Deerwood Service Company
Source Water Protection Plan

Routt County, Colorado
May 22, 2014

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Source Water Specialist
Colorado Rural Water Association

For the Community Water Provider:
Deerwood Service Company: ID # CO0154205

Cover Photo by Teresa Audesirk

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ACRONYMS

AST	Aboveground Storage Tank
BLM	Bureau of Land Management
BMP	Best Management Practice
CDPHE	Colorado Department of Public Health and Environment
COGCC	Colorado Oil and Gas Conservation Commission
CRWA	Colorado Rural Water Association
CWPP	Community Wildfire Protection Plan
DCS	Deerwood Service Company
DRMS	Colorado Division of Reclamation, Mining and Safety
GIS	Geographic Information System
LLC	Limited Liability Corporation
MOU	Memorandum of Understanding
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
TOT	Time of Travel
USFS	United States Forest Service
WBID	Water Body Identification
WQCC	Water Quality Control Commission

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 Deerwood Service Company 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 December, 2013 through May, 2014 at various locations in Steamboat Springs, CO. 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 Deerwood Service Company obtains its drinking water supply from a groundwater well located within the Trout Creek watershed located in northwestern Colorado. The Source Water Protection Area for the Deerwood Service Company includes the Trout Creek watershed upstream from the Whetstone Valley fault, approximately 54 square miles. This Source Water Protection Area is the area that the Deerwood Service Company 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 Deerwood Service Company's drinking water sources. The Steering Committee prioritized the list of issues of concern as: future oil and gas development, spills on roads, private water wells, fuel storage tanks on private property, wildland fires, heavy rain events, resource extraction, growth and development, septic systems, and residential property hazardous waste.

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 2014-2015. 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 Deerwood Service Company operates a community water supply system that maintains the infrastructure to supply 67 homes at buildout, and currently supplies drinking water to 31 homes located within unincorporated Routt County, Colorado. The Deerwood Service Company obtains their drinking water from one groundwater well (DP$) located in the Trout Creek watershed. A second well (DP#) has been drilled but is not in use. Deerwood Service Company recognizes the potential for contamination of the source of their drinking water, and realizes that it is necessary to develop a protection plan to prevent the contamination of this valuable resource. Proactive planning and implementing contamination prevention strategies are essential to protect the long-term integrity of their water supply and to limit their costs and liabilities.[1]

Table 1. Primary Contact Information for Deerwood Service Company

PWSID	PWS Name	Name	Title	Address	Phone
CO0154205	Deerwood Service Company, LLC	Theresa Audesirk	Board of Directors	31130 Routt County Road 179 P.O. Box 881546 Steamboat Springs, CO 80487	970-871-6026

Purpose of the Source Water Protection Plan

The Source Water Protection Plan (SWPP) is a tool for the Deerwood Service Company 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 protection measures implemented at the state and federal governmental levels by filling protection gaps that can only be addressed at the local level.

[1] The information contained in this Plan is limited to that available from public records and the Deerwood Service Company 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. Information discussed at the meetings helped the Deerwood Service Company 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
August 14, 2013	Meeting with Deerwood Service Company Board members and and Water Operator to discuss process of developing a source water protection plan for the Deerwood Service Company. Tour of well pump house facility.
December 10, 2013	First Planning Meeting - Presentation on the process of developing a Source Water Protection Plan for the Deerwood Service Company. The Steering Committee verified correct location of wells, discussed delineating the source water protection area, and reviewed the groundwater hydrology and geology report.
January 16, 2014	Second Planning Meeting – Presentations on the Upper Yampa Plan. Steering Committee reviewed the State's delineation of the source water protection areas surrounding wells, decided on adding additional protection areas, developed an inventory of potential contaminant sources and issues of concern within the Source Water Protection Area.
February 13, 2014	Third Planning Meeting – The Steering Committee reviewed the potential contaminant sources and 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.
May 22, 2014	Fourth Planning Meeting –Used a SWAP Matrix grid to prioritize issues of greatest concern and reviewed draft Source Water Protection Plan.

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 Deerwood Service Company's source water protection planning process attracted interest and participation from 18 stakeholders including local citizens and landowners, water operator, local and county governments, and agency representatives. During the months of December, 2013 through May, 2014, four stakeholder meetings were held at the Routt County Conservation District's office, Community Center and Library in Steamboat Springs, CO 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
Teresa Audesirk	Board of Directors	Deerwood Service Company
Gerald Audesirk	Creek Ranch Owners ASSN	Creek Ranch Owners Association
Terry Silva	Board of Directors	Deerwood Service Company
Roger Young	Board of Directors	Deerwood Service Company
Bruce Thompson	Water Operator	Deerwood Service Company
Greg Brown	Supervisor	Routt County Weed Program
Jackie Brown	District Manager	Routt County Conservation District & Upper Yampa Watershed
Alan Goldich	Planner	Routt County Planning Department
Jennifer Valentine	Planner	Routt County Planning Department
Jason Striker	Environmental Health Specialist	Routt County Environmental Health
Kent Sandstedt	Resident	Creek Ranch
Kenneth Clark	Resident	Deerwood Ranch Owners Association
Kent Baucke		Deerwood Service Company
Jeremiah Zamora		USDA Forest Service Yampa Ranger District
Doug Myhre		USDA Forest Service Yampa Ranger District
Colleen Williams	Source Water Specialist	Colorado Rural Water Association

Development and Implementation Grant

The Deerwood Service Company has been awarded a $5,000 Development and Implementation Grant from the Colorado Department of Public Health and Environment (CDPHE) in August 2013. This funding is available to public water systems who are committed to developing and implementing a source water protection plan. The Deerwood Service Company intends on using this funding to implement management approaches that are identified in this Plan.

WATER SUPPLY SETTING

Location and Description

The Deerwood Service Company (DSC) is an LLC owned by its users and managed by a volunteer Board of Directors. It provides drinking water from a groundwater well (DP4) to three subdivisions: Deerwood Ranches, Creek Ranch, and the Wilkerson Subdivision within an unincorporated area in south-central Routt County in Section 20 of Township 5 North, Range 85 West. The three subdivisions served by DSC are located approximately 15 miles southwest of Steamboat Springs, Colorado along County Road 179. Deerwood Service Company currently provides drinking water to 17 out of 24 lots in Deerwood, 11 out of 39 lots in Creek Ranch and 3 out of 4 in Wilkerson. At buildout, the DSC will be supplying water to 67 lots (Audesirk, 2014).

Routt County is located in northwestern Colorado on the western side of the Continental Divide. The County covers a total area of 2,368 miles and according to the 2010 U.S. Census, has a population of 23,509 people (DOLA, 2012). The county seat is located in the town of Steamboat Springs.

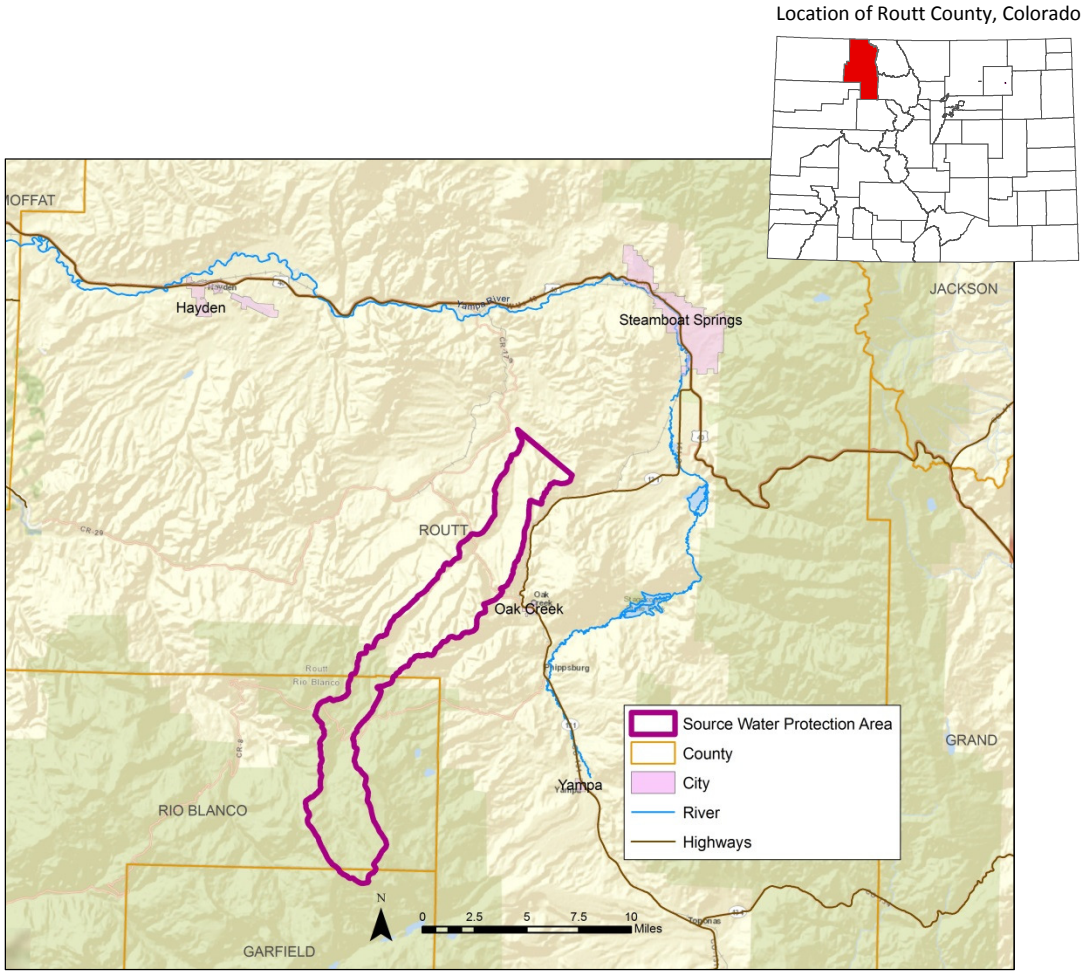


Figure 1. Regional setting map.

Physical Characteristics

The Deerwood Service Company's source water protection area is located in the Sand Wash Basin, part of the Wyoming Basin physiographic province of Colorado. The Wyoming Basin province interrupts the continuity of the Southern Rocky Mountain System as a structural depression between the Southern and Middle Mountain Ranges. It consists for the most part as a number of separate broad intermountain basins divided by isolated hills and low mountains (PIF, 2014).

The Sand Wash Basin of northwestern Colorado straddles the Wyoming state line between the Park Range on the east and the Uinta Uplift on the west (Fig. 2). Structurally, the basin is bounded on the south by the White River Uplift and the Axial Basin Arch. Most of the basin is a rolling plain with elevations above 6,000 feet, although the eastern part of the basin grades into foothills and mountains with elevations above 10,000 feet (Topper, et al, 2003).

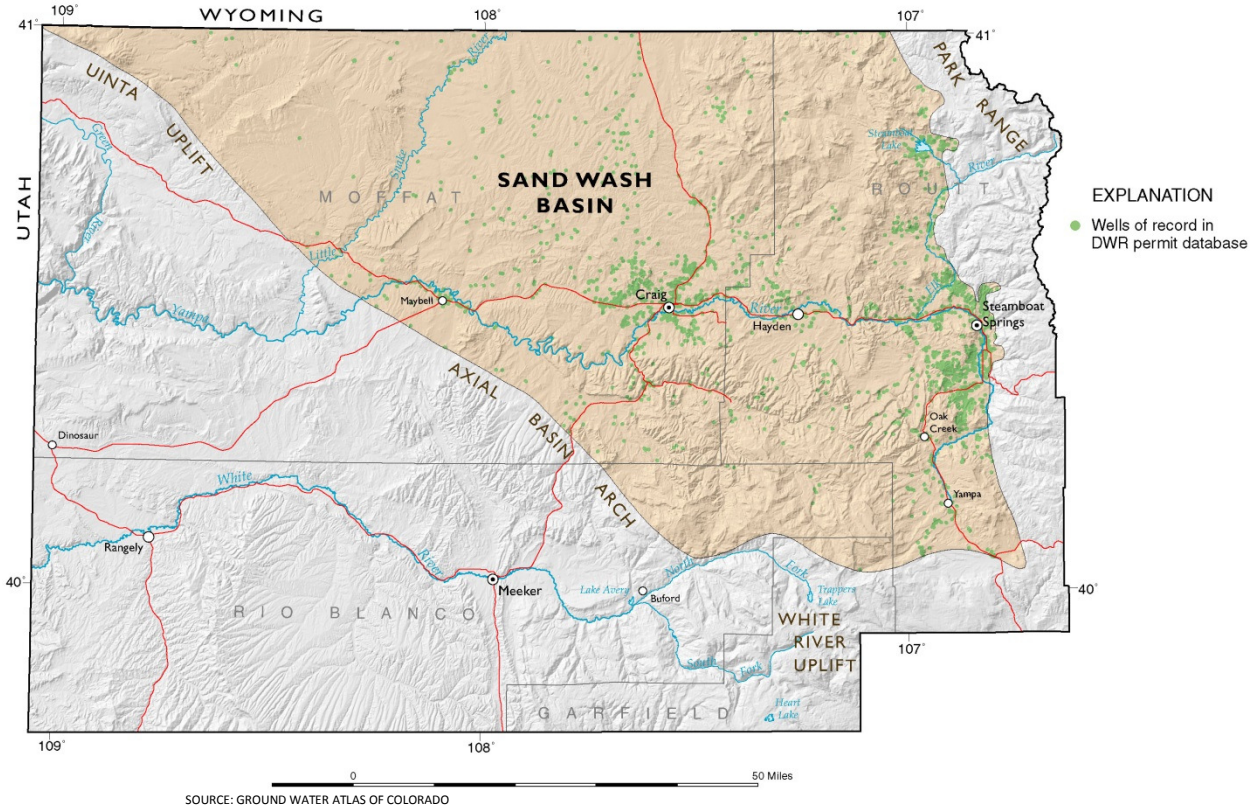


Figure 2. Location and extent of the Sand Wash Basin.

Topography

The Source Water Protection Area lies within the Trout Creek Watershed. The elevation in the northern portion of the Source Water Protection Area around the Deerwood Service Company's wells is 6,800 feet. The southwestern boundary of the SWPA lies within the Flat Top Wilderness Area with elevations up to 12,087 feet. The site is characterized by hogback topography forming north-south trending ridges and valleys. The topography is controlled by the differential weathering and erosion of tilted alternating sequences of more resistant sandstone ridges and less resistant shale valleys (D&A, 2011).

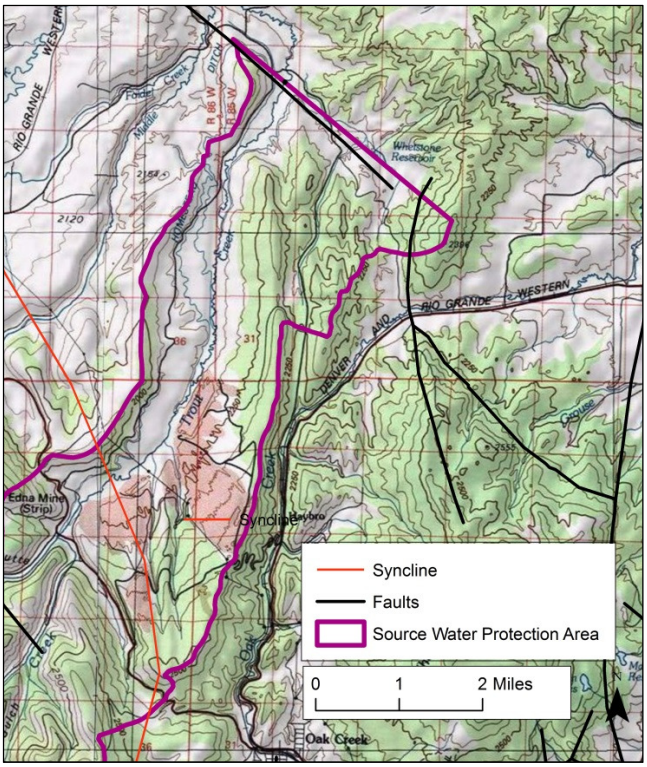


Figure 3. Topographic map of the northern portion of the Source Water Protection Area.

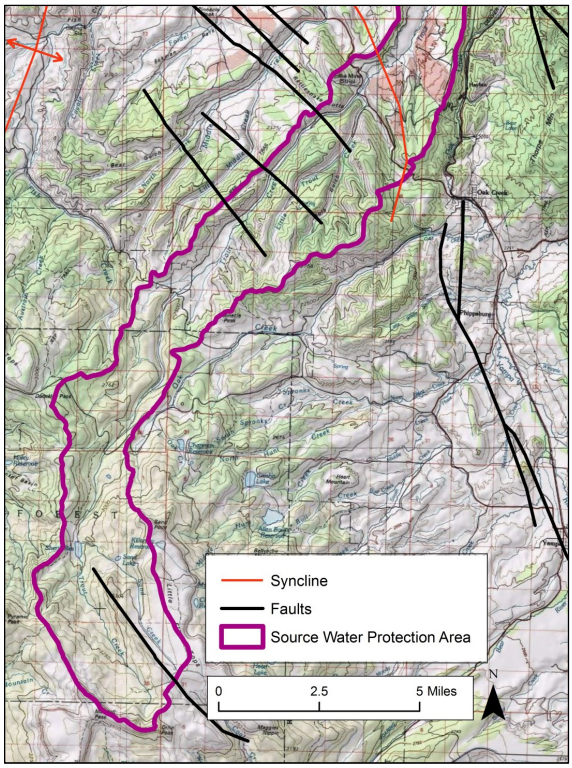


Figure 4. Topographic map of the southern portion of the Source Water Protection Area.

The northern portion of the SWPA is situated on the eastern limb of the Twenty Mile Syncline. This syncline is a downward folded sequence of rocks that forms a subsurface basin underlying Twentymile Park. The rocks strike approximately north-south and dip west-southwest toward the axis approximately three to four miles west-southwest of the groundwater wells site. Numerous faults are located within the SWPA. A fault is a fracture in rock along which there has been an observable amount of displacement from extensive tectonic forces (Whitten, 1974). Two faults mapped in the vicinity of the Deerwood Service Company's wells trend roughly northwest to southeast. The Whetstone Valley fault is located at the northern boundary of the Source Water Protection Area (Fig. 3). The second fault is located west of the wells, trends northwest to southeast with a reverse offset in the vicinity of Trout Creek (Ohlsen, 2011).

Geology

The oldest rocks in the Source Water Protection Area are mapped on the northeastern edge of the map as the Dakota, Morrison and Sundance Formations (KJds). These formations consist primarily of Jurassic to Cretaceous age sandstones and claystones. The next overlying unit is the Cretaceous age Mancos Shale (Km), which consists primarily of thick shale with minor interbedded sandstone lenses and is approximately 5,000 feet thick. The next younger unit on top of the Mancos is the Cretaceous age Iles Formation. The Iles Formation (Ki) is approximately 1,500 feet thick and is subdivided into the upper Trout Creek Sandstone Member and Lower Member. Above the Iles Formation is the Cretaceous age Williams Fork Formation (Kw), which consists of 1,100 to 2,000 feet of interbedded sandstone and shale with abundant coal beds that are mined in the region. The youngest overlying layers located in the upper watershed include the Tertiary age volcanic basalt flows (Tbb), sedimentary beds of the Brown Park Formation (Tbp), and the Quaternary age landslide (Ql) (Table 4, Fig. 5) (Ohlsen, 2011).

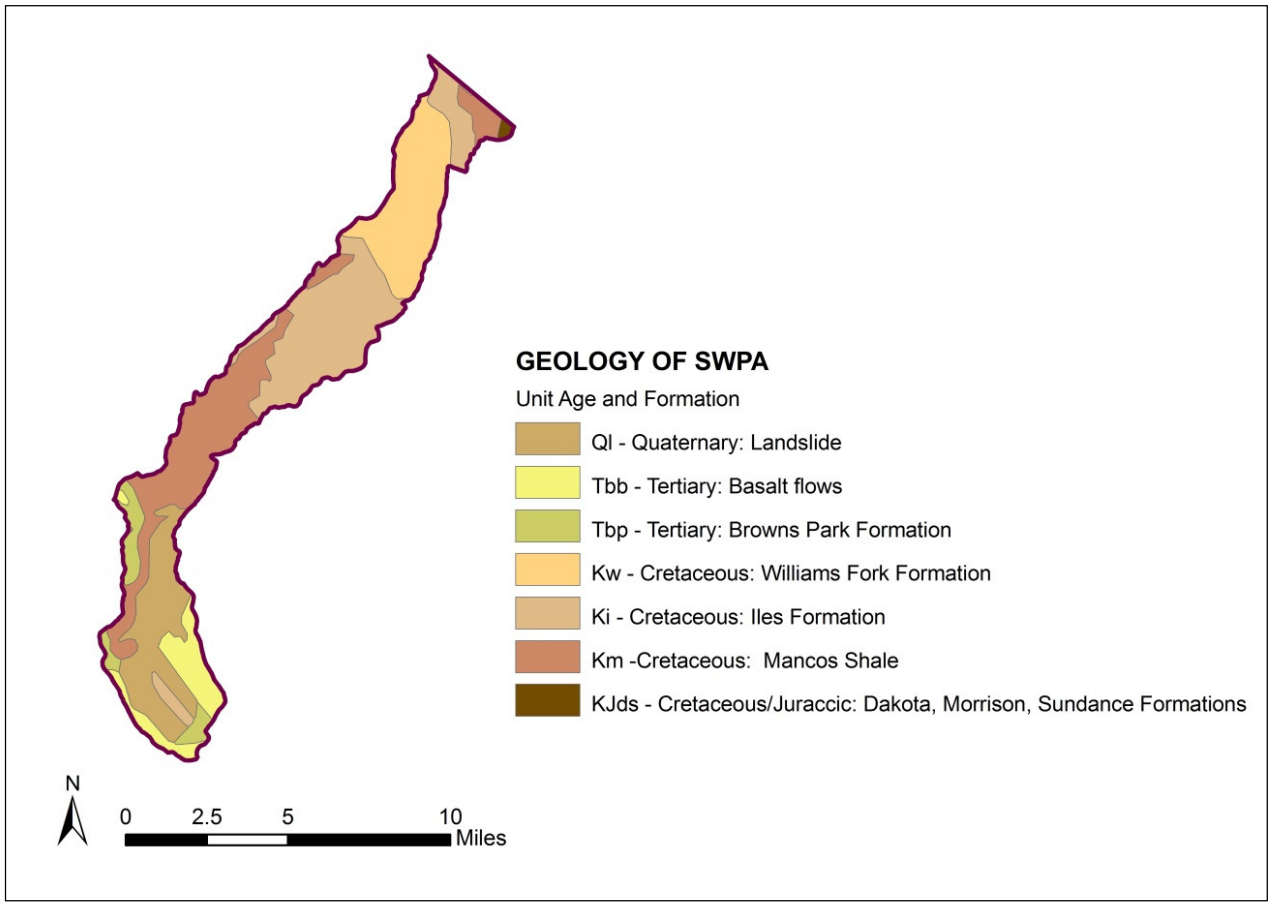


Figure 5. Geologic map of the Source Water Protection Area.

Table 4. Table of Geologic Units in the Source Water Protection Area

<table>
<tr><th>Era</th><th colspan="2">Period</th><th colspan="3">Stratigraphy</th><th>Aquifer</th></tr>
<tr><td rowspan="5">Cenozoic</td><td colspan="2">Quaternary</td><td colspan="3"></td><td></td></tr>
<tr><td rowspan="4">Tertiary</td><td>Miocene</td><td colspan="3">Browns Park Formation</td><td>Local aquifer</td></tr>
<tr><td>Oligocene</td><td colspan="3">Basalt Flows</td><td></td></tr>
<tr><td>Eocene</td><td colspan="3">Wasatch Formation</td><td rowspan="2">Wasatch – Fort Union Aquifer</td></tr>
<tr><td>Paleocene</td><td colspan="3">Fort Union Formation</td></tr>
<tr><td rowspan="12">Mesozoic</td><td rowspan="11">Cretaceous</td><td rowspan="10">Upper Cretaceous</td><td colspan="3">Lance Formation</td><td rowspan="3">Leaky Confining Aquifer</td></tr>
<tr><td colspan="3">Fox Hill Sandstone</td></tr>
<tr><td colspan="3">Lewis Shale</td></tr>
<tr><td rowspan="5">Mesa Verde Group</td><td rowspan="3">Williams Fork Formation</td><td>Upper Member</td><td rowspan="5">Mesaverde Aquifers:

Twenty Mile Sandstone Aquifer

Trout Creek Sandstone Aquifer</td></tr>
<tr><td>Twenty Mile Sandstone Member</td></tr>
<tr><td>Middle and Lower Member</td></tr>
<tr><td rowspan="2">Iles Formation</td><td>Upper Trout Creek Sandstone Member</td></tr>
<tr><td>Lower Trout Creek Sandstone Member</td></tr>
<tr><td colspan="3">Mancos Shale</td><td>Confining Unit</td></tr>
<tr><td>Lower Cretaceous</td><td colspan="3">Dakota Sandstone</td><td>Dakota Aquifer</td></tr>
<tr><td colspan="2">Jurassic</td><td colspan="3">Morrison Formation</td><td>Morrison Aquifer</td></tr>
</table>

Ecological Regions

The source water protection area lies within the foothills shrublands, mid-elevation forest, subalpine forest and alpine zone. Vegetation type and density varies with altitude, topography, and slope aspect. In areas of lower altitude below 7,000 feet and minimal topographic relief, vegetation consists of sagebrush and meadow grasses with patches of Douglas fir, Gambel's oak, service berry, chokecherry, and pinon juniper. Upland vegetation above 7,000 feet are primarily spruce-fire, ponderosa pine, Lodgepole pine, Colorado blue spruce, Engelmann's spruce, aspen, pinon pines, juniper, sagebrush and mixed grasslands (Brown, 2014).

The subalpine zone lies immediately below treeline, generally found between 10,000 and 11,500 feet in elevation. Engelmann spruce and Subalpine fir dominate the higher elevations of the zone and Limber and Lodgepole pine in the lower elevations. The Alpine Zone, the highest mountain zone, includes alpine meadows as well as steep, exposed rock and glaciated peaks.

Climate

The climate within the Trout Creek watershed is dependent on elevation and location, with precipitation increasing moderately with altitude. Average annual precipitation ranges from about 17 inches in the lower reaches to 49 inches in the highest reaches (Fig. 6). Much of the precipitation at the higher altitudes is in the form of snow during the winter and spring, which can accumulate to more than 166 inches per year in the mountains. Temperature also varies depending on elevations with average high temperature during July around 82 degrees Fahrenheit and January lows around 1 degree Fahrenheit. The climate is dominated by cool summers and cold winters (RCCWPP, 2010).

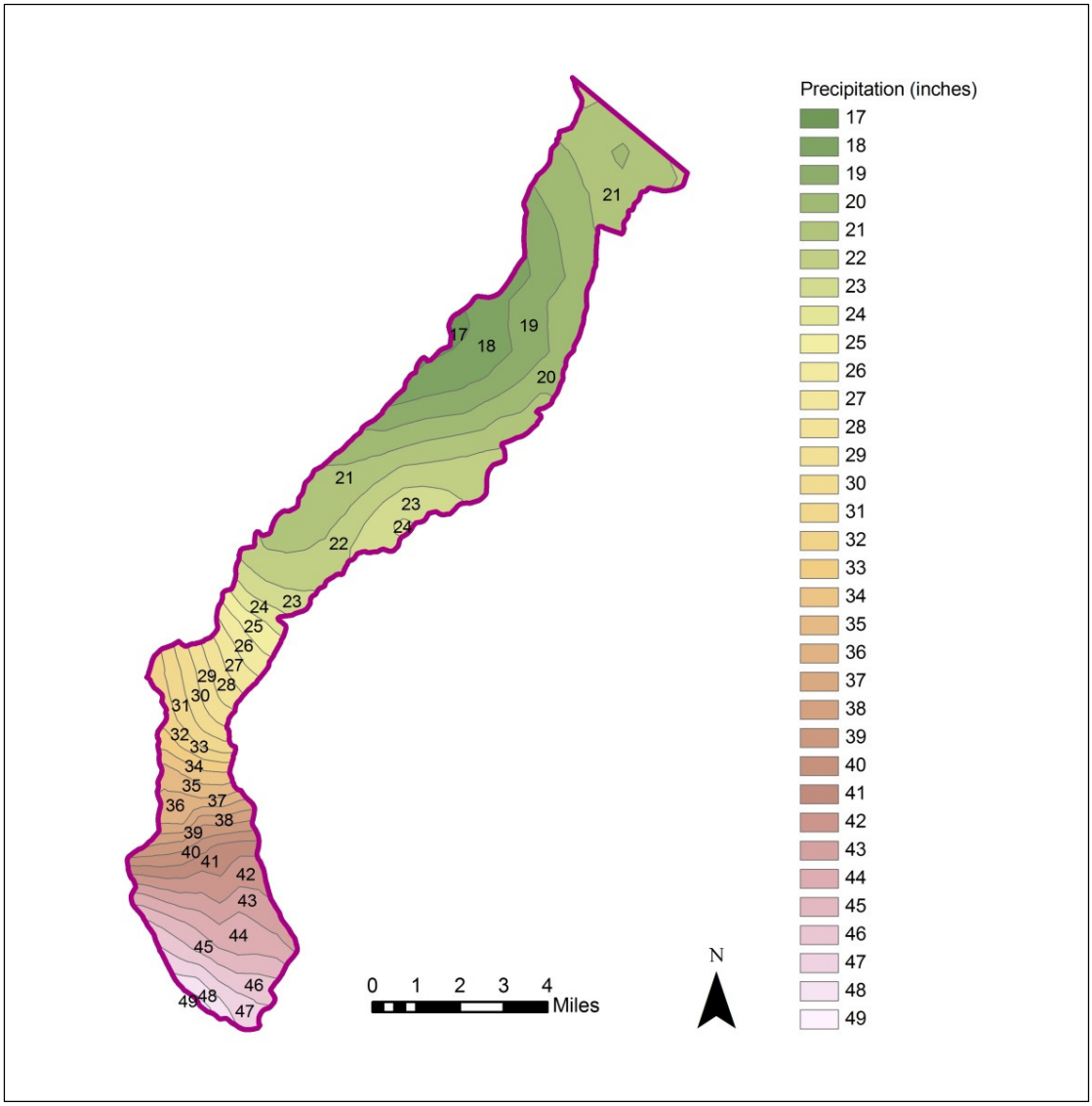


Figure 6. Average annual precipitation map of the Source Water Protection Area.

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 Routt County. The public lands include Routt National Forest land, managed by the Yampa Ranger District and Bureau of Land Management land. Land use includes sparse rural residential development, recreation (camping, hiking, climbing, fishing, mountain biking, x-country skiing), big game hunting, old mine sites, grazing and wildlife habitat (Fig. 7).

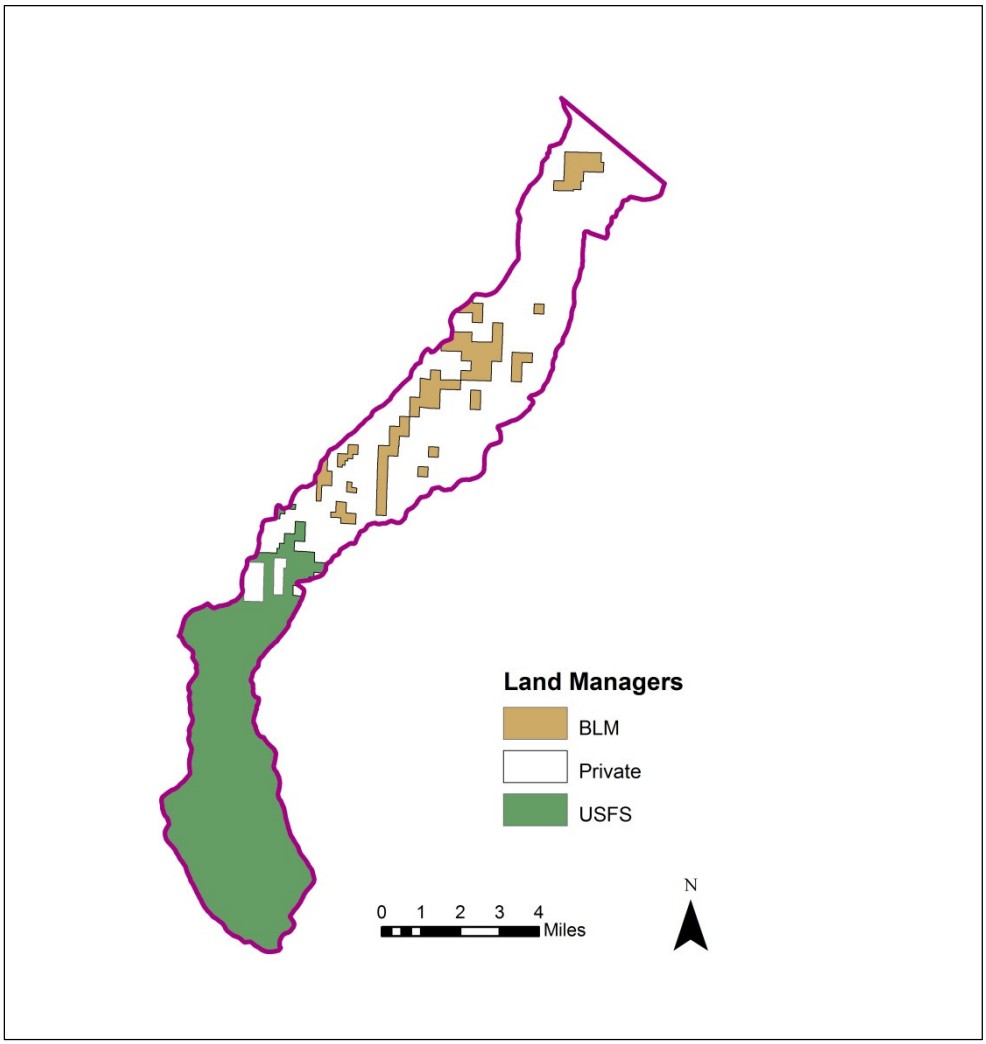


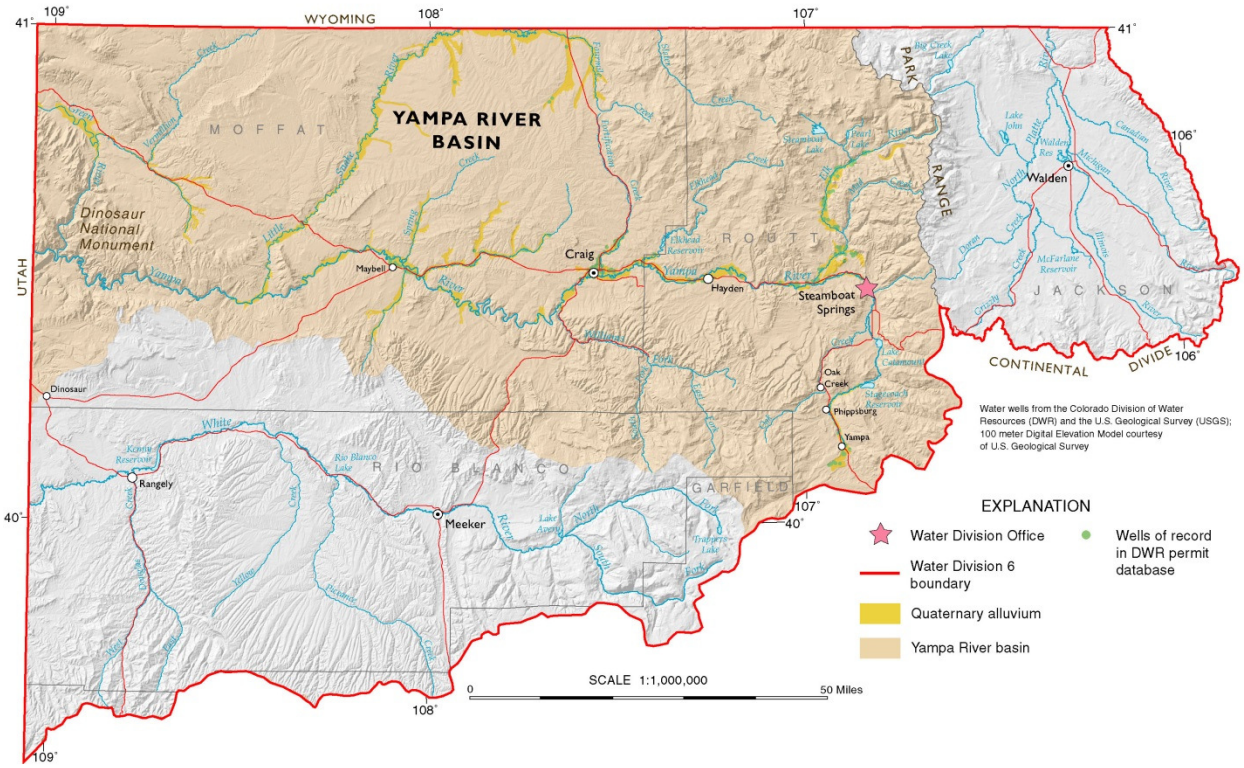
Figure 7. Landowners map of the Source Water Protection Area.

WATER QUALITY

Hydrologic Setting

The Deerwood Service Company obtains its drinking water supply from groundwater wells located within the Trout Creek watershed located in northwestern Colorado. The Trout Creek watershed lies within Routt, Rio Blanco, and a small part of Garfield Counties. The source water protection area includes the Trout Creek watershed upstream from the Whetstone Valley fault which drains approximately 54.13 square miles (34,646 acres). The Trout Creek watershed (Hydrologic Unit Code 140500010502) is a subwatershed of the Yampa River watershed, which is a tributary to the Green River and further downstream flows into the Colorado River.

The Yampa River Basin is part of Colorado Water Division Six with the office of the Division Engineer in Steamboat Springs (Fig. 8) (Topper et al, 2003). Water Division Six of the Colorado Division of Water Resources (DWR) administers river flows in the Yampa, White, and North Platt River Basins. This area encompasses approximately 11,000 square miles in the northwest corner of the State (RCCD, 2006).



SOURCE: GROUND WATER ALTLAS OF COLORADO

Figure 8. Map of the Yampa River Basin.

Ground Water Aquifers

The principal bedrock aquifers in the region are the Trout Creek Sandstone Member of the Iles Formation, Twentymile Sandstone Member of the Williams Fork Formation and local aquifers. The structural complexity of the region, coupled with rugged topography, cause the irregular outcrop of the aquifer units, primarily on the back slopes of the cuestas and elevated limbs of several anticline. The aquifers are recharged by infiltration of precipitation in the elevated outcrops. The recharge of the sandstone aquifers generally flow west-southwest along the dip of the rocks towards the axis of the syncline where it collects. Groundwater generally moves at rates of 1 to 30 feet per year toward topographically low areas in Twentymile Park and the valleys of the Yampa River and its local tributaries. Discharge occurs by upward leaking through confining layers, lateral flow to stream valleys on low-lying outcrops, and evapotranspiration (Robson & Stewart, 1990).

The Deerwood Service Company has two groundwater wells: DP-4 (main well) and DP-3 (back-up well). Well DP-4 was drilled to a depth of 460 feet with water bearing fractured sandstone at depth intervals of 200-220, 301-329 and 404-419 feet. Groundwater enters this well from a 317-foot interval from 103 to 420 feet via the silica sand pack surrounding the well casing and screens. The well produces artesian flows which illustrates the confined nature of the aquifer located in the Iles Formation's Trout Creek Sandstone formation (Ohlsen, 2011). The Trout Creek aquifer occurs below the top of the Twentymile Sandstone Member and overlies about 300 feet of shale that hydraulically isolates it from underlying formations. The upper aquifer boundary is poorly defined and the confining beds vary in thickness and lateral continuity, thus forming a leaky confining layer. The aquifer thickness averages about 100 feet, with a range from 70 to 150 feet (Robson & Stewart, 1990).

Well DP-3 was drilled to a depth of 460 feet into the Mancos Shale and encountered a waterbearing sandstone local aquifer from 390 to 442 feet, 52 feet thick. The well was screened from 400 to 440 feet across this interval and draws water from a local sandstone unit within the Mancos Shale. However, in general, the Mancos Shale is a confining unit and thick barrier to vertical and lateral groundwater flow, not a source of ground water. A 3/8-inch gravel pack surrounds the well casing of DP-3 and allows water to enter the well from 22 to 440 feet. This enables groundwater from overlying aquifers to mix with the Mancos Shale sandstone unit.

Characteristics of Aquifers

The most important hydraulic properties of aquifers are their ability to store and transmit water. The aquifer's hydraulic conductivity is a measure of its ability to transmit water from areas of recharge to areas of discharge. Hydraulic conductivity is dependent on the porosity and permeability of the material as well as on the dynamic characteristics of the water (Fig. 9). Transmission of water through an aquifer requires a driving force (hydraulic gradient). Fluid flow in an aquifer is driven by pressure changes. The change in total pressure over a specific distance or length is termed the hydraulic gradient. A measure of the volume of water that can be transmitted horizontally by the full saturated thickness of an aquifer is referred to as its transmissivity. The transmissivity is the product of the hydraulic conductivity and the saturated

thickness of the aquifer. The hydraulic conductivity, hydraulic gradient, and transmissivity are all characteristics of aquifers that are used to describe the flow of water (Topper et al, 2003).

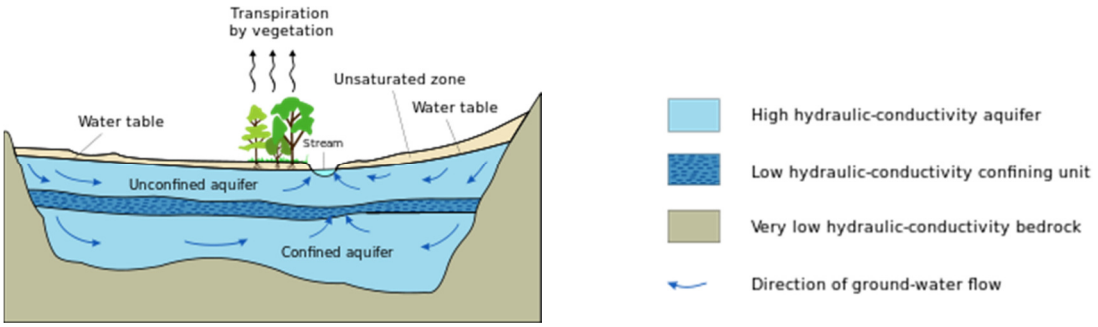


Figure 9. Confined and unconfined aquifer system.

Groundwater Protection

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

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

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

Surface Water Influence

In 2010, the Deerwood Service Company hired Deere & Ault Consultants to review and analyze groundwater hydrology and geology in regards to their wells. The conclusion of their report shows the complicated hydrogeology of the well sites and the possibility that there may be a hydraulic connection between the aquifer and Trout Creek. One point of possible connection is located on Trout Creek where the Whetstone valley fault subcrops below the Trout Creek alluvium approximately 2,540 feet upstream of the confluence with Whetstone Creek. Based on this finding, the Steering Committee decided to include the Trout Creek watershed upstream from the Whetstone Valley fault in their Source Water Protection Area.

Trout Creek is a perennial stream with headwaters originating within the mountainous area of the Flat Tops Wilderness at an elevation of 11,000 feet. Trout Creek flows generally northerly to its confluence with the Yampa River near Milner. Peak flows in Trout 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.

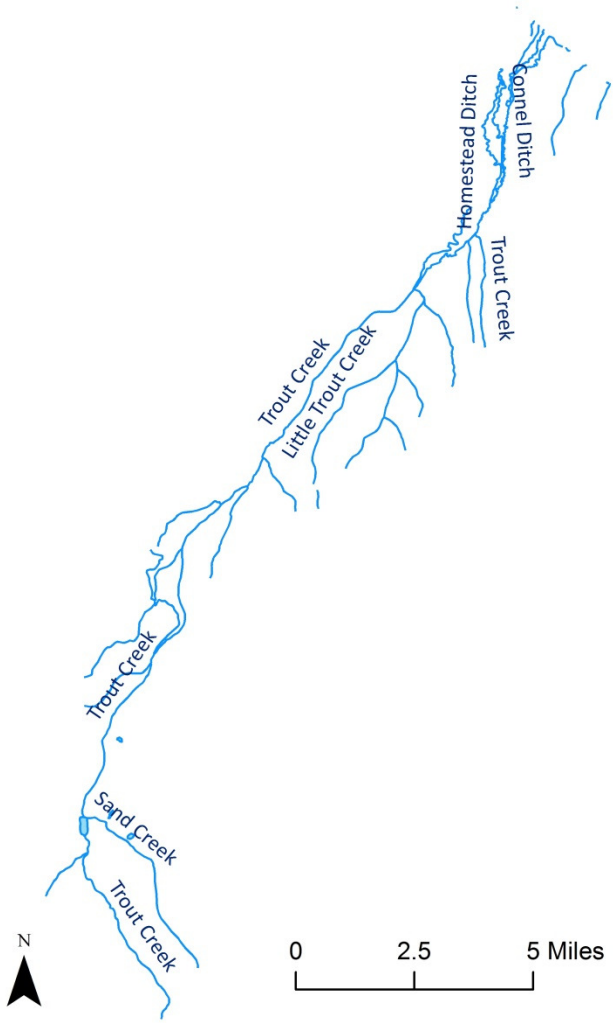


Figure 10. Trout Creek and its tributaries within the Source Water Protection Area.

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 5). 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. The water bodies within the source water protection area of the Trout Creek watershed have fully attained their designated use.

Table 5. Stream Segments within the Source Water Protection Area and Their Designated Use

Segment WBID	Portion of Segment	Designated Use
COUCYA13A	Mainstem of Trout Creek, including all tributaries, lakes and reservoirs, from the source to the confluence with the Yampa River, which are not on National Forest lands, except for specific listings in Segment 13b, 13c and 13F.	Aquatic Life Cold 1 Domestic Water Supply Agriculture Recreation Primary Contact
COUCYA13C	Mainstem of Trout Creek from headgate of Spruce Hill Ditch (approximately 2,500 feet north of where County Road 27 crosses Trout Creek) to its confluence with Fish Creek. All tributaries to Trout Creek from the headgate of Spruce Hill Ditch (approximately 2,500 feet north of where County Road 27 crosses Trout Creek) to County Road 179 except for specific listings in 13b.	Aquatic Life Cold 1 Domestic Water Supply (June through February) Agriculture Recreation Primary Contact

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.

- 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 Primary Contact - means recreational activities where the ingestion of small quantities of water is likely to occur. Such activities include but are not limited to swimming, rafting, kayaking, tubing, windsurfing, waterskiing, and frequent water play by children (WQCC, 2013).

Drinking Water Supply Operations

Water System Information

The Deerwood Service Company operates a community water system that provides drinking water to the residents of three subdivisions: Deerwood Ranches, Creek Ranch, and the Wilkerson Subdivision in unincorporated south-central Routt County. The water system consists of one active well and one emergency well that are housed in pump house buildings located on private property within easements on unincorporated county land. The wells are drilled into the Iles Formation Trout Creek aquifer and a water-bearing unit within the Mancos Shale formation. The wells are located approximately 15 miles southwest of Steamboat Springs, Colorado. Well log information was obtained from the Colorado Division of Water Resources (Table 6).

Table 6. Well Data

Well Name	WDID	State Engineers Permit No.	Aquifer	Total Depth of Well (ft.)	Static Water Level (ft.)	Yield GPM
DP Well #3	5705031	56801-F	Mancos Shale	460	N/A	14
DP Well #4	5705032	56800-F	Iles – Trout Creek	460	~380	200

Raw water from the main well (DP-4) is treated with chlorine and then pumped via underground pipeline for 2.5 miles of 6 inch pipe to the 30,000 gallon Deerwood tank and 2 miles of 6 inch pipe to the 30,000 gallon Creek Ranch tank storage tank. The total storage capacity of the tanks is 60,000 gallons (Thompson, 2014).

Treated water is distributed to their customers via a network of approximately 8.7 miles of underground pipes. Deerwood Service Company currently provides drinking water to 17 out of 24 lots in Deerwood, 11 out of 39 lots in Creek Ranch and 3 out of 4 in Wilkerson. At build-out, the DSC will be supplying water to 67 lots (Audesirk, 2014). The size of the service area is approximately 3.6 square miles.

The Deerwood Service Company provides an Annual Drinking Water Quality Report to the public that provides information on the results of their water monitoring program. The 2012 report is available at the DSC Office located at 3220 Mack Lane, Steamboat Springs, Colorado or by contacting Bruce Thompson at yvwater@gmail.com. The DSC is currently in compliance with all State water quality regulations and has had no violations.

Water Supply Demand

Deerwood Service Company currently has water rights to divert 100 acre feet annually between DP-3 and DP-4 wells to supply 67 households. The permitted daily capacity for 100 acre feet is 89,274 gallons per day. The Deerwood Service Company serves an estimated 31 connections and approximately 62 residents in the service area annually. The water system currently has the capacity to produce 0.1007 million gallons per day. Current estimates by the water system manager indicate that the average daily demand is approximately 9,260 gallons per day, and that the average peak daily demand is approximately 22,807 gallons per day (Thompson, 2014). Using these estimates, the water system has a surplus average daily demand capacity of 80,014 gallons per day and a surplus average peak daily demand capacity of 66,467 gallons per day.

Using the surplus estimates above, Deerwood Service Company has evaluated its ability to meet the average daily demand and the average peak daily demand of its customers in the event the water supply from its main water source becomes disabled for an extended period of time due to potential contamination. The evaluation indicated would not be able to meet the average daily demand or the average peak daily demand of its customers if its only water source becomes disabled for an extended period.

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

The Deerwood Service Company recognizes that potential contamination of its ground water sources could result in having to treat the ground water and/or abandon the water source if treatment proves to be ineffective or too costly. Treatment costs vary depending on the type of contaminants that need to be treated. Replacing one of the DSC's well could cost approximately $180,000 or more depending on the depth of the well.

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 DSC. As a result, the DSC believes the development and implementation of a source water protection can help to reduce the risks posed by potential contamination of its water sources. Additionally, the DSC 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.

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

Defining the Source Water Protection Area

The Deerwood Service Company did not receive a SWAP report from CDPHE because they were a new facility. Instead, the Steering Committee provided CDPHE with GIS locations of their wells and requested a delineation of the source water assessment area. Delineation is the process used to identify and map the area around a pumping well that supplies water to the well or spring, or to identify and map the drainage basin that supplies water to a surface water intake. The size and shape of the area depends on the characteristics of the aquifer and the well, or the watershed and recharge area that supplies water to a public 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 Deerwood Service Company's water source and decided to expand the protection area to include both their ground water wells and the potential influence from Trout Creek. The Source Water Protection Area for the Deerwood Service Company includes the Trout Creek watershed upstream from the Whetstone Valley fault, approximately 54 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:

Primary Protection Area around Groundwater Wells (Fig. 11):

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

Zone 2 *is defined by calculating the distance from the wellhead through which a parcel of water travels over a two year time period or 2 year time of travel (TOT).*

Zone 3 *is defined by calculating the distance from the wellhead through which a parcel of water travels over a five year time period or 5 year time of travel (TOT).*

Secondary Protection Area (Fig. 12)

Zone 1 *is located 1,000 feet on either side of the surface water drainage network. 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.*

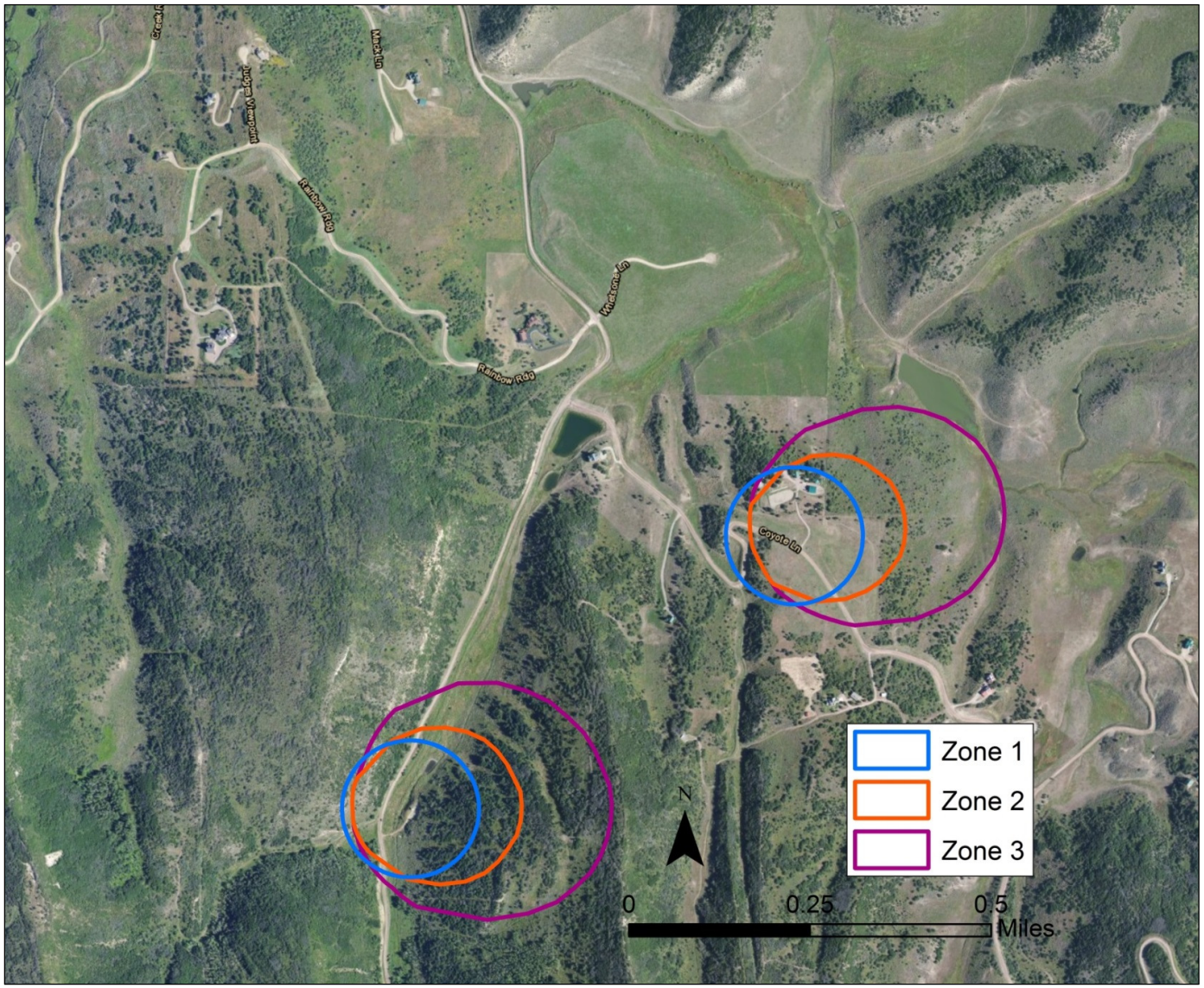


Figure 11. Map of the Primary Source Water Protection Area's Protection Zones.

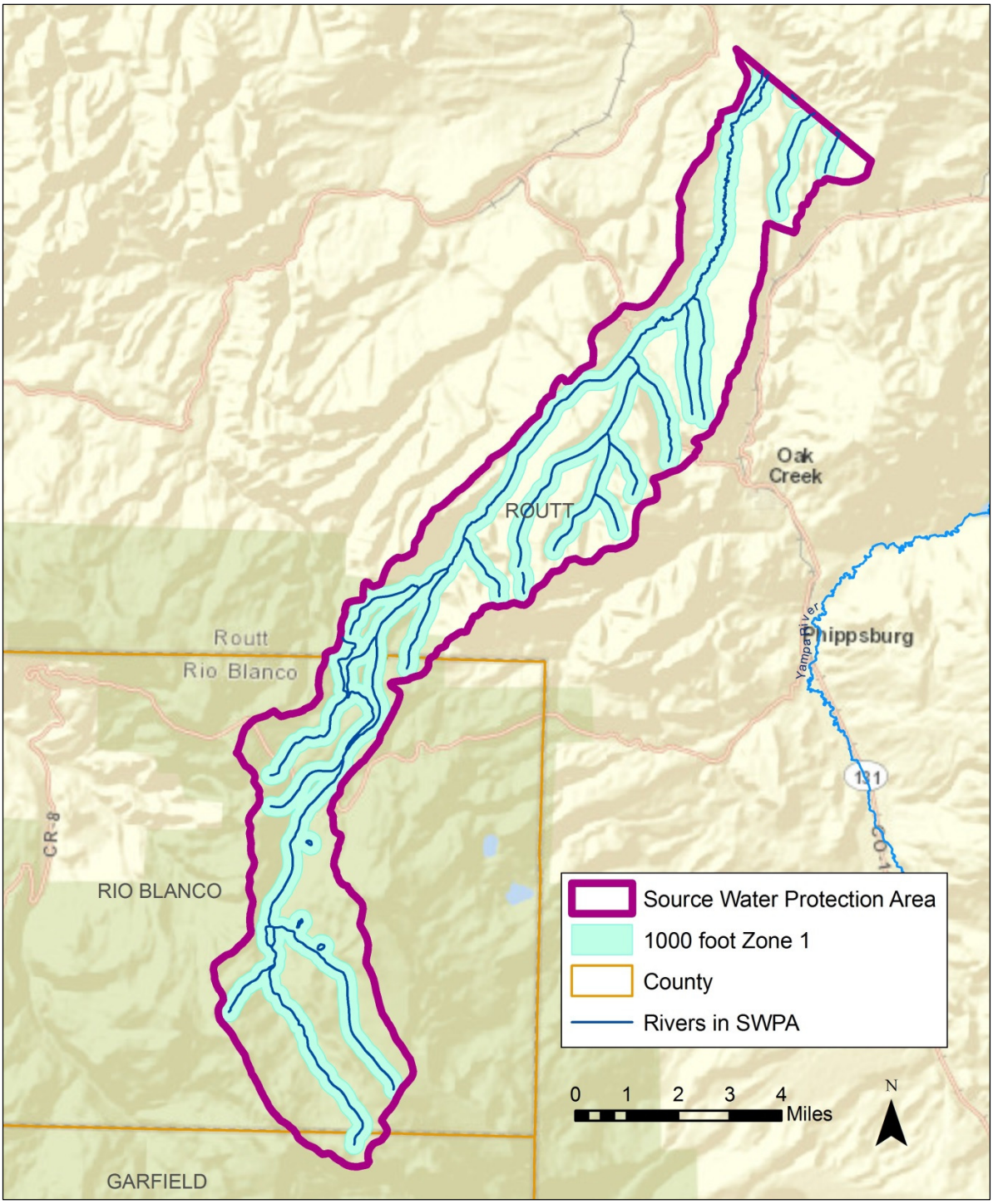


Figure 12. Map of the Deerwood Service Company's Secondary Source Water Protection Area.

Potential Contaminant Source Inventory

In 2013, CDPHE provided the Deerwood Service Company 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 then 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 DSC's drinking water sources.

Issues of Concern Include:

- Septic Systems
- Spills on roads
- Resource Extraction – past and future mining
- Future oil/gas development
- Fuel storage tanks on private property
- Growth and development
- Private water wells
- Natural disasters – fire and heavy rain events
- Residential property – hazardous waste, trash

Priority Strategy

The Steering Committee used the SWAP Risk Assessment Matrix developed by CRWA to prioritize the issues of concern (Table 7). 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 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 Deerwood Service Company's water sources was considered relative to the sensitivity zones in the Source Water Protection Area (i.e. Zones 1, 2, and 3).

- **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 7). 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 7. 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
Septic systems	Indirect	Moderate	Unlikely	Low	4
Spills on roads	No	Major	Possible	High	2
Resource extraction	Indirect	Minor	Unlikely	Low	4
Future oil-gas development	Indirect	Major	Likely	Very High	1
Fuel storage tanks on private property	Direct	Major	Unlikely	Intermediate	3
Growth and development	Indirect	Moderate	Unlikely	Low	4
Private water wells	Indirect	Major	Possible	High	2
Wildland fires	Indirect	Major	Unlikely	Intermediate	3
Heavy rain events	No	Major	Unlikely	Intermediate	3
Residential property - hazardous waste, trash, dumps	Indirect	Minor	Unlikely	Very Low	5

DISCUSSION OF ISSUES OF CONCERN

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 source 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:

- Future oil/gas development
- Spills on roads
- Private Water wells
- Fuel storage tanks on private property
- Wildland Fires
- Heavy Rain Events
- Resource Extraction
- Growth and Development
- Septic Systems
- Residential property hazardous waste

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. While catastrophic contaminant spills or releases can wipe out a water resource, groundwater degradation can result from a plethora of small releases of harmful substances. According to the USEPA, nonpoint-source pollution (when water runoff moves over or into the ground picking up pollutants and carrying them into surface and groundwater) is the leading cause of water quality degradation (GWPC, 2008).

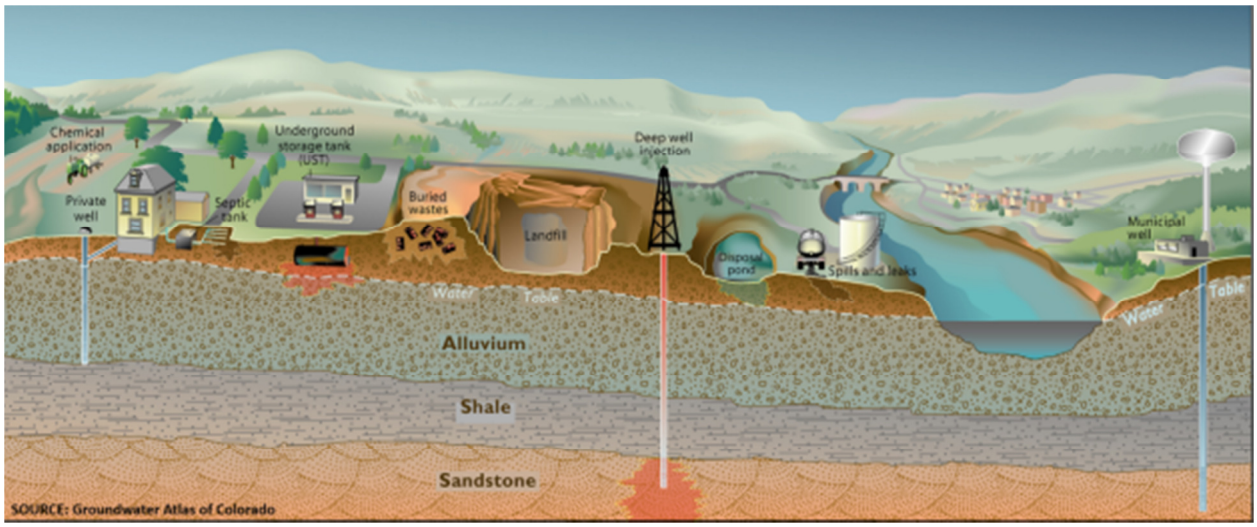


Figure 13. Schematic drawing of the potential source of contamination to surface and groundwater.

Transportation on Roads

The source water protection area is accessed by two-lane native surface roads including County Roads 8, 179, 29, 27, 442, 45z, 132a and a few Forest Service routes. County Road 179 runs parallel to an intermittent stream and Well #4. County Roads 8, 27, and 29 cross over Trout Creek. The roads in the protection area are maintained by the Routt County Road Department and U.S. Forest Service. The County Road Department's annual road maintenance on their County Roads consists of grading the road surface.

The roads in the protection area are used for residential, industry, utility, tourism and recreational access. Chemicals and petroleum products are transported via trucks along the roadways to area residents and industry.

Contaminants of Concern

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

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 Trout Creek. 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, snowmelt, or residential water, 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.

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.

Native surface roads along creek corridors are often sources of sediment into the creek. Sediment has the potential for entering Trout Creek during high-water events or flooding, storm water runoff over native surface roads and upland areas within the watershed. Native surface roads that are improperly engineered and maintained can result in erosion and delivery of sediment into nearby streams, thus impacting the ecological health of the stream system. Heavy traffic along these routes can cause damage to the road surface and erosion.

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.

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. Obtain approval from Routt County Planning Department prior to constructing "Drinking Water Protection Area" signage on roadways.

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 and schedules within the SWPA.

4. Provide a copy of the Source Water Protection Plan and map of the SWPA to Routt County Road and Bridge Department, U.S. Forest Service Yampa Ranger District, Oak Creek Fire Protection District, Steamboat Rural Fire Department and Routt County Office of Emergency Management (EOC).
5. Request to be notified by Routt County EOC when a hazardous spill occurs within the SWPA.

6. Purchase small spill kits to be used by utility, managers, and responders within the SWPA.

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.

Private Fuel Storage Tanks

Rural residents of the source water protection area may have private aboveground storage tanks containing gasoline for vehicular fuel. The private aboveground storage tanks are a concern because they may be old, subject to leakage and not properly contained. It only takes a small amount of petroleum to contaminate the ground or surface water. The Steering Committee recommends maintaining a contact list of residents within the source water protection area who have fuel storage tanks used for vehicular fuel.

Figure 15. An aboveground fuel storage tanks with secondary containment.

Fuel tanks should be inspected visually on a regular basis and properly seated on a type of secondary containment structure to prevent spills, allow leaks to be easily detected, and prevent spills from reaching the ground. The containment area should be able to hold 110% of the tank capacity plus freeboard for precipitation. Secondary containment for ASTs must be impermeable to the materials stored (Fig. 15). Methods include berms, dikes, liners, vaults, and double-walled tanks. A manually controlled sump pump should be used to collect rain water that may accumulate in the secondary containment area. Any discharge should be inspected for petroleum or chemicals prior to being dispersed/released. Accumulated minor spillage, over time, may result in a film or sheen on collected rain water, making it unsuitable for discharge to the soil or drains. Periodic cleanup of the containment areas (e.g., sweeping with a broom and using limited absorbent) can prevent unnecessary dirt and contaminant buildup.

Fuel Storage Tank Recommendations:

1. Maintain an inventory with contact information of residential unregulated aboveground storage tanks (AST) within the source water protection area.

2. Provide information to fuel storage tank owners on how they can implement storage tank practices to prevent petroleum products from leaking onto the ground. Information should include: inspection schedule, secondary containment, spill clean-up, and removal of secondary containment discharge.

3. Provide residential owners of AST with contact information for emergency responders in case of a release.

4. Purchase and provide small spill kits to be used residents with fuel tanks within the SWPA.

Residential Practices

The Deerwood Service Company's Source Water Protection Area includes rural residential dwellings that use chemicals in their home or operations. Common household practices may cause pollutants to runoff residential property and enter the surface or groundwater as indicated in the picture below (Fig. 16). Prevention of groundwater contamination requires education, public involvement, and people motivated to help in the effort. Public education will help people understand the potential threats to their drinking water source and motivate them to participate as responsible citizens to protect their valued resources.

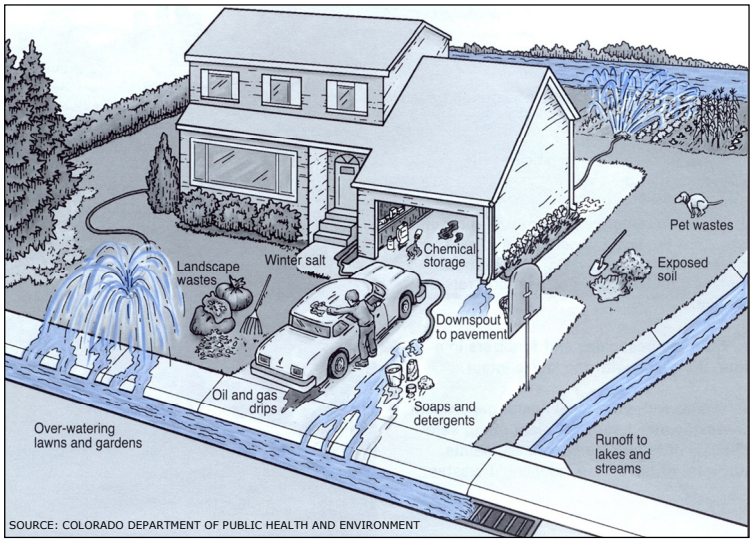


Figure 16. Common household practices may cause pollutants to runoff residential property and enter the surface or groundwater.

Recommendations for Residents:

1. Properly Dispose of Chemicals and Motor Oil – Never pour on the ground, down the drain, or toilet. Participate in household hazardous waste collection events.
2. Use Fertilizers, Herbicides and Pesticides Properly - Apply chemicals according to label instructions and avoid runoff. Do not exceed recommended application rates. Use only if necessary.
3. Properly Dispose of Drugs and Personal Care Products – Participate in medication drop off campaigns. If non available, pour medications into a sealable plastic bag and add kitty litter, sawdust, coffee grounds, or glue and deposit in the trash along with unused personal care products.
4. Dispose of Pet Waste Properly – Flush pet wastes down the toilet, put into the garbage, or bury under 8 inches of soil. Pick up your pet waste when walking your dog.
5. Use Water Wisely – Check for plumbing leaks, use water-saving showerheads and faucets, water laws morning or evenings, avoid over watering, and direct runoff onto vegetative buffers.
6. Purchase Safer Alternative Products – Choose natural alternatives or Green Products.

Future Oil and Gas Development

Many areas of the State are experiencing an oil and gas boom. According to the Colorado Petroleum Association, oil and gas wells are located in 42 of Colorado's 63 counties. The top 3 counties in oil production are Rio Blanco, Weld, and Cheyenne. La Plata, Weld, and Garfield counties lead the state in natural gas production.

The oil and gas industry in Colorado is regulated by the Colorado Oil and Gas Conservation Commission (COGCC), the U.S. Forest Service (USFS), and the Bureau of Land Management (BLM). The COGCC maintains regulatory authority over privately owned mineral rights in Colorado. Updated information on the location and status of oil and gas operations in Colorado can be found at www.cogcc.state.co.us

The USFS and BLM have authority on both federal surface and federal mineral interests with the BLM being the well permitting agency. The Mineral Leasing Act of 1920 and the Mineral Leasing Act for Acquired Lands of 1947 give the BLM responsibility for oil and gas leasing on about 570 million acres of BLM, national forest, and other Federal lands, as well as private lands where mineral rights (subsurface) have been retained by the Federal Government. Federal mineral lands within the SWPA are identified in Figure 17 and have stipulations on the type of resource that can be extracted: all minerals; coal only; and oil, gas and coal only.

Oil and/or gas are currently being produced in areas of Routt County. There are 92 leases and 411 wells in the County that were permitted by the Colorado Oil and Gas Conservation Commission as of April 2014. Although there are currently no oil/gas permits for wells within the Source Water Protection Area, there are 16 abandoned wells. These abandoned wells were either plugged and abandoned, dry and abandoned, or the location abandoned.

The potential for development in Routt County depends on the future economic and resource needs on both public and private lands. Public lands that have a potential for oil and/or gas development include those identified as BLM Lease (current and proposed) or State Land Board Minerals. In addition to the current BLM leases within the SWPA, there are areas proposed for the 2015 oil and gas BLM lease sale (Fig. 17). The proposed oil and gas lease site is within and in close proximity to the Deerwood Service Company’s protection areas for their wells. Also, Shell Oil has notified the County of their plans in the future to drill along County Road 27 which run through the SWPA.

The public can also access the COGCC website to find out information regarding violations and complaints of well permit holders. Between 1959 and April 2014, COGCC conducted 501 inspections of oil/gas facilities/wells in Routt County and found 149 wells that did not meet current regulations and issued 129 violations, thus requiring actions to come into compliance. There were 10 spills reported to COGCC between 1993 and 2013 within Routt County (COGCC, 2014).

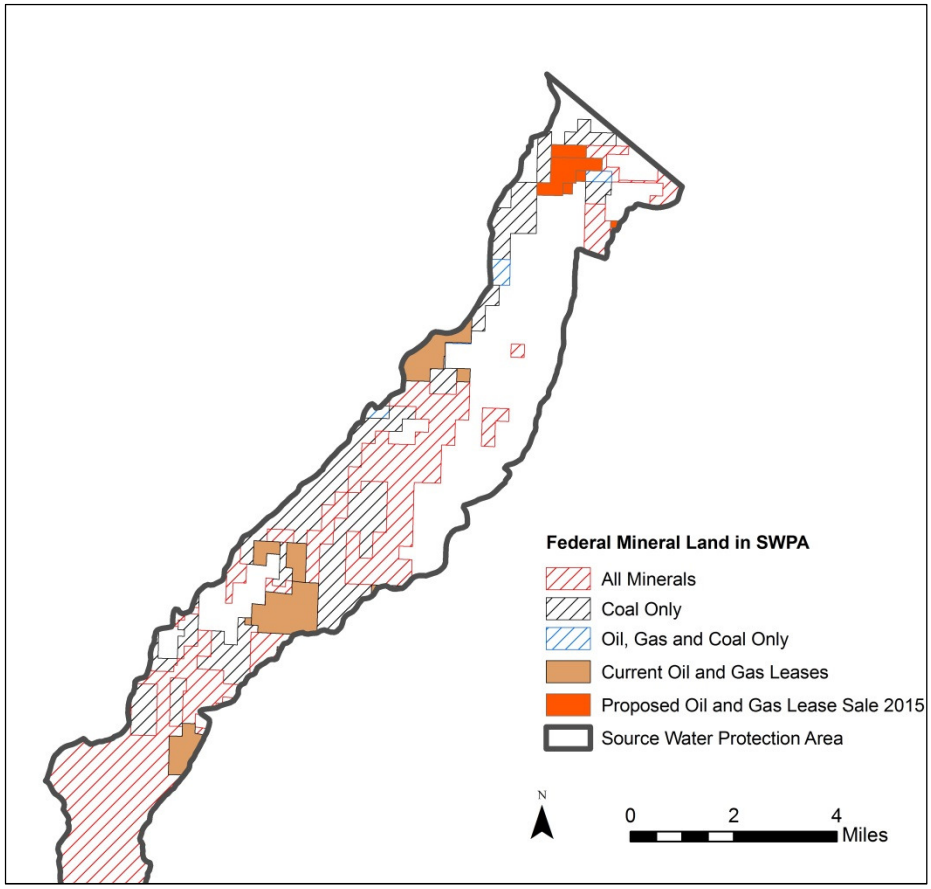


Figure 17. Federal mineral land within the SWPA and BLM current and proposed leases.

Water Quality Concerns

Many different activities related to oil and gas development may result in risks to groundwater drinking water supplies. Improperly constructed and/or maintained oil or gas wells can act as migration pathways for oil, gas, formation water, drilling fluid, or "fracking" fluid to contaminate groundwater. Hydraulic fracturing or fracking is the process of drilling and injecting fluid into the ground at a high pressure in order to fracture shale rock to release petroleum, natural gas or other substances for extraction. Fracking fluid can also migrate along natural geologic fractures or fault and migrate into groundwater aquifers, depending on how much separation there is between the producing formation and the aquifer. Well drilling and production may result in spills or releases of drilling fluids, fracking fluids, produced water, hydrocarbons, or other chemicals transported within the protection areas. It is important for local communities to stay informed of any potential oil and gas development on surrounding lands and become involved in the public process to encourage Best Management Practices (BMPs) to protect streams and groundwater aquifers.

Spills of exploration and production waste on state or private lands in excess of 20 barrels, and spills of any size that impact or threaten to impact waters of the state, an occupied structure, or

public byway must be reported to the Colorado Oil and Gas Conservation Commission as soon as practicable, but not more than 24 hours after discovery. Spills of any size that impact or threaten to impact waters of the state must be reported to CDPHE immediately. Spills that impact or threaten to impact a surface water intake must be reported to the emergency contact for that facility immediately after discovery. Spills of more than five (5) barrels of exploration and production waste must be reported in writing to the Oil and Gas Conservation Commission within 10 days of discovery.

All spills on federal lands of more than 100 barrels of fluid and/or 500 MCF of gas released, must be reported to the Bureau of Land Management (BLM) immediately. Spills of oil, gas, salt water, toxic liquids and waste materials must also be reported to the BLM and the surface management agency (CDPHE, 2009).

Oil and Gas Development Recommendations:

1. Stay informed on oil and gas development within and around the Source Water Protection Area by using the State's COGCC website, attending Oil and Gas Regional Forums, contacting County Planners and Public Land managers (BLM & USFS), and meeting with industry representatives.

2. Ensure industry protects Deerwood Service Company's water source by implementing these activities:

    - Conduct geologic and hydrologic mapping and risk analysis to identify underground fractures and faults that may provide pathways for gas and fluids to groundwater.
    - Identify existing wellbores in or near the protection area and determine the integrity of the casings, cement, plugs.
    - Assess the potential impacts to ground water used to supply hydraulic fracturing base fluid.
    - Provide the DSC disclosure of all chemical planned for a fracking operation at least 30 days beforehand, and a report on chemicals actually used within 30 days following fracking.
    - Comply with and implement all actions in the approved Storm Water Management Plan to prevent or minimize impacts from storm water to the source waters.
    - Adequately treat wastewater before discharge; no discharge to publicly owned treatment works; and no road or ground spreading of wastewater.
    - Use routine and preventative maintenance to help prevent spills and immediately notify the DSC of any spills.
    - Provide adequate buffer zones from the DSC's groundwater wells.

3. Conduct baseline water testing of DSC's water sources and ongoing monitoring of potentially affected source waters.

Septic Systems

Within the source water protection areas there 67 properties within Creek Ranch and Deerwood Ranch that rely on septic systems to dispose of their sewage. A septic system is a type of onsite wastewater system 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. 18).

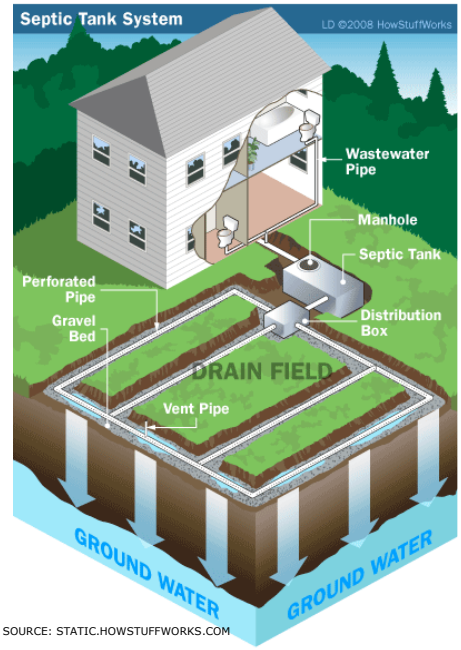


Figure 18. Schematic of a septic tank system.

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.

In Routt County individual sewage disposal systems are permitted by their Environmental Health Department. The County administers and enforces the minimum standards, rules, and regulations outlined in the state of Colorado's Revised Statutes (CRS 25-10-105). These regulations include among other requirements minimum setback requirements from streams, ditches and other waterways.

Septic Systems Recommendations:

1. Develop an inventory of permitted and non-permitted (before 1972) septic systems in the SWPA.

2. Educate the residents within the SWPA on the source water protection plan, the proper use and maintenance of their septic systems and how the source of their drinking water can be affected by an inadequate functioning septic system.

3. The County Environmental Health Department will educate property owners when they apply for a septic permit on the link between good septic practices and protecting groundwater.

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Resource Extraction: Mining

Mining and resource extraction have played a major role in the economy of Routt County since its early history, with waves of production through the decades based on advances in transportation and technology, market conditions and trends in national energy usage. Coal mining in Routt County dates back to the 1880s. Currently, Peabody Energy is a major producer of coal in Routt County at its Twentymile Mine and new Sage Creek Portal located 16 miles southwest of Steamboat Springs (SSEDC, 2013). The Source Water Protection Area for Deerwood Service Company lies within a historic coal mining area.

Permitted Mines

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 for the Source Water Protection Area was obtained from the Colorado Division of Reclamation, Mining and Safety (DRMS). Within the protection area there were three permitted mining operations and no active mining operations (Table 8).

The Edna Strip Mine which began operation in 1946 to surface mine coal was last operated by Chevron Mining, Inc., ending operations at the site in 1981 (Melancon et al, 1980). In April of 2014, the Chevron Mining was recognized for excellence in the final reclamation of the Edna Strip Mine site from the Colorado Division of Reclamation, Mining and Safety. This resulted in the release from liability of 1,186 acres and the Phase III bond. The reclamation consisted of establishing post mining land uses of rangeland, wildlife habitat, and recreation-hunting. The company constructed a unique sediment control feature on steep hillsides to provide water and a series of check dams nicknamed “The String of Pearls” to control erosion and provide water for grazing animals (CMA & DRMS, 2014).

Table 8. Permitted Mines within the Source Water Protection Area

Mines	Permit Number	Operator	Permit Status
Edna Exploration Mine	X199216909	Midway Coal Mining Company	Terminated
Edna Strip Mine	C1980001	Chevron Mining, Inc.	Permanent cessation
Apex No. 2 Mine	C1981011	Sunland Mining Corporation	Terminated

Historic Mine Land

There are some historic coal mining sites within the protection area that were obtained from the State’s GIS database (Fig. 19). Mining practices during the early days allowed the mine owners to simply abandon their mines without consideration of the impact on streams, water quality, slope stability and safety. Both active and inactive mining operations have a potential to contaminate drinking water supplies from either point source discharge or nonpoint source discharge from run-off over waste piles.

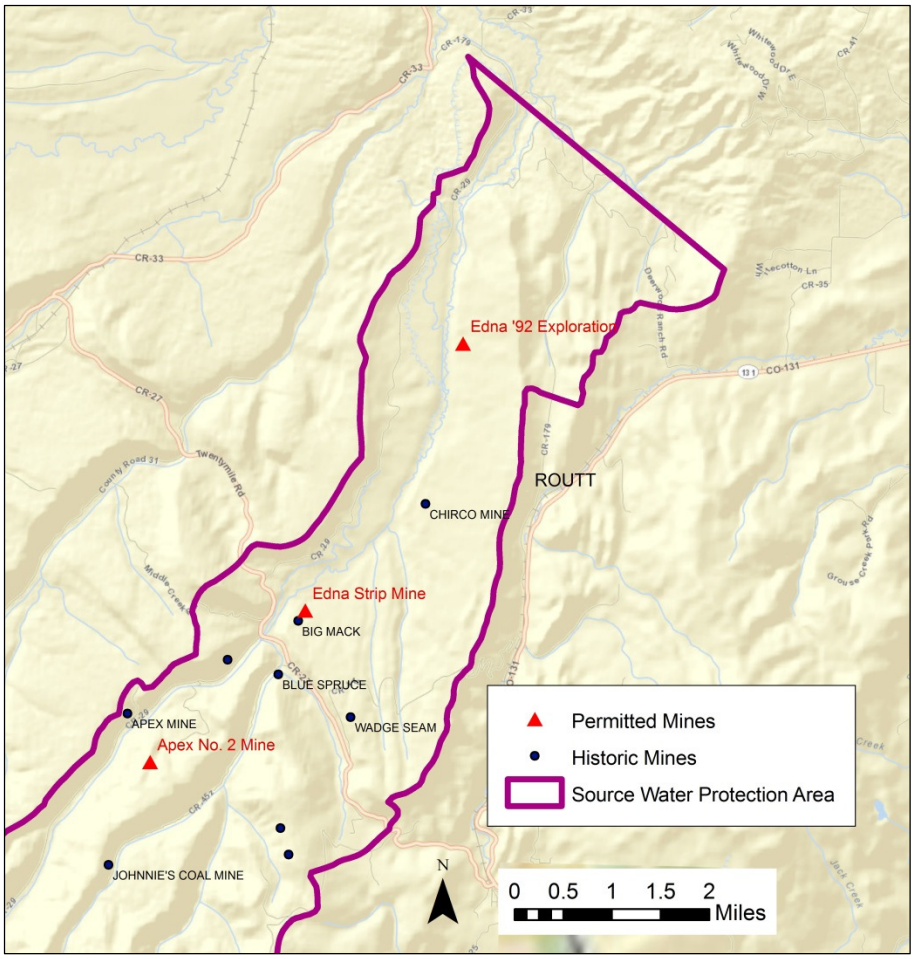

Figure 19. Mines within the Source Water Protection Area.

Resource Extraction: Mining

1. Stay informed on mining and reclamation activities within the SWPA.
2. Monitor new mining activity in the watershed, BLM leases and lease sales, and County's website.
3. Provide USFS and BLM with a copy of the Source Water Protection Plan and GIS layer of the protection area.
4. Work with the County on land use decisions regarding mining operations (i.e. special use permits).
5. Monitor water quality of the drinking water wells. Stay abreast of other agencies conducting water quality monitoring in the basin and periodically request data results from agencies. Share information with each other.

Public Land Management

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 Trout Creek watershed originate on Routt National Forest land managed by the Yampa Ranger District in Yampa, Colorado. The Yampa Ranger District is the southernmost district of the Medicine Bow-Routt National Forests and Thunder Basin National Grassland.

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). Approximately two-thirds of the source water protection area for the Deerwood Service Company 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 Yampa Ranger District adheres to the management directives established under the 1998 Revised Land and Resource Management Plan (1998 Forest Plan)

for the Routt National Forest. The current 1998 Forest Plan identifies management area prescriptions with directions for activities and management practices to be followed within the specified area (Fig. 20)(RNF, 1998).

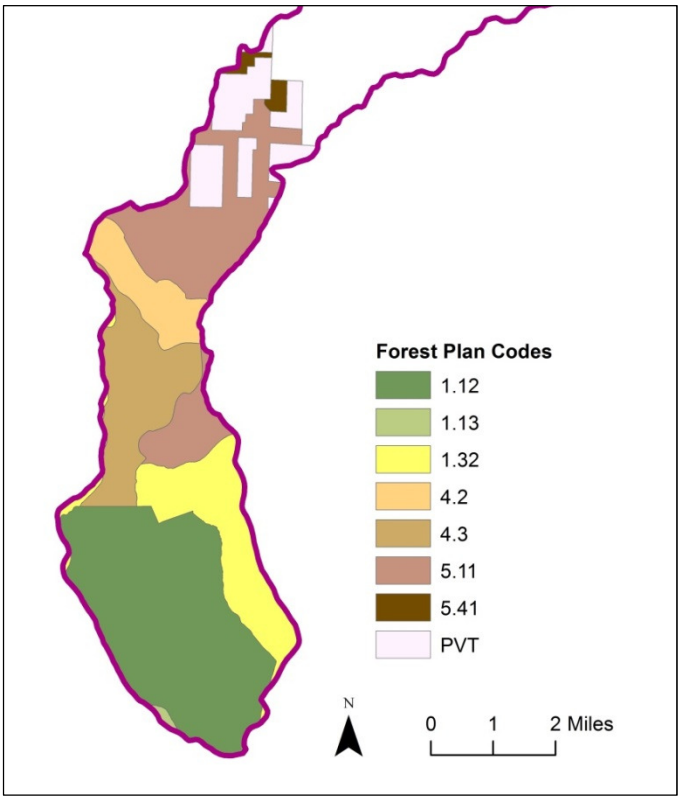

Figure 20. The Forest Service land within the source water protection area has the following management area prescription:

- 1.12 – Wilderness, Primitive
- 1.13 – Wilderness, Semi-Primitive
- 1.32 – Backcountry Recreation, nonmotorized with winter limited motorized
- 4.2 – Scenery
- 4.3 - Dispersed Recreation
- 5.11 – General Forest & Rangeland – Forest Vegetation Emphasis
- 5.44 – Deer & Elk Winter Range

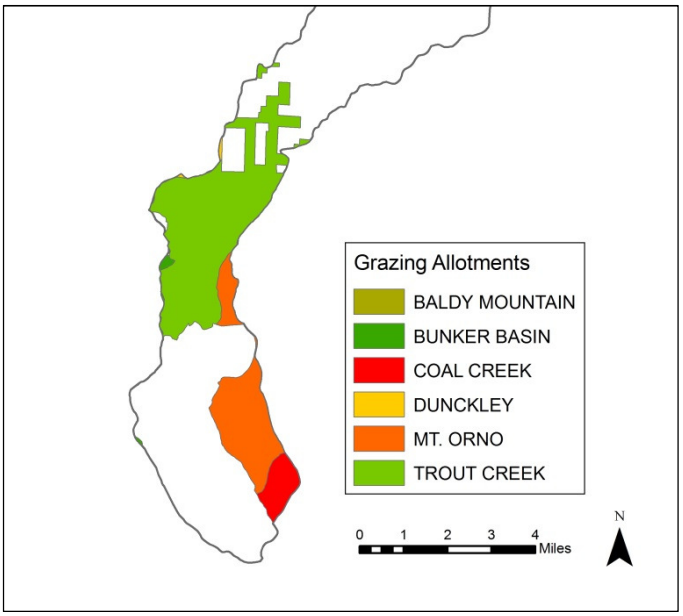

Figure 21. Map of the Grazing Allotments within the source water protection area. The allotments are for grazing sheep.

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. Although Mountain Pine Beetle is considered an epidemic throughout the west, the spread of the mountain pine beetle epidemic has slowed dramatically, while the spruce beetle outbreak is expanding.

The U.S. Forest Service Rocky Mountain Region 2 has conducted aerial and ground surveys annually over western conifer and aspen forest to detect damage caused by defoliating insects. The aerial detection survey conducted in 2012 provides us with current information on insect damage in southern Routt and Rio Blanco Counties as indicated in Fig. 22 below.

Tree mortality is a continuing problem in high-elevation subalpine fir (*Abies lasiocarpa*). The 2012 survey showed small pockets of Subalpine Fir Mortality in the SWPA and surrounding area (USFS, 2013). 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 confuses*) and two species of root decay fungi (*Armillaria* sp. and *Heterobasidion annosum*) (Harris et al, 2011).

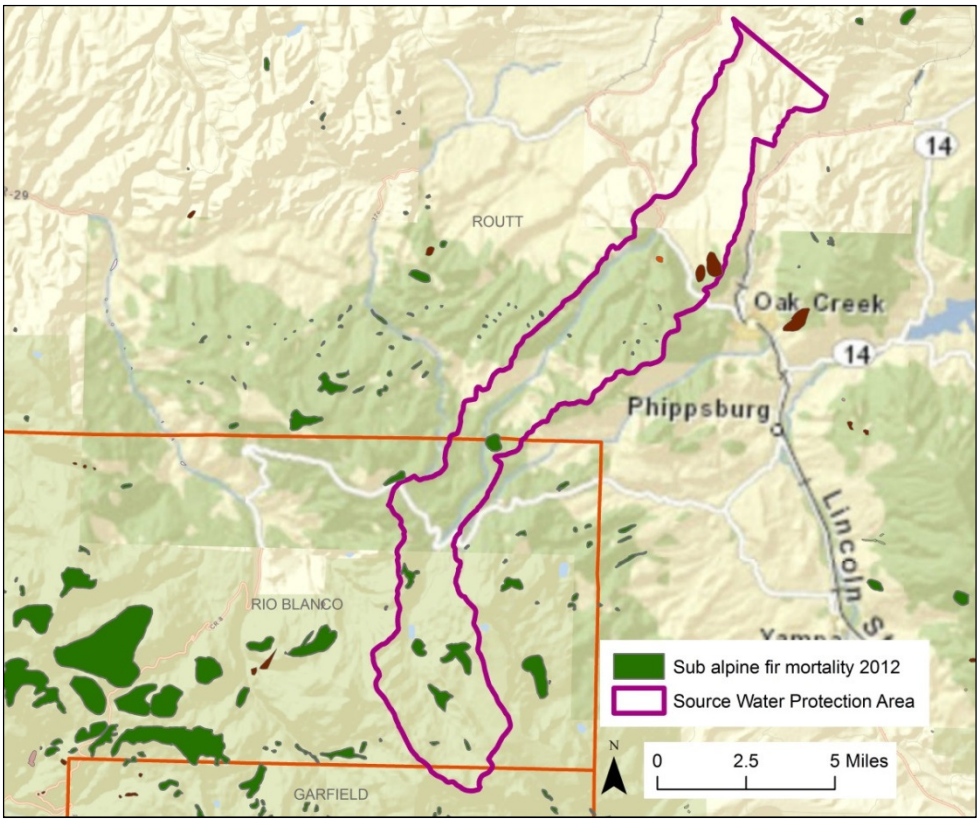

Figure 22. Map of the Subalpine Fir Mortality area from the 2012 aerial survey.

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 2010, the Upper Yampa Phase 1Watershed 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 Upper Trout Creek watershed was ranked 2.4 for wildfire hazard and an overall composite hazard ranking of 5.1 due to the high flooding/debris flow potential and soil erodability post-fire (Fig. 23) (JWA, 2010). Information from this assessment could be used to identify areas to incorporate forest management treatments that could minimize adverse hydrologic responses following intense wildfires.

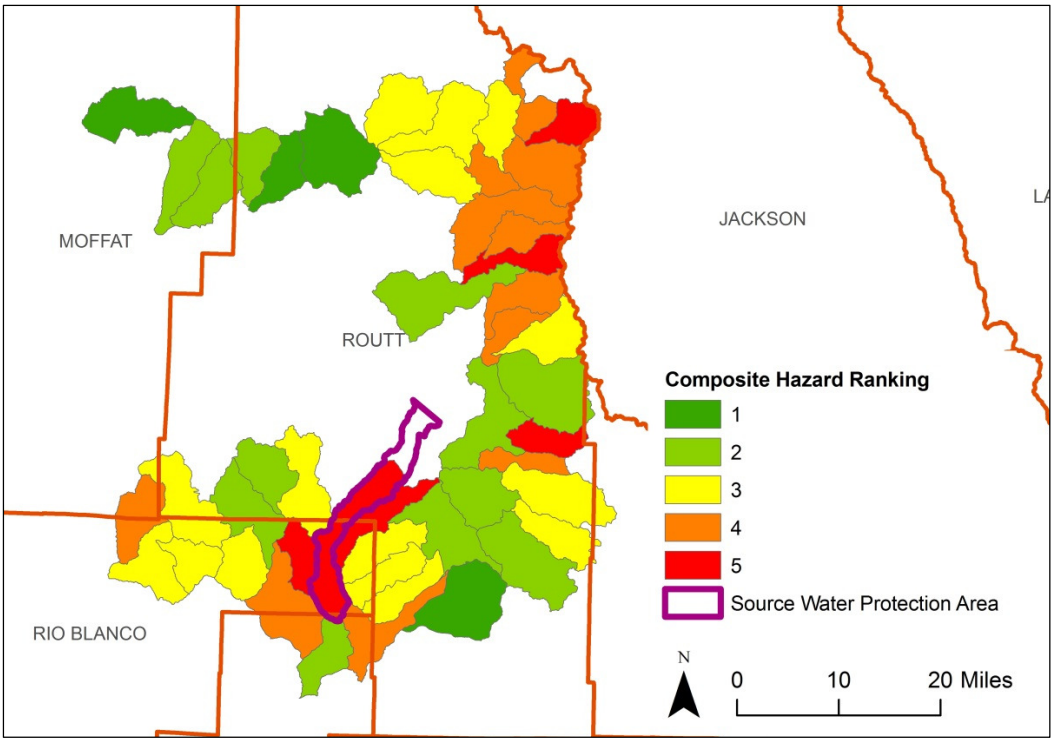

Figure 23. Map of the Composite Hazard Ranking of watersheds within the Upper Yampa watershed.

Community Wildfire Protection Plan

In 2010, Routt County completed their Community Wildfire Protection Plan which identifies strategies for the community and land managers to implement to reduce the impacts of wildland fire to the community and maintain a healthy watershed. The main focus is reducing the amount of hazardous fuels and creating a vegetative stand composition to more natural levels.

Water Quality Effects from Fire

Water quality effects after a wildfire can include changes in nutrients (nitrogen and phosphorus), turbidity, organic carbon, metals, major ions, alkalinity, and flow. The magnitude of these changes will depend upon several factors including the severity, intensity, and duration of the fire, the slope of the terrain, and the amount and intensity of precipitation during post-fire rain events. Changes in water quality may be manifest under different runoff conditions. Effects tend to be the greatest soon after a fire; a "first flush" storm (i.e., the first substantial post-fire rain event) can produce significant increases in dissolved organic carbon (DOC), turbidity, nitrate, and other constituents (WRF, 2013).

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, Wilderness designations, and other outreach opportunities. Provide written comments to public land managers on source water protection concerns.

2. Actively continue to foster an open, collaborative relationship with U.S. Forest Service, Routt County, and Upper Yampa River watershed group to protect water quality in the watershed.

3. Support efforts to improve watershed conditions (i.e. fuels reduction activities, wildfire assessment, and other reclamation projects).

4. Support efforts to mitigate wildfire risks within the source water protection area as identified in the Community Wildfire Protection Plan and Watershed/Wildfire Assessment Report.

Private Water Wells

There are many private permitted water wells within the Source Water Protection Area (Fig. 25). Private wells can be a direct route for contaminants to enter the groundwater if not properly cased and maintained. Contaminants that infiltrate from the surface are more likely to pollute old, shallow, uncased or abandoned wells.

Private Water Wells Recommendations:

1. Conduct an inventory of all private wells within the Source Water Protection Area and the condition of these wells. Information may be obtained from the State Department of Water Resources and local residents.

2. Provide public education to residents who have private water wells on how they can protect both private and public water supply.

3. Secure and cap wells that are temporarily not being used and permanently cap wells that are abandoned.

Public Relations and Communication

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 Deerwood Service Company has been identified as an ongoing need. Vehicles for providing information can include: Board meetings, web-postings on a website, community gatherings and special meetings. Fostering good public relations can prevent local citizens from becoming disenfranchised with local management 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.

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 9, "Source Water Protection Best Management Practices" be considered for implementation by:

- Deerwood Service Company
- Routt County
- U.S. Forest Service Yampa Ranger District
- Upper Yampa Watershed
- Colorado Rural Water Association
- Residents of Deerwood Ranches, Creek Ranch and Wilkerson Subdivision
- Residents and Visitors to the Trout Creek watershed

Evaluating Effectiveness of Best Management Practices

The Deerwood Service Company 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 Deerwood Service Company 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 9. Source Water Protection Best Management Practices

Issue	Management Approach	Implementer
Resource Extraction: Mining	1. Stay informed on mining and reclamation activities within the SWPA. 2. Monitor new mining activity in the watershed, BLM leases and lease sales, and County's website.. 3. Provide USFS and BLM with a copy of the Source Water Protection Plan and GIS layer of the protection area. 4. Work with the County on land use decisions regarding mining operations (i.e. special use permits). 5. Monitor water quality of the drinking water wells. Stay abreast of other agencies conducting water quality monitoring in the basin and periodically request data results from agencies. Share information with each other.	Steering Committee Deerwood Service Company Colorado Rural Water Association Deerwood Service Company Deerwood Service Company Upper Yampa Watershed
Septic Systems	1. Develop an inventory of permitted and non-permitted (before 1972) septic systems in the SWPA. 2. Educate the residents within the SWPA on the source water protection plan, the proper use and maintenance of their septic systems and how the source of their drinking water can be affected by an inadequate functioning septic system. 3. The County Environmental Health Department will educate property owners when they apply for a septic permit on the link between good septic practices and protecting groundwater.	Routt County Environmental Health Department
Municipal Utilities	1. Inspect and protect well heads; be knowledgeable of the emergency response plan, and provide Information concerning the SWPP and implementation measures in the annual Consumer Confidence Report (CCR). 2. Conduct water quality monitoring according to a monitoring plan.	Deerwood Service Company Water Operator

Table 9. Source Water Protection Best Management Practices

Issue	Management Approach	Implementer
Transportation on Roadways	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 Routt County Planning Department prior to constructing "Drinking Water Protection Area" signage on roadways.	Steering Committee
	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	Steering Committee
	3. Keep informed on road maintenance practices and schedules within the SWPA.	Deerwood Service Company
	4. Provide a copy of the Source Water Protection Plan and map of the SWPA to Routt County Road and Bridge Department, U.S. Forest Service Yampa Ranger District, Oak Creek Fire Protection District, Steamboat Rural Fire Department and Routt County Office of Emergency Management (EOC).	Deerwood Service Company
	5. Request to be notified by Routt County EOC when a hazardous spill occurs within the SWPA.	Deerwood Service Company
	6. Purchase small spill kits to be used by utility, managers, and responders within the SWPA.	Deerwood Service Company
Land Use Planning	1. Provide Routt County with a copy of the Source Water Protection Plan and GIS mapping information of the SWP area and encourage them to overlay this area on their land use maps.	Colorado Rural Water Association
	2. Request to be notified by Park County officials of land use hearings or meetings regarding land within the SWPA and will have the opportunity to participate in the process.	Deerwood Service Company
	3. Check County website regularly to keep informed of land use opportunities to submit comments or attend hearings.	Deerwood Service Company

Table 9. Source Water Protection Best Management Practices

Issue	Management Approach	Implementer
Public Land Management	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, Wilderness designations, and other outreach opportunities. Provide written comments to public land managers on source water protection concerns.	Deerwood Service Company Upper Yampa Watershed
	2. Actively continue to foster an open, collaborative relationship with U.S. Forest Service, Routt County, and Upper Yampa River watershed group to protect water quality in the watershed.	Deerwood Service Company Yampa Ranger District Upper Yampa Watershed
	3. Support efforts to improve watershed conditions (i.e. fuels reduction activities, wildfire assessment, and other reclamation projects).	Steering Committee
	4. Support efforts to mitigate wildfire risks within the source water protection area as identified in the Community Wildfire Protection Plan and Watershed/Wildfire Assessment Report.	Steering Committee
Fuel Storage Tanks	1. Maintain an inventory with contact information of residential unregulated aboveground storage tanks (AST) within the source water protection area.	Deerwood Service Company
	2. Provide information to fuel storage tank owners on how they can implement storage tank practices to prevent petroleum products from leaking onto the ground. Information should include: inspection schedule, secondary containment, spill clean-up, and removal of secondary containment discharge.	Deerwood Service Company
	3. Provide residential owners of AST with contact information for emergency responders in case of a release.	Deerwood Service Company
	4. Purchase and provide small spill kits to be used residents with fuel tanks within the SWPA.	Deerwood Service Company

Table 9. Source Water Protection Best Management Practices

Issue	Management Approach	Implementer
Oil and Gas Development	1. Stay informed on oil and gas development within and around the Source Water Protection Area by using the State's COGCC website, attending Oil and Gas Regional Forums, contacting County Planners and Public Land managers (BLM & USFS), and meeting with industry representatives.	Deerwood Steering Committee Routt County Land Use Dept.
	2. Ensure industry protects Deerwood Service Company's water source by implementing these activities: • Conduct geologic and hydrologic mapping and risk analysis to identify underground fractures and faults that may provide pathways for gas and fluids to groundwater. • Identify existing wellbores in or near the protection area and determine the integrity of the casings, cement, plugs. • Assess the potential impacts to ground water used to supply hydraulic fracturing base fluid. • Provide the DSC disclosure of all chemical planned for a fracking operation at least 30 days beforehand, and a report on chemicals actually used within 30 days following fracking. • Comply with and implement all actions in the approved Storm Water Management Plan to prevent or minimize impacts from storm water to the source waters. • Adequately treat wastewater before discharge; no discharge to publicly owned treatment works; and no road or ground spreading of wastewater. • Use routine and preventative maintenance to help prevent spills and immediately notify the DSC of any spills. • Provide adequate buffer zones from the DSC's groundwater wells.	Routt County Land Use Dept. Yampa Ranger District
	3. Conduct baseline water testing of DSC's water sources and ongoing monitoring of potentially affected source waters.	Deerwood Service Company Water Operator

Table 9. Source Water Protection Best Management Practices

Issue	Management Approach	Implementer
Residential Practices	1. Properly Dispose of Chemicals and Motor Oil – Never pour on the ground, down the drain, or toilet. Participate in household hazardous waste collection events. 2. Use Fertilizers, Herbicides and Pesticides Properly - Apply chemicals according to label instructions and avoid runoff. Do not exceed recommended application rates. Use only if necessary. 3. Properly Dispose of Drugs and Personal Care Products – Participate in medication drop off campaigns. If non available, pour medications into a sealable plastic bag and add kitty litter, sawdust, coffee grounds, or glue and deposit in the trash along with unused personal care products. 4. Dispose of Pet Waste Properly – Flush pet wastes down the toilet, put into the garbage, or bury under 8 inches of soil. Pick up your pet waste when walking your dog. 5. Use Water Wisely – Check for plumbing leaks, use water-saving showerheads and faucets, water laws morning or evenings, avoid over watering, and direct runoff onto vegetative buffers. 6. Purchase Safer Alternative Products – Choose natural alternatives or Green Products.	Deerwood Service Company Residents of the SWPA
Natural Hazards – Heavy Rain Events	1. Monitor rainfall events regularly and enact the Emergency Response Plan when threat of flooding or impact to the water system. 2. Notify residents of Boil Water Order in the event that the well gets contaminated.	Deerwood Service Company Water Operator

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APPENDICES

A. Contingency Plan*

B. Meeting Attendance, Agendas and Presentations

C. Contact List of Stakeholders Invited to Participate

D. Citizen Guides

E. Contaminant Health Concerns

F. Miscellaneous Maps and Reports

G. Funding Sources for Source Water Protection

H. 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.*