

City of Trinidad

Source Water Protection Plan



City of Trinidad Water Treatment Plant



Written by: Elisa Dawson, AmeriCorps VISTA, Purgatoire Watershed Partnership
Karen Wolf, Watershed Coordinator, Purgatoire Watershed Partnership

Coordinated by: Kimberly Mihelich, Colorado Rural Water Association

For the Community Water Provider:
City of Trinidad
PWSID: CO0136800 and CO01236-300

This Source Water Protection Plan for the City of Trinidad was developed using version 05.09.14 of the Colorado Rural Water Association’s Source Water Protection Plan Template.

Table of Contents

EXECUTIVE SUMMARY	5
INTRODUCTION.....	6
PURPOSE OF THE SOURCE WATER PROTECTION PLAN.....	7

SOURCE WATER ASSESSMENT PHASE	8
SOURCE WATER PROTECTION PHASE	9
STEERING COMMITTEE.....	10
PROTECTION PLAN DEVELOPMENT	11
DEVELOPMENT AND IMPLEMENTATION GRANT	12
WATER SUPPLY SETTING	12
Location	12
Land Administration and Zoning.....	15
Economic Development, Growth, and Population.....	16
Land Ownership and Use	16
Topography, Geology, and Soil	18
Climate	21
Hydrology	25
WATER QUALITY STANDARDS.....	26
Impaired Waters.....	27
DRINKING WATER SUPPLY OPERATION	28
City of Trinidad Drinking Water Infrastructure	29
Water Demand Analysis.....	30
SOURCE WATER ASSESSMENT REPORT REVIEW.....	31
Source Water Assessment Area of Delineation.....	31
POTENTIAL CONTAMINANT SOURCE INVENTORY	33
PRIORITIZATION OF POTENTIAL THREATS.....	35
SUSEPTIBILITY ANALYSIS OF WATER SOURCES.....	38
DISCUSSION OF LOCAL SOURCE WATER CONCERNS AND BEST MANAGEMENT PRACTICES	39
Fire	39
Campgrounds and Recreation	43
Landslides, Flooding and Erosion.....	44
Transportation and Roadways	45
Climate Change and Water Quantity	47
Reservoir and Ditch Maintenance	48
Livestock Grazing.....	48
Septic Tanks	49
Residential Practices	50
Land Use Change	51
Pesticide Application.....	52
WATER QUALITY MONITORING.....	53
PUBLIC EDUCATION AND OUTREACH.....	53

Consumer Confidence Report..... 53
Plant Tours..... 53
Signage 54
Newspaper 54
Website..... 54
Watershed-Wide Education 54
Partnerships..... 55
IMPLEMENTATION PLAN 56
EVALUATING EFFECTIVENESS 61
LIST OF REFERENCES..... 63
LIST OF APPENDICES..... 64

ACRONYMS

BMP	Best Management Practice
CDPHE	Colorado Department of Public Health and Environment
CRWA	Colorado Rural Water Association
EPA	Environmental Protection Agency
GIS	Geographic Information System
NRCS	Natural Resources Conservation Service
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
SP-PRCD	Spanish Peaks-Purgatoire River Conservation District
USFS	United States Forest Service

EXECUTIVE SUMMARY

There is a growing effort in Colorado to protect community drinking water sources from potential contamination. Many communities are taking a proactive approach to preventing the pollution of their drinking water sources by developing 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 in order 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 City of Trinidad 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, government, and agency representatives during the months of February 2014 through February 2015. 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 City of Trinidad obtains its drinking water from two surface water intakes, one at North Lake and the other at Monument Lake. The Source Water Protection Area for these water sources is remote alpine forest with public and private landownership. This Source Water Protection Area is the area that the City of Trinidad 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. Through this process, it was determined that the highest priority potential contaminant sources and/or issues of concern are wildfire risk and recreation and camping. Other noted water quality threats include: transportation and roadways, landslides and flooding, pesticide application, septic tanks, land use change, and residential issues.

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.

The following list highlights best management practices which pertain to the highest priority potential contaminant sources and other issues of concern.

- Implement Fuels Reduction measures on private and public land to reduce fire risk;
- Educate public on the Source Water Protection Area and Best Management Practices;
- Distribute a copy of the City of Trinidad Source Water Protection Plan to County officials and decision makers.

The Steering Committee recognizes that the usefulness of this Source Water Protection Plan lies in its implementation and will begin to execute these best management practices upon completion of this Plan.

This Plan is a living document that is meant to be updated to address any changes that will inevitably come. The Steering Committee will review this Plan at a frequency of once every 2-5 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 City of Trinidad is located in Las Animas County in southeastern Colorado. The City of Trinidad manages drinking water for the city and 23 water associations within the community, providing water for an estimated 85% of the Las Animas County population. The City of Trinidad acquires all of its source water from the Purgatoire River, a surface water river located in the

Culebra Mountains of southern Colorado. The City of Trinidad has water rights to the headwaters of the river, allowing the City access to fresh snowmelt and therefore a pristine source water. The Source Water Protection Plan (SWPP) for the City of Trinidad began in July 2014 with the purpose of providing a framework for the public water system to identify threats to the drinking water supply and collaborate on the protection of the drinking water sources from potential sources of contamination¹. Proactive planning and prevention is essential to the long-term integrity of a water system as well as in limiting their costs and liabilities associated with providing water to the community.

Table 1: Primary Contact Information for the City of Trinidad Source Water Protection Plan

PWSID	PWS Name	Name	Title	Address	Phone	Website
CO-0136800	City of Trinidad	Gil Ramirez	Senior Water Treatment Plant Operator	135 N. Animas Street Trinidad, CO 81082	719-680-1432	www.trinidad.co.gov

PURPOSE OF THE SOURCE WATER PROTECTION PLAN

Source Water Assessment and Protection (SWAP) 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 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. The SWAP program protection plan is integrated with the Colorado Wellhead Protection Program that was established in amendments made to the federal Safe Drinking Water Act (SDWA, Section 1428) in 1986.

¹ The information contained in this Plan is limited to that available from public records and the Water System Name 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.

Colorado's SWAP program is an iterative, two-phased process designed to assist public water systems in preventing potential contamination of their untreated drinking water supplies. The two phases include the Assessment Phase conducted by the CDPHE and the Protection Phase.

The focus of the Colorado Source Water Protection Plan is primarily on education, outreach, and communication, not regulation. The Source Water Protection Plan (SWPP) is a voluntary tool for the City of Trinidad to help ensure clean and high quality drinking water sources for current and future generations. This Source Water Protection Plan is designed to:

1. Create an awareness of the community's drinking water sources and the potential risks to water quality within the watershed;
2. Encourage education and voluntary solutions to alleviate pollution risks;
3. Promote management practices to protect and enhance drinking water supplies; and
4. Provide for a comprehensive action plan in case of an emergency that threatens or disrupts the community water supplies.

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.

SOURCE WATER ASSESSMENT PHASE

The Assessment Phase conducted by CDPHE 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; and
4. Reporting the results of the source water assessment to the public water systems and the general public.

The Assessment Phase involves understanding where the City of Trinidad's source water comes from, what contaminant sources potentially threaten the water sources, and how susceptible each water source is to potential contamination. The susceptibility of an individual water source is analyzed by examining the properties of its physical setting and potential contaminant source threats. The resulting analysis calculations are used to report an estimate of how susceptible each water source is to potential contamination.

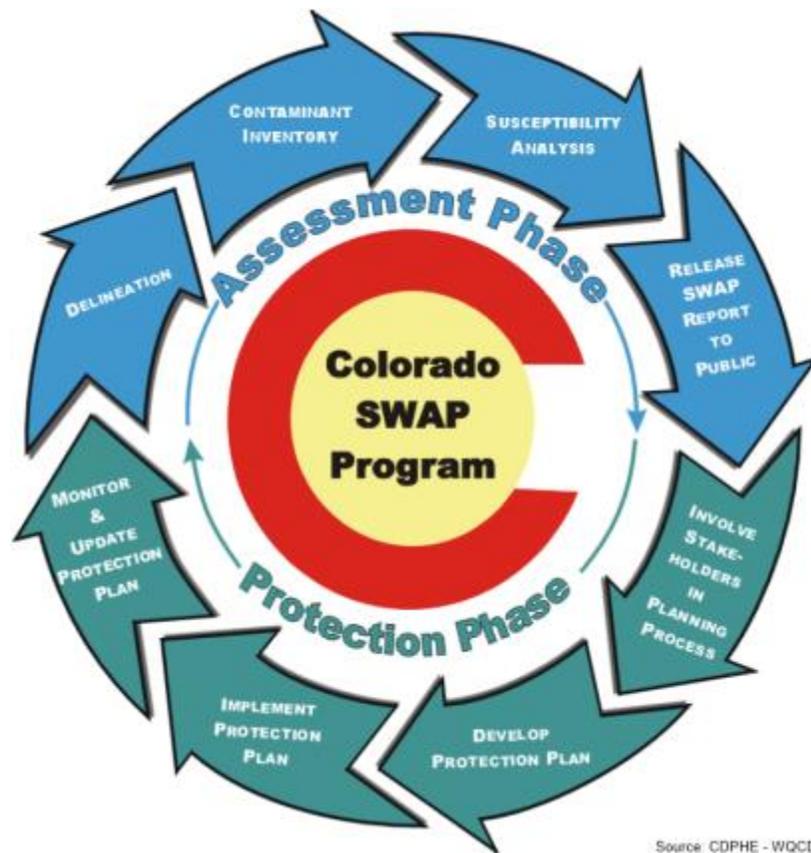
SOURCE WATER PROTECTION PHASE

The Protection Phase is a voluntary, ongoing process in which all public water systems have been encouraged to voluntarily employ preventative measures to protect their water supply from the potential sources of contamination to which it may be most susceptible. The Protection Phase can be used to take action to avoid unnecessary treatment or replacement costs associated with potential contamination of the untreated water supply. Source water protection begins when local decision-makers use the source water assessment results and other pertinent information as a starting point to develop a protection plan. As depicted in the lower portion of Figure 1, 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.

The water system and the community recognize that the Safe Drinking Water Act grants no statutory authority to the Colorado Department of Public Health and Environment or to any other state or federal agency to force the adoption or implementation of source water protection measures. This authority rests solely with local communities and local governments. The source water protection phase is an ongoing process as indicated in Figure 1. The evolution of the SWAP program is to incorporate any new assessment information provided by the public water supply system and update the protection plan accordingly.

Figure 1: Colorado Source Water Protection Program Phases



STEERING COMMITTEE

During the development of this Plan, a volunteer Steering Committee was formed from the stakeholder group to develop and implement this Source Water Protection Plan. Specifically, the Steering Committee’s role in the source water protection planning process was to advise the City of Trinidad in the identification and prioritization of potential contaminant sources as well as management approaches that can be voluntarily implemented to reduce the risks of potential contamination of the untreated source water. All members attended at least one Steering Committee meeting and contributed to planning efforts from their areas of experience and expertise. Their representation provided diversity and led to a thorough Source Water Protection Plan. The City of Trinidad and the Colorado Rural Water Association are very appreciative of the participation and expert input from the following participants (see Table 2 below):

Table 2: Steering Committee Members

Name	Title	Affiliation
------	-------	-------------

Gil Ramirez	Senior Water Treatment Plant Operator	City of Trinidad
Karen Wolf	Executive Director	Purgatoire Watershed Partnership
Elisa Dawson	AmeriCorps VISTA	Purgatoire Watershed Partnership
Loyd Holliman	Fire Chief	Stonewall Fire Protection District
C.K. Morey	Forester	CO State Forest Service
Mark Loveall	Forester	CO State Forest Service
Bert Nale	Firefighter	Stonewall Fire Protection District
Steven Hanks	Ranch Manager	Bar NI Ranch
James Vigil	Commissioner	CO Parks and Wildlife
Penny Bieber	Project Coordinator	Stonewall Fire Protection District
Jeffer Wingate	Forestry Technician	United States Forest Service
Bob Holder	District Wildlife Manager	Colorado Parks and Wildlife

PROTECTION PLAN DEVELOPMENT

The creation of the City of Trinidad SWPP was a collaboration between the City of Trinidad, Steering committee members, the Stonewall Fire Protection District and the Purgatoire Watershed Partnership. Stakeholder meetings were conducted over the course of the Plan development, where information was discussed which helped the Steering Committee develop an understanding of the issues affecting source water protection for the City of Trinidad. The Stonewall Fire Protection District aided in the assemblage of contaminant source inventory in collaboration with the Community Wildfire Protection Plan. This partnership allowed for the efficient gathering of data for the SWPP, data that was gathered using a list of potential contaminant sources designed by the City of Trinidad (see Appendix A: Watershed Protection Assessment Definitions and Checklist). Recommendations for management approaches to be incorporated into a protection plan were proposed by the City of Trinidad and Steering Committee members. Once assessment was completed, the responsibility of writing the City of Trinidad Source Water Protection Plan was given to the Purgatoire Watershed Partnership. A summary of the Protection Plan development is presented below.

Table 3: Source Water Protection Plan Development

Date	Action
Feb. 12, 2014	Initial Stakeholder Meeting

Feb. 22, 2014	Steering Committee Meeting
June 19, 2014	Public Meeting
Oct. 17, 2014	Steering Committee Meeting
Oct. 29, 2014	Stakeholder Meeting
Nov. 6, 2014	Public Meeting
Feb. 2, 2015	Steering Committee and Stakeholder Meeting

DEVELOPMENT AND IMPLEMENTATION GRANT

The City of Trinidad has been awarded a \$5,000 Development and Implementation Grant from the Colorado Department of Public Health and Environment (CDPHE). This funding is available to public water systems and representative stakeholders committed to developing and implementing a source water protection plan. A one-to-one financial match (cash or in-kind) is required. The City of Trinidad was approved for this grant in January of 2014.

WATER SUPPLY SETTING

Location

The City of Trinidad is located in the Purgatoire River Watershed in Southeastern Colorado along the Interstate 25 corridor, just 11 miles from the New Mexico border (see Figure 2: Location Setting for the Source Water Protection Area on page 14). Trinidad was first settled in 1861 by Felipe and Delores Baca. Felipe Baca, a sheep rancher, first witnessed the potential of the Purgatoire River Valley when he passed through the area in 1860 on his way to Denver, Colorado, to sell produce and goods from his ranch. The following year he brought his and eleven other families, all from the Mora Valley near the town of Guadalupe, New Mexico, to

settle along the Purgatoire River. The town, which Felipe Baca helped establish through his benevolence and leadership, grew up around his hacienda which he had built adjacent to the Purgatoire River. In 1876, the same year that Colorado became a state, the City of Trinidad was officially incorporated. Trinidad’s culture, due to settlement and mining, can be generally described as Hispanic, Italian and Anglo. Although many Native American tribes inhabited and traveled through the Purgatoire River Watershed, only remnants of their presence can be found.

The City of Trinidad’s water supply, however, comes from the upper Purgatoire River Watershed. The water supply watershed, or Source Water Protection Area (SWPA), is located below the Culebra Range of the Sangre de Cristo Mountains on Colorado Highway 12, approximately 40 miles west and upriver from the City itself. The elevation of Trinidad’s SWPA ranges from approximately 8,400 feet to 13,500 feet above sea level. North Lake and Monument Lake (see the images below) store the City’s water supply and are fed by the North Fork and West Fork of the Purgatoire River, Brown Creek, Whiskey Creek, and the following ditches: Ditches A and B on the North Fork and Brown Creek, and Ditch C on Whiskey Creek (see Figure 3: Source Water Protection Area and Ditches on page 15).



North Lake



Monument Lake

ation Setting for the Source Wat

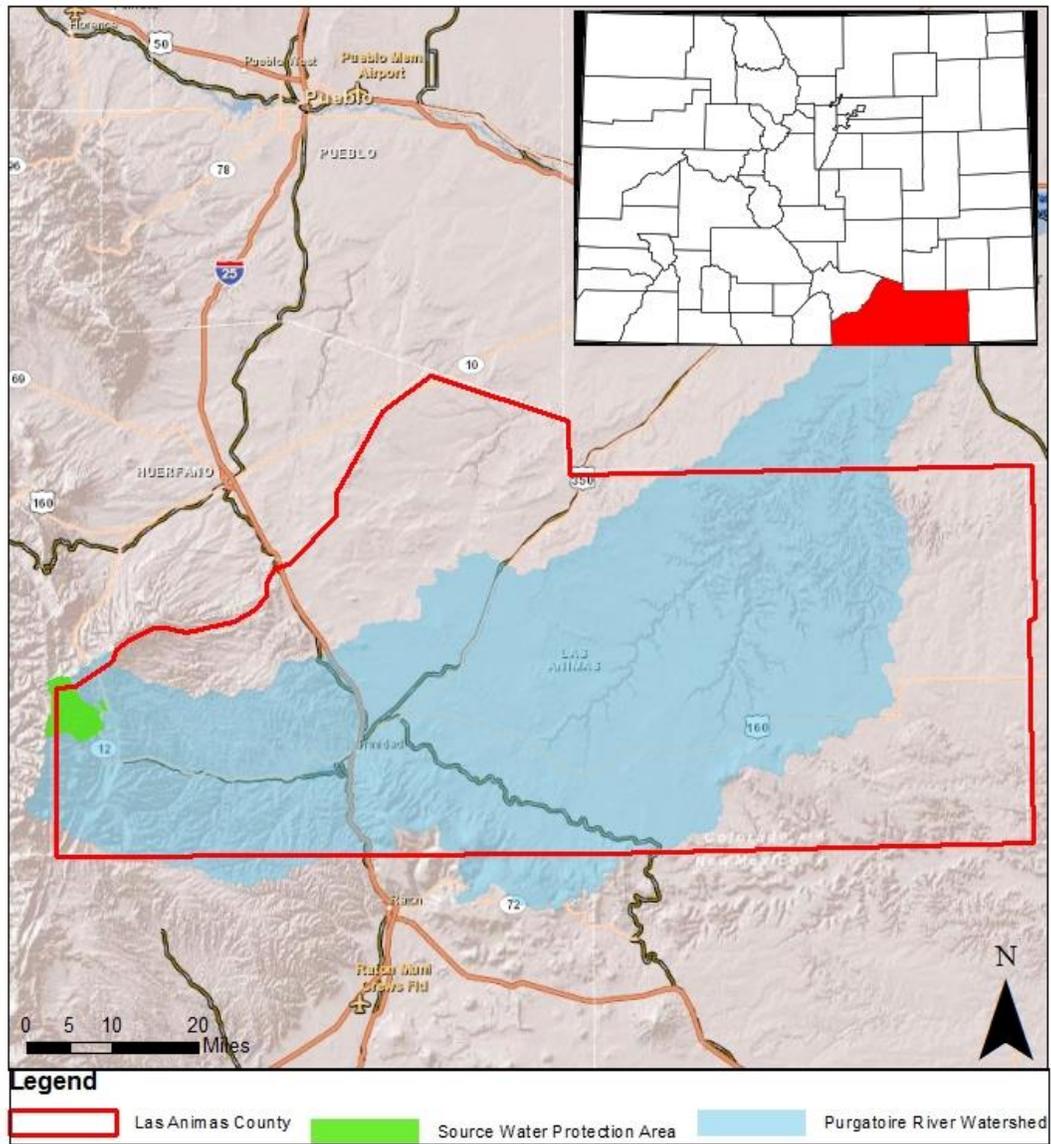
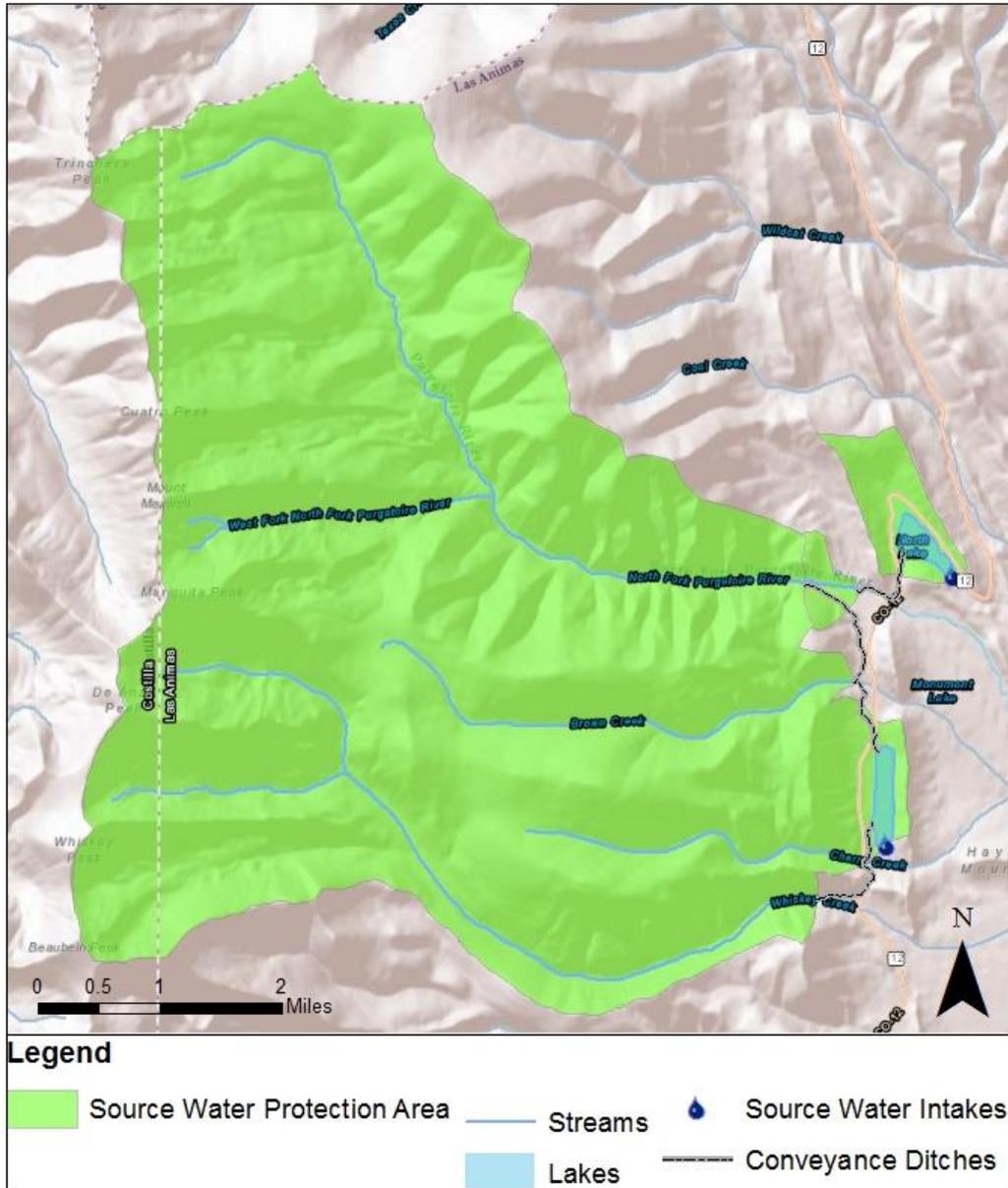


Figure 3: Source Water Protection Area and Ditches



Land Administration and Zoning

The City of Trinidad is the county seat for Las Animas County. Trinidad is governed by a Colorado Home Rule Charter Commission and a publicly elected seven member City Council which includes a mayor. The Home Rule Provisions of the Constitution of the State of Colorado

provides the citizens of Trinidad the right of self-government (City of Trinidad, 1993) The City of Trinidad Municipal Code defines the City's regulations, ordinances, building codes and zoning codes. Las Animas County has a similar form of government with a three member County Commission. The City's water supply is located almost entirely in Las Animas County yet stretches into Costilla County as well. Las Animas County makes up 21,190 acres or 94 percent of the source water protection area and Costilla County accounts for the remaining 1,295 acres or 6 percent.

Economic Development, Growth, and Population

Trinidad's economy began in agriculture, primarily farming and cattle and sheep ranching. Industry in Trinidad soon included coal mining and manufacturing, including brick and bottle making. Mining, which began in the 1890's and continued—for the most part—until the 1940's, was responsible for the City's population growth, as well as the installation of a few transcontinental railroad lines. The height of Trinidad's population occurred in the 1930's when Trinidad and the surrounding mining communities totaled over 30,000 residents. The largest census of the City of Trinidad ever taken registered around 13,000 residents. Since mining activity began to diminish in the 1940's, Trinidad's population has been slowly declining each decade. Despite the presence of the oil and gas industry, primarily during the 1990's and 2000's, Trinidad's population never really grew again. Since the Twenty-First Century began, Trinidad maintained a population of 9,000, yet dropped from approximately 9,000 to 8,500 residents between 2010 and 2013. In the same time frame Las Animas County decreased from approximately 15,500 to 14,500 residents. (United States Census Bureau, 2015)

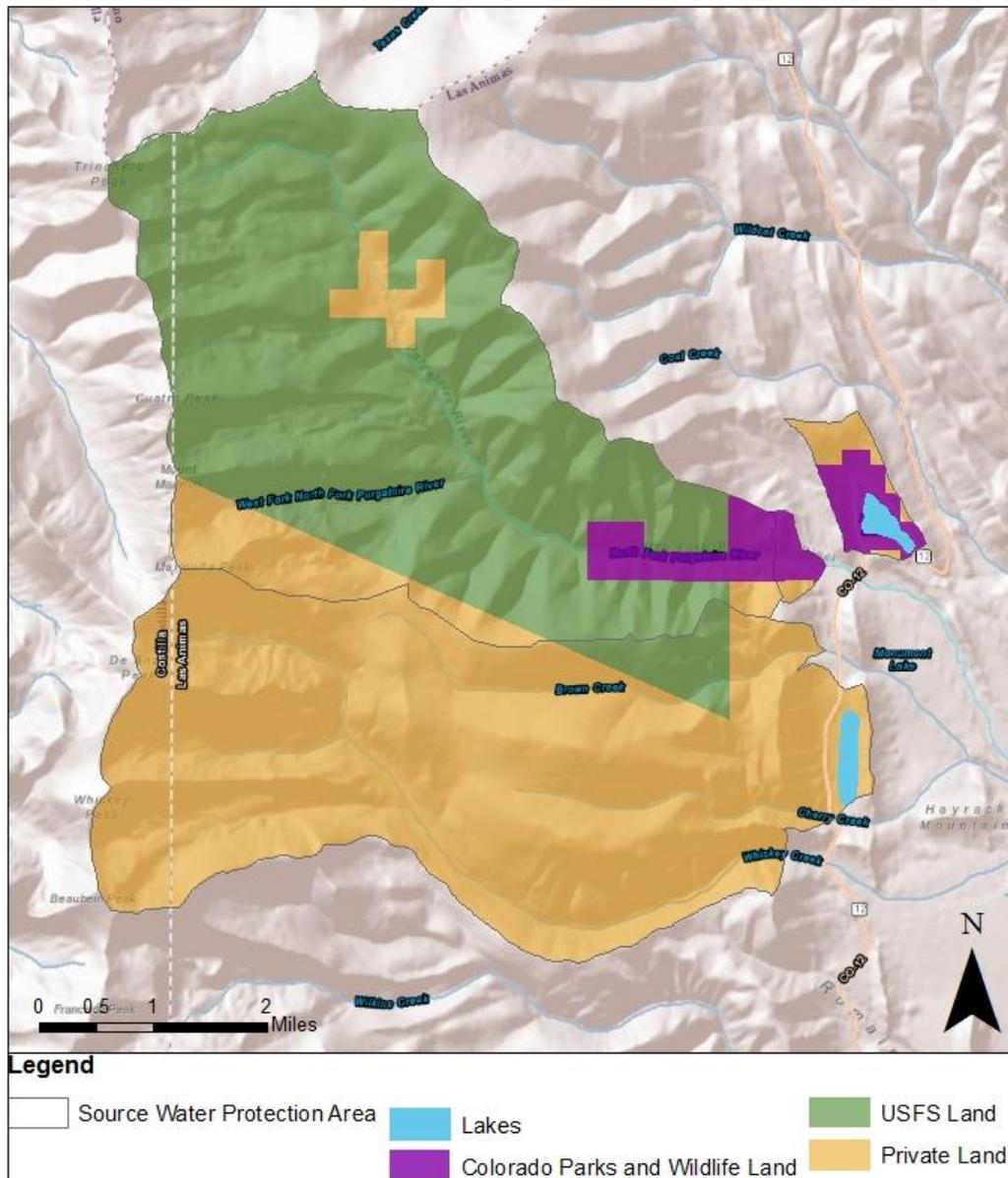
The economy of Trinidad's SWPA and the surrounding region, due to its high elevation, rural location and forested setting, has consistently been ranching and outdoor recreation. The population of Trinidad's source water protection area has also remained rather consistent for over a century, ranging from only a handful of year-round residents to—at maximum—two to four or five dozen during the summer season.

Land Ownership and Use

The majority of the Purgatoire River Watershed is privately owned. Historically, subsequent to the Maxwell Land Grant of 1864 which followed the Beaubien-Miranda Land Grant of 1843, the region became one of the largest, single private landholdings of its time. Soon after, starting in 1870, the Maxwell land was resold and eventually purchased by various wealthy families, which resulted in a number of large, private ranches such as the Bar NI (Purgatoire River Watershed (PWP), 2014, "Purgatoire River Watershed Plan"). Landowners in the Trinidad source water protection area include the Bar NI Ranch, the City of Trinidad, Colorado Parks and Wildlife, the United States Forest Service and a group of homeowners located in a small neighborhood called Glenn Aspen (see Figure 4: Land Ownership in the Source Water Protection Area on page 18).

The primary use of land in the Purgatoire River Watershed is agriculture, yet the upper watershed and the site of Trinidad’s SWPA is so dominated by forests and rocky slopes that the primary land uses are residential, ranching, conservation and recreation. Single-family residential land use within the water supply is limited to the Glenn Aspen rural mountain development, which contains approximately 30 to 50 seasonal vacation homes that are typically occupied during weekends from May through September. Grazing practices are limited and often not practiced in the source water protection area and the portion of the source water protection area located on the Bar NI Ranch has been designated through easement for conservation. Land owned by the State of Colorado, the Federal government and the City of Trinidad are also used for conservation, as well as recreation. These public lands offer camping, hiking trails and fishing. The historic and City-owned Monument Lake Resort also provides seasonal camping, fishing and rental cabins.

Figure 4: Land Ownership in the Source Water Protection Area



Topography, Geology, and Soil

The eastern half of the Purgatoire River Watershed is characteristic of the Great Plains, with expansive, flat grasslands. Yet this region also contains canyonlands, mesas and pinyon-juniper shrublands. The western Watershed and the SWPA, however, is hilly and mountainous and is

dominated by conifer forests, as well as rocky outcroppings, sub-alpine meadows and riparian corridors (see Figure 5: Land Cover in the Source Water Protection Area on page 20). Tree species include ponderosa pine, Douglas fir, subalpine fir, Engelmann spruce and quaking aspen. Riparian zones also contain willows. The surface geology, or Type 1 rocks, of the SWPA is predominately conglomerate, followed by sandstone, shale and glacial drift. Soils in the water supply region are primarily loamy yet gravelly or cobbled (see Figure 6: Geology in the Source Water Protection Area on page 21).

Figure 5: Land Cover in the Source Water Protection Area

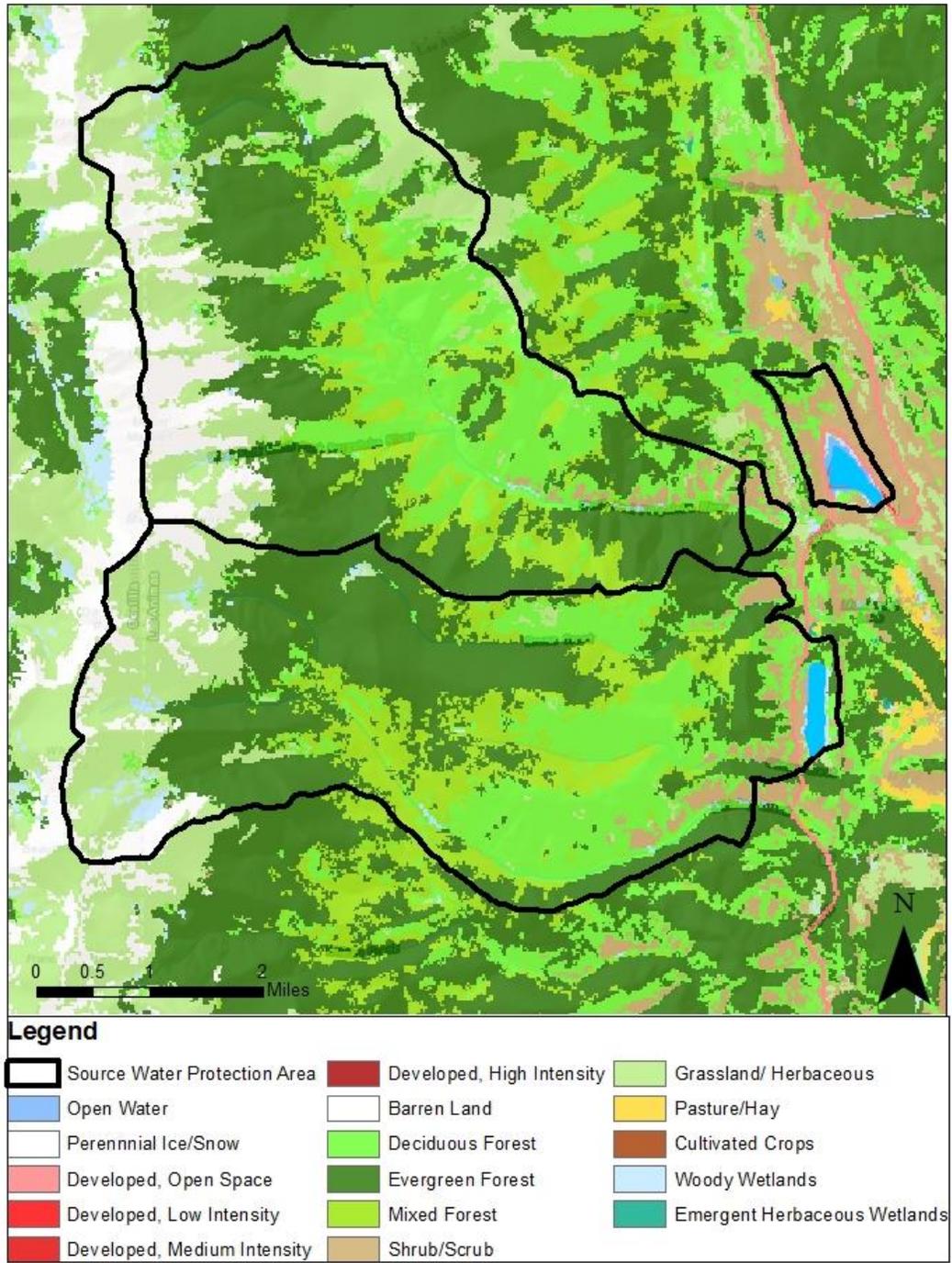
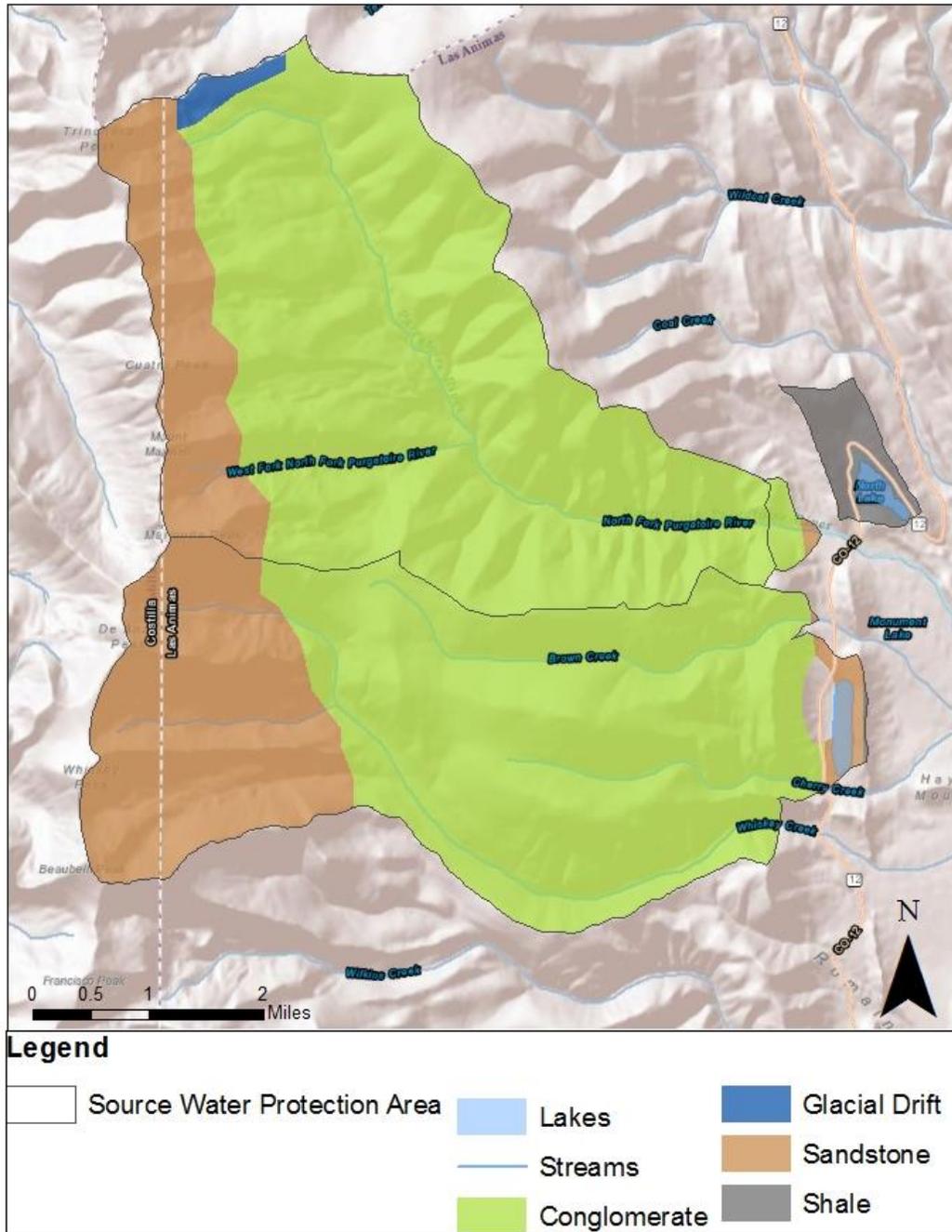


Figure 6: Geology in the Source Water Protection Area



Climate

Although the climate of the majority of the Purgatoire River Watershed is semi-arid, with the plains receiving an average of 12 to 14 inches of rainfall and the City of Trinidad about 16 inches, the mountainous upper watershed receives from 20 to over 30 inches of precipitation annually. More specifically, the average annual rainfall for Trinidad’s SWPA is 26 inches in the lower half and 30 inches in the upper region. The mountains of the Culebra Range that feed the City’s water supply experience an average of 34 inches of rainfall each year (see Figure 7: Annual Average Precipitation in the Source Water Protection Area on page 23). Throughout the year, temperatures in Trinidad extend from 10 to 20 degrees below zero to over 100 degrees Fahrenheit. Record lows have dropped to -32 and record highs have reached 101. The average annual temperatures range is 87 degrees in July to 18 degrees in January. At the elevation of the source water protection area, air temperatures are typically 10 degrees cooler (see Figure 8: Annual Average High Temperature in the Source Water Protection Area on page 24 and Figure 9: Annual Average Low Temperature in the Source Water Protection Area on page 25). In general, the water supply for the City of Trinidad is situated at a location that is notably wetter and colder than the lower elevation sites utilizing the water supply. (Natural Resources Conservation Service (NRCS), 2007)

Figure 7: Annual Average Precipitation in the Source Water Protection Area

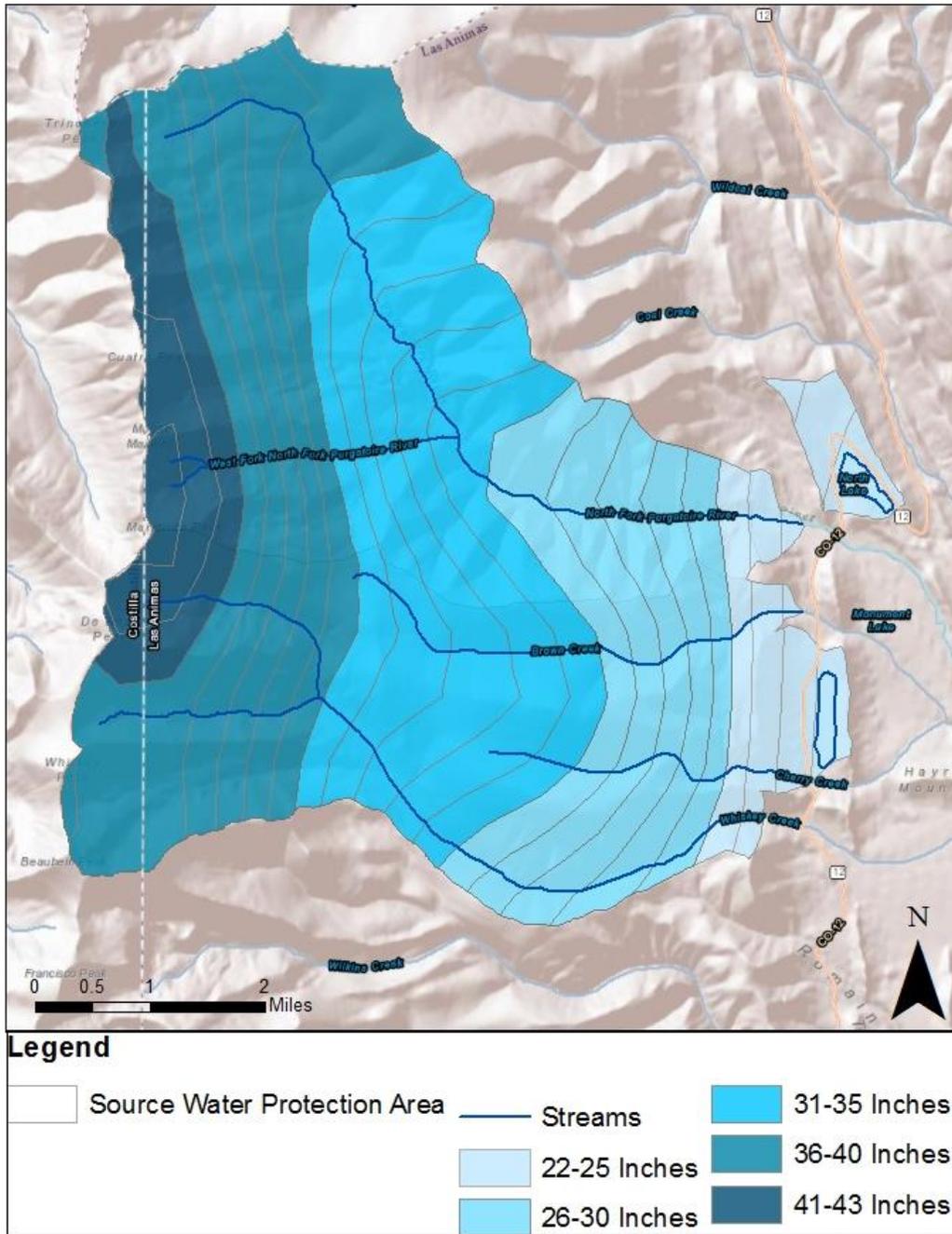


Figure 8: Annual Average High Temperature in the Source Water Protection Area

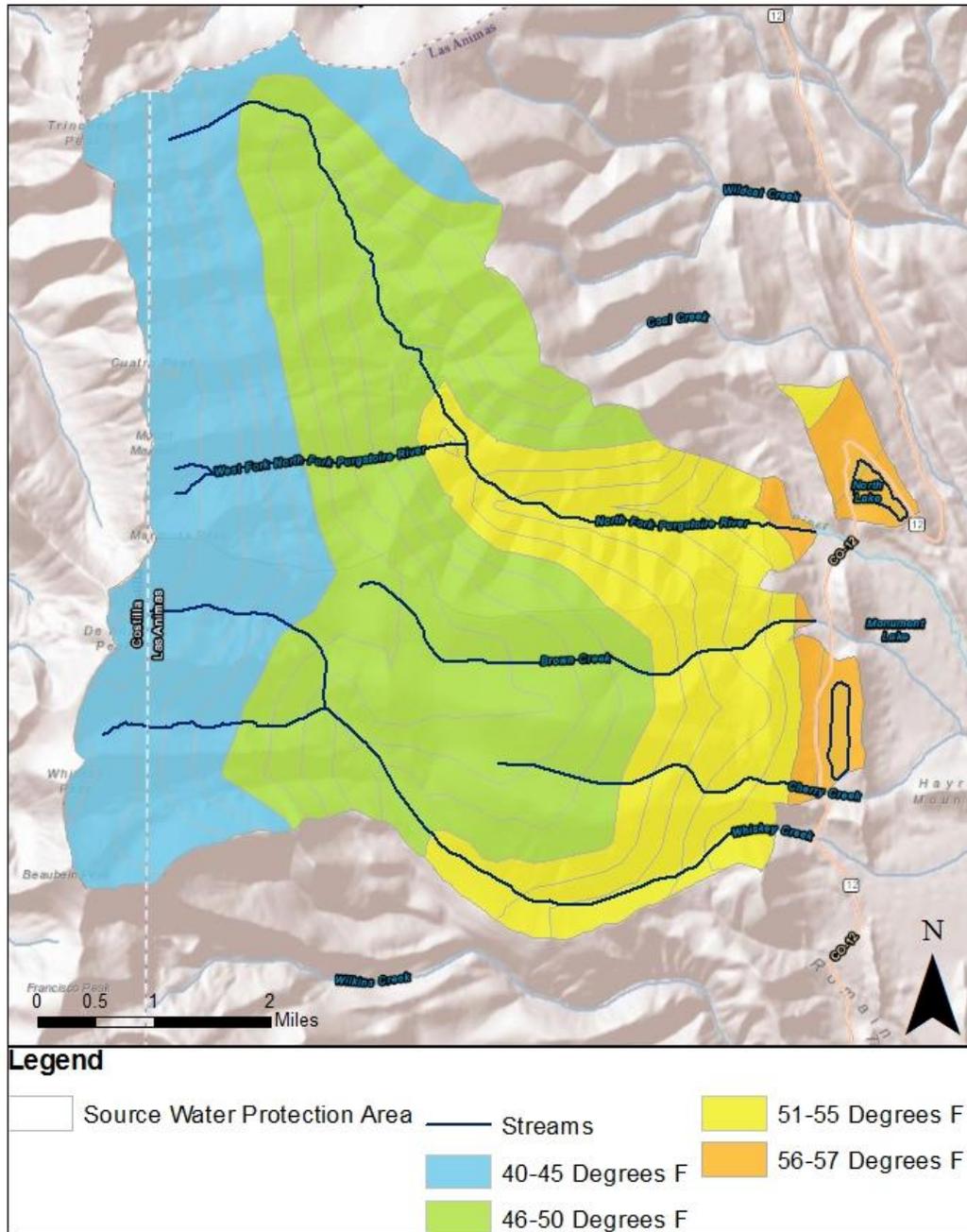
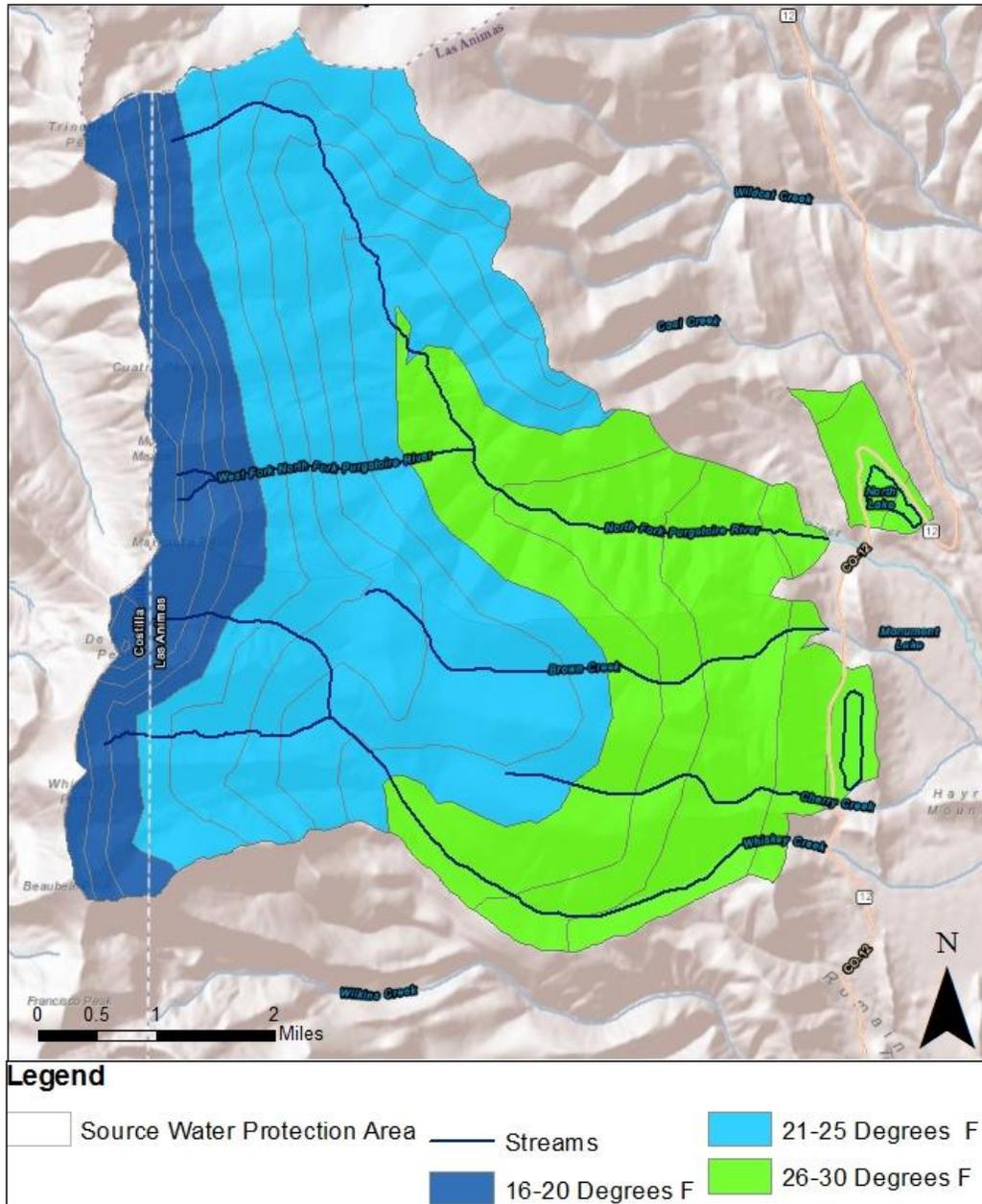


Figure 9: Annual Average Low Temperature in the Source Water Protection Area

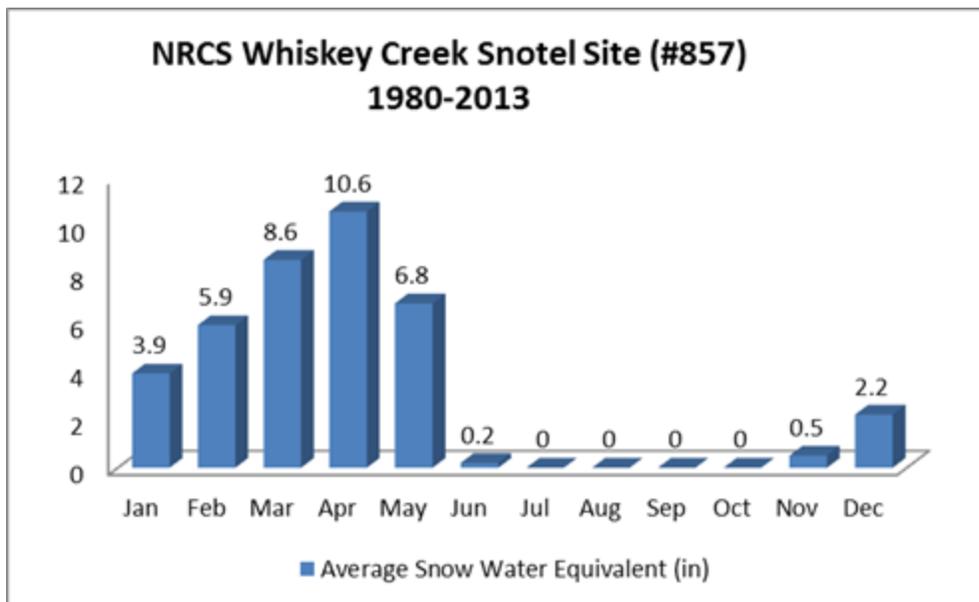


Hydrology

Situated at the southwestern edge of the Arkansas River Basin, the SWPA's drainage includes the North Fork of the Purgatoire River, the West Fork of the Purgatoire River, Brown Creek and

Whiskey Creek. The headwaters of these perennial streams begin near the following Sangre de Cristo peaks, respectively: Trinchera Peak (13,517 ft.), Cuatro Peak (13,488 ft.) and Mount Maxwell, Mariquita Peak (13,406 ft.), and De Ariza Peak (13,350 ft.). These streams, and thus the water supply for Trinidad, are primarily fed by snowmelt. Snow water equivalent (SWE) data on Whiskey Creek is collected by the National Water and Climate Center for the Snow Telemetry Program (SNOTEL). Whiskey Creek’s hydrologic code is 110200100102 and the chart below displays its average monthly snowpack.

Figure 10: Average Monthly Snowpack at Whiskey Creek



NRCS, 2013

Average monthly snowpack is greatest in April on Whiskey Creek. This data can assist with tracking snowfall totals and predicting potential water shortages and forest fire risks. (PWP, 2014, “Purgatoire River Watershed Plan”)

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. 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.

Impaired Waters

Currently, stream segments within the Source Water Protection Area have been identified as impaired under the 2010 State’s 303(d) list of impaired waters (Table 4). States are required under the Clean Water Act to submit to Congress their list of impaired waters that do not meet the state’s water quality standards for their designated and existing uses. States are also required to develop a watershed restoration action plan called a “Total Maximum Daily Load” for each impaired water body.

Table 4: Stream segments within and below the City of Trinidad Source Water Watershed and their Designated Uses and Impairment Status

Waterbody Name	Waterbody ID	Location	Designated Use	Status
Purgatoire River- North, South, Middle Forks of	COARLA05A_4200	Upper watershed region including source water watershed	River	Impaired, Selenium TMDL needed
Trinidad Reservoir	COARLA03BL_4200	Located below the source water protection area at the Trinidad Lake Dam	Freshwater Lake	Impaired, Dissolved Oxygen and Mercury TMDL needed

(See Appendix B: Source Water Assessment Report, City of Trinidad.)

The North Fork of the Purgatoire River falls within the Source Water Protection Area. This segment currently needs more information collected on selenium levels. Selenium, a nonmetal chemical element, is naturally found in sedimentary rocks. As water infiltrates through these rocks or soils derived from them, selenium can leach from soils and be transported to the nearest waterway, resulting in increased instream concentrations of selenium.

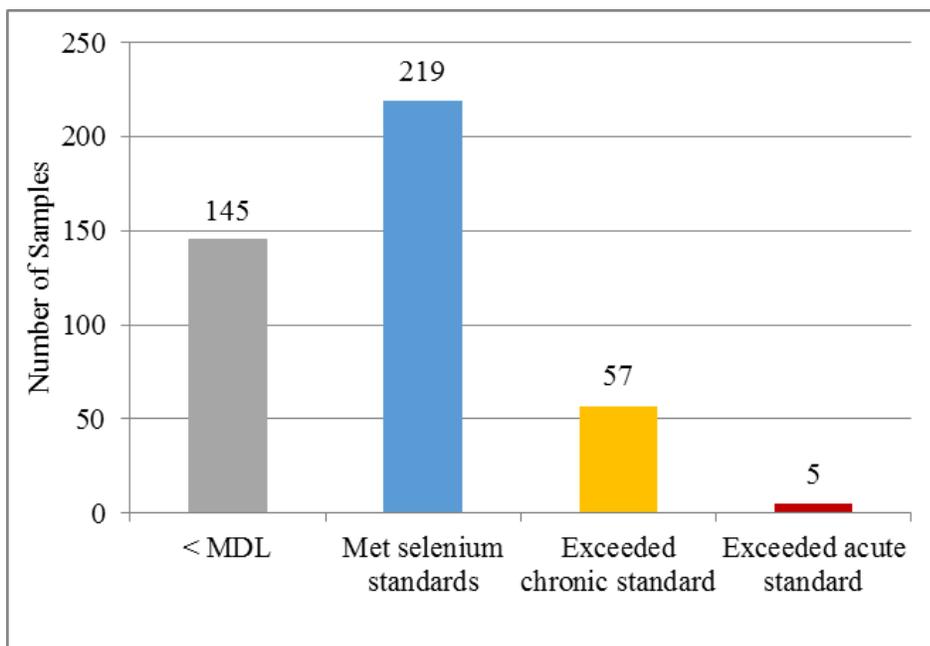
Dissolved selenium concentrations have been measured in 276 samples collected from 41 locations in the Purgatoire River Watershed. Over half of the dissolved selenium concentrations, 149 samples, were collected from locations on segment COARLA07, the mainstem of the Purgatoire River from Interstate-25 to the Arkansas River (Figure 11). The

upper portions of the Purgatoire River on segments COARLA05a and COARLA05b have been sampled 38 and 48 times, respectively.

Collectively, samples collected from the mainstem of the Purgatoire River and named forks (i.e. north, middle and south forks) account for 83 percent of the selenium samples. Other tributaries to the Purgatoire River account for 17 percent of the dissolved selenium samples collected to date. Paired stream flow measurements were completed during 24 of the sample events, which allows for an instantaneous load calculation.

The chronic and acute dissolved selenium standards were met in 219 of 276 samples, or 79% of the evaluations. The chronic dissolved selenium standard was exceeded in 21% of the samples collected from 11 locations. An additional 5 of the samples also exceeded the acute dissolved selenium standard. Acute exceedance occurred at 3 locations in the Purgatoire River Watershed.

Figure 11: Dissolved Selenium Standards Assessment (n=276)



(PWP, 2014, "Purgatoire River Watershed Water Quality Analysis")

DRINKING WATER SUPPLY OPERATION

Table 5: Surface Water Supply Information

Water System Facility Name	Water System Facility Number	Surface Water Source	Constructed Date	Appropriation Dates	Appropriation Amount (af/yr)
----------------------------	------------------------------	----------------------	------------------	---------------------	------------------------------

City of Trinidad	CO0136800	North Lake	1965	1906 & 1965	4,300
City of Trinidad	CO01236-300	Monument Lake	1931	1905 & 1908	1,400

City of Trinidad Drinking Water Infrastructure

Maintained by the Utilities Department, the municipal water system for the City of Trinidad includes water supply, treatment, storage, and distribution. City policy stipulates water rates, plant investment fees and line extensions, which are the responsibility of the developer.

North Lake and Monument Lake, located approximately 40 miles west of Trinidad, provide raw water storage for the City. North Lake contains approximately 4,300 acre-feet of water primarily generated by flows from the North Fork stream, which are governed by senior water rights.

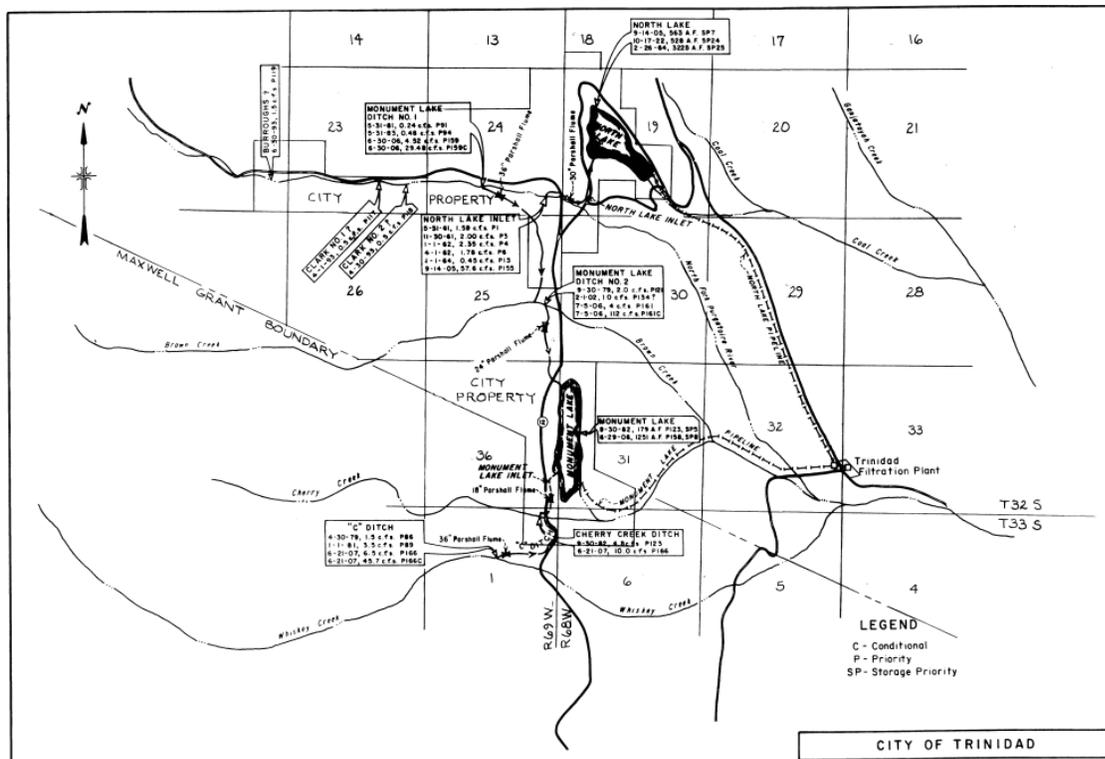
Monument Lake contains approximately 1,400 acre-feet of water controlled by senior water rights. Both Monument Lake and North Lake have a pipeline that carries water from these reservoirs to the Trinidad Filtration Plant, located approximately two miles east of Monument Lake, which provides water treatment for the City and its service area (see Figure 12: City of Trinidad Mountain Water System Mapping on page 30).

From the plant, treated water is delivered to the City of Trinidad from the Mountain Water System, a 36-mile transmission pipeline that has a hydraulic capacity of approximately 9 million gallons per day (MGD). With future expansion of the water filtration plant’s capacity, this transmission pipeline will need to be either replaced or paralleled to convey additional flow. Due to the potential of a water main break on this conduit, Trinidad is vulnerable to a major disruption in treated water supply.

Treated water is stored in several storage tanks with a total existing storage capacity of 9.46 million gallons. The primary tank is the Jansen storage tank, which holds 5 million gallons and supplies water to the satellite storage tanks, North, South, and Allendale, through a series of pump stations. The excess storage capacity allows time to implement water treatment capacity upgrades.

Improvements to the water distribution system will be required to meet future needs. Recommended improvements include a second water main to the Industrial Park and a pipeline to extend from the Allendale pump station to Saddle Road.

Figure 12: City of Trinidad Mountain Water System Mapping Dec. 19, 1975



Water Demand Analysis

The City of Trinidad provides water service within its service area, which includes the city limits and a substantial part of the developed rural area outside the City. The service area extends east to the Trinidad Correctional Facility and the Piñon Canyon Maneuver Site. As of December 2014, within city limits there are 3,731 water hook-ups with 3,221 residential sites and 510 commercial sites. Outside of city limits there are 521 water hook-ups, of which 440 are residential, 77 are commercial, and 4 are re-sale water refilling station sites. Approximately 10,000 residents and other users are served in the service area annually. The water system currently has the capacity to produce 8.4 million gallons per day (MGD). Current estimates by the water system indicate that the average daily demand is approximately 2.8 MGD, with winter minimums reaching 1.3 MGD and summer maximums reaching 4.5 MGD. Using these estimates, the water system has a surplus average daily demand capacity of 5.6 MGD and a surplus of 3.9 MGD during summer peak flows.

Using the surplus estimates above, the City of Trinidad has evaluated its ability to meet the average daily demand and the average peak daily demand of its customers in the event the water supply from one or more of its water sources becomes disabled for an extended period of time due to potential contamination. The evaluation indicated that the City of Trinidad has the ability to meet the daily demand of its customers if one of the two raw water storage tanks were to become disabled for an extended period of time. The City of Trinidad has the ability to transfer its senior water rights between North Lake and Monument Lake, allowing for this

flexibility in case of an emergency. If both water sources were disabled for an extended amount of time, the City of Trinidad would not be able to meet the water demands of its customers.

However, because the City of Trinidad has only one drinking water treatment site available, the City of Trinidad would not be able to meet water needs of the community if the treatment plant were to fail. Furthermore, due to the single Mountain Water System transmission line from the Treatment Plant to the City, the City of Trinidad would not be able to meet the water needs of its customers if this line were to be disabled for an extended period of time. Furthermore, the ability of the City of Trinidad to meet the water demands of its customers for an extended period of time is also affected by the amount of treated water that the water system has in storage if the water sources or treatment plant should become disabled.

SOURCE WATER ASSESSMENT REPORT REVIEW

The City of Trinidad has reviewed the CDPHE's Source Water Assessment Report (see Appendix B: Source Water Assessment Report, City of Trinidad) along with the Steering Committee. These Assessment results were used as a starting point to guide the development of appropriate management approaches to protect the source waters of the City of Trinidad from potential contamination. A copy of the Source Water Assessment Report for the City of Trinidad can be obtained by contacting the City of Trinidad or by downloading a copy from the CDPHE's SWAP program website located at: <http://www.colorado.gov/cs/Satellite/CDPHE-WQ/CBON/1251596793639>.

Source Water Assessment Area of Delineation

A source water protection area is the surface and subsurface areas from which contaminants are reasonably likely to reach a water source. The purpose of delineating a source water protection area is to determine the recharge area that supplies water to a public water source. 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—or watershed—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, which is the case for Trinidad. The source water assessment area that was delineated as part of the City of Trinidad's Source Water Assessment Report provides the basis for understanding where the community's source water and potential contaminant threats originate, and where the community has chosen to implement its source water protection measures in an attempt to manage the susceptibility of their source water to potential contamination.

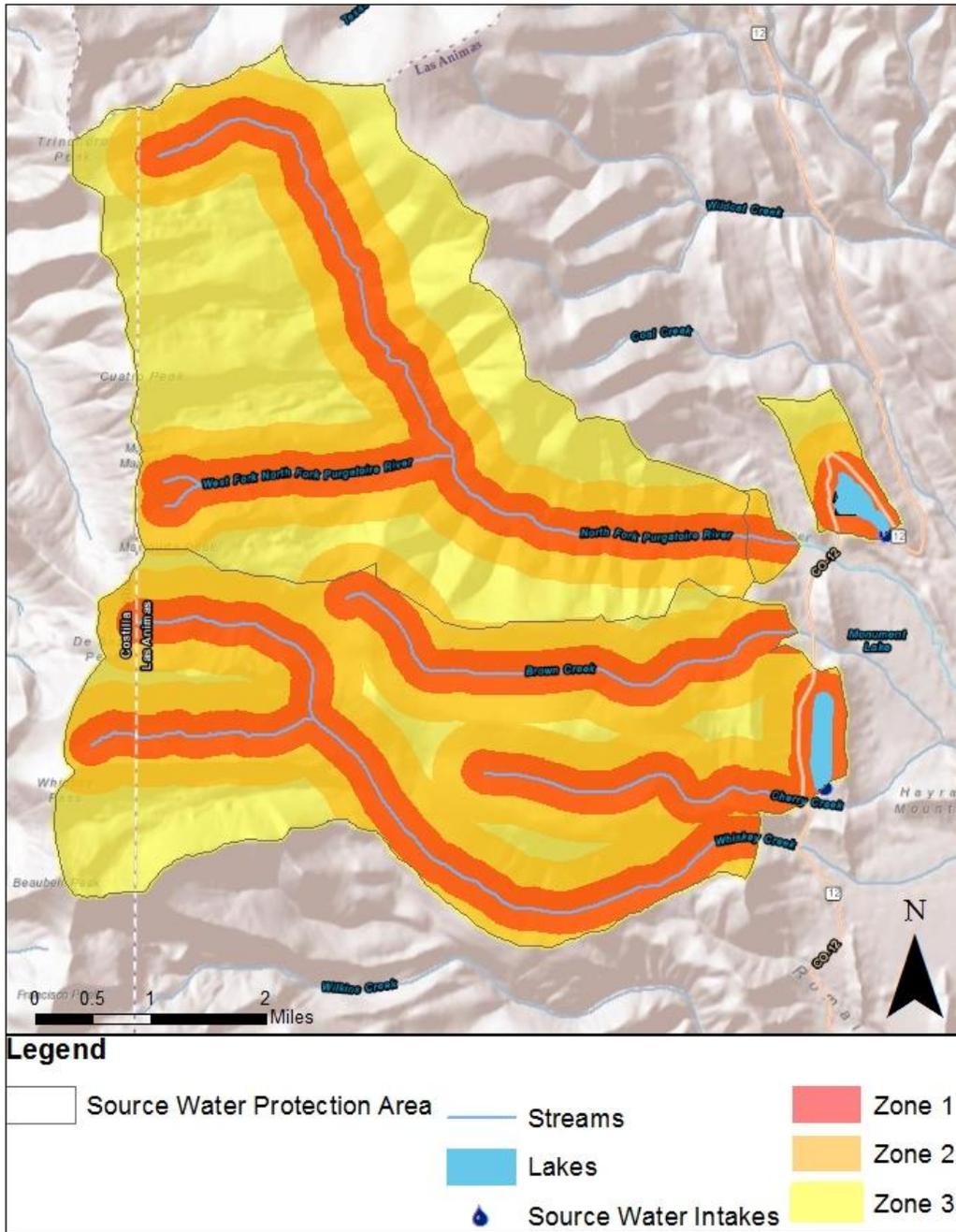
After carefully reviewing the City's Source Water Assessment Report and the CDPHE's delineation of the Source Water Assessment Area for each of the City of Trinidad's sources, the Steering Committee chose to accept this watershed as their Source Water Protection Area for this Source Water Protection Plan.

The City of Trinidad's Source Water Protection Area is defined as:

1. Zone 1 is defined as a 1,000 foot wide band on either side of the stream.
2. Zone 2 extends 1/4 mile beyond each side of the boundary of zone 1 (2,320 feet from the stream).
3. Zone 3 is made up by the remainder of the SWAA area up to the watershed boundary or the State boundary

The Source Water Protection Area is illustrated in the map, Figure 13: Source Water Protection Area Contamination Zones, on page 33.

Figure 13: Source Water Protection Area Contamination Zones



POTENTIAL CONTAMINANT SOURCE INVENTORY

Many types of land uses have the potential to contaminate source waters, such as: 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; and urban and agricultural runoff. While catastrophic contaminant spills or releases can wipe out water resources, water degradation can result from a plethora of small releases of harmful substances. According to the USEPA, nonpoint-source pollution (when water runoff moves over or into the ground picking up pollutants and carrying them into surface and groundwater) is the leading cause of water quality degradation (Ground Water Protection Council, 2008).

From 2001 to 2002, as part of the Source Water Assessment Report, a contaminant source inventory was conducted by the Colorado Department of Public Health and Environment to identify selected potential sources of contamination that might be present within the source water assessment areas. Discrete² contaminant sources were inventoried using selected state and federal regulatory databases, including: mining and reclamation, oil and gas production, above and underground petroleum tanks, Superfund sites, hazardous waste generators, solid waste disposal, industrial and domestic wastewater dischargers, and water well permits. Dispersed contaminant sources were inventoried using the recent land use / land cover and transportation maps of Colorado, along with selected state regulatory databases. The contaminant inventory was completed by mapping the potential contaminant sources with the aid of a Geographic Information System (GIS).

The State's contaminant source inventory consisted of draft maps, along with a summary of the discrete and dispersed contaminant sources inventoried within the source water assessment area. The City of Trinidad was asked, by CDPHE, to review the inventory information, field-verify selected information about existing and new contaminant sources, and provide feedback on the accuracy of the inventory.

The City of Trinidad partnered with the Stonewall Fire Protection District to obtain accurate information of contaminant sources within the source water protection area. The SFPD conducted a Risk Assessment for their Community Wildfire Protection Plan and the contaminant source inventory was done in conjunction to this assessment. This allowed for a thorough investigation of the source water protection area, as well as the entire Stonewall Fire Protection District, enabling information on contaminant sources to be collected about a large portion of the western Purgatoire River Watershed. Firefighters assessed the entire region for contaminant sources and marked if the contaminant source was present on each parcel of land within the Source Water Protection Area and the entire Stonewall Fire Protection District. An example of the contaminant source inventory checklists can be seen in Appendix C: CDPHE Potential Contaminant Inventory Tables.

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

After much consideration, discussion, input from local stakeholders, and the Stonewall Fire Protection District's Source Water Contaminant Assessment, the City of Trinidad and the Steering Committee have developed a more accurate and current inventory of contaminant sources located within the Source Water Protection Area. Upon completion of this contaminant source inventory, the City of Trinidad has decided to adopt this list in place of the original contaminant source inventory provided by the CDPHE.

Contaminant Source Inventory (in no particular order):

- Fire
- Transportation and Roadways
- Landslides, Flooding and Erosion
- Pesticide Application
- Septic Tanks
- Land Use Change
- Residential Activities
- Campgrounds and Recreation
- Livestock Grazing

In addition to the discrete and dispersed contaminant sources identified in the contaminant source inventory, the Steering Committee has also identified other issues of concern that may impact the City of Trinidad's drinking water sources.

Additional Issues of Concern (in no particular order):

- Climate Change and Water Quantity
- Reservoir and Ditch Maintenance

PRIORITIZATION OF POTENTIAL THREATS

After developing a contaminant source inventory and list of issues of concern that is more accurate, complete and current, the Steering Committee utilized CRWA's SWAP Risk Assessment Matrix (see Appendix D: CRWA SWAP Risk Assessment Matrix) to assist with the prioritization of this inventory for the implementation of the Best Management Practices outlined in this Source Water Protection Implementation Plan (see Table 8: Implementation Plan for the City of Trinidad Source Water Protection Plan on page 54).

The City of Trinidad and Steering Committee considered the following criteria when estimating the risk of contaminant sources and issues 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:

- A. **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 City of Trinidad's water sources were considered relative to the three sensitivity zones in the Source Water Protection Area (i.e. Zone 1, Zone 2, and Zone 3).
- B. **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 Appendix C: CDPHE Potential Contaminant Inventory Tables), the Steering Committee considered the following contaminant hazard concerns for each contaminant source:
- i. **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).
 - ii. **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.
 - iii. **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.
- C. **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 City of Trinidad and Steering Committee determined whether each PSOC or issue of concern is in the water system's Direct Control (i.e. water system can take direct measures to prevent), Indirect Control (i.e. water system cannot directly control the issue, but can work with another person or entity to take measures to prevent), or No Control (i.e. PSOC or issue of concern is outside the control of the public water system and other entities). This determination of control, in conjunction with the estimation of risk to the source water(s), helped guide the prioritization of the contaminant source inventory and the issues of concern in a way that best fits the needs and resources of the community. The City of Trinidad and Steering Committee ranked the potential contaminant source inventory and issues of concern in the following way (see Table 6: Potential Sources of Contamination and Issues of Concern Prioritization on page 38).

Table 6: Potential Sources of Contamination and Issues of Concern Prioritization

Potential	Controllable	Impact to	Probability of	Risk	Priority
-----------	--------------	-----------	----------------	------	----------

Source of Contamination or Issue of Concern	(Direct, Indirect, No)	Water System (Minor, Moderate, Major)	Occurrence (Unlikely, Possible, Likely, Very Likely)	(Very Low, Low, Intermediate, High, Very High)	Ranking
Fire	Indirect	Major	Very Likely	Very High	1
Campgrounds and Recreation	Indirect	Major	Very Likely	Very High	2
Landslides, Flooding and Erosion	No	Major	Very Likely	Very High	3
Transportation and Roadways	Indirect	Moderate	Likely	High	4
Climate Change and Water Quantity	No	Moderate	Likely	High	5
Reservoir and Ditch Maintenance	Direct	Moderate	Possible	Intermediate	6
Livestock Grazing	Indirect	Moderate	Possible	Intermediate	7
Septic Tanks	Indirect	Moderate	Unlikely	Low	8
Residential Practices	Indirect	Minor	Possible	Low	9
Land Use Change	Indirect	Moderate	Unlikely	Low	10
Pesticide Application	Indirect	Minor	Unlikely	Very Low	11

SUSEPTIBILITY ANALYSIS OF WATER SOURCES

The City of Trinidad’s Source Water Assessment Report contained a susceptibility analysis³ to identify how susceptible an untreated water source could be to contamination from potential sources of contaminants inventoried within the source water assessment area. The analysis looked at the susceptibility posed by individual potential contaminant sources and the collective or total susceptibility posed by all of the potential contaminant sources in the source water assessment area. The CDPHE developed a susceptibility analysis model for surface water sources under the influence of surface water. This model provided an objective analysis based on the best available information at the time of the analysis. The two main components of the CDPHE’s susceptibility analysis are:

1. **Physical Setting Vulnerability Rating** – This rating is based on the ability of the surface water and/or groundwater flow to provide a sufficient buffering capacity to mitigate potential contaminant concentrations in the water source.
2. **Total Susceptibility Rating** – This rating is based on two components: the physical setting vulnerability of the water source and the contaminant threat.

Upon review of the susceptibility analysis, the Steering Committee determined that the Physical Setting Vulnerability Rating and the Total Susceptibility Rating needed to be updated to more accurately reflect the current situation.

Table 7: Updated Susceptibility Analysis

Source ID #	Source Name	Source Type	Total Susceptibility Rating	Physical Setting Vulnerability Rating
CO0136800-003	North Lake	Surface Water	Moderate	Moderate
CO0236-300	Monument Lake	Surface Water	Moderate	Moderate

DISCUSSION OF LOCAL SOURCE WATER CONCERNS AND BEST MANAGEMENT PRACTICES

Fire

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

The City of Trinidad's Source Water Protection Area sits in the western Purgatoire River Watershed and has a considerable risk of damage from wildfire. In describing the risk of wildfire to the area, the term "low frequency, high consequence" may be appropriate. The general area is fire-prone as shown in Figure 14 (page 42) and would have moderately high consequences for the Source Water Protection Area as shown in Figure 15 (page 43). Nationally, wildfires are primarily naturally caused (i.e., lightning); however, the SWPA is prone to human-caused wildfires due to recreational and camping access within the SWPA.

There is mixed ownership and jurisdiction in the area of concern, including private, city, state, and federal lands, along with the Stonewall Fire Protection District having responsibility for initial response, which can complicate dispatch and initial response effectiveness and in turn allow a potential fire to escape control. In addition, access and egress to the area is limited, which could also complicate suppression efforts. In fact, suppression may be delayed while responders assist the evacuation of area residents and recreational users. Fire season, traditionally described as May through early July, is now considerably longer, with wildfires occurring state-wide in virtually any month in the calendar. Fire weather and dangerous fuel conditions in the area have historically risen to extreme levels many days per year, with the number of such periods likely to increase along with the longer fire season.

Mitigating wildfire danger using fuel reduction techniques, such as tree thinning, may have limited short-term benefit, for much of the vegetation in the creek beds and surrounding slopes is fast growing. Other fuels are located on steep slopes, some on private lands and others on federal lands. These factors can lead to a high rate of wildfire spread. Due to a number of logistical challenges, among other factors, a comprehensive approach to fuels treatment that would provide long-term protection to the Source Water Protection Area seems unlikely. Currently the United States Forest Service has no intention to harvest timber on its lands in the SWPA, yet it may pursue biofuel mitigation. The USFS is aware of the need for mitigation, as is Colorado Parks and Wildlife, due to the beetle kill effects on pine trees and the presence of tent caterpillars in aspen trees. Fuels mitigation would require collaboration between the various stakeholders and an analysis of mitigation strategies and issues, such as prescribed fires (controlled burns), thinning, stand reduction, hydro axing and control features.

A large hot fire in the watershed can have an impact on source waters by removing vegetation and decreasing infiltration during rain events. This can result in soil erosion and sediment and ash pollution in drinking water. Large rain events can produce mudslides, and subsequent debris flows capable of destroying water infrastructure and altering clarity and pH of the source waters.

The Stonewall Fire Protection District completed a Community Wildfire Protection Plan in November 2014 to help manage the wildfire risk to the Source Water Protection Area. As a part of this effort, homeowners in the area were encouraged to create or improve defensible space near their homes, as well as improve their home's resistance to wildfire.

The Stonewall Fire Protection District will seek out opportunities to reduce the fuels on private lands near the source water protection area, utilizing available cost-share grants, continuing our successful fuels mitigation efforts in the Colorado State Forest District. The SFPD will also review any controlled burn or other mitigation plans, whether drafted by private or public stakeholders, prior to implementation.

Wildfire Best Practices Recommendations:

1. Fuels Reduction Plan - The Pike/San Isabel National Forest will continue to implement agency direction to reduce fuels within the areas of National Forest lying within the Source Water Protection Area. The Forest Service will provide an opportunity for the public during their NEPA process. The Steering Committee will become actively involved in reviewing the plan and providing comment when needed on source water protection concerns.
2. Explore opportunities to work with private landowners for landscape-scale fuel reduction and defensible space projects.
3. Identify and Establish Demonstration Sites where mitigation strategies can be tested and shared with the public.
4. Fire Prevention – The District Ranger will continue to implement their fire prevention plan which includes public education programs, for example the *FireWise* Program and *Project Learning Tree*.
5. Share a copy of the SWPP with Las Animas County Sheriff’s Department as it pertains to fire bans and restrictions. Encourage collaboration with Sherriff’s office in reviewing fire prevention measures
6. Develop fire response plans for the Source Water Protection Area with Stonewall Fire Protection District and Colorado State Forest Service.
7. Request *Timely Appropriate Response* designation on Source Water Protection Area with a plan to manage the amount of vegetation in the area.
8. Develop a comprehensive Forest Management Plan that follows and addresses the SWPP goals.

Figure 14: Wildfire Risk in the Source Water Protection Area

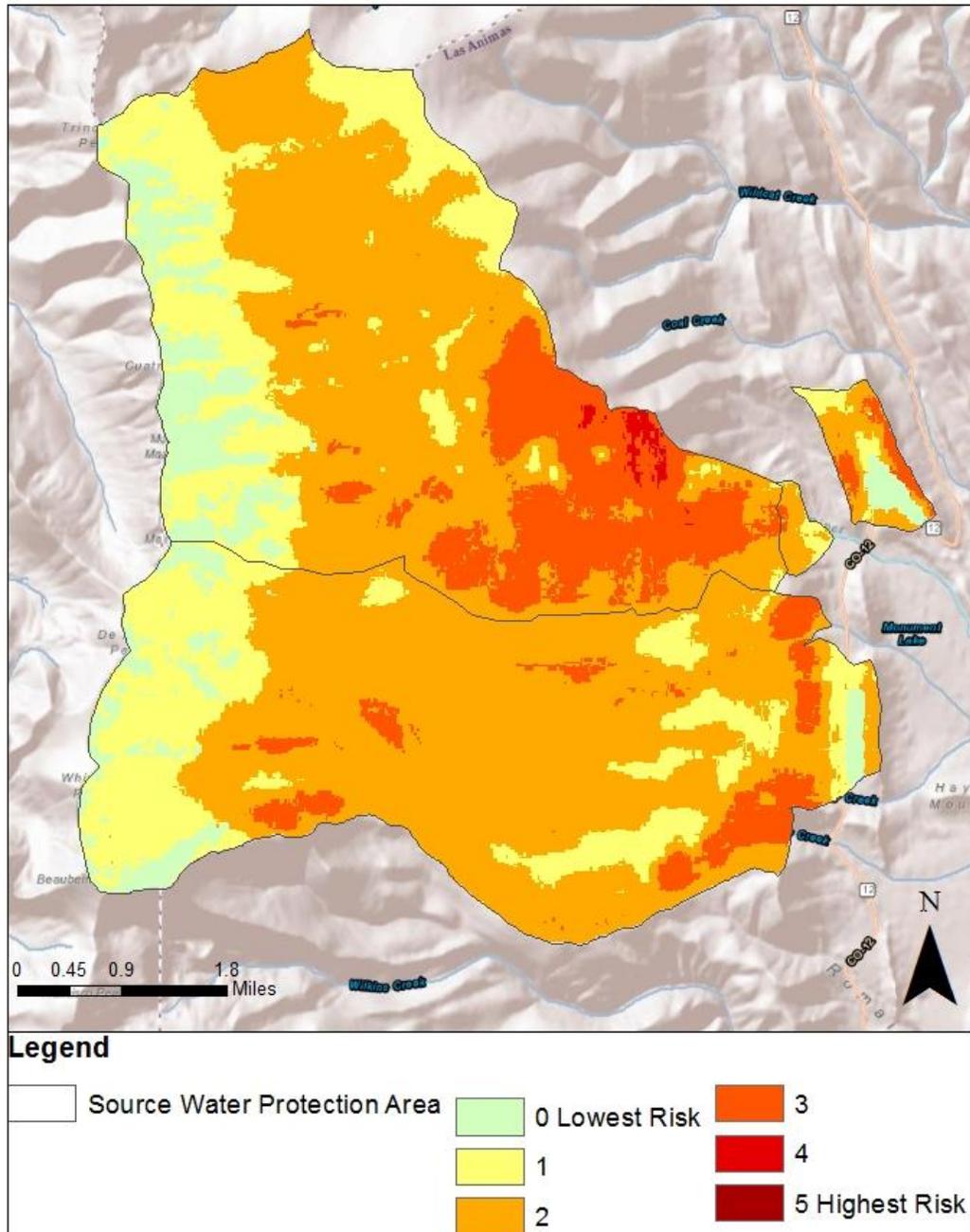
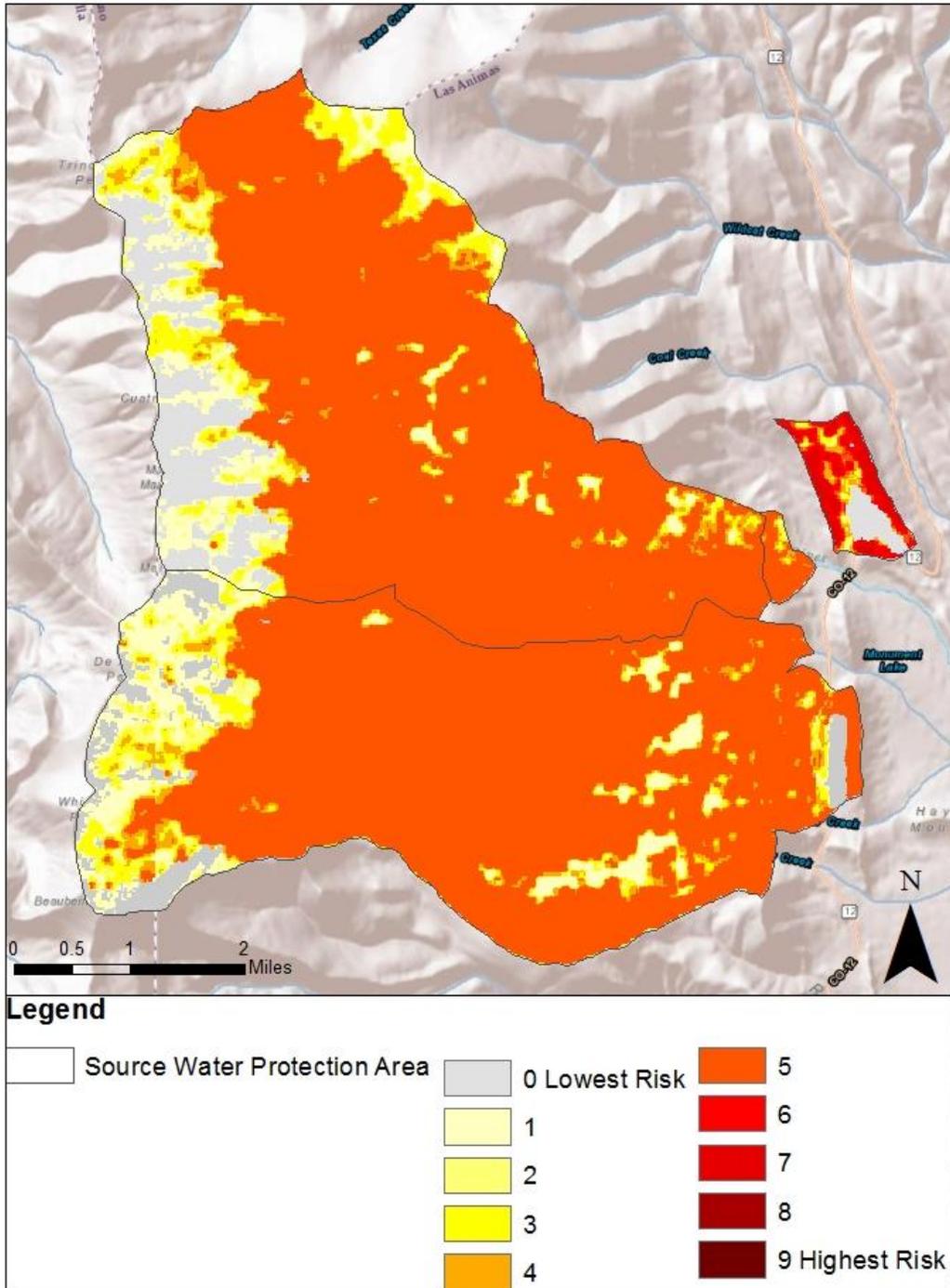


Figure 15: Drinking Water Risk If a Wildfire Occurs



Campgrounds and Recreation

A portion of the United States Forest Service’s Pike-San Isabel National Forest is located within the Source Water Protection Area. The Pike-San Isabel National Forest draws both tourists and

locals for camping and recreation. Hunting and guiding, for example, are a form of recreation that occurs on USFS land from August until December. The Purgatoire Campground, the only campground on USFS property, is nestled near the headwaters of the Purgatoire River in the Culebra Range within this National Forest. This primitive campground is laid out on two loops: one is a large grassy meadow with sites that accommodate equestrian campers and one that is wooded with aspen and spruce trees. The River offers recreational fishing and a trailhead attracts hikers and horseback riders. There are three closed-vault outhouses within the campground area that are monitored and regularly pumped. However, it is possible that in a runoff event containing human or animal waste could contaminant intakes, ditches and ultimately raw water storage facilities.

Monument Lake Resort is located adjacent to the Monument Lake raw water storage site. Monument Lake Resort is 350 acres in size, which includes the 100 acre lake. Recreational activities at Monument Lake include fishing, picnicking, hiking, no-wake boating and camping. Monument Lake is stocked with a variety of fish, such as browns, cutthroats, rainbows, kokanee salmon, and splake, for recreational fishing. There is a vault toilet located near the campsites at the Monument Lake Campground. However, it is possible that human or animal waste could contaminate the Lake, which provides additional raw water storage for the City of Trinidad. Due to its high level of use and proximity to Monument Lake, as well as the campground's degraded state, managing activities and enabling proper use of the facilities and grounds at Monument Lake Resort is a priority for the City of Trinidad.

North Lake is also a State Wildlife Area and is stocked with rainbow, brown, and cutthroat trout, kokanee salmon and splake. The Lake has a boat ramp, allowing access for water craft that may be propelled only by hand, wind or electric motor, a composting toilet restroom, and a parking area. Similar to Monument Lake, this toilet also poses a human or animal waste contamination threat. Ensuring proper use of North Lake and its amenities is also a priority for the City of Trinidad, for North Lake is the primary raw water storage site for the City.

Campgrounds and Recreation Best Management Practices Recommendations:

1. Provide the US Forest Service, public campgrounds, and North Lake State Wildlife Area with a copy of the final SWPP and Emergency Response Cards.
2. Work with USFS, Monument Lake Resort, and North Lake State Wildlife Area to erect City of Trinidad Source Water Protection Area signs at campgrounds, Monument Lake, and North Lake recreational sites.

Landslides, Flooding and Erosion

It is unlikely that a geologic hazard such as a major landslide or flood could occur in the City of Trinidad's drinking water supply protection area. However, if such an event were to occur, the results could endanger the City of Trinidad's drinking water supply.

The City of Trinidad's raw source water storage lakes lie at the base of steep hillsides, allowing for easy capture and storage of water. Under certain circumstances, such as excessive precipitation, snowmelt, earthquakes, etc., the surrounding slopes could fail. A large landslide may affect the City of Trinidad's drinking water, which would cause the raw water storage tanks to become greatly compromised by high levels of turbidity. Landslides or flood events could also affect the water treatment plant or well house structures directly, as well as limit access to these sites. In order to mitigate such a catastrophe, a berm could be constructed around the raw water storage lakes to deflect possible floods. In the case of an emergency, the City of Trinidad would have to rely on stored water supplies, hauled water and conservation measures.

High levels of rainfall and snowmelt, as well as spring run-off, will cause erosion along stream banks and can result in sediment loading. Forest fires also cause post-fire erosion issues. A rainfall event on deforested lands, especially following a fire, will create mudslides and excessive sedimentation, which can contaminate water resources.

Landslide, Flooding and Erosion Hazards Best Management Practices Recommendations:

1. Educate landowners on emergency response procedures to a geologic event such as a flood or debris flow via an informational flier.
2. Create a Source Water Protection Area Emergency Response Card and distribute to Emergency Responders within the Source Water Protection Area.
3. Research flood deflection strategies, including construction options, i.e. berms, for deflecting flood waters away from reservoirs.
4. Assess and improve erosion issues at campgrounds, including the north shore area of Monument Lake, high traffic areas, and stream banks.

Transportation and Roadways

The Source Water Protection Area is located outside the boundaries of the City of Trinidad and is accessed by the paved two-lane State Highway 12. Highway 12 is a scenic byway and is traveled by sightseers, as well as commuters between the towns of Trinidad, Segundo, Primero, Weston, La Veta and Walsenburg. Several gravel and dirt roads are located within the Source Water Protection Area. These gravel and dirt roads are used for residential and recreational access. The roads within the protection area are maintained by the Las Animas County Road and Bridge Department. The USFS also conducts maintenance on County roads within the SWPA.

Motor vehicles, roads and parking facilities are a major source of water pollution to surface water. An estimated 46% of US vehicles leak hazardous fluids, including crankcase oil, transmission, hydraulic, and brake fluids, and antifreeze. Oil spots on roads and parking lots and rainbow sheens of oil in puddles and roadside drainage ditches are evidence of vehicle pollution. An estimated 30-40% of the 1.4 billion gallons of lubricating oils used in automobiles

are either burned in the engine or lost in drips and leaks, and another 180 million gallons are disposed of improperly onto the ground or into sewers. Runoff from roads and parking lots has a high concentration of toxic metals, suspended solids and hydrocarbons, which originate largely from automobiles (Gowler & Sage, 2006). Storm water runoff over these roads can deliver contaminants from the road surface into the surface water. As Northlake and Monument Lake are located adjacent to Highway 12 and Monument Lake Resort, the source water raw storage sites are vulnerable to contamination from roadways and parking lots.

While unlikely due to the remote location of North Lake and Monument Lake, vehicular spills may occur along the transportation route within the Source Water Protection Area from trucks that transport fuels, waste and other chemicals that have a potential for contaminating the source waters. Chemicals from accidental spills are often diluted with water, potentially washing the chemicals into the soil and infiltrating into the groundwater. Roadways are also frequently used for illegal dumping of hazardous or other potentially harmful wastes.

During the winter season, the Las Animas County Road and Bridge Department applies a salt-sand mixture and de-icer (magnesium chloride) to melt snow and prevent slippage by vehicles. These applications occur within the SWPA along Highway 12. Salt from the highway is introduced into the water supply through several pathways:

- 1) Salt-sand mixtures can run off of road surfaces, then migrate on land and directly enter the surface water storage at North Lake and Monument Lake.
- 2) Snow containing these salts can often be plowed off of the road and into large piles. When these accumulated piles of snow melt during warmer weather, the water that results contains dissolved salts that can drain into surface water supplies.

Salts used in the de-icing process can contribute to elevated chloride levels in groundwater and surface water through infiltration of runoff from roadways. Unlike other contaminants that can result from transportation activities such as heavy metals and hydrocarbons, chloride is not naturally removed from water as it migrates through the soil, nor is it broken down quickly in raw water storage. Chloride may remain in surface water storage lakes for long periods of time, leading to elevated levels of chloride throughout the year, not just during the winter.

Transportation on Roads Best Management Practices Recommendations:

1. Educate the public on how to call "911" to report any spills or dumping within the SWPA both on public and private lands.
2. Work with local emergency response teams to ensure that any spill within the protection areas can be effectively contained.
3. Provide a copy of the Source Water Protection Plan to Las Animas County Road and Bridge Department and encourage County staff to use Best Management Practices to prevent road materials from entering the source waters.
4. Research long term effects of magnesium chloride entering the water supply from roads.

5. Address road-related erosion, such as repairing culverts, i.e. along Potato Patch Road which is in a multi-use area, and follow the State engineer's schedule.

Climate Change and Water Quantity

Changes in Colorado's climate and implications for water resources are occurring on a global context. The accumulation of greenhouse gases in the atmosphere is very likely the cause of most of the increase in global average temperature. Elevated temperatures combined with changes in precipitation and streamflow will impact the ecosystems, socioeconomics and water supply of Colorado. Climate projections and the impacts to Colorado's water resources include:

- Temperature increases: In Colorado, temperatures have increased by approximately 20 Fahrenheit between 1977 and 2006. Climate models project Colorado will warm 2.5F degrees by 2025, and 40F degrees by 2050.
- Precipitation and snowpack: A projected seasonal shift in precipitation may result in more mid-winter precipitation throughout the State and, in some areas, a decrease in late spring and summer precipitation. Lower elevation snowpack (below 8200 feet) is likely to decline, with modest declines for high elevation snowpack.
- Runoff: Warmer spring temperatures will lead to earlier snowmelt, runoff and peak natural stream flows. There will be a reduction in late summer stream flows.
- Evaporation rates: Warmer temperatures will increase the evaporation rates in our rivers, streams and reservoirs, perhaps making less water available for beneficial use. There is a potential for decreased annual streamflow volume.

Secondary changes within the Watershed will occur as a result of climate projections. These include: earlier drying of soil moisture and riparian habitats; increase in fire risk and insect outbreaks; elevation shifts in plant and animal communities; a reduction or loss of alpine tundra; and a potential for more extreme weather events (e.g. droughts, floods, more intense summer storms). (Colorado Water Conservation Board, 2008).

Climate change will affect Colorado's use and distribution of water, resulting in substantial water supply shortages for Colorado communities. Although the total annual water supply available to municipal users is not projected to change significantly under global warming, seasonal availability will likely shift (Clarke, Crandall, Emerick, Fuller, Katzenberger, Malone, Masone, Slap, & Thomas, 2008). A key management challenge for water suppliers is anticipating the potential long-term shifts in annual precipitation and water availability and planning for the flexibility to address those shifts.

Climate Change and Water Quantity Best Management Practices Recommendations:

1. Understand the vulnerability of the City of Trinidad's water supply.
2. Consider acquiring additional water rights.
3. Assess the need to build additional water storage.
4. Implement ongoing water conservation measures.
5. Involve the community in discussions about various options related to adapting to climate changes.
6. Prepare plans for rapid response to severe drought.

Reservoir and Ditch Maintenance

The City of Trinidad's source waters include water stored at two raw water storage reservoirs: North Lake and Monument Lake. These raw water storage reservoirs are filled from intakes. North Lake is filled from an intake on the North Fork of the Purgatoire River through Ditch A, while Monument Lake is filled from intakes on Browns Creek through Ditch B and Whiskey Creek through "C" Ditch. "C" Ditch is currently an open ditch, and the City of Trinidad plans to seek funding opportunities to update "C" Ditch to an enclosed ditch. The Bar NI Ranch is also a key player regarding the integrity of the watershed for Ditch C, for they own five (5) acres that drain to this diversion. Through collaboration among the City, Bar NI Ranch and The Nature Conservancy, it may be possible to conduct forest thinning to alleviate a potential threat to Ditch C. All intakes, ditches and reservoirs are managed by the City of Trinidad.

The City of Trinidad routinely conducts maintenance activities at drinking water intakes, ditches and reservoirs, as well on the Mountain Water Supply pipeline. Maintenance activities may include removing silt and debris, clearing shoreline vegetation, removing nuisance aquatic and shoreline vegetation, managing eutrophication, ditch maintenance and other work. Any of these activities may include partial or complete drawdown of the reservoir. Pipelines can develop leaks, which will also require repair and/or replacement. If maintenance work is conducted improperly, there can be short-term or long-term damage to recreational areas, streams or ponds, fisheries, state and federal rare and endangered species habitat, drinking water sources, and other resources.

Reservoir and Ditch Maintenance Best Management Practices Recommendations:

1. Conduct reservoir and intake gate regular maintenance
2. Enclose Ditch "C" from Whiskey Creek to Monument Lake.

Livestock Grazing

Currently, there is no livestock grazing on public lands within the source water protection area and no future plans to allow for permitting of grazing on any of the public lands. Livestock grazing does occur within some of the private lands in the source water protection area. However there are only a handful of small ranch holdings which actively graze on their land within the SWPA.

Within the source water area, livestock grazing can impact riparian health, stream-channel conditions and water quality. The most common water quality impacts include pathogen contamination, sedimentation, and increased water temperatures from loss of vegetative stream coverage. Livestock grazing activities with the highest potential for direct and indirect impacts to water resources include long-term concentrated grazing in riparian areas, and trampling/trailing near water sources. Direct bank damage may add large amounts of sediment directly into streams, especially in wet meadow streams or erosive topography that is prone to gully formation.

Animal waste contains many pollutants that can contaminate surface and ground waters used as drinking water sources. Pathogens found in animal waste can infect humans if ingested. Organisms like *Cryptosporidium*, *Giardia lamblia*, and *Salmonella* can induce symptoms ranging from skin sores to chest pain. *E. coli*, which causes diarrhea and abdominal gas, can cause serious illness and even death. *Cryptosporidium* is of particular concern because it is highly resistant to disinfection with chlorine. This protozoan causes gastrointestinal illness that lasts 2 to 10 days in healthy individuals but can be fatal in people with weakened immune systems. Animal wastes can contribute to nitrates in drinking water. Consumption of nitrates can cause methemoglobinemia (blue baby syndrome) in infants, which reduces the ability of the blood to carry oxygen. If left untreated, methemoglobinemia can be fatal. Because of this health risk, EPA set a drinking water maximum contaminant level (MCL) of 10 milligrams per liter or parts per million for nitrate measured as nitrogen (Environmental Protection Agency (EPA), 2001). While the Town's water treatment is designed to remove these contaminants, there are costs and risks associated with high concentrations of nutrients, bacteria and protozoa, and sediment.

Livestock Grazing Best Management Practices Recommendations:

1. Develop public outreach for area residents within the SWPA on agricultural BMPs for grazing management, pasture rotation, manure management, chemical use and storage, preventing weed infestations and animal rendering. Education outreach may include: mailings and personal communication to promote watershed stewardship to minimize water quality impacts.
2. Work with landowners to encourage the use of effective alternative management strategies such as prescribed grazing. (EPA, 2001)

Septic Tanks

Within the Source Water Protection Area are properties 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 into a layered drainage basin, followed by final treatment as the filtered liquids are dispersed into the surrounding soil.

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. If a septic system fails to properly pump accumulated solids, backed up material in a septic tank can eventually clog its lines and cause untreated wastewater to back up into the home. These solids, and their accompanying fluids, can also surface on the ground, where contaminants can run off into a surface water source. If managed improperly, these residential septic systems can contribute excessive nutrients, bacteria, pathogenic organisms and chemicals to the groundwater and potentially source water sites.

In Las Animas County individual sewage disposal systems are permitted by the Health Department. The County administers and enforces the minimum standards, rules and regulations outlined in the State of Colorado Revised Statutes (CRS 25-10-105). The number of septic systems within Las Animas County is unknown at this time, as well as the number of unapproved systems currently in use and the age of all septic systems in the County. Within the SWPA there are known septic systems in the Glen Aspen neighborhood and it is possible that septic systems exist on some private parcels up the North Fork of the Purgatoire River. If septic systems were to leak, due to their location, Browns Creek and Ditch B could become contaminated. Plans have been drafted for enclosing Ditch B which is currently an open ditch (see reservoir and ditch maintenance) and funding from the Colorado Water Conservation Board's Water Supply Reserve Account will be sought in 2015. The absence of effective monitoring and education increases the risk of septic system contamination.

Septic System Best Management Practices Recommendations:

1. Develop a GIS layer with septic systems identified along with prioritizing which septic systems are the most immediate threat (Zone 1 or 1,000 ft. for 5 miles upstream may be considered).
2. Share GIS layer with the County to identify sensitive areas, buffer zones and protection areas related to septic systems.
3. Use public outreach to educate specific septic system owners about how to maintain and check their systems. Consider sending this information out in the City's water utility billing (e.g.: Are you aware that not operating your septic system properly could affect your drinking water quality?)
4. Coordination on adoption of new state septic systems regulations and add language to county plans to address threats to drinking water from septic systems.
5. Consider septic pumping rebates or "sludge judge" monitoring in sensitivity zones.

Residential Practices

Residents of rural communities may have private aboveground or underground storage tanks that contain fuel for heating and/or vehicles. While there is a small population of residents within the Source Water Protection Area, the private residents are rural and the Contaminant Assessment completed by the Stonewall Fire Protection District found several storage tanks

within the SWPA. If an underground storage tank is 110 gallons capacity or less, or if an aboveground storage tank is less than 660 gallons, they are excluded from the Colorado Department of Labor and Employment Division of Oil and Public Safety regulations. Typically many storage tanks are old and subject to leakage, which can be caused by corrosion, improper installation, failure of a piping systems, spills and overfills that occur during fuel transfers or due to improper operation and maintenance.

Because it only takes a small amount of petroleum to contaminate a significant area of surface water supplies, proper petroleum product storage practices are important. Aboveground storage tanks should utilize secondary containment, such as an impermeable liner made of concrete or aluminum. The containment area should be able to hold 110% of the tank's capacity. A manually controlled sump pump should also be used to remove rain water that could accumulate in the secondary containment area.

Garbage collection and materials stockpiling is also a concern for the City of Trinidad Source Water Protection Area. Garbage collection services are unavailable in the rural communities located within the SWPA. Therefore residents take their trash off their property and dispose of it themselves, or residents sometimes dispose of garbage directly on their property. These disposal practices can include dumping hazardous materials at times. Material stockpiling also presents a threat to water supplies, especially when residents allow toxic materials to accumulate, such as paints, fuels and cleaning products.

Residential Practices Best Management Practices Recommendations:

1. Conduct public education and outreach programs for residents in the City of Trinidad SWPA to encourage practices that will protect their drinking water source. Encourage resident reporting of any issues that may threaten to contaminate the water supply.
2. Build relationships with the owners of storage tanks and provide information regarding actions to prevent petroleum products from leaking and entering surface water. Encourage private unregulated storage tank owners to construct secondary containment areas under their storage tanks and research funding opportunities to assist them in this endeavor.

Land Use Change

Land use change within and adjacent to the Source Water Protection Area is not considered likely, however it is possible. North Lake and Monument Lake are surrounded by National Forest land, City of Trinidad land, expanses of private land on the BarNI Ranch, and some small private land plots. The National Forest and City lands are protected from development. In addition, there is a conservation easement on the Bar NI Ranch, further limiting development within the Source Water Protection Area.

The Source Water Protection Area is susceptible to development of its remaining private land, as well as at Monument Lake Resort, which is located adjacent to Monument Lake. The Steering Committee therefore recommends that all land use decision makers within the

western area of Las Animas County be encouraged to consider protecting the City of Trinidad’s source water lands, and that their decisions minimize any impacts to the quality of the SWPA’s raw water storage.

Future Development Best Management Practices Recommendations:

1. Las Animas County will be encouraged to consider protecting the City of Trinidad drinking water supply protection areas and source water when making land use decisions or zoning laws. Modification of the Las Animas County land use codes will need to occur before Building and Planning can move forward with this request.
2. Present information to the Las Animas County Commissioners regarding opportunities for protecting the drinking water source for the City of Trinidad, notify USFS and other stakeholders of potential land use changes, and collaborate with other agencies, such as NRCS and SP-PRCD, to determine best land uses.

Pesticide Application

Pesticides can be harmful to both aquatic life and human health should they be allowed to enter the water supply. The term “pesticides” in this case applies to both herbicides and insecticides. Private landowners within the City of Trinidad Source Water Protection Area may utilize a variety of pesticides on their land. The use of pesticides poses the greatest risk when they are improperly applied. If a private landowner uses an incorrect dosage and exceeds the recommended concentration of a pesticide per volume of water, or sprays too frequently, runoff contaminated by pesticide chemicals can travel into the source water lakes (reservoirs) and damage raw water supplies.

A large portion of the land area within the Source Water Protection Area lies within the National Forest boundary. Pesticide, herbicide and insecticide application can occur on these lands for vegetation management. The United States Forest Service does not apply pesticides in the Purgatoire Campground area and have no plans to do so. Colorado Parks and Wildlife does not utilize pesticides in the SWPA. The City of Trinidad continues to work with the National Forest Service, the Colorado State Forest Service and the National Resource Conservation Service in order to implement best practice recommendations for pesticide use within the Source Water Protection Area.

Pesticide Application Best Management Practices Recommendations:

1. Continue to work with the National Forest Service, Colorado State Forest Service, and the National Resource Conservation Service to discuss current vegetation management strategies and BMPs within the SWPA
2. Provide the National Forest Service, Colorado State Forest Service, and the National Resource Conservation Service with a copy of the City of Trinidad Source Water Protection Plan.
3. Educate stakeholders about pesticide precautions, purposes, applications and impacts.

WATER QUALITY MONITORING

The City of Trinidad is aware of the Purgatoire River and Trinidad Lake being listed on the Colorado 303(d) list for selenium and dissolved oxygen. Currently, the Total Maximum Daily Loads need to be determined for the river and its tributaries and data collection must be done. The City of Trinidad is committed to providing and sharing data, as well as creating programs for collecting data to fill this need.

PUBLIC EDUCATION AND OUTREACH

Education and outreach is an integral part of maintaining watershed health. The more information that stakeholders—and the public in general—have the more likely they are to become involved in the protection of their natural resources, such as water. Involving youth in public outreach efforts, and specifically through educational programming, will also instill a sense of stewardship and help maintain these resources for future generations.

Consumer Confidence Report

In compliance with Federal regulations and the Consumer Confidence Rule, each year the City of Trinidad publishes an annual *Consumer Confidence Report* (CCR) which is distributed by postal mail to all of its water customers (see Appendix E: City of Trinidad 2014 Annual Drinking Water Quality Report). According to the Environmental Protection Agency, “the Consumer Confidence Rule requires public water suppliers that serve the same people year round (community water systems) to provide consumer confidence reports (CCR) to their customers. The CCR summarizes information regarding sources used (i.e., rivers, lakes, reservoirs, or aquifers) any detected contaminants, compliance and educational information.” (EPA, 2013)

Because the City of Trinidad’s CCR is mailed to all of its customers, this would be an opportunity to provide water users with additional information about the Source Water Protection Plan and water conservation in general. To take advantage of this educational opportunity, the CCR publication could be redesigned to include additional source water, source water protection, and water conservation information, as well as make the CCR data more accessible to water users.

Plant Tours

Tours of the Trinidad Water Treatment Facility would provide an opportunity for the public and youth groups to become more informed about the water treatment process. This strategy would directly engage visitors in gaining an understanding of how water is treated for domestic use, and in turn foster a sense of responsibility for water resources and water conservation. Facility tours could be offered on an as-needed basis for school children and an

annual open house of the plant, as well as the entire Source Water Protection Area, could be conducted annually.

Signage

A variety of signs could be posted in the Source Water Protection Area. Road signs along Highway 12 could note the boundaries of the SWPA, such as “You are entering the City of Trinidad Source Water Protection Area” or “City of Trinidad Source Water Watershed.” Strategically placed signage could also indicate watchable wildlife, identify bighorn sheep habitat, or present the consequences of poaching. Informational kiosks could be placed in parking lots or handicap accessible areas at North Lake and Monument Lake that explain watersheds and source water protection, promote public land stewardship, and provide information specific to Trinidad’s Source Water Protection Area. Signs could include maps of the watershed and mention threats to source water, such as fire. Signage could also be placed at the Water Treatment Facility that graphically displays the water treatment process, and at campground areas to further promote stewardship.

Newspaper

Local newspapers are a source for disseminating information to the public about source water protection and other water-related topics. For example, articles could be submitted monthly to *The Chronicle News* in Trinidad, and other publications in the Purgatoire River Watershed, that focus on different subjects, such as Trinidad’s Source Water Protection Area and water resources, the history of North Lake and Monument Lake, the water treatment process, among other topics.

Website

Similar to newspaper publications, the City of Trinidad’s website could include a link to a page dedicated to Trinidad’s Source Water Protection Area and water-related topics. The same articles published in *The Chronicle News*, for example, could also be posted on the website.

Watershed-Wide Education

The Purgatoire Watershed Partnership (PWP) is a non-profit organization whose mission is to address the health of the 2.2 million acre Purgatoire River Watershed through collaborative efforts and by providing stakeholders with a venue for addressing their concerns. The PWP pursues involvement in projects that will improve the Watershed, whether agricultural, municipal, recreational, environmental or educational in nature. The PWP’s recently completed *Purgatoire River Watershed Plan* specifically identifies projects that include educating the public and youth about watersheds and water conservation. The PWP’s education and outreach goals that relate to the Source Water Protection Plan include the following:

- Create and implement curriculum in schools within the Watershed around the Trinidad Water Festival.
- Publish website, social media, and news releases.
- Print educational materials for the public.
- Conduct field tours of water infrastructure and watershed projects.
- Partner with Monument Lake Resort to offer educational programs.
- Communicate and work with government, non-profits, education and conservation groups, industry, and local and regional water agencies.
- Expand publicity and participation.

(PWP, 2014, “Purgatoire River Watershed Plan”)

Through collaborative efforts the City of Trinidad and the PWP can work towards source water protection within the Source Water Protection Area and throughout the entire Purgatoire River Watershed. Achieving the goals listed above would be much more challenging and almost impossible without collaboration.

Partnerships

Establishing partnerships is also essential for collaborative efforts to occur. The Source Water Protection Area is fortunate to have positive, stable relationships with its stakeholders as well as its neighbors. There is a need in the SWPA to establish a network for communication. A network would create an efficient means for implementing fire mitigation, seeking funding and educating stakeholders and the public about the watershed, just to name a few benefits.

IMPLEMENTATION PLAN

The best management practices for each issue in the Source Water Protection Area are presented in Table 8 below, which includes the partners necessary to apply these practices or address issues in the SWPA. In order to achieve the SWPP’s goals, funding will also be needed. Potential funding sources, as well as a few educational resources, are presented in Table 9: Funding and Educational Resources for SWPP Implementation on page 60.

Table 8: Implementation Plan for the City of Trinidad Source Water Protection Plan

Issue of Concern	Implementation Goals & Strategies	Project Partners
<p>Fire</p>	<ol style="list-style-type: none"> 1. National Fire Plan Implementation <ul style="list-style-type: none"> ▪ Reduce fuels within National Forest. ▪ Gather public input through NEPA process. ▪ Review Plan progress through Steering Committee. ▪ Collaborate with City of Trinidad to address source water protection concerns. 2. Private Property - Fuel Reduction and Defensible Space Projects <ul style="list-style-type: none"> ▪ Meet with HOA’s and educate landowners, i.e. Glen Aspen, about fire issues and mitigation strategies. ▪ Assist landowners with developing landscape-scale fire mitigation projects. 3. Identify and Establish Demonstration Sites <ul style="list-style-type: none"> ▪ Exemplify fire mitigation at sites where strategies can be tested and shared with the public. 4. Fire Prevention Plan Implementation <ul style="list-style-type: none"> ▪ Include Education Programs: i.e. <i>FireWise</i> and <i>Project Learning Tree</i>. 5. County-Wide Fire Prevention <ul style="list-style-type: none"> ▪ Review SWPP with Las Animas County Sheriff’s Department. ▪ Address fire bans and restrictions. ▪ Collaborate on fire prevention measures. 6. Fire Response Plan Development <ul style="list-style-type: none"> ▪ Write fire response plan for SWPA. 7. Vegetation Management Plan Development <ul style="list-style-type: none"> ▪ Pursue Full Suppression Designation for SWPA. ▪ Address vegetation amounts in SWPA. 	<ul style="list-style-type: none"> ▪ Stonewall Fire Protection District ▪ USFS ▪ CSFS ▪ City of Trinidad ▪ Las Animas County ▪ Bar NI Ranch ▪ Glen Aspen ▪ CPW ▪ NRCS ▪ SP-PRCD ▪ TNC ▪ Private Landowners & HOA’s

	<p>8. Forest Management Plan</p> <ul style="list-style-type: none"> ▪ Develop a comprehensive forest management plan that follows and addresses the SWPP goals. 	
Campgrounds and Recreation	<p>1. Distribute SWPP and Emergency Response Information</p> <ul style="list-style-type: none"> ▪ Provide partners with the SWPP and Emergency Response Cards. <p>2. Education through Signage</p> <ul style="list-style-type: none"> ▪ Work with partners to erect City of Trinidad SWPA informational signs at campgrounds, Monument Lake, and North Lake. 	<ul style="list-style-type: none"> ▪ USFS ▪ CPW ▪ City of Trinidad ▪ Monument Lake Resort ▪ CDPHE
Landslides, Flooding and Erosion	<p>1. Educate landowners by creating an SWPA Emergency Response Card for Flood and Landslide Event Procedures.</p> <p>2. Distribute cards to emergency responders, landowners and recreation sites within SWPA.</p> <p>3. Flood Deflection Strategies</p> <ul style="list-style-type: none"> ▪ Research construction options, i.e. berms, for deflecting flood waters away from reservoirs. <p>4. Address Erosion Issues</p> <ul style="list-style-type: none"> ▪ Campgrounds, including north shore of Monument Lake ▪ High traffic area ▪ Stream banks 	<ul style="list-style-type: none"> ▪ City of Trinidad ▪ Las Animas County ▪ SFPD ▪ NRCS ▪ USFS ▪ SP-PRCD ▪ CSFS ▪ Colorado Division of Fire Prevention and Control ▪ Colorado Emergency Management
Transportation and Roadways	<p>1. 911 Education Plan Development</p> <ul style="list-style-type: none"> ▪ Educate public on procedures for reporting spills and dumping in SWPA on public and private land. <p>2. Spill Containment Coordination</p> <ul style="list-style-type: none"> ▪ Establish local emergency response team coordination for spill mitigation. <p>3. Road Material Contamination Prevention</p> <ul style="list-style-type: none"> ▪ Review SWPP with Las Animas County Road and Bridge Department. ▪ Utilize Best Management Practices to prevent road materials from entering the source waters. <p>4. Salts and Magnesium Chloride Contamination</p> <ul style="list-style-type: none"> ▪ Research salt and magnesium chloride contamination and road treatment alternatives. ▪ Develop strategies for limiting contamination. 	<ul style="list-style-type: none"> ▪ City of Trinidad ▪ Las Animas County ▪ CDOT ▪ Colorado State Patrol ▪ USFS ▪ SFPD

	5. Address Road-related Erosion	
Climate Change and Water Quantity	<ol style="list-style-type: none"> 1. Climate Change Education <ul style="list-style-type: none"> ▪ Provide opportunities for stakeholders to understand the vulnerability of water supply. 2. Evaluate Potential for Water Rights Acquisition 3. Assess Additional Water Storage Options 4. Implement Water Conservation Strategies. 5. Provide Public Forums for Adapting to Climate Change 6. Develop Severe Drought Rapid Response Plans 	<ul style="list-style-type: none"> ▪ City of Trinidad ▪ USFS ▪ CSFS ▪ CPW ▪ Stonewall Fire Protection District ▪ Las Animas County ▪ Private Landowners ▪ NRCS ▪ SP-PRCD
Reservoir and Ditch Maintenance	<ol style="list-style-type: none"> 1. Maintain Reservoir and Intake Gates 2. Enclose Ditch “C”: Whiskey Creek to Monument Lake. <ul style="list-style-type: none"> ▪ Develop ditch enclosure plans. ▪ Seek funding from State sources, i.e. WSRA. 	<ul style="list-style-type: none"> ▪ City of Trinidad
Livestock Grazing	<ol style="list-style-type: none"> 1. Public Outreach for Area Residents <ul style="list-style-type: none"> ▪ Grazing management and practices ▪ Publications to promote watershed stewardship 2. Work with landowners to encourage the use of effective alternative management strategies such as prescribed grazing. 	<ul style="list-style-type: none"> ▪ USFS ▪ CPW ▪ NRCS ▪ Private Landowners
Septic Tanks	<ol style="list-style-type: none"> 1. Map Septic Systems in the SWPA <ul style="list-style-type: none"> ▪ GPS septic tanks in SWPA. ▪ Develop a GIS layer of septic tanks for the County’s mapping system. ▪ Prioritize septic threats. 2. Identify sensitive areas, buffer zones, and protection areas related to septic systems. <ul style="list-style-type: none"> ▪ Coordinate information with the County. ▪ Map areas and zones. 3. Septic Tank System Education <ul style="list-style-type: none"> ▪ Distribute septic system brochures to landowners in the SWPA that address use, maintenance and contamination threats. 4. Address New Colorado Septic System Regulations <ul style="list-style-type: none"> ▪ Adopt new state septic systems regulations. ▪ Expand County plans to include descriptions of 	<ul style="list-style-type: none"> ▪ City of Trinidad ▪ Las Animas County ▪ Glen Aspen ▪ Camp Salvation

	<p>threats to drinking water from septic systems.</p> <p>5. Research Stakeholder Incentives</p> <ul style="list-style-type: none"> ▪ Evaluate the potential for offering septic pumping rebates and implement a program if feasible. ▪ Evaluate the potential for developing a “sludge judge” monitoring program in sensitivity zones. 	
Residential Practices	<p>1. Public Education and Outreach for SWPA Residents</p> <ul style="list-style-type: none"> ▪ Develop materials or programs to encourage residents to protect their drinking water source. ▪ Encourage resident-reporting of threats. <p>2. Information Sharing with Stakeholders</p> <ul style="list-style-type: none"> ▪ Build relationships with storage tank owners to provide hazard prevention strategies and limit contamination. ▪ Assist residents with constructing secondary containment systems. 	<ul style="list-style-type: none"> ▪ City of Trinidad ▪ Glen Aspen ▪ Camp Salvation ▪ Private Inholdings on USFS Land
Land Use Change	<p>1. SWPA Consideration in Land Use Planning and Zoning</p> <ul style="list-style-type: none"> ▪ Consider source water areas and their protection prior to land use or zoning changes in the County. <p>2. County Outreach and Education</p> <ul style="list-style-type: none"> ▪ Present opportunities for protecting drinking water sources to Las Animas County Commissioners. ▪ Notify USFS and other stakeholders of potential land use changes. ▪ Collaborate with other agencies, such as NRCS and SP-PRCD, to determine best land uses. 	<ul style="list-style-type: none"> ▪ City of Trinidad ▪ Las Animas County ▪ CPW ▪ USFS ▪ NRCS ▪ SP-PRCD
Pesticide Application	<p>1. Review and Develop Vegetation Management Strategies with Partners</p> <ul style="list-style-type: none"> ▪ Address and implement best management practices for vegetation issues. <p>2. Review SWPP with Partners</p> <p>3. Educate stakeholders about pesticide precautions, purposes, applications and impacts.</p>	<ul style="list-style-type: none"> ▪ USFS ▪ CSFS ▪ City of Trinidad ▪ NRCS

Table 9: Funding and Educational Resources for SWPP Implementation

Issue of Concern	Funding and Educational Resources
------------------	-----------------------------------

<p>Fire</p>	<ul style="list-style-type: none"> ▪ Wildfire Risk Reduction Grant (WFRR) Program: http://www.coemergency.com/2014/01/wildfire-risk-reduction-grant-program.html ▪ NRCS Environmental Quality Incentives Program (EQIP) (for individuals): http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/financial/eqip/?cid=nrcs141p2_022777 ▪ NRCS Regional Conservation Partnership Program (appropriate for City): http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/farmbill/rcpp/ ▪ FireWise: http://firewise.org/?sso=0 ▪ Project Learning Tree: https://www.plt.org/
<p>Transportation and Roadways</p>	<ul style="list-style-type: none"> ▪ CDOT Transportation Safety Grants: https://www.codot.gov/business/grants/safetygrants
<p>Landslides, Flooding and Erosion</p>	<ul style="list-style-type: none"> ▪ Colorado Water Conservation Board <i>Colorado Watershed Restoration Grants</i>: http://cwcb.state.co.us/LoansGrants/colorado-watershed-restoration-grants/Pages/main.aspx
<p>Pesticide Application</p>	<ul style="list-style-type: none"> ▪ Colorado Pesticide Program: https://www.colorado.gov/pacific/cdphe/wq-pesticides-permits ▪ Colorado Noxious Weed Program and Funding Assistance Resources: https://www.colorado.gov/pacific/agconservation/noxiousweeds
<p>Septic Tanks</p>	<ul style="list-style-type: none"> ▪ EPA: http://water.epa.gov/infrastructure/septic/funding.cfm
<p>Land Use Change</p>	<ul style="list-style-type: none"> ▪ Las Animas County Information: http://lasanimascounty.org/
<p>Residential Practices</p>	<ul style="list-style-type: none"> ▪ Colorado Storage Tank Information: http://costis.cdle.state.co.us/home.asp ▪ EPA Water Information Resources: http://water.epa.gov/
<p>Campgrounds and Recreation</p>	<ul style="list-style-type: none"> ▪ US Fish and Wildlife Service Grants: http://wsfrprograms.fws.gov/Subpages/GrantPrograms/GrantProgramsIndex.htm ▪ Colorado Water Conservation Board <i>Fish and Wildlife Resources Fund Grant</i>: http://cwcb.state.co.us/LoansGrants/fish-and-wildlife-resources-fund-grants/Pages/main.aspx ▪ Rocky Mountain Elk Foundation: http://www.rmef.org/
<p>Climate Change and Water Quantity</p>	<ul style="list-style-type: none"> ▪ Colorado Water Conservation Board <i>Water Efficiency Grants</i>: http://cwcb.state.co.us/LoansGrants/water-efficiency-grants/Pages/main.aspx

<p>Reservoir and Ditch Maintenance</p>	<ul style="list-style-type: none"> ▪ Colorado Water Conservation Board <i>Water Supply Reserve Account</i>: http://cwc.state.co.us/LoansGrants/water-supply-reserve-account-grants/Pages/main.aspx ▪ Arkansas Basin Roundtable: http://cwc.state.co.us/water-management/basin-roundtables/Pages/ArkansasWaterSupplyReserveAccountGrants.aspx
<p>Livestock Grazing</p>	<ul style="list-style-type: none"> ▪ USDA Assistance Programs: http://www.usda.gov/wps/portal/usda/usdahome?navid=GRANTS_LOANS
<p>General</p>	<ul style="list-style-type: none"> ▪ CDPHE Grants and Resources for Public Water Systems: http://coloradoruralwater.sharepoint.com/Pages/SourceWaterProtection.aspx ▪ CDPHE Requests for Grant Information: cdphe_grantsandloans@state.co.us ▪ EPA Watershed Grants: https://ofmpub.epa.gov/apex/watershedfunding/f?p=109:1:0::NO:RP::#search_results

EVALUATING EFFECTIVENESS

The City of Trinidad is committed to developing a tracking and reporting system to gauge the effectiveness of the various source water best management practices which will be and 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 two 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 City of Trinidad has also drafted a *Contingency Plan* (see Appendix F: City of Trinidad SWPP Contingency Plan) for the purpose of addressing emergency situations efficiently and effectively. The Contingency Plan should also be reviewed at a frequency of once every two years.

The City of Trinidad 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. Furthermore, the City has already begun the SWPP implementation process by applying for additional CDPHE funds, seeking funds from other state agencies, and working with stakeholders to address wildland fire issues.

LIST OF REFERENCES

- City of Trinidad. (1993). *Charter for the city of Trinidad, Colorado*. Trinidad, CO: City of Trinidad. Retrieved from <http://trinidad.co.gov/shared/docs/charter.pdf>
- Clarke, S.; Crandall, K.; Emerick, J.; Fuller, M.; Katzenberger, J.; Malone, D.; Masone, M.; Slap, A.; Thomas, J. (2008). *State of the roaring fork watershed report*. Basalt, CO: Ruedi Water & Power Authority.
- Colorado Water Conservation Board. (2008). *Climate change in Colorado - a report for the Colorado water conservation board*. Boulder, CO: University of Colorado.
- Environmental Protection Agency. (2013). *Water: consumer confidence report rule*. Retrieved from: <http://water.epa.gov/lawsregs/rulesregs/sdwa/ccr/index.cfm>
- Environmental Protection Agency. (2001). *Source water protection practices bulletin: managing livestock, poultry, and horse waste to prevent contamination of drinking water* (Publication No. EPA 916-F-01-026). Washington D.C.: U. S. Environmental Protection Agency Office of Water.
- Gowler A. & Sage, R. (2006). *Traffic and transport: potential hazards and information needs*. In O. Schomoll, J. Howar, J. Chilton, I. Chorus, *Protecting Groundwater Health*. London, UK: IWA Publishing.
- Ground Water Protection Council. (2008). *Ground Water Report to the Nation: A Call to Action*. Oklahoma City, Oklahoma: Ground Water Protection Council.
- Natural Resources Conservation Service. (2007). *Purgatoire watershed hydrologic unit code 10021010 rapid assessment*. Lakewood, CO: United States Department of Agriculture, NRCS.
- Natural Resources Conservation Service. (2013). *(SNOWTEL data graph). Water and climate information*. Retrieved from <http://www.wcc.nrcs.usda.gov/snotel/Colorado/colorado.html>
- Purgatoire Watershed Partnership. (2014). *Purgatoire river watershed plan*. Trinidad, CO: Purgatoire Watershed Partnership.
- Purgatoire Watershed Partnership. (2014). *Purgatoire river watershed water quality analysis*. Crested Butte, CO: Alpine Environmental Consultants LLC.
- United States Census Bureau. (2015). *State and county quick facts* (data file). Retrieved from <http://quickfacts.census.gov>

LIST OF APPENDICES

- A. Watershed Protection Assessment Definitions and Checklist
- B. Source Water Assessment Report, City of Trinidad
- C. CDPHE Potential Contaminant Inventory Tables
- D. CRWA SWAP Risk Assessment Matrix
- E. City of Trinidad 2014 Annual Drinking Water Quality Report
- F. City of Trinidad SWPP Contingency Plan*

(*Contact the City of Trinidad for a current copy of this document.)