Chapman, K.A., Best, R.J., Smith, M.E., Mueller, E.R., Grams, P.E., and Parnell, R.A., 2020, Estimating the contribution of tributary sand inputs to controlled flood deposits for sandbar restoration using elemental tracers, Colorado River, Grand Canyon National Park, Arizona: GSA Bulletin, <https://doi.org/10.1130/B35642.1>.

Supplemental Material

Table S1. Mean reported concentration and standard error for all elemental XRF data

Table S2. Proportion of total variance between the Glen Canyon and Paria River sand populations explained by the first five principal components in each grain size.

Table S1:

TABLE S1: MEAN REPORTED CONCENTRATION AND STANDARD ERROR (ppm*)

63-90 μm														
Population	Fe	Fe σ	Ca	Ca σ	K	K σ	Ti	Ti σ	Rb	Rb σ	Sr	Sr σ	Zr	Zr σ
Glen Canyon	13254.5	974.3	15843.9	964.6	906.8	17.5	1940.0	127.3	42.1	0.3	99.3	1.0	2971.6	474.5
Paria River	5747.1	68.2	18510.9	556.0	1661.4	65.0	920.7	11.7	47.0	0.3	77.3	0.5	134.3	6.7
Marble 2013	6462.4	168.3	15333.0	479.9	715.3	11.6	1039.6	27.9	42.2	0.2	77.5	0.8	543.8	50.4
Marble 2014	6709.8	165.1	22856.7	740.3	712.4	20.9	1160.4	29.6	42.4	0.3	79.9	0.8	538.1	52.6
90 – 125 μm														
Glen Canyon	9739.7	854.3	11597.8	664.3	855.0	21.9	1290.4	107.9	33.9	0.7	79.9	1.3	694.5	109.8
Paria River	4352.4	101.1	16100.4	454.2	1637.3	65.4	685.7	15.0	40.6	0.4	59.7	0.7	57.7	2.0
Marble 2013	4641.8	289.5	10847.8	419.6	682.6	9.8	680.7	30.1	37.3	0.4	54.8	0.9	124.9	19.1
Marble 2014	4169.0	95.8	15526.6	585.6	707.8	15.5	660.4	14.8	38.6	0.5	58.3	1.0	109.9	6.0
125 – 180 μm														
Glen Canyon	4995.1	219.3	10478.5	772.2	826.5	15.6	726.3	32.7	28.9	0.8	71.8	1.9	83.8	7.2
Paria River	4458.0	139.2	19276.2	674.7	1579.0	62.8	631.3	19.8	35.8	0.5	58.1	0.9	41.3	1.0
Marble 2013	4320.3	144.5	10240.1	495.5	700.7	9.7	605.6	21.4	31.5	0.6	49.8	1.1	55.2	2.0
Marble 2014	3796.5	112.1	15073.9	427.4	744.1	26.0	563.9	17.7	33.6	0.6	51.5	0.9	52.3	1.8
180 – 250 μm														
Glen Canyon	4517.5	319.6	12033.0	855.3	853.4	20.7	578.6	40.3	29.5	1.0	73.9	2.5	54.3	2.9
Paria River	4035.1	205.1	14379.8	587.8	1649.5	63.5	564.8	29.4	28.5	0.7	48.5	1.2	35.6	0.6
Marble 2013	4199.8	113.7	9329.0	316.2	662.7	10.4	591.4	20.9	24.1	0.4	41.5	0.6	51.7	3.0
Marble 2014	4413.2	214.4	15797.0	473.3	779.3	36.1	646.2	36.1	29.0	0.7	51.0	1.2	57.7	4.2
250 – 355 μm														
Glen Canyon	4955.7	329.1	12210.4	825.1	823.5	16.6	608.4	44.9	32.1	1.1	80.1	2.5	63.5	5.0
Paria River	2969.9	168.6	12157.4	1177.3	1685.7	79.8	436.7	23.8	17.7	0.5	36.3	1.4	31.7	0.6
Marble 2013	4138.5	129.0	10650.1	330.8	644.0	11.5	502.8	15.1	20.5	0.5	41.8	0.9	45.3	1.5
Marble 2014	4135.7	139.1	14069.0	427.1	727.1	39.9	581.2	22.9	22.9	0.6	45.1	1.0	51.6	2.7
355 – 500 μm														
Glen Canyon	6174.2	854.3	14966.9	1501.0	868.1	26.0	718.0	81.7	39.7	1.9	88.9	4.8	72.2	11.2
Paria River	2171.8	130.2	12310.9	1210.3	1658.6	96.0	308.2	14.2	11.0	0.5	29.6	1.2	28.0	0.7
Marble 2013	3581.3	115.0	11327.1	321.8	614.8	10.4	418.8	11.5	18.0	0.5	42.4	1.1	39.2	0.8
Marble 2014	4935.3	262.6	16969.2	631.5	762.9	27.1	576.4	31.1	22.1	1.1	51.7	2.2	50.9	2.5

* based on values reported directly by the XRF, not absolute. See text for details

Table S2:

TABLE S2: VARIANCE EXPLAINED BY EACH PRINCIPAL COMPONENT*						
Grain Size (μm)	PC1	PC2	PC3	PC4	PC5	Variance explained by PC1 and PC2†
63 – 125	0.461	0.281	0.149	0.073	0.022	0.742
125 – 250	0.673	0.160	0.090	0.048	0.020	0.833
250 – 500	0.719	0.132	0.059	0.018	0.007	0.851

* Proportion of total variance between the Glen Canyon and Paria River sand populations explained by the first five principal components in each grain size.

† Cumulative original variance explained by PC1 and PC2.