Supplementary Material

Physical and Biogeochemical Drivers of Solute Mobilization and Flux through the Critical Zone after Wildfire

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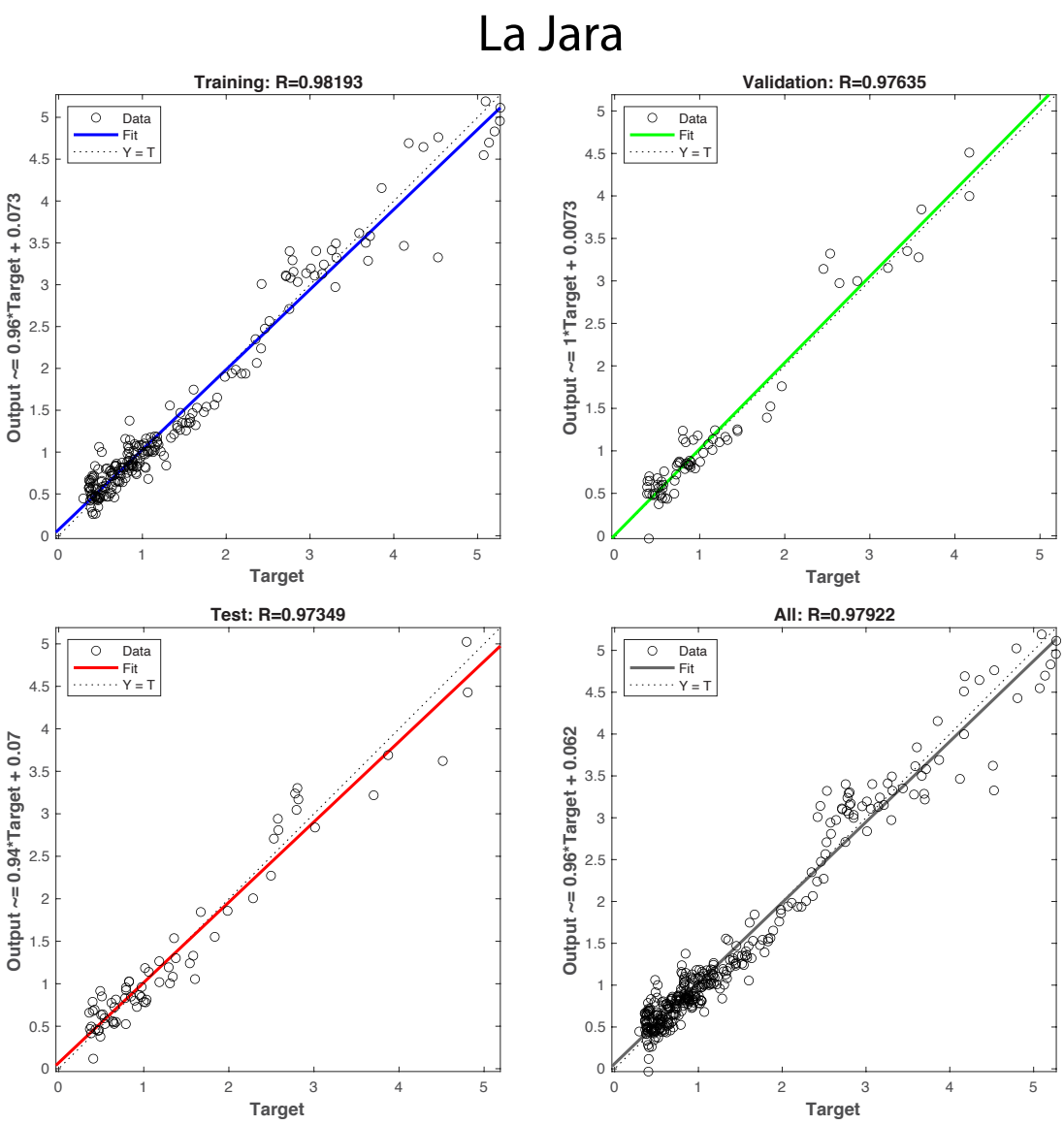
(a)



(b)

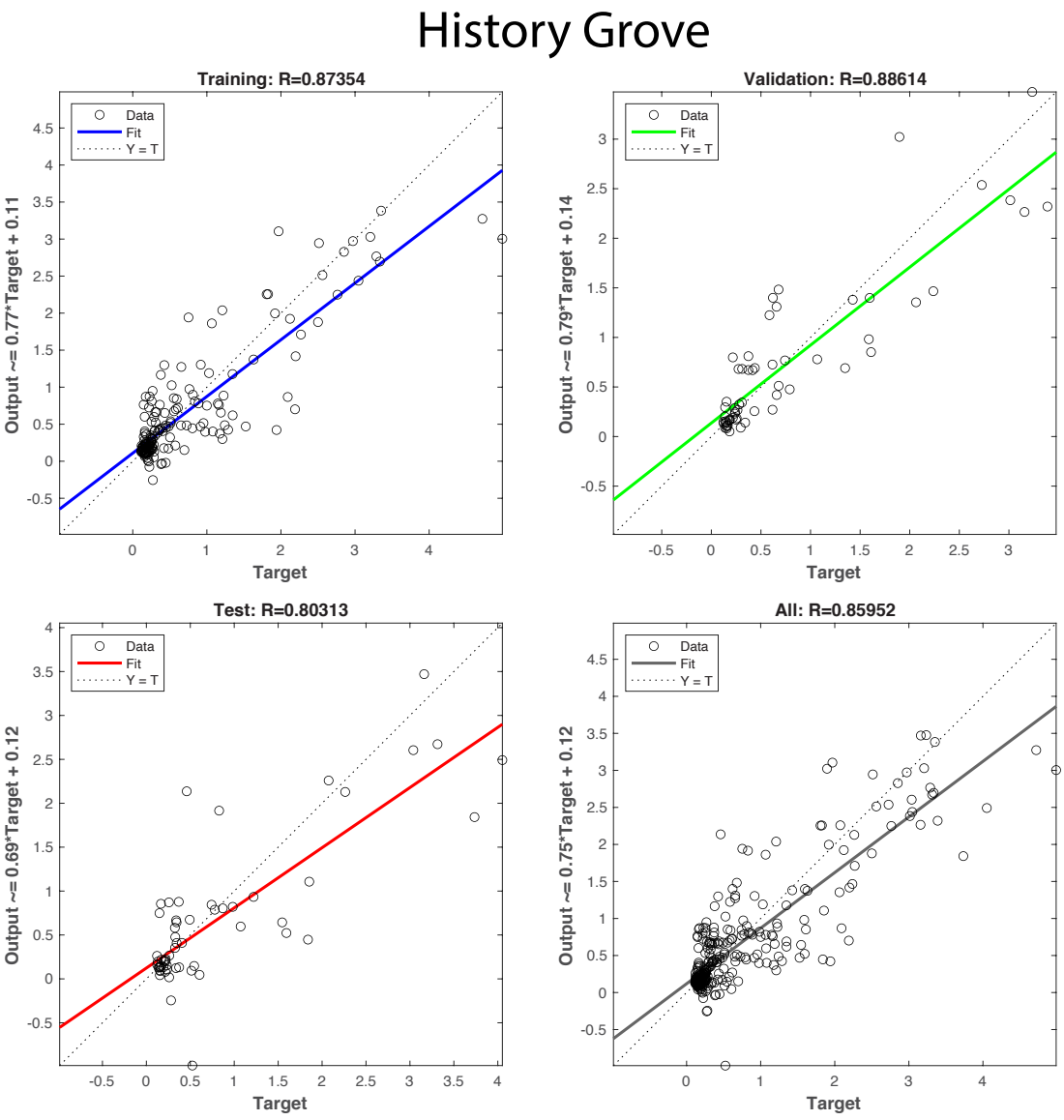


Figure S1. Artificial Neural Network (ANN) training, validation, and testing results for (a) La Jara, and (b) History Grove catchments. The *x* axis represents observed discharged is plotted, and the *y* axis shows the predicted discharge values for each simulation and model.

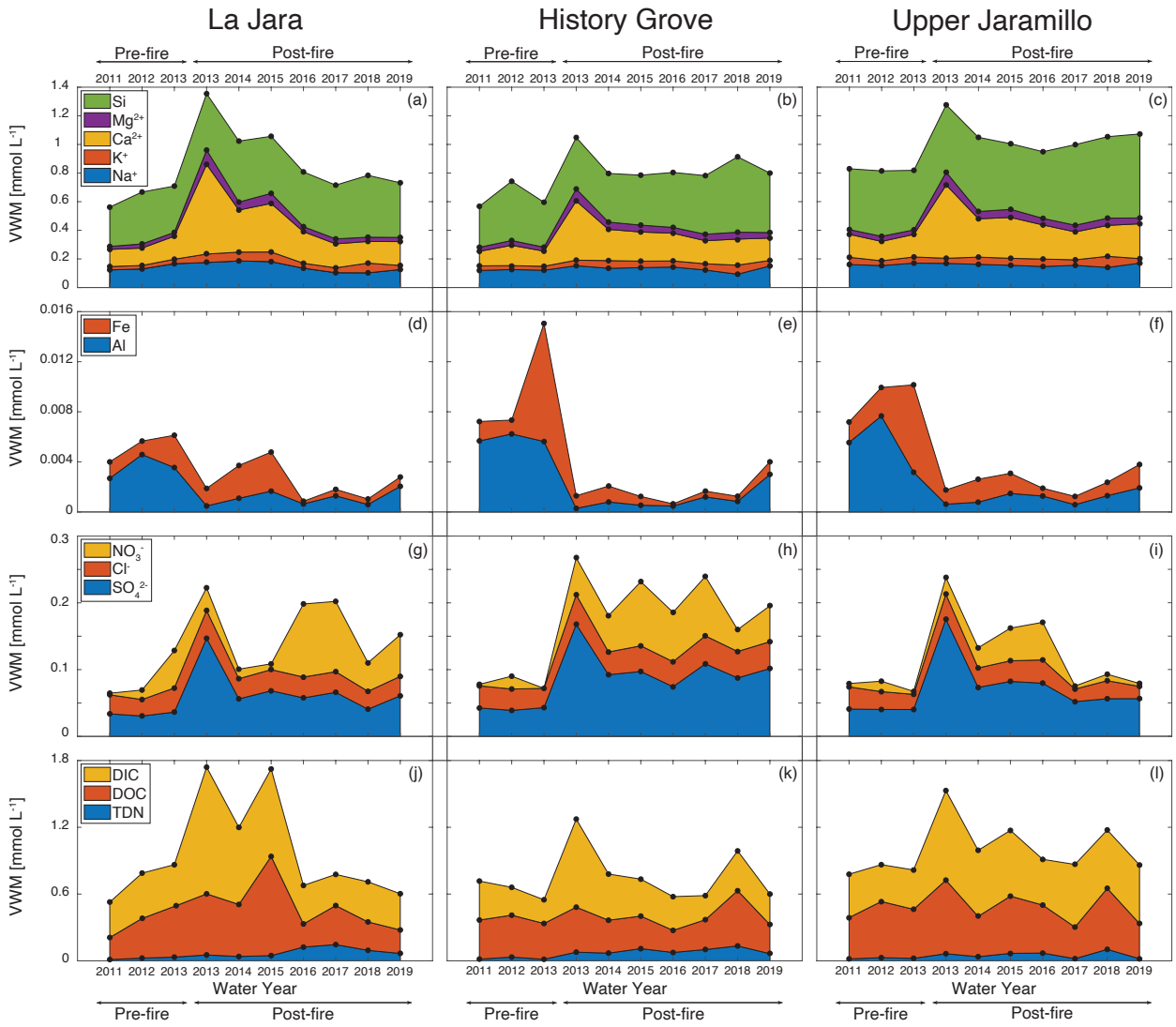


Figure S2. Calculated annual fluxes from La Jara, History Grove, and Upper Jaramillo catchments. Notice that for the WY 2013 there are two calculated VWM—before and after the Thomson Ridge wildfire in the summer of 2013—in order to illustrate the immediate effect of the fire in the three headwater catchments.

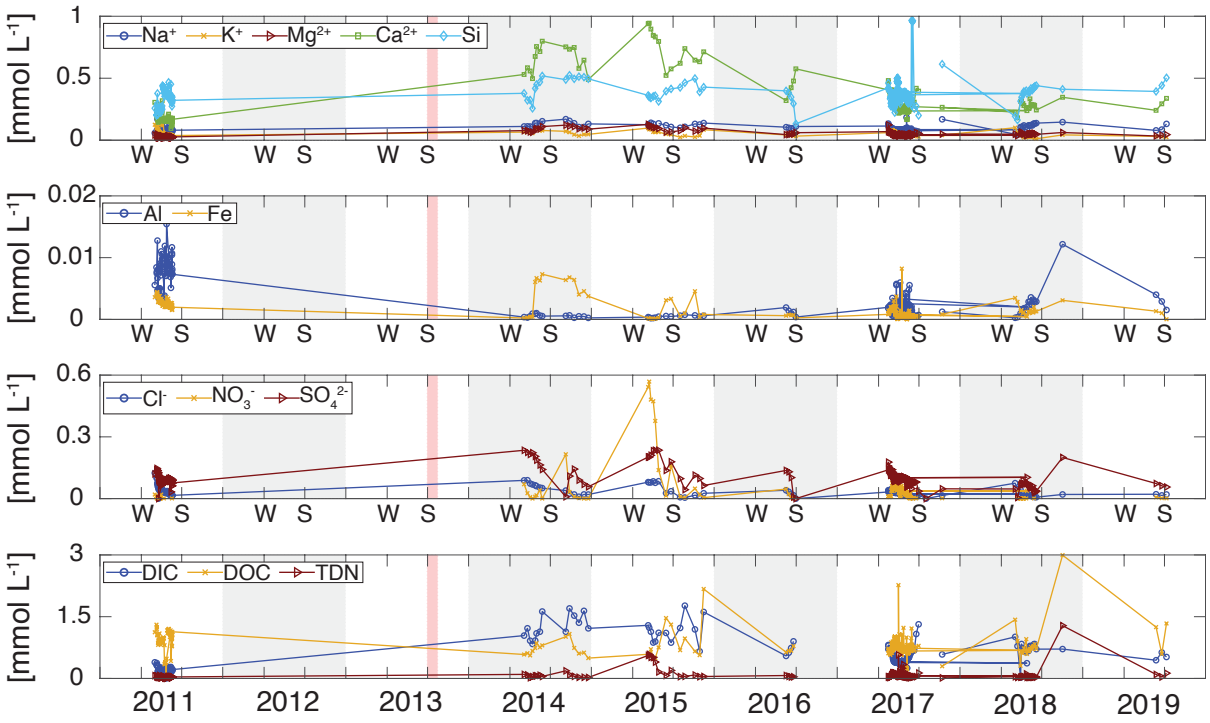


Figure S3. Time series of (A) major cations (Na, K, Ca and Mg), Si and the polyvalent cations Fe and Al; and (B) strong anions (Cl^-, NO_3^-, SO_4^{-2}), total inorganic and organic carbon, and total nitrogen before and after burning from the ZOB flume. The shaded red region marks the timing of the Thomson Ridge wildfire from May 31 through June 30.

	Na^+ Fluxes [mmol m^{-2} $year^{-1}$]	K^+ Fluxes [mmol m^{-2} $year^{-1}$]	Ca^{2+} Fluxes [mmol m^{-2} $year^{-1}$]	Mg^{2+} Fluxes [mmol m^{-2} $year^{-1}$]	Si Fluxes [mmol m^{-2} $year^{-1}$]	Al Fluxes [mmol m^{-2} $year^{-1}$]	Fe Fluxes [mmol m^{-2} $year^{-1}$]
La Jara							
WY 2011	4.9 (*1.3*)	0.9 (*0.51*)	4.7 (*0.96*)	0.8 (*0.18*)	10.9 (*3.17*)	0.1 (*0.05*)	0.1 (*0.17*)
WY 2012	9.9 (*2.37*)	1.8 (*0.96*)	9.3 (*6.56*)	2.2 (*1.01*)	27.6 (*4.8*)	0.3 (*0.22*)	0.1 (*0.05*)
WY 2013[a]	3.7 (*0.76*)	0.7 (*0.31*)	3.6 (*1.11*)	0.6 (*0.25*)	7.2 (*1.94*)	0.1 (*0.14*)	0.1 (*0.12*)
WY 2013[b]	14.1 (*3.97*)	4.8 (*7.36*)	50.5 (*25.88*)	8.1 (*3.6*)	31.8 (*4.95*)	0.04 (*0.02*)	0.1 (*0.05*)
WY 2014	48.2 (*13.58*)	16 (*8.47*)	76.2 (*27.86*)	14.4 (*6.37*)	110.3 (*28.84*)	0.3 (*0.36*)	0.7 (*0.56*)
WY 2015	74.8 (*14.35*)	27.9 (*16.83*)	140.1 (*29.85*)	29.1 (*5.28*)	164.7 (*29.51*)	0.7 (*0.32*)	1.3 (*0.8*)
WY 2016	52.9 (*5.18*)	13.5 (*2.36*)	86.5 (*10.93*)	13.8 (*1.76*)	149.9 (*15.2*)	0.3 (*0.06*)	0.1 (*0.06*)
WY 2017	31 (*3.85*)	10.2 (1.59)	50.1 (*7.43*)	10.4 (*1.51*)	112.2 (*41.89*)	0.4 (*0.22*)	0.2 (*0.51*)
WY 2018	9.4 (*3.45*)	6.2 (12.49)	13.9 (*5.21*)	2.7 (*0.86*)	39.7 (*17.22*)	0.1 (*0.04*)	0 (*0.06*)
WY 2019	36.6 (*4.15*)	8.2 (1.75)	48.5 (*3.19*)	8.4 (*0.83*)	111 (*7.16*)	0.6 (*0.28*)	0.2 (*0.1*)
History Grove							
WY 2011	3.7 (*1.08*)	1.0 (*0.39*)	3.1 (*0.92*)	0.9 (*0.25*)	8.8 (*2.27*)	0.2 (*0.14*)	0 (*0.04*)
WY 2012	7.3 (*0.85*)	1.6 (*0.32*)	8.3 (*3.67*)	1.9 (*0.77*)	24.2 (*3.91*)	0.4 (*0.25*)	0.1 (*0.08*)
WY 2013[a]	2.3 (*0.25*)	0.5 (*0.12*)	2 (*0.75*)	0.5 (*0.15*)	6 (*2.5*)	0.1 (*0.1*)	0.2 (*0.23*)
WY 2013[b]	7.4 (*1.98*)	1.9 (*4.81*)	20.2 (*17.63*)	4.1 (*3.37*)	17.5 (*0.65*)	0 (*0.01*)	0 (*0.01*)
WY 2014	23.9 (*5.39*)	9.6 (*4.14*)	38.8 (*12.52*)	9 (*2.86*)	60.5 (*14.31*)	0.1 (*0.11*)	0.2 (*0.2*)
WY 2015	49.1 (*6.48*)	16.1 (*2.92*)	72.1 (*7.76*)	17 (*1.87*)	123.6 (*13.53*)	0.2 (*0.08*)	0.2 (*0.25*)
WY 2016	31.4 (*3.57*)	9.3 (*1.83*)	42.6 (*12.71*)	8.9 (*1.36*)	84.3 (*6.59*)	0.1 (*0.08*)	0 (*0.03*)
WY 2017	29.3 (*4.85*)	10.4 (*1.49*)	38.6 (*6.3*)	10.9 (*1.42*)	98.2 (*28.16*)	0.3 (*0.13*)	0.1 (*0.12*)
WY 2018	4 (*2.14*)	2.7 (*2.98*)	7.9 (*2.65*)	2.1 (*0.53*)	22.7 (*7.03*)	0.04 (*0.04*)	0 (*0.02*)
WY 2019	35.2 (*6.32*)	9 (*1.06*)	36.4 (*2.55*)	9 (*0.64*)	96.9 (*4.13*)	0.7 (*0.15*)	0.2 (*0.1*)
Upper Jaramillo							
WY 2011	8.3 (*1.24*)	2.6 (*1.37*)	8.3 (*1.25*)	1.7 (*0.19*)	22.1 (*4.78*)	0.3 (*0.1*)	0.1 (*0.03*)
WY 2012	13.1 (*4.99*)	2.9 (*0.53*)	11.6 (*5.16*)	3 (*0.42*)	39 (*4.32*)	0.7 (*0.52*)	0.2 (*0.14*)
WY 2013[a]	5.3 (*0.64*)	1.3 (*0.2*)	4.9 (*0.81*)	1 (*0.07*)	13 (*4.72*)	0.1 (*0.06*)	0.2 (*0.3*)
WY 2013[b]	7.6 (*1.86*)	1.6 (*2.69*)	23.1 (*12.04*)	4 (*1.94*)	21.2 (*4.26*)	0.03 (*0.01*)	0.1 (*0.02*)
WY 2014	18.8 (*4.63*)	5.8 (*2.87*)	31 (*7.42*)	5.9 (*1.26*)	60.1 (*14.7*)	0.1 (*0.03*)	0.2 (*0.16*)
WY 2015	33.2 (*3.46*)	10.5 (*2.6*)	61.2 (*10.26*)	12.1 (*2.12*)	98.3 (*12.78*)	0.3 (*0.1*)	0.3 (*0.2*)
WY 2016	27.6 (*1.91*)	9.8 (*1.9*)	44.9 (*3.64*)	8.6 (*0.69*)	87.8 (*4.75*)	0.2 (*0.12*)	0.1 (*0.04*)
WY 2017	31.3 (*9.84*)	7.8 (*1.56*)	39.5 (*8.4*)	9.4 (*1.36*)	114.1 (*18.6*)	0.1 (*0.07*)	0.1 (*0.13*)
WY 2018	13.2 (*6.18*)	7.3 (*7.5*)	20.3 (*3.81*)	4.8 (*0.57*)	53.5 (*9.92*)	0.1 (*0.06*)	0.1 (*0.06*)
WY 2019	43.9 (*2.36*)	8.2 (*1.56*)	62.7 (*18.42*)	10.5 (*0.96*)	151.3 (*11.91*)	0.5 (*0.26*)	0.5 (*0.03*)

Table S1. Annual fluxes for major cations (Na^+, K^+, Ca^{2+} and Mg^{2+}), Si, and the polyvalent cations Fe and Al with standard deviation (stdev) error associated with parameter variability.

	NO_3^- Fluxes [mmol m^{-2} $year^{-1}$]	Cl- Fluxes [mmol m^{-2} $year^{-1}$]	SO_4^{2-} Fluxes [mmol m^{-2} $year^{-1}$]	TIC Fluxes [mmol m^{-2} $year^{-1}$]	TOC Fluxes [mmol m^{-2} $year^{-1}$]	TN Fluxes [mmol m^{-2} $year^{-1}$]
La Jara						
WY 2011	0.1 (*0.09*)	1.1 (*0.54*)	1.3 (*0.33*)	12.6 (*4.76*)	7.8 (*2.56*)	0.5 (*0.19*)
WY 2012	1.1 (*0.29*)	1.9 (*1.08*)	2.3 (*0.45*)	30.9 (*15.77*)	27.1 (*11.87*)	1.9 (*1.09*)
WY 2013[a]	1.3 (*2.86*)	0.8 (*1.58*)	0.8 (*0.56*)	8.4 (*2.53*)	10.2 (*7.66*)	0.7 (*0.61*)
WY 2013[b]	2.7 (*3.84*)	3.4 (*0.89*)	11.8 (*5.46*)	91.8 (*47.45*)	44.3 (*26.63*)	4.3 (*1.51*)
WY 2014	3.7 (*3.64*)	7.8 (*4.21*)	14.6 (*6.17*)	179.3 (*84.22*)	121.1 (*79.44*)	10.1 (*3.42*)
WY 2015	3.6 (*6.85*)	13.1 (*8.79*)	28.2 (*14.59*)	324.5 (*90.69*)	368.3 (*142.09*)	19.4 (*7.79*)
WY 2016	42.9 (*17.46*)	12.2 (*2.89*)	22.6 (*7.94*)	135.7 (*28.44*)	81.3 (*22.81*)	48.4 (*16.39*)
WY 2017	31.5 (*7.99*)	9.2 (*1.95*)	19.7 (*3.31*)	83.6 (*14.13*)	104.8 (*71.09*)	43.6 (*27.7*)
WY 2018	3.9 (*1.98*)	2.5 (*0.82*)	3.7 (*1.23*)	33.1 (*6.3*)	23.4 (*35.13*)	8.7 (*12.65*)
WY 2019	18.1 (*7.33*)	8.4 (*2.44*)	17.7 (*4.4*)	94.5 (*19.17*)	61.2 (*18.17*)	19.4 (*10.82*)
History Grove						
WY 2011	0.1 (*0.05*)	1 (*0.36*)	1.3 (*0.26*)	10.7 (*9.11*)	10.8 (*3.91*)	0.5 (*0.24*)
WY 2012	1.1 (*0.25*)	1.9 (*0.52*)	2.3 (*0.46*)	14.6 (*5.16*)	22 (*4.66*)	2 (*0.84*)
WY 2013[a]	---	0.6 (*0.14*)	0.8 (*0.13*)	4.1 (*1.85*)	6.2 (*1.29*)	0.3 (*0.07*)
WY 2013[b]	2.7 (*1.2*)	2.2 (*0.57*)	8.2 (*4.69*)	38.6 (*35.86*)	19.7 (*12.7*)	3.8 (*2.05*)
WY 2014	9.7 (*5.01*)	6.1 (*1.35*)	16.4 (*4.24*)	73.8 (*29.12*)	52.6 (*23.98*)	12.3 (*4.74*)
WY 2015	34 (*14.73*)	13.6 (*2.66*)	34.4 (*3.97*)	117.6 (*30.21*)	103.3 (*40.88*)	38.8 (*14.64*)
WY 2016	16.2 (*8.9*)	8.2 (*3.43*)	16.3 (*8.19*)	66.5 (*20.1*)	43.5 (*13.96*)	16.5 (*9.78*)
WY 2017	21.3 (*8.64*)	10.1 (*2.24*)	26 (*4.2*)	52 (*19.06*)	64.1 (*9.94*)	24.4 (*9.21*)
WY 2018	1.4 (*0.95*)	1.7 (*0.44*)	3.8 (*0.61*)	15.4 (*4.1*)	21.5 (*48.59*)	5.8 (*14.37*)
WY 2019	12.5 (*9.79*)	9.4 (*4.53*)	23.7 (*4.43*)	64 (*22.7*)	60.8 (*16.18*)	15.1 (*8.83*)
Upper Jaramillo						
WY 2011	0.3 (*0.3*)	1.7 (*0.77*)	2.1 (*0.32*)	20.2 (*7.55*)	19.3 (*5.08*)	0.9 (*0.35*)
WY 2012	1.3 (*0.47*)	2.3 (*0.92*)	3.4 (*0.59*)	28.3 (*8.75*)	43.1 (*17.06*)	2.4 (*1.32*)
WY 2013[a]	0.1 (---)	0.7 (*0.2*)	1.3 (*0.15*)	11.1 (*1.59*)	13.8 (*5.13*)	0.7 (*0.31*)
WY 2013[b]	1.1 (*0.57*)	1.7 (*0.61*)	7.9 (*3.32*)	36.3 (*15.86*)	29.8 (*9.81*)	2.9 (*2.73*)
WY 2014	3.5 (*1.98*)	3.4 (*1.39*)	8.5 (*2.71*)	68.8 (*16.7*)	42 (*7.28*)	4.3 (*2.11*)
WY 2015	10.5 (*12.23*)	6.6 (*3.36*)	17.6 (*5.85*)	126.7 (*29.84*)	110.2 (*41.63*)	14.4 (*12.06*)
WY 2016	10.6 (*4.18*)	6.6 (*1.98*)	15 (*5.58*)	77.4 (*14.65*)	81.3 (*19.87*)	13.2 (*5.15*)
WY 2017	0.9 (*0.62*)	3.8 (*2.75*)	10.5 (*2.76*)	113.9 (*12.58*)	57.5 (*7.92*)	3.9 (*1.0*)
WY 2018	0.9 (*0.86*)	2.5 (*0.63*)	5.3 (*0.88*)	49.3 (*11*)	51.5 (*47.19*)	9.7 (*18.2*)
WY 2019	1.1 (*0.47*)	4.7 (*4.5*)	14.5 (*0.98*)	135.9 (*20.35*)	81.4 (*28.78*)	4.9 (*1.05*)

Table S2. Annual fluxes for strong anions (Cl^-, NO_3^-, and SO_4^{2-}), total inorganic carbon (TIC), total organic carbon (TOC), and total nitrogen (TN) with standard deviation (stdev) error associated with parameter variability.

	Na^+ [mmol L^{-1}]	K^+ [mmol L^{-1}]	Ca^{2+} [mmol L^{-1}]	Mg^{2+} [mmol L^{-1}]	Si [mmol L^{-1}]	Al [mmol L^{-1}]	Fe [mmol L^{-1}]
La Jara							
WY 2011	0.12 (*0.033*)	0.02 (*0.013*)	0.12 (*0.024*)	0.02 (*0.005*)	0.27 (*0.08*)	0.003 (*0.001*)	0.001 (*0.004*)
WY 2012	0.13 (*0.031*)	0.02 (*0.013*)	0.12 (*0.086*)	0.03 (*0.013*)	0.36 (*0.063*)	0.005 (*0.003*)	0.001 (*0.001*)
WY 2013[a]	0.17 (*0.034*)	0.03 (*0.014*)	0.16 (*0.05*)	0.03 (*0.011*)	0.32 (*0.087*)	0.004 (*0.006*)	0.003 (*0.005*)
WY 2013[b]	0.18 (*0.049*)	0.06 (*0.091*)	0.63 (*0.321*)	0.1 (*0.045*)	0.39 (*0.061*)	0.0005 (*0.0003*)	0.001 (*0.001*)
WY 2014	0.19 (*0.052*)	0.06 (*0.033*)	0.29 (*0.108*)	0.06 (*0.025*)	0.43 (*0.111*)	0.001 (*0.001*)	0.003 (*0.002*)
WY 2015	0.18 (*0.035*)	0.07 (*0.041*)	0.34 (*0.072*)	0.07 (*0.013*)	0.4 (*0.071*)	0.002 (*0.001*)	0.003 (*0.002*)
WY 2016	0.14 (*0.013*)	0.03 (*0.006*)	0.22 (*0.028*)	0.04 (*0.004*)	0.38 (*0.039*)	0.001 (*0.0002*)	0.0002 (*0.0002*)
WY 2017	0.1 (*0.013*)	0.03 (*0.005*)	0.17 (*0.025*)	0.03 (*0.005*)	0.38 (*0.14*)	0.001 (*0.001*)	0.001 (*0.002*)
WY 2018	0.1 (*0.038*)	0.07 (*0.136*)	0.15 (*0.057*)	0.03 (*0.009*)	0.43 (*0.188*)	0.001 (*0.0005*)	0.0004 (*0.001*)
WY 2019	0.13 (*0.014*)	0.03 (*0.006*)	0.17 (*0.011*)	0.03 (*0.003*)	0.38 (*0.025*)	0.002 (*0.001*)	0.001 (*0.0004*)
History Grove							
WY 2011	0.12 (*0.035*)	0.03 (*0.013*)	0.1 (*0.03*)	0.03 (*0.008*)	0.29 (*0.074*)	0.006 (*0.004*)	0.002 (*0.001*)
WY 2012	0.13 (*0.015*)	0.03 (*0.005*)	0.14 (*0.063*)	0.03 (*0.013*)	0.41 (*0.067*)	0.006 (*0.004*)	0.001 (*0.001*)
WY 2013[a]	0.12 (*0.013*)	0.03 (*0.007*)	0.11 (*0.039*)	0.03 (*0.008*)	0.31 (*0.13*)	0.006 (*0.005*)	0.009 (*0.012*)
WY 2013[b]	0.15 (*0.041*)	0.04 (*0.099*)	0.41 (*0.362*)	0.08 (*0.069*)	0.36 (*0.013*)	0.0003 (*0.0003*)	0.001 (*0.0002*)
WY 2014	0.13 (*0.03*)	0.05 (*0.023*)	0.22 (*0.07*)	0.05 (*0.016*)	0.34 (*0.08*)	0.001 (*0.001*)	0.001 (*0.001*)
WY 2015	0.14 (*0.018*)	0.05 (*0.008*)	0.2 (*0.022*)	0.05 (*0.005*)	0.35 (*0.038*)	0.001 (*0.0002*)	0.001 (*0.001*)
WY 2016	0.14 (*0.016*)	0.04 (*0.008*)	0.19 (*0.058*)	0.04 (*0.006*)	0.38 (*0.03*)	0.0005 (*0.0004*)	0.0002 (*0.0001*)
WY 2017	0.12 (*0.02*)	0.04 (*0.006*)	0.16 (*0.026*)	0.05 (*0.006*)	0.41 (*0.117*)	0.001 (*0.001*)	0.0005 (*0.001*)
WY 2018	0.09 (*0.05*)	0.06 (*0.069*)	0.18 (*0.061*)	0.05 (*0.012*)	0.53 (*0.163*)	0.001 (*0.001*)	0.0004 (*0.0004*)
WY 2019	0.15 (*0.027*)	0.04 (*0.005*)	0.16 (*0.011*)	0.04 (*0.003*)	0.42 (*0.018*)	0.003 (*0.001*)	0.001 (*0.0004*)
Upper Jaramillo							
WY 2011	0.16 (*0.024*)	0.05 (*0.026*)	0.16 (*0.024*)	0.03 (*0.004*)	0.42 (*0.092*)	0.006 (*0.002*)	0.002 (*0.001*)
WY 2012	0.15 (*0.058*)	0.03 (*0.006*)	0.14 (*0.06*)	0.04 (*0.005*)	0.46 (*0.051*)	0.008 (*0.006*)	0.002 (*0.002*)
WY 2013[a]	0.17 (*0.02*)	0.04 (*0.006*)	0.16 (*0.026*)	0.03 (*0.002*)	0.42 (*0.151*)	0.003 (*0.002*)	0.007 (*0.01*)
WY 2013[b]	0.17 (*0.041*)	0.04 (*0.06*)	0.51 (*0.267*)	0.09 (*0.043*)	0.47 (*0.094*)	0.001 (*0.0002*)	0.001 (*0.001*)
WY 2014	0.16 (*0.04*)	0.05 (*0.025*)	0.27 (*0.064*)	0.05 (*0.011*)	0.52 (*0.127*)	0.001 (*0.0003*)	0.002 (*0.001*)
WY 2015	0.16 (*0.016*)	0.05 (*0.012*)	0.29 (*0.048*)	0.06 (*0.01*)	0.46 (*0.06*)	0.001 (*0.0005*)	0.002 (*0.001*)
WY 2016	0.15 (*0.01*)	0.05 (*0.01*)	0.24 (*0.019*)	0.05 (*0.004*)	0.47 (*0.025*)	0.001 (*0.001*)	0.001 (*0.0002*)
WY 2017	0.15 (*0.049*)	0.04 (*0.008*)	0.2 (*0.042*)	0.05 (*0.007*)	0.56 (*0.092*)	0.001 (*0.0004*)	0.001 (*0.001*)
WY 2018	0.14 (*0.066*)	0.08 (*0.08*)	0.22 (*0.04*)	0.05 (*0.006*)	0.57 (*0.106*)	0.001 (*0.001*)	0.001 (*0.001*)
WY 2019	0.17 (*0.009*)	0.03 (*0.006*)	0.24 (*0.071*)	0.04 (*0.004*)	0.59 (*0.046*)	0.002 (*0.001*)	0.002 (*0.0001*)

Table S3. Annual volume-weighted means for major cations (Na^+, K^+, Ca^{2+} and Mg^{2+}), Si, and the polyvalent cations Fe and Al with standard deviation (stdev) error associated with parameter variability.

	NO_3^- [mmol L^{-1}]	Cl^- [mmol L^{-1}]	SO_4^{2-} [mmol L^{-1}]	TIC [mmol L^{-1}]	TOC [mmol L^{-1}]	TN [mmol L^{-1}]
La Jara						
WY 2011	0.002 (*0.002*)	0.03 (*0.014*)	0.03 (*0.008*)	0.32 (*0.12*)	0.2 (*0.064*)	0.01 (*0.005*)
WY 2012	0.01 (*0.004*)	0.02 (*0.014*)	0.03 (*0.006*)	0.41 (*0.207*)	0.36 (*0.156*)	0.02 (*0.014*)
WY 2013[a]	0.06 (*0.128*)	0.04 (*0.07*)	0.04 (*0.025*)	0.37 (*0.113*)	0.46 (*0.342*)	0.03 (*0.027*)
WY 2013[b]	0.03 (*0.048*)	0.04 (*0.011*)	0.15 (*0.068*)	1.14 (*0.588*)	0.55 (*0.33*)	0.05 (*0.019*)
WY 2014	0.01 (*0.014*)	0.03 (*0.016*)	0.06 (*0.024*)	0.69 (*0.325*)	0.47 (*0.307*)	0.04 (*0.013*)
WY 2015	0.01 (*0.017*)	0.03 (*0.021*)	0.07 (*0.035*)	0.79 (*0.22*)	0.89 (*0.344*)	0.05 (*0.019*)
WY 2016	0.11 (*0.045*)	0.03 (*0.007*)	0.06 (*0.02*)	0.35 (*0.073*)	0.21 (*0.058*)	0.12 (*0.042*)
WY 2017	0.11 (*0.027*)	0.03 (*0.007*)	0.07 (*0.011*)	0.28 (*0.047*)	0.35 (*0.238*)	0.15 (*0.093*)
WY 2018	0.04 (*0.022*)	0.03 (*0.009*)	0.04 (*0.013*)	0.36 (*0.069*)	0.26 (*0.383*)	0.09 (*0.138*)
WY 2019	0.06 (*0.025*)	0.03 (*0.008*)	0.06 (*0.015*)	0.33 (*0.066*)	0.21 (*0.063*)	0.07 (*0.037*)
History Grove						
WY 2011	0.002 ($3x10^{-6}$)	0.03 (*0.012*)	0.04 (*0.008*)	0.35 (*0.297*)	0.35 (*0.127*)	0.02 (*0.008*)
WY 2012	0.02 (*0.004*)	0.03 (*0.009*)	0.04 (*0.008*)	0.25 (*0.088*)	0.38 (*0.08*)	0.03 (*0.014*)
WY 2013[a]	---	0.03 (*0.008*)	0.04 (*0.007*)	0.21 (*0.096*)	0.32 (*0.067*)	0.01 (*0.004*)
WY 2013[b]	0.06 (*0.018*)	0.04 (*0.012*)	0.17 (*0.096*)	0.79 (*0.736*)	0.4 (*0.261*)	0.08 (*0.042*)
WY 2014	0.05 (*0.028*)	0.03 (*0.008*)	0.09 (*0.024*)	0.41 (*0.164*)	0.3 (*0.135*)	0.07 (*0.027*)
WY 2015	0.1 (*0.042*)	0.04 (*0.008*)	0.1 (*0.011*)	0.33 (*0.085*)	0.29 (*0.116*)	0.11 (*0.041*)
WY 2016	0.07 (*0.041*)	0.04 (*0.016*)	0.07 (*0.037*)	0.3 (*0.092*)	0.2 (*0.064*)	0.08 (*0.045*)
WY 2017	0.09 (*0.036*)	0.04 (*0.009*)	0.11 (*0.018*)	0.22 (*0.079*)	0.27 (*0.041*)	0.1 (*0.038*)
WY 2018	0.03 (*0.022*)	0.04 (*0.01*)	0.09 (*0.014*)	0.36 (*0.095*)	0.5 (*1.126*)	0.13 (*0.333*)
WY 2019	0.05 (*0.042*)	0.04 (*0.019*)	0.1 (*0.019*)	0.27 (*0.097*)	0.26 (*0.069*)	0.06 (*0.038*)
Upper Jaramillo						
WY 2011	0.01 (*0.006*)	0.03 (*0.015*)	0.04 (*0.006*)	0.39 (*0.145*)	0.37 (*0.098*)	0.02 (*0.007*)
WY 2012	0.02 (*0.005*)	0.03 (*0.011*)	0.04 (*0.007*)	0.33 (*0.102*)	0.5 (*0.2*)	0.03 (*0.015*)
WY 2013[a]	0.005 (---)	0.02 (*0.006*)	0.04 (*0.005*)	0.35 (*0.051*)	0.44 (*0.164*)	0.02 (*0.01*)
WY 2013[b]	0.03 (*0.013*)	0.04 (*0.013*)	0.18 (*0.074*)	0.81 (*0.352*)	0.66 (*0.218*)	0.06 (*0.061*)
WY 2014	0.03 (*0.017*)	0.03 (*0.012*)	0.07 (*0.023*)	0.59 (*0.144*)	0.36 (*0.063*)	0.04 (*0.018*)
WY 2015	0.05 (*0.057*)	0.03 (*0.016*)	0.08 (*0.027*)	0.59 (*0.139*)	0.51 (*0.194*)	0.07 (*0.056*)
WY 2016	0.06 (*0.022*)	0.03 (*0.01*)	0.08 (*0.03*)	0.41 (*0.078*)	0.43 (*0.105*)	0.07 (*0.027*)
WY 2017	0.005 (*0.003*)	0.02 (*0.014*)	0.05 (*0.014*)	0.56 (*0.062*)	0.28 (*0.039*)	0.02 (*0.005*)
WY 2018	0.01 (*0.009*)	0.03 (*0.007*)	0.06 (*0.009*)	0.52 (*0.117*)	0.55 (*0.502*)	0.1 (*0.194*)
WY 2019	0.004 (*0.002*)	0.02 (*0.017*)	0.06 (*0.004*)	0.53 (*0.079*)	0.32 (*0.112*)	0.02 (*0.004*)

Table S4. Annual volume-weighted means for strong anions (Cl^-, NO_3^-, and SO_4^{2-}), total inorganic carbon (TIC), total organic carbon (TOC), and total nitrogen (TN) with standard deviation (stdev) error associated with parameter variability.

Burn Severity	La Jara	History Grove	Upper Jaramillo
Unburned	8.80 %	2.79 %	20.95 %
Low	31.96 %	22.71 %	46.19 %
Moderate	36.03 %	53.45 %	25.22 %
High	23.04 %	21.26 %	4.07 %

Table S5. Calculated percentages of burn severity intensities in each catchment.

Supplemental information S1. On Fluorescence Index (FI), humification index (HIX) and specific UV absorbance at 245 nm ($SUVA_{254}$).

These metrics provide valuable insights on the origin and structure of the organic matter dissolved in a water samples. HIX and $SUVA_{254}$ indices are correlated with sample aromaticity (Olshansky et al., 2018), whereas FI determines whether the organic matter is microbial- or terrestrial-derived. Increased FI values of DOM in the surface waters of the three catchments suggests reduction of plant-derived DOM due to biomass combustion (Olshansky, Root, et al., 2018). Moreover, increased HIX values in streams after fire suggest higher aromaticity of organic matter (i.e., more mineralized organic matter) (Birdwell & Engel, 2010).