APPENDIX F
WATER QUALITY ANALYSIS RESULTS FOR FIELD PARAMETERS AND TRACE METALS

Waterbody	Sample Site Name	Sample site Description	Sample Date	Flow (cfs)	pH	Hardness (mg/L as CaCO3)	Total Suspended Solids (mg/L)	Al - Dissolved (mg/L)	As - Total Recoverable (mg/L)	Cd - Total Recoverable (mg/L)	Cu - Total Recoverable (mg/L)	Fe - Total Recoverable (mg/L)	Hg - Total Recoverable (mg/L)	Pb - Total Recoverable (mg/L)
Douglas Creek	CO3DOUGC10	Douglas Creek 150 yds upstream from second reservoir	9/27/2003	9.0	7.82	150	7.8		0.011	<0.0001	<0.001	0.18		<0.001
Douglas Creek	DCSW-2	Douglas Creek upstream of confluence with Sturgeon Creek	5/11/2005	4.38	7.64	232	<10	<0.05	<0.005	NM	0.001	0.25		<0.003
Douglas Creek	DCSW-2	Douglas Creek upstream of confluence with Sturgeon Creek	8/25/2005	3.42	8.17	181	11		<0.005	NM	<0.001	0.37		<0.003
Douglas Creek	CO3DOUGC20	Douglas Creek 0.25 mi upstream of Murray Cr confluence	9/27/2003	1.0	7.67	312	16.2		0.025	<0.0001	0.001	0.48		<0.001
Douglas Creek	DCSW-1	Douglas Creek upstream of road crossing west of Helmville (STORET 4124DO01)	6/12/2003	2.91	8.21	246		0.07	0.005	<0.0001	<0.001	0.23		<0.001
Douglas Creek	DCSW-1	Douglas Creek upstream of road crossing west of Helmville (STORET 4124DO01)	10/1/2003	0.76	8.35	294	13.6	<0.01	0.021	<0.0001	<0.001	0.13		<0.001
Douglas Creek	DCSW-1	Douglas Creek upstream of road crossing west of Helmville (STORET 4124DO01)	5/11/2005	15.9	7.51	183	43	<0.05	<0.005	NM	0.002	1.41		<0.003
Douglas Creek	DCSW-1	Douglas Creek upstream of road crossing west of Helmville (STORET 4124DO01)	8/25/2005	2.69	7.30	169	11		<0.005	NM	<0.001	0.58		<0.003
Jefferson Creek	JCSW-2	Jefferson Creek upstream of confluence with Madison Gulch	10/1/2003	0.56	8.28	100	4.3	<0.01	0.008	<0.0001	<0.001	0.08		<0.001
Jefferson Creek	JCSW-1	Jefferson Creek upstream of Dalton Mountain Road crossing	6/12/2003	2.05	7.66	75		0.27	0.002	<0.0001	<0.001	0.22		0.001
Jefferson Creek	JCSW-1	Jefferson Creek upstream of Dalton Mountain Road crossing	10/1/2003	0.67	8.15	96	25	<0.01	0.009	<0.0001	<0.001	0.51		<0.001
Jefferson Creek	JCSW-1	Jefferson Creek upstream of Dalton Mountain Road crossing	5/11/2005	4.15	8.30	66	27	<0.05				2.06	<0.0001	
Kleinschmidt Creek	KLSW-2	Kleinschmidt Creek at upstream Highway 200 crossing	5/12/2005	0.92	7.89	190	<10		<0.005		0.001	0.32		
Kleinschmidt Creek	KLSW-2	Kleinschmidt Creek at upstream Highway 200 crossing	8/24/2005	0.1	7.81	200	<10		<0.005		<0.001	0.19		
Kleinschmidt Creek	KLSW-1	Kleinschmidt Creek at downstream Highway 200 crossing	5/12/2005	1.26	7.75	220	<10	<0.05	<0.005		0.001	0.35		
Kleinschmidt Creek	KLSW-1	Kleinschmidt Creek at downstream Highway 200 crossing	8/24/2005	0.056	7.44	228	<10		<0.005		<0.001	0.34		
Kleinschmidt Creek	C03KLSMC01	Kleinschmidt Creek 200 yds upstream of confluence with Rock Cr	9/11/2003	16.32	7.46				0.022	<0.0001	<0.001	0.03		<0.001
Kleinschmidt Creek	C03KLSMC01	Kleinschmidt Creek 200 yds upstream of confluence with Rock Cr	5/12/2005	8.62	7.18	140	<10	<0.05	<0.005		<0.001	0.004		
Kleinschmidt Creek	C03KLSMC01	Kleinschmidt Creek 200 yds upstream of confluence with Rock Cr	8/24/2005	11.2	7.02	138	<10		<0.005		<0.001	0.002		
Murray Creek	C03MURYC10	Murray Creek 100 yds upstream from highest road crossing	9/26/2003	4.0	6.91	81			0.005	<0.0001	<0.001	0.09		<0.001
Murray Creek	C03MURYC20	Murray Creek 100 yds upstream of lowest road crossing	9/26/2003	0.2	7.49	238			0.016	<0.0001	<0.001	0.25		<0.001

Waterbody	Sample Site Name	Sample site Description	Sample Date	Flow (cfs)	pH	Hardness (mg/L as CaCO3)	Total Suspended Solids (mg/L)	Al - Dissolved (mg/L)	As - Total Recoverable (mg/L)	Cd - Total Recoverable (mg/L)	Cu - Total Recoverable (mg/L)	Fe - Total Recoverable (mg/L)	Hg - Total Recoverable (mg/L)	Pb - Total Recoverable (mg/L)
Nevada Creek (Upper)	NCSW-1	Nevada Creek upstream of Highway 141 crossing (STORET 4026NE03)	6/12/2003	30.6	8.24	90		0.04	0.003	<0.0001	<0.001	0.24		<0.001
Nevada Creek (Upper)	NCSW-1	Nevada Creek upstream of Highway 141 crossing (STORET 4026NE03)	10/1/2003	4.75	7.76	120	7.0	<0.01	0.010	<0.0001	<0.001	0.34		<0.001
Nevada Creek (Upper)	NCSW-1	Nevada Creek upstream of Highway 141 crossing (STORET 4026NE03)	5/11/2005	103	8.13	65	97	<0.05				2.62	<0.0001	
Nevada Creek (Upper)	NCSW-1	Nevada Creek upstream of Highway 141 crossing (STORET 4026NE03)	8/25/2005	3.61	8.13	109	<10		<0.005		<0.001	0.29		<0.003
Nevada Creek (Upper)	NCSW-2	Nevada Creek upstream of confluence with Gallagher Creek	8/25/2005	8.21	8.01	131	<10		<0.005		0.004	0.29		<0.003
Nevada Creek (Upper)	12335500	Nevada Cr above Reservoir, near Helmville, MT (USGS gaging station)	6/10/1980	182	7.7	99	24	0.03	0.005		0.030	0.76	0.0004	
Nevada Creek (Upper)	12335500	Nevada Cr above Reservoir, near Helmville, MT (USGS gaging station)	7/8/1980	63	8.1	120	6	0.02	0.006		0.010	0.29	0.0001	
Nevada Creek (Upper)	12335500	Nevada Cr above Reservoir, near Helmville, MT (USGS gaging station)	5/14/2003	52	8.5	127	11		0.003	<0.0002	0.0019	0.30		0.00023
Nevada Creek (Upper)	12335500	Nevada Cr above Reservoir, near Helmville, MT (USGS gaging station)	5/29/2003	189										
Nevada Creek (Upper)	12335500	Nevada Cr above Reservoir, near Helmville, MT (USGS gaging station)	6/3/2003	126										
Nevada Creek (Upper)	12335500	Nevada Cr above Reservoir, near Helmville, MT (USGS gaging station)	6/6/2003	81	8.2	105	16		0.003	<0.0002	0.0016	0.37		0.00031
Nevada Creek (Upper)	12335500	Nevada Cr above Reservoir, near Helmville, MT (USGS gaging station)	7/11/2003	19										
Nevada Creek (Upper)	12335500	Nevada Cr above Reservoir, near Helmville, MT (USGS gaging station)	7/23/2003	11	8.2	141	5		0.005	<0.00004	0.0012	0.18		0.00009
Nevada Creek (Upper)	12335500	Nevada Cr above Reservoir, near Helmville, MT (USGS gaging station)	8/13/2003	11	8.2	123	5		0.005	<0.00004	0.0012	0.04		0.00018
Nevada Creek (Upper)	12335500	Nevada Cr above Reservoir, near Helmville, MT (USGS gaging station)	8/27/2003	8.0										
Nevada Creek (Upper)	12335500	Nevada Cr above Reservoir, near Helmville, MT (USGS gaging station)	12/2/2003	11	7.7		9							
Nevada Creek (Upper)	12335500	Nevada Cr above Reservoir, near Helmville, MT (USGS gaging station)	3/10/2004	146	7.4	37	44	0.008	0.005	0.00002	0.0028	0.77		0.00069
Nevada Creek (Upper)	12335500	Nevada Cr above Reservoir, near Helmville, MT (USGS gaging station)	4/13/2004	29	8.3	110	7		0.004	<0.00004	0.0011	0.31		0.00012
Nevada Creek (Upper)	12335500	Nevada Cr above Reservoir, near Helmville, MT (USGS gaging station)	5/27/2004	51	8.4	120	8	0.002	0.004	<0.00004	0.0019	0.27		0.00018
Nevada Creek (Upper)	12335500	Nevada Cr above Reservoir, near Helmville, MT (USGS gaging station)	7/14/2004	13	8.5	142	7		0.005	<0.00004	0.0011	0.29		0.00013
Nevada Creek (Upper)	12335500	Nevada Cr above Reservoir, near Helmville, MT (USGS gaging station)	8/25/2004	8.4	8.5	142	4	<0.002	0.006	<0.00004	0.001	0.26		0.00007
Nevada Creek (Upper)	12335500	Nevada Cr above Reservoir, near Helmville, MT (USGS gaging station)	5/11/2005	142	8.2	84	304				0.010	7.27	0.0000156	0.006
Nevada Creek (Upper)	12335500	Nevada Cr above Reservoir, near Helmville, MT (USGS gaging station)	8/25/2005	7.8	8.0	129	<10		<0.005		<0.001	0.27		<0.003
Washington Creek	WASW-2	Washington Creek upstream of confluence with Cow Gulch	10/1/2003	0.72	7.83	119	<1.0	<0.01	0.006	<0.0001	<0.001	0.02		<0.001
Washington Creek	WASW-1	Washington Creek upstream of Highway 141 crossing(STORET 4026WA01)	6/12/2003	3.11	8.03	106		0.05	0.004	<0.0001	<0.001	0.97		<0.001

Waterbody	Sample Site Name	Sample site Description	Sample Date	Flow (cfs)	pH	Hardness (mg/L as CaCO3)	Total Suspended Solids (mg/L)	Al - Dissolved (mg/L)	As - Total Recoverable (mg/L)	Cd - Total Recoverable (mg/L)	Cu - Total Recoverable (mg/L)	Fe - Total Recoverable (mg/L)	Hg - Total Recoverable (mg/L)	Pb - Total Recoverable (mg/L)
Washington Creek	WASW-1	Washington Creek upstream of Highway 141 crossing(STORET 4026WA01)	10/1/2003	0.024	7.72	149	6.0	<0.01	0.013	<0.0001	<0.001	1.38		<0.001
Washington Creek	WASW-1	Washington Creek upstream of Highway 141 crossing(STORET 4026WA01)	5/11/2005	17.1	8.11	80	63	<0.05				2.45	<0.0001	

SEDIMENT

Waterbody	Sample Site Name	Sample Site Description	Sample Date	Aluminum (µg/g)	Antimony (µg/g)	Arsenic (µg/g)	Barium (µg/g)	Beryllium (µg/g)	Cadmium (µg/g)	Chromium (µg/g)	Copper (µg/g)	Iron (µg/g)	Lead (µg/g)	Manganese (µg/g)	Nickel (µg/g)	Selenium (µg/g)	Silver (µg/g)	Thallium (µg/g)	Zinc (µg/g)
Douglas Creek	CO3DOUGC10	Douglas Creek 150 yds upstream from second reservoir	9/27/2003	9870	<1	6.6	206	<1	<1	27.7	14.1	9470	7.7	387	26.6	<1	<1	<1	34.3
Douglas Creek	CO3DOUGC20	Douglas Creek 0.25 mi upstream of Murray Cr confluence	9/27/2003	9550	<1	9.5	372	<1	<1	13.3	20.6	11500	9.1	1930	21.7	<1	<1	<1	43.2
Douglas Creek	DCSW-1	Douglas Creek upstream of road crossing west of Helmville (STORET 4124DO01)	10/1/2003	9740	<1	13.1	445	<1	<1	17.9	22.5	13400	10.7	827	25.9	<1	<1	<1	42.4
Jefferson Creek	JCSW-2	Jefferson Creek upstream of confluence with Madison Gulch	10/1/2003	12200	0.4	13.9	285	<1	<1	11.9	20.7	14000	17	522	14	<1	<1	<1	42.5
Jefferson Creek	JCSW-1	Jefferson Creek upstream of Dalton Mountain Road crossing	10/1/2003	9120	0.4	15.3	368	<1	<1	15.5	20.5	14500	12.5	600	22.2	<1	<1	<1	46.2
Kleinschmidt Creek	C03KLSMC01	Kleinschmidt Creek 200 yds upstream of confluence with Rock Cr	9/11/2003	11400	0.3	19.6	414	<1	<1	13.2	59.1	16000	18	839	9.5	1.3	<1	<1	84.1
Nevada Creek (Upper)	NCSW-1	Nevada Creek upstream of Highway 141 crossing (STORET 4026NE03)	10/1/2003	11200	0.4	30.7	484	<1	<1	10.7	26.1	17400	15.9	1110	18.9	<1	<1	<1	47
Ward Creek	C03WARDC01	Ward Creek 3.0 mi above Hwy 200 turnoff	6/20/2001	11600	<1	25	649	<1	<1	16	19	15800	15	395	18	<1	<1	<1	75
Ward Creek	C03WARDC02	Ward Creek First Stream crossing above Browns Lake	6/20/2001	12600	<1	18	489	<1	<1	10	34	18100	16	547	12	<1	<1	<1	75
Washington Creek	WASW-2	Washington Creek upstream of confluence with Cow Gulch	10/1/2003	13600	0.5	16	472	<1	<1	18.2	28.9	21300	18.1	493	24.3	1.6	<1	<1	57.4
Washington Creek	WASW-1	Washington Creek upstream of Highway 141 crossing(STORET 4026WA01)	10/1/2003	11700	0.4	52.3	1040	<1	<1	13	17.5	40300	13.8	8290	22	<1	<1	<1	61
Wilson Creek	WCSW-1	Wilson Creek upstream of hwy 141 rd xing	10/1/2003	15200	0.5	21.7	315	<1	<1	17.9	29.2	25100	16	3270	28.5	<1	<1	<1	50.7
Yourname Creek	C03YRNMC20	Yourname Creek 300 yds downstream from bridge	9/12/2003	15400	<1	7.2	245	<1	<1	31.5	31.9	13600	9.9	434	21.6	1	<1	<1	55.1
		Freshwater Sediment Toxicity Benchmark Values (Jones et al., 1997)																	
		Assessment and Remediation of Contaminated Sediments Program																	

Waterbody	Sample Site Name	Sample Site Description	Sample Date	Aluminum (µg/g)	Antimony (µg/g)	Arsenic (µg/g)	Barium (µg/g)	Beryllium (µg/g)	Cadmium (µg/g)	Chromium (µg/g)	Copper (µg/g)	Iron (µg/g)	Lead (µg/g)	Manganese (µg/g)	Nickel (µg/g)	Selenium (µg/g)	Silver (µg/g)	Thallium (µg/g)	Zinc (µg/g)
		(EPA, 1996a)																	
		Threshold Effect Concentration (TEC)				12.1			0.592	56	28		34.2	1673	39.6				159
		Probable Effect Concentration (PEC)		58030		57			11.7	159	77.7		396	1081	38.5				1532
		High No Effect Concentration (NEC)				92.9			41.1	312	54.8		68.7	819	37.9				541
		Ontario Ministry of Environment (Canada)																	
		Low (5th percentile of screening level concentration)				6			0.6	26	16	20000	31	460	16				120
		Severe (95th percentile of screening level concentration)				33			10	110	110	40000	250	1110	75				820
		EPA Region IV 1995 Ecological Screening Values for Sediment			12	7.24			1	52.3	18.7		30.2		15.9		2		124
		EPA Office of Solid Waste and Emergency Response Ecotox Thresholds (1996b)				8.2			1.2	81	34		47		21				150

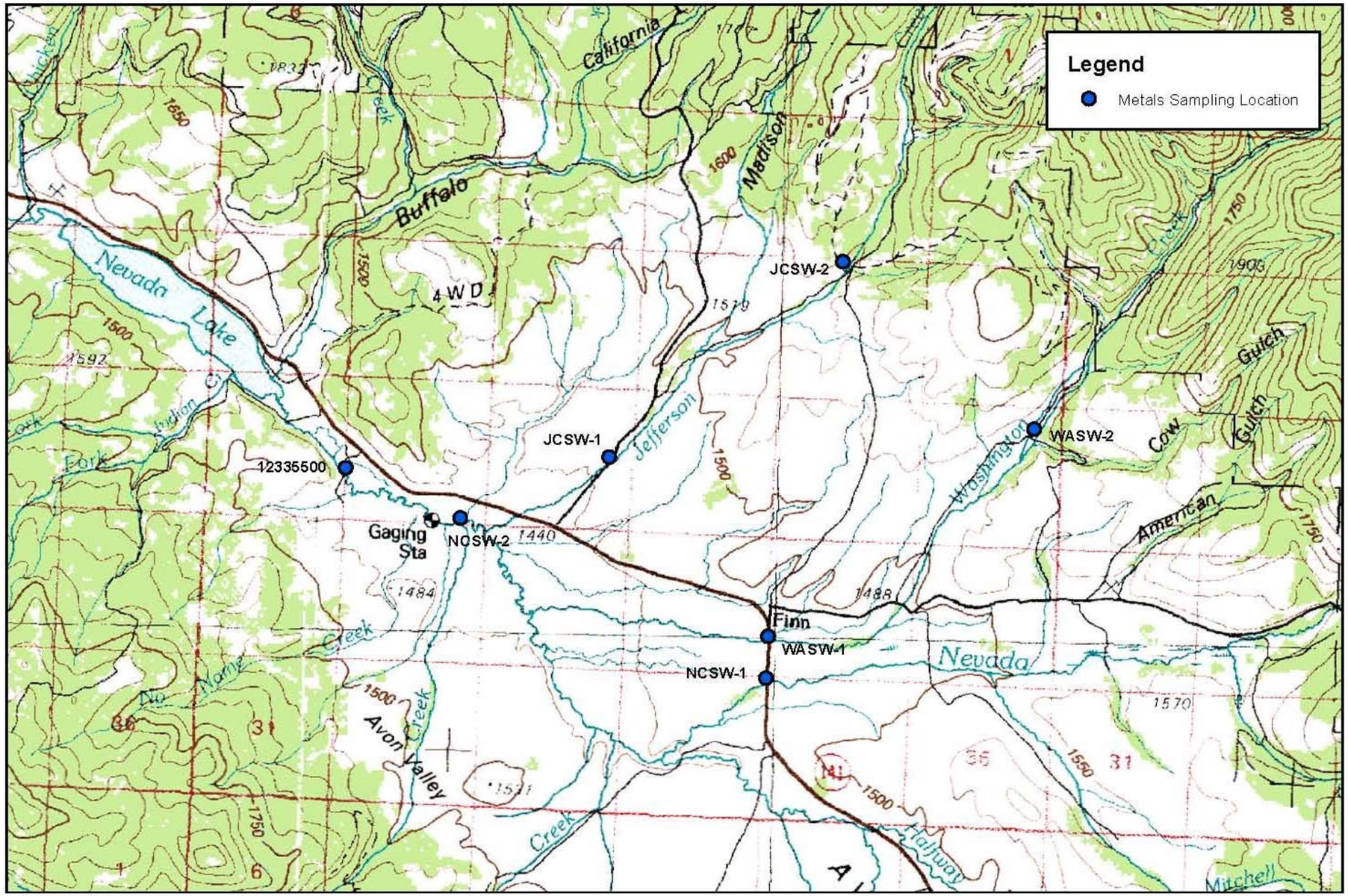

Figure F-1. Upper Nevada Creek Metals Sampling Locations