

Logjams and channel morphology influence sediment storage, transformation of organic matter, and carbon storage within mountain stream corridors

Nicholas A. Sutfin^{1,2*}, Ellen Wohl¹, Timothy Fegel³, Laurel Lynch⁴

¹*Department of Geosciences, Colorado State University, Fort Collins, CO 80523-1482*

²*Integrated Water, Atmosphere, and Ecosystem Education and Research Program, Colorado State University*

³*Rocky Mountain Research Station, United States Forest Service, Fort Collins, CO 80526*

⁴*Department of Soil and Water Systems, University of Idaho, Moscow, ID 83844*

**Corresponding author current affiliation: Department of Earth, Planetary, and Environmental Sciences, Case Western Reserve University, Cleveland, OH 44106*

Corresponding author: Nicholas A. Sutfin (nicksutfin@gmail.com)

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Introduction

This file of supporting information includes tables of datasets that provide the basis for data and statistical analysis included in the accompanying manuscript.

Additional large, raw datasets can be accessed at the following links:

<http://hdl.handle.net/10217/173334> and

Sutfin (2020) <https://doi.org/10.6084/m9.figshare.12014586.v1>

Table S1. Table of bulk density measurements made along numerous study reaches

Location/stream	Reach	Sample #	Min Depth (cm)	Max depth (cm)	Ave depth (cm)	Sampler radius (cm)	Soil volume (cm ³)	Dry Mass (g)	Dry bulk density (g/cm ³)
Glacier Creek	MT2	S1.0	3.5	11	7.25	3.65	293	260.48	0.89
North St. Vrain	MT1	S10.0	3.5	11	7.25	3.65	293	146.12	0.50
Glacier Creek	IMT2	S1.0	3.5	11	7.25	3.65	314	258.13	0.82
Mills Creek	UC3	S8.0	3.5	11	7.25	3.65	293	181.56	0.62
Mills Creek	UC3	S11.0	3.5	11	7.25	3.65	293	139.98	0.48
Mills Creek	UC3	S11.1	28	34	31	3.65	293	286.11	0.98
Mills Creek	UC3	S11.1	33	40	36.5	3.65	293	282.35	0.96
Mills Creek	UC3	S8.0	8	15	11.5	3.65	293	174.39	0.60
Mills Creek	UC3	S11.0	16	23	19.5	3.65	293	135.96	0.46
Ouzel Creek	PC2	S4.1	3	15	9	0.65	16	17.99	1.13
North St. Vrain	PC7	S1.1	10	25	17.5	0.65	20	18.89	0.95
North St. Vrain	PC1	S21.1	4	11	7.5	3.65	293	379.9	1.30
North St. Vrain	PC1	S21.2	28	34	31	3.65	293	283.36	0.97
South Fork Poudre River	AB6	S1.0	3.5	11	7.25	3.65	293	356.49	1.22
South Fork Poudre River	AB6	S1.1	28	34	31	3.65	293	376.5	1.29
South Fork Poudre River	AB6	S3.0	3.5	11	7.25	3.65	293	244.7	0.84
South Fork Poudre River	AB6	S3.1	28	34	31	3.65	293	328.3	1.12
South Fork Poudre River	AB6	S6.0	3.5	11	7.25	3.65	293	288.92	0.99
South Fork Poudre River	AB6	S7.0	3.5	11	7.25	3.65	293	248.92	0.85
South Fork Poudre River	AB6	S10.0	3.5	11	7.25	3.65	293	268.78	0.92
Big Thompson River	AB5	S2.0	3.5	11	7.25	3.65	293	153.29	0.52
Big Thompson River	AB5	S7.1	3.5	11	7.25	3.65	293	240.27	0.82
Big Thompson River	AB5	S7.2	28	34	31	3.65	293	269.89	0.92
Big Thompson River	AB5	S9.2	28	34	31	3.65	293	353	1.21
Big Thompson River	AB5	S11.1	3.5	11	7.25	3.65	293	262.88	0.90
Big Thompson River	AB5	S11.2	28	34	31	3.65	293	288.82	0.99
Big Thompson River	AB5	S20.1	8.5	15.5	12	3.65	293	266.06	0.91
Big Thompson River	AB5	S20.2	28	34	31	3.65	293	234.28	0.80
Big Thompson River	AB5	S9.1	5	12	8.5	3.65	293	284.67	0.97
Big Thompson River	AB5	S1.0	6	21	13.5	0.65	20	21.4	1.08
Ouzel Creek	AB2	S1b	23	40	31.5	0.65	23	20.32	0.90
Big Thompson River	AB5	S1.1	21	31	26	0.65	13	13.72	1.03
Ouzel Creek	CF2	S4.2	19	44	31.5	0.65	33	5.69	0.17
								Mean	0.88
								STD	0.25

Table S2. Number of logjams observed over a six-year time period within a subset of the study reaches.

Reach	Stream	Surveyed length (m)	Transect spacing	Wood reach length (m)	2010	2011	2012	2013	2014	2015	6-yr average
MT1	NSV	100	10	120	3	4	4	6	6	6	4.83
CF4	NSV	70	7	84	0	0	1	1	0	0	0.33
AB1	NSV	87	8.7	104.4	0	1	1	0	1	1	0.67
MT3	OCK	74	7.4	88.8	3	3	3	6	2	5	3.67
AB2	OCK	73	7.3	87.6	2	3	3	4	5	4	3.50
CF2	OCK	55	5.5	66	1	2	1	1	0	0	0.83
PC2	OCK	63	6.3	75.6	0	0	0	0	0	0	0.00
UC1	CCK	56	5.6	67.2	0	0	0	0	1	2	0.50
PC4	HCK	39	3.9	46.8	0	1	2	1	2	1	1.17

Table S3. Number of surface and soil water samples collected along each stream.

Reach	Ouzel		Glacier	
	Water	Soil	Water	Soil
Upper	2	9	2	3
Multithread	5	2	4	6
Lower	2	9	2	10

Table S4. Correlation (r) tables for organic carbon storage per area in different reservoirs and channel and valley characteristics

	Valley width (m)	Channel width (m)	Confinement (m/m)	Stream Gradient (m/m)	Drainage Area (km ²)	Elevation (m)	Soil moisture (%)	SOC (Mg C ha ⁻¹)	Duff Mg C ha ⁻¹)	Wood (Mg C ha ⁻¹)	Total (Mg C ha ⁻¹)
Valley width (m)	1	0.48	0.88	-0.45	0.52	-0.29	-0.06	0.07	-0.3	-0.34	0
Channel width (m)	0.48	1	0.12	-0.41	0.61	-0.88	0.06	-0.41	-0.06	-0.49	-0.49
Confinement (m/m)	0.88	0.12	1	-0.4	0.27	0.04	-0.06	0.31	-0.21	-0.17	0.28
Stream Gradient (m/m)	-0.45	-0.41	-0.4	1	-0.36	0.4	0.23	-0.3	0.33	0.38	-0.24
Drainage Area (km ²)	0.52	0.61	0.27	-0.36	1	-0.54	0.15	-0.23	-0.35	-0.43	-0.32
Elevation (m)	-0.29	-0.88	0.04	0.4	-0.54	1	-0.16	0.49	0.15	0.46	0.57
Soil moisture (%)	-0.06	0.06	-0.06	0.23	0.15	-0.16	1	-0.29	-0.14	-0.14	-0.33
SOC (Mg C ha ⁻¹)	0.07	-0.41	0.31	-0.3	-0.23	0.49	-0.29	1	-0.31	-0.15	0.98
Duff Mg C ha- 1)	-0.3	-0.06	-0.21	0.33	-0.35	0.15	-0.14	-0.31	1	0.51	-0.17
Wood (Mg C ha ⁻¹)	-0.34	-0.49	-0.17	0.38	-0.43	0.46	-0.14	-0.15	0.51	1	0.01
Total (Mg C ha ⁻¹)	0	-0.49	0.28	-0.24	-0.32	0.57	-0.33	0.98	-0.17	0.01	1

Table S5. Correlation (r) tables for fine sediment depth, channel characteristics, and valley geometry.

	Drainage Area (km ²)	Elevation (m)	Stream Gradient (m/m)	Reach length (m)	Valley width (m)	Channel width (m)	Confinement (m/m)	Surface Area (m ²)	Floodplain Volume (m ³)	Calculated sediment depth (m)	6-year average number of logjams	Depth standardized by valley width (m/m)
Drainage Area (km ²)	1	-0.4	0	0.56	0.35	0.59	0.04	0.42	0.6	0.4	-0.19	-0.32
Elevation (m)	-0.4	1	-0.16	-0.16	-0.03	-0.27	-0.23	-0.1	-0.36	-0.19	0.43	0.04
Stream Gradient (m/m)	0	-0.16	1	-0.25	-0.64	-0.28	0.83	-0.58	-0.51	-0.48	-0.27	0.68
Reach length (m)	0.56	-0.16	-0.25	1	0.81	0.77	-0.46	0.83	0.66	0.2	0.57	-0.81
Valley width (m)	0.35	-0.03	-0.64	0.81	1	0.59	-0.84	0.99	0.86	0.58	0.65	-0.83
Channel width (m)	0.59	-0.27	-0.28	0.77	0.59	1	-0.25	0.61	0.57	0.19	0.31	-0.66
Confinement (m/m)	0.04	-0.23	0.83	-0.46	-0.84	-0.25	1	-0.8	-0.63	-0.56	-0.61	0.73
Surface Area (m ²)	0.42	-0.1	-0.58	0.83	0.99	0.61	-0.8	1	0.9	0.62	0.6	-0.8
Floodplain Volume (m ³)	0.6	-0.36	-0.51	0.66	0.86	0.57	-0.63	0.9	1	0.84	0.21	-0.58
Calculated depth (m)	0.4	-0.19	-0.48	0.2	0.58	0.19	-0.56	0.62	0.84	1	-0.06	-0.19
6-year average number of logjams	-0.19	0.43	-0.27	0.57	0.65	0.31	-0.61	0.6	0.21	-0.06	1	-0.6
Depth normalized by valley width (m/m)	-0.32	0.04	0.68	-0.81	-0.83	-0.66	0.73	-0.8	-0.58	-0.19	-0.6	1

Table S6. Fluorescence data from floodplain sediment leachate and water samples

Site	Stream ID	Stream	Reach	Reach type	Sample Type	Region I	Region II	Region III	Region IV	Region V	SUVA 254
1	OCK	Ouzel	UC1	Upper	soil	16.41	35.78	19.95	20.88	6.99	0.18
2	OCK	Ouzel	UC1	Upper	soil	22.09	38.44	10.09	26.20	3.19	0.18
3	OCK	Ouzel	UC1	Upper	soil	12.75	36.46	20.91	22.95	6.94	0.18
4	OCK	Ouzel	UC2	Upper	soil	16.07	38.71	16.20	23.84	5.18	0.18
5	OCK	Ouzel	UC2	Upper	soil	17.33	45.91	8.69	25.48	2.59	0.18
6	OCK	Ouzel	UC2	Upper	soil	19.34	35.30	14.38	26.32	4.66	0.19
7	OCK	Ouzel	UC2	Upper	soil	14.34	39.78	16.11	24.75	5.02	0.17
8	OCK	Ouzel	UC2	Upper	soil	17.72	37.69	15.83	23.86	4.89	0.18
9	OCK	Ouzel	UC2	Upper	soil	20.62	41.33	5.50	28.55	4.00	0.18
10	OCK	Ouzel	MT	Multithread	soil	15.62	40.19	12.69	27.29	4.20	0.19
11	OCK	Ouzel	MT	Multithread	soil	18.61	33.81	19.23	22.39	5.95	0.18
12	OCK	Ouzel	LC2	Lower	soil	11.39	28.86	33.90	14.34	11.50	0.18
13	OCK	Ouzel	LC2	Lower	soil	13.42	30.31	31.21	14.64	10.41	0.18
14	OCK	Ouzel	LC2	Lower	soil	17.70	35.65	25.98	13.77	6.89	0.17
15	OCK	Ouzel	LC1	Lower	soil	13.53	32.53	27.03	17.98	8.92	0.18
16	OCK	Ouzel	LC1	Lower	soil	14.13	33.52	23.55	20.46	8.34	0.18
18	OCK	Ouzel	LC1	Lower	soil	8.32	27.13	37.88	14.39	12.28	0.17
19	GCK	Glacier	UC1	Upper	soil	11.24	30.38	34.29	13.18	10.90	0.17
20	GCK	Glacier	UC2	Upper	soil	14.59	34.19	21.87	21.74	7.61	0.18
21	GCK	Glacier	UC2	Upper	soil	18.92	39.76	10.10	27.72	3.49	0.18
22	GCK	Glacier	MT	Multithread	soil	20.46	38.39	10.20	27.46	3.49	0.18
25	GCK	Glacier	MT	Multithread	soil	14.84	34.79	20.69	22.78	6.89	0.18
26	GCK	Glacier	MT	Multithread	soil	14.03	40.28	24.45	15.69	5.54	0.18
27	GCK	Glacier	MT	Multithread	soil	18.12	36.22	19.48	19.95	6.23	0.18
28	GCK	Glacier	MT	Multithread	soil	20.09	33.20	18.44	22.52	5.76	0.18
29	GCK	Glacier	MT	Multithread	soil	24.39	35.46	12.70	23.59	3.87	0.18
30	GCK	Glacier	LC1	Lower	soil	16.87	39.35	14.48	24.66	4.65	0.19
31	GCK	Glacier	LC1	Lower	soil	20.10	28.46	23.66	20.14	7.64	0.19
32	GCK	Glacier	LC1	Lower	soil	19.22	39.33	14.13	23.09	4.23	0.19
33	GCK	Glacier	LC1	Lower	soil	17.93	42.05	10.86	25.40	3.76	0.19
34	GCK	Glacier	LC2	Lower	soil	14.72	39.83	17.02	22.92	5.51	0.18
35	GCK	Glacier	LC2	Lower	soil	13.21	34.72	25.79	18.04	8.24	0.19
36	GCK	Glacier	LC1	Lower	soil	19.92	33.69	23.28	16.51	6.60	0.18
37	GCK	Glacier	LC2	Lower	soil	17.00	33.84	20.40	21.96	6.81	0.18
38	GCK	Glacier	LC2	Lower	soil	16.12	32.94	23.69	19.31	7.95	0.18
39	GCK	Glacier	LC2	Lower	soil	16.64	30.43	24.91	20.06	7.96	0.18
41	GCK	Glacier	LC1	Lower	H2O	5.73	43.80	25.85	16.10	8.53	0.68
42	GCK	Glacier	LC2	Lower	H2O	13.68	42.46	13.25	26.62	3.99	0.68
43	GCK	Glacier	MT1	Multithread	H2O	34.07	41.70	17.13	6.00	1.10	0.33
44	GCK	Glacier	MT1	Multithread	H2O	31.50	45.56	11.68	10.02	1.23	0.63
45	GCK	Glacier	MT2	Multithread	H2O	26.67	39.83	13.67	15.76	4.08	0.66
46	GCK	Glacier	MT2	Multithread	H2O	11.42	41.60	17.08	24.31	5.59	0.73
47	GCK	Glacier	UC1	Upper	H2O	8.21	42.46	23.97	17.35	8.00	0.71
48	GCK	Glacier	UC2	Upper	H2O	9.62	44.97	20.13	18.69	6.60	0.76
49	OCK	Ouzel	LC1	Lower	H2O	31.84	45.01	10.27	11.51	1.37	0.89
50	OCK	Ouzel	LC2	Lower	H2O	21.40	42.77	14.30	17.22	4.31	0.87
51	OCK	Ouzel	MT1	Multithread	H2O	12.20	45.24	18.22	18.53	5.82	1.00
52	OCK	Ouzel	MT2	Multithread	H2O	13.86	46.16	16.31	18.56	5.12	1.09
53	OCK	Ouzel	MT2	Multithread	H2O	11.77	47.38	15.77	19.96	5.12	0.94
54	OCK	Ouzel	MT3	Multithread	H2O	16.30	44.58	15.25	19.00	4.88	1.02
55	OCK	Ouzel	MT4	Multithread	H2O	8.17	44.61	21.53	18.61	7.07	0.95
56	OCK	Ouzel	UC1	Upper	H2O	8.03	44.38	23.11	17.19	7.29	0.83
57	OCK	Ouzel	UC2	Upper	H2O	16.10	45.65	15.50	18.02	4.74	1.20