Extended methods – Supplemental data

Sampled basins ranged in area from 2 to 730 km^2 with discharge measured at sampling of <0.1 to 40 m^3/s. At each site, we measured pH, conductivity, and dissolved oxygen using meters. Field blanks were collected each day. *E. coli* samples were processed in the field using the Aquagenx compartment bag test (results are most probable number, MPN/100 ml (Stauber et al., 2014)). Fecal matter source tracing was done by Source Molecular using DNA specific to different animal digestive tracts.

Samples collected for major and trace element analysis by inductively coupled plasma mass spectroscopy (ICP-MS) at Middlebury College, Vermont, were filtered in the field (0.45 μm nylon) and then acidified using 5 drops of 10% nitric acid in 50 ml of sample water. Unfiltered, unacidified samples (1 liter) were collected and kept cold. We measured Cl, NO_3, and HPO_4 in unfiltered samples within 24 hours using LaMotte low-range field kits. Major cations and anions were measured in filtered, unacidified samples using atomic absorption spectroscopy and ion chromatography, respectively, at Williams College, where lab pH and alkalinity were determined on unfiltered samples using automated titration. Charge balance for the 25 samples averaged 0.98 ± 0.04 (1 SD).

We analyzed filtered (0.45um) samples for concentrations of Dissolved inorganic Carbon (DIC), Dissolved Organic Carbon (DOC), and Total Dissolved Nitrogen (TDN). Analysis of DIC involved instrumental acidification of solution followed by purging for infrared measurement of CO2, whereas analysis of DOC was by high temperature combustion of the purged samples, followed also by infrared CO2 detection (Shimadzu, Columbia, MD, USA).

Drainage basins upstream of sampled points were extracted from the ASTER Global Digital Elevation Model (LP DAAC). Mean annual precipitation for each basin was determined

from WorldClim (Hijmans et al., 2005) and run-off coefficients from GLOH2O (Beck et al., 2015, 2017). We determined dissolved loads using estimated runoff for each watershed and by assuming elemental concentrations we measured at moderate flow were representative of annual mean values; an approach supported by the work of Godsey et al. (2009). Bedrock geology was extracted from the USGS Caribbean layer (French and Schenk, 2004) and land use was determined using the Global Land Cover dataset (Chen et al., 2015). We consider relevant criteria to evaluate water quality (Cuban National Bureau of Standards, 2014, 2017; United States Environmental Protection Agency, 2018; World Health Organization, 2017).

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TABLE S1. Field Data

	Site name	Date	Hour	Latitude	Longitude	discharge	Temperature	Conductivity	DO	pH	E. coli	Field Cl-	Field N	Field P
Technique						Meter	Meter	Meter	Meter	Meter	Aquagenex	Lamotte	Lamotte	Lamotte
SAMPLE						(m3/s)	C	(uS)	% saturation		MPN	mg/L	mg/L	mg/L
CU-14	Mabujina	8/23/18	1435	22.066218	-79.796231	4.243	33.5	400 +/- 17	144.8 +/- 4.0	8.2 +/- 0.1	136	36	0.6	0.4
CU-15	Saltadero	8/24/18	1100	22.148453	-79.423129	22*	28.7	597 +/- 6	95.9 +/- 1.6	8.3 +/- 0.0	326	48	0.4	0.6
CU-16	Paso Real	8/24/18	1400	22.208998	-79.017224	1.161	29.4	457 +/- 6	112.8 +/- 2.7	8.4 +/- 0.0	483	ND	0.8	0.2
CU-101	El Negrito	8/22/18	1222	22.052580	-80.292180	2.149	29.1	313 +/- 6	96.1 +/- 0.6	7.7 +/- 0.4	326	24	0	0.1
CU-102	Limones	8/19/18	1620	22.301066	-80.500401	0.608	29.7	353 +/- 6	94.9 +/- 1.5	8.0 +/- 0.0	>1000	240	0.4	0.2
CU-104	San Pedro	8/21/18	1450	22.881545	-80.519811	0.545	29.7	583 +/- 12	97.7 +/- 4.7	7.2 +/- 0.2	47	48	0.4	0.2
CU-106	Puente Blanco	8/21/18	1830	22.706792	-80.366741	1.082	30.7	297 +/- 12	74.2 +/- 1.1	7.7 +/- 0.2	>1000	ND	0.3	0.1
CU-107	San Gil	8/21/18	1015	22.535410	-79.879570	0.076	28.3	630 +/- 10	94.8 +/- 3.4	7.6 +/- 0.2	>1000	42	1	0.4
CU-108	Zulueta	8/21/18	1530	22.392370	-79.669060	0.272	28.0	583 +/- 12	116.0 +/- 3.0	7.9 +/- 0.0	136	30	0.4	0.2
CU-109	Falcon	8/21/18	1645	22.356970	-79.761220	0.159	31.3	627 +/- 6	ND +/- ND	7.6 +/- 0.2	136	30	0.8	0.4
CU-110	Ormigas	8/22/18	1200	21.918681	-80.265871	1.337	30.0	333 +/- 6	101.1 +/- 0.6	8.1 +/- 0.1	>1000	21	0.1	0.1
CU-111	Manicaragua	8/23/18	1207	22.089492	-79.916892	0.221	30.9	373 +/- 6	88.4 +/- 22.6	8.4 +/- 0.1	136		0.3	0.6
CU-113	La Lima	8/22/18	1550	21.837604	-80.104537	0.7*	30.7	297 +/- 15	ND +/- ND	8.1 +/- 0.2	>1000	30	0.1	0.1
CU-114	Seibabo	8/22/18	1007	22.105607	-80.225297	0.469	28.0	319 +/- 11	107.0 +/- 1.3	8.1 +/- 0.1	47	24	0.1	0.1
CU-115	El Mamey	8/22/18	1018	22.110610	-80.129100	0.777	27.3	247 +/- 6	99.7 +/- 0.7	8.1 +/- 0.1	136	36	0.2	0.1
CU-116	Jibacoa	8/23/18	1040	22.027663	-79.988887	0.819	25.5	407 +/- 6	89.5 +/- 2.7	7.1 +/- 0.3	>1000	36	0.2	0.2
CU-117	Guinia de Miranda	8/23/18	1318	22.049357	-79.843068	0.121	33.2	390 +/- 10	104.0 +/- 29.8	8.5 +/- 0.0	483	42	0.5	0.4
CU-118	Miller	8/21/18	1810	22.375160	-79.816940	0.618	32.7	310 +/- 0	ND +/- ND	6.9 +/- 0.2	47	60	0.1	0.1
CU-119	26 de Julio	8/20/18	1640	22.566843	-80.222009	1.914	30.3	567 +/- 6	125.0 +/- 2.6	7.6 +/- 0.2	ND	300	0.4	0.8
CU-120	Cartagena	8/20/18	1105	22.443130	-80.480883	0.368	29.0	1050 +/- 0	80.0 +/- 0.5	6.8 +/- 0.2	>1000	300	0.2	0.2
CU-121	Damují (highway)	8/20/18	1222	22.444158	-80.444816	0.224	30.3	907 +/- 15	75.3 +/- 1.3	6.8 +/- 0.1	483	300	0.1	0.2
CU-122	San Marcos uno	8/20/18	1415	22.504696	-80.290681	0.002	33.0	1377 +/- 12	110.5 +/- 9.4	7.4 +/- 0.1	136	360	0.1	0.2
CU-124	Azucar	8/21/18	1715	22.758724	-80.362130	0.102	30.0	677 +/- 15	71.1 +/- 1.9	8.0 +/- 0.0	136	33	1	0.1
CU-131	Congojas	8/20/18	910	22.354729	-80.508793	39.964	26.7	130 +/- 0	66.3 +/- 1.4	6.9 +/- 0.0	483	10	0.2	0.4
CU-132	Yumurí	8/20/18	1305	22.491781	-80.296337	0.149	32.0	690 +/- 10	58.5 +/- 2.1	6.9 +/- 0.2	483	210	0.5	0.2
BLANK 8/20		8/20/18									0	ND	ND	ND
BLANK 8/21		8/21/18									0	ND	0.1	0
BLANK 8/22		8/22/18									0	ND	0.1	0
BLANK 8/24		8/24/18									ND	ND	0	0

	discharge	Temperature	Conductivity	DO	pH	E. coli	Field Cl-	Field N	Field P
min	0.002	25.5	130	59	6.78	47	10	0.00	0.10
max	39.96	33.2	1377	125	8.50	483	360	1.00	0.80
avg	2.47	29.8	521	92	7.60	230	109	0.34	0.25

TABLE S2. Analyses performed at Williams College

	Ca^{+2}	Mg^{+2}	Na^{+}	K^{+}	NH_4^{+}	HCO_3^{-}	F-	Cl^{-}	NO_3^{-}	$HPO4^{-2}$	SO_4^{-2}	NO_2	Br-	SiO2	pH	charge
Technique	AA	AA	AA	AA	IC	IC	IC	IC	IC	IC	IC	IC	IC	Color	meter	balance
SAMPLE	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L		
Cu-014	41.50	12.33	27.56	2.32	0.00	211.30	0.29	15.68	2.49	1.29	12.53	1.20	0.49	22.03	8.37	1.01
Cu-015	56.07	36.77	23.04	1.52	0.00	354.40	0.23	24.87	2.44	1.36	13.19	0.74	0.53	38.43	8.30	0.99
Cu-016	53.96	18.88	20.42	1.22	0.00	250.20	0.23	23.21	3.94	0.00	8.79	1.37	0.50	38.43	8.03	1.01
Cu-101	68.81	4.78	6.64	1.18	0.00	214.80	0.17	10.56	1.55	0.00	9.82	1.15	0.45	11.10	8.43	1.00
Cu-102	40.76	12.10	16.76	2.15	0.00	194.90	0.21	13.02	2.00	1.18	11.49	1.05	0.47	17.25	8.30	0.97
Cu-104	79.48	16.33	17.54	0.52	0.06	341.90	0.21	23.25	2.30	0.00	13.23	1.59	0.49	14.52	8.78	0.90
Cu-106	33.30	11.19	17.37	2.32	0.04	147.30	0.16	24.92	1.32	0.00	10.94	0.93	0.51	13.15	8.14	0.99
Cu-107	71.79	24.68	17.32	0.73	0.00	371.50	0.26	23.62	4.66	0.00	12.56	1.80	0.53	36.38	8.41	0.88
Cu-108	76.46	21.79	25.81	1.40	0.00	380.60	0.23	20.94	2.77	1.19	10.52	1.75	0.50	39.11	8.59	0.94
Cu-109	57.41	48.71	23.14	1.41	0.00	399.90	0.26	22.21	5.83	1.42	16.08	0.69	0.49	50.04	8.44	1.03
Cu-110	63.00	5.37	8.21	1.33	0.00	201.10	0.19	12.75	0.91	0.00	7.91	1.12	0.46	12.47	8.32	1.01
Cu-111	41.18	14.78	14.91	2.40	0.00	202.50	0.26	14.98	2.40	1.60	6.28	1.15	0.46	26.81	8.33	1.00
Cu-113	54.05	1.98	4.12	1.29	0.00	164.60	0.16	6.88	1.15	1.43	5.19	0.98	0.00	7.00	8.15	0.99
Cu-114	53.58	5.70	10.84	1.24	0.00	166.30	0.16	19.22	0.51	0.00	11.86	1.01	0.48	10.42	8.17	1.01
Cu-115	47.32	5.15	6.25	1.31	0.06	150.80	0.16	9.65	1.17	0.00	8.20	0.93	0.46	7.00	8.13	1.03
Cu-116	71.44	5.96	7.55	0.86	0.00	229.80	0.16	10.34	1.81	0.00	9.01	1.25	0.47	13.83	8.27	1.00
Cu-117	40.49	12.74	15.99	1.42	0.00	189.10	0.25	14.46	3.17	1.23	9.16	1.10	0.46	28.18	8.35	0.99
Cu-118	22.29	24.54	11.89	1.44	0.06	194.50	0.17	13.34	0.50	0.00	7.54	1.13	0.46	23.40	8.18	0.97
Cu-119	53.48	27.67	32.00	3.85	0.07	311.30	0.29	29.08	3.86	1.58	30.83	1.51	0.53	30.23	8.38	0.96
Cu-120	98.36	22.02	95.58	4.28	0.00	230.50	0.23	150.88	0.91	1.18	160.06	1.46	1.12	13.83	8.40	0.95
Cu-121	77.74	18.58	94.92	2.37	0.00	226.00	0.22	116.51	0.88	0.00	138.63	1.30	0.95	11.10	8.34	0.95
Cu-122	66.01	32.75	120.27	1.39	0.00	242.20	0.30	192.90	0.49	1.14	100.87	2.11	0.93	24.08	8.45	0.96
Cu-124	74.70	20.77	19.94	1.84	0.00	353.60	0.26	24.00	6.13	0.00	14.43	1.67	0.53	17.25	8.65	0.90
Cu-131	13.87	4.00	6.66	2.65	0.00	65.31	0.15	5.16	1.68	1.34	4.21	0.55	0.00	11.78	7.81	1.01
Cu-132	72.25	12.14	81.11	1.24	0.00	356.50	0.58	31.78	2.24	0.00	43.37	1.43	0.63	21.35	8.52	1.05
Blk 8/20	0.04	0.01	0.02	0.01	0.00	2.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.17	
Blk 8/21	0.03	0.01	0.04	0.00	0.00	2.10	0.00	0.00	0.46	0.00	0.00	0.00	0.00	0.00	5.43	
Blk 8/22	0.04	0.01	0.14	0.23	0.00	2.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.41	
Blk 8/23	0.07	0.02	1.42	0.01	0.00	5.42	0.00	1.22	0.00	0.00	0.59	0.00	0.00	0.00	6.41	
Blk 8/24	0.14	0.04	2.14	0.03	0.00	6.25	0.00	1.24	0.46	0.00	0.74	0.00	0.00	0.00	6.59	
	Ca+2	Mg+2	Na+	K+	NH4+	HCO3-	F-	Cl-	NO3-	HPO4-2	SO4-2	NO2	Br-	SiO2	pH	charge
min	13.87	1.98	4.12	0.52	0.00	65.31	0.15	5.16	0.49	0.00	4.21	0.55	0.00	7.00	7.81	0.88
max	98.36	48.71	120.27	4.28	0.07	399.90	0.58	192.90	6.13	1.60	160.06	2.11	1.12	50.04	8.78	1.05
avg	57.17	16.87	29.03	1.75	0.01	246.04	0.23	34.17	2.28	0.64	27.07	1.24	0.52	21.57	8.33	0.98

AA= atomic absorption Color = colormetric IC = ion chromatograph

TABLE S3. Analyses performed at Middlebury College

	23Na	25Mg	29Si	SiO2	31P	39K	44Ca	48Ti	51V	52Cr	55Mn	59Co	60Ni	63Cu	66Zn	75As	85Rb	86Sr	88Sr	137Ba	208Pb	238U
Technique	ICP=MS	ICP=MS	ICP=MS	ICP=MS	ICP=MS	ICP=MS	ICP=MS	ICP=MS	ICP=MS	ICP=MS	ICP=MS	ICP=MS	ICP=MS	ICP=MS	ICP=MS	ICP=MS	ICP=MS	ICP=MS	ICP=MS	ICP=MS	ICP=MS	ICP=MS
SAMPLE	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB
Cu-014	16.5	13.3	14.3	30.6	0.11	2.3	53	87	8.2	< 0.5	< 5	< 0.5	< 1	< 10	< 25	< 1	0.4	124	115	31.2	< 1	< 0.5
Cu-015	21.0	35.7	25.4	54.4	<0.1	2.5	77	121	14.7	< 0.5	< 5	< 0.5	2.3	< 10	< 25	< 1	0.9	123	113	27.1	< 1	< 0.5
Cu-016	17.1	17.5	21.7	46.5	<0.1	1.2	59	96	12.4	< 0.5	< 5	< 0.5	< 1	< 10	< 25	< 1	0.6	92	92	23.2	< 1	< 0.5
Cu-101	6.7	5.3	5.6	12.0	<0.1	1.4	84	140	< 1	< 0.5	13.6	< 0.5	< 1	< 10	< 25	< 1	0.3	165	150	16.2	< 1	< 0.5
Cu-102	13.6	13.6	12.0	25.6	<0.1	2.5	54	80	10.5	< 0.5	6.7	< 0.5	< 1	< 10	< 25	< 1	1.2	173	155	41.1	< 1	< 0.5
Cu-104	14.0	17.0	9.6	20.6	<0.1	1.0	115.0	197.5	1.6	<0.5	<5	<0.5	<1	<10	<25	< 1	1.4	177	163	24.1	<1	0.7
Cu-106	12.6	12.4	9.1	19.4	<0.1	2.4	43	81	6.5	1.2	30.8	< 0.5	5.2	< 10	< 25	< 1	1.6	82	81	41.9	< 1	< 0.5
Cu-107	16.3	30.0	23.4	50.1	<0.1	1.1	100	166	5.1	2.2	< 5	< 0.5	2.7	< 10	< 25	< 1	0.5	220	196	69.6	< 1	< 0.5
Cu-108	24.7	25.8	24.4	52.2	<0.1	1.8	92	158	14.4	< 0.5	< 5	< 0.5	1.2	< 10	< 25	< 1	0.9	131	120	21.4	< 1	< 0.5
Cu-109	15.9	44.7	27.8	59.5	<0.1	1.4	63	97	10.6	1.7	6.4	< 0.5	1.3	< 10	< 25	< 1	0.5	112	112	17.4	< 1	< 0.5
Cu-110	7.4	6.2	6.9	14.8	<0.1	1.6	82	129	1.6	< 0.5	14.8	< 0.5	< 1	< 10	< 25	< 1	0.6	185	166	17.8	< 1	< 0.5
Cu-111	10.5	15.8	15.6	33.4	0.22	2.4	43	74	8.2	< 0.5	< 5	< 0.5	< 1	< 10	< 25	< 1	0.6	96	89	14.6	< 1	< 0.5
Cu-113	8.3	2.8	4.6	9.9	<0.1	1.2	69	109	< 1	< 0.5	6.2	< 0.5	< 1	< 10	< 25	< 1	0.6	143	128	10.5	< 1	< 0.5
Cu-114	7.8	6.1	6.3	13.4	<0.1	1.3	61.0	100.7	< 1	< 0.5	10.9	< 0.6	< 1	< 10	< 25	< 1	0.3	166	150	15.2	< 1	< 0.5
Cu-115	5.1	5.9	4.7	10.0	<0.1	1.6	56	95	1.4	< 0.5	8.2	< 0.5	< 1	< 10	< 25	< 1	0.5	117	108	12.1	< 1	< 0.5
Cu-116	6.3	6.6	8.9	19.1	<0.1	1.0	89	141	< 1	< 0.5	46.3	< 0.5	< 1	< 10	< 25	< 1	0.5	190	175	28.3	< 1	0.67
Cu-117	11.7	14.1	18.0	38.5	<0.1	1.5	55	79	8.6	< 0.5	< 5	< 0.5	< 1	< 10	< 25	< 1	0.4	127	117	19.0	< 1	< 0.5
Cu-118	10.6	26.7	13.5	28.8	<0.1	1.5	27	38	4.7	< 0.5	< 5	< 0.5	4.7	< 10	< 25	< 1	0.8	70	68	15.6	< 1	< 0.5
Cu-119	24.7	30.2	18.5	39.5	0.19	4.1	64	97	8.6	< 0.5	< 5	< 0.5	5.3	< 10	< 25	1.2	1.5	285	260	52.4	< 1	< 0.5
Cu-120	67.4	21.4	8.2	17.5	<0.1	4.8	117	170	2.8	< 0.5	< 5	< 0.5	3.5	< 10	< 25	1.0	2.1	618	559	56.2	< 1	1.83
Cu-121	68.3	21.8	8.6	18.3	<0.1	5.0	119	175	3.8	< 0.5	< 5	< 0.5	4.9	< 10	< 25	1.3	2.9	817	735	74.5	< 1	3.50
Cu-122	84.5	32.5	15.2	32.5	<0.1	2.4	171	262	2.0	< 0.5	< 5	< 0.5	1.0	< 10	< 25	1.4	2.0	817	741	137	< 1	4.27
Cu-124	15.1	22.4	11.4	24.5	<0.1	0.6	134	216	3.2	< 0.5	9.7	< 0.5	1.4	< 10	< 25	< 1	0.7	372	336	18.2	< 1	0.87
Cu-131	4.0	3.8	5.8	12.3	<0.1	2.4	15	24	5.8	< 0.5	5.3	< 0.5	< 1	< 10	< 25	< 1	1.1	34	34	15.5	< 1	< 0.5
Cu-132	56.6	11.7	13.1	28.0	<0.1	1.9	83	121	4.8	< 0.5	< 5	< 0.5	1.8	< 10	< 25	1.1	1.6	724	646	56.2	< 1	3.33
Blk 8/20	-0.1	0.0	-0.1	-0.1	0.0	0.0	-0.2	-0.4	-0.1	-0.1	-0.2	0.0	-0.2	-5.3	-1.6	0.0	0.0	-2.7	-2.8	0.9	-0.4	0.0
Blk 8/21	0.6	0.0	0.0	-0.1	0.0	0.0	-0.2	-0.4	0.0	-0.1	-0.2	0.0	-0.2	-5.2	-2.7	0.0	0.0	-2.6	-2.7	0.4	-0.5	0.0
Blk 8/22	-0.1	0.0	-0.1	-0.1	0.0	0.0	-0.2	-0.5	-0.1	-0.1	-0.2	0.0	-0.2	-5.3	-2.3	0.0	0.0	-2.7	-2.9	0.3	-0.4	0.0
Blk 8/23	2.7	0.0	0.0	0.1	0.0	0.0	-0.2	-0.4	0.0	-0.1	-0.2	0.0	-0.2	-5.2	-2.5	0.0	0.0	-2.4	-2.5	0.8	-0.5	0.0
Blk 8/24	1.5	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.0	-0.1	-0.1	0.0	-0.2	-4.9	-1.3	0.0	0.0	-1.7	-1.8	0.9	-0.5	0.0
	23Na	25Mg	29Si	SiO2	31P	39K	44Ca	48Ti	51V	52Cr	55Mn	59Co	60Ni	63Cu	66Zn	75As	85Rb	86Sr	88Sr	137Ba	208Pb	238U
min	3.97	2.76	4.62	9.88	0.11	0.59	14.63	23.61	1.43	1.22	5.30	0.00	1.00	0.00	0.00	0.99	0.32	34	34	10	0.00	0.66
max	**84.49**	**44.73**	**27.82**	**59.51**	**0.22**	**4.97**	**171.03**	**262.33**	**14.70**	**2.17**	**46.34**	**0.00**	**5.32**	**0.00**	**0.00**	**1.42**	**2.88**	**817**	**741**	**137**	**0.00**	**4.27**
avg	21.86	17.73	13.30	28.46	0.17	2.03	77.10	122.13	6.64	1.70	14.46		2.94			1.20	0.98	246	224	34	`	2.16

ICP MS - inductively coupled argon plasma mass spectrometer

TABLE S4. Analyses performed at University of Vermont

	measured DIC	measured DOC	measured TDN	blank corrected DIC	blank corrected DOC	blank corrected TDN
Technique						
SAMPLE	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Cu-014	38.6	3.13	0.89	37.3	2.17	0.83
Cu-015	68.5	3.14	0.97	67.2	2.18	0.91
Cu-016	48.1	2.79	1.02	46.9	1.83	0.96
Cu-101	40.4	2.25	0.81	39.1	1.30	0.75
Cu-102	39.1	6.26	0.73	37.8	5.31	0.66
Cu-104	67.6	3.03	1.26	66.3	2.07	1.20
Cu-106	30.6	8.11	0.67	29.4	7.15	0.61
Cu-107	73.4	2.52	1.48	72.1	1.56	1.42
Cu-108	75.1	3.17	0.78	73.9	2.22	0.72
Cu-109	79.0	2.83	1.50	77.8	1.87	1.44
Cu-110	41.1	2.19	0.32	39.9	1.23	0.26
Cu-111	37.5	2.17	0.60	36.2	1.21	0.54
Cu-113	32.0	2.23	0.72	30.8	1.28	0.66
Cu-114	31.4	2.01	0.16	30.1	1.06	0.10
Cu-115	28.5	2.38	0.48	27.3	1.43	0.42
Cu-116	44.3	1.83	0.60	43.1	0.87	0.54
Cu-117	35.9	2.14	0.77	34.6	1.18	0.71
Cu-118	37.1	5.38	0.47	35.9	4.42	0.41
Cu-119	58.8	5.32	1.29	57.5	4.37	1.23
Cu-120	44.8	6.97	0.54	43.6	6.01	0.48
Cu-121	43.4	6.58	0.58	42.1	5.62	0.51
Cu-122	93.0	6.54	0.44	91.7	5.58	0.38
Cu-124	78.0	2.00	1.59	76.7	1.05	1.53
Cu-131	14.7	9.96	0.92	13.4	9.00	0.85
Cu-132	68.5	5.65	0.91	67.2	4.70	0.85
Blk 8/20	2.62	1.42	0.07			
Blk 8/21	ND	ND	ND			0.76 average
Blk 8/22	0.31	0.82	0.13			0.37 standard deviation
Blk 8/23	0.93	0.63	0.01			0.71 median
Blk 8/24	1.17	0.96	0.04			1.53 max
						0.10 min

	measured DIC	measured DOC	measured TDN	blank corrected DIC	blank corrected DOC	blank corrected TDN
min	14.7	1.83	0.16	13.4	0.87	0.10
max	93.0	9.96	1.59	91.7	9.00	1.53
avg	50.0	4.02	0.82	48.7	3.07	0.76

Supplemental Table 5. Coorelation Matrix with p values.

	DIC	DOC	TDN	Cations	Anions	pH (lab)	Cl-	Discharge	Temp.	Cond.	DO	pH (field)	E. coli	N	P	Ag.	Marine rocks	Elevation	MAP	Slope	Area	Ca	Mg	K	HCO3	F	NO3	HPO4	SO4	NO2	Br	SiO2	TDS	Chem. Load
DIC		4.3E-01	**7.2E-03**	**2.5E-04**	**1.9E-05**	**7.3E-04**	7.4E-02	1.9E-01	4.7E-01	**5.6E-05**	6.7E-01	6.8E-01	2.2E-01	**1.3E-02**	4.6E-01	1.3E-01	9.1E-02	**4.3E-02**	4.4E-01	**1.3E-02**	7.2E-01	**6.0E-03**	**4.2E-05**	3.6E-01	**0.0E+00**	**8.2E-03**	**1.0E-02**	8.2E-01	2.7E-01	**3.8E-04**	**3.4E-02**	**9.0E-03**	**1.4E-06**	**1.1E-04**
DOC	-0.17		5.4E-01	3.1E-01	3.1E-01	3.5E-01	**3.3E-02**	**3.0E-02**	6.6E-01	3.0E-01	6.0E-02	**1.5E-03**	3.3E-01	2.1E-01	8.8E-01	**3.3E-02**	**8.5E-03**	**8.9E-04**	8.7E-01	**1.3E-03**	9.7E-01	1.9E-01	7.8E-01	**4.9E-04**	4.1E-01	7.2E-01	1.0E-01	4.4E-01	**2.1E-02**	7.1E-01	3.4E-01	3.8E-01	6.1E-01	9.5E-01
TDN	**0.52**	-0.13		7.7E-01	6.2E-01	8.0E-01	2.6E-01	6.8E-01	9.8E-01	6.4E-01	8.4E-01	9.5E-01	6.3E-01	**5.7E-07**	**4.7E-02**	**1.1E-02**	5.5E-01	5.2E-02	5.1E-01	**1.2E-02**	3.1E-01	9.6E-01	**2.1E-02**	3.7E-01	**1.3E-02**	1.6E-01	**1.6E-09**	6.2E-01	2.6E-01	4.2E-01	4.8E-01	**9.3E-03**	1.8E-01	3.1E-01
Cations	**0.67**	0.21	0.06		**1.3E-15**	**4.2E-04**	**9.3E-09**	1.9E-01	2.8E-01	**9.3E-15**	8.2E-01	8.6E-02	7.5E-01	7.0E-01	6.1E-01	1.8E-01	**5.3E-03**	**1.7E-02**	8.9E-01	**1.2E-02**	8.2E-01	**3.0E-05**	**4.5E-04**	5.3E-02	**1.1E-04**	**2.9E-02**	8.4E-01	4.3E-01	**1.4E-07**	**2.4E-03**	**8.1E-08**	1.6E-01	**7.3E-13**	**2.5E-09**
Anions	**0.75**	0.21	0.10	**0.97**		**1.4E-03**	**3.9E-09**	2.0E-01	3.1E-01	**0.0E+00**	9.2E-01	7.7E-02	6.1E-01	6.5E-01	8.3E-01	2.4E-01	**8.8E-04**	**1.2E-02**	6.7E-01	**7.1E-03**	5.1E-01	**1.2E-04**	**9.5E-04**	1.7E-01	**8.7E-06**	**3.0E-02**	7.9E-01	6.3E-01	**1.0E-06**	**2.0E-04**	**7.9E-07**	3.0E-01	**1.9E-12**	**5.9E-07**
pH (lab)	**0.63**	-0.20	0.05	**0.65**	**0.61**		6.7E-02	**7.0E-03**	1.2E-01	**2.4E-03**	2.5E-01	7.9E-01	7.4E-01	7.2E-01	4.7E-01	9.4E-01	4.7E-01	4.2E-01	8.1E-01	5.1E-01	8.0E-01	**3.7E-04**	**2.5E-02**	6.5E-01	**3.1E-04**	**5.2E-03**	6.0E-01	3.9E-01	8.3E-02	**5.8E-03**	**3.6E-03**	1.0E-01	**2.1E-04**	**1.0E-04**
Cl-	0.36	**0.43**	-0.23	**0.88**	**0.89**	0.37		4.3E-01	3.5E-01	**1.1E-09**	7.1E-01	**3.8E-02**	9.2E-01	3.0E-01	7.0E-01	6.5E-01	**5.3E-04**	**4.0E-02**	8.2E-01	**4.8E-02**	4.1E-01	**2.6E-03**	7.1E-02	**1.4E-02**	5.5E-02	3.4E-01	1.6E-01	6.2E-01	**5.7E-13**	**9.4E-03**	**5.6E-07**	7.5E-01	**2.5E-05**	**8.7E-04**
Discharge	-0.27	**0.44**	0.09	-0.27	-0.26	**-0.53**	-0.16		1.5E-01	2.0E-01	3.1E-01	5.5E-01	8.8E-01	6.2E-01	1.1E-01	1.6E-01	6.4E-01	4.3E-01	7.8E-01	3.3E-01	2.1E-01	**4.0E-02**	6.2E-01	2.6E-01	1.7E-01	3.7E-01	7.4E-01	1.4E-01	4.5E-01	**1.1E-02**	**3.4E-02**	7.6E-01	1.5E-01	9.5E-02
Temp.	0.15	0.09	0.00	0.22	0.21	0.32	0.20	-0.30		2.8E-01	3.0E-01	6.5E-01	2.9E-01	7.4E-01	7.0E-01	9.9E-01	2.7E-01	2.4E-01	7.5E-01	3.7E-01	6.6E-01	5.0E-01	1.3E-01	5.7E-01	3.9E-01	**3.3E-02**	9.7E-01	2.3E-01	5.3E-01	5.3E-01	4.4E-01	4.0E-01	4.7E-01	4.9E-01
Cond.	**0.72**	0.21	0.10	**0.96**	**1.00**	**0.58**	**0.90**	-0.26	0.23		8.5E-01	7.9E-02	7.1E-01	6.2E-01	8.3E-01	2.4E-01	**3.7E-04**	**1.1E-02**	6.8E-01	**6.8E-03**	4.8E-01	**1.3E-04**	**2.2E-03**	1.5E-01	**2.9E-05**	**2.7E-02**	8.1E-01	6.2E-01	**3.0E-07**	**1.9E-04**	**4.9E-07**	4.0E-01	**5.8E-12**	**1.3E-06**
DO	0.10	-0.41	-0.05	0.05	-0.02	0.25	-0.08	-0.23	0.23	-0.04		**9.2E-03**	1.6E-01	7.8E-01	2.1E-01	9.1E-02	**1.5E-02**	3.1E-01	1.6E-01	3.3E-01	**4.4E-03**	2.8E-01	1.8E-01	9.5E-01	5.5E-01	5.6E-01	7.7E-01	1.5E-01	3.9E-01	3.7E-01	8.6E-01	6.5E-02	8.5E-01	5.9E-01
pH (field)	-0.09	**-0.60**	0.01	-0.35	-0.36	-0.06	**-0.42**	-0.13	0.09	-0.36	0.54		5.6E-01	2.0E-01	4.5E-01	8.5E-02	**9.7E-03**	5.2E-02	6.0E-01	5.6E-02	2.7E-01	6.5E-01	6.9E-01	1.4E-01	7.2E-01	4.4E-01	2.0E-01	2.7E-01	**7.1E-03**	4.3E-01	1.0E-01	4.7E-01	8.1E-02	2.6E-01
E. coli	-0.26	0.21	-0.10	-0.07	-0.11	-0.07	0.02	-0.03	-0.22	-0.08	-0.32	-0.13		7.8E-01	4.9E-01	9.6E-01	7.0E-01	6.4E-01	1.7E-01	7.2E-01	2.8E-01	5.6E-01	1.2E-01	3.4E-01	1.9E-01	5.4E-01	5.2E-01	8.1E-01	6.2E-01	7.2E-01	9.0E-01	2.4E-01	6.5E-01	5.0E-01
N	**0.49**	-0.26	**0.82**	0.08	0.09	0.08	-0.22	-0.10	0.07	0.10	0.06	0.27	-0.06		1.8E-01	**4.7E-03**	6.5E-01	6.0E-02	6.9E-01	**2.4E-02**	6.0E-01	8.7E-01	**2.5E-02**	1.6E-01	**1.8E-02**	6.2E-02	**2.5E-10**	9.8E-01	2.3E-01	2.6E-01	9.5E-01	**3.6E-03**	2.1E-01	1.9E-01
P	0.16	0.03	**0.40**	0.11	0.04	0.15	-0.08	0.33	0.08	0.05	0.28	0.16	-0.15	0.28		5.4E-01	2.1E-01	2.4E-01	**4.1E-02**	2.3E-01	**3.2E-03**	6.6E-01	**3.0E-02**	**2.2E-02**	3.8E-01	2.3E-01	**4.9E-02**	**4.2E-04**	7.2E-01	6.8E-01	8.1E-01	**2.6E-02**	5.1E-01	2.7E-01
Ag.	0.31	**0.43**	**0.50**	0.27	0.24	0.02	0.09	0.29	0.00	0.24	-0.37	-0.35	0.01	**0.55**	0.13		**3.9E-02**	**2.8E-05**	6.8E-01	**2.2E-06**	9.4E-01	9.0E-01	**4.2E-02**	3.5E-01	1.7E-01	7.5E-02	**4.4E-02**	9.2E-01	4.0E-01	7.3E-01	3.5E-01	1.1E-01	**4.9E-02**	1.3E-01
Marine rocks	0.35	**0.51**	0.13	**0.54**	**0.62**	0.15	**0.64**	-0.10	0.23	**0.66**	**-0.51**	**-0.51**	0.08	0.10	-0.26	**0.42**		**6.6E-04**	8.3E-02	**3.6E-04**	2.5E-01	2.1E-01	6.1E-01	2.5E-01	1.2E-01	**4.7E-02**	7.9E-01	3.6E-01	**3.5E-04**	**2.7E-02**	**2.5E-03**	2.2E-01	**3.2E-03**	1.9E-01
Elevation	**-0.41**	**-0.62**	-0.39	**-0.47**	**-0.50**	-0.17	**-0.41**	-0.17	-0.24	**-0.50**	0.23	0.39	0.10	-0.38	-0.24	**-0.74**	**-0.63**		5.4E-01	**9.3E-15**	9.3E-01	9.8E-01	**9.6E-03**	5.5E-02	5.3E-02	**4.9E-02**	1.9E-01	5.8E-01	**4.3E-02**	1.2E-01	**2.2E-02**	2.7E-01	**6.3E-03**	7.8E-02
MAP	-0.16	0.03	-0.14	0.03	-0.09	0.05	-0.05	0.06	0.07	-0.09	0.31	0.11	-0.29	0.08	**0.41**	0.09	-0.35	-0.13		8.2E-01	3.0E-01	3.8E-01	2.8E-01	2.5E-01	6.0E-01	5.6E-01	8.1E-01	2.2E-01	8.4E-01	4.4E-01	5.7E-01	8.8E-02	7.9E-01	2.7E-01
Slope	**-0.49**	**-0.61**	**-0.49**	**-0.49**	**-0.52**	-0.14	**-0.40**	-0.20	-0.19	**-0.53**	0.22	0.39	0.08	**-0.45**	-0.25	**-0.79**	**-0.66**	**0.96**	-0.05		6.5E-01	8.2E-01	**4.6E-03**	8.5E-02	**1.8E-02**	**4.3E-02**	1.1E-01	5.4E-01	5.9E-02	1.1E-01	**4.3E-02**	2.0E-01	**2.8E-03**	5.3E-02
Area	-0.08	0.01	0.21	-0.05	-0.14	-0.05	-0.17	0.26	0.09	-0.15	**0.58**	0.23	-0.23	0.11	**0.57**	0.02	-0.24	-0.02	0.22	-0.09		8.3E-01	5.1E-01	5.8E-02	8.2E-01	7.8E-01	5.5E-01	1.2E-01	4.8E-01	4.8E-01	6.4E-01	7.5E-01	6.8E-01	7.8E-01
Ca	**0.53**	-0.27	0.01	**0.73**	**0.69**	**0.66**	**0.58**	**-0.41**	-0.14	**0.69**	0.24	-0.09	0.12	0.04	-0.09	-0.03	0.26	**-0.01**	-0.18	-0.05	-0.05		2.3E-01	7.3E-01	**4.3E-03**	4.3E-01	8.8E-01	8.3E-01	**2.6E-03**	**1.9E-03**	**4.5E-04**	7.7E-01	**4.0E-05**	**2.0E-04**
Mg	**0.72**	0.06	**0.46**	**0.65**	**0.62**	**0.45**	0.37	-0.10	0.31	**0.58**	0.30	-0.08	-0.33	**0.45**	**0.43**	**0.41**	0.11	-0.51	0.23	**-0.55**	0.14	0.25		4.3E-01	**2.6E-05**	1.5E-01	**1.3E-02**	9.3E-02	2.0E-01	2.3E-01	**3.8E-02**	**7.7E-07**	**2.0E-04**	**2.8E-05**
K	-0.19	**0.65**	-0.19	0.39	0.28	0.10	**0.49**	0.24	0.12	0.29	-0.02	-0.30	0.20	-0.29	**0.45**	0.19	0.24	-0.39	0.24	-0.35	0.38	0.07	0.16		4.3E-01	5.5E-01	1.9E-01	**7.6E-03**	**1.8E-03**	6.7E-01	**4.4E-02**	7.6E-01	2.0E-01	2.3E-01
HCO3	**1.00**	-0.17	**0.49**	**0.70**	**0.76**	**0.66**	0.39	-0.28	0.18	**0.73**	0.13	-0.08	-0.28	**0.47**	0.18	0.28	0.32	-0.39	-0.11	**-0.47**	-0.05	**0.55**	**0.74**	-0.16		**5.1E-03**	**1.4E-02**	7.3E-01	2.2E-01	**3.1E-04**	**2.4E-02**	**8.0E-03**	**7.9E-07**	**4.3E-05**
F	**0.52**	0.08	0.29	**0.44**	**0.44**	**0.54**	0.20	-0.19	**0.43**	**0.44**	-0.13	-0.16	-0.13	0.38	0.25	0.36	**0.40**	**-0.40**	0.12	**-0.41**	0.06	0.16	0.30	0.13	**0.54**		1.6E-01	7.1E-01	2.8E-01	5.7E-02	1.1E-01	2.1E-01	**6.9E-03**	**1.2E-02**
NO3	**0.51**	-0.33	**0.89**	0.04	0.06	0.11	-0.29	-0.07	-0.01	0.05	0.07	0.27	-0.14	**0.91**	**0.40**	**0.41**	-0.06	-0.27	0.05	-0.33	0.13	0.03	**0.49**	-0.27	**0.48**	0.29		5.3E-01	1.4E-01	4.9E-01	6.0E-01	**4.8E-04**	2.6E-01	1.6E-01
HPO4	0.05	0.16	0.11	0.16	0.10	0.18	0.11	0.30	0.25	0.10	0.32	0.23	-0.05	0.01	**0.65**	0.02	-0.19	-0.12	0.25	-0.13	0.32	-0.04	0.34	**0.52**	0.07	0.08	0.13		7.5E-01	4.1E-01	5.3E-01	7.4E-02	6.9E-01	3.1E-01
SO4	0.23	**0.46**	-0.23	**0.84**	**0.81**	0.35	**0.95**	-0.16	0.13	**0.83**	-0.19	**-0.52**	0.11	-0.25	-0.08	0.18	**0.66**	**-0.41**	-0.04	-0.38	-0.15	**0.58**	0.27	**0.59**	0.25	0.22	-0.30	0.07		**4.5E-02**	**2.0E-07**	5.5E-01	**4.2E-05**	**9.7E-04**
NO2	**0.65**	-0.08	0.17	**0.58**	**0.68**	**0.54**	**0.51**	**-0.50**	0.13	**0.68**	0.20	-0.16	-0.08	0.23	-0.09	0.07	**0.44**	-0.32	-0.16	-0.33	-0.15	**0.59**	0.25	-0.09	**0.66**	0.39	0.14	-0.17	**0.40**		**5.6E-03**	7.1E-01	**6.3E-04**	**1.9E-02**
Br	**0.43**	0.20	-0.15	**0.85**	**0.81**	**0.56**	**0.82**	**-0.42**	0.16	**0.82**	-0.04	-0.33	-0.03	-0.01	-0.05	0.19	**0.58**	**-0.46**	0.12	**-0.41**	-0.10	**0.65**	**0.42**	**0.41**	**0.45**	0.33	-0.11	-0.13	**0.84**	**0.54**		8.5E-01	**1.7E-06**	**8.7E-05**
SiO2	**0.51**	-0.19	**0.51**	0.29	0.21	0.34	-0.07	-0.06	0.18	0.18	0.40	0.15	-0.25	**0.56**	**0.44**	0.33	-0.26	-0.23	0.35	-0.27	0.07	0.06	**0.81**	-0.06	**0.52**	0.26	**0.65**	0.36	-0.12	-0.08	0.04		7.9E-02	**1.6E-03**
TDS	**0.80**	0.11	0.28	**0.95**	**0.94**	**0.68**	**0.74**	-0.30	0.15	**0.94**	-0.04	-0.36	-0.10	0.26	0.14	**0.40**	**0.57**	**-0.53**	-0.06	**-0.57**	-0.09	**0.73**	**0.68**	0.26	**0.81**	**0.53**	0.24	0.08	**0.72**	**0.64**	**0.80**	0.36		**9.4E-10**
Chem. Load	**0.70**	-0.01	0.21	**0.89**	**0.82**	**0.70**	**0.62**	-0.34	0.14	**0.80**	0.12	-0.23	-0.14	0.27	0.23	0.31	0.27	-0.36	0.23	-0.39	-0.06	**0.68**	**0.74**	0.25	**0.72**	**0.49**	0.29	0.21	**0.62**	**0.47**	**0.70**	**0.60**	**0.90**	