Debris Collection Write-Ups
TJ Palmer

01/17/23 Debris Collection Write-Up

The following data represents a categorized count of all but two very large trash items (wooden palette and rubber air mattress) caught in a *100 ft x 2 ft* section of metal fence *(2"x2" openings)* on Fashion Valley Rd on Tuesday January 17th at 3pm following a moderate flood event on the 16th of January. I recorded video and captured photos of the site and then proceeded to collect all visible trash items that I could pick up in a standard trash bag using latex gloves for protection. The trash/debris in question was caught in metal fencing constructed over a culvert above the road. There was a substantial amount of organic debris such as twigs, branches, and especially long grasses caught in the fencing. Amongst all this organic debris was also a noticeable amount of trash, especially plastic wrappers and plastic bags. Much of these plastics were debris fragments. There was also a substantial amount of foam pieces and some articles of clothing (e.g three shoes were recovered). In the surrounding area there was a lot of similar organic debris amongst infrastructure (pipes, signs, etc) and natural vegetation (trees & bushes) interspersed with human debris of similar sizes and materials.
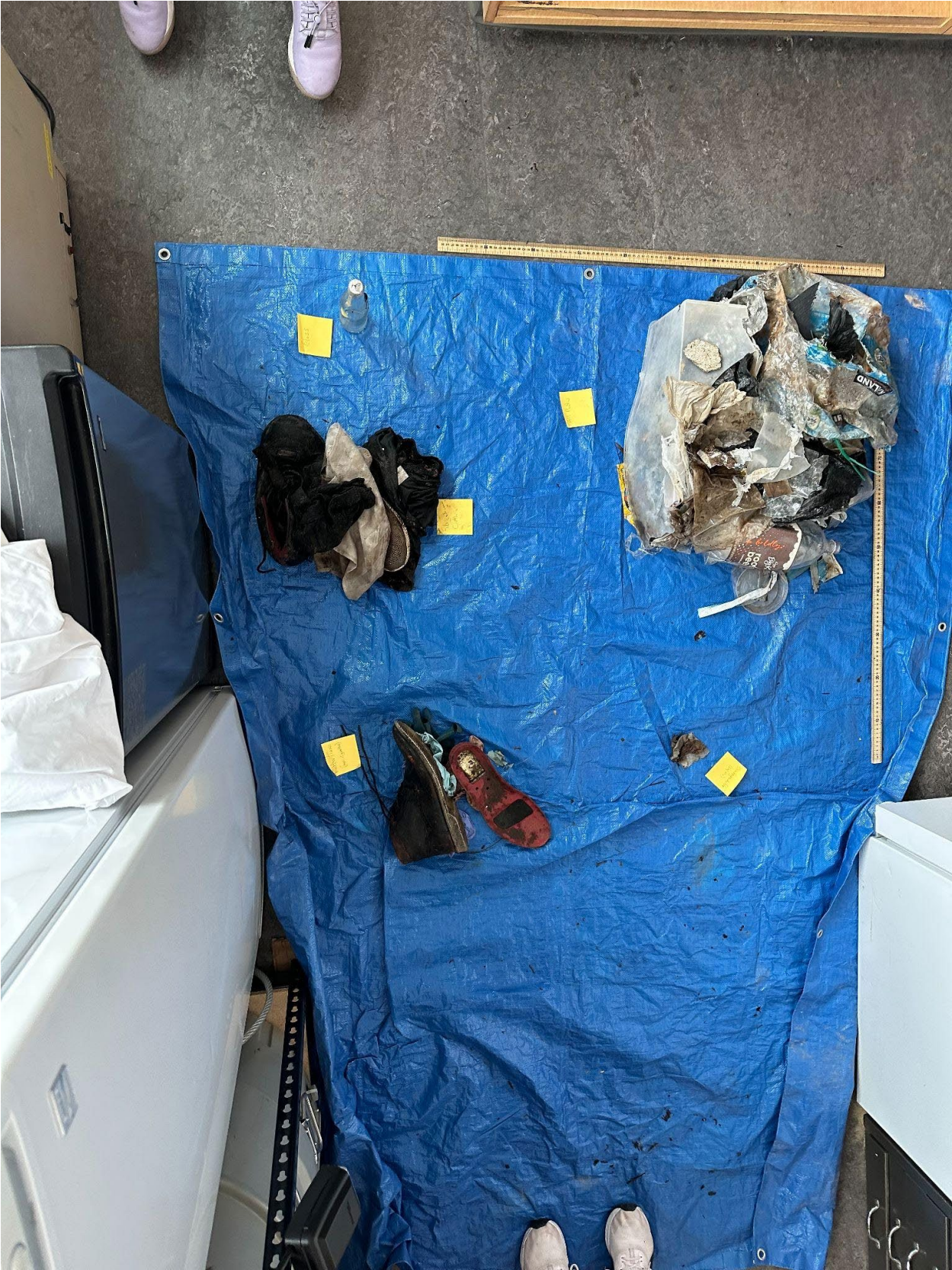
Total Wet Volume (gallons): 8 gallons wet volume
Biodegradable : 0 gallons
Rubber : 1 gallon
Glass :0.25 gallons
Fabric : 1 gallon
Plastic: 5.75 gallons

Total Mass (?):
Biodegradable mass:
Rubber mass :
Glass mass:
Fabric mass:
Plastic mass:

Gage height, ft ⓘ

12.73 ft - Jan 16, 2023 09:00:00 AM PST

Gage height, ft

Fashion Valley Gage
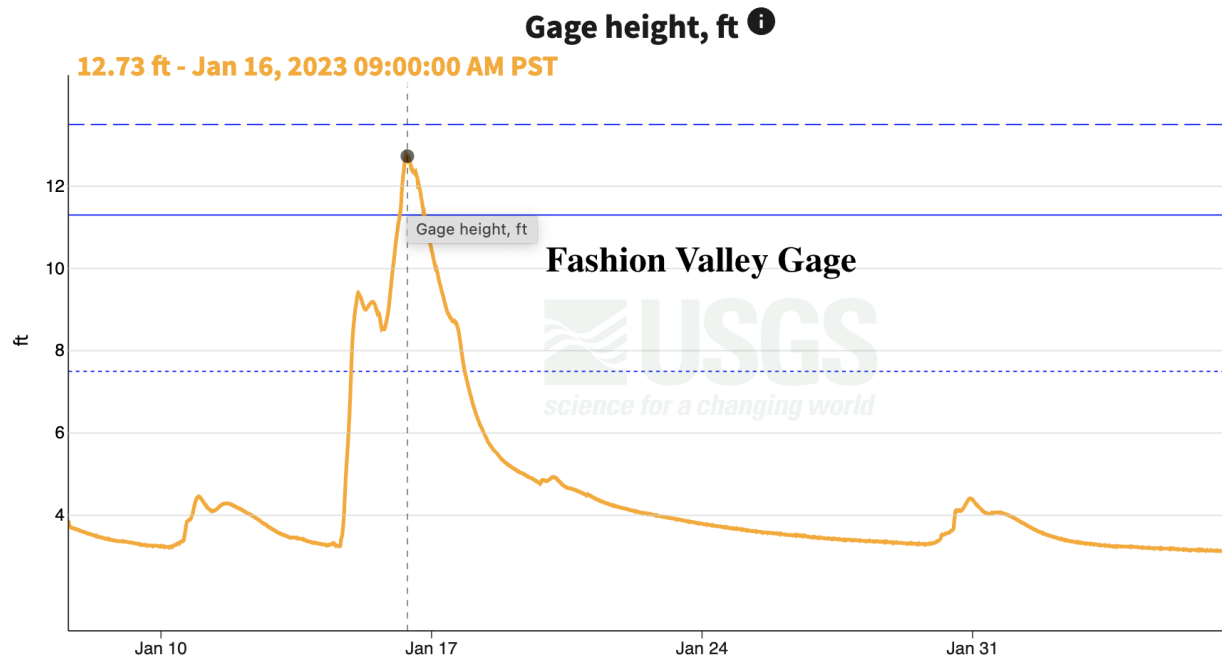
Item Descriptor	Max Size (cm)	Min Size (cm)	Material Type
Foam	28	8	Plastic

Item Descriptor	Max Size (cm)	Min Size (cm)	Material Type
Glass bottle	21.5	5	Glass
Tupperware	49	18	Plastic
Shoe	29	15	Fabric/Cloth
Rubber sole Shoe	30	11	Rubber Toxic
Foam	8.5	5	Plastics
Foam	8	7	Plastic

Item Descriptor	Max Size (cm)	Min Size (cm)	Material Type
Foam	4	3	Plastic
Foam	4	4	Plastic
Foam	8	4	Plastic
Foam	6	4	Plastic
Foam	7	4	Plastic
Foam	5	5	Plastic

Item Descriptor	Max Size (cm)	Min Size (cm)	Material Type
Foam	10	8	Plastic
Foam	16	2	Plastic
Foam	4	3	Plastic
Foam	4	2	Plastic
Foam	4	4	Plastic
Foam	6	4	Plastic

Item Descriptor	Max Size (cm)	Min Size (cm)	Material Type
Foam	8	10	Plastic
Foam	6	3	Plastic
Foam	6	4	Plastic
Foam	11	5	Plastic
Foam	3	2	Plastic
Plastic Food wrappers	18	12	Plastic

Item Descriptor	Max Size (cm)	Min Size (cm)	Material Type
Plastic Food wrapper	41	32	Plastic
Plastic Food wrapper	14	4	Plastic
Plastic Food wrapper	28	9	Plastic
Plastic Food wrapper	24	13	Plastic
Plastic Food wrapper	12	8	Plastic
Plastic Food wrapper	16	7	Plastic

Item Descriptor	Max Size (cm)	Min Size (cm)	Material Type
Plastic Food wrapper	12	13	Plastic
Plastic Food wrapper	29	8	Plastic
Plastic Food wrapper	29	13	Plastic
Plastic Food wrapper	21	2	Plastic
Plastic Food wrapper	6	11	Plastic
Plastic Food wrapper	6	6	Plastic

Item Descriptor	Max Size (cm)	Min Size (cm)	Material Type
Plastic Food wrapper	25	11	Plastic
Plastic Food wrapper	47	16	Plastic
Plastic Food wrapper	11	5	Plastic
Plastic Food wrapper	8	7	Plastic
Plastic Food wrapper	17	8	Plastic
Plastic Food wrapper	19	12	Plastic

Item Descriptor	Max Size (cm)	Min Size (cm)	Material Type
Plastic Food wrapper	9	2	Plastic
Plastic Food wrapper	64	10	Plastic
Plastic Food wrapper	17	4	Plastic
Plastic Food wrapper	10	7	Plastic
Plastic Food wrapper	14	3	Plastic
Plastic Food Wrapper	18	7	Plastic

Item Descriptor	Max Size (cm)	Min Size (cm)	Material Type
Plastic Food Wrapper	4	3	Plastic
Plastic Food Wrapper	10	3	Plastic
Plastic Food wrapper	9	6	Plastic
Plastic Food Wrapper	6	1	Plastic
Plastic Food Wrapper	9	2	Plastic
Plastic Bottles	19	8	Plastic

Item Descriptor	Max Size (cm)	Min Size (cm)	Material Type
Plastic Bottle	30	8	Plastic
Plastic Lid	11	11	Plastic
Plastic Lid	18	12	Plastic
Plastic Bags	71	44	Plastic
Plastic Bags	51	18	Plastic
Plastic Bags	49	49	Plastic

Item Descriptor	Max Size (cm)	Min Size (cm)	Material Type
Plastic Bags	43	26	Plastic
Plastic Bags	27	13	Plastic
Plastic Bags	23	6	Plastic
Plastic Bags	30	19	Plastic
Plastic Bags	8	13	Plastic
Plastic Bags	34	35	Plastic

Item Descriptor	Max Size (cm)	Min Size (cm)	Material Type
Plastic Bags	45	29	Plastic
Plastic Bags	36	2	Plastic
Plastic Bags	48	21	Plastic
Plastic Bags	30	2	Plastic
Plastic Bags	55	12	Plastic
Plastic Bags	16	7	Plastic

Item Descriptor	Max Size (cm)	Min Size (cm)	Material Type
Plastic Bags	33	25	Plastic
Plastic Bags	50	30	Plastic
Plastic Bags	62	47	Plastic
Plastic Bags	15	24	Plastic
Plastic Bags	27	7	Plastic
Plastic Bags	38	18	Plastic

Item Descriptor	Max Size (cm)	Min Size (cm)	Material Type
Plastic Bags	20	14	Plastic
Plastic Bags	30	20	Plastic
Plastic Bags	17	9	Plastic
Plastic Bags	11	3	Plastic
Plastic Bags	16	11	Plastic
Plastic Bags	15	6	Plastic

Item Descriptor	Max Size (cm)	Min Size (cm)	Material Type
Plastic Bags	5	2	Plastic
Plastic Bags	18	9	Plastic
Plastic Bags	69	15	Plastic
Plastic Bags	7	2	Plastic
Plastic Bags	10	1	Plastic
Plastic Bags	5	3	Plastic

Item Descriptor	Max Size (cm)	Min Size (cm)	Material Type
Plastic Bags	5	4	Plastic
Misc Plastic	22	10	Plastic
Misc Plastic	21	4	Plastic
Misc Plastic	5	2	Plastic
Misc Plastic	21	2	Plastic
Misc Plastic	18	3	Plastic

Item Descriptor	Max Size (cm)	Min Size (cm)	Material Type
Misc Plastic	15	15	Plastic
Misc Plastic	16	13	Plastic
Misc Plastic	18	9	Plastic
Misc Plastic	18	7.5	Plastic
Misc Plastic	29	.5	Plastic
Misc Plastic	18	2	Plastic

Item Descriptor	Max Size (cm)	Min Size (cm)	Material Type
Misc Plastic	22	2	Plastic
Misc Plastic	19	1	Plastic
Misc Plastic	20	2	Plastic
Misc Plastic	26	1	Plastic
Misc Plastic	23	3	Plastic
Misc Plastic	7	2	Plastic

Item Descriptor	Max Size (cm)	Min Size (cm)	Material Type
Misc Plastic	7	2	Plastic
Misc Plastic	6	3	Plastic
Misc Plastic	12	2	Plastic
Misc Plastic	17	2	Plastic
Misc Plastic	50	37	Plastic
Misc Plastic	9	3	Plastic

Item Descriptor	Max Size (cm)	Min Size (cm)	Material Type
Misc Plastic	25	6	Plastic
Misc Plastic	35	35	Plastic
Misc Plastic	12.5	4	Plastic
Misc Plastic	4	2	Plastic
Misc Plastic	7	11	Plastic
Misc Plastic	14	6	Plastic

Item Descriptor	Max Size (cm)	Min Size (cm)	Material Type
Misc Plastic	10	2	Plastic
Misc Plastic	18	12	Plastic
Misc Plastic	2	2	Plastic
Misc Plastic	18	1	Plastic
Bottle Cap	3	3	Plastic
Plastic Comb	16	3	Plastic

Item Descriptor	Max Size (cm)	Min Size (cm)	Material Type
Rubber Gloves	26	10	Rubber
Rubber Gloves	30	10	Rubber
Rubber Gloves	17	7	Rubber
Rubber Gloves	23	9	Rubber
Rubber Gloves	5	4	Rubber
Rubber shoe sole	29	10	Rubber

Item Descriptor	Max Size (cm)	Min Size (cm)	Material Type
Shoe	23	10	Fabric
Tablecloth	47	44	Fabric
Part of a hot	27	8	Fabric
Boxers	40	31	Fabric
Shirt	47	47	Fabric
Paper	12	7	Biodegradable

Item Descriptor	Max Size (cm)	Min Size (cm)	Material Type
Paper	4	2	Biodegradable
Paper	8	2	Biodegradable
Paper	8	2	Biodegradable
Plastic Bag	19	16	Plastic

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Stream Samples Feb 25 & Mar 1, 2023

The following data represents two categorized counts of minor-moderate rain events on Feb 25 and March 1st, respectively. Both events were sampled on the "rising limb of the hydrograph between 5-7ft with similar measured stream flows. The 25th was a bigger event with more visible trash mobilization and more trash collected despite samples being taken at about the same point on the rising limb. Two possible explanations are one, the first event had higher measured stream velocities potentially leading to more trash mobilization, and second, there was

much more antecedent dry days (no substantial rain events) before the first event. More antecedent dry days allow for more trash accumulation in areas subject to inundation from rising water. In both cases the majority of pisces of trash were plastic, with the majority of plastic being polystyrene foams. Almost all the plastic debris were fragments. Another common item on the 25th were cigarettes. The mass of the sample from the 25th was majority wood from one heavy wood piece but still significant plastic debris mass. In comparison there was 17x less plastic debris by mass on March 1st, and much less visible trash mobilization.

San Diego R a Fashion Valley at San Diego CA

January 7, 2023 - March 6, 2023

Gage height, ft ⓘ
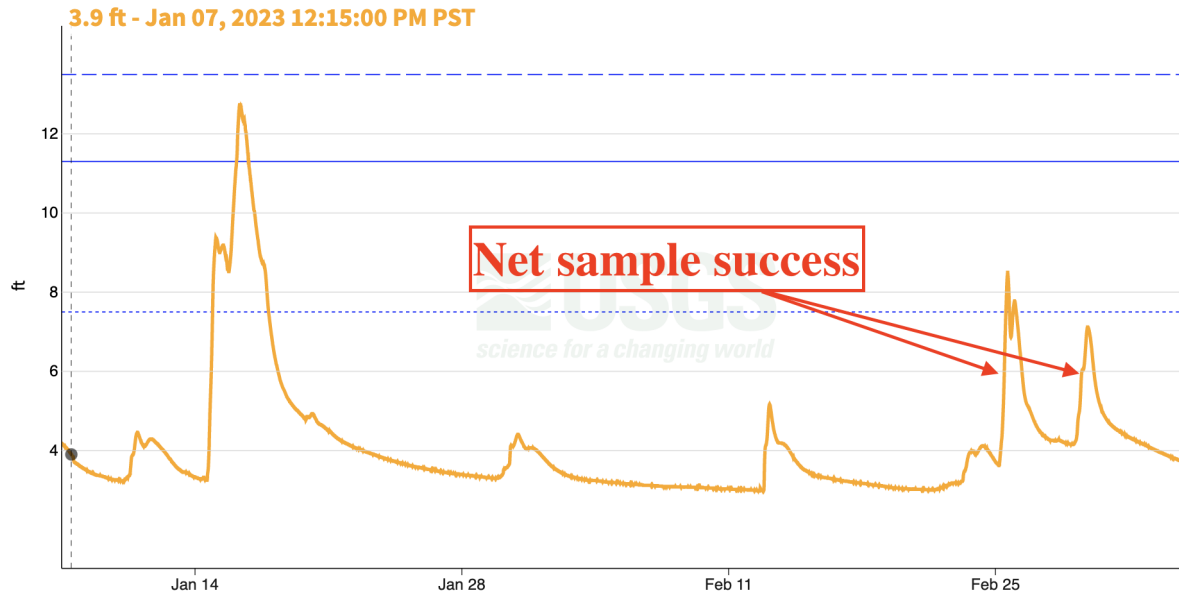
San Diego R a Fashion Valley at San Diego CA
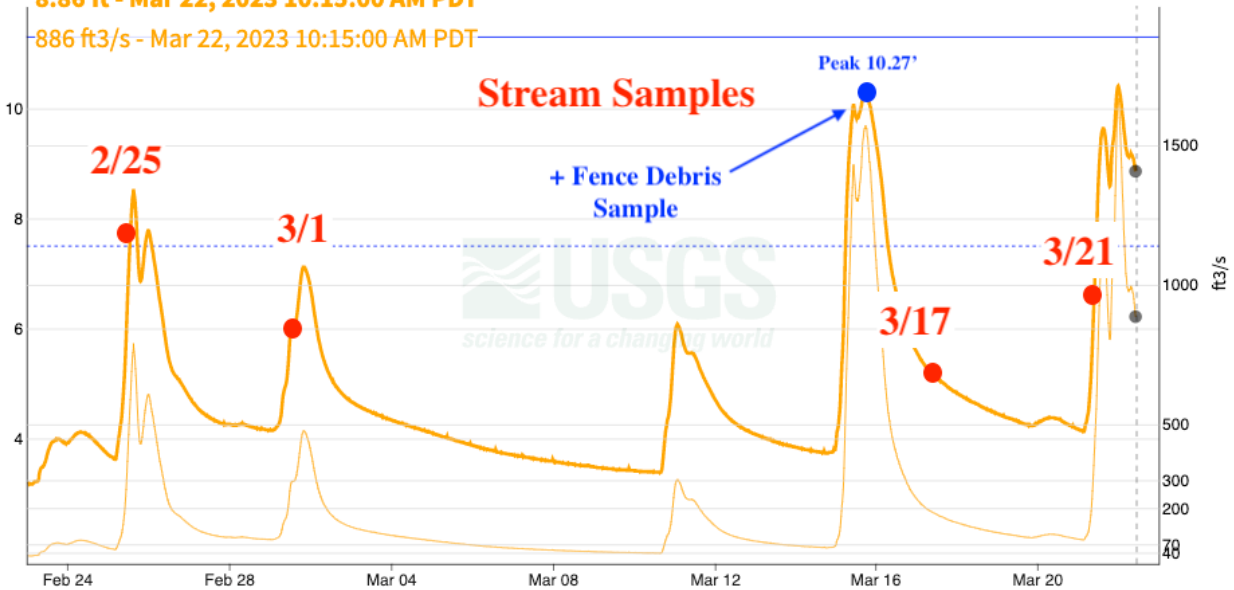
February 23, 2023 - March 22, 2023
Gage height, ft ⓘ
Streamflow, ft³/s ⓘ

8.86 ft - Mar 22, 2023 10:15:00 AM PDT

886 ft3/s - Mar 22, 2023 10:15:00 AM PDT

Stream Samples

Peak 10.27'

**+ Fence Debris
Sample**

2/25

3/1

3/17

3/21
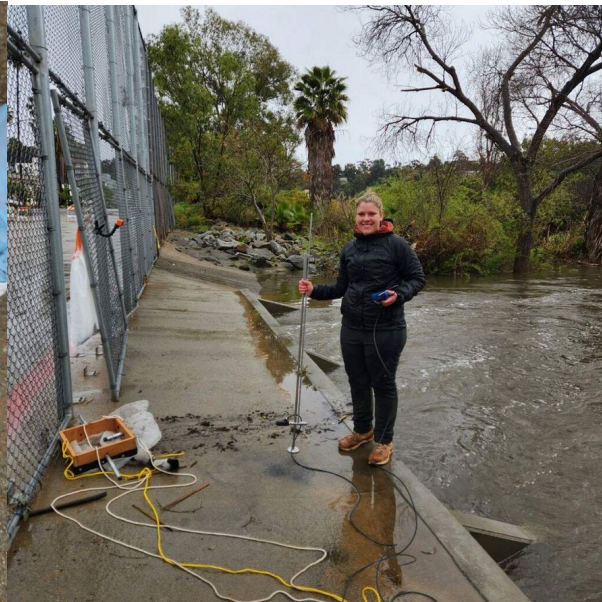
Total Wet Volume (gallons) (2/25): 0.25
Biodegradable :
Rubber :
Glass :
Fabric :
Plastic:

Total Mass (g) (2/25): 411.4
Biodegradable/paper mass: 1
Rubber mass : 2.2
Glass mass: <1
Fabric mass: 0
Plastic mass: 17.4
Toxic/cigarette: 3.3
Wood: 387.5

$$\frac{411.4}{\big((14\cdot60)\cdot(3\cdot0.3048)\cdot(0.092903)\big)+\big((10\cdot60)\cdot(3.6\cdot0.3048)\cdot(0.092903)\big)+\big((9\cdot60)\cdot(4.6\cdot0.3048)\cdot(0.092903)\big)} = 2.027981595$$

Total Debris Load 2/25: 2.028 g/m^3

Trash Count 2/25 @ 1pm: Sample 1 Time = 14 mins - Velocity = 3ft/s			
Item Descriptor	**Max Size (cm)**	**Min Size (cm)**	**Material Type**
hard yellow fragment	3.5	2.5	plastic
bottle cap	3	3	plastic
hard green fragment	1.5	1.5	plastic
Blue fragment	3	0.1	plastic
Blue Bag fragment	1	0.1	plastic
Low density foam particle	0.5	0.5	plastic
Low density foam particle	0.5	0.5	plastic
Low density foam particle	0.5	0.5	plastic
Low density foam particle	0.5	0.5	plastic
Low density foam particle	0.5	0.5	plastic
Low density foam particle	0.5	0.5	plastic
Low density foam particle	0.25	0.25	plastic

Low density foam particle	0.25	0.25	plastic
Low density foam particle	0.25	0.25	plastic
Low density foam particle	0.25	0.25	plastic
Low density foam particle	0.25	0.25	plastic
Low density foam particle	0.25	0.25	plastic
Low density foam particle	0.25	0.25	Plastic

Low density foam particle	0.25	0.25	plastic
Low density foam particle	0.25	0.25	plastic
Low density foam particle	0.25	0.25	plastic
Low density foam particle	0.25	0.25	plastic
Low density foam particle	0.25	0.25	plastic
Low density foam particle	0.25	0.25	plastic
Low density foam particle	0.25	0.25	plastic
Low density foam particle	0.25	0.25	plastic
Low density foam particle	0.25	0.25	plastic
Low density foam particle	0.25	0.25	plastic
Low density foam particle	0.25	0.25	Plastic

Low density foam particle	0.25	0.25	Plastic
Low density foam piece	9	8	Plastic
Med density foam piece	2	1	Plastic
Med density foam piece	4	4	Plastic
High density foam piece	6	4	Plastic
High density foam piece	6	4	Plastic
Cigarette	3	0.5	Toxic
Cigarette	3	0.5	Toxic
Wood piece	23	6	wood

Trash Count 2/25 @ 1:30pm: Sample 2 Time = 10 mins - Velocity = 3.6 ft/s			
Low density foam particle	0.5	0.5	plastic
Low density foam particle	0.5	0.5	plastic
Low density foam particle	0.5	0.5	plastic
Low density foam particle	0.5	0.5	plastic
Low density foam particle	0.5	0.5	plastic
Low density foam particle	0.5	0.5	plastic
Low density foam	0.5	0.5	plastic

particle			
Low density foam particle	0.5	0.5	plastic
Low density foam particle	0.5	0.5	plastic
Low density foam piece	2	2	plastic
Med density foam piece	2	1.5	plastic
Foam piece	4	1	plastic
Hard plastic piece	0.25	0.25	plastic
Hard plastic piece	0.25	0.25	plastic
Hard plastic piece	0.25	0.25	plastic
Hard plastic piece	0.25	0.25	plastic
Plastic food wrapper piece	3	3	plastic
Plastic food wrapper piece	3	2	plastic
Plastic cosmetic wrapper piece	1	0.5	plastic
Lollipop stick	6	0.5	paper
Unidentifiable	2	2	paper
cigarette	3	0.5	toxic
Glass shard	0.25	0.25	glass
Rubber glove piece	6	5	rubber

Trash Count 2/25 @ 1:45pm: Sample 3 Time = 9 mins - Velocity = 4.6 ft/s

Item Descriptor	Max Size (cm)	Min Size (cm)	Material Type
Low density foam particle	1	0.5	plastic
Low density foam particle	0.25	0.25	plastic
Low density foam particle	0.5	0.5	plastic
Hard Plastic fragment	1	0.5	plastic

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Total Mass from (3/1) (g): 1g

$$\frac{1}{\left(\left(15\cdot60\right)\cdot\left(3.6\right)\right)+\left(\left(15\cdot60\right)\cdot\left(3.62\right)\right)+\left(\left(15\cdot60\right)\cdot\left(3.65\right)\right)} = 1.02218133 \times 10^{-4}$$

Total debris load: 0.0036 g/m^3

Trash Count 3/1 @ 12:45pm: Sample 1 Time = 15 mins - Velocity = 3.6 ft/s			
Item Descriptor	**Max Size (cm)**	**Min Size (cm)**	**Material Type**
Low density foam particle	1	0.5	plastic
Low density foam particle	1	0.5	plastic
Low density foam particle	0.5	0.5	plastic
Low density foam piece	1	1	plastic
Low density foam piece	2	2	plastic
Hard plastic fragment	1	0.5	plastic

Trash Count 3/1 @ 1pm: Sample 2 Time = 15 mins - Velocity = 3.62 ft/s			
Item Descriptor	**Max Size (cm)**	**Min Size (cm)**	**Material Type**
Low density foam particle	0.5	0.5	plastic
Low density foam particle	0.5	0.5	plastic
Low density foam particle	0.5	0.5	plastic
Low density foam piece	1	1	plastic

Trash Count 3/1 @ 1:30pm: Sample 3 Time = 15 mins - Velocity = 3.65 ft/s			
Item Descriptor	Max Size (cm)	Min Size (cm)	Material Type
Low density foam particle	0.5	0.5	plastic
Low density foam particle	0.25	0.25	plastic
Low density foam particle	0.5	0.5	plastic
Low density foam piece	3	0.5	plastic
Plastic straw	12	0.5	plastic
Low density foam piece	1	0.5	plastic

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## Stream sample March 17th, 2023

3/17: This event included one in-stream sample and an opportunistic fence trap collection following a minor flood event (gage @ 10.27ft @ 6:15pm 3/16). Very little mobilized debris were seen and ZERO debris was captured in the net (15 min @ 3.49 ft/s), though one plastic bottle was observed prior to sampling.

Trash Count 3/17 @ 10:30am: Sample 1/1 Time = 15 mins - Velocity = 3.49 ft/s	ZERO debris in falling limb

San Diego R a Fashion Valley at San Diego CA

March 10, 2023 - March 17, 2023

Gage height, ft ⓘ

5.16 ft - Mar 17, 2023 10:30:00 AM PDT

Sample @ 10:38 am
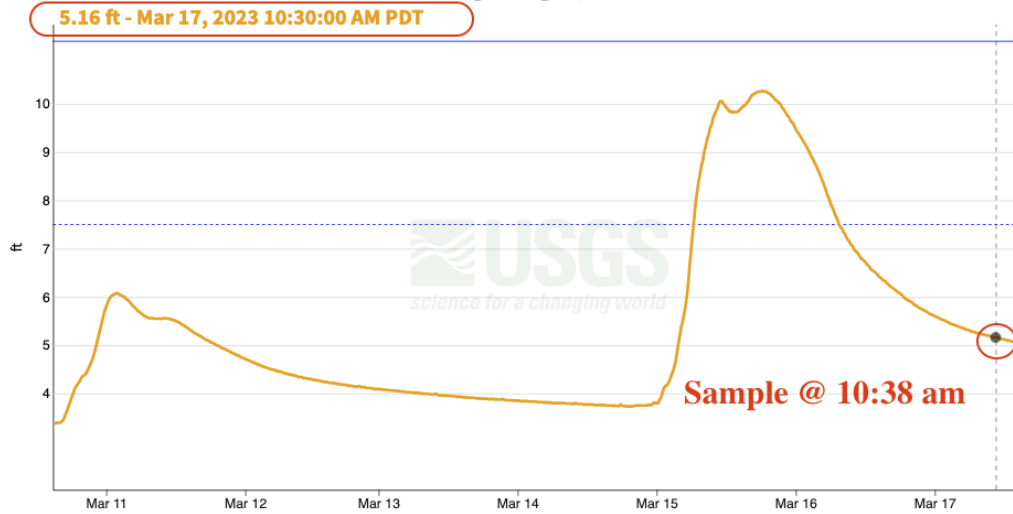
Total Wet Volume (gallons) (3/17):
Biodegradable :
Rubber :
Glass :

Fabric :
Plastic:

Total Mass (g) (3/17):
Biodegradable/paper mass:
Rubber mass :
Glass mass:
Fabric mass:
Plastic mass:
Toxic/cigarette:
Wood:

Trash Count 3/17 @ 10:30am: ***FENCE TRAP SAMPLE***			
Item Descriptor	**Max Size (cm)**	**Min Size (cm)**	**Material Type**
Plastic bag	38	27	plastic
Plastic ziplock	16	16	plastic
Plastic ziplock	16	16	plastic
Plastic bag	30	25	plastic
Plastic bag	90	60	plastic
Plastic milk jug	25	10	plastic
Nylon string	25	1	Plastic
Nylon string	30	1	plastic
Plastic wrapper hersheys	9	2	plastic
Wrapper fragment	11	7	plastic
Plastic fragment	14	2	plastic
Plastic fragment	4	1	plastic
Plastic fragment	12	2	plastic
Plastic fiber/insulation	9	1	plastic
Plastic fiber/insulation	2	1	plastic

Plastic wrapper	12	2	plastic
Foam piece	20	3	plastic
Foam piece	1	1	plastic
Foam piece	3	2	plastic
Foam piece	2	1	plastic
Foam piece	1	0.5	plastic
Minute maid juice carton	22	10	Paper
Dryer sheet	38	3	paper
Water bottle	26	12	metal
Fabric / clothing	39	28	fabric

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Stream Sample March 21st, 2023

Total Wet Volume (gallons) (3/21):
Biodegradable :
Rubber :
Glass :
Fabric :
Plastic:

Total Mass (g) (3/21):   38.9g
Biodegradable/paper mass:

Rubber mass :
Glass mass:
Fabric mass:
Plastic mass: 3.6g
Toxic/cigarette:
Wood:
Fabric & Cloth: 35.2

Trash Count 3/21 @ 9:15am Sample 1 Time = 15 mins - Velocity = 3.7 ft/s			
Item Descriptor	**Max Size (cm)**	**Min Size (cm)**	**Material Type**
Foam piece	4.5	3	Plastic
Foam piece	5	1	Plastic
Foam piece	4	2	Plastic
Foam piece	2.5	1	Plastic
Foam piece	2	2	Plastic
Foam piece	6	2	Plastic
Foam piece	2	1	Plastic
Foam piece	2	1	Plastic
Foam piece	2	0.5	Plastic
Foam piece	1	1	Plastic
Foam piece	0.5	0.5	Plastic
Foam piece	0.25	0.25	Plastic
Foam piece	0.25	0.25	Plastic
Foam piece	0.25	0.25	Plastic
Foam piece	0.25	0.25	Plastic
Hard plastic piece	2.5	2	Plastic
food wrapper piece	3	2	Plastic

Trash Count 3/21 @ 9:40am Sample 2 Time = 15 mins - Velocity = 4.7 ft/s

Item Descriptor	Max Size (cm)	Min Size (cm)	Material Type
Toddler sandal	13	7	Fabric and cloth
Foam piece	3	2	Plastic
Foam piece	2	2	Plastic
Foam piece	1	1	Plastic
Foam piece	0.5	0.5	Plastic
Foam piece	0.5	0.5	Plastic
Foam piece	0.5	0.5	Plastic
Foam piece	1	1	Plastic
Foam piece	0.25	0.25	Plastic
Foam piece	0.25	0.25	Plastic
Foam piece	0.25	0.25	Plastic
Wrapper piece	1.5	0.5	Plastic
Wrapper piece	6	0.5	Plastic

Trash Count 3/21 @ 10:09am Sample 3 Time = 15 mins - Velocity = 5.7 ft/s

Item Descriptor	Max Size (cm)	Min Size (cm)	Material Type
Plastic cap	2	1.5	Plastic