Provo River Basin

Drinking Water Source Protection Plan

PRWC

December 2019

Provo River
Watershed Plan

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Introduction

Public water systems (PWSs) in the State of Utah who treat surface water or groundwater under the direct influence of surface water are required by the Drinking Water Source Protection (DWSP) Rule, to develop, submit and implement a DWSP Plan for all sources of public drinking water. All PWSs are required to delineate watershed protection zones, develop a listing of potential contamination sources within the protection zones, and subsequently prepare and implement management plans to provide protection for surface water sources within the watershed protection zones.

The following PWSs along the Wasatch Front have formed the Watershed Protection Coalition (Coalition) and have initiated a cooperative project to develop their DWSP Plans for the Provo River Basin Watershed:

Central Utah Water Conservancy District
Jordan Valley Water Conservancy District
Metropolitan Water District of Salt Lake & Sandy

The mission of the Watershed Protection Coalition is to:

- Work cooperatively to understand the watershed, identify priorities, and develop and implement long-term strategies to protect the drinking water source(s) from contamination, as a primary safeguard to protect the public health.

- Support federal, state and local agencies that are empowered with the authority and jurisdiction necessary to protect the watershed(s) and drinking water source(s) through regulations, rules and ordinances.

The members of the Coalition, all of whom are active signing and funding members of the Provo River Watershed Council (PRWC), are working together to protect regional surface water resources. By working together in cooperation with other agencies and programs, the Coalition is able to maximize efficiency, and jointly manage potential contamination sources. Nearly all of the surface water sources, and watershed protection zones fall in areas outside of the PWSs jurisdiction. For this reason, as well as to reduce duplicated efforts, a cooperative, large-scale approach is needed to develop a DWSP plan for all surface water sources attributed to the Coalition. This cooperative approach will allow the PWSs to participate in the approval process for new potential contamination sources proposing to locate within the designated watershed protection zones, for surface water sources located outside the respective PWSs boundaries.

Provo River
Watershed Plan

Chapter 1 Watershed Overview

The Provo River is a major source of public drinking water for the growing areas of Salt Lake, Utah, Wasatch, and Summit Counties. The Central Utah Water Conservancy District (CUWCD), the Jordan Valley Water Conservancy District (JVWCD), and the Metropolitan Water District of Salt Lake & Sandy (MWDSLS) all divert water from the Provo River to water treatment facilities for treatment and delivery for potable use as shown in Table 1.0. The preservation of high source water quality is an important part of a multiple barrier approach to improve the overall quality of drinking water and also reduces the costs of treatment.

Table 1.0 Information for Systems Diverting Water from the Provo River

Utility Name	Water System Number	Utility Address	Type of System	Existing Source Number
JVWCD	18027	Main Office 8215 S 1300 W West Jordan, UT 84088 JVWTP 15305 S 3200 W Herriman, UT 84065 SERWTP 11574 S Wyndcastle Dr Sandy, UT 84092	CWS	Source 02
CUWCD	25112	Main Office 1426 E 750 N Suite 400 Orem, UT 84097 DACRWTP 1120 E. Cascade Dr. Orem, UT 84057	CWS	Source 01
MWDSLS	18016	Main Office 3430 E Danish Rd Cottonwood Heights, UT 84093 Little Cottonwood Water Treatment Plant (LCWTP) 9000 S Danish Rd Cottonwood Heights, UT 84093 Point of the Mountain Water Treatment Plant (POMWTP) 235 W Marion Vista Dr Draper, UT 84020	CWS	Source 01

1.1 General Watershed Description

1.1.1 Climate

The climate of the Provo River Basin varies from its headwaters in the Uintah Mountains to the Heber Valley. The average annual rainfall for the area varies from 16 inches in Heber Valley to 22 inches in the Uintah Mountains. Most of the precipitation at the headwaters falls as snow. The peak runoff at higher elevations generally occurs in May as the snow melts. Average temperatures range from 29^0C in the summer to 1^0C in the winter. The frost-free period is from 27 to 129 days in Heber with an average frost-free period of 90 days.

1.1.2 Geology and Geomorphology

The Upper Provo River Basin watershed includes part of the east side of the Central Wasatch Mountains and part of the western end of the Uintah Mountains. The transitional area between the two mountain ranges includes the West Hills and the Rhodes Plateau. Elevations range from 5,400 feet at Deer Creek Reservoir to slightly over 10,000 feet at some of the watershed boundaries.

Much of the Upper Provo River Basin watershed was formed from Tertiary volcanic activity, most of which has been covered by Pleistocene glacial tills and moraines. The valleys within the watershed are made up of unconsolidated Quaternary fill deposits, possibly from glacial outwashes. Tufa deposits (from thermal springs), near Midway intermix with the valley fill deposits.

Rocks throughout the Upper Provo Watershed range in age from Precambrian to Quaternary through Triassic. These rocks are primarily sedimentary, and metasedimentary with several intrusions of igneous stocks of monzonite. More specifically the rocks consist of Pennsylvanian and Permian-aged limestones, sandstones, and quartzites.

1.1.3 Soils

In general, soils in the Upper Provo Basin watershed are characterized by loamy textures. Soils in the high mountains (above 6800 feet) on the east, south, and west sides of the watershed are loams, gravelly loams, or cobbly loams derived from residuum, colluvium, or glacial deposits. Soils on mountain slopes at lower elevations and on the plateau areas are clay

loams, silt loams, sandy loams, or cobbly loams derived from sedimentary or volcanic rocks. The foothills and alluvial fans bordering the three main valleys are mainly cobbly loams, silt loams, or clay loams formed in residuum and alluvium from sedimentary rocks. Soils on stream terraces and in the valley bottoms are comprised of loams or gravelly loams.

The fine-grained texture of most of these soils means that a significant percentage of the material eroded from upland areas will ultimately become part of the sediment yield to the Provo River and the reservoirs. Most of the fine silt and clay derived from these loams will be delivered over time as suspended sediment in streamflow, and much of the sand will be carried in the bedload.

The erosion potential of soils in Heber Valley was computed for use in the *Guide for Erosion and Sediment Control* prepared for Wasatch County (see Appendix A). The erosion potential is a combination of the erodibility of the soils, the slope of the terrain, the proximity to perennial and intermittent streams and the potential rainfall. Due to the variances associated with parameters, typical erosion potentials varies from low to very high for the Heber Valley area.

1.2 Water Quality within the Watershed

1.2.1 Tributary Streams

There are four principle tributary streams that empty into Deer Creek Reservoir. These tributary streams include:

- Provo River
- Snake Creek
- Daniels Creek
- Main Creek

1.2.2 Streams Classification

The State of Utah classifies the water bodies in the state according to the beneficial use of the water. The water quality standards are different for each beneficial use category. A description of each beneficial use category found in Wasatch County is included below:

Class 1C: Protected for domestic purposes with prior treatment processes as required by Utah Department of Environmental Quality.

Class 2A: Protected for primary contact recreation such as swimming.

Class 2B: Protected for boating, water skiing and similar uses, excluding swimming.

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

Class 4: Protected for agricultural uses including stock watering and irrigation of crops.

The Provo River and tributaries from Murdock Diversion to the headwaters have been classified by the State of Utah for the following beneficial use categories: 1C, 2B, 3A and 4. Deer Creek Reservoir has been classified as 1C, 2A, 2B, 3A and 4. Jordanelle Reservoir has been classified as 1C, 2A, 3A, and 4.

Water quality standards are violated if the chronic or acute values are exceeded more than once in three years. The State of Utah water quality criteria for each different classification in the Upper Provo River Basin are summarized in Table 1.1 and Table 1.2.

Table 1.1 Beneficial Use Water Quality Criteria for Waters in Wasatch County.

PARAMETER	CLASS 1C	CLASS 2A	CLASS 2B	CLASS 4
BACTERIOLOGICAL				
E. Coli (30-day geo. Mean)	206	126	206	N/A
E. coli (max)	668	409	668	N/A
PHYSICAL				
pH (Range)	6.5-9.0	6.5-9.0	6.5-9.0	6.5-9.0
Turbidity Increase (NTU)	N/A	10	10	N/A
METALS (Dissolved max mg/l)				
Arsenic	0.01	N/A	N/A	0.1
Barium	1.0	N/A	N/A	N/A
Beryllium	<0.004	N/A	N/A	N/A
Cadmium	0.01	N/A	N/A	0.01
Chromium	0.05	N/A	N/A	0.10
Copper	N/A	N/A	N/A	0.2
Lead	0.015	N/A	N/A	0.1
Mercury	0.002	N/A	N/A	N/A
Selenium	0.05	N/A	N/A	0.05
Silver	0.05	N/A	N/A	N/A
INORGANICS (mg/l)				
Bromate	0.01	N/A	N/A	N/A
Boron	N/A	N/A	N/A	0.75
Chlorite	<1.0	N/A	N/A	N/A
Fluoride	1.4-2.4	N/A	N/A	N/A
Nitrates as N	10	N/A	N/A	N/A
TDS	N/A	N/A	N/A	1200
RADIOLOGICAL (pCi/l)				
Gross Alpha	15	N/A	N/A	15
Gross Beta (mrem/yr	4	N/A	N/A	N/A
Radium 226, 228	5	N/A	N/A	N/A
Strontium 90	8	N/A	N/A	N/A
Tritium	20000	N/A	N/A	N/A
URANIUM	30	N/A	N/A	N/A
Organics (UG/L)				
Chlorophenoxy Herbicides:				
2,4-D	70	N/A	N/A	N/A
2,4,5-TP	10	N/A	N/A	N/A
Methoxychlor	40	N/A	N/A	N/A
POLLUTION INDICATORS				
BOD (mg/l)	N/A	5	5	5
Nitrate as N (mg/l)	N/A	4	4	N/A
Phosphate as P (mg/l)	N/A	0.05	0.05	N/A

Table 1.2 Numeric Criteria for Aquatic Wildlife Use in Wasatch County.

PHYSICAL	**4 DAY AVE.**	**1 HOUR AVE.**
DO (mg/l) - 30 Day Ave.	6.5	N/A
DO (mg/l) - 7 Day Ave.	9.5/5.0	N/A
DO (mg/l) - 1 Day Ave.	8.0/4.0	N/A
Max. Temp (C)	20	N/A
Max. Delta Temp (C)	2	N/A
pH (Range)	6.5-9.0	N/A
Turbidity Increase (NTU)	10	N/A
METALS (Dissolved ug/l)	**4 DAY AVE.**	**1 HOUR AVE.**
Aluminum	87	750
Arsenic (Trivalent)	150	340
Cadmium	0.25	2.0
Chromium (Hexavalent)	11	16
Chromium (Trivalent)	74	570
Copper	9	13
Cyanide (free)	5.2	22
Iron (Maximum)	1000	1000
Lead	2.5	65
Mercury	0.012	0.012
Nickel	52	468
Selenium	4.6	18.4
Silver	1.6	1.6
Tributyltin	0.072	0.46
Zinc	120	120
INORGANICS	**4 DAY AVE.**	**1 HOUR AVE.**
Ammonia	Temp / pH based	Temp / pH based
Chlorine (Total Residual)	0.011	0.019
Hydrogen Sulfide (Undissociated Max. ug/l)	2.0	N/A
Phenol (Maximum)	0.01	N/A
RADIOLOGICAL (MAXIMUM pCi/l)		
Gross Alpha	15	

Table 1.2 Numeric Criteria for Aquatic Wildlife Use in Wasatch County. (cont).

ORGANICS (g/l)	**4 DAY AVE.**	**1 HOUR AVE.**
Acrolein	3.0	3.0
Aldrin	N/A	1.5
Chlordane	0.0043	1.2
Chlorpyrifos	0.041	0.083
DDT and Metabolites	0.0010	0.55
Diazinon	0.17	0.17
Dieldrin	0.056	0.24
Endosulfan	0.056	0.11
Endrin	0.036	0.086
Heptachlor	0.0038	0.26
Hexachlorocyclohexane (Lindane)	0.08	1.0
Methoxychlor (Maximum)	0.03	N/A
Mirex (Maximum)	0.001	N/A
Nonylphenol	6.6	28.0
Parathion	0.013	0.066
PCB's	0.014	
Pentachlorophenol	15	19
Toxaphene	0.0002	0.73
POLLUTION INDICATORS		
Gross Beta (pCi/l)	50	N/A
BOD (mg/l)	5	N/A
Nitrate as N (mg/l)	4	N/A
Phosphate as P (mg/l)	0.05	N/A

1.2.3 Streams Monitoring

Because of its importance as a drinking water source, there have been a number of long-term monitoring programs on the Provo River and its various tributaries. The PRWC in coordination with the Division of Water Quality (DWQ) compiles the yearly monitoring program. During 2019, PRWC took samples from 20 stream sample locations and 7 reservoir stations for the purpose of water quality analysis.

The 2018 Water Quality Implementation Report (Appendix G) prepared for Wasatch County and PRWC contains current water quality status and trends throughout the Provo River basin.

1.2.4 Groundwater Monitoring Study

In 1995, the State Water Quality Board classified the aquifer in the Heber Valley as Class 1A pristine. From recommendations made in previous implementation reports, PRWC has been working with Wasatch County and the U.S. Geological Survey (USGS) to monitor groundwater in Heber Valley. The 2005 through 2012 results of this program are shown in Appendix N. A cost-share funding program with USGS has been on-going to collect and analyze samples from selected existing observation wells in the valley. This monitoring will help determine groundwater quality returning to Provo River and Deer Creek Reservoir, detect existing or future problems, and define trends in the groundwater.

1.2.5 Division of Water Quality's 303(d) List

The DWQ is also responsible for determining areas of the watershed which are not supporting their beneficial use criteria. This list of non-supporting streams is contained in the 303(d) report, which is compiled every other year. The 303(d) list for Utah Lake – Jordan River including Provo River Basin was updated in 2016 as shown on Map 1.2 and available from DWQ at:
https://documents.deq.utah.gov/water-quality/monitoring-reporting/integrated-report/DWQ-2017-004941.pdf

1.3 Land Use of the Watershed

1.3.1 Primary Land Uses

The primary land uses for the Provo River Basin watershed are shown in Table 1.3. Map 1.1 (Provo River Basin General Land Use) shows the geographical distribution of the many land uses with the Provo River Basin watershed area.

Table 1.3 Primary Watershed Land Uses.

Land Use	**Percentage of Watershed Area**
Forest	67%
Agriculture (pasture and row crops)	25%
Residential, Commercial and industrial uses	4%
Riparian/wetlands	<1%
Various Other Uses	3%

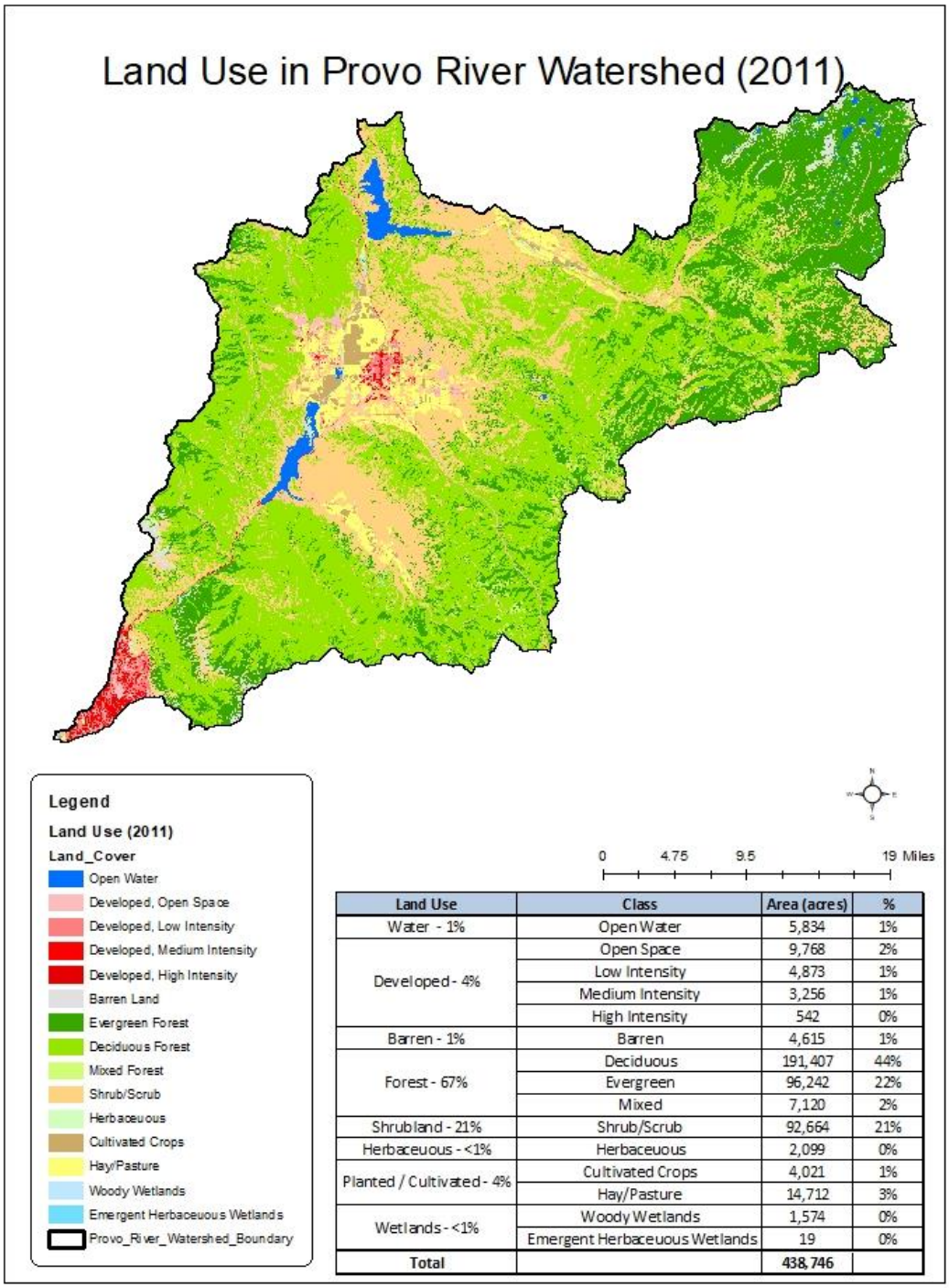
1.3.2 Population Within Watershed Area

The Provo Basin Watershed encompasses Summit, Utah and Wasatch counties. The populations of each county based upon the 2010 census.

Table 1.4 Population Of Counties Within Watershed.

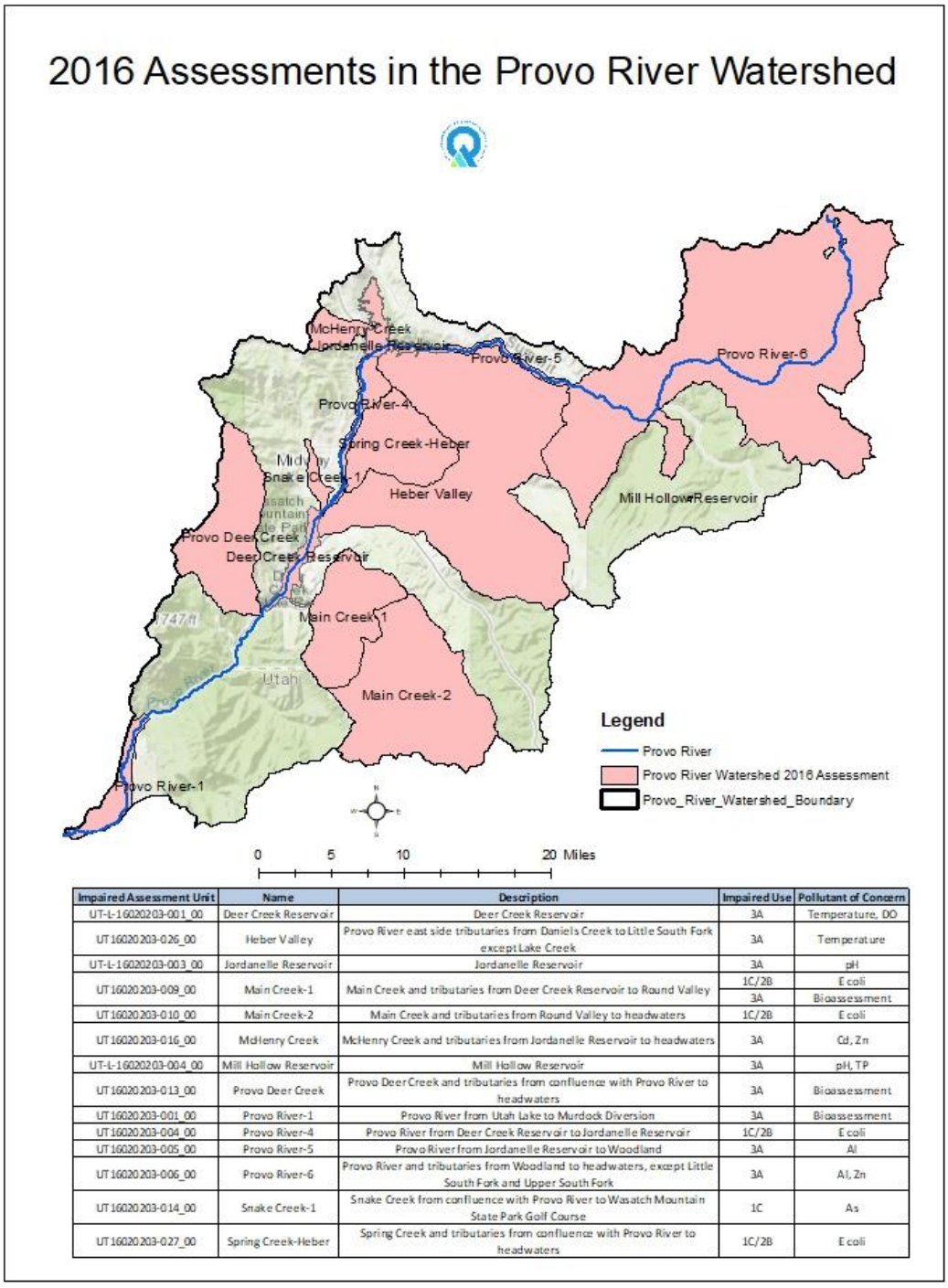
County	**2010 Census Population**
Summit	36,324
Utah	516,564
Wasatch	23,530
Total Population	576,418

Map 1.1



Land Use	Class	Area (acres)	%
Water - 1%	Open Water	5,834	1%
Developed - 4%	Open Space	9,768	2%
	Low Intensity	4,873	1%
	Medium Intensity	3,256	1%
	High Intensity	542	0%
Barren - 1%	Barren	4,615	1%
Forest - 67%	Deciduous	191,407	44%
	Evergreen	96,242	22%
	Mixed	7,120	2%
Shrubland - 21%	Shrub/Scrub	92,664	21%
Herbaceuous - <1%	Herbaceuous	2,099	0%
Planted / Cultivated - 4%	Cultivated Crops	4,021	1%
	Hay/Pasture	14,712	3%
Wetlands - <1%	Woody Wetlands	1,574	0%
	Emergent Herbaceuous Wetlands	19	0%
Total		**438,746**	

Map 1.2



Impaired Assessment Unit	Name	Description	Impaired Use	Pollutant of Concern
UT-L-16020203-001_00	Deer Creek Reservoir	Deer Creek Reservoir	3A	Temperature, DO
UT16020203-026_00	Heber Valley	Provo River east side tributaries from Daniels Creek to Little South Fork except Lake Creek	3A	Temperature
UT-L-16020203-003_00	Jordanelle Reservoir	Jordanelle Reservoir	3A	pH
UT16020203-009_00	Main Creek-1	Main Creek and tributaries from Deer Creek Reservoir to Round Valley	1C/2B	E coli
			3A	Bioassessment
UT16020203-010_00	Main Creek-2	Main Creek and tributaries from Round Valley to headwaters	1C/2B	E coli
UT16020203-016_00	McHenry Creek	McHenry Creek and tributaries from Jordanelle Reservoir to headwaters	3A	Cd, Zn
UT-L-16020203-004_00	Mill Hollow Reservoir	Mill Hollow Reservoir	3A	pH, TP
UT16020203-013_00	Provo Deer Creek	Provo Deer Creek and tributaries from confluence with Provo River to headwaters	3A	Bioassessment
UT16020203-001_00	Provo River-1	Provo River from Utah Lake to Murdock Diversion	3A	Bioassessment
UT16020203-004_00	Provo River-4	Provo River from Deer Creek Reservoir to Jordanelle Reservoir	1C/2B	E coli
UT16020203-005_00	Provo River-5	Provo River from Jordanelle Reservoir to Woodland	3A	Al
UT16020203-006_00	Provo River-6	Provo River and tributaries from Woodland to headwaters, except Little South Fork and Upper South Fork	3A	Al, Zn
UT16020203-014_00	Snake Creek-1	Snake Creek from confluence with Provo River to Wasatch Mountain State Park Golf Course	1C	As
UT16020203-027_00	Spring Creek-Heber	Spring Creek and tributaries from confluence with Provo River to headwaters	1C/2B	E coli

1.3.3 Demographics, Land Use, and Recreation of the Watershed

The federal government oversees about 40 percent of the 324,600 acres of total land area in the Utah Lake Basin in Wasatch County. Federally administered land is under the jurisdiction of five agencies, the Forest Service, Bureau of Land Management, National Park Service, U.S. Army and the Bureau of Reclamation. Private and State ownership of land in Wasatch County is approximately 158,100 acres and 35,100 acres respectively.

The largest recreational attraction in the area is the Wasatch Mountain State Park near Midway. The park has a number of campgrounds for overnight use but the primary attraction is its golf course. In the winter the park also attracts a number of snowmobilers and cross-country skiing enthusiasts.

Outside of the Heber Valley most of the human impact is due to recreation. The two large reservoirs in the basin (Jordanelle and Deer Creek) draw the largest number of visitors to the area, but other sites draw visitors as well. In the upper areas of the Provo River, the land is under the jurisidiction of the National Forest Service being part of the Wasatch-Cache National Forest.

1.3.4 Hydrology of the Watershed

The Provo River Watershed consist of 825 square miles or approximately 528,000 acres. The Provo River Basin above Deer Creek Reservoir has been divided into nine hydrologic sub-basins. Snow melt provides most of the runoff for these sub-basins and is the main hydrologic factor. Because of this, spring runoff is one of the predominant factors in determining the water quality for the Provo River.

The hydrology of the Provo River is significantly altered by the presence of two large water storage reservoirs. Jordanelle Reservoir lies just north of Heber Valley. The reservoir started filling in 1989 and making initial deliveries in 1994. The operational capacity of the Jordanelle Reservoir is over 300,000 acre-feet of water. Deer Creek Reservoir lies just below the Heber Valley and has been in operation since the early 1950's. This reservoir holds 150,000 acre-feet of water.

1.3.4.1 Weber River

As the water flows into the Heber Valley there are many diversions for irrigation. Almost 55,000 acre-feet of the water is

diverted yearly from the Provo for agricultural use. Water is also diverted from Daniels Creek, Snake Creek and Lake Creek.

In addition to the natural runoff of the Provo River basin, there are two transbasin diversions which import water into the basin above Jordanelle Reservoir. Water is diverted from the Weber River approximately three quarters of a mile east of Oakley and conveyed to a discharge point on the Provo River approximately four and one half miles northwest of Woodland. For the period 1961 through 1990, historical annual diversions near Oakley have averaged about 38,000 acre-feet and historical discharges to the Provo River from 1941 to 1990 have averaged about 35,000 acre-feet. More than 90 percent of the annual diversions occur during the period of April through July. Map 4.2 (Provo River Basin Contribution from Weber River Basin) shows the Weber River as well as the protection zones surrounding it.

Weber Basin Water Conservancy District has developed a DWSP Plan for the Weber River and surrounding watershed area (see Appendix C).

1.3.4.2 Duchesne Tunnel

The second transbasin diversion diverts water from the Duchesne River into the Provo River, approximately 14 miles upstream of Woodland. Historical diversions for the period 1954 through 1984 have averaged about 23,900 acre-feet per year. Map 4.3 (Provo River Basin Contribution from Duchesne Tunnel) shows the location of the tunnel as well as the protection zones near the tunnel.

1.3.4.3 Strawberry Reservoir and Syar Tunnel

A third transbasin diversion diverts water from the Strawberry Reservoir to the Diamond Fork and Utah Lake system pipelines and tunnels and will eventually be available as source water to water treatment plants. Map 4.4 (Strawberry Reservoir and tributaries above Syar Inlet) shows the location of the tunnel as well as the protection zones around Strawberry Reservoir.

1.3.5 Current Water Users and Activities

1.3.5.1 Municipal

The Provo River is a major source of public drinking water for the growing areas in Salt Lake, Utah, Wasatch and Summit Counties. The CUWCD, the JVWCD, the MWDSLS, all divert water from the Provo River to water treatment facilities for treatment and delivery for potable use. The preservation of good water quality is important to reduce the costs of expensive water treatment.

1.3.5.2 Agricultural

The Provo River is also a source of irrigation water used for agricultural purposes. In Heber Valley, there are fourteen irrigation companies that have water rights to the Provo River. The Provo River Water Users Association (PRWUA) and several irrigation companies in Utah and Salt Lake Valleys also have water rights to much of the water contained in Deer Creek Reservoir.

1.3.5.3 Recreation and Fisheries

Jordanelle and Deer Creek Reservoirs along with the Provo River and its tributaries, are a source of recreation for many. State Parks are located on Jordanelle and Deer Creek Reservoirs to provide basic services for the recreationists that visit. The reservoirs provide for water skiing, swimming, boating, fishing and more. Jordanelle opened its waters to fishing in 1995. Deer Creek and Jordanelle Reservoirs, along with the Provo River and its tributaries, provide excellent fisheries for anglers.

1.3.5.3.1 Deer Creek State Park

Deer Creek State Park offers boating, water skiing, jet skiing, wind surfing, fishing, camping and other recreational activities at its sites. These sites include Island Beach, Sailboat Beach, Rainbow Bay (day use), and Wallsburg Bay. These facilities have been upgraded to improve water quality.

1.3.5.3.2 Jordanelle State Park

Camping, fishing, boating, hiking and other recreational activities are available at the two developed recreation sites of Jordanelle State Park.

The Rock Cliff Recreation Site is located at the east end of the reservoir and has accommodations which include a nature center, elevated boardwalk systems, modern restrooms with showers, group-use pavilions, 50 walk-in camping sites, and limited non-motorized trails.

The Hailstone Recreation Site and Jordanelle Reservoir opened its park gates and launch ramps at the end of June 1995. The 400 acre tract of land located on the west shore of the reservoir provides facilities for 180 camping units, individual powerboats and personal water craft launching sites, 30 individual day use cabanas, beach house facility, 3 large group-use pavilions, playgrounds, laundromats, visitor center and a convenience store/restaurant.

The Ross Creek site is located on the east shore of the north arm of the reservoir. The Ross Creek Recreation Area has had limited development serving as a trailhead to the Perimeter Trail with a self-pay fee box in a gravel parking area, vault toilet restrooms and a hitching post No permanent facilities are being designed at present because of its limited use due to reservoir fluctuation, and because full development cannot proceed until a sewer system is developed and extended to this location.

The perimeter trail system opened in conjunction with the Hailstone facilities. The park now offers 13 miles of trails available for hiking, jogging, mountain biking, equestrian use, and cross-country skiing.

1.3.5.3.3 North Fork Canyon

The North Fork of Provo Canyon is home of the Sundance Ski Resort which provides year-round recreation activities: skiing, horseback riding, mountain biking, summer theater/plays, and many

hiking trails. This canyon also is home to the Brigham Young University Timp Lodge which offers many recreational activity opportunities to BYU alumni and their guests. The past 15 years have seen an influx of recreational cabins/properties, bringing many more people into the watershed to enjoy its beauty.

1.3.5.3.4 South Fork Canyon

Similar to the North Fork, South Fork of the Provo Canyon experiences many recreational activities also, but it is much less developed. The Girl Scouts of America operate a year-round girls camp, Trefoil, which provides camping and hiking experiences to young women ages 8 to 20 years old. Provo City has two city parks located within South Fork. These parks are heavily used in the spring, summer and fall. Provo City also owned and operated the Big Springs Riding Stables in South Fork, but after considering the potential impact manure may have on the watershed, the operation was discontinued and the horses were removed from the canyon.

1.3.5.4 Jordanelle Reservoir Operation

Jordanelle Reservoir retains sediments and phosphorus which helps lowers total phosphorus concentrations in the Provo River and Deer Creek Reservoir below. The 1984 PRWC management plan called for the retention of 50% of all phosphorus originating above Jordanelle Reservoir. Current data indicate that the goal has been met or surpassed through the operation of the Selective Level Outlet Works (SLOW) on Jordanelle Dam by selecting the depth from which water is released from the reservoir.

1.3.5.5 Jordanelle Special Service District - Water System

Jordanelle Special Service District water system design (including waterlines, pump stations, intake structures, treatment plant, and storage tanks) began in 1997. Construction of some of the tanks and waterlines also began in 1997. Final design of the initial system needed to operate much of the Deer Crest area was substantially completed in 1998.

1.3.5.6 Jordanelle Special Service District - WRF

Jordanelle Special Service District Water Reclamation Facility has a design flowrate of 1.0 million gallons per day (MGD). The facility serves the developments in the area of Jordanelle Reservoir north of Heber City in Wasatch County, UT. The facility's flow passes through; fine screens, and then through a series of anaerobic and aerobic tanks (which is a biological aid in the removal of phosphorous), then through a membrane bio-reactor (which includes the addition of alum for further phosphorous removal), then through an ultra violet (UV) disinfection system. The solids handling consist of an aerated solids handling basin and a belt press for dewatering. There has not been a discharge from the facility to this point but the UPDES permit was renewed, including interim start-up limits, to expire on March 31, 2024.

1.3.5.7 Heber Valley Special Service District - Sewer System

The Heber Valley Special Service District was constructed to treat the sewage flows from Heber. The treatment effluent does not discharge into any water body. Instead it is stored in holding ponds where it is pumped to irrigate several acres of fields. Some of this effluent is lost to evaporation and natural percolation. Recently, a rapid infiltration basin was constructed to reduce the need for the expansion of winter holding ponds.

1.3.5.8 Mayflower Resort

Mayflower Mountain Resort has been monitoring stream flows and water quality parameters in the McHenry Canyon drainage area and reporting the results in an annual report to Wasatch County since 1984. The DWQ had issued a Ground Water Quality Discharge Permit for the stabilization of the three tailing ponds located adjacent to US Highway 40. This 5-year permit expired in 1998. DWQ did not renew the permit because of failure by Mayflower to address a Notice of Violation (NOV) issued in 1996.

The NOV addressed the issue of stabilizing the tailing ponds. Plans and specifications have been prepared for the stabilization of the tailing ponds. The tailing ponds have not yet been capped because an economical source of random fill has not been obtained. Mayflower is presently attempting to identify an alternative source of random fill.

In the meantime, Mayflower has implemented interim storm water controls around the tailing ponds to control the migration of tailing material. The interim storm water controls consist of diversion channels and detention basins which are inspected, with DWQ oversight, twice a year and maintained as necessary. Biannual inspection reports are prepared and submitted to the DWQ identifying inspection observations and recommendations, and summarizing any maintenance performed on the interim storm water controls.

1.3.5.9 Soldier Hollow: Winter Sports Park

Soldier Hollow was used as a site during the 2002 Winter Olympics for all Cross-country, Biathlon, and Nordic combined events. The site is located on the southern end of Wasatch Mountain State Park and directly west of the northern tip of Deer Creek Reservoir. In order to facilitate hosting of these Olympic events it was necessary to construct 23 kilometers of trail, a shooting range for small caliber rifles, a stadium area and a Competition Management facility.

In the fall of 1998 the first 5 kilometers of trail were constructed. The trails consist primarily of 5 to 11 meter wide trails bladed into the hillside, following existing contours. Drainage culverts were installed at drainage crossings and erosion control measures were incorporated to prevent erosion of the newly bladed areas into the existing waterways and streams. The trail areas were re-seeded using a native seed mixture approved by the Department of Natural Resources (DNR).

During 1999 an additional 18 kilometers of trail were completed including the installation of a snow making system; installation of water, sewer, gas, electrical and telecommunications lines; and the construction of a shooting range and a Competition Management building. Bridges and culverts were built to bridge streams and trail crossings. The design team worked with the Army Corps of Engineers to obtain the necessary permits to allow construction of trails across existing wetlands and streams. Drainage channel improvements were created to keep surface flows in drainage channels and away from the shooting range and stadium areas.

As part of the snow making system, a small holding pond was constructed at the end of the Midway Irrigation Company pipeline. This pond serves as a cooling pond for snow making and serves as a holding pond for irrigation for the two existing golf courses.

With the completion of the Midway Irrigation piping, the West Bench Ditch was abandoned and serves only as a storm drainage collection ditch. The ditch has been breached just north of the main drainage channel running through the venue to prevent flows north of the drainage from contributing to the erosion potential along the newly constructed trails south of the drainage.

Overflows from the Midway Irrigation Piping are allowed to flow through the Epperson to the main drainage just east of the stadium area, where they join with natural flows running through an existing detention basin and then into Deer Creek Reservoir.

1.3.5.10 Midway Fish Hatchery

The Midway Fish Hatchery's Utah Pollutant Discharge Elimination System (UPDES) permit UT0025879 was renewed on January 1, 2016 and will expire in December 31, 2020. It specifically limits the total suspended solids (TSS) maximum concentration to 25 mg/l, pH to a range of 6.5 to 9.0, and net increase of total phosphorus to 400 kg/yr. The permit requires the hatchery to monitor the influent springs and the effluent springs for the determination of net increase of total phosphorus.

1.3.5.11 Kamas Fish Hatchery

The Kamas Fish Hatchery is authorized to discharge under the UPDES General Permit UTG 1300006 for concentrated aquatic animal production facilities (CAAPF). The permit became effective March 1, 2015 and will expire in February 8, 2020.

1.3.5.12 Jordanelle Special Service District (JSSD)

On the west side of Jordanelle Reservoir, JSSD manages the discharge water from their treatment facilities at Keetley Station. This water originates from old mines in Park City that are drained through the Ontario #2 Drain Tunnel. The UPDES

permit sets specific limitations on daily maximum concentrations of TSS, aluminum, copper, lead, mercury, zinc, oil and grease. Limitations are also placed on 30-day average concentrations of TSS, lead, aluminum, and mercury. This mine water is treated through the JSSD Treatment Plant before being discharged. The drain tunnel is not a significant source of phosphorus and phosphorus is not limited in the permit although the State monitors the effluent. The current permit was effective on June 1, 2013 and will expire on May 31, 2023.

Chapter 2 Designated Person(s)

2.1 General

Each designated person is responsible to ensure compliance to the DWSP rule for surface water sources rule, and is also responsible to receive and respond to communications from the Division of Drinking Water (DDW). The designated person information will be updated directly by the individual PWSs as changes occur. Any and all changes will be officially updated every six (6) years as required by the rule.

The following individuals have been assigned by their respective PWSs, as the "designated person(s)":

Table 2.1 Designated Persons

Designated Person	Utility	Utility Address	Designated Person's Phone Number	Designated Person's Email Address
Shazelle Terry	Jordan Valley Water Conservancy District (JVWCD)	Jordan Valley Water Treatment Plant 15305 South 3200 West Herriman, UT 84065	(801)446-2004	ShazelleT@jvwcd.org
Mike Rau	Central Utah Water Conservancy District (CUWCD)	1426 E 750 N Suite 400 Orem, UT 84097	(801)226-7113	miker@CUWCD.com
Claudia Bauleth	Metropolitan Water District of Salt Lake & Sandy (MWDSLS)	3430 East Danish Road Cottonwood Heights, UT 84093	(801)942-9651	bauleth@mwdsls.org

Chapter 3 Source Protection Rule Requirements

3.1 General

PWSs in the State of Utah who treat surface water or ground water under the direct influence of surface water are required by the DWSP Rule, to develop, submit and implement a DWSP Plan for all sources of public drinking water. All PWSs are required to delineate watershed protection zones, develop a listing of potential contamination sources within protection zones, and subsequently prepare and implement management plans to provide protection of the surface water sources within the watershed protection zones.

3.2 Delineation Zones

The information for the delineation maps for surface water sources was acquired from the DDW. The delineation maps were prepared to meet the requirements of the DWSP Rule. The preferred delineation procedure requires that four zones be delineated for management purposes as follows:

- Zone 1 (for streams, rivers, and canals) encompasses the area on both sides of the source, ½ mile on each side measured laterally from the high water mark of the source (bank full), and from 100 feet downstream of the point of diversion (POD) to 15 miles upstream (or to the limits of the watershed or to the State line, whichever comes first). If a natural stream or river is diverted into an uncovered canal or aqueduct for the purpose of delivering water to a system or a water treatment facility, the entire canal will be considered to be part of Zone 1, and the 15 miles measurement upstream will apply to the stream or river contributing water to the system from the diversion.

- Zone 1 (for reservoir or lakes) is considered to be the area ½ mile from the high water mark of the source. Any stream or river contributing to the reservoir or lake will be included in Zone 1 for a distance of 15 miles upstream, and a half mile laterally on both sides of the source. If a reservoir is diverted into an uncovered canal or aqueduct for the purpose of delivering water to a system or a water treatment facility, the entire canal will be considered to be part of Zone 1, and the 15 miles measurement upstream will apply to the stream or river contributing water to the system from the diversion.

- Zone 2 is defined as the area from the end of Zone 1 to a point an additional
  50 miles upstream (or to the limits of the watershed or to the State line, whichever comes first), and for a width of 1,000 feet on each side measured from the high water mark of the source.

- Zone 3 is defined as the area from the end of Zone 2 to the limits of the watershed or to the State line, whichever comes first, and for a width of 500 feet on each side measured from the high water mark of the source.

- Zone 4 is defined as the remainder of the area of the watershed contributing to the source that does not fall within the boundaries of Zones 1 through Zone 3.

Map 4.1 (Provo River Basin Protection Zones), Map 4.2 (Weber River Basin above Weber-Provo Canal), Map 4.3 (Duchesne River above Duchesne Tunnel), and Map 4.4 (Strawberry Reservoir and tributaries above Syar Inlet) show the watershed protection zones for all watershed areas included in this plan.

3.3 Intake Susceptibility

An intake receives water from the source which is then conveyed to the treatment plant. The design and operation of an intake becomes a crucial element in reducing a PWSs susceptibility to contamination. Each member of the Coalition has evaluated the susceptibility and structural integrity of the intake(s) which supply source water to their respective treatment plants. This evaluation considered the physical conditions of the intake regarding its ability to adequately protect from contamination events. In addition, the physiographic and/or hydrogeologic factors influencing the intake sensitivity will also be considered to assess the likelihood of decreasing a contamination event. (Refer to Chapter 4 for the completed intake evaluations as well as a discussion regarding the physical conditions surrounding each intake.)

3.4 Management Programs

The purpose of the management program is to provide the members of the Coalition with a means to protect the drinking water source from existing and future potential contamination source (PCS). Members of the Coalition are actively involved in the Provo River Watershed Council (PRWC) and other committees working to implement the many existing management programs to protect the Provo River Basin Watershed. Chapters 7 and 8 of this document provide a detailed explanation of the proposed management program and strategies.

This DWSP Plan utilizes the listing of PCSs provided by the DDW. These PCSs are presented and addressed in Chapter 5.

The completed management program will be made accessible to the public for their viewing at each Coalition member's offices. The public will be notified of this report's availability through the annual Consumer Confidence Reports that are generated and distributed by each member of the Coalition. Members of the Coalition hosting web pages will also post public notification bulletins there as well.

3.5 Contingency Plans

Contingency plans provide an overview of how the utilities can and should respond to a contamination event. This plan also identifies resources that are available to the Coalition members. It also identifies alternative sources of water that may be provided on a temporary need to the PWSs customers.

If a contamination event occurred within a watershed or upstream of an intake, each PWS has developed a contingency plan to address the issues of emergency response, public notification, rationing and remediation. Each contingency plan is specific to the needs and resources of each member of the Coalition. (Refer to sections 12.2, 12.3, and 12.4 for contingency plans for CUWCD, JVWCD and MWDSLS respectively.

Chapter 4 Intake Information, Susceptibility Assessment & Delineation Zones

4.1 General

An intake receives water from the source which is then conveyed to the treatment plant. The design and operation of an intake becomes a crucial element in reducing a PWSs susceptibility to contamination. Each member of the Coalition has evaluated the susceptibility and structural integrity of the intakes(s) which supply water to their respective treatment plants. This evaluation considered the physical conditions of the intake regarding its ability to adequately protect source water from contamination events. In addition to this, the physiographic and/or hydrogeologic factors influencing the intake sensitivity have also been considered to assess their likelihood of decreasing a contamination event.

Table 4.1 assesses the design and construction of each intake according to the requirements outlined in the *Administrative Rules for Public Drinking Water Systems, Part II, R309-204.5.(5).*

Table 4.1 Intake Assessment.

	SLA Intake	**Olmsted Intake**	**Murdock Diversion/Intake**
Does the intake allow for water withdrawal from more than one level if water quality varies with depth?	No	No	No
Is the lowest intake withdrawal elevation located at a sufficient depth to be submerged at the low elevation of the reservoir?	Yes	N/A	N/A
Does the intake have a separate facility for the release of less desirable water held in storage?	Yes	N/A	N/A
Does the intake allow for occasional cleaning of the inlet line?	Yes	Yes	Yes
Is the diversion device capable of keeping fish and/or debris from entering the intake?	Yes	Yes	Yes A new automatic rake system and four large traveling screen were added in 2013.
If you use pumps to transfer diverted water, do the pumps have suitable protection?	N/A	N/A	N/A
If you have an impoundment reservoir, have brush and trees been removed to the high water level?	No	There is not a reservoir, but water can back up above diversion structure and inundate streamside vegetation.	N/A
Has the impoundment provided adequate precautions to limit nutrient loads?	No	N/A	N/A
Can the intake be closed to allow contamination to pass by?	Yes	Yes	Yes
Do the physical conditions of the intake provide adequate protection from contamination events?	No	Yes	No

4.2 Physiographic and Hydrogeologic Factors

Listed below are the physiographic and/or hydrogeologic factors that influence the sensitivity of the intake to potential contamination. These factors may be natural or man-made and may increase or decrease the likelihood of contamination.

4.2.1 Salt Lake Aqueduct Intake

The intake into the Salt Lake Aqueduct is located in the tail race of the Deer Creek Dam and was re-constructed in 2001. The Deer Creek reservoir is open to the public for recreation. There are also several runoff streams that enter the reservoir from agricultural lands as well as new and established residential developments. The intake does not have the ability to control the quality of the water that it may divert, only whether or not the water is actually diverted. The area surrounding the intake is natural vegetation with the exception of the dam itself, and the facilities onsite associated with the intake and the hydroelectric plant of the dam. The reconstructed highway passes across the downstream side of the dam. The dam and intake are located in a mountainous canyon so runoff from the hillsides on both sides as well as from the highway are likely to enter the tail race area.

4.2.2 Olmsted Intake

The majority of the water reaches the intake from the dam release at Deer Creek Reservoir. However, there are tributary streams (Provo Deer Creek (Little Deer Creek), North Fork and South Fork) that can at times contribute to contamination. Also, the river is adjacent to the Provo Canyon highway and therefore is susceptible to contamination from accidental spills, salt, etc.

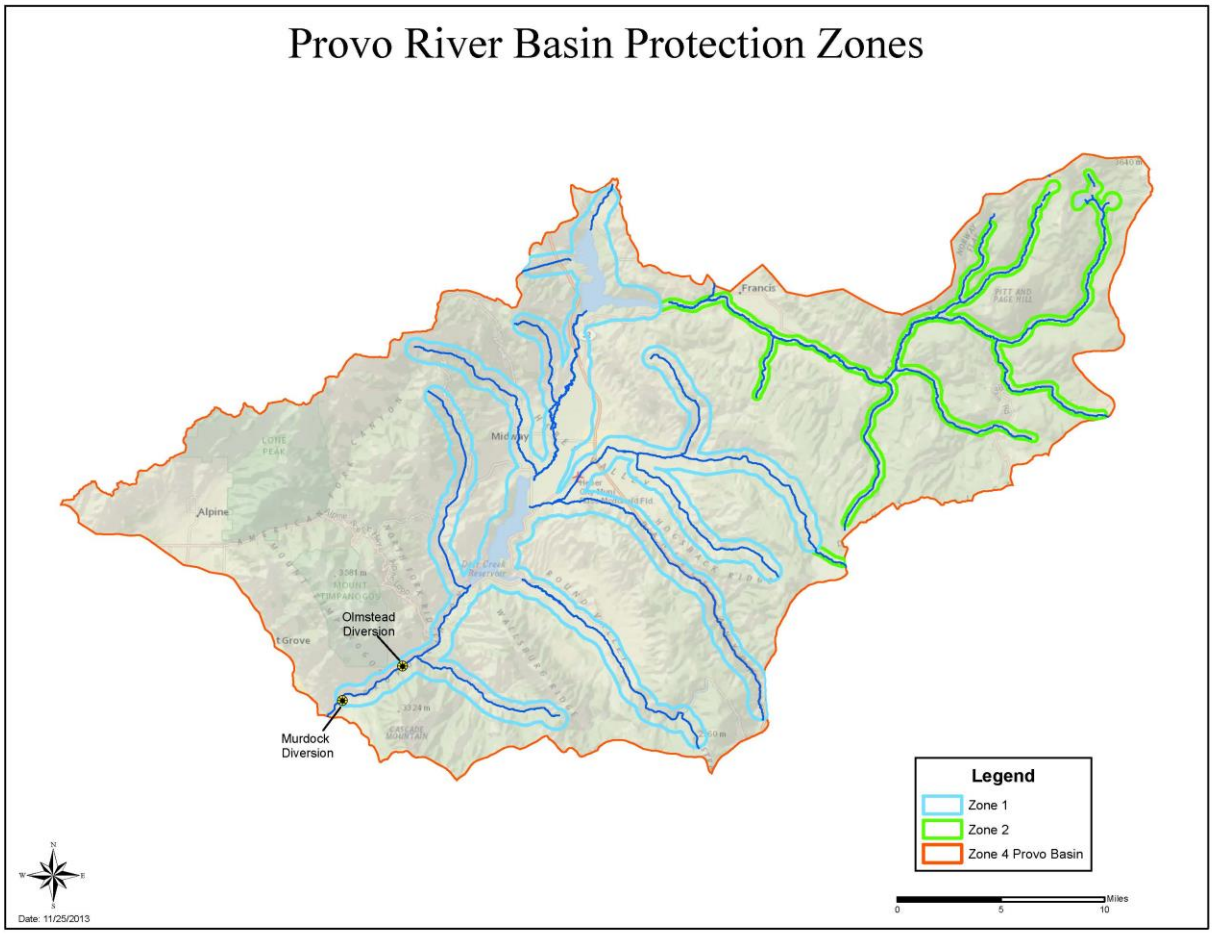
4.2.3 Murdock Intake

The Murdock Diversion is located near the entrance of Provo Canyon, and diverts water from the Provo River into the Provo River Aqueduct, formerly the Murdock Canal. The aqueduct is only operated from April through October. At this location, the Provo River is adjacent to the Provo Canyon highway and is therefore susceptible to contamination from accidental spills, road salts, etc. The canal was completely enclosed in 2012 and the Murdock Diversion was rebuilt in 2013.

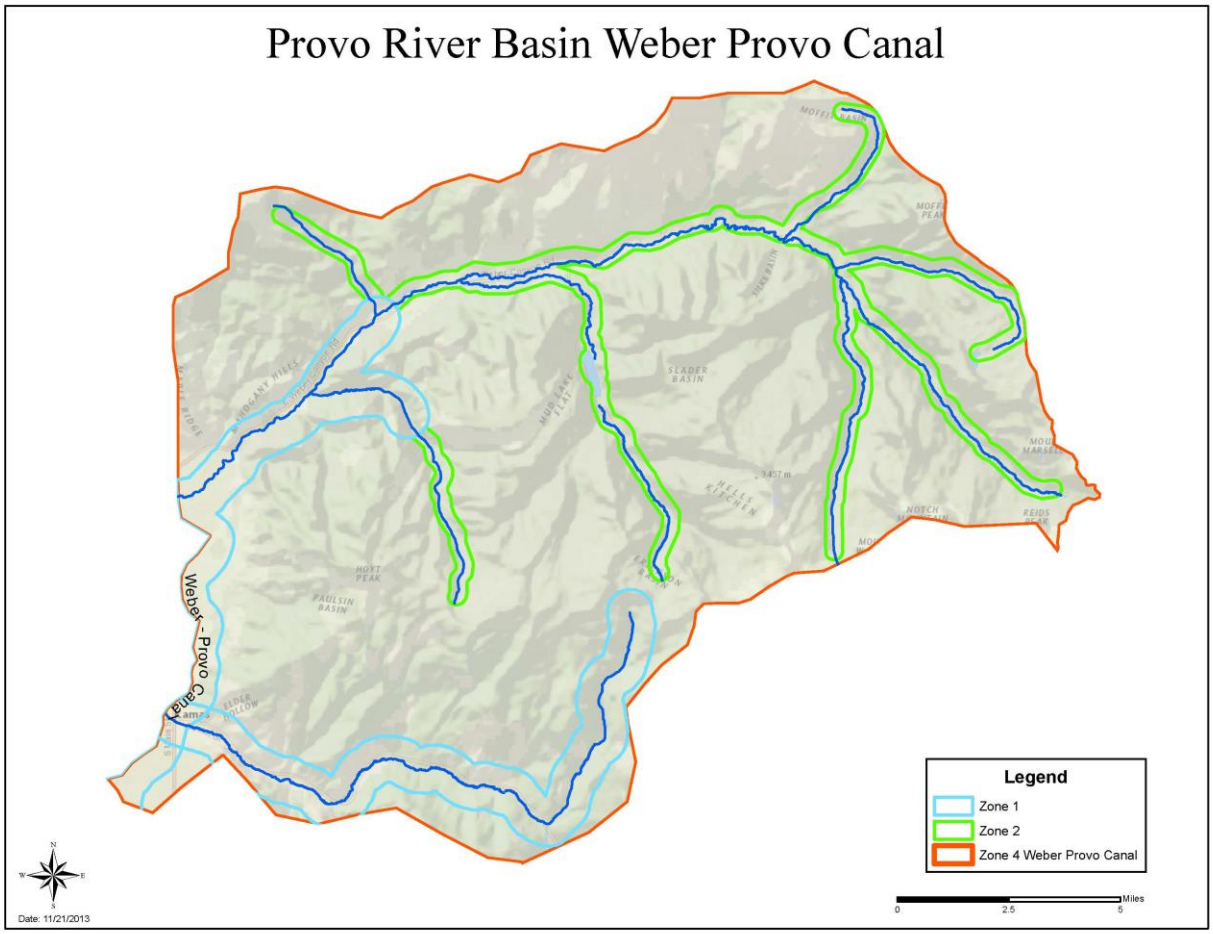
4.3 Delineation and Protection Zones

Maps 4.1 (Provo River Basin Protection Zones), 4.2 (Provo River Basin Contribution from Weber Basin), 4.3 (Provo River Basin Contribution from Duchesne Tunnel) and 4.4 (Strawberry Reservoir and tributaries above Syar Inlet) show the delineation and protection zones for the Provo River Basin as a whole, as well as zones surrounding the Weber River Basin, the Duchesne Tunnel, and above the Murdock Diversion.

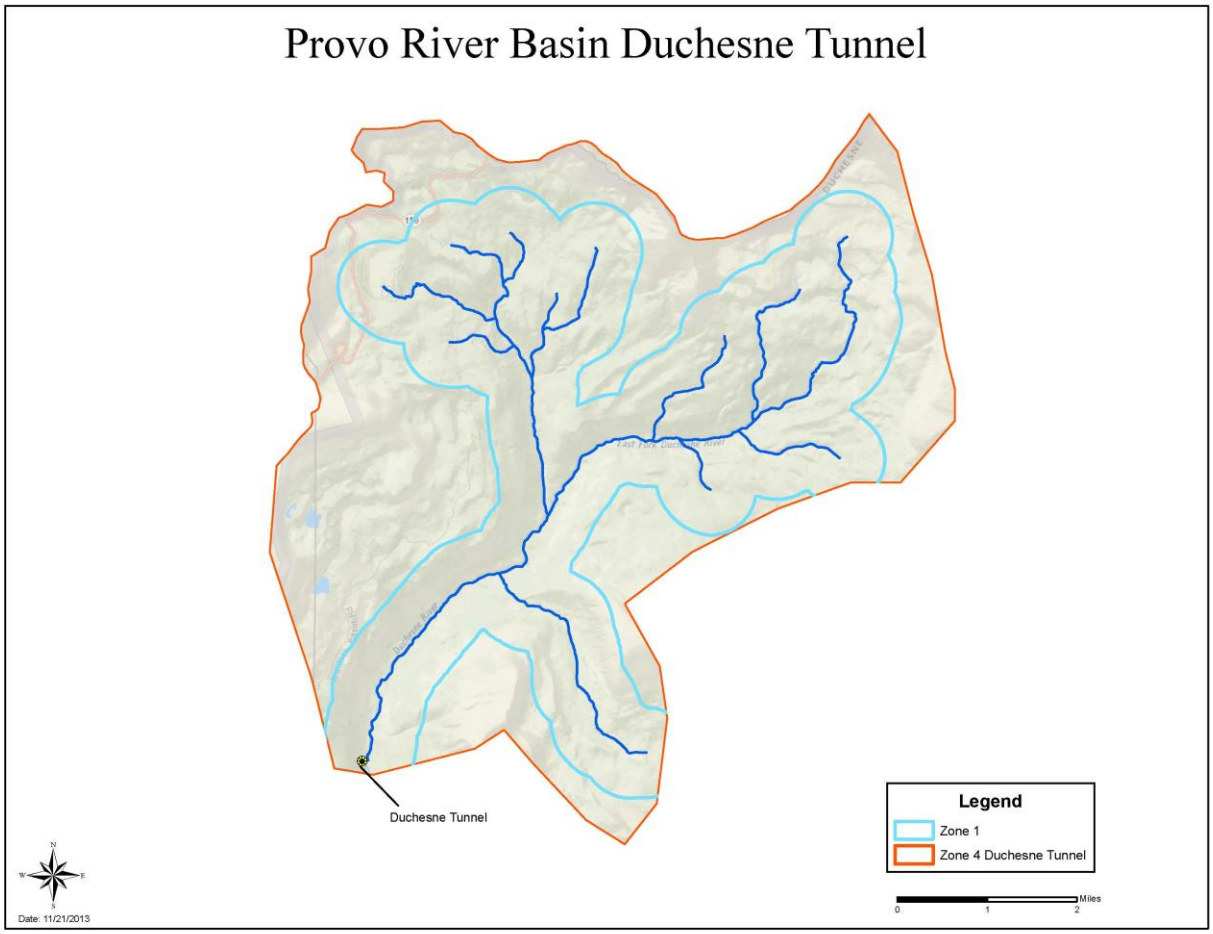
Map 4.1


Provo River Basin Protection Zones
Francis
Midway
Alpine
Olmstead
Diversion
Murdock
Diversion
Legend
Zone 1
Zone 2
Zone 4 Provo Basin
Miles
0
5
10
Date: 11/25/2013

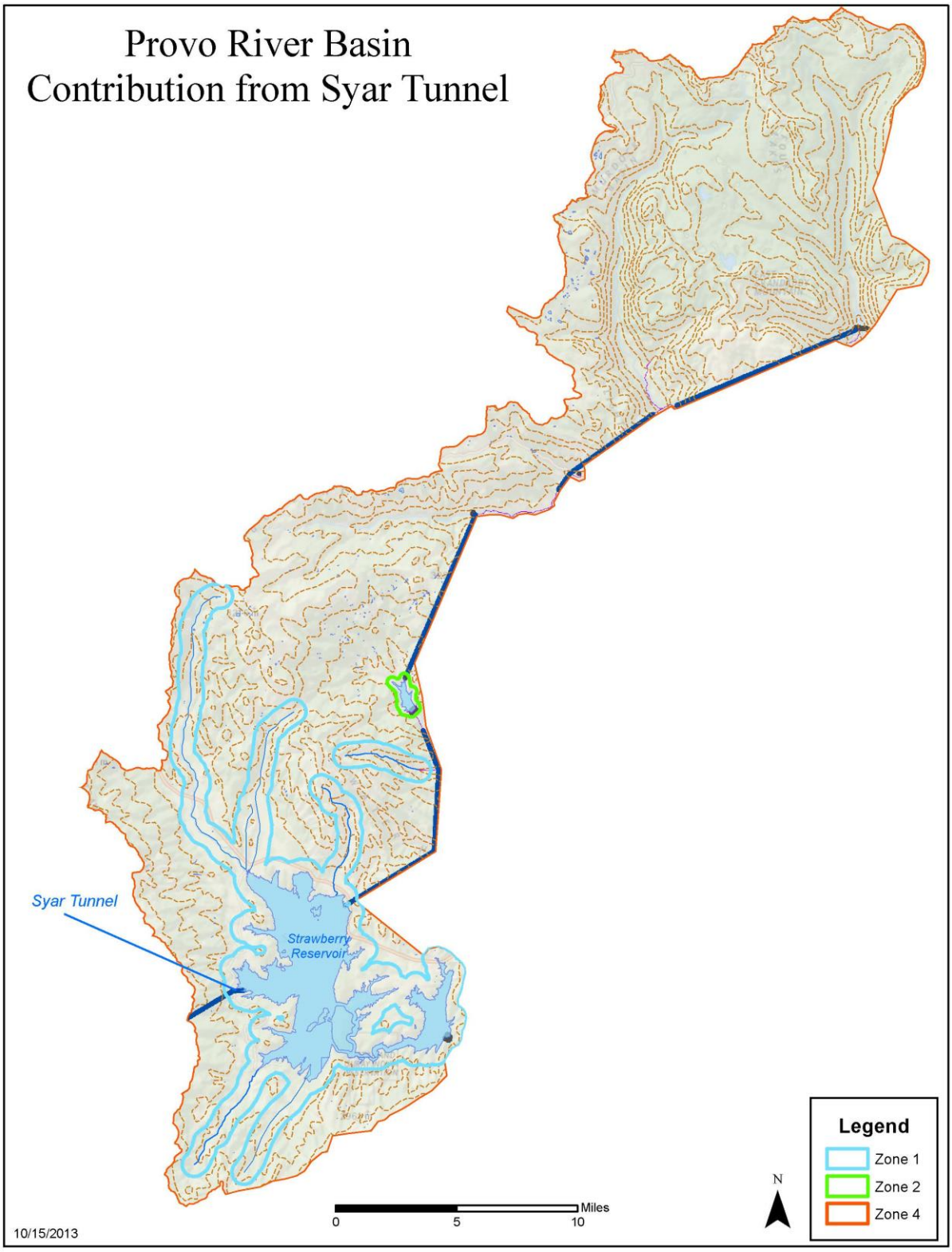
Map 4.2


Provo River Basin Weber Provo Canal
Weber - Provo Canal
Legend
Zone 1
Zone 2
Zone 4 Weber Provo Canal
Miles
0
2.5
5
Date: 11/21/2013

Map 4.3


Provo River Basin Duchesne Tunnel
Duchesne Tunnel
Legend
Zone 1
Zone 4 Duchesne Tunnel
Miles
0
1
2
Date: 11/21/2013

Map 4.4


Provo River Basin
Contribution from Syar Tunnel
Syar Tunnel
Strawberry Reservoir
Legend
Zone 1
Zone 2
Zone 4
N
0
5
10
Miles
10/15/2013

4.4 Susceptibility Assessment

The Provo River Watershed is susceptible to harmful cyanobacteria blooms, quagga mussel infestations, and wildfires.

4.4.1 Harmful Cyanobacteria Blooms

Cyanobacteria are important primary producers in many freshwater ecosystems. However, parameters such as varying temperatures and elevated nutrient levels (e.g. nitrogen and phosphorus) within the water column can lead to an overabundance of cyanobacteria. These cyanobacteria blooms can release cyanotoxins that are dangerous to aquatic and human health. To ameliorate the cyanobacteria problems adherence to the Deer Creek TMDL is crucial. In the event of a bloom that exceeds the World Health Organization public health advisories the PRWC works closely with the Division of Water Quality and the State Health Department.

4.4.2 Quagga and Zebra Mussels

Quagga and Zebra mussels are indigenous to the Dnieper River of Ukraine and the Caspian Sea. They were most likely transported from their native environment to the United States from ballast water in large commercial cargo ships. By attaching themselves to boats and boating equipment they have been transported from one body of water to another, including Lake Powell in 2007, causing billions of dollars of damage to infrastructure along the way. Boats leaving Lake Powell are frequently brought directly to a reservoir within the Provo River Watershed, significantly increasing the chance of an infestation. To reduce the likelihood of an infestation the PRWC annually donates a significant amount of funding to the States Aquatic Invasive Species program. Fortunately, as of the end of 2019 no waterbody within the watershed has been infested.

4.4.3 Wildfires

Wildfires increase susceptibility of watersheds to both flooding and erosion, and thus can impair water supplies. Wildfires can compromise water quality both during active burning, and for months and years after the fire is out. Storms following wildfires are known to impair drinking water supplies, as burn areas are prone to greater rates of erosion, increasing the downstream accumulation of sediment in streams, rivers, and reservoirs. Thus, the potential impacts from past, current, and future wildfires on the quantity and quality of runoff are considerable, and the unpredictable nature of wildfire makes it challenging to develop treatment-plant-specific strategies for treating source water degraded by the effects of wildfire. The PRWC is developing relationships with local, state, and federal agencies and resource managers to identify, mitigate and evaluate issues related to wildfires in the watershed. We continue to monitor source water downstream of burned areas to allow us to minimize adverse water-quality effects.

CHAPTER 5 POTENTIAL CONTAMINATION SOURCE INVENTORY

5.1 General

Development of the Potential Contamination Source Inventory (PCSI) involved the listing of all existing activities that have a potential for causing contamination of the drinking water source. Such activities include the use, storage, transportation, or handling of hazardous/toxic substances that are detrimental to the watershed and to the quality of the drinking water. The PCSs identified in the Provo River Basin Watershed have been categorized by type. PCSs within each category create similar risks and have similar control strategies. A list of the categories with their specific issues, controls and risk is presented in Table 5.0. The following sections explain the information given in Table 5.0. The tables in section 5.2 identify the specific PCSs located within the Provo River Basin Watershed.

5.1.1 Related Issues and Contributing Factors

This column of the table identifies why a specific PCS is of concern in the watershed and what type of contamination may occur. It also identifies the associated activities that contribute to the PCS.

5.1.2 Assessment of Controls, Applicable Regulations and Agencies

Using the existing controls summarized in Tables 6.1 and 6.2, the Coalition determined which PCSs were already subject to an existing regulation or rule, the name of the agency regulating that PCS, and whether or not the control provided an adequate level of protection in preventing contamination within the watershed protection zones. In most cases, where a PCS is controlled, a permit or identification number is issued by the regulating agency, and the contamination risk is minimized by requiring best management practices, pollution prevention measures, or physical barriers to provide adequate control. Assessment of the existing Federal and State requirements indicate that nearly all PCSs in the watershed are adequately controlled.

5.1.3 Susceptibility Analysis

The table outlines how susceptible the watershed is to each PCS by labeling it highly susceptible (1), moderately susceptible (2), or minimally susceptible (3). Members of the Coalition determined how susceptible the watershed is to each PCS category based upon intake integrity (Chapter 4, Table 4.1); watershed hydrogeology, climate, and land use (Chapter 1); and existing controls (Chapter 6). High susceptibility indicates that the PCS occurs more frequently in the watershed, that controls may not be as effective at minimizing risk, and the hydrogeology and climate are likely to increase the impact.

5.1.4 Priority Rankings

The Coalition determined a priority ranking (see Table 5.0) of PCS categories based upon the susceptibility ranking, water quality data, regulatory controls, and best management practices currently in place.

Invasive species were determined to be the number one priority. There are hundreds of boats each year that leave Lake Powell and come directly to Jordanelle or Deer Creek Reservoirs, significantly increasing the chance for an invasive species infestation.

Accidental spills were determined to be the second highest priority since there is currently no way to control or predict a spill. The PRWC is currently working with Utah Division of Transportation (UDOT) to implement the following preventative measures: reduce the truck speed limit within Provo Canyon, install oil separators, and increase communication with First Responders in the event of a spill.

Because of the ever-increasing development in the watershed, and the associated impacts, development was determined to be the third highest priority to address in protecting the watershed. There are many projects, management plans, and ordinances in place to address these issues.

5.1.5 Best Management Practices

Best Management Practices (BMPs) which address the PCS categories listed in the Table 5.0 are discussed in detail in the text of Chapter 7, the appendices referenced in Chapter 7, and the text of Chapter 8.

Table 5.0 Susceptibility Determination and Priority Ranking Table

PCS	Related Issues	Contributing Factors	Adequately Controlled	Rule or Regulation	Regulating Agency	Location	Susceptibility Ranking	Priority	Management Strategies
Invasive Species	1. Out compete native species 2. Obstruct Flow 3. Degrade Ecosystem 4. Wildlife Problems 5. Health Issues	1. Human Transportation 2. Animal Transportation 3. Passive Water Transportation	yes	Aquatic Invasive Species Interdiction Act Aquatic Invasive Species Interdiction	Utah Department of Natural Resources	Zone 1 and 2	1	1	Do-it-yourself Decontamination Professional Decontamination Clean, Drain, and Dry
Underground Storage Tanks	1. Petroleum 2. Chemicals	1. Leaking Tanks	yes	Underground Storage Tank Rule	Utah Division of Environmental Response and Remediation, Department of Environmental Quality	Zone 1 and 2	3	7	Tanks that are on the UST list are regularly inspected and often have safeguards such as secondary containment or continuous monitoring. Tanks on the LUST list are required to empty the leaking tank and fix or remove the tank before being used again. The Coalition will rely on existing government controls.
Agricultural Non-point Source Runoff	1. Cyanobacteria 2, Phosphorus 3. Nitrogen 4. Microbial 4. Cryptosporidium 6. Erosion and Sediment Control	1. Livestock 2. Irrigation Practices 3. Storm Runoff	yes	Concentrated Animal Feeding Operation Rule Total Maximum Daily Load Requirements	Department of Agriculture Utah Division of Water Quality, Department of Environmental Quality	Zone 1 and 2	1	6	Heber Valley Storm Water Management Plan Wasatch County Water Efficiency Plan Erosion and Sediment Control Guide Pasture and Hayland Management Plan WQ Monitoring

PCS	Related Issues	Contributing Factors	Adequately Controlled	Rule or Regulation	Regulating Agency	Location	Susceptibility Ranking	Priority	Management Strategies
Development	1. Erosion and Sediment Control 2. Phosphorus 3. Nitrogen 4. Chemicals 5. PFAS	1. Household Chemical Use and Disposal 2. Storm Runoff 3. Golf Courses 4. Industry 5. Development Construction 6. Septic Systems	yes	City/County Ordinances	Wasatch, Summit, and Utah Counties	Zone 1 and 2	2	3	Jordanelle Boundary Zone (USBR, UT State Parks) Management plans are required by Wasatch County for all proposed golf courses. These plans are prepared by the developers and reviewed by PRWC and the County. Wasatch Co./PRWC review of development issues The Murdock Canal was enclosed into the Provo Reservoir Aqueduct in 2012.
Wastewater	1. Nitrogen 2. Phosphorus 3. Microbial 4. Other pollutants	1. Septic System 2. WW Treatment Discharge	yes	UPDES Permitting 208 CWA WQ Plans Standards for Quality of Waters of the State	Utah Division of Water Quality, Department of Environmental Quality	Zone 1 and 2	3	4	DWQ and MAGPRWC have to approve 208 plans and new discharges through the TMDL requirements.
Recreation	1. Erosion and Sediment Control 2. Petroleum 3. Nitrogen 4. Phosphorus 5. Microbial 6. Cryptosporidium	1. Human Impacts 2. Water craft use 3. Waste Disposal Practices	yes	Reservoir Management Plans	United States Forest Service	Zone 1 and 2	3	5	Provo Canyon Scenic By-way Plan Deer Creek Recreation Management Plan Jordanelle Recreation Management Plan The Murdock Canal was enclosed into the Provo Reservoir Aqueduct in 2012.

PCS	Related Issues	Contributing Factors	Adequately Controlled	Rule or Regulation	Regulating Agency	Location	Susceptibility Ranking	Priority	Management Strategies
Accidental or Intentional Spills	1. Petroleum 2. Chemicals	1. Roadways near Waterways and Reservoirs 2. Human Impacts	yes	Federal and State Hazmat Regulations for transportation and storage	Utah Division of Environmental Response and Remediation, Department of Environmental Quality	Zone 1 and 2	1	2	Early warning systems Interagency and Agency specific Emergency Response Plans The Murdock Canal was enclosed into the Provo Reservoir Aqueduct in 2012.
Mining	Metals	1. Tailing Ponds	yes	Mine permit requirements and abandon mine requirements	Utah Division of Oil, Gas, and Mining, Department of Natural Resources	Zone 1 and 2	3	8	The Coalition will rely on existing government controls.

5.2 PCS Location Data

The tables and maps discussed in the following subsections include all the PCSs located in the Provo River Basin Watershed as of November 2019. The PCSs were identified using the State's comprehensive GIS system as well as through contacts at various agencies including the Utah Division of Oil, Gas, and Mining, and the Division of Water Quality

5.2.1 Underground Storage Tanks (UST)

The UST sites listed in Tables 5.1 and 5.2 have been identified as PCSs within the Provo River Basin watershed area. All have corresponding permit numbers indicating regulation by the appropriate State agency and therefore considered "controlled" by the Coalition. Maps 5.1 (Active Underground Storage Tank Facilities within the Provo River Basin Protection Zones), 5.2 (Inactive Underground Storage Tank Sites within the Provo River Basin Protection Zones), 5.3 (PCSs with the Syar Tunnel Contribution Protection Zones), and 5.9 (PCSs within the Weber Provo Canal Protection Zones) show the location of each listed UST site.

Table 5.1 Active UST Sites located within source water protection zones.

Zone	Facility Name	Type of Facility	State ID Number	Address	City
1	Mountainland One Stop	Gas Station	1100001	1175 S Main St	Heber City
1	Deer Creek Island Resort	Gas Station	1100033	Island Beach/Highway 189	Midway
1	UDOT Station 3431	State Government	1100027	JCT US-40 & US-189	Heber City
1	Hailstone Maintenance Facility	State Government	1100064	Jordanelle Dam	Heber City
1	Jordanelle Hailstone Marina	Gas Station	1100065	Mayflower Exit Hwy 40	Heber City
1	7-Eleven #53611	Gas Station	1100069	800 S Main St	Heber City
1	Midway 7-Eleven	Gas Station	1100029	10 W Main St	Midway
1	Charleston North Merc	Gas Station	1100080	3715 S 3600 W	Charleston
1	Strawberry Bay	Gas Station	1100044	20 Miles E on HWY 40	Heber City
2	Mirror Lake Service Chevron	Gas Station	7000029	2 N Main St	Kamas
2	Kamas Food Town Sinclair	Gas Station	7000142	145 W 200 S	Kamas
2	Kamas 7-Eleven	Gas Station	7000066	220 S Main St	Kamas
2	UDOT Station 2437	State Government	7000090	192 E 400 S	Kamas
4	7-Eleven #53604	Gas Station	1100016	215 N Main St	Heber City
4	Heber Light & Power	Utilities	1100383	350 S 700 W	Heber City
4	Ridleys Express	Gas Station	1100073	51 W Main	Midway
4	Maverick #361	Gas Station	1100081	435 N Main ST	Heber City
4	Smiths #63	Gas Station	1100079	550 N Main St	Heber City

Map 5.1 Active Underground Storage Tank Facilities within the Provo River Basin Protection Zones.

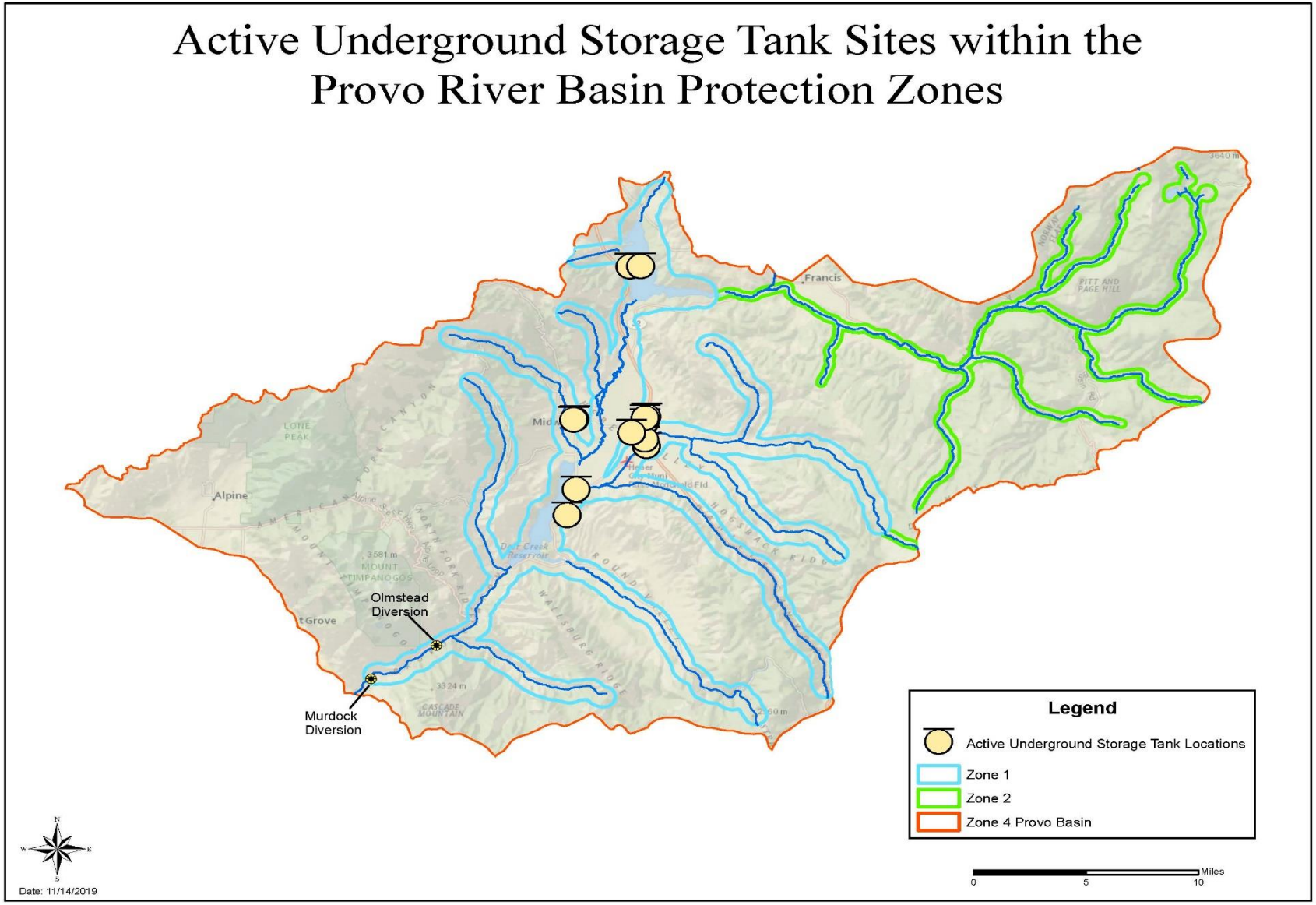


Table 5.2 Inactive UST Facilities within source water protection zones.

Zone	Facility Name	Type of Facility	State ID Number	Address	City
1	Cottage Mkt & Goodies Inc.	Commercial	1100004	3650 S Hwy 40	Heber City
1	Circle K Management	Gas Station	1100006	595 S Main	Heber City
1	P.D.Q. Gas & Grocery	Commercial	1100009	Junction of Hwy # 189	Heber City
1	Wasatch County Hospital	Commercial	1100012	55 S 500 E	Heber City
1	7-Eleven #53605	Gas Station	1100018	750 S Main St	Heber City
1	U.H.P. Port of Entry	State Government	1100034	E Hwy 40	Heber City
1	Wasatch Aero Services	Not Listed	1100035	Heber Airport	Heber City
1	Snow's Marina, Melvin Snow	State Government	1100039	Deer Creek Reservoir Wallsburg Junction	Heber City
1	Charleston City Garage	Local Government	1100045	Charleston City; C/O Cheryl Lambert	Heber City
1	Crossroads Service Center	Commercial	1100005	1500 S Main	Heber City
1	Heber City Corporation	Local Government	1100046	345 N 400 W	Heber City
1	Public Works Department	Local Government	1100047	805 W 100 S, P.O. Box 69	Heber City
1	Larry J. Coet Chevrolet, Pontiac, Buick	Auto Dealership	1100050	901 S Main St	Heber City
1	Golden West Livestock	Truck/Transporter	1100055	168 W 3000 S	Heber City
1	Abandoned Site	Railroad	1100070	Approx 100 S 700 W	Heber City
1	Wasatch Rentals	Not Listed	1100071	845 S Main St	Heber City
1	Deer Creek Lake State Park	State Government	1100022	Hwy 189, Wallsburg Point	Midway
1	Midway City Shop	Local Government	1100038	50 N 100 W	Midway
1	Wasatch Mtn. State Park	State Government	1100062	1281 N Warm Springs Rd	Midway
1	Elmo Ford	Commercial	1100037	20 N Center St	Wallsburg
1	Givens Round Valley Market	Gas Station	1100041	154 N Main Canyon Rd	Wallsburg

Table 5.2 Inactive UST Facilities within source water protection zones (cont.).

Zone	Facility Name	Type of Facility	State ID Number	Address	City
1	Wasatch Mtn. State Park Golf Shop	State Government	1100063	1281 N Warm Springs Rd	Midway
1	Strawberry Field Office	Federal Government	1100024	N/A	Heber City
1	Soldier Creek Field Station	Local Government	1100056	US HWY 40 1/2 Mile E of Mile Marker #51	Fruitland
1	K and T's Last Stop Silver Eagle	Gas Station	1100019	1590 S Hwy 40	Heber City
1	UDOT Station 3445	State Government	1100028	US 40 Mile Post 41.95 Strawberry Valley	Heber City
2	South Summit School District Bus Garage	Local Government	7000084	50 S 300 E	Kamas
2	Current Creek Dam	Local Government	1100023	S End of Current Creek Reservoir	Fruitland
2	Kamas Valley CO-OP	Gas Station	7000024	3186 N HWY 189	Marion
2	Blazzard Lumber Company	Commercial	7000007	525 N Main St	Kamas
2	Smith Lumber Co.	Industrial	7000104	412 N Main St	Kamas
2	F.D.I.C. Property Kamas Lumber	Industrial	7000115	205 N Main St	Kamas
2	Blazzard Lumber	Truck/Transport	7000027	100 N 40 E	Kamas
2	Sinclair Service	Gas Station	7000044	23 N Main St	Kamas
2	Kamas City	Local Government	7000023	Main & Center	Kamas
2	South Summit School District	Local Government	7000105	50 S 300 E	Kamas
2	TR's Auto Repair	Auto Dealership	7000082	110 S Main St	Kamas
2	Leavitt Lumber Co.	Truck/Transport	7000026	395 SR 32	Kamas
2	Kamas Road Shed	Local Government	7000050	210 E 400 S	Kamas
4	Barnes Excavating - Stop Sinclair	Contractor	1100003	150 N 500 W	Heber City
4	Hilton Service	Gas Station	1100010	106 N Main St	Heber City
4	Hilton 66 Service	Commercial	1100011	510 N Main St	Heber City

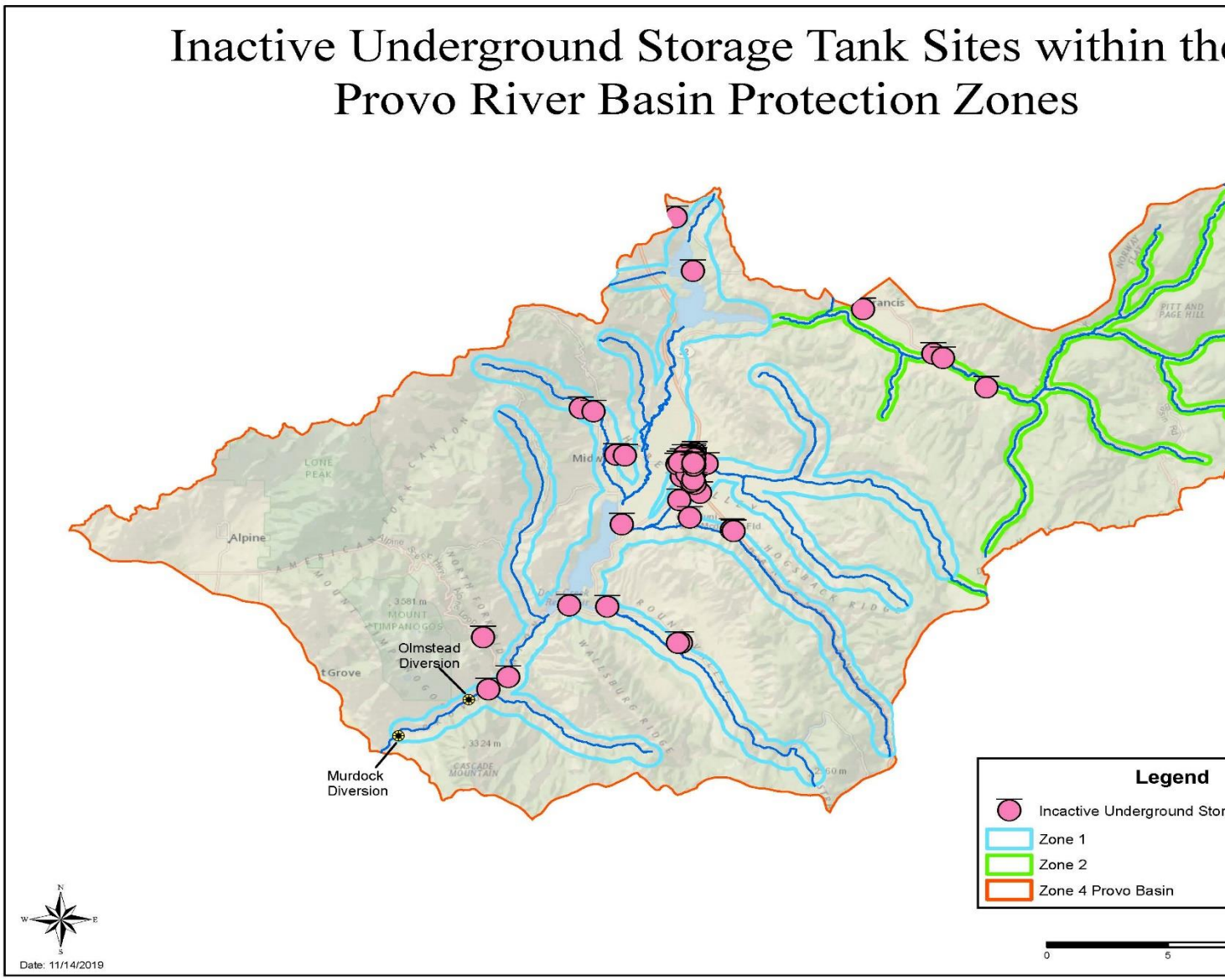
4	Mountain Fuel Supply Co.	Utilities	1100014	167 W Center St	Heber City
4	Timpanogos Pottery Co.	Commercial	1100015	150 N Main St	Heber City

Table 5.2 Inactive UST Facilities within source water protection zones (cont.).

Zone	Facility Name	Type of Facility	State ID Number	Address	City
1	Chalet Café	Gas Station	1000515	3630 E Provo Canyon Rd	Provo
1	Sundance Resort	Commercial	1000518	North Fork Provo Canyon	Provo
1	Wildwood Resort	State Government	1000698	Provo Canyon	Provo
1	Jitterbug Gas and Variety	Gas Station	1100054	210 N Main	Heber City
1	Abandoned Tank-Main Street	Not Listed	1100076	154 S Main St	Heber City
1	Abandoned Tank-Main Street	Former Gas Station	1100077	123 S Main St	Heber City
1	Abandoned Tank-Main Street	Not Listed	1100078	2 S Main St	Heber City
2	Leavitt Lumber CO., Inc	Commercial	7000028	395 S 300 E	Kamas
2	Woodland Pump Station	Petroleum Distributor	7000089	RFD Bench Creek Road	Kamas
4	Sunmart #901 Phillips 66	Gas Station	1100020	95 S Main St	Heber City
4	Horner's Corner	Gas Station	1100021	391 N Main St	Heber City
4	Royal Solutions LLC	Gas Station	1100030	315 N Main St	Heber City
4	Newman C. Petty Property	Federal, Non-Military	1100036	Keetley Store	Heber City
4	Mike Witt Excavating	Contractor	1100042	725 S 600 W	Heber City
4	David Early Tire	Gas Station	1100052	110 S Main St	Heber City
4	Wagon Wheel Inc.	Gas Station	1100054	210 N Main St	Heber City
4	Cloyes Gear Company	Industrial	1100059	300 W 600 S	Heber City
4	Heber Motor	Auto Dealership	1100061	164 S Main St	Heber City

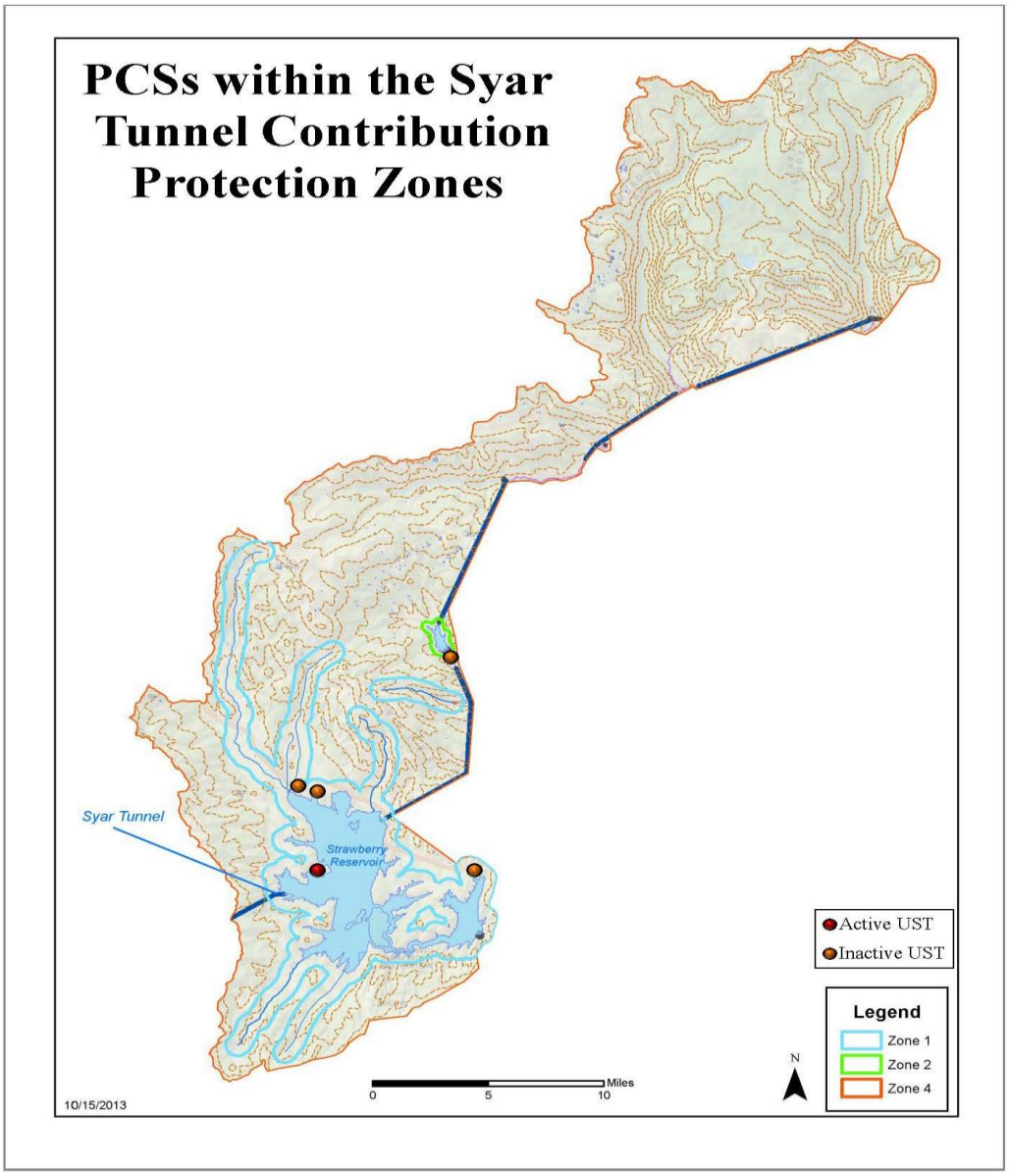
4	Mill Hollow Center	Local Government	1100066	State Rd 35 11 miles from Woodland	Heber City
4	Founders Title Company	Former Gas St.	1100068	45 S Main St	Heber City
4	Midway Automotive	Commercial	1100043	201 E Main St	Midway
4	Phoston Siding Site	Industrial	1100067	5 miles E of Park City	Park City
4	Uinta Junction	Gas Station	7000012	15 W 2200 S	Francis
4	Woodland Cash Store	Commercial	7000078	2734 E HWY 35	Woodland
4	Ennis Gibbs	Farm	700138	3262 E HWY 35	Woodland

Map 5.2 Inactive Underground Storage Tank Sites within the Provo River Basin Protection Zones



Map 5.3 Syar Tunnel PCSs

Map 5.3 Syar Tunnel Potential Contamination Sources



Map 5.3 Syar Tunnel Potential Contamination Sources

5.2.2 Leaking Underground Storage Tanks (LUST)

The LUST sites listed in Table 5.3 have been identified as PCSs within the Provo River Basin watershed area. All have corresponding permit numbers indicating regulation by the appropriate State agency and therefore considered "controlled" by the Coalition. Map 5.4 (Leaking Underground Storage Tank Sites within the Provo River Basin Protection Zones) shows the location of each listed LUST site.

Table 5.3 LUST Sites within source water protection zones.

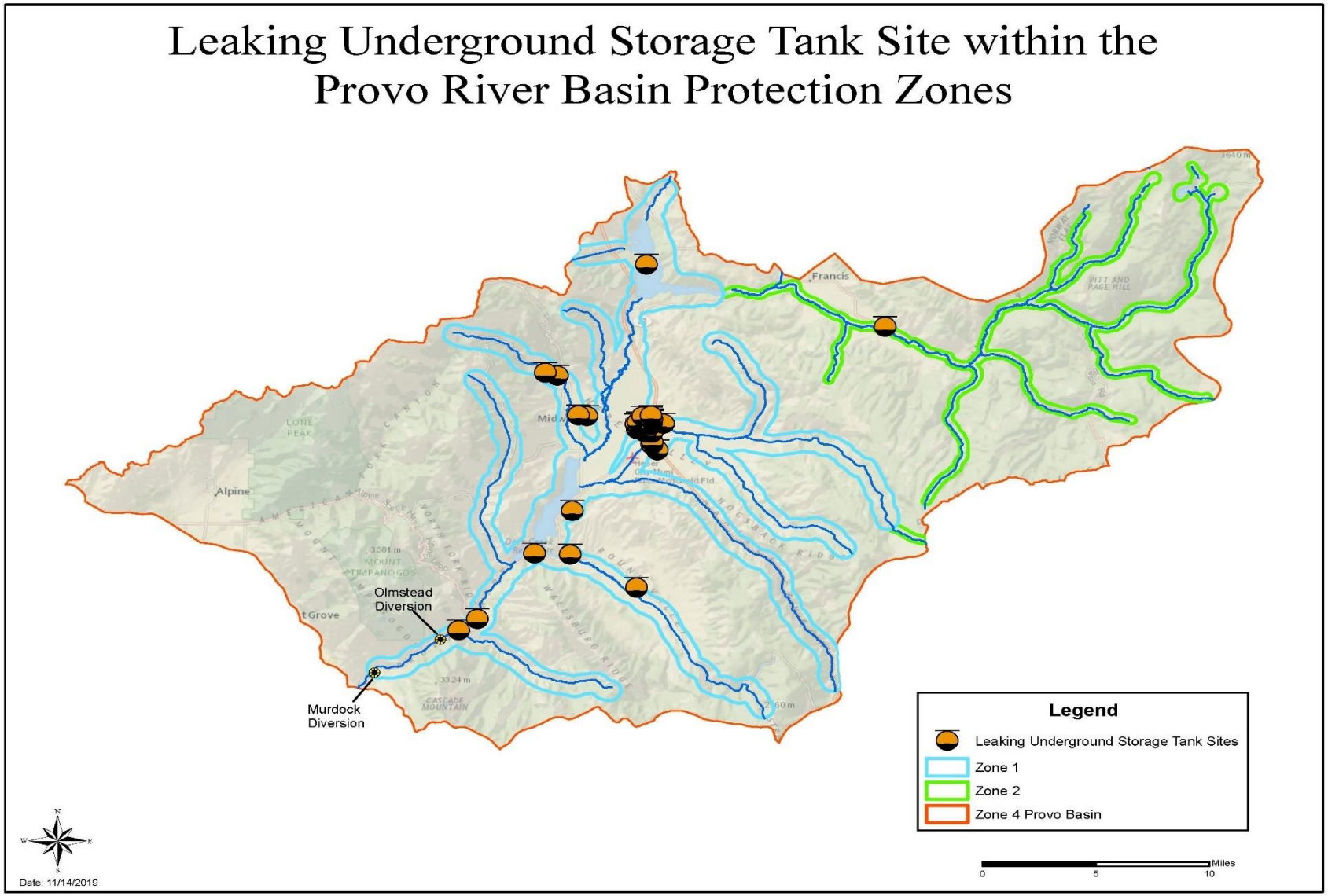
Zone	Facility Name	Type of Facility	State ID Number	Address	City
1	Abandoned Site	Railroad	1100070	Approx 100 S 700 W	Heber City
1	Heber City Corporation	Local Government	1100046	345 N 400 W	Heber City
1	Mountainland One-Stop	Gas Station	1100001	1175 S Main St	Heber City
1	Crossroads Service Center	Commercial	1100005	1500 S Main	Heber City
1	Public Works Department	Local Government	1100047	805 W 100 S, P.O. Box 69	Heber City
1	Snow's Marina, Melvin Snow	State Government	1100039	Deer Creek Reservoir, Wallsburg	Heber City
1	UDOT Station #3431	State Government	1100027	Jct US - 40 & US - 89	Heber City
1	Wasatch County Hospital	Commercial	1100012	55 S 500 E	Heber City
1	Midway City Shop	Local Government	1100038	50 N 100 W	Midway
1	Jordanelle Hailstone Marina	Gas Station	1100065	Mayflower Exit Highway 40	Heber City
1	Wasatch Mtn. State Park Golf Shop	State Government	1100063	1281 N Warm Springs Rd	Midway
1	Givens Round Valley Market	Gas Station	1100041	154 N Main Canyon Rd	Wallsburg
1	Chalet Cafe	Gas Station	1000515	3630 E Provo Canyon	Provo
1	Wildwood Resort	State Government	1000698	Provo Canyon	Provo
1	Deer Creek Lake State Park	State Government	1100022	Hwy 189, Wallsburg Point	Midway
1	Deer Creek Island Resort	Gas Station	1100033	Island Beach/Highway 189	Midway
1	K & T Last Stop DBA Silver Eagle Country Store	Gas Station	1100019	1590 S Hwy 40	Heber City

1	Circle K Management #628	Gas Station	1100006	595 S Main	Heber City
1	Founders Title Company	Former Gas Station	1100068	45 S Main	Heber City
1	Jitterbug Gas and Variety	Gas Station	1100054	210 N Main	Heber City
1	Horner's Corner	Gas Station	1100021	391 N Main St	Heber City
1	Wasatch Mtn State Park	State Government	1100062	1281 N Warm Springs Rd	Midway
1	UDOT Station #3445	State Government	1100028	US-40 MP 41.95 Strawberry Valley	Heber City
1	Strawberry's Bay Marina	Gas Station	1100044	23 Miles East Hwy 40	Heber City
1	Currant Creek Gas N' Grub	Gas Station	1100049	Mile Post 59 U.S. Hwy 40	Heber City
1	Heber Mercantile Building	Local Government	1100075	2 S Main	Heber City
2	UDOT Station #2437 Kamas	State Government	7000090	192 E 400 S	Kamas
2	Kamas 7-Eleven	Gas Station	7000066	220 S Main St	Kamas
2	TR's Auto Repair	Auto Dealership	7000082	110 S Main St	Kamas
2	South Summit School District Bus Garage	Local Government	7000105	50 S 300 E	Kamas
2	Mirror Lake Service Chevron	Gas Station	7000029	2 N Main St	Kamas
2	F.D.I.C Property Kamas Lumber	Industrial	7000115	205 N Main St	Kamas
2	Mill Creek Guard Station	Local Government	7000057	45 Miles South of Utah/Wyoming Border 5 Miles East of Hwy 150	Kamas
4	Cloyes Gear Company	Industrial	1100059	300 W 600 S	Heber City
4	Heber Light & Power	Utilities	1100383	350 S 700 W	Heber City
4	Hilton Service	Gas Station	1100010	106 N Main St	Heber City
4	David Early Tires	Gas Station	1100052	110 S Main St	Heber City
4	Royal Solutions	Gas Station	1100030	315 N Main St	Heber City

Table 5.3 LUST Sites within source water protection zones (cont.).

Zone	Facility Name	Type of Facility	State ID Number	Address	City
4	Timpanogos Pottery Co.	Commercial	1100015	150 N Main St	Heber City
4	SunMart #901 Phillips 66	Gas Station	1100020	95 S Main St	Heber City
4	7-Eleven #53605	Gas Station	1100018	750 S Main St	Heber City
4	Ennis Gibbs	Farm	7000138	3262 E Hwy 35	Woodland
4	Midway Automotive	Commercial	1100043	201 E Main St	Midway

Map 5.4 Leaking Underground Storage Tank Sites within the Provo River Basin Protection Zones



5.2.3 National Priority List Sites (NPL)

No NPL sites were located in the Provo River Basin watershed as of October 2019. The Coalition will check this listing periodically and revise the DWSP Plan as necessary.

5.2.4 Toxic Release Inventory Sites (TRI)

No TRI sites were located in the Provo River Basin watershed as of October 2019. The Coalition will check this listing periodically and revise the DWSP Plan as necessary.

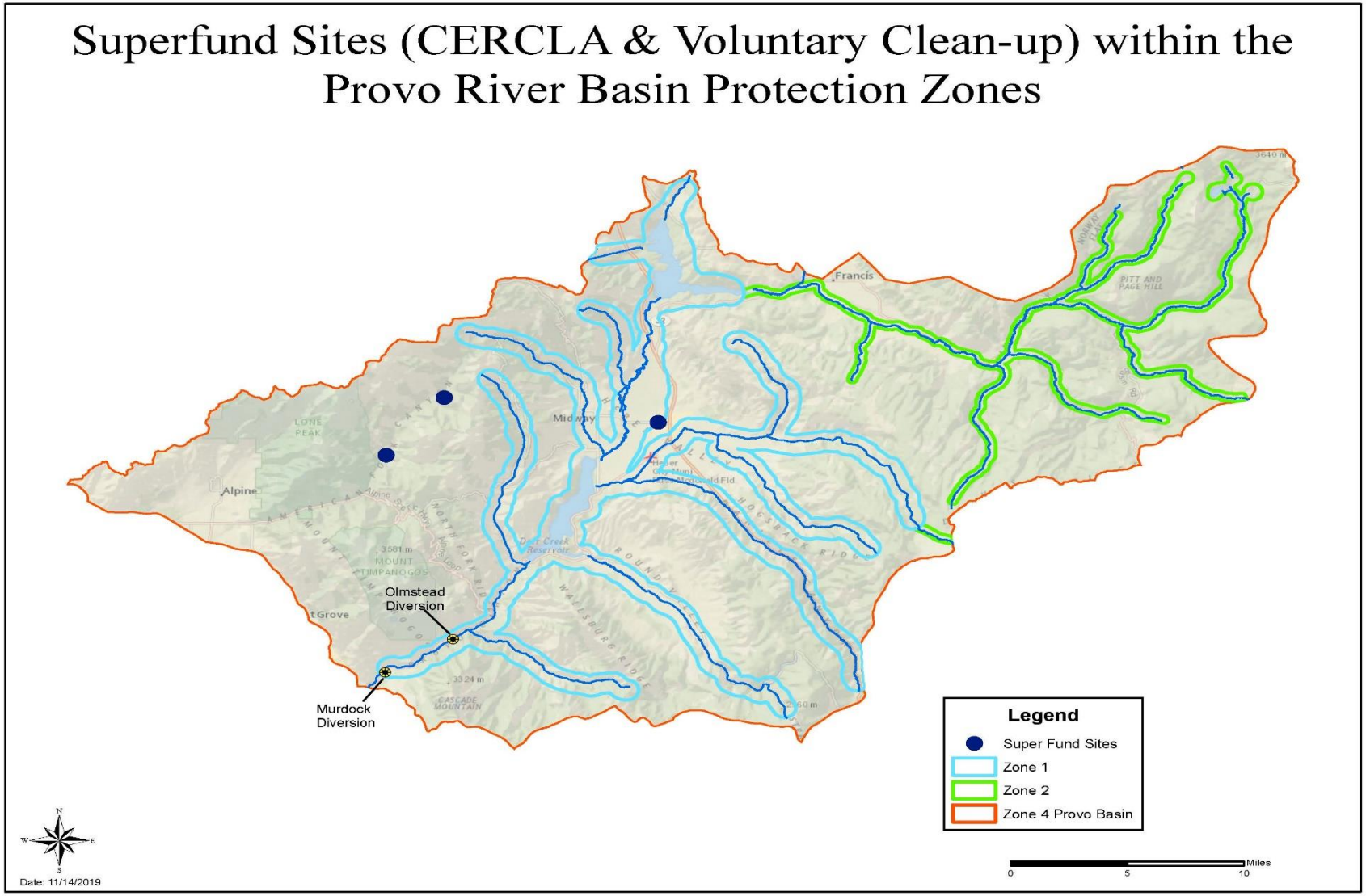
5.2.5 Voluntary Clean-Up Sites

The voluntary clean-up sites listed in Table 5.4 have been identified as PCSs within the Provo River Basin watershed area. All entities having corresponding permit numbers indicate regulation by the appropriate State agency and are therefore considered "controlled" by the Coalition. For all sources listed which do not have a current permit or state ID number, the Coalition assumes that the State is either aware of and is controlling the entity if active or that the entity is dormant and is not considered to be a PCS. Map 5.5 (Superfund Sites (CERCLA and Voluntary Clean-up) within the Provo River Basin Protection Zones) shows the location of each listed voluntary clean-up site.

Table 5.4 Voluntary Clean-up Program Sites within Source Water Protection Zones.

Zone	Facility Name	Type of Facility	State ID Number	Address	City
1	HISTORIC HEBER CREEPER RAIL YARD	N/A	N/A	600 WEST 100 SOUTH	HEBER CITY
4	AMERICAN FORK CANYON/UINTA NATIONAL	N/A	N/A	AMERICAN FORK CANYON	PLEASANT GROVE
4	TIBBLE FORK DAM	N/A	N/A	UTAH	UTAH COUNTY

Map 5.5 Superfund Sites (CERCLA and Voluntary Clean-up) within the Provo River Basin Protection Zones



5.2.6 Site Assessments

The site assessments listed in Table 5.5 have been identified as PCSs within the Provo River Basin watershed area. All have corresponding permit numbers indicating regulation by the appropriate State agency and therefore considered "controlled" by the Coalition. Map 5.5 (Superfund Sites (CERCLA and Voluntary Clean-up) within the Provo River Basin Protection Zones) shows the location of each listed site assessment.

Table 5.5 Site Assessments within Source Water Protection Zones

Zone	Facility Name	Type of Facility	State ID Number	Address	City
1	Olsen/Neihart Reservoir	N/A	UTD980951412	6.5 miles N of Heber City, near Hailstone Junction	Heber City
1	Historic Heber Creeper Rail Yard	N/A	UTSFN7577542	600 W 100 S	Heber City
1	Mayflower Mountain Tailings Pond	N/A	UTD980951438	7 miles N of Heber City	Mayflower Mountain
4	Soapstone Basin Sinkhole	N/A	UTD980960074	P.O. Box 1428	Provo
4	American Fork Canyon Uintah National	N/A	UTD988074951	American Fork Canyon	Pleasant Grove

5.2.7 Utah Pollutant Discharge Elimination System (UPDES)

The UPDES sites listed in Tables 5.6 and 5.7 have been identified as PCSs within the Provo River Basin watershed area. All entities having corresponding permit numbers indicate regulation by the appropriate State agency and are therefore considered "controlled" by the Coalition. For all sources listed which do not have a current permit or state ID number, the Coalition assumes that the State is either aware of and is controlling the entity if active or that the entity is dormant and is not considered to be a PCS. Maps 5.6 (UPDES Sites within the Provo River Basin Protection Zones) and 5.9 (PCSs within the Weber Provo Canal Protection Zones) show the location of each listed UPDES site.

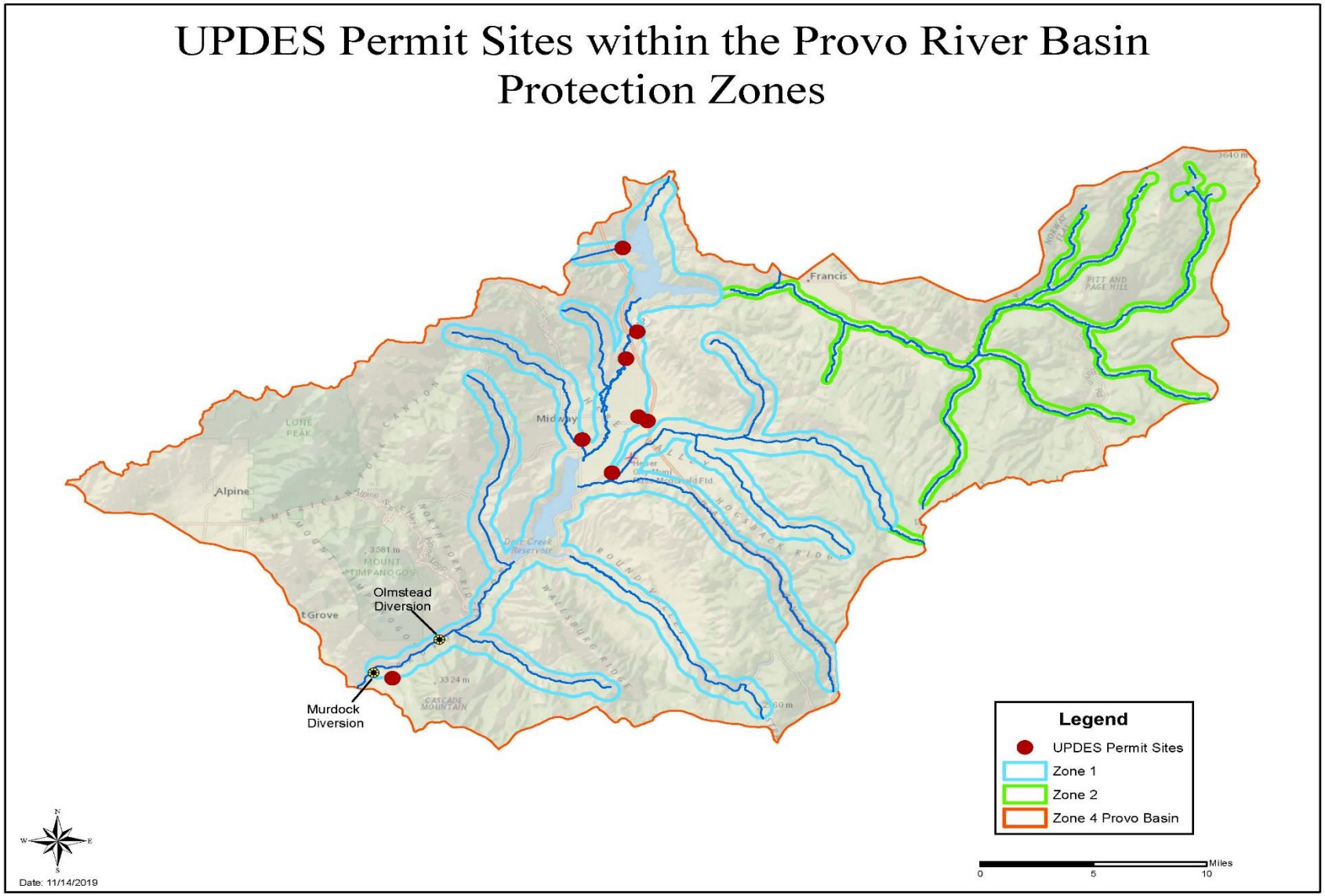
Table 5.6 UPDES Locations Within Provo River Basin.

Zone	Facility Name	Type of Facility	State ID Number	Address	City
1	Wasatch County Weed Dept	General Permit Facility	UTG170049	1891 W 3000 S	Heber City
4	Midway City Corporation	General Permit Facility	UTG170065	75 N 100 W	Heber City
1	JSSD Water Reclaimation Facility	Municipal	UT0025747	5400 N Old Hwy 40	Heber City
1	JSSD Keetely Water Treatment Plant	Municipal	UT0022403	10500 N 1420 W	Heber City
1	Midway Fish Hatchery	General Permit Facility	UT0025879	850 S 140 E	Midway
1	Feeder Line 99 Pipeline Replacement Process	Construction De-watering	UTG070755	SR-32 AND RIVER ROAD	Wasatch County
1	2015 NorthWest Sewer Improvements	Construction De-watering	UTG070774	300 N 600 W	Heber City
1	Pioneer Plaza	Construction De-watering	UTG070765	7935 NORTH 1100 WEST	Lehi
2	Kamas City Wastewater	Municipal	UT0020966	BOX 7, 178 North Main	Kamas

Table 5.7 UPDES Locations within Weber River Basin.

Zone	Facility Name	Type of Facility	State ID Number	Address	City
1	Utah Division of Wildlife-Kamas	General Permit Facility	UTG130006	2722 E Mirror Lake Hwy	Kamas

Map 5.6 UPDES Sites within Provo River Basin Protection Zones



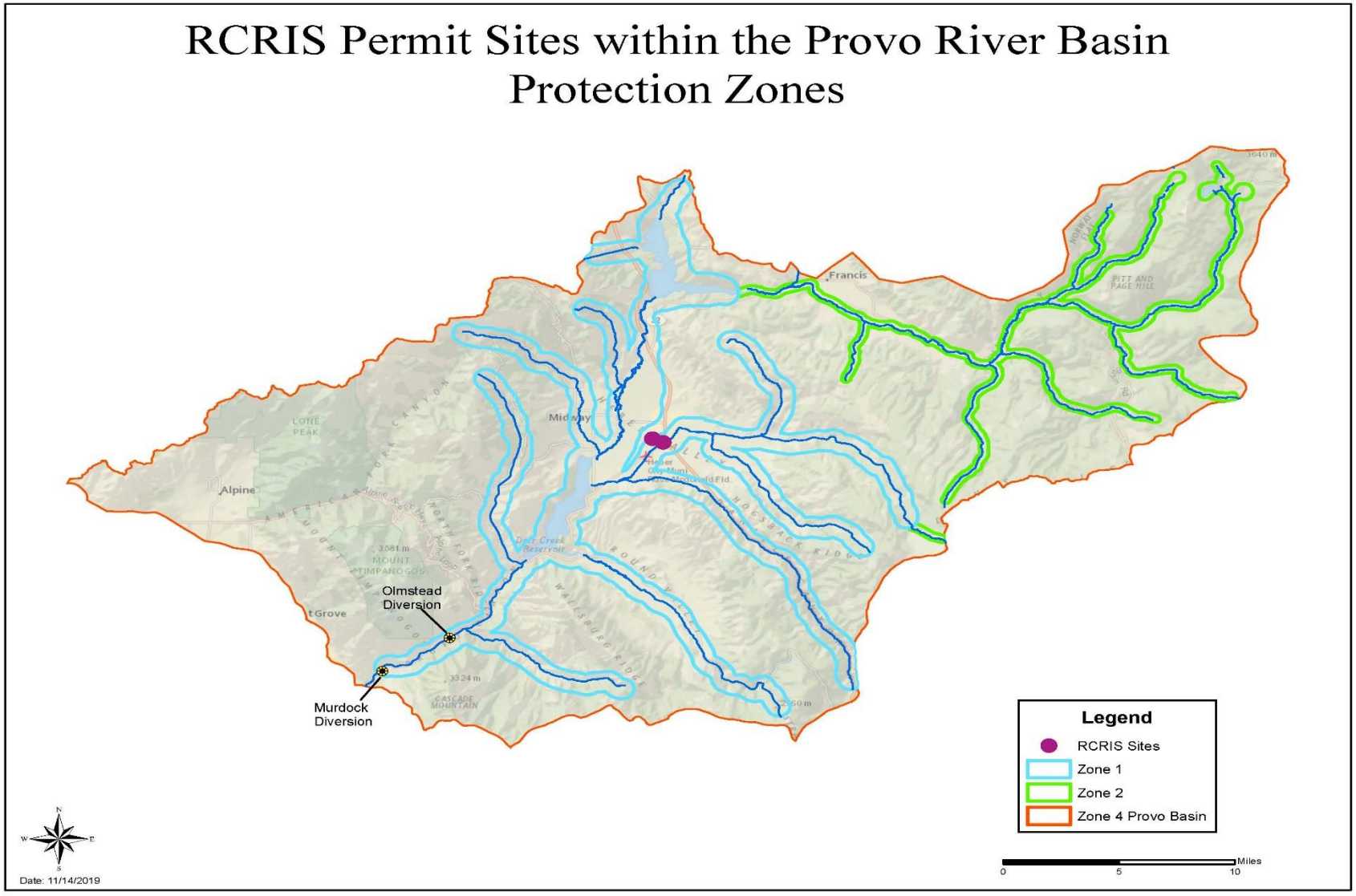
5.2.8 Resource Conservation and Recovery Information System (RCRIS)

The RCRIS sites listed in Table 5.8 have been identified as PCSs within the Provo River Basin watershed area. All have corresponding permit numbers indicating regulation by the appropriate State agency and therefore considered "controlled" by the Coalition. Map 5.7 (RCRIS Sites within the Provo River Basin Protection Zones) shows the location of each listed site assessment.

Table 5.8 RCRIS Sites in the Provo River Watershed

Zone	Facility Name	Type of Facility	State ID Number	Address	City
1	Mountain Cabinetry	N/A	UTR000014217	999 SOUTH 600 WEST	Heber City
1	Walmart Supercenter #4696	N/A	UTR000011585	1274 S HWY 189	Heber City

Map 5.7 RCRIS Sites within the Provo River Basin Protection Zones



5.2.9 Mineral Producers

The mineral producing sites listed in Table 5.9 and Table 5.10 have been identified as PCSs within the Provo River Basin watershed area. All entities having corresponding permit numbers indicate regulation by the appropriate State agency and are therefore considered "controlled" by the Coalition. For all sources listed which do not have a current permit or state ID number, the Coalition assumes that the State is either aware of and is controlling the entity if active or that the entity is dormant and is not considered to be a PCS. Maps 5.8 (Mineral Production Sites within the Provo River Basin Protection Zones) and 5.9 (Potential Contamination Sites within the Weber Provo Canal Protection Zones) show the location of each listed mineral producing site.

Table 5.9 Mineral Producers within the Provo River Basin Protection Zones

Zone	Name	Commodity	County
1	Phoston Operation Mill	Phosphorus-Phosphates	Wasatch
1	Bone Hollow Claims	Iron	Wasatch
1	Midway Hot Pot	Geothermal	Wasatch
1	Copper Queen Prospects	Copper	Wasatch
1	Bone Hollow Claims	Iron	Wasatch
1	Snake Creek District	Copper	Wasatch
1	Ut Dep of Hwys No 26002	Sand and Gravel	Wasatch
1	Ut Dept of Hwys No 26023	Sand and Gravel	Wasatch
1	Ut Dept of Hwys Pit No 26006	Sand and Gravel	Wasatch
1	Ut Dept of Hwys No 26012	Sand and Gravel	Wasatch
1	Keetley Prospect	Stone	Wasatch
1	Park Heber Tunnel	Lead	Wasatch
1	Ontario Drain Tunnel No 2 Portal	Gold	Wasatch
1	East Ontario Mine	Copper	Wasatch
1	Ut Dept of Hwys No 26003	Sand and Gravel	Wasatch
1	Ut Dept of Hwys No 26019	Sand and Gravel	Wasatch
1	Park Premier Shaft	Zinc	Wasatch
1	Ut Dept of Hwys No 26024	Sand and Gravel	Wasatch
1	Ut Dep of Hwys No 26028	Sand and Gravel	Wasatch
1	Ut Dept of Hwys No 26004	Sand and Gravel	Wasatch
1	Park King Shaft	Silver	Wasatch
1	Ut Dept of Hwys No 26018	Sand and Gravel	Wasatch
1	Keeler Tunnel	Zinc	Wasatch
1	Ut Dept of Hwys No 26020	Sand and Gravel	Wasatch
1	Ut Dept of Hwys No 26010	Sand and Gravel	Wasatch
1	Heber City Mine	Lead	Wasatch
1	East Utah Shaft	Zinc	Wasatch
1	Ut Dept of Hwys No 26027	Sand and Gravel	Wasatch
1	Ut Dept of Hwys No 26021	Sand and Gravel	Wasatch
1	Ross Todd Hollow Adit	Stone	Wasatch
1	Mccune Tunnel	Zinc	Wasatch
1	Ut Dept of Hwys No 26015	Sand and Gravel	Wasatch
1	Sphinx Prospect	Zinc	Wasatch
1	Ut Dept of Hwys No 26017	Sand and Gravel	Wasatch
1	Ontario Drain Tunnel No. 2 Portal	Silver	Wasatch
1	Center Creek Gravel Pit	Sand and Gravel	Wasatch
1	Limestone Borrow Pit.	Limestone	Wasatch
1	Gravel Pit	Sand and Gravel	Wasatch
1	East Utah Shaft	Silver	Wasatch

Table 5.9 Mineral Producers within the Provo River Basin Protection Zones (cont.)

Zone	Name	Commodity	County
1	Ut. Dept. of Hwys. Gravel Pit No. 26028	Sand and Gravel	Wasatch
1	Utah Dept. of Highways Gravel Pit No. Z6027	Sand and Gravel	Wasatch
1	Utah Dept. of Highways Pit No. I6021	Sand and Gravel	Wasatch
1	Utah Dept. of Highways Pit No. 26019	Sand and Gravel	Wasatch
1	Park King Tunnel	Silver	Wasatch
1	Mccune Tunnel	Zinc	Wasatch
1	East Ontario Mine	Silver	Wasatch
1	Unknown Tunnel	Silver	Wasatch
1	Blue Ledge-Mayflower Mine	Copper	Wasatch
1	Cottonwood Canyon Stone Quarry	Stone	Wasatch
1	Timber Lakes Quarries	Stone	Wasatch
1	Gravel Pit	Sand and Gravel	Wasatch
1	Utah Dept. of Hwys. Gravel Pit No. 26026	Sand and Gravel	Wasatch
1	Utah Dept. of Hwys. Gravel Pit No. 26024	Sand and Gravel	Wasatch
1	Utah Dept. of Hwys. Gravel Pit No. 26023	Sand and Gravel	Wasatch
1	Heber City Borrow Pit. #1	Sand and Gravel	Wasatch
1	Charleston Crushed Stone Quarry	Stone	Wasatch
1	Big Hollow Crushed Stone Quarry	Stone	Wasatch
1	West Park Mine	Copper	Wasatch
1	Green Monster Mine	Copper	Wasatch
1	Steamboat Tunnel	Iron	Wasatch
1	Deer Creek Reservoir Quarry	Stone	Wasatch
1	Utah Dept of Highways Pit No. 26020	Sand and Gravel	Wasatch
1	Park-Utah No. 2 Shaft	Silver	Wasatch
1	Thaynes Mine		Wasatch
1	East Utah	Lead	Wasatch
2	Phosphate Deposit #1	Phosphorus-Phosphates	Duchesne
2	Ut Dept of Highways No 22058	Sand and Gravel	Summit
2	Ut. Dept of Hwy Gravel Pit 22060	Sand and Gravel	Summit
2	Utah Dept of Highways Pit 22062	Sand and Gravel	Summit
2	Ut Dept of Highways No 22036	Sand and Gravel	Summit
2	Utah Dept of Highways Pit No 22057	Sand and Gravel	Summit
2	Gravel Pit In Sec. 20	Sand and Gravel	Summit
2	Utah Dept. of Highways Pit No. 22036	Sand and Gravel	Summit
2	Utah Dept. of Highways Pit No. 22057	Sand and Gravel	Summit
2	Ut. Dept. of Hwys Pit 22062	Sand and Gravel	Summit
2	Ut Dep of Hwys No 26032	Sand and Gravel	Wasatch
2	High Bluff Quarry	Stone	Wasatch
2	Utah Dept. of Highways Pit No. 22058	Sand and Gravel	Wasatch
2	Utah Dept of Highways Gravel Pit No. 26005	Sand and Gravel	Wasatch

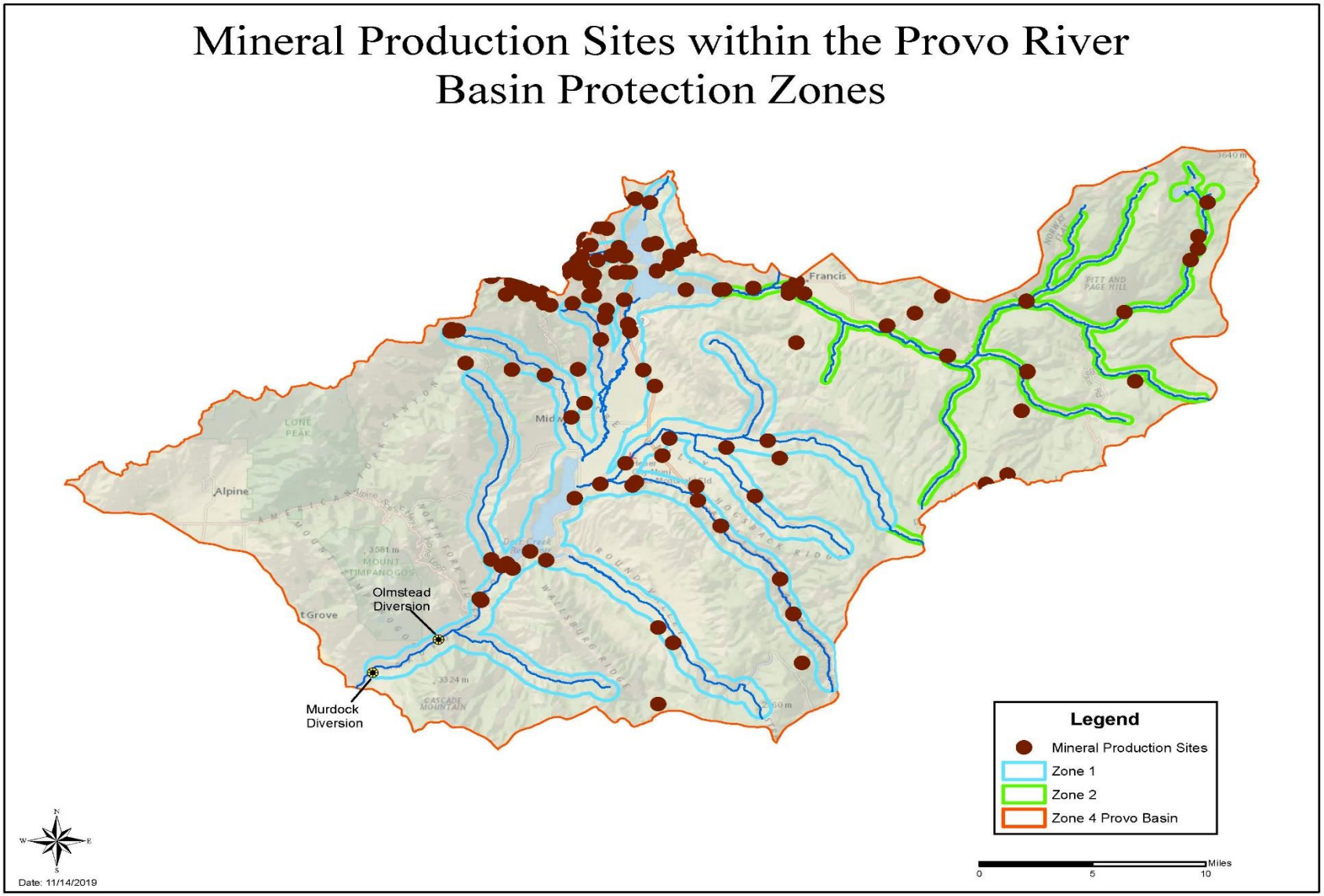
Table 5.9 Mineral Producers within the Provo River Basin Protection Zones (cont.)

Zone	Name	Commodity	County
4	Deer Creek Reservoir Quarry	Stone	Wasatch
4	Utah Dept of Highways Pit No. 26020	Sand and Gravel	Wasatch
4	Ut. Dept. of Hwys. No. 22053	Sand and Gravel	Wasatch
4	Park-Utah Tunnel No. 1 and Prospects	Silver	Wasatch
4	Unknown Tunnel	Lead	Wasatch
4	Park-Utah No. 2 Shaft	Silver	Wasatch
4	Thaynes Mine		Wasatch
4	East Utah	Lead	Wasatch
4	Mayflower Mine	Copper	Wasatch

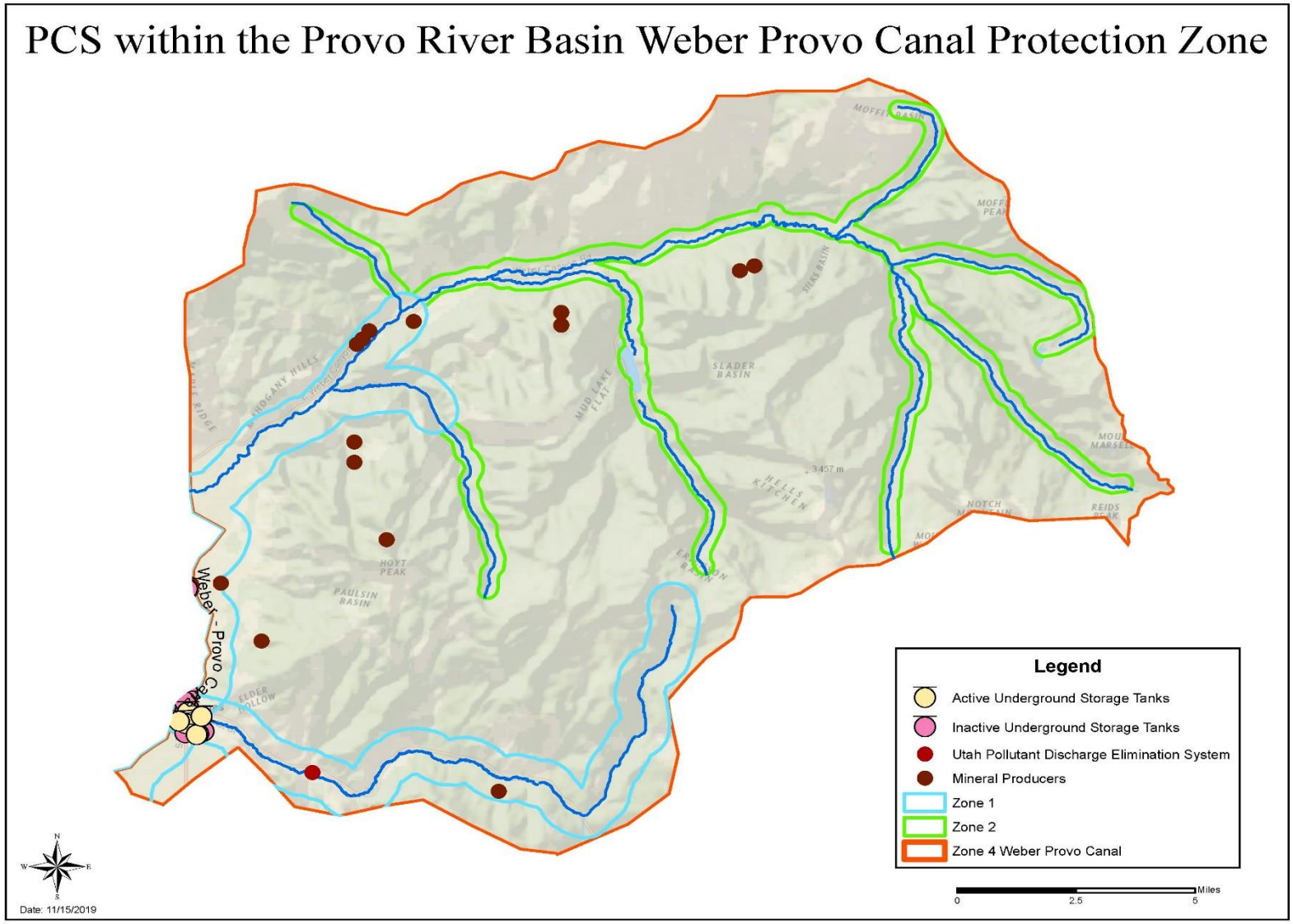
Table 5.10 Mineral Producers within the Weber Provo Canal Protection Zones.

Zone	Name	Commodity	County
1	Shale Pit In Sec 6	Stone	Summit
1	Ut Dept of Hwys Gravel Pit 22072	Stone	Summit
1	Ut Dep of Hwys Pit No 22033	Sand and Gravel	Summit
1	Shale Pit In Sec 1	Stone	Summit
1	Ut Dept of Hwys Gravel Pit 22072	Stone	Summit
1	Shale Pit In Sec. 1	Stone	Summit
1	Utah Silver Group	Lead	Summit
1	Shale Pit In Sec. 6	Stone	Summit
1	Ut. Dep. of Hwys. Pit No. 22033	Sand and Gravel	Summit
1	Marion Cemetery Borrow Pit	Sand and Gravel	Summit
4	Slader Basin Quad Phosphate	Phosphorus-Phosphates	Summit
4	Hidden Lake Phosphate Deposits	Phosphorus-Phosphates	Summit
4	South Fork Weber River Section	Phosphorus-Phosphates	Summit
4	Hidden Lake Phosphate Deposit	Phosphorus-Phosphates	Summit
4	Slader Basin Quad. Phosphate	Phosphorus-Phosphates	Summit
4	South Fork Weber River Section	Phosphorus-Phosphates	Summit
4	Shale Pit In Sec 6	Stone	Summit
4	Ut Dept of Hwys Gravel Pit 22072	Stone	Summit
4	Ut Dep of Hwys Pit No 22033	Sand and Gravel	Summit
4	Shale Pit In Sec 1	Stone	Summit
4	Gold Bullion No. 1 Thru 5	Gold	Summit
4	Ut Dept of Hwys Gravel Pit 22072	Stone	Summit
4	Shale Pit In Sec. 1	Stone	Summit
4	Utah Silver Group	Lead	Summit
4	Lucky Strike Nos. 1 Thru 6.	Gold	Summit
4	Chuck No. 1 Thru 15	Gold	Summit
4	Shale Pit In Sec. 6	Stone	Summit
4	Ut. Dep. of Hwys. Pit No. 22033	Sand and Gravel	Summit
4	Marion Cemetery Borrow Pit	Sand and Gravel	Summit
4	Beaver Creek Lead Zinc Mine	Lead	Summit

Map 5.8 Mineral Production Sites within the Provo River Basin Protection Zones



Map 5.9 PCSs within the Weber Provo Canal Protection Zones



Chapter 6 Summary of Existing Regulations and Programs

6.1 General

Surface water from reservoirs, rivers, and canals is one of the primary sources of drinking water for the communities supplied by the Coalition members. As such, it is important that these resources be protected from contamination. Preventing contamination is the easiest and most cost effective way to keep the water supply safe. Because management controls can serve as an important component of a DWSP program, it is the objective of the Coalition that protection of the water supply is through preventive measures. Developing management strategies for PCSs will help minimize possible contamination.

The purpose of the DWSP program is to provide utilities with the means to assess the adequacy of existing environmental regulations and to implement management programs to enhance such controls to improve adequate protection. The first step required in developing appropriate management programs is to identify and understand existing governmental controls. Table 6.1 and Table 6.2 are included to present a general summary of each existing rule or regulation.

6.2 Existing Controls

Several Federal, State, and local regulations and ordinances have been developed to help protect water quality. Most regulations protect water indirectly by governing the generation, use, storage, transportation, recycling and disposal of hazardous materials and wastes

The Safe Drinking Water Act and the Clean Water Act along with other Federal guidelines have been established to protect surface water resources. Most government regulations control activities that are potential contamination sources through permitting, monitoring, and enforcing penalties. Some regulations require that the facility notify the regulating agency of what chemicals they use and how much they store. Other regulations set specific concentration, toxicity, discharge or other limits on the facility.

6.2.1 Permitting

Permitting is the process by which activities addressed by existing regulations are managed and operational standards are established. The regulating agency can require the regulated community to obtain permits to ensure compliance with a specific regulation. Businesses must usually register their facilities with the regulating agency and obtain permits to handle, store, or dispose of hazardous materials. The permits can set maximum concentration levels or other limits on waste streams, set treatment requirements for wastes, limit the type and use

of chemicals, require the facility to develop safety procedures, educational programs or emergency response procedures, or comply with other requirements (Woodside 1993).

6.2.2 Monitoring

Almost all Federal and State regulations require that facilities monitor and keep records of their compliance, or noncompliance, with issued permits. Some regulations require periodic submittal of monitoring records while others only require notification of violations of the permit. The monitoring is often augmented with regular inspections by the regulating agency to verify that the facility is following the provisions of the permit. The submitted monitoring records usually become public record. Other data pertinent to a facility can be reviewed by the regulating agency but are not public record.

6.2.3 Enforcing Penalties

Enforcement of the requirements of the regulation is usually the responsibility of the regulating agency. The regulating agency has the right to inspect the facility site and to audit its records. If the facility is not complying with the requirements of the regulation, penalties (e.g., citations of non-compliance, orders to cease operations or administrative penalties) can be issued. Many regulations have fines for non-compliance. These fines can vary from a few hundred dollars for accidental or minor infractions, to several thousand dollars per day for major or intentional violations. Major and intentional violations can also result in criminal charges involving legal action.

6.2.4 Key Regulations

Several regulations have been established by both the Federal and State government levels to help protect surface water resources. The regulations listed below are the key laws that regulate the types of potential contamination sources likely to locate within the watershed protection zones.

6.2.4.1 Federal Regulations

There are Federal regulations that either directly or indirectly protect surface water resources. These regulations are listed below and are briefly described in Table 6.1.

Table 6.1 Existing Federal Regulations and Regulating Agencies.

Federal Regulations and Regulating Agencies		
Federal Regulations	**Description**	**Regulating Agency**
CWA	Controls chemical discharges into surface water.	Utah Division of Water Quality
SDWA	Sets safe water standards for public drinking water.	Utah Division of Drinking Water
LT2	Regulates additional drinking water treatment based on source water *Cryptosporidium* levels.	Utah Division of Drinking Water
GWR	Regulates ground waters used as drinking water sources	Utah Division of Drinking Water
RCRA	Controls the use and disposal of hazardous wastes.	Utah Division of Solid and Hazardous Waste
CERCLA	Regulates the cleanup of existing spills.	Utah Division of Environmental Response and Remediation
SARA Title III or EPCRA	Regulates chemicals and activities included under both RCRA and CERCLA.	U.S. Environmental Protection Agency
FIFRA	Controls manufacturing, labeling and sales of insecticides and herbicides.	U.S. Environmental Protection Agency
TSCA	Establishes use, storage and disposal requirements for new chemical substances or mixtures.	U.S. Environmental Protection Agency
CAFO	Develop and implement comprehensive nutrient management plans to minimize the impact from concentrated animal feeding operations.	U.S. Environmental Protection Agency

6.2.4.2 State Rules

In 2002 the Division of Water Quality created a total maximum daily load (TMDL) for Deer Creek Reservoir to determine what pollutants were impairing water quality and how to reduce them. One area of importance was to reduce phosphorus loading (see table 8.2) and phosphorus concentrations. The TMDL target level for Total Phosphorus (TP) within Deer Creek reservoir is 0.025 mg/L (average for all depths). The target level for in-stream phosphorus concentration is 0.030 mg/L TP and for Dissolved Total Phosphorus it is 0.020 mg/L (DTP).

In addition to the TMDL and Federal regulations, the State of Utah has adopted several rules to protect water quality. Many of these rules are the State equivalent to the Federal regulations cited above. Each is briefly described in Table 6.2.

Table 6.2 Existing State Rules and Responsible Agencies.

State Rules and Responsible Agencies		
State Rule	**Description**	**Responsible Agency**
Underground Storage Tank Rule (USTR)	Underground storage tanks are registered with the State and are periodically checked for leaks.	Utah Division of Environmental Response and Remediation
Utah Pollutant Discharge Elimination System (UPDES)	State-wide program for issuing permits for discharges of biologically, chemically or physically altered water to the surface water of the State.	Utah Division of Water Quality
Standards of Quality for Waters of the State	Establishes a policy to conserve, protect, maintain, and improve the quality of public water supplies by designating classifications for all surface water sources. Also, establishes an anti-degradation policy.	Utah Division of Water Quality
Underground Injection Control Rule (UIC)	Regulates discharges directly into the groundwater through injection wells.	Utah Division of Water Quality
Used Oil Management Rule	Regulates the handling and disposal of used motor oil and other petroleum fluids used by private and public vehicles and in industries.	Utah Division of Solid and Hazardous Waste
Utah Pesticide Control Act	Requires pesticide users to be certified. Prohibits the transportation, storage and disposal of pesticides or pesticide containers in such a manner that may pollute any water way.	Department of Agriculture
Hazardous Material Rule	State law adopting the provisions of SARA Title III. Establishes State and local emergency response centers.	Utah Division of Environmental Response and Remediation
Hazardous and Solid Waste Permitting and Management Rules	State law adopting the provisions of RCRA. Regulates hazardous and solid waste streams and landfills.	Utah Division of Solid and Hazardous Waste
Concentrated Animal Feeding Operation Rule	Requires concentrated animal feeding operations to develop and implement comprehensive nutrient management plans to minimize the impact.	Department of Agriculture
TMDL	Establish pollutant loadings for waterbodies of the State.	Division of Water Quality

6.2.4.3 County Regulations

Wasatch City-County Health Department adopted Rule 00-1 entitled "Rule Governing Ground Water Requirements for Onsite Wastewater Systems". This ruling was adopted on September 19, 2001 and was created to ensure that there is adequate separation between the bottom of the adsorption system excavation for a septic tank drain field and the groundwater table. A copy of this rule is included in Appendix F. The primary purpose of this rule is to provide adequate protection of the groundwater which discharges into Deer Creek Reservoir and the Provo River.

6.2.5 Adequacy of Existing Controls

It is important to appreciate the scope and limits of existing regulations. Although there are numerous Federal and State requirements, there may be potential contamination sources that could either be inadequately controlled or uncontrolled under the existing regulations. This is especially true for very small generators and users of hazardous materials.

Using the existing controls summarized in Tables 6.1 and 6.2, the Coalition assessed the adequacy of these controls in preventing contamination from the types of PCSs located within the watershed protection zones. Each potential contamination source has a permit number and therefore has been registered with the State and is being regulated and managed by the appropriate state agency according to current regulations. Each agency is controlling the contamination risk by requiring each PCS to employ best management practices, pollution prevention measures, or physical barriers to provide adequate control. Assessment of all existing Federal and States requirements indicate that all PCSs are adequately controlled and require no further action by the Coalition.

Chapter 7 Managing Existing Contamination Hazards

7.1 General

Strategies are needed to manage existing land use activities that have the potential to contaminate surface water sources within the watershed protection zones. The intent of management strategies, which are mostly incentive-based and educationally focused, is to provide the ways in which to encourage the protection of watershed protection zones through adoption and implementation of best management practices for potential contamination sources. Many management strategies are developed to inform and educate the community about source protection and how to be an active participant in achieving it. Management controls that focus on preventive measures are often the most successful strategies to reduce the risk of possible contamination within the watershed. The effectiveness of each strategy depends upon several factors, such as: available resources, cost, manpower, cooperation of the PCSs, and the cooperation of legislative bodies within the watershed boundary.

Management strategies are generally categorized as either regulatory or non-regulatory. Regulatory controls involve legislation or other means of control exercised according to the water provider's jurisdiction. These controls vary in their ability to manage land uses and activities. Some examples of regulatory management strategies are zoning and subdivision ordinances, site plan reviews, design and operating standards, and source prohibitions. The Coalition is not able to directly pursue these types of regulatory controls because the watershed boundaries are typically established beyond the jurisdictional authority and boundaries of members of the Coalition, with the exception of Class I cities. Also, in many instances the members of the Coalition are not directly associated with any local legislative body. This means that the Coalition cannot make zoning or subdivision ordinance changes. To pursue regulatory controls, the Coalition is working through existing programs and agencies such as the Provo River Watershed Council (PRWC) to persuade local city councils and county commissioners who have the ability to establish and enforce watershed protection measures.

7.2 Existing Management Plans

PRWC has developed water quality management plans to establish and implement watershed protection efforts and activities for the watershed of the Provo River Basin. The Upper Provo River water Quality Management Plan developed by PRWC is attached to this document as Appendix H. The PRWC continues to meet quarterly to share information, coordinate the activities of various agencies with responsibilities in the watershed, and provide advice to agencies on water quality issues in the basin. As part of this continuing watershed protection effort, the downstream water agencies which use the Provo

River to provide drinking water to a large percentage of the Wasatch Front population, contribute substantial resources to assist Wasatch County in preparing master plans, developing ordinances, and administering ongoing programs including the review of development plans. This assistance also provides for annual monitoring and reporting of water quality conditions along the Provo River as well as Jordanelle and Deer Creek Reservoirs.

7.2.1 Deer Creek Resource Management Plan (DCRMP)

The DCRMP (see Appendix E) ensures water integrity as a principle source of water supply for the Wasatch Front area. It protects and maintains the purposes for which the Provo River Project was authorized by congress, as well as provides long term management-direction information for prospective users as well as interested public.

It describes the activities necessary to achieve the desired future condition of the project in the following decision areas:

- Area-wide goals and objectives,
- Area-wide management requirements,
- Specific area management direction,
- Lands suited or not suited for resource use and production, and
- Monitoring and evaluation requirements.

The DCRMP was completed in 1998 and the environmental assessment was released for public comment. Due to public comments received by the USBR, control grazing on project lands was allowed to continue, but modified the original action. This grazing modification is intended to reduce the hazard for grass fires, which could impact water quality by allowing for rapid soil erosion following a fire event. USBR has decided to allow grazing on project lands east of U.S. Highway 189, the opposite side of the reservoir, with best management practices being implemented.

7.2.2 Provo Canyon Scenic Byway Corridor and Watershed Management Plan

The U.S. Highway 189 segment from the mouth of Provo Canyon to the intersection with U.S. Highway 40 in Heber City has been designated a state Scenic Byway for its outstanding recreational, natural, and scenic qualities. This scenic byway also bisects the Provo Canyon Watershed, which supplies an important source of drinking water for the Salt Lake Valley and Utah Valley populations. These two uses make Provo Canyon a complicated transportation, recreation and watershed corridor. The help protect the resources of Provo Canyon, the MAG has prepared the Provo Canyon Scenic Byway Corridor and Watershed Management Plan (see Appendix I).

The purpose of the Corridor Management Plan is to assess the byway's potential to accommodate increased tourism levels within a clearly defined and realistic framework and to protect the natural, scenic, historic, cultural, and recreational resources along the byway.

The purpose of a Watershed Management Plan is to describe existing water resource conditions, identify specific water quality problems, and outline how watershed stakeholders plan to protect and restore water resources to the desired conditions.

7.2.4 Jordanelle Master Plan

Wasatch County has adopted the Jordanelle Basin Master Plan. Since the adoption of this plan, a Jordanelle Basin Overlay Zone has also been adopted, which will supplement existing county zoning regulations for lands within this overlay zone. These regulations will guide development within the Basin and provide the vision for what is to come.

7.2.5 Wasatch County Water Efficiency Project (WCWEP)

The WCWEP Area mission statement is to:

"Manage and Distribute water to water right owners and their shareholders in a safe, efficient and equitable manner."

Specific purposes include:

Improve irrigation efficiencies
Conserve water
Improve water management
Supplement flows in Heber Valley Streams
Protect water rights of downstream users
Minimize cost of project features
Minimize impacts to groundwater and wetlands
Return portions of the Strawberry River to a naturally functioning state

7.2.6 Utah Pollutant Discharge Elimination System Controls

There are existing PCS that are being managed by the UPDES permitting system which is administered by the DWQ. These PCSs are described below.

7.2.6.1 Midway Fish Hatchery

The Midway Fish Hatchery's Utah Pollutant Discharge Elimination System (UPDES) permit UT0025879 was renewed on January 1, 2016 and will expire in December 31, 2020. It specifically limits the total suspended solids (TSS) maximum concentration to 25 mg/l, pH to a range of 6.5 to 9.0, and net increase of total phosphorus to 400 kg/yr. The permit requires the hatchery to monitor the influent springs and the effluent springs for the determination of net increase of total phosphorus.

7.2.6.2 Kamas Fish Hatchery

The Kamas Fish Hatchery is currently authorized to discharge under the UPDES General Permit UTG 1300006 for concentrated aquatic animal production facilities (CAAPF). The permit became effective March 1, 2015 and will expire in February 8, 2020.

The UPDES permit does not require phosphorus monitoring, however, to offset the potential for increased phosphorus discharges, the DWR included settling ponds to reduce the amount of phosphorus loads that otherwise would be discharged. The settling ponds at the Midway Fish Hatchery appear to have helped greatly to meet phosphorus limitations.

7.2.6.3 United Park City Mines

On the west side of Jordanelle Reservoir, the United Park City Mines discharges water from the treatment facilities at Keetley Station. This water originates from old mines in Park City that are drained through the Ontario #2 Drain Tunnel. The UPDES permit sets specific limitations on daily maximum concentrations of TSS, aluminum, copper, lead, mercury, zinc, oil and grease. Limitations are also placed on 30-day average concentrations of TSS, lead and mercury. Although the State Division of Water Quality monitors the effluent, the drain tunnel is not a significant source of phosphorus, and phosphorus is not limited in the permit. They are currently regulated by UPDES permit UT0022403 for all discharges.

7.2.6.4 Wastewater Discharges

Active point source discharges of wastewater are adequately controlled through the UPDES permit system, with discharge requirements developed to meet the recommendations of the PRWC Water Quality Management Plan.

Jordanelle Special Service District Water Reclamation Facility has a design flowrate of 1.0 million gallons per day (MGD). The facility serves the developments in the area of Jordanelle Reservoir north of Heber City in Wasatch County, UT. The facility's flow passes through; fine screens, and then through a series of anaerobic and aerobic tanks (which is a biological aid in the removal of phosphorous), then through a membrane bio-reactor (which includes the addition of alum for further phosphorous removal), then through an ultra violet (UV) disinfection system. The solids handling consists of an aerated solid handling basin and a belt press for dewatering. There has not been a discharge from the facility to this point but the UPDES permit UT0025747 was renewed on April 1, 2019 and will expire on March 31, 2024. The UPDES permit limits are critical to protect water quality and limit phosphorus to 0.03 mg/L in the summer and 0.06 mg/L in the winter with a total annual load of 91 lbs.

The Heber Valley Special Service District was constructed to treat the sewage flows from Heber. The treatment effluent does not discharge into any water body. Instead it is stored in holding ponds where it is pumped to irrigate several acres of fields. Some of this effluent is lost to evaporation and natural percolation. Recently, a rapid infiltration basin was constructed to reduce the need for the expansion of winter holding ponds.

7.2.7 Heber Valley Storm Water Management Plan

In response to recommendation from PRWC implementation reports, Wasatch County completed the Storm Water Study in Heber Valley (See Appendix J). The purpose of the study was to identify potential sites for

construction of new sedimentation basins and or wet ponds to reduce eroded sediment and pollution in surface water runoff entering Deer Creek Reservoir.

7.2.8 Small Farm & Pasture Management Guide

The Wasatch Soil Conservation District published A Pasture & Hayland Management Guide: For Small Farms and Ranches in Wasatch County (See Appendix D). The guide addresses planning, economics, water management, soil conservation, best management practices, and other important issues involved with agricultural lands. The District presents seminars to educate farmers and ranchers on use of the guide. The class is required for those farmers receiving government financial aid. Classes began in 1998 when the guide was released.

7.2.9 Wasatch County Guide for Erosion and Sediment Control

The Wasatch County Guide for Erosion and Sediment Control (See Appendix A) was published in 1996 to provide guidance to those involved with land disturbing activities within Wasatch County. The manual defines the basic principles of erosion and sediment control and presents a step by step process for developing temporary and permanent erosion and sediment control plans during and after development. The manual also defines regulations that pertain to erosion and sediment control within Wasatch County, along with the required permit procedures.

0 7.2.10 Provo Reservoir Canal Enclosure Project

Provo River Water Users Association, JVWCD, CUWCD, and MWDSLS along with other agencies completed the project to enclose the Provo Reservoir Canal in 2012. The 23 mile long canal runs through several cities in North Utah County resulting in water quality impacts from development, agricultural runoff, and recreation. A road runs the length of the canal also provides access for accidental or intentional spills. Enclosing the canal has virtually eliminated PCSs to this conveyance system.

7.3 PCS Control Accomplishments

In the early 1980's, a water quality management plan was prepared for the Jordanelle/Deer Creek watershed as a condition of EPA’s approval of the environmental impact statement (EIS) for the construction of the Jordanelle Dam. That plan was completed in 1984, with implementation reports being written on

nearly an annual basis (see Appendix G for the 2012 Implementation Report).

The preparation of the water quality management plan, and the various implementation reports and updates, has been under the oversight of the PRWC which provides advice and assistance to elected officials and agencies on many issues related to protecting the quality of Deer Creek and Jordanelle Reservoirs and the Provo River. During roughly the same time frame this planning effort was occurring, other programs and activities were affecting the watershed. (1) The Heber Valley Special Services District constructed a new $13 million sewage treatment facility to incorporate land application and eliminate the sewage treatment discharges to Deer Creek Reservoir from the communities of Heber City and Midway. (2) A Rural Clean Water Project (RCWP) under the U.S. Department of Agriculture provided funding to many of the dairy farmers in the Snake Creek area to clean up their dairy operations by preventing the discharge of manure (and phosphorus) into surface waters and ultimately Deer Creek Reservoir. (3) A Clean Lakes plan and project for Deer Creek Reservoir, funded by the EPA, provided substantial funding to continue clean-up activities (primarily phosphorus reduction for dairy farmers in the area).(4) Implementation of various management plans have facilitated multi-jurisdictional awareness and participation on preserving and improving watershed stability. (5) The Deer Creek TMDL was completed in March 2002. This provides the limits for the Division of Water Quality to use in restricting discharge permits and activities.

A few years later, a great deal of effort went into providing sewer service on the west side of Jordanelle Reservoir. The USBR and the DWQ provided nearly $6 million dollars, in addition to other state and local contributions, for connection of the sewer to the Heber Valley sewage treatment plant specifically for the purpose of avoiding the need for sewage discharges into Jordanelle Reservoir.

All of these efforts have resulted in substantial reductions of phosphorus inputs into Deer Creek Reservoir and commensurate improvements in water quality. Algal blooms have been reduced and the need for chemical treatment of the reservoir by the downstream water users has been eliminated. It has been a success story which has been a model for similar efforts throughout the state and the nation.

7.4 Management Strategies for Specific PCSs

Table 7.1 is provided as a reference for existing rules, regulations, or other controls that are already in place to address specific PCS which may or may not currently exist in the watershed area along with the regulatory agency that is currently responsible to regulate the given PCS.

Nearly all of the PCS identified in Chapter 5 (Table 5.0) are adequately controlled by a Federal or State agency. These agencies are responsible for requiring each

PCS to develop and implement best management strategies and appropriate measures to ensure adequate control and protection. If a particular PCS is not in compliance with applicable rules and regulations, the regulating agency is required to take appropriate action to ensure the PCS will soon be in compliance and therefore will not pose an un-necessary risk to the watershed.

In addition to existing regulatory controls, the existing management plans discussed in Section 7.2 address nearly all of the PCS identified in Chapter 5 (Table 5.0) for further protection against contamination of waters in the watershed.

Table 7.1 Existing governmental controls of potential chemical contamination sources.

Description of Contamination Process or Chemical	Potential Hazard	Existing Governmental Controls
Underground storage tanks (on State UST list)	Tanks could leak stored chemical directly into the ground and eventually be discharged into surface water sources.	Regulated by the Division of Environmental Response and Remediation through the Underground Storage Tank Rule. Tanks that are on the UST list are regularly inspected and often have safeguards such as secondary containment or continuous monitoring.
Leaking underground storage tanks (on State LUST list)	Leaks into the ground have been recorded. Until the source of the leak is located and repaired, the tank is a hazard. Contaminants could eventually be discharged into surface water sources.	Regulated by the Division of Environmental Response and Remediation through the Underground Storage Tank Rule. Tanks that are on the Leaking Underground Storage Tank (LUST) list are required to empty the leaking tank and fix or remove the tank before using it again.
Underground storage tanks (not on State list)	Tanks could leak stored chemical directly into the ground. There is no official monitoring of the tank to determine if it is leaking. A leak in this type of tank could go on unnoticed for long periods of time. Contaminants could eventually be discharged into surface water sources.	Regulated by the Division of Environmental Response and Remediation through the Underground Storage Tank Rule.
Above ground storage tank	Tanks located on or above the ground could leak their contents onto the ground and eventually be discharged into surface water sources. Spills may occur during filling or emptying of the tank. A major spill may also occur if the tank is ruptured due to an accident or natural disaster.	Tanks sold commercially are constructed according to ASTM standards. There are no existing governmental controls to regulate or observe above ground storage tanks at business locations.
Closed or abandoned underground storage tanks	When a tank is left in the ground after a business closes, the potential risk of contamination from the tank continues as long as the tank remains in the ground.	Closed tanks continue to be regulated by the Division of Environmental Response and Remediation.

Description of Contamination Process or Chemical	Potential Hazard	Existing Governmental Controls
Used oil collection and storage	The occurrence of used oil is the most common containment within the watershed protection zone. In the past many people have improperly disposed of used oil. Used oil is a persistent and severe contaminant. Today, the public is encouraged to take their oil to a certified collection owner. Garages frequently perform oil changes and often serve as collection centers. There is still a potential contamination risk, though much less than from private disposal, as the oil is stored at the collection center.	Disposal of used oil is regulated by the Division of Solid and Hazardous Waste through the Used Oil Management Act.
Brake fluid collection and storage	Brake fluid is not classified as a hazardous material but is considered toxic under Toxic Substance Control Act (TSCA) and Safe Drinking Water Act (SDWA). The presence of brake fluid in large quantities will diminish the quality of drinking water. This may result in added costs to the Coalition due to the need to removing the contaminant through treatment.	The majority of oils and oily wastes, including brake fluid, are not classified as hazardous waste under EPA regulations (MacKenzie, 1985). Brake fluid is a solid waste under RCRA and is regulated by the Division of Solid and Hazardous Waste. The Division only requires that the brake fluid be disposed of in a responsible manner. This means that the waste is sent to a Treatment, Storage, and Disposal facility instead of to a public landfill. Most businesses have the brake fluid removed by a registered transporter at the same time their used oil and other waste fluids are removed.
New oil used and storage	Oil storage in large quantities may be released to the ground by slow leaks, occasional spills, accidents, or natural disasters. The oil can pollute large volumes of water, as can used oil.	Governmental regulation related to environmental protection governing new oil use and storage is the Spill Prevention Control and Countermeasure Program, under the Clean Water Act. The regulating agency is the Division of Water Quality. This program does not directly regulate quality of containment and does not regulate storage under 660 gallons.

Description of Contamination Process or Chemical	Potential Hazard	Existing Governmental Controls
Asphalt products	The potential hazard to the water supply from the use and storage of asphalt products is the hydrocarbons in the viscous products such as the tack coat material, primers, and asphaltic cement. These products are often stored in liquid form in 55 gallon drums or larger containers. They are often stored outside and are loaded into tank trucks over unpaved surfaces.	There is no direct governmental control over the storage of asphalt products by contractors.
Inks and printing chemicals	Printing chemicals such as inks contain heavy metals, such as barium, that are toxic. Printers often use other dyes, oils and solvents that can pose a similar threat to the water supply.	Barium and other heavy metals are reportable under Section 313 of the Community Right to Know Act (SARA Title III).
Glues, stains, or paint sales	Glues, stains, and paints contain several organic compounds such as petroleum products and halogenated hydrocarbons. Some of these components are considered toxic and/or hazardous and would diminish the quality of the drinking water. Release may occur through accidental spills during transportation and handling, leaking during storage, or by improper disposal.	Some products contain chemicals that qualify as hazardous waste under RCRA when disposed or are listed as toxic under SARA Title III. These substances are regulated through the Division of Solid and Hazardous Waste, but most local businesses use too small of quantities to be regulated. There are usually no direct requirements placed upon sellers of the products other than those required by the product manufacturers.

Description of Contamination Process or Chemical	Potential Hazard	Existing Governmental Controls
Resins	Resins are typically used in industrial manufacturing. They usually set up in a solid state quickly when exposed to the air and do not mix well with water, but they do often have some volatile organic compounds (VOC) which would mix with water. The VOCs are considered toxic and/or hazardous and if released into the water would diminish the quality of the drinking water. Release may occur through accidental spills during transportation and handling, leaking during storage, or by improper disposal.	Resins contain hazardous chemicals that are listed as toxic under the SARA Title III. These substances are regulated through the Division of Solid and Hazardous Waste, but most local businesses use too small quantities to be regulated.
Furniture refinishers	Furniture refinishers use a variety of chemicals in their stripping refinishing processes that can be harmful to the water. Stripping operations often use solutions such as methylene chloride, acetone, hydrochloric or phosphoric acid, perchloroethylene, and toluene. Many of the caustic solutions become wastes that contain high concentrations of methylene chloride, alcohols, metals, and other solvents. Several products are used during refinishing, such as stains, varnishes, shellacs, polyurethane, enamels, lacquers, and acrylic paints. These products contain several organic compounds such as petroleum products and halogenated hydrocarbons. (USEPA, 1990)	Some products contain chemicals that qualify as hazardous waste under RCRA when disposed or are listed as toxic under SARA Title III. These substances are regulated through the Division of Solid and Hazardous Waste, but most local businesses use too small quantities to be regulated.

Description of Contamination Process or Chemical	Potential Hazard	Existing Governmental Controls
Solvent use-thinners and degreasers	The presence of solvents in the water supply can render the water unsuitable for drinking. Solvents are used in a variety of commercial and residential applications. They are used to clean objects and thin chemicals. The waste is usually toxic and hazardous to the water supply.	Solvents are often governed under SARA Title III and are regulated by the local Fire Department under the Division of Environmental Response and Remediation. The wastes are regulated by RCRA through the Division of Solid and Hazardous Waste.
Dry cleaners	Dry cleaners use solvents and spotting chemicals to remove stains and grime from clothing. The most common solvent used is perchloroethylene. Release of these solvents or spotting chemicals into the water supply can render the water unsuitable for drinking.	Solvents are often governed under SARA Title III and are regulated by the local Fire Department under the Division of Environmental Response and Remediation. The wastes are regulated by RCRA through the Division of Solid and Hazardous Waste.
Anti-freeze collection and storage	Anti-freeze is not a hazardous waste, but it can contaminate the water supply. Releases to the water supply may occur during draining of vehicles or while being stored.	There are no governmental controls.
Acids - industrial use	Acids, like solvents, are very hazardous substances and can have a detrimental effect on the water source if released. There is a potential for release of acids from industrial operations during use in acid baths, draining of containers, storage, and disposal.	Acids are toxic substances that are governed under SARA Title III and are regulated by the local Fire Department under the Division of Environmental Response and Remediation. The wastes are hazardous and are governed under RCRA.
Automobile battery storage	Batteries pose a hazard to the water supply if the acid is spilled or escapes through cracked casings.	The collection and disposal of batteries is regulated by the Division of Solid and Hazardous Waste through RCRA. Under the regulations, only batteries that are reclaimed or disposed are subject to the notification, transportation, storage, and disposal requirements or RCRA. Batteries that are returned to the manufacturer for regeneration are not subject to the law.

Description of Contamination Process or Chemical	Potential Hazard	Existing Governmental Controls
Extremely hazardous chemicals	This category covers a large list of chemicals that are considered to be hazardous to human health and the environment. They are used in light and heavy commercial and industrial settings. Most of these chemicals are toxic, even when greatly diluted, and some are carcinogenic. The presence of these chemicals in the water supply will diminish the water quality and can render it unusable. Release may occur through accidental spills during transportation and handling, leaking during storage or by improper disposal.	Extremely hazardous chemicals are governed under SARA Title III and are regulated by the local Fire Department under the Division of Environmental Response and Remediation. The wastes are regulated by RCRA through the Division of Solid and Hazardous Waste.
Electroplaters and metal fabricators	These types of businesses produce several by-products that can be a threat to the water supply, if released. The electroplating industry produces wastes such as metal scraps, spent solvents, still bottoms, paint residuals, acid and alkaline solutions, plating and strippting solutions, waste oils, heavy metal wastewater sludges, and metal dusts. (USEPA, 1990) These wastes can reach the water supply through deliberate or accidental dumps, spills, leaks, or floor washes.	The wastes from electroplating operations are usually hazardous substances and their disposal is regulated by the Division of Solid and Hazardous Waste under RCRA.
Photo-developing chemicals	Photo developers contain cyanides, biosludges, silver sludges and other sludges that can contaminate the water supply (USEPA, 1993). These contaminants may be released through improper disposal of the used photo developers.	The wastes are often classified as hazardous wastes under RCRA, but the quantities associated with most photo developing businesses is too small to be regulated.

Description of Contamination Process or Chemical	Potential Hazard	Existing Governmental Controls
Permanents	Perm solutions, dyes and miscellaneous chemicals contained in hair rinses can contaminate the water supply if present in large quantities.	These chemicals are regulated through the Toxic Substance Control Act (TSCA).
Soaps and waxes	Soaps and waxes are not a major source of contamination but can be detrimental to water quality if discharged in large concentrations. Typical uses are car and truck washes, cleaning facilities, and commercial and industrial manufacturing. These contaminants may be released through leaks in underground sumps or accidental spills of soap or wax concentrates.	Soaps and waxes are not classified as hazardous or toxic under RCRA or EPCRA. There is no governmental controls related to water supply protection.
Fertilizer/pesticide/ herbicide application - residential	The over-application of pesticides or herbicides around private residencies can result in excess amounts being carried into the water supply. Fertilizers can contain toxins and contribute nitrates to the water supply. The contribution by one residence is small, but the cumulative effect of a large number of homes and apartment complexes can result in a significant contribution to the water supply.	There are no governmental controls that can directly control the activities of residents in their own homes. The only means of control that the government has are regulations placed upon the manufacturers through FIFRA. These regulations require manufacturers to produce safer products and to label proper application rates.

Description of Contamination Process or Chemical	Potential Hazard	Existing Governmental Controls
Fertilizer/pesticide/herbicide application - parks/ cemeteries/ schools/churches	The over-application of pesticides or herbicides in municipal and other public locations such as parks, cemeteries, churches, and schools can result in excess amounts being carried into water supply. Fertilizers can contain toxins and contribute nitrates to the water supply. The contribution by the application of these chemicals on large grassed areas can result in a significant contribution to the water supply.	There are no regulations governing the application of these chemicals. There are requirements placed upon the manufacturers through FIFRA to produce safer products and to label proper application rates.
Storm Drains	Storm drain systems collect run-off from rain and snow melt. Hazardous chemicals may enter the storm drains due to accidents or delinquent spills. These drains often empty into water ways (rivers, lakes, or streams) that will impact the water supply.	Cities and counties are responsible for controlling and managing storm water through detention and/or retention ponds. The purpose for the detention structure is to store and then release the run-off at a slower rate. This slower discharge rate can help to minimize the effects and impacts of contaminants that are picked up and transported by storm run-off.
Septic systems	The septic tank/drain-field system is designed to provide limited treatment to sanitary wastewater from individual households, small businesses or small hotels. Most raw sewage is removed in the tank while the pathogens and phosphates are immobilized through a variety of physical and chemical processes as the effluent travels through the leaching field. The ability of the soil to remove the contaminants is limited and once the capacity of the soil is reached, the contaminants move through the soil relatively unaffected. Also, the capability of the soils to treat many household contaminants is limited. For example, nitrates and volatile organic compounds (solvents) are not removed in the septic tank nor are they immobilized in the soil. These and other household contaminants can move relatively easily into the groundwater (DDW, 1995) and be discharged to surface water.	The construction and location of septic tank/drain-field systems is regulated by the local Health Department, but there are no controls to regulate compounds which are disposed into the septic system. The State does mandate that the septic systems is at least 300 feet away from any public water supply.

Description of Contamination Process or Chemical	Potential Hazard	Existing Governmental Controls
Junk yards	Junk yard businesses buy or accept discarded, wrecked and abandoned vehicles, trailers, and equipment. Some junk yard operators collect brake and transmission fluids, anti-freeze, batteries, gasoline and motor oils from the junk vehicles. Waste fluids are generally stored on-site in 55 gallon drums or in tanks. Uncontaminated gasoline may be stored for use by junk yard forklifts and other machinery. The storage areas for waste fluids are a potential threat to the surface water.	Much of the used anti-freeze, lubricating fluids, and oil contains volatile organic compounds and heavy metals and fall under RCRA as hazardous wastes. The used oil is also regulated by the Used Oil Management Act. Batteries can also become a hazardous waste if the acid is released out of the cell. Much of the fluids remain unregulated.
Storm drains - Class V injection wells	Storm drains that are not tied into a storm water collection and removal system and drain the water immediately into the ground are classified as Class V injection wells (shallow wells) by the State of Utah. These drains act as concentrated zones of contribution and provide direct access of water collected from a large area into the groundwater under high hydraulic heads. Hazardous chemicals may enter the storm drains due to accidents or delinquent spills.	There are no governmental controls of storm drains related to groundwater quality protection or as injection wells.
Concrete products	The hazard from concrete products is minimal because of the hydration reaction with water. In the presence of water, the cement hardens into concrete. Some of the constituents of the cement, such as lime, can increase the salinity of the water. Some chemicals are used in concrete production, casting, and curing processes.	There are no regulations governing the storage or disposal of concrete products.

Description of Contamination Process or Chemical	Potential Hazard	Existing Governmental Controls
Salt piles	Large quantities of salt that are stored outside (salt piles) are usually exposed to the weather. Water falling on the salt pile or runoff flowing through the pile will pick up salt in solution. If the saline water enters the surface water, the salt will remain in solution and will increase the salinity of the surface water.	There are no governmental controls for the containment of salt piles.
Residential homes- toxic chemicals and wastes	A variety of household products such as automobile fluids, paints, household cleansers, detergents, wood preservatives, chlorine for swimming pools, and many others have components that are harmful to the surface water. These products can be released through septic systems, sewer systems, improper storage, overuse, reckless use, or dumping.	There are no governmental controls on the private use of household chemicals. Some blatant dumping of contaminants into the environment can be treated as a criminal offense, but the government is not able to monitor private dumping in any way.
Medical wastes	Medical wastes may contain contaminants such as X-ray developers, infectious wastes, radiological wastes, biological wastes, disinfectants, asbestos, beryllium, dental acids, or miscellaneous chemicals (USEPA, 1993). The bacterial contaminants are short lived and would not pose any problem over long distances; but the radiological wastes, disinfectants, and other medical chemicals can contaminate surface water.	Medical wastes are treated as hazardous wastes and are disposed of in a similar manner to other RCRA hazardous wastes.

Chapter 8 Managing Future PCS Hazards

8.1 General

The population within the upper and middle Provo River Watershed (Wasatch and Summit counties) is projected to grow by a combined 267% by the year 2065 (Gardner 2017). With that much growth and development it will be even more imperative to adhere to best management practices (see section 5.1.5) and strict adherence to the Deer Creek TMDL.

Future potential contamination sources are businesses and other activities that do not yet exist within the watershed but have a potential of locating within these areas under existing social, economic and zoning conditions. Some of these future sources might perform the same type of functions as existing PCSs, or they could be activities that were not previously located in the watershed. Management strategies to control future potential contamination sources involve controlling or prohibiting future PCSs that may become established within the watershed. The management strategies also address the larger issue of preparing ordinances that address future PCSs throughout the watershed.

Creating a successful Watershed Protection/Management Program requires management strategies that consider the specific authorities and jurisdictions of those who can enforce the plan to protect the surface water resource. The Coalition, though given the mandated responsibility by EPA to protect its source water, relies on regulatory agencies and those with authority or jurisdiction to direct the amount, size, or severity of risk associated with future potential contamination hazards. Therefore, in order to effectively prevent or reduce the potential for contaminating sources, each member of the Coalition is actively involved with the PRWC, working cooperatively with a variety of city, county, and state representatives to protect water quality. The Coalition coordinates with and relies on these agencies and municipalities to effectively protect the watershed and the drinking water sources.

8.2 PRWC Plan to Manage Future PCSs

The Provo River System is a great resource that benefits many people throughout the area. The recommendations provided below are suggestions to further protect water quality in the Provo River, and Jordanelle and Deer Creek Reservoirs. Coalition members plan to review and implement any or all of the following recommendations to further protect water quality and the Provo River Basin watershed as part of PRWC and other organizations. PRWC prioritizes which recommendations get completed first according to time, personnel, cost restrictions and effect on water quality.

8.2.1 Jordanelle Reservoir – Management of Releases

The Jordanelle Reservoir has helped improve the water quality in the middle Provo River by retaining phosphorus and controlling dissolved phosphorus levels in releases through the Selective Level Outlet Works (SLOW) which is operated by CUWCD. The SLOW has been used effectively to optimize water quality going into Deer Creek Reservoir since 1996.

8.2.2 Heber Valley – Storm Water Controls

PRWC and Wasatch County have completed a Storm Water Study in Heber Valley. The valley continues to experience increased urbanization which tends to increase natural storm runoff conditions. This study has identified potential sites for construction of new sedimentation basins intended to reduce eroded sediments in surface waters prior to entering Deer Creek Reservoir. A copy of this study is presented in Appendix J.

Evidence shows that spring runoff is the primary source of the total phosphorus load entering Deer Creek Reservoir. On average over 60% of the TP load entering Deer Creek Reservoir enters during the three months of the spring runoff and the majority of that load is in the form of suspended solids. This suggests that a series of strategically located storm water detention basins could reduce the amount of total phosphorus entering the reservoir from tributary streams by about 25%. These settling basins should be located at the terminus of the canals and ditches that catch the runoff to prevent the suspended solids from reaching the tributary streams.

8.2.3 Agricultural – Non-Point Source Erosion

In coordination with the Tri-Valley Watershed Project, the NRCS has developed a guide for farmers and ranchers called *A Pasture & Hayland Management Guide: For Small Farms & Ranches in Wasatch County* (see Appendix D). The guide addresses planning, economics, water management, soil conservation, and other important issues involved with agricultural lands. Best management practices are encouraged to reduce erosion and pollution entering the local streams. The NRCS offers free training to farmers interested in using the guide for management of their farms.

The Main Creek, Wallsburg Utah Riparian Improvement Project was initiated following these same guidelines and BMPs to help reduce phosphorus loading to Deer Creek Reservoir. The Coalition will continue to look for opportunities to assist farmers in implementing BMPs to prevent agricultural erosion and pollution.

8.2.4 Ordinances around Jordanelle

Heavy development is expected to continue in the Jordanelle area for the foreseeable future. Wasatch County adopts ordinances that will address the specific needs of the Jordanelle basin developments. These ordinances address such water quality concerns as proper storm water management, sediment controls, erosion controls, re-vegetation, restoration and drainage.

8.2.5 Potential Reduction in Phosphorus Loading

The following are possible management scenarios to help reduce total phosphorus levels which are of primary concern. Each sub basin, as outlined in Table 1.4, will be addressed separately. This section focuses only on phosphorus because it is the nutrient of primary concern.

8.2.6.1 Provo River above Jordanelle Reservoir

Non-point sources are the primary cause of total phosphorus loads in the section of the Provo River between Woodland and Hailstone. These loads can have an effect on the water quality of Jordanelle Reservoir. Farming and grazing practices in this area should be observed and best management practices implemented where necessary. Furthermore, stream banks should be examined to determine if stream bank erosion is a significant problem during spring runoff.

Many new developments are being planned that will be located in the Provo River Drainage above Jordanelle Reservoir. Wasatch County currently has adopted the manual, *A Guide for Erosion and Sediment Control,* (see Appendix A) to be followed for all new development. This guide should be strictly enforced to limit the impact that these developments will have on the water quality in the area. Furthermore, all new developments should comply with Wasatch County guidelines for storm water management as outlined in *A Guide for Erosion and Sediment Control* that call for the containment of the entire runoff volume from a 2-year, 24-hour storm event. Following these measures will help limit the impact to the water quality in the Upper Provo River Basin.

8.2.6.2. Provo River below Jordanelle Reservoir

The SLOW at Jordanelle Reservoir is operated to reduce the export of phosphorus into Provo River and Deer Creek Reservoir. Studies have shown that releases from gates or a combination of gates to create optimal fishery temperatures downstream also minimizes the release of phosphorus.

In 2003, the 208 area-wide water quality management plan was amended to allow a new point source discharge in the Provo River. The Jordanelle Special Service District (JSSD) constructed a discharging wastewater treatment facility located below Jordanelle Dam. It includes advanced technology membrane filters which will result in a discharge water quality that will not degrade water quality in the Provo River. The PRWC has been closely involved in the review of the UPDES permit limitations to protect the drinking water source and will continue to be involved when the permit is reviewed because any changes to the original permit limitations have the potential to negatively impact water quality in the watershed. The permit limits on phosphorus are critical to protecting water quality and limit phosphorus to 0.03 mg/L in the summer and 0.06 mg/L in the winter with a total annual load of 91 pounds. The discharge permit was issued in 2008 and in 2018 the permit was reviewed for renewal even though the facility has not treated any wastewater nor discharged. The wastewater facility is scheduled to go online in 2020.

8.2.6.3 Provo River above confluence with Snake Creek

The majority of total phosphorus entering this section of the Provo River can be attributed to storm water runoff, spring snowmelt runoff, and the return flow from irrigation in the valley. These flows bring with them contaminants picked up from the land as the water flows over it. With the increasing urbanization in Wasatch County, storm water runoff is expected to increase as a significant source of pollution. Wasatch County, in cooperation with PRWC, has created a *Heber Valley Storm Water Management Plan* to evaluate the best options on how to control the quality and quantity of storm water and irrigation return flow entering the Provo River (see Appendix J). Wasatch County and PRWC should adopt the measures suggested in this plan and work on their implementation.

8.2.6.4 Provo River below Deer Creek Reservoir

The Provo River below Deer Creek Reservoir is influenced primarily by the water quality in the reservoir. Since much of the water released from the reservoir is for culinary purposes, it is important to maintain the water quality in the reservoir. Therefore most of the efforts discussed previously are primarily aimed at improving the water quality in Deer Creek Reservoir. In addition to the efforts discussed previously, efforts are being made to support the Resource Management Plan being adopted by the USBR for the operation of Deer Creek Reservoir (Appendix E).

8.2.6.5 Snake Creek above confluence with Provo River

A major source of phosphorus in Snake Creek comes from the Midway Fish Hatchery. The fish hatchery has a UPDES permit limit of 626 kg/yr of total phosphorus. Phosphorus levels are monitored and regulated by DWQ. Continued efforts should be made to ensure that TP loads coming from the hatchery are below permit limits. These efforts include maintenance of sedimentation ponds and the use of low phosphorus food for the fish.

The Midway Fish Hatchery's Utah Pollutant Discharge Elimination System (UPDES) permit UT0025879 was renewed on January 1, 2016 and will expire in December 2020. It specifically limits the total suspended solids (TSS) maximum concentration to 25 mg/l, pH to a range of 6.5 to 9.0, and net increase of total phosphorus to 400 kg/yr. The permit requires the hatchery to monitor the influent springs and the effluent springs for the determination of net increase of total phosphorus.

In addition, efforts should be made to implement best management practices and erosion control measures in this area. This could include a fertilizer management plan to help reduce the phosphorus from the golf courses in the area. The United States Golf Association has conducted a great deal of research on how to limit the environmental impacts of golf courses. A number of publications have been published and it is recommended that these resources be fully investigated and more specific recommendations made.

Because much of Snake Creek flows through the town of Midway, an effort to coordinate water quality efforts with the town should be made. The *Heber Valley Storm Water Management Plan* should detail ways in which the County and town of Midway can work together to improve the water quality in Snake Creek.

8.2.6.6 Daniels Creek above Deer Creek Reservoir

Daniels Creek continues to have poor water quality. This is largely attributed to the high percentage of irrigation return flows and to spring and storm runoff. Many of the dairy farms which contributed to the poor water quality in Daniels Creek have been sold and therefore, animal waste is not as great a concern as it has been in the past. However, because of the continued poor water quality, additional efforts must be made. This can include implementation of best management practices and implementation of the *Heber Valley Storm Water Management Plan*. Potential projects which can improve the water quality include storm water basins and detention facilities on the canals and tributaries that feed Daniels Creek.

8.2.6.7 Main Creek above Deer Creek Dam

Main Creek consistently had phosphorus concentrations above State DWQ water quality recommendations. Factors that contributed to this poor water quality included spring snowmelt and storm water causing stream-bank erosion and irrigation return flows. The Tri-Valley report suggested that septic tank failure might also be contributing to this problem. However, this has not been confirmed. PRWC contributed to a multiple year project to restore the stream bank and will continue efforts to help landowners implement best management practices and support other efforts of erosion control in this area.

8.2.7 Potential Phosphorus Reductions to Deer Creek Reservoir

Table 8.1 presents anticipated reductions in TP due to the various management techniques discussed in this document. Attempting to put a numeric figure on the amount of phosphorus removed by certain management techniques is not an exact science. The actual amount of a particular constituent that is removed depends on a variety of factors. The potential reductions due to the operation of the SLOW is based on data from the 1996 water year, the only year for which data is available when the SLOW was operational. Potential reductions in Heber Valley due to the implementation of the *Heber Valley Storm Water Management* (see Appendix J) plan are based using detention ponds used to trap sediments that contain phosphorus.

Table 8.1 Anticipated Reductions in Total Phosphorus Due to Various Management Strategies.

Management Strategy	**Responsibility**	**Potential Reduction**
Additional Reductions with Operation of SLOW Tower at Jordanelle Reservoir	CUWCD & USBR	2,800 kg/yr
Water Efficiency and Daniel Replacement Projects	CUWCD	100 kg/yr
Provo River Restoration Project	URMCC	100 kg/yr
Tri-Valley Watershed Improvements	NRCS	300 kg/yr
Storm Water Management	Wasatch County	448 kg/yr
Total Potential Reductions		3,748 kg/yr

The Deer Creek TMDL Study completed in March, 2002 identified phosphorus load reduction criteria. In order to achieve the necessary load reductions, multiple projects will be required that incorporate Best Management Practices (BMPs). In addition to the previously mentioned management plans, the following projects are currently in process of being completed or are recommended to be

completed to achieve necessary reductions: Cleanup of Potential CAFOs Conversion to Sprinkler Irrigation Systems, Integrated Watershed Information System, Main Creek Stream Bank Restoration, and Agricultural BMP Project. Table 8.2 below shows the load allocations set in the Deer Creek TMDL Study. The study is included in Appendix B.

Table 8.2 Phosphorus Load Allocations from Deer Creek TMDL Study (March 2002).

Description	Current Loads kg TP / year	Load Allocation kg TP / year	Load Reduction kg TP / year
Groundwater	2725	2725	
Background (Includes Jordanelle Reservoir Discharge of 2,965 kg/year)	4225	4225	
WLA - Current Point (Hatchery)	700	500	200
WLA - Future Point	0	500	
LA – Agriculture	6350	5485	865
LA – Urban	1300	1115	185
LA - Future Nonpoint	0	750	
Total Load	15300	15300	
15% Margin of Safety		2700	
Maximum TMDL Load		18000	

8.2.8 Future Monitoring

Jordanelle has the greatest potential to release high dissolved total phosphorus (DTP) concentrations and loads from late August through November. After Heber Valley irrigation diversions stop in September, the full phosphorus load is conveyed to the Deer Creek Reservoir. Deer Creek has the greatest potential to respond with blue-green algae blooms from mid-September to mid-November depending on temperatures. The operation of the SLOW at Jordanelle Dam has been used effectively at this critical time to minimize the release of DTP.

Continued efforts should be made to trace the sources of DTP entering the water system. This could have profound impact on reducing the DTP concentrations in Deer Creek Reservoir. In addition, efforts should be made to monitor the DTP levels of the water being discharged from the Jordanelle Reservoir. As has been noted, if the DTP concentration of water discharged from Jordanelle and thus entering Deer Creek Reservoir continues to increase, the water quality problems in Deer Creek Reservoir may be compounded. In order to help understand the impacts that activities in Heber Valley are having on the groundwater quality, a groundwater monitoring program has been implemented. This will help to insure that the water quality of the Heber Valley Aquifer is not being negatively impacted and to determine the quality of the groundwater returning to Provo River.

8.2.9 Private Developments

Require that any new private development be subject to regulations for control of runoff, pollutant control, and plan review similar to that required of Deer Valley and Mayflower Mountain Resorts. This means proper monitoring, feasibility studies, engineering evaluations, and signed agreements for compliance prior to construction.

8.2.10 Public Developments

Implement a process whereby any public development, be it state, federal or local, including recreational developments or facilities built around Deer Creek Reservoir or Jordanelle Reservoir, comply with the same requirements as for private developments. Also, continue the review process by State County Health Departments whereby proper sanitation facilities are constructed.

8.2.11 Amend County Zoning Ordinances

Require that zoning ordinances of Wasatch and Summit County be amended to prohibit runoff or discharges from animal concentrations from entering any live stream or waterway that reaches Deer Creek Reservoir or Jordanelle Reservoir.

8.2.12 Mayflower Tailings

Upon construction of the Mayflower Mountain Resort, require developers to include stabilization of the Mayflower tailings ponds in their plans. This should include preventing runoff or seepage of water from other polluted mines or mine dumps where water issues from the mine and runs over or through said dumps. Developers should also be required to ensure that tailings that have been mitigated are not negatively impacted during the development process.

8.2.13 Other Restoration Techniques

Continue to consider other restoration techniques or phosphorus reduction programs. There may be others that may have not yet proven cost-effective, been demonstrated as needed or conceived. There may still be other reductions achievable with little or no effort.

8.2.14 Perfluoroalkyl Substances (PFAS)

Continue to be aware of and monitor for contaminants of emerging concern such as PFAS. PFAS are widely used chemicals present in clothing, packaging materials, cookware, furniture, and firefighting materials; and are used in a number of industrial processes. They have been linked to adverse health effects including development issues in infants, cancer, liver damage, thyroid issues, and other effects.

In 2016, EPA established health advisories for PFOA and PFOS which are two types of PFAS compounds. The PRWC has been monitoring for PFOA and PFOS since 2008 as part of a monitoring plan that was established in response to construction of the JSSD waterwater treatment plant (discussed in 8.2.6.2).

8.3 Future Management Strategies

Because the Coalition is not vested with legislative or land use planning authority, it cannot make zoning or subdivision ordinance changes. The management strategies to be pursued by the Coalition will be to: (1) maximize implementation activities under its authority; and (2) work with the State agencies, County governments, and local City Councils to encourage implementation of regional protection strategies that require the cooperation of multiple agencies and jurisdictions. Table 8.3 shows the kinds of management strategies that are proposed for PRWC consideration and delineates them into three categories: (1) strategies that prevent impacts; (2) strategies that minimize impacts; and (3) strategies that provide information or react to impacts.

Table 8.3 Management Strategies Considered for Future Application

Management Strategies Considered for Future Application to the Regional Protection Program
Strategies that Prevent Impacts ➢ Conservation Easements ➢ Household Hazardous Waste Programs ➢ Land Use Prohibitions ➢ Septic Systems - Prohibit New Ones ➢ Septic Systems - Extend Sewer System and Tie-In Existing Septic Systems
Strategies that Minimize Impacts ➢ Above Ground Storage Tanks and Pipeline Regulations ➢ Agricultural Best Management Practices ➢ Hazardous Materials Use Prohibitions ➢ Impervious Surface Limits ➢ Industrial Best Management Practices ➢ Inspections of Industrial Best Management Practice Implementation ➢ Overlay Zone ➢ Public Education ➢ Toxic, Hazardous, and Other Materials Handling Regulations ➢ Underground Storage Tank and Line Regulations ➢ Storage of Road Salt Limitations
Strategies that Provide Information or React to Impacts ➢ Emergency Spill Response Plan ➢ Evaluation of Source of Nitrates ➢ Monitoring ➢ DWSP Boundary, Spill Notification, and Other Signs

8.3.1 Conservation Easements

A conservation easement may be donated to or purchased by a land trust or the State, for the purpose of providing long-term protection of a natural resource. The landowner donating or selling an easement continues to own the land, but gives up most or all rights to develop it. The land trust or agency accepting the easement agrees to monitor the easement and ensure that the terms of the easement are met. A conservation easement may permit continued private ownership, use, and residency of a parcel; will allow the sale of the property with conservation provisions; and will provide a landowner with tax benefits and financial incentives.

Although conservation easements are not expected to be a primary management strategy, they are a valuable tool to protect the most sensitive portion of the watershed protection zones (Zone 1). As such, they will be considered as one of the options available to prevent impacts to the source water.

8.3.2 Household Hazardous Waste Collection Program

A variety of common materials used around homes pose a threat if spilled or improperly disposed of onto the ground or into household garbage. These materials include photographic chemicals, drain cleaners, rug and upholstery cleaners, floor and furniture polish, pool chemicals, brake fluids, silver polishes, pesticides, oil-based paints, furniture strippers, and wood preservatives and stains. A household hazardous waste collection program provides for the periodic collection and appropriate disposal of these hazardous materials.
Collection programs can address a source of pollutants that are difficult to regulate.

Opportunities for hazardous waste collection programs that include common household hazardous wastes such as batteries, pesticides, oil-based paints and solvents, and cleaning materials should be included. This program will be considered as an educational component of a management strategy.

8.3.3 Above Ground Storage Tank and Pipeline Regulations

Surface tanks, or aboveground storage tanks, are used to store waste and non-waste materials. They primarily store chemicals that are used by industry and agriculture or store motor and heating fuel for home and farm use. If above ground storage tanks are not properly designed, installed, maintained, and operated, they can leak and cause contamination. The primary cause of releases from above ground storage tanks is from spills and overflows.

8.3.4 Agricultural Best Management Practices (BMP)

Agricultural activities often involve the use of fertilizers to provide nutrients for better plant growth and pesticides to control crop diseases, kill insects, and destroy weeds. Pesticides and nitrates, which are a component of fertilizers, are soluble and have the potential to contaminate groundwater. The likelihood of a pesticide reaching a surface water source depends on its characteristics.
Pesticides that are resistant to degradation, are soluble, or leach from soil have the greatest potential to contaminate surface water sources.

8.3.5 Industrial BMPs and Implementation Inspections

Industrial BMPs are any practice that reduces the potential for spills and leaks at an industrial or business site. In addition to the practices described below, they include general storm water management practices, underground storage tank and pipeline regulations, and above around storage tank and line regulations.

Other BMPs to be considered are those requiring containment for runoff from firefighting water. Often, an industry that has virtually no hazardous materials on site can be the source of highly hazardous substances in the event of a fire. For example, in the event of a fire, a textile warehouse or distribution center would pose a high threat. As it burns, wool releases cyanide and ammonia, cotton releases poly-nuclear aromatics, and would be mobilized by the application for a water to a fire.

8.3.6 Public Education

Public education is another tool available to build support for DWSP and to reduce contamination associated with unregulated, dispersed, and small quantities of pollutants. Despite the fact that quantities are often small, cumulatively they can be significant. Target audiences include:

- Residential and industrial water users inside the watershed zones;
- Landowners with any portion of their property inside the watershed zones;
- Any facility or operation (business, industry, agriculture) identified as a PCS;
- Business leaders interested in the impacts of the DWSP Plan on the community;
- Community members interested in environmental issues;
- Service organizations and community groups; and
- Educational facilities (particularly grade and middle schools).

Public education activities differ among target audiences, but in general should provide information on source water as a source of drinking water (e.g., the water cycle, water and its uses), the vulnerability of the water supply (e.g., how surface water becomes contaminated), how the DWSP Plan helps to ensure a safe drinking water supply, and

what every resident, business, and landowner can do to support the management program and include pollution prevention strategies in their daily activities.

Additional strategies for educating the public and disseminating information may include:

- Utility bill inserts that provide residents with information about source water/watershed protection;
- Meetings with the business community to enhance their understanding of the goals and requirements of the management program, and to encourage existing industry to comply with the requirements;
- Elementary and high school curriculum developed by teachers;
- Press releases to enhance public understanding of the DWSP Plan; and
- Fact sheets and presentations to local cities and the counties.

A public information subcommittee of PRWC reviews the education program and makes recommendations for activities that will contribute to PRWCs mission to support public education. Recently PRWC is creating school curriculum and holding events at local libraries to promote watershed protection.

8.3.7 Toxic, Hazardous, and Other Materials Handling Regulations

Business and industry permitted to operate within a watershed area have the potential to store, handle, and use large quantities of hazardous and toxic materials that could, if not properly controlled, result in a release.

Regulated substances may be used, handled, or stored in quantities not exceeding the "Reportable Quantity" for each regulated substance, as designated in 40 CFR 302 (pursuant to Section 311 of the Clean Water Act).

8.3.8 Underground Storage Tank (UST) and Pipeline Regulations

USTs are used by municipalities, homeowners to store heating oil; by farmers to store fuel for farm equipment; by service stations, trucking companies, and

highway departments to store gasoline and diesel fuel; and by many other businesses to store gasoline, heating oil, solvents, hydraulic fluids, industrial process materials, and various (frequently hazardous) wastes. Tank capacities can range from less than 55 gallons to 25,000 gallons or more.

Leaking USTs are a direct and serious threat to source water because of the types of materials they store, and the potential for leaks to go undetected. Gasoline additives such as benzene, toluene, and methyl tertiary butyl ether (MTBE) will dissolve in the groundwater and move through it where it will eventually discharge into a surface water source.

Public education activities will be directed to residents and oil suppliers to make them aware of the need for a permit to remove or close leaking USTs. The permit will require that leaking tanks are pumped dry and removed from the

ground by a State-licensed company. If removal is not feasible, the lines will be disconnected and capped and the tank will be filled with an inert substance such as washed sand. This will prevent an empty tank from collapsing if it rusts.

8.3.9 Evaluation of Source of Nitrates

Large dairy and cattle operations can contribute to concentrated nitrates levels. These operations can be regulated under the Confined Animal Feeding Operation (CAFO) rule. Smaller operations should be encouraged to manage manure production and waste flows that will impact surface water sources.

8.4 Criteria for Selecting Management Strategies

A high level of preference, or importance, will be placed on management strategies that address pollutant sources posing the highest risk to human health. Ease of implementation will also be considered because a highly effective strategy that could be implemented using existing staff, institutions, or funding is preferable to a highly effective strategy that requires new staff, new funding, or new layers of government. The criteria and objectives for evaluating the management strategies are shown in Table 8.4.

Table 8.4 Criteria for Evaluating Potential Management Strategies.

Criteria for Evaluating Potential Management Strategies	
Criterion	***Objective***
1. Implementation Cost	The objective is to reduce the up-front cost of implementing each management strategy. Up-front costs may include construction expenditures, development of regulations, and initial staff time. These costs are separate from on-going operation and maintenance, or life cycle, costs.
2. Life Cycle Cost	The objective of this criterion is to reduce the on-going operation and maintenance costs associated with the life cycle to the management strategy. Life cycle costs may include monitoring, on-going education, inspection, reprinting, operation and maintenance.
3. Preventive Strategies	The objective of this criterion is to maximize the use of management strategies that emphasize prevention of potential pollutant sources, rather than reaction to sources once they have occurred. The possibility of aquifer contamination is greater once a source exists.
4. Prioritized Risk	The objective of this criterion is to maximize the use of strategies that address the highest risk pollutant sources on the basis of type and quantity. This acknowledges that all pollutant sources do not present the same level of risk to human health. Some sources may pose a higher risk than other sources.
5. Existing Conditions	The objective of this criterion is to maximize the use of strategies that address known pollutant sources and existing conditions, rather than facilities, land uses, or other structures that are not currently pollutant sources, but may become a source in the future.
6. Effectiveness	The objective of this criterion is to maximize the use of management strategies that most effectively protect the surface water sources.
7. Ease of Implementation - Use of Existing Institutions	The objective of this criterion is to maximize the use of management strategies that can be implemented easily. This is defined as a strategy that can be implemented quickly using existing regulations or institutions, their funding level, and their staff. This would be distinguished from a management strategy that requires the creation of a new institution, hiring new staff, or allocating new funding.
8. Ease of Obtaining New Funding or Staffing	The objective of this criterion is to maximize the use of management strategies that can easily and quickly obtain the necessary level of funding and staffing for successful implementation. This criterion would apply to (or help select between) only those strategies that require new funding or staffing.
9. Acceptance by Majority of Affected Parties	The objective of this criterion is to maximize the use of management strategies that will be acceptable to the affected interest groups such as general residential, agricultural, and business/industry.
10. Economic Impacts	The objective of this criterion is to select management strategies with the least impact on revenue generation such as reduction in potential tax base, construction potential, or employment opportunities.
11. Unregulated Sources	The objective of this criterion is to select management strategies that address unregulated sources.

8.5 Management Strategy Review

Existing management plans are reviewed and updated as necessary. The Jordanelle Reservoir Management Review is included in Appendix K. The Recreation and Land Management Review for Deer Creek Reservoir is included in Appendix L.

Chapter 9 Implementation Schedule

9.1 General

The members of the Coalition will work within PRWC and other agencies and organizations to continue implementing watershed protection activities as outlined in the organizations' yearly workplans (see Appendix M). These workplans will address those activities which are deemed most urgent and necessary to continue to protect the water quality and watershed within the Provo River Basin area.

An implementation report is prepared by PRWC which presents data collected, conclusions made, successes, failures, and recommendations for the following year's PRWC workplan. The 2018 Implementation Report for the 2017 water year may be viewed in Appendix G.

Chapter 10 Resources

10.1 General

Existing staff of each individual Coalition member will be used to implement the DWSP Plan. Currently staff from each Coalition utility is active in the PRWC as well as the Utah Water Quality Alliance (Alliance). While PRWC is dedicated to preserving and enhancing raw water quality, the Alliance is committed to ensuring the best possible water treatment processes are practiced. Each organization is valuable in ensuring the public receives the highest quality drinking water available.

Each member of the Coalition contributes significantly to the PRWC by in-kind contributions as well as monetary funding.

Chapter 11 Record Keeping

11.1 General

The Coalition will document any land management strategies that are implemented for the purpose of protecting drinking water source supplies. This will be accomplished by inserting copies of zoning ordinances, public education materials, permits, memorandum of agreements, and other relevant information into their administrative record. The administrative records will be housed according to the in-house record keeping management practices for each individual member of the Coalition. In addition to the records kept by each utility, annual PRWC Implementation Reports will also be kept to show progress and success pertaining to each area of emphasis identified in Chapter 5.

Chapter 12 Contingency Plan

12.1 General

Due to the size of the Provo River Basin and activities occurring within the area it is impossible to plan for and prevent every scenario which may contaminate waters within the watershed. Therefore it is necessary for those using water from the watershed to have a contingency plan in place to the protect public health and water supply in the event of contamination. In the event of an emergency, such as a chemical spill or vehicle entering the Provo River or Deer Creek Reservoir, the notification tree in Figure 12.1 will be followed in order to notify each utility. After notification, each utility will determine the appropriate action to be taken, which may include closing the intake from Deer Creek Reservoir and using other water sources until the contamination is eliminated.

While each Coalition member has established its own contingency plan, it is expected that each utility will be in constant communication with the other utilities to notify, aid one another and share available resources in such an event. Each Coalition member has included its contingency plan as outlined in the following sections.

12.2 CUWCD–Utah Valley Water Treatment Plant

When raw water from Olmsted Diversion is not suitable for treatment (TSS, pollutants, etc.) at the Utah Valley Water Treatment Plant (UVWTP), CUWCD customer agencies (Orem MWD and Provo MWD) and JVWCD are contacted. It is then the customer agencies decision and responsibility to determine which alternative source to use, including: contacting MWDSLS to obtain raw water through the Salt Lake Aqueduct (which would then be treated at the respective treatment plants UVWTP and JVWTP), or to use wells and spring sources for their water demand. Olmsted Diversion water will not be used at UVWTP until it has been determined that the water is suitable for treatment.

12.3 JVWCD–Jordan Valley Water Treatment Plant

The surface waters from the Provo, Weber and Duchesne Rivers constitute the largest portion of the current water supply. Each river system involves a series of storage reservoirs and direct flows without storage in rivers. Toxic contamination would most likely occur as discreet episodes, rather than continual contamination. This is due to the high flow rates in the rivers and large storage volumes in the reservoirs. Therefore, the JVWCD relies upon emergency notification plans (see Figure 12.1) for vehicle accidents and other contamination threats to the Provo River. Upon notification of a possible contamination threat, JVWCD would have various options. The staff at the Jordan Valley Water Treatment Plant (JVWTP) in Bluffdale would choose the best option given the type and magnitude of the contamination threat, the possible threat to human health, as well as the water demand at the time. The available options include:

- Closing the intake until the contamination is passed or remedied.
- Utilizing another intake such as the Salt Lake Aqueduct at Deer Creek Dam, the Olmsted Diversion midway down Provo Canyon, or the Murdock Diversion near the mouth of Provo Canyon. The choice of intakes would depend upon the location and extent of the contamination.
- Utilizing the Upper Pond located on JVWTP property, which has a storage capacity volume of 180,000,000 million gallons, would allow continued operation until the contaminant has bypassed the intake and water is considered safe for treatment and consumption.
- Discontinuing operation of the JVWTP until the contamination threat passes. Small to normal water demands could be met by JVWCD's Southeast Regional Water Treatment Plant, Southwest Groundwater Treatment Plant, and/or by operating groundwater wells. High water demands could be met, for a short time, using the same alternative sources or by diverting water from the POMWTP or LCWTP through the Point of the Mountain Aqueduct. If necessary, the JVWCD General Manager may ask the public to voluntarily conserve water until the event has passed.

Inorganic contamination is not anticipated. This type of contamination would involve long trends over time. Any inorganic contamination would most likely be addressed by membrane treatment processes or chemical precipitative softening.

12.4 MWDSLS

The MWDSLS currently operates 2 treatment plants, the Little Cottonwood Water Treatment Plant (LCWTP) and the Point of the Mountain Water Treatment Plant (POMWTP). The LCWTP treats water from Deer Creek reservoir through the Salt Lake Aqueduct as well as Little Cottonwood Creek water. If an emergency notification came to the plant that the water quality of Deer Creek Reservoir or the water quality just below Deer Creek Dam had been compromised, the plant would discontinue the use of the contaminated water and switch solely to Little Cottonwood Creek water. This switch would be in effect until the threat to Deer Creek passes below the Salt Lake Aqueduct intake and the water is considered safe. The POMWTP gets water from the Jordan Aqueduct and the Provo River Aqueduct. These are the same sources providing water to the JVVWTP.
The available options for POMWTP include:

- Closing the intake until the contamination has passed or is remedied.
- Utilizing another intake such as the Salt Lake Aqueduct at Deer Creek Dam, the Olmsted Diversion midway down Provo Canyon, or the Murdock Diversion near the mouth of Provo Canyon. The choice of intakes would depend upon the location and extent of the contamination.

- Utilizing the raw water pond located on POMWTP property, which has a storage capacity volume of 30 million gallons, would allow limited continued operation until the contaminant has bypassed the intake and water is considered safe for treatment and consumption.

- Discontinuing operation of the POMWTP until the contamination threat passes and using the LCWTP to bring water through the Point of the Mountain Aqueduct as an alternative source.

12.5 Emergency Notification Tree

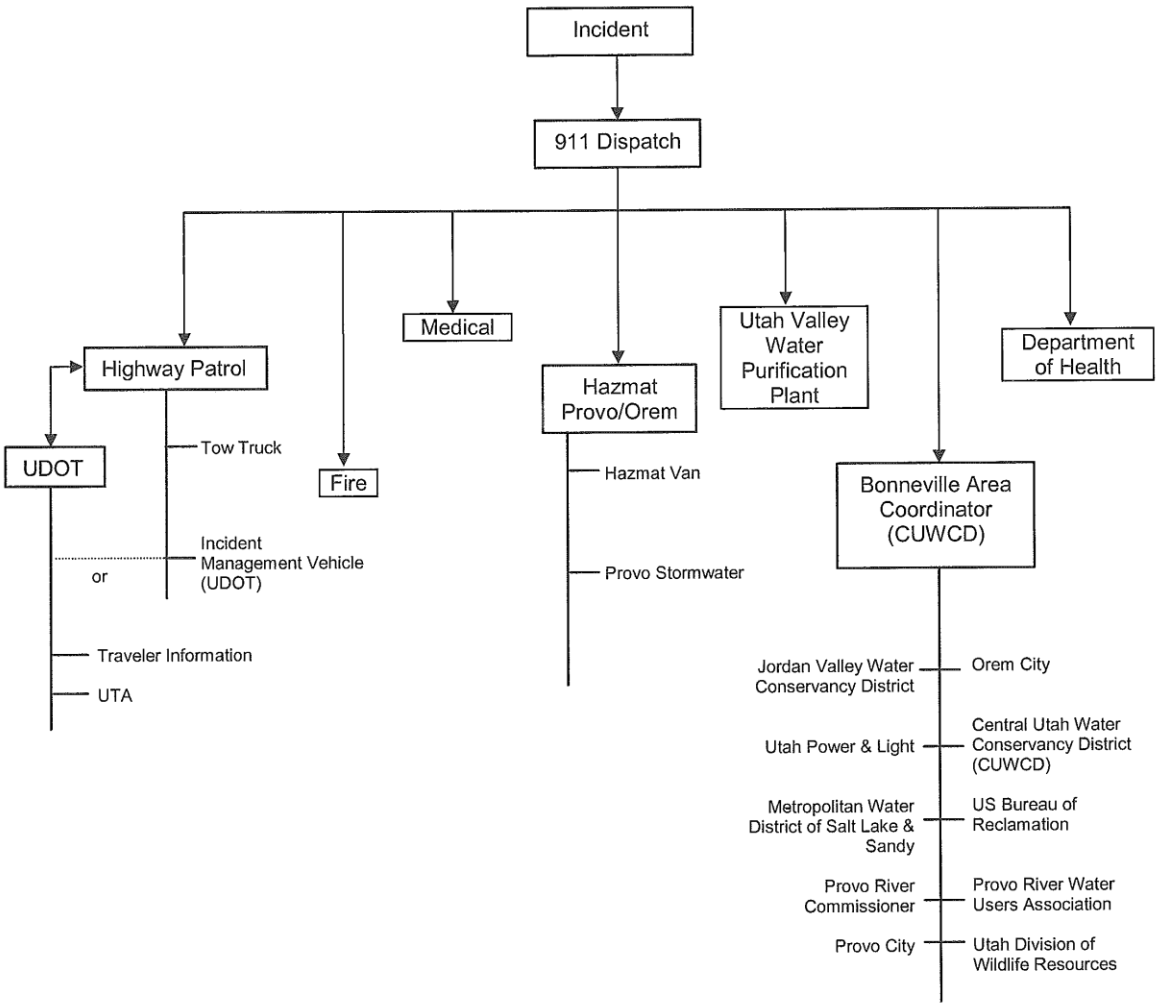


Figure 12.1 Emergency Notification Tree

Chapter 13 Public Notification

13.1 General

As required by the Source Water Protection Rule, the Coalition has prepared the following Source Water Assessment Public Summary. This summary will serve the purpose of notifying the public about the completed source water assessment and watershed management plan.

13.1.1 Introduction

A Watershed Protection Coalition (Coalition) has been formed by the following utilities: Jordan Valley Water Conservancy District (JVWCD), Metropolitan Water District of Salt Lake and Sandy (MWDSLS) and Central Utah Water Conservancy District (CUWCD). The purpose of the Coalition is to work cooperatively in an effort to improve water quality by managing potential sources of contamination within the watershed. The Coalition has completed an assessment of potential contamination sources to protect regional surface water resources used for public drinking water as required by the 1996 Safe Drinking Water Act and by R309-600 and 605 of the State of Utah Drinking Water regulations. Coalition members obtain the majority of their source water from the Provo River Basin. The Coalition has prepared this Source Water Assessment Public Summary to provide information to their customers regarding local and state efforts to protect the water quality of the drinking water sources. This assessment encompasses the watershed that provides water to treatment facilities of JVWCD, MWDSLS and CUWCD. The assessment is of “source” (river, lake, reservoir water) rather than “tap” water. Information on "tap" water quality is available in the annual Consumer Confidence Report provided by each utility. The various utilities can be contacted as outlined in Table 13.1 on the last page of this summary.

13.1.2 What is the Source of Your Drinking Water?

Members of the Coalition obtain water from the Provo River and Deer Creek Reservoir. An average of 148 million gallons of water is withdrawn from these sources each day. The water systems serve a combined population of approximately 2 million customers. The watershed area is approximately 825 square miles or approximately 528,000 acres in Wasatch, Utah and Summit counties. The Provo River is the largest river in the watershed and it is fed by numerous smaller tributaries. Approximately 59% of the watershed is forested, 35% is used for agriculture (pasture and row crops), 2% is developed for residential, commercial or industrial uses, 1% is riparian/wetland area and the remaining 3% is used for various other purposes. There are approximately 576,418 (2010 Census) people living within the watershed.

13.1.3 Water Quality and Water Treatment Information

Water withdrawn from the Provo River and Deer Creek Reservoir is treated, filtered and chlorinated prior to distribution to customers. Water quality testing performed by members of the Coalition indicates that treated water met all EPA and Utah State drinking water rules and regulations.

13.1.4 Evaluation of Significant Potential Sources of Contamination (PCS)

The Coalition, through this assessment, has evaluated contaminants with the potential for entering the water drawn from the Provo River and Deer Creek Reservoir prior to treatment. The contaminants addressed in this assessment include those regulated under the Federal Safe Drinking Water Act as well as those that the Coalition has determined may present a health concern. The following categories have been identified as possible contamination risks to the water sources within the Provo Basin watershed. They include sewage discharges, agricultural practices, increasing development, storm-water runoff and recreational impacts. Each of these PCS is being addressed by a combination of the Utah Division of Water Quality and the cooperative agencies of the Provo River Watershed Council (PRWC).

13.1.5 Ongoing Watershed Protection Activities

State and federal agencies regulate direct discharge of regulated contaminants in this watershed. Other organizations, such as the PRWC are also active in further characterizing water quality within the watershed and recommending measures to reduce contaminants that may adversely impact the quality of the water supply. Other volunteer and government agencies are working cooperatively to address contamination within the Provo River Basin watershed.

An educated public is vital to ensuring that the Provo River Basin watershed is kept as pristine as possible. As a result the PRWC is actively working on public education programs.

13.1.6 Source Water Protection Needs

Based on the evaluation that was completed as part of this Source Water Assessment, the Coalition has determined that existing state and local programs provide adequate protection of the drinking water sources.

13.1.7 How to Obtain Additional Information

This *Source Water Assessment Public Summary* was completed in March 2002 and updated in 2019. A complete copy of the Coalition's Drinking Water Source Protection Plan is available at the Utah Division of Drinking Water and may be obtained by calling (801) 536-4200. Individual Coalition utilities can be contacted, as outlined below, for further information.

Table 13.1 Utility Phone Numbers and Web Sites.

Utility	**Phone Number**	**Web Site Address**
JVWCD	(801) 446-2000	www.jvwcd.org
MWDSLS	(801) 942-1391	www.mwdsls.org
CUWCD	(801) 226-7160	www.cuwcd.com

Acronyms

Acronym	Definition
Alliance	Utah Water Quality Alliance
BMP	Best Management Practice
CAFO	Confined Animal Feeding Operation
Coalition	Watershed Protection Coalition (includes members from CUWCD, JVWCD and MWDSLS)
CUWCD	Central Utah Water Conservancy District
DCRMP	Deer Creek Resource Management Plan
DDW	Utah Division of Drinking Water
DMR	Discharge Monitoring Report
DNR	Utah Department Of Natural Resources
DO	Dissolved Oxygen
DTP	Dissolved Total Phosphorus
DWQ	Utah Division of Water Quality
DWR	Utah Division of Wildlife Resources
DWSP	Drinking Water Source Protection
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
EQIP	Environmental Quality Improvement Program
JTAC	Jordanelle Technical Advisory Committee
JVWCD	Jordan Valley Water Conservancy District
JVWTP	Jordan Valley Water Treatment Plant
LUST	Leaking Underground Storage Tank
MAG	Mountainland Association of Governments
MTBE	Methyl tertiary butyl ether
MWDSLS	Metropolitan Water District of Salt Lake and Sandy
NOV	Notice of Violation
NPL	National Priority List Sites
NRCS	Natural Resources Conservation Service
PCS	Potential Contamination Source

PCSI	Potential Contamination Source Inventory
PRRP	Provo River Restoration Project
PRTAC	Provo River Technical Advisory Committee
PRWC	Provo River Watershed Council
PRWUA	Provo River Water Users Association
PWS	Public Water System
RCRIS	Resource Conservation and Recovery Information System
RCWP	Rural Clean Water Project
SARA III	Community Right to Know Act
SDWA	Safe Drinking Water Act
SLOC	Salt Lake Olympic Committee
SLOW	Selective Level Outlet Works
TP	Total Phosphorus
TRI	Toxic Release Inventory
TSCA	Toxic Substance Control Act
TSS	Total Suspended Solids
UDOT	Utah Department of Transportation
UPDES	Utah Pollutant Discharge Elimination System
USBR	United States Bureau of Reclamation
USFS	United States Forest Service
USGS	United States Geological Survey
UST	Underground Storage Tank
UVWTP	Utah Valley Water Treatment Plant
VOC	Volatile Organic Compound
WSCD	Wasatch Soil Conservation District

APPENDICES