

**Appendix G**

**SAN JUAN RIVER WATER QUALITY  
EXCEEDENCES TABLES**

**Table G-1.—Comparison of New Mexico standards with sample results at approximate 250 cfs flows at the Archuleta, New Mexico, USGS gage**

Parameters	Physical standards for reach 20.6.4.405	High quality cold water fishery	Wildlife habitat standard	Irrigation standard	Livestock standard	Sample values during Low Flow Test July 9-15, 2001	Median historical values low flows (number of samples)	Exceedences of standards
Streamflow (cfs)						264	260 (11)	
Conductivity (umhos/cm)	<400					306	255 (11)	0
Water temp. (°C)	<20	<20				12.8	4.14 (11)	0
Turbidity	10 NTU					1.4	6.6 (8)	1
Dissolved oxygen		<6.0				8.45	10.8 (11)	0
pH	6.6-8.8	6.6-8.8				8.0	7.81 (11)	0
Fecal coliform #/100 mL	200			2000		4	1.5(6)	0
Total organic carbon (mg/L)		<7				20	No Data	1
Total ammonia (mg/L)		see regs				<0.4	0.08(4)	0
Arsenic diss. (ug/L)		150		100	200	ND	5 (9)	0
Barium diss. (ug/L)						No Data	64 (n=4)	
Boron diss. (ug/L)				750	5000	<5	No Data	0
Beryllium (ug/L)		5.3				<5	No Data	0
Cadmium diss. (ug/L)		HD(2.3)		10	50	ND	No Data	0
Chromium diss. (ug/L)		HD(76.5)		100	1000	<1	No Data	0
Cobalt diss. (ug/L)				50	1000	<5	No Data	0
Copper diss. (ug/L)		HD(9.3)		200	500	1	5 (8)	0
Lead diss. (ug/L)		HD(2.6)		5000	100	<1	1 (9)	0
Manganese diss. (ug/L)						ND	14 (4)	
Molybdenum diss. (ug/L)				1000		<100	No Data	0
Nickel diss. (ug/L)		HD(53.8)				ND	7.5 (8)	0

**Table G-1.—Comparison of New Mexico standards with sample results at approximate 250 cfs flows at the Archuleta, New Mexico, USGS gage**

Parameters	Physical standards for reach 20.6.4.405	High quality cold water fishery	Wildlife habitat standard	Irrigation standard	Livestock standard	Sample values during Low Flow Test July 9-15, 2001	Median historical values low flows (number of samples)	Exceedences of standards
Silver diss. (ug/L)		HD(3.7 acute)				ND	No Data	0
Zinc diss. (ug/L)		HD(122.1)		2000	25,000	5.2	10 (9)	0
Aluminum diss. (ug/L)		87		5000	5000	<10	35 (8)	1
Selenium diss. (ug/L)				130	50	ND	0.5 (9)	0
Selenium total (ug/L)		5TREC	5TREC			ND	1 (9)	0
Vanadium (ug/L)				100	100	ND	No Data	0
Hardness (mg/L)						106	100 (8)	
Cyanide (ug/L)			5.2			ND	No Data	0
Total chlorine residual (ug/L)			11			<1000	No Data	
Total DDT (ug/L)			0.001			ND	No Data	0
Total PCBs (ug/L)			0.014			ND	No Data	0
Mercury diss. (ug/L)		0.012T	0.77		10T	ND	0.16 (9)	
Radium226+228 (pCi/L)					30	1	No Data	0
Tritium (pCi/L)					20,000	No Data	No Data	
Total gross alpha (pCi/L)					15	0.54	No Data	0

Notes: For data below detection levels, the value used to calculate the median value was ½ the detection limit. ND is not detected as reported by the laboratory doing the analysis; n is the number of samples taken; diss is dissolved; TREC Total Recoverable Concentration; T is total; Median value is given due to skewness of much of the data; Hardness-dependent standards were calculated with average hardness value. Chronic standards are presented here because generally these are lower values; in some cases there are no chronic standards, only acute. The exceedence column indicates where samples exceeded the standard listed here. Additional checks against the acute standard were not performed for this analysis because this is intended to be only a general comparison of standards along the mainstem of the San Juan River.

Table G-2.—Comparison of New Mexico standards with sample results at flows between 500 and 1,000 cfs at the Farmington, New Mexico, USGS gage

Parameters	Physical standards for reach 20.6.4.401	Marginal cold water fishery	Warm water fishery	Wildlife habitat standard	Irrigation standard	Livestock standard	Median values (number of samples)	Range of sample values	Exceedences of standards
Streamflow (cfs)							770(87)	500-997	
Water temp. (°C)	<32.2		<32.2				9(65)	0-25.5	0
Dissolved oxygen		<6.0	<5.0				No Data	No Data	
pH	6.6-9.0	6.6-9.0	6.6-9.0				8(75)	7.3-8.95	0
Fecal coliform (#/100 mL)	400				2000		3700(15)	1-110,000	
Total ammonia (mg/L)		see regs	see regs				No Data	No Data	
Arsenic diss. (ug/L)		150			100	200	1(4)	1-2	0
Boron diss. (ug/L)					750	5000	50(44)	20-360	0
Beryllium (ug/L)		5.3	5.3				No Data	No Data	
Cadmium diss. (ug/L)		HD(3.7)	HD(3.7)		10	50	0.5(4)	0-2	0
Chromium diss. (ug/L)		HD(128.6)	HD(128.6)		100	1000	0(3)	0	0
Cobalt diss. (ug/L)					50	1000	2(3)	0-3	0
Copper diss. (ug/L)		HD(15.9)	HD(15.9)		200	500	2(4)	1-4	0
Lead diss. (ug/L)		HD(5.2)	HD(5.2)		5000	100	0(3)	0-4	0
Molybdenum diss. (ug/L)					1000		No Data	No Data	
Nickel diss (ug/L)		HD(91.9)	HD(91.9)				No Data	No Data	
Silver diss. (ug/L)		HD (11 acute)	HD (11 acute)				1(2)	0-2	0
Zinc diss. (ug/L)		HD(208.9)	HD(208.9)		2000	25,000	4(7)	0-20	0
Aluminum diss. (ug/L)		87	87		5000	5000	20(3)	5-30	0

**Table G-2.—Comparison of New Mexico standards with sample results at flows between 500 and 1,000 cfs at the Farmington, New Mexico, USGS gage**

Parameters	Physical standards for reach 20.6.4.401	Marginal cold water fishery	Warm water fishery	Wildlife habitat standard	Irrigation standard	Livestock standard	Median values (number of samples)	Range of sample values	Exceedences of standards
Aluminum diss. (ug/L)		87	87		5000	5000	20(3)	5-30	0
Selenium diss. (ug/L)					130	50	1(7)	0.5-1	0
Selenium total (ug/L)		5TREC	5TREC	5TREC			1(3)	1	0
Vanadium (ug/L)					100	100	No Data	No Data	
Hardness (mg/L)							196(65)	130.4-486.1	
Cyanide (ug/L)		5.2	5.2	5.2			No Data	No Data	
Total chlorine residual (ug/L)		11	11	11			No Data	No Data	
Total DDT (ug/L)				0.001			No Data	No Data	
Total PCBs (ug/L)				0.014			No Data	No Data	
Mercury diss (ug/L)		0.012T		0.77		10T	0.5(3)D	0.1-0.5	3
Radium226+228 (pCi/L)						30	No Data	No Data	
Tritium (pCi/L)						20,000	No Data	No Data	
Total gross alpha (pCi/L)						15	No Data	No Data	

Notes: For data below detection levels, the value used to calculate the median value was ½ the detection limit. ND is not detected as reported by the laboratory doing the analysis; n is the number of samples taken; diss is dissolved; TREC Total Recoverable Concentration; T is total; Median value is given due to skewness of much of the data; Hardness-dependent standards were calculated with median hardness value. Chronic standards are presented here because generally these are lower values; in some cases there are no chronic standards, only acute. The exceedence column indicates where samples exceeded the standard listed here. Additional checks against the acute standard were not performed for this analysis because this is intended to be only a general comparison of standards along the mainstem of the San Juan River.

**Table G-3.—Draft Ute Mountain Ute Tribal and State of Colorado standards compared with sample results from San Juan River flows between 500 and 1,000 cfs at Four Corners, Colorado**

Parameters	UMUT warm water aquatic life	UMUT wildlife ecology	UMUT Rec sec contact	CO aquatic life warm 1	CO Rec 1a	CO agriculture	Median values (number of samples)	Range of sample values	Exceedences of standards (standard)
Fecal coliform	200		2000				253(6)	10-570	3(200)
E. Coli per 100 mL					126		NS	NS	
Fecal coliform (geometric mean CFU))					200		NS	NS	
Temperature (max °C)	background ± 3 standard dev.			30			8.11(49)	0.02-26.5	0(30)
pH (standard units)	6.5-9.0	NA	NA	6.5-9.0	6.5-9.0	NA	8.4(48)	7.8-8.75	0
Turbidity (max NTU)							35.5(16)	4.7-7900	
Dissolved oxygen, minimum (mg/L)	5.0			5.0	3.0	3.0	10.5(47)	6.1-14.3	0
Ammonia mg/L	0.06			0.06			NS	NS	
Boron ug/L	NA		NA			750	185(16)	60-290	0
Chlorine (total residual, ug/L)	11		11	11			NS	NS	
Cyanide (ug/L)	5.2		5.2	5.0		200	NS	NS	
Nitrate (mg/L)	see regs			0.5		100	1.1(5)	0.16-4.04	4(0.5)
Nitrite (mg/L)				case by case		10	0.005(4)	0.005-0.02	0(10)
Sulfides (ug/L)	2		2	2			NS	NS	
Gross Alpha (pCi/L)	15						NS	NS	
Gross Beta (pCi/L)	any						NS	NS	
Radium 226+228 (pCi/L)	any			5			NS	NS	

Table G-3.—Draft Ute Mountain Ute Tribal and State of Colorado standards compared with sample results from San Juan River flows between 500 and 1,000 cfs at Four Corners, Colorado

Parameters	UMUT warm water aquatic life	UMUT wildlife ecology	UMUT Rec sec contact	CO aquatic life warm 1	CO Rec 1a	CO agriculture	Median values (number of samples)	Range of sample values	Exceedences of standards (standard)
Radon (pCi/L)	150						NS	NS	
Tritium (pCi/L)				20,000			NS	NS	
Aluminum (ug/L)				87			15(4)	0-20	0
Arsenic (ug/L)	190D			100TREC		100	1(8)	0.5-2	0
Arsenic III (ug/L)							NS	NS	
Beryllium (ug/L)						100	0.5(6)	0.25-5	0
Cadmium (ug/L)	HD(2.4)			HD(4.5)		10	1(8)	0.5-2	0
Chromium (III+VI) (ug/L)							0(7)	0-1	0
Chromium III (ug/L)	HD			HD		100	NS	NS	
Chromium VI (ug/L)	11			11		100	NS	NS	
Copper (ug/L)	HD(43.1)			HD(20.1)		200	3(7)	1.5-15	0
Iron (Total Rec)	1000			2200			10D(14)	5-50	0
Lead (ug/L)	HD(6.6)			HD(6.9)		100	1(7)	0-3	0
Manganese (ug/L)	NA			1000		200	4(9)	3-8	0
Mercury (ug/L)	0.012			0.01T			0.05T(7)	0.05-0.1T	7
Molybdenum (ug/L)							3.5(6)	2-5	0
Nickel (ug/L)	HD(196)			HD(116)		200	0.5(6)	0-1	0
Selenium (ug/L)	20			4.6		20	2D(8)	0.5-6	1(4.6)
Selenium (in presence of >500 mg/l sulfate) (ug/L)							NS	NS	

**Table G-3.—Draft Ute Mountain Ute Tribal and State of Colorado standards compared with sample results from San Juan River flows between 500 and 1,000 cfs at Four Corners, Colorado**

Parameters	UMUT warm water aquatic life	UMUT wildlife ecology	UMUT Rec sec contact	CO aquatic life warm 1	CO Rec 1a	CO agriculture	Median values (number of samples)	Range of sample values	Exceedences of standards (standard)
Silver (ug/L)	HD(20.6 acute)			HD(1.6)			NS	NS	
Thallium (ug/L)				15			NS	NS	
Uranium (pCi/L)	40			40			NS	NS	
Uranium (ug/L)				HD(4244)			3.6(3)	3-7.4	0
Vanadium (ug/L)	narrative						0.5(7)	0-6	
Zinc (ug/L)	47			HD(262.9)		2000	9(7)	4-30	0
Hardness (mg/L)							257(30)	215-340	

Notes: NCNS - No current numeric standard; HD - hardness dependent; TREC - Total Recoverable; NS - no sample; T - total; D - dissolved

Median value is given due to skewness of much of the data. Where the sample result was reported as less than the detection limit, one half the detection limit was used to calculate the median. Hardness-dependent standards were calculated with the median value which generally resulted in a lower standard. Chronic standards are presented here because generally they are lower; in some cases there are no chronic standards, only acute which is noted on the table. The exceedence column indicates where samples exceeded the standard listed here. Additional checks against the acute standards were not performed for this analysis because this is intended to be only a general comparison of standards.



**Table G-4.— Navajo Nation standards compared with sample results  
from San Juan River flows between 500 and 1,000 cfs at USGS gage, Shiprock, New Mexico**

Parameters	Domestic water supply	Primary human contact	Secondary human contact	Agricultural water supply	Cold water habitat	Livestock and wildlife	Median values (number of samples)	Range of sample values	Exceedences of standards
Fecal coliform (single sample CFU))	200	200	400				18(24)	2-2000	7(200) 2(400)
Fecal coliform (geometric mean CFU))	100	100	200						
Temperature (max °C)					20.0		10.25(90)	0-27.5	18
pH (standard units)	6.5-9.0	6.5-9.0	6.5-9.0		6.6-8.8		8(56)	7.3-8.7	0
Turbidity (max NTU)		50	50		10		28(17)	5.4-310	14(10) 3(50)
Dissolved oxygen, minimum (mg/L)					6.0		NS	NS	
Ammonia mg/L					see reg table		NS	NS	
Boron ug/L				750D		5000D	105(38)	50-310	0
Chlorine (total residual, ug/L)					5	11	NS	NS	
Cyanide (ug/L)	200D				5.2T	5.2T	NS	NS	
Nitrate (mg/L)	10						0.65(7)	0.11-0.82	0
Sulfides (ug/L)					100acute		NS	NS	
Gross Alpha (pCi/L)	15T					15	4.3(1)		0
Radium 226+228 (pCi/L)	5T					30	NS	NS	
Tritium (pCi/L)	20,000T					20,000	NS	NS	
Aluminum (ug/L)				5000D	87D	5,000D	10(13)	4-20	0
Antimony (ug/L)					30D		1(1)		0
Arsenic (ug/L)	50D			100D		200D	1.0(12)	1-2	0
Arsenic III (ug/L)					190D		NS	NS	
Barium (ug/L)	1000D						62(15)	57-94	0
Beryllium (ug/L)					5.3D		0.5(7)	0.25-0.5	0

**Table G-4.— Navajo Nation standards compared with sample results  
from San Juan River flows between 500 and 1,000 cfs at USGS gage, Shiprock, New Mexico**

Parameters	Domestic water supply	Primary human contact	Secondary human contact	Agricultural water supply	Cold water habitat	Livestock and wildlife	Median values (number of samples)	Range of sample values	Exceedences of standards
Cadmium (ug/L)	10D			10D	HD(2.4)	50D	0.5(12)	0-3	2
Chromium (III+VI) (ug/L)	50D			100D		1,000D	0.5(12)	0-5	0
Chromium III (ug/L)					HD(454)		NS	NS	
Chromium VI (ug/L)					11D		NS	NS	
Cobalt (ug/L)				50D		1,000D	1.5(16)	0-1.5	0
Copper (ug/L)				200D	HD(26.8)	500D	2(12)	0-5	0
Lead (ug/L)	50D			5000D	HD(10.8)	100D	2.3(12)	0-6	0
Mercury (ug/L)	2D				0.012T	10T/0.012T	0.1D(10)	0-0.5D	10
Molybdenum (ug/L)				10D			5(12)	2-5	0
Nickel (ug/L)					HD(355)		0.5(14)	0.5-5	0
Selenium (ug/L)	50D			130D	2T	50D/2T	1.0D(18)	0.5-3D	1
Selenium (in presence of >500 mg/l sulfate) (ug/L)				250D			NS	NS	
Silver (ug/L)	50D				21.6(acute)		0.5(14)	0-0.5	0
Thallium (ug/L)					150D		NS	NS	
Uranium (ug/L)	35D						2.2(11)	1.7-3.1	0
Vanadium (ug/L)				100D		100D	3(11)	3	0
Zinc (ug/L)				2000D	HD(238.9)	25,000D	10.5(12)	2-42	0
Hardness (mg/L)							261(54)	179-491	

Notes: HD - hardness dependant; NS - no sample; T - total; D - dissolved; NS - no sample; Median value is given due to skewness of much of the data.

Hardness-dependent standards were calculated with the median hardness value which generally resulted in a lower standard. Due to space concerns, chronic standards are presented here because generally these are lower values; in some cases there are no chronic standards only acute. The exceedence column indicates where samples exceeded the standard listed here. Additional checks against the acute standard were not performed for this analysis because this is intended to be only a general comparison of standards along the mainstem of the San Juan River.

**Table G-5.—Utah standards compared with sample results  
from San Juan River flows between 500 and 1,000 cfs at USGS gage, Bluff, Utah**

<b>Parameters</b>	<b>Domestic source 1C</b>	<b>Recreation 2B</b>	<b>Aquatic wildlife 3B</b>	<b>Agricultural 4</b>	<b>Median values (number of samples)</b>	<b>Range of sample values</b>	<b>Exceedences of standards</b>
Total coliform (geometric mean CFU)	5000	5000			NS	NS	
Fecal coliform (geometric mean CFU)	2000	200			26(22) single sample	1-230 single samples	1
Temperature (max °C)			27		10.6(78)	0-30	3
pH (standard units)	6.5-9.0	6.5-9.0	6.5-9.0	6.5-9.0	8.3(62)	7.2-8.6	
Turbidity (NTU increase)		+10	+10		56(19)	1-2000	
Dissolved oxygen, minimum (mg/L) 1 day average			5.0/3.0		10(50)	6.36-12.9	
Ammonia mg/L			see reg table		0.055(4)	0.025-0.06	
Boron ug/L				750D	NS	NS	
Chlorine (total residual, ug/L)			11		NS	NS	
Fluoride (mg/L)	1.4-2.4				NS	NS	
Total suspended solids (mg/L)		90	90		NS	NS	
Total dissolved solids (mg/L)				1200	NS	NS	
Hydrogen sulfide (ug/L)			2		NS	NS	
BOD (mg/L)		5	5	5	NS	NS	
Cyanide (ug/L)	700		5.2		NS	NS	
Nitrate (mg/L)	10	4	4		0.44(4)	0.12-0.66	
Gross Alpha (pCi/L)	15		15	15	NS	NS	
Gross Beta (pCi/L)	50		50	50	NS	NS	

**Table G-5.—Utah standards compared with sample results  
from San Juan River flows between 500 and 1,000 cfs at USGS gage, Bluff, Utah**

<b>Parameters</b>	<b>Domestic source 1C</b>	<b>Recreation 2B</b>	<b>Aquatic wildlife 3B</b>	<b>Agricultural 4</b>	<b>Median values (number of samples)</b>	<b>Range of sample values</b>	<b>Exceedences of standards</b>
Strontium (pCi/L)	8				NS	NS	
Radium 226+228 (pCi/L)	5				NS	NS	
Tritium (pCi/L)	20,000				NS	NS	
Aluminum (ug/L)			87D	5000D	30(14)	10-200	1
Antimony (ug/L)	14				NS	NS	
Arsenic (ug/L)	50D			100D	2(29)	0.9-5	
Arsenic III (ug/L)			190D		NS	NS	
Barium (ug/L)	1000D		NCNS		78.5(4)	69-80	
Cadmium (ug/L)	10D		HD(2.8)	10D	1(8)	0-2	
Chromium (III+VI) (ug/L)	50D			100D	2.5(8)	0-6	
Chromium III (ug/L)			HD(539.3)		NS	NS	
Chromium VI (ug/L)			11D		NS	NS	
Cobalt (ug/L)			NCNS	50D	3(8)	0-3	
Copper (ug/L)	1300		HD(32.1)	200D	6(19)	1-13	
Lead (ug/L)	50D		HD(14.1)	5000D	1(28)	0.1-10	
Mercury (ug/L)	0.14		0.012		0.1D(29)	0-0.1	29
Molybdenum (ug/L)				10D	NS	NS	
Nickel (ug/L)	610		HD(424)		10(17)	1-50	
Selenium (ug/L)	10D		5D	50D	1D(28) 2T(25)	0.5-5D 0.4-4T	

**Table G-5.—Utah standards compared with sample results  
from San Juan River flows between 500 and 1,000 cfs at USGS gage, Bluff, Utah**

<b>Parameters</b>	<b>Domestic source 1C</b>	<b>Recreation 2B</b>	<b>Aquatic wildlife 3B</b>	<b>Agricultural 4</b>	<b>Median values (number of samples)</b>	<b>Range of sample values</b>	<b>Exceedences of standards</b>
Selenium (in presence of >500 mg/L sulfate) (ug/L)					NS	NS	
Silver (ug/L)	50D		HD (30.3) acute		1(7)	0-1	
Thallium (ug/L)	1.7				NS	NS	
Uranium (ug/L)	35D				NS	NS	
Vanadium (ug/L)				100D	6(5)	6	
Zinc (ug/L)			HD(285.5)	2000D	10(28)	3-50	
Hardness (mg/L)					322(48)	236-460	

Notes: HD - hardness dependent; NS - no sample; T - total; D - dissolved; For data that was below detection levels, the value used to calculate the median value was ½ the detection limit. Median value is given due to skewness of much of the data. Hardness-dependent standards were calculated with the median hardness value, which generally resulted in a lower standard. Due to space concerns, chronic standards are presented here because generally these are lower values; in some cases there are no chronic standards only acute. The exceedence column indicates where samples exceeded the standard listed here. Additional checks against the acute standard were not performed for this analysis because this is intended to be only a general comparison of standards along the mainstem of the San Juan River.