

**DRINKING WATER SOURCE PROTECTION PLAN  
CENTRAL UTAH WATER CONSERVANCY DISTRICT  
DUCHESNE VALLEY WATER TREATMENT PLANT  
Starvation Reservoir/Duchesne River Watershed  
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**DECEMBER 2014**

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## Starvation Reservoir Watershed Source Protection Plan

### EXECUTIVE SUMMARY

This Source Protection Plan (SPP) was prepared by Central Utah Water Conservancy District, (CUWCD), for the public drinking water source of Starvation Reservoir in the town of Duchesne, Utah. This report was completed to assess the potential contamination threats to the raw water quality of its public drinking water sources as required by the 1996 Safe Drinking Water Act and by R309-600 and 605 of the State of Utah Drinking Water regulations.

### 1.0 INTRODUCTION

#### 1.1 System Information

CUWCD has prepared this SPP for the purpose of protecting the raw water quality of CUWCD's drinking water source by identifying and managing potential sources of contamination and threatening activities that occur within the watershed area. This assessment is for the Starvation Reservoir watershed that provides water to the CUWCD, Duchesne Valley Water Treatment Plant (DVWTP) a Public Water Supplier, P. O. Box 912, Duchesne, Utah 84021. DVWTP, water system number 07050, is a direct filtration water treatment plant with a capacity of 8 MGD. The plant currently treats an average of 2.75 MGD for 4,800 customers. Water quality information is available in DVWTP's Public Water Supplier Consumer Confidence Report that can be obtained at <http://www.cuwcd.com/drinkingwater/duchesne.htm>.

#### 1.2 Source Information

The water source of Starvation Reservoir, source number 01, is classified by the State of Utah as a surface water source. The location of the intake is on the east side of the Starvation reservoir dam at 40°11' 39.2" N, 110° 26' 14.8" W .

#### 1.3 Source Protection Area

The Starvation Reservoir watershed covers approximately 1,088,315 acres in Duchesne County (Figure 1). The watershed spans from Starvation Reservoir to Strawberry Reservoir and the south slope of the Uinta Mountains. Two rivers supply water to Starvation Reservoir, the Strawberry River from the west and the Duchesne River from the Knight Diversion to the east. Approximately 90% of the watershed is high desert with Cedars, Juniper and Sage brush being the main foliage. Population is sparse and scattered. The land directly northwest of the reservoir is subject to heavy grazing by cattle and wildlife. There are many oil wells scattered throughout the watershed. Starvation Reservoir is within State

Park boundaries and is a recreation park (Fishing, Camping, Boating and water sports, etc.).

1.4 Designated Person

The person compiling this report is Michael Rau, Water Quality Manager, CUWCD. Correspondence regarding this report should be sent to:

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## 2.0 THE DELINEATION REPORT

2.1 Source Protection Zones

For surface water sources, the entire watershed area that contributes water to the source is considered to be the area of concern. The watershed is further broken down into three zones, with Zone 1 being the closest to the intake (the area of most concern) and Zones 2 and 4 corresponding to areas further away and of lower concern (Figure 1).

2.2 Zone 1

Zone 1 for the Starvation Reservoir source, starts at Starvation dam and follows the Strawberry River channel westerly through the reservoir to the confluence with Avintaquin and Red Creeks and extends ½ mile wide from the high water mark laterally. Zone 1 also extends from the reservoir at Knight Diversion where the Duchesne River is diverted into the reservoir and upstream along Duchesne River for a distance of fifteen miles and extends ½ mile wide from the high water mark laterally. For detailed view of this zone refer to Figure 1.

2.3 Zone 2

Zone 2 for the Starvation Reservoir source is a continuation of the end of the Zone 1 description for one thousand feet laterally instead of ½ mile wide. This zone starts upstream of Zone 1 on Strawberry and Duchesne Rivers and continues to the headwaters of all streams within the watershed including Strawberry Reservoir. For detailed view of this zone refer to Figure 1.

2.4 Zone 4 (Watershed Boundary)

Zone 4 is defined as the entire drainage area of Strawberry River from Starvation Dam to its headwaters and Duchesne River from Knight Diversion to its headwaters. For detailed view of this zone refer to Figure 1.

## 3.0 SUSCEPTIBILITY ANALYSIS AND DETERMINATION

### 3.1 Susceptibility Analysis

3.1.1 Source water is withdrawn from a multi-level intake pump station within Starvation Reservoir. The multi-level intake provides a means to respond to changes in water quality.

#### 3.1.2 Sensitivity

Most of the headwaters area of the watershed is within the U.S. Forest boundary and therefore managed under the Forest Management Plan to protect water quality within those lands. There are major highways adjacent to streams throughout the watershed area presenting the hazard of vehicle spills into waterways. There are private lands within Zones 1 & 2 which present potential contamination through new development, septic systems, and livestock operations. The land immediately around Starvation Reservoir, the highest potential contamination risk area, is owned by USBR and managed to protect water quality through the Starvation Reservoir Management Plan by Utah State Parks.

#### 3.1.3 Assessment of the management and control of the potential contamination sources. (Appendix 1 potential contamination source survey)

After an analysis of the potential contamination sources, it was concluded that all sources are adequately controlled through appropriate Federal, State, or local agencies. A susceptibility determination of high, moderate, or low has been based upon proximity of the source to the intake, protection zone location of the source, type of control identified (i.e., regulatory, physical, BMP), and the type of contamination.

Upon the review of the Ashley Forest Management Plan, potential water quality impairments are identified and, where appropriate, mitigated. This plan limits grazing, logging, and road construction, and recognizes the effect these activities have on water quality. The Forest Management Plan limits activities that can contribute to large point and nonpoint sources of contamination. The TriCounty Health Department has the responsibility to site and inventory septic systems throughout the watershed. Animal feeding operations have been surveyed in accordance with "A Utah Strategy to Address Water Pollution from Animal Feeding Operations" through the Utah Division of Water Quality. The Utah Strategy is the result of a National Strategy that was developed by EPA and USDA. Recreation impacts to and livestock grazing around Starvation Reservoir are managed through State Parks and the reservoir management plan.

#### **4.0 MANAGEMENT PLAN TO CONTROL EXISTING POTENTIAL CONTAMINATION SOURCES**

4.1 The area of protection referred to in this plan is the Starvation Reservoir watershed. We propose the following course of action to control existing PCS as part of this management plan:

4.1.1 Emergency Response Planning.

Review the existing U.S.EPA Green River Area Contingency Plan and Emergency Response Action Plan (ERAP) to ensure adequate notification procedures for hazardous materials spills. A local ERAP will be developed/revised pertaining to Highway crossings of waterways.

4.1.2 Starvation State Park.

Establish contact with the Starvation Park Supervisor to review the existing resource management plan for the park. Participate in the review/revision to ensure awareness and protection of drinking water quality within the reservoir.

4.1.3 Help Develop Management Plans with Federal Agencies.

Contact the federal land management agencies having responsibility within the Starvation watershed (i.e., BLM, USFS, USBR) to be included in land use planning and management. Provide appropriate comment with regard to the protection of water quality.

4.1.4 Collect more water quality data in Starvation Reservoir.

Conduct regular monitoring on Starvation Reservoir to track seasonal and overall water quality trends.

4.1.5 TriCounty Health Department.

Provide the Health Department with the source water plan to allow awareness of protection zones within the watershed for future development and new or existing septic system placement.

#### **5.0 MANAGEMENT PLAN TO CONTROL FUTURE POTENTIAL CONTAMINATION SOURCES**

5.1 Management Strategies and controls

5.1.1 The USFS , USBR, and BLM have control over the management of lands within a significant portion of the watershed. The water districts will need to work closely with the management teams of these agencies. Identify and assess controls and land management strategies that will maintain and improve water quality.

5.1.2 Work with TriCounty Health Department on ordinances for septic tank

and drain fields within areas of Zone 1. Determine if the state wastewater ordinances will provide enough protection or if more stringent rules need to be developed.

- 5.1.3 Become a participant/stakeholder in the Uintah Basin Watershed activities which are coordinated through the Utah Division of Water Quality. This includes adequate notification of permit applications or renewals and participation in nonpoint source assessment strategies and controls.
- 5.1.4 CUWCD continues to be an active partner with Utah Division of Wildlife Resources in their Aquatic Invasive Species program (<http://wildlife.utah.gov/invasive-mussels.html>).
- 5.1.5 Coordinate with Utah Division of Oil, Gas, and Mining for well site locations and permit applications.

## **6.0 IMPLEMENTATION SCHEDULE**

- 6.1 Upon approval of this Source Water Protection Plan, copies will be sent to the following agencies for information and incorporation into land use planning and regulatory purposes:
  - US Forest Service (Ashley NF)
  - BLM
  - US Bureau of Reclamation
  - Utah Department of Environmental Quality
  - Utah Division of Oil, Gas, and Mining
  - Utah Division of State Parks and Recreation
  - Duchesne County
  - TriCounty Health Department

## **7.0 RESOURCE EVALUATION**

- 7.1 Resources will be allocated through in-kind services and staff time to participate in watershed planning and evaluation.

## **8.0 RECORD KEEPING**

- 8.1 All records of source protection activities are file coded and stored in the Records Management Center at Central Utah Water Conservancy District (CUWCD), 355 West University Parkway, Orem, Utah.

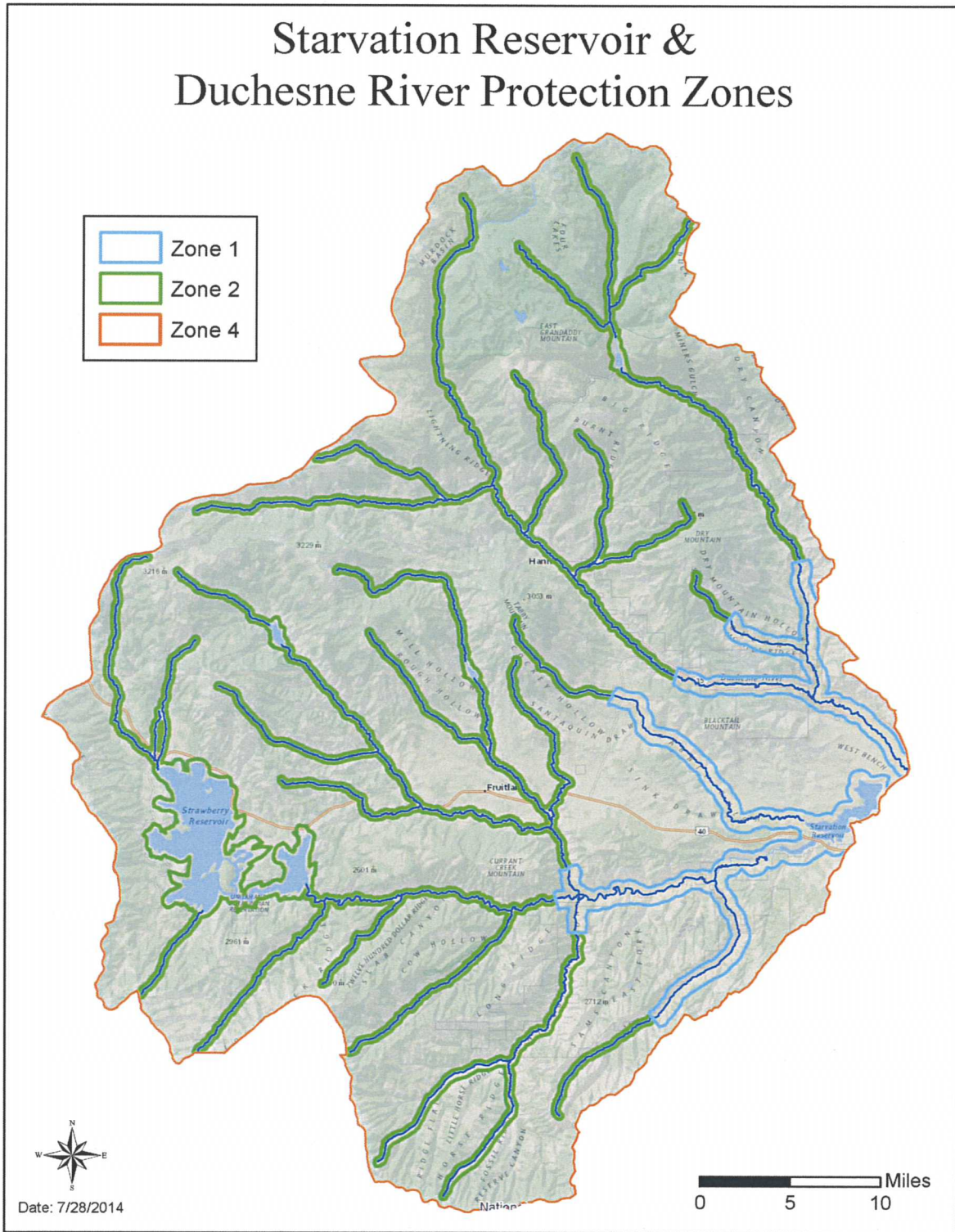
## **9.0 PUBLIC NOTIFICATION**

- 9.1 Refer to appendix 2 for a copy of the Public Notification.

## **10.0 CONTINGENCY PLAN**

- 10.1 In the event that this source water is found to contain contaminants which exceed treatment capabilities, the following steps will be taken:
1. Follow procedures as outlined in the DVWTP Emergency Response Plan.
  2. Intake depth will be adjusted to attempt to avoid contaminant plume.
  3. Sampling and analysis will be performed to determine type and concentration of contaminant and if treatment can be adjusted.
  4. If contamination persists, further action will require consultation with local customer agencies and Utah Division of Drinking Water.

Figure 1. Starvation Watershed Delineation Zones.



**Appendix 1: Potential Contamination Source Survey.**

| <b>Contaminant Source</b>  | <b>Priority Rank - Description</b>  | <b>Source</b>                    | <b>Zone</b> | <b>Type</b>                            | <b>Susceptibility Determination</b>   | <b>Controlled</b> | <b>Description of Controls/Management</b>   |
|--|---|----------------------------------|-------------|--|---|-------------------|---|
| Oil and Gas exploration and drilling, Hazardous Materials & Brackish Water | 1 - Quantity of transported materials, number of wells within watershed.            | Spills along Highways, Oil Wells | 1 & 2       | Chemical, Salt water                   | Moderate – Proximity within protection zones, High level of activity within watershed | Yes               | Local ERAP - Notification<br>U.S. EPA Green River Area Contingency Plan, Oversight by Utah DOGM |
| Livestock Grazing/Feeding Operations                                       | 2 - Numbers of animals in close proximity to surface waters; Type of contamination. | Private Lands                    | 1 & 2       | Biological - viral, bacteria, protozoa | High – Proximity to intake, Private lands grazing practices                           | Yes               | Starvation Management Plan,<br>CAFO/AFO Strategy  |
| Dreissenid Mussels   | 3 – Discovery in Colorado River system and Red Fleet Reservoir                      | Transport on contaminated boats  | 1           | Biological                             | Moderate – Proximity to Red Fleet and Colorado River system                           | Yes               | Ut Div of Wildlife Resources and CUWCD monitoring and Plan development                          |
| Sewage/Wastewater  | 4 - Increasing development within watershed.  | Starvation Park Private Lands    | 1 & 2       | Biological                             | Low – State, Local wastewater rules   | Yes               | Starvation Management Plan<br>TriCounty Health - Wastewater Ordinance                           |
| Agriculture Activities   | 5 - Runoff and irrigation return flows.   | Private Lands                    | 1 & 2       | Fertilizers                            | Low – BMP's, Physical controls  | Yes               | Minimal lands under cultivation, reservoir reduces impact to water supply                       |

|   |                                     |                     |       |          |                               |     |  |
|---|-------------------------------------|---------------------|-------|----------|-------------------------------|-----|--|
| Underground Storage Tanks, Figure 2       | 5 - Tanks inventoried or removed.   | Multiple Facilities | 1 & 2 | Chemical | Low - DEQ Permit or Inventory | Yes | Facilities have been identified and have been assigned ID #'s. |
| Leaking Underground Tanks, Figure 3.      | 5 - Tanks inventoried or removed    | Multiple Facilities | 1 & 2 | Chemical | Low - DEQ Permit or Inventory | Yes | Facilities have been identified and have been assigned ID #'s. |
| Open Leaking Underground Tanks, Figure 4. | 5 - Tanks inventoried or removed    | Multiple Facilities | 2     | Chemical | Low - DEQ Permit or Inventory | Yes | Facilities have been identified and have been assigned ID #'s. |
| CERCLIS Sites, Figure 5.                  | Inventoried or remediated           | Tabiona PCB's       | 2     | Chemical | Low - DEQ Permit or Inventory | Yes | Facilities have been identified and have been assigned ID #'s. |
| Small Quantity Generators, Figure 6.      | Facilities permitted or inventoried | Multiple Facilities | 1 & 2 | Chemical | Low - DEQ Permit or Inventory | Yes | Facilities have been identified and have been assigned ID #'s. |

Figure 2. UST Sites.

Duchesne Valley Water Treatment Plant  
Underground Storage Tank Facilities

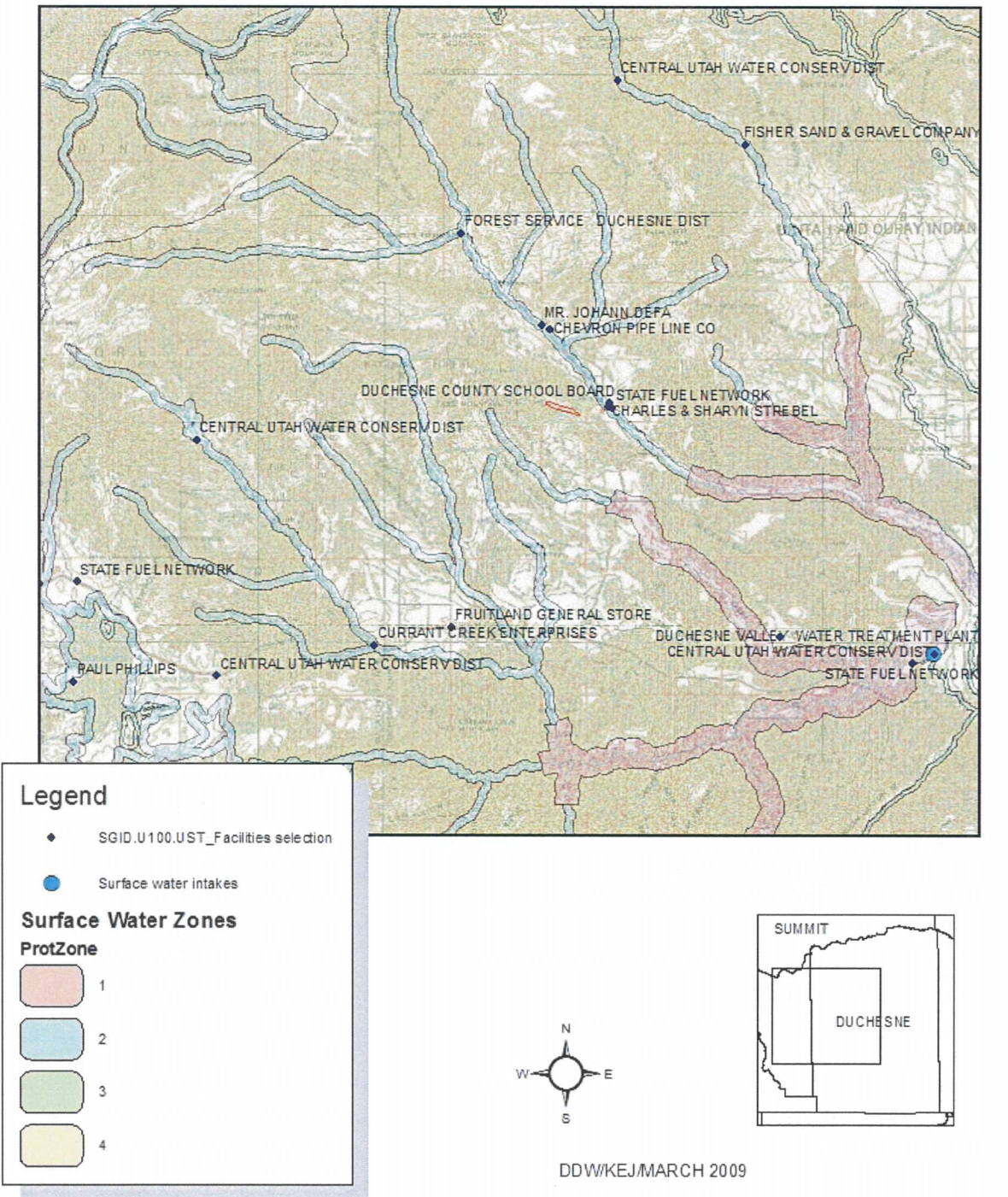


Figure 3. LUST Sites.

Duchesne Valley Water Treatment Plant  
Leaking Underground Storage Tank Sites

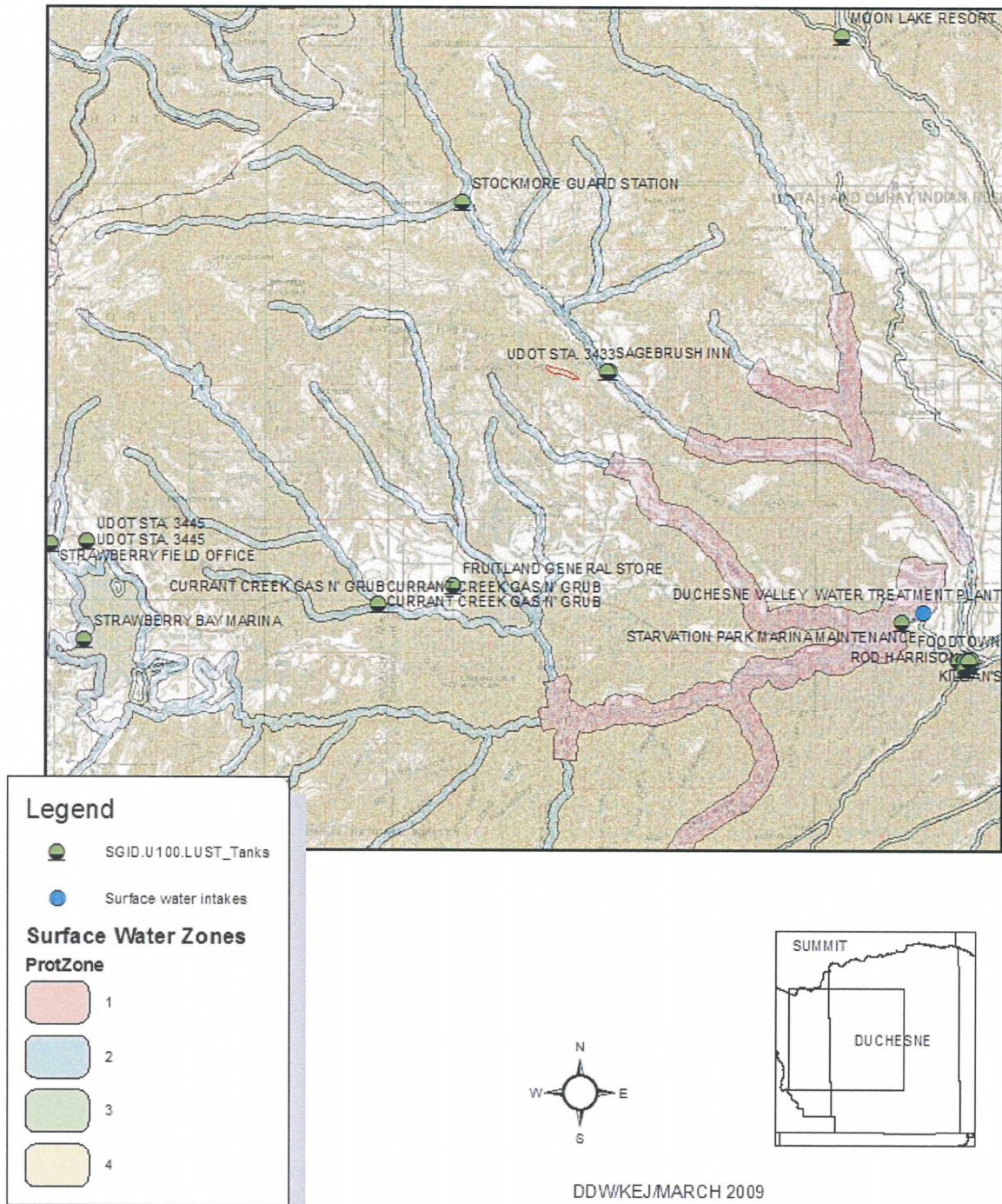


Figure 4. Open LUST Sites.

Duchesne Valley Water Treatment Plant  
Open Leaking Underground Storage Tank Sites

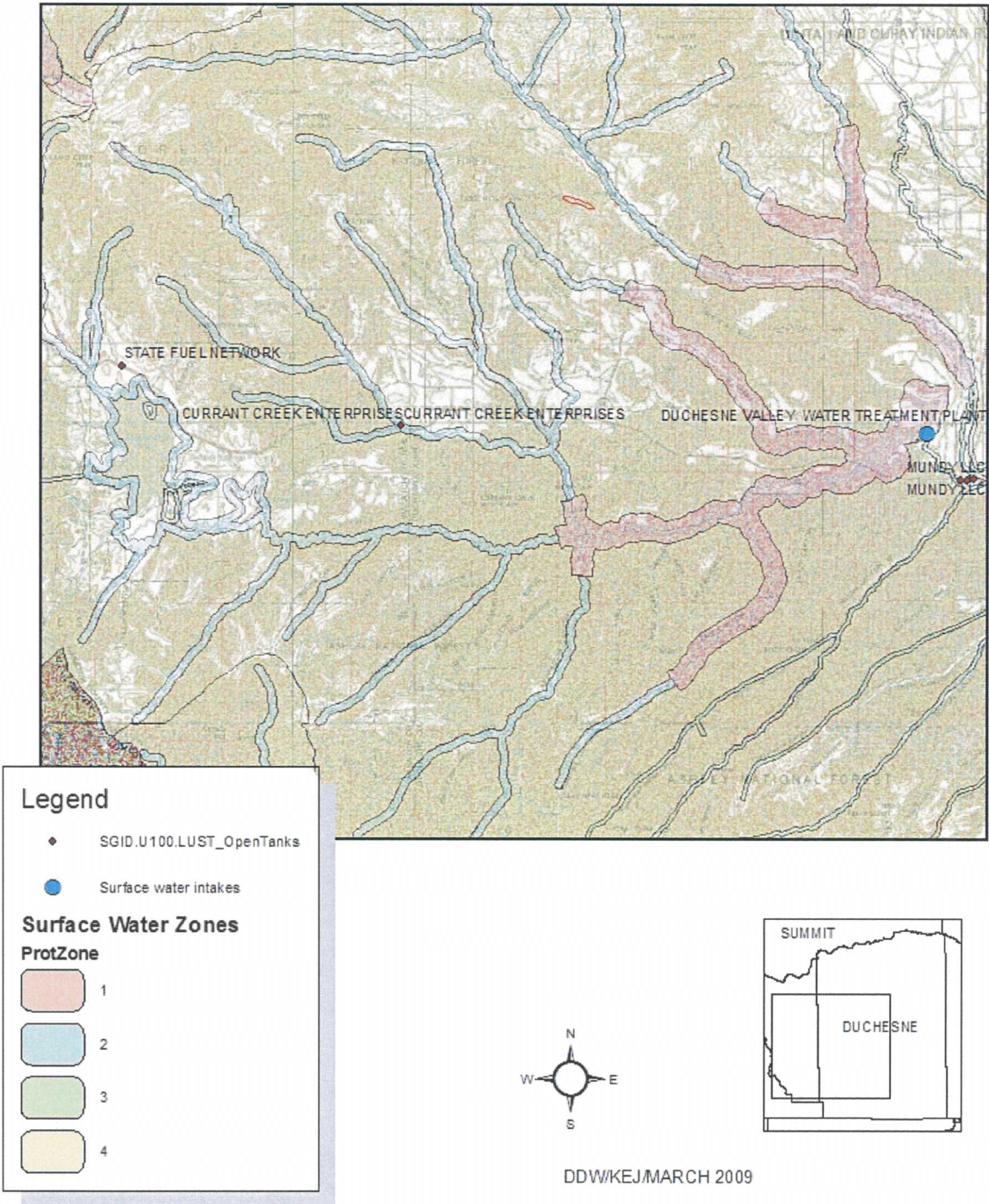
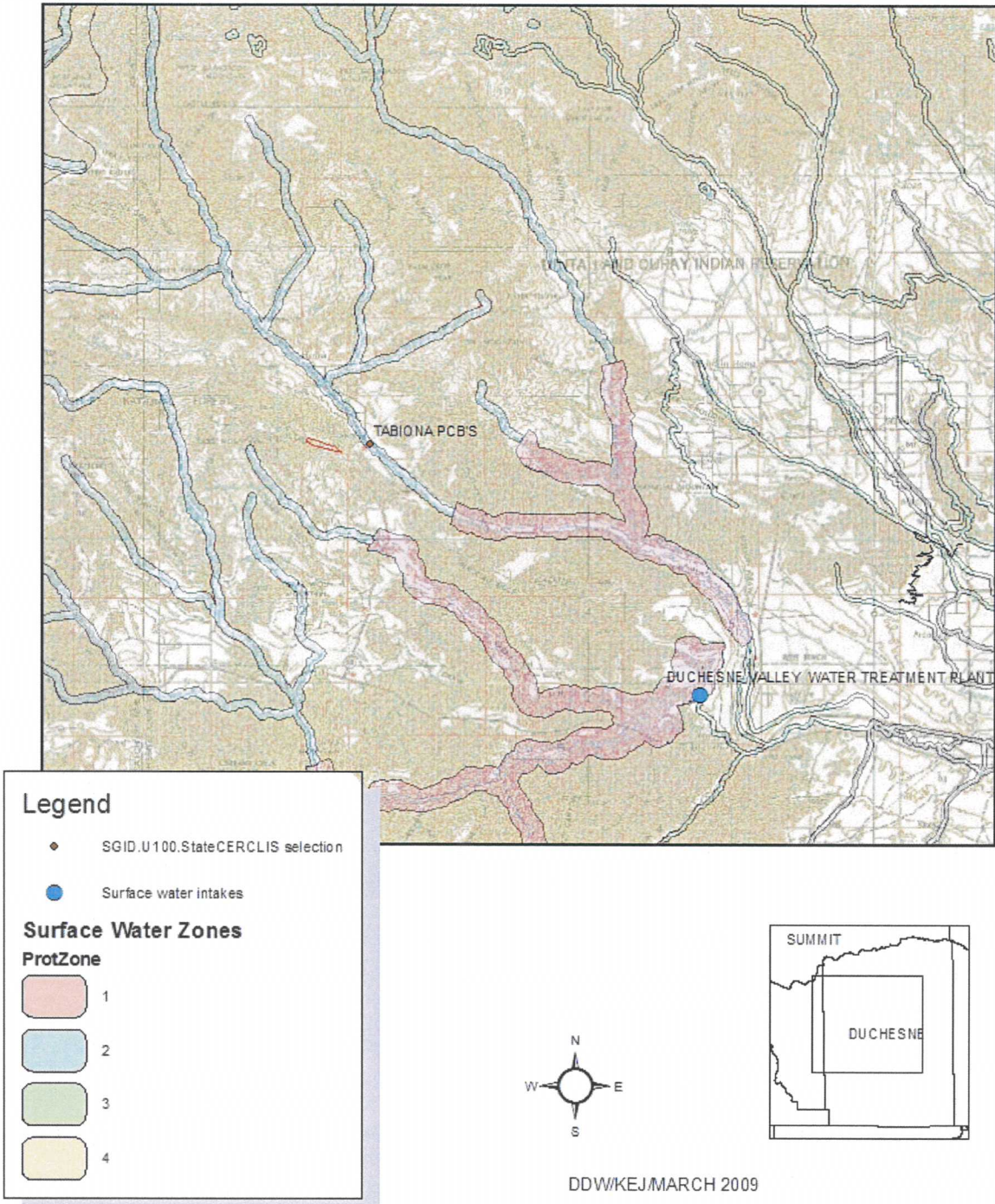


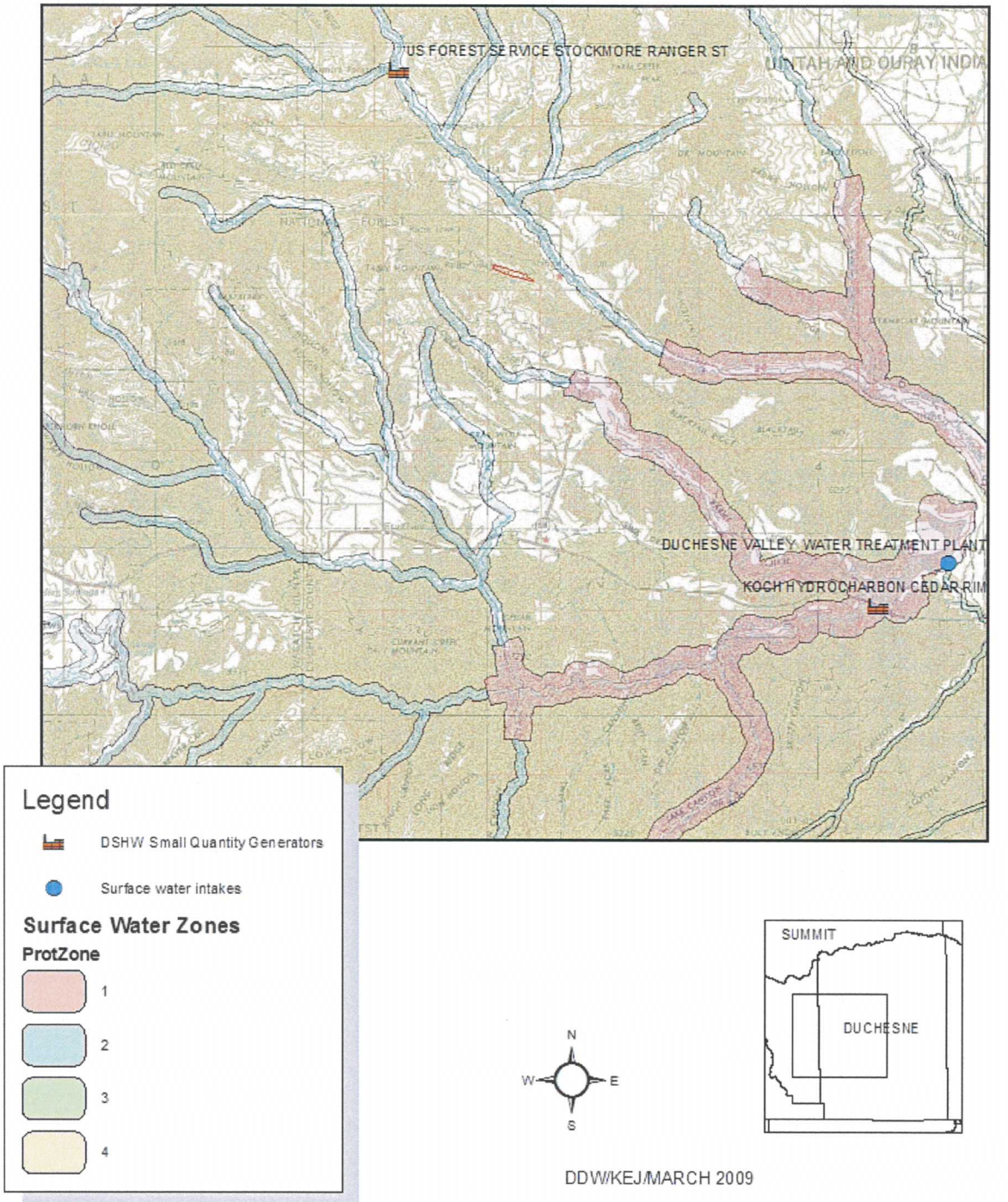
Figure 5. CERCLIS Sites.

Duchesne Valley Water Treatment Plant  
State CERCLIS Sites



**Figure 6. Small Quantity Generator Sites.**

**Duchesne Valley Water Treatment Plant  
Small Quantity Generators**



## **Appendix 2: Public Notification**

### **Source Water Assessment Public Summary Central Utah Water Conservancy District Duchesne Valley Water Treatment Plant December 2014**

#### **Introduction**

The Central Utah Water Conservancy District (CUWCD) has completed assessments of potential contamination threats to the raw water quality of its public drinking water sources as required by the 1996 Safe Drinking Water Act and by R309-600 and 605 of the State of Utah Drinking Water regulations. CUWCD has prepared this Source Water Assessment Public Summary to provide information to its customers regarding local and State efforts to protect the raw water quality of its drinking water source. This assessment is for the watershed that provides water to the Duchesne Valley Water Treatment Plant (DVWTP). The assessment is of source (river, lake, reservoir water) rather than tap water. Information on "tap" water quality is available in DVWTP's Public Water Supplier Consumer Confidence Report that can be obtained at <http://www.cuwcd.com/drinkingwater/duchesne.htm>.

#### **What is the Source of Your Drinking Water?**

The source of the water for DVWTP is Starvation Reservoir. An average of 2.75 MGD is treated each day. The water system serves a population of approximately 4,800 customers. The location of DVWTP's water supply intake is on the east side of the Starvation Reservoir Dam. The boundaries of the watershed and location of the intake is shown in Figure 1. The total watershed area is over 1 million and spans from Starvation Reservoir to Strawberry Reservoir and the south slope of the Uinta Mountains. Two rivers supply water to Starvation Reservoir, the Strawberry River from the west and the Duchesne River from the Knight Diversion to the east. (Figure 1). Approximately 90% of the watershed is high desert with Cedars, Juniper and Sage brush being the main foliage.

#### **Water Quality and Water Treatment Information**

Water withdrawn from Starvation Reservoir is treated by DVWTP prior to distribution to customers. This plant uses a coagulation, flocculation, and direct filtration process with the addition of chlorine for final disinfection. The water quality testing performed by CUWCD concluded that results of the tap water sampling done through 2014 were acceptable.

#### **Evaluation of Significant Potential Sources of Contamination**

This assessment evaluates contaminants that may enter the water before treatment. The

contaminants addressed in this assessment include those regulated under the federal Safe Drinking Water Act as well as those that CUWCD has determined may present a concern to health. Each significant potential source of contamination has been analyzed and given a qualitative susceptibility rating according to its potential to impact the water supply.

### **Potential Impact to Source Water Quality**

Oil and gas wells, untreated sewage discharges, and pathogens (bacteria, virus, Giardia, and Cryptosporidium).

Activities associated with oil field exploration and wells are significant potential sources of contamination. Produced water and oil pipelines may break and may not be detected until large quantities have spilled into drainage ditches or waterways that lead into Starvation Reservoir.

Treated and untreated sewage discharges into the watershed may be significant sources of waterborne pathogens (disease causing organisms). A concern remains about Giardia and Cryptosporidium since these pathogens cause intestinal diseases which can be very serious for people with a weakened immune system, those undergoing chemotherapy or dialysis, transplant patients, and people with Crohn's disease or HIV infection.

Giardia and Cryptosporidium pathogens have not been found in Starvation Reservoir. But it is probably that these pathogens could be found in the future. The increase of these pathogens is probably attributable to failed septic systems, and fecal matter from farm animals and perhaps wildlife close to or entering the waterways. Levels of these pathogens appear to increase in stream water following a heavy precipitation event.

A combination of direct filtration and chlorine disinfection at DVWTP removes and/or destroys at least 99.9% of these pathogens.

The impact of hazardous materials within the watershed or as a result of spills is minimal to the Public Water Supply. Stored materials are regulated under state and federal agencies and are identified by permit or site numbers. In the case of spills, notification through emergency response planning should provide adequate protection to the water supply.

### **Ongoing Watershed Protection Activities**

State and federal agencies regulate direct discharge of regulated contaminants in this watershed.

Other volunteer and government agencies are working cooperatively to address indirect sources of contamination within the watershed.

### **Source Water Protection Needs**

Based on the evaluation that was completed as part of this Source Water Assessment, CUWCD has determined that existing state and local programs should provide adequate protection of these

drinking water sources. In 2015, as part of an EPA drinking water regulation, sampling will be conducted to better understand potential Giardia and Cryptosporidium contamination in the watershed.

**How to Obtain Additional Information**

The Source Water Protection Plan was completed in December, 2014. Copies are available by contacting the Records Department at CUWCD ([Chris@CUWCD.com](mailto:Chris@CUWCD.com)).

Figure 1. Starvation Watershed Delineation Zones.

