

American Fork Canyon Water Quality



Presentation to: Cedar Hills City Council

***Division of Water Quality
Utah Department of Environmental Quality***

Meeting Purpose

1. Provide an overview of general water quality conditions in American Fork Canyon
2. Provide Brief history of mining activities in the context of water quality
3. Provide an update on the Tibble Fork Reservoir sediment release
4. Discuss DWQ's role in the Snowbird expansion project
5. Provide overview of EPA CERCLA Preliminary Assessment

Water Quality Conditions



Beneficial Uses

Assessment Unit Name	AU Description	Use Class
American Fork River-1	American Fork River and tributaries from Diversion at mouth of Canyon to Tibble Fork Reservoir	2B, 3A, 4
American Fork River-2	American Fork River and tributaries from Tibble Fork Reservoir to headwaters	2B, 3A, 4
American Fork	American Fork and tributaries from Utah Lake to diversion at mouth of American Fork Canyon	2B, 3B, 4
Tibble Fork Reservoir	Tibble Fork Reservoir	2B, 3A, 4
Silver Lake Flat Reservoir	Silver Lake Flat Reservoir	2B, 3A, 4

Beneficial Use Descriptions

2B: Infrequent primary contact recreation

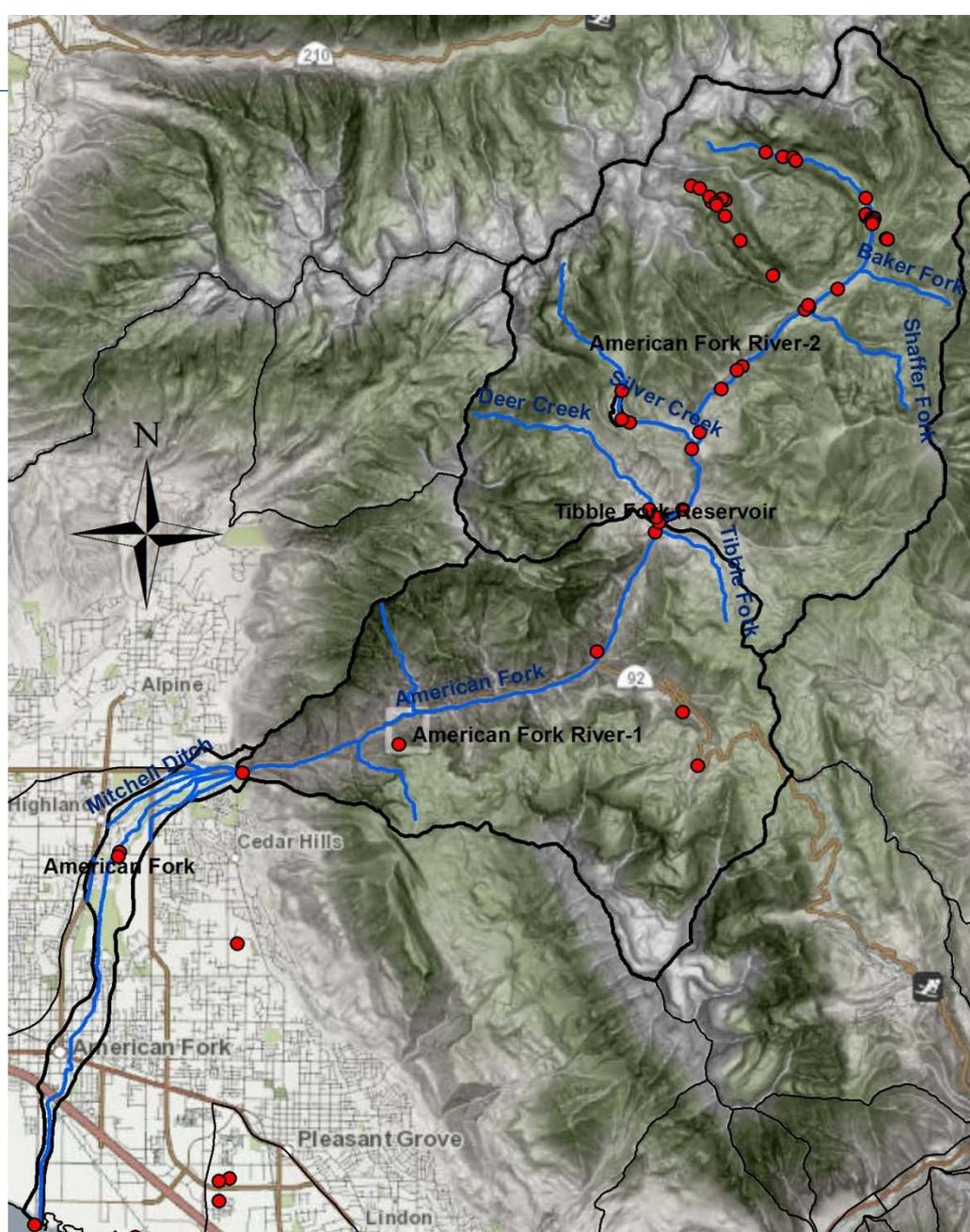
3A: Cold water species of game fish and other cold water aquatic life, including the necessary aquatic organisms in their food chain

3B: Warm water species of game fish and other warm water aquatic life, including the necessary aquatic organisms in their food chain

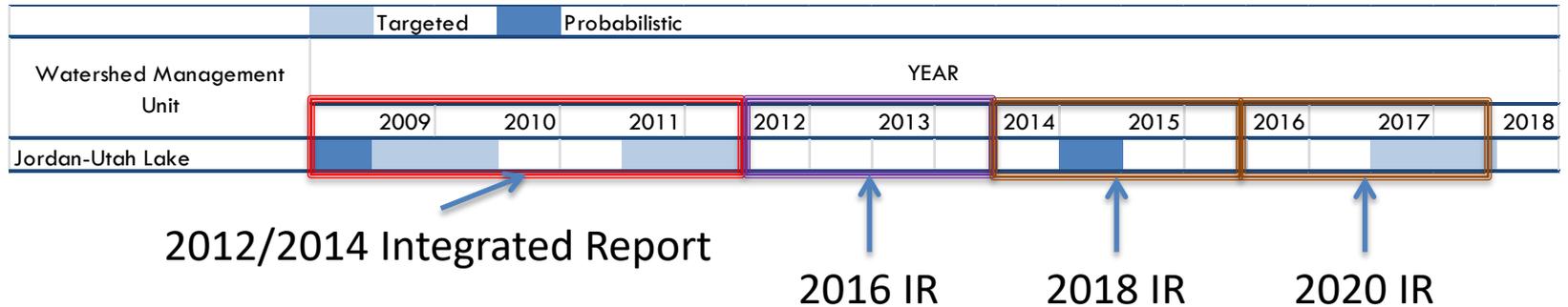
4: Agricultural uses including irrigation of crops and stock watering

Monitoring Locations

Monitoring Location Name	Start Date	End Date
HANSEN CAVE SPRING IN TIMPANOGOS CAVE NM	7/29/08	11/5/15
WIDE HOLLOW AB CONFL DEER CK AB TIBBLE FORK RES	10/26/09	6/30/15
N FK AMERICAN FK CK AB TIBBLE FORK RES	6/3/81	9/13/12
N FK AMERICAN FK R AB CNFL/ S FK	5/4/92	8/17/12
DEER CREEK AB TIBBLE FORK RES	6/3/81	7/17/12
SILVER CK AB SILVER LAKE FLAT RESERVOIR	7/1/97	7/17/12
N FK AMERICAN FK BL MARY ELLEN GULCH AF-12	6/7/00	10/26/11
SILVER LAKE FLAT RESERVOIR	7/1/97	8/25/10
TIBBLE FORK RES AB DAM 01	6/3/81	8/25/10
MARY ELLEN GULCH AB CNFL W/ N. FK OF AMERICAN FK	10/7/09	10/7/09
N FK AMERICAN FK AB PACIFIC MINE AF-5	6/6/00	10/23/08
N FK AMERICAN FK BL PACIFIC MINE AF-10	6/6/00	10/23/08
AMERICAN FORK RIVER AT MOUTH OF CANYON	2/12/92	6/30/05
S FK AMERICAN FK R 1/2 MILE ABOVE MUTUAL DELL	9/15/04	9/15/04
Pacific Mine Well 02	7/25/01	7/25/01
Pacific Mine Well 03	7/25/01	7/25/01



Monitoring and Assessment



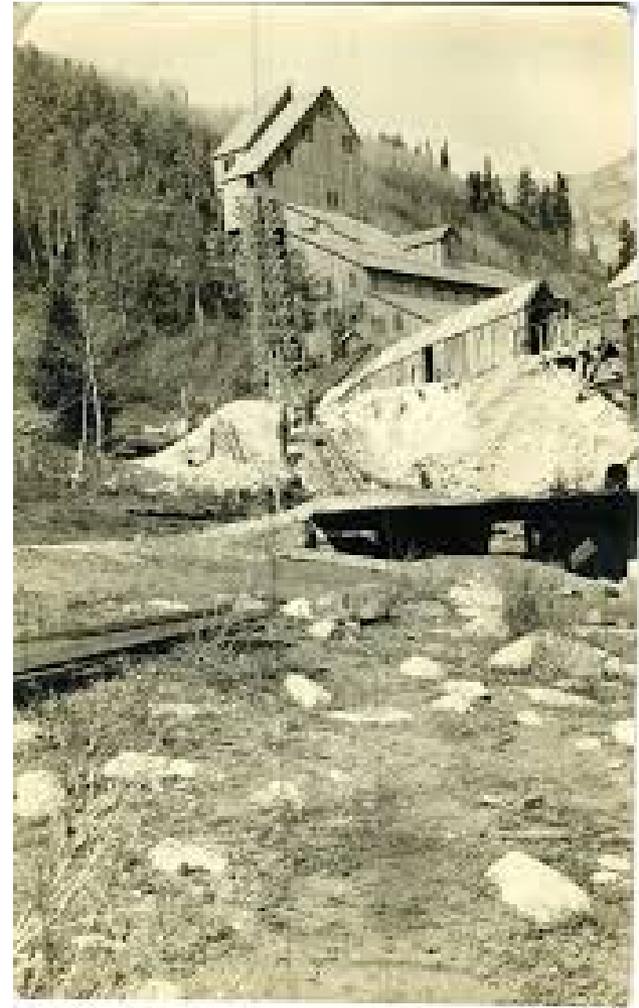
Assessment Unit Name	AU Description	Assessment Results
American Fork River-1	American Fork River and tributaries from Diversion at mouth of Canyon to Tibble Fork Reservoir	Supporting Uses
American Fork River-2	American Fork River and tributaries from Tibble Fork Reservoir to headwaters	Insufficient Data w/ exceedances
American Fork	American Fork and tributaries from Utah Lake to diversion at mouth of American Fork Canyon	Supporting Uses
Tibble Fork Reservoir	Tibble Fork Reservoir	No Evidence of impairment
Silver Lake Flat Reservoir	Silver Lake Flat Reservoir	No Evidence of impairment

Mining History



Mining in American Fork Canyon

- Mining began in 1870
- Several mines operated in upper American Fork Canyon
- The mines produced gold, silver, copper, lead and zinc ores
- Smelters operated in canyon
- Most mining ended prior to World War II
- Ores were transported down a tram conveyor to a “tibble station” at confluence of Deer Creek and North Fork American Fork River, hence the name “Tibble Fork”



Pacific Mine, American Fork Canyon

Mining Impacts on Water Quality

- Uncovered tailings piles remain outside of several mines
- Some mines are discharging contaminated groundwater
- Some streams flowing over tailings, dissolving metals
- Contaminated water and sediment flowing directly into streams
- Primary contaminants of concern are Arsenic, Cadmium, Copper, Lead, Mercury and Zinc



Tibble Fork Dam Sediment Release



Tibble Fork Reservoir

- Dam built in 1966 for flood control and sediment retention
- Dam is currently being seismically upgraded and raised 15 feet to increase water storage
- Stores approximately 258 acre-feet of water (~ 385 ac. ft. after upgrade)
- About 14 acres in size (23 after upgrade)
- Construction began in June 2016 and will be completed in December 2016



Tibble Fork Reservoir prior to construction

August 22, 2016 Sediment Release

- On August 19, 2016 the contractor and dam operator began a planned draw down to lower the water level of the reservoir
- On August 22nd, a large plug of sediment and debris from the bottom of the reservoir blocked the outlet gate
- Removing the plug resulted in a release of an estimated 5,141 cubic yards of sediment into the North Fork of the river
- The water contained large amounts of suspended sediment
- The release lasted for several hours and killed an estimated 5,250 fish



American Fork River, near mouth of American Fork Canyon

Water Quality Above Dam, 23 Aug 16



North Fork of American Fork River above Tibble Fork Reservoir

Water Quality Below Dam, 23 Aug 16



North Fork of American Fork River below Tibble Fork Dam

Fish Kill Below Dam



Dead trout in North Fork American Fork River below Tibble Fork Dam

Erosion of sediment in lake bed



North Fork of American Fork River flowing through bottom of Tibble Fork Reservoir

Division of Water Quality Response

- Division of Water Quality was not notified of the release until August 23, 2016
- DWQ consulted with several agencies, including Forest Service, Park Service, National Resource Conservation Service, Division of Wildlife Resources, and Utah County Health Department
- DWQ took samples at several points upstream and downstream of dam
- Contractor for dam construction dug a canal to allow the river to bypass the sediment in the lake bed and prevent further erosion

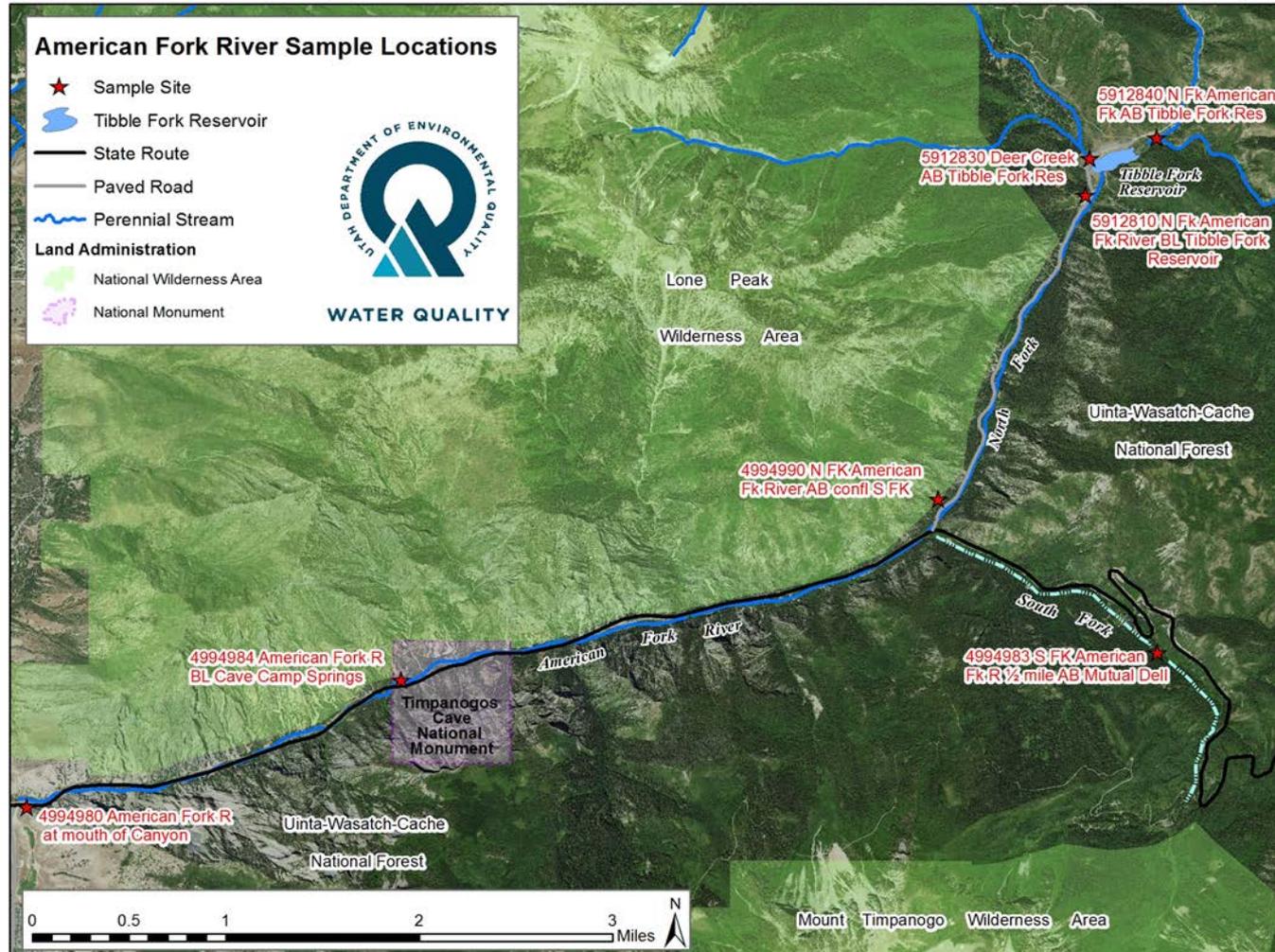


Bypass Canal



Bypass Canal in bottom of Tibble Fork Reservoir

DWQ Sampling Stations

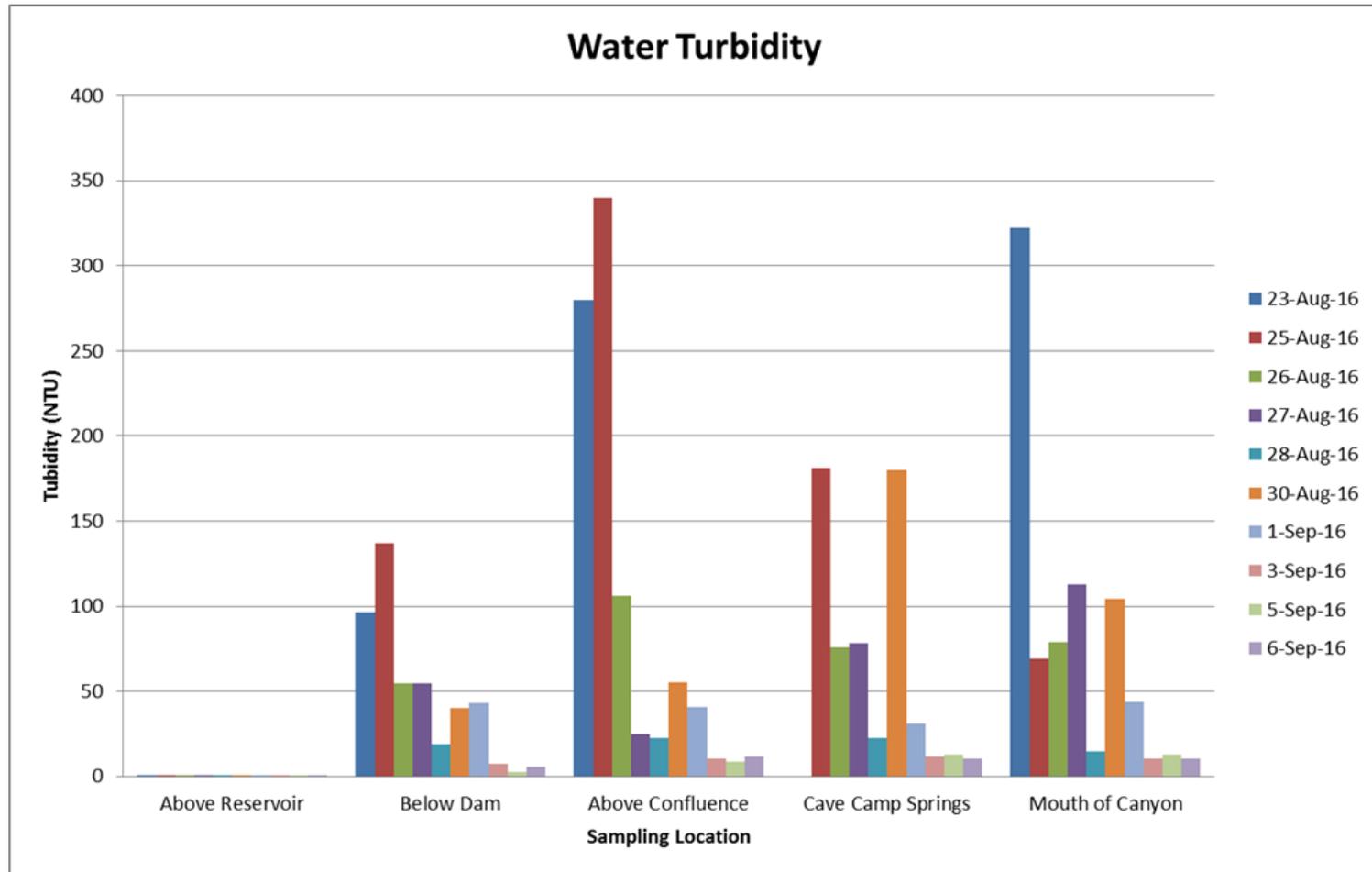


DWQ Sampling Plan

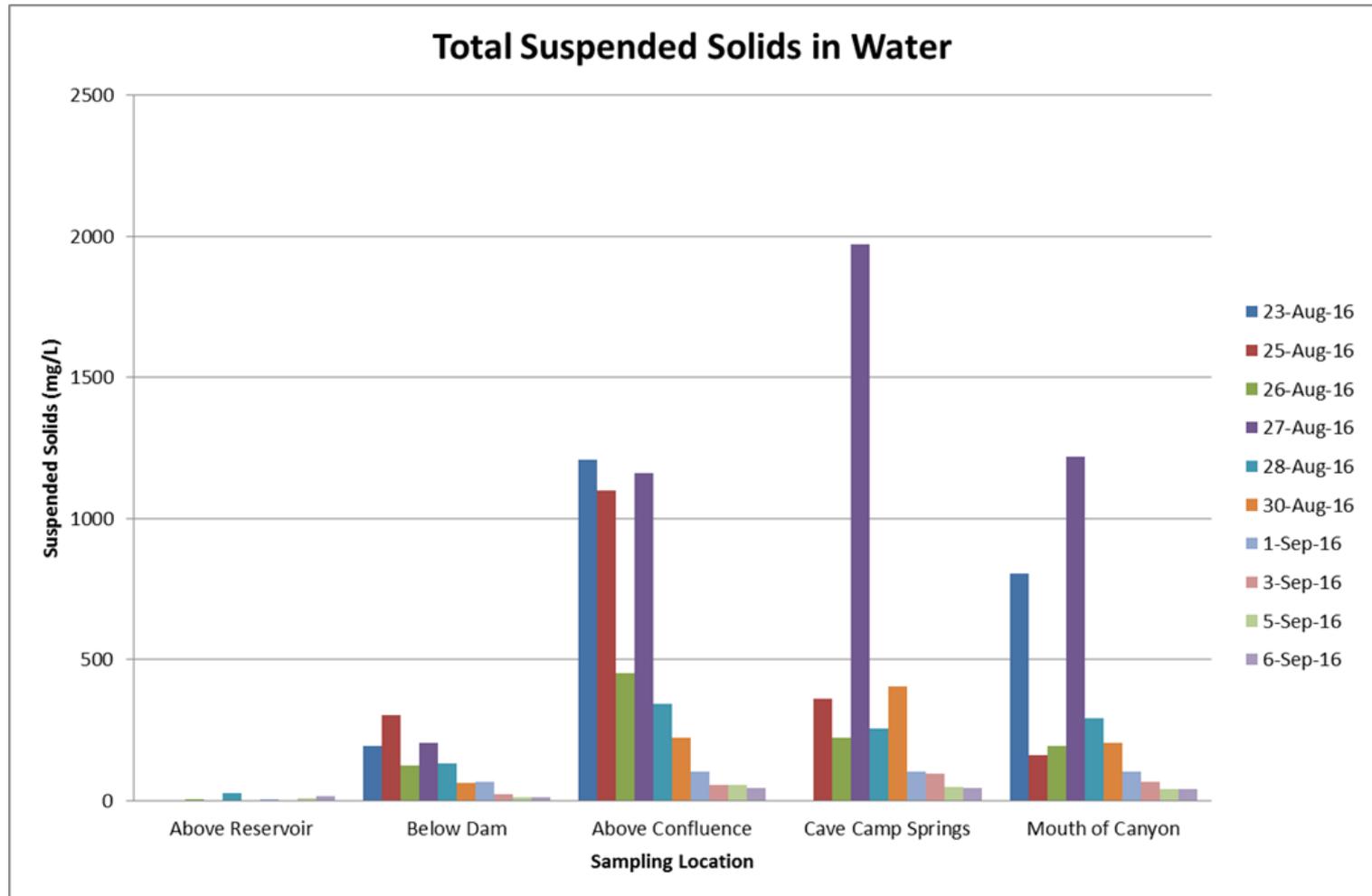
- Samples were taken for two weeks after discharge to monitor water quality and determine scope of spill
- Water samples were analyzed for water chemistry, dissolved metals, total metals, turbidity, and suspended solids
- Sediment samples were analyzed for total metals
- Metal results were screened for human health, agricultural use, and aquatic wildlife health
- Water turbidity and dissolved solids were used as an indicator for overall water quality



Water Turbidity Sample Results



Suspended Solids Sample Results



Water Chemistry Metals Sampling Results

Recreational Water (Total Metals)																									
		No Exceedence	Above Screening Level																						
				Aluminum	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc	
Recreational Screening Values				1,579,000	630	7,900	315,800	3,160	315,800	790	1,787,000	39,480	15,790												
Monitoring Location	Site Description	Collection Date	Collection Time	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	
MLID	Site Description	Collection Date	Collection Time	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	
5912840	N FK American FK CK AB Tibble Fork Res	8/23/2016	2:25 PM	ND	ND	ND	41.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.1	ND	ND	ND	ND	ND	6.2	
		8/25/2016	4:35 PM	ND	ND	ND	41.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.8	
		8/26/2016	11:40 AM	ND	ND	ND	40.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.4
		8/27/2016	8:55 AM	ND	ND	ND	41.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	10.3
		8/28/2016	8:40 AM	ND	ND	ND	42.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	10.0
5912830	Deer Creek AB Tibble Fork Res	8/30/2016	2:10 PM	ND	ND	ND	42.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.1	ND	ND	ND	ND	ND	7.5	
		8/25/2016	4:21 PM	ND	ND	ND	98.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.1	ND	2.6	ND	ND	ND	ND	ND	
5912810	N FK American FK R BL Tibble Fork Res	8/23/2016	2:45 PM	1,510.0	4.6	15.4	179.0	ND	ND	1.0	2.1	ND	9.5	3,500.0	83.0	279.0	ND	2.7	4.6	ND	ND	ND	ND	122.0	
		8/24/2016	4:25 PM	2,370.0	5.0	13.9	165.0	ND	ND	0.9	2.6	ND	12.0	3,820.0	73.0	239.0	ND	2.5	5.2	ND	ND	ND	ND	106.0	
		8/25/2016	4:08 PM	2,460.0	4.3	15.1	159.0	ND	ND	1.5	5.0	ND	18.7	5,730.0	115.0	305.0	ND	2.2	8.0	ND	ND	ND	ND	5.0	170.0
		8/26/2016	11:17 AM	1,040.0	3.0	9.3	130.0	ND	ND	0.6	ND	ND	7.7	2,410.0	45.5	174.0	ND	2.5	3.4	ND	ND	ND	ND	ND	65.1
		8/27/2016	9:27 AM	ND	2.9	10.0	142.0	ND	ND	0.9	2.6	ND	9.7	ND	53.2	221.0	ND	2.3	4.4	ND	ND	ND	ND	ND	79.9
		8/28/2016	9:00 AM	ND	2.5	8.3	102.0	ND	ND	0.9	ND	ND	8.2	ND	60.5	136.0	ND	ND	3.2	ND	ND	ND	ND	ND	78.9
		8/30/2016	2:35 PM	1,010.0	2.4	3.5	72.7	ND	ND	ND	ND	ND	3.9	1,300.0	19.1	57.2	ND	2.4	ND	ND	ND	ND	ND	ND	36.2
4994990	N FK American FK R AB confl S FK	8/23/2016	3:00 PM	7,780.0	6.3	28.3	295.0	ND	ND	3.9	11.2	8.2	40.1	15,700.0	296.0	779.0	0.3	2.1	21.4	ND	ND	ND	ND	14.6	475.0
		8/25/2016	3:48 PM	6,790.0	6.5	28.3	350.0	ND	ND	4.4	13.6	9.4	41.8	17,200.0	317.0	907.0	0.3	ND	23.6	ND	ND	ND	ND	13.4	538.0
		8/26/2016	12:20 PM	2,080.0	3.8	14.0	161.0	ND	ND	1.4	3.4	ND	14.8	5,560.0	106.0	353.0	ND	2.2	8.0	ND	ND	ND	ND	ND	173.0
		8/27/2016	9:45 AM	ND	5.3	31.2	275.0	ND	ND	5.0	12.7	9.1	59.9	ND	364.0	773.0	0.3	ND	23.6	ND	ND	ND	ND	ND	574.0
		8/28/2016	9:20 AM	ND	2.6	9.2	119.0	ND	ND	1.0	2.6	ND	10.5	ND	72.6	194.0	ND	ND	4.7	ND	ND	ND	ND	ND	112.0
4994983	S FK American FK R ½ mile AB Mutual Dell	8/30/2016	2:45 PM	1,570.0	ND	5.3	89.7	ND	ND	0.6	2.9	ND	6.5	2,490.0	37.4	113.0	ND	2.1	3.6	ND	ND	ND	ND	69.0	
		8/25/2016	3:26 PM	ND	ND	ND	31.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4994984	American Fork River BL Cave Camp Springs	8/9/2016	4:30 PM	NS	ND	ND	NS	ND	NS	ND	ND	NS	ND	NS	ND	NS	ND	NS	ND	2.7	ND	ND	NS	ND	
		8/22/2016	3:50 PM	NS	12.4	276.0	NS	8.3	NS	76.8	94.9	NS	781.0	NS	5,610.0	NS	4.3	NS	221.0	3.5	25.9	2.5	NS	8,050.0	
		8/24/2016	4:15 PM	2,610.0	3.8	12.0	138.0	ND	NS	1.3	3.2	ND	14.7	5,310.0	93.7	217.0	ND	NS	6.7	ND	ND	ND	NS	5.4	154.0
		8/25/2016	3:01 PM	2,920.0	4.7	14.4	147.0	ND	ND	2.0	6.2	ND	23.8	6,210.0	138.0	275.0	0.2	2.1	9.1	ND	ND	ND	ND	6.2	223.0
		8/26/2016	12:45 PM	1,430.0	3.2	9.4	112.0	ND	ND	1.0	2.4	ND	10.6	3,620.0	76.2	189.0	ND	ND	5.2	ND	ND	ND	ND	ND	124.0
		8/27/2016	10:05 AM	ND	11.5	92.6	418.0	2.2	ND	22.0	25.9	22.2	246.0	ND	1,640.0	1,540.0	1.2	ND	55.1	ND	8.0	ND	ND	ND	2,270.0
		8/28/2016	9:35 AM	ND	ND	6.5	99.9	ND	ND	0.9	2.2	ND	8.7	ND	59.5	147.0	ND	ND	4.4	ND	ND	ND	ND	ND	92.3
		8/29/2016	11:13 AM	NS	3.2	8.6	NS	ND	NS	1.3	2.8	NS	12.7	NS	93.1	NS	NS	NS	6.0	ND	ND	ND	NS	NS	153.0
		8/30/2016	2:55 PM	4,300.0	ND	6.9	119.0	ND	ND	0.9	10.2	ND	12.5	5,040.0	49.0	231.0	ND	ND	8.3	ND	ND	ND	ND	9.0	96.1
		9/7/2016	10:53 AM	NS	ND	2.2	NS	ND	NS	NS	ND	NS	ND	NS	12.2	NS	NS	NS	NS	ND	ND	ND	ND	NS	22.5
9/14/2016	11:35 AM	NS	ND	3.6	NS	ND	NS	ND	NS	ND	NS	4.3	NS	29.1	NS	NS	NS	2.1	ND	ND	ND	NS	45.3		
9/21/2016	2:35 PM	NS	ND	ND	NS	ND	NS	ND	NS	ND	NS	ND	NS	6.3	NS	NS	NS	NS	ND	ND	ND	NS	14.7		
4994980	American Fork River at mouth of Canyon	8/23/2016	12:25 PM	3,450.0	6.1	19.8	155.0	ND	ND	3.1	5.2	4.6	26.6	7,510.0	231.0	423.0	0.4	ND	10.2	ND	ND	ND	7.7	341.0	
		8/25/2016	2:42 PM	1,270.0	3.6	8.0	103.0	ND	ND	0.9	2.4	ND	9.8	3,000.0	65.7	133.0	ND	ND	4.2	ND	ND	ND	ND	108.0	
		8/26/2016	12:55 PM	935.0	3.0	8.5	100.0	ND	ND	1.0	ND	ND	9.3	2,780.0	76.2	173.0	0.2	ND	4.1	ND	ND	ND	ND	116.0	
		8/27/2016	10:20 AM	ND	9.2	50.0	290.0	ND	ND	10.8	18.2	13.0	131.0	ND	795.0	948.0	0.6	ND	36.7	ND	3.9	ND	ND	1,140.0	
		8/28/2016	10:00 AM	ND	2.2	7.7	103.0	ND	ND	1.0	2.8	ND	10.4	ND	68.9	161.0	ND	ND	5.5	ND	ND	ND	ND	114.0	
		8/30/2016	3:10 PM	2,550.0	ND	6.6	93.3	ND	ND	0.8	4.5	ND	9.7	3,580.0	52.5	151.0	ND	ND	4.9	ND	ND	ND	ND	5.3	90.5



Sediment Metals Sampling Results

				No Exceedence	Above Screening Level																		
				Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Silver	Vanadium	Zinc	Molybdenum	
Health Based Comparison Values for Recreation				165,428	66	753	33,086	331	87	213,402	1,654	1,654	115,799	400	7,775	1,158	3,309	827	827	1,654	49,628	827	
Monitoring Location	Site Description	Collection Date	Collection Time	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	
5912840	N FK American FK CK AB Tibble Fork Res	8/23/2016	2:25:00 PM	6,840	ND	13	60	ND	2	20	5	ND	17,300	40	466	0	21	ND	ND	26	213	ND	
		8/27/2016	8:55:00 AM	11,000	ND	17	54	ND	2	22	9	ND	18,900	70	563	ND	24	ND	ND	24	207	ND	
		8/28/2016	8:40:00 AM	10,300	ND	13	38	ND	2	26	7	ND	29,600	43	471	0	21	ND	ND	27	265	ND	
5912810	N FK American FK R BL Tibble Fork Res	8/23/2016	2:45:00 PM	7,760	ND	16	181	ND	2	22	6	ND	12,100	109	406	0	ND	ND	ND	35	280	ND	
		8/27/2016	9:27:00 AM	7,540	5	19	178	ND	2	17	6	23	23,900	114	442	0	ND	ND	ND	22	306	ND	
		8/28/2016	9:00:00 AM	7,950	ND	18	137	ND	2	16	6	20	25,000	105	391	0	ND	ND	ND	21	262	ND	
4994990	N FK American FK R AB confl S FK	8/23/2016	3:00:00 PM	11,700	9	34	162	ND	5	26	9	56	15,700	347	560	0	ND	ND	ND	42	601	ND	
		8/27/2016	9:45:00 AM	8,800	ND	20	158	ND	2	18	6	25	26,800	128	471	0	ND	ND	ND	22	342	ND	
		8/28/2016	9:20:00 AM	10,000	ND	21	181	ND	3	19	7	25	28,300	154	491	0	ND	ND	ND	23	370	ND	
4994984 - b	American Fork River BL Cave Camp Springs - Blw Water Line	9/1/2016	12:18:00 PM	NS	10	39	NS	0	6	23	NS	66	NS	415	NS	0	30	0	0	NS	650	NS	
		9/7/2016	10:55:00 AM	NS	6	31	NS	0	4	27	NS	44	NS	262	NS	0	0	0	0	NS	484	NS	
4994984 - a	American Fork River BL Cave Camp Springs - Abv Water Line	9/1/2016	12:18:00 PM	NS	0	22	NS	0	3	21	NS	33	NS	163	NS	0	0	0	0	NS	339	NS	
		9/7/2016	10:55:00 AM	NS	0	20	NS	0	2	22	NS	24	NS	142	NS	0	0	0	0	NS	330	NS	
4994984	American Fork River BL Cave Camp Springs	8/27/2016	10:05:00 AM	7,660	4	19	139	ND	2	15	6	20	24,300	128	483	0	ND	ND	ND	19	321	ND	
		8/28/2016	9:35:00 AM	9,360	ND	15	107	ND	2	18	5	20	21,300	93	357	0	ND	ND	ND	24	235	ND	
4994980	American Fork River at mouth of Canyon	8/23/2016	12:25:00 PM	12,900	7	31	155	ND	4	26	9	43	18,400	267	576	0	26	ND	ND	38	509	ND	
		8/27/2016	10:20:00 AM	16,600	12	49	180	ND	8	30	13	92	41,000	522	616	1	36	ND	3	38	916	ND	
		8/28/2016	10:00:00 AM	9,560	ND	22	116	ND	3	18	7	31	23,100	170	440	0	ND	ND	ND	22	351	ND	



Sediment Metals Sampling Results

		No Exceedence	Above Screening Level																			
				Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Silver	Vanadium	Zinc	Molybdenum
EPA Aquatic Life Screening Values						9.8			1.0	43.4	50.0	31.6	20,000.0	35.8	460.0	0.2	22.7	2.0	1.0		121.0	
Monitoring Location	Site Description	Collection Date	Collection Time	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
5912840	N FK American FK CK AB Tibble Fork Res	8/23/2016	2:25:00 PM	6,840	ND	13	60	ND	2	20	5	ND	17,300	40	466	0.1	21	ND	ND	26	213	ND
		8/27/2016	8:55:00 AM	11,000	ND	17	54	ND	2	22	9	ND	18,900	70	563	ND	24	ND	ND	24	207	ND
		8/28/2016	8:40:00 AM	10,300	ND	13	38	ND	2	26	7	ND	29,600	43	471	0.1	21	ND	ND	27	265	ND
5912810	N FK American FK R BL Tibble Fork Res	8/23/2016	2:45:00 PM	7,760	ND	16	181	ND	2	22	6	ND	12,100	109	406	0.2	ND	ND	ND	35	280	ND
		8/27/2016	9:27:00 AM	7,540	5	19	178	ND	2	17	6	23	23,900	114	442	0.2	ND	ND	ND	22	306	ND
		8/28/2016	9:00:00 AM	7,950	ND	18	137	ND	2	16	6	20	25,000	105	391	0.2	ND	ND	ND	21	262	ND
4994990	N FK American FK R AB confl S FK	8/23/2016	3:00:00 PM	11,700	9	34	162	ND	5	26	9	56	15,700	347	560	0.4	ND	ND	ND	42	601	ND
		8/27/2016	9:45:00 AM	8,800	ND	20	158	ND	2	18	6	25	26,800	128	471	0.2	ND	ND	ND	22	342	ND
		8/28/2016	9:20:00 AM	10,000	ND	21	181	ND	3	19	7	25	28,300	154	491	0.2	ND	ND	ND	23	370	ND
4994984 - b	American Fork River BL Cave Camp Springs - Blw Water Line	9/1/2016	12:18:00 PM	NS	10	39	NS	0	6	23	NS	66	NS	415	NS	0.5	30	0	0	NS	650	NS
		9/7/2016	10:55:00 AM	NS	6	31	NS	0	4	27	NS	44	NS	262	NS	0.3	0	0	0	NS	484	NS
4994984 - a	American Fork River BL Cave Camp Springs - Abv Water Line	9/1/2016	12:18:00 PM	NS	0	22	NS	0	3	21	NS	33	NS	163	NS	0.2	0	0	0	NS	339	NS
		9/7/2016	10:55:00 AM	NS	0	20	NS	0	2	22	NS	24	NS	142	NS	0.2	0	0	0	NS	330	NS
4994984	American Fork River BL Cave Camp Springs	8/27/2016	10:05:00 AM	7,660	4	19	139	ND	2	15	6	20	24,300	128	483	0.2	ND	ND	ND	19	321	ND
		8/28/2016	9:35:00 AM	9,360	ND	15	107	ND	2	18	5	20	21,300	93	357	0.1	ND	ND	ND	24	235	ND
4994980	American Fork River at mouth of Canyon	8/23/2016	12:25:00 PM	12,900	7	31	155	ND	4	26	9	43	18,400	267	576	0.3	26	ND	ND	38	509	ND
		8/27/2016	10:20:00 AM	16,600	12	49	180	ND	8	30	13	92	41,000	522	616	0.6	36	ND	3	38	916	ND
		8/28/2016	10:00:00 AM	9,560	ND	22	116	ND	3	18	7	31	23,100	170	440	0.3	ND	ND	ND	22	351	ND



Sampling Conclusions

- Although heavy metals were present in the water column they did not exceed the screening values for recreation, agricultural, or aquatic life uses
- Water Turbidity and Suspended Solids returned to near-normal levels within 3 weeks of original discharge
- The bypass canal appeared to significantly reduce turbidity and suspended solids
- Levels of lead in the sediment sometimes exceeded the human recreational health screening values
- Levels of arsenic, cadmium, lead, and zinc in the sediment exceeded the screening values for aquatic life both upstream and downstream from the dam
- In general, levels of heavy metals in the sediment were 2 to 7 times higher below the dam than above the dam

Enforcement Action

- DWQ documented six violations of the Utah Water Quality Act and Water Quality Rules
- A Notice of Violation was issued to North Utah County Water Conservancy District on September 28, 2016
- The District will be responsible for the cost of the investigation
- The settlement of the NOV will include a penalty based on the Utah Water Quality Act
- District will be responsible to determine the damage to stream and will be required to formulate a plan for restoration and monitoring



Dam Construction at Tibble Fork Reservoir

Proposed Sampling and Monitoring Plan

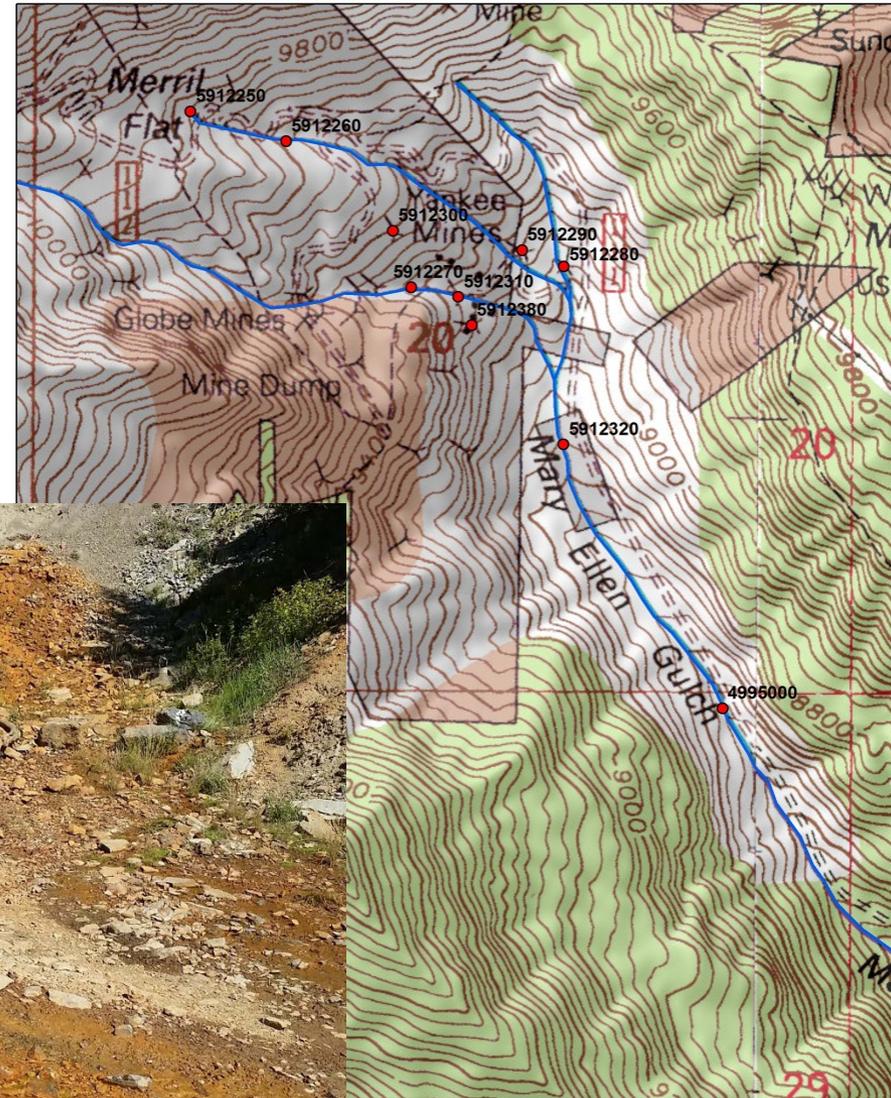
- An environmental consulting company has prepared a conceptual plan for assessment and monitoring of the river
- The plan includes surveys of macroinvertebrates and fish upstream and downstream of the dam
- Tissue samples of macroinvertebrates and fish will be analyzed for heavy metal contamination
- Water and sediment samples will be taken at the same locations to assess levels of heavy metals contamination
- Sediment in irrigation canals downstream will be sampled to determine if contaminated sediment entered the irrigation system
- Sampling will be performed at least 4 times per year, at times of the year corresponding with high and low water conditions
- Monitoring will continue for 5 years after incident

Snowbird Expansion Project



DWQ Involvement

- **Monitoring plan review**
 - Surface water metals sampling
 - Macroinvertebrate sampling
 - Quality assurance
 - Guidance for UPDES permit application
- **Data available for future assessments**
 - Fill assessment data gaps



Map of Mary Ellen Gulch,
American Fork Canyon

DWQ Involvement

- **Individual UPDES Permit**
 - UPDES Permit application submitted October 5, 2016
 - Permit is currently being drafted and will likely contain monitoring and reporting requirements only
- **Construction storm water permitting**
 - Required when areas greater than 1 acre area disturbed
 - Permit requires BMPs to be in place to minimize pollutant run off
 - Oversight will occur from Utah County with support from DWQ and will include:
 - Approval of SWPPP
 - Site inspections every two weeks to ensure compliance with permit conditions

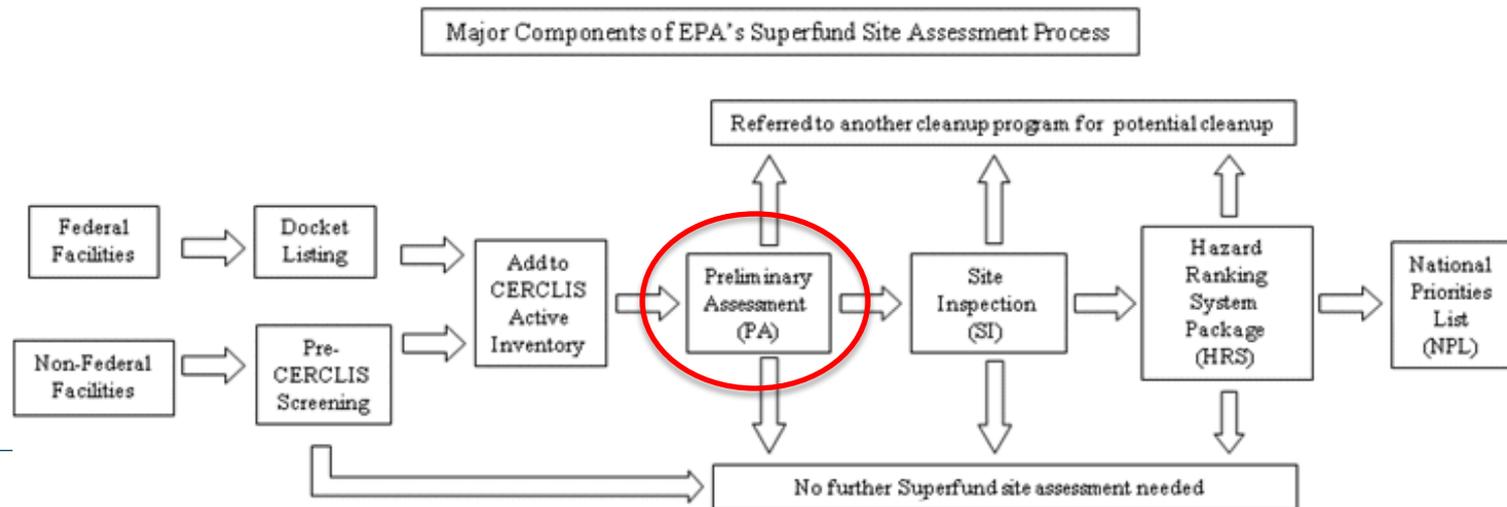


Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)



CERCLA (aka Superfund)

- Petition to EPA by Protect and Preserve American Fork Canyon
 - Impacts of draining mine tunnels
 - Potential mine pool blowouts
 - Human exposure to discharged mine water
- EPA initiated Preliminary Assessment (PA)
 - Review existing information
 - Are contaminants of concern posing risk?
 - What are the exposure pathways?
 - Is further investigation under a Site Inspection necessary?
 - DOES NOT consider impacts from Tibble Fork Reservoir dam rehabilitation project



Questions

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