

Middle Fork of the South Platte River Sampling

Active Mines



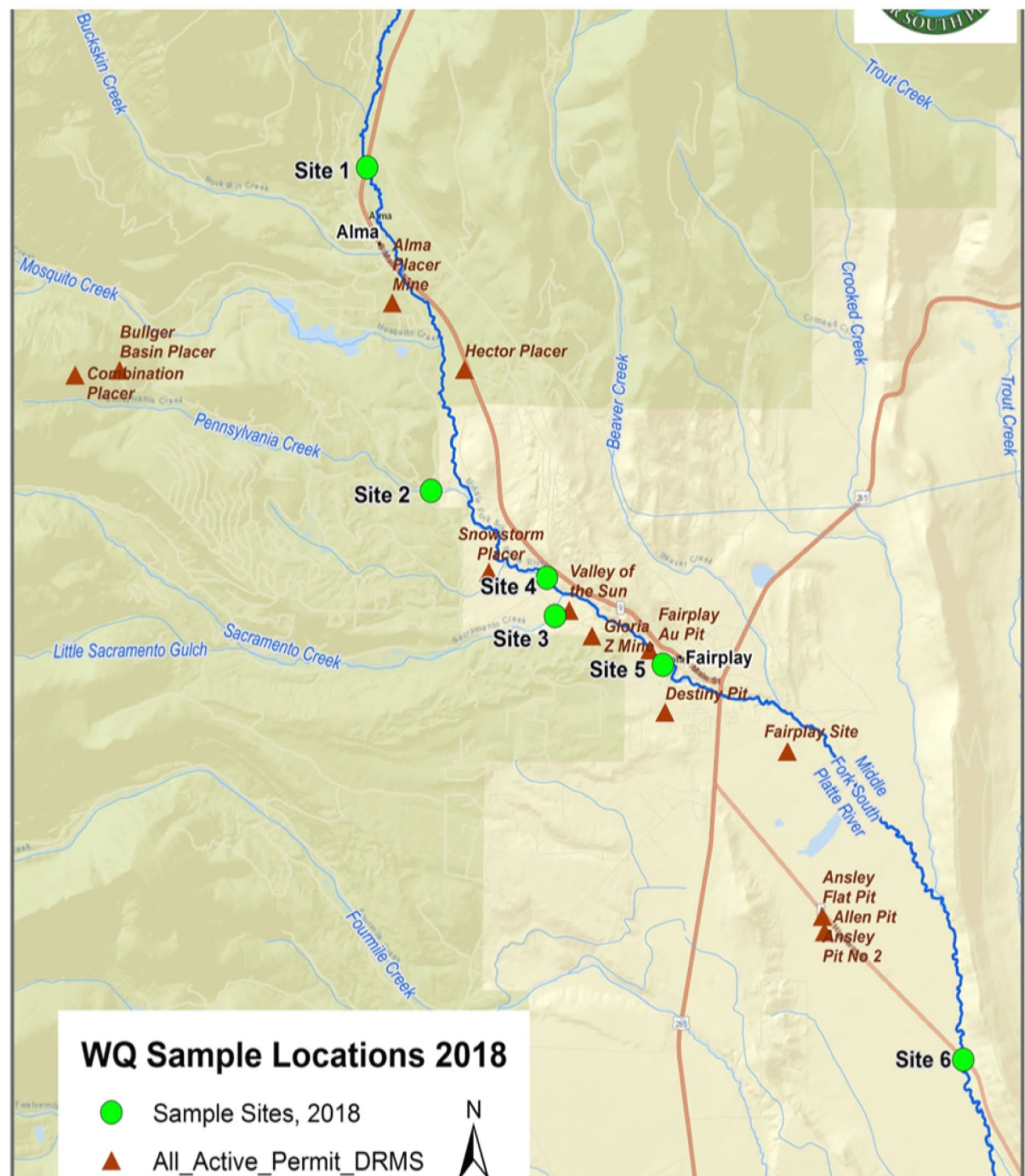
Active Mines in Vicinity

PermitID	SiteName	Permittee	Commodity	SecondaryC	PermitIssu	StatusDesc
M1980012	Valley of the Sun	Park County	sand and gravel		1981-04-01	Active
M1980251	Ansley Flat Pit	Park County	sand and gravel		1981-04-01	Active
M1982086	Fairplay Site	Alpine Rock Company	sand and gravel		1982-06-11	Active
M1983084	Snowstorm Placer	Snowstorm Sand & Gravel, LLC	sand and gravel	gold	1983-07-28	Active
M1984094	Gloria Z Mine	Sanborn Sand and Gravel/dba Golden Cross Aggregates, Inc.	sand and gravel	gold	1984-07-17	Active
M1985022	Bullger Basin Placer	Eagle Peaks Mining LLC	gold		1985-05-23	Active
M1985029	Alma Placer Mine	High Mountain Mining Co., LLC	gold		1990-02-22	Active
M1991037	Fairplay Au Pit	High Speed Mining, LLC	aggregate	gold	1991-05-03	Active
M1995027	Ansley Pit No 2	Park County	gravel		1995-05-08	Active
M2005080	Allen Pit	Allen Drilling and Excavating	gravel	sand	2006-10-24	Active
M2009056	Destiny Pit	Destiny Mining, LLC	sand and gravel	gold	2014-07-31	Active
M2011009	Hector Placer	IGWT Mining, Inc.	gold		2011-07-20	Active
M2013028	Combination Placer	Western States Minerals, LLC	gold		2013-11-04	Active

Sample Locations

Site #	Description	Latitude (Decimal Degrees xx.xxx)	Longitude (Decimal Degrees xx.xxxx)
1	Above Town of Alma	39.2948794	-106.0653703
2	On Pennsylvania Creek	39.2484383	-106.0521589
3	On Sacramento Creek	39.2305408	-106.0271329
4	Above Fairplay at CR14 Bridge	39.2360239	-106.0288047
5	Above Fairplay Beach	39.2236194	-106.0053948
6	On Highway 9	39.1684093	-105.9446120

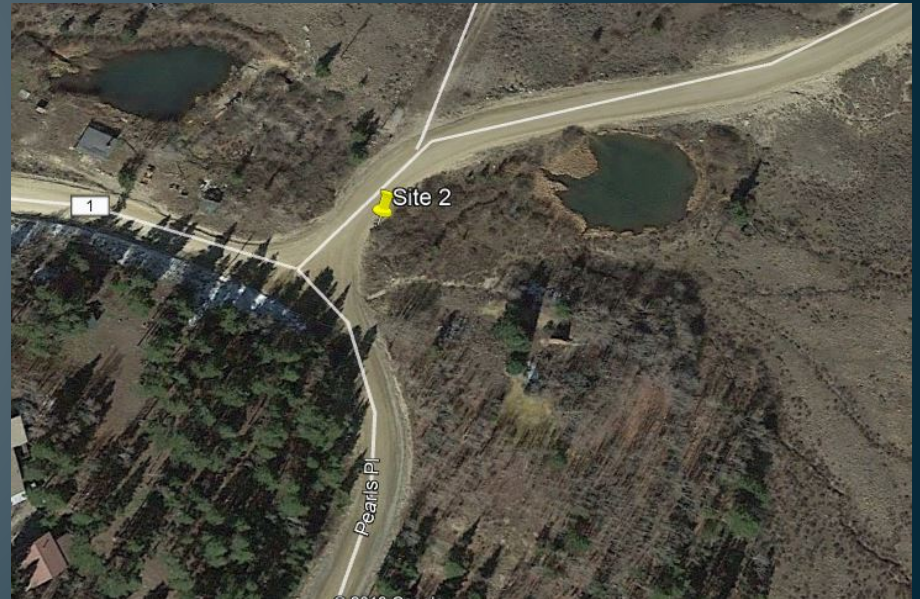
Sample sites



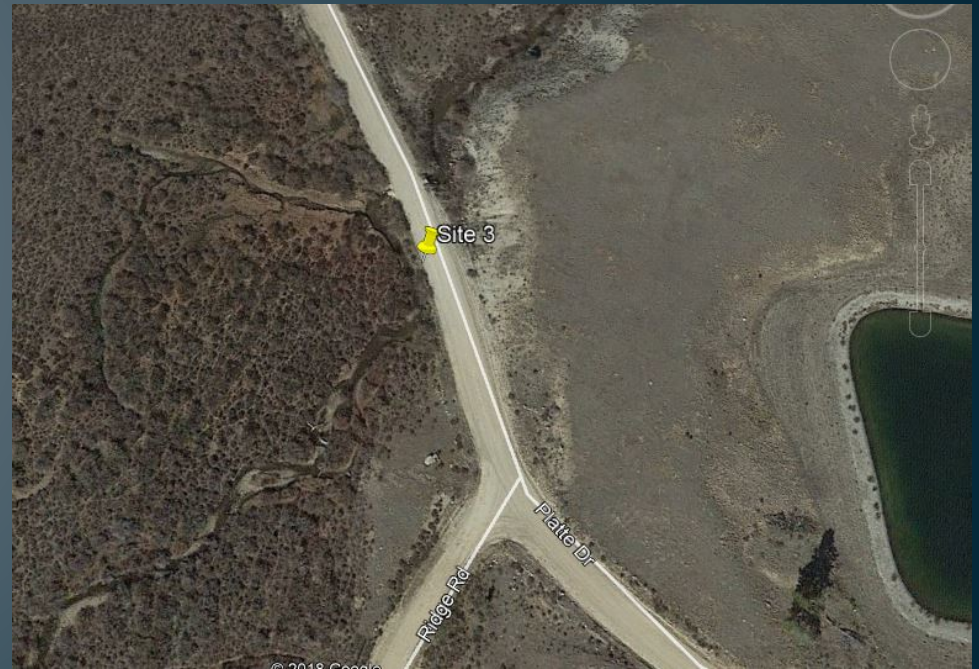
Site 1- Middle Fork above Alma



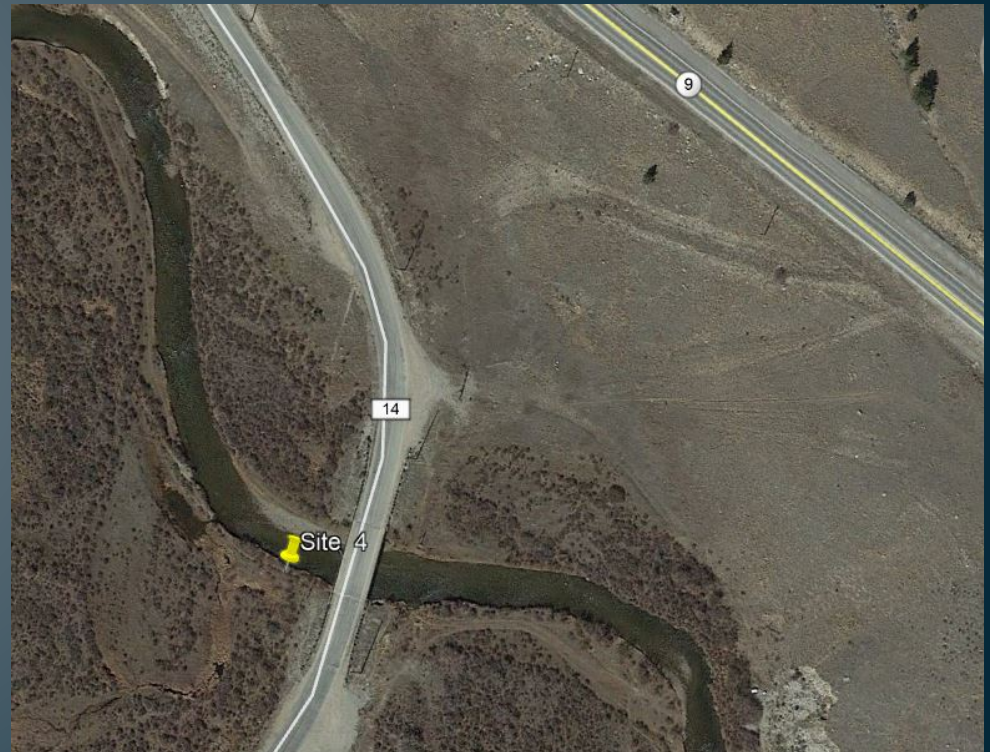
Site 2- Pennsylvania Creek



Site 3- Sacramento Creek



Site 4- Middle Fork at bridge on CR 14

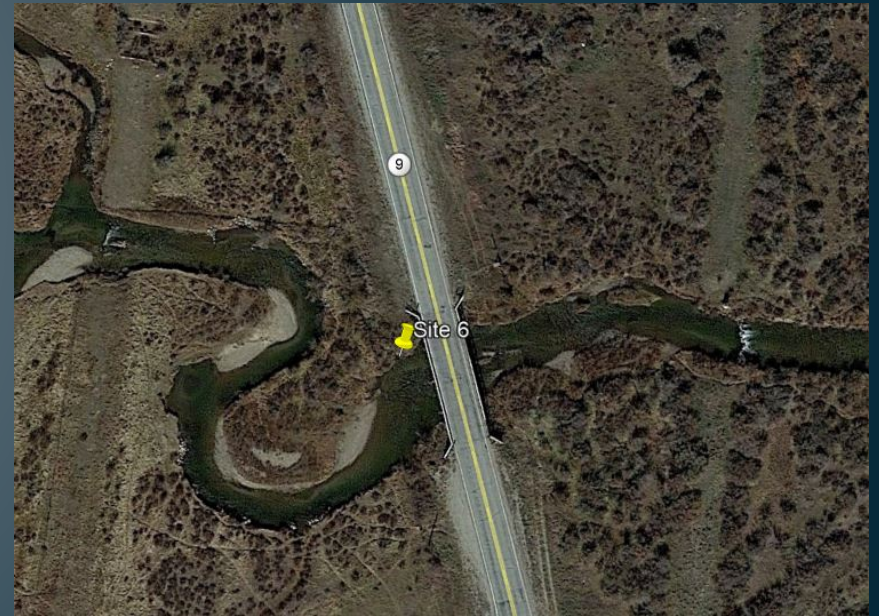


Site 5- Middle Fork above Fairplay Beach



Google Earth

Site 6- Middle Fork at Hwy 9



Sampling Dates

June 4, 2018

- Jara Johnson assisted with sample site selection

August 27, 2018

- Added soil sampling at two sites-Above Alma and above Fairplay Beach
- Only tested for mercury and methylmercury

September 26, 2018

- Final round of sampling

The background of the slide features a series of thin, vertical, slightly wavy lines in a light blue-grey color against a darker grey gradient. A solid teal horizontal band spans the width of the slide, positioned below the patterned area. The word "Results" is written in a white, bold, sans-serif font within this teal band.

Results

Definitions

Reporting Limit

- The smallest concentration of analyte that can be reported by a laboratory based on the sensitivity of the equipment.

MDL is generally lower than RL and results reported down to MDL are not reliable and must be qualified as estimated values

Method Detection Limit

- The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.

Site 1

Above Alma

Location	Analyte	Medium	Primary^	Secondary^	June Result	August Result	September Result
MFSP1- Above Alma			1 ug/l = 0.001 mg/l				
Site 1	Aluminum	Water	5 mg/l	0.05 to 0.2 mg/l	41 ug/l*	29 ug/l*	25 ug/l*
Site 1	Antimony	Water	0.006 mg/l		-999 ug/l	-999 ug/l	-999 ug/l
Site 1	Arsenic	Water	0.01 mg/l		-999 ug/l	-999 ug/l	-999 ug/l
Site 1	Barium	Water	2.0 mg/l		27 ug/l	45 ug/l	58 ug/l
Site 1	Beryllium	Water	0.004 mg/l		-999 ug/l	-999 ug/l	-999 ug/l
Site 1	Bromide	Water			-999 mg/l	-999 mg/l	-999 mg/L
Site 1	Cadmium	Water	0.005 mg/l		-999 ug/l	-999 ug/l	-999 ug/l
Site 1	Calcium	Water			17000 ug/l	29000 ug/l	32000 ug/l
Site 1	Chloride	Water	250 mg/l	250 mg/l	2.8 mg/l*	4.8 mg/l	6 mg/L
Site 1	Chromium	Water	0.1 mg/l		-999 ug/l	-999 ug/l	-999 ug/l
Site 1	Cobalt	Water			0.06 ug/l*	-999 ug/l	-999 ug/l
Site 1	Copper	Water	1.3 mg/l	1.0 mg/l	1.7 ug/l*	0.72 ug/l*	0.61 ug/l*
Site 1	Diesel range organics	Water			-999 mg/l	0.07 mg/l*	0.035 mg/l*
Site 1	Fluoride	Water	4.0 mg/l	2.0 mg/l	0.082 mg/l*	-999 mg/l	0.071 mg/l*
Site 1	Gasoline range organics	Water			-999 ug/l	-999 ug/l	-999 ug/l
Site 1	Iron	Water	0.3 mg/l	0.3 mg/l	220 ug/l	380 ug/l	230 ug/l
Site 1	Lead	Water	0.015 mg.l		0.55 ug/l*	0.41 ug/l*	0.39 ug/l*
Site 1	Magnesium	Water			6600 ug/l	11000 ug/l	14000 ug/l
Site 1	Manganese	Water	0.05 mg/l		41 ug/l	71 ug/l	76 ug/l
Site 1	Mercury	Water	0.002 mg/l		-999 ug/l	-999 ug/l	-999 ug/l
Site 1	Methylmercury(1+)	Water			0.07 ng/l	0.11 ng/l	0.058 ng/l
Site 1	Nickel	Water	0.1 mg/l		-999 ug/l	-999 ug/l	-999 ug/l
Site 1	Potassium	Water			710 ug/l*	1100 ug/l*	1100 ug/l*
Site 1	Selenium	Water	0.05 mg/l		-999 ug/l	-999 ug/l	-999 ug/l
Site 1	Silver	Water	0.05 mg/l	0.1 mg/l	-999 ug/l	-999 ug/l	-999 ug/l
Site 1	Sodium	Water			1600 ug/l	1700 ug/l	2300 ug/l
Site 1	Sulfate	Water	250 mg/l	250 mg/l	15 mg/l	16 mg/l	19 mg/L
Site 1	Thallium	Water	0.002 mg/l		0.061 ug/l*	-999 ug/l	-999 ug/l
Site 1	Total dissolved solids	Water		500 mg/l	88 mg/l	60 mg/l	160 mg/L
Site 1	Vanadium	Water			-999 ug/l	-999 ug/l	-999 ug/l
Site 1	Zinc	Water	5 mg/l	5 mg/l	9.7 ug/l*	3 ug/l*	3.3 ug/l*
Site 1	Gross alpha radioactivity, (Thorium-230 ref std)	Water	15 pCi/l		-999 pCi/L	-999 pCi/L	2.51 pCi/L
Site 1	Gross beta radioactivity, (Strontium-Yttrium-90 ref std)	Water			1.37 pCi/L	1.71 pCi/L	1.65 pCi/L
Site 1	Methylmercury(1+)	Soil				-999 ug/kg	
Site 1	Mercury	Soil				ug/kg 15 *	
^ Blank space means the EPA has not designated a primary and/or secondary standard							
*=Amount is an estimate, it is between the RL and MDL				Analyte not detected= -999			

Site 2

Pennsylvania Creek

Location	Analyte	Medium	Primary^ Drinking Water Standards	Secondary^	June Result	August Result	September Result
PNC1-Penn Creek			1 ug/l = 0.001 mg/l				
Site 2	Aluminum	Water	5 mg/l	0.05 to 0.2 mg/l	320 ug/l	98 ug/l*	120 ug/l
Site 2	Antimony	Water	0.006 mg/l		-999 ug/l	-999 ug/l	-999 ug/l
Site 2	Arsenic	Water	0.01 mg/l		-999 ug/l	-999 ug/l	-999 ug/l
Site 2	Barium	Water	2.0 mg/l		64 ug/l	100 ug/l	110 ug/l
Site 2	Beryllium	Water	0.004 mg/l		-999 ug/l	-999 ug/l	-999 ug/l
Site 2	Bromide	Water			-999 mg/l	-999 mg/l	-999 mg/L
Site 2	Cadmium	Water	0.005 mg/l		-999 ug/l	-999 ug/l	-999 ug/l
Site 2	Calcium	Water			19000 ug/l	32000 ug/l	31000 ug/l
Site 2	Chloride	Water	250 mg/l	250 mg/l	0.57 mg/l*	0.59 mg/l*	0.67 mg/l*
Site 2	Chromium	Water	0.1 mg/l		-999 ug/l	-999 ug/l	-999 ug/l
Site 2	Cobalt	Water			0.15 ug/l*	-999 ug/l	-999 ug/l
Site 2	Copper	Water	1.3 mg/l	1.0 mg/l	0.67 ug/l*	-999 ug/l	-999 ug/l
Site 2	Diesel range organics	Water			-999 mg/l	0.045 mg/l*	0.044 mg/l*
Site 2	Fluoride	Water	4.0 mg/l	2.0 mg/l	-999 mg/l	-999 mg/l	-999 mg/L
Site 2	Gasoline range organics	Water			-999 ug/l	-999 ug/l	-999 ug/l
Site 2	Iron	Water	0.3 mg/l	0.3 mg/l	560 ug/l	290 ug/l	310 ug/l
Site 2	Lead	Water	0.015 mg.l		1.2 ug/l	0.32 ug/l*	0.5 ug/l*
Site 2	Magnesium	Water			8700 ug/l	15000 ug/l	16000 ug/l
Site 2	Manganese	Water	0.05 mg/l		31 ug/l	15 ug/l	18 ug/l
Site 2	Mercury	Water	0.002 mg/l		-999 ug/l	-999 ug/l	-999 ug/l
Site 2	Methylmercury(1+)	Water			0.036 ng/l*	0.025 ng/l*	-999 ng/l
Site 2	Nickel	Water	0.1 mg/l		0.44 ug/l*	-999 ug/l	-999 ug/l
Site 2	Potassium	Water			630 ug/l*	810 ug/l*	790 ug/l*
Site 2	Selenium	Water	0.05 mg/l		-999 ug/l	-999 ug/l	-999 ug/l
Site 2	Silver	Water	0.05 mg/l	0.1 mg/l	-999 ug/l	-999 ug/l	-999 ug/l
Site 2	Sodium	Water			1300 ug/l	1900 ug/l	2500 ug/l
Site 2	Sulfate	Water	250 mg/l	250 mg/l	11 mg/l	10 mg/l	13 mg/L
Site 2	Thallium	Water	0.002 mg/l		-999 ug/l	-999 ug/l	-999 ug/l
Site 2	Total dissolved solids	Water		500 mg/l	100 mg/l	74 mg/l	170 mg/L
Site 2	Vanadium	Water			-999 ug/l	-999 ug/l	-999 ug/l
Site 2	Zinc	Water	5 mg/l	5 mg/l	5.4 ug/l*	2.2 ug/l*	3.2 ug/l*
Site 2	Gross alpha radioactivity, (Thorium-230 ref std)	Water	15 pCi/l		-999 pCi/L	-999 pCi/L	-999 pCi/L
Site 2	Gross beta radioactivity, (Strontium-Yttrium-90 ref std)	Water			-999 pCi/L	-999 pCi/L	2.18 pCi/L
^ Blank space means the EPA has not designated a primary and/or secondary standard							
*=Amount is an estimate, it is between the RL and MDL				Analyte not detected= -999			

Site 3

Sacramento Creek

Location	Analyte	Medium	Primary^ Drinking Water Standards	Secondary^	June Result	August Result	September Result
SAC1-Sacramento Creek			1 ug/l = 0.001 mg/l				
Site 3	Aluminum	Water	5 mg/l	0.05 to 0.2 mg/l	56 ug/l*	-999 ug/l	-999 ug/l
Site 3	Antimony	Water	0.006 mg/l		-999 ug/l	-999 ug/l	-999 ug/l
Site 3	Arsenic	Water	0.01 mg/l		-999 ug/l	-999 ug/l	-999 ug/l
Site 3	Barium	Water	2.0 mg/l		38 ug/l	53 ug/l	52 ug/l
Site 3	Beryllium	Water	0.004 mg/l		-999 ug/l	-999 ug/l	-999 ug/l
Site 3	Bromide	Water			-999 mg/l	-999 mg/l	-999 mg/L
Site 3	Cadmium	Water	0.005 mg/l		-999 ug/l	-999 ug/l	-999 ug/l
Site 3	Calcium	Water			14000 ug/l	22000 ug/l	22000 ug/l
Site 3	Chloride	Water	250 mg/l	250 mg/l	0.55 mg/l*	0.77 mg/l*	0.97 mg/l*
Site 3	Chromium	Water	0.1 mg/l		-999 ug/l	-999 ug/l	-999 ug/l
Site 3	Cobalt	Water			-999 ug/l	-999 ug/l	-999 ug/l
Site 3	Copper	Water	1.3 mg/l	1.0 mg/l	-999 ug/l	-999 ug/l	-999 ug/l
Site 3	Diesel range organics	Water			-999 mg/l	0.053 mg/l*	-999 mg/L
Site 3	Fluoride	Water	4.0 mg/l	2.0 mg/l	-999 mg/l	-999 mg/l	-999 mg/L
Site 3	Gasoline range organics	Water			-999 ug/l	-999 ug/l	-999 ug/l
Site 3	Iron	Water	0.3 mg/l	0.3 mg/l	110 ug/l	130 ug/l	28 ug/l*
Site 3	Lead	Water	0.015 mg/l		0.19 ug/l*	-999 ug/l	-999 ug/l
Site 3	Magnesium	Water			6200 ug/l	9000 ug/l	9500 ug/l
Site 3	Manganese	Water	0.05 mg/l		5.4 ug/l	7.6 ug/l	12 ug/l
Site 3	Mercury	Water	0.002 mg/l		-999 ug/l	-999 ug/l	-999 ug/l
Site 3	Methylmercury(1+)	Water			0.039 ng/l*	-999 ng/l	0.019 ng/L*
Site 3	Nickel	Water	0.1 mg/l		-999 ug/l	-999 ug/l	-999 ug/l
Site 3	Potassium	Water			490 ug/l*	740 ug/l*	540 ug/l*
Site 3	Selenium	Water	0.05 mg/l		-999 ug/l	-999 ug/l	-999 ug/l
Site 3	Silver	Water	0.05 mg/l	0.1 mg/l	-999 ug/l	-999 ug/l	-999 ug/l
Site 3	Sodium	Water			790 ug/l*	950 ug/l*	1400 ug/l
Site 3	Sulfate	Water	250 mg/l	250 mg/l	9.6 mg/l	13 mg/l	15 mg/L
Site 3	Thallium	Water	0.002 mg/l		-999 ug/l	-999 ug/l	-999 ug/l
Site 3	Total dissolved solids	Water		500 mg/l	70 mg/l	100 mg/l	110 mg/L
Site 3	Vanadium	Water			-999 ug/l	-999 ug/l	-999 ug/l
Site 3	Zinc	Water	5 mg/l	5 mg/l	7.7 ug/l*	2.1 ug/l*	-999 ug/l
Site 3	Gross alpha radioactivity, (Thorium-230 ref std)	Water	15 pCi/l		-999 pCi/L	-999 pCi/L	-999 pCi/L
Site 3	Gross beta radioactivity, (Strontium-Yttrium-90 ref std)	Water			-999 pCi/L	1.23 pCi/L	-999 pCi/L

^ Blank space means the EPA has not designated a primary and/or secondary standard

*=Amount is an estimate, it is between the RL and MDL

Analyte not detected= -999

Site 4

Bridge at CR14

Location	Analyte	Medium	Primary^ Drinking Water Standards	Secondary^	June Result	August Result	September Result
MFSP2- Above bridge on CR14			1 ug/l = 0.001 mg/l				
Site 4	Aluminum	Water	5 mg/l	0.05 to 0.2 mg/l	35 ug/l*	-999 ug/l	-999 ug/l
Site 4	Antimony	Water	0.006 mg/l		-999 ug/l	-999 ug/l	-999 ug/l
Site 4	Arsenic	Water	0.01 mg/l		-999 ug/l	-999 ug/l	-999 ug/l
Site 4	Barium	Water	2.0 mg/l		33 ug/l	52 ug/l	56 ug/l
Site 4	Beryllium	Water	0.004 mg/l		0.11 ug/l*	-999 ug/l	-999 ug/l
Site 4	Bromide	Water			-999 mg/l	-999 mg/l	0.47 mg/L
Site 4	Cadmium	Water	0.005 mg/l		-999 ug/l	-999 ug/l	-999 ug/l
Site 4	Calcium	Water			18000 ug/l	35000 ug/l	37000 ug/l
Site 4	Chloride	Water	250 mg/l	250 mg/l	1.9 mg/l*	4.5 mg/l	6 mg/L
Site 4	Chromium	Water	0.1 mg/l		-999 ug/l	-999 ug/l	-999 ug/l
Site 4	Cobalt	Water			-999 ug/l	-999 ug/l	-999 ug/l
Site 4	Copper	Water	1.3 mg/l	1.0 mg/l	1.8 ug/l*	0.82 ug/l*	0.8 ug/l*
Site 4	Diesel range organics	Water			-999 mg/l	0.077 mg/l*	-999 mg/L
Site 4	Fluoride	Water	4.0 mg/l	2.0 mg/l	0.2 mg/l*	0.19 mg/l*	0.23 mg/l*
Site 4	Gasoline range organics	Water			-999 ug/l	-999 ug/l	-999 ug/l
Site 4	Iron	Water	0.3 mg/l	0.3 mg/l	110 ug/l	140 ug/l	100 ug/l
Site 4	Lead	Water	0.015 mg.l		0.89 ug/l*	0.66 ug/l*	0.63 ug/l*
Site 4	Magnesium	Water			7600 ug/l	14000 ug/l	16000 ug/l
Site 4	Manganese	Water	0.05 mg/l		23 ug/l	31 ug/l	30 ug/l
Site 4	Mercury	Water	0.002 mg/l		-999 ug/l	-999 ug/l	-999 ug/l
Site 4	Methylmercury(1+)	Water			0.053 ng/l	0.058 ng/l	-999 ng/l
Site 4	Nickel	Water	0.1 mg/l		-999 ug/l	-999 ug/l	-999 ug/l
Site 4	Potassium	Water			660 ug/l*	1100 ug/l*	830 ug/l*
Site 4	Selenium	Water	0.05 mg/l		-999 ug/l	-999 ug/l	0.8 ug/l*
Site 4	Silver	Water	0.05 mg/l	0.1 mg/l	-999 ug/l	-999 ug/l	-999 ug/l
Site 4	Sodium	Water			1400 ug/l	2600 ug/l	3400 ug/l
Site 4	Sulfate	Water	250 mg/l	250 mg/l	21 mg/l	39 mg/l	48 mg/L
Site 4	Thallium	Water	0.002 mg/l		-999 ug/l	-999 ug/l	-999 ug/l
Site 4	Total dissolved solids	Water		500 mg/l	95 mg/l	180 mg/l	190 mg/L
Site 4	Vanadium	Water			-999 ug/l	-999 ug/l	-999 ug/l
Site 4	Zinc	Water	5 mg/l	5 mg/l	51 ug/l	33 ug/l	29 ug/l
Site 4	Gross alpha radioactivity, (Thorium-230 ref std)	Water	15 pCi/l		-999 pCi/L	2.45 pCi/L	2.18 pCi/L
Site 4	Gross beta radioactivity, (Strontium-Yttrium-90 ref std)	Water			-999 pCi/L	-999 pCi/L	-999 pCi/L
^ Blank space means the EPA has not designated a primary and/or secondary standard							
*=Amount is an estimate, it is between the RL and MDL				Analyte not detected= -999			

Site 5

Fairplay Beach

Location	Analyte	Medium	Primary^ Drinking Water Standards	Secondary^	June Result	August Result	September Result
MFSP3- above Fairplay Beach			1 ug/l = 0.001 mg/l				
Site 5	Aluminum	Water	5 mg/l	0.05 to 0.2 mg/l	60 ug/l*	23 ug/l*	-999 ug/l
Site 5	Antimony	Water	0.006 mg/l		-999 ug/l	-999 ug/l	-999 ug/l
Site 5	Arsenic	Water	0.01 mg/l		-999 ug/l	-999 ug/l	0.39 ug/l*
Site 5	Barium	Water	2.0 mg/l		33 ug/l	52 ug/l	20 ug/l
Site 5	Beryllium	Water	0.004 mg/l		0.13 ug/l*	-999 ug/l	-999 ug/l
Site 5	Bromide	Water			-999 mg/l	0.25 mg/l	0.36 mg/L
Site 5	Cadmium	Water	0.005 mg/l		-999 ug/l	-999 ug/l	-999 ug/l
Site 5	Calcium	Water			18000 ug/l	36000 ug/l	37000 ug/l
Site 5	Chloride	Water	250 mg/l	250 mg/l	2 mg/l*	5.9 mg/l	6.8 mg/L
Site 5	Chromium	Water	0.1 mg/l		-999 ug/l	-999 ug/l	0.73 ug/l*
Site 5	Cobalt	Water			-999 ug/l	-999 ug/l	0.33 ug/l*
Site 5	Copper	Water	1.3 mg/l	1.0 mg/l	1.7 ug/l*	1 ug/l*	9.5 ug/l
Site 5	Diesel range organics	Water			-999 mg/l	0.048 mg/l*	-999 mg/L
Site 5	Fluoride	Water	4.0 mg/l	2.0 mg/l	0.17 mg/l*	0.18 mg/l*	0.21 mg/l*
Site 5	Gasoline range organics	Water			-999 ug/l	-999 ug/l	-999 ug/l
Site 5	Iron	Water	0.3 mg/l	0.3 mg/l	170 ug/l	260 ug/l	64 ug/l*
Site 5	Lead	Water	0.015 mg.l		1.3 ug/l	0.72 ug/l*	0.31 ug/l*
Site 5	Magnesium	Water			7800 ug/l	15000 ug/l	16000 ug/l
Site 5	Manganese	Water	0.05 mg/l		26 ug/l	14 ug/l	15 ug/l
Site 5	Mercury	Water	0.002 mg/l		-999 ug/l	0.045 ug/l*	-999 ug/l
Site 5	Methylmercury(1+)	Water			0.058 ng/l	0.054 ng/l	-999 ng/l
Site 5	Nickel	Water	0.1 mg/l		0.33 ug/l*	-999 ug/l	1.7 ug/l*
Site 5	Potassium	Water			670 ug/l*	1100 ug/l*	870 ug/l*
Site 5	Selenium	Water	0.05 mg/l		-999 ug/l	-999 ug/l	33 ug/l
Site 5	Silver	Water	0.05 mg/l	0.1 mg/l	-999 ug/l	-999 ug/l	-999 ug/l
Site 5	Sodium	Water			1700 ug/l	3500 ug/l	4100 ug/l
Site 5	Sulfate	Water	250 mg/l	250 mg/l	20 mg/l	39 mg/l	47 mg/L
Site 5	Thallium	Water	0.002 mg/l		-999 ug/l	-999 ug/l	-999 ug/l
Site 5	Total dissolved solids	Water		500 mg/l	90 mg/l	180 mg/l	190 mg/L
Site 5	Vanadium	Water			-999 ug/l	-999 ug/l	-999 ug/l
Site 5	Zinc	Water	5 mg/l	5 mg/l	50 ug/l	22 ug/l	25 ug/l
Site 5	Gross alpha radioactivity, (Thorium-230 ref std)	Water	15 pCi/l		-999 pCi/L	2.92 pCi/L	3.89 pCi/L
Site 5	Gross beta radioactivity, (Strontium-Yttrium-90 ref std)	Water			1.02 pCi/L	-999 pCi/L	1.17 pCi/L
Site 5	Methylmercury(1+)	Soil				-999 ug/kg	
Site 5	Mercury	Soil				ug/kg 8.6 *	
^ Blank space means the EPA has not designated a primary and/or secondary standard							
*=Amount is an estimate, it is between the RL and MDL				Analyte not detected= -999			

Site 6

Hwy 9

Location	Analyte	Medium	Primary^ Drinking Water Standards	Secondary^	June Result	August Result	September Result
MFSP4- Bridge on Hwy 9			1 ug/l = 0.001 mg/l				
Site 6	Aluminum	Water	5 mg/l	0.05 to 0.2 mg/l	75 ug/l*	39 ug/l*	29 ug/l*
Site 6	Antimony	Water	0.006 mg/l		-999 ug/l	-999 ug/l	-999 ug/l
Site 6	Arsenic	Water	0.01 mg/l		-999 ug/l	-999 ug/l	0.38 ug/l*
Site 6	Barium	Water	2.0 mg/l		38 ug/l	52 ug/l	23 ug/l
Site 6	Beryllium	Water	0.004 mg/l		-999 ug/l	-999 ug/l	-999 ug/l
Site 6	Bromide	Water			-999 mg/l	-999 mg/l	0.17 mg/l*
Site 6	Cadmium	Water	0.005 mg/l		-999 ug/l	-999 ug/l	-999 ug/l
Site 6	Calcium	Water			21000 ug/l	38000 ug/l	39000 ug/l
Site 6	Chloride	Water	250 mg/l	250 mg/l	2.3 mg/l*	6.7 mg/l	7.6 mg/L
Site 6	Chromium	Water	0.1 mg/l		-999 ug/l	-999 ug/l	-999 ug/l
Site 6	Cobalt	Water			-999 ug/l	-999 ug/l	0.14 ug/l*
Site 6	Copper	Water	1.3 mg/l	1.0 mg/l	2 ug/l	0.71 ug/l*	1.8 ug/l*
Site 6	Diesel range organics	Water			-999 mg/l	0.059 mg/l*	0.049 mg/l*
Site 6	Fluoride	Water	4.0 mg/l	2.0 mg/l	0.17 mg/l*	0.15 mg/l*	0.17 mg/l*
Site 6	Gasoline range organics	Water			-999 ug/l	-999 ug/l	-999 ug/l
Site 6	Iron	Water	0.3 mg/l	0.3 mg/l	210 ug/l	270 ug/l	82 ug/l*
Site 6	Lead	Water	0.015 mg.l		1.8 ug/l	0.84 ug/l*	0.18 ug/l*
Site 6	Magnesium	Water			8600 ug/l	15000 ug/l	16000 ug/l
Site 6	Manganese	Water	0.05 mg/l		25 ug/l	27 ug/l	27 ug/l
Site 6	Mercury	Water	0.002 mg/l		-999 ug/l	-999 ug/l	-999 ug/l
Site 6	Methylmercury(1+)	Water			0.054 ng/l	0.06 ng/l	0.027 ng/L*
Site 6	Nickel	Water	0.1 mg/l		0.41 ug/l*	-999 ug/l	0.69 ug/l*
Site 6	Potassium	Water			760 ug/l*	1300 ug/l*	850 ug/l*
Site 6	Selenium	Water	0.05 mg/l		-999 ug/l	-999 ug/l	-999 ug/l
Site 6	Silver	Water	0.05 mg/l	0.1 mg/l	-999 ug/l	-999 ug/l	-999 ug/l
Site 6	Sodium	Water			1900 ug/l	3700 ug/l	4200 ug/l
Site 6	Sulfate	Water	250 mg/l	250 mg/l	21 mg/l	39 mg/l	44 mg/L
Site 6	Thallium	Water	0.002 mg/l		-999 ug/l	-999 ug/l	-999 ug/l
Site 6	Total dissolved solids	Water		500 mg/l	110 mg/l	190 mg/l	190 mg/L
Site 6	Vanadium	Water			-999 ug/l	-999 ug/l	-999 ug/l
Site 6	Zinc	Water	5 mg/l	5 mg/l	34 ug/l	12 ug/l	2.8 ug/l*
Site 6	Gross alpha radioactivity, (Thorium-230 ref std)	Water	15 pCi/l		-999 pCi/L	2.68 pCi/L	4.49 pCi/L
Site 6	Gross beta radioactivity, (Strontium-Yttrium-90 ref std)	Water			-999 pCi/L	1.58 pCi/L	1.02 pCi/L

^ Blank space means the EPA has not designated a primary and/or secondary standard

*=Amount is an estimate, it is between the RL and MDL

Analyte not detected= -999

Guidelines for Colorado fish

CDPHE



The FDA recommends that you eat two or three servings of fish per week. However, some fish contain high levels of mercury, which can make them unsafe to eat.

One fish, two fish. Bad fish, good fish.

Mercury is a metal that is found in soil, rock, air and water. Fish are exposed to mercury that is in the water and their food. Nearly all fish have at least traces of mercury in them. The mercury builds up in their tissues over their lifespan. If humans consume fish with high levels of mercury, it can interfere with the developing nervous system. Mercury in fish can also harm older children and adults but requires larger amounts. Usually the harmful effects can be corrected if a person stops eating fish that contain high levels of mercury.

Big fish, small fish. Old fish, new fish.

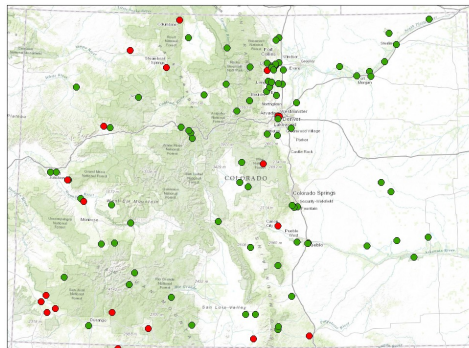
The amount of mercury in a fish depends on its age and what it eats. Bigger, older fish may have more mercury, especially if they eat other fish with mercury. Some fish may be safe to eat when they are small, but unhealthy when they are large.

Cooked fish, raw fish. Caught fish, bought fish.

Cooking or cleaning fish does not remove mercury. The guidelines provided here only apply to fish caught in Colorado. Fish from restaurants and stores may also have high levels of mercury. Guidelines for safely eating these fish can be found through the FDA at www.fda.gov.

Green fish, red fish. Live fish, dead fish.

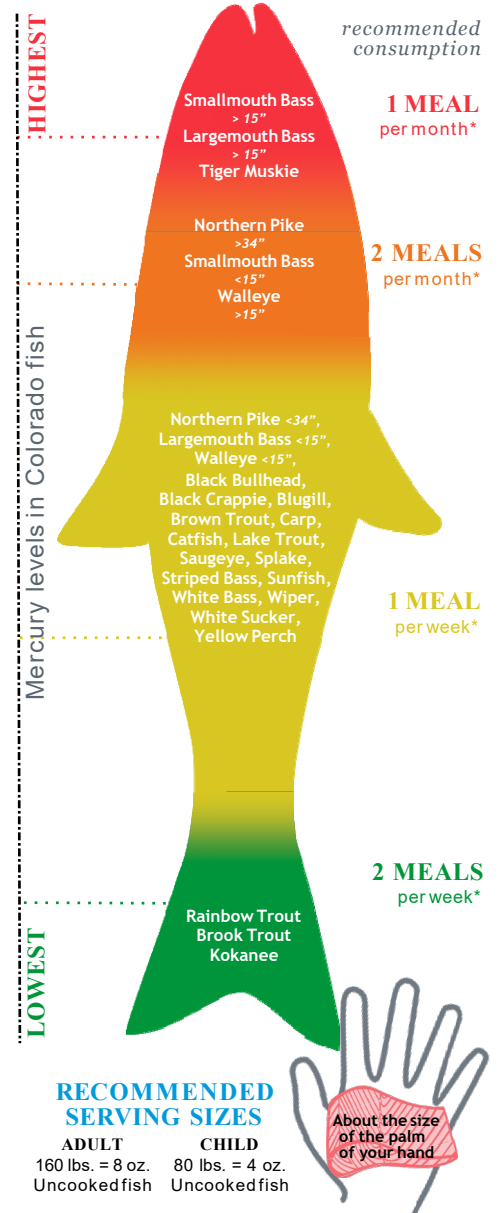
The fish in Colorado are routinely tested for mercury levels. The map below displays locations where fish have been tested. Green dots mean that the location has no advisories. Red dots mean that there are advisories for some of the fish in that location. You should check our website before eating fish from these locations.



www.colorado.gov/cdphe/wq-fish-consumption



Guidelines for Colorado fish



*Recommendations for the general population. Individuals that are considered high risk should follow more detailed guidelines.

Mercury testing at Spinney Reservoir 2009

Sample ID	Waterbody	Sample Date	Species	Number of Fish	Sample Type	Length (in)	Pollutant	Result
06092009SPINLOC01	Spinney Mountain Reservoir	6/9/2009	BROWN TROUT	1	Fillet	18	Mercury	0.09 ppm
06092009SPINLOC02	Spinney Mountain Reservoir	6/9/2009	BROWN TROUT	1	Fillet	19	Mercury	0.13 ppm
06092009SPINNPK03	Spinney Mountain Reservoir	6/9/2009	NORTHERN PIKE	3	Fillet-composite	18	Mercury	0.20 ppm
06092009SPINNPK04	Spinney Mountain Reservoir	6/9/2009	NORTHERN PIKE	1	Fillet	32	Mercury	0.23 ppm
06092009SPINRBT05	Spinney Mountain Reservoir	6/9/2009	RAINBOW TROUT	2	Fillet-composite	19	Mercury	0.13 ppm
06092009SPINRBT06	Spinney Mountain Reservoir	6/9/2009	RAINBOW TROUT	2	Fillet-composite	19	Mercury	0.19 ppm
06092009SPINRBT07	Spinney Mountain Reservoir	6/9/2009	RAINBOW TROUT	2	Fillet-composite	20	Mercury	0.12 ppm

Mercury and Methylmercury

Results by site

Water Samples		Methylmercury	Mercury ug/L	
Location	Date	ug/L	Dissolved	Total
MFSP1	6/4/2018	0.07	ND	ND
MFSP1	8/27/2018	0.11	ND	ND
MFSP1	9/26/2018	0.058	ND	ND
MFSP2	6/4/2018	0.053	ND	ND
MFSP2	8/27/2018	0.058	ND	ND
MFSP2	9/26/2018	ND	ND	ND
MFSP3	6/4/2018	0.058	ND	ND
MFSP3	8/27/2018	0.054	ND	0.045
MFSP3	9/26/2018	ND	ND	ND
MFSP4	6/4/2018	0.054	ND	ND
MFSP4	8/27/2018	0.06	ND	ND
MFSP4	9/26/2018	0.018	ND	ND
PNC 1	8/27/2018	0.025	ND	ND
PNC1	6/4/2018	0.036	ND	ND
PNC1	9/26/2018	ND	ND	ND
SAC 1	8/27/2018	ND	ND	ND
SAC1	6/4/2018	0.039	ND	ND
SAC1	9/26/2018	0.019	ND	ND
Soil Samples		Methylmercury		Mercury
Location	Date	ug/kg		ug/kg
MPSP1	8/27/2018	ND		15
MPSP3	8/27/2018	ND		8.6
Mercury	RL=0.020	Primary Drinking Water Standard= 2 ug/L		
		MDL=0.027	Estimate	
Methylmercury	RL= 0.050	No Primary Drinking Water Standard Set		
ND=Not Detected		MDL= 0.018	Estimate	

Analysis of fish mercury data

Park County - Middle Fork S. Platte River watershed

Joint project from DRMS, CPW, CDPHE-
2018

Hypotheses

Table 1. Sampling locations.

Sample location	Sample position relative to mines	Latitude	Longitude
Montgomery Reach	Upstream on Middle Fork of the S. Platte	39.352004	-106.069148
Fairplay Upstream	Downstream on Middle Fork of the S. Platte	39.225100	-106.006284
Fairplay Beach	Downstream on Middle Fork of the S. Platte	39.222664	-106.003538
Spinney Mountain Reservoir	On-channel reservoir approximately 25 miles downstream	38.981261	-105.638492

Table 3. Mean (range) mercury concentrations in the fish collected from Park County in 2018.

Species	Sample location			
	Montgomery Reach	Fairplay Upstream	Fairplay Beach	Spinney Mountain Reservoir
Brook trout	0.07 (0.03-0.19)			
Brown trout	0.06 (0.03-0.09)	0.04 (BDL*-0.08)	0.02 (BDL-0.03)	0.11 (0.06-0.21)
Northern pike				0.23 (0.16-0.26)
Rainbow trout				0.09 (0.04-0.18)

* BDL = Below detection limit of 0.01 mg/kg

If the claim that mercury was being released into the waterways from the mining activity near Fairplay and Alma were true, we might also reasonably expect one or more of the following to be true:

- Fish collected downstream of the mining activity (at the two Fairplay sites) will show higher levels of mercury than fish collected upstream of the mining (at the Montgomery Reach site) due to increased exposure to mercury downstream of the mines.
- Fish collected from the mining impacted area will show elevated levels of mercury relative to fish collected statewide.
- Fish collected at Spinney Mountain Reservoir in 2018 will show elevated levels of mercury compared to fish collected prior to recent mining activities from the same reservoir.

Findings

It stands to reason that legacy mining activity in the vicinity of Montgomery Reservoir and/or conditions which promote transformation of mercury from inorganic to organic forms in the reservoir are contributing to elevated levels at the upstream site. However, the mercury levels in brown trout at the Fairplay site are lower than the levels measured in that species at all river sites and all waterbodies statewide (Figure 3)3. **Therefore, based on the data collected in this study, we see no evidence of increased bioaccumulation of mercury in fish downstream of the mining activity.**

Next Steps

- Collect additional samples at sites above the town of Alma to determine the exact source of the mercury
- Sample both water and soil
- Continue monitoring at Fairplay Beach

Proposed Sample Sites

Additional Mercury
Testing

