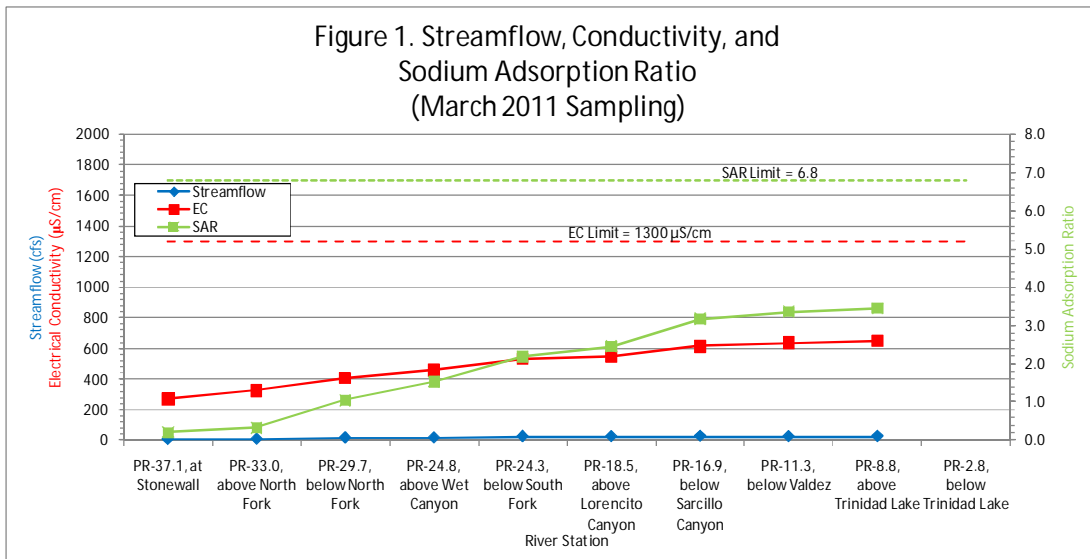
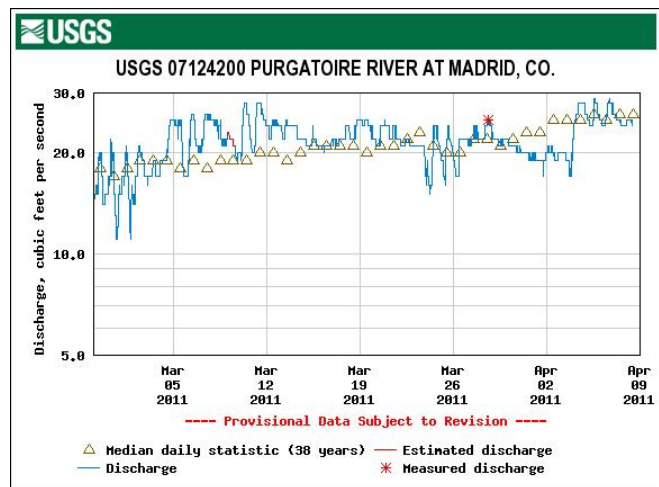
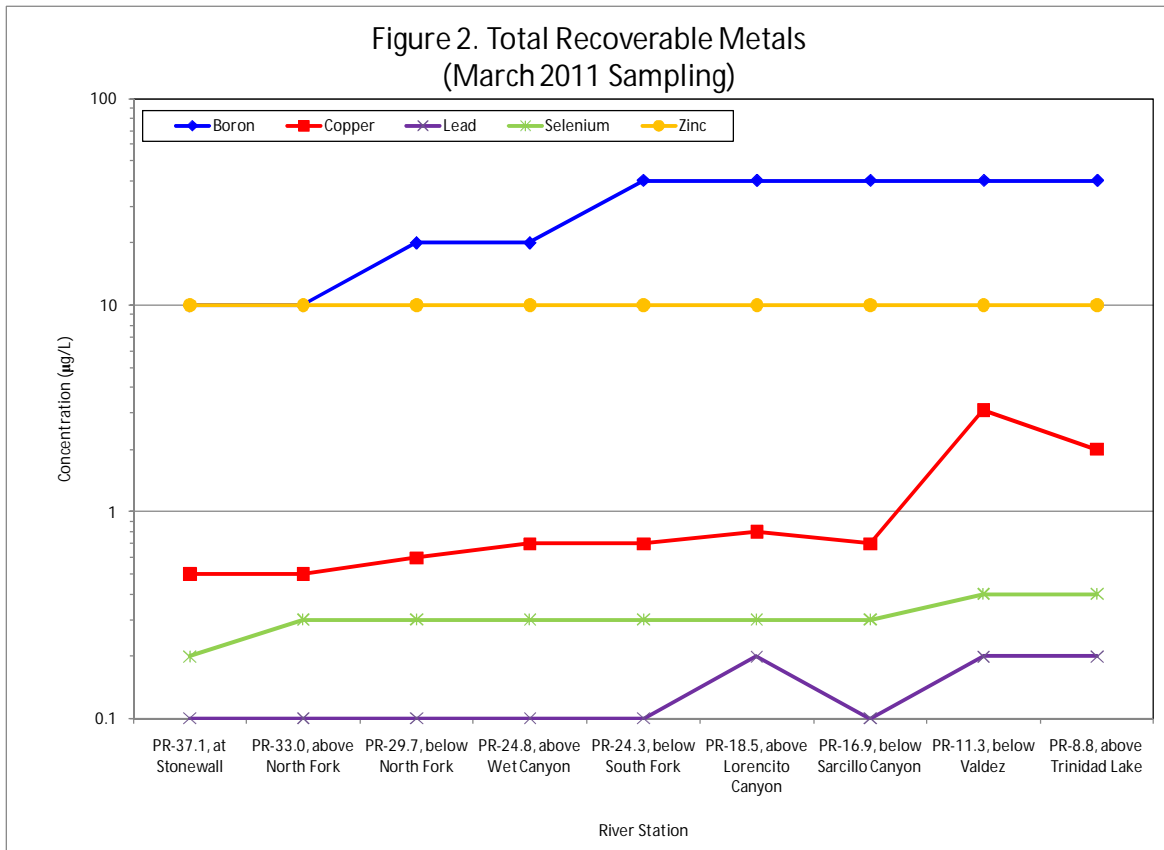


Tetra Tech sampled the Purgatoire River and tributaries on March 16 and 17, 2011. The following information provides a “snapshot” of water quality information from these two days of water quality monitoring. Figure 1 depicts streamflow, electrical conductivity (EC), and calculated Sodium Adsorption Ratio (SAR) at various points along the Purgatoire River from upstream (PR37.1 at Stonewall) to downstream (PR 8.8 above Trinidad Lake). The Purgatoire River picks up streamflow from the tributaries and its watershed as it flows downstream towards Trinidad Lake. March streamflow (Figure 1, blue line on graph) in the Purgatoire River has decreased from around 28 cfs in February to around 18 cfs downstream of the South Fork (PR 24.3) to PR 8.8, above Trinidad Lake. Sampling was conducted for each of the stations except for PR 2.8 because the lake’s gates were closed. The EC that is protective of alfalfa crops in the Purgatoire valley is 1,300 $\mu\text{S}/\text{cm}$. EC increased in March from a high of approximately 552 $\mu\text{S}/\text{cm}$ in February to a maximum value of around 649 $\mu\text{S}/\text{cm}$ in March. EC values remain well below the alfalfa protection threshold. The SAR measurements were well below the alfalfa threshold value of 6.8, and slightly decreased in a downstream direction in comparison to values in January and February.



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 20 cfs during the March 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 March 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. 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
March Sampling 2011

STREAM WATER QUALITY STANDARDS

LABID	CALCULATED HARDNESS (mg/L as CaCO ₃)	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
PR8.8-031611	154	5a	20.2	12.9	0.3	1000	102.8	4.0	18.4	4.6	11.2	206.9	179.4
PR11.3-031611	155	5a	20.3	13.0	0.3	1000	103.7	4.0	18.4	4.6	11.2	208.3	180.6
PR16.9-031611	155	5a	20.2	13.0	0.3	1000	103.4	4.0	18.4	4.6	11.2	207.7	180.1
PR18.5-031611	161	5a	21.1	13.5	0.3	1000	108.2	4.2	18.4	4.6	11.2	215.4	186.7
PR24.3-031611	162	5a	21.2	13.6	0.3	1000	109.0	4.2	18.4	4.6	11.2	216.7	187.9
PR24.3-031611D	161	5a	21.0	13.5	0.3	1000	108.0	4.2	18.4	4.6	11.2	215.1	186.5
PR24.8-031611	161	5a	21.0	13.4	0.3	1000	108.0	4.2	18.4	4.6	11.2	215.1	186.5
PR29.7-031611	162	5a	21.2	13.5	0.3	1000	108.7	4.2	18.4	4.6	11.2	216.2	187.5
PR33.0-031611	157	5a	20.6	13.2	0.3	1000	105.4	4.1	18.4	4.6	11.2	211.0	182.9
PR37.1-031611	133	5a	17.6	11.4	0.3	1000	88.0	3.4	18.4	4.6	11.2	182.9	158.6

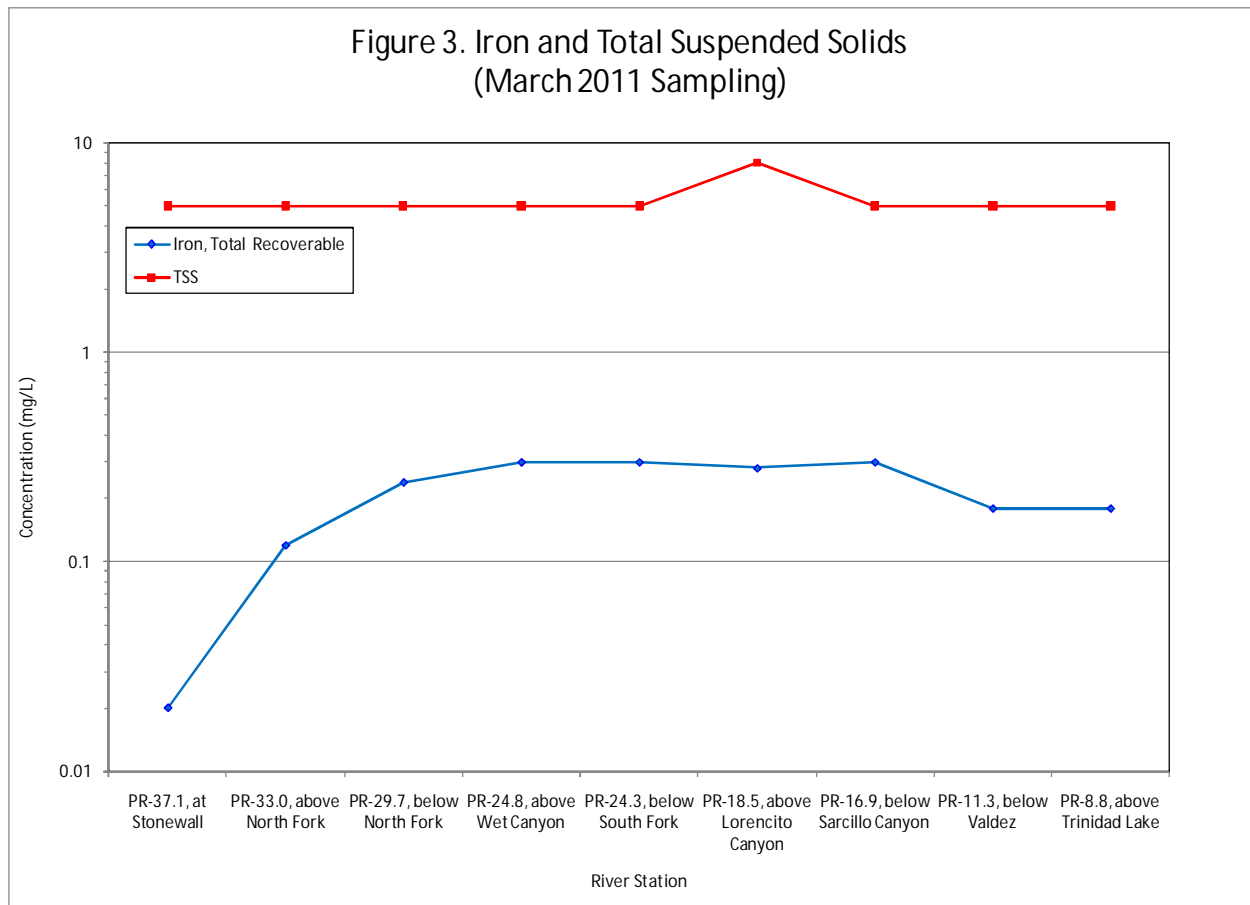
STREAM WATER QUALITY STANDARDS

LABID	CALCULATED HARDNESS (mg/L as CaCO ₃)	STREAM SEGMENT	BORON DISSOLVED mg/L	CHLORIDE mg/L	SULFATE mg/L	pH-Low S.U.	pH-High S.U.
PR8.8-031611	154	5a	0.75	250	250	6.5	9
PR11.3-031611	155	5a	0.75	250	250	6.5	9
PR16.9-031611	155	5a	0.75	250	250	6.5	9
PR18.5-031611	161	5a	0.75	250	250	6.5	9
PR24.3-031611	162	5a	0.75	250	250	6.5	9
PR24.3-031611D	161	5a	0.75	250	250	6.5	9
PR24.8-031611	161	5a	0.75	250	250	6.5	9
PR29.7-031611	162	5a	0.75	250	250	6.5	9
PR33.0-031611	157	5a	0.75	250	250	6.5	9
PR37.1-031611	133	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, decreased compared to those measured in the February 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 March 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.

