

## **Appendix V-1**

Baseline Particle Size Survey for the Tracer Survey

Pebble Count Data															
	Left Bank														Right Bank
Riffle Cluster	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38
Cross Section	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Segment	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Tagline Interval <sup>a</sup>	1 to 5	5 to 9	15 to 20	32 to 35	35 to 40	40 to 45	45 to 50	50 to 55	55 to 60	63 to 68	68 to 73	73 to 78	78 to 83	83 to 88	88 to 91
Sieve Size (mm)	# Retained	# Retained	# Retained	# Retained	# Retained	# Retained	# Retained	# Retained	# Retained	# Retained	# Retained	# Retained	# Retained	# Retained	# Retained
256	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
128	0	2	1	0	0	0	0	0	1	1	0	3	2	1	1
90	4	11	11	0	1	6	9	1	25	14	12	20	13	20	19
64	8	22	26	17	17	13	21	10	19	30	22	20	21	22	10
45	19	22	28	37	43	37	21	40	12	21	20	20	24	20	18
32	32	22	21	19	22	19	16	16	11	16	18	14	21	9	11
22.6	17	16	8	16	11	14	10	8	7	10	12	9	14	13	11
16	8	2	5	8	3	5	7	3	6	6	7	7	4	7	7
11.3	7	1	0	2	1	2	4	7	4	0	5	4	1	5	9
8	2	0	0	1	1	2	4	2	5	2	4	1	1	1	5
5.7	1	1	0	0	1	3	1	2	2	1	1	1	0	0	1
4	1	1	0	0	0	1	3	3	3	0	0	0	0	2	0
2	1	1	0	0	2	1	2	6	5	0	0	0	0	0	5
<2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	1
<b>Total Count</b>	100	101	100	100	102	103	100	100	100	101	101	99	101	100	98
<b>Statistics</b>	<b>mm</b>	<b>mm</b>	<b>mm</b>	<b>mm</b>	<b>mm</b>	<b>mm</b>	<b>mm</b>	<b>mm</b>	<b>mm</b>	<b>mm</b>	<b>mm</b>	<b>mm</b>	<b>mm</b>	<b>mm</b>	<b>mm</b>
D <sub>10</sub> :	14	25	28	22	24	18	10	5	8	23	16	19	25	18	10
<b>MEDIAN or D<sub>50</sub>:</b>	<b>37</b>	<b>50</b>	<b>55</b>	<b>47</b>	<b>49</b>	<b>47</b>	<b>46</b>	<b>45</b>	<b>55</b>	<b>58</b>	<b>48</b>	<b>57</b>	<b>52</b>	<b>57</b>	<b>44</b>
D <sub>90</sub> :	70	99	96	74	75	80	89	66	113	102	95	113	103	109	109
D <sub>16</sub> :	19	28	34	25	29	24	16	12	12	29	22	25	29	23	13
D <sub>84</sub> :	59	86	85	65	66	68	80	61	104	89	84	102	88	98	98
D <sub>25</sub> :	25	34	39	31	35	30	24	23	23	37	29	34	35	30	19
D <sub>75</sub> :	50	74	76	59	60	60	69	57	91	80	73	87	76	85	77

**Notes:**

<sup>a</sup> = Tagline interval units are 2 feet. As an example, cross section 1 segment 4 is 64 feet from the left bank and extends to 70 feet from the left bank. Gaps in the tagline intervals between segments indicate heavily vegetated areas where performing a pebble count would have been ineffective.

<b>Pebble Count Data</b>	<b>Left Bank</b>						<b>Peak in Midchannel Bar</b>						<b>Right Bank</b>
<b>Riffle Cluster</b>	<b>38</b>	<b>38</b>	<b>38</b>	<b>38</b>	<b>38</b>	<b>38</b>	<b>38</b>	<b>38</b>	<b>38</b>	<b>38</b>	<b>38</b>	<b>38</b>	<b>38</b>
<b>Cross Section</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>
<b>Segment</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>1a</b>	<b>2a</b>	<b>3a</b>	<b>4a</b>	<b>5a</b>
<b>Tagline Interval</b>	<b>5.5 to 7.5</b>	<b>16 to 20</b>	<b>20 to 25</b>	<b>25 to 30</b>	<b>30 to 35</b>	<b>39.5 to 45</b>	<b>45 to 50</b>	<b>50 to 55</b>	<b>5 to 10</b>	<b>10 to 15</b>	<b>15 to 20</b>	<b>20 to 25</b>	<b>25 to 30</b>
<b>Sieve Size (mm)</b>	<b># Retained</b>	<b># Retained</b>	<b># Retained</b>	<b># Retained</b>	<b># Retained</b>	<b># Retained</b>	<b># Retained</b>	<b># Retained</b>	<b># Retained</b>	<b># Retained</b>	<b># Retained</b>	<b># Retained</b>	<b># Retained</b>
256	0	0	0	0	0	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0	0	0	0	0	0
128	2	2	1	1	1	3	2	0	1	0	1	2	3
90	11	17	13	19	9	9	14	16	11	6	12	24	21
64	27	24	26	17	18	10	21	25	21	9	31	29	33
45	27	24	27	27	23	16	22	14	22	12	18	28	20
32	14	19	15	13	25	28	13	12	19	11	18	11	8
22.6	7	10	10	9	11	19	15	10	25	17	13	6	8
16	8	3	2	6	5	10	1	8	17	25	4	0	3
11.3	3	0	1	3	5	2	4	6	19	11	3	0	3
8	4	1	1	2	2	1	0	5	7	9	2	0	0
5.7	0	0	2	1	0	1	1	0	5	1	0	0	1
4	0	0	0	2	1	0	0	0	2	2	0	0	0
2	0	0	2	0	0	2	3	2	2	1	0	0	0
<2	0	0	0	0	0	0	5	3	0	0	0	0	0
<b>Total Count</b>	<b>103</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>101</b>	<b>101</b>	<b>101</b>	<b>151</b>	<b>104</b>	<b>102</b>	<b>100</b>	<b>100</b>
<b>Statistics</b>	<b>mm</b>	<b>mm</b>	<b>mm</b>	<b>mm</b>	<b>mm</b>	<b>mm</b>	<b>mm</b>	<b>mm</b>	<b>mm</b>	<b>mm</b>	<b>mm</b>	<b>mm</b>	<b>mm</b>
<b>D<sub>10</sub>:</b>	18	28	24	18	18	18	12	11	11	10	23	36	26
<b>MEDIAN or D<sub>50</sub>:</b>	<b>55</b>	<b>58</b>	<b>56</b>	<b>54</b>	<b>46</b>	<b>39</b>	<b>52</b>	<b>50</b>	<b>31</b>	<b>24</b>	<b>56</b>	<b>68</b>	<b>69</b>
<b>D<sub>90</sub>:</b>	98	108	100	108	90	97	104	102	86	76	98	114	114
<b>D<sub>16</sub>:</b>	24	33	30	24	25	23	24	16	13	13	27	44	33
<b>D<sub>84</sub>:</b>	86	96	88	97	80	78	90	90	74	61	87	104	103
<b>D<sub>25</sub>:</b>	35	39	38	34	32	27	29	24	17	16	34	50	47
<b>D<sub>75</sub>:</b>	77	83	78	81	68	60	77	79	59	46	78	91	89

**Notes:**

<sup>a</sup> = Tagline interval units are 2 feet. As an example, cross section 2 segment 4 is approximately 50 feet from the left bank and extends to 60 feet from the left bank. Gaps in the tagline intervals between segments indicate heavily vegetated areas where performing a pebble count would have been ineffective.

\* = A prominent midchannel bar exists in this cross section. A second stake was placed approximately 110 feet from the left bank near the peak of the exposed bar. Here the segment and tagline interval were re-initialized. During the summer of 2009, the dominant channel existed to the right of this midchannel stake.

Pebble Count Data		Left Bank							Right Bank
Riffle Cluster	38	38	38	38	38	38	38	38	38
Cross Section	3	3	3	3	3	3	3	3	3
Segment	1	2	3	4	5	6	7	8	
Tagline Interval	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 44	48 to 55	
Sieve Size (mm)	# Retained	# Retained	# Retained	# Retained	# Retained	# Retained	# Retained	# Retained	# Retained
256	0	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0	0
128	4	7	4	2	0	1	4	2	
90	22	27	35	16	3	18	27	9	
64	15	32	30	30	18	24	28	18	
45	14	10	15	18	24	24	23	13	
32	6	7	7	12	30	12	13	8	
22.6	6	1	3	1	8	9	3	9	
16	7	3	1	3	5	6	2	7	
11.3	4	1	6	5	11	5	1	9	
8	11	4	0	4	1	2	0	7	
5.7	2	3	0	5	0	3	0	6	
4	4	0	0	3	1	0	0	5	
2	6	2	0	1	0	0	0	2	
<2	2	3	1	0	0	0	0	1	
<b>Total Count</b>	103	100	102	100	101	104	101	96	
<b>Statistics</b>	<b>mm</b>	<b>mm</b>	<b>mm</b>	<b>mm</b>	<b>mm</b>	<b>mm</b>	<b>mm</b>	<b>mm</b>	<b>mm</b>
D <sub>10</sub> :	5	10	29	9	15	16	36	6	
<b>MEDIAN or D<sub>50</sub>:</b>	<b>49</b>	<b>76</b>	<b>79</b>	<b>62</b>	<b>42</b>	<b>56</b>	<b>71</b>	<b>35</b>	
D <sub>90</sub> :	116	123	120	107	79	106	118	95	
D <sub>16</sub> :	9	23	41	14	20	23	42	9	
D <sub>84</sub> :	105	114	113	94	70	94	109	83	
D <sub>25</sub> :	12	47	54	35	31	33	50	13	
D <sub>75</sub> :	90	101	103	83	60	81	97	70	

**Notes:**

<sup>a</sup> = Tagline interval units are 2 feet. As an example, cross section 3 segment 4 is 50 feet from the left bank and extends to 60 feet from the left bank. Gaps in the tagline intervals between segments indicate the upstream end of a vegetated midchannel bar that separates the main low flow channel from a small side channel. Within this gap performing a pebble count would have been ineffective.

## **Appendix V-2**

Painted Tracers Count per Bin and Sizes

# Tracer Study: Tracer Location, Size, and Count

Location: Riffle Cluster 38

Cross-Section: 1

Crew: S. Garcia, E. Mendez, M. Meyers, G. Soto

Begin from: Left bank - starting 8 feet from left bank stake

Tagline Units: 2 feet

Paint Color: Orange-popcycle

Left Bank																	
Dates	8/4/09	8/4/09	8/4/09	8/4/09	8/4/09	8/4/09	8/4/09	8/4/09	8/4/09	8/4/09	8/4/09	8/4/09	8/5/09	8/5/09	8/5/09	8/5/09	
Tagline Bins	-3	-2	-1	0	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	
Clast Size (mm)	<b>VEGETATION</b>				34	40	42	<b>VEGETATION</b>					14	18	9	9	2
32					24	14	23						20	11	11	5	7
45					1	1	2						3	10	7	4	3
64					0	0	0						1	1	0	2	3
90					0	0	0						1	0	1	0	0
128					0	0	0						0	0	0	0	0
180					0	0	0						0	0	0	0	0
256	0	0	0	0	0	0	0	0									
<b>Sum</b>	/	/	/	/	59	55	67	/	/	/	/	39	40	28	20	15	

Dates	8/5/09	8/5/09	8/5/09	8/5/09	8/5/09	8/5/09	8/5/09	8/5/09	8/5/09	8/5/09	8/5/09	8/5/09	8/5/09	8/5/09	8/5/09	8/5/09	8/5/09	8/5/09	8/5/09	8/5/09	8/5/09
Tagline Bins	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33
Clast Size (mm)	<b>VEGETATION</b>																				
32																					
45																					
64																					
90																					
128																					
180																					
256																					
<b>Sum</b>	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/

# Tracer Study: Tracer Location, Size, and Count

Location: Riffle Cluster 38

Cross-Section: 1

Crew: S. Garcia, E. Mendez, M. Meyers, G. Soto

Begin from: Left bank - starting 8 feet from left bank stake

Tagline Units: 2 feet

Paint Color: Orange-popcycle

Dates	8/5/09	8/5/09	8/5/09	8/5/09	8/5/09	8/5/09	8/5/09	8/5/09	8/5/09	8/5/09	8/11/09	8/11/09	8/11/09	8/11/09	8/11/09	8/11/09	8/11/09	8/11/09	8/11/09	8/11/09	8/12/09
Tagline Bins	33 - 34	34 - 35	35 - 36	36 - 37	37 - 38	38 - 39	39 - 40	40 - 41	41 - 42	42 - 43	43 - 44	44 - 45	45 - 46	46 - 47	47 - 48	48 - 49	49 - 50	50 - 51	51 - 52	52 - 53	53 - 54
<b>Clast Size (mm)</b>																					
32	6	9	5	10	8	16	4	5	6	7	6	9	14	7	9	9	14	7	10	13	11
45	11	16	24	12	12	14	15	13	10	17	13	11	6	10	12	14	10	17	11	12	11
64	14	5	1	7	7	1	9	6	8	3	7	6	5	4	6	5	3	3	5	5	7
90	0	1	0	1	0	3	1	1	1	3	0	1	0	0	1	0	1	0	0	0	0
128	0	0	0	0	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
256	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Sum</b>	31	31	30	30	28	34	29	25	25	31	26	27	25	22	28	28	28	27	26	30	29

Dates	8/12/09	8/12/09	8/12/09	8/12/09	8/12/09	8/12/09	8/12/09	8/12/09	8/12/09	8/12/09	8/12/09	8/12/09	8/12/09	8/12/09	8/12/09	8/12/09	8/12/09	8/13/09	8/13/09	8/13/09	8/13/09	8/13/09
Tagline Bins	54 - 55	55 - 56	56 - 57	57 - 58	58 - 59	59 - 60	60 - 61	61 - 62	62 - 63	63 - 64	64 - 65	65 - 66	66 - 67	67 - 68	68 - 69	69 - 70	70 - 71	71 - 72	72 - 73	73 - 74	74 - 75	
<b>Clast Size (mm)</b>																						
32	10	6	7	5	3	3	3	2	5	3	2	5	3	5	1	0	4	8	6	9	6	
45	8	8	10	3	4	6	4	2	4	7	11	4	6	8	3	0	10	7	7	8	9	
64	5	5	1	6	5	3	4	4	7	7	3	8	8	1	1	0	3	7	4	8	9	
90	1	6	4	4	5	2	1	5	0	1	2	2	2	3	1	0	3	5	3	2	1	
128	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
256	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<b>Sum</b>	24	25	22	18	17	14	12	14	16	18	18	19	19	17	6	0	20	27	20	27	25	

## Tracer Study: Tracer Location, Size, and Count

Location: Riffle Cluster 38

Cross-Section: 1

Crew: S. Garcia, E. Mendez, M. Meyers, G. Soto

Begin from: Left bank - starting 8 feet from left bank stake

Tagline Units: 2 feet

Paint Color: Orange-popcycle

Dates	8/13/09	8/13/09	8/13/09	8/13/09	8/13/09	8/13/09	8/13/09	8/13/09	8/13/09	9/2/09	9/2/09	9/2/09	9/2/09	9/2/09	9/2/09	9/2/09
Tagline Bins	75 - 76	76 - 77	77 - 78	78 - 79	79 - 80	80 - 81	81 - 82	82 - 83		83 - 84	84 - 85	85 - 86	86 - 87	87 - 88	88 - 89	89 - 90
Clast Size (mm)																
32	13	12	15	6	11	3	6	1		2	3	3	1	0	1	2
45	8	8	15	10	9	10	12	2		5	4	3	2	1	4	2
64	6	2	4	9	9	6	4	2		1	1	2	2	2	1	1
90	4	1	2	3	6	2	2	1		2	1	1	0	0	0	0
128	0	0	0	0	0	0	0	1		0	0	1	0	0	0	0
180	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0
256	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0
<b>Sum</b>	31	23	36	28	35	21	24	7		10	9	10	5	3	6	5

**Total # of Tracers = 1544**

**Notes:** Midchannel stake separates 52-53.

Right bank stake is at 91.5 tagline units

Beginning of right bank starts in tagline bin 90-91

Scour occurred that affected the bed in bins 68 through 70. Bins 70 through 84 were hastily completed to avoid scour issues in to these bins.

Right bank consists of willows. Their roots in the channel are seen beginning around tagline bin 84. Their effect is to form a webbing like reinforcement that grasp pebbles and larger.

# Tracer Study: Tracer Location, Size, and Count

Location: Riffle Cluster 38

Cross-Section:

2

Crew: S. Garcia, E. Mendez, M. Meyers, G. Soto

Begin from: Left bank - starting 12 feet from left bank stake

Tagline Units:

2 feet

Paint Color: Schoolbus

Yellow

Dates	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09
Tagline Bins	-5	-4	-3	-2	-1	0	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	
<b>Clast Size (mm)</b>	<b>VEGETATION</b>									<b>VEGETATION</b>							<b>VEGETATION</b>				
32							8	11	0						0	1					
45							9	13	0						1	3					
64							12	12	1						5	5					
90							8	0	1						2	2					
128							0	0	0						0	0					
180							0	0	0						0	0					
256	0	0	0	0	0																
<b>Sum</b>	/	/	/	/	/	/	37	36	2	/	/	/	/	/	/	8	11	/	/	/	/

Dates	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	
Tagline Bins	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34		
<b>Clast Size (mm)</b>	<b>VEGETATION</b>																					
32												2	4	2	3	10	8	12	13			
45												3	9	2	5	19	12	14	8			
64												2	10	7	4	11	6	6	4			
90												5	3	2	5	5	3	3	2			
128												0	0	0	2	0	0	0	0			
180												0	0	0	0	0	0	0	0			
256	0	0	0	0	0	0	0	0														
<b>Sum</b>	/	/	12	26	13	19	45	29	35	27	/	/	/	/	/	/	/	/	/	/		

# Tracer Study: Tracer Location, Size, and Count

Location: Riffle Cluster 38

Cross-Section: 2

Crew: S. Garcia, E. Mendez, M. Meyers, G. Soto

Begin from: Left bank - starting 12 feet from left bank stake

Tagline Units: 2 feet

Paint Color: Schoolbus Yellow

Dates	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	9/1/09	9/1/09	9/1/09	9/1/09	9/1/09	9/1/09	9/1/09	9/1/09	9/1/09	9/1/09	9/1/09	9/1/09
Tagline Bins	34 - 35	35 - 36	36 - 37	37 - 38	38 - 39	39 - 40	40 - 41	41 - 42	42 - 43	43 - 44	44 - 45	45 - 46	46 - 47	47 - 48	48 - 49	49 - 50	50 - 51	51 - 52	52 - 53	53 - 54	
<b>Clast Size (mm)</b>																					
32	1	5	4	1	2	8	11	0	1	1	5	4	0	1	4	8	1	0	0	18	
45	0	11	5	1	4	1	10	1	1	3	9	9	1	3	4	6	1	0	0	5	
64	1	2	1	2	1	2	2	2	4	4	6	14	10	16	4	3	4	2	0	2	
90	0	3	0	2	1	2	0	1	0	2	1	1	6	3	6	2	2	0	0	3	
128	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	
180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
256	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<b>Sum</b>	2	21	10	6	8	13	23	4	7	10	21	28	17	24	18	19	8	2	0	28	

Dates	9/1/09	9/1/09	9/1/09	8/28/09	8/28/09	8/28/09	8/28/09	8/28/09	8/28/09	8/28/09	8/28/09	8/28/09	8/28/09	8/28/09	8/28/09	8/28/09	8/28/09	8/28/09	8/28&31/09	8/31/09
Tagline Bins	54 - 55	55 - 56	56 - 57	57 - 58	58 - 59	59 - 60	60 - 61	61 - 62	62 - 63	63 - 64	64 - 65	65 - 66	66 - 67	67 - 68	68 - 69	69 - 70	70 - 71	71 - 72	72 - 73	73 - 74
<b>Clast Size (mm)</b>																				
32	20	10	11	13	7	6	8	6	7	5	2	1	3	1	2	2	4	3	5	4
45	9	14	10	18	10	7	4	4	8	5	3	4	8	1	3	5	3	2	6	3
64	8	10	3	5	4	6	4	5	4	2	4	4	4	3	6	3	2	4	5	5
90	0	1	1	1	1	3	0	0	0	3	1	0	1	2	0	0	0	1	1	2
128	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
256	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Sum</b>	37	36	25	37	22	22	16	15	19	15	10	9	16	7	11	10	9	10	17	14

## Tracer Study: Tracer Location, Size, and Count

Location: Riffle Cluster 38

Cross-Section: 2

Crew: S. Garcia, E. Mendez, M. Meyers, G. Soto

Begin from: Left bank - starting 12 feet from left bank stake

Tagline Units: 2 feet

Paint Color: Schoolbus Yellow

Dates	8/31/09	8/31/09	8/31/09	8/31/09	8/31/09	8/31/09	8/31/09	9/2/09	9/2/09
Tagline Bins	74 - 75	75 - 76	76 - 77	77 - 78	78 - 79	79 - 80	80 - 81	81 - 82	82 - 83
<b>Clast Size (mm)</b>									
32	2	4	5	5	3	5	3	10	1
45	5	10	5	5	4	7	8	13	6
64	2	2	5	4	7	6	2	3	4
90	2	2	3	2	1	3	5	1	1
128	0	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0	0
256	0	0	0	0	0	0	0	0	0
<b>Sum</b>	11	18	18	16	15	21	18	27	12

<b>Total # of Tracers =</b>	1082
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**Notes:** Mid-channel stake between bins 48-49 & 49-50

# Tracer Study: Tracer Location, Size, and Count

Location: Riffle Cluster 38

Cross-Section: 3

Crew: S. Garcia, E. Mendez, M. Meyers, G. Soto, T. Snyder

Begin from: Left bank - starting 20 feet from left bank stake

Tagline Units: 2 feet

Paint Color: Barbi Pink

Dates	8/18/09	8/18/09	8/18/09	8/18/09	8/18/09	8/18/09	8/18/09	8/18/09	8/18/09	8/18/09	8/18/09	8/18/09	8/18/09	8/18/09	8/18/09	8/18/09	8/18/09	8/19/09	8/19/09	8/19/09									
Tagline Bins	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20									
<b>Clast Size (mm)</b>	<b>VEGETATION</b>																												
32																				1	0	1	2	2	7	4	3	1	2
45																				1	1	3	1	1	3	8	7	7	11
64																				8	5	6	6	2	6	3	6	4	8
90																				2	6	3	6	5	2	3	4	1	3
128																				0	1	1	0	0	1	0	0	0	0
180																				0	0	0	0	0	0	0	0	0	0
256										0	0	0	0	0	0	0	0	0	0										
<b>Sum</b>	/	/	/	/	/	/	/	/	/	/	12	13	14	15	10	19	18	20	13	24									

Dates	8/19/09	8/19/09	8/19/09	8/19/09	8/19/09	8/19/09	8/19/09	8/19/09	8/19/09	8/19/09	8/19/09	8/19/09	8/19/09	8/25/09	8/25/09	8/25/09	8/25/09	8/25/09	8/25/09	8/25/09	8/25/09
Tagline Bins	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35	35-36	36-37	37-38	38-39	39-40	
<b>Clast Size (mm)</b>																					
32	0	0	0	0	3	1	2	2	2	4	4	2	5	5	6	2	5	3	2	4	
45	1	0	4	5	3	0	1	5	3	5	1	4	5	6	6	12	9	6	10	23	
64	9	7	6	6	3	2	4	7	4	5	6	6	4	6	6	4	3	3	6	8	
90	4	4	3	4	3	6	4	2	5	4	2	2	6	4	2	1	0	1	0	0	
128	0	1	0	1	0	0	0	0	0	1	0	1	0	0	1	0	0	0	0	0	
180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
256	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<b>Sum</b>	14	12	13	16	12	9	11	16	14	19	13	15	20	21	22	19	17	13	18	35	

## Tracer Study: Tracer Location, Size, and Count

Location: Riffle Cluster 38

Cross-Section: 3

Crew: S. Garcia, E. Mendez, M. Meyers, G. Soto, T. Snyder

Begin from: Left bank - starting 20 feet from left bank stake

Tagline Units: 2 feet

Paint Color: Barbi Pink

Dates	8/25/09								8/26/09										
	8/25/09	8/25/09	8/25/09	8/25/09	8/25/09	8/25&26/2009	8/25/09	8/25&26/2009	8/26/09	8/26/09	8/26/09	8/26/09	8/26/09	8/26/09	8/26/09	8/26/09	8/26/09	8/26/09	8/26/09
Tagline Bins	40 - 41	41 - 42	42 - 43	43 - 44	44 - 45	45 - 46	46 - 47	47 - 48	48-49	49-50	50-51	51-52	52-53	53-54	54-55	55-56	56-57	57-58	
<b>Clast Size (mm)</b>																			
32	5	7	4	1	1	4	3	11	3	1	2	9	10	13	7	9	1	3	
45	9	9	3	7	7	6	9	5	10	8	11	19	11	6	6	3	1	1	
64	9	6	5	8	7	4	3	8	8	11	14	11	0	0	3	1	1	3	
90	2	3	4	1	3	0	2	5	3	1	2	3	0	0	0	0	1	3	
128	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
256	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	
<b>Sum</b>	26	25	17	17	18	15	17	29	24	21	29	42	21	19	16	13	4	10	

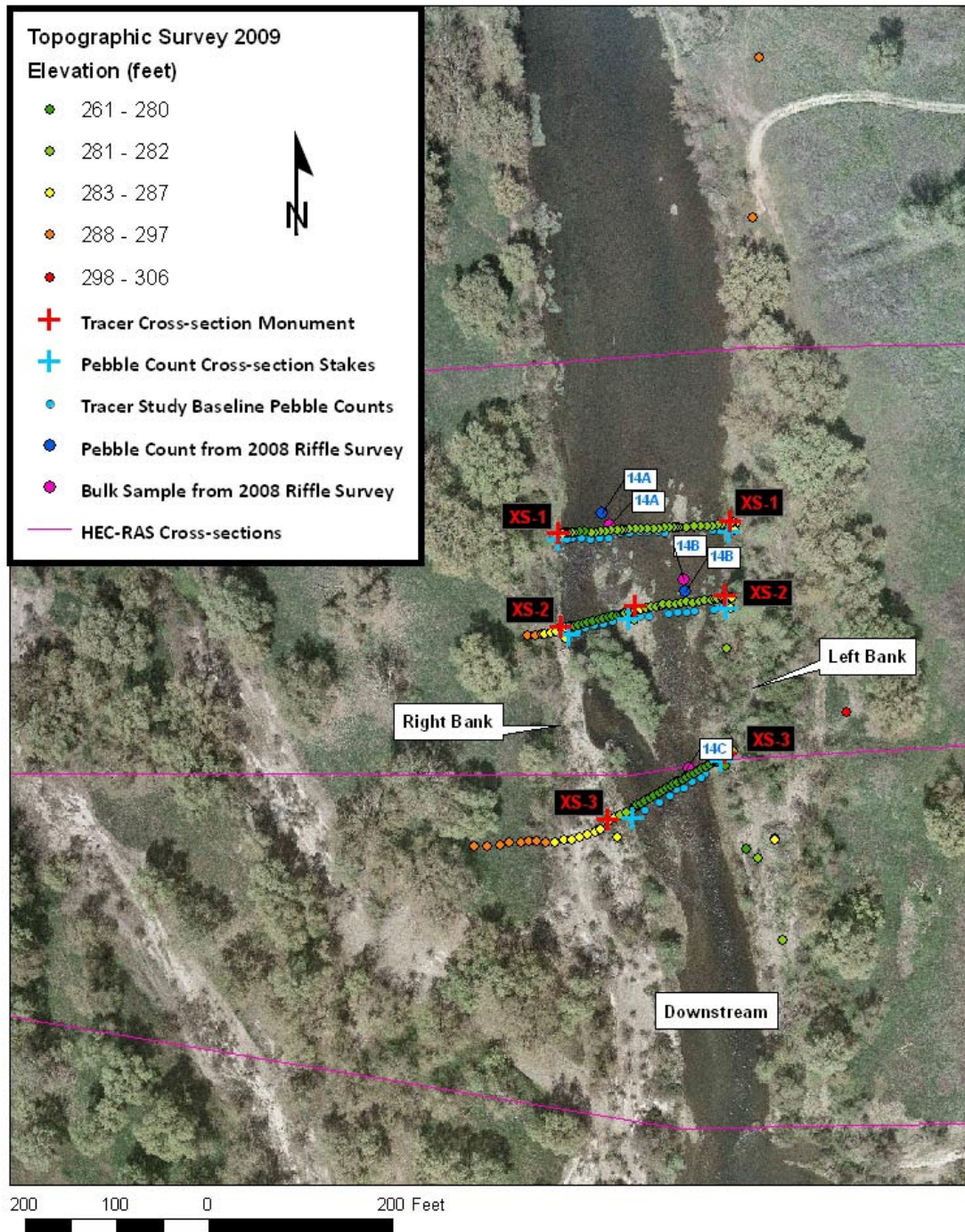
**Total # of Tracers =** 850

**Notes:** After bin 54.5 the bed became fine and embedded

## **Appendix V-3**

Baseline Topographic Survey Data

# Riffle Cluster 38: Pilot Tracer Study



**Figure C-1:** Tracer study site at Riffle Cluster 38, Reach 1A, San Joaquin River. Topographic survey points plotted and elevation illustrated relative to tracer cross-sections and grain size sample locations.

**Baseline Tracer Cross-section Topographic Survey Data**

*Tracer Cross-section 1*

Point Number	Easting (feet)	Northing (feet)	Point Elevation	Longitude	Latitude	Point Type
1001	6780719.9324	1797660.0795	283.046	119° 45 02.19"	36° 55 45.99"	xs-1
1002	6780717.8266	1797660.2526	283.064	119° 45 02.22"	36° 55 45.99"	xs-1
1003	6780715.9286	1797659.8560	282.401	119° 45 02.24"	36° 55 45.99"	xs-1
1004	6780716.0973	1797659.9863	281.618	119° 45 02.24"	36° 55 45.99"	xs-1 we
1006	6780713.9902	1797659.5799	281.343	119° 45 02.26"	36° 55 45.98"	xs-1
1007	6780708.0867	1797658.5601	281.652	119° 45 02.34"	36° 55 45.97"	xs-1
1008	6780704.3774	1797658.1902	281.697	119° 45 02.38"	36° 55 45.97"	xs-1
1009	6780700.0523	1797658.3162	281.911	119° 45 02.43"	36° 55 45.97"	xs-1
1010	6780694.2678	1797656.9153	281.897	119° 45 02.51"	36° 55 45.96"	xs-1
1011	6780689.2579	1797656.9729	281.951	119° 45 02.57"	36° 55 45.96"	xs-1
1012	6780682.5084	1797657.1879	281.932	119° 45 02.65"	36° 55 45.96"	xs-1
1013	6780674.9706	1797656.5047	282.028	119° 45 02.74"	36° 55 45.96"	xs-1
1014	6780667.0671	1797655.8686	281.995	119° 45 02.84"	36° 55 45.95"	xs-1
1015	6780658.5254	1797655.4234	282.066	119° 45 02.95"	36° 55 45.95"	xs-1
1016	6780654.6534	1797655.1957	282.144	119° 45 02.99"	36° 55 45.95"	xs-1
1017	6780651.8566	1797655.2967	282.307	119° 45 03.03"	36° 55 45.95"	xs-1
1018	6780647.5677	1797655.2099	281.836	119° 45 03.08"	36° 55 45.95"	xs-1
1019	6780643.1852	1797654.6361	281.802	119° 45 03.14"	36° 55 45.94"	xs-1
1020	6780637.4383	1797654.4414	281.769	119° 45 03.21"	36° 55 45.94"	xs-1
1021	6780631.8027	1797654.4709	281.568	119° 45 03.28"	36° 55 45.94"	xs-1
1022	6780624.4080	1797654.2896	281.584	119° 45 03.37"	36° 55 45.94"	xs-1
1023	6780617.2845	1797653.7864	281.544	119° 45 03.45"	36° 55 45.93"	xs-1
1024	6780610.7881	1797653.7355	281.484	119° 45 03.53"	36° 55 45.93"	xs-1
1025	6780604.9692	1797653.4952	281.463	119° 45 03.61"	36° 55 45.93"	xs-1
1026	6780599.2485	1797652.6891	281.528	119° 45 03.68"	36° 55 45.93"	xs-1
1027	6780595.8851	1797652.9837	281.621	119° 45 03.72"	36° 55 45.93"	xs-1
1028	6780591.3456	1797652.5897	281.394	119° 45 03.77"	36° 55 45.93"	xs-1
1029	6780584.8144	1797651.6935	281.262	119° 45 03.85"	36° 55 45.92"	xs-1
1030	6780579.1912	1797651.4717	280.894	119° 45 03.92"	36° 55 45.92"	xs-1
1031	6780572.7111	1797651.3083	280.807	119° 45 04.00"	36° 55 45.91"	xs-1
1032	6780567.6403	1797649.8087	280.705	119° 45 04.07"	36° 55 45.90"	xs-1
1033	6780562.7525	1797650.1154	280.553	119° 45 04.13"	36° 55 45.90"	xs-1
1034	6780556.4287	1797650.7904	280.157	119° 45 04.20"	36° 55 45.91"	xs-1
1035	6780550.8747	1797650.4603	280.358	119° 45 04.27"	36° 55 45.91"	xs-1
1036	6780545.6154	1797650.0531	280.531	119° 45 04.34"	36° 55 45.90"	xs-1
1037	6780541.6288	1797649.1177	280.772	119° 45 04.39"	36° 55 45.89"	xs-1
1038	6780538.0642	1797649.3320	280.550	119° 45 04.43"	36° 55 45.90"	xs-1
1039	6780535.6623	1797649.7657	280.901	119° 45 04.46"	36° 55 45.90"	xs-1
1040	6780534.8282	1797649.6714	281.526	119° 45 04.47"	36° 55 45.90"	xs-1 we
1041	6780533.3794	1797649.6073	283.085	119° 45 04.49"	36° 55 45.90"	xs-1
1042	6780533.1583	1797648.7161	283.426	119° 45 04.49"	36° 55 45.89"	xs-1

**Baseline Tracer Cross-section Topographic Survey Data**

*Tracer Cross-section 2*

Point Number	Easting (feet)	Northing (feet)	Point Elevation	Longitude	Latitude	Point Type
1044	6780494.1103	1797537.4562	291.888	119° 45 04.98"	36° 55 44.79"	xs-2
1045	6780501.8627	1797537.4068	289.839	119° 45 04.89"	36° 55 44.79"	xs-2
1046	6780509.0002	1797538.7503	287.590	119° 45 04.80"	36° 55 44.81"	xs-2
1047	6780512.7128	1797539.4899	286.577	119° 45 04.75"	36° 55 44.81"	xs-2
1048	6780519.9958	1797541.2245	285.286	119° 45 04.66"	36° 55 44.83"	xs-2
1049	6780525.5803	1797542.1562	283.813	119° 45 04.59"	36° 55 44.84"	xs-2
1050	6780530.8803	1797545.7636	284.103	119° 45 04.53"	36° 55 44.87"	xs-2
1051	6780534.5890	1797546.6134	283.491	119° 45 04.48"	36° 55 44.88"	xs-2
1053	6780538.6440	1797547.4886	283.142	119° 45 04.43"	36° 55 44.89"	xs-2
1054	6780540.6867	1797547.9649	282.522	119° 45 04.41"	36° 55 44.89"	xs-2
1055	6780541.7568	1797547.4433	280.794	119° 45 04.39"	36° 55 44.89"	xs-2 we
1056	6780544.3698	1797548.2893	279.974	119° 45 04.36"	36° 55 44.90"	xs-2
1057	6780549.3198	1797549.4568	279.525	119° 45 04.30"	36° 55 44.91"	xs-2
1058	6780554.6790	1797550.9596	279.557	119° 45 04.24"	36° 55 44.92"	xs-2
1059	6780559.3947	1797552.1011	279.602	119° 45 04.18"	36° 55 44.93"	xs-2
1060	6780564.6560	1797553.5092	279.681	119° 45 04.11"	36° 55 44.95"	xs-2
1061	6780571.1252	1797554.2099	279.549	119° 45 04.03"	36° 55 44.95"	xs-2
1062	6780576.4148	1797555.7863	279.464	119° 45 03.97"	36° 55 44.97"	xs-2
1063	6780581.4436	1797557.8876	279.390	119° 45 03.91"	36° 55 44.99"	xs-2
1064	6780586.4985	1797558.8598	279.363	119° 45 03.84"	36° 55 45.00"	xs-2
1065	6780591.4767	1797559.6914	279.417	119° 45 03.78"	36° 55 45.01"	xs-2
1066	6780596.2726	1797561.1478	279.863	119° 45 03.72"	36° 55 45.02"	xs-2
1067	6780598.5977	1797561.3484	280.154	119° 45 03.69"	36° 55 45.02"	xs-2
1068	6780600.4863	1797562.1903	280.610	119° 45 03.67"	36° 55 45.03"	xs-2 we
1069	6780604.8191	1797563.6224	281.557	119° 45 03.62"	36° 55 45.04"	xs-2
1070	6780611.0706	1797564.9694	281.934	119° 45 03.54"	36° 55 45.06"	xs-2
1071	6780616.3676	1797566.4369	281.941	119° 45 03.47"	36° 55 45.07"	xs-2
1073	6780622.0186	1797567.1935	281.972	119° 45 03.40"	36° 55 45.08"	xs-2
1074	6780628.5029	1797568.4329	282.047	119° 45 03.32"	36° 55 45.09"	xs-2
1075	6780634.7035	1797568.8627	282.084	119° 45 03.25"	36° 55 45.09"	xs-2
1076	6780639.6624	1797570.3256	282.023	119° 45 03.19"	36° 55 45.11"	xs-2
1077	6780641.0969	1797571.2553	281.845	119° 45 03.17"	36° 55 45.12"	xs-2 we
1078	6780648.0774	1797571.4864	281.545	119° 45 03.08"	36° 55 45.12"	xs-2
1079	6780654.6818	1797572.4403	281.610	119° 45 03.00"	36° 55 45.13"	xs-2
1080	6780660.7366	1797573.3295	281.511	119° 45 02.93"	36° 55 45.14"	xs-2
1081	6780666.2623	1797574.4909	281.501	119° 45 02.86"	36° 55 45.15"	xs-2
1082	6780673.3026	1797573.4602	281.663	119° 45 02.77"	36° 55 45.14"	xs-2
1083	6780680.0723	1797574.3883	281.739	119° 45 02.69"	36° 55 45.14"	xs-2
1084	6780686.7252	1797575.4819	281.795	119° 45 02.61"	36° 55 45.16"	xs-2
1085	6780693.4466	1797576.0771	282.073	119° 45 02.52"	36° 55 45.16"	xs-2
1086	6780697.3532	1797577.3862	281.562	119° 45 02.48"	36° 55 45.17"	xs-2
1087	6780700.8905	1797577.7320	281.253	119° 45 02.43"	36° 55 45.18"	xs-2
1088	6780705.6999	1797578.1429	281.351	119° 45 02.37"	36° 55 45.18"	xs-2
1089	6780706.1109	1797578.5549	281.617	119° 45 02.37"	36° 55 45.18"	xs-2
1090	6780708.7171	1797578.6113	282.854	119° 45 02.34"	36° 55 45.18"	xs-2 we
1091	6780713.8626	1797578.9628	283.133	119° 45 02.27"	36° 55 45.19"	xs-2
1093	6780715.3631	1797579.4787	283.298	119° 45 02.25"	36° 55 45.19"	xs-2

**Baseline Tracer Cross-section Topographic Survey Data**

*Tracer Cross-section 3*

Point Number	Easting (feet)	Northing (feet)	Point Elevation	Longitude	Latitude	Point Type
1095	6780435.6537	1797309.0604	292.097	119° 45 05.73"	36° 55 42.54"	xs-3
1096	6780450.1184	1797309.2644	291.879	119° 45 05.55"	36° 55 42.54"	xs-3
1097	6780463.7426	1797310.5320	291.703	119° 45 05.38"	36° 55 42.55"	xs-3
1098	6780474.9582	1797312.7626	291.247	119° 45 05.24"	36° 55 42.57"	xs-3
1099	6780486.7082	1797313.6635	291.337	119° 45 05.10"	36° 55 42.58"	xs-3
1100	6780495.0001	1797314.2088	290.036	119° 45 04.99"	36° 55 42.59"	xs-3
1101	6780504.5331	1797314.6333	289.750	119° 45 04.88"	36° 55 42.59"	xs-3
1102	6780513.1535	1797313.0769	288.361	119° 45 04.77"	36° 55 42.57"	xs-3
1103	6780523.6201	1797312.5847	286.840	119° 45 04.64"	36° 55 42.57"	xs-3
1104	6780533.0913	1797315.2057	285.476	119° 45 04.52"	36° 55 42.59"	xs-3
1105	6780542.4981	1797316.1294	284.072	119° 45 04.41"	36° 55 42.60"	xs-3
1106	6780550.8561	1797319.1739	283.602	119° 45 04.31"	36° 55 42.63"	xs-3
1107	6780559.2111	1797322.0149	283.703	119° 45 04.20"	36° 55 42.66"	xs-3
1108	6780567.5975	1797323.7325	283.749	119° 45 04.10"	36° 55 42.68"	xs-3
1109	6780573.8062	1797327.0150	283.594	119° 45 04.02"	36° 55 42.71"	xs-3
1110	6780581.7086	1797335.5352	283.604	119° 45 03.92"	36° 55 42.79"	xs-3
1111	6780588.2557	1797340.0136	282.882	119° 45 03.84"	36° 55 42.83"	xs-3
1113	6780593.9910	1797342.7667	282.029	119° 45 03.77"	36° 55 42.86"	xs-3
1114	6780601.3840	1797346.0547	281.424	119° 45 03.68"	36° 55 42.89"	xs-3
1115	6780610.1394	1797351.1756	281.303	119° 45 03.57"	36° 55 42.94"	xs-3
1116	6780611.7782	1797351.7490	280.707	119° 45 03.55"	36° 55 42.95"	xs-3
1117	6780612.7557	1797352.2797	280.081	119° 45 03.54"	36° 55 42.95"	xs-3 we
1118	6780613.4069	1797354.2969	279.334	119° 45 03.53"	36° 55 42.97"	xs-3
1119	6780617.1790	1797356.0701	279.391	119° 45 03.48"	36° 55 42.99"	xs-3
1120	6780621.4572	1797358.2609	279.609	119° 45 03.43"	36° 55 43.01"	xs-3
1121	6780626.5041	1797361.1327	279.652	119° 45 03.37"	36° 55 43.04"	xs-3
1122	6780631.7505	1797363.9565	279.629	119° 45 03.30"	36° 55 43.07"	xs-3
1123	6780636.8230	1797366.5846	279.155	119° 45 03.24"	36° 55 43.09"	xs-3
1124	6780640.5078	1797368.9251	278.813	119° 45 03.20"	36° 55 43.12"	xs-3
1125	6780644.7910	1797371.8801	278.535	119° 45 03.14"	36° 55 43.15"	xs-3
1126	6780649.1547	1797373.6579	278.547	119° 45 03.09"	36° 55 43.16"	xs-3
1127	6780653.0374	1797376.3657	278.548	119° 45 03.04"	36° 55 43.19"	xs-3
1128	6780657.1943	1797378.3772	278.791	119° 45 02.99"	36° 55 43.21"	xs-3
1129	6780662.2307	1797381.3175	279.070	119° 45 02.93"	36° 55 43.24"	xs-3
1130	6780666.6887	1797384.2369	279.116	119° 45 02.87"	36° 55 43.27"	xs-3
1131	6780670.9695	1797386.9962	279.062	119° 45 02.82"	36° 55 43.29"	xs-3
1132	6780675.2822	1797388.6284	278.931	119° 45 02.77"	36° 55 43.31"	xs-3
1133	6780679.8868	1797391.4712	278.769	119° 45 02.71"	36° 55 43.34"	xs-3
1134	6780683.6683	1797393.6615	278.927	119° 45 02.66"	36° 55 43.36"	xs-3
1135	6780687.6699	1797395.5023	279.044	119° 45 02.61"	36° 55 43.38"	xs-3
1136	6780692.1918	1797398.5283	279.228	119° 45 02.56"	36° 55 43.41"	xs-3
1137	6780696.8196	1797400.9346	279.321	119° 45 02.50"	36° 55 43.43"	xs-3
1138	6780699.4515	1797401.2315	279.584	119° 45 02.47"	36° 55 43.43"	xs-3
1139	6780700.0916	1797401.3698	279.775	119° 45 02.46"	36° 55 43.43"	xs-3 we
1140	6780702.2375	1797401.9856	279.970	119° 45 02.43"	36° 55 43.44"	xs-3
1141	6780706.3179	1797404.0467	280.322	119° 45 02.38"	36° 55 43.46"	xs-3
1142	6780711.4827	1797407.8250	280.756	119° 45 02.32"	36° 55 43.50"	xs-3
1143	6780714.3754	1797409.9176	280.835	119° 45 02.28"	36° 55 43.52"	xs-3
1145	6780717.4328	1797411.3767	280.920	119° 45 02.24"	36° 55 43.53"	xs-3
1152	6780840.9973	1797453.8779	306.063	119° 45 00.72"	36° 55 43.94"	xs-3

**Survey Monuments Location Information**

Point Number	Easting (feet)	Northing (feet)	Point Elevation (feet)	Longitude	Latitude	Point Type
100	6780745.0500	1798165.5200	297.130	119° 45 01.83"	36° 55 50.98"	control
101	6780739.1105	1797991.0472	291.644	119° 45 01.92"	36° 55 49.26"	control
102	6780610.0433	1797554.6270	282.493	119° 45 03.55"	36° 55 44.96"	xs-2 pc stake
103	6780535.0109	1797534.5918	283.716	119° 45 04.48"	36° 55 44.76"	survey point
104	6780710.9337	1797523.4350	282.103	119° 45 02.31"	36° 55 44.64"	survey point
105	6780592.2314	1797318.2683	283.778	119° 45 03.80"	36° 55 42.62"	xs-3 pc stake
106	6780744.5891	1797295.8007	282.055	119° 45 01.92"	36° 55 42.39"	survey point
107	6780770.8449	1797206.8670	282.197	119° 45 01.61"	36° 55 41.50"	survey point
1000	6780720.2285	1797659.8684	284.052	119° 45 02.19"	36° 55 45.99"	xs-1 monument
1005	6780719.0450	1797651.8710	284.527	119° 45 02.20"	36° 55 45.91"	xs-1 pc stake
1043	6780532.8597	1797648.6144	284.348	119° 45 04.49"	36° 55 45.89"	xs-1 monument
1052	6780534.8191	1797546.6544	284.353	119° 45 04.48"	36° 55 44.88"	xs-2 monument
1072	6780616.6113	1797566.4836	282.848	119° 45 03.47"	36° 55 45.07"	xs-2 monument
1092	6780713.5666	1797578.8873	284.657	119° 45 02.28"	36° 55 45.19"	xs-2 monument
1094	6780714.5997	1797567.5844	282.936	119° 45 02.26"	36° 55 45.07"	xs-2 pc stake
1112	6780588.5394	1797339.7763	284.139	119° 45 03.84"	36° 55 42.83"	xs-3 monument
1144	6780714.4748	1797410.3150	281.125	119° 45 02.28"	36° 55 43.52"	xs-3 monument
1146	6780709.0636	1797396.6753	281.023	119° 45 02.35"	36° 55 43.39"	xs-3 pc stake
1148	6780762.5050	1797316.6435	282.874	119° 45 01.70"	36° 55 42.59"	survey point
1150	6780731.9757	1797305.7243	280.652	119° 45 02.08"	36° 55 42.48"	survey point