Animas Drinking Water Alliance
Source Water Protection Plan PUBLIC VERSION

La Plata and San Juan Counties, Colorado
October 16, 2015

Written by: Ann Oliver
Plan Coordinator

For participating Community Water Providers:
Animas Water Company, PWSID# CO0134020
Association of Owners, Blue Sky Ranch, Inc., PWSID# CO0134065
City of Durango, PWSID# CO0134150
Glacier Club, PWSID# CO0134840
Goodman Property Owners Association, PWSID# CO0134480
Hermosa Mobile Home Village, PWSID# CO0134450
Purgatory Metro District, PWSID# CO0134750
Town of Silverton, PWSID# CO0156600

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Clockwise from top left: Town of Silverton courtesy www.uncovercolorado.com; Animas Canyon courtesy durango-co-real-estate.com; Animas Valley courtesy Basin Hydrology; City of Durango courtesy www.mountain-bike-diaries.com.

This Source Water Protection Plan is a planning document and there is no legal requirement to implement the recommendations herein. Actions on public lands will be subject to federal, state, and county policies and procedures. Action on private land may require compliance with county land use codes, building codes, local covenants, and permission from the landowner. This Source Water Protection Plan was developed using the Colorado Rural Water Association's Source Water Protection Plan Template.

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EMERGENCY CONTACT LIST

In the case of an emergency that might affect the ADWA public water suppliers, please notify each of the contacts in the table below:

PWSID	PWS Name	Name	Title	Phone Website
n/a	Co. Department of Public Health and Environment	Casey Kay	Field Unit #2 - Grand Junction	970/901-0603(c) 970/248-7000(o) casey.kay@state.co.us
CO0134020	Animas Water Company	John Ott	General Manager	(970) 259.4788
CO0134065	Association of Owners Blue Sky Ranch, Inc.	Rob Johnston	Water Committee Member	(970) 759.0444
CO0134150	City of Durango	Steve Salka	Utilities Director	(970) 375.4801
CO0134150	City of Durango	Dave Ferguson	Water Treatment Superintendent	(970) 375.4887
CO0134840	Glacier Club	Danny Paul	Operator	(970) 481.8380
CO0134840	Glacier Club	Bill Kroeker	Operator in Responsible Charge	(970) 769.1765 (c) (970) 533.7464 (h)
CO0134480	Goodman POA	Chris Meyer	Board Member	(970) 259.8720
CO0134480	Goodman POA	Fred Stephenson	Operator in Charge	(970) 247. 4271
CO0134450	Hermosa Mobile Home Village	Fred Stephenson	Operator in Responsible Charge	(970) 247.4271
CO0134450	Hermosa Mobile Home Village	Jim DeArmond	Owner Representative	(480) 837.8347
CO0134750	Purgatory Metro District	Eric Hassel	District Manager	(970) 247.3954
CO0156600	Town of Silverton	John Sites	Public Works Director	(970) 946.6839
CO0156600	Town of Silverton	John Girodo	Public Works Manager	(505) 947.5109

ACRONYMS

ADWA	Animas Drinking Water Alliance
BLM	Bureau of Land Management
BMP	Best Management Practice
CDOT	Colorado Department of Transportation
CDPHE	Colorado Department of Public Health and Environment
CODRMS	Colorado Division of Reclamation Mining and Safety
CODWR	Colorado Division of Water Resources of the State Engineer
COGCC	Colorado Oil and Gas Conservation Commission
COWQCC	Colorado Water Quality Control Commission
COWQCD	Colorado Water Quality Control Division
CRWA	Colorado Rural Water Association
EPA	Environmental Protection Agency
GIS	Geographic Information System
NRCS	Natural Resources Conservation Service
PSOC	Potential Source of Contamination
PWS	Public Water System
SDWA	Safe Drinking Water Act
SWAA	Source Water Assessment Area
SWAP	Source Water Assessment and Protection
SWPA	Source Water Protection Area
SWPP	Source Water Protection Plan
TOT	Time of Travel
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Area
USGS	United States Geological Survey
USFS	United States Forest Service

EXECUTIVE SUMMARY

There is a growing effort in Colorado to protect community drinking water sources from potential contamination. Many communities are taking a proactive approach to preventing the pollution of their drinking water sources by developing source water protection plans. A source water protection plan identifies a source water protection area, lists potential contaminant sources and outlines best management practices to implement to decrease risks to the water sources. Implementation of a source water protection plan provides an additional layer of protection at the local level beyond drinking water regulations.

Eight public water suppliers, collaborating under the name Animas Drinking Water Alliance, formed a Steering Committee to develop and implement this source water protection plan. The Animas Drinking Water Alliance values clean, high quality drinking water supplies and decided to work collaboratively with area stakeholders to develop a source water protection plan. The planning effort consisted of individual and public planning meetings with water operators, government, and agency representatives from October 2013 to August 2015, at the Animas Valley Grange. The Colorado Rural Water Association provided technical assistance in the development of this Source Water Protection Plan.

The participating public water systems obtain their drinking water from a total of 13 groundwater wells and 6 surface water intakes within the upper Animas River watershed. The source water protection planning area is the Animas River watershed upstream of the City of Durango's intake at Santa Rita Park. Within this area, each system identified source water protection areas for its water sources. These Source Water Protection Areas are where each water system has chosen to focus measures to reduce susceptibility to contamination.

The Steering Committee conducted an inventory of potential contaminant sources and identified other issues of concern within the source water protection planning area. Through this process, it was determined that the highest priority potential contaminant sources and issues of concern are Roads and Hazardous Materials Transportation, Wildfire, Private Wells, Fuel Storage Tanks, and Security/Vandalism. Other water quality concerns include Drought, Durango & Silverton Narrow Gauge Railroad, Emergency Backup Power, Existing/Abandoned Mines, Geothermal Wells, Residential Issues, Sanitary Sewer Line Breaks, Skiers/Hikers, Snowmobiles, Weed and Pest Management Activities.

The Steering Committee developed best management practices that may help reduce the risks from the potential contaminant sources and other issues of concern. The best management practices are centered on the themes of building partnerships with community members, businesses, and local decision makers; raising awareness of the value of protecting drinking water supplies; and empowering local communities to become stewards of their drinking water by taking actions to protect their water sources. The Steering Committee recognizes that the usefulness of this Plan lies in its implementation and will begin to execute these practices upon completion of the Plan. The Steering Committee will review this Plan every year or if new water sources and source water protection areas develop, or new risks are identified.

INTRODUCTION

The Animas Drinking Water Alliance (ADWA) is a collaboration of eight Public Water Systems (PWSs) operating community water supply systems that provide drinking water to - approximately 20,100 residents located within La Plata and San Juan Counties, Colorado. The participating water systems are Animas Water Company, Association of Owners, Blue Sky Ranch, Inc. (Blue Sky Ranch), City of Durango, Glacier Club, Goodman Property Owners Association (Goodman POA), Hermosa Mobile Home Village (Hermosa MHV), Purgatory Metro District (Purgatory MD), and Town of Silverton (Table 1). ADWA was established in October 2013 with the purpose of providing a framework for PWSs in the Animas River watershed to identify threats to their drinking water supply and to network and collaborate on the protection of their water sources from potential sources of contamination.

As a group, these systems obtain their drinking water from a total of 13 wells and 6 surface water intakes in the Animas River watershed (Table 2). Each ADWA water system recognizes the potential for contamination of the source of their drinking water, and realizes that it is necessary to develop a protection plan to prevent the contamination of this valuable resource. Proactive planning and implementing contamination prevention strategies are essential to protect the long-term integrity of their water supply and to limit their costs and liabilities.[1]

Purpose of the Source Water Protection Plan

The Source Water Protection Plan (SWPP) is a tool for the eight participating ADWA water systems to ensure clean and high quality drinking water sources for current and future generations. This SWPP is designed to:

- Create an awareness of the community's drinking water sources and the potential risks to surface water and/or groundwater quality within the watershed;
- Encourage education, networking and voluntary solutions to alleviate pollution risks;
- Promote management practices to protect and enhance the drinking water supply;
- Provide for a comprehensive action plan in case of an emergency that threatens or disrupts the community water supply.

Developing and implementing source water protection measures at the local level (i.e. county and municipal) complements existing regulatory protection measures implemented at the state and federal levels by filling protection gaps that can only be addressed at the local level.

[1] The information contained in this Plan is limited to that available from public records and from the participating water systems at the time that the Plan was written. Other potential contaminant sites or threats to the water supply may exist in the Source Water Protection Area that are not identified in this Plan. Identification of a site as a "potential contaminant site" should not be interpreted as one that will necessarily cause contamination of the water supply.

Table 1 Primary Contact Information for Animas Drinking Water Alliance public water systems.

PWSID	PWS Name	Name	Title	Address	Phone Website
CO0134020	Animas Water Company	John Ott	General Manager	PO Box 1012 Durango, CO 81302-1012	(970) 259.4788 animaswatercompany.com
CO0134065	Association of Owners Blue Sky Ranch, Inc.	Rob Johnston	Water Committee Member	1 Blue Sky Dr. Durango, CO 81301-7146	(970) 759.0444
CO0134150	City of Durango	Dave Ferguson	Water Treatment Superintendent	949 E. 2nd Ave. Durango, CO 81301	(970) 375.4887 www.durangogov.org
CO0134150	City of Durango	Steve Salka	Utilities Director	949 E. 2nd Ave. Durango, CO 81301	(970) 375.4801 www.durangogov.org
CO0134840	Glacier Club	Danny Paul	Operator	600 Glacier Club Dr. Durango, CO 81301-8108	(970) 481.8380 www.theglacierclub.com
CO0134480	Goodman POA	Chris Meyer	Board Member	76 Hermosa Dr. Durango, CO 81301-8609	(970) 259.8720
CO0134450	Hermosa Mobile Home Village	Shirley R. Newton	Owner	16221 Hyde Park Fountain Hills, AZ 8528-2740	(480) 586.1591
CO0134750	Purgatory Metro District	John Reiter	District Manager	PO Box 2501 Durango, CO 81302-2501	(970) 247.3954 www.purgatorymetrodistrict.com
CO0156600	Town of Silverton	John Sites	Public Works Director	PO Box 250 Silverton, CO 81433	(970) 946.6839 www.colorado.gov/townofsilverton

Table 2 Water source Information for ADWA Water Systems.

PWSID	PWS Name	# Surface Water Sources	# Ground Water Sources
CO0134020	Animas Water Company	0	4
CO0134065	Blue Sky Ranch	0	2
CO0134150	City of Durango	2	0
CO0134840	Glacier Club	2	2
CO0134480	Goodman POA	0	2
CO0134450	Hermosa Mobile Home Village	0	1
CO0134750	Purgatory Metro District	0	2
CO0156600	Town of Silverton	3	0

Protection Plan Development

The Colorado Rural Water Association's (CRWA) Source Water Protection Specialist, Dylan Eiler, guided and facilitated the source water protection planning process. The goal of the CRWA's Source Water Protection Program is to assist rural and small communities served by PWSs to reduce or eliminate the potential risks to drinking water supplies through the development of SWPPs, and provide assistance for the implementation of prevention measures.

The source water protection planning effort consisted of a series of public planning meetings. Information discussed at the meetings helped the eight participating water systems develop an understanding of the issues affecting source water protection for the community. The Steering Committee then made recommendations for management practices to be incorporated into the SWPP. In addition to the planning meetings, information pertaining to the source water protection planning area was gathered via consultation with experts, public documents, internet research, phone calls, emails, and field trips within the protection area. A summary of the meetings is represented in Table 3.

Table 3 Animas Drinking Water Alliance Planning Meetings.

Date	Purpose of Meeting
October 23, 2013	Logistics Meeting - Roles, timeline, contracts and grants, and coordination of field assessments
December 4, 2013	1st Steering Committee Meeting - Presentation on the process of developing a SWPP for the ADWA systems. Overview of participating systems. Begin delineation of source water protection areas for each system. Identify additional key stakeholders.
January 15, 2014	2nd Steering Committee Meeting – Review of Source Water Protection; Continue Delineation of the Source Water Protection Areas; Begin Inventory of Potential Sources of Contamination; Plan Expert Presentations.
February 12, 2014	3rd Steering Committee meeting – Review Source Water Protection; Finalize Delineation of the Source water Protection areas; Review each system's current top concerns; Inventory of potential sources of contamination; plan Expert Presentations.
March 19, 2014	4th Steering Committee Meeting – Overview of Source water Protection; Transportation Expert Presentations; Town of Silverton Water System PSOC Inventory and BMP discussion.
April 23, 2014	5th Steering Committee Meeting – Overview of Source Water Protection; Industry Expert Presentations; Purgatory Metro District PSOC Inventory and Prioritization.
May 15, 2014	6th Steering Committee Meeting - Overview of Source Water Protection; DWR Expert Presentation; The Glacier Club PSOC Inventory and Prioritization.
June 19, 2014	7th Steering Committee Meeting - Overview of Source Water Protection; Pest Management Expert Presentation.
July 17, 2014	8th Steering Committee Meeting - Overview of Source Water Protection; Animas Water Company, Goodman Subdivision, Blue Sky Ranch and Hermosa MHV PSOC Inventory and Prioritization.
August 14, 2014	9th Steering Committee Meeting - Overview of Source Water Protection; Emergency Services Expert Presentation; wrap up Blue Sky PSOC Inventory and Prioritization.

Date	Purpose of Meeting
September 16, 2014	10th Steering Committee Meeting - Overview of Source Water Protection; Hard rock Mining Experts Presentations; City of Durango and wrap up Hermosa PSOC Inventory and Prioritization.
October 16, 2014	11th Steering Committee Meeting - Overview of Source Water Protection; Review and edit PSOC and BMP tables.
June 23, 2015	12th Steering Committee Meeting – Overview of Source Water Protection; Review and Discuss Draft; Update Susceptibility Ratings.
August 6, 2015	13th Steering Committee Meeting – Finalize and approve plan; Develop BMP Implementation Action Plan.

Stakeholder Participation in the Planning Process

Local stakeholder participation is vitally important to the overall success of Colorado's Source Water Assessment and Protection (SWAP) program. Source water protection was founded on the concept that informed citizens, equipped with fundamental knowledge about their drinking water source and the threats to it, will be the most effective advocates for protecting this valuable resource. Local support and acceptance of the SWPP is more likely where local stakeholders have actively participated in the development of their Protection Plan.

The ADWA source water protection planning process attracted interest and participation from 46 stakeholders including local citizens and landowners, private businesses, water operators, local and state governments, and agency representatives (Table 4). During the months of October 2013 through August 2015, 14 stakeholder meetings were held at the Animas Valley Grange to encourage local stakeholder participation in the planning process. Stakeholders were engaged through email and phone invitations and by word-of-mouth. Input from these participants was valuable and greatly appreciated.

Steering Committee

During the development of this Plan, a volunteer Steering Committee was formed (Table 4) from the stakeholder group to develop and implement this SWPP. Specifically, the Steering Committee's role in the source water protection planning process was to advise the participating water systems in the identification and prioritization of potential contaminant sources as well as management approaches that can be voluntarily implemented to reduce the risks of potential contamination of the untreated source water. All members attended at least one Steering Committee meeting and contributed to planning efforts from their areas of experience and expertise. Their representation provided diversity and led to a thorough SWPP. The ADWA and CRWA are very appreciative of the participation and input from all participants.

Table 4 Stakeholders and Steering Committee Members.

Stakeholder	Title	Affiliation	Steering Committee Member
Dylan Eiler	Source Water Specialist	Colorado Rural Water Association	X
Dave Ferguson	Water Treatment Superintendent	City of Durango	X
Rob Johnston	Board Member	Blue Sky Ranch	X
Christopher Meyer	Board Member	Goodman Property Owners Association	X
Ann Oliver	Plan Developer	Animas Drinking Water Alliance	X
John Ott	Manager	Animas Water Company	X
Danny Paul	Water Treatment Technician	Glacier Club	X
John Reiter	Manager	Purgatory Metro District	X
John Sites	Water Operator	Town of Silverton	X
Fred Stephenson	Water Operator	Hermosa MHV, Goodman POA and Blue Sky Ranch	X
Ivan Geer	Aggregates Manager	Elam Construction and SandCo Inc.	
Fran Mallonee	Environmental Specialist	CO Department of Transportation	
Jason Voorhees	Durango Area Manager	Elam Construction and SandCo Inc.	
Joe Kuefler	General Manager	Animas Mosquito Control District	
Bill Kroeker	Water and Sewer Plant Mgr.	Glacier Club	
Ted Cox		Hermosa Ditch Company	
Damian Peduto	Community Development Director	La Plata County	
Mike Chadwick	Facility Director	Durango School District 9R	
Mike Trefry	Board Member	Goodman Property Owners Association	
Peter Butler	Co-Coordinator	Animas River Stakeholders Group	
Gary Derck	Chief Executive Officer	Durango Mountain Resort	
Matt Carnahan	Resource/ Environmental Mgr.	Four Corners Materials	
Gilbert Archuleta	Former Public Works Director	Town of Silverton	
Larry Raab	Former Water Operator	Town of Silverton	
Rod Cook	Weed Manager	La Plata County	
James Hards	Vice President	Durango Mountain Resort	
Dave Dillon		Citizen, Former owner of SandCo	
Tom Hartnett	President	La Plata Conservation District	
Eric Herchmer	Hydrologist	San Juan National Forest	
Tim Holt		Stakeholder	
Ryan Huggins	Water Resources Consultant	Wright Water Engineers	
Jennifer Jardine	Realty Specialist	BLM Tres Rios Field Office	
Gayle Lyman	Compliance Director	Elam Construction and SandCo Inc.	
Cecilia Whitaker	Secretary	La Plata Conservation District	
Ed Zink	Board Member	Animas Water Company	
Mike Cameron	Water Operator	Purgatory Metro District	
Evan Buchanan	D&SNG Vice President and Superintendent of Operations	Durango & Silverton Narrow Gauge Railroad	
Paul Schranck	Sr. Vice President of Operations and General Mgr.	Durango & Silverton Narrow Gauge Railroad	
Jon Scott	AmeriCorps/Vista Volunteer	Animas Watershed Partnership	
Pat Kelly	Staff Supervisor	Animas Mosquito Control District	

Stakeholder	Title	Affiliation	Steering Committee Member
John Girodo		Town of Silverton	
Todd Bauer	President	Elam Construction	
Jeff Titus	Water Commissioner	CO Division of Water Resources	
John Dezendorf	Water Operator	Animas Water Company	
Mark Fuson	Chief Plant Operator	City of Durango	
Greg Drover	Director of Field Operations	Glacier Club	
Butch Knowlton	Director	La Plata County Emergency Management	
Kirstin Brown	Project Manager	CO Division of Reclamation Mining and Safety	
Kay Zillich	Abandoned Mine Lands Specialist	BLM Tres Rios Field Office	

Development and Implementation Grant

Each ADWA water system has been awarded a $5,000 Development and Implementation Grant from the Colorado Department of Public Health and Environment (CDPHE). This funding is available to PWSs and representative stakeholders committed to developing and implementing a SWPP. A one to one financial match (cash or in-kind) is required. The water systems were approved for this grant in 2013, and they all expire four years after the approval date. Each PWS used 47% of the grant funds to pay the Plan Developer to develop the SWPP, and will use the remaining funds to implement management approaches that are identified in this Plan.

ADWA WATER SUPPLY PLANNING AREA SETTING

Eight public water suppliers have partnered to develop this SWPP, as ADWA. Figure 1 shows the location of each partnering water supplier within the watershed of the Animas River in Colorado, as well as the planning area that ADWA has identified for this plan. This section provides an overview of the planning area, including information on area growth projections, water quality, as well as individual descriptions of each supplier's specific water supply settings. As part of these descriptions, suppliers have provided information regarding their water supply demands and operations.

The planning area is located in southwest Colorado and encompasses the Animas River watershed upstream of the City of Durango's surface water intake on the Animas at Santa Rita Park, about 692 square miles. It includes portions of two counties: La Plata County, where Durango is the County Seat and San Juan County, where Silverton is the county seat. The economies of these communities from their founding in the late 1800's to now have been based in mineral extraction, farming, ranching, railroad operations, education and tourism.

Hydrologic Setting

The Animas River watershed (Hydrologic Unit Code (HUC) 14080104), drains approximately 1360 square miles where it joins the San Juan River, a major tributary of the Colorado River. The Animas River flows south out of the San Juan Mountains, through the Town of Silverton, then enters the Animas Canyon. This confined reach eventually opens on to a flat and sinuous stretch of river just below Baker's Bridge. After winding its way through this wide valley bottom of agricultural, residential and light commercial land use, the river enters the City of Durango and drops more rapidly through town to the City's intake at Santa Rita Park. Downstream of Durango, the river flows through the Southern Ute Tribal Lands and into New Mexico. It joins the San Juan River at Farmington, New Mexico.

Elevations range from approximately 6,500 feet above sea level at Santa Rita Park to 14,090 feet above sea level at the top of Mount Eolus in the Needles Range of the San Juan Mountains. The geology of the headwaters in San Juan County is composed of igneous and volcanic rocks formed as a result of late Tertiary volcanism that eventually formed the Silverton caldera. The caldera is highly mineralized. The Animas Canyon is formed by Precambrian rocks, giving way to Paleozoic and Mesozoic sedimentary outcrops in the lower part of the drainage (United States Department of the Interior 1997).

The climate in the planning area ranges from alpine to semi-arid. Average annual precipitation ranges from about 40 inches per year in the headwaters of San Juan County to about 15 inches per year around Durango (Western Regional Climate Center 2015). Typically, the heaviest rains fall during the monsoon season from July thru October.

Growth and Land Use Projections

The U.S. Census Bureau estimates the 2013 population to be 17,557 for the City of Durango; 53,334 for La Plata County; and 699 San Juan County (no separate estimate provided for the Town of Silverton). Based on these estimates compared to the 2010 census, both the City of Durango (3.9%) and La Plata County (3.9%) experienced an increase in population, while the estimated population of San Juan County has remained steady (0%) between 2010 and 2013 (United States Census Bureau 2015). Future projections by the City of Durango estimate that the population of La Plata County will increase through 2030. Various population growth estimates exist for this period, ranging from 1.3% to 2.4% (Economic Planning Systems 2011).

Water Quality Setting

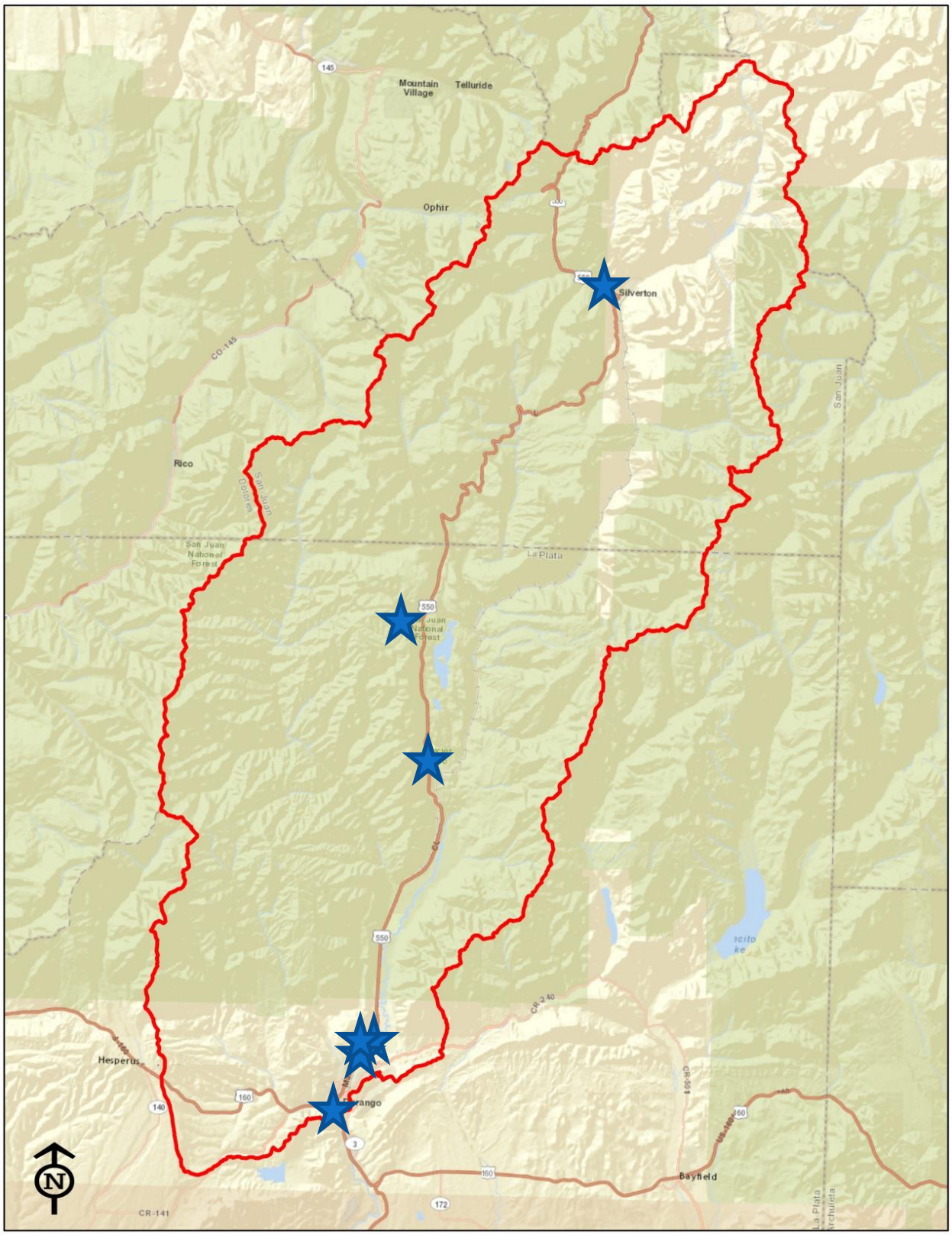
Water Quality Standards

Under the Clean Water Act, every state must adopt water quality standards to protect, maintain and improve the quality of the nation's surface waters. The State of Colorado's Water Quality Control Commission (COWQCC) has established water quality standards that define the goals and limits for all waters within their jurisdictions. Colorado streams are divided into individual stream segments for the purpose of identifying use classifications and standards (Table 5). Standards are designed to protect the associated classified uses of the streams (Designated Use). Stream use classifications can only be downgraded if it can be demonstrated that the existing use classification is not presently being attained and cannot be attained within a twenty-year time period (Section 31.6(2)(b)). A Use Attainability Analysis must be performed to justify the downgrade.

Currently, most of the stream segments located within the overall source water protection planning area addressed by this plan are classified to protect drinking water use, except for seven segments. These seven segments not classified for drinking water use are located high in the watershed and their water quality is influenced by their geology and/or by historic mining activities. For the stream segments with a water supply use classification, numeric standards protective of this use have been established. The Numeric Standards Table for COWQCC Regulation 34 shows the numeric standards protective of water supply use in the Animas River and its tributaries. The table can be accessed at https://www.colorado.gov/pacific/cdphe/water-quality-control-commission-regulations. The water supply use classification and associated standards provide public water suppliers and communities with a mechanism for monitoring and protecting the quality of their source water.

The potential financial and water supply risks related to the long-term disablement of one or more of each water supplier's water sources are a concern to the ADWA. As a result, the Alliance believes the development and implementation of this SWPP can help to reduce the risks posed by potential contamination of its water sources.

Figure 1 Animas Drinking Water Alliance source water protection planning area, with stars indicating the locations of the eight participating public water suppliers.



Impaired Waters

Stream segments within the Animas River watershed are listed on the 2012 CDPHE 303(d) list of Impaired waters (Table 5). States are required under the Clean Water Act to submit to Congress their list of impaired waters that do not meet the state's water quality standards for their designated and existing uses. States are also required to develop a watershed restoration action plan called a "Total Maximum Daily Load" (TMDL) for each impaired water body.

Water Quality Data

Several entities are engaged in either ongoing or focused water quality sampling within the ADWA source water protection planning area. The Colorado River Watch (River Watch) program, and the Colorado Water Quality Control Division (COWQCD) collect water quality data at locations within the Source Water Planning Area on an ongoing basis. The Southern Ute Indian Tribe (SUIT) Environmental Programs Division, Animas River Stakeholders Group (ARSG) and the Animas Watershed Partnership (AWP) are local entities with a focus on water quality that have conducted water quality sampling within the planning area.

Table 5 Stream segments within the Surface Water Source Water Protection Watershed with their Designated Uses and Impairment Status (COWQCD Regulation 34 Numeric Table, 2015 (https://www.colorado.gov/pacific/sites/default/files/Regulation-34-Numeric-Standards-Tables.pdf), CDPHE 303d List (https://www.colorado.gov/pacific/cdphe/impaired-waters), and CDPHE TMDLs (https://www.colorado.gov/pacific/cdphe/total-maximum-daily-loads-tmdls)).

Water body Name	Waterbody ID	Location	Designated Use	Status	TMDL Development
Animas River and Florida River Tributaries	COSJAF01_8900	All tributaries to the Animas River and Florida River, including all wetlands, which are within the Weminuche Wilderness Area.	Aquatic Life Cold Water- Class 1 Recreation E-Primary Contact Water Supply Agriculture	Good	
Animas River - Denver Lake To Maggie Gulch	COSJAF02_8900	Mainstem of the Animas River, including all tributaries and wetlands, from the outlet of Denver Lake to a point immediately above the confluence with Maggie Gulch, except for specific listings in Segment 6.	Recreation E-Primary Contact Agriculture	Impaired for Al, Cu, Cd, Fe, Pb	TMDL completed
Animas River	COSJAF03A_8900	Mainstem of the Animas River, including wetlands, from a point immediately below the confluence with Maggie Gulch to immediately above the confluence with Cement Creek.	Aquatic Life Cold Water- Class 1 Recreation E-Primary Contact Agriculture	Not Assessed	
Animas River	COSJAF03B_8900	Mainstem Of The Animas River, Including Wetlands, From A Point Immediately Above The Confluence With Cement Creek To A Point Immediately Above The Confluence With Mineral Creek.	Sept. 11 to May 14 Recreation N-Not Primary Contact May 15 to Sept. 10 Recreation E-Primary Contact	Impaired for Al, Cd, Cu, Fe, Pb	TMDL completed
Arrastra Gulch	COSJAF03C_8900	Arrastra Gulch including all tributaries and wetlands from the source to the confluence with the Animas River.	Aquatic Life Cold Water- Class 2 Recreation E-Primary Contact Agriculture	Impaired for Cd, Zn. On CO Monitoring and Evaluation List for Pb.	Not completed
Animas River - Mineral Creek to Elk Creek	COSJAF04A_8900	Mainstem of the Animas River, including wetlands, from a point immediately above the confluence with Mineral Creek to a point immediately above the confluence with Deer Park Creek.	Aquatic Life Cold Water- Class 2 Recreation E-Primary Contact Agriculture	Impaired for Cu, Fe, Zn, pH. Impaired for Al (Trec).	TMDL completed Not completed

Water body Name	Waterbody ID	Location	Designated Use	Status	TMDL Development
Animas River -Elk Creek To Junction Creek	COSJAF04B_8900	Mainstem of the Animas River, including wetlands, from a point immediately above the confluence with Deer Park Creek to Bakers Bridge.	Aquatic Life Cold Water- Class 1 Recreation E-Primary Contact Water Supply Agriculture	Impaired for Zn	TMDL completed
Animas River - Junction Creek To The Southern Ute Indian Res.	COSJAF05A_8900	Mainstem of the Animas River, including wetlands, from Bakers Bridge to the Southern Ute Indian Reservation boundary.	Aquatic Life Cold Water- Class 1 Recreation E-Primary Contact Water Supply Agriculture	Impaired for Mn (water supply)	Not completed
Animas River	COSJAF05B_8900	Mainstem of the Animas River, including wetlands, from the Southern Ute Indian Reservation boundary to the Colorado/New Mexico border.	Aquatic Life Cold Water- Class 1 Recreation E-Primary Contact Water Supply Agriculture	Not Assessed	
Cinnamon Creek, Grouse Creek, Picayne Gulch, Minnie Gulch.	COSJAF06_8900	Mainstem of the Animas River from the source to the outlet of Denver Lake. Mainstem, including all tributaries and wetlands of Cinnamon Creek, Grouse Creek, Picayne Gulch, and Minnie Gulch. All tributaries and wetlands to the Animas River from immediately above Maggie Gulch to Elk Park except for those listed under segments 3c, 7, 8 and 9.	Aquatic Life Cold Water- Class 1 Recreation E-Primary Contact Water Supply Agriculture	Not Assessed	
Cement Creek	COSJAF07_8900	Mainstem of Cement Creek, including all tributaries, and wetlands, from the source to the confluence with the Animas River.	Recreation E-Primary Contact Agriculture	Impaired for Al, Cd, Cu, Fe, Pb	TMDL completed

Water body Name	Waterbody ID	Location	Designated Use	Status	TMDL Development
Mineral Creek - Source To S. Mineral Creek Confluence	COSJAF08_8900	Mainstem of Mineral Creek, including wetlands, from the source to a point immediately above the confluence with South Mineral Creek. All tributaries on the east side of this segment of Mineral Creek including wetlands, except for Big Horn Creek. Mainstem of the Middle Fork of Mineral Creek including all tributaries and wetlands from the source to the confluence with Mineral Creek except for Crystal Lake and its exiting tributary to confluence with Middle Fork of Mineral Creek.	Recreation E-Primary Contact Agriculture	Impaired for Al, Cd, Cu, Fe, Pb	TMDL completed
Mineral Creek (Upper Animas Basin)	COSJAF09_8900	Mainstem of Mineral Creek, including wetlands, from immediately above the confluence with South Mineral Creek to the confluence with the Animas River.	Aquatic Life Cold Water- Class 2 Recreation E-Primary Contact Agriculture Water Supply	Impaired For Cu, Fe, Zn, pH	TMDL completed
Animas River Tributaries	COSJAF12A_8900	All tributaries to the Animas River from a point immediately above the confluence with Elk Creek to a point immediately below the confluence with Hermosa Creek except for specific listings in Segments 12b, 12c and 15. All tributaries to the Florida River from the source to below the confluence with Mud Spring Creek, except the specific listing in Segment 1.	Aquatic Life Cold Water- Class 1 Recreation E-Primary Contact Water Supply Agriculture	Electra Lake on CO Monitoring and Evaluation List for Ag, Zn	
-	COSJAF12C_8900	Hermosa Creek, including all tributaries, from the source to immediately below the confluence with Long Hollow, except for the East Fork of Hermosa Creek.	Aquatic Life Cold Water- Class 1 Recreation E-Primary Contact Water Supply Agriculture	Good- Outstanding Waters	

Water body Name	Waterbody ID	Location	Designated Use	Status	TMDL Development
-	COSJAF12D_8900	Mainstem of Junction Creek, including all tributaries, from the source to the U.S. Forest Boundary. Mainstem of Falls Creek, including all tributaries, from the source to the confluence with Animas River.	Aquatic Life Cold Water- Class 1 Recreation E-Primary Contact Water Supply Agriculture		
Junction Creek	COSJAF13A_8900	Mainstem of Junction Creek including all tributaries, from the U.S. Forest Boundary to the confluence with Animas River.	Aquatic Life Cold Water- Class 2 Recreation E-Primary Contact Agriculture Water Supply	On CO Monitoring and Evaluation List for Ag, E.coli	
Animas River	COSJAF13B_8900	All tributaries to the Animas River from a point immediately below the confluence with Hermosa Creek to the Southern Ute Indian Reservation boundary except for the specific listings in Segments 12d, 13a, 14a and 14b; all tributaries to the Florida River, from a point immediately below the confluence with Mud Creek to the Southern Ute Indian Reservation boundary, except for specific listings in Segment 12d.	Aquatic Life Cold Water- Class 2 Recreation E-Primary Contact Water Supply Agriculture	Good	
Animas River Tributaries	COSJAF13C_8900	All tributaries to the Animas River from the Southern Ute Indian Reservation boundary to the Colorado/New Mexico border, except for Segment 11b; all tributaries to the Florida River from the Southern Ute Indian Reservation boundary to the confluence with the Animas River.	Aquatic Life Cold Water- Class 2 Recreation E-Primary Contact Water Supply Agriculture	Not Assessed	

Water body Name	Waterbody ID	Location	Designated Use	Status	TMDL Development
Lightner Creek	COSJAF14A_8900	Mainstem of Lightner Creek, including all tributaries, from the source to below the confluence with Deep Creek.	Aquatic Life Cold Water- Class 1 Recreation E-Primary Contact Water Supply Agriculture	Not Assessed	
Lightner Creek	COSJAF14B_8900	Mainstem of Lightner Creek from below the confluence with Deep Creek to the confluence with the Animas River.	Aquatic Life Cold Water- Class 1 Recreation E-Primary Contact Water Supply Agriculture	Not Assessed	
Purgatory Creek	COSJAF15_8900	Mainstem of Purgatory Creek from the source to Cascade Creek; Goulding Creek from the source to Elbert Creek; and Nary Draw from the source to Haviland Lake.	Aquatic Life Cold Water- Class 2 Recreation E-Primary Contact Water Supply Agriculture	Not Assessed	

Both River Watch and COWQCD gather water samples at many monitoring sites within the planning area (Figure 2). The River Watch is a volunteer water quality monitoring program in Colorado. The River Watch mission is to "is to work with voluntary stewards to monitor water quality and other indicators of watershed health and utilize this high quality data to educate citizens and inform decision makers about the condition of Colorado's waters" (http://www.coloradoriverwatch.org/).

CDPHE is the state agency responsible for protecting and improving the health of Colorado's people and the quality of its environment. The COWQCD is charged with, among other things, surface water quality planning, monitoring and enforcement for rivers, streams and lakes.

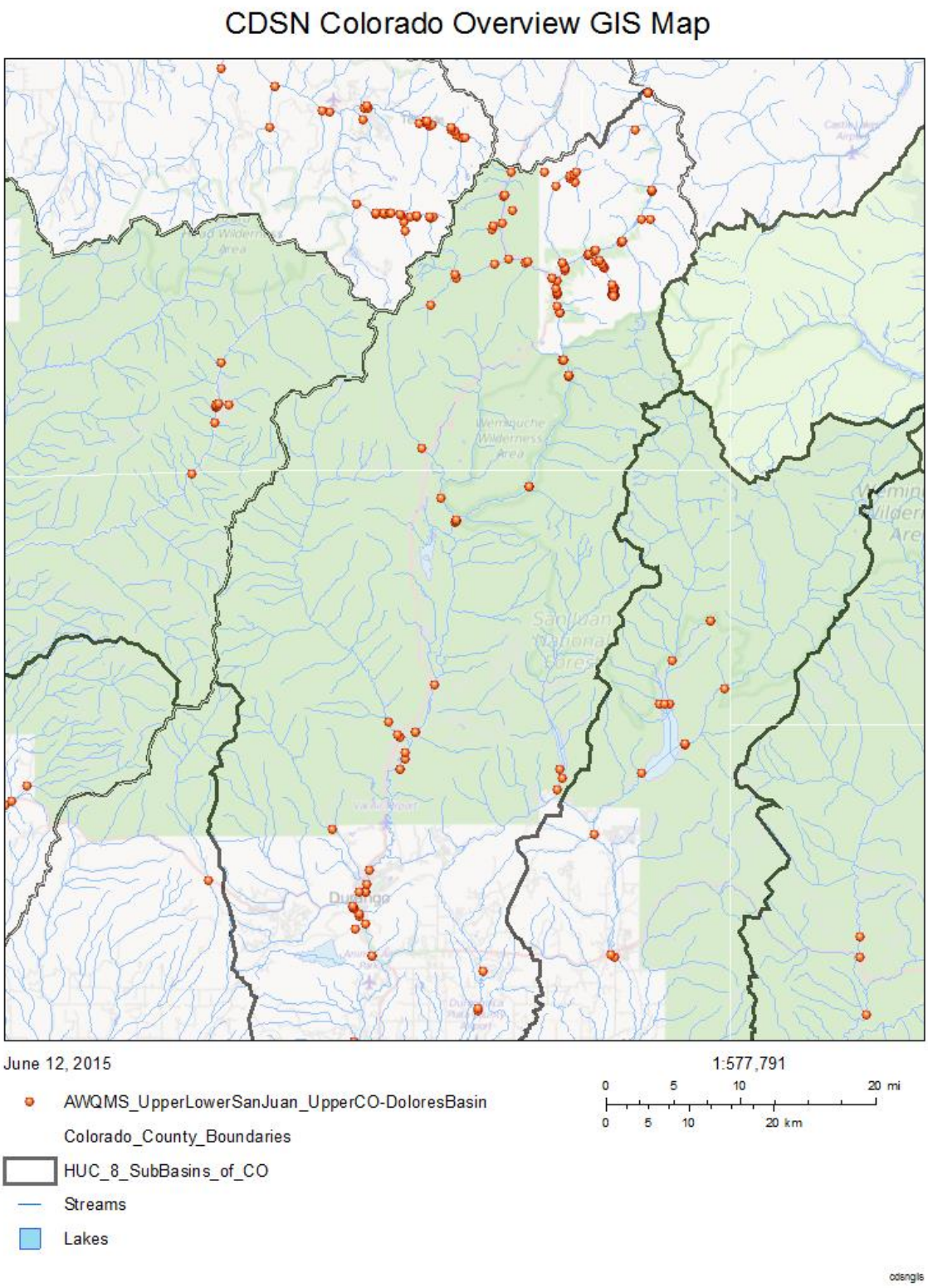
The SUIT Environmental Programs Division is responsible for "making available the resources needed to protect the health, welfare, and environment of the Tribal membership and reservation." The Division's Water Quality Program "strives to improve the quality of surface waters on the Southern Ute Indian Reservation through monitoring and with projects that employ best management practices" https://www.southernute-nsn.gov/environmental-programs/water-quality/). The SUIT Water Quality Program conducts some ongoing sampling as well as special sampling projects.

The ARSG is a collaborative group focusing on addressing water quality issues related to mining and/or geology in the upper Animas River Basin. The ARSG's mission is to "improve water quality and habitats in the Animas River through a collaborative process designed to encourage participation from all interested parties" (http://www.animasriverstakeholdersgroup.org/). As an important part of their efforts, the ARSG has conducted extensive collection of water quality data on chemical, physical and biological components.

The AWP is a collaborative, watershed-based group made up of partners across the watershed in New Mexico, the Southern Ute Tribal Lands and Colorado. The group's mission is to "protect and improve the quality of water resources to benefit the Animas River, now and in the future" (http://animaswatershedpartnership.org/). As part of its efforts, AWP conducts focused sampling efforts with an emphasis on identifying primary source areas for non-point source pollutants, including E. coli, nitrogen and phosphorus.

Water quality data made available by each of these entities can be viewed and downloaded at the Colorado Data Sharing Network website: http://www.coloradowaterdata.org/index.html.

Figure 2 Map of Colorado River Watch and Animas River Stakeholders Group water quality sampling locations within the ADWA source water protection planning area (Colorado Data Sharing Network, June 2015).



Groundwater Protection

Groundwater protection is managed as two separate issues of quantity and quality in Colorado. Quantity issues are managed through the Colorado Division of Water Resources Office of the State Engineer (CODWR). The CODWR administers and enforces all surface and groundwater rights throughout the State of Colorado, issues water well permits, approves construction and repair of dams, and enforces interstate compacts. The CODWR is also the agency responsible for implementing and enforcing the statutes of the Groundwater Management Act passed by the Legislature as well as implementing applicable rules and policies adopted by the Colorado Groundwater Commission and the State Board of Examiners of Water Well Construction and Pump Installation Contractors.

Under the Clean Water Act, every state must adopt water quality standards to protect, maintain and improve the quality of the nation's surface waters. Water quality is protected by the Colorado Water Quality Control Act through a number of state agencies. The CDPHE is the lead agency. The COWQCC is responsible for promulgating groundwater and surface water classifications and standards. The Commission has established basic standards for groundwater regulations that apply a framework for groundwater classifications and water quality standards for all waters within their jurisdictions. Standards are designed to protect the associated classified uses of water or a designated use. The groundwater classifications are applied to groundwater within a specified area based upon use, quality and other information as indicated in the COWQCC's Regulation No. 41, "The Basic Standards for Ground Water." Statewide standards have been adopted for organic chemicals and radionuclides. Significant areas of the state have been classified for site specific use classification and the remainder of the state's groundwater is protected by interim narrative standards.

Classifications and standards are implemented by seven separate state agencies through their rules and regulations for activities that they regulate. Regulated activities include mining and reclamation, oil and gas production, petroleum storage tanks, agriculture, Superfund sites, hazardous waste generation and disposal, solid waste disposal, industrial and domestic wastewater discharges, well construction and pump installation, and water transfers.

Colorado has proactive groundwater protection programs that include monitoring groundwater for agricultural chemicals and pesticides, issuing groundwater discharge permits; voluntary cleanup program, permitting for large hog farm operations, and educational programs. In addition, water wells must have a permit and meet minimum standards of construction and pump installation.

Individual Public Water Suppliers Water Supply Settings

Animas Water Company

Physical Characteristics

The Animas Water Company is located in the Animas Valley, just north of Durango. The Company obtains its drinking water from four wells drilled into the alluvial aquifer of the Animas River valley. Historically, water yields from these wells range from 160 gallons to 600 gallons per minute (Table 6). Recharge is assumed to be comprised of precipitation, Hermosa Creek and Animas River flows, irrigation flows, ditch seepage and septic systems.

Soils in the valley floor are well drained sandy loams. Saturated hydraulic conductivity (Ksat), which is a measure of the ease with which pores in a saturated soil transmit water, ranges from 35 to 248 micrometers/second in these soils. Because these soils have high Ksat, spills on top of the ground would be absorbed into the groundwater faster than in non-permeable soils (United States Department of Agriculture 2015).

The Animas Water Company has not petitioned the COWQCC for the establishment of a classified ground water area and associated site-specific ground water quality standards for its ground water intakes.

Table 6 Animas Water Company Groundwater Supply Information

Water System Facility Name	Total Depth of Well (ft)	Depth of Plain Casing (ft)	Depth of Perforation (ft)	Yield (gpm)	Year Drilled	Permit Number
Hermosa Meadows Well	120	70	70-100	330-450	1997	47825-F
Animas School Well	120	70	70-100	350-500	2009	65792-F
Red Rock Well	120	70	70-100	330-450	1996	45856-F
Chapin Well	120	70	70-100	130-180	1994	43554-F

Drinking Water Supply Operations

Water Supply and Infrastructure

The Animas Water Company source water supply comes from four wells located within the Animas Valley, three of which are located in the central part of the valley, to the west of the Animas River and downstream of Hermosa Creek. The fourth well is located to the east of the Animas River, between Baker's Bridge and Hermosa Creek.

The water is treated with sodium hypochlorite injected at the well house pipe string. The three primary wells have the capacity to pump 450 gpm and the fourth 160 gpm. From the wells, the treated water enters the distribution system including four primary storage tanks with a

combined capacity of 2,125,000 gallons. There are also two high altitude tanks serving customers above the main storage, with a combined capacity of 20,000 gallons.

Water Supply Demand Analysis

The Animas Water Company serves an estimated 1,150 connections and approximately 2,200 residents and other users in the service area annually. The water system has the current capacity to produce 2,000,000 gallons per day. Current estimates indicate that the average daily demand is approximately 40,000 gallons per day, and that the average peak daily demand is approximately 730,000 gallons per day. Using these estimates, the water system has a surplus average daily demand capacity of 1,960,000 gallons per day and a surplus average peak daily demand capacity of 1,270,000 gallons per day.

Based on the estimates above, the Animas Water Company has determined that if two of its water sources become disabled for an extended period of time due to contamination, the Company may not be able to meet the average daily demand or average peak daily demand of its customers. The ability of the Animas Water Company to meet either of these demands for an extended period of time is also affected by the amount of treated water the water system has in storage at the time a water source(s) becomes disabled.

Animas Water Company recognizes that potential contamination of its groundwater source(s) could result in having to treat the groundwater to a greater degree and/or abandon the water source if treatment proves to be ineffective or too costly. To understand the potential financial costs associated with such an accident, the Company estimates that it could cost $300,000 in today's dollars to replace one of its water sources (i.e., replacement of the intake structure and the associated infrastructure). Treatment costs, which can vary depending on the type of contaminant(s) that need(s) to be treated, were not included in this estimate.

The potential financial and water supply risks related to the long-term disablement of one or more of the community's water sources are a concern to the Company. As a result, the Steering Committee believes the development and implementation of a SWPP for the Animas Water Company can help to reduce the risks posed by potential contamination of its water sources. Additionally, the Company has developed an emergency response plan or contingency plan (Appendix 1.1) to coordinate rapid and effective response to any emergency incident that threatens or disrupts the Company's water supply.

Association of Owners, Blue Sky Ranch, Inc.

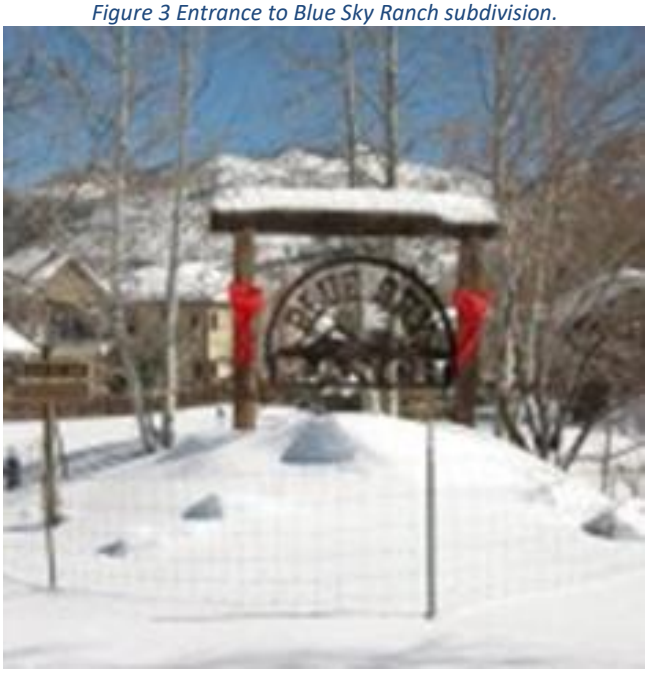
Physical Characteristics

Blue Sky Ranch is located in the Animas Valley, about 7 miles north of Durango on Highway 550 and 1 mile east on Hermosa Meadows Road (Figure 3). Blue Sky Ranch obtains its drinking water from two wells drilled into the alluvial aquifer of the Animas River valley. Historically, water yields from these wells range from 100 gallons to 150 gallons per minute (Table 7). Recharge is assumed to be comprised of precipitation, Hermosa Creek and Animas River flows, irrigation flows, ditch seepage and septic systems.

The soils in the valley floor are well drained sandy loams. Saturated hydraulic conductivity (Ksat), which is a measure of the ease with which pores in a saturated soil transmit water, ranges from 35 to 248 micrometers/second in these soils. Because these soils have high Ksat, spills on top of the ground would be absorbed into the groundwater faster than in non-permeable soils (United States Department of Agriculture 2015).

Blue Sky Ranch has not petitioned the COWQCC for the establishment of a classified ground water area and associated site-specific ground water quality standards for its ground water intakes.

Figure 3 Entrance to Blue Sky Ranch subdivision.



Drinking Water Supply Operations

Water Supply and Infrastructure

The Blue Sky Ranch Subdivision is served by two wells drilled into an unconfined aquifer of alluvial sediment about 1/2 mile west of the Animas River and east of Highway 550 North of

Durango, Colorado. Well #1 is located at 37.40435, -107.83397, and Well #2 is located at 37.40393, -107.83382. The legal maximum pumping rate is 150 gpm and since production began in 1993, the water supply is more than ample and the system's capabilities are excellent.

The wells serve 44 single family homes, about 175 people, and also produce enough water to irrigate individual yards and a green belt that runs through the subdivision consisting of approximately 6 acres. The distribution system consists of a looped main distribution water main of 6" and 4" sized PVC pipe, approximately 3,000 feet in length. Water services to individual homes consist of 1" copper services from the main line. A number of frost proof hydrant risers (estimated at 7) are spaced throughout the subdivision's common areas to provide irrigation. There are backflow prevention devices (atmospheric vacuum breakers) installed on each hydrant for summer use.

Each well has its own 3 inch PVC line into the treatment building where the line converts to steel. Two 150-gallon pressure tanks provide a negligible amount of storage and serve mainly to allow chlorine contact time and to allow the well pumps to rest at least 3 minutes before the pressure switches call for more water.

Each well can be isolated in the treatment building to operate independently of the other. They normally alternate each 24-hour period by means of a timer on the control panel. By the use of pressure switches, settings to co-mingle production are achieved during periods of high demand. Also, if one well fails, the other will automatically start production when the pre-set low pressure setting is reached. An alarm on the control panel is then activated to alert personnel that only one well is actively operating.

Each well has its own Pulsafeeder chlorine injection system and solution barrel employing Regular Clorox Bleach in the treatment building. The chlorine pumps activate automatically when the individual well pump comes on and inject the correct amount of chlorine solution into the incoming stream. After chlorination, the separate well piping converges to a single 6-inch line and is metered before leaving the treatment building into distribution.

Table 7 Blue Sky Ranch groundwater supply information.

Water System Facility Name	Water System Facility Number	Total Depth of Well (ft)	Depth of Plain Casing (ft)	Depth of Perforation (ft)	Yield (gpm)	Year Drilled	Permit Number	Annual Permitted Amount (acre feet)
Well #1	134065-001	62	0-40	40-60	100	1981	40365-F	50
Well #2	134065-002	95	0-60	40-60	150	1993	42529-F	50

Water Supply Demand Analysis

Blue Sky Ranch serves an estimated 44 connections and approximately 175 residents and other users in the service area annually. The water system has the current capacity to produce 100,000 gallons per day. Current estimates indicate that the average daily demand is

approximately 4,500 to 10,000 gallons per day (winter, spring), or 5,000 to 70,000 gallons per day (summer, fall). The average peak daily demand is approximately 66,000 gallons per day (peak summer month average over last seven years). Using these estimates, the water system has a surplus, average daily demand capacity of 90,000 gallons per day to 95,500 gallons per day (winter, spring) or 30,000 to 95,000 gallons per day (summer, fall), and a surplus average peak daily demand capacity of 34,000 gallons per day.

Based on the estimates above, the Blue Sky Ranch has determined that if both wells become disabled for an extended period of time due to contamination, the system may not be able to meet the average daily demand of its customers. And in the event that one of the wells should become disabled for an extended period of time, Blue Sky Ranch may not be able to meet the average peak daily demand of its customers.

Blue Sky Ranch recognizes that potential contamination of its groundwater source(s) could result in having to treat the groundwater and/or abandon the water source if treatment proves to be ineffective or too costly. To understand the potential financial costs associated with such an accident, the system estimates that it could cost $300,000 in today's dollars to replace one of its water sources (i.e., replacement of the intake structure and the associated infrastructure). Treatment costs, which can vary depending on the type of contaminant(s) that need(s) to be treated, were not included in this estimate

The potential financial and water supply risks related to the long-term disablement of one or more of the community's water sources are a concern to the Blue Sky Ranch. As a result, the system believes the development and implementation of a SWPP can help to reduce the risks posed by potential contamination of its water sources. Additionally, the Blue Sky Ranch has developed an emergency response plan or contingency plan (Appendix 2.1) to coordinate rapid and effective response to any emergency incident that threatens or disrupts the community water supply.

City of Durango

Physical Characteristics

The City of Durango is located in La Plata County, at an elevation of 6,512 feet. Of the partnering ADWA PWSs, the City is at the lowest elevation within the Animas River watershed. The City obtains its drinking water from two surface water sources: the Animas River and the Florida River.

Figure 4 The City of Durango Terminal Reservoir.

Drinking Water Supply Operations

Water Supply and Infrastructure

The City of Durango PWS has two sources of supply, the Florida and Animas Rivers. The Florida is the primary and year-round source that is gravity-fed through 9 miles of pipeline to Terminal Reservoir, a 74 Million Gallon (MG) raw water storage facility, on the College Mesa (Figure 4). The Florida River source water was addressed in the Florida River Source Water Protection Plan (2013) and therefore is not addressed in this plan.

The Animas River supply supplements the Florida supply during peak season (May – October) or for emergencies, i.e. loss of the Florida (Table 8). Animas River water is conveyed to Terminal Reservoir via a pipeline with a Pump Station located at Santa Rita Park. Design and construction is in progress that will also give the City the ability to utilize the Animas La Plata Pump Station to pump water to Terminal Reservoir. Additionally, the City supplies raw water to other users for irrigation purposes. These include: Hillcrest Golf Course, Fort Lewis College, Memorial Park, Greenmount Cemetery, and Smith Field & Riverview Sports Complexes.

Water Treatment: The College Mesa Water Treatment Plant (CMWTP) was built in 1956 and had a major expansion in 1968. Plant upgrades are continuous as aging equipment and operating systems become obsolete. Currently the plant has a 14 Million Gallon per Day (MGD) capacity and is in operation 24/7/365. By definition, it is a "Conventional Water Treatment Plant", utilizing coagulation, flocculation, sedimentation, and filtration. Treatment chemicals required for the process are Aluminum Chlorohydrate and a cationic polymer. Disinfection is achieved with MIOX (primary) and a secondary or back-up system utilizing Calcium Hypochlorite. The City of Durango elects to fluoridate its water with the addition of Sodium Fluoride. Plant production ranges from 2 MGD during the winter months, to 8 MGD in the middle of summer; daily average is 4.2 MGD. The CMWTP has a 6-person staff; a Superintendent, Chief Plant Operator and 4 Plant Operators. Design and engineering is in progress to construct a second, new treatment facility that will be called the Ridges Basin Water Treatment Plant. This plant's source water will come from the Animas River via Lake Nighthorse.

Water Distribution: The City of Durango potable water distribution system is comprised of 136 miles of main pipelines, 11 storage tanks (15.5 MG total capacity), 5 pumping stations, 6 pressure zones, and 6,323 service taps. The service area reaches north to the Iron Horse Inn on Highway 550, south to La Plata County Road & Bridge yard, east to Three Springs and west to Wildcat Canyon. The City has a Cross Control Connection Program that helps ensure water quality is maintained once it has left the plant.

Table 8 City of Durango surface water supply information.

Water System Facility Name	Water System Facility Number	Surface Water Source	Constructed Date
Terminal Reservoir	134150-004	Animas River	1956

Water Supply Demand Analysis

The City of Durango serves an estimated 6,600 connections and approximately 23,000 residents and other users in the service area annually. The water system currently has the capacity to produce 14 million gallons per day. Current estimates by the water system indicate that the average daily demand is approximately 4.2 million gallons per day, and that the average peak daily demand is approximately 8 million gallons per day. Using these estimates, the water

system has a surplus average daily demand capacity of 9.8 million gallons per day and a surplus average peak daily demand capacity of 6 million gallons per day.

Using the surplus estimates above, the City of Durango has evaluated its ability to meet the average daily demand and the average peak daily demand of its customers in the event the water supply from one or more of its water sources becomes disabled for an extended period of time due to potential contamination. The evaluation indicated that the City may not be able to meet the average daily demand of its customers if as few as one of the water sources became disabled for an extended period of time. The evaluation also indicated that the City of Durango may not be able to meet the average peak daily demand of its customers if as few as one of the water sources became disabled for an extended period of time. The ability of the City to meet either of these demands for an extended period of time is also affected by the amount of treated water the water system has in storage at the time a water source(s) becomes disabled.

The potential financial and water supply risks related to the long-term disablement of one or more of the community's water sources are a concern to the City of Durango. As a result, the City believes the development and implementation of this SWPP can help to reduce the risks posed by potential contamination of its water source(s). Additionally, the City of Durango has developed an emergency response plan or contingency plan (Appendix 3.1) to coordinate rapid and effective response to any emergency incident that threatens or disrupts the community water supply.

Glacier Club

Physical Characteristics

The Glacier Club is located in northern La Plata County, about 18 miles north of Durango, to the east of and adjacent to US Highway 550 (Figure 5). The Glacier Club obtains its drinking water from two wells within the Elbert Creek drainage (Table 9), as well as two surface water intakes, one on Elbert Creek and one on the Animas River (Table 10). Historically, water yields from the wells range from 75 gallons to 100 gallons per minute. Recharge is assumed to be comprised of precipitation, irrigation water, Goulding Creek and Mud Springs.

Soils in the Glacier Club's Source Water Protection Area are stony loams with slopes of 3-20%. Saturated hydraulic conductivity (Ksat), which is a measure of the ease with which pores in a saturated soil transmit water, ranges from 7 to 15 micrometers/second in these soils. Because these soils have moderately high to high Ksat, spills on top of the ground would be absorbed into the groundwater more quickly than in non-permeable soils (United States Department of Agriculture 2015).

Glacier Club has not petitioned the COWQCC for the establishment of a classified ground water area and associated site-specific ground water quality standards for its ground water intakes.

Figure 5 Entrance to Glacier Club.

Drinking Water Supply Operations

The Glacier Club water system, PWSID# CO 0134840, is supplied with water from four different sources. The system uses a blend of Elbert Creek, Animas River and Well D-1, as source water characteristics and customer demand dictate (Figure 6). The intake for the Animas River is located approximately 3 miles east of the intersection of County Road 200 and US Highway 550 at coordinates 37°29'18.28"N 107°48'17.22"W. The intake structure for Elbert Creek is located on County Road 200, ½ mile east of the intersection of County Road 200 and US Highway 550 at coordinates 37°29'27.14"N 107°48'17.22"W. Well D-1 is located at 527 County Road 200, coordinates 37°29'34.09"N 107°48'25.71"W. Well D-2 is located on Glacier Club Drive, ¼ mile north of the intersection of Glacier Club Drive and County Road 200, coordinates 37°29'31.21"N 107°48'22.40"W.

All source water is pumped to a distribution center adjacent to the Glacier Club water treatment facility, located at 527 County Road 200. From the distribution center, water can be sent to ponds for golf course irrigation or to a settling pond for domestic treatment. From the domestic settling pond, water is pumped into a conventional filtration treatment facility with a capacity of 400,000 gallons per day. The plant influent is first treated with chemical clarification aid, Ultrion 8185. The water and chemical mixture passes through a rapid mixer into a flocculation basin where two paddle mixers keep the created floc in suspension.

The flocculation basin then flows into an upward "settling tube" filter. The settling tubes are on a 60° angle. The settling tube filter basin then flows to a gravity filter media bed. The filter media is comprised of anthracite coal and varying sizes of gravel. The filter media is cleaned by a high flow rate backwash process. The backwash water is sent to waste water treatment facility. Water flows through the filter media into a 30,000 gallon clear well, where chlorine gas is introduced. The clear well also acts as a contact chamber. Two high service pumps transfer water from the clear well to a booster pump station. From the booster pump station, water is pumped into the distribution system and, depending on system demand, to the 1-million-gallon storage tank. This is the only storage facility on the system.

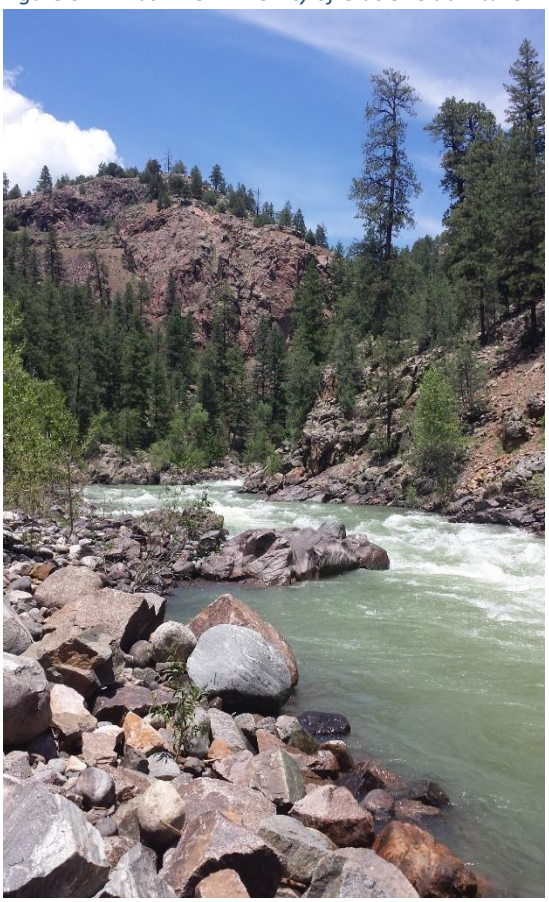
Table 9 Glacier Club groundwater supply information.

Water System Facility Name	Water System Facility Number	Depth	Yield	Year Drilled	Permit #	Permitted Amount
Well D-1	134840-003	65 feet	90 gpm	1974	19439-F	200 gpm
Well D-2	134840-004	47 feet	0 gpm	1981	29890-F	300 gpm

Table 10 Glacier Club surface water supply information.

Water System Facility Name	Water System Facility Number	Surface Water Source	Constructed Date	Appropriation Date	Appropriation Amount (af/yr)
Elbert Creek Intake	134840-002	Elbert Creek	1997	1973	400 acre feet
Animas River Intake	134840-005	Animas River	2003	1973	5 cfs

Figure 6 Animas River in vicinity of Glacier Club intake.



Water Supply Demand Analysis

The Glacier Club serves an estimated 580 connections; the number of users is seasonal and transient and therefore difficult to estimate. The water system has the current capacity to produce 400,000 gallons per day. Current estimates indicate that the average daily demand is approximately 136,986 gallons per day, and that the average peak daily demand is approximately 315,000 gallons per day. Using these estimates, the water system has a surplus average daily demand capacity of 263,014 gallons per day and a surplus average peak daily demand capacity of 85,000 gallons per day.

Based on the estimates above, Glacier Club has determined that if three of its water sources become disabled for an extended period of time due to contamination, the Glacier Club may not be able to meet the average daily demand of its customers. And in the event that one water source becomes disabled for an extended period of time, the Glacier Club may not be able to meet the average peak daily demand of its customers.

The ability of Glacier Club to meet either of these demands for an extended period of time is also affected by the amount of treated water the water system has in storage at the time a water source becomes disabled.

Glacier Club recognizes that potential contamination of its groundwater source(s) could result in having to treat the groundwater and/or abandon the water source if treatment proves to be ineffective or too costly. To understand the potential financial costs associated with such an accident, the Glacier Club estimates that it could cost $100,000 in today's dollars to replace one of its water sources (i.e., replacement of the intake structure and the associated infrastructure). Treatment costs, which can vary depending on the type of contaminant(s) that need(s) to be treated, were not included in this estimate.

The potential financial and water supply risks related to the long-term disablement of one or more of the system's water sources are a concern to the Glacier Club. As a result, the Glacier Club believes the development and implementation of a SWPP can help to reduce the risks posed by potential contamination of its water source(s). Additionally, the Glacier Club has developed an emergency response plan or contingency plan (Appendix 4.1) to coordinate rapid and effective response to any emergency incident that threatens or disrupts the community water supply.

Goodman Property Owners Association

Physical Characteristics

Goodman Property Owners Association (POA) is located in the Animas Valley in La Plata County, about 10.5 miles north of Durango on the east side of Highway 550. The system obtains its drinking water from two wells drilled into the alluvial aquifer of the Animas River valley (Table 11). Historically, water yields from these wells range from 35 gallons to 100 gallons per minute. Recharge is assumed to be comprised of precipitation, Hermosa Creek and Animas River flows, irrigation flows, ditch seepage and septic systems.

The soils in the valley floor are well drained sandy loams. Saturated hydraulic conductivity (Ksat), which is a measure of the ease with which pores in a saturated soil transmit water, ranges from 35 to 248 micrometers/second in these soils. Because these soils have high Ksat, spills on top of the ground would be absorbed into the groundwater faster than in non-permeable soils (United States Department of Agriculture 2015).

Goodman POA has not petitioned the COWQCC for establishment of a classified ground water area and associated site-specific ground water quality standards for its ground water intakes.

Drinking Water Supply Operations

Water Supply and Infrastructure

The Goodman Subdivision is served by two wells drilled into an unconfined aquifer of alluvial sediment about 1/2 mile from the Animas River east of Highway 550 North of Durango, Colorado at (Well #1) 37.41592, -107.83379, and (Well #2) 37.41589, -107.83408. The wells serve 27 building lots, about 100 people, and can produce enough water to also successfully irrigate individual yards.

Each well has its own 2 inch PVC line into the treatment building where they are individually metered, connected then into a single 2 inch PVC line, and chlorinated. The treated water is then sent to a 3,600 gallon in-ground storage cistern. Variable speed pressure pumps maintain a constant pressure out of the cistern of 65 psi to the distribution lines into the subdivision.

Well #1 (Northeast) is the main well serving the subdivision year round. It is 53 feet deep with the 5 hp pump set at 38 feet. It can produce and sustain 35 gallons per minute indefinitely with minimal impact on the level of the aquifer. It is about 100 feet from the treatment building to the northeast. Well #2 (West) is used mainly in the summer as a back-up well when outside irrigating can, at peak usage times, call for more water than Well #1 can produce without a drop in system pressure. Well #2 is about 30 feet from the treatment building, and is 80 feet deep with a 7.5 hp pump set at 74 feet. It can produce up to 100 gpm, also with minimal effect on the water table from which the water is drawn. If Well #1 loses pressure during peak flows, Well #2 will commence operation at a set pressure to augment that flow until Well #1 can again maintain the pressure on its own. Well #2 can also be valved in the treatment building to

supply water in the lead position if Well #1 ceases production. Well #2 will then run off a 40-60 psi pressure switch in the treatment building.

The distribution system consists of about 2,700 feet of 3 inch PVC mains that follow the edges of the subdivision roads, on easements that are 10 feet wide, except the frontage road that is 15 feet wide. Shut-off valves to individual properties are located along these easements.

Each well is wired to activate its own chlorine pump to supply disinfectant chlorine solution. One solution pump activated by Well #1 can inject enough to maintain an adequate chlorine residual even if Well #2 does come on during periods of peak usage. Manipulating the strength of the solution (weaker in the winter, stronger in the summer) simplifies the disinfecting process, although the residual will vary more depending whether Well # 2 is coming on as back-up to Well #1 or not. Regular Clorox bleach mixed to specific conditions in a 35-gallon solution barrel by the operator is used for disinfection purposes.

Table 11 Goodman Property Owner's Association groundwater supply information.

Water System Facility Name	Water System Facility Number	Total Depth of Well (ft)	Depth of Plain Casing (ft)	Depth of Perforation (ft)	Yield (gpm)	Year Drilled	Permit Number	Annual Permitted Amount (acre feet)
Well #1	134480-001	53	0-44	44-51	30	1971	45558-F	Not stated
Well #2	134480-002	80	0-60	60-80	100	1984	45557-F	20

Water Supply Demand Analysis

The Goodman POA serves an estimated 27 connections and approximately 100 residents and other users in the service area annually. The water system has the current capacity to produce 86,000 gallons per day. Current estimates indicate that the average daily demand is approximately 4,000 to 10,000 gallons per day (winter, spring), or 30,000 to 50,000 gallons per day (summer, fall). The average peak daily demand is approximately 30,000 gallons per day (peak summer month average over the last seven years). Using these estimates, the water system has a surplus average daily demand capacity of 82,000 gallons per day to 76,000 gallons per day (winter, spring) or 56,000 to 81,000 gallons per day (summer, fall), and a surplus average peak daily demand capacity of 56,000 gallons per day.

Based on the estimates above, the Goodman POA has determined that if both of its water sources become disabled for an extended period of time due to contamination, the water system may not be able to meet the average daily demand of its customers. And in the event that one of the water sources becomes disabled for an extended period of time, the system may not be able to meet the average peak daily demand of its customers (summer only).

The ability of Goodman POA to meet either of these demands for an extended period of time is also affected by the amount of treated water the water system has in storage at the time a water sources becomes disabled.

Goodman POA recognizes that potential contamination of its groundwater source(s) could result in having to treat the groundwater and/or abandon the water source if treatment proves to be ineffective or too costly. To understand the potential financial costs associated with such an accident, the system estimates that it could cost more than $20,000 in today's dollars to replace one of its water sources (i.e., replacement of the intake structure and the associated infrastructure). Treatment costs, which can vary depending on the type of contaminant(s) that need(s) to be treated, were not included in this estimate.

The potential financial and water supply risks related to the long-term disablement of one or more of the community's water sources are a concern to the Goodman POA. As a result, the system believes the development and implementation of a source water protection can help to reduce the risks posed by potential contamination of its water sources. Additionally, the Goodman POA has developed an emergency response plan or contingency plan (Appendix 5.1) to coordinate rapid and effective response to any emergency incident that threatens or disrupts the community water supply.

Hermosa Mobile Home Village

Physical Characteristics

Hermosa Mobile Home Village (MHV) is located in the Animas Valley, about 10 miles north of Durango on the east side of Highway 550. Hermosa Mobile Home Village obtains its drinking water from one well drilled into the alluvial aquifer of the Animas River valley (Table 12). Historically, water yields from this well is over 100 gallons per minute. Recharge is assumed to be comprised of precipitation, Hermosa Creek and Animas River flows, irrigation flows, ditch seepage and septic systems.

The soils in the valley floor are well drained sandy loams. Saturated hydraulic conductivity (Ksat), which is a measure of the ease with which pores in a saturated soil transmit water, ranges from 35 to 248 micrometers/second in these soils. Because these soils have high Ksat, spills on top of the ground would be absorbed into the groundwater faster than in non-permeable soils (United States Department of Agriculture 2015).

Hermosa MHV has not petitioned the COWQCC for establishment of a classified ground water area and associated site-specific ground water quality standards for its ground water intakes.

Drinking Water Supply Operations

Water Supply and Infrastructure

The Hermosa Mobile Home Village is served by one well drilled into an unconfined aquifer of alluvial sediment about 1/2 mile from the Animas River east of Highway 550 North of Durango, Colorado at 37.41096, -107.836889. The current well was drilled and put in service in the fall of 2007 when the original well began to deteriorate. This old well was kept as an emergency back-up source, but it is unlikely that it is capable of producing enough water to be effective in a long- term emergency.

The new well serves 57 mobile home and single family lots, about 120 people, and can produce a surplus of water in excess of 100 gallons per minute on a sustained basis. The system is sized to treat a peak of 70 gallons per minute, and an average 35 gallons per minute indefinitely. Less than 7 gallons per minute is normal usage winter or summer, since there is no culinary water allowed for outside irrigating as a matter of policy by the private owner.

The well pumps to an 1,800 gallon in-ground cistern, which doubles as a foundation for the treatment building built on top of it at ground level. This building also was constructed in 2007 as part of a major well/treatment upgrade. The water is metered, then chlorinated with a sodium hypochlorite solution as it comes in from the well, and is then stored in the cistern. Two variable speed submersible pumps pressurize the treated water to about 70 psi in a lead/lag configuration. The treated water then runs through two 80-gallon flow-through pressure tanks and then out of the building into the distribution system. The treatment building contains the flow meter, pump controllers, the chlorine solution tank and injection

pump, the pressure tanks, and controls for a visible outside alarm to alert that a low-water situation exists in the underground storage cistern. The distribution system consists of 1½ and 1¼ inch PVC mains in a loop through the MHV that have proven to be of an adequate size to supply water under all conditions during the MHV's entire existence.

Table 12 Hermosa MHV Groundwater Supply Information

Water System Facility Name	Water System Facility Number	Total Depth of Well (ft)	Depth of Plain Casing (ft)	Depth of Perforation (ft)	Yield (gpm)	Year Drilled	Permit Number	Annual Permitted Amount (acre feet)
Well 1R	134450-003	80	0 to 60	60-80	100	2007	66218-F	19.2

Water Supply Demand Analysis

The Hermosa MHV serves an estimated 57 connections and approximately 120 residents and other users in the service area annually. The water system has the current capacity to produce 50,000 gallons per day. Current estimates indicate that the average daily demand is approximately 5000 gallons per day, and that the average peak daily demand is approximately 7500 gallons per day. Using these estimates, the water system has a surplus average daily demand capacity of 45,000 gallons per day and a surplus average peak daily demand capacity of 42,500 gallons per day.

Based on the estimates above, the Hermosa MHV has determined that if the system's well becomes disabled for an extended period of time due to contamination, the water system may not be able to meet the average daily demand (nor the average peak daily demand) of its customers. The ability of Hermosa MHV to meet either of these demands for an extended period of time is also affected by the amount of treated water the water system has in storage at the time a water source(s) becomes disabled

Hermosa MHV recognizes that potential contamination of its groundwater source could result in having to treat the groundwater and/or abandon the water source if treatment proves to be ineffective or too costly. To understand the potential financial costs associated with such an accident, the water system estimates that it could cost more than $20,000 in today's dollars to replace its water source (i.e., replacement of the intake structure and the associated infrastructure). Treatment costs, which can vary depending on the type of contaminant(s) that need(s) to be treated, were not included in this estimate.

The potential financial and water supply risks related to long-term disablement of the community's water sources are a concern to Hermosa MHV. The water system believes the development and implementation of a SWPP can help to reduce the risks posed by potential contamination of its water source(s). Additionally, the Hermosa MHV has developed an emergency response plan or contingency plan (Appendix 6.1) to coordinate rapid and effective response to any emergency incident that threatens or disrupts the community water supply.

Purgatory Metro District

Physical Characteristics

Purgatory MD is located in northern La Plata County, about 26 miles north of Durango. It serves the Purgatory Resort and associated commercial and residential development. Purgatory MD maintains four wells drilled into the aquifer underlying the Purgatory Ski Area, located in the Purgatory Creek drainage (Table 13). Historically, water yields from these wells range from 300 gallons to 350 gallons per minute. Recharge is assumed to be comprised of precipitation.

Soils in the Purgatory MD's Source Water Protection Area are Clayburn-Heisspitz Complex and Tuckerville very stony sandy loam, with slopes of 15 to 55%. Saturated hydraulic conductivity (Ksat), which is a measure of the ease with which pores in a saturated soil transmit water, ranges from 5.5 to 40 micrometers/second in these soils (United States Department of Agriculture 2015).

Purgatory MD has not petitioned the COWQCC for establishment of a classified ground water area and associated site-specific ground water quality standards for its ground water intakes.

Table 13 Purgatory Metro District groundwater supply information.

Water System Facility Name	Water System Facility Number	Total Depth of Well (ft)	Depth of Plain Casing (ft)	Depth of Perforation (ft)	Yield (gpm)	Year Drilled	Permit Number	Annual Permitted Amount (acre feet)
Well #4	134750-004	396	396	Unknown	200	1973	W-1908-78	403
Well #5	134750-005	620	620	Unknown	130	1984	10CW40	307
Well #1	Not potable	290	290	Unknown	61	1971	08CW55	97.5
Well #6	Not online							

Drinking Water Supply Operations

Water Supply and Infrastructure

The Purgatory MD's water supply is entirely sourced from two wells located on USFS land adjacent to the Purgatory Resort. The wells are 400 and 600 feet deep and can provide sustained production of 200 and 130 gpm, respectively. Untreated water from each well is piped to a gas chlorination system via a 6-inch supply line and from there to two 750,000-gallon storage tanks. From the tanks, treated water is delivered to the system via a 12-inch ductile iron pipe.

The water system currently operates in three pressure zones (high, medium and low) where pressures are regulated by two central multi-valve pressure reducing stations. Distribution piping is primarily 8-inch diameter and is made up of ductile iron and C-900 plastic material. A small section of water line is HDPE material.

The system currently serves approximately 600 taps that are primarily residential, with a small number of commercial facilities. The system is able to deliver potable water to upwards of 1,200 taps at maximum production.

As the wells, storage tanks, and certain distribution piping are located on USFS land, the Purgatory MD maintains a permit with the USFS for operating and maintaining those facilities on USFS land.

Water Supply Demand Analysis

The Purgatory MD serves an estimated 550 connections and approximately 550 residents and other users in the service area annually, including about 100,000 summer visitors and 250,000 winter visitors. The water system has the current capacity to produce 1.5 million gallons per day. Current estimates indicate that the average daily demand is approximately 279 gallons per day per Equivalent Residential Unit (EQR), and that the average peak daily demand is approximately 420 gallons per day per EQR. Using these estimates, the water system has a surplus average daily demand capacity of 1.5 million gallons per day and a surplus average peak daily demand capacity of 1.5 million gallons per day.

Based on the estimates above, the Purgatory MD has determined that if two sources become disabled for an extended period of time due to contamination, the Purgatory MD may not be able to meet the average daily demand (nor the average peak daily demand) of its customers. The ability of Purgatory MD to meet either of these demands for an extended period of time is also affected by the amount of treated water the water system has in storage at the time a water source becomes disabled.

Purgatory MD recognizes that potential contamination of its groundwater source(s) could result in having to treat the groundwater and/or abandon the water source if treatment proves to be ineffective or too costly. To understand the potential financial costs associated with such an accident, the Purgatory MD estimates that it could cost $200,000 in today's dollars to replace one of its water sources (i.e., replacement of the intake structure and the associated infrastructure). Treatment costs, which can vary depending on the type of contaminant(s) that need(s) to be treated, were not included in this estimate.

The long-term disablement of one or more of the Purgatory MD sources could entail financial and water supply risks. As a result, the system believes the development and implementation of a SWPP can help to reduce the risks posed by potential contamination of its water sources. Additionally, the Purgatory MD has developed an emergency response plan or contingency plan (Appendix 7.1) to coordinate rapid and effective response to any emergency incident that threatens or disrupts the community water supply.

Town of Silverton

Physical Characteristics

The Town of Silverton is located in San Juan County, just upstream of the confluence of Mineral Creek with the Animas River. Of the partnering ADWA public water suppliers, the Town is the closest to the Animas headwaters, with an elevation of 9,318 ft. The Town obtains its drinking water from three headwater streams: Bear Creek, Boulder Creek and Galvin Creek (Table 14). Bear Creek is a tributary of South Mineral Creek and Boulder Creek and the small streams are tributaries of the Animas River. The land within the watersheds of these creeks is primarily public land managed by the San Juan National Forest for Bear Creek and BLM's Tres Rios Field Office for Boulder and Galvin Creeks. There are no roads or formal trails present in either watershed, upstream of the intakes. The land cover in both drainages is largely alpine vegetation, with some spruce/fir subalpine forest.

Drinking Water Supply Operations

Water Supply and Infrastructure

The Town of Silverton source water supply comes from surface water diversions on three different streams: Bear Creek, Boulder Creek and Galvin Creek. The Bear Creek intake is located off CO Highway 550 at latitude [redacted], longitude [redacted]. The Boulder and Galvin Creek intake is located off of San Juan County Road 110 at latitude [redacted], longitude [redacted].

The Bear Creek water line is transmitted through a ten-inch pipe that reduces to six inches by the time it reaches the plant. The Boulder/Galvin Creek line is transmitted through an eight-inch pipe. The water is treated by direct filtration. The system can treat 300 gallons per minute producing up to 43,200 gallons per day. Chlorination is used to ensure that regulations for disinfection are met.

From the plant the water is piped to two storage tanks with a combined storage capacity of 800,000 gallons. Both tanks serve the same distribution system and draw down simultaneously with demand.

Table 14 Town of Silverton surface water supply information.

Water System Facility Name	Water System Facility Number	Surface Water Source	Constructed Date	Appropriation Date	Appropriation Amount (af/yr)
Bear Creek Intake	156600-003	Bear Creek	7/14/1920	11/8/1923	7cfs
Boulder Creek Intake	156600-002	Boulder Creek	12/31/1883	12/31/1883	4.65cfs
Galvin Creek Intake	156600-004	Galvin Creek	3/31/1889	3/31/1889	4.65cfs

Water Supply Demand Analysis

The Town of Silverton serves an estimated 510 connections and approximately 1,515 residents and other users in the service area annually. The water system currently has the capacity to produce 432,000 gallons per day. Current estimates by the water system indicate that the

average daily demand is approximately 200,000 gallons per day, and that the average peak daily demand is approximately 300,000 gallons per day. Using these estimates, the water system has a surplus average daily demand capacity of 232,000 gallons per day and a surplus average peak daily demand capacity of 132,000 gallons per day.

Using the surplus estimates above, the Town of Silverton has evaluated its ability to meet the average daily demand and the average peak daily demand of its customers in the event the water supply from one or more of its water sources becomes disabled for an extended period of time due to potential contamination. The evaluation indicated that the Town may not be able to meet the average daily demand of its customers if as few as one of the water sources became disabled for an extended period of time. The evaluation also indicated that town may not be able to meet the average peak daily demand of its customers if as few as two of the water sources became disabled for an extended period of time. The ability of the Town of Silverton to meet either of these demands for an extended period of time is also affected by the amount of treated water the water system has in storage at the time a water source becomes disabled.

The potential financial and water supply risks related to the long-term disablement of one or more of the community's water sources are a concern to the Steering Committee. As a result, the Steering Committee believes the development and implementation of this SWPP for ADWA water suppliers can help to reduce the risks posed by potential contamination of its water sources. Additionally, the Town of Silverton has developed an emergency response plan or contingency plan (Appendix 8.1) to coordinate rapid and effective response to any emergency incident that threatens or disrupts the community water supply.

OVERVIEW OF COLORADO'S SWAP PROGRAM

Source water assessment and protection came into existence in 1996 as a result of Congressional reauthorization and amendment of the Safe Drinking Water Act. The 1996 amendments required each state to develop a source water assessment and protection (SWAP) program. The COWQCD, an agency of the CDPHE, assumed the responsibility of developing Colorado's SWAP program. The SWAP program protection plan is integrated with the Colorado Wellhead Protection Program that was established in amendments made to the federal Safe Drinking Water Act (SDWA, Section 1428) in 1986.

Colorado's SWAP program is an iterative, two-phased process designed to assist PWSs in preventing potential contamination of their untreated drinking water supplies. The two phases include the Assessment Phase and the Protection Phase as depicted in the upper and lower portions of Figure 7, respectively.

Figure 7 Source water assessment and protection phases.

Source Water Assessment Phase

The Assessment Phase for all PWSs consists of four primary elements:

1. Delineating the source water assessment area for each of the drinking water sources;
2. Conducting a contaminant source inventory to identify potential sources of contamination within each of the source water assessment areas;
3. Conducting a susceptibility analysis to determine the potential susceptibility of each public drinking water source to the different sources of contamination;
4. Reporting the results of the source water assessment to the PWSs and the public.

The Assessment Phase involves understanding where each PWS's water comes from, what contaminant sources potentially threaten those water sources, and how susceptible each source is to potential contamination. The susceptibility of an individual water source is analyzed by examining the properties of its physical setting and potential contaminant threats. The resulting analysis calculations represent an estimate of how susceptible each water source is to potential contamination. In 2004, a Source Water Assessment Report was provided to each PWS in Colorado that outlines the results of this Assessment Phase (Appendices 1-8).

Source Water Protection Phase

The Protection Phase is a voluntary, ongoing process in which all PWSs are encouraged to voluntarily employ preventative measures to protect their water supply from the potential sources of contamination it is most susceptible to. The Protection Phase can be used to take action to avoid unnecessary treatment or replacement costs associated with potential contamination of the untreated water supply. Source water protection begins when local decision-makers use the source water assessment results and other information as a starting point to develop a protection plan. As depicted in the lower portion of Figure 7, the source water protection phase for all PWSs consists of four primary elements:

1. Involving local stakeholders in the planning process;
2. Developing a comprehensive protection plan for all of their drinking water sources;
3. Implementing the protection plan on a continuous basis to reduce the risk of potential contamination of the drinking water sources; and
4. Monitoring the effectiveness of the protection plan and updating it accordingly as future assessment results indicate.

The water systems and the community recognize that the Safe Drinking Water Act grants no statutory authority to the CDPHE or to any other state or federal agency to force the adoption or implementation of source water protection measures. This authority rests solely with local communities and local governments. The source water protection phase is an ongoing process as indicated in Figure 7. The evolution of the SWAP program is to incorporate any new information provided by the PWSs and update the protection plan accordingly.

SOURCE WATER PROTECTION PLAN DEVELOPMENT

Source Water Assessment Report Review

Each ADWA public water supplier has reviewed the Source Water Assessment Report prepared for them, along with the Steering Committee. These Assessment results were used as a starting point to guide the development of appropriate management approaches to protect the suppliers' source waters from potential contamination. Appendices 1-8 include the Source Water Assessment Report for each participating water system. These can also be obtained by contacting the individual system or by downloading a copy from the CDPHE's SWAP program website located at: http://www.colorado.gov/cs/Satellite/CDPHE-WQ/CBON/1251596793639.

Defining the Source Water Protection Area

A Source Water Protection Area (SWPA) is the surface and subsurface areas from which contaminants are reasonably likely to reach a water source. The purpose of delineating a SWPA is to determine the recharge area that supplies water to a public water source. Delineation is the process of identifying and mapping the area around a pumping well that supplies water to the well, or the drainage basin that supplies water to a surface water intake. The size and shape of the area depends on the characteristics of the aquifer, the well, or the watershed.

The Source Water Assessment Area (SWAA) that was delineated as part of each water system's Source Water Assessment Report provides the basis for understanding where the system's source water and potential contaminant threats originate, and where the community has chosen to implement its source water protection measures in an attempt to manage the susceptibility of their source water to potential contamination.

After carefully reviewing their Source Water Assessment Reports and the CDPHE's delineation of the SWAA for each PWS's sources, the ADWA Steering Committee chose to modify these areas for this SWPP. The source water protection planning area is defined as the whole Animas River watershed upstream of the lowest elevation water source, i.e. the City of Durango's Animas River intake at Santa Rita Park. Within this overall planning area, the SWPAs for each water system's sources were delineated based on the group's review and discussion of the original SWAAs. The adjusted boundaries incorporated corrections to source locations, the group's best local understanding of the sources of recharge (e.g. surface water streams and drainages for alluvial aquifers) direction of flow, as well as concerns for specific potential sources of contamination in the vicinity of each well or intake.

ADWA Source Water Protection Areas

Animas Water Company

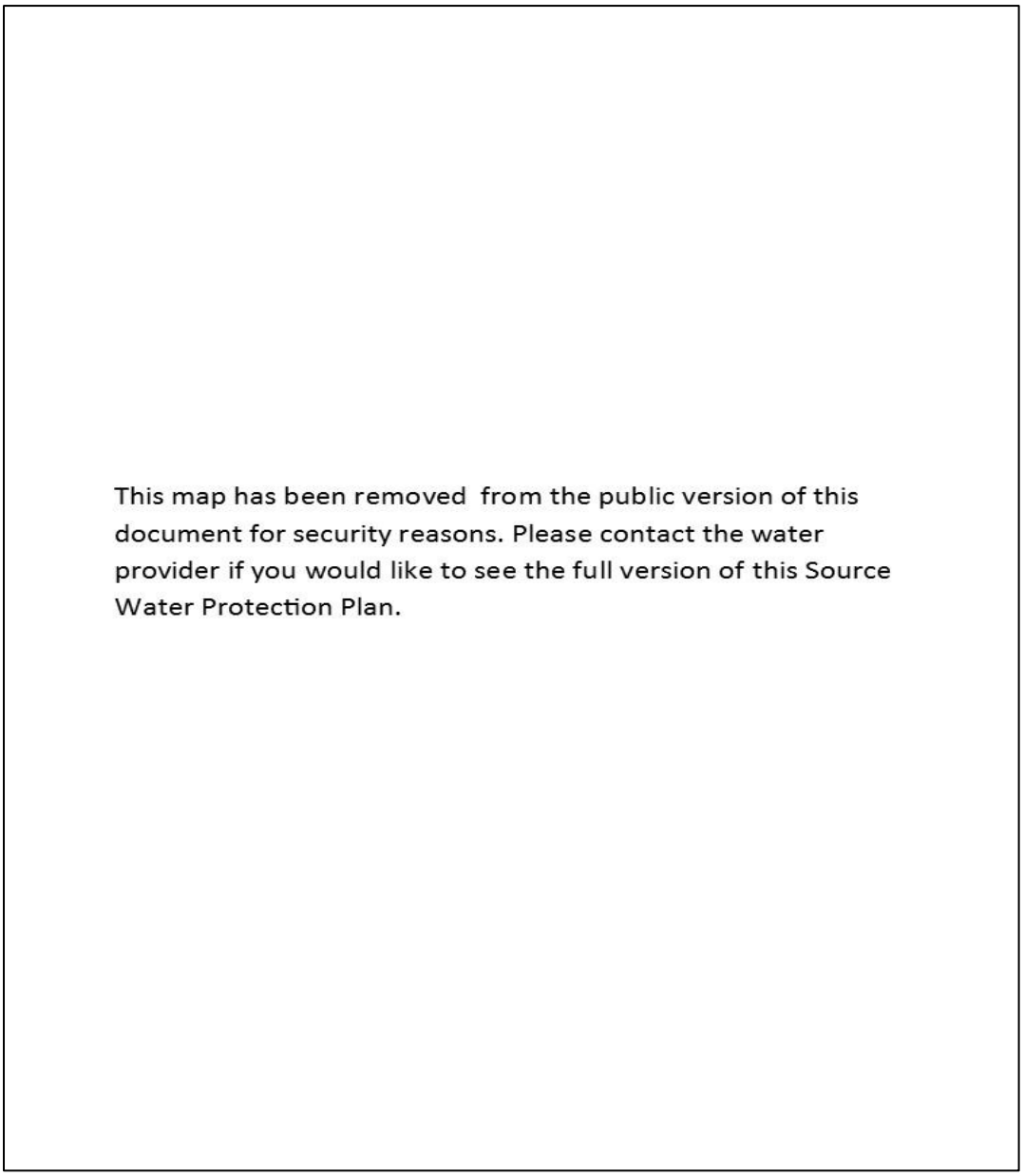
The Animas Water Company SWPA for its four wells (Figure 8) is defined as:

Zone 1 is defined as a 500-foot radius around the wellhead.

Zone 2 is defined by CDPHE's calculation of the distance from the wellhead through which a parcel of water travels over a two-year time period or 2-year time of travel (TOT).

Zone 3 is defined by CDPHE's calculation of the 5-year TOT.

Figure 8 Source Water Protection Area for Animas Water Company.



Association of Owners, Blue Sky Ranch, Inc.

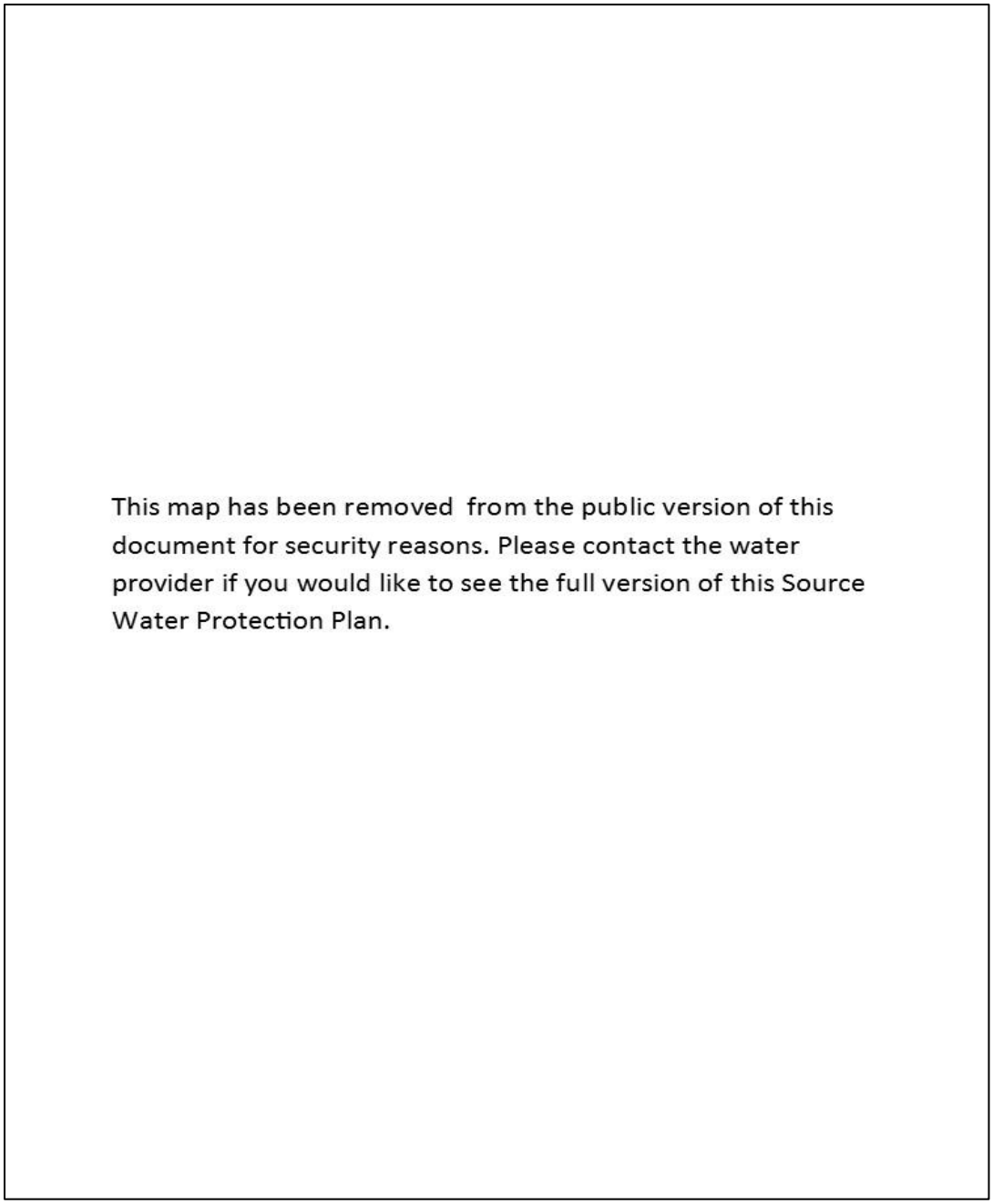
Blue Sky Ranch's SWPA for its two wells (Figure 9) is defined as:

Zone 1 is defined as a 500-foot radius around each wellhead.

Zone 2 is based on CDPHE's calculation of a 2-year TOT for the Animas WC.

Zone 3 is based on CDPHE's calculation of a 5-year TOT for the Animas WC. Zone 2 and 3 assume that the extent and direction of groundwater flow is similar to that of Animas Water Company.

Figure 9 Source Water Protection Area for Blue Sky Ranch.



City of Durango

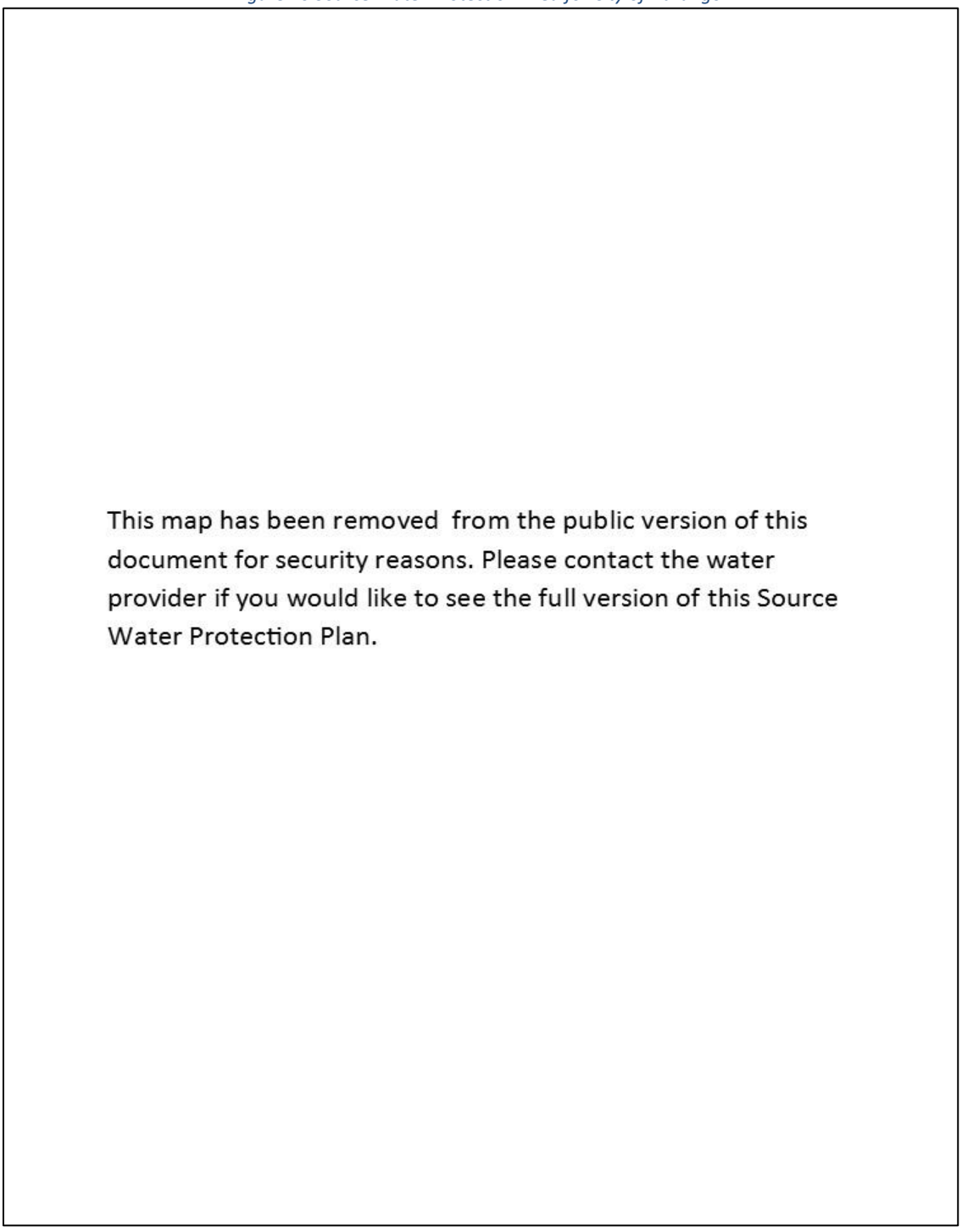
The City of Durango's SWPA for its Animas River surface water intake (Figure 10) is defined as:

Zone 1 is defined as a 1,000-foot-wide buffer on either side of the river and its tributaries.

Zone 2 extends 1/4 mile beyond the boundary of Zone 1 (i.e. 2,320 feet from the stream).

Zone 3 is the entire watershed upstream of the Animas intake structure.

Figure 10 Source Water Protection Area for City of Durango.



Glacier Club

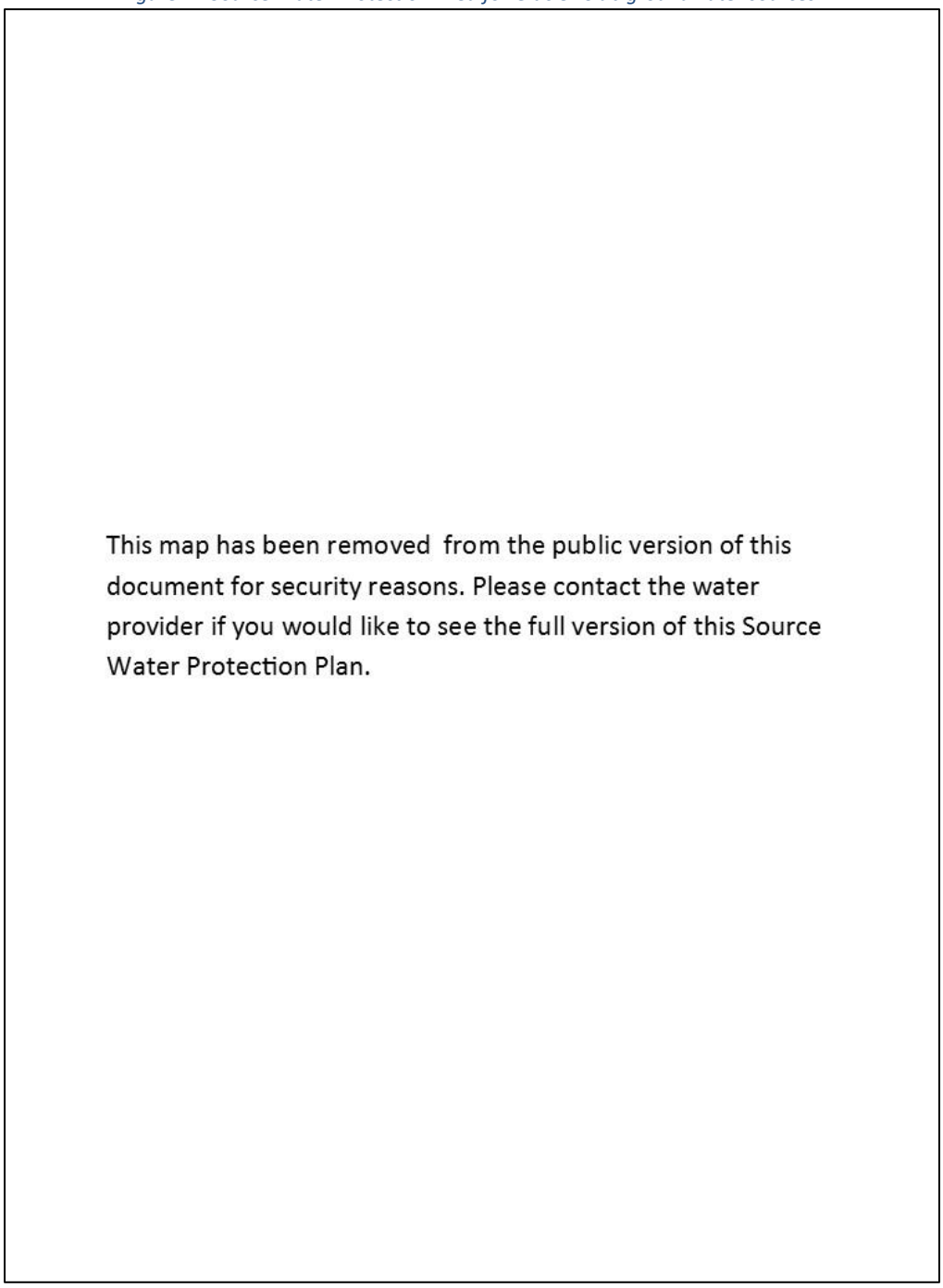
Glacier Club's SWPA for its wells (Figure 11) is defined as:

Zone 1 is defined as a 500-foot radius around each wellhead.

Zone 2 is based on CDPHE's calculation of a 2-year TOT, but expanded to the northwest.

Zone 3 is based on CDPHE's calculation of a 5-year TOT, but expanded to the northwest 1,000 feet beyond Goulding Creek.

Figure 11 Source Water Protection Area for Glacier Club groundwater sources.



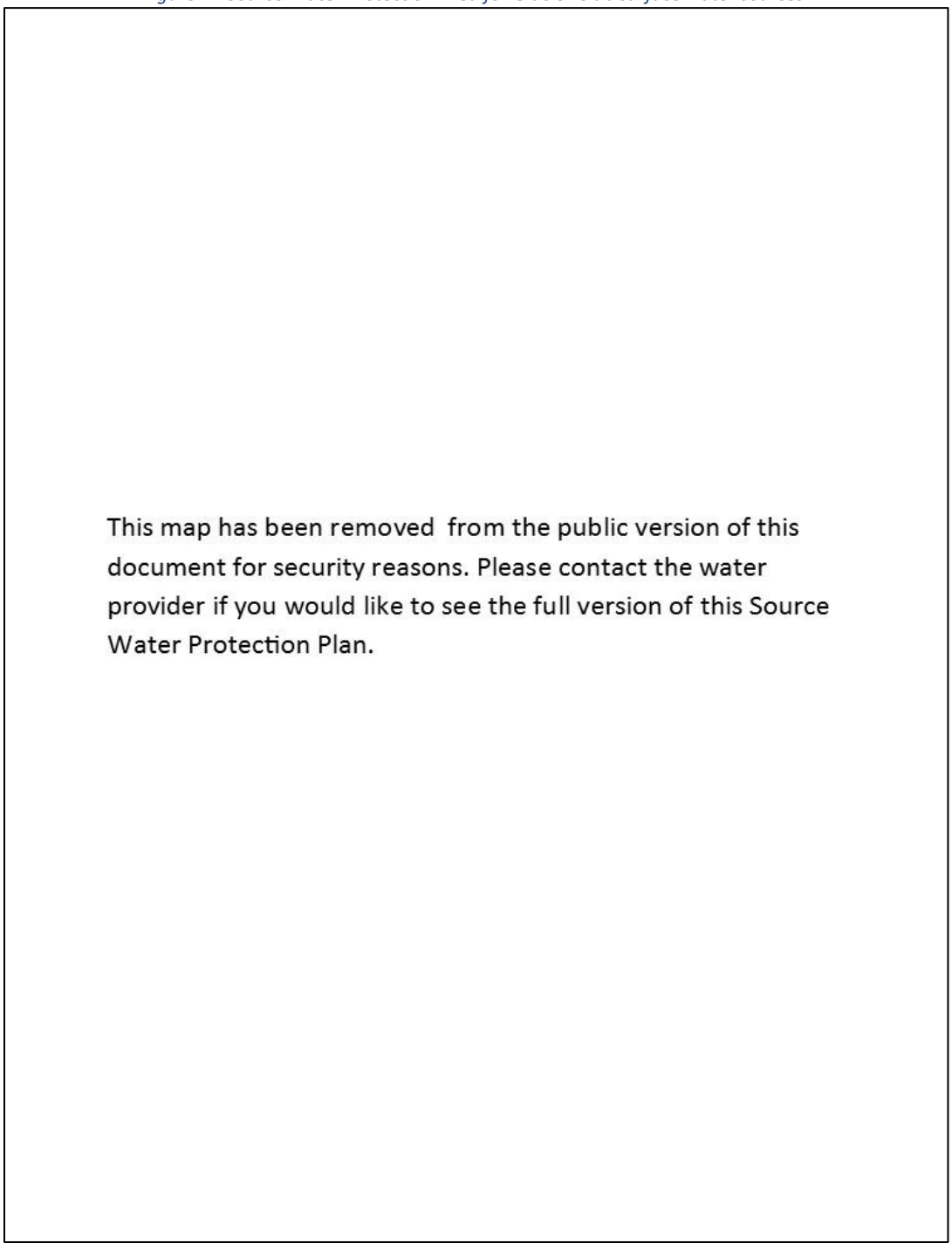
Glacier Club's SWPA for its surface water intakes (Figure 12) is defined as:

Zone 1 is defined as a 1,000-foot-wide band on either side of the stream.

Zone 2 extends 1/4 mile beyond the boundary of Zone 1 (2,320 feet from the stream).

Zone 3 is defined as the entire watershed, upstream of the Animas Intake Structure and the Elbert Creek Intake.

Figure 12 Source Water Protection Area for Glacier Club surface water sources.



Hermosa MHV

The Hermosa MHV SWPA for its well (Figure 13) is defined as:

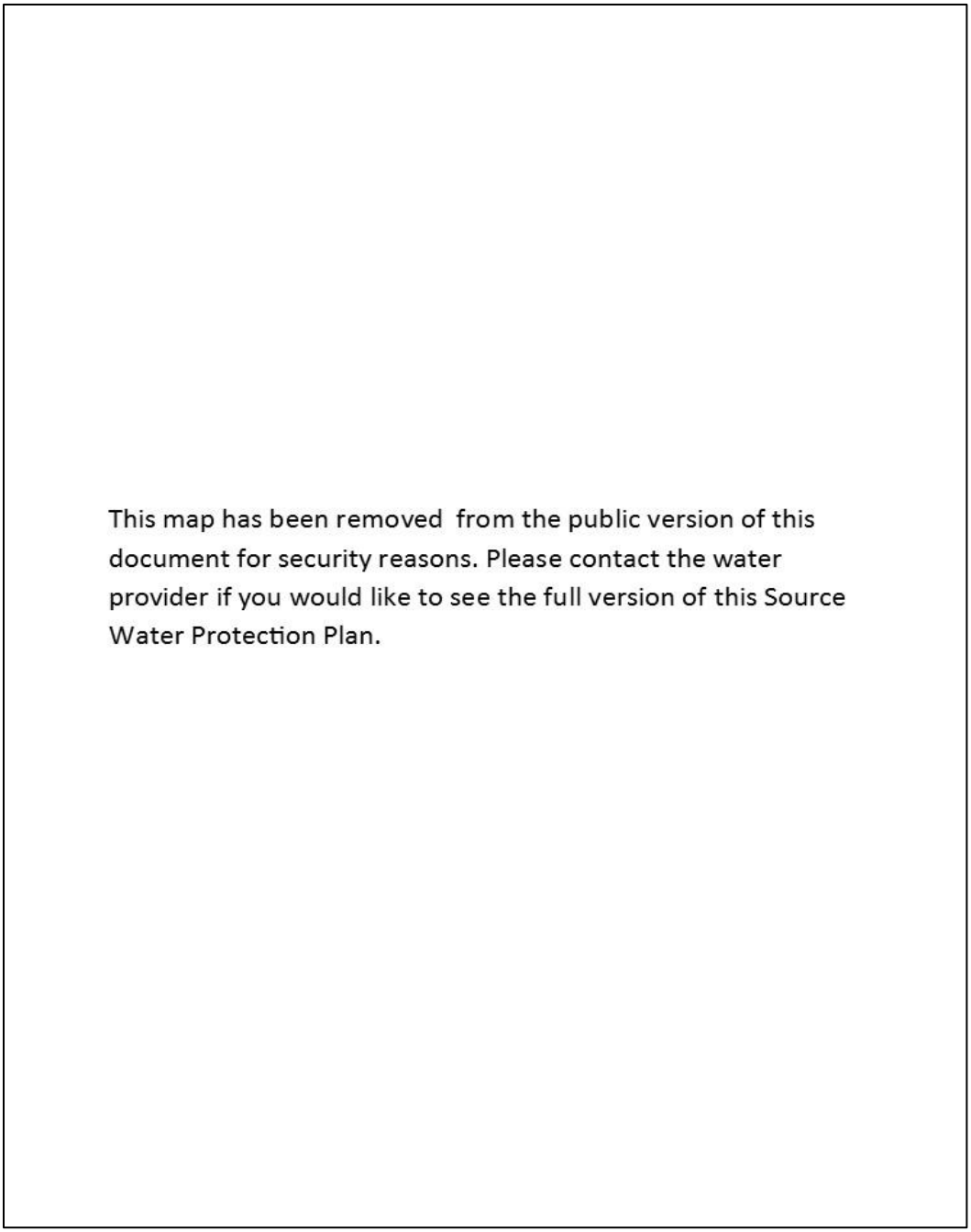
Zone 1 is defined as a 500-foot radius around the wellhead.

Zone 2 is based on CDPHE's calculation of a 2-year TOT for the Animas Water Company.

Zone 3 is based on CDPHE's calculation of a 5-year TOT for the Animas Water Company.

Zone 2 and 3 assume that the extent and direction of groundwater flow is similar to that of Animas Water Company.

Figure 13 Source Water Protection Area for Hermosa MHV.



Goodman POA

The Goodman POA SWPA for its two wells (Figure 14) is defined as:

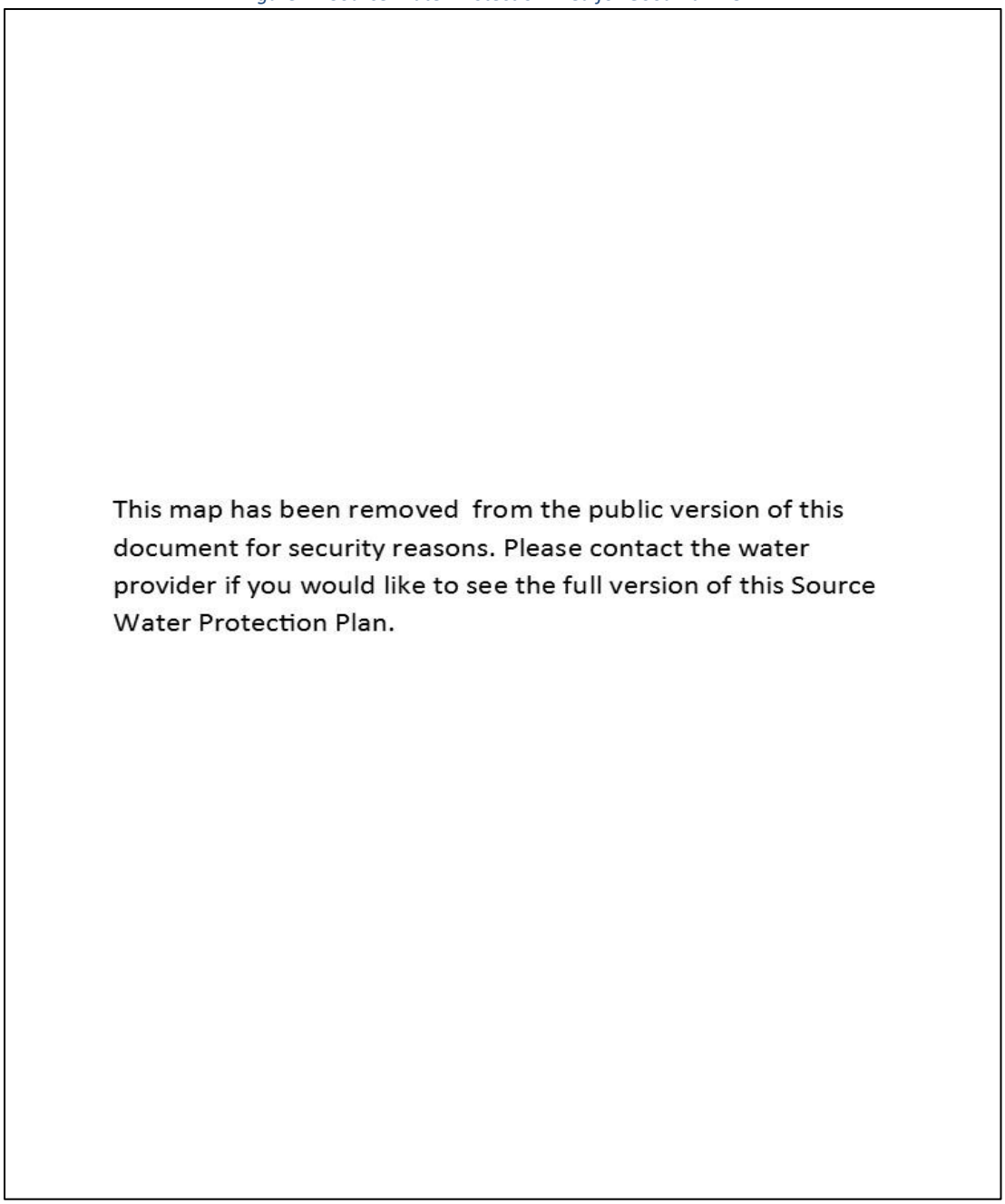
Zone 1 is defined as a 500-foot radius around the wellhead.

Zone 2 is based on CDPHE's calculation of a 2-year TOT for the Animas Water Company.

Zone 3 is based on CDPHE's calculation of a 2-year TOT for the Animas Water Company.

Zones 2 and 3 assume that the extent and direction of groundwater flow is similar to that of Animas Water Company, although they are centered on Hermosa Creek.

Figure 14 Source Water Protection Area for Goodman POA.



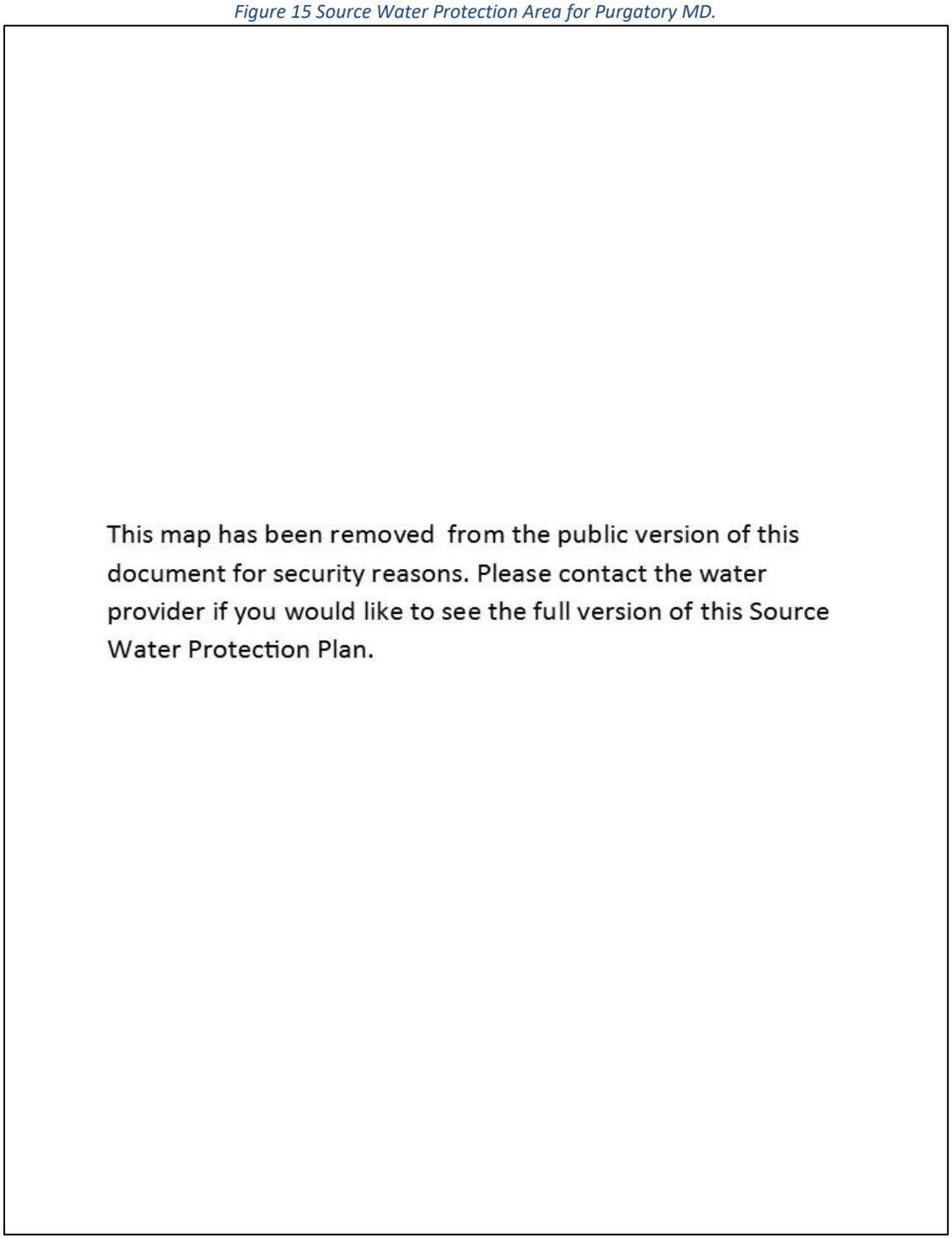
Purgatory Metro District

The Purgatory MD SWPA (Figure 15) is defined as:

Primary Zone is defined as a 1000-foot radius around each wellhead, to include all commercial development at the base area of Purgatory Ski Area.

Secondary Zone is the watershed boundary of Purgatory Creek, upstream of Highway 550.

Figure 15 Source Water Protection Area for Purgatory MD.



Town of Silverton

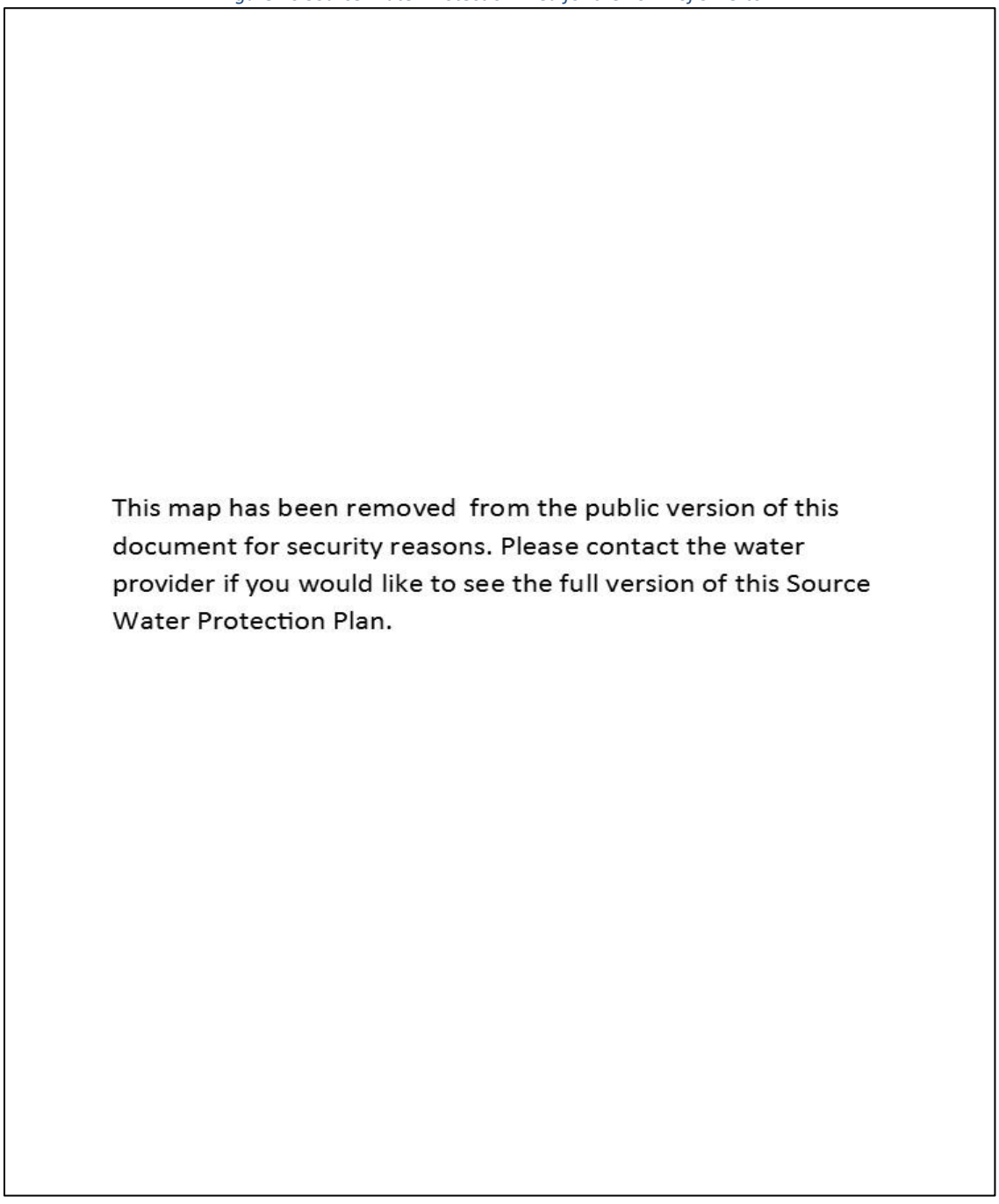
The Town of Silverton's SWPA for its Bear, Boulder and Galvin Creek surface water intakes (Figure 16) is defined as:

Zone 1 is defined as a 1,000-foot-wide band on either side of the stream upstream of each intake.

Zone 2 extends 1/4 mile beyond the boundary of Zone 1 (2,320 feet from the stream).

Zone 3 is made up by the remainder of the watershed boundary upstream of the intake.

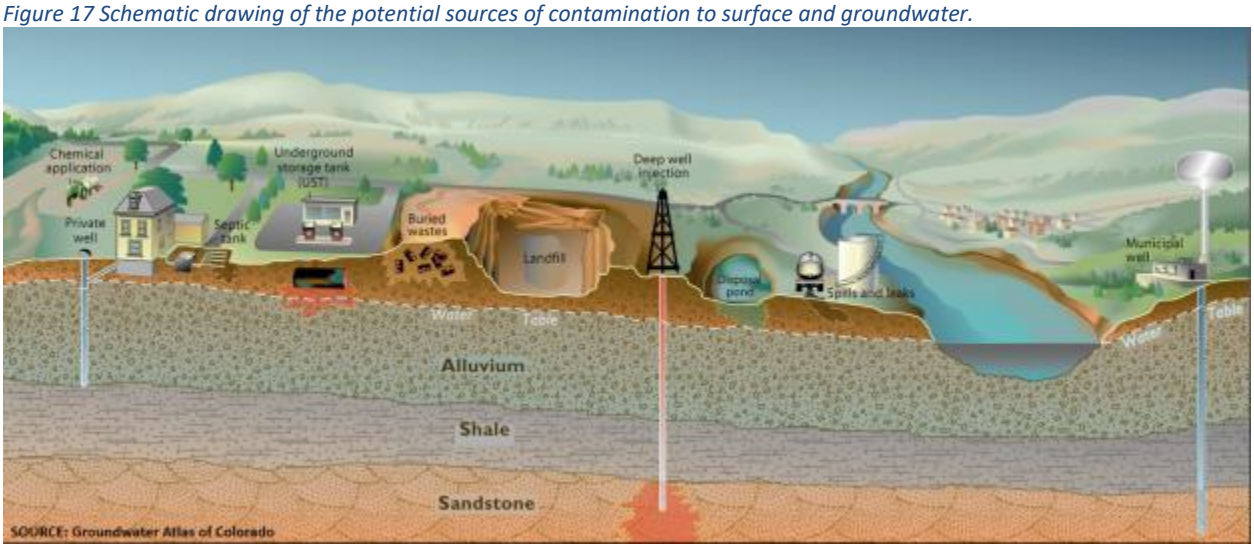
Figure 16 Source Water Protection Area for the Town of Silverton.



Potential Contaminant Source Inventory and Other Issues of Concern

Many types of land uses have the potential to contaminate source waters: spills from tanks, trucks, and railcars; leaks from buried containers; failed septic systems, buried or injected wastes underground, use of fertilizers, pesticides, and herbicides, road salting, as well as urban and agricultural runoff (Figure 17). While catastrophic contaminant spills or releases can wipe out a water resource, groundwater degradation can result from a plethora of small releases of harmful substances. According to the USEPA, nonpoint-source pollution (when water runoff moves over or into the ground picking up pollutants and carrying them into surface and groundwater) is the leading cause of water quality degradation (Ground Water Protection Council 2008).

Figure 17 Schematic drawing of the potential sources of contamination to surface and groundwater.



In 2001 – 2002, as part of the Source Water Assessment Report, a contaminant source inventory was conducted by the CDPHE to identify selected potential sources of contamination that might be present within the source water assessment areas. Discrete[2] contaminant sources were inventoried using selected state and federal regulatory databases including: mining and reclamation, oil and gas production, above and underground petroleum tanks, Superfund sites, hazardous waste generators, solid waste disposal, industrial and domestic wastewater dischargers, and water well permits. Dispersed contaminant sources were inventoried using then recent land use / land cover and transportation maps of Colorado, along with selected state regulatory databases. The contaminant inventory was completed by mapping the potential contaminant sources using a Geographic Information System (GIS).

The State's contaminant source inventory consisted of draft maps, along with a summary of the discrete and dispersed contaminant sources inventoried within the source water assessment area. The ADWA PWSs were asked, by CDPHE, to review the inventory information, field-verify

[2] The WQCD's assessment process used the terms "discrete" and "dispersed" potential sources of contamination. A discrete source is a facility that can be mapped as a point, while a dispersed source covers a broader area such as a type of land use (crop land, forest, residential, etc.).

selected information about existing and new contaminant sources, and provide feedback on the accuracy of the inventory. Through this SWPP, the eight ADWA water systems are reporting their findings to the CDPHE.

After review and discussion of current databases, and with input from local stakeholders, the ADWA Steering Committee developed the following more accurate and current inventory of contaminant sources, as well as other issues of concern, located within the SWPAs of the eight participating water systems (see Appendices 1-8; Table 15).

- Abandoned Wells
- Drought
- Durango & Silverton Narrow Gauge Railroad and Hermosa Yard
- Emergency Backup Power
- Existing/Abandoned Mine Sites and Metals
- Fire (including ash from regional fire)
- Fuel Storage Tanks (including Conoco)
- Ditches
- Geothermal Wells
- Residential Issues (fertilizers, pesticides, hazardous waste disposal, structural fires)
- Roads and Hazmat Transportation
- Sanitary Sewer Line Breaks
- Security/Vandalism
- Skiers/Hikers
- Snowmobiles
- Weed and Pest Management Activities

Upon completion of these potential contaminant source inventories, each water system decided to adopt their new inventory in place of the original contaminant source inventory provided by the CDPHE.

Priority Strategy

After developing the contaminant source inventory and list of issues of concern that are more accurate, complete, and current, each ADWA water system prioritized among the PSOC's and issues of concern pertinent to their water sources. These priority levels are helpful in guiding the implementation of the Best Management Practices (BMPs) outlined in this SWPP (Tables 28-35).

The strategy which each water system used is based on an assessment of the following four criteria:

1. **Controllability –** Whether each PSOC or issue of concern is in the water system's Direct Control (i.e. water system can take direct measures to prevent), Indirect Control (i.e.

water system cannot directly control the issue, but can work with another person or entity to take measures to prevent) or No Control (i.e. PSOC or issue of concern is outside the control of the PWS and other entities).

2. **Impact to Water System -** Whether the impact to the water system for each PSOC or issue of concern is Minor, Moderate, or Major. The following descriptions provide a framework to estimate the impact to the PWS (this is taken directly from the SWAP Risk Assessment Matrix in Figure 18).

    - Major - substantial or irreversible damage to the water source(s). This could include a loss of use for an extended period of time, the need for new treatment technologies, and/or the replacement of existing water source(s).
    - Moderate - moderate damage to the water source(s). This could include the loss of use for an extended period of time and/or the need for increased monitoring and/or maintenance activities.
    - Minor - damages resulting in minimal, recoverable, or localized efforts. This could include temporarily shutting off an intake or well and/or the issuance of a boil order.

3. **Probability of Occurrence -** Whether the probability of occurrence for each PSOC or issue of concern is Unlikely, Possible, Likely, or Very Likely. The following descriptions provide a framework to estimate the relative probability that damage or loss of the water source would occur within one to ten years (this is taken directly from the SWAP Risk Assessment Matrix in Figure 18).

    - Very Likely - nearly certain occurrence (>90%)
    - Likely - likely occurrence (>50% to <90%)
    - Possible - possible occurrence (>10% to <50%)
    - Unlikely - unlikely occurrence (<10%)

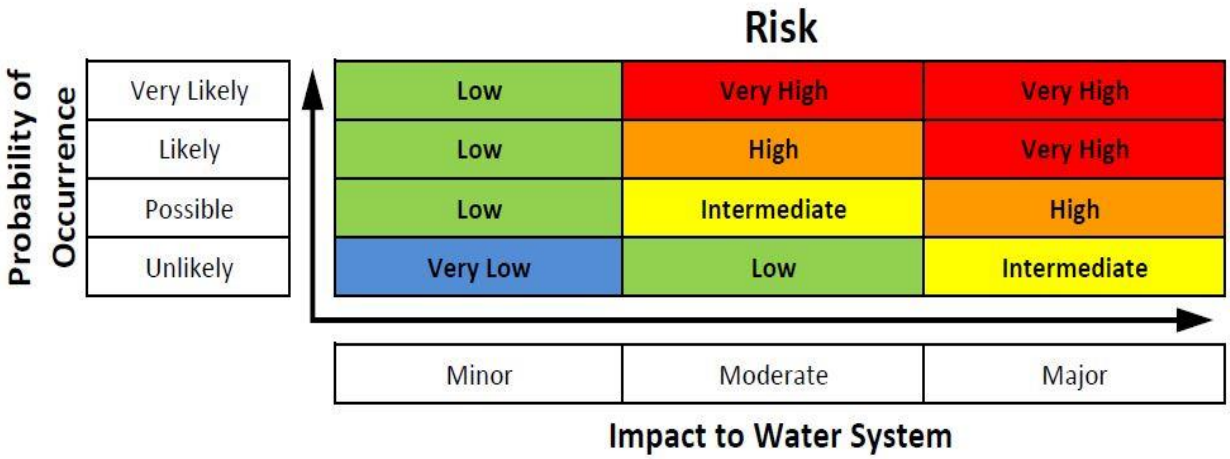
4. **Risk –** Whether the risk for each PSOC or issue of concern is Very Low, Low, Intermediate, High, or Very High (this is taken directly from the SWAP Risk Assessment Matrix in Figure 18). These risk assessments correspond to the following numerical ranks which can be used to assign a priority for focus:

    - 1 = Very High Risk
    - 2 = High Risk
    - 3 = Intermediate Risk
    - 4 = Low Risk
    - 5 = Very Low Risk

Each water system used the above criteria to rank each potential contaminant source and issue of concern that they had identified as pertinent to their system. In some cases, upon reviewing

the rank assigned by the risk level, a system decided to adjust the assigned ranks in order to give greater priority to a source or concern that they felt did not rank-out at a level that reflected their overall level of concern, due to relative levels of controllability or other factors.

Figure 18 Source Water Protection plan risk assessment matrix.



The highest priority concerns identified by the ADWA systems included the following:

- Roads and Hazardous Materials Transportation
- Wildfire
- Abandoned private wells
- Fuel Storage Tanks
- Security/Vandalism

Table 15 shows the PSOCs and Issues of Concern identified by the Steering Committee, with the priorities assigned by each water system.

Table 15 Potential Sources of Contamination (PSOCs) and Issues of Concern identified and prioritized by the ADWA public water suppliers.

PSOC's and Issues of Concern	Animas Water Company	Blue Sky Ranch	City of Durango	Glacier Club	Goodman Property Owners Association	Hermosa Mobile Home Village	Purgatory Metro District	Town of Silverton
Abandoned Wells	1	3			5	5		
Ditches	6	4						
Drought			3	4				
Durango & Silverton Narrow Gauge Railroad and Hermosa Yard					2	2		
Emergency Backup Power	7	7	2	3	3	6	2	
Existing/Abandoned Mine Sites and Metals			4	2				2
Wildfire (including ash from regional fire)			5	1			3	1
Fuel Storage Tanks (including Conoco)	4					1	4	
Geothermal Wells		2						
Residential Issues (fertilizers, pesticides, hazardous waste disposal, structural fires)	2	5			4	4		
Roads and Hazmat Transportation	5	1	1	6	1			
Sanitary Sewer Line Breaks	3	6	7			3		
Security/Vandalism		8	6		6		1	
Skiers/Hikers								3
Snowmobiles								4
Weed and Pest Management Activities				5				

Susceptibility Analysis of Water Sources

Each ADWA public water supplier's Source Water Assessment Report(s) contained a susceptibility analysis[3] to identify how susceptible an untreated water source could be to contamination from potential sources of contamination inventoried within its source water assessment area. The analysis looked at the susceptibility posed by individual potential contaminant sources and the collective or total susceptibility posed by all of the potential contaminant sources in the source water assessment area. The CDPHE developed a susceptibility analysis model for surface water sources and ground water sources under the influence of surface water, and another model for groundwater sources. Both models provided an objective analysis based on the best available information at the time of the analysis. The two main components of the CDPHE's susceptibility analysis are:

1. **Physical Setting Vulnerability Rating** – This rating is based on the ability of the surface water and/or groundwater flow to provide a sufficient buffering capacity to mitigate potential contaminant concentrations in the water source.

2. **Total Susceptibility Rating** – This rating is based on two components: the physical setting vulnerability of the water source and the contaminant threat.

Upon review of the susceptibility analysis, the Steering Committee determined that the Physical Setting Vulnerability Rating and the Total Susceptibility Rating needed to be updated to more accurately reflect the current situation. Table 16 through Table 23 show the updated Susceptibility Ratings for each ADWA water supplier.

Table 16 Updated Susceptibility Analysis for Animas Water Company.

Source ID #	Source Name	Source Type	Updated Physical Setting Vulnerability Rating	Updated Total Susceptibility Rating
134020-002	Well #1 Chapin	Groundwater	Moderate	Moderate
134020-003	Well #2 Red Rock Range Well	Groundwater	Moderately High	Moderately Low
134020-004	Well #3 Hermosa Meadows Well	Groundwater	Moderately High	Moderately Low
134020-011	School Well #1	Groundwater	Moderately High	Moderately Low

[3] The susceptibility analysis provides a screening level evaluation of the likelihood that a potential contamination problem could occur rather than an indication that a potential contamination problem has or will occur. The analysis is NOT a reflection of the current quality of the untreated source water, nor is it a reflection of the quality of the treated drinking water that is supplied to the public.

Table 17 Updated Susceptibility Analysis for Association of Owners, Blue Sky Ranch, Inc.

Source ID #	Source Name	Source Type	Updated Physical Setting Vulnerability Rating	Updated Total Susceptibility Rating
134065-001	Well #1	Groundwater	Moderately High	Moderate
134065-002	Well #2	Groundwater	Moderately High	Moderate

Table 18 Updated Susceptibility Analysis for City of Durango.

Source ID #	Source Name	Source Type	Updated Physical Setting Vulnerability Rating	Updated Total Susceptibility Rating
134150-004	City Reservoir #1	Surface Water	Low	Moderately High

Table 19 Updated Susceptibility Analysis for Goodman Property Owners Association.

Source ID #	Source Name	Source Type	Updated Physical Setting Vulnerability Rating	Updated Total Susceptibility Rating
134480-001	Well #1 (NE)	Groundwater	Moderately High	Moderate
134480-002	Well #2 (W)	Groundwater	Moderately High	Moderate

Table 20 Updated Susceptibility Analysis for Glacier Club.

Source ID #	Source Name	Source Type	Updated Physical Setting Vulnerability Rating	Updated Total Susceptibility Rating
134840-003	Well #1 (D1)	Groundwater	Moderate	Moderate
134840-004	Well #2 (D2)	Groundwater	Moderate	Moderate
134840-005	Animas River	Surface Water	High	High
134840-002	Elbert Creek	Surface Water	Moderate	Moderate

Table 21 Updated Susceptibility Analysis for Hermosa Mobile Home Village.

Source ID #	Source Name	Source Type	Updated Physical Setting Vulnerability Rating	Updated Total Susceptibility Rating
134450-003	Well 1R	Groundwater	Moderately High	Moderate

Table 22 Updated Susceptibility Analysis for Purgatory Metro District.

Source ID #	Source Name	Source Type	Updated Physical Setting Vulnerability Rating	Updated Total Susceptibility Rating
134750-004	Well #4	Groundwater	Moderately Low	Moderately Low
134750-005	Well #5	Groundwater	Moderately Low	Moderately Low
	Well #1 (not potable, irrigation)	Groundwater	N/A	N/A
	Well #6 (not online)	Groundwater	N/A	N/A

Table 23 Updated Susceptibility Analysis for Town of Silverton.

Source ID #	Source Name	Source Type	Updated Physical Setting Vulnerability Rating	Updated Total Susceptibility Rating
156600-002	Boulder Creek / Blended	Surface Water	Moderately High	Moderately High
156600-003	Bear Creek / Blended	Surface Water	Moderately High	Moderate High
156600-004	Galvin Creek	Surface Water	Moderate	Moderate

DISCUSSION OF POTENTIAL CONTAMINANT SOURCES AND ISSUES OF CONCERN

The following section provides a brief description of potential contaminant sources and issues of concern that have been identified in this plan, describes the way in which they threaten the water source(s) and outlines BMPs.

Private Wells

Private wells, both permitted and non-permitted, can be a concern for groundwater protection. Table 24 shows the number of private wells within each ADWA water system's source water protection area zones.

Table 24 Number of domestic wells mapped by DWR within SWPAs of ADWA water system using groundwater sources (Source: Water well applications received by the DWR State Engineer as of 9/5/2014, http://water.state.co.us/DataMaps/GISandMaps/Pages/GISDownloads.aspx).

Public Water System	SWPA Zone 1 (# other than PWS' source wells)	SWPA Zone 2 and 3
Purgatory Metro District	5 (5)	3
Glacier Club	3 (1)	4
Animas Water Company	8 (4)	38
Blue Sky Ranch HOA	2 (0)	24
Hermosa Mobile Home Village	1 (0)	15
Goodman POA	4 (2)	11
Durango	227 (227)	123
Silverton	0 (0)	0

Private wells can be a direct route for contaminants to enter the groundwater if not properly cased and maintained while in use, and properly plugged when abandoned. Contaminants that infiltrate from the surface are more likely to pollute old, shallow, uncased or improperly abandoned wells.

Identifying and securing wells on private property that are no longer in use can be a significant challenge due to incomplete records, respect for private property, and lack of resources for enforcement. Prior to 1972, Colorado did not require a well permit. Since then, a domestic well requires a permit from the CODWR. A water right is only required where surface waters are over-appropriated. If you purchase a property with a well, you assume responsibility for that well. Although the state does have maps of permits online, many locations may be inaccurate, especially prior to 1990. If a well has been abandoned, it should still show up online. Real estate law requires permitted wells to be transferred to the new landowner, but this is not well enforced.

A well can be properly abandoned and secured by welding on a cap or pounding on a PVC cap. If there is no intention or desire to ever use the well again it should be plugged and abandoned.

If a landowner is replacing a permitted well, they are required to plug and abandon the old well. Groundwater monitoring wells are required to have a permanent locking cap on them. If a well is a decreed water right, it must have a meter on a non-exempt well. DWR does not force such metering, but rather tries to ensure that people understand the importance of metering, and that it is valuable for people to be able to prove how much they use.

The CODWR does not have the resources to actively pursue identification of abandoned wells, nor proper plugging of abandoned wells. CODWR does not have a well inspector in the ADWA planning area is located (District 7). However, CODWR can educate landowners about the risks and rules, and request that owners plug and abandon wells, especially if there is a safety concern. The local water commissioner can explain the importance of properly abandoning or securing wells and the dangers of open wells on their property.

Private Well Best Management Practices Recommendations:

1. Compile a list of private wells that are of highest concern based on proximity to the PWS wells and the water operator's on-the ground-knowledge of the private wells.
2. Submit the list to Jeff Titus, DWR Water Commissioner, and let him narrow down the list to a focus group of wells to be followed up on.
3. Collaborate with Jeff Titus to follow up with private landowners with wells in the focus group and to work with them to properly cap or plug the abandoned wells.
4. Utilize SWAP grant funds and/or funding from the NRCS's Water Well Decommissioning program to cap or plug the remaining abandoned wells.

Ditches

Irrigation ditches that divert water from the Animas River (or a tributary) and convey that water to properties throughout the valley have the potential to also convey contaminants from the river to those properties, as well as to groundwater.

Ditches Best Management Practices Recommendations:

1. Maintain and exchange current contact lists with owners/operators of ditches delivering water within the SWPA of each PWS.
2. Share maps and shapefiles of the well locations and the SWPAs with ditch operators.
3. Work with ditch owners/operators to develop and maintain head gates that can be closed to prevent river water from entering the ditch during a time of concern.

Drought

According to the National Weather Service, "Drought is a deficiency in precipitation over an extended period, usually a season or more, resulting in a water shortage causing adverse impacts on vegetation, animals, and/or people" (National Oceanic and Atmospheric Administration 2008).

When precipitation is reduced over an extended period, this shortage will be reflected in declining surface and groundwater levels. The U.S. Drought Monitor website run by the National Drought Mitigation Center (NDCM) at the University of Nebraska maintains climate and drought data for the entire United States and publishes regular updates on the web (Rippey 2015). Figure 19 shows that as of May 21, 2015, the Animas River Basin was in moderate drought (i.e. D1 on a scale of 0-4).

Although drought is a natural phenomenon in Colorado, temperature trends may be creating conditions more favorable to droughts, or exacerbating the impacts of droughts. In Colorado, temperatures increased by approximately two degrees between 1997 and 2006 (Williams 2013). Phase I of the Colorado Water Availability Study (CRWAS) considered five climate change scenarios for the Colorado River basin within western Colorado (Study Area), all treated as equally probable. Based on these scenarios, Phase I projects the following changes in temperature, precipitation, and hydrology related to southwest Colorado (CWCB 2013).

Temperature

- Each of the five climate projections shows an increase in average annual and monthly temperature within the Study Area, with average annual increases ranging from 1.8°F to 5.2°F.

Precipitation

- Generally increases in the winter months and decreases in the summer months.
- Average winter increases are smaller in the southwestern portion of the Study Area.
- Increase in temperatures causes a shift from snow to rain in early and late winter months.
- Study Area winter average changes by 102% to 116% of historical.
- Study Area April through October average changes by 82% to 105% of historical.

Climate-Adjusted Hydrology

- At over 80% of the sites, the majority of climate cases suggest a decrease in annual flow.
- Annual flow is more likely to decrease in southwestern watersheds and at lower elevations.
- At 75% of locations, all climate cases showed a shift toward earlier runoff, and at all locations, some climate cases showed a shift toward earlier runoff. Runoff shifts earlier by an average of 8 days

.

Modeled Streamflow

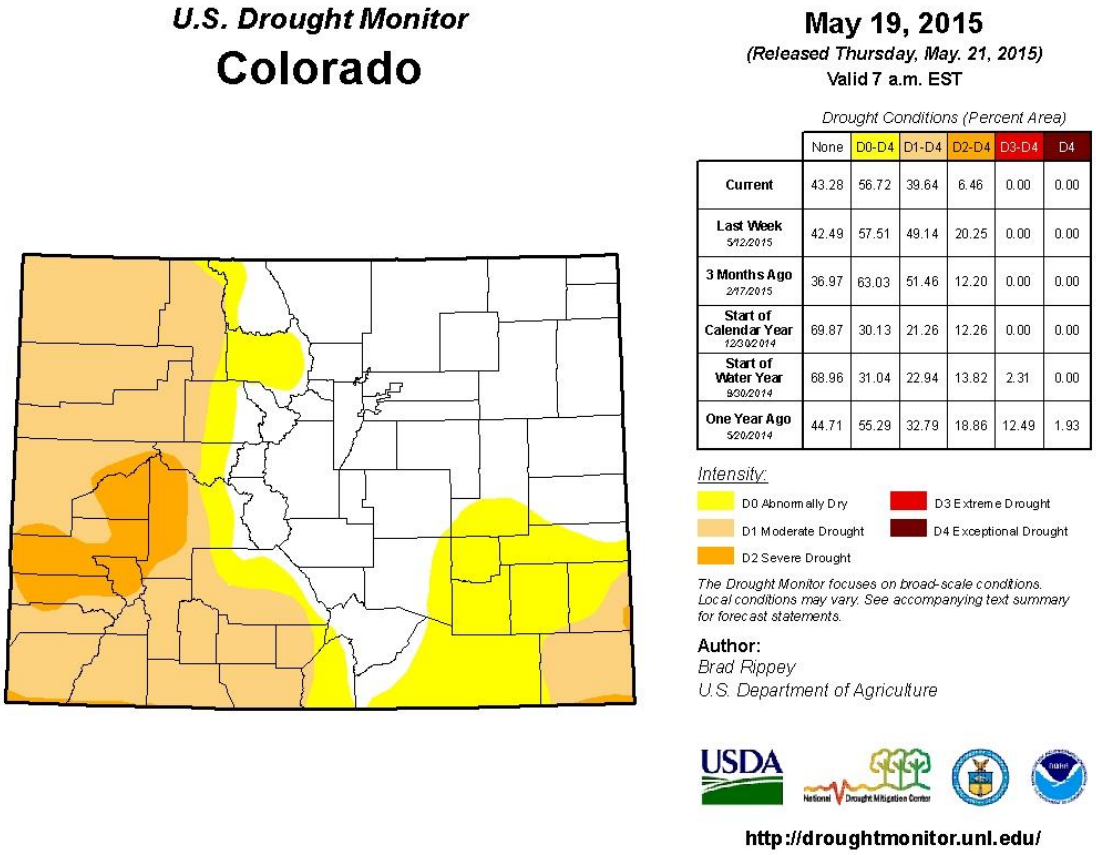
- Flows are generally higher than historical in May-June and lower in July through March.
- The historical annual low flow values generally fall within the range of projected low-flow values.

Water Available to Meet Future Demands

- Upstream locations on main rivers and smaller tributaries generally have less flow available to meet future demands as a percent of modeled streamflow than gages farther downstream that include more tributary inflow.
- Most locations show less water availability for three of the five climate projections, although one projection shows more water available at the locations selected to display CRWAS results.
- Generally more water availability in April and May, corresponding to the shift in natural flow hydrographs.
- The historical annual minimum water availability values generally fall within the range of projected minimum water availability values for 2040 throughout the Study Area.

A key management challenge for public water suppliers is anticipating the potential long-term impacts from drought and planning for the flexibility to address the changes. The Colorado Water Conservation Board recommends that water providers develop a Drought Mitigation Plan to preserve essential public services and minimize the adverse effect of a water supply emergency. The drought plan allows identification of actions and procedures for responding to a drought-related water supply shortage before an actual emergency occurs (Williams 2013).

Figure 19 Drought conditions in Colorado from the May 21, 2012 U.S. Drought Monitor (Rippey 2015).



Drought Best Management Practices Recommendations:

1. Stay informed on the effects of future climate change.
2. Monitor the U.S. Drought Monitor on a regular basis to stay informed on the drought conditions of the Animas River Watershed.
3. Participate in local and regional forums on drought.
4. Assess current water rights and acquire additional water rights in the future if needed.
5. Build an additional water storage tank in the future if needed.
6. Develop a Water Conservation Plan using a template and grant funding available from the Colorado Water Conservation Board. Implement water conservation measures.
7. Develop a Drought Mitigation Plan using a template available online at the Colorado Water Conservation Board's website.
8. Prepare plans for a rapid response to severe drought conditions.

Durango & Silverton Narrow Gauge Railroad and Hermosa Yard

The Durango & Silverton Narrow Gauge Railroad (D&SNGR) has run between Durango and Silverton along the Animas River. The railroad has 45.4 miles of track, five bridges across the Animas River, and two rail yards, all within the ADWA planning area. Table 25 shows the D&SNGR facilities present within each public water supplier's SWPA. The railroad's operations include passenger service with diesel and coal fired engines, track maintenance, weed control and fire control.

In the overview of operations that D&SNGR staff shared with ADWA, they explained that the railroad does not transport hazardous materials. Steam Engines carry only coal and diesel engines have 150-gallon fuel tanks. The D&SNGR offloads human waste in Silverton, where it is treated in the Silverton sewer plant. The Railroad uses straight water for fire protection along the tracks. They contract with Four Corners Weed Control to control weeds within the railroad's right of way. This is primarily spot application.

They have prepared a stormwater management plan for and have a stormwater discharge permit for the Main Rail Yard, located in downtown Durango. Materials present at that yard that have the potential to affect water quality include grease, oils, fuels and toilets. All oil and fuel tanks have secondary containment.

At the Hermosa Rail Yard, the railroad conducts light maintenance and stores track maintenance equipment. There are no underground storage tanks. Creosote ties are all collected and transported down to the Hermosa Creek Rail yard. Goodman POA and Hermosa MHV have water supply wells very close to the Rail Yard. One concern is the storage of creosote ties there. The compounds that leave wood treated with creosote can travel through soil, and can migrate up to 150m laterally, 12m deep. These compounds can be carcinogenic in lab rats

(United States Environmental Protection Agency 2008; Agency for Toxic Substances and Disease Registry 2002). The area at the Hermosa Rail Yard where the ties are stored is contained on the east side by the berm on which the railroad tracks sit, and on the west side by the raised Highway 550. The raised railroad tracks may prevent surface flow of stormwater toward the Goodman POA and Hermosa MHV wells.

Table 25 Durango and Silverton Narrow Gage Railroad facilities located within ADWA Public Water Systems' Source Water Protection Areas.

Public Water System	SWPA Zone 1	SWPA Zone 2 and 3
Purgatory Metro District	None	None
Glacier Club	Tracks, Silverton Depot	Tracks
Animas Water Company	None	Tracks, Hermosa Railyard
Association of Owners, Blue Sky Ranch, Inc.	None	Tracks, Hermosa Railyard
Hermosa Mobile Home Village	Tracks	Tracks, Hermosa Railyard
Goodman Property Owners Association	Tracks, Hermosa Railyard	Tracks
City of Durango	Tracks, Main Railyard, Silverton Depot	Tracks, Hermosa Railyard
Town of Silverton	None	None

D&SNGRR Best Management Practices Recommendations:

1. Maintain and exchange current contact lists with the D&SNGRR.
2. Share maps and shapefiles of the well locations and the SWPAs with the D&SNGRR.
3. Research the mobility of creosote in soil and groundwater.
4. Collaborate with the D&SNGRR to construct a permanent cover over the railroad ties at the Hermosa Yard to minimize the risk of creosote entering the soil and groundwater.

Emergency Backup Power

One of the top concerns identified by the La Plata County Office of Emergency Management is power supply in the county and that there is currently no backup generation (Knowlton, B., Personal Communication, 2014). In a power outage situation, this could be a concern for water supply and safety. As an example, during the 2002 Missionary Ridge Fire, some water supply sources in the Vallecito area were contaminated by ash and sediment, and without power there was no ability to filter or decontaminate the water. While some PWSs might be able to continue to supply treated water for a period of time (e.g. AWC has a few days' supply in tanks and gravity pressure), a loss of power, with no emergency backup available, would impact a system's ability to pump and treat water from its source(s).

Emergency Backup Power Best Management Practices Recommendations:

1. Each PWS will complete or update a Contingency Plan to address backup power needs.
2. Animas Water Company will encourage residents to register cell phone numbers with the County so that they can be notified and encouraged to implement conservation measures in the event of a disruption to water service.

3. Blue Sky Ranch, Goodman POA, Hermosa MHV and Purgatory MD will identify and analyze the potential need for an emergency backup power supply so that drinking water operations can continue in the event of a disruption in the power supply.
4. Blue Sky Ranch, Goodman POA, Hermosa MHV and Purgatory MD will determine what modifications need to be made for the system to interface with a portable generator.
5. City of Durango has identified a need for emergency backup power to maintain storage during a power outage. They will continue to plan to implement measures identified.
6. Glacier Club: Plan A – Glacier Club will attempt to refurbish and relocate an existing 90 kilowatt generator.
7. Glacier Club Plan B – If Plan A fails, Glacier Club will identify, plan, and budget for an emergency backup power supply in the distribution system so that drinking water operations can continue in the event that a fire disrupts the power supply.

Existing/Abandoned Mine Sites and Metals

The source water protection planning area for ADWA includes the historic Silverton Mining District, associated with the Silverton Caldera. This district is one of the major historic gold and silver producing areas of Colorado. In 1860, American prospectors first discovered placer deposits of gold at Eureka, near the headwaters of the Animas River. Silverton was incorporated as a town in 1874. Lower tributaries of the Animas, including Hermosa Creek and Junction Creek also have supported mining activity, both historic and permitted.

Permitted Mines

The State of Colorado began requiring mines to be permitted in 1973. Mine permits are administered by the Colorado Division of Reclamation, Mining and Safety (DRMS). According to the DRMS database, there are currently five active permitted mining operations within the ADWA source water protection planning area (Table 26). Permitted mines in the source water protection planning area include: hardrock gold, silver and lead. The Mason Mine is operating but is a very small operation; all the others are currently active but not operating (Brown, K., Personal Communication, 2014).

Table 26. Active permitted hardrock mines within the ADWA source water protection planning area (DRMS, http://mining.state.co.us/Reports/Pages/default.aspx, July 20, 2015)

Mines (Operator)	ID Number	Commodities Mined
Freda Claim (Red Arrow Gold Corporation)	M1984072	Gold, Silver
Sunnyside Gold (Sunnyside Gold Corp)	M1977378	Lead, Zinc, Copper, Iron, Gold
Toltec No. 2 (Wilbur F Benham)	M1984039	Silver, Gold, Copper, Lead, Zinc
Mason Mine (Donna Thompson)	M1989074	Gold
Neglected Mine (Mine Development Inc)	M1981165	Gold

Abandoned Mine Lands and Reclamation Efforts

During the pre-permitting days of mining, mines could be abandoned without addressing impacts to streams, water quality, slope stability and safety. Such abandoned mine properties may contain open tunnels, piles of mine waste, and/or mill tailings. These abandoned mine

facilities can contaminate drinking water supplies due to the acidic, metal-laden water that may drain from tunnels or run off of piles of waste rock or tailings. Acid Mine Drainage typically occurs year round, while mine waste leaches acidic water and metals when precipitation runs over, through and off of the waste.

There has been mining activity throughout the planning area, although the highest density of abandoned mines is in San Juan County, in the upper part of the Animas basin. In addition to permitting mines, CODRMS also conducts abandoned mine land reclamation. The BLM is working to safeguard abandoned mine features at Falls Creek and Chris Park. The Graysill uranium mine was located at the headwaters of Hermosa Creek and was cleaned up in early 2000s. These lower mines do not present significant concerns for water quality, whereas some mines in the upper portion of the watershed are more challenging.

The Animas River Stakeholders Group (ARSG) formed in 1994 due to the threat of Superfund designation by the EPA, and the possibility that unrealistically strict water quality standards might be imposed by the Colorado Water Quality Control Division. ARSG uses a collaborative process to take the following approach:

- Identify the problem
- Prioritize contributing sources
- Determine feasibility
- Propose water quality standards based on remediation feasibility (these may not be fully protective of aquatic life)
- Remediate sites.

ARSG completed a Use Attainability Analysis in 2001. It has completed 60 remediation projects, most at mine waste sites. Only five draining mines have been addressed, due to liability concerns (i.e. the lack of Good Samaritan Provision). Draining mines are point sources and therefore require a permit, while mine waste piles are generally treated as non-point sources.

To date, the water quality results of these remediation efforts are mixed. In Mineral Creek, the ARSG has found improvements due to reductions in zinc and copper levels, but not in iron and aluminum levels. In the Animas River upstream of Cement Creek, water quality has also mostly improved. However, Cement Creek water quality has become substantially poorer, and water quality in the Animas River below Silverton is worse than it was in the 1990s. Biological conditions reflect these changes. While in 2005, four species of trout were present in the Animas at Cascade Creek, in 2010, only one species was sampled, and at far fewer numbers. Similarly, there are now far fewer species and total numbers of benthic macro-invertebrates collected in the Animas Canyon. Water quality standards for aquatic life are not met at Bakers Bridge, but they are met at Trimble Lane, due to the dilution provided by Hermosa Creek in the intervening reach.

The ARSG explains that these changes are related to the unintended results of placement of bulkheads to stop drainage from the Sunnyside Mine. Since placement of these bulkheads,

discharge has increased at several other mines (e.g. Gladstone, American Tunnel). The new untreated drainage totals about 380-805+ gpm and overrides past improvements.

The issue most pertinent to public drinking water supply is lead levels in the Animas River. They are generally not that high. However, "slugs" of high lead levels do come down the Animas from time to time. The water quality standard is 50 micrograms per liter total lead. However, at times, levels as high as 100 micrograms per liter are measured in Durango, and even as far downstream as Weaselskin Bridge. Such high levels appear to be associated with big rain events, e.g. a monsoon hitting Cement Creek or Mineral Creek; and also with spring runoff. Lead may deposit in Animas Canyon and then remobilize with high flows.

These intermittent higher lead levels may not necessarily be related to the issue at Sunnyside Mine. They could have their source in Animas Canyon. The Canyon is a difficult place to sample, and the USGS is deploying some new continuous automatic samplers that may shed light on the sources of lead, more than the current monthly samples are able to provide (Butler, P. Personal Communication 2014).

Abandoned Mine Best Management Practices Recommendations:

1. Share maps, shapefiles, and contact information with CDPHE, CODRMS and EPA so that PWSs can be notified of mine blowouts and spill events in a timely manner.
2. Become involved in the ARSG to be kept aware of current threats and to participate in ongoing projects.
3. Coordinate with the ARSG, the BLM, and CODRMS to gain a better understanding of the lead slugs that have been detected in the Animas River recently.
4. Monitor Animas River flows and Animas River characteristics during storm events to help determine when to shut off the Animas Intake (Glacier Club).

Wildfire

High severity wildfires can impact water supplies by mobilizing pollutants otherwise stored in soils and organic matter, and by increasing erosion and flooding potential in the landscape after the fire. In addition, chemicals used in fire retardants can have a negative impact on water quality, and direct impacts to water supply system function, such as loss of pressure, can introduce bacteria into the systems (Arizona Department of Environmental Quality 2014).

When a wildfire removes the plants that hold the soil, hillslope runoff rates can increase up to 1,200 times, and hillslope erosion rates up to five orders of magnitude, depending on the topography and the magnitude of rains following the fire (Hill et al. 2009). According to the CDPHE (2012), this increased runoff and erosion of soil and micro-ash can bring a surge in water, sediments and debris to surface waters that can cause water quality concerns including:

- Low dissolved oxygen (DO)
- Fish kills and other ecological changes
- Increased turbidity, suspended solids, and conductivity

- Increased total organic carbon (TOC)
- Increased ammonia from fire retardants
- Clogged intakes and increased sludge handling
- Elevated phosphorus, iron, manganese, and nitrate levels
- Unpleasant taste and odor
- Changes in pH and alkalinity (CDPHE 2012)

Firefighting retardants often contain ammonia nitrogen; ammonia is toxic to fish. The chemicals may also contain large amounts of nitrogen and phosphorus which can use up all the oxygen in a stream or lake, resulting in fish kills (Arizona Department of Environmental Quality 2014).

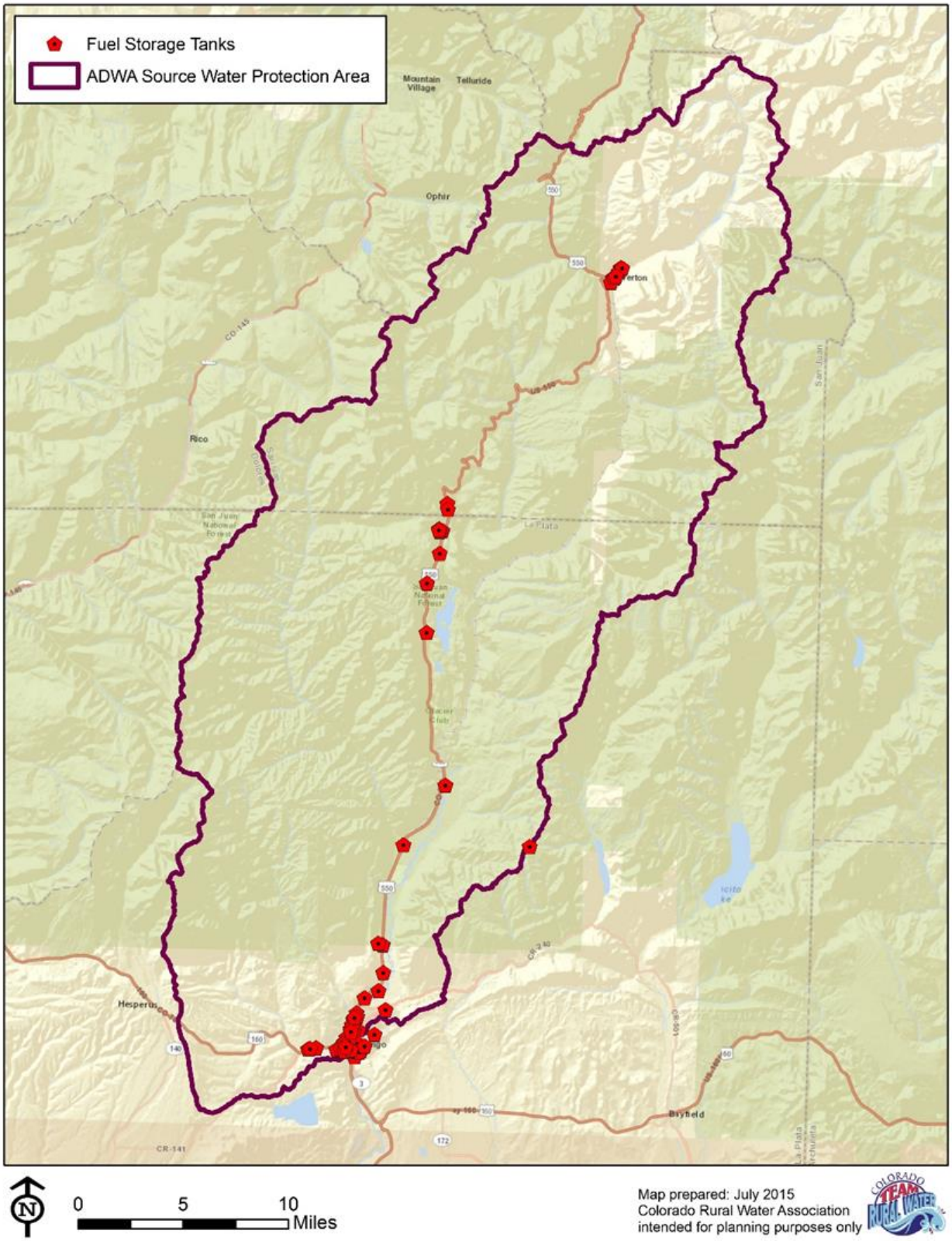
Wildfire Best Management Practices Recommendations:

1. Provide a copy of the final SWPP along with GIS shapefiles of the source water protection area to USFS, the local Fire Protection District, and the La Plata County Office of Emergency Management for consideration during fire suppression, as well as in planning and implementing wildland fire mitigation projects.
2. Provide the USFS with maps and shapefiles that they can refer to when applying fire retardant. According to the USFS's "Implementation Guide for Aerial Application of Fire Retardant" and the "Aerial Application of Fire Retardant and Foam: Avoidance Areas," the USFS will:
    a. Maintain a minimum 300-foot avoidance area on either side of all intermittent and perennial streams where water is flowing.
    b. Avoid aerial application of fire retardant or foam within 300 feet of waterways. A waterway is defined as a body of water including lakes, rivers, streams and ponds whether or not they contain aquatic life.
3. Explore opportunities to work with private landowners for landscape scale fuel reduction and defensible space projects.
4. Develop a post fire mitigation plan to effectively deal with things such as mudslides, increased turbidity, ash, etc.

Fuel Storage Tanks

There are 104 permitted fuel storage tank sites within the ADWA source water planning area (42 active and 62 inactive) (Appendix 9, Figure 20). Information on the current status of Aboveground Storage Tanks (AST), Underground Storage Tanks (UST) and Liquid Propane Gas (LPG) tanks within the source water protection planning area was obtained from the Colorado Department of Labor and Employment Division of Oil and Public Safety's database via their Colorado Storage Tank Information (COSTIS) website at http://costis.cdle.state.co.us.

Figure 20. Active storage tanks within the ADWA source water protection planning area.
Source: Colorado Department of Labor and Employment Division of Oil and Public Safety 2014.

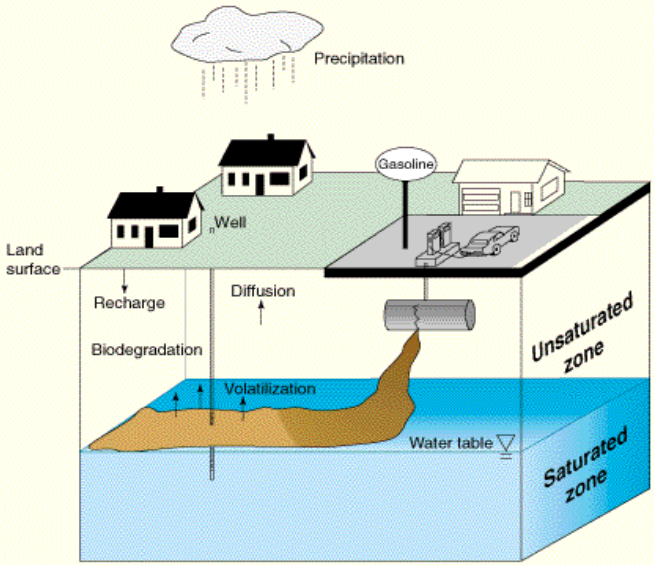


Storage Tank Spills

In the COSTIS system, a release means any spilling, leaking, emitting, discharging, escaping, leaching, or disposing of a regulated substance from a storage tank into groundwater, surface water or soils. The owner/operator must report a suspected release within 24 hours and investigate suspected releases within seven days. After confirming a release and conducting the initial response and abatement, the owner/operator must continue further source investigation, site assessment, characterization and corrective actions.

The leaky underground storage tank (LUST) releases gasoline or "liquid phase hydrocarbon" (Figure 21). The gasoline descends through the unsaturated soil zone to float on the water table (gasoline is lighter than water). The gasoline releases compounds like benzene, toluene, ethylbenzene, and xylenes (BTEX) and methyl tert-butyl ether (MTBE) to the groundwater and they are carried in the direction of groundwater flow. The extent of contamination is defined by the concentration of benzene (from 10 to 10,000 parts per billion) in the groundwater.

Figure 21 Schematic of a Leaking Underground Storage Site.



SOURCE: WWW.AEGWEB.ORG

Spills from leaking underground storage tanks (LUST) sites can contaminate the groundwater and also present other hazards. Because gasoline is lighter than water, gasoline floats on the water table and remains relatively close to the land surface. The most hazardous compounds in groundwater (the BTEX compounds) are quite volatile and carcinogenic. Besides the potential for being consumed in drinking water, volatile compounds can enter nearby buildings. In poorly ventilated buildings, the compounds can accumulate and present a health risk through inhalation. In buildings, the volatile compounds can also present an explosion hazard (Ryan 2006).

Residential Storage Tanks

Rural residents of the source water protection area may have private aboveground storage tanks containing gasoline to store vehicular fuel. The private aboveground storage tanks are a concern because they may be old and subject to leakage. It only takes a small amount of petroleum to contaminate the ground or surface water. Fuel tanks should be inspected visually on an annual basis and properly seated on a type of secondary containment structure to prevent spills from reaching the ground. The containment area should be able to hold 125% of the tank capacity.

Storage Tank Best Management Practices Recommendations:

1. Share maps, shapefiles, and contact information with the Division of Oil and Public Safety and the CDPHE so that PWSs can be notified of spill events in a timely manner.
2. Work with fuel delivery services to develop an inventory of residential or farm unregulated storage tanks within the source water protection area.
3. Provide information to tank owners on how they can implement storage tank practices to prevent petroleum products from leaking onto the ground.
4. Meet with the local and upper management of the Conoco station to distribute maps of the source water protection area and to open channels of communication to facilitate timely notification in the event of a spill.

Geothermal Wells

Geothermal heat pumps (GHPs), also referred to as earth-coupled, ground-source, or water-source heat pumps, have been in use since the late 1940s. They make use of the constant below ground temperature of soil to heat and cool a home or other building efficiently. While seasonal air temperatures may swing between sweltering summer days to below zero winter days, just a few feet below ground, the temperature remains relatively constant. Depending on latitude, ground temperatures range from 45°F (7°C) to 75°F (21°C). The ground temperature is cooler than the air in summer and warmer than the air in winter, and the GHP can take advantage of this differential by exchanging heat with the earth to cool or warm a building. According to the US Department of Energy, GHP system life is estimated at 25 years for the inside components and 50+ years for the ground loop. Approximately 50,000 geothermal heat pumps are installed in the United States each year (US Department of Energy 2015).

Types of Geothermal Heat Pump Systems

There are two basic types of ground loop systems: closed-loop (Figure 22) and open-loop (Figure 23). The system chosen depends on the climate, soil conditions, available land, installation costs at the site and any local regulations.

Closed-loop geothermal heat pumps generally circulate an antifreeze solution through a closed loop of plastic tubing buried in the ground. A heat exchanger transfers heat between the refrigerant in the heat pump and the antifreeze solution in the closed loop. The loop may be in a horizontal or vertical configuration. One variation of the closed-loop system, called direct exchange, does not use a heat exchanger and instead pumps the refrigerant through copper tubing that is buried in the ground in a horizontal or vertical configuration. Direct exchange systems work best in moist soils. They should not be installed where soils are corrosive to copper tubing. In some places, local regulations may prohibit direct exchange systems because they circulate refrigerant through the ground.

Horizontal closed-loop systems are often most cost-effective for residential purposes, especially where enough land is available. They require trenches at least four feet deep. Vertical systems

are often used for commercial or school installations if land area is limited. Vertical systems use holes, approximately four inches in diameter, drilled 100-400 feet deep.
Open-loop GHP systems use well or surface water as the heat exchange fluid that circulates directly through the system. When the water has circulated through the system, it returns to the ground through the well, a recharge well, or surface discharge. This option is practical only in locales where there is an adequate supply of clean water, and local codes and regulations regarding groundwater discharge can be met (US Department of Energy 2015).

Figure 22 Types of closed loop geothermal heat pump systems.

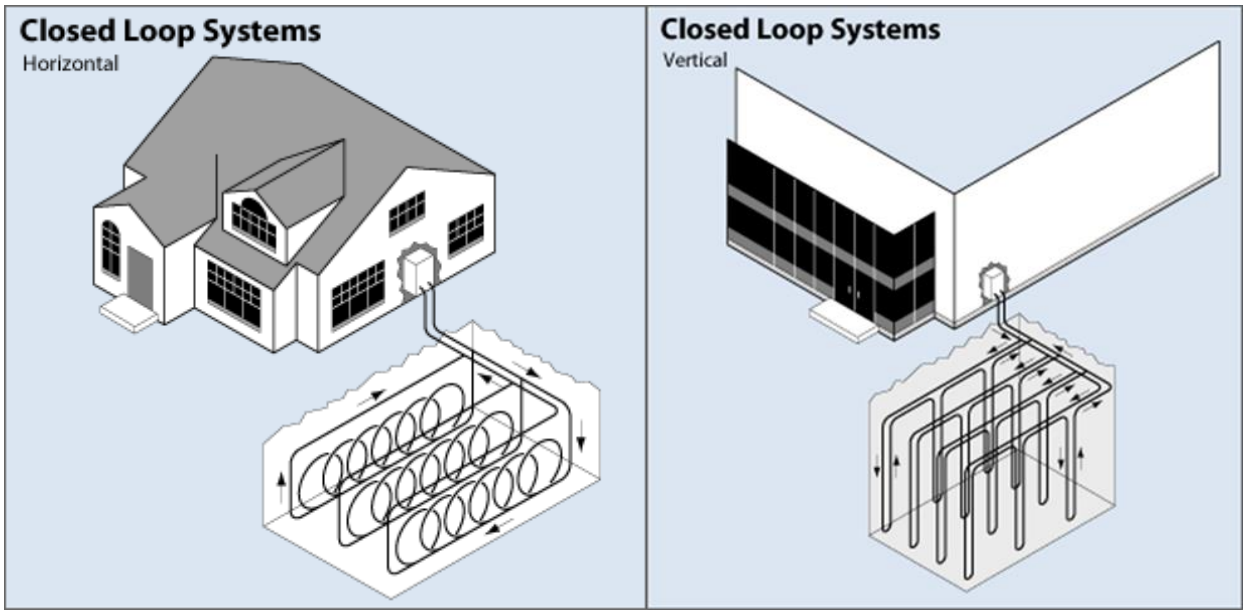
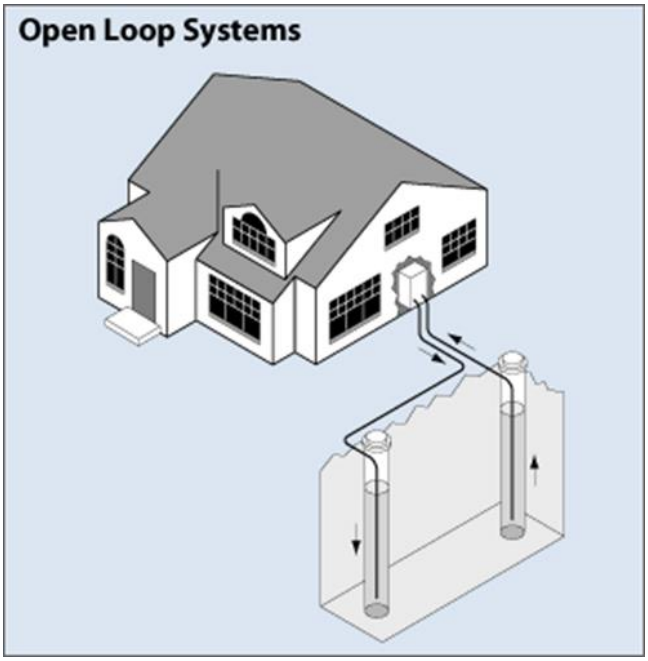


Figure 23 Open Loop geothermal heat pump system.



Public drinking water suppliers have concerns about the installation of geothermal wells (open or closed) because of the possibility that exists for contamination of nearby drinking water sources if a leak of the heat exchange fluid occurs in a closed loop system or a contaminant is introduced to groundwater via an open loop system.

Geothermal Wells Best Management Practices Recommendations:

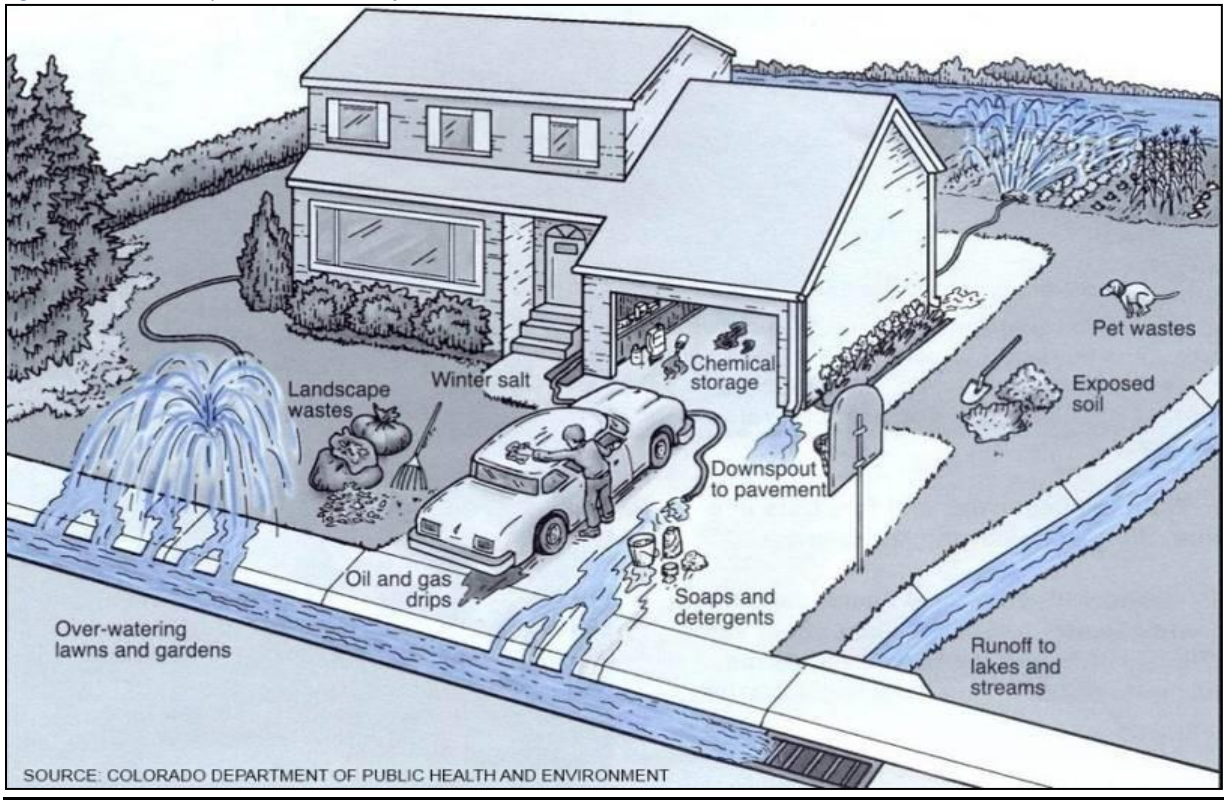
1. Research with the CODWR to find out if the existing geothermal well(s) has been plugged and abandoned.
2. If it has not been plugged and abandoned, work with the CODWR to properly plug and abandon it.
3. Research the risks associated with any future geothermal wells that may be developed.

Residential Issues (fertilizers, pesticides, hazardous waste disposal, structural fires)

Most of the SWPAs for the ADWA water systems include rural, urban, and sub-urban residential land uses. Common household practices can allow chemicals and biologic pollutants to enter the water supply. Such practices may include washing vehicles, fertilizing lawns and gardens, applying pesticides, and generating pet wastes (Figure 24). In some areas residents may dispose of, or burn, garbage on their property, and some residential trash may release hazardous materials. Stockpiling of toxic household chemicals, such as paints, fuels and cleaning products can represent a threat to water supplies if containers rust and leak or especially in the event of improper disposal or a residential fire (Hill 2013).

Residential practices are of particular concern to public drinking water systems where residences are very close to drinking water intakes (i.e. Animas Water Company, Blue Sky Ranch, City of Durango, Goodman POA and Hermosa MHV).

Figure 24 Residential potential sources of contamination.



Residential Issues Best Management Practices Recommendations:

1. Work in conjunction with La Plata County Weed Management Program to develop weed management plans with private landowners.
2. Conduct public education and outreach programs for landowners/homeowners in the source water protection area to report issues and to encourage practices that will protect their drinking water source from potential contamination. This could include the installation of signs at strategic locations throughout the source water protection area, water bill inserts, public presentations, etc.
3. Promote the use of the City of Durango's existing hazardous waste collection and electronics recycling programs.
4. Provide the Durango Fire and Rescue Authority with maps of the source water protection area. This will better equip them to implement appropriate protocols to prevent groundwater contamination from structure fire runoff that occurs near wells.

Roads and Hazmat Transportation

Roads, both major and minor, are of concern to the ADWA public drinking water systems as potential sources of contamination because of both the potential for spills of hazardous materials to occur along them and the practices used to maintain them. The roads within the SWPAs of the ADWA public drinking water systems are maintained by the Colorado Department of Transportation (CDOT), La Plata County, San Juan County, the City of Durango, the City of Silverton, the USFS San Juan National Forest or the BLM Tres Rios Field Office.

Spills

According to CDOT, most highway spills in Colorado involve vehicle fuel, such as diesel or gasoline. Notification is required. Figure 25 provides the notification contacts.

Figure 25 Contacts for immediate spill notification in Colorado.

Designated Emergency Response Authority (DERA):	**9-1-1**
Colorado State Patrol (CSP):	**9-1-1 or 1 (303) 239-4501**
CDPHE 24-hour spill reporting number:	**1 (877) 518-5608**
National Response Center (NRC):	**1 (800) 424-8802**
CDOT Water Quality Hot Line:	**1 (303) 512-4426**

In the event of notification of a spill outside of city limits, the first responder is the State Patrol. The spiller's insurance company is responsible for cleanup. The CDPHE is responsible for enforcing the cleanup on non-Federal, non-Tribal lands. Other entities are notified if they have requested to be added to the Distribution list for the CDPHE's Environmental Emergency Spill Reporting Line. A spill report must be filed if the spill is greater than 25 gallons (or other reportable quantity specified by EPA), if it is impacting or threatens to impact waters of the State, and/or if it meets other triggers specified by CDPHE (CDPHE 2015).

Spills must be remediated to CDPHE and EPA approved thresholds. According to CDOT, the preferred and most common method of soil clean-up at highway spill sites is excavation and off-site disposal. If excavation is not feasible or allowed, remediation may include other technologies such as: excavation, air sparge, soil venting, bioremediation, steam cleaning, physical collection, and monitored natural attenuation (Mallonee, F., Personal Communication, 2015).

Maintenance Practices

In CDOT Region 5, the department makes an effort to minimize the application of magnesium chloride for road de-icing. If the temperature is above 20 degrees F, they apply salt brine. If it is colder, they apply a magnesium chloride ($MgCl_2$) brine (Meltdown ApexTM).

Each CDOT shop is required to develop a facility management plan. The Rockwood CDOT shop, located within the SWPA for the Glacier Club, does not store fuel and has no outdoor storage of any material (Mallonee, F., Personal Communication, 2015).

Roads and Hazmat Best Management Practices Recommendations:

1. Share shapefiles of the SWPAs with CDOT to be overlaid on their spill response maps.
2. Maintain current PWS contact information with CDOT to improve notification of spill response activities.
3. Share PWS contact list and maps/shapefiles of the SWPAs, wells, and intakes with the La Plata County Office of Emergency Management and commit to update it annually.
4. Share PWS Emergency Response Plans or PWS Contingency Plans with the La Plata County Office of Emergency Management and commit to update it annually.

Sanitary Sewer Line Breaks

There are seven National Pollutant Discharge Elimination System permitted sewerage systems located within the ADWA planning area (Table 27). While these dischargers are permitted by CDPHE and perform monitoring of their discharge under their permits, sewer line breaks may go unnoticed and could potentially contaminate ground and surface water sources.

Permitted sewerage facilities are required to monitor and report their effluent. Discharge Monitoring Reports summarizing test results for all parameters and monitoring frequencies specified in their permits are to be submitted to CDPHE every month. Special reports (e.g. Sanitary Sewer Overflow (SSO) reports) are required in the event of any spill, bypass or exceedance of their permitted discharge levels. Reports can be obtained at http://echo.epa.gov/facilities/facility-search or through COWQCD Records Center (cdphe.wqrecordscenter@state.co.us).

Table 27 CDPHE NPDES permitted sewerage systems located within the ADWA planning area.

Facility Name	Facility ID
Town of Silverton Waste Water Treatment Facility	CO 0020311
Purgatory Metropolitan District	CO G589010
Needles Homeowners Association	CO X631009
Durango North Ponderosa KOA	CO G588020
Hermosa Sanitation District	CO G588010
Lightner Creek Campground	CO 0026468
Durango West Metro District #2 Waste Water Treatment Facility	CO G589115

Sanitary Sewer Line Breaks Best Management Practices Recommendations:

1. Work with the Hermosa Sanitation District to ensure that lines of communication are open and that contact info is updated regularly.
2. Share maps and shapefiles of the SWPAs with the Hermosa Sanitation District.
3. If necessary, locate and map all Hermosa Sanitation District Lines within Zone 1 of the SWPAs. This could be accomplished by obtaining maps from Hermosa Sanitation District, or through the use of a snake and/or a magnetometer.

Security/Vandalism

ADWA public drinking water suppliers identified vandalism as a concern, although each system does currently have a level of security in place for their water sources. Several water sources are located in relatively public areas, and they recognize the potential for vandalism to occur.

Security and Vandalism Best Management Practices Recommendations:

1. Secure wellheads with a locking mechanism to lower risk of contamination from vandalism.
2. Blue Sky Ranch will consider installation of fencing or a secure structure for their wells.

Hikers, Skiers and Snowmobiles

Significant portions of the source water protection area for the Town of Silverton are under either USFS (Bear Creek) or BLM (Boulder Creek) management. Although both the Bear Creek and the Boulder Creek source water protection areas are fairly remote, they do experience some limited recreational use. During the winter, snowmobilers sometimes use upper portions of the Bear Creek drainage and skiers may at times access both drainages, as do some hikers in the summer months. Some undesirable (and often unintended) impacts from such recreational uses include the potential for fuel spills from vehicles, eroded soils, user-created unplanned trails, and damaged wetlands. Such impacts can degrade water quality.

Skiers/Hikers and Snowmobile Best Management Practices Recommendations:

1. Coordinate with the USFS and BLM on education and outreach opportunities that may include signage at the access to the source water protection areas.

Weed and Pest Management Activities

Pesticides are compounds used to control plant (herbicides, fungicides) or animal (insecticides, rodenticides, etc.) pests. Pesticides are used on both public and private lands within the ADWA source water protection planning area, and are applied by private landowners, commercial applicators as well as city, county and federal managers.

Compounds developed and marketed specifically as pesticides must undergo a great degree of testing to ascertain and limit their toxicity and other effects on humans, livestock and other animals and plants, and they are required by law to be labeled to disclose these effects, and to be handled and used safely and appropriately. It can take 7-10 years to develop product, with testing required on the effects on livestock, toxicology, environmental fate, and effectiveness. Required testing includes: acute, dermal, and inhalation toxicity, teratogenicity, carcinogenicity, eye irritation, mobility, and half-life in the environment (Cook, R., Personal Communication, 2014). Nevertheless, pesticide safety depends on strict adherence to the label instructions, as well as best management practices. Certain pesticides do have the potential to harm both aquatic life and human health if they enter surface or ground water. These harmful effects can be acute (sudden and severe) or chronic (developing after prolonged or repeated exposure).

Private Applications by Landowners

Within the ADWA source water protection planning area, private individuals use a variety of pesticides on their lawns, gardens, pastures and crops to control weeds, insects, fungi and rodents. Use of pesticides by homeowners, farmers and ranchers poses the greatest risk if the chemicals are improperly mixed and/or applied. If the private landowner uses an incorrect dosage and exceeds the recommended concentration of the pesticide per volume of water, sprays too frequently or too heavily, or disposes of containers, excess or waste chemical improperly, then runoff or infiltration of the pesticides can occur and they may enter drinking water supplies.

La Plata County Weed Management

The mission of the La Plata County Weed Management Program is “to provide compliance, information and county roads/properties weed management services to landowners, residents and visitors so they can benefit from reduced weed infestations.” The County has established a County noxious list of targeted species. In addition, the State of Colorado has a noxious weed list that includes species that are not on the County’s List. These species are List A and List B species and also require management. The State list is dynamic and may change slightly from year to year.

The La Plata County Weed Management Program has developed a county weed management plan, as mandated by the Colorado Noxious Weed Act. The county noxious weed list and weed management plan are available at the following website: http://www.co.laplata.co.us/departments_and_elected_officials/general_services/weed_management_office/weed_lists_and_laws.

They also conduct a cost-share program in partnership with the La Plata Conservation District to provide financial assistance to landowners for controlling noxious weeds. Information and forms for this program can be found at http://www.co.laplata.co.us/departments_elected_officials/general_services/weed_office. As a last resort, La Plata County does have weed enforcement capabilities on private lands under the Colorado Noxious Weed Act.

Printed Resources:

- Best Management Practices for Ag Pesticide use to protect Water Quality: at CSU fact sheet http://www.extc.colostate.edu/pubs/pubs.html
- www.cdms.net has label info for herbicides and material safety data sheet.

Animas Mosquito Control District

The Animas Mosquito Control District was voted into being in the 1950s, and is supported by a .999 mil levy. They conduct active mosquito abatement in the Animas Valley, as well as some abatement at the Glacier Club and Electra Lake. They are a public district, but are able to work on private property.

Mosquito larvae need to breathe at the water surface. They live in shallow water, and go through four larval stages. They then pupate and emerge as adult fliers over about 5-7days in warm conditions or longer if cooler. There are more than 20 species of mosquito found in the District, with a variety of different life spans. Adults of some of these species overwinter.

Public health is the District's primary concern. As more mosquito-borne diseases are approaching the U.S. According to the District, they are constantly trying to move toward less toxic, more environmentally friendly control methods. Whereas they employed Malathion and diesel for mosquito control up until 1993, they currently employ Natular to control larvae and adults, and supplement with application of mineral oil to suffocate larvae in certain locations. They use Permethrin to control adult populations. They follow best management practices, following labels, carrying absorbents to clean-up any spills, and only carrying enough product for daily application.

Natular is a product composed of Saccharopolyspora spinosa bacteria, which are naturally occurring bacteria in fermentation, a by-product of rum distilling. Natular is an organic product, with no bioaccumulation, but it is extremely toxic to the neurological system of mosquito larvae. It received the Presidential green award as an environmental product. There are two forms of Natular: slow release granules (short-term) and briquettes (180 wet days). Use of Natular has allowed great reduction in the District's mineral oiling and adulticiding activities.

Permethrin, used to control mosquito adults, is toxic to bees if sprayed during the day when they are active. Therefore, the District is required to spray permethrin at night when bees are not active. Once it dries, it is not toxic. In the past, the District sprayed Permethrin along regular routes, but now they only spray the chemical when they see or receive calls about adult

mosquito populations. The District's use of Natular has allowed a great reduction in their use of Permethrin (Kuefler, J., Personal Communication, 2014).

Weed and Pest Management Best Management Practices Recommendations:

1. Share maps and shapefiles of well/intake locations and source water protection areas to allow the La Plata County Weed Management and the Animas Mosquito Control District to effectively protect them.
2. Work with the La Plata County Weed Management Program to establish a weed management plan for Zone 1 of the source water protection areas that may be comprised of mechanical treatment only.
3. Maintain a current contact list between the PWSs and the La Plata County Weed Management Program and the Animas Mosquito Control District.
4. Coordinate with the La Plata County Weed Management Program on education and outreach opportunities within the community.

SOURCE WATER PROTECTION MEASURES

Best Management Practices

The Steering Committee reviewed and discussed several possible BMPs that could be implemented within the participating water systems' SWPAs to help reduce the potential risks of contamination to their water sources. Each water system established a "common sense" approach in identifying and selecting the most feasible source water management activities to implement locally. The focus was on selecting those protection measures that are most likely to work for the system and the community. The BMPs were obtained from multiple sources including: EPA, CDPHE, NRCS, and other SWPPs.

The Steering Committee recommends the BMPs listed in Table 28 through Table 35 be considered for implementation by various entities, as indicated in the "Implementer" column of the table.

Evaluating Effectiveness of Best Management Practices

The ADWA Water Systems are committed to evaluating the effectiveness of the various source water best management practices that they implement. The purpose of such an evaluation is to determine if the intended goals of the best management practices are being achieved, and if not, what adjustments to the SWPP will be taken in order to achieve the intended outcomes. It is further recommended that this Plan be reviewed annually or if circumstances change resulting in the development of new water sources and source water protection areas, or if new risks are identified.

The ADWA Steering Committee is committed to a mutually beneficial partnership with the CDPHE in making future refinements to their source water assessment and to revise this SWPP accordingly based on any major refinements.

Table 28 Source Water Protection Best Management Practices for Animas Water Company.

Animas Water Company PSOC's and/or Issues of Concern	Best Management Practices	Implementers
Abandoned Wells	1. Compile a list of private wells that are of highest concern based on proximity to the PWS wells and the water operator's on-the ground-knowledge of the private wells. 2. Submit the list to Jeff Titus, DWR Water Commissioner, and let him narrow down the list to a focus group of wells to be followed up on. 3. Collaborate with Jeff Titus to follow up with private landowners with wells in the focus group and to work with them to properly cap or plug the abandoned wells. 4. Utilize SWAP grant funds and/or funding from the NRCS's Water Well Decommissioning program to cap or plug the remaining abandoned wells	1. Animas WC 2. Animas WC 3. Animas WC and Jeff Titus 4. Animas WC
Residential Issues (fertilizers, pesticides, hazardous waste disposal, structural fires)	1. Work in conjunction with La Plata County Weed Management Program to develop weed management plans with private landowners. 2. Conduct public education and outreach programs for landowners/homeowners in the source water protection area to report issues and to encourage practices that will protect their drinking water source from potential contamination. This could include the installation of signs at strategic locations throughout the source water protection area, water bill inserts, public presentations, etc. 3. Promote the use of the City of Durango's existing hazardous waste collection and electronics recycling programs. 4. Provide the Durango Fire and Rescue Authority with maps of the source water protection area. This will better equip them to implement appropriate protocols to prevent groundwater contamination from structure fire runoff that occurs near the PWS wells.	1. Animas WC and La Plata County Weed Management 2. Animas WC 3. Animas WC 4. Animas WC
Sanitary Sewer Line Breaks	1. Work with the Hermosa Sanitation District to ensure that lines of communication are open and that contact info is updated regularly. 2. Share maps and shapefiles of the source water protection area with the Hermosa Sanitation District. 3. If necessary, locate and map all Hermosa Sanitation District Lines within Zone 1 of the source water protection areas. This could be accomplished by obtaining maps from Hermosa Sanitation District, or through the use of a snake and/or a magnetometer.	1. Animas WC 2. Animas WC 3. Animas WC and Hermosa Sanitation District

Animas Water Company PSOC's and/or Issues of Concern	Best Management Practices	Implementers
Fuel Storage Tanks	1. Share maps, shapefiles, and contact information with the Division of Oil and Public Safety and the Colorado Department of Public Health and Environment so that public water systems can be notified of spill events in a timely manner. 2. Meet with the local management of the Conoco station to distribute maps of the source water protection area and to open channels of communication to facilitate timely notification in the event of a spill. 3. Work with fuel delivery services to develop an inventory of residential or farm unregulated storage tanks within the SWPA. 4. Provide information to tank owners on how they can implement storage tank practices to prevent petroleum products from leaking to the ground.	1. Animas WC 2. Animas WC 3. Animas WC 4. Animas WC
Roads and Hazmat Transportation	1. Share shapefiles of the source water protection areas with CDOT to be overlaid on their spill response maps. 2. Maintain current PWS contact information with CDOT to improve notification of spill responses. 3. Share PWS contact list and maps/shapefiles of the SWPAs, wells, and intakes with the La Plata County Office of Emergency Management and commit to update it annually. 4. Share PWS Emergency Response Plans or PWS Contingency Plans with the La Plata County Office of Emergency Management and commit to update it annually.	1. Animas WC 2. Animas WC 3. Animas WC 4. Animas WC
Ditches	1. Maintain and exchange current contact lists with owners/operators of ditches delivering water within the SWPA of each PWS. 2. Share maps and shapefiles of the well locations and the SWPAs with ditches. 3. Work with ditch owners/operators to develop and maintain headgates that can be closed to prevent river water from entering the ditch during a time of concern.	1. Animas WC 2. Animas WC 3. Animas WC, and ditch operators
Emergency Backup Power	1. Encourage residents to register cell phone numbers with the County so that they can be notified and encouraged to implement conservation measures in the event of a disruption to water service. 2. Each PWS will complete and/or update the Contingency Plan to address the solution to emergency backup power needs.	1. Animas WC and La Plata County OEM 2. Animas WC

Table 29 Source Water Protection Best Management Practices for Blue Sky Ranch.

Blue Sky Ranch PSOC's and/or Issues of Concern	Best Management Practices	Implementers
Roads and Hazmat Transportation	1. Share shapefiles of the source water protection areas with CDOT to be overlaid on their spill response maps. 2. Maintain current PWS contact information with CDOT to improve notification of spill responses. 3. Share PWS contact list and maps/shapefiles of the SWPAs, wells, and intakes with the La Plata County Office of Emergency Management and commit to update it annually. 4. Share PWS Emergency Response Plans or PWS Contingency Plans with the La Plata County Office of Emergency Management and commit to update it annually.	1. Blue Sky Ranch 2. Blue Sky Ranch 3. Blue Sky Ranch 4. Blue Sky Ranch
Geothermal Wells	1. Research with the Colorado Division of Water Resources to find out if the existing geothermal well(s) has been plugged and abandoned. 2. If it has not been plugged and abandoned, work with the CO DWR to properly plug and abandon. 3. Research the risks associated with any future geothermal wells that may be developed.	1. Blue Sky Ranch 2. Blue Sky Ranch 3. Blue Sky Ranch
Abandoned Wells	1. Compile a list of private wells that are of highest concern based on proximity to the PWS wells and the water operator's on-the ground-knowledge of the private wells. 2. Submit the list to Jeff Titus, DWR Water Commissioner, and let him narrow down the list to a focus group of wells to be followed up on. 3. Collaborate with Jeff Titus to follow up with private landowners with wells in the focus group and to work with them to properly cap or plug the abandoned wells. 4. Utilize SWAP grant funds and/or funding from the NRCS's Water Well Decommissioning program to cap or plug the remaining abandoned wells	1. Blue Sky Ranch 2. Blue Sky Ranch 3. Blue Sky Ranch and Jeff Titus 4. Blue Sky Ranch
Ditches	1. Maintain and exchange current contact lists with owners/operators of ditches delivering water within the SWPA of each PWS. 2. Share maps and shapefiles of the well locations and the SWPAs with ditches. 3. Work with ditch owners/operators to develop and maintain headgates that can be closed to prevent river water from entering the ditch during a time of concern.	1. Blue Sky Ranch 2. Blue Sky Ranch 3. Blue Sky Ranch and ditch operators

Blue Sky Ranch PSOC's and/or Issues of Concern	Best Management Practices	Implementers
Residential Issues (fertilizers, pesticides, hazardous waste disposal, structural fires)	1. Work in conjunction with La Plata County Weed Management Program to develop weed management plans with private landowners. 2. Conduct public education and outreach programs for landowners/homeowners in the source water protection area to report issues and to encourage practices that will protect their drinking water source from potential contamination. This could include the installation of signs at strategic locations throughout the source water protection area, water bill inserts, public presentations, etc. 3. Promote the use of the City of Durango's existing hazardous waste collection and electronics recycling programs. 4. Provide the Durango Fire and Rescue Authority with maps of the source water protection area. This will better equip them to implement appropriate protocols to prevent groundwater contamination from structure fire runoff that occurs near the PWS wells.	1. Blue Sky Ranch and La Plata County Weed Management 2. Blue Sky Ranch 3. Blue Sky Ranch 4. Blue Sky Ranch
Sanitary Sewer Line Breaks	1. Work with the Hermosa Sanitation District to ensure that lines of communication are open and that contact info is updated regularly. 2. Share maps and shapefiles of the source water protection area with the Hermosa Sanitation District. 3. If necessary, locate and map all Hermosa Sanitation District Lines within Zone 1 of the source water protection areas. This could be accomplished by obtaining maps from Hermosa Sanitation District, or through the use of a snake and/or a magnetometer.	1. Blue Sky Ranch 2. Blue Sky Ranch 3. Blue Sky Ranch and Hermosa Sanitation District
Emergency Backup Power Supply	1. Identify and analyze the potential need for an emergency backup power supply so that drinking water operations can continue in the event of a disruption in the power supply. 2. Determine what modifications need to be made for the system to interface with a portable generator. 3. Each PWS will complete and/or update the Contingency Plan to address the solution to emergency backup power needs.	1. Blue Sky Ranch 2. Blue Sky Ranch 3. Blue Sky Ranch
Security/Vandalism	1. Secure the wellheads with a locking mechanism to lower risk of contamination from vandalism. 2. Blue Sky Ranch will consider the installation of fencing or a secure structure for the wells.	1. Blue Sky Ranch 2. Blue Sky Ranch

Table 30 Source Water Protection Best Management Practices for City of Durango.

City of Durango PSOC's and/or Issues of Concern	Best Management Practices	Implementers
Roads and Hazmat Transportation	1. Share shapefiles of the source water protection areas with CDOT to be overlaid on their spill response maps. 2. Maintain current PWS contact information with CDOT to improve notification of spill responses. 3. Share PWS contact list and maps/shapefiles of the SWPAs, wells, and intakes with the La Plata County Office of Emergency Management and commit to update it annually. 4. Share PWS Emergency Response Plans or PWS Contingency Plans with the La Plata County Office of Emergency Management and commit to update it annually.	1. City of Durango 2. City of Durango 3. City of Durango 4. City of Durango
Emergency Backup Power Supply	1. City of Durango has identified a need for emergency backup power to maintain storage during a power outage. They will continue to develop a plan to implement these measures that were identified. 2. Each PWS will complete and/or update the Contingency Plan to address the solution to emergency backup power needs.	1. City of Durango 2. City of Durango
Drought	1. Stay informed on the effects of future climate change. 2. Monitor the U.S. Drought Monitor on a regular basis to stay informed on the drought conditions of the Animas River Watershed. 3. Participate in local and regional forums on drought. 4. Assess your current water rights and acquire additional water rights in the future if needed. 5. Build an additional water storage tank in the future if needed. 6. Develop a Water Conservation Plan using a template and grant funding available from the Colorado Water Conservation Board. Implement ongoing water conservation measures. 7. Develop a Drought Mitigation Plan using a template available online at the Colorado Water Conservation Board's website. 8. Prepare plans for a rapid response to severe drought conditions.	1. City of Durango 2. City of Durango 3. City of Durango 4. City of Durango 5. City of Durango 6. City of Durango 7. City of Durango 8. City of Durango
Existing/Abandoned Mine Sites and Metals	1. Share maps, shapefiles, and contact information with CDPHE, CODRMS and EPA so that PWSs can be notified of mine blowouts and spill events in a timely manner. 2. Become involved in the Animas River	1. City of Durango 2. City of Durango

City of Durango PSOC's and/or Issues of Concern	Best Management Practices	Implementers
	Stakeholder Group to be kept aware of current threats and to participate in ongoing projects. 3. Coordinate with the ARSG, BLM, and DRMS to gain a better understanding of the lead slugs that have been detected in the Animas River recently. 4. Monitor Animas River flows and Animas River characteristics during storm events to help determine when to shut off the Animas Intake.	3. City of Durango 4. City of Durango
Wildfire	1. Provide a copy of the final SWPP along with GIS shapefiles of the source water protection area to USFS, the local Fire Protection District, and the La Plata County Office of Emergency Management for consideration during fire suppression as well as when planning and implementing wildland fire mitigation projects. 2. Provide the USFS with maps and shapefiles that they can refer to when applying fire retardant. According to the USFS's "Implementation Guide for Aerial Application of Fire Retardant" and the "Aerial Application of Fire Retardant and Foam: Avoidance Areas," the USFS will: a. Maintain a minimum 300-foot avoidance area on either side of all intermittent and perennial streams where water is flowing. b. Avoid aerial application of fire retardant or foam within 300 feet of waterways. A waterway is defined as a body of water including lakes, rivers, streams and ponds whether or not they contain aquatic life. 3. Explore opportunities to work with private landowners for landscape scale fuel reduction and defensible space projects. 4. Develop a post fire mitigation plan to effectively deal with things such as mudslides, increased turbidity, ash, etc.	1. City of Durango 2. City of Durango 3. City of Durango 4. USFS and City of Durango
Security/Vandalism	1. Rely on current security solutions in place and look for ways to improve those solutions as needs change.	1. City of Durango
Sanitary Sewer Line Breaks	1. Work with the Hermosa Sanitation District to ensure that lines of communication are open and that contact info is updated regularly. 2. Share maps and shapefiles of the SWPA with the Hermosa Sanitation District. 3. If necessary, locate and map all Hermosa Sanitation District Lines within Zone 1 of the	1. City of Durango 2. City of Durango 3. City of Durango and Hermosa

City of Durango PSOC's and/or Issues of Concern	Best Management Practices	Implementers
	source water protection areas. This could be accomplished by obtaining maps from Hermosa Sanitation District, or through the use of a snake and/or a magnetometer.	Sanitation District

Table 31 Source Water Protection Best Management Practices for Glacier Club.

Glacier Club PSOC's and/or Issues of Concern	Best Management Practices	Implementers
Wildfire	1. Provide a copy of the final SWPP along with GIS shapefiles of SWPA to USFS, the local Fire Protection District, and the La Plata County Office of Emergency Management for consideration during fire suppression and when planning and implementing wildland fire mitigation projects. 2. Provide the USFS with maps and shapefiles that they can refer to when applying fire retardant. According to the USFS's "Implementation Guide for Aerial Application of Fire Retardant" and the "Aerial Application of Fire Retardant and Foam: Avoidance Areas," the US Forest Service will: a. Maintain a minimum 300-foot avoidance area on either side of all intermittent and perennial streams where water is flowing. b. Avoid aerial application of fire retardant or foam within 300 feet of waterways. A waterway is defined as a body of water including lakes, rivers, streams and ponds whether or not they contain aquatic life. 3. Explore opportunities to work with private landowners for landscape scale fuel reduction and defensible space projects. 4. Develop a post fire mitigation plan to effectively deal with things such as mudslides, increased turbidity, ash, etc.	1. Glacier Club 2. Glacier Club 3. Glacier Club 4. USFS and Glacier Club
Existing/Abandoned Mine Sites and Metals	1. Share maps, shapefiles, and contact information with CDPHE, CODRMS and EPA so that PWSs can be notified of mine blowouts and spill events in a timely manner. 2. Become involved in the Animas River Stakeholder Group to be kept aware of current threats and to participate in ongoing projects. 3. Coordinate with the ARSG, BLM, and DRMS to gain a better understanding of the lead slugs that have been detected in the Animas River recently. 4. Monitor Animas River flows and Animas River characteristics during storm events to help determine when to shut off the Animas Intake.	1. Glacier Club 2. Glacier Club 3. Glacier Club 4. Glacier Club
Emergency Backup Power	1. Plan A – Glacier Club will attempt to refurbish and relocate an existing 90 kilowatt generator. 2. Plan B – If Plan A fails, Glacier Club will identify, plan, and budget for an emergency backup power supply in the distribution system so that drinking water operations can continue in the event that a fire disrupts the power supply.	1. Glacier Club 2. Glacier Club

Glacier Club PSOC's and/or Issues of Concern	Best Management Practices	Implementers
Drought	1. Stay informed on the effects of future climate change. 2. Monitor the U.S. Drought Monitor on a regular basis to stay informed on the drought conditions of the Animas River Watershed. 3. Participate in local and regional forums on drought. 4. Assess your current water rights and acquire additional water rights in the future if needed. 5. Build an additional water storage tank in the future if needed. 6. Develop a Water Conservation Plan using a template and grant funding available from the Colorado Water Conservation Board. Implement ongoing water conservation measures. 7. Develop a Drought Mitigation Plan using a template available online at the Colorado Water Conservation Board's website. 8. Prepare plans for a rapid response to severe drought conditions.	1. Glacier Club 2. Glacier Club 3. Glacier Club 4. Glacier Club 5. Glacier Club 6. Glacier Club 7. Glacier Club 8. Glacier Club
Weed and Pest Management Activities	1. Share maps and shapefiles of well/intake locations and SWPAs to allow the La Plata County Weed Management and the Animas Mosquito Control District to effectively protect them. 2. Work with the La Plata County Weed Management Program to establish a weed management plan for Zone 1 of the source water protection areas that may be comprised of mechanical treatment only. 3. Maintain a current contact list between the public water systems and the La Plata County Weed Management Program and the Animas Mosquito Control District. 4. Coordinate with the La Plata County Weed Management Program on education and outreach opportunities within the community.	1. Glacier Club 2. Glacier Club 3. Glacier Club 4. Glacier Club
Roads and Hazmat Transportation	1. Share shapefiles of the SWPAs with CDOT to be overlaid on their spill response maps. 2. Maintain current PWS contact information with CDOT to improve notification of spill responses. 3. Share PWS contact list and maps/shapefiles of the SWPAs, wells, and intakes with the La Plata County Office of Emergency Management and commit to update it annually. 4. Share PWS Emergency Response Plans or PWS Contingency Plans with the La Plata County Office of Emergency Management and commit to update it annually.	1. Glacier Club 2. Glacier Club 3. Glacier Club 4. Glacier Club

Table 32 Source Water Protection Best Management Practices for Goodman POA.

Goodman POA PSOC's and/or Issues of Concern	Best Management Practices	Implementers
Roads and Hazmat Transportation	1. Share shapefiles of the SWPAs with CDOT to be overlaid on their spill response maps. 2. Maintain current PWS contact information with CDOT to improve notification of spill responses. 3. Share PWS contact list and maps/shapefiles of the source water protection areas, wells, and intakes with the La Plata County Office of Emergency Management and commit to update it annually. 4. Share PWS Emergency Response Plans or PWS Contingency Plans with the La Plata County Office of Emergency Management and commit to update it annually.	1. Goodman POA 2. Goodman POA 3. Goodman POA 4. Goodman POA
Durango & Silverton Narrow Gauge Railroad and Hermosa Yard	1. Maintain and exchange current contact lists with the D&SNGRR. 2. Share maps and shapefiles of the well locations and the source water protection areas with the D&SNGRR. 3. Research the mobility of creosote in soil and groundwater. 4. Collaborate with the D&SNGRR to construct a permanent cover over the railroad ties at the Hermosa Yard to minimize the risk of creosote entering the soil and groundwater.	1. Goodman POA 2. Goodman POA 3. Goodman POA 4. Goodman POA and Hermosa MHV
Emergency Backup Power	1. Identify and analyze the potential need for an emergency backup power supply so that drinking water operations can continue in the event of a disruption in the power supply. 2. Determine what modifications need to be made for the system to interface with a portable generator. 3. Each PWS will complete and/or update the Contingency Plan to address the solution to emergency backup power needs.	1. Goodman POA 2. Goodman POA 3. Goodman POA

Goodman POA PSOC's and/or Issues of Concern	Best Management Practices	Implementers
Residential Issues (fertilizers, pesticides, hazardous waste disposal, structural fires)	1. Work in conjunction with La Plata County Weed Management Program to develop weed management plans with private landowners. 2. Conduct public education and outreach programs for landowners/homeowners in the source water protection area to report issues and to encourage practices that will protect their drinking water source from potential contamination. This could include the installation of signs at strategic locations throughout the SWPA, water bill inserts, public presentations, etc. 3. Promote the use of the City of Durango's existing hazardous waste collection and electronics recycling programs. 4. Provide the Durango Fire and Rescue Authority with maps of the source water protection area. This will better equip them to implement appropriate protocols to prevent groundwater contamination from structure fire runoff that occurs near the PWS wells.	1. Goodman POA and La Plata County Weed Management 2. Goodman POA 3. Goodman POA 4. Goodman POA
Abandoned Wells	1. Compile a list of private wells that are of highest concern based on proximity to the PWS wells and the water operator's on-the ground-knowledge of the private wells. 2. Submit the list to Jeff Titus, CODWR Water Commissioner, and let him narrow down the list to a focus group of wells to be followed up on. 3. Collaborate with Jeff Titus to follow up with private landowners with wells in the focus group and to work with them to properly cap or plug the abandoned wells. 4. Utilize SWAP grant funds and/or funding from the NRCS's Water Well Decommissioning program to cap or plug the remaining abandoned wells	1. Goodman POA 2. Goodman POA 3. Goodman POA and Jeff Titus 4. Goodman POA
Security/Vandalism	1. Improve the door on our pump house and check the security of the wellheads to prevent tampering.	1. Goodman POA

Table 33 Source Water Protection Best Management Practices for Hermosa MHV.

Hermosa MHV PSOC's and/or Issues of Concern	Best Management Practices	Implementers
Fuel Storage Tanks (including Conoco)	1. Share maps, shapefiles, and contact information with the Division of Oil and Public Safety and the CDPHE so that public water systems can be notified of spill events in a timely manner. 2. Work with fuel delivery services to develop an inventory of residential or farm unregulated storage tanks within the SWPA. 3. Provide information to tank owners on how they can implement storage tank practices to prevent petroleum products from leaking onto the ground. 4. Meet with the local and upper management of the Conoco station to distribute maps of the SWPA and to open channels of communication to facilitate timely notification in the event of a spill.	1. Hermosa MHV 2. Hermosa MHV 3. Hermosa MHV 4. Hermosa MHV
Durango & Silverton Narrow Gauge Railroad and Hermosa Yard	1. Maintain and exchange current contact lists with the D&SNGRR. 2. Share maps and shapefiles of the well locations and the source water protection areas with the D&SNGRR. 3. Research the mobility of creosote in soil and groundwater. 4. Collaborate with the D&SNGRR to construct a permanent cover over the railroad ties at the Hermosa Yard to minimize the risk of creosote entering the soil and groundwater.	1. Hermosa MHV 2. Hermosa MHV 3. Hermosa MHV 4. Hermosa MHV and Goodman POA
Sanitary Sewer Line Breaks	1. Work with the Hermosa Sanitation District to ensure that lines of communication are open and that contact info is updated regularly. 2. Share maps and shapefiles of the SWPA with the Hermosa Sanitation District. 3. If necessary, locate and map all Hermosa Sanitation District Lines within Zone 1 of the SWPAs. This could be accomplished by obtaining maps from Hermosa Sanitation District, or through the use of a snake and/or a magnetometer.	1. Hermosa MHV 2. Hermosa MHV 3. Hermosa MHV and Hermosa Sanitation District

Hermosa MHV PSOC's and/or Issues of Concern	Best Management Practices	Implementers
Residential Issues (fertilizers, pesticides, hazardous waste disposal, structural fires)	1. Work in conjunction with La Plata County Weed Management Program to develop weed management plans with private landowners. 2. Conduct public education and outreach programs for landowners/homeowners in the source water protection area to report issues and to encourage practices that will protect their drinking water source from potential contamination. This could include the installation of signs at strategic locations throughout the source water protection area, water bill inserts, public presentations, etc. 3. Promote the use of the City of Durango's existing hazardous waste collection and electronics recycling programs. 4. Provide Durango Fire and Rescue Authority with maps of the SWPA. This will better equip them to implement appropriate protocols to prevent groundwater contamination from structure fire runoff that occurs near the PWS wells.	1. Hermosa MHV and La Plata County Weed Management 2. Hermosa MHV 3. Hermosa MHV 4. Hermosa MHV
Abandoned Wells	1. Compile a list of private wells that are of highest concern based on proximity to the PWS wells and the water operator's on-the ground-knowledge of the private wells. 2. Submit the list to Jeff Titus, CODWR Water Commissioner, and let him narrow down the list to a focus group of wells to be followed up on. 3. Collaborate with Jeff Titus to follow up with private landowners with wells in the focus group and to work with them to properly cap or plug the abandoned wells. 4. Utilize SWAP grant funds and/or funding from the NRCS's Water Well Decommissioning program to cap or plug the remaining abandoned wells	1. Hermosa MHV 2. Hermosa MHV 3. Hermosa MHV and Jeff Titus 4. Hermosa MHV
Emergency Backup Power Supply	1. Identify and analyze the potential need for an emergency backup power supply so that drinking water operations can continue in the event of a disruption in the power supply. 2. Determine what modifications need to be made for the system to interface with a portable generator. 3. Each PWS will complete and/or update the Contingency Plan to address the solution to emergency backup power needs.	1. Hermosa MHV 2. Hermosa MHV 3. Hermosa MHV

Table 34 Source Water Protection Best Management Practices for Purgatory Metro District.

Purgatory MD PSOC's and/or Issues of Concern	Best Management Practices	Implementers
Security/Vandalism	1. Rely on existing measures to prevent vandalism/tampering. 2. Remain vigilant to recognize if/when vandalism/tampering occurs, especially during ski season. 3. Consider the installation of fencing around the tank.	1. Purgatory MD 2. Purgatory MD 3. Purgatory MD
Emergency Backup Power	1. Purgatory MD will identify and analyze the potential need for an emergency backup power supply so that drinking water operations can continue in the event of a disruption in the power supply. 2. Determine what modifications need to be made for the system to interface with a portable generator. 3. Each PWS will complete and/or update the Contingency Plan to address the solution to emergency backup power needs.	1. Purgatory MD 2. Purgatory MD 3. Purgatory MD
Wildfire	1. Provide a copy of the final SWPP along with GIS shapefiles of the source water protection area to USFS, the local Fire Protection District, and the La Plata County Office of Emergency Management for consideration during fire suppression as well as when planning and implementing wild land fire mitigation projects. 2. Provide the USFS with maps and shapefiles that they can refer to when applying fire retardant. According to the USFS's "Implementation Guide for Aerial Application of Fire Retardant" and the "Aerial Application of Fire Retardant and Foam: Avoidance Areas," the USFS will: a. Maintain a minimum 300-foot avoidance area on either side of all intermittent and perennial streams where water is flowing. b. Avoid aerial application of fire retardant or foam within 300 feet of waterways. A waterway is defined as a body of water including lakes, rivers, streams and ponds whether or not they contain aquatic life. 3. Explore opportunities to work with private landowners for landscape scale fuel reduction and defensible space projects. 4. Develop a post fire mitigation plan to effectively deal with things such as mudslides, increased turbidity, ash, etc.	1. Purgatory MD 2. Purgatory MD 3. Purgatory MD 4. USFS and Purgatory MD

Purgatory MD PSOC's and/or Issues of Concern	Best Management Practices	Implementers
Fuel Storage Tanks	1. Share maps, shapefiles, and contact information with the Division of Oil and Public Safety and the Colorado Department of Public Health and Environment so that public water systems can be notified of spill events in a timely manner. 2. Meet with the local management of the Conoco station to distribute maps of the source water protection area and to open channels of communication to facilitate timely notification in the event of a spill. 3. Work with fuel delivery services to develop an inventory of residential or farm unregulated storage tanks within the SWPA. 4. Provide information to tank owners on how they can implement storage tank practices to prevent petroleum products from leaking onto the ground.	1. Purgatory MD 2. Purgatory MD 3. Purgatory MD 4. Purgatory MD

Table 35 Source Water Protection Best Management Practices for Town of Silverton.

Town of Silverton PSOC's and/or Issues of Concern	Best Management Practices	Implementers
Wildfire (including ash from a regional fire)	1. Provide a copy of the final SWPP along with GIS shapefiles of the source water protection area to USFS, the local Fire Protection District, and the La Plata County Office of Emergency Management for consideration during fire suppression as well as when planning and implementing wild land fire mitigation projects. 2. Provide the USFS with maps and shapefiles that they can refer to when applying fire retardant. According to the USFS's "Implementation Guide for Aerial Application of Fire Retardant" and the "Aerial Application of Fire Retardant and Foam: Avoidance Areas," the USFS will: a. Maintain a minimum 300-foot avoidance area on either side of all intermittent and perennial streams where water is flowing. b. Avoid aerial application of fire retardant or foam within 300 feet of waterways. A waterway is defined as a body of water including lakes, rivers, streams and ponds whether or not they contain aquatic life. 3. Explore opportunities to work with public land managers for landscape scale fuel reduction and defensible space projects. 4. Develop a post fire mitigation plan to effectively deal with things such as mudslides, increased turbidity, ash, etc. *5.* Monitor raw water and filters and increase backwashing as necessary.	1. Silverton 2. Silverton 3. Silverton 4. USFS and Silverton 5. Silverton
Existing/Abandoned Mine Sites and Metals	1. Share maps, shapefiles, and contact information with CDPHE, CODRMS and EPA so that PWSs can be notified of mine blowouts and spill events in a timely manner. 2. Become involved in the Animas River Stakeholder Group to be kept aware of current threats and to participate in ongoing projects. 3. Coordinate with the ARSG, the BLM, and DRMS to gain a better understanding of the lead slugs that have been detected in the Animas River recently.	1. Silverton 2. Silverton 3. Silverton
Skiers/Hikers	1. Coordinate with the USFS and BLM on education and outreach opportunities that may include signage at the access to the SWPAs.	1. Silverton
Snowmobiles	1. Coordinate with the USFS and BLM on education and outreach opportunities that may include signage at the access to the SWPAs.	1. Silverton

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APPENDICES[4]

1. Animas Water Company Appendices
   1.1. Contingency Plan*
   1.2. Source Water Assessment Report
   1.3. Source Water Assessment Report Appendix
   1.4. PSOC Inventory Map

2. Association of Owners, Blue Sky Ranch, Inc. Appendices
   2.1. Contingency Plan*
   2.2. Source Water Assessment Report
   2.3. Source Water Assessment Report Appendix
   2.4. PSOC Inventory Map

3. City of Durango Appendices
   3.1. Contingency Plan*
   3.2. Source Water Assessment Report
   3.3. Source Water Assessment Report Appendix
   3.4. PSOC Inventory Map

4. Glacier Club Appendices
   4.1. Contingency Plan*
   4.2. Source Water Assessment Report
   4.3. Source Water Assessment Report Appendix
   4.4. PSOC Inventory Map

5. Goodman POA Appendices
   5.1. Contingency Plan*
   5.2. Source Water Assessment Report
   5.3. Source Water Assessment Report Appendix
   5.4. PSOC Inventory Map

6. Hermosa MHV Appendices
   6.1. Contingency Plan*
   6.2. Source Water Assessment Report
   6.3. Source Water Assessment Report Appendix
   6.4. PSOC Inventory Map

[4] Notice: This public document does not include appendices that may be sensitive to the safety and operation of the individual public water system. Appendices marked with an "*" are only included in the public water system's report or kept on file at their office. All other documents are included on the CD located in the back pocket of this report. All documents can be reprinted.

7. Purgatory MD Appendices
   7.1. Contingency Plan*
   7.2. Source Water Assessment Report
   7.3. Source Water Assessment Report Appendix
   7.4. PSOC Inventory Map

8. Town of Silverton Appendices
   8.1. Contingency Plan*
   8.2. Source Water Assessment Report
   8.3. Source Water Assessment Report Appendix
   8.4. PSOC Inventory Map

9. Permitted Fuel Storage Tank Sites Within the ADWA SWPA

10. MOU Between CDPHE and U.S. Forest Service Rocky Mountain Region

11. Table A-1 Discrete Contaminant Types

12. Table A-2 Discrete Contaminant Types (SIC Related)

13. Table B-1 Dispersed Contaminant Types

14. Table C-1 Contaminants Associated with Common PSOC's

15. ADWA Emergency Notification Card