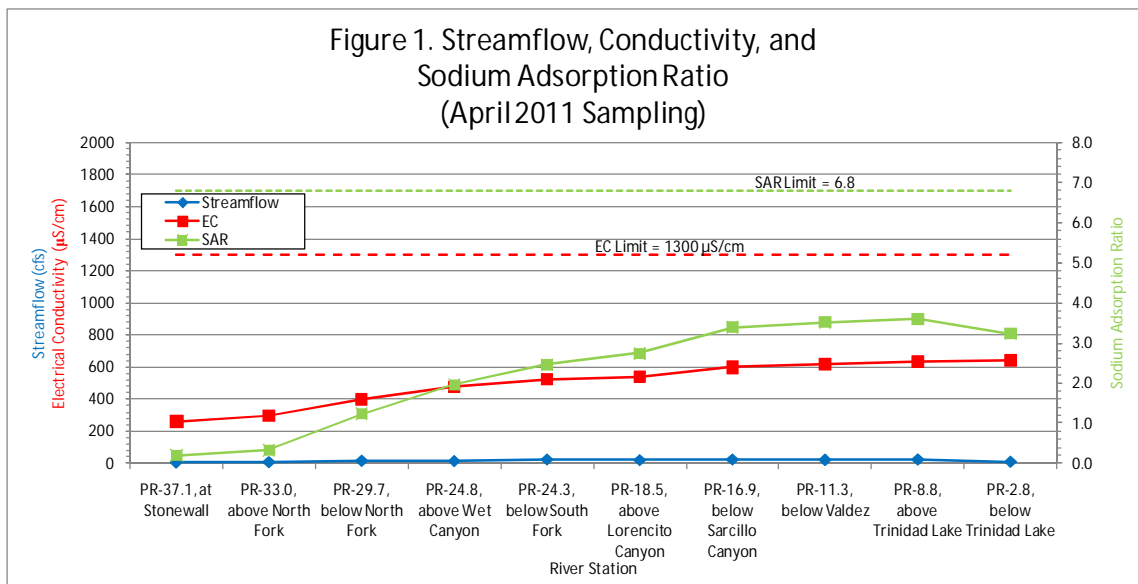
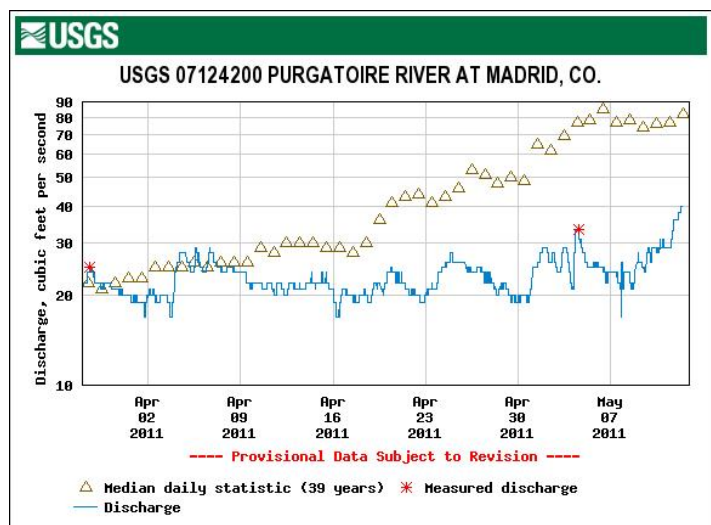
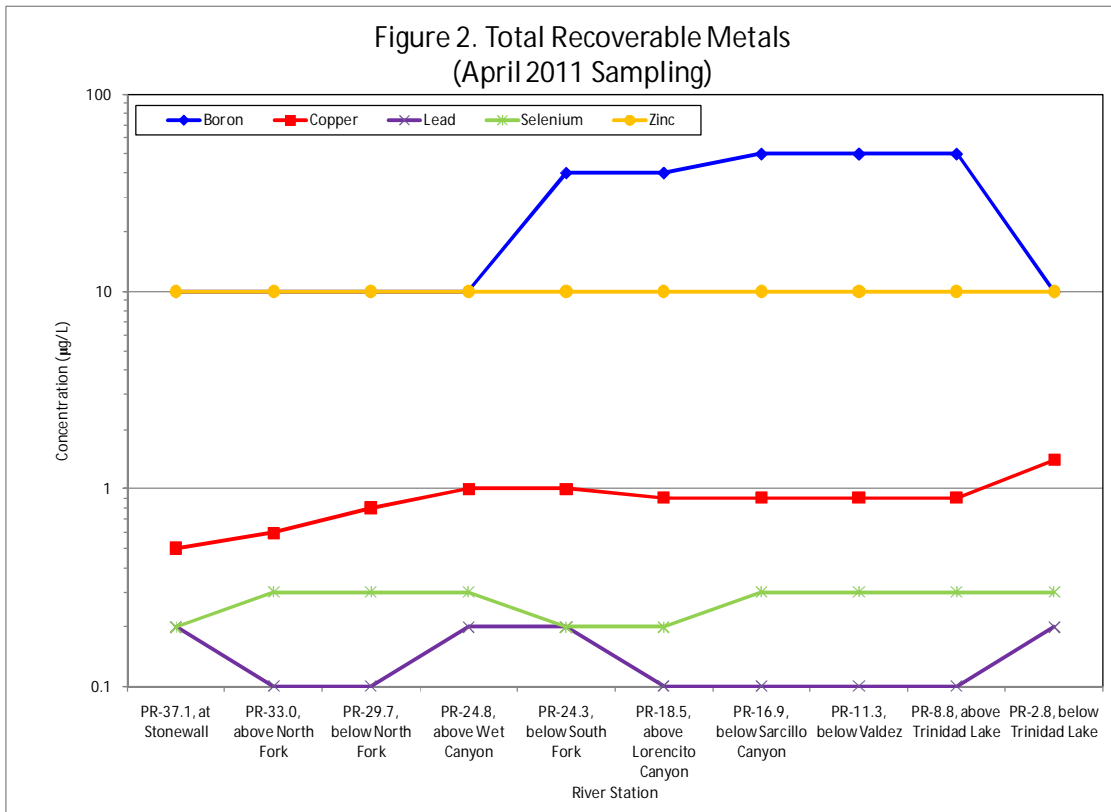


Tetra Tech sampled the Purgatoire River and tributaries on April 13 and 14, 2011. The following information provides a “snapshot” of water quality information from these two days of water quality monitoring. Figure 1 depicts streamflow, electrical conductivity (EC), and calculated Sodium Adsorption Ratio (SAR) at various points along the Purgatoire River from upstream (PR37.1 at Stonewall) to downstream (PR 2.8 below Trinidad Lake). The Purgatoire River picks up streamflow from the tributaries and its watershed as it flows downstream towards Trinidad Lake. April streamflow (Figure 1, blue line on graph) in the Purgatoire River has stayed consistent with March flows with around 25 cfs downstream of the South Fork (PR 24.3) to PR 8.8, above Trinidad Lake. The Trinidad Reservoir outlet works were open for a few days in mid-April that coincided with our sampling event. Sampling was conducted for each of the Purgatoire River stations. The EC that is protective of alfalfa crops in the Purgatoire valley is 1,300  $\mu\text{S}/\text{cm}$ . EC decreased slightly from a high of approximately 649  $\mu\text{S}/\text{cm}$  in March to a maximum value of around 640  $\mu\text{S}/\text{cm}$  in April. EC values remain well below the alfalfa protection threshold. The SAR measurements were also well below the alfalfa threshold value of 6.8, and slightly increased in a downstream direction in comparison to values in March.



As depicted on the USGS hydrograph of the Purgatoire River at Madrid, CO (located upstream of Trinidad Lake), the flows in the Purgatoire River fluctuated around 25 cfs during the April sampling event.





Since sampling commenced in April 2010 the monthly water quality monitoring has shown the metal concentrations of boron, copper, lead, selenium and zinc remain below the water quality standards established by the Water Quality Control Commission for these segments in the Purgatoire. The April 2011 metals data are shown in Figure 2; the yellow line of zinc concentrations indicates that all data were below method detection limits (MDLs).

Except for boron (agricultural-irrigation water quality standard of 750 µg/L), all of the metal concentrations depicted in Figure 2 are hardness based standards. Table 1 below provides more information on the specific water quality standards on the Purgatoire River along the various monitoring locations. Again, all April metal concentrations were below the standard values listed on Table 1. Our FAQ page on the website summarizes other information about the MDLs of the laboratory analytical methods.

Water Quality Standards for Purgatoire River Mainstem, Segment 5a  
April Sampling 2011

STREAM WATER QUALITY STANDARDS

LABID	CALCULATED HARDNESS (mg/L as CaCO3)	STREAM SEGMENT	ACUTE COPPER DISSOLVED ug/L	CHRONIC COPPER DISSOLVED ug/L	CHRONIC IRON DISSOLVED ug/L	CHRONIC IRON TOTAL RECOVERABLE ug/L	ACUTE LEAD DISSOLVED ug/L	CHRONIC LEAD DISSOLVED ug/L	ACUTE SELENIUM DISSOLVED ug/L	CHRONIC SELENIUM DISSOLVED ug/L	TEMPORARY MODIFIED SELENIUM, DISSOLVED ug/L	ACUTE ZINC DISSOLVED ug/L	CHRONIC ZINC DISSOLVED ug/L
PR8.8-041311	142	5a	18.7	12.1	0.3	1000	94.4	3.7	18.4	4.6	11.2	193.3	167.6
PR11.3-041311	143	5a	18.8	12.2	0.3	1000	95.1	3.7	18.4	4.6	11.2	194.5	168.6
PR16.9-041311	141	5a	18.6	12.0	0.3	1000	93.7	3.7	18.4	4.6	11.2	192.1	166.6
PR18.5-041311	144	5a	18.9	12.2	0.3	1000	95.8	3.7	18.4	4.6	11.2	195.6	169.6
PR2.8-041311	133	5a	17.6	11.4	0.3	1000	88.0	3.4	18.4	4.6	11.2	182.8	158.5
PR24.3-041311	151	5a	19.8	12.7	0.3	1000	100.8	3.9	18.4	4.6	11.2	203.7	176.6
PR24.8-041311	150	5a	19.7	12.7	0.3	1000	100.1	3.9	18.4	4.6	11.2	202.6	175.6
PR29.7-041311	155	5a	20.3	13.0	0.3	1000	103.7	4.0	18.4	4.6	11.2	208.3	180.6
PR33.0-041311	143	5a	18.8	12.2	0.3	1000	95.1	3.7	18.4	4.6	11.2	194.5	168.6
PR33.0-041311D	146	5a	19.2	12.4	0.3	1000	97.3	3.8	18.4	4.6	11.2	197.9	171.6
PR37.1-041311	124	5a	16.5	10.8	0.3	1000	81.6	3.2	18.4	4.6	11.2	172.2	149.3

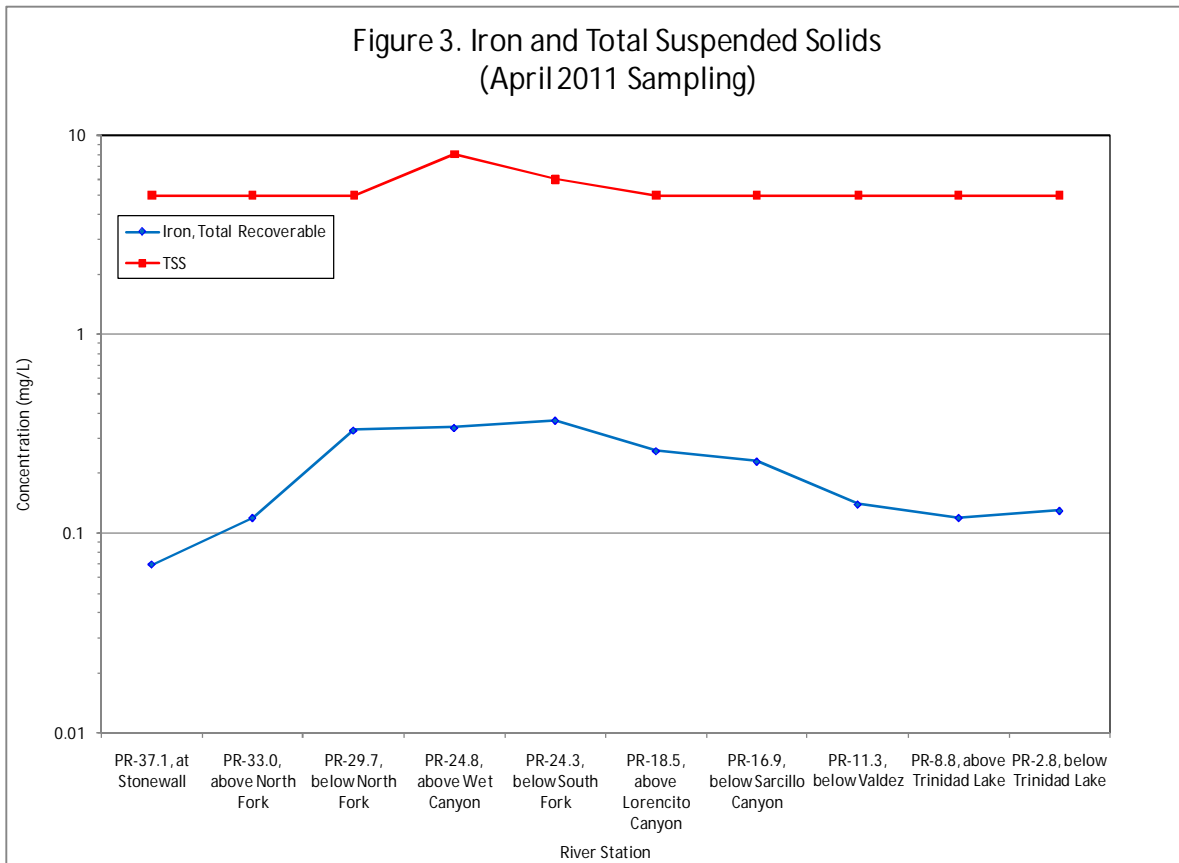
STREAM WATER QUALITY STANDARDS

LABID	CALCULATED HARDNESS (mg/L as CaCO3)	STREAM SEGMENT	BORON DISSOLVED mg/L	CHLORIDE mg/L	SULFATE mg/L	pH-Low S.U.	pH-High S.U.
PR8.8-041311	142	5a	0.75	250	250	6.5	9
PR11.3-041311	143	5a	0.75	250	250	6.5	9
PR16.9-041311	141	5a	0.75	250	250	6.5	9
PR18.5-041311	144	5a	0.75	250	250	6.5	9
PR2.8-041311	133	5a	0.75	250	250	6.5	9
PR24.3-041311	151	5a	0.75	250	250	6.5	9
PR24.8-041311	150	5a	0.75	250	250	6.5	9
PR29.7-041311	155	5a	0.75	250	250	6.5	9
PR33.0-041311	143	5a	0.75	250	250	6.5	9
PR33.0-041311D	146	5a	0.75	250	250	6.5	9
PR37.1-041311	124	5a	0.75	250	250	6.5	9

SAMPLING LOCATION DESCRIPTIONS

STATION ID	STATION DESCRIPTION
PR-02.8	Purgatoire River below Trinidad Lake
PR-08.8	Purgatoire River above Trinidad Lake
PR-11.3	Purgatoire River below Valdez
PR-16.9	Purgatoire River below Sarcillo Canyon
PR-18.5	Purgatoire River above Lorencito Canyon
PR-24.3	Purgatoire River below South Fork
PR-24.8	Purgatoire River above Wet Canyon
PR-29.7	Purgatoire River below North Fork
PR-33.0	Purgatoire River above North Fork
PR-37.1	Purgatoire River at Stonewall

Total recoverable iron (Fe) and sediment (TSS) concentrations, depicted in Figure 3, were similar to those measured in the March sampling event. The red line of TSS concentrations at the various river stations shows that all of the data were below 10 mg/L. For the month of April the iron concentrations were all under the water quality standard of 1 mg/L in the lower Purgatoire River.



The box and whiskers plots on Figure 4 illustrate historic USGS metals concentration data measured at the Purgatoire River at Madrid station, 1978 – 1981. As shown, metals concentrations Tetra Tech has measured since April 2010 (depicted in the colored dots) are below the historic range measured by USGS with the exception of boron. Recent boron concentrations are similar to those observed by the USGS, but are well below the stream standard of 750 µg/L.

