

APPENDIX R
HISTORIC CHEMICAL DATA

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APPENDIX R

1.0 HISTORIC CHEMICAL DATA

1.1 INTRODUCTION

This section contains the basic statistics summary tables for each study area (with the exception of Carrizo Creek), the organization of which and methods used for calculated statistics are as follows:

- The summary tables are grouped by study area and then ordered from upstream to downstream.
- Each summary table contains all parameters measured at each individual reconnaissance site within the study area and recorded within either the U.S. Environmental Protection Agency's (EPA's) Storage and Retrieval (*STORET*) database, or the U.S. Geological Survey's (USGS's) database. For the Las Vegas Wash study area, additional data were retrieved from the Southern Nevada Water Authority (SNWA) database. For the South Platte study area, additional data were retrieved from the Denver Metro Wastewater treatment plant operators.
- Due to the data sets containing multiple detection limits for an individual parameter, the highest detection limit reported at that reconnaissance site, for that parameter, was used. All data less than this maximum detection limit, either measured or nondetect, were replaced with the maximum detection limit value. For cases where there was no detection limit value, but zeros were recorded, the lowest measured value was used as the detection limit and zeros were replaced by this determined detection limit.
- When the data set for an individual parameter was partially censored (i.e., some measurements below the detection limit), the parameter means and standard deviations were calculated using Cohen's adjustment method (described in detail below). In cases where the frequency of detection was less than 50 percent, no calculated statistics were determined. When the number of measurements above the detection limit were less than three, no calculated statistics were determined.
- Means and standard deviations were calculated for the data assuming the data were normally distributed (mean and standard deviation) and log-normally distributed (geometric mean and geometric standard deviation).

1.1.1 Cohen's Adjustment Method

Cohen's adjustment method was used to calculate estimates for the mean and standard deviation of left singly censored data sets, as follows:

$$\hat{\mu} = \bar{x}' - (\bar{x}' - x_o)\lambda(g, h)$$

$$\sigma^2 = s'^2 + (\bar{x}' - x_o)^2 \lambda(g, h)$$

where:

\bar{x}' = the mean of the n_1 measured values

$$\bar{x}' = \frac{1}{n_1} \sum_{i=1}^{n_1} x_i$$

s'^2 = the variance of the n_1 measured values

$$s'^2 = \frac{1}{n_1} \sum_{i=1}^{n_1} (x_i - \bar{x}')^2$$

h = the proportion of nondetects

x_o = the censoring point (e.g. MDL or PQL)

$$g = \frac{s'^2}{(\bar{x}' - x_o)^2}$$

An approximation was used to determine $\lambda(g, h)$ to within 6 percent relative error. This approximation is as follows:

$$\begin{aligned} \ln \lambda(g, y) = & 0.182344 - \frac{0.3756}{g+1} + 0.10017g + 0.78079y - 0.00581g^2 - 0.06642y^2 \\ & - 0.0234gy + 0.000174g^3 + 0.001663g^2y - 0.00086gy^2 - 0.00653y^3 \end{aligned}$$

where:

$$y = \ln\left(\frac{h}{1-h}\right)$$

Category/Parameter	STUDY AREA: STATION: SALT RIVER NEAR PHOENIX, ARIZONA 09512165 (UPSTREAM)											
	Initial POR	Final POR	Number of Measurements	Frequency of Detection	Detection Limit	Basic Statistics			Calculated Statistics			
						Minimum	Median	Maximum	Mean	Standard Deviation	Geometric Mean	Geometric SD
Physical/Field												
Dissolved Solids (sum) (mg/L)	12/31/92	04/01/98	4	100%	---	48	83	406	155.000	146.056	125.803	78.767
Dissolved Solids (Tons/day)	12/31/92	06/14/93	3	100%	---	10.2	15.4	1370	465.200	639.794	205.279	672.562
Residue (diss) (Tons/ac-ft)	12/31/92	04/01/98	4	100%	---	0.05	0.13	0.61	0.230	0.222	0.184	0.131
Residue@180C (diss) (mg/L)	12/31/92	04/01/98	5	100%	---	35	110	445	179.000	147.085	151.425	102.854
Specific conductivity (uS/cm)	12/31/92	04/01/98	5	100%	---	88	170	774	307.200	255.232	259.528	158.385
Nutrients												
Nitrogen (NH4) (tot) (mg/L NH4)	12/31/92	12/31/92	1	100%	---	---	2.6	---	---	---	---	---
Nitrogen (total) (mg/L NO3)	12/31/92	04/01/98	5	100%	---	2	15	29	14.740	8.964	13.412	9.690
Trace Elements												
Anitmony (EPA-CON) (ug/L)	01/04/93	06/14/93	3	0%	<20	<20	<20	<20	---	---	---	---
Mercury (totrec) (ug/L)	12/31/92	04/01/98	6	0%	<0.1	<0.1	<0.1	<0.1	---	---	---	---
Silver (EPA-CON) (ug/L)	01/04/93	06/14/93	3	0%	<10	<10	<10	<10	---	---	---	---
Major Ions												
Alkalinity (diss) (l) (mg/L CaCO3)	12/31/92	01/12/93	2	100%	---	16	---	113	---	---	---	---
Organics												
Benzo_a_pyrene (tot) (ug/L)	01/04/93	02/11/93	3	0%	<10	<10	<10	<10	---	---	---	---
Ethylbenzene (tot) (ug/L)	06/14/93	04/01/98	2	0%	<0.2	<0.2	---	<0.2	---	---	---	---
Hexachloroethane (ug/L)	01/12/93	06/14/93	2	0%	<5	<5	---	<5	---	---	---	---
Indenopyrene (tot) (ug/L)	01/12/93	06/14/93	2	0%	<10	<10	---	<10	---	---	---	---
MTBE (ug/L)	06/14/93	04/01/98	2	50%	<1	<1	---	1	---	---	---	---
Naphthalene (tot) (ug/L)	01/12/93	04/01/98	3	0%	<5	<5	<5	<5	---	---	---	---
Nitrobenzene (ug/L)	01/12/93	06/14/93	2	0%	<5	<5	---	<5	---	---	---	---

STUDY AREA: STATION:	SALT RIVER NEAR PHOENIX, ARIZONA 09512165 (UPSTREAM)												
	Category/Parameter	Initial POR	Final POR	Number of Measurements	Frequency of Detection	Detection Limit	Basic Statistics			Calculated Statistics			
							Minimum	Median	Maximum	Mean	Standard Deviation	Geometric Mean	Geometric SD
p,p'-DDD (tot) (ug/L)	01/04/93	06/14/93	3	0%	<0.1	<0.1	<0.1	<0.1	---	---	---	---	
p,p'-DDE (tot) (ug/L)	01/04/93	06/14/93	3	0%	<0.04	<0.04	<0.04	<0.04	---	---	---	---	
p,p'-DDT (tot) (ug/L)	01/04/93	06/14/93	3	0%	<0.1	<0.1	<0.1	<0.1	---	---	---	---	
PCB,48%CL (tot) (ug/L)	01/04/93	06/14/93	3	0%	<0.1	<0.1	<0.1	<0.1	---	---	---	---	
PCB,54%CL (tot) (ug/L)	01/04/93	06/14/93	3	0%	<0.1	<0.1	<0.1	<0.1	---	---	---	---	
PCB,60%CL (tot) (ug/L)	01/04/93	06/14/93	3	0%	<0.1	<0.1	<0.1	<0.1	---	---	---	---	
Phenol (6H-50H) (ug/L)	01/12/93	06/14/93	2	0%	<5	<5	---	<5	---	---	---	---	
Phenols (tot) (ug/L)	01/04/93	04/01/98	7	71%	<1	<1	1	3	1.506	1.137	1.650	1.170	
Pyrene (tot) (ug/L)	01/12/93	06/14/93	2	0%	<5	<5	---	<5	---	---	---	---	
Sediments													
Ethion (ug/kg)	02/11/93	01/12/95	2	0%	<0.1	<0.1	---	<0.1	---	---	---	---	
p,p'-DDD (ug/kg)	02/11/93	01/12/95	2	50%	<0.2	<0.2	---	2.2	---	---	---	---	
p,p'-DDE (ug/kg)	02/11/93	01/12/95	2	100%	---	8.6	---	51	---	---	---	---	
p,p'-DDT (ug/kg)	02/11/93	01/12/95	2	100%	---	4.9	---	6.5	---	---	---	---	
PCB (ug/kg)	02/11/93	01/12/95	2	50%	<10	<10	---	20	---	---	---	---	
Biological													
COLIFORM FECAL 0 (COLS_/100 ML)	01/12/93	02/11/93	2	100%	---	100	---	290	---	---	---	---	
CYANIDE, EPA-CON (mg/l)	01/04/93	06/14/93	2	0%	<0.01	<0.01	---	<0.01	---	---	---	---	
FECAL STRPT KF A (COLS_/100 ML)	01/04/93	02/11/93	3	100%	---	230	540	1310	693.333	454.044	619.306	331.724	

STUDY AREA: STATION:	SANTA CRUZ RIVER NEAR NOGALES, ARIZONA 09481740 (DOWNSTREAM)											
						Basic Statistics			Calculated Statistics			
Category/Parameter	Initial POR	Final POR	Number of Measurements	Frequency of Detection	Detection Limit	Minimum	Median	Maximum	Mean	Standard Deviation	Geometric Mean	Geometric SD
Physical/Field												
Dissolved Solids (sum) (mg/L)	08/02/96	06/25/98	17	100%	---	706	797	1020	850.118	119.642	845.953	83.251
Dissolved Solids (Tons/day)	08/02/96	06/25/98	17	100%	---	17.4	688	6500	1075.318	1589.344	743.775	1851.462
Residue (diss) (Tons/ac-ft)	08/02/96	06/25/98	17	100%	---	1	1.12	1.41	1.181	0.160	1.175	0.111
Residue@180C (diss) (mg/L)	08/02/96	06/25/98	17	100%	---	736	821	1040	867.647	117.499	863.716	81.597
Specific conductivity (uS/cm)	08/02/96	09/19/96	2	100%	---	1380	---	1390	---	---	---	---
Suspended Sediment discharge (Tons/day)	10/11/95	07/17/96	10	100%	---	1670	12000	223000	62249.000	84494.889	36700.993	65755.971
Nutrients												
Nitrogen (NO3) (tot) (mg/L NO3)	10/17/96	06/25/98	15	100%	---	1.5	2.1	3.1	2.220	0.586	2.182	0.409
Trace Elements												
Mercury (diss) (ug/L)	08/02/96	09/19/96	2	0%	<0.1	<0.1	---	<0.1	---	---	---	---
Mercury (totrec) (ug/L)	08/02/96	09/19/96	2	0%	<0.1	<0.1	---	<0.1	---	---	---	---
Major Ions												
Alkalinity (diss) (l) (mg/L CaCO3)	08/02/96	09/19/96	2	100%	---	126	---	127	---	---	---	---
Organics												
Benzene (tot) (ug/L)	11/14/97	06/25/98	2	0%	<0.1	<0.1	---	<0.1	---	---	---	---
Carbon Tetrachloride (ug/L)	11/14/97	06/25/98	2	0%	<0.176	<0.176	---	<0.176	---	---	---	---
Toluene (tot) (ug/L)	11/14/97	06/25/98	2	0%	<0.054	<0.054	---	<0.054	---	---	---	---

STUDY AREA: STATION:	SANTA CRUZ RIVER NEAR TUCSON, ARIZONA 09482500 (UPSTREAM)											
	Category/Parameter	Initial POR	Final POR	Number of Measurements	Frequency of Detection	Detection Limit	Basic Statistics			Calculated Statistics		
Minimum							Median	Maximum	Mean	Standard Deviation	Geometric Mean	Geometric SD
Physical/Field												
Dissolved Solids (sum) (mg/L)	12/23/65	08/17/89	14	100%	---	616	878	1270	887.071	145.398	881.292	100.533
Dissolved Solids (Tons/day)	12/23/65	08/17/89	14	100%	---	2.43	13.6	4930	765.137	1528.134	200.353	1069.060
Residue (diss) (Tons/ac-ft)	12/23/65	08/17/89	14	100%	---	0.86	1.26	1.77	1.255	0.210	1.246	0.147
Residue@180C (diss) (mg/L)	12/23/65	08/17/89	14	100%	---	636	925.5	1300	922.571	153.410	916.321	107.515
Nutrients												
Nitrogen (NO3) (tot) (mg/L NO3)	12/23/65	08/17/89	13	100%	---	1.4	2	4.9	2.392	1.044	2.294	0.610

STUDY AREA: STATION:	SANTA ANA RIVER NEAR SAN BERNARDINO, CALIFORNIA 11051500 (UPSTREAM)											
Category/Parameter	Initial POR	Final POR	Number of Measurements	Frequency of Detection	Detection Limit	Basic Statistics			Calculated Statistics			
						Minimum	Median	Maximum	Mean	Standard Deviation	Geometric Mean	Geometric SD
Physical/Field												
Dissolved Solids (sum) (mg/L)	10/20/98	02/21/00	26	100%	---	135	166.5	338	188.269	59.280	184.121	35.927
Dissolved Solids (Tons/day)	06/02/99	02/20/00	4	100%	---	8.93	28.35	52.5	29.533	20.085	25.739	16.378
Residue@180C (diss) (mg/L)	10/20/98	02/21/00	26	100%	---	140	173	337	200.038	64.411	195.354	39.716
Specific conductivity (uS/cm)	10/20/98	02/21/00	26	100%	---	229	276.5	530	313.577	96.445	306.844	59.822
Suspended Sediment discharge (Tons/day)	03/17/82	06/02/99	11	100%	---	1.3	570	32600	3,739.57 3	9,250.588	2,138.563	28,591.568
Nutrients												
Nitrogen (NH4) (mg/L NH4)	02/12/73	02/12/73	1	100%	---	---	1.3	---	---	---	---	---
Nitrogen (NH4) (tot) (mg/L NH4)	02/12/73	02/12/73	1	100%	---	---	1.3	---	---	---	---	---
Nitrogen (NO3) (mg/L NO3)	12/22/71	02/26/75	16	100%	---	1.4	5.95	12	5.925	2.795	5.594	2.240
Nitrogen (total) (mg/L NO3)	08/09/73	08/09/73	1	100%	---	---	7.8	---	---	---	---	---
Trace Elements												
Mercury (diss) (ug/L)	11/14/72	02/26/75	11	9%	<0.5	<0.5	<0.5	1.1	---	---	---	---
Mercury (totrec) (ug/L)	12/22/71	02/26/75	15	13%	<0.5	<0.5	<0.5	12	---	---	---	---
Major Ions												
Alkalinity (diss) (I) (mg/L CaCO3)	10/20/98	02/21/00	26	100%	---	86	106	143	108.308	13.184	107.917	9.009
Organics												
p,p'-DDT (tot) (ug/L)	12/22/71	12/22/71	1	100%	---	---	1.4	---	---	---	---	---
Sediments												
p,p'-DDE (ug/kg)	08/28/74	08/28/74	1	100%	---	---	1	---	---	---	---	---
p,p'-DDT (ug/kg)	08/28/74	08/28/74	1	100%	---	---	1.2	---	---	---	---	---

STUDY AREA: STATION:	FOUNTAIN CREEK NEAR COLORADO SPRINGS, COLORADO 07105800 (DOWNSTREAM)												
	Category/Parameter	Initial POR	Final POR	Number of Measurements	Frequency of Detection	Detection Limit	Basic Statistics			Calculated Statistics			
							Minimum	Median	Maximum	Mean	Standard Deviation	Geometric Mean	Geometric SD
Physical/Field													
Dissolved Solids (sum) (mg/L)	07/26/72	03/11/75	48	100%	---	143	509.5	659	477.708	140.406	466.289	132.877	
Dissolved Solids (Tons/ac-ft)	08/05/72	03/11/75	30	100%	---	0.19	0.69	0.9	0.656	0.182	0.643	0.171	
Dissolved Solids (Tons/day)	07/26/72	03/11/75	48	100%	---	19.8	48.35	206	59.310	37.678	54.871	20.463	
DO (mg/L)	01/30/74	07/22/87	13	100%	---	5	7.7	10	7.492	1.757	7.387	1.284	
DO Saturation (%)	01/30/74	07/22/87	13	100%	---	51.5	64.2	84	66.831	8.616	66.556	6.048	
pH (lab) (SU)	02/10/87	02/11/87	2	100%	---	7.9	---	7.9	---	---	---	---	
pH (SU)	08/05/72	07/22/87	33	100%	---	6.7	7.3	8.5	7.427	0.486	7.419	0.339	
Specific conductivity (micromhos/cm)	11/04/70	09/28/90	307	100%	---	100	820	1280	764.564	211.732	749.029	188.075	
Suspended Sediment (mg/L)	10/17/85	06/03/93	104	100%	---	56	328.5	22700	1,588.865	3,490.509	720.707	974.548	
Suspended Sediment Discharge (Tons/day)	09/25/84	08/23/99	135	100%	---	4.8	108	136000	5,356.484	18,403.58	740.390	2,837.940	
Water Temp (C)	04/05/65	09/27/90	312	98%	<1	<1	14.5	31	14.713	8.107	16.277	15.850	
Water Temp (F)	04/05/65	09/27/90	312	100%	---	32	58.1	87.8	58.553	14.429	57.652	10.597	
Nutrients													
BOD 20C5DAY CAR (mg/L)	07/15/86	07/22/87	8	100%	---	3.8	6.95	9.4	6.938	1.780	6.817	1.400	
BOD 5DAY (mg/L)	07/15/86	03/06/98	9	100%	---	3.6	6.7	9.4	6.556	1.914	6.412	1.444	
Nitrogen (Kjel) (tot) (mg/L N)	07/15/86	07/22/87	8	100%	---	5.5	9.5	19	11.288	4.276	10.894	2.986	
Nitrogen (NH3 unionized) (mg/L N)	07/15/86	07/22/87	8	100%	---	0.074	0.125	0.344	0.155	0.082	0.146	0.048	
Nitrogen (NH3 unionized) (mg/L NH3)	07/15/86	07/22/87	8	100%	---	0.09	0.152	0.419	0.189	0.100	0.177	0.058	
Nitrogen (NH3+NH4) (tot) (mg/L N)	07/15/86	07/22/87	8	100%	---	2.7	8	12	7.263	2.735	6.988	2.328	
Nitrogen (NO2&NO3) (diss) (mg/L N)	08/05/72	03/11/75	30	100%	---	0.1	1.75	12	2.780	2.825	2.282	2.000	
Nitrogen (NO2&NO3) (tot) (mg/L N)	07/15/86	07/22/87	8	100%	---	3	3.8	5.6	4.100	0.851	4.057	0.585	
Nitrogen (NO2) (tot) (mg/L N)	07/15/86	07/22/87	8	100%	---	0.1	0.43	1	0.514	0.373	0.440	0.317	
Nitrogen (total) (mg/L NO3)	07/11/86	03/06/98	12	100%	---	33	65	96	64.083	16.691	62.964	12.898	
Nitrogen Ammonia (diss) (mg/L NH3)	07/11/86	02/29/00	5	100%	---	1	2.2	3.9	2.260	1.005	2.149	0.735	
Nitrogen Ammonia (tot) (mg/L NH3)	07/11/86	03/06/98	12	100%	---	1.5	9.2	17	8.667	4.376	8.119	3.941	
Phosphate (ortho) (diss) (mg/L P)	08/05/72	03/11/75	30	100%	---	0.31	2.9	4.1	2.555	1.090	2.432	1.206	
Phosphate (ortho) (diss) (mg/L PO4)	08/05/72	03/11/75	30	100%	---	0.95	8.9	13	7.795	3.322	7.423	3.680	
Phosphorous (diss) (mg/L P)	09/24/73	09/24/73	1	100%	---	---	2.6	---	---	---	---	---	

STUDY AREA: STATION:	FOUNTAIN CREEK NEAR COLORADO SPRINGS, COLORADO 07105800 (DOWNSTREAM)												
	Category/Parameter	Initial POR	Final POR	Number of Measurements	Frequency of Detection	Detection Limit	Basic Statistics			Calculated Statistics			
							Minimum	Median	Maximum	Mean	Standard Deviation	Geometric Mean	Geometric SD
Trace Elements													
Aluminum (diss) (ug/L)	08/17/73	04/04/74	6	100%	---	10	30	40	28.333	10.672	27.234	9.555	
Iron (diss) (ug/L)	08/05/72	03/11/75	30	100%	---	20	60	300	72.667	49.728	66.801	26.852	
Manganese (diss) (ug/L)	08/05/72	03/11/75	29	100%	---	20	320	790	327.931	196.282	301.468	228.989	
Mercury (diss) (ug/L)	03/06/98	06/10/99	7	0%	<0.1	<0.1	<0.1	<0.1	---	---	---	---	
Mercury (totrec) (ug/L)	03/06/98	06/10/99	5	0%	<0.1	<0.1	<0.1	<0.1	---	---	---	---	
Silica (diss) (mg/L)	08/05/72	03/11/75	30	100%	---	13	17	20	17.000	1.414	16.970	1.023	
Major Ions													
Alkalinity (total) (mg/L CaCO3)	08/05/72	03/11/75	30	100%	---	43	131.5	212	139.367	45.065	135.523	37.933	
Bicarbonate (mg/L HCO3)	08/05/72	03/11/75	30	100%	---	52	160	258	169.433	54.963	164.741	46.178	
Calcium (diss) (mg/L)	08/05/72	03/11/75	30	100%	---	22	59.5	88	58.533	14.537	57.567	12.389	
Carbon Dioxide (mg/L)	08/05/72	11/07/74	25	100%	---	0.9	18	44	18.100	10.801	16.682	12.012	
Carbonate (mg/L CO3)	08/05/72	04/29/74	22	5%	<6	<6	<6	6	---	---	---	---	
Chloride (tot) (mg/L)	08/05/72	03/11/75	30	100%	---	6	35	62	35.200	13.313	33.914	13.196	
Fluoride (diss) (mg/L)	08/05/72	03/11/75	30	100%	---	1.6	2	3	2.070	0.305	2.059	0.205	
Hardness (Calculated) (mg/L CaCO3)	08/05/72	03/11/75	30	100%	---	73	222.5	306	216.700	56.411	212.717	50.097	
Hardness (NC) (mg/L CaCO3)	08/05/72	03/11/75	30	100%	---	25	83.5	130	77.633	29.267	74.681	24.789	
Hardness (total) (mg/L CaCO3)	08/05/72	03/11/75	30	100%	---	73	225	310	217.567	55.829	213.674	49.839	
Magnesium (diss) (mg/L)	08/05/72	03/11/75	30	100%	---	4.4	18	24	17.150	5.038	16.747	4.821	
Potassium (diss) (mg/L)	08/05/72	03/11/75	30	100%	---	0.4	7.55	10	7.233	2.121	7.145	3.106	
SAR (ratio)	08/05/72	03/11/75	30	100%	---	0.7	2.1	2.6	2.013	0.484	1.981	0.451	
Sodium (%)	08/05/72	03/11/75	30	100%	---	25	40	44	39.200	4.003	39.091	3.200	
Sodium (diss) (mg/L)	08/05/72	03/11/75	30	100%	---	15	73.5	99	69.167	22.592	67.187	23.567	
Sulfate (tot) (mg/L)	08/05/72	03/11/75	30	100%	---	45	185	240	172.800	50.198	168.820	48.622	
Organics													
BENZENE NITROD5 ((PERCENT))	07/30/99	08/05/99	2	100%	---	74.85	---	99.02	---	---	---	---	
Benzo_a_pyrene (tot) (ug/L)	07/29/98	08/05/99	3	0%	<10	<10	<10	<10	---	---	---	---	
ETHOPROP FIL 0_7 ((UG/L))	07/28/98	08/02/99	3	0%	<0.003	<0.003	<0.003	<0.003	---	---	---	---	
Hexachloroethane (ug/L)	07/29/98	08/05/99	3	0%	<5	<5	<5	<5	---	---	---	---	
Indenopyrene (tot) (ug/L)	07/29/98	08/05/99	3	0%	<10	<10	<10	<10	---	---	---	---	
Naphthalene (tot) (ug/L)	07/29/98	08/05/99	3	0%	<5	<5	<5	<5	---	---	---	---	
NAPROPAMIDE FIL ((UG/L))	07/28/98	08/02/99	3	0%	<0.003	<0.003	<0.003	<0.003	---	---	---	---	
Nitrobenzene (ug/L)	07/29/98	08/05/99	3	0%	<5	<5	<5	<5	---	---	---	---	
p_p'-DDE (diss) (ug/L)	07/29/98	08/05/99	3	0%	<0.006	<0.006	<0.006	<0.006	---	---	---	---	
Pyrene (tot) (ug/L)	07/29/98	08/05/99	3	0%	<5	<5	<5	<5	---	---	---	---	

STUDY AREA: STATION:		FOUNTAIN CREEK NEAR COLORADO SPRINGS, COLORADO 07105800 (DOWNSTREAM)										
Category/Parameter	Initial POR	Final POR	Number of Measurements	Frequency of Detection	Detection Limit	Basic Statistics			Calculated Statistics			
						Minimum	Median	Maximum	Mean	Standard Deviation	Geometric Mean	Geometric SD
Sediments												
Susp Sed< 062mm (%)	10/17/85	06/26/92	71	97%	<31	<31	64	95	63.798	15.922	64.073	17.962
Biological												
FEC COLIMFM-FCBR (/100ML)	04/01/98	02/15/00	13	15%	<620	<620	<620	7000	---	---	---	---
FEC STREPMFKFAGAR (/100ML)	04/01/98	10/19/99	12	58%	<110	<110	130	30000	1,240.789	11,573.417	2,272.902	35,400.519

STUDY AREA: STATION:	SOUTH PLATTE RIVER NEAR DENVER, COLORADO SP-160 (DOWNSTREAM)											
	Category/Parameter	Initial POR	Final POR	Number of Measurements	Frequency of Detection	Detection Limit	Basic Statistics			Calculated Statistics		
Minimum							Median	Maximum	Mean	Standard Deviation	Geometric Mean	Geometric SD
Physical/Field/Nutrients												
Dissolved Oxygen (mg/L)	01/13/88	11/18/98	347	100%	---	5.2	7.4	13.7	7.545	1.175	7.501	0.793
Temp. (Celcius)	01/13/88	11/18/98	349	100%	---	1	13	24	13.431	5.421	12.878	4.481
TSS (mg/L)	01/13/88	11/18/98	349	100%	<3	<3	27	744	42.712	66.387	38.929	38.823
Orthophosphate (mg/L)	01/13/88	11/18/98	349	100%	<0.14	<0.14	1.68	3.68	1.787	0.770	1.844	1.101
BOD	01/13/88	11/18/98	343	100%	---	3	14	252	15.605	14.146	14.552	4.635
CBOD	01/13/88	11/18/98	345	93%	<1	<1	3	43	3.848	3.595	3.919	2.708
Alkalinity (mg/L)	01/13/88	11/18/98	349	100%	<55	<55	171	289	168.436	40.707	169.123	47.816
Unionized Ammonia (mg/L)	01/13/88	11/18/98	349	99%	<0.001	<0.001	0.025	0.454	0.035	0.040	0.040	0.068
TDS	01/13/88	11/18/98	348	100%	<154	<154	593.5	805	560.878	117.162	563.970	150.805
Total Ammonia (mg/L)	01/13/88	11/18/98	349	99%	<0.2	<0.2	4.6	15.9	5.188	3.745	5.865	7.253
NO5 (mg/L)	01/13/88	11/18/98	349	100%	---	0.87	3.51	8.06	3.632	1.764	3.414	1.350
NO2 (mg/L)	01/13/88	11/18/98	349	99%	<0.06	<0.06	0.34	1.06	0.376	0.189	0.382	0.229
NO3 (mg/L)	01/13/88	11/18/98	349	100%	---	0.71	3.09	7.69	3.256	1.720	3.023	1.338
TKNH (mg/L)	01/13/88	11/18/98	349	100%	---	0.7	6.2	42.3	7.144	4.737	6.508	3.239
HARD (mg/L)	01/13/88	11/18/98	349	100%	---	67	232	384	225.668	42.909	223.514	35.692
Field pH	01/13/88	11/18/98	349	100%	---	6.3	7.4	8.8	7.377	0.277	7.374	0.196
Fecal Coliform , Membrane Filter /100 ml	01/13/88	11/18/98	335	99%	<5	<5	140	45000	674.173	2,799.304	504.208	1,527.899
E. Coli , MPN/100ml	02/07/95	06/25/97	57	95%	<20	<20	130	4900	309.777	743.065	285.195	561.688
Fecal Coliform MPN/100ml	02/07/95	06/25/97	57	98%	<20	<20	220	11000	677.999	1,670.912	568.382	1,292.541

STUDY AREA: STATION:	SOUTH PLATTE RIVER NEAR DENVER, COLORADO SP-160 (DOWNSTREAM)											
	Initial POR	Final POR	Number of Measurements	Frequency of Detection	Detection Limit	Basic Statistics			Calculated Statistics			
Minimum						Median	Maximum	Mean	Standard Deviation	Geometric Mean	Geometric SD	
Category/Parameter												
Trace Elements												
Soluble Mercury (ug/L)	12/15/89	11/18/98	242	13%	<0.2	<0.2	<0.2	2.6	---	---	---	---
Soluble Cadmium (ug/L)	01/13/88	11/18/98	346	87%	<0.1	<0.1	0.2	5.9	0.312	0.488	0.334	0.319
Soluble Silver (ug/L)	01/13/88	11/18/98	349	16%	<0.1	<0.1	<0.1	3.4	---	---	---	---
Soluble Lead (ug/L)	03/15/89	11/18/98	289	2%	<0.1	<0.1	<0.1	22	---	---	---	---
Soluble Zinc (mg/L)	01/13/88	11/18/98	350	80%	<0.02	<0.02	0.02	0.33	0.027	0.025	0.029	0.014
Soluble Nickel (mg/L)	01/13/88	11/18/98	350	9%	<0.01	<0.01	<0.01	0.07	---	---	---	---
Soluble Lead (mg/L)	01/13/88	11/18/98	350	8%	<0.02	<0.02	<0.02	0.2	---	---	---	---
Soluble Manganese (mg/L)	01/13/88	11/18/98	350	99%	<0.02	<0.02	0.22	0.54	0.219	0.087	0.227	0.132
Soluble Iron (mg/L)	01/13/88	11/18/98	350	71%	<0.02	<0.02	0.07	3.5	0.054	0.274	0.117	0.235
Soluble Chromium (mg/L)	01/13/88	11/18/98	350	1%	<0.02	<0.02	<0.02	0.02	---	---	---	---
Soluble Copper (mg/L)	01/13/88	11/18/98	350	10%	<0.01	<0.01	<0.01	0.07	---	---	---	---
Potentially Dissolved Copper (ug/L)	05/04/88	02/22/89	46	100%	---	1	6	49	9.478	9.424	7.989	4.381
Soluble Selenium (ug/L)	06/11/91	11/18/98	88	38%	<1	<1	<1	5	---	---	---	---
Total Selenium (ug/L)	01/20/88	11/18/98	128	41%	<2	<2	<2	7	---	---	---	---
Soluble Arsenic (ug/L)	01/20/88	11/18/98	128	2%	<5	<5	<5	17	---	---	---	---
Soluble Molybdenum (mg/L)	02/24/95	11/18/98	47	2%	<0.03	<0.03	<0.03	0.03	---	---	---	---

STUDY AREA: STATION:	LAS VEGAS WASH NEAR LAS VEGAS, NEVADA LW11.2 (UPSTREAM)											
Category/Parameter	Initial POR	Final POR	Number of Measurements	Frequency of Detection	Detection Limit	Basic Statistics			Calculated Statistics			
						Minimum	Median	Maximum	Mean	Standard Deviation	Geometric Mean	Geometric SD
General												
Chemical Oxygen Demand (mg/l)	04/02/97	04/02/97	1	100%	---	---	290	---	---	---	---	---
Color (units)	04/02/97	04/02/97	1	100%	---	---	150	---	---	---	---	---
Conductivity (umhos/cm)	04/02/97	04/02/97	1	100%	---	---	1549	---	---	---	---	---
pH (units)	04/02/97	04/02/97	1	100%	---	---	7.1	---	---	---	---	---
Temperature Water (deg C)	04/02/97	04/02/97	1	100%	---	---	12.6	---	---	---	---	---
Total Dissolved Solids (mg/l)	04/02/97	04/02/97	1	100%	---	---	1060	---	---	---	---	---
Total Suspended Solids (mg/l)	04/02/97	04/02/97	1	100%	---	---	480	---	---	---	---	---
Turbidity (ntu)	04/02/97	04/02/97	1	100%	---	---	230	---	---	---	---	---
Nutrients												
Ammonia Nitrogen (mg N/l)	04/02/97	04/02/97	1	100%	---	---	1.3	---	---	---	---	---
BOD (mg/l)	04/02/97	04/02/97	1	100%	---	---	77	---	---	---	---	---
Nitrogen Nitrate as N (mg N/l)	04/02/97	04/02/97	1	100%	---	---	3.3	---	---	---	---	---
Nitrogen Total (mg N/l)	04/02/97	04/02/97	1	100%	---	---	11.8	---	---	---	---	---
Nitrogen Total Kjeldahl (mg N/l)	04/02/97	04/02/97	1	100%	---	---	8.5	---	---	---	---	---
Phosphate Ortho (mg P/l)	04/02/97	04/02/97	1	100%	---	---	0.55	---	---	---	---	---
Phosphate Phosphorus Total (mg P/l)	04/02/97	04/02/97	1	100%	---	---	0.91	---	---	---	---	---
Trace Elements												
Copper (mg/l)	04/02/97	04/02/97	1	100%	---	---	0.02	---	---	---	---	---
Cyanide (mg/l)	04/02/97	04/02/97	1	100%	---	---	0.01	---	---	---	---	---
Lead (mg/l)	04/02/97	04/02/97	1	0%	<0.1	---	<0.1	---	---	---	---	---
Zinc (mg/l)	04/02/97	04/02/97	1	100%	---	---	0.18	---	---	---	---	---

STUDY AREA: STATION:	LAS VEGAS WASH NEAR LAS VEGAS, NEVADA LW11.2 (UPSTREAM)											
Category/Parameter	Initial POR	Final POR	Number of Measurements	Frequency of Detection	Detection Limit	Basic Statistics			Calculated Statistics			
						Minimum	Median	Maximum	Mean	Standard Deviation	Geometric Mean	Geometric SD
Major Ions												
Boron (mg/l)	04/02/97	04/02/97	1	100%	---	---	0.52	---	---	---	---	---
Organics												
Herbicides (# of detects)	04/02/97	04/02/97	1	100%	---	---	4	---	---	---	---	---
MBAS (mg/l)	04/02/97	04/02/97	1	100%	---	---	0.63	---	---	---	---	---
Oil & Grease (mg/l)	04/02/97	04/02/97	1	0%	<3	---	<3	---	---	---	---	---
Pesticides (# of detects)	04/02/97	04/02/97	1	100%	---	---	1	---	---	---	---	---
Phenol (mg/l)	04/02/97	04/02/97	1	100%	---	---	0.01	---	---	---	---	---
Total Petroleum Hydrocarbons (TPH) (mg/l)	04/02/97	04/02/97	1	100%	---	---	4.3	---	---	---	---	---
Biological												
Coliform Fecal 1 (MPN/100ml)	04/02/97	04/02/97	1	100%	---	---	7500	---	---	---	---	---
Salmonella (MPN/100ml)	04/02/97	04/02/97	1	0%	<2	---	<2	---	---	---	---	---
Streptococcal Fecal 1 (MPN/100ml)	04/02/97	04/02/97	1	100%	---	---	90000	---	---	---	---	---

STUDY AREA: STATION:		SANTA FE RIVER NEAR SANTA FE, NEW MEXICO URG110.002045 (DOWNSTREAM)										
Category/Parameter	Initial POR	Final POR	Number of Measurements	Frequency of Detection	Detection Limit	Basic Statistics			Calculated Statistics			
						Minimum	Median	Maximum	Mean	Standard Deviation	Geometric Mean	Geometric SD
Physical/Field												
DO (mg/L)	08/07/84	02/25/88	13	100%	---	4.8	6.4	9.2	6.592	1.082	6.549	0.747
DO Saturation (%)	08/07/84	02/25/88	13	100%	---	64.6	91.1	109.6	86.131	11.410	85.748	8.283
pH (SU)	08/08/84	02/25/88	12	100%	---	7.9	8	8.53	8.103	0.184	8.101	0.129
Residue (tot not filtered) (mg/L)	08/07/84	02/25/88	11	100%	---	11	345	9326	1,082.455	2,616.414	426.158	942.684
Residue@180C (diss) (mg/L)	08/08/84	02/25/88	6	100%	---	350	379	398	378.000	16.371	377.822	11.697
Specific conductivity (micromhos/cm)	08/07/84	02/25/88	13	100%	---	145	513	666	457.077	154.847	442.226	146.963
Nutrients												
Nitrogen (Kjel) (tot) (mg/L N)	08/07/84	02/25/88	11	100%	---	1.22	14.5	40	12.990	10.440	11.198	8.748
Nitrogen (NH3 unionized) (mg/L N)	08/08/84	02/25/88	10	100%	---	0.02	0.2705	0.652	0.304	0.180	0.282	0.214
Nitrogen (NH3 unionized) (mg/L NH3)	08/08/84	02/25/88	10	100%	---	0.024	0.3295	0.793	0.369	0.219	0.343	0.262
Nitrogen (NH3+NH4) (tot) (mg/L N)	08/07/84	02/25/88	11	100%	---	0.73	5.55	14.74	6.809	4.167	6.221	3.949
Nitrogen (NO2&NO3) (tot) (mg/L N)	08/07/84	02/25/88	11	100%	---	0.23	1.12	5.66	2.344	1.937	1.931	1.858
Nitrogen (organic) (mg/L N)	05/27/85	02/25/88	7	0%	<11.77	<11.77	<11.77	<11.77	---	---	---	---
Nitrogen (tot inorg) (mg/L N)	05/27/85	02/25/88	7	0%	<9.43	<9.43	<9.43	<9.43	---	---	---	---
Nitrogen (total) (mg/L N)	05/27/85	02/25/88	7	0%	<21.2	<21.2	<21.2	<21.2	---	---	---	---
Phosphorous (tot) (mg/L P)	08/07/84	02/25/88	11	100%	---	0.64	3.69	7.17	3.474	1.816	3.230	1.710

STUDY AREA: STATION:		SANTA FE RIVER NEAR SANTA FE, NEW MEXICO URG110.002045 (DOWNSTREAM)											
Category/Parameter	Initial POR	Final POR	Number of Measurements	Frequency of Detection	Detection Limit	Basic Statistics			Calculated Statistics				
						Minimum	Median	Maximum	Mean	Standard Deviation	Geometric Mean	Geometric SD	
Trace Elements													
Aluminum (tot)	02/25/88	02/25/88	1	100%	---	---	510	---	---	---	---	---	---
Arsenic (tot)	08/08/84	02/25/88	6	17%	<5	<5	<5	28	---	---	---	---	---
Barium (tot)	08/08/84	02/25/88	6	100%	---	100	110	170	120.000	25.166	118.760	16.342	---
Cadmium (tot)	08/08/84	02/25/88	6	0%	<2	<2	<2	<2	---	---	---	---	---
Chromium (tot)	08/08/84	02/25/88	6	17%	<10	<10	<10	34	---	---	---	---	---
Iron (tot) (ug/L)	05/28/85	05/28/85	1	100%	---	---	6900	---	---	---	---	---	---
Lead (tot) (ug/L)	08/08/84	02/25/88	6	17%	<10	<10	<10	21	---	---	---	---	---
Mercury (tot)	08/08/84	02/25/88	6	0%	<0.5	<0.5	<0.5	<0.5	---	---	---	---	---
Selenium (tot)	08/08/84	02/25/88	6	0%	<5	<5	<5	<5	---	---	---	---	---
Silver (tot)	08/08/84	02/25/88	6	50%	<2	<2	2	2	---	---	---	---	---
Major Ions													
Alkalinity (carbonate) (mg/L CaCO3)	07/10/85	07/10/85	1	100%	---	---	139	---	---	---	---	---	---
Alkalinity (total) (mg/L CaCO3)	08/06/86	02/25/88	2	100%	---	113	---	172	---	---	---	---	---
Bicarbonate (mg/L HCO3)	08/08/84	02/25/88	5	100%	---	101	148	210	153.200	35.941	151.087	25.950	---
Calcium (diss) (mg/L)	08/06/86	02/25/88	2	100%	---	32.8	---	36	---	---	---	---	---
Calcium (tot) (mg/L)	09/06/84	07/10/85	2	100%	---	36	---	58.4	---	---	---	---	---
Chloride (tot) (mg/L)	09/06/84	02/25/88	4	100%	---	38	39	42	39.500	1.500	39.486	1.044	---
Hardness (Calculated) (mg/L CaCO3)	09/06/84	02/25/88	4	100%	---	100	103	148	113.500	20.069	112.663	13.036	---
Hardness (total) (mg/L CaCO3)	02/25/88	02/25/88	1	100%	---	---	100	---	---	---	---	---	---
Magnesium (diss) (mg/L)	08/06/86	02/25/88	2	100%	---	2.4	---	4.4	---	---	---	---	---
Magnesium (tot) (mg/L)	09/06/84	07/10/85	2	100%	---	0.5	---	3.9	---	---	---	---	---

STUDY AREA: STATION:		SANTA FE RIVER NEAR SANTA FE, NEW MEXICO URG110.002045 (DOWNSTREAM)											
Category/Parameter	Initial POR	Final POR	Number of Measurements	Frequency of Detection	Detection Limit	Basic Statistics			Calculated Statistics				
						Minimum	Median	Maximum	Mean	Standard Deviation	Geometric Mean	Geometric SD	
Potassium (diss) (mg/L)	08/06/86	02/25/88	2	100%	---	7.02	---	12	---	---	---	---	
Potassium (tot) (mg/L)	09/06/84	07/10/85	2	100%	---	7.8	---	8.97	---	---	---	---	
Sodium (diss) (mg/L)	08/06/86	02/25/88	2	100%	---	74	---	78.2	---	---	---	---	
Sodium (tot) (mg/L)	09/06/84	07/10/85	2	100%	---	55.2	---	59.8	---	---	---	---	
Sulfate (diss) (mg/L)	02/25/88	02/25/88	1	100%	---	---	34	---	---	---	---	---	
Sulfate (tot) (mg/L)	08/08/84	08/06/86	4	100%	---	33	36.5	37	35.750	1.639	35.731	1.186	
Biological													
Chlorine Total Residual (mg/L)	05/27/85	02/25/88	3	100%	---	0.04	0.07	0.09	0.067	0.021	0.065	0.016	
FEC COLIMFM-FCBR (/100ML)	08/08/84	02/25/88	7	100%	---	57	260	25000	5,441.286	8,961.459	2,106.450	7,109.031	

STUDY AREA: STATION:	CROW CREEK NEAR CHEYENNE, WYOMING 06756100 (DOWNSTREAM)											
Category/Parameter	Initial POR	Final POR	Number of Measurements	Frequency of Detection	Detection Limit	Basic Statistics			Calculated Statistics			
						Minimum	Median	Maximum	Mean	Standard Deviation	Geometric Mean	Geometri c SD
Physical/Field												
Dissolved Solids (Tons/day)	8/29/1990	8/29/1990	1	100%	---	---	8.21	---	---	---	---	---
Dissolved Solids (sum) (mg/L)	8/29/1990	8/29/1990	1	100%	---	---	454	---	---	---	---	---
Residue (diss) (Tons/ac-ft)	8/29/1990	8/29/1990	1	100%	---	---	0.62	---	---	---	---	---
Specific conductivity (uS/cm)	8/29/1990	8/29/1990	1	100%	---	---	740	---	---	---	---	---
Nutrients												
Nitrogen (total) (mg/L NO3)	8/29/1990	8/29/1990	1	100%	---	---	4	---	---	---	---	---
Trace Elements												
Mercury (diss) (ug/L)	8/29/1990	8/29/1990	1	0%	<0.1	---	<0.1	---	---	---	---	---
Organics												
Phenols (tot) (ug/L)	8/29/1990	8/29/1990	1	100%	---	---	1	---	---	---	---	---
Biological												
Fecal Coliform (cols/100ml)	8/29/1990	8/29/1990	1	0%	<180	---	<180	---	---	---	---	---