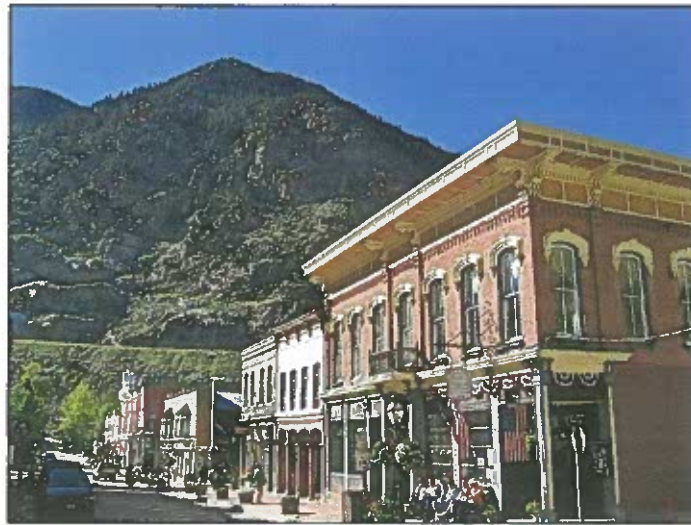


# **Town of Georgetown Source Water Protection Plan**

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**Clear Creek County, Colorado  
February 23, 2015**



Written by: Colleen Williams  
Source Water Specialist  
Colorado Rural Water Association

For the Community Water Provider:  
Town of Georgetown: ID # CO0110015



Cover Photo by \_\_\_\_\_

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## ACRONYMS

ARNF/PNG	Arapaho Roosevelt National Forest and Pawnee National Grasslands
BMP	Best Management Practice
CCWF	Clear Creek Watershed Foundation
CDOT	Colorado Department of Transportation
CDPHE	Colorado Department of Public Health and Environment
CFS	Cubic Feet per Second
COC	Contaminant of Concern
CRWA	Colorado Rural Water Association
DOC	Dissolved Organic Carbon
DRMS	Division of Reclamation, Mining and Safety
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Administration
GIS	Geographic Information System
MCL	Maximum Contaminant Level
MOU	Memorandum of Understanding
OEM	Office of Emergency Management
OWTS	Onsite Wastewater Treatment System
PSOC	Potential Source of Contamination
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
TMDL	Total Maximum Daily Load
TU	Trout Unlimited
UCCWA	Upper Clear Creek Watershed Association
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USDA	United States Department of Agriculture
USGS	United States Geological Survey
WBID	Water Body Identification
WQCC	Water Quality Control Commission
WQCD	Water Quality Control Division

## 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 a source water protection plan. 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 source. Implementation of a source water protection plan provides an additional layer of protection at the local level beyond drinking water regulations.

The Town of Georgetown values a clean, high quality drinking water supply and decided to work collaboratively with area stakeholders to develop a Source Water Protection Plan. The source water protection planning effort consisted of public planning meetings and individual meetings with water operators during the months of September, 2014 through February, 2015 at the Georgetown Community Center in Georgetown, Colorado. During the development of this Plan, a Steering Committee was formed to develop and implement this Source Water Protection Plan. Colorado Rural Water Association was instrumental in this effort by providing technical assistance in the development of this Source Water Protection Plan.

The Town of Georgetown obtains their drinking water from a surface water intake on South Clear Creek. The Source Water Protection Area for this water source is the South Clear Creek watersheds upstream from the Town's intake. This Source Water Protection Area is the area that the Town of Georgetown has chosen to focus its source water protection measures to reduce source water susceptibility to contamination.

The Steering Committee conducted an inventory of potential contaminant sources and identified other issues of concern within the Source Water Protection Area that may impact the Town's drinking water sources. The Steering Committee prioritized the list of issues of concern as: abandoned mine land, roads runoff and spills, wildland fire, flooding, dam failure, wildlife bacteria, weed abatement, future mining activity, dumping, camping along creek, septic systems, and reservoir maintenance.

The Steering Committee developed several 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 community drinking water supplies; and empowering local communities to become stewards of their drinking water supplies by taking actions to protect their water sources.

At the completion of this plan, members of the Steering Committee will meet to develop an Action Plan of BMPs to implement during 2015. It is further recommended that this Plan be reviewed at a frequency of once every three years or if circumstances change resulting in the development of new water sources and source water protection areas, or if new risks are identified.

## INTRODUCTION

The Town of Georgetown operates a community water supply system that supplies drinking water to 1,034 residents and businesses located within Clear Creek County, Colorado. The Town of Georgetown obtains their drinking water from surface water intakes on South Clear Creek. The Town 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.<sup>1</sup>

Table 1. Primary Contact Information for Town of Georgetown

PWSID	PWS Name	Name	Title	Address	Phone
CO0110015	Town of Georgetown	Tom Hale	Town Administrator	P.O. Box 426 404 6 <sup>th</sup> Street Georgetown, CO 80444	303-569-2555

### Purpose of the Source Water Protection Plan

The Source Water Protection Plan (SWPP) is a tool for the Town of Georgetown to ensure clean and high quality drinking water sources for current and future generations. This Source Water Protection Plan 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 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) will complement existing regulatory mandates implemented at the state and federal governmental levels by filling any gaps through local management strategies that are collaboratively developed.

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<sup>1</sup> The information contained in this Plan is limited to that available from public records and the Town of Georgetown 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. Furthermore, identification of a site as a "potential contaminant site" should not be interpreted as one that will necessarily cause contamination of the water supply.



## Protection Plan Development

The Colorado Rural Water Association's (CRWA) Source Water Protection Specialist, Colleen Williams, helped facilitate 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 public water systems to reduce or eliminate the potential risks to drinking water supplies through the development of Source Water Protection Plans, and provide assistance for the implementation of prevention measures.

The source water protection planning effort consisted of a series of public planning meetings and individual meetings (Table 2). Information discussed at the meetings helped the Town of Georgetown develop an understanding of the issues affecting source water protection for the community. The Steering Committee then made recommendations for management approaches to be incorporated into the Source Water Protection Plan. In addition to the planning meetings, data and other information pertaining to Source Water Protection Area was gathered via public documents, internet research, phone calls, emails, and field trips to the protection area. A summary of the meetings is represented below.

Table 2. Planning Meetings

Date	Purpose of Meeting
April 22, 2014	Provided a presentation to the Georgetown Board of Selectmen on Colorado Rural Water Association's Source Water Protection Program and developing a protection plan for the Town of Georgetown.
September 10, 2014	First Planning Meeting - Presentation on the process of developing a Source Water Protection Plan for the Town of Georgetown. Review of the State's Source Water Assessment for Town of Georgetown and the delineation of the source water protection area.
October 20, 2014	Second Planning Meeting – Developed an inventory of potential contaminant sources and issues of concern within the Source Water Protection Area. Steering Committee completed a SWAP Risk Assessment to prioritize the issues of concern.
November 17, 2014	Third Planning Meeting – Developed a list of best management practices to include in the SWPP to address the issues of concern and decrease risk to the source waters. Completed a SWAP Risk Assessment to prioritize the issues of concern.
December 15, 2014	Fourth Planning Meeting – Continued to work on developing a list of best management practices to include in the SWPP to address the issues of concern and decrease risk to the source waters. Focused on abandoned mine land within the Leavenworth Creek watershed.
February 23, 2015	Fifth Planning Meeting – Reviewed and edited draft Source Water Protection Plan; appointed Steering Committee members to help implement the Plan; and set the date for the final edits and first plan implementation meeting.



## Stakeholder Participation in the Planning Process

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 Source Water Protection Plan is more likely where local stakeholders have actively participated in the development of their Protection Plan.

The Town of Georgetown's source water protection planning process attracted interest and participation from 18 stakeholders including local citizens and landowners, water operators, local and county governments, and agency representatives (Table 3). During the months of September, 2014 through February, 2015, five stakeholder meetings were held at the Community Center in Georgetown to encourage local stakeholder participation in the planning process. Input from these participants was greatly appreciated. At the end of the planning process, a Steering Committee was formed from the stakeholder group to implement this Source Water Protection Plan.

Table 3. Table of Stakeholder Participants

Stakeholder	Title	Affiliation
Tom Hale	Town Administrator	Town of Georgetown
John Curtis	Water Operations	Town of Georgetown
Ryan Zabel	Water Operator	Town of Georgetown
Lynette Kelsey	Board of Selectmen	Town of Georgetown
Ed Hoover	Board of Selectmen	Town of Georgetown
Fred Rollenhagen	Planning Department	Clear Creek County
Kathleen Krebs	Emergency Management Director	Clear Creek County
Smoky Anderson	Open Space	Clear Creek County
Phil Buckland	Board of Commissioners	Clear Creek County
Frank Young	Open Space	Clear Creek County
Bert Weaver	Community Development Director	Clear Creek County
JoAnn Sorensen	Land Use Division Director	Clear Creek County
Dave Holm	Executive Director	Clear Creek Watershed Foundation
Deb Zack	Inactive Mines Reclamation Program Project Manager	Colorado Division Reclamation, Mining and Safety
Christine Johnson	Senior Environmental Analyst	XCEL Energy
Elizabeth Russell		Trout Unlimited
Dylan Trujillo	Source Water Specialist	Colorado Rural Water Association
Colleen Williams	Source Water Specialist	Colorado Rural Water Association

## Development and Implementation Grant

The Town of Georgetown has been awarded a \$5,000 Development and Implementation Grant from the Colorado Department of Public Health and Environment (CDPHE) in July 2014. This funding is available to public water systems who are committed to developing and implementing a source water protection plan. The Town intends on using this funding to implement management approaches that are identified in this Plan.

## WATER SUPPLY SETTING

### Location and Description

The Town of Georgetown is a rural community located in Clear Creek County in the north-central front range of Colorado. The town of Georgetown is located at Latitude 39°42'45"N, Longitude 105°41'45"W at an elevation of 8,530 feet. Georgetown is situated along the Interstate Highway 70 corridor 45 miles west of Denver. According to the U.S. 2010 Census Bureau, the town has a total area of 1.2 square miles (3.0 km<sup>2</sup>), 505 occupied residential dwellings, and a population of 1,034 residents. The population in 2000 was 1,088 and has decreased 4.96% by 2010 (DOLA, 2012).

The Town was incorporated in 1868 as a Territorial Charter Municipality, the only Colorado municipality that still operates under a charter from the Territory of Colorado (Wiki, 2014). The Town's municipal affairs are governed by the Georgetown Board of Selectmen. The county seat is located in the city of Idaho Springs, 10 miles south of Georgetown.

The Town obtains its drinking water supply from a surface water intake off South Clear Creek. The source water protection area includes the watersheds upstream from the town's intake including the Leavenworth Creek subwatershed (Fig. 1).

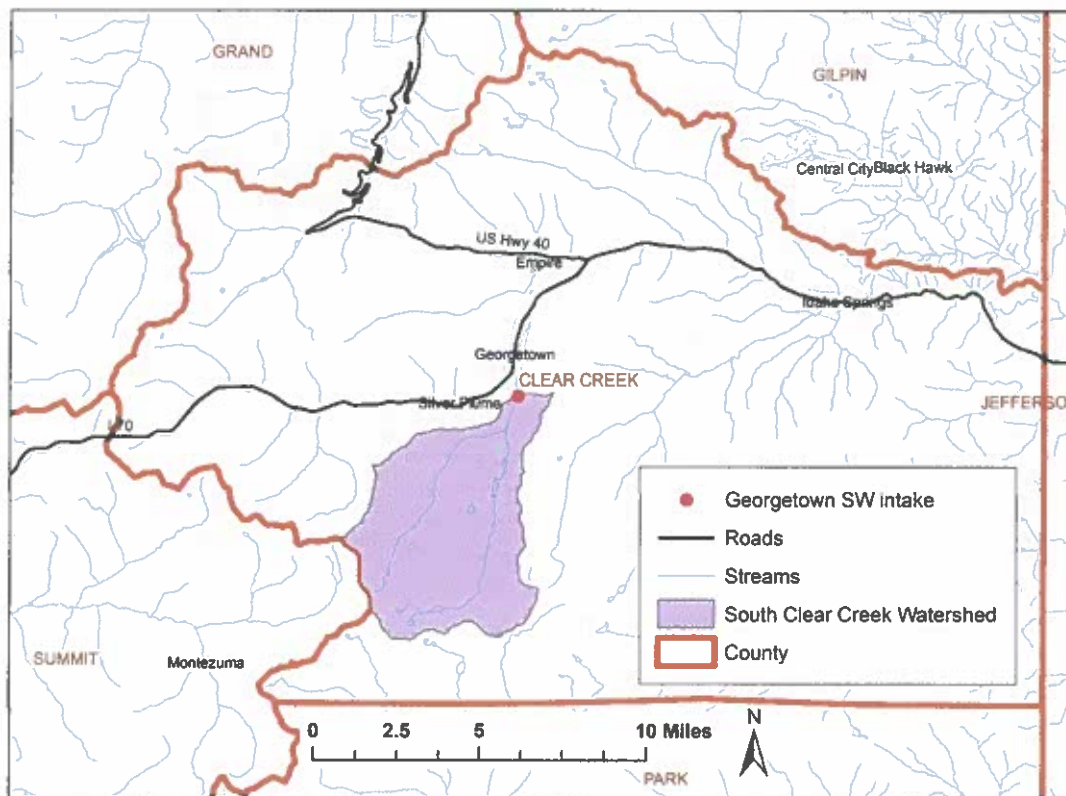


Figure 1. Regional setting map.



## Physical Characteristics

The Town of Georgetown's source water protection area, the South Clear Creek watershed, lies within the Southern Rocky Mountain province physiographic area that encompasses the center of the state and runs its entire north-south length. The South Clear Creek watershed is surrounded by high mountain peaks including Alpine Peak (11,552 feet), Sugarloaf Peak (12,513 feet), Pendleton Mountain (12,275 feet), Ganley Mountain (12,902 feet) and Mount Wilcox (13,408 feet). Mount Edwards (13,850 feet) and Argentine Peak (13,738 feet) form the southwestern boundary of the watershed along the Continental Divide, and the eastern boundary lies within the Mount Evans Wilderness Area (Fig. 2).

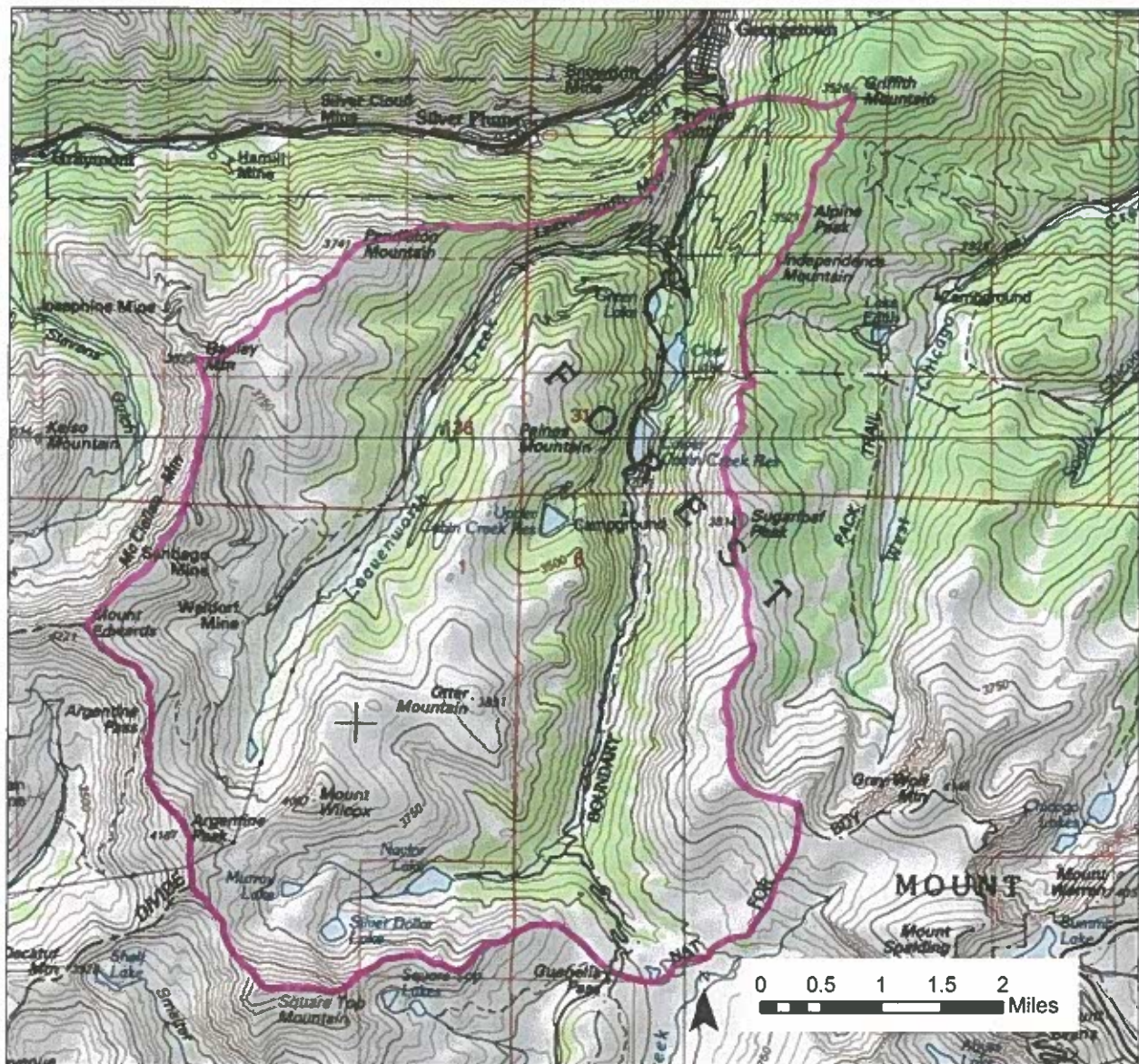


Figure 2. Topographic map of the Source Water Protection Area.



## Ecological Regions

The source water protection area lies within the Subalpine and Alpine Ecosystem (Fig. 3). The subalpine zone lies immediately below treeline, generally found between 10,000 and 11,000 feet. The subalpine forest is a transition zone from dense forest below to alpine tundra above treeline. Treeline is not really a line, but rather a zone where trees gradually get smaller and more stunted until conditions are too challenging for tree growth. A typical subalpine forest may consist mostly of subalpine fir, Engelmann spruce and Limber pine. Clark's nutcracker, golden eagle, red-tailed hawk, dusky grouse, mountain chickadee, and gray jay find habitat in this life zone, as well as cottontail rabbit, boreal toad, snowshoe hare, and Fremont squirrel (USP, 2015).

The Alpine Zone, the highest mountain zone starting at elevations of 11,000 to 11,500 feet, includes alpine meadows as well as steep, exposed rock and glaciated peaks. The alpine zone is a tundra community with a harsh environment and a short growing season. This life zone is characterized by the dominance of elk sedge, low willow, hairgrass meadow, and small fens and ponds. Strong winds, low temperatures, and shallow soils make this area especially vulnerable to the impacts of overuse. Supporting one of the largest alpine willow carrs in Colorado, this landscape is home to pika, bighorn sheep, mountain goat, and marmot as well as critical winter habitat and nesting grounds for white-tailed ptarmigan and nesting opportunities for rosey finch, water pipit, and whitecrowned sparrow (GPSBC, 2001).

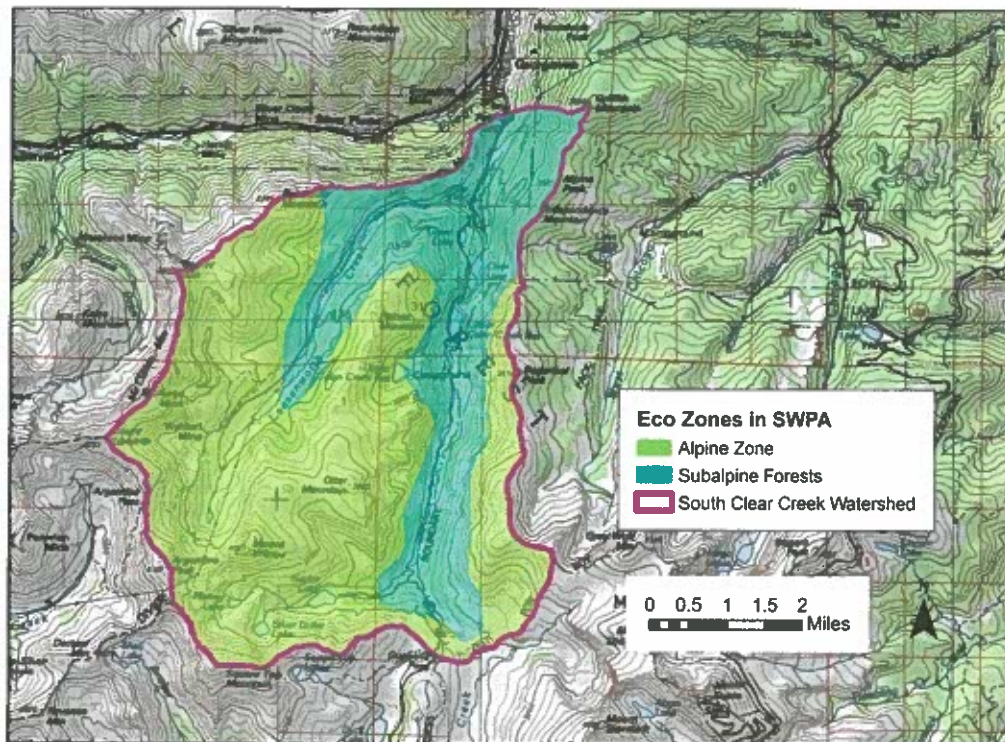


Figure 3. Map of the ecological zones within the Source Water Protection Area.

## Climate

The climate within the Source Water Protection Area is dependent on elevation and location, with precipitation increasing moderately with altitude. Average annual precipitation ranges from about 22 inches in the lower watershed to about 37 inches in the higher mountains (Fig. 4). The majority of precipitation occurs during heavy spring snow and late summer monsoon rains. The county's high elevation and proximity to the continental divide play a major role in moderating summertime temperatures and deepening the chill of winter. Temperature also varies depending on elevations with average high temperature during July around 82 degrees Fahrenheit and January lows around 1 degree Fahrenheit (CCCCWPP).

Most of the precipitation that falls on the land surface during storm events flows directly into drainages, streams, and rivers as runoff. Some of the water will infiltrate the soil and recharge the underlying fractured rock aquifers. The average runoff for the watershed is 20 inches at the top of the ridges and 5-10 inches in the lower watershed (Topper et al, 2003).

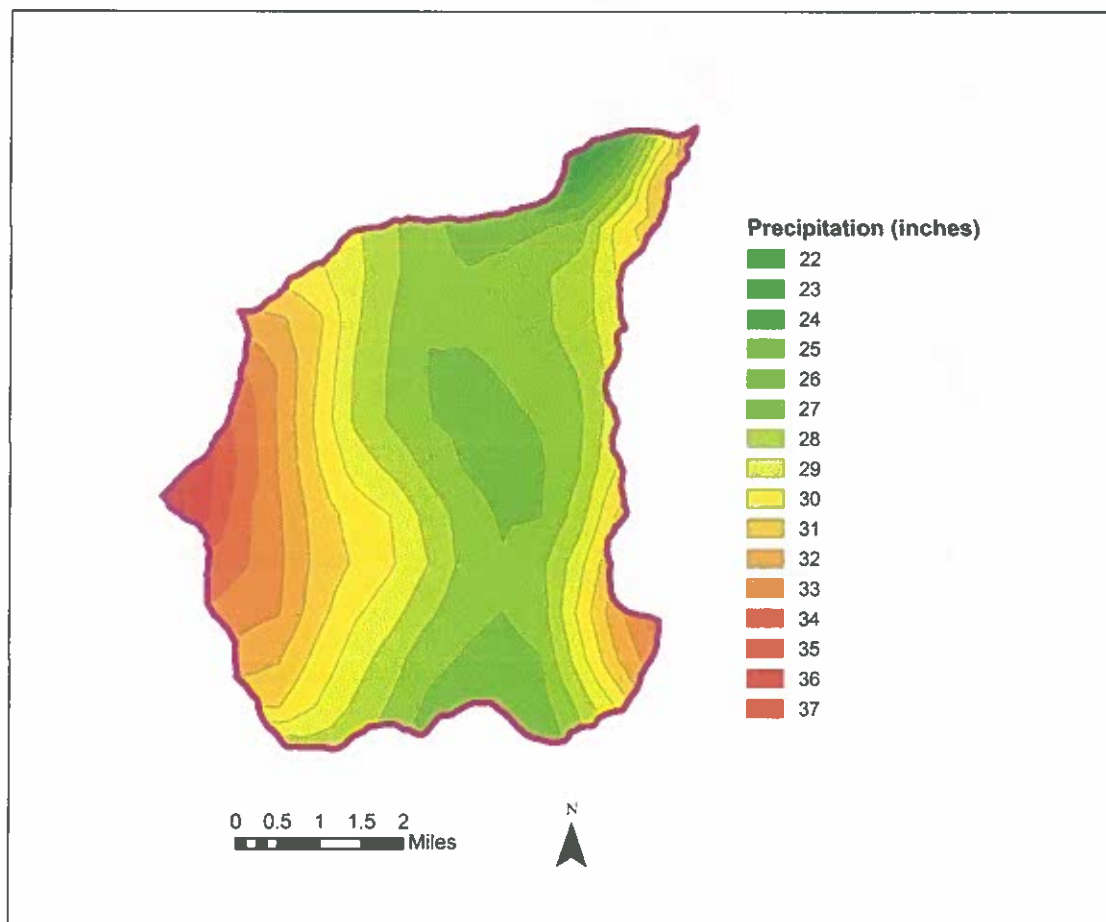


Figure 4. Average annual precipitation map of the Source Water Protection Area.

## Land Ownership and Use

The Source Water Protection Area lies within both public and private lands. The private land includes land within the unincorporated areas of Clear Creek County. The public lands include Arapaho National Forest land managed by the Clear Creek Ranger District, Clear Creek County Open Space, and Silver Heritage Area of Upper Clear Creek (Fig. 5). Land use includes sparse rural residential development, recreation (camping, hiking, climbing, fishing, mountain biking, x-country skiing, horseback riding, auto touring, sightseeing), big game hunting, old mine sites, grazing, wildlife habitat and other.

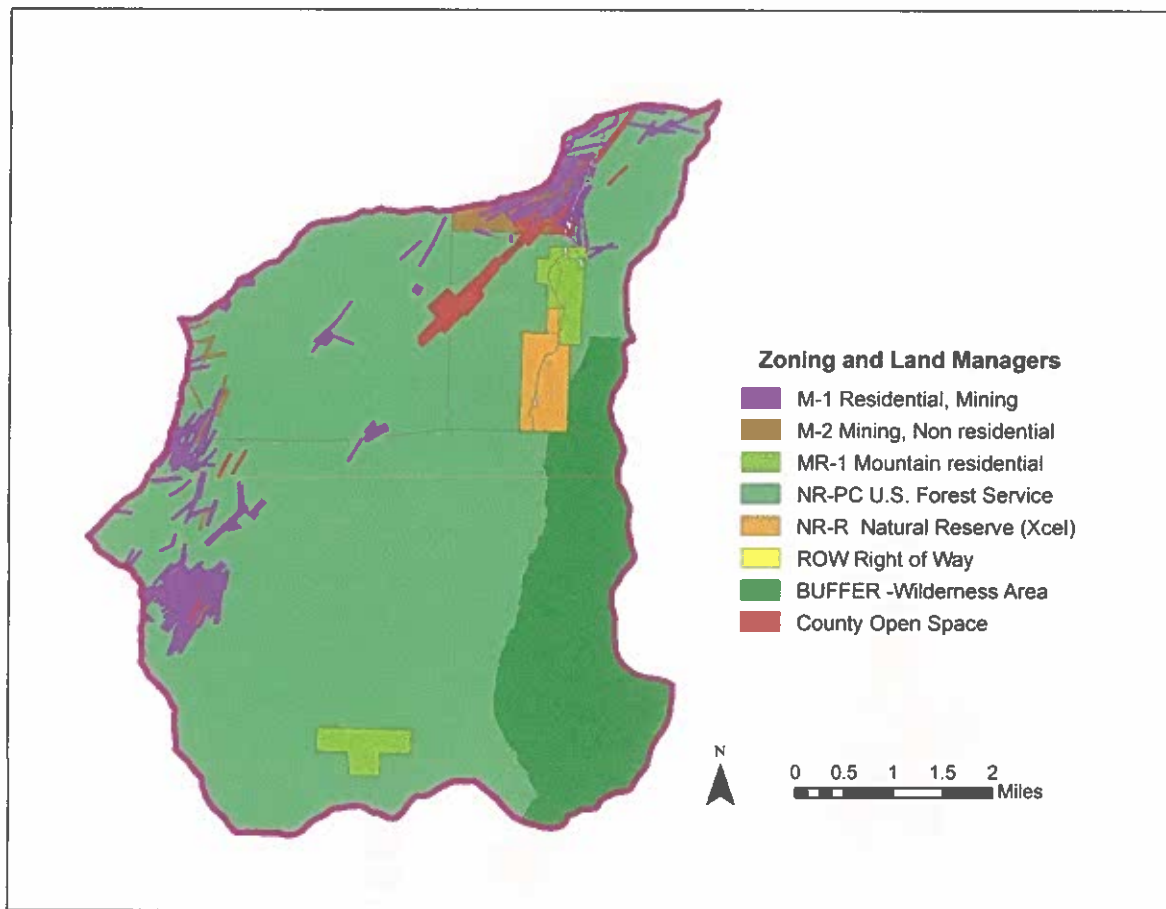


Figure 5. Land managers of the Source Water Protection Area.

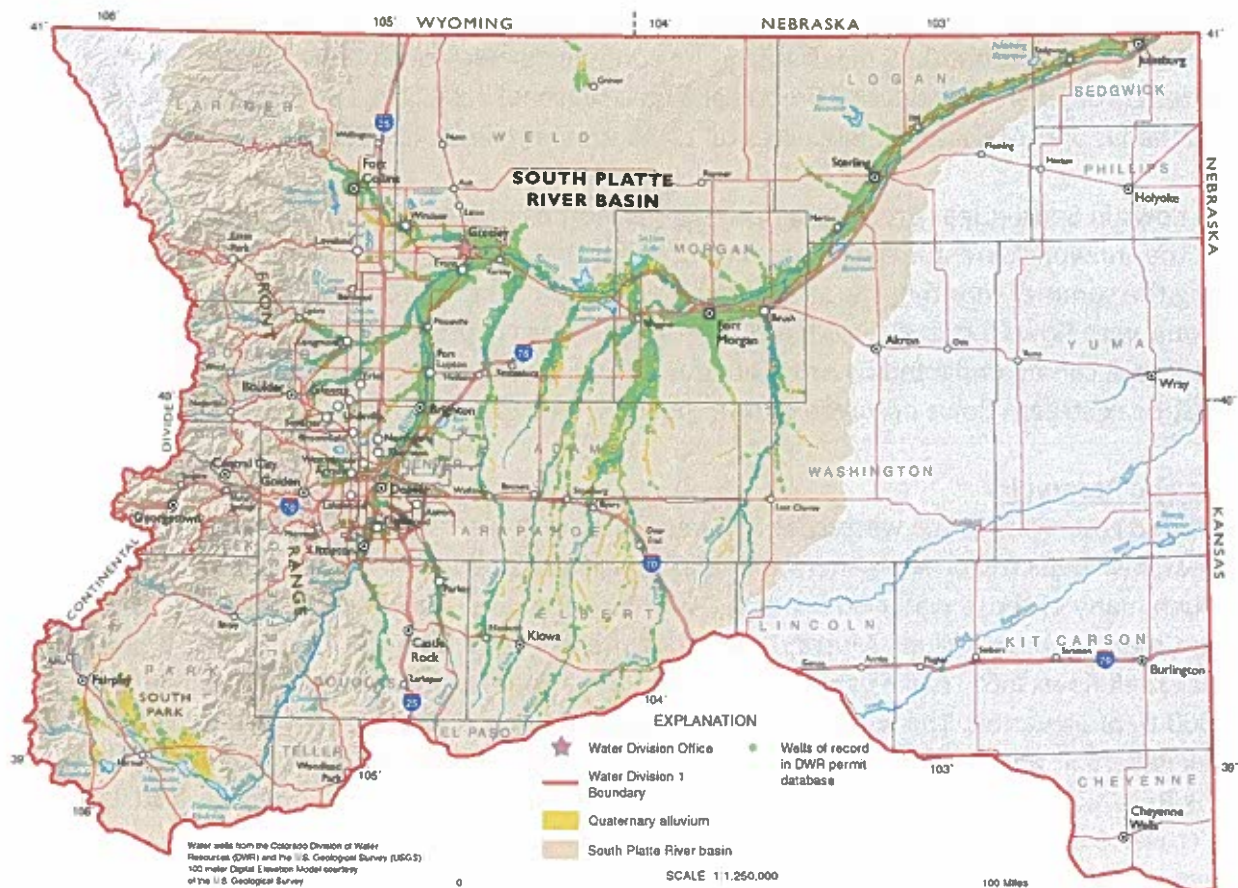


# WATER QUALITY

## Hydrologic Setting

The Town of Georgetown obtains its drinking water supply from South Clear Creek, a tributary of Clear Creek which flows west to east from the Continental Divide on the western edge to the confluence with the South Platte River in Denver (UCCWPU, 2014). The source water protection area (SWPA) includes the South Clear Creek watershed upstream from the town's intakes. The South Clear Creek watershed's SWPA (Hydrologic Unit Code 101900040404) lies within Clear Creek County and drains approximately 29.37 square miles (18,795 acres). The South Clear Creek watershed is a subwatershed of the Clear Creek watershed, which is within the South Platte River Basin.

The South Platte River Basin is part of Colorado Water Division One with the office of the Division Engineer in Greeley (Fig. 6) (Topper et al, 2003).



SOURCE: GROUND WATER ATLAS OF COLORADO

Figure 6. Map of the South Platte River Basin.



### Stream Segments

South Clear Creek and Leavenworth Creek are the only perennial streams in the source water protection area and are fed by numerous intermittent tributary channels (Fig. 7). South Clear Creek's headwaters originate near Guanella Pass (elevation 13,000 feet) and drain high mountain lakes, alpine tundra, and forested lands within Arapaho National Forest and the Mt. Evans Wilderness. South Clear Creek flows north from its headwaters through Lower Cabin Creek Reservoir, Clear Lake and Green Reservoir to its confluence with Leavenworth Creek before flowing into Georgetown Reservoir and into the town of Georgetown and downstream into Georgetown Lake. The length of South Clear Creek from its headwaters to the Town's intake is approximately 22 miles.

Leavenworth Creek is located in the upper South Clear Creek Watershed approximately 6 miles southwest of Georgetown, Colorado. The headwaters originate from a glacial cirque located north of Argentine Pass along the east side of the Continental Divide. Leavenworth Creek flows northeast for 6.6 miles from its headwaters to the confluence with South Clear Creek. There are eight minor, unnamed streams which feed into Leavenworth Creek. The Vidler Tunnel is a trans-mountain diversion which diverts water draining from upper Peru Creek on the western slope of Colorado through the Continental Divide into the Leavenworth Creek watershed for downstream use. About 0.65 miles above the confluence with South Clear Creek, water is diverted through an aqueduct to Green Lake on a seasonal basis. The Leavenworth Creek watershed is approximately 7,642 acres or 11.94 square miles (URS, 2013).

Peak flows in South Clear Creek occur during the months of May and June when runoff flows from the snowpack are at a maximum. Intense thunderstorms may temporarily increase flow during the summer months. The stream segments in the watershed are generally gaining streams, with flows increasing with distance downstream in proportion to drainage area. Flows in the creek can be impacted by droughts due to low winter snow accumulation. The two lowest peak stream flows occurred during the 2002 and 2012 droughts (UCCWPU, 2014).

### Lakes and Reservoirs

Lakes and reservoirs in the watershed are important resources for drinking water, aquatic habitat, hydroelectric power generation, and irrigation storage. South Clear Creek travels through many of these water bodies on its way downstream. The headwater lakes in the South Clear Creek drainage include Murray, Silver Dollar and Naylor Lakes. Further downstream South Clear Creek flows into Lower Cabin Creek Reservoir, a shallow reservoir at approximately 10,000 ft. of elevation. The water from Lower Cabin Creek Reservoir is pumped to Upper Cabin Creek Reservoir and released to generate power through a power plant located at Lower Cabin Creek Reservoir. Public Service Company of Colorado (an Xcel Company) operates both Upper and Lower Cabin Reservoirs for the purpose of power generation; and Clear Lake for recreation (Stevens, 2001).

Immediately downstream From Lower Cabin Creek Reservoir, South Clear Creek flows into Clear Lake, a natural water body that has been modified with a small dam and is more than 100 feet deep. Clear Lake is a heavy use recreational facility and has 8 developed campsite and picnic

areas. West of Clear Lake is Green Lake, a small but deep (more than 50 ft.) natural lake, whose capacity is increased by a small dam and has storage augmented by flows piped from Leavenworth Creek on a seasonal basis. The City of Black Hawk along with Clear Creek County has been operating Green Lake which receives water delivery by way of Vidler Tunnel and Leavenworth Creek (Hawley et al, 2014).

Downstream from Clear Lake and the confluence of Leavenworth Creek, South Clear Creek flows into Georgetown Reservoir, a small shallow reservoir. Water from Georgetown Reservoir is diverted to a power plant in Georgetown and the Georgetown water treatment plant. Water quality in the reservoir is similar in character to a mixture of Leavenworth and South Clear Creeks (Stevens, 2001).

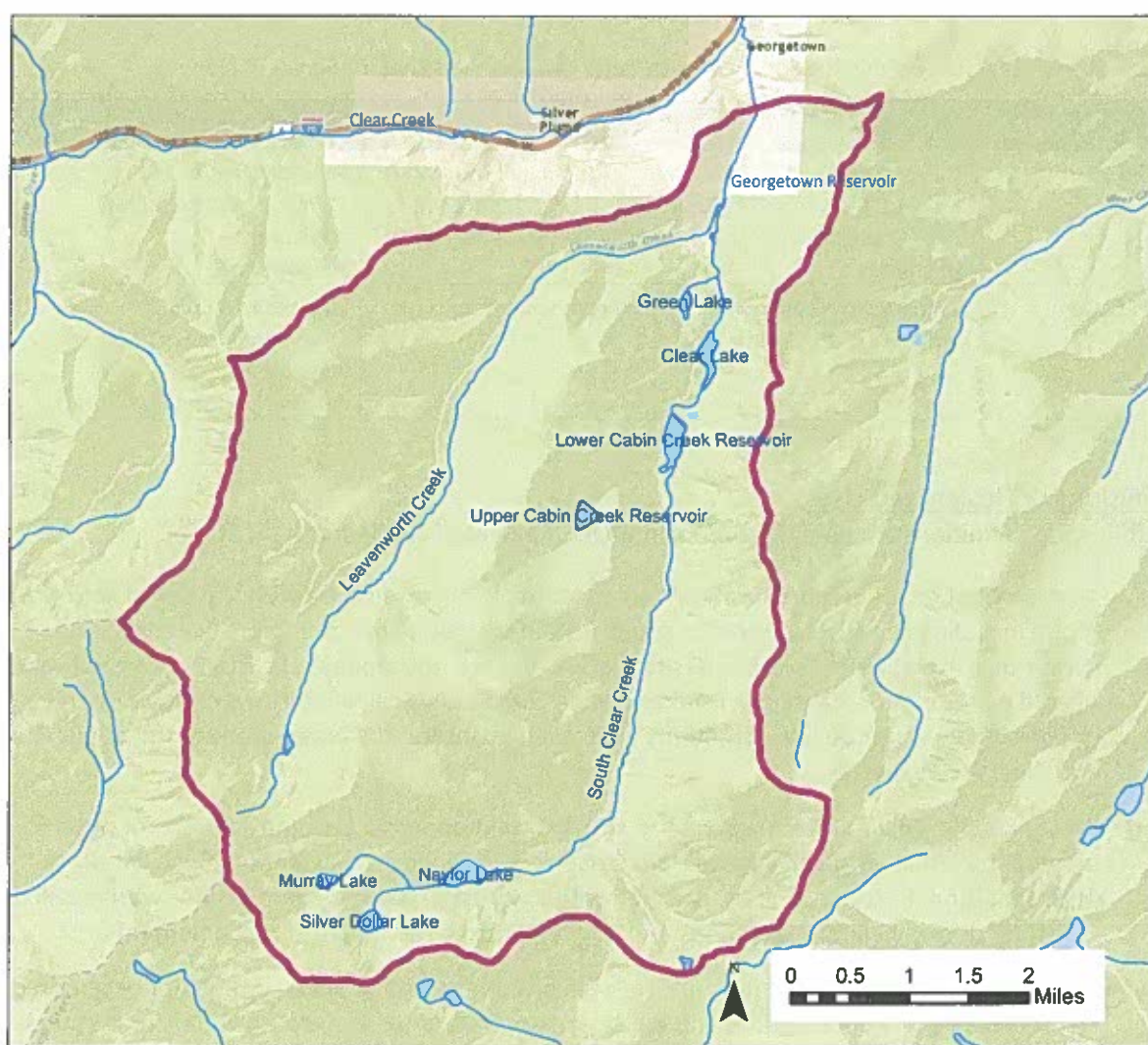


Figure 7. Watershed map with lakes and stream segments

## 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 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 classification and standards identification purposes (Table 4). Standards are designed to protect the associated classified uses of the streams (Designated Use).

Stream 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.

Table 4. Stream Segments within the Source Water Protection Area and Their Designated Use

Segment WBID	Portion of Segment	Designated Use
COSPCL3a	Mainstem of South Clear Creek, including all tributaries and wetlands, from the source to the confluence with Clear Creek, except for the specific listings in Segments 3b and 19	Aquatic Life Cold 1 Domestic Water Supply Agriculture Recreation E
COSPCL3b	Mainstem of Leavenworth Creek from source to confluence with South Clear Creek.	Aquatic Life Cold 2 Domestic Water Supply Agriculture Recreation Primary Contact

SOURCE: CDPHE, 2014

### Definitions of Designated Uses

The following definitions are paraphrased from WQCC Regulation 31, January 31, 2013:

- **Aquatic Life Cold 1:** Refers to waters that are capable of sustaining a wide variety of cold water biota, including sensitive species, or could sustain such biota in correctable water quality conditions. Aquatic Life Cold 2 refers to waters that are not capable of sustaining a wide variety of cold water biota, including sensitive species, due to physical habitat, water flows or levels, or uncorrectable water quality conditions that result in substantial impairment of the abundance and diversity of species.
- **Water Supply:** These surface waters are suitable or intended to become suitable for potable water supplies. After receiving standard treatment (defined as coagulation, flocculation, sedimentation, filtration, and disinfection with chlorine or its equivalent), these waters will meet Colorado drinking water regulations and any revisions, amendments, or supplements.
- **Agriculture:** These surface waters are suitable or intended to become suitable for irrigation of crops usually grown in Colorado and which are not hazardous as drinking water for livestock.
- **Recreation Class E - Existing Primary Contact Use.** These surface waters are used for primary contact recreation or have been used for such activities since November 28, 1975. Primary Contact recreation refers to waters suitable for full-body contact and ingestion. Class E also includes a Water Quality Standard for E.coli not to exceed 126/100 ml (WQCC, 2013).

### Impaired Segments

As required by Section 305(b) of the Clean Water Act, the Water Quality Control Division (WQCD) is required to assess and report to Congress on the quality of waters within their State every two years to determine whether beneficial uses are supported. The stream segments within the South Clear Creek watershed that are not achieving the State's water quality standards and listed as impaired on the 303(d) list include South Clear Creek and Leavenworth Creek. In 2012, South Clear Creek and Leavenworth Creek were identified on Colorado's 303(d) list of impaired water bodies as not supporting the use classification for aquatic life. The listing specified that the numeric standards for copper were not being attained. No other beneficial uses are at risk according to current state regulations.

In 2006, South Clear Creek was listed as impaired on the 303(d) list for zinc; and Leavenworth Creek for both zinc and lead. Leavenworth Creek was reclassified as an Aquatic Life Stream 2 due to the concentrations of dissolved lead and zinc. Once listed, the State is required to determine the maximum amount of a pollutant that a water body may receive and still maintain water quality. This maximum allowable pollutant quantity is referred to as the Total Maximum Daily Load (TMDL). In 2008, the WQCD developed TMDL guidelines for the lead and zinc in Leavenworth Creek; and for zinc in South Clear Creek (TMDL) (WQCD, 2008). Once a TMDL has been completed, impaired waters are removed from the 303(d) List and placed into Integrated Reporting Category 4a (WQCC, 2012). Therefore, these stream segments were removed from the 2012 303(d) list for the zinc and lead impairment.

### Watershed District Ordinance

Communities throughout Colorado are taking local control by adopting a Watershed Protection District Ordinance to protect their drinking water supply from activities that will create a hazard to health and water quality or a danger of pollution to the water supply. Direct authority to create this Watershed District is granted in Section 31-15-707 (1)(b), of the Colorado Revised Statutes, as amended. Municipalities that provide drinking water to their residents have the ability to protect the quality of their drinking water by regulating pollution-generating activities in the watershed from which this water is taken. In particular, this provision gives municipal water providers regulatory and supervisory jurisdiction over all streams and sources contributing to the municipal water supplies for a distance of 5 miles above the points from which municipal water supplies are diverted.

The Town of Georgetown developed a Watershed Protection District in 2000 for the purpose of protecting the sources, supply, quantity, quality, delivery, storage, treatment and distribution of water serving the Town, its citizens and water-using customers. An ordinance was developed to protect the Town's water resources from pollution and degradation within 5 miles upstream of the point of diversion. A permit is required for work within this 5 miles zone upstream of the intake on South Clear Creek and Leavenworth Creek. Restricted activities include Individual Sewage Disposal System (ISDS); earthwork; timber harvesting; drilling; work on the waterways; mining; use of fertilizers, herbicides, pesticides, toxic or hazardous substances, and explosive materials; altering the hydrology, or any other potential pollution activity (UCCWPU, 2014).



### Upper Clear Creek Watershed Association

In the 1980s, nutrient growth and taste/odor issues in Standley Lake shifted water quality management from individual community concerns to a watershed-wide approach. In 1993, local upper Clear Creek entities and downstream users developed a plan to coordinate water quality issues relating primarily to nutrients in Clear Creek. These efforts resulted in the adoption of the Clear Creek Watershed Management Agreement. The Agreement, signed by 23 participants, included adoption of a narrative standard for Standley Lake, establishment of the Upper Clear Creek Watershed Association (UCCWA) for upstream entities and development of a cooperative watershed monitoring program. As the designated Section 208-management agency per the Clean Water Act, UCCWA is responsible for overseeing water quality and water resources issues through the Upper Clear Creek Watershed. The Town of Georgetown is an active member of the Association. Monthly meetings are held at the Idaho Springs City Hall (UCCWA, 2015).

### Clear Creek Watershed Foundation

Incorporated in 1997, the Clear Creek Watershed Foundation (CCWF) is a non-profit organization dedicated to improving the ecological, aesthetic, recreational and economic conditions in the Clear Creek Watershed through comprehensive and cooperative efforts with watershed stakeholders. Their focus is on improving the water quality of Clear Creek and its tributaries through watershed-based sustainability project including: inactive mine remediation; natural resource management; water and wastewater management; preservation and promotion of historic mine site; alternative energy and transportation; waste stream reduction; subsurface rights and use; and outreach and education. The office of the CCWF is located at 2060 Miner Street, Idaho Spring in the Idaho Springs Visitor Center and Heritage Museum (CCWF, 2015).

### Recent studies

Recent studies, assessments, or plans in the South Clear Creek Watershed include:

- Clear/Bear Creek Wildfire Watershed Assessment (2013)
- High Peaks to Headwaters Environmental Assessment (2013)
- CDOT Highway-Related Water Quality Studies in Upper Clear Creek Watershed
- Upper Clear Creek Watershed Plan Update (2014)
- USGS Assessment of Water Quality, Road Runoff, and Bulk Atmospheric Deposition, Guanella Pass Area (2001)
- Clear Creek County Community Wildfire Protection Plan (2008)
- Total Maximum Daily Load Assessment Clear Creek (2008)
- Clear Creek Watershed Report – Exploring Watershed Sustainability (2007)
- Clear Creek Watershed Annual Report (2013)
- Community Wildfire Protection Implementation Plan – Georgetown Area (2014 draft)
- Guanella Pass Scenic and Historic Byway Corridor Management Strategy (2001)
- Leavenworth Watershed Abandoned Mine Sites: Evaluation of Existing Data and Data Gap Analysis Report (2013)

## Drinking Water Supply Operations

### Water Supply and Infrastructure

The Town of Georgetown operates a municipal water supply system that provides drinking water to the residents and commercial users of Georgetown. The water treatment utility was originally constructed in the 1964's and has been upgraded in 2011. The Town's water system consists of surface water supply, storage, treatment, and distribution facilities.

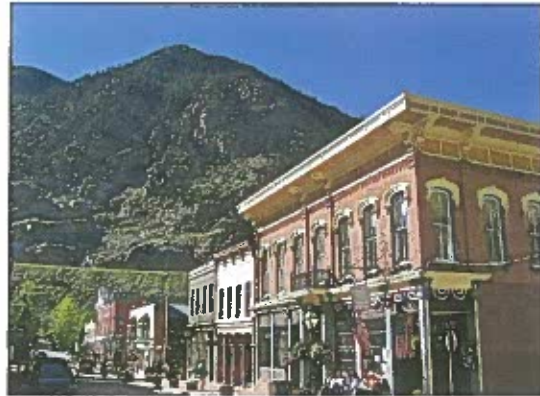


Figure 8. Historic Town of Georgetown.

Raw water is diverted from an intake off South Clear Creek into a pond and flows via gravity into the Georgetown Water Treatment Plant. The raw water is treated through a process of membrane filtration and chlorination. After treatment, the filtered water is gravity flowed into two aboveground storage tanks, one 1,000,000 gallon tank built in 2012 and one 400,000 gallon tank built in 2011. Total water storage capacity is 1,400,000 gallons. The treated water is distributed via gravity to residential and commercial customers through a network of 5.0 miles of underground pipes to 692 service connections or taps.

The Town of Georgetown provides an Annual Drinking Water Quality Report with the Consumer Confidence Report (CCR) to the public that provides information on the results of their water monitoring program. The 2014 report is available at the Georgetown Town Office located at 404 6th Street, Georgetown, Colorado or online at [www.town.georgetown.co.us](http://www.town.georgetown.co.us). The Town is currently in compliance with all State water quality regulations.



Figure 9. South Clear Creek originates from high mountain drainages.

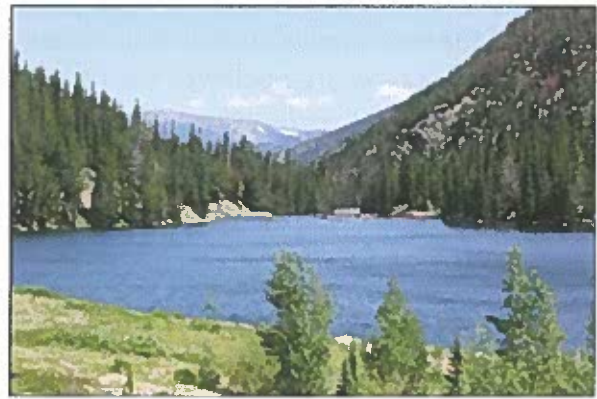


Figure 10. South Clear Creek flows through lakes and reservoirs on its way downstream.

### Water Supply Demand Analysis

The Town owns water rights for 3.0 cubic feet per second (cfs) from April 1<sup>st</sup> to October 31<sup>st</sup> and 1.4 cubic feet per second (cfs) from November 1<sup>st</sup> to March 31<sup>st</sup> flow from South Clear Creek. The water system currently has the capacity to produce 648,000 gallons per day. Current estimates by the water system indicate that the average daily demand is approximately 206,000 gallons per day in 2014. Peak use is during the summer with an average of 319,000 gallons per day. Lowest is in the winter (February) with average daily usage of 244,000 gallons per day (Curtis, 2015). Using these estimates, the water system has a surplus average daily demand capacity and a surplus average peak daily demand capacity per day. The Town's water rights are adequate to supply a population more than double the current size of the town. The water demand estimator is included in the Appendices of this report.

The Town of Georgetown 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, or its water source, becomes disabled for an extended period of time due to potential contamination. The evaluation indicated that the Town of Georgetown may not be able to meet the average daily demand of its customers if its only water source became disabled for an extended period of time. The ability of the Town of Georgetown to meet either daily or peak demand for an extended period of time is also affected by the flow of the creek as well as the amount of treated water the water system has in storage at the time a water source becomes disabled.

The Town of Georgetown recognizes that potential contamination of its surface water source could potentially result in having to treat the surface water 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, Georgetown evaluated what it might cost to replace one of its water sources (i.e., replacement of the intake structure and the associated infrastructure) if this occurs. The evaluation did not attempt to estimate treatment costs, which can be variable depending on the type of contaminant(s) that need(s) to be treated. The evaluation indicated that it could cost millions in today's dollars to find a new water source.

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 a source water protection plan for Georgetown can help to reduce the risks posed by potential contamination of its water source(s). Additionally, the Town of Georgetown has developed an emergency response plan or contingency plan 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 Water Quality Control Division, an agency of the Colorado Department of Public Health and Environment (CDPHE), assumed the responsibility of developing Colorado's SWAP program. Colorado's SWAP program is a two-phased process designed to assist public water systems in preventing potential contamination of their untreated drinking water supplies.

### Source Water Assessment Phase

The Assessment Phase for all public water systems 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 public water systems and the general public.

The Assessment Phase involves understanding where the Town of Georgetown's source water comes from, what contaminant sources potentially threaten the water sources, and how susceptible each water source is to potential contamination.

### Source Water Protection Phase

The Protection Phase is a voluntary, ongoing process in which all public water systems have been encouraged to voluntarily employ preventative measures to protect their water supply from the potential sources of contamination to which it may be most susceptible. 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 pertinent information as a starting point to develop a protection plan. The source water protection phase for all public water systems 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.

## SOURCE WATER PROTECTION PLAN DEVELOPMENT

### Source Water Assessment Report Review

The Town of Georgetown received their Source Water Assessment Report from the Colorado Department of Public Health and Environment in November 2004. During the Source Water Protection stakeholder meetings, the assessment report was reviewed and used as a starting point to guide the development of this Source Water Protection Plan. A copy of the Source Water Assessment Report for the Town of Georgetown can be obtained by contacting the Town 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

The State's Assessment Report included a delineated Source Water Assessment Area for the Town's surface water sources. Delineation is the process used to identify and map the drainage basin or watersheds that supplies water to a surface water source. The delineated source water assessment area provides the basis for understanding where the community's source water and potential contaminant threats originate.

The Steering Committee reviewed the State's delineated Source Water Assessment Area for the Town of Georgetown's water sources and decided to accept this as the Town's Source Water Protection Area. The Source Water Protection Area for the Town of Georgetown includes the South Clear Creek watershed upstream from the diversion on South Clear Creek, approximately 27.37 square miles (Fig. 11). This protection area is 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.

### Source Water Protection Zones

The Source Water Protection Area includes the following protection zones:

***Zone 1*** is located 1,000 feet on either side of the surface water drainage network and ditch. Zone 1 is the most sensitive and important area to protect from potential sources of contamination. This area is where nonpoint source contaminants are most likely to reach the water source.

***Watershed Protection District*** includes the 5-mile zone upstream from the Town's intake off South Clear Creek.

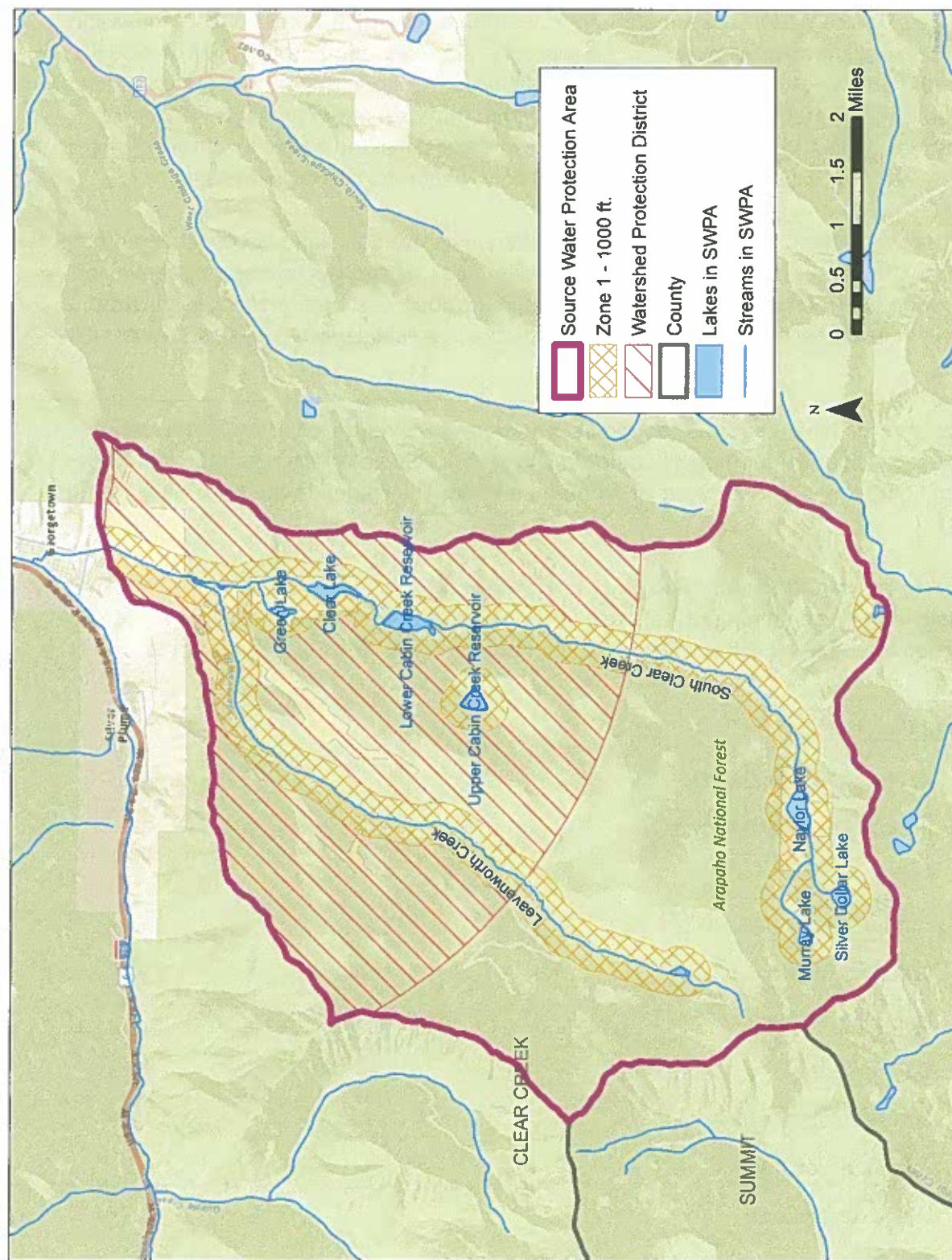


Figure 11. Map of the Town of Georgetown's Source Water Protection Area.

## Potential Contaminant Source Inventory

The State's Source Water Assessment Report identified potential sources of contamination (PSOCs) that might be present within the source water assessment areas. In 2014, CDPHE provided the Town of Georgetown with Geographic Information System (GIS) information on these potential contaminant sources located within the assessment areas. The Steering Committee conducted a more accurate and current contaminant source inventory of the Source Water Protection Area. This report will only reflect the current inventory.

Discrete contaminant sources (point sources) were inventoried using selected state and federal regulatory databases including: mining and reclamation, oil and gas operations, above and underground petroleum tanks, Superfund sites, hazardous waste generators, solid waste disposal, industrial and domestic wastewater dischargers, solid waste sites, and water well permits.

Dispersed contaminant sources (nonpoint sources) were inventoried using recent land use, land cover and transportation maps of Colorado, along with selected state regulatory databases. A table of Contaminants Associated with Common PSOCs is included in the Appendices of this report.

The Steering Committee identified other areas of concern to add to the potential contaminant source inventory, combining these into a list of issues of concern within the source water protection area that may impact the Town of Georgetown's drinking water sources.

### Issues of Concern

- Abandoned mine land
- Runoff and spills on roads
- Flooding
- Dumping on roads
- Wildland fires
- Dumping
- Dam failure
- Future mining activity
- Camping along creeks
- Weed abatement
- Reservoir maintenance
- Wildlife bacteria



## Priority Strategy

The Steering Committee used the SWAP Risk Assessment Matrix developed by CRWA to prioritize the issues of concern (Table 5). Using SWAP Risk Assessment Matrix, the Steering Committee considered the following criteria when estimating the risk of each issue of concern.

1. **Impact to the Public Water System** – The risk to the source waters increases as the impact to the water system increases. The impact is determined by:
  - **Migration Potential or Proximity to the Water Source** - The migration potential generally has the greatest influence on whether a contaminant source could provide contaminants in amounts sufficient for the source water to become contaminated at concentrations that may pose a health concern to consumers of the water. Shorter migration paths and times of travel mean less chance for dilution or degradation of the contaminant before it reaches water sources. The proximity of a potential contaminant source of contamination to the Town of Georgetown's water sources was considered relative to the sensitivity zones in the Source Water Protection Area (i.e. Zones 1 and 2).
  - **Contaminant Hazard** - The contaminant hazard is an indication of the potential human health danger posed by contaminants likely or known to be present at the contaminant source. Using the information tables provided by CDPHE (see Appendices), the Steering Committee considered the following contaminant hazard concerns for each contaminant source:
    - **Acute Health Concerns** - Contaminants with acute health concerns include individual contaminants and categories of constituents that pose the most serious immediate health concerns resulting from short-term exposure to the constituent. Many of these acute health concern contaminants are classified as potential cancer-causing (i.e. carcinogenic) constituents or have a maximum contaminant level goal (MCLG) set at zero (0).
    - **Chronic Health Concerns** - Contaminants with chronic health concerns include categories of constituents that pose potentially serious health concerns due to long-term exposure to the constituent. Most of these chronic health concern contaminants include the remaining primary drinking water contaminants.
    - **Aesthetic Concerns** - Aesthetic contaminants include the secondary drinking water contaminants, which do not pose serious health concerns, but cause aesthetic problems such as odor, taste or appearance.

- **Potential Volume** - The volume of contaminants at the contaminant source is important in evaluating whether the source water could become contaminated at concentrations that may pose a health concern to consumers of the water in the event these contaminants are released to the source water. Large volumes of contaminants at a specific location pose a greater threat than small volumes.

2. **Probability of Occurrence** – The risk to the source waters increases as the relative probability of damage or loss increases. The regulatory compliance history for regulated facilities and operational practices for handling, storage, and use of contaminants were utilized to evaluate the likelihood of release.

The Steering Committee determined whether each 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 public water system and other entities) (Table 5). This determination of control in conjunction with the estimation of risk to the source water(s), helped guide the prioritization of the issues of concern in a way that best fits the needs and resources of the community.

Table 5. Potential Contaminant Source Prioritization using SWAP Risk Assessment Matrix

Potential Source of Contamination or Issue of Concern	Controllable (Direct, Indirect, No)	Impact to Water System (Minor, Moderate, Major)	Probability of Occurrence (Unlikely, Possible, Likely, Very Likely)	Risk (Very Low, Low, Intermediate, High, Very High)	Priority Ranking
Abandoned Mine Land	Indirect	Moderate	Likely	High	1a
Roads: Runoff, spills	No	Moderate	Likely	High	1b
Wildland fire	No	Major	Possible	High	1c
Flooding	No	Major	Possible	High	1d
Dam failure	Indirect	Major	Unlikely	Intermediate	2
Wildlife bacteria	No	Moderate	Possible	Intermediate	2
Weed abatement	Indirect	Moderate	Possible	Intermediate	2
Future mining activity	Direct/Indirect	Minor	Possible	Low	3
Dumping	No	Minor	Possible	Low	3
Camping along creek	Indirectly	Minor	Likely	Low	3
Septic systems	Indirect	Minor	Possible	Low	3
Reservoir maintenance	Indirect	Minor	Unlikely	Very low	4

## DISCUSSION OF ISSUES OF CONCERN

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The following section provides a description of the issues of concern that have been identified in this plan, describes the way in which they threaten the water sources and outlines best management practices. The purpose of this section is as a guidance document to understand the issues. The prioritized list of issues of concern includes:

- Abandoned mine land
- Roads: runoff and spills
- Wildland fire
- Flooding
- Dam failure
- Wildlife bacteria
- Weed abatement
- Future mining activity
- Dumping
- Camping along creek
- Septic systems
- Reservoir maintenance

### Surface and Groundwater Contaminants

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 injection of wastes underground, use of fertilizers, pesticides, and herbicides, road salting, as well as urban and agricultural runoff (Fig. 12). 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 U.S. EPA, 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 (GWPC, 2008).

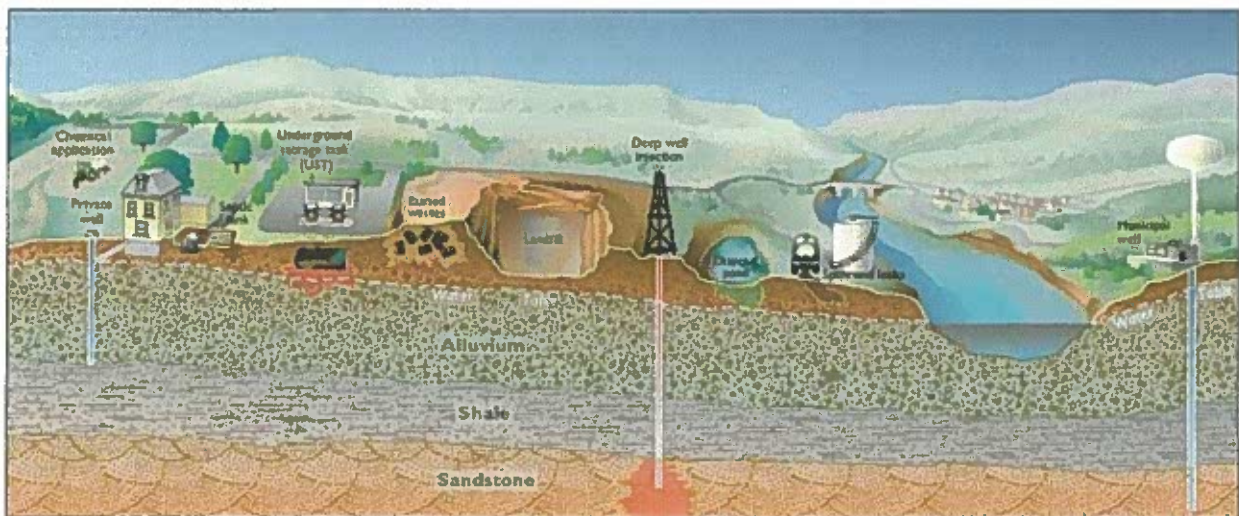


Figure 12. Schematic drawing of the potential source of contamination to surface and groundwater.



## Mining

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The source water protection area for the Town of Georgetown lies within the historic Argentine Mining District, one of the major gold and silver producing areas of Clear Creek and Summit County, Colorado. The district is made up of about 75 square miles that straddles the Continental Divide. Silver was first discovered in the district in 1864 on Glacier Mountain. The main producing mines include the Pennsylvania, Delaware, Peruvian, Santiago, and Independence; while the Baker, Josephine and Stevens mines also produced some ore (NBM, 2015).

Thousands of unpatented claims and small exploratory mining operations throughout Colorado exist, most of which were never recorded in state or local government offices. It was not until 1973 that the State of Colorado required mines to be permitted. Current mining permit data obtained from the Colorado Division of Reclamation, Mining, and Safety indicate that there are no active or inactive permitted mines in the SWPA.

### Abandoned Mine Land

Multiple historic mine sites including several adits, tunnels, ore processing mills, and tailings piles are located within close proximity to the Leavenworth Creek (Fig. 13). In 2013, URS completed a report for the U.S. Forest Service, "Leavenworth Watershed Abandoned Mine Sites: Evaluation of Existing Data and Data Gap Analysis Report." The report identifies four mills, six tunnels and seven significant mine sites in the Leavenworth Creek Watershed including the following:

- Geijsbeek Mill & Vidler Tunnel, and associated mining waste piles and tailings - The Vidler Tunnel diverts water from Peru Creek to Leavenworth Creek. The discharged water flows across waste rock and adds zinc to Leavenworth Creek.
- Waldorf Mill and Mine adit, and associated mining waste piles and tailings – The Waldorf Mine adit discharge water flows through a waste-rock pile and is the greatest contributor of metal loading into Leavenworth Creek.
- Santiago Mill, Tunnel, and associated mining waste piles and tailings - The Santiago Mine and Waldorf tunnel are interconnected and drain groundwater.
- Dibbens Smelter Site – This site was found to have elemental mercury in the soil and a removal action was conducted in 2004. There is no record of effectiveness of removal.
- Sydney Tunnel and associated mining waste piles and tailings - This site was found to be not a significant contributor to metals concentration in Leavenworth Creek.

- Lower Leavenworth Creek Mine Workings associated with the Colorado Central Mine – The Kirtley Mine and Marshal Tunnel have the potential to contribute to metals loading, but there is limited data and therefore it is unclear if these sites impact the creek.
- Upper Level Adits – This site was found to not significantly contribute to metal loading in Leavenworth Creek (URS, 2013).

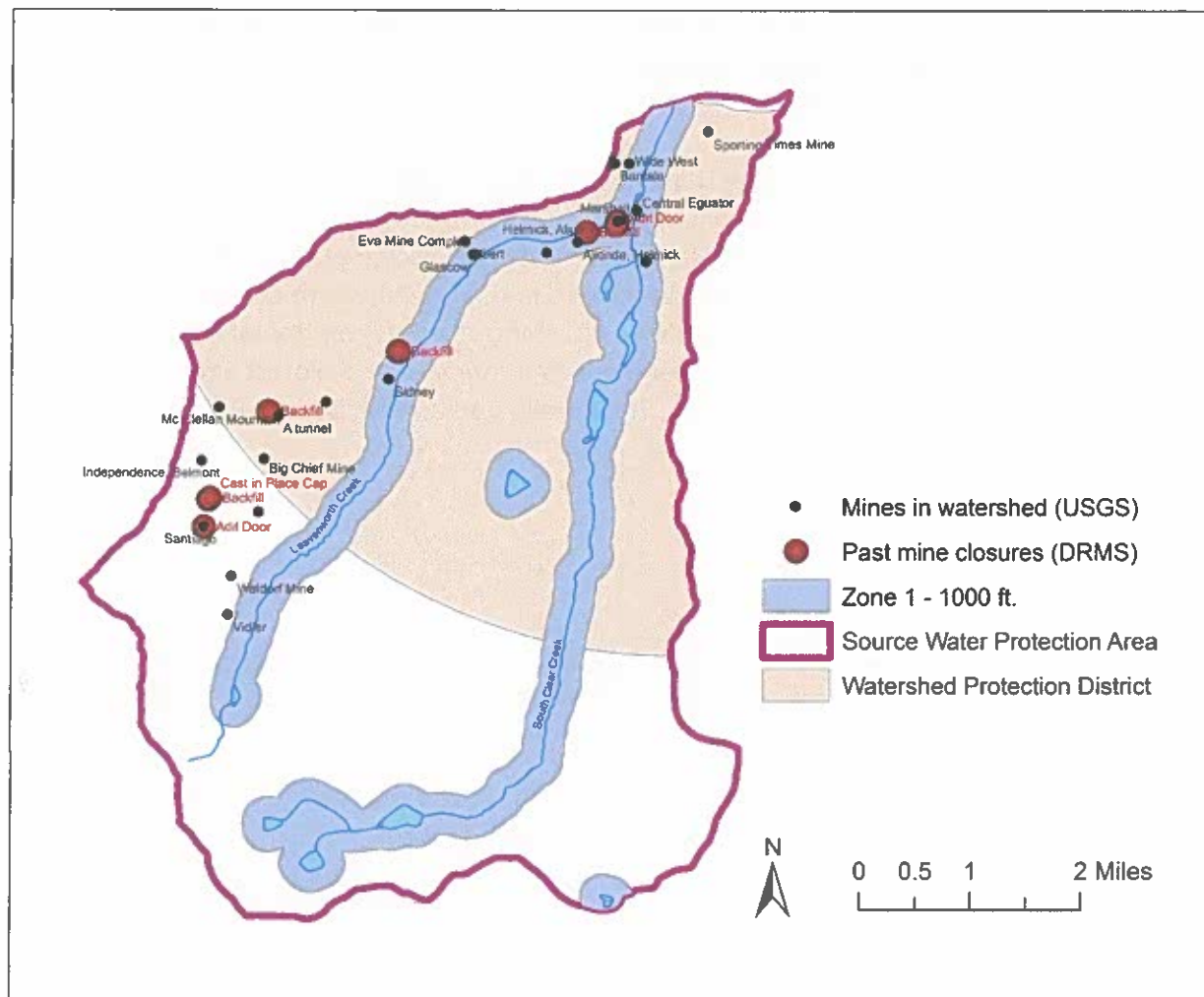


Figure 13. Map of the mines and mine closures in the Source Water Protection Area.

### Water Quality Concerns

Previous environmental investigations within the Leavenworth Creek watershed indicate impacts to surface water, sediment, soil, and shallow groundwater from historic mining activities. Elevated metal concentrations associated with acid mine drainage are responsible for the degradation of water quality in Leavenworth Creek and its impairment. The source of the metals includes acid mine drainage from mine adits or tunnels, waste rock piles, and tailings

piles. The contaminants of concern (COCs) for surface water, sediment, and soil are metals including cadmium, copper, lead, manganese, nickel, and zinc. The primary source of the COCs identified to date are waste rock piles located at the Waldorf Mine site.

Existing water quality data for Leavenworth Creek indicate that the surface water exceeds aquatic water quality standards for one or more metals, at locations adjacent to the Waldorf Mine site and remains impacted to below the Sydney Tunnel location. At sample points located near the confluence with South Clear Creek metals sampled did not exceed the USEPA MCLs for drinking water, with the exception of lead (36 ug/L) (URS, 2013). Multiple agencies are currently collaborating in an effort to mitigate impacts from mining within the Leavenworth Creek Watershed, primarily at the Waldorf Mine site.

Mine land reclamation work within the Leavenworth Creek watershed has been completed by the Colorado Division of Reclamation, Mining and Safety (DRMS) (Fig. 13). A collaborative effort is currently underway by multiple agencies to remediate the discharge water that flows over the waste-rock pile in the Waldorf Mine area located in the Leavenworth Creek watershed. Agencies/partners involved in this collaborative effort include: Environmental Protection Agency, Colorado Department of Public Health and Environment, U.S. Forest Service, U.S. Fish and wildlife Service, U. S. Geological Survey, Trout Unlimited and Division of Reclamation Mining and Safety.

**Mining Recommendations:**

1. Stay informed and participate in the collaborative effort underway to mitigate impacts from mining within the Leavenworth Creek Watershed (USFS, EPA, DRMS, TU, CDPHE, USGS, USFWS).
2. Continue to evaluate water quality monitoring data to characterize the effects of mine land reclamation activities and impacts of abandoned mine land.
3. Participate in the River Watch program to monitor the raw water quality of Georgetown Reservoir and South Clear Creek at the Town's intake.
4. Get involved in the review process for new mining activity permits at the State and County level including unpatented claims on both public and private lands.
5. Frequently check the County website to keep informed of any mine related permits, hearings, and opportunities to submit comments.

## Transportation on Roads

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The source water protection area, located outside the boundaries of the Town, is accessed by two-lane paved and native surface roads. The Guanella Pass road connects U.S. Interstate 70 at Georgetown with U.S. Highway 285 at Grant and is designated a Scenic and Historic Byway. The northern 13.1 miles of the Byway is known as Clear Creek County Road 381 to the top of the pass and Park County Road 62 south of the pass. The Clear Creek County section of the road is paved and lies within the source water protection area (Stevens, 2001). The Guanella Pass road runs north/south and parallels South Clear Creek from the pass to Georgetown. This road section is maintained year around by the Clear Creek County Road Department.

Native surface roads within the source water protection area include Leavenworth Creek Road, also called County Road 352, and numerous Forest Service routes within the Leavenworth Creek basin. The native surface roads are maintained seasonally by the Clear Creek County Road Department and the U.S. Forest Service as needed. Annual road maintenance on the County roads consists of grading the road surface.

The roads in the protection area are used for residential, utility, tourism and recreational access. Thousands of visitors travel over the Guanella Pass road every year, with the majority of use occurring in summer and fall. Forest routes within the Leavenworth Creek basin are popular with ATV/OHV enthusiasts.

### Contaminants of Concern

The construction and maintenance of roads has been recognized as a potential source of contaminants in forested watersheds. Roads can change natural run-off patterns by increasing the amount of impervious surface in a watershed, intercepting overland flow, and routing this water directly into streams. Storm water runoff over these roads can deliver contaminants from the road surface into nearby surface waters including: vehicular leaks, spills and sediment.

Runoff from the Guanella Pass road enters South Clear Creek through surface channels connected to culverts and roadside ditches. Road runoff is generated during snowmelt and during summer rainstorms. Greater than 80 percent of suspended sediment is transported during annual snowmelt (about May to July); whereas transport during rainstorms only accounted for less than about 15 percent of the annual suspended sediment discharge. The water-quality effects of road runoff are more substantial during low streamflows of early snowmelt and late summer baseflows due to the low dilution capacity (Stevens, 2001).

The Georgetown Reservoir may be sensitive to the effects of road runoff. The large suspended-sediment concentrations and turbidity values in road runoff have the potential to degrade the quality of the water in the reservoir should the runoff reach the reservoir.

Similarly, native surface roads along creek corridors, like that along Leavenworth Creek, can also have the potential for delivering sediment to the creek. Increased sediment delivery also has the potential for impacting the physical instream habitat by causing reductions in the quality and quantity of aquatic habitats and overall ecological health of the stream system.

The U.S. Forest Service has identified forest roads within the Leavenworth Creek basin that have potential negative impacts on the water quality and aquatic habitat of the creek. Forest roads (248.1J, 248.2B, 248.2C) have been proposed to be decommissioned. The objectives of decommissioning would be to reduce soil erosion, decrease road density, reduce impacts to fish and aquatic habitat associated with sedimentation and stream crossings, and restore natural infiltration rates (USFS, 2013).

Motor vehicles leaks are a major source of water pollution to both surface and ground water. Vehicular leaks on the roadway may runoff during storm events and deliver contaminants from the road surface into nearby creeks. Runoff from roads may have a high concentration of toxic metals, suspended solids, and hydrocarbons, which originate largely from automobiles (Gowler and Sage, 2006).

Vehicular spills may occur along the transportation route within the source water protection area from trucks that transport fuels, septic waste and other chemicals that have a potential for contaminating the source waters. Accidental spills of small amounts of contaminants may not be detected or reported and are often diluted with rain water or snowmelt, potentially washing the chemicals into the soil or nearby waterways. Large spills require immediate emergency response from the local fire department to ensure contaminants do not enter the source waters. Spills may also occur in parking areas along the South Clear Creek corridor that provide access to trailheads including Guanella Pass, Silverdale and Silver Dollar Lake.

A release of any chemical, oil, petroleum product, sewage, etc., which may enter waters of the state of Colorado (which include surface water, ground water and dry gullies and storm sewers leading to surface water) must be reported immediately to CDPHE. Spills and incidents that have or may result in a spill along a highway must be reported to the nearest law enforcement agency immediately. The Colorado State Patrol and CDPHE must also be notified as soon as possible (CDPHE, 2009). More information on “Environmental Spill Reporting” can be found in the Appendices of this report.

In Clear Creek County, a salt (sodium chloride) and sand mixture is applied to road sections in winter as a deicer. A recent study conducted by the U.S. Geological Survey demonstrates a detrimental impact from road-salt runoff to surface water affecting the stream water quality and aquatic life (Corsi, et al, 2010). Salt contributes to increased chloride levels in groundwater through infiltration of runoff from roadways. Unlike other contaminants, such as heavy metals or hydrocarbons, chloride is not naturally removed from water as it travels through soil and sediments and moves towards the water table. Once in the groundwater, it may remain for a long time if groundwater velocity is slow and it is not flushed away. Chloride may also be discharged from groundwater into surface water and can account for elevated levels of chloride



throughout the year, not just in winter. In high concentrations for extended periods of time, chloride in streams is toxic to aquatic life. Chloride may also negatively impact vegetation near the roadside; an important part of the riparian corridor (Wood, et al, 2005).

Roadways are also frequently used for illegal dumping of hazardous or other types of waste. Illegal dumping along County roads has been identified as a potential risk.



Figure 14. Placing signage along the road corridor within the source water protection area is one way of educating travelers on how to notify emergency personnel if a contamination should occur.

#### **Transportation Corridor Recommendations:**

1. Educate the public on how to call “911” to report any hazardous spills within the SWPA both on public and private lands. This can be done with a public outreach brochure or signage on roadways (Fig. 14). Obtain approval from Clear Creek County Road and Bridge Department prior to constructing “Drinking Water Protection Area” signage on roadways (i.e. entering watershed, near campsites, at parking lots).
2. Work with local emergency response teams to ensure that any spill within the protection area can be effectively contained and proper protocols are followed for clean-up of hazardous materials spilled within the transportation corridors
3. Keep informed on road maintenance practices, schedules within the SWPA, and CDOT monitoring studies.
4. Provide a copy of the Source Water Protection Plan and map of the SWPA to Clear Creek County Road and Bridge Department, U.S. Forest Service Clear Creek Ranger District, Georgetown Fire Protection District and Clear Creek County Office of Emergency Management (OEM).
5. Request to be notified by Clear Creek County when a hazardous spill occurs within the SWPA.
6. Purchase small spill kits to be used by utility, managers, and responders within the SWPA.

## Public Land Management

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Public lands within the Source Water Protection Area are owned by the federal government with lands managed by the U.S. Department of Agriculture's Forest Service. The source waters for the Town of Georgetown originate on Arapaho National Forest land managed by the Clear Creek Ranger District located at 101 Highway 103, Idaho Springs, Colorado. These source waters have the greatest potential to be directly affected by land use or forest management activities and decisions.

### Protecting Water Resources

A principal purpose for which the Forest Reserves (predecessor to the National Forest System) were established was to "secure favorable conditions of water flows". Throughout its history, the Forest Service has had a very diverse and broad mission of multiple use management outlined by the Federal Land Policy and Management Act. This means that they balance outdoor recreation and preservation of wildlife habitat, air and water, and other scenic and historical values with environmentally responsible commercial development of the land and its resources. The Forest Service's mandate to manage lands for multiple-use requires balancing present and future resource use with domestic water supply needs as well as many other needs. The greater the proportion of National Forest System lands in a source water area, the greater the potential to be directly affected by Forest Service land use and management activities. It is the desired condition of the National Forest System land managers to "maintain favorable conditions of flow and sustain supplies of high quality raw water while providing for multiple-use management" (GMUG, 2006).

One of the long-term management goals of the Rocky Mountain Region is to manage the forest for water resources:

*"Protect the resource. Maintain, and where opportunities exist, restore watershed and forest health to ensure full watershed function exhibiting high geomorphic, hydrologic, and biotic integrity. Ensure that forest management activities occur in a manner that adequately protects the integrity of watersheds" (USFS, 2010).*

In October 2009, the Forest Service Rocky Mountain Region and the State of Colorado Department of Public Health and Environment signed a Memorandum of Understanding (MOU) to establish a framework to work together on issues regarding the management and protection of water quality on state defined Source Water Assessment Areas on National Forest System lands in Colorado. Under this agreement, the Forest Service recognizes a CDPHE-delineated Source Water Area as a "Municipal Supply Watershed" per definition in FSM 2542 (MOU, 2009). Over three-fourths of the source water protection area for the Town of Georgetown lie within these National Forest lands and according to the MOU will be included in future Revised Forest Plans as a municipal supply watershed.



### Forest Plan

At the District level, the Clear Creek Ranger District adheres to the management directives established under the 1997 Revised Land and Resource Management Plan (1997 Forest Plan) for the Arapaho and Roosevelt National Forest and Pawnee National Grasslands (ARNF/PNG). The revised 1997 Forest Plan identifies management area prescriptions with directions for activities and management practices to be followed within the specified area (Fig. 15)(USDA, 1997).

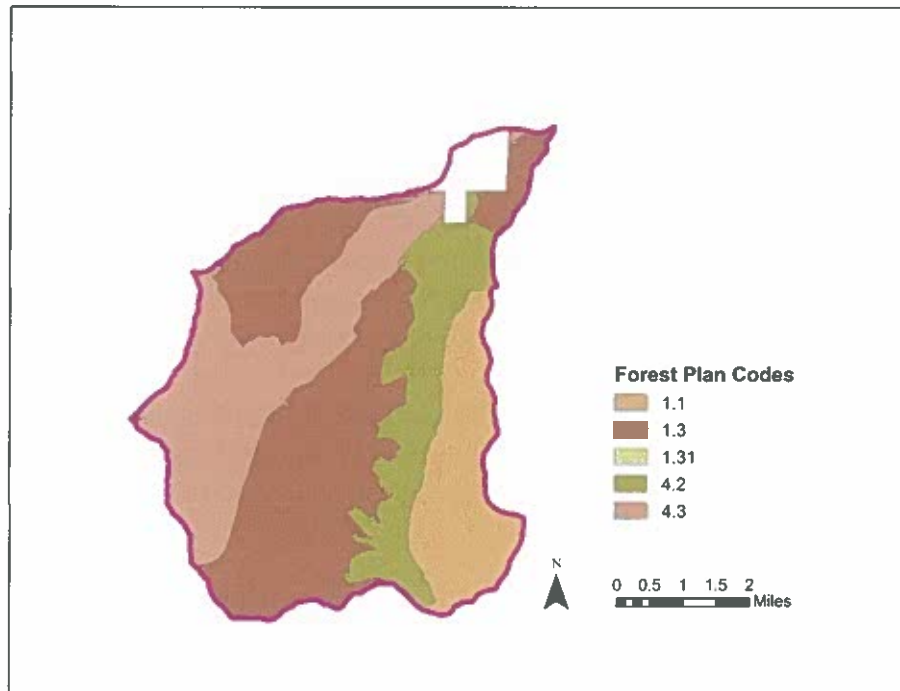


Figure 15. The Forest Service land within the source water protection area has the following management area prescription:

- 1.1 – Wilderness
- 1.3 – Backcountry Recreation
- 1.31 – Backcountry Recreation Non-motorized
- 4.2 – Scenery
- 4.3 – Dispersed Recreation

### Water Quality Concerns

The Steering Committee identified activities on public land within the source water protection area that have a potential for impacting the water quality of Leavenworth and South Clear Creeks. These include dispersed camping along the riparian corridor with lack of sanitation facilities for campers; wildland fires; forest health; and mining and vehicular travel (previously addressed in this report).

### Camping

The Forest Service maintains two designated campgrounds along the South Clear Creek corridor, Clear Lake Campground with 8 campsites and Guanella Pass Campground with 17 sites. These designated campgrounds are open from June to Labor Day. Dispersed camping occurs along the Guanella Pass roadway within the South Clear Creek riparian corridor and along routes within the Leavenworth Creek basin. The dispersed camping sites along South Clear Creek were identified as having a potential to adversely affect the water quality of the creek due to the lack of sanitation facilities for the campers. The ARNF/PNG Forest Plan (USDA Forest Service 1997) provides direction on dispersed camping sites to close, rehabilitate, or otherwise mitigate sites when unacceptable resource damage is occurring (USFS, 2013).

The Clear Creek Ranger District is currently developing a plan to close the dispersed campsite along the Guanella Pass roadway. This plan involves constructing a new designated campsite for 12 tent sites that may be kept open until the end of October and have restroom facilities. The plan also includes increasing the capacity at Clear Lake Campground by 4 additional campsites. After the additional campsites are constructed, the dispersed campsites along South Clear Creek will be closed in a phased approach over a 2-3 year period. The dispersed sites will be revegetated and signage will be placed to discourage overnight camping (Denton, 2014).

Closing the dispersed campsites along South Clear Creek may increase camping in the Leavenworth Creek watershed. The Steering Committee recommended promoting low impact camping and educating visitors on how to “Tread Lightly on the Land.”

### Forest Health Conditions

The overly dense forests throughout the Rocky Mountains are concentrated with older age classes of trees that lack diversity in age and size. This lack of diversity, along with intense competition for resources has left many forest stands vulnerable to insect and disease attacks and widespread damage.

The U.S. Forest Service Rocky Mountain Region 2 conducts aerial and ground surveys annually over western conifer and aspen forest to detect damage caused by defoliating insects. The aerial detection survey conducted in 2013 provides us with current information on insect damage in the SWPA and surrounding areas as indicated in Fig. 16 (USFS, 2014).

Although Mountain Pine Beetle is considered an epidemic throughout the west, the spread of the mountain pine beetle epidemic has slowed dramatically. In Colorado, the Mountain pine beetle (*Dendroctonus ponderosa*) was active on 97,000 acres in 2013 and 32,000 of that was in ponderosa pine. Tree mortality is a continuing problem in high-elevation subalpine fir (*Abies lasiocarpa*). The 2012 and 2013 survey showed small pockets of Subalpine Fir Mortality in the SWPA and surrounding area and tree damage by wind. The Subalpine Fir Mortality in these areas is from both insects and disease. Mortality is attributed to a combination of the western balsam bark beetle (*Dryocoetes confusus*) and two species of root decay fungi (*Armillaria* sp. and *Heterobasidion annosum*) (Harris et al, 2011).

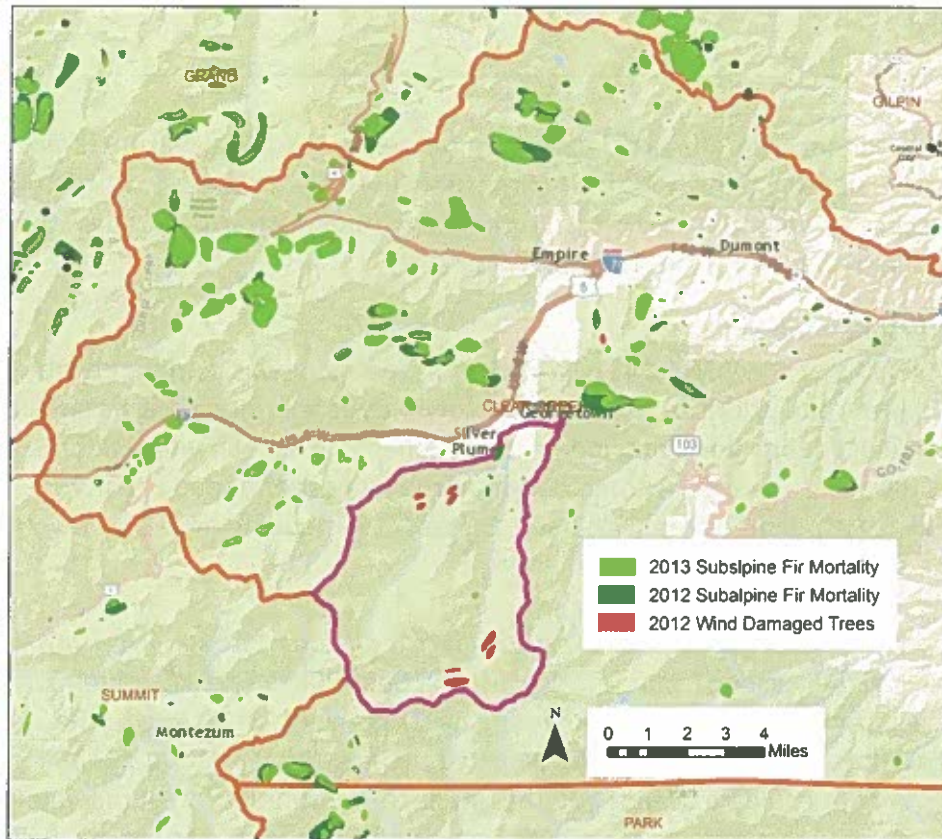


Figure 16. Map of the Subalpine Fir Mortality in and surrounding the Source Water Protection Area from the 2013 and 2012 aerial surveys.

#### Public Land Recommendations:

1. Keep informed and participate in public land management issues/activities at the district and regional level including: Forest Plan Revisions, Fuels Reduction Plan, Timber Management Plan, Travel Management and other outreach opportunities. Provide written comments to public land managers on source water protection concerns. Provide Clear Creek Ranger District with a copy of the Source Water Protection Plan and GIS shape files on the location of the intake and protection area.
2. Actively foster an open, collaborative relationship with the following groups to protect water quality in the watershed: U.S. Forest Service Clear Creek Ranger District, Clear Creek County, and Upper Clear Creek Watershed Association, Clear Creek Foundation, Division of Reclamation, Mining and Safety, Historic District Public Land Commission, Colorado Department of Public Health and Environment and Environmental Protection Agency.
3. Support efforts to improve watershed conditions (i.e. fuels reduction activities, wildfire assessment, dispersed camping closures, mine land reclamation and management approaches identified in the Upper Clear Creek Watershed Management Plan).
4. Monitor designated and dispersed camping in the watershed to prevent degradation of water quality.

## Wildland Fires

The forests throughout Colorado are dense with fuel build-up from a century of fire suppression and thus more vulnerable to high-intensity fires than it was historically. Most of Colorado's wildfires are caused by lightning strikes from the many thunderstorms that pass through the state on a regular basis during the summer months.

### Wildfire/Watershed Assessment

In 2013, the Clear/Bear Creek Wildfire/Watershed Assessment was completed which was designed to identify and prioritize sixth-level watersheds based upon their hazards of generating flooding, debris flows and increased sediment yields following wildfires that could have impacts on water supplies. A combination of ruggedness and road density (miles of road per square mile of watershed area) was used to assess the flooding or debris flow hazard portion of the analysis.

The Assessment analysis resulted in a hazardous ranking of one through five, with five being the highest ranking of the existing forest conditions. The South Clear Creek watershed was ranked 0.5 for wildfire hazard and an overall composite hazard ranking of 1.5 due to the flooding/debris flow potential and soil erodability post-fire (Fig. 17) (JWA, 2013). Information from this assessment could be used to identify areas to incorporate forest management treatments that could minimize adverse hydrologic responses following intense wildfires.

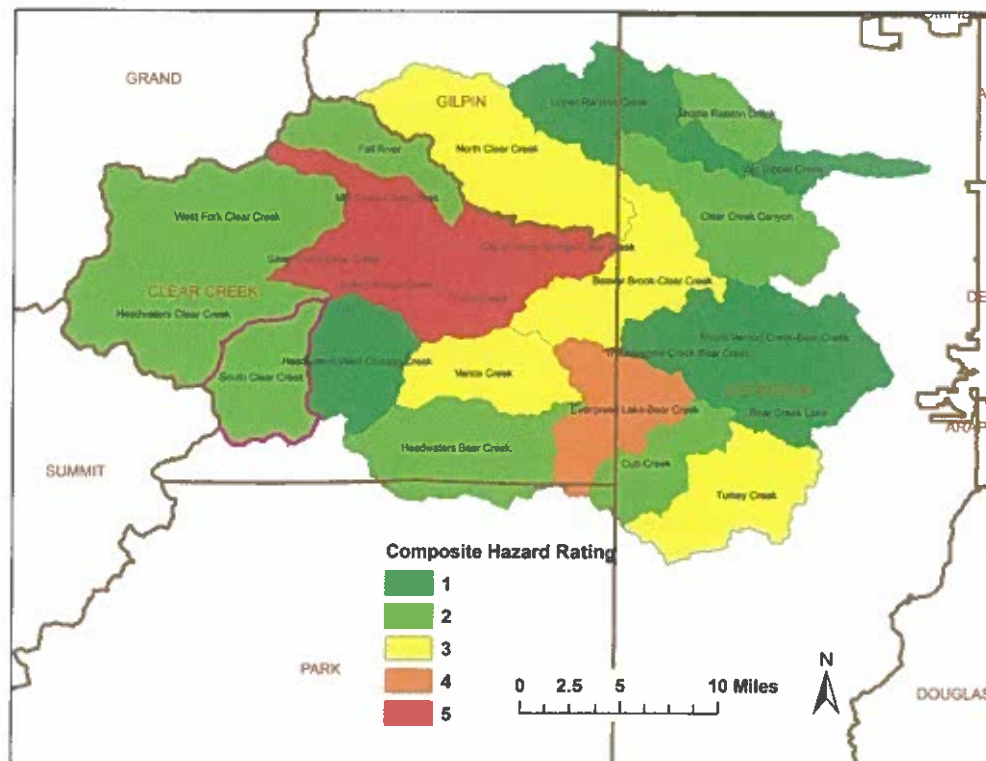


Figure 17. Map of Composite Hazard Ranking in the Bear/Clear Creek watersheds.



### Community Wildfire Protection Plan

In 2008, Clear Creek County completed their Community Wildfire Protection Plan which identifies strategies for the community and land managers to implement to reduce the impacts of wildfire to the community and maintain a healthy watershed. The Plan identifies measures that can be taken to mitigate the impact of catastrophic wildfire by reducing the fire behavior potential in areas of highest risk (CCCCWPP, 2008).

### Water Quality Effects from Fire

The degree to which wildfire degrades water quality and supply depends on wildfire extent and intensity, post-wildfire precipitation, watershed topography, and local ecology. Potential effects of wildfire on municipal water supplies and downstream aquatic ecosystems include the following:

- Changes in the magnitude and timing of snowmelt runoff, which influence filling of water-supply reservoirs,
- Increased loading of streams by nutrients (nitrogen and phosphorus), dissolved organic carbon (DOC), major ions, and metals,
- Post-fire erosion and transport of sediment and debris to downstream water-treatment plants, water-supply reservoirs, and aquatic ecosystems, and
- Changes in source-water chemistry that can alter drinking water quality (Writer & Murphy, 2012).

Variable source-water quality presents challenges for drinking-water providers. Drinking-water treatment processes operate more effectively when source-water quality is constant, DOC concentrations are below 5 milligrams per liter (mg L<sup>-1</sup>), and turbidity (an indicator of suspended material) is less than 20 nephelometric turbidity units (NTU). Elevated nitrate concentrations can promote algal growth in water supply reservoirs, which can increase DOC concentrations and lead to disagreeable taste and odor (Writer & Murphy, 2012).

Post-fire impacts to water quality occurred during “first flush” storm events, snowmelt, and high intensity thunderstorms. Thunderstorms can transport substantial amounts of sediment and debris from hillslopes of the burned area into the source waters. Even if the Town of Georgetown’s water treatment is capable of removing the sediment, operational costs may increase and could require more advanced treatment technologies if sediment levels stay too high.

#### **Wildland Fire Recommendations:**

1. Refer to the Clear Creek County Community Wildfire Protection Plan and Watershed/Wildfire Assessment Report as guides to understand wildfire risks and measure that may reduce risk.
2. Share maps, GIS shapefiles, and Emergency Notification Cards with the USFS and County.
3. Support fuels reduction efforts on public and private lands.

## Flooding

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Flooding was considered by the Steering Committee to be a high risk to create a major impact to the Town of Georgetown's water system. Flooding occurs when soils become saturated from prolonged rains and/or snowmelt runoff during spring months. If runoff or rain continues, water begins to accumulate faster than it can be absorbed or carried away in stream channels, stream levels begin to rise and eventually overflow the normal stream channel. A general flood event occurs over a minimum period of at least a few hours and can take days to reach flood crest height as seen with the September 2013 flooding in Boulder County, Colorado. A flash flooding event is usually short in duration and can happen so fast that little warning can be given. Flash flooding can also occur from upstream dam failure.

Localized flooding and debris-flow activity producing sediment-laden water can threaten or destroy bridges, culverts, and any other structures in the floodplain. Erosion from flood events can undercut and destroy structures that would otherwise receive little damage from inundation.

The potential for flooding can change and increase through various land use changes (human activity) and changes to land surface (wildfires). Wildfires create hydrophobic soils, a hardening or "glazing" of the earth's surface that prevents rainfall from being absorbed into the ground, thereby increasing runoff, erosion, and downstream sedimentation of channels (RCCWPP, 2010). Climate-driven changes to the hydrological system may likely increase the frequency, magnitude, and cost of extreme weather events.

### Town of Georgetown Floodplain

Portions of the Town of Georgetown lie within the floodplain (Fig. 18). Floodplain refers to the 100-year floodplain which is a term used by the Federal Emergency Management Agency (FEMA) and refers to lands adjacent to a waterway that have at least a one percent change of being covered by a flood in any one year. This also means that there is a 100% chance that these lands will experience flooding over a 100-year period. The 100-year flood is the national standard to which communities regulate their floodplains through the National Flood Insurance Program. The Town has included in their Land Use Code the adoption of FEMA floodplain regulations and has updated these regulations in January 2014 to keep them current with FEMA standards.

#### **Flooding Recommendations:**

1. Continue to periodically update the Town's floodplain regulations to keep them current with FEMA standards. Support and enforce regulations that limit development within the 100-year floodplain.
2. Include flood preparedness and an evacuation plan in the County's Emergency Response Plan, Hazard Mitigation Plan and the local fire departments plan.

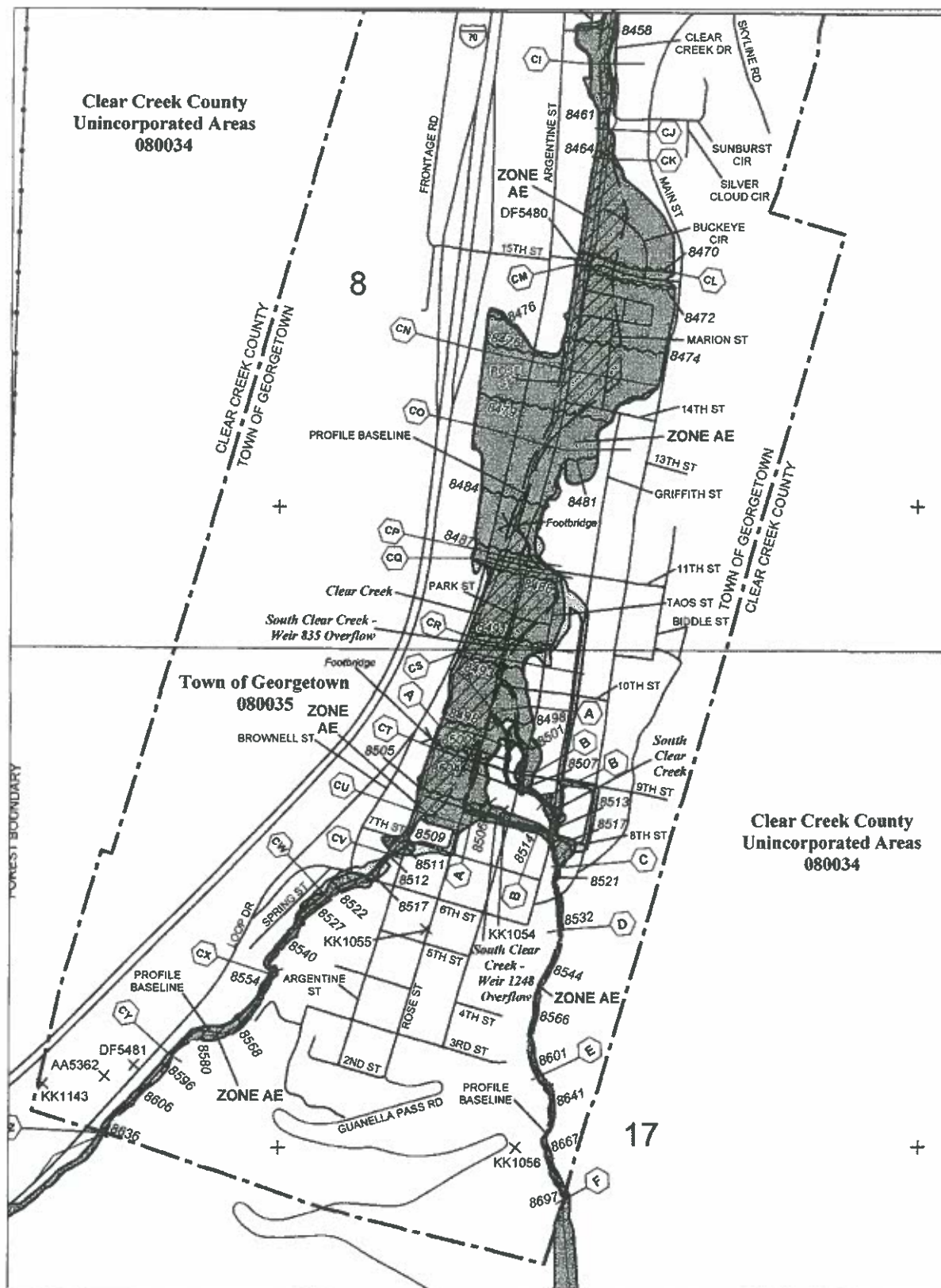


Figure 18. Map of the Town of Georgetown and the FEMA floodplain.

## Dam Failure

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The State's Dam Safety Program is administered by the Colorado Division of Water Resources' Dam Safety Branch. The branch carries out two principal duties of the State Engineer: to determine the safe storage level of reservoir dams in the state; and to approve plans and specifications. The branch conducts scheduled dam safety field inspections of existing dams.

There is no specific evidence to indicate the likelihood of dam failure within the County. Two factors that influence the potential severity of a full or partial dam failure are the amount of water impounded and the density, type, and value of development and infrastructure located downstream. Dam failures can result from any one or a combination of the following causes:

- Prolonged periods of rainfall and flooding, which result in overtopping
- Inadequate spillway capacity resulting in excess overtopping flows
- Internal erosion caused by embankment or foundation leakage, piping, or rodent activity
- Improper design, maintenance or negligent operation
- Earthquake
- Upstream dam failure

Dam safety and dam failure is a concern to the Town of Georgetown which lies directly downstream along Clear Creek. There are eight reservoirs/lakes in the source water protection area; seven of them have dams (Table 8). The Clear Lake Dam located upstream of the Town on Clear Lake is a small, high hazard-potential dam that is more than 110 years old and has a long history of seepage and dam safety issues. XCEL Energy (Public Service Company of Colorado) is currently replacing Clear Lake Dam, a 2-year project that is scheduled to be completed by May 31, 2016. The dam permit requires the XCEL Energy to closely coordinate with downstream water users (Town of Georgetown) advising them of any water quality changes to be caused by construction. Further knowledge on the condition of other dams in the source water protection area is needed to understand the risk to the downstream communities.

### **Dam Failure Recommendations:**

1. Monitor conditions of the reservoir/lakes dams and request reports from the Colorado Division of Water Resources annual dam inspection.
2. Consider implementing remote, electronic dam/river flood monitoring systems.
3. Continue to work closely with XCEL Energy on preventing water quality changes caused by the construction of the Clear Lake Dam.



## Reservoir Maintenance

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There are 8 reservoirs/lakes in the source water protection area of which 7 are owned or managed by the following entities: Public Service Company of Colorado (PSCo), City of Black Hawk, Clear Creek County, and Town of Georgetown (Table 6).

Table 6. Table of Reservoir/Lakes and Owners in the Source Water Protection Area.

Reservoir/Lakes	Owner/Manager	Dam
Murray Lake	Public Service Company of Colorado, an Xcel Energy Co.	x
Silver Dollar	Public Service Company of Colorado, an Xcel Energy Co.	x
Naylor Lake	Privately Owned	
Lower Cabin Creek Reservoir	Public Service Company of Colorado, an Xcel Energy Co.	x
Upper Cabin Creek Reservoir	Public Service Company of Colorado, an Xcel Energy Co.	x
Clear Lake	Public Service Company of Colorado, an Xcel Energy Co.	x
Green Lake	City of Black Hawk and Clear Creek County	x
Georgetown Reservoir	Town of Georgetown	x

Lakes and reservoirs can accumulate sediment and lessen the transport of sediment to downstream reaches. Selected lakes and reservoirs near the Guanella Pass road were sampled in the 1990s to document water quality conditions including Green Lake, Clear Lake, Lower Cabin Creek Reservoir and Georgetown Reservoir. Among lake and reservoir sites sampled for bottom-sediment trace elements, Green Lake and Georgetown Reservoir generally had the largest concentrations of zinc and lead. The larger concentrations of these trace elements in bottom sediment are related to sources of trace elements in the Leavenworth Creek Basin, which is the major water source to both impoundments. A possible source of the accumulated material in Georgetown Reservoir is a large mine dump that shows evidence of erosion where Leavenworth Creek passes underneath the Guanella Pass road. The relatively large concentrations of trace elements in the bottom of Georgetown Reservoir could be a concern if the reservoir is dredged or decommissioned (Stevens, 2001).

Reservoir managers are responsible for conducting maintenance activities at the reservoirs, as well as pipelines. Maintenance activities may include removing silt and debris upstream of a dam, dam or spillway repairs, clearing shoreline vegetation, removing nuisance aquatic and shoreline vegetation, managing eutrophication, dredging to restore depth, and other in-lake work. Any of these activities may include partial or complete drawdown of the reservoir. Pipelines can develop leaks, which will also require repair and/or replacement.

If the maintenance work is not conducted properly, there can be short-term or long-term damage to wetlands, streams or ponds, floodplain, fisheries, state and federal rare and endangered species habitat, drinking water sources, and other resources.

Releasing sediment-laden waters downstream can lower water quality below standards and affect fisheries and wildlife habitat. Increasing turbidity can also interfere with disinfection at water supplies

downstream. Releasing too much water too fast or with precipitation events and intense snowmelt can damage public and private property (including homes and roadways) and can affect water users.

Sediment management efforts to control upstream erosion and pollution in the watershed will help to improve downstream water quality and reduce the need for dredging downstream reservoirs.

**Reservoir Maintenance Recommendations:**

1. Provide information to the reservoir owners/managers about the source water protection plan and how they can help with protecting the drinking water sources (Xcel Energy, City of Black Hawk, and Clear Creek County).
2. Implement BMPs across the watershed to decrease sedimentation and contamination to the reservoirs and downstream waterways (i.e. County road maintenance, stormwater permit for construction of Clear Creek dam, mine land reclamation in Leavenworth Creek basin).
3. Work with Xcel Energy to discuss potential flooding issues from movement of water in and out of the reservoirs.
4. Monitor reservoir and stream gage levels and regulate reservoir levels to minimize impacts from high water events on downstream water utilities, town, and residents along the riparian corridor (i.e. USGS stream gage upstream of Lower Cabin Creek Reservoir).

## **Public Relations and Communication**

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One cannot overemphasize the importance of engaging the local community in the protection of the water quality of the source waters. One of the goals of this Source Water Protection Plan is to create an engaged community that will want to become stewards of their watershed. Providing opportunities to the public to become informed on the workings of the Town can include: Town Board meetings, web-postings on the Town's website, community gatherings and special meetings. Fostering good public relations can prevent local citizens from becoming disenfranchised with local government and creating negative effects on the community. Providing opportunities at local meetings for citizens to voice their concerns and participate in the decision making can help to create a healthy empowered community.

## Weed Abatement

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Herbicides are used by Clear Creek County and the U.S. Forest Service to control noxious weeds within the source water protection area. The Clear Creek County Weed Program works to control noxious and nuisance weeds on county road rights of way, educate the public on weed management, and provide weed control in cooperation with other land management agencies. The County Weed Supervisor is responsible for implementing the County Weed Program. This is consistent with the State mandate for managing noxious weeds. The Clear Creek County Weed Program uses chemical and biological methods to manage, control, and eradicate noxious weeds. Chemical control methods change while the weeds can become resistant to chemicals. Consistency is the best method for long-term and successful eradication of noxious weeds.

Certain noxious weeds in the County that are on the States List A are required to be eradicated (destroyed). These include: Cypress spurge, Myrtle spurge, Orange hawkweed. Noxious weeds in the County on List B are treated chemically with herbicides, but may also be controlled mechanically. The remaining noxious weeds on List C are recommended for voluntary management (CCC, 2015).

The County uses herbicides with the lowest rates recommended for effective weed control that have the lowest toxicity and volatility, and are spot sprayed whenever possible, instead of broadcast on weed infestations. Almost all herbicides used are selective for control of broadleaf weed species. Grasses are unaffected.

All employees in the weed group, full-time and seasonal, are certified with the Colorado Department of Agriculture under Pesticide Application. Application equipment is regularly calibrated to insure accurate delivery. Herbicide label information provides precautionary information relating to proximity to water, sensitive vegetation, re-entry intervals, etc. Product labels are referenced and present with applicators in the field.

Improper use of herbicides may lead to contamination of ground and surface water supplies for drinking water. These chemicals can enter the water source through direct application, runoff, and wind transport or drift. The goal is to prevent contamination of water supplies the using best management practices in the application and use of these chemicals.

### **Weed Abatement Recommendations:**

1. Provide the County weed supervisor and the U.S. Forest Service with a copy of the Source Water Protection Plan, a map of the source water protection area and location of water intakes.
2. Encourage the use of non-herbicidal alternatives in a 50-foot buffer zone around drinking water intakes and streams.

## Septic Systems

Within the Source Water Protection Area there are properties that rely on septic systems to dispose of their sewage. A septic system is a type of onsite wastewater treatment system (OWTS) consisting of a septic tank that collects all the sewage and a leach field that disperses the liquid effluent onto a leach field for final treatment by the soil (Fig. 19).

Septic systems are the second most frequently cited source of groundwater contamination in our country. Unapproved, aging, and failing septic systems have a large impact on the quality and safety of the water supply. The failure to pump solids that accumulate in the septic tank will also eventually clog the lines and cause untreated wastewater to back up into the home, to surface on the ground, or to seep into groundwater. If managed improperly, these residential septic systems can contribute excessive nutrients, bacteria, pathogenic organisms, and chemicals to the groundwater.

### Regulations and Permitting

In 2014, the Clear Creek County Board of Health adopted the Clear Creek County Onsite Wastewater Treatment System Regulations (See Appendices). These regulations were derived from Regulation #43 which was adopted by the state of Colorado in 2013. The County's Environmental Health Department administers and enforces the minimum standards, rules and regulations; and issues permits for the OWTS

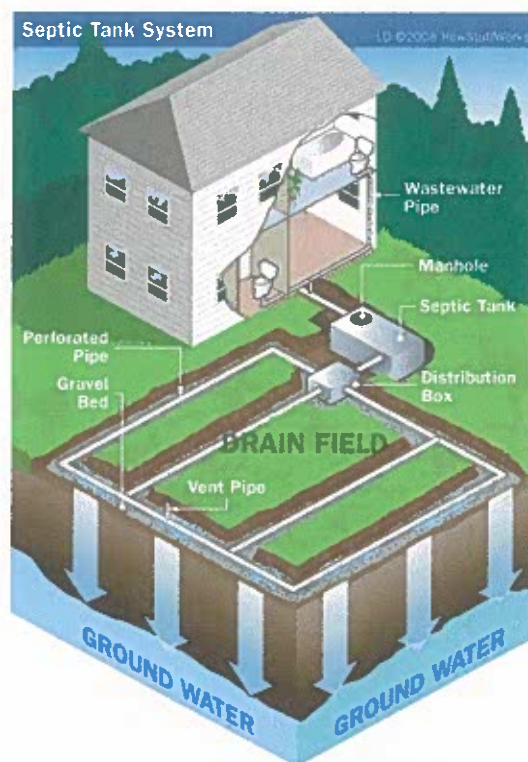


Figure 19. Septic systems are the second most frequently cited source of ground water contamination in our county.

### **Septic System Recommendations:**

1. Develop a public education program for property owners within the SWPA on the source water protection plan, the proper use and maintenance of their septic system and how the source of their drinking water can be affected by an inadequate functioning septic system. Develop a list of property owners in the SWPA.
2. Encourage the County Environmental Health Department to educate property owners when they apply for a septic permit on the link between good septic practices and protecting groundwater.
3. Require new septic system owners to obtain a Watershed District Permit from the Town of Georgetown and provide education to permittees on SWPP and septic BMPs.



## **SOURCE WATER PROTECTION MEASURES**

### **Best Management Practices**

The Steering Committee reviewed and discussed several possible best management practices that could be implemented within the Source Water Protection Area to help reduce the potential risks of contamination to the community's source water. The Steering Committee 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 community. The best management practices were obtained from multiple sources including: Environmental Protection Agency, Colorado Department of Public Health and Environment, Natural Resources Conservation Service, and other source water protection plans.

The Steering Committee recommends the best management practices listed in Table 7, "Source Water Protection Best Management Practices" be considered for implementation by:

- Town of Georgetown
- Clear Creek County
- U.S. Forest Service Clear Creek Ranger District
- Georgetown Fire Protection District
- Upper Clear Creek Watershed Association
- Clear Creek Watershed Foundation
- Colorado Division of Reclamation, Mining and Safety
- Colorado Rural Water Association
- Visitors to the Source Water Protection Area

### **Evaluating Effectiveness of Best Management Practices**

The Town of Georgetown is committed to developing a tracking and reporting system to gauge the effectiveness of the various source water best management practices that have been implemented. The purpose of tracking and reporting the effectiveness of the source water best management practices is to update water system managers, consumers, and other interested entities on whether or not the intended outcomes of the various source water best management practices are being achieved, and if not, what adjustments to the Source Water Protection Plan will be taken in order to achieve the intended outcomes. It is further recommended that this Plan be reviewed at a frequency of once every 1-3 years or if circumstances change resulting in the development of new water sources and source water protection areas, or if new risks are identified.

The Town of Georgetown is committed to a mutually beneficial partnership with the Colorado Department of Public Health and Environment in making future refinements to their source water assessment and to revise the Source Water Protection Plan accordingly based on any major refinements.

Table 7. Source Water Protection Best Management Practices

Issue	Management Approach	Partners
<i>Transportation</i>	<ol style="list-style-type: none"> <li>1. Educate the public on how to call "911" to report any hazardous spills within the SWPA both on public and private lands. This can be done with a public outreach brochure or signage on roadways. Obtain approval from Clear Creek County Road and Bridge Department prior to constructing "Drinking Water Protection Area" signage on roadways (i.e. entering watershed, near campsites, at parking lots).</li> <li>2. Work with local emergency response teams to ensure that any spill within the protection area can be effectively contained and proper protocols are followed for clean-up of hazardous materials spilled within the transportation corridors.</li> <li>3. Keep informed on road maintenance practices, schedules within the SWPA, and CDOT monitoring studies.</li> <li>4. Provide a copy of the Source Water Protection Plan and map of the SWPA to Clear Creek County Road and Bridge Department, U.S. Forest Service Clear Creek Ranger District, Georgetown Fire Protection District and Clear Creek County Office of Emergency Management (OEM).</li> <li>5. Request to be notified by Clear Creek County when a hazardous spill occurs within the SWPA.</li> <li>6. Purchase small spill kits to be used by utility, managers, and responders within the SWPA.</li> </ol>	<p>Town of Georgetown Clear Creek County Clear Creek Ranger District</p> <p>Town of Georgetown Clear Creek County</p> <p>Town of Georgetown</p> <p>Town of Georgetown</p> <p>Town of Georgetown</p> <p>Town of Georgetown</p>
<i>Wildland Fires</i>	<ol style="list-style-type: none"> <li>1. Refer to the Clear Creek County Community Wildfire Protection Plan and Watershed/Wildfire Assessment Report as guides to understand wildfire risks and measure that may reduce risk.</li> <li>2. Share maps, GIS shapefiles, and Emergency Notification Cards with the USFS and County.</li> <li>3. Support fuels reduction efforts on public and private lands.</li> </ol>	<p>Town of Georgetown</p> <p>Town of Georgetown</p> <p>Town of Georgetown Clear Creek County</p>

Table 7. Source Water Protection Best Management Practices

Issue	Management Approach	Partners
<i>Reservoir Maintenance</i>	<ol style="list-style-type: none"> <li>1. Provide information to the reservoir owners/managers about the source water protection plan and how they can help with protecting the drinking water sources (PSCo, City of Black Hawk, Clear Creek County).</li> <li>2. Implement BMPs across the watershed to decrease sedimentation and contamination to the reservoirs and downstream waterways (i.e. County road maintenance, stormwater permit for construction of Clear Creek dam, mine land reclamation in Leavenworth Creek basin).</li> <li>3. Work with Xcel Energy to discuss potential flooding issues from movement of water in and out of the reservoirs.</li> <li>4. Monitor reservoir and stream gage levels and regulate reservoir levels to minimize impacts from high water events on downstream water utilities, town, and residents along the riparian corridor (i.e. USGS stream gage upstream of Lower Cabin Creek Reservoir).</li> </ol>	<p>Town of Georgetown</p> <p>Clear Creek County Public Service Company of CO Clear Creek Ranger District</p> <p>Town of Georgetown</p> <p>Reservoir Owners/Managers</p>
<i>Flooding</i>	<ol style="list-style-type: none"> <li>1. Continue to periodically update the Town's floodplain regulations to keep them current with FEMA standards. Support and enforce regulations that limit development within the 100-year floodplain.</li> <li>2. Include flood preparedness and an evacuation plan in the County's Emergency Response Plan, Hazard Mitigation Plan and the local fire departments plan.</li> </ol>	<p>Town of Georgetown</p> <p>Clear Creek County Clear Creek Fire Protection District</p>
<i>Dam Failure</i>	<ol style="list-style-type: none"> <li>1. Monitor conditions of the reservoir/lakes dams and request reports from the Colorado Division of Water Resources annual dam inspection.</li> <li>2. Consider implementing remote, electronic dam/river flood monitoring systems.</li> <li>3. Continue to work closely with Public Service Company of Colorado on preventing water quality changes caused by the construction of the Clear Lake Dam.</li> </ol>	<p>Town of Georgetown</p> <p>Public Service Company of CO</p> <p>Town of Georgetown</p>

Table 7. Source Water Protection Best Management Practices

Issue	Management Approach	Partners
<i>Public Land Management</i>	<ol style="list-style-type: none"> <li>1. Keep informed and participate in public land management issues/activities at the district and regional level including: Forest Plan Revisions, Fuels Reduction Plan, Timber Management Plan, Travel Management and other outreach opportunities. Provide written comments to public land managers on source water protection concerns. Provide Clear Creek Ranger District with a copy of the Source Water Protection Plan and GIS shape files on the location of the intake and protection area.</li> <li>2. Actively foster an open, collaborative relationship with the following groups to protect water quality in the watershed: U.S. Forest Service Clear Creek Ranger District, Clear Creek County, and Upper Clear Creek Watershed Association, Clear Creek Foundation, Division of Reclamation, Mining and Safety, Historic District Public Land Commission, Colorado Department of Public Health and Environment and Environmental Protection Agency.</li> <li>3. Support efforts to improve watershed conditions (i.e. fuels reduction activities, wildfire assessment, dispersed camping closures, mine land reclamation and management approaches identified in the Upper Clear Creek Watershed Management Plan).</li> <li>4. Monitor designated and dispersed camping in the watershed to prevent degradation of water quality.</li> </ol>	<p>Town of Georgetown Clear Creek Ranger District</p> <p>Town of Georgetown</p> <p>Town of Georgetown</p> <p>Clear Creek Ranger District</p>
<i>Municipal Utilities</i>	<ol style="list-style-type: none"> <li>1. Inspect and protect source water intakes; be knowledgeable of the emergency response plan, and provide information concerning the SWPP and implementation measures in the annual Consumer Confidence Report (CCR).</li> <li>2. Conduct water quality monitoring according to a monitoring plan.</li> <li>3. Implement contingency plan in the event of a disruption in the water source.</li> <li>4. Use alternative power source in the event of a power outage (i.e. generator).</li> </ol>	<p>Georgetown Water Operator</p> <p>Georgetown Water Operator</p> <p>Town of Georgetown</p> <p>Town of Georgetown</p>



Table 7. Source Water Protection Best Management Practices

Issue	Management Approach	Partners
<i>Septic Systems</i>	<ol style="list-style-type: none"> <li>1. Develop a public education program for property owners within the SWPA on the source water protection plan, the proper use and maintenance of their septic system and how the source of their drinking water can be affected by an inadequate functioning septic system. Develop a list of property owners in the SWPA.</li> <li>2. Encourage the County Environmental Health Department to educate property owners when they apply for a septic permit on the link between good septic practices and protecting groundwater.</li> <li>3. Require new septic system owners to obtain a Watershed District Permit from the Town of Georgetown and provide education to permittees on SWPP and septic BMPs.</li> </ol>	<p>Town of Georgetown Clear Creek County</p> <p>Town of Georgetown</p> <p>Town of Georgetown</p>
<i>Mining</i>	<ol style="list-style-type: none"> <li>1. Stay informed and participate in the collaborative effort underway to mitigate impacts from mining within the Leavenworth Creek Watershed (USFS, EPA, DRMS, TU, CDPHE, USGS, USFWS).</li> <li>2. Continue to evaluate water quality monitoring data to characterize the effects of mine land reclamation activities and impacts of abandoned mine land.</li> <li>3. Participate in the River Watch program to monitor the raw water quality of Georgetown Reservoir and South Clear Creek at the Town's intake.</li> <li>4. Get involved in the review process for new mining activity permits at the State and County level including unpatented claims on both public and private lands.</li> <li>5. Frequently check the County website to keep informed of any mine related permits, hearings, and opportunities to submit comments.</li> </ol>	<p>Town of Georgetown Clear Creek County Clear Creek Ranger District EPA, DRMS, TU, CDPHE, USGS, USFWS</p> <p>Town of Georgetown</p> <p>Town of Georgetown</p> <p>Town of Georgetown</p>

Table 7. Source Water Protection Best Management Practices

Issue	Management Approach	Partners
<i>Land Use Planning and Growth</i>	<ol style="list-style-type: none"> <li>1. Provide Clear Creek County with a copy of the SWPP and GIS mapping information and encourage them to overlay this area on their land use maps.</li> <li>2. Request to be notified by Clear Creek County officials of land use hearings or meetings regarding land within the SWPA and participate in the process.</li> <li>3. Check County's websites regularly to keep informed of land use opportunities to submit comments or attend meetings.</li> </ol>	<p>Colorado Rural Water Association</p> <p>Town of Georgetown</p> <p>Town of Georgetown</p>
<i>Weed Abatement</i>	<ol style="list-style-type: none"> <li>1. Provide the County weed supervisor and the U.S. Forest Service with a copy of the Source Water Protection Plan, a map of the source water protection area and location of water intakes.</li> <li>2. Encourage the use of non-herbicidal alternatives in a 50-foot buffer zone around drinking water intakes and streams.</li> </ol>	<p>Town of Georgetown</p>

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## APPENDICES

- A. Contingency Plan\*
- B. Source Water Assessment Report and Appendices
- C. Meeting Agendas and Presentations
- D. Contact List of Stakeholders Invited to Participate
- E. Citizen Guides
- F. Contaminant Health Concerns
- G. Miscellaneous Maps and Reports
- H. Funding Sources for Source Water Protection
- I. Glossary

*Notice: This public document will only include information that is not deemed sensitive to the safety and operation of the individual community's water plan operation. Appendices marked with a \* are only included in the Public Utility'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.*

*Review Due on Friday 13<sup>th</sup>  
March 30<sup>th</sup>*