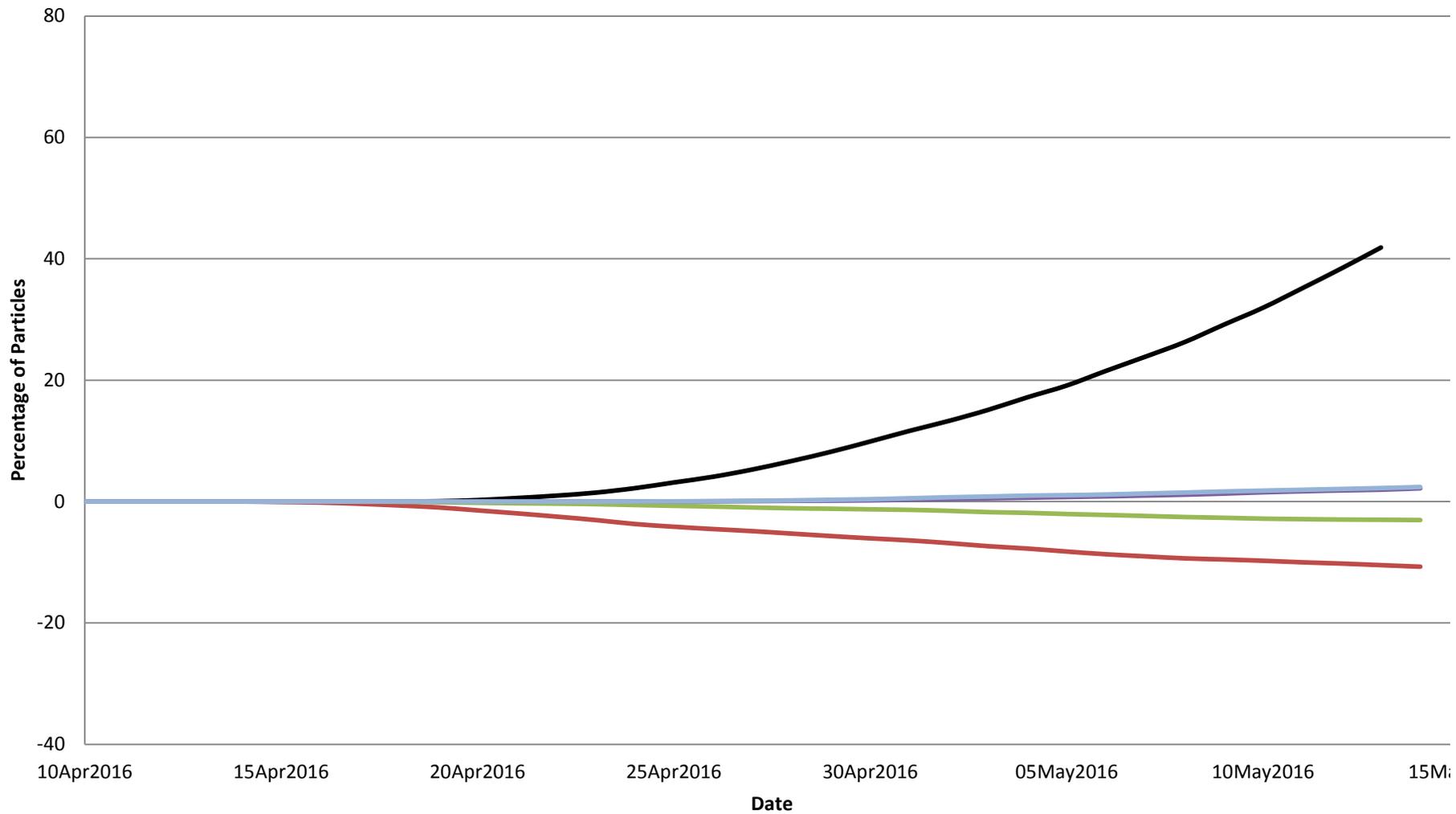
## Particles inserted at SJR at Prisoner's Point on April 13, 2016



— Chipps — Old River adjacent to Holland Tract — Middle River adjacent to Bacon Island — SWP — CVP

# Flux at OMR -2500 cfs

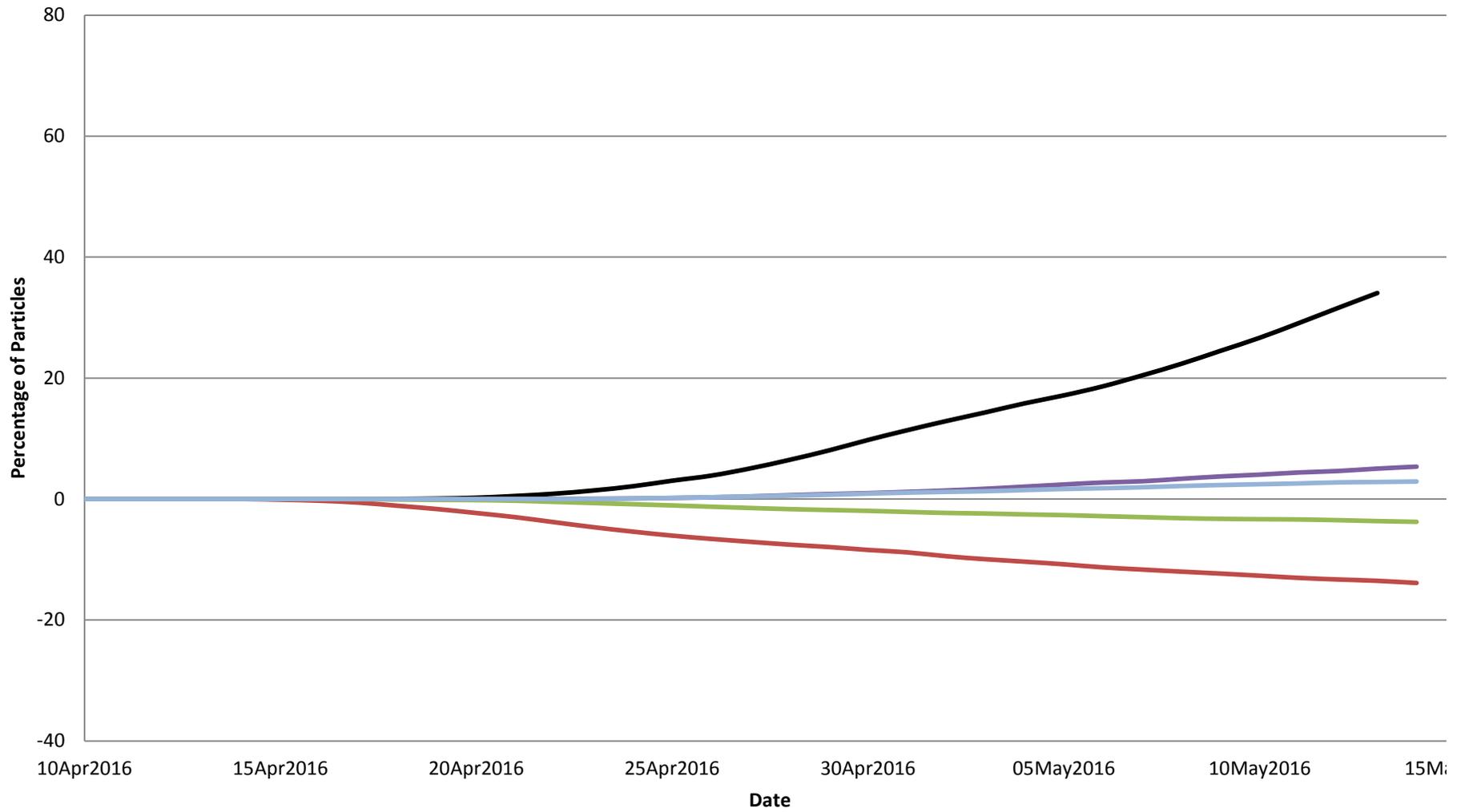
## Particles inserted at SJR at Prisoner's Point on April 13, 2016



— Chipps — Old River adjacent to Holland Tract — Middle River adjacent to Bacon Island — SWP — CVP

# Flux at OMR -3000 cfs

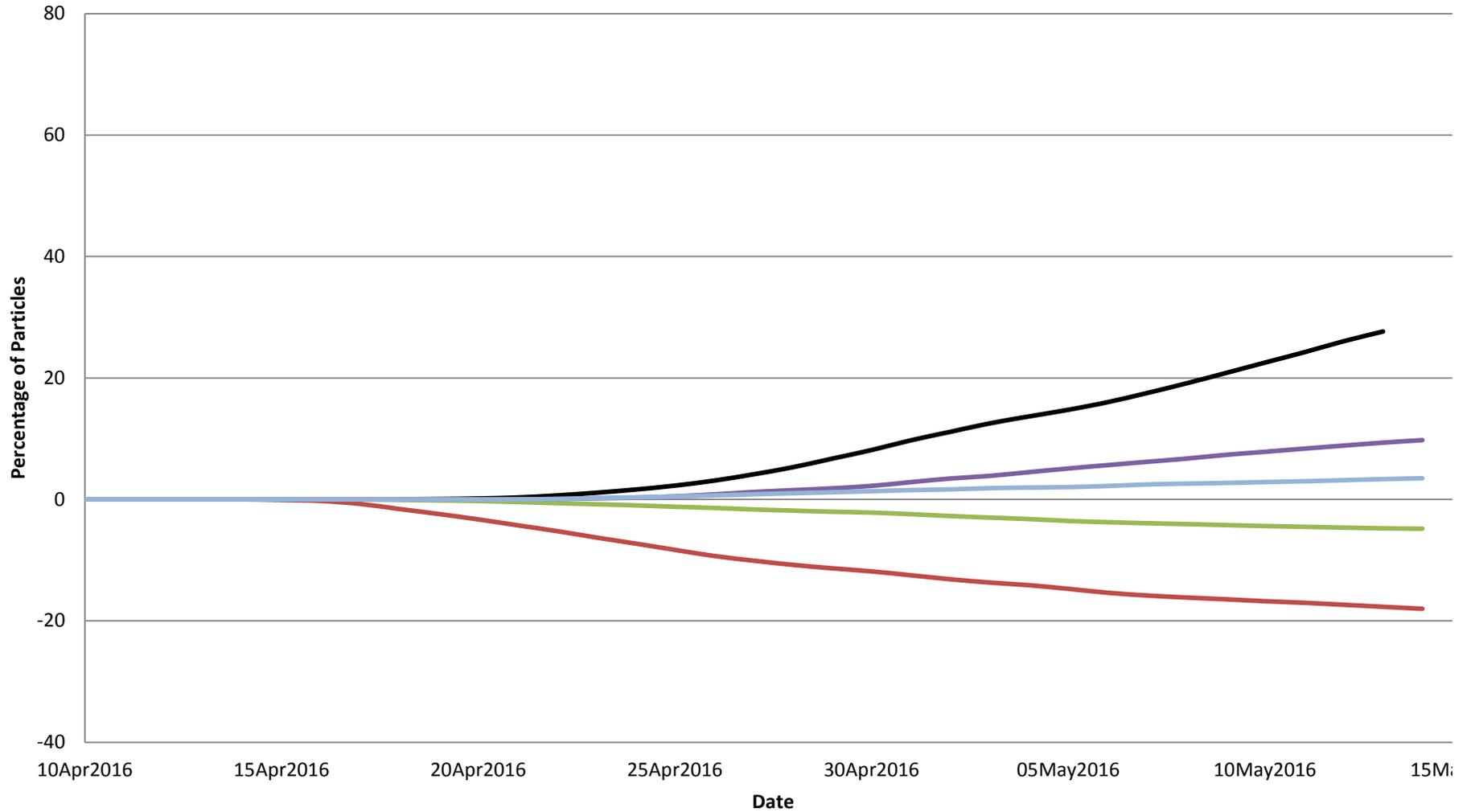
## Particles inserted at SJR at Prisoner's Point on April 13, 2016



— Chipps — Old River adjacent to Holland Tract — Middle River adjacent to Bacon Island — SWP — CVP

# Flux at OMR -3500 cfs

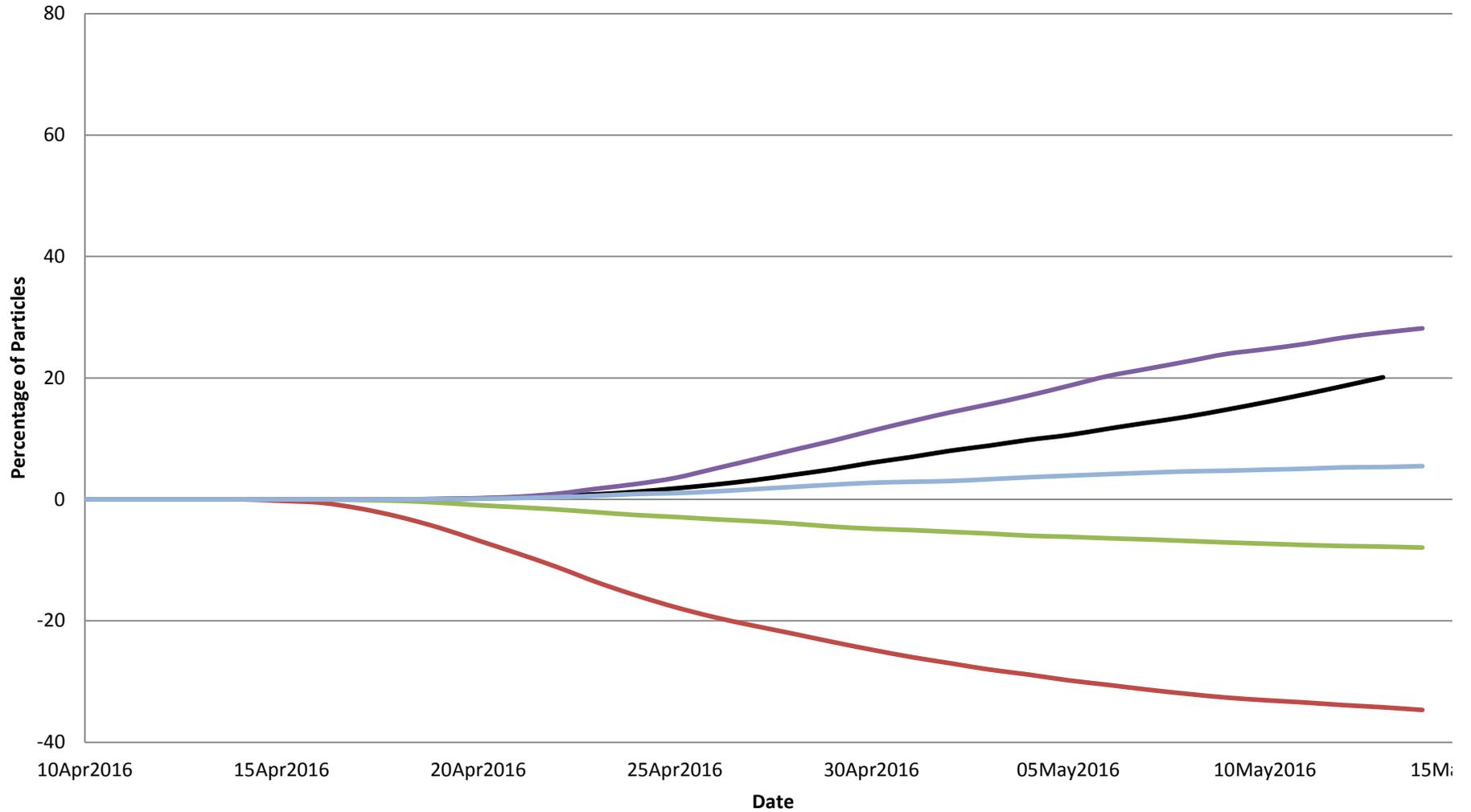
## Particles inserted at SJR at Prisoner's Point on April 13, 2016



— Chipps — Old River adjacent to Holland Tract — Middle River adjacent to Bacon Island — SWP — CVP

# Flux at OMR -5000 cfs

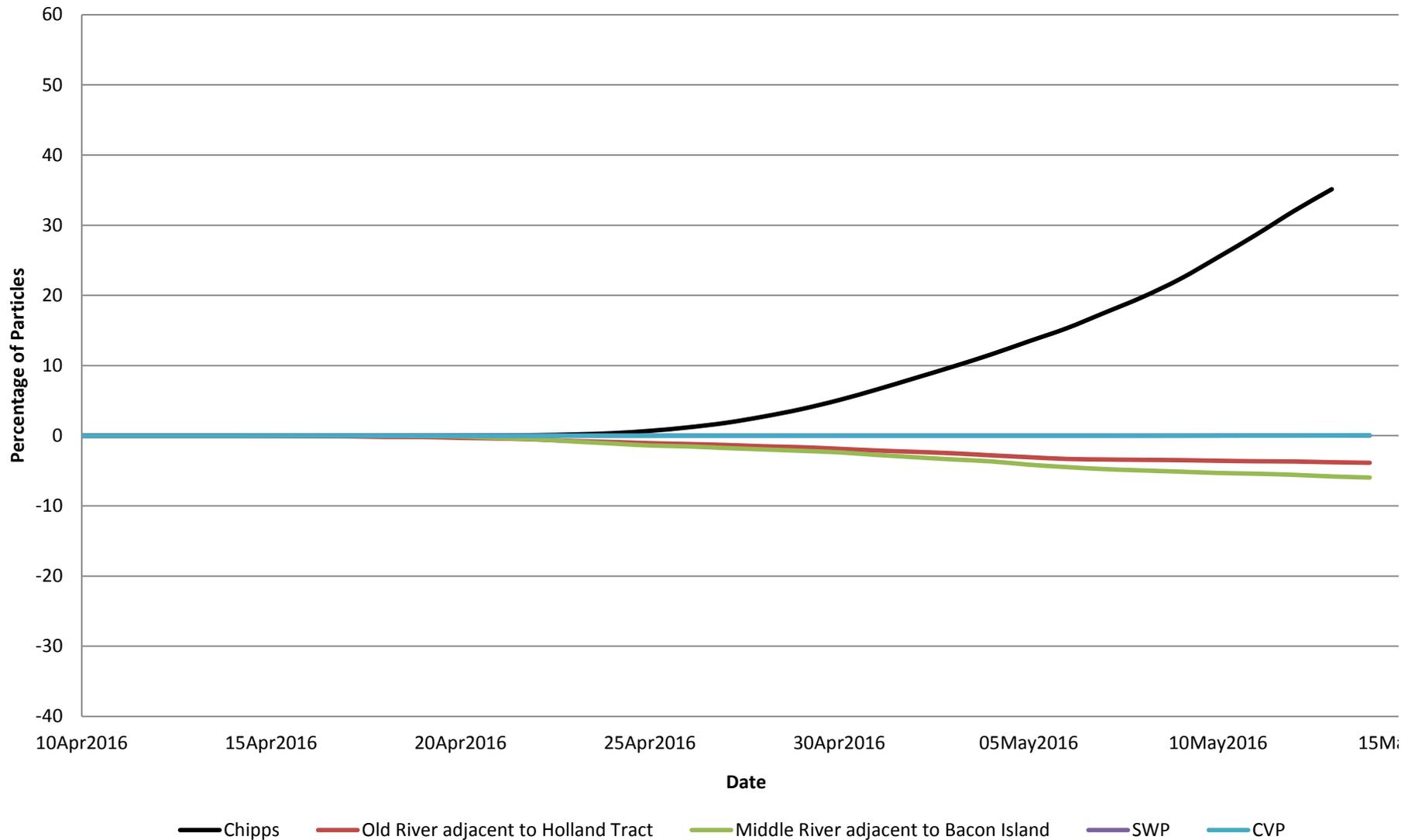
## Particles inserted at SJR at Prisoner's Point on April 13, 2016



— Chipps — Old River adjacent to Holland Tract — Middle River adjacent to Bacon Island — SWP — CVP

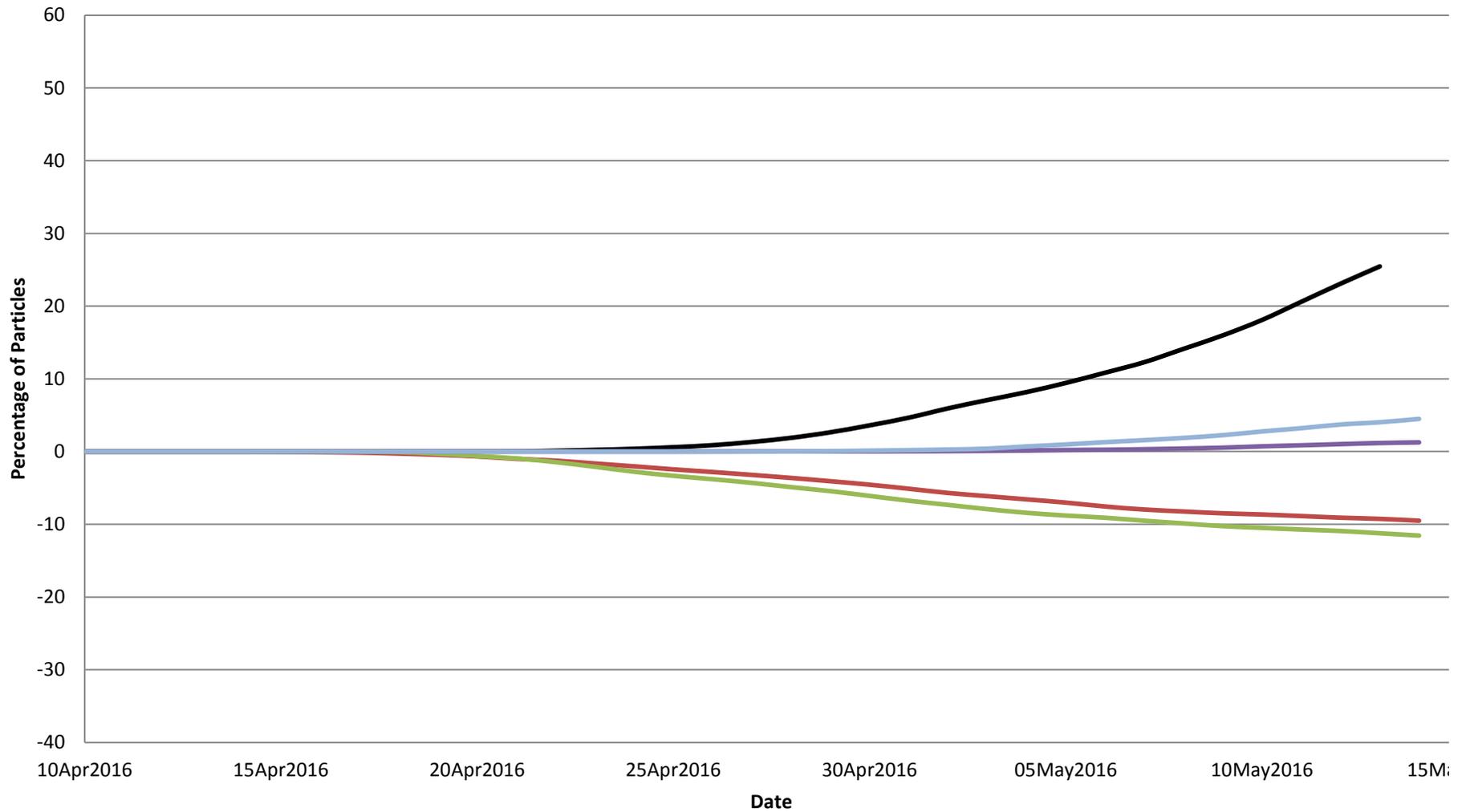
# Flux at OMR -1250 cfs

## Particles inserted at SJR at Medford Island on April 13,2016



# Flux at OMR -2000 cfs

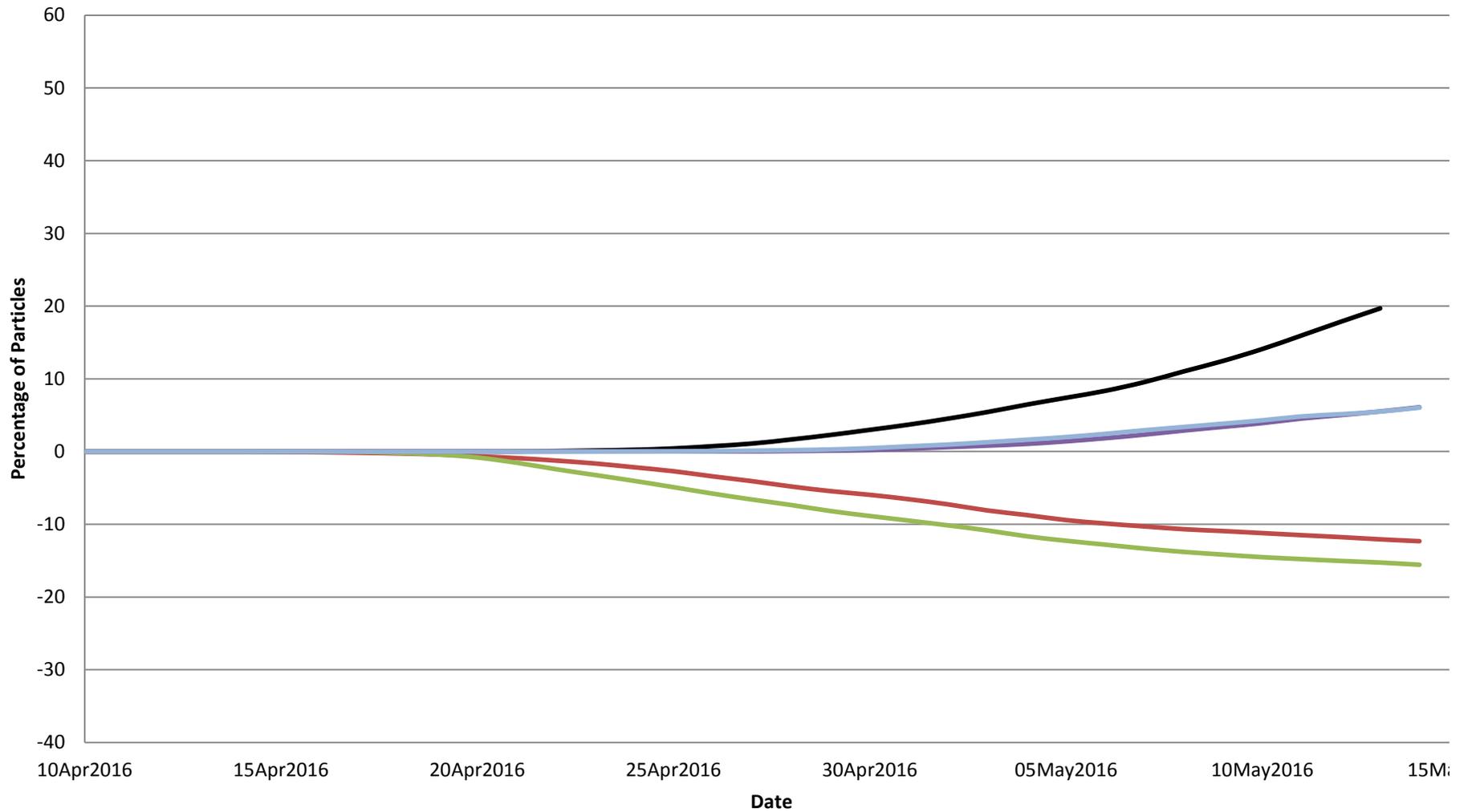
## Particles inserted at SJR at Medford Island on April 13,2016



— Chipps — Old River adjacent to Holland Tract — Middle River adjacent to Bacon Island — SWP — CVP

# Flux at OMR -2500 cfs

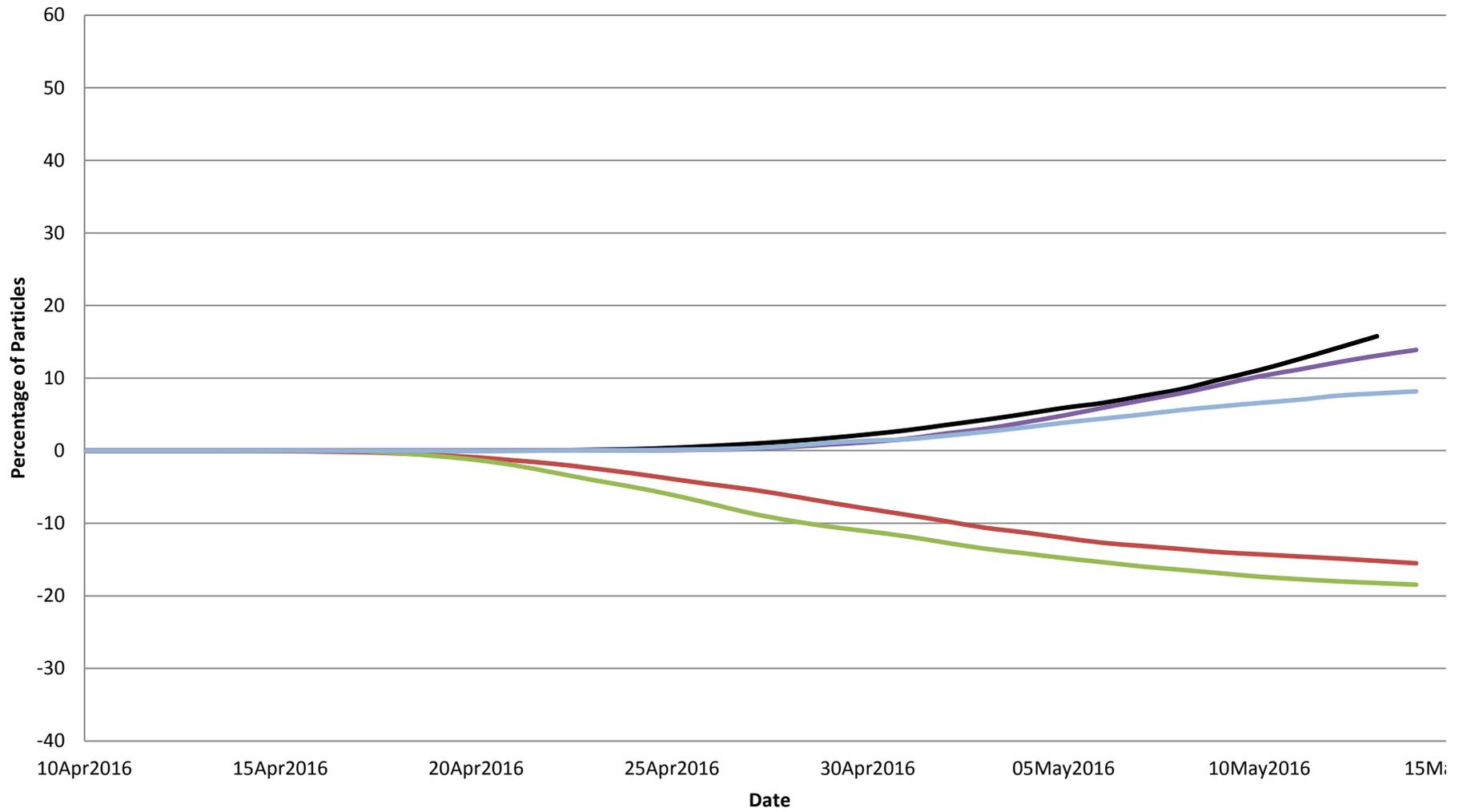
## Particles inserted at SJR at Medford Island on April 13,2016



— Chipps — Old River adjacent to Holland Tract — Middle River adjacent to Bacon Island — SWP — CVP

# Flux at OMR -3000 cfs

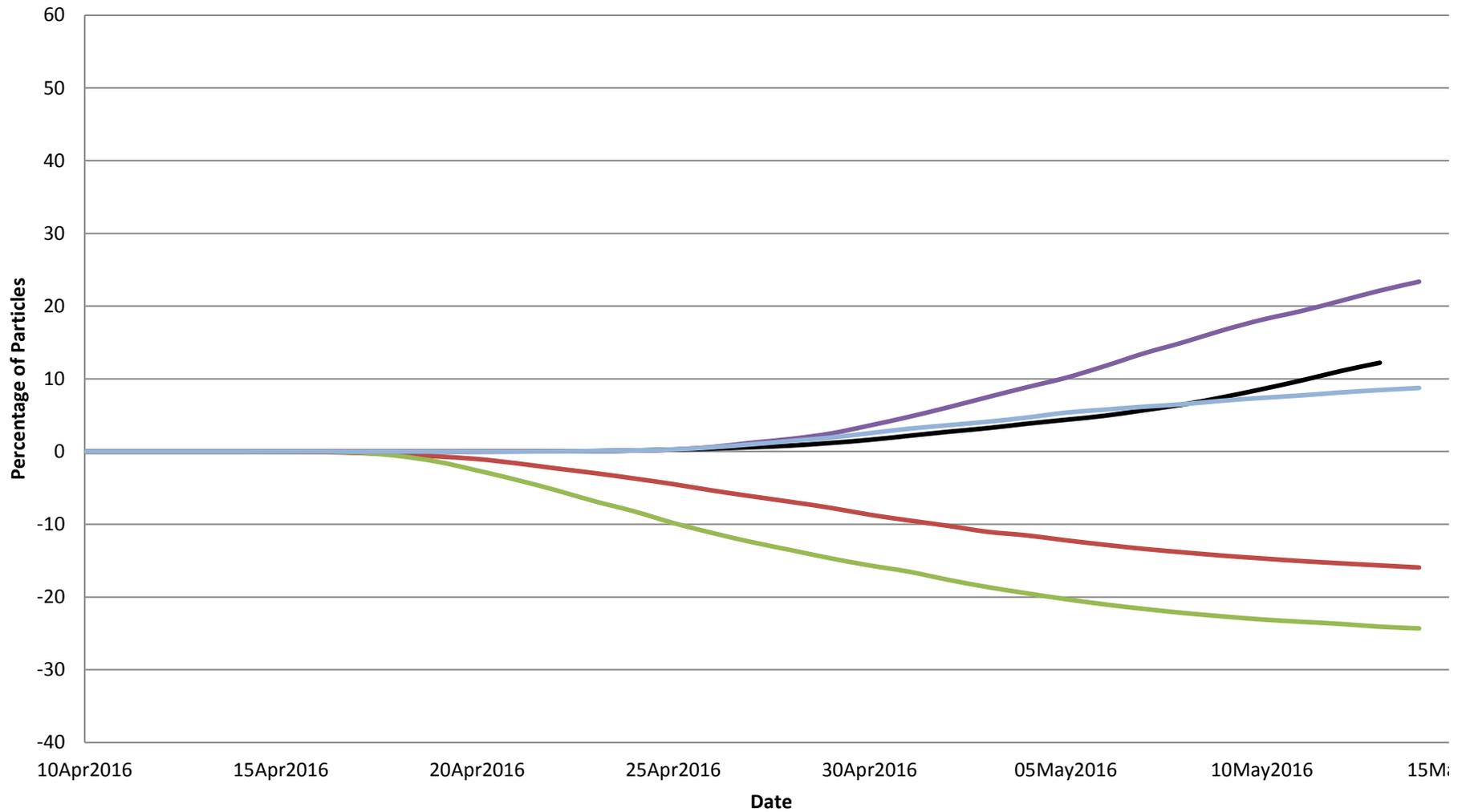
## Particles inserted at SJR at Medford Island on April 13,2016



— Chipps — Old River adjacent to Holland Tract — Middle River adjacent to Bacon Island — SWP — CVP

# Flux at OMR -3500 cfs

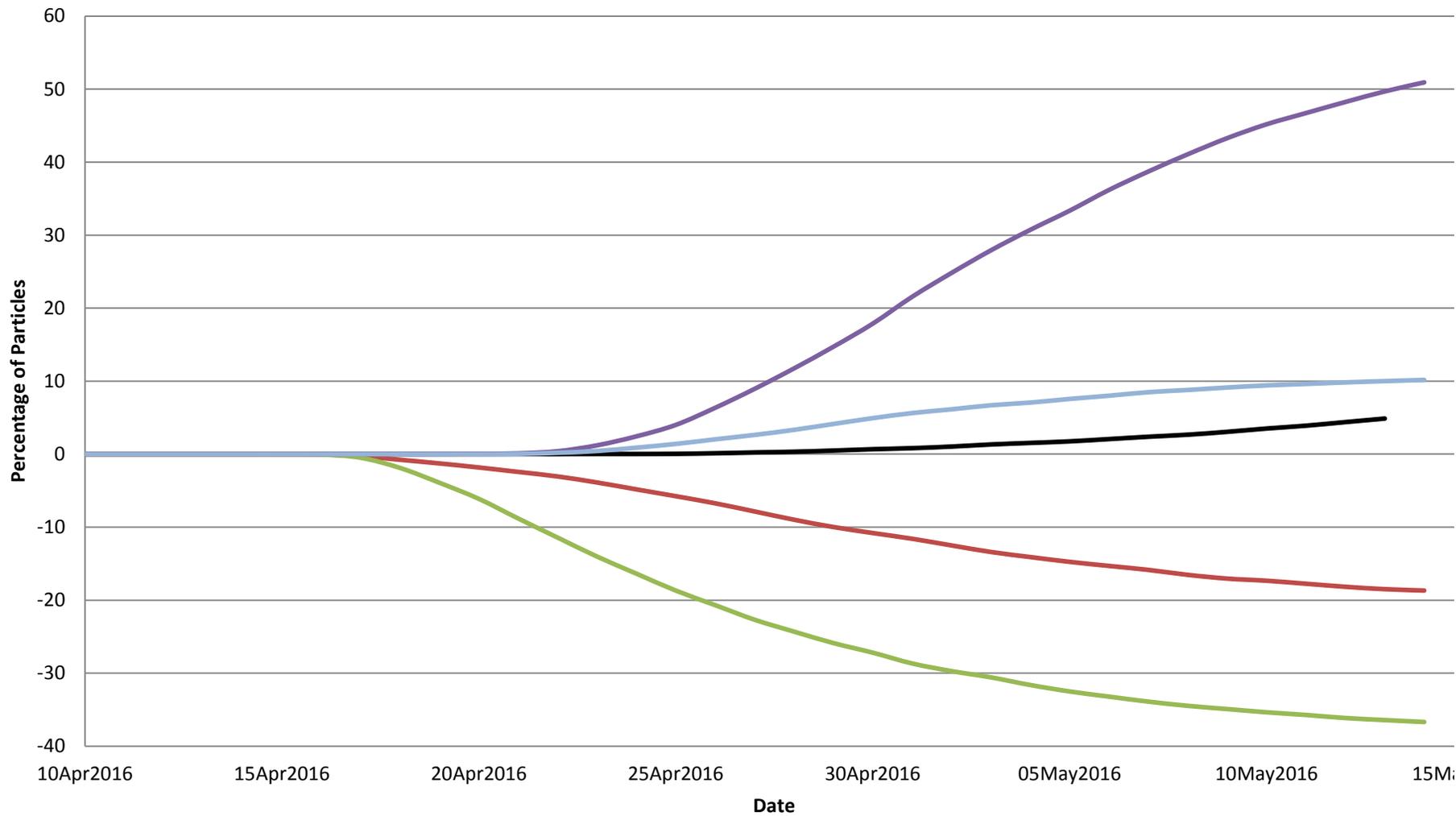
## Particles inserted at SJR at Medford Island on April 13,2016



— Chipps — Old River adjacent to Holland Tract — Middle River adjacent to Bacon Island — SWP — CVP

# Flux at OMR -5000 cfs

## Particles inserted at SJR at Medford Island on April 13,2016



— Chipps — Old River adjacent to Holland Tract — Middle River adjacent to Bacon Island — SWP — CVP

PTM runs for the forecast period between April 12<sup>th</sup> and May 13<sup>th</sup>.

PTM Results on April 27, 2016

Location	OMR -1250*			OMR -2000			OMR -2500			OMR -3000			OMR -3500			OMR -5000**		
	809	815	906	809	815	906	809	815	906	809	815	906	809	815	906	809	815	906
<b>CVP</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.4	0.4	0.1	0.8	1.0	0.2	1.7	2.6
<b>SWP</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.4	0.3	0.1	1.2	1.2	0.7	6.6	8.9
<b>Middle R. adj Bacon Island</b>	0.0	-0.4	-1.8	-0.1	-0.7	-4.3	-0.1	-1.0	-6.6	-0.1	-1.5	-8.6	-0.2	-1.6	-12.5	-0.2	-3.6	-22.7
<b>Old R. adj Holland Tract</b>	-0.1	-1.1	-1.3	-0.3	-3.3	-3.2	-0.6	-4.9	-4.1	-0.7	-7.1	-5.3	-1.1	-10.1	-6.2	-2.5	-20.8	-7.9
<b>Chipps</b>	66.5	6.8	1.8	61.8	5.9	1.3	57.1	5.3	1.1	52.5	5.1	0.9	48.9	4.1	0.6	38.3	3.2	0.2

PTM Results on May 13, 2016

Location	OMR -1250*			OMR -2000			OMR -2500			OMR -3000			OMR -3500			OMR -5000**		
	809	815	906	809	815	906	809	815	906	809	815	906	809	815	906	809	815	906
<b>CVP</b>	0.0	0.0	0.0	0.2	1.4	4.0	0.3	2.2	5.5	0.3	2.8	7.9	0.4	3.3	8.5	0.5	5.3	10.0
<b>SWP</b>	0.0	0.0	0.0	0.1	0.3	1.2	0.2	2.0	5.5	0.5	5.0	13.1	0.8	9.4	22.1	2.8	27.5	49.7
<b>Middle R. adj Bacon Island</b>	0.0	-1.4	-5.8	-0.2	-1.8	-11.2	-0.2	-3.0	-15.3	-0.2	-3.6	-18.2	-0.3	-4.8	-24.1	-0.6	-7.8	-36.4
<b>Old R. adj Holland Tract</b>	-0.2	-2.7	-3.8	-0.6	-7.2	-9.3	-0.9	-10.5	-12.1	-1.2	-13.5	-15.2	-1.7	-17.7	-15.7	-4.3	-34.2	-18.5
<b>Chipps</b>	94.7	62.1	35.1	93.7	51.1	25.5	92.5	41.9	19.7	91.1	34.1	15.8	88.3	27.6	12.2	77.1	20.1	4.9

**Notes:**

\*For -1250: These assumptions and associated results were developed at the request of USFWS. DWR and Reclamation do not anticipate having to operate to this highly restrictive level given current hydrologic conditions and smelt population and distribution.

\*\*For -5000: These assumptions and associated results were developed at the request of USFWS and are understood to be completely artificial. DWR and Reclamation do not intend to operate to this level given current hydrologic conditions and established objective limits.

**SWG Weekly Salvage Update**  
**Reporting Period: April 11-17, 2016**  
*Prepared by Bob Fujimura on April 18, 2016: 9:00*  
**Preliminary Results -Subject to Revision**

Species/Life Stage	Daily Salvage							Trend	
	11-Apr	12-Apr	13-Apr	14-Apr	15-Apr	16-Apr	17-Apr		
<b>Juvenile Delta Smelt</b>									
SWP	0	0	0	0	0	0	0		0
CVP	0	0	0	0	4	0	0		1
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	↗	0.6
CUM TAKE	0	0	0	0	4	4	4		
% of 2016 CL	0%	0%	0%	0%	2%	2%	2%		
<b>Juvenile Longfin Smelt</b>									
SWP	0	0	0	0	0	0	0		0
CVP	0	0	0	0	0	0	0		0
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	→	0
<b>SWP daily export</b>	924	901	710	992	1,074	924	1,073	→	943
<b>CVP daily export</b>	1,983	1,979	1,977	1,979	1,976	1,969	1,970	→	1,976
<b>SWP reduced counts</b>	0%	0%	0%	0%	0%	0%	0%	→	0%
<b>CVP reduced counts</b>	0%	0%	0%	0%	0%	0%	0%	→	0%
<b>SWP larval samples</b>	100%	100%	100%	100%	100%	100%	100%	↘	100%
<b>CVP larval samples</b>	100%	100%	100%	100%	100%	100%	100%	→	100%
<b>DS larvae present - SWP</b>	N	N	N	N	NA	NA	NA	→	
<b>DS larvae present - CVP</b>	N	N	N	N	N	N	N	→	
<b>LFS larvae present - SWP</b>	N	N	N	N	NA	NA	NA	→	
<b>LFS larvae present - CVP</b>	N	N	N	N	N	N	N	→	

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TOTAL = combine daily salvages for CVP+SWP; daily water export = AF; Trend = compared to previous week

NA = not available at the time of this report; NS = not sampled

Reduced counts = percentage of time that routine salvage sample time were less than 30 min per 2 hours of salvage and export operations

Larval samples = percentage of daily scheduled samples taken during periods of water export

Yellow highlighted dates indicate fish salvage facility outage occurred.

Larvae present = whether Delta Smelt (DS) or Longfin Smelt < 20 mm was observed from daily fish larva collections at the SWP or CVP fish facilities

Generated by Bob Fujimura on April 17, 2016

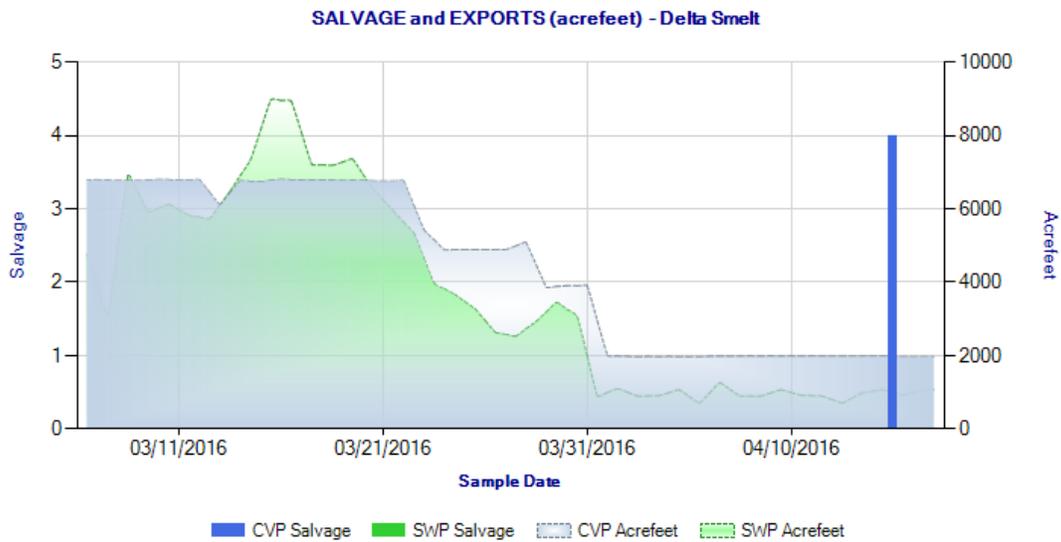


Figure 1. Daily salvage of Delta Smelt and water exports from the state and federal fish salvage facilities during March 7-April 17, 2016. Graph obtained from the DFG salvage monitoring web-page: <http://www.dfg.ca.gov/delta/apps/salvage/SalvageExportCalendar.aspx>

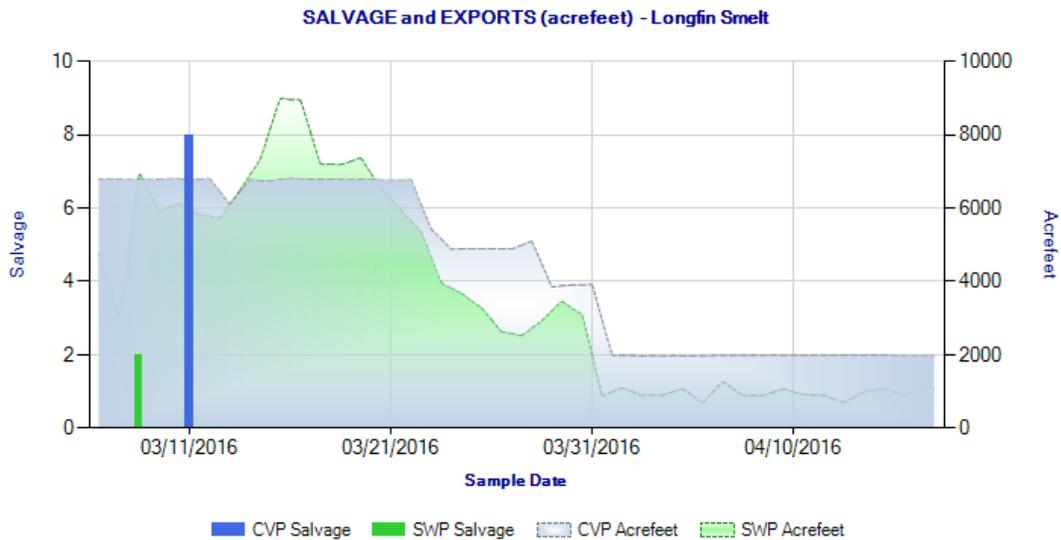


Figure 2. Daily salvage of Longfin Smelt and water exports from the state and federal fish salvage facilities during March 7-April 17, 2016. Graph obtained from the DFG salvage monitoring web-page: <http://www.dfg.ca.gov/delta/apps/salvage/SalvageExportCalendar.aspx>

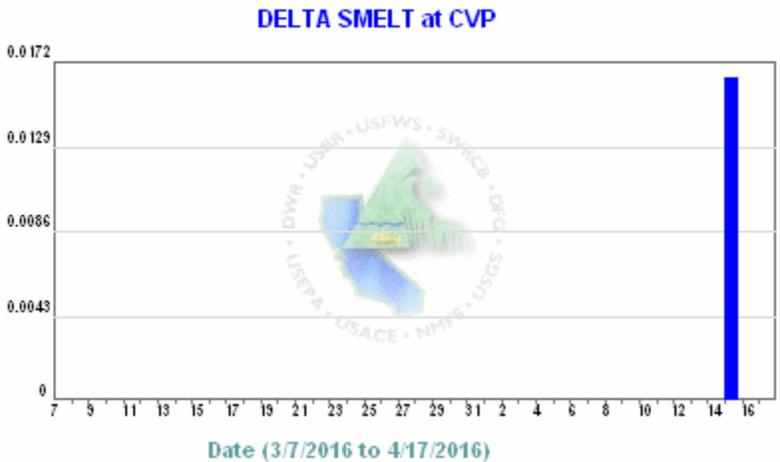


Figure 3. Daily salvage densities (fish per 10,000 m3) Delta Smelt from the federal fish salvage facilities during March 7-April 17, 2016. Graph obtained from the DFG salvage monitoring web-page: <http://www.dfg.ca.gov/delta/apps/salvage/SalvageExportCalendar.aspx>

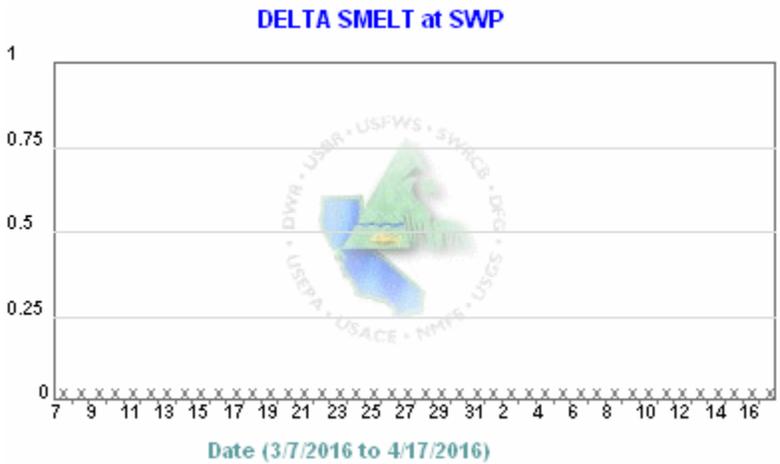


Figure 4. Daily salvage densities (fish per 10,000 m3) Delta Smelt from the state fish salvage facilities during March 7-April 17, 2016. Graph obtained from the DFG salvage monitoring web-page: <http://www.dfg.ca.gov/delta/apps/salvage/SalvageExportCalendar.aspx>

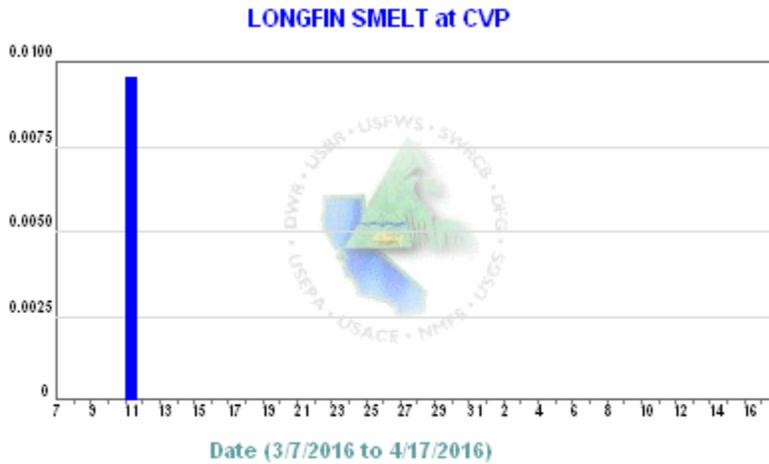


Figure 5. Daily salvage densities (fish per 10,000 m3) Longfin Smelt from the federal fish salvage facilities during March 7-April 17, 2016. Graph obtained from the DFG salvage monitoring web-page:

<http://www.dfg.ca.gov/delta/apps/salvage/SalvageExportCalendar.aspx>

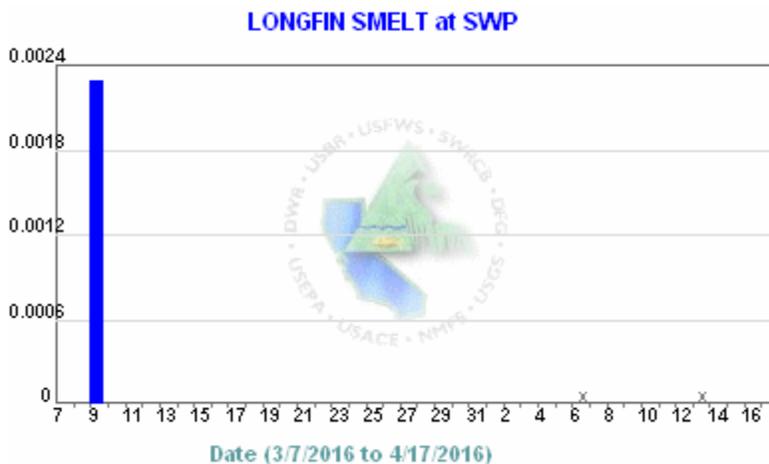


Figure 6. Daily salvage densities (fish per 10,000 m3) Longfin Smelt from the state fish salvage facilities during March 7-April 17, 2016. Graph obtained from the DFG salvage monitoring web-page:

<http://www.dfg.ca.gov/delta/apps/salvage/SalvageExportCalendar.aspx>