SOURCE WATER PROTECTION PLAN

for

Village of Taos Ski Valley Region

PWS #NM 3533329

June 1, 2020

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Village of Taos Ski Valley Region

Source Water Protection Plan

Prepared for: Village of Taos Ski Valley

PWS # NM 3533329

Prepared by New Mexico Rural Water Association

June 1, 2020

Approved by:

Village of Taos Ski Valley — 8/26/20 Date

Martha Graham, Source Water Protection Specialist — 6/1/2020 Date
NMRWA Source Water Protection Program

Date Reviewed	Reviewed By	Comments
5.15.20		

This Source Water Protection Plan is a planning document and there is no legal requirement to implement the recommendations herein. Actions on public lands will be subject to Federal, State, and county policies and procedures. Action on private land may require compliance with Village or land use codes, building codes, local covenants, and permission from the landowner.

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Acronyms and Glossary

AF/yr	Acre-feet per year
AMSL	Above Mean Sea Level
AST	Above-ground storage tank
BMP	Best Management Practices
Carson NF	Carson National Forest
CWA	Clean Water Act
CWPP	Community Wildfire Protection Plan

DWB	Drinking Water Bureau
EPA	Environmental Protection Agency
GGI	Glorieta Geoscience, Inc.
gpm	Gallons per minute
Groundwater vulnerability	The likelihood that a contaminant will reach a specified position – such as the water table or the depths used for public-water supply – in a groundwater-flow system (National Research Council 1993). Groundwater vulnerability is a function not only of the properties of the groundwater flow system (intrinsic susceptibility) but also of the proximity of contaminant sources, relative location of wells, and the fate and transport of the contaminant(s).
Intrinsic susceptibility	The ease with which water and contaminants can travel to and through an aquifer.
Intrinsic vulnerability	A type of groundwater where contamination is general, and non-specific.
IPM	Integrated Pest Management
LRE	Leonard Rice Engineers
NM WARN	New Mexico Water / Wastewater Agency Response Network
NMED	New Mexico Environment Department
NMRWA	New Mexico Rural Water Association
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NPS	Nonpoint Source
NRCS	Natural Resource Conservation Service
NC	Transient noncommunity transient public water system
NWS	National Weather Service
PSOC	Potential Source of Contamination
RAWS	Remote automated weather station
RHAC	Rio Hondo Acequia Community
SDWA	Safe Drinking Water Act
Specific vulnerability	A type of groundwater vulnerability where the contaminant is specific.
SUP	Special Use Permit
SWP	Source Water Protection
TOT	Time-of-travel
TSVI	Taos Ski Valley, Inc.
USFS	United States Forest Service
UST	Underground storage tank
UV	Ultraviolet
VTSV	Village of Taos Ski Valley
WUI	Wildland Urban Interface

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Village of Taos Ski Valley Region
Source Water Protection Plan

June 1, 2020

Executive Summary

Access to clean, safe drinking water is a key component of a healthy and viable community. Protecting sources of drinking water from contamination and depletion can prevent adverse consequences to economy, ecology, and human health. Source Water Protection is a voluntary program, created by Congress in the 1996 amendments to the Safe Drinking Water Act (SDWA).

Between 2017 and 2020, the Village of Taos Ski Valley (VTSV, Village) and the New Mexico Rural Water Association (NMRWA) collaborated with Taos Ski Valley, Inc. (TSVI), The Resort at Taos Ski Valley, LLC (Shopoff Realty Investments, Shopoff), Taos Land and Cattle Company I, LLC, New Mexico Environment Department (NMED) Drinking Water Bureau's Source Water Protection Program, Rio Hondo Communities Acequias, Amigos Bravos, Carson National Forest (Carson NF), Taos Pueblo, The Nature Conservancy and Rio Grande Water Fund, and others to develop the Village of Taos Ski Valley Region Source Water Protection Plan (VTSV Region SWP Plan).

The VTSV Region SWP plan identifies potential sources of contamination and other issues of concern for the Phoenix Spring Infiltration Gallery and the Gunsite Spring. The Village of Taos Ski Valley receives its drinking water from Phoenix Spring, an infiltration gallery developed in 1992. The Phoenix Spring Infiltration Gallery is the sole drinking water source for the Village currently. The Village and Shopoff are in the process of determining the feasibility of developing the Gunsite Spring as a second water source for the Village. Depending on the location of the Gunsite Spring, this process could also involve the Taos Land and Cattle Company I, LLC. Our intention is that the Village could apply the VTSV Region SWP Plan's findings and recommendations to future water sources. The VTSV Region SWP Plan sets up measures to monitor and protect these drinking water sources and assembles information into a document that can serve as a valuable reference in the future.

The community of Amizette, while part of the Village, is independent of the Village's water and wastewater systems currently. This community is beyond the Phoenix Spring Infiltration Gallery and Gunsite Spring SWP Areas. However, the VTSV Region SWP Team emphasizes that protection of water quality to Amizette and other downstream communities is of vital importance to the Village. It is the goal of the Village that the water leaving the Village meets the quality standards that the State has for its discharge stream. Therefore, we include aspects of Amizette's water and wastewater systems in the VTSV Region SWP Plan.

Conclusions of the SWP Plan include:

1. SWP Team members and participants in SWP meetings are in accord that protecting drinking water in Taos Ski Valley is the highest priority.
2. The greatest potential risks to the Village's drinking water are wildfire and postfire impact, which were rated as High Priority.
3. Illegal dumping and land development are also among the highest priorities for the SWP Team, although the members did not agree on whether there was a significant difference between "land development" and "unregulated land development" for the purposes of protection or best management practices (BMPs).
4. For the Phoenix Spring Infiltration Gallery, a large number of PSOCs rated of lower priority including petroleum storage tanks, outdoor recreation (general), animal corrals/feeding areas, the use of equipment and machinery, as well as various natural events such as flood, avalanche, and landslides. For the Gunsite Spring, PSOCs of next greatest concern are outdoor recreation (general), animal corrals/feeding areas.
5. The SWP Team has laid out BMPs that help prevent PSOCs from impairing or contaminating drinking water sources.
6. In addition to implementing BMPs, the Village may develop new ordinances and a permitting process for certain kinds of activities that could be proposed in the SWP Zones. Such new regulatory initiatives, however, are outside the scope of this SWP Plan.

Protecting source water involves a combination of regulatory and nonregulatory approaches. In addition to Federal and State laws and local ordinances, BMPs provide practical guidance for addressing the VTSV Region SWP Plan's concerns and priorities. One of the most effective ways to manage several of the VTSV Region SWP Plan's priorities – specifically those of hazardous household waste, illegal dumping, and outdoor recreation – is through monitoring and education and outreach.

The VTSV Region SWP Plan is a work in progress. It should be updated and amended as new information becomes available. The Village has undertaken a review of hydrogeological and other information on the Phoenix Spring and infiltration gallery. It also has initiated hydrogeological studies of the Gunsite Spring. The Village intends to pursue the development of the Gunsite Spring as a second source of drinking water. The Bull of the Woods Spring is another possible drinking water source for the Village. In 2018, the Pattison Trust initiated hydrogeological studies of the Bull of the Woods Spring to investigate this possibility. Recently, Mr. Robert Corroon of Taos Land and Cattle I, LLC, purchased the land with this spring. Mr. Corroon also is investigating this possibility.

SWP Plans are intended to be used frequently. The information in this Plan is intended to be applied when and if other drinking water sources are developed. The Plan should also be reviewed and updated every 2-3 years or as needed.

1 Introduction

Access to clean, safe drinking water is a key component of a healthy and viable community. Protecting sources of drinking water from contamination and depletion can prevent negative consequences to economy, ecology, and human health. Source Water Protection is a voluntary program, created by Congress in the 1996 amendments to the Safe Drinking Water Act (SDWA). The program encourages partnerships between states and public water systems to safeguard sources of drinking water. The U.S. Department of Agriculture Farm Services Agency provides funding to the New Mexico Rural Water Association (NMRWA) to partner with public water systems to protect water sources from contamination and depletion, and to develop contingency plans if water sources dry up or become contaminated.

The Village of Taos Ski Valley (VTSV, Village) and the New Mexico Rural Water Association (NMRWA) collaborated with Taos Ski Valley, Inc. (TSVI), The Resort at Taos Ski Valley, LLC (Shopoff Realty Investments, Shopoff), Taos Land and Cattle Company I, LLC, New Mexico Environment Department (NMED) Drinking Water Bureau's Source Water Protection Program, Rio Hondo Communities Acequias, Amigos Bravos, Carson National Forest (NF), Taos Pueblo, The Nature Conservancy and Rio Grande Water Fund, and others to develop the Village of Taos Ski Valley Region Source Water Protection Plan (VTSV Region SWP Plan).

The VTSV Region SWP Plan identifies potential sources of contamination (PSOCs) and other issues of concern for the Phoenix Spring Infiltration Gallery and the Gunsite Spring. While the Phoenix Spring Infiltration Gallery is the sole drinking water source for the Village currently, the Village plans to pursue development of the Gunsite Spring as a second source of drinking water. In 2018 the Village initiated hydrogeological studies of the Gunsite Spring and the Pattison Trust initiated the same for the Bull of the Woods Spring. One goal of these investigations is to assess the feasibility of developing the springs as additional drinking water sources for the Village. The Village has secured funding for additional studies and engineering for Gunsite Spring. It plans to issue a Request for Proposal for engineering and design of Gunsite Spring as a drinking water source in 2020. This SWP Plan includes the Gunsite Spring as a potential drinking water source, delineates a SWP Area, and identifies PSOCs and other areas of concern. Considerations for whether the Bull of the Woods Spring would be another drinking water source for the Village are beyond the scope of this SWP Plan.

Several other public drinking water systems are in Taos Ski Valley. Most of these systems are transient noncommunity (NC) water systems, and most are in the community of Amizette. We include some references to Amizette's water and wastewater systems in this Plan, although these public water systems are independent of the Village's water system. Because Amizette's public water systems are distinct from the Village, and because they are below the SWP Area of the Phoenix Spring Infiltration Gallery, we have not identified SWP Areas or assessed PSOCs or other issues of concern for them. Nevertheless, the Village and SWP Team agree that protection of water quality within the Village is of vital importance for the Village, Amizette, and other downstream communities. The VTSV Region SWP Plan sets up measures to monitor and protect drinking water sources and assembles information into a document that can serve as a valuable reference.

1.1 Source Water Protection Background

Source Water Protection is part of a multi-barrier approach by which a public water system can actively protect its valuable drinking water resources and the capital investment used to develop these water resources. The multi-barrier approach to protecting drinking water supplies protects current and future drinking water sources through prevention, standards and treatment, an effective distribution system, and creating an engaged public. Because there is no single approach to water safety, the best way to protect drinking water is through the effective management of the drinking water treatment, and distribution system, and source water protection. This plan focuses on the last approach.

The Environmental Protection Agency (EPA) defines *source water* as "untreated water from streams, rivers, lakes, or underground aquifers that is used to supply private wells and public drinking water." The SWP Program, which Congress authorized in the 1996 Amendments to the SDWA, outlines a comprehensive plan to achieve maximum public health protection.

The purpose of developing a SWP Plan is to establish SWP Areas and take the necessary measures to safeguard them against PSOCs and other issues of concern, thereby protecting the community's water resources. The term *SWP Area* is defined as "the surface and subsurface area surrounding a water well or wellfield, supplying a public water system, through which contaminants are reasonably likely to move toward and reach such water well or wellfield" (42 U.S.C. §300h—7(e)). Source water protection focused first on wells and groundwater systems and then expanded to its current use, which includes surface water and springs as drinking water sources. Some of the terminology, such as "water well" and "wellhead protection" remains.

The goal of NMRWA's SWP Program is to protect drinking water resources through the implementation of a community based SWP Plan. NMRWA assists in the development and implementation of this plan by providing onsite technical assistance to water systems. NMRWA facilitates communication and collaboration among the water system department, community, other interested parties, and coordinating government agencies. It can provide outreach, educational materials, and training related to source water protection issues.

NMRWA's SWP planning process follows the 5-step process set up by the EPA and the National Rural Water Association under the Well Protection Program Plan. These steps are:

1. Form a community planning team (SWP Team)
2. Delineate SWP Areas
3. Identify PSOCs and other issues of concern
4. Manage the SWP Areas
5. Contingency planning

1.2 Village of Taos Ski Valley Region

The Village is located within the Carson National Forest (Carson NF), approximately 19 miles northeast of the Town of Taos, Taos County, New Mexico (Figure 1). Taos Ski Valley is in the traditional territory of the Taos Pueblo Indians. Early Euro-American occupation started in the late 1600s, when the Spanish arrived in the area. The Taos Ski Valley and the surrounding Carson NF

are within and/or next to historical Spanish Land grants that include the Lucero de Godoi (Antonio Martinez Land Grant, 1716), the Arroyo Hondo Land Grant (1815), and the El Salto Land Grant. These lands were historically used by the Hispano settlers in Arroyo Seco, Des Montes, Valdez, Canoncito and Arroyo Hondo for grazing livestock, (sheep and cattle), hunting, fishing and wood gathering. Those communities continue to rely on the waters off the Rio Hondo to feed their acequias and to replenish the aquifer, which is their main source of drinking water. Mining brought Anglos to the area in the late 1800s and early 1900s when the area was called Twining. After mining ceased in the early 1900s, Twining was abandoned except to picnickers, campers, and summer residents. In 1945, Orville E. Pattison purchased a large amount of land east of the Lake Fork and North Fork reaches of the Hondo River as a summer getaway. Over the years the Pattison family sold some of its property for commercial and residential development. In 1955, Ernie Blake began developing the valley as a ski resort. The Blakes continued to own Taos Ski Valley until 2013, when it sold the operation to Taos Ski Valley, Inc. (TSVI). The Pattison Trust LLC continued to own a large area of the Village until 2019, when it sold this area, the Northside at Taos Ski Valley, to the Taos Land and Cattle Company I, LLC.

Taos Ski Valley is one of New Mexico's premier skiing destinations. It provides world class recreational and resort opportunities year-round. The Village incorporated as a municipality in 1996 and provides infrastructure and services to residents and seasonal visitors.

Several entities share an interest in Taos Ski Valley's water.

- Taos Ski Valley, Inc. (TSVI) owns the tract of land on which the Phoenix Spring is located as well as the infiltration gallery and surrounding lands, with the exception of the parcel on which the chlorination station sits which was deeded to the Village. The Village has a permanent easement for the infiltration gallery. TSVI has a special use permit (SUP) with the Carson NF where it has developed most of its skiing and other recreational facilities.
- Shopoff Realty Investments (Shopoff) is a private real estate investment firm that owns undeveloped land within the Village in a partnership called The Resort at Taos Ski Valley, LLC. The Gunsite Spring appears to be on Shopoff-owned land, although it is possible that the actual location of the contemplated infiltration gallery will be located higher in elevation, which could put it on land owned by the Taos Land and Cattle Company I, LLC. The Village and Shopoff are in the initial stages of developing the Gunsite Spring as a drinking water source for the Village. Shopoff plans to develop a 5-star luxury resort with hotels and condominiums on its land.
- Taos Land and Cattle Company, I, LLC recently purchased approximately 1,227 acres east of Kachina Road from the Pattison Trust LLC. This area includes the Bull of the Woods Spring. Prior to the sale, the Pattison Trust LLC, through Northside at Taos Ski Valley, had structured, fee-based, access to the public for a variety of outdoor recreational activities. The Village and Pattison Trust LLC were investigating the development of the Bull of the Woods Spring as another municipal drinking water source. The Taos Land and Cattle Company I, LLC is considering its plans for this area.
- Arising from the former Twining Water & Sanitation District, the Village of Taos Ski Valley was established as a municipality in 1996. The vision of the Village is to create a year-round

economy based upon resort-related commerce by improving infrastructure, preserving the environment, improving amenities for the community and its visitors, and protecting the health, safety and welfare of the community (2006 and 2010 Village of Taos Ski Valley Master Plans). The Village is surrounded by the Carson NF and lies between the Columbine Hondo and Wheeler Peak Wilderness areas.

- The Carson NF offers a variety of outdoor recreational activities year-round. Its mission is to "tak[e] care of the land while making the forest resources available to all [of its] share holders. Resources include high quality water, wilderness and outdoor recreation; quality habitat for many plants and animals; wood for paper, homes and hundreds of other uses; forage for wildlife and livestock; a source of minerals." (https://www.fs.usda.gov/detail/carson/home/?cid=fsbdev7_011765, accessed January 30, 2020.)
- Taos Pueblo is the oldest continuously occupied community in North America. The people of Taos Pueblo have lived and used the lands in and around the area now called Taos Ski Valley for thousands of years. Taos Pueblo lands abut the Wheeler Peak Wilderness area. Before the prospect of mining brought Euro-Americans into the area to establish mining towns/ventures at Twining and Amizette, the downstream Rio Hondo communities of Arroyo Hondo, Des Montes, and Valdez, were already established. Then and now, agricultural production in these communities relies on the acequias that feed from the Rio Hondo, whose headwaters are in Taos Ski Valley. In addition to their concerns about water quality and quantity upstream, these downstream communities' ties with their water source represent a cultural commitment to traditional heritage and way of life.

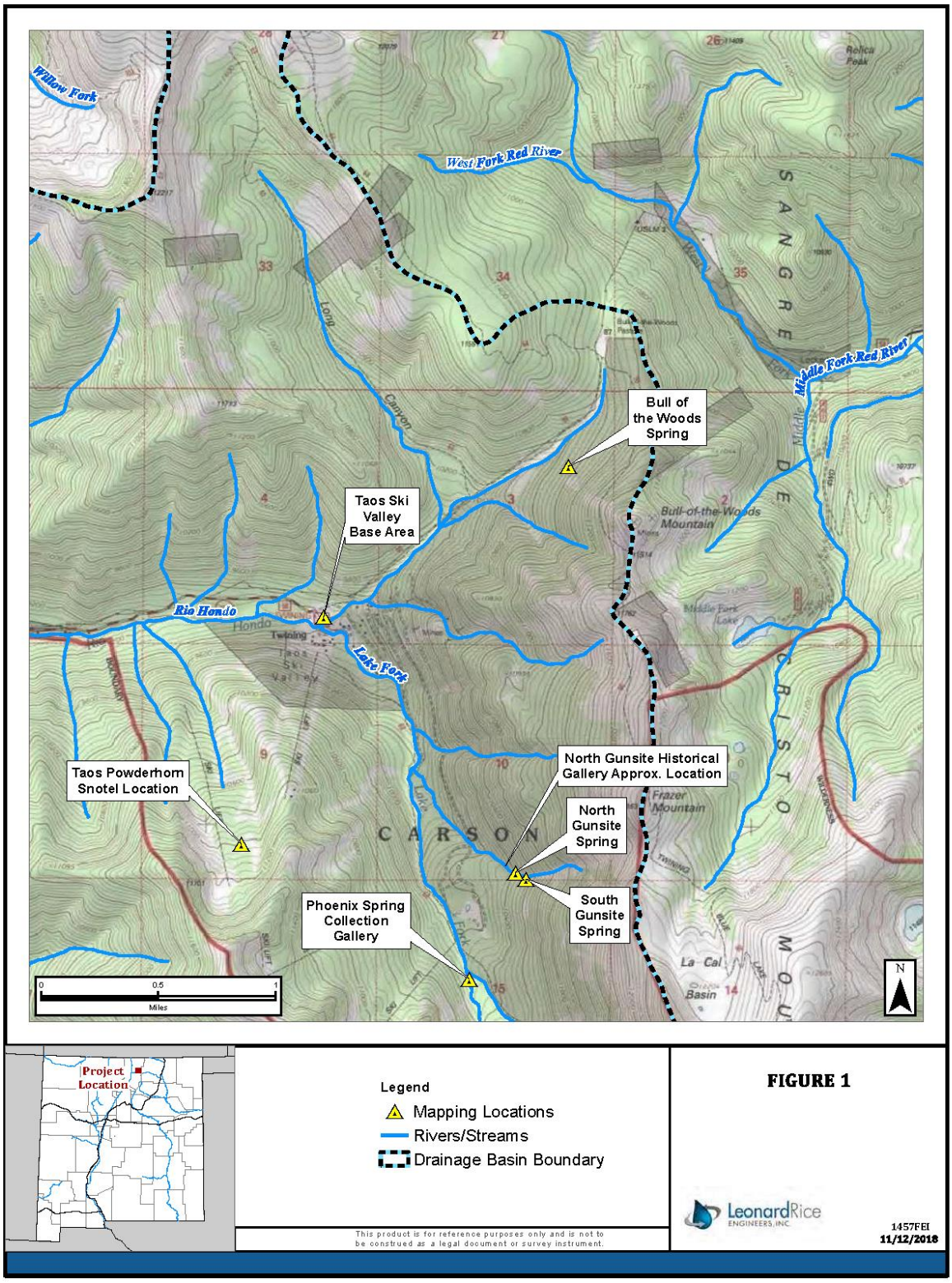

Figure 1. Map showing the Phoenix Spring Infiltration Gallery and Gunsite and Bull of the Woods Springs.

1.2.1 Taos Ski Valley Drinking Water Resources

The Village of Taos Ski Valley is approximately 20 miles north of Taos and 10 miles north of Arroyo Seco, on State Highway 150. Currently, Taos Ski Valley residents and visitors get their water primarily through public water systems, although some are on private water. Several cabins in the northern region of the Village are on wells or are drafting directly from a stream. The St. Bernard Condominiums has its own spring-sourced water system. TSVI's Whistlestop Café, also a separate water system, gets its water from a well. Private residents of the Amizette subdivision downstream of the Village rely on their water sources. Several of the inns and condominiums within Amizette are on independent NC public water systems.

1.2.1.1 Public Water Systems

EPA provides the following definition of a *public water system* (sometimes called a *community water system*):

> A public water system provides water for human consumption through pipes or other constructed conveyances to at least 15 service connections or serves an average of at least 25 people for at least 60 days a year. A public water system may be publicly or privately owned. (https://www.epa.gov/dwreginfo/information-about-public-water-systems)

Within the main Village of Taos Ski Valley, the Village supplies most residents and visitors with drinking water through the Phoenix Spring Infiltration Galley (NM 3533329). This is the sole *community* public water system in Taos Ski Valley. Within Village limits, there are five *transient noncommunity (NC)* public water systems that operate independently of the Village's system. *Transient noncommunity* water systems regularly serve at least 25 non-residential individuals (transient) during 60 or more days per year.

The community of Amizette is within the Village limits but is not presently connected to the Village's water system. Residences and lodging businesses in Amizette are on their own septic systems and are not connected to the Village's wastewater treatment plant. It is in the Village's long-term Capital Improvement Plan to extend both water and wastewater utility lines to the Amizette area.

The public water systems in Taos Ski Valley are listed below. Figure 2 shows their general locations. The locations are based according to the NMED Open EnviroMap (https://gis.web.env.nm.gov/oem/?map=egis) and are not precise.

- Village of Taos Ski Valley (NM3533329)
  - Community water system
  - Phoenix Infiltration Gallery
  - Groundwater system (spring-sourced)
  - Serves a population of 1,025 through 210 connections
- St. Bernard Condominiums (NM3584429)
  - Transient noncommunity water system
  - Groundwater system (spring-sourced)

    - Serves a population of 75 through 13 connections
- Whistle Stop (NM3599829)
    - Transient noncommunity water system
    - Groundwater system
    - Serves a population of 100 through 1 connection
    - Cafe is located at the base of Lift #6 and open during ski season
- Amizette Inn (NM3599229)
    - Transient noncommunity water system
    - Groundwater system
    - Serves a population of 28 through 1 connection
- Columbine Inn (NM3582129)
    - Transient noncommunity water system
    - Groundwater system
    - Serves a population of 30 through 21 connections
- Austing Haus (NM3590219)
    - Transient noncommunity water system
    - Groundwater system
    - Serves a population of 60 through 2 connections

1.2.1.2 Undeveloped Springs

In addition to the springs that the Village and St. Bernard Condominiums have developed into drinking water sources, Taos Ski Valley has a variety of undeveloped springs (Tolley 2014; Frisbee et al. 2017). Two of these springs have been identified as potential drinking water sources.

- Gunsite Spring
  The Gunsite Spring is spring complex that includes a North and a South spring located on the west facing slope of Frazer Mountain, approximately 1.3 miles southeast of the main base area of VTSV (Bauer 2019b). Based on the work of Tolley and Frisbee (Frisbee et al. 2017; Tolley 2014; Tolley et al. 2015), Leonard Rice Engineers' (LRE) observations of the Gunsite Spring, and other information, Bauer believes that "the origin of the Gunsite Springs is primarily groundwater originating as winter/spring recharge upslope on Frazer Mountain. There is a downward groundwater flow path to the location where spring water circulates laterally to the [N]orth Gunsite Spring" (Bauer 2019b). An infiltration gallery and collection system were installed at the Gunsite Spring in the 1990s. After they were developed NMED classified the water such that it would require treatment as surface water due to the presence of Giardia in the water. The Gunsite Spring's infiltration gallery and the intention to use it as a drinking water source was abandoned at that time; the Village did not need the water and did not want to develop the surface water treatment plant it would need to meet drinking water standards.

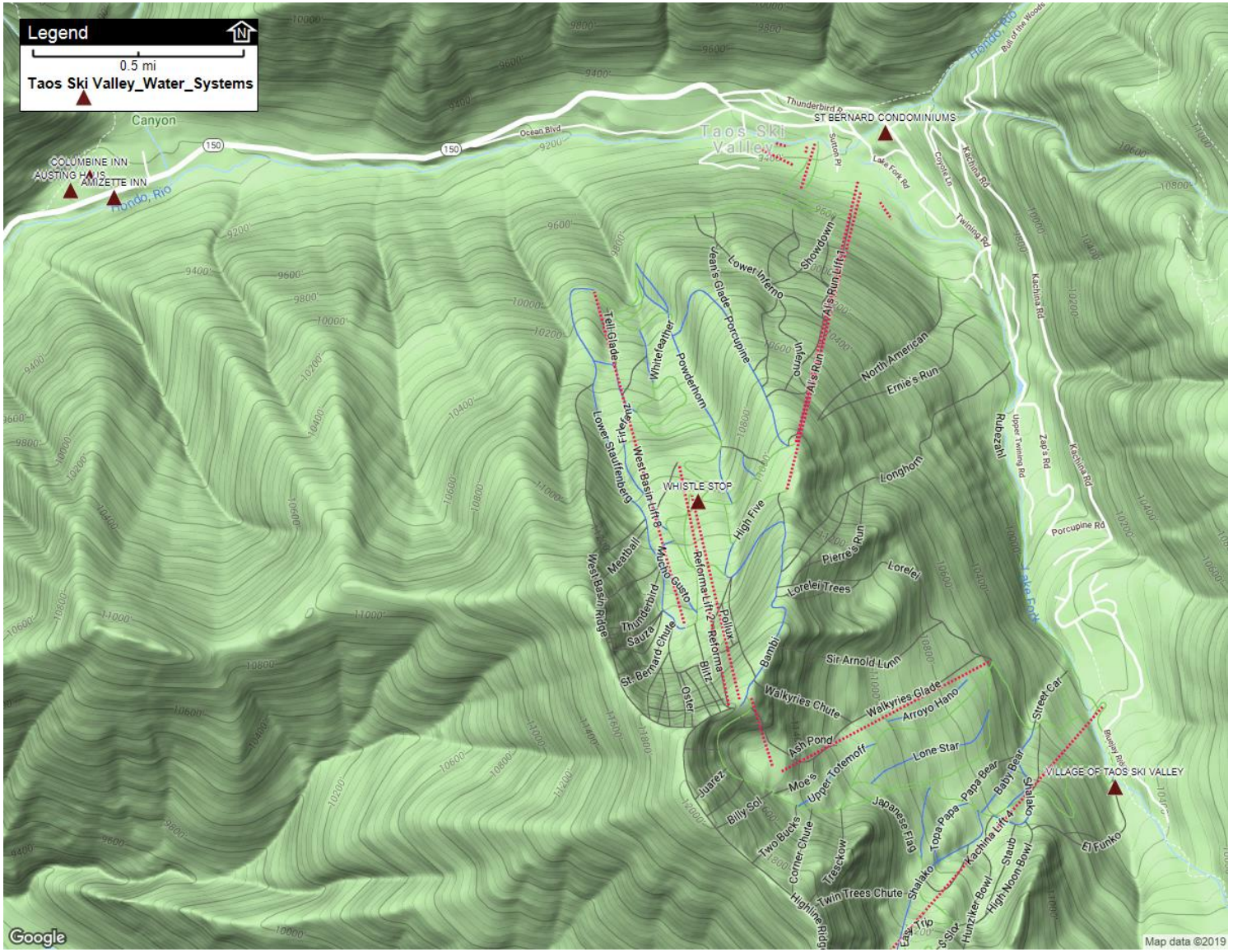

Figure 2. Public Drinking Water Systems in the Village of Taos Ski Valley (locations approximate).

The Village and Shopoff are re-evaluating the Gunsite Spring as an additional drinking water supply. In September 2018, the Village initiated a 2-3-year hydrogeological study of the Gunsite Spring as a first step in determining the location of the spring, on whose land it originates, how to develop it, and other matters. Recent measurements by Drakos (personal communication 2018) and assessments by Bauer (2019b) yielded promising results for developing the spring as a second water source for the Village. Bauer observed moss and other vegetation growth that is associated with perennial springs in the area (Bauer 2019b). Bauer also reported that Souder Miller and Associates (SMA) noted wetland areas around the Gunsite Spring (SMA, 2018 cited in Bauer 2019b). The vegetation types and presence of wetland areas increase confidence in the perennial nature of the North Gunsite Spring.

- Bull of the Woods Spring
  The Bull of the Woods Spring is a spring on the northwest slope of Bull of the Woods Mountain in an undeveloped area of the Village. The Pattison Trust LLC sold this land to the Taos Land and Cattle Company I, LLC in 2019.

  Over 20 years ago, the Village put a weir at the spring. Prior to the sale of the property, the Village and Pattison Trust LLC were researching whether the Village has development rights for the spring. The Pattison Trust initiated a hydrogeological study in September 2018 to assess the spring's potential as another drinking water source for the Village. According to that evaluation (Bauer 2019a), the Bull of the Wood Spring consists of multiple springs coming from the hillside.

  The Taos Land and Cattle Company I, LLC is exploring issues regarding the Bull of the Woods Spring as a drinking water source for the Village.

1.2.2 History of VTSV Region Source Water Protection Planning

The NMED DWB completed the *Source Water Assessment & Protection Program Report of Village of Taos Ski Valley Water Utility, Public Water System # 333-29* (Appendix A of this SWP Plan) in July 2004 (NMED 2004). Source water assessment follows a similar process to that of source water protection planning. However, it does not include the formation of a community planning team, or the development of a management plan to protect the delineated source water protection areas. It also lacks recommendations on contingency planning.

For the Village's Source Water Assessment, NMED used its *Designated Fixed Radius* method to delineate the VTSV water source.

> The method utilizes a 1,000-foot radius (72.12 acres) as the delineated source area or capture zone, which is further subdivided into three zones. Zone A represents a radius that is from 0 to 200 feet from the wellhead, Zone B 200 to 500 feet from the wellhead, and Zone C is the area between 500 to 1,000 feet of the wellhead. (NMED 2004)

For the VTSV water source, the "wellhead" references the Phoenix Spring Infiltration Gallery. NMED's use of the designated fixed radius method reflects the drinking water system's classification as a groundwater system. The single PSOC that NMED identified in each zone was the

Lake Fork Creek, assessing its vulnerability ranking as high in Zone A and low in Zones B and C. NMED provided a susceptibility ranking for the system of Moderately High based on a sensitivity rank of moderate, a vulnerability rank of high, and a susceptibility rank of moderately high (NMED 2004, see Appendix J—Step 4).

In October of 2009, NMRWA began facilitating planning sessions with Village departments to assess water and wastewater system issues and develop a SWP Plan. The sessions assisted staff working directly with land use and water and wastewater to identify and prioritize the system's issues and source water protection needs, and to develop the framework for a SWP Plan. These sessions also helped staff members to identify and articulate planning needs beyond the scope of drinking water protection.

While records indicate that the VTSV SWP Plan was completed in 2010, neither the Village nor NMRWA has located a final version of it. NMRWA located early drafts of the 2010 Plan and electronic notes for updating it. The SWP Team has incorporated relevant information from these documents into the current SWP Plan. The work with NMED in 2004 and NMRWA in 2009-10 increased the Village's awareness of how sensitive the Phoenix Spring Infiltration Gallery was should anyone begin development above it. It also led to the Village requirement that all holding tanks throughout the village tie onto the main sewer system to allow for nitrogen credit on the National Pollutant Discharge Elimination System (NPDES) permit for the Village's wastewater treatment plant. The Village's emphasis turned to connecting residents and businesses to the sewer system in lieu of individual septic tanks. The Bavarian lift station and wastewater improvements, the Pioneer Glades water tank construction, the Chlorination Station, and a few other projects grew out of the early SWP discussions.

In 2017, the Village and NMRWA set about to update the 2010 VTSV SWP Plan. While the SWP planning process remains the same, the current plan differs in several significant ways from that earlier plan. First, there has been wider and more extensive community involvement in the current plan. For this reason, we call this the Village of Taos Ski Valley Region (VTSV Region) SWP Plan. Second, rather than using the Designated Fixed Radius Method to delineate SWP Areas, we used a combined understanding of the area's hydrogeology and planning conventions to identify SWP Areas and Zones. Third, while the Phoenix Spring Infiltration Gallery is still the only public drinking water source for the Village, our discussions included the Gunsite and Bull of the Woods Springs because of the interest in developing these springs as additional drinking water sources. This SWP Plan assumes the development of the Gunsite Spring and discusses PSOCs and BMPs for it. This Plan will be reviewed and amended as necessary using the principles and information developed here.

1.2.3 VTSV Drinking Water System (Phoenix Spring Infiltration Gallery)

The Village's water system (NM3533329) has 210 metered connections. It serves a population of approximately 200 people with 58 year-round full-time residents and roughly 1500 people per day during the ski season. The Village estimates that 300,000 people visit during the 4-5 months of the ski season. It is a high elevation infiltration gallery, located on a VTSV easement on TSVI property at 10,290 feet above mean sea level (AMSL).

The Phoenix Spring was developed with a shallow subsurface gallery in 1972 (Kaufman and McLaughlin 1997). Improvements to the infiltration gallery were made in 1992 to comply with the SDWA and the increase the supply rate by extending the collection system to some adjacent smaller springs (Kaufman and McLaughlin 1997). The system belonged to the Twining Water and Sanitation District until April 2001, when the Village took over (VTSV 2017).

> Construction of shallow infiltration galleries to capture pre-emergent springs involves some risk. Such supplies are presumed to be under the influence of surface water according to EPA policies. Based on special design considerations, the Phoenix Gallery was deepened and protected from surface contamination. At the completion of the project, long-term particulate analyses samples were collected and examined. It was then determined that the water was safe and the New Mexico Environmental [sic] Department approved the use of the Phoenix Springs without subsequent filtration treatment (Kaufman and McLaughlin 1997).

The distribution network consists of iron and PVC piping. Booster pumps and a pressure tank serve one connection above the level of the pressure tank and main treatment facility. This pumphouse also contains an inactive chlorination system. The spring box is protected by two stainless steel screens that are cleaned manually. The Village uses sodium hypochlorite to disinfect its water. A handful of connections are located below the pumping station but above the main treatment facility and the storage tank. These connections use private ultraviolet (UV) disinfection.

The 250,000-gallon concrete Pioneer Glades water storage tank uses an altitude valve to control water levels. A second 250,000-gallon concrete storage tank, the Green Tank, is also operational. Construction for a third 250,000-gallon tank, the Kachina Tank, began in 2018 and is expected to be completed and the new tank becoming fully operational in the summer of 2020.

NMED DWB classifies the Phoenix Spring Infiltration Gallery as a ground water source for the purposes of drinking water treatment. The diversion/collection area for the infiltration gallery is located approximately 75 feet south and up gradient of the spring box and water treatment plant. According to Glorieta Geoscience, Inc. (GGI), flow into the infiltration gallery during low-flow conditions is approximately 200 +/- 50 gallons per minute (gpm) (Drakos, personal communication 2018). Low-flow conditions typically occur during late December to early March.

2 Source Water Protection Planning Team

The first step in the SWP process is to form a community planning, or SWP Team. The role of the SWP Team is to assemble relevant technical information and draft the SWP Plan. The SWP Team defines SWP Areas and surveys them to identify and assess contaminant sources that have the potential to pollute water sources. It develops strategies to protect the source water. The most important duty of the planning team is to help ensure the SWP Plan's implementation. The NMRWA is available to give continued support and technical help with the SWP Plan's components once this plan is in place.

2.1 VTSV Region Source Water Protection Team

Public participation is vitally important to the overall success of the source water planning and implementation process. The SWP Team reflects the varied interests and concerns surrounding the Village's source water. Between June 2017 and February 2020, a diverse group of people and entities has provided expertise and continuity in the VTSV Region SWP planning process.

Table 1 lists the participants of the SWP Team meetings and indicates which are members of the SWP Team. While not all SWP Team members participated in all meetings, each contributed their expertise and knowledge to developing the VTSV Region SWP Plan.

Table 1. Members and Participants of the VTSV Region SWP Team Meetings. (Shaded rows indicate entities invited originally as members.)

Name	Title	Affiliation
Rachel Conn	Projects Director	Amigos Bravos *(invited)*
Elena Fernandez	Projects Associate	Amigos Bravos
Ray Corral	Fire Management Officer	Carson National Forest
George Long	Wildlife Biologist	Carson National Forest
Phoebe Suina		Highwater Mark LLC
Jill Turner	Source Water Protection Program Manager	NMED DWB, Source Water Protection
Martha Graham	Source Water Protection Specialist	NMRWA, Source Water Protection
Carlos Miera		Rio Hondo Acequias
Dean Archuleta		Rio Hondo Acequias
Laura Oest		Rio Hondo Acequias (Acequia de los Prandos)
Pennie Herrera Wardlow		Rio Hondo Acequias (Upper Arroyo Hondo Land Grant)
Michael Gregg		Shopoff Realty Investments
Brian Rupp		Shopoff Realty Investments
Don Schieber		Shopoff Realty Investments
Abby Sanger		Shopoff Realty Investments / Taos Attorney LLC
Scott Sanger		Shopoff Realty Investments / Taos Attorney LLC
Robert Corroon		Taos Land and Cattle Company I, LLC
Jeffrey Wechsler		Taos Land and Cattle Company I, LLC / Montgomery & Andrews Law Firm
Kari Olson		Taos Land and Cattle Company I, LLC / Montgomery & Andrews Law Firm
Governor of Taos Pueblo	Governor (current)	Taos Pueblo, Governor *(invited)*
Cameron Martinez	Director of Natural Resources	Taos Pueblo, Natural Resources
Taos Pueblo Tribal Secretary		Taos Pueblo, Tribal Secretary *(invited)*
Craig Taggart		Taos Ski Valley, Inc.

Name	Title	Affiliation
Peter Johnson	Director of Development	Taos Ski Valley, Inc.
Dawn Boulware	Chief Administrative Officer	Taos Ski Valley, Inc.
Paul Drakos	Senior Geologist	Taos Ski Valley, Inc. / Glorieta Geoscience, Inc. / Taos Land and Cattle Company I, LLC
Colin Haffey		Taos Watershed Coalition/TNC
Laura McCarthy		Taos Watershed Coalition/TNC
Roger Pattison	Councilor and landowner	Village of Taos Ski Valley
Patrick Nicholson	Director of Planning & Community Development	Village of Taos Ski Valley
Christof Brownell	Mayor	Village of Taos Ski Valley
Dick Duffy	Planning & Zoning Committee	Village of Taos Ski Valley
Anthony Martinez	Public Works	Village of Taos Ski Valley
Ray Keen	Public Works	Village of Taos Ski Valley
Christina Wilder	Public Works Administrative Assistant	Village of Taos Ski Valley
Patrick O'Brien	Engineer	Village of Taos Ski Valley / FEI Engineers
Jacob Bauer		Village of Taos Ski Valley / Leonard Rice Engineers (LRE)
Sheila Duffy	Resident	Village of Taos Ski Valley
Tom Wittman	Mayor Pro-temp	Village of Taos Ski Valley
Clifton Bain		Clean Water Guardians

2.2 VTSV Region Source Water Protection Meetings

Local support and acceptance of SWP Plans are more likely where local stakeholders have actively participated in the development of their protection plan. Table 2 lists the dates and purposes of the meetings we held to develop the VTSV Region SWP Plan.

Table 2. Dates and Purposes of VTSV Region SWP Meetings.

Date	Purpose of meeting
June 22, 2017	Review status of VTSV SWP Plan. Discuss updating the VTSV SWP Plan (2010/2011)
October 25-26, 2017	Preliminary meetings to identify interested parties. Discuss purpose of SWP and identify possible members of the SWP Team
November 14, 2017	Presentation by Jill Turner to VTSV Council on the VTSV Region SWP Plan
December 6, 2017	Initial VTSV Region SWP Planning Meeting.
January 4, 2018	Wildfire and after wildfire effects on source water and implications for Phoenix Spring. Drakos presented on post-fire effects in the Jemez Mountains.
February 1, 2018	Suina presented on pre- and post-wildfire hazard mitigation. Corral presented on Carson NF's Highway 150 forest treatment project. Drakos presented on preliminary findings of hydrogeologic studies.
March 1, 2018	Taggart presented on TSVI Forest Management Plan in coordination with the Highway 150 Project.

Date	Purpose of meeting
April 5, 2018	Schieber presented on Shopoff Realty Investments' plans for developing the area around the Gunsite Spring.
April 9, 2018	Graham, Keen, and Fratrick attended a meeting of the Rio Hondo Acequia Community to provide information about the purpose and process of the VTSV Region SWP Plan and consider ways to get input from these downstream communities.
May 3, 2018	Archuleta presented on the Rio Hondo acequias. Drakos proposed an approach and SWP Areas for the Phoenix Spring Infiltration Gallery and Gunsite Spring.
June 7, 2018	McCarthy presented on the Taos Watershed Coalition, Rio Grande Watershed/The Nature Conservancy, and the Highway 150 Project. Review of SWP Plan outline and draft table of PSOCs
July 12, 2018	Site visit to Gunsite Spring prior to regular SWP Team meeting. Discuss the Gunsite Spring's hydrogeology and alternative ways to establish SWP Areas.
August 2, 2018	Gunsite Spring hydrogeology and additional studies discussed. The SWP Team agreed to model VTSV Region SWP Plan after the approach used for the Telluride SWP Plan
September 6, 2018	Review PSOC tables.
October 4, 2018	Taggart presented on the Spring Fire (CO) and its effects on treated and nontreated lands (in and around the Trincheras Ranch). Discussion of PSOCs and future development.
November 8, 2018	Discuss PSOCs and SWP Areas.
December 12, 2018	(No meeting – Submit comments on draft SWP Plan to Graham)
February 7, 2019	Discuss edits to the draft SWP Plan, LRE's memoranda on the Phoenix and Gunsite Springs, and LRE's recommended SWP Areas.
March 7, 2019	Affirmed shared interest in & commitment to protecting VTSV drinking water. Discussed & agreed to continuing collaborative process in developing the SWP Plan. Without waiting to define SWP Areas/Zones, will continue developing BMPs and restriction details.
April 25, 2019	Discuss aspects "development" and the need for a definition. Discuss SWP Areas of two zones – A and B (or B/C); overlays and permitting to address development-related PSOCs. Pattison pointed out the need to include Amizette in the SWP Plan.
May 16, 2019	Tabled SWP Zone discussion until the next meeting. Taggart presented on the question of how much ground compaction occurred in the thinning near the infiltration gallery. Amizette water and wastewater discussed.
June 20, 2019	Discuss various PSOCs. Nicholson had provided a map with proposed SWP Zones for the Phoenix Spring Infiltration Gallery, which needed clarification between TSVI and VTSV before being discussed.
August 1, 2019	Agreed upon SWP Areas/Zones. Reviewed the revised Table 4. Discussed permitting and overlays for land development.
October 16, 2019	Discuss October 2019 draft of SWP Plan. Discuss water quality issues regarding Amizette. After the meeting adjourned, received information on fire suppressants for the Village.
November 2019	Discuss Tables 3-6 and issue of how to assess priorities. Taggart presented results and comparison views of pre-/post-forest treatments around the Phoenix Spring Infiltration Gallery.
December 2019	Discussion of PSOCs and related tables.
January 9, 2020	General discussion of draft SWP Plan and schedule.
February 20, 2020	Final review of final draft SWP Plan.

In addition to SWP Team meetings, participants gathered data and other information through public documents, internet research, phone calls, emails, and field trips to the water sources. We gratefully acknowledge the contributions of the many individuals that worked with us to develop the VTSV Region SWP Plan and protect the Taos Ski Valley's water and watershed.

Comments on the first draft of the SWP Plan were received through December 2018. Graham addressed these comments for a second version of the VTSV Region SWP Plan. Graham distributed the second draft in January 2019, and Nicholson made comments on that draft. At the same time, the Village provided memoranda that its consultant LRE had prepared on the hydrogeology of the Phoenix Spring (Bauer 2019c), the Gunsite Spring (Bauer 2019b) and the Bull of the Woods Spring (Bauer 2019a). Between January and August 2019, the VTSV Region SWP meetings focused on defining SWP Zones for the Gunsite and Phoenix Springs. Meetings from September 2019 through January 2020 considered risks and BMPs associated with PSOCs. A final draft SWP Plan was developed and distributed in February 2020.

3 Defining the VTSV Region Source Water Protection Area

3.1 Hydrogeologic Setting

Taos Ski Valley is within the Rio Hondo watershed, a sub-watershed of the Rio Grande Basin. The Rio Hondo watershed ranges from 6,470 above mean sea level (AMSL) to 13,161 feet AMSL. The watershed has a drainage area of approximately 71 square miles. The Village lies within the headwaters of the upper 36 square miles. The Phoenix Spring Infiltration Gallery is along the Lake Fork Valley in the watershed.

Williams Lake, a popular hiking destination, is in a glacially carved valley, or cirque, near the top of the watershed. Recharge for the Williams Lake Cirque and the Lake Fork Valley comes from snowmelt and monsoonal precipitation infiltrating directly into the highly permeable glacial deposits (Drakos et al. 2018). This water discharges as groundwater through springs and the Lake Fork stream; no surface water flows from the Williams Lake Cirque. Recent work by GGI indicates that, although winter precipitation provides the majority of recharge, more comes from summer monsoonal precipitation than had been found previously (Drakos et al. 2018). Based on these studies, Drakos et al. have concluded that the Lake Fork is a gaining stream from its origin at the Phoenix Spring to the confluence with the North Fork, and that below this confluence, the Rio Hondo is a gaining reach to the USGS gaging station at Valdez (see also Tolley 2014).

Schilling (1960) and Lipman and Reed (1989) completed detailed geologic maps of the Twining area (i.e., Taos Ski Valley) and the surrounding Latir Volcanic Field, respectively. Precambrian metamorphic rocks (gneiss, phyllite, and quartzite), and Precambrian and Tertiary granite form the predominant bedrock in the mountains. The Lake Fork and Rio Hondo valleys are underlain by glacial deposits, including valley bottom till and rock glacier deposits overlain in places by younger alluvium. Mineral resources are primarily gold and copper, but of low grade. According to Schilling, the most recent mining activity was in 1956 at the Frazer Copper Mine. Soils in the Twining area are mostly coarse to rocky in texture and tend to be acidic. The soils are loamy on colluvial slopes

and other hillslope areas, alluvial along drainages, and histic (organic-rich) in wetland areas. Rock outcrops are common.

Steep slopes result in a high potential for erosion if vegetative cover or litter is removed, and they present a difficult environment for construction. Shallow water tables in the valley bottom can be problematic for construction.

The following information is from recent work that GGI conducted (Drakos et al. 2018; Drakos and Tafoya 2018). The Lake Fork Valley, where the Phoenix Spring and Phoenix Spring Infiltration Gallery are located, is a north-to-northwest-trending glacial valley that drains the Williams Lake basin. This valley is underlain by glacial deposits including rock glacier and thick valley bottom till (Lipman and Reid, 1989). The Phoenix Spring discharges at a location where the width of glacial deposits narrows between a bedrock constriction formed by Precambrian gneiss.

The degree of permeability has been a topic of discussion for the SWP Team. Previous studies have characterized the permeability as moderate, and the underlying substratum of bedrock as relatively impermeable – resulting in seeps and springs. LRE suggests that the permeability is greater than previously thought because of the extent to which the bedrock has faulted and fractured (Bauer 2019c).

The Lake Fork above the Phoenix Spring is an intermittent stream that flows during spring runoff in response to discharge from two springs – the South Fork Lake Fork and the East Fork Lake Fork. GGI's recent piezometer study (Drakos et al. 2018) shows an approximately two-week lag between summer monsoonal precipitation and shallow groundwater recharge. The Phoenix Spring shows a similar two-week lag between summer monsoonal precipitation events and increases in discharge. This study also indicates that the Phoenix, Gunsite, and several other springs in Taos Ski Valley show modern recharge (less than 5-10 years).

LRE has developed a "Supplemental Conceptual Model," which suggests that deep bedrock flow discharges beneath the overlying alluvium at the locations of the Phoenix and Gunsite Springs (Bauer 2019c). LRE suggests:

> a "combined" model of spring flow; transient peaks in groundwater discharge are likely the result of precipitation recharge on the glacial alluvium of the valley as described by GGI, and the long term baseflow is likely the result of longer groundwater flow paths converging and discharging at the Phoenix Spring location. (Bauer 2019c)

3.2 Establishing Source Water Protection Areas

The SWP Area delineation process sets up the physical area around a drinking water source that will become the focal point of the drinking water protection process. The localized and regional hydrogeology of the SWP Area gives valuable information about the water resources.

For groundwater systems, the vulnerability of the public water supply depends in part on its groundwater vulnerability. *Groundwater vulnerability* is the likelihood that a contaminant will reach a specified position – such as the water table or the depths used for public-water supply – in a groundwater-flow system (National Research Council 1993). This vulnerability can be further

refined. A *specific vulnerability* is contaminant-specific; if the assessment is for contamination in general, it is considered *intrinsic vulnerability*. The three factors influencing groundwater vulnerability are:

1. The presence of manmade and/or natural contaminant sources;
2. The combination of chemical and physical surficial and subsurface processes that affect contaminant concentrations; and
3. The ease with which water and contaminants can travel to and through an aquifer (this is the *intrinsic susceptibility* of the groundwater resource).

Groundwater vulnerability is a function not only of the properties of the groundwater flow system but also of the proximity of contaminant sources, relative location of the water source, and the rate and transport of the contaminant(s). In addition to the factors influencing groundwater vulnerability, a public water supply's vulnerability also depends on how the water source is captured and used – specifically, its location, design, construction, operation, and maintenance.

For the source water assessment in 2004, NMED used the Designated Fixed Radius method to delineate the Village's SWP Area around the Phoenix Spring Infiltration Gallery. Zones of 200, 500, and 1000 feet around the infiltration gallery were surveyed for potential contaminants (NMED 2004). While the fixed radius method is an inexpensive way to circumscribe a clearly delineated area associated with groundwater supply systems, it does not represent actual groundwater capture zones for the source. It does not address all three factors influencing groundwater vulnerability or the rate or transport of potential contaminants.

Critically, because they are springs, the Phoenix Spring Infiltration Gallery and Gunsite Spring are not conventional groundwater systems. The factors influencing the intrinsic susceptibility of these springs are not necessarily those assessed for groundwater systems.

Graham conducted internet research to identify other SWP Plans with springs and infiltration galleries as examples of how SWP Areas were delineated. Those SWP Plans typically adopted a general groundwater or surface water approach, depending on whether the water system was classified as groundwater, surface water, or groundwater under the direct influence of surface water. The SWP Team considered a more detailed approach to delineating the SWP Area, and zones within it, for the Phoenix Spring Infiltration Gallery and Gunsite Spring. This approach was informed by the hydrogeological investigations of the springs and the general vicinity and, potentially, time-of-travel (TOT). *Time-of-travel* in this case refers to the travel time for water flow. While TOT can be calculated for specific contaminants at specific locations, for the purposes of this SWP Plan, the emphasis is on the time that it would take a given amount of water to enter the public water system – e.g., the infiltration gallery. Appendix B contains information on these approaches.

The SWP Team considered these approaches inadequate for delineating the VTSV Region SWP Areas and Zones. In the end, the SWP Team agreed on an approach to the delineations that is both more pragmatic and tailored to the Phoenix Spring Infiltration Gallery and the Gunsite Spring. It is based on an understanding of the geohydrology while considering NMED's recommended areas. Currently, each SWP Area is defined in terms of two zones – Zone A and Zone B (Figures 3-5).

- Zone A is the area immediately around the water source, extending out 100 ft downgradient and 200 ft laterally. Zone A extends 300 ft upgradient for both the Phoenix Spring Infiltration Gallery and the Gunsite Spring.
    - Outdoor recreation activities and existing roads and trails are allowed but no new construction or ground disturbance that might affect the underground spring system are permitted.
    - Essential management activities including access to and maintenance of the chlorination station, routine activities related to ski management, and ongoing forest management to reduce wildfire risk are permitted.
- Zone B for the Phoenix Spring Infiltration Gallery extends to the ridgeline above Williams Lake. Zone B for the Gunsite Spring is the springshed area upgradient of the Gunsite Spring, extending into Taos Land and Cattle Company I, LLC land to the top ridge of Frazer Mountain.
    - The Village has indicated that it will consider designating a SWPP Overlay Zone and establish a permitting process to evaluate development activities on a case-by-case basis.

The SWP Areas cover extensive areas, and the SWP Team recognizes that certain activities might be more likely to impact the source water depending on their distance and location from the source. We decided that addressing many of these activities as PSOCs are best handled on a case-by-case basis, employing BMPs. We reviewed the activity-related PSOCs and assessed the BMPs for each. These issues are discussed in the next sections and Tables 3-11. The Village may choose to use the information in this SWP Plan to inform its ordinances and permitting processes. Additionally, TSVI, Shopoff, and Taos Land and Cattle Company I, LLC can use the information for their land use planning.

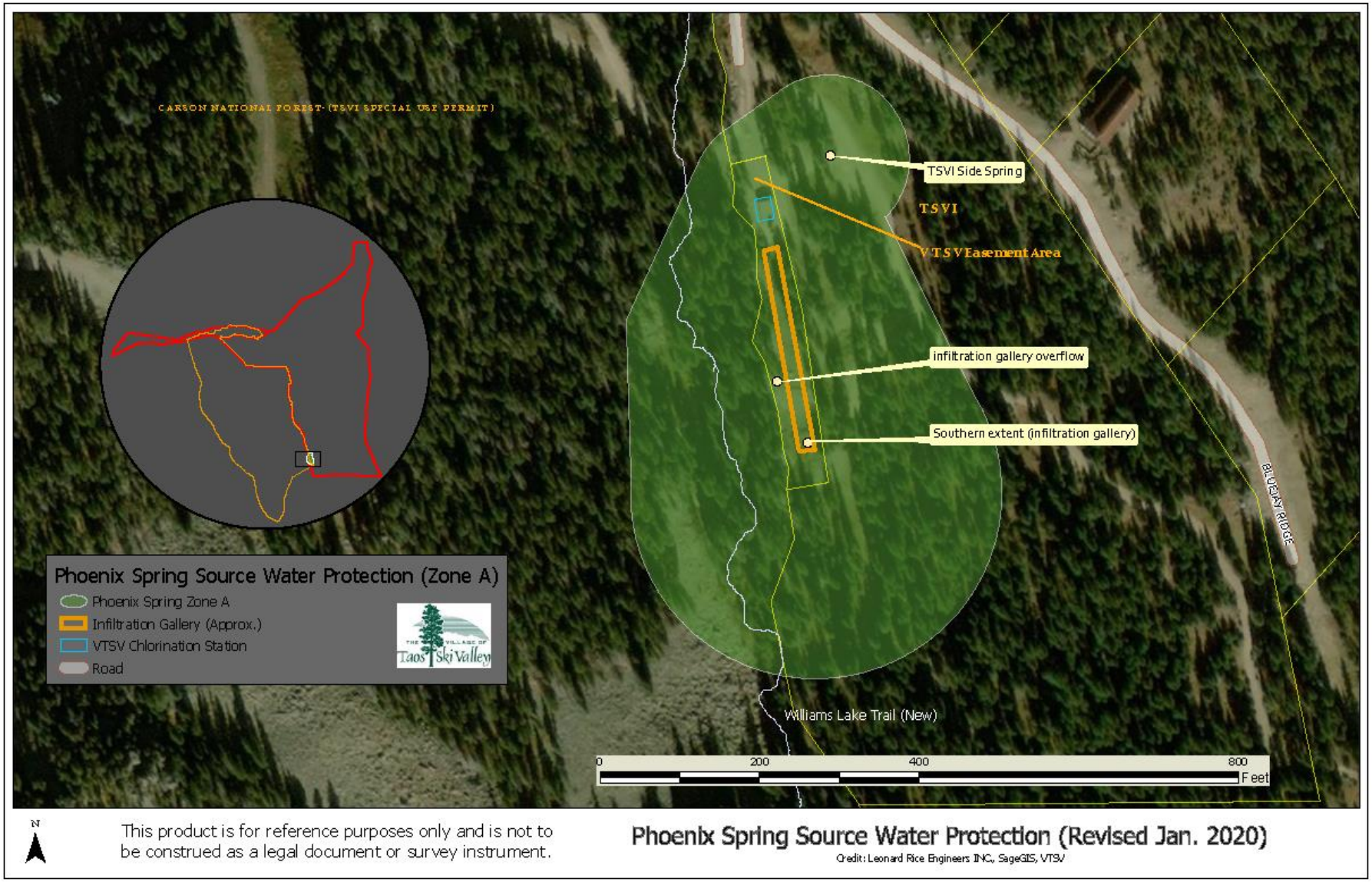

Figure 3. Zone A - Phoenix Infiltration Gallery. Note existing roads and trails in Zone A.

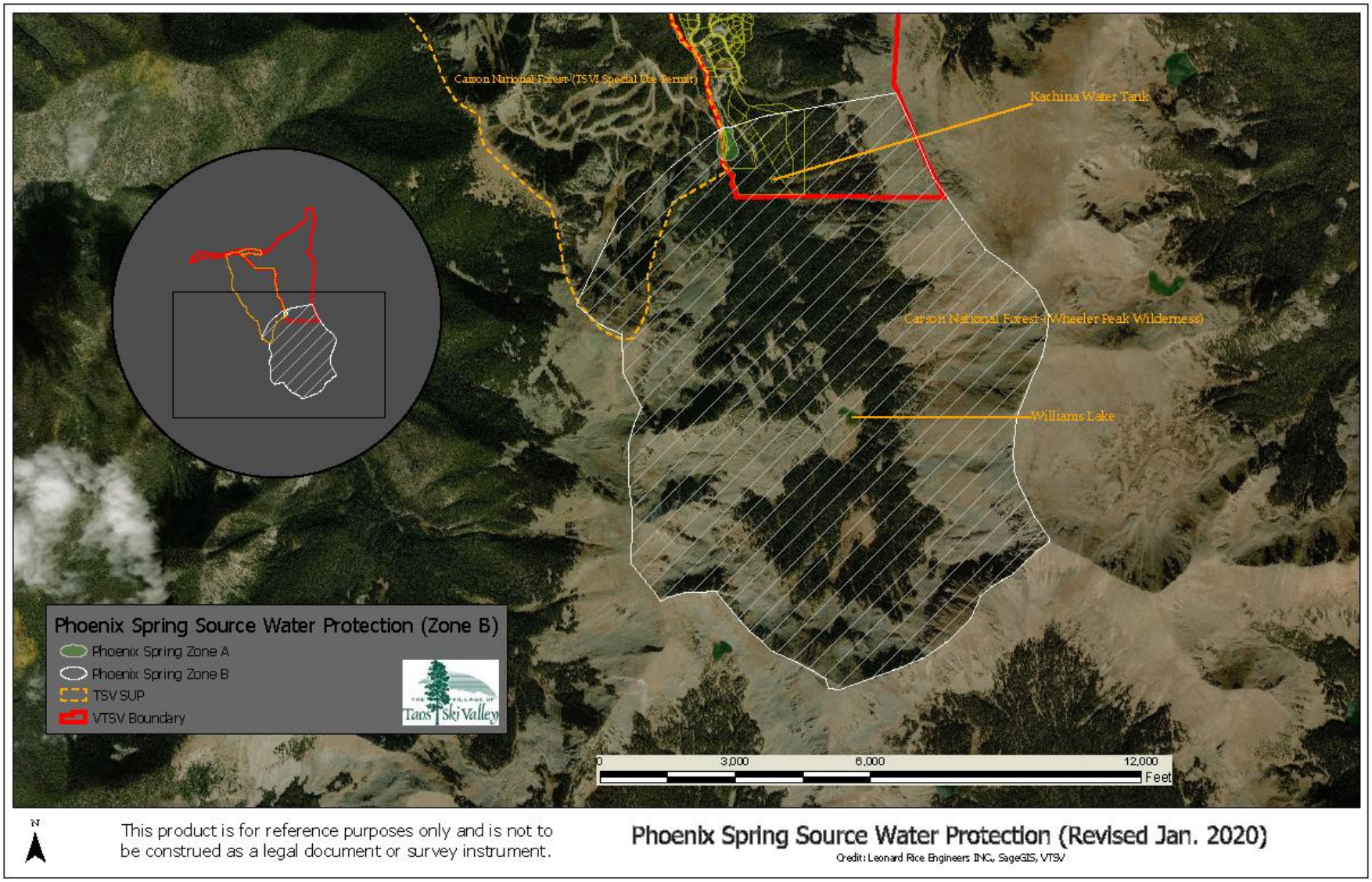

Figure 4. Zone B - Phoenix Infiltration Gallery

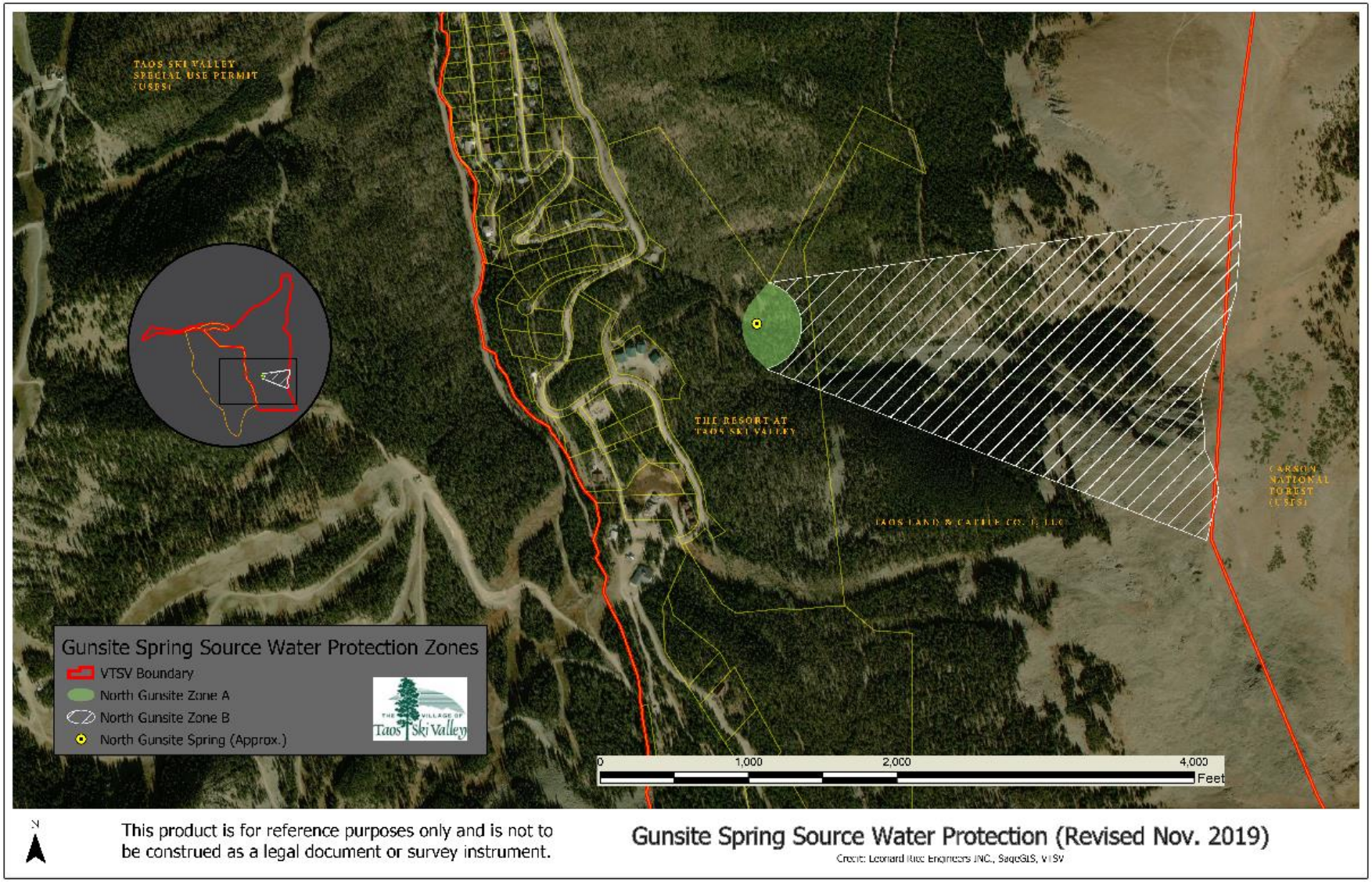

Figure 5. Zones A and B - Gunsite Spring.

4 Potential Sources of Contamination

4.1 Sources of Contamination

The third step in creating a SWP Plan is to identify any PSOCs and other issues of concern to the system's drinking water within the SWP Zones. The SWP Plan then identifies ways to safeguard the area from these PSOCs as part of the multi-barrier approach to protecting Taos Ski Valley's drinking water resources.

A *PSOC* is any facility or activity that stores, uses, or produces, as a product or by-product, SWDA-regulated contaminants with the potential for release of contaminants, under any circumstance and time frame, that could pose a concern relative to drinking water sources. The most direct pathway of contamination into an aquifer is through surface water seepage, such as storm water run-off.

It is important to understand that a release may never occur from a potential contaminant source, particularly if BMPs are being used. Many PSOCs are regulated at the Federal or State level, or both, to reduce the risk of release. When a business facility or other property is identified as having a PSOC, it should not be interpreted to mean that it is in violation of any local, State, or Federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation.

Contamination can enter a water system through point source or nonpoint source (NPS) pollutants. *Point source pollution* is "any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged" (EPA n.d.).

Nonpoint source pollution is "any source of water pollution that does not meet the legal definition of 'point source' in Section 502(14) of the Clean Water Act" (EPA n.d.). NPS pollution comes from many different sources. This type of pollution is caused by rainfall or snowmelt moving over and through the ground and subsurface. As the runoff moves and infiltrates, it picks up and carries away natural and human-made pollutants, depositing them into lakes, rivers, wetlands, coastal waters, and drinking water sources. Sediment from forest land runoff and eroding streambeds, precipitation, atmospheric deposition, drainage, and seepage or hydrologic modifications can result in NPS pollution. Storm water runoff from paved and unpaved roads is another example of NPS contamination, with the potential to introduce motor fuels, solvents, road salts, and automotive water into a SWP Area. Most surface water quality issues are caused by NPS water pollution. Nonpoint sources of contamination within a SWP Area have the potential to affect the drinking water supply adversely.

4.2 Inventory of Potential Contaminant Sources and Other Issues of Concern

Following is the inventory of PSOCs that the SWP Team developed through SWP Team meetings, discussions with knowledgeable individuals, and literature review (Tables 3-10). The SWP Team subsequently reviewed the inventory and other information in this SWP Plan and prioritized each PSOC to guide the implementation of the BMPs outlined in this Plan (Table 11).

The following approach and the text that explains it are taken from the Town of Telluride Source Water Protection Plan, San Miguel County, Colorado (Mihelich 2016). The text is used with permission and modified to apply to the Taos Ski Valley.

4.2.1 Priority Strategy of Potential Contaminant Sources and Other Issues of Concern

The prioritization ranking of each potential contaminant source or other issue of concern factored in the following criteria (as described below): the level of risk, the water system's control over the PSOC or issue of concern, and the BMPs associated with each item.

4.2.1.1 Risk

The level of risk for each contaminant source is a measure of the water source's potential exposure to contamination. When prioritizing, a water system may assign a higher priority ranking to a potential contaminant source that has a higher risk level than one of lower risk level shown in the Risk Assessment Matrix (Figure 6).

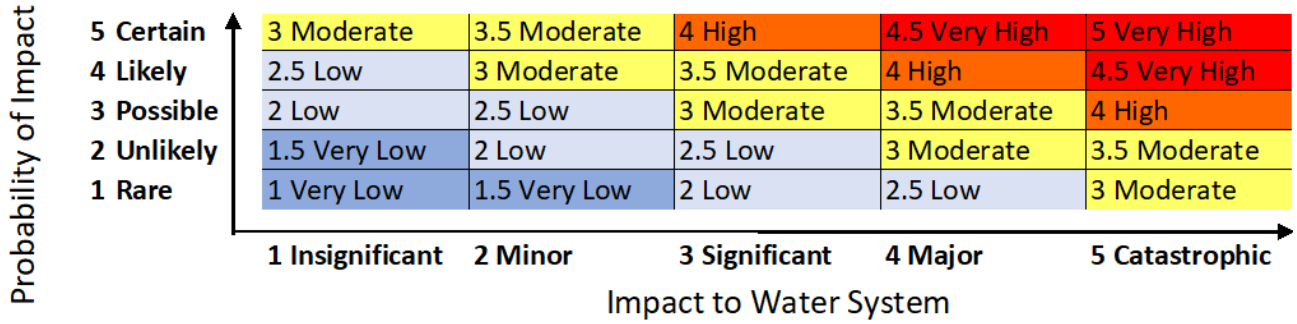

Figure 6. Risk Assessment Matrix (after the Colorado Rural Water Association's Source Water Assessment and Protection Program).

The Risk Assessment Matrix calculates the level of risk by estimating the following:

- Impact to the Public Water System – Risk to the source water increases as the impact to the water system increases. The impact is determined by evaluating the human health concerns and potential volume of the contaminant source. The following descriptions provide a framework to estimate the impact to the public water system.
    1. Insignificant - damage that may be too small or unimportant to be worth consideration but may need to be observed for worsening conditions. For example, the development of administrative procedures to maintain awareness of changing conditions.
    2. Minor - minor damage resulting in minimal, recoverable, or localized efforts. This could include temporarily shutting off an intake or well and/or the issuance of a boil order.
    3. Significant - moderate damage to the water source(s). This could include a loss of use for an extended period and/or the need for increased monitoring and/or maintenance activities.
    4. Major - substantial damage to the water source(s). This could include a loss of use for an extended period and/or the need for new treatment technologies.
    5. Catastrophic - irreversible damage to the water source(s). This could include the need for new treatment technologies and/or the replacement of existing water source(s).

- Probability of Impact – The risk to the source water increases as the relative probability of damage or loss increases. The probability of impact is determined by evaluating the number of contaminant sources, the migration potential or proximity to the water source, and the historical data. The following descriptions provide a framework to estimate the relative probability that damage or loss would occur within one to ten years.
    1. Rare: < 5% probability of impact
    2. Unlikely: > 5% to < 30% probability of impact
    3. Possible: > 30% to < 70% probability of impact
    4. Likely: > 70% to < 95% probability of impact
    5. Certain: > 95% probability of impact

4.2.1.2 Control

The level of water system *control* describes the ability of the water system to take measures to prevent contamination or minimize impact. A potential contaminant source that falls within a water system's authority (i.e. direct control) may be of higher priority since it can take direct measures to prevent contamination or minimize the impact.

- Direct Control – The water system can take direct measures to prevent contamination or minimize impact.
- Indirect Control – The water system cannot directly control the issue, but can work with another entity, agency, or person to take measures to prevent.
- No Control – The potential contaminant or issue of concern is outside the control of the public water system and other entities.

4.2.1.3 Priority

A Priority Matrix (Figure 7) was derived by using the level of risk (Figure 6) in conjunction with the level of Control to develop a Priority Matrix (Figure 7). Priority ranking were then assigned for each PSOC or issue of concern. The high priority ranked PSOCs were also informed and adjusted by SWP Team discussions.

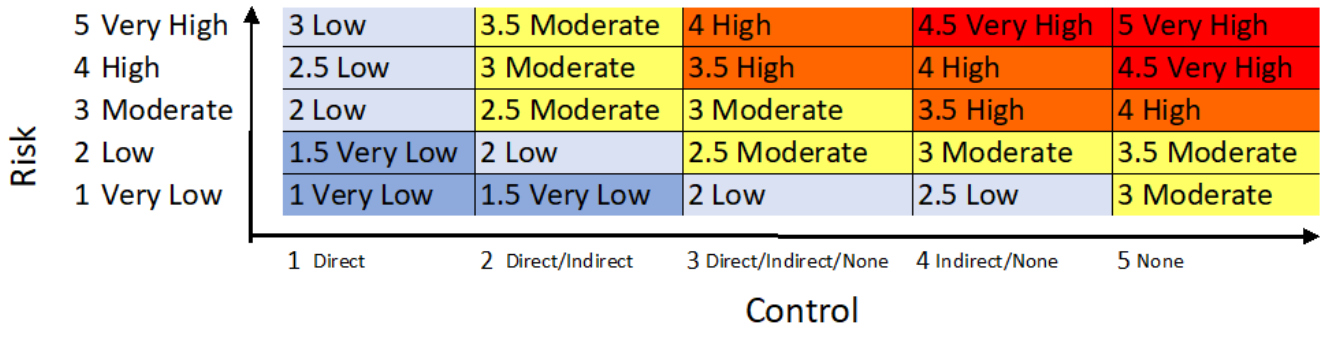

Figure 7. Priority Matrix. Note: A value of 4 was assigned when control was either Indirect or None.

Table 3. Potential Sources of Contamination for the Zone A – Phoenix Spring Infiltration Gallery. This table also shows what types of control the Village and its partners have over the PSOCs and assigns a Priority Ranking to them. *The values are the result of averaging the assessed numbers as provided by Elena Fernandez, Brian Rupp, Craig Taggart, Patrick Nicholson, and Paul Drakos. While this approach probably is not mathematically sound it serves to reflect the (usually minor) individual variation.*

Potential Source of Contamination	Types of Contaminants	Impact on Source water	Probability of Impact	Risk to Source water	Control	Priority
Agriculture and farming practices	Pesticides, Herbicides, Fertilizers, Nitrate, Ammonia, Chloride, Phosphate, Pathogens (e.g., Fecal coliform)	3 Moderate	1 Very Low	2 Low	1 Direct	1.5 Very Low
Animal corrals /pens and watering/feeding areas	Nitrate, Ammonia, Phosphate, Chloride, Pathogens (e.g., Fecal coliform), Pharmaceuticals, Fungicides	4.4 High	1 Very Low	3 Moderate	2 Direct/Indirect	2.5 Moderate
Avalanche control (e.g., in the dynamite shack below the spring and unexploded ordnance)	Explosives	1 Very Low	2 Low	1.5 Very Low	2 Direct/Indirect	1.75 Low
Equipment and machinery– storage, and maintenance (including snow cats, etc.) minor spills (less than 50 gallons)	Automotive Wastes, Welding Wastes, Fuels, Oils, Lubricants, Solvents, Gasoline, Diesel Fuels, Wood Treatment Chemicals, Paints, Varnishes, Explosives, Road Salt, Asphalt	3 Moderate	2 Low	2.5 Low	2 Direct/Indirect	2.2 Low
Equipment and machinery– use (including snow cats, etc.) minor spills (less than 50 gallons)	Automotive Wastes, Welding Wastes, Fuels, Oils, Lubricants, Solvents, Gasoline, Diesel Fuels, Wood Treatment Chemicals, Paints, Varnishes, Explosives, Road Salt, Asphalt	2 Low	2.4 Low	2.4 Low	2 Direct/Indirect	2.5 Moderate
Hazardous household waste	Chlorine, Potassium Chloride, Pharmaceuticals, Household Chemicals	3 Moderate	1 Very Low	2 Low	2 Direct/Indirect	2 Low
Historic mining	Metals, Inorganic Chemicals, Acids, Bases, Radiological Materials	3.4 Moderate	1 Very Low	1.4 Very Low	2 Direct/Indirect	2.0 Low
Illegal dumping (especially in/near arroyos, drainages, and streams)	Organic/Inorganic Chemicals, Automotive Wastes, Oil, Gasoline, Runoff from Adjacent Sites	4 High	2 Low	3.0 Moderate	3 Direct/Indirect/ No	3.0 Moderate
Outdoor recreation (general) • Hiking, skiing, hunting, and fishing • Camping and trailhead parking • Horseback riding and mountain biking	• Nitrate, Ammonia, Phosphate, Chloride, Pesticides, Pathogens • Septage, Gasoline, Pesticides, Organic/Inorganic Chemicals • Runoff, Pesticides, Fertilizer,	2 Low	4 High	3 Moderate	2 Direct/Indirect	2.5 Moderate

Table 3

Potential Source of Contamination	Types of Contaminants	Impact on Source water	Probability of Impact	Risk to Source water	Control	Priority
	Pathogens, Nitrate, Phosphate, Oil					
Outdoor recreation (winter) • Snowmaking • Ski area facilities Over-snow vehicles	• Runoff • Gasoline, Pesticides, Organic/Inorganic Chemicals, Runoff • Runoff, Pathogens, Fuels, Oils. Gasoline	2 Low	2.2 Low	2 Low	2 Direct/Indirect	2 Low
Pesticide application	Pesticides, Herbicides, Fertilizers, Nitrate, Ammonia, Chloride, Phosphate, Pathogens	3.2 Moderate	1.6 Very Low	2 Low	2 Direct/Indirect	2 Low
Petroleum storage tanks (UST and AST)	Gasoline, Diesel Fuel, Organic/Inorganic Chemicals	5 Very High	1.6 Very Low	3 Moderate	2 Direct/Indirect	2.5 Moderate
Roads	Pesticides, Gasoline, Diesel Fuels, Automotive Wastes, Organic/Inorganic Chemicals, PCB's, Sewage, Metals, Storm water Runoff, Pathogens	3 Moderate	1.6 Very Low	2 Low	2 Direct/Indirect	2 Low
Stormwater runoff	Pesticides, Herbicides, Fertilizers, Nitrate, Pathogens, Organic/Inorganic Chemicals, Automotive Wastes, Oil, Gasoline, Runoff from Adjacent Sites	2.2 Low	2 Low	2.1 Low	2 Direct/Indirect	2.05 Low
Trails	Septage, Gasoline, Pesticides, Organic/Inorganic Chemicals, Runoff, Fertilizer, Pathogens, Nitrate, Phosphate, Oil	2.2 Low	2.2 Low	2.2 Low	2 Direct/Indirect	2.1 Low
Wastewater systems (septic systems, sewer lines)	Septage, Septic Effluent, Pathogens, Nitrate, Ammonia, Chloride, Sewage, Pathogens, Metals, Organic/Inorganic Chemicals	4 High	1.6 Very Low	2.5 Low	1 Direct	1.75 Low
Water treatment plants	Organic/Inorganic Chemicals, Chlorine	1.2 Very Low	2.2 Low	1.4 Low	1 Direct	1.2 Very Low
Wildlife and livestock	Nitrate, Ammonia, Phosphate, Chloride, Pesticides, Pathogens (e.g., Fecal coliform)	2 Low	2 Low	2 Low	2 Direct/Indirect	2 Low

Table 4. Potential Sources of Contamination for the Zone B – Phoenix Spring Infiltration Gallery. This table also shows what types of control the Village and its partners have over the PSOCs and assigns a Priority Ranking to them. *The values are the result of averaging the assessed numbers as provided by Elena Fernandez, Brian Rupp, Craig Taggart, Patrick Nicholson, and Paul Drakos. While this approach probably is not mathematically sound it serves to reflect the (usually minor) individual variation.*

Potential Source of Contamination	Types of Contaminants	Impact on Source water	Probability of Impact	Risk to Source water	Control	Priority
Agriculture and farming practices	Pesticides, Herbicides, Fertilizers, Nitrate, Ammonia, Chloride, Phosphate, Pathogens (e.g., Fecal coliform)	2.4 Low	1.0 Very Low	1.8 Very Low-Low	1 Direct	1.4 Very Low
Animal corrals /pens and watering/feeding areas	Nitrate, Ammonia, Phosphate, Chloride, Pathogens (e.g., Fecal coliform), Pharmaceuticals, Fungicides	3.8 Moderate-High	1.0 Very Low	2.8 Low-Moderate	2 Direct/Indirect	2.4 Moderate
Avalanche control (e.g., in the dynamite shack below the spring and unexploded ordnance)	Explosives	1.0 Very Low	2.0 Low	1.5 Very Low	2 Direct/Indirect	1.8 Low
Equipment and machinery– storage, and maintenance (including snow cats, etc.) minor spills (less than 50 gallons)	Automotive Wastes, Welding Wastes, Fuels, Oils, Lubricants, Solvents, Gasoline, Diesel Fuels, Wood Treatment Chemicals, Paints, Varnishes, Explosives, Road Salt, Asphalt	2.3 Low	2.0 Low	2.5 Low	2 Direct/Indirect	1.9 Low
Equipment and machinery– use (including snow cats, etc.) minor spills (less than 50 gallons)	Automotive Wastes, Welding Wastes, Fuels, Oils, Lubricants, Solvents, Gasoline, Diesel Fuels, Wood Treatment Chemicals, Paints, Varnishes, Explosives, Road Salt, Asphalt	1.8 Very Low-Low	1.8 Very Low-Low	1.9 Very Low-Low	2 Direct/Indirect	2.3 Moderate
Hazardous household waste	Chlorine, Potassium Chloride, Pharmaceuticals, Household Chemicals	2.6 Low-Moderate	2.2 Low	2.6 Low-Moderate	2 Direct/Indirect	2.3 Low
Historic mining	Metals, Inorganic Chemicals, Acids, Bases, Radiological Materials	3.0 Moderate	1.0 Very Low	1.3 Very Low	2 Direct/Indirect	1.5 Very Low
Illegal dumping (especially in/near arroyos, drainages, and streams)	Organic/Inorganic Chemicals, Automotive Wastes, Oil, Gasoline, Runoff from Adjacent Sites	3.6 Moderate-High	2.0 Low	3.0 Moderate	3 Direct/Indirect /No	3.0 Moderate
Outdoor recreation (general) • Hiking, skiing, hunting, and fishing • Camping and trailhead parking • Horseback riding and mountain biking	• Nitrate, Ammonia, Phosphate, Chloride, Pesticides, Pathogens • Septage, Gasoline, Pesticides, Organic/Inorganic Chemicals Runoff, Pesticides, Fertilizer, Pathogens,	1.6 Very Low	4.0 High	3.0 Moderate	2 Direct/Indirect	2.5 Moderate

Table 4

Potential Source of Contamination	Types of Contaminants	Impact on Source water	Probability of Impact	Risk to Source water	Control	Priority
	Nitrate, Phosphate, Oil					
Outdoor recreation (winter) • Snowmaking • Ski area facilities • Over-snow vehicles	• Runoff • Gasoline, Pesticides, Organic/Inorganic Chemicals, Runoff • Runoff, Pathogens, Fuels, Oils. Gasoline	1.6 Very Low	2.0 Low	2.0 Low	2 Direct/Indirect	2.0 Low
Pesticide application	Pesticides, Herbicides, Fertilizers, Nitrate, Ammonia, Chloride, Phosphate, Pathogens	3.2 Moderate	1.0 Very Low	2.0 Low	2 Direct/Indirect	2.0 Low
Petroleum storage tanks (UST and AST)	Gasoline, Diesel Fuel, Organic/Inorganic Chemicals	5.0 Very High	1.0 Very Low	3.0 Moderate	2 Direct/Indirect	2.5 Moderate
Roads	Pesticides, Gasoline, Diesel Fuels, Automotive Wastes, Organic/Inorganic Chemicals, PCB's, Sewage, Metals, Storm water Runoff, Pathogens	3.0 Moderate	1.2 Very Low	2.1 Low	2 Direct/Indirect	2.1 Low
Stormwater runoff	Pesticides, Herbicides, Fertilizers, Nitrate, Pathogens, Organic/Inorganic Chemicals, Automotive Wastes, Oil, Gasoline, Runoff from Adjacent Sites	2.2 Low	1.0 Very Low	1.5 Very Low	2 Direct/Indirect	1.8 Low
Trails	Septage, Gasoline, Pesticides, Organic/Inorganic Chemicals, Runoff, Fertilizer, Pathogens, Nitrate, Phosphate, Oil	1.8 Very Low-Low	2.2 Low	2.3 Low	2 Direct/Indirect	2.1 Low
Wastewater systems (septic systems, sewer lines)	Septage, Septic Effluent, Pathogens, Nitrate, Ammonia, Chloride, Sewage, Pathogens, Metals, Organic/Inorganic Chemicals	4.0 High	1.2 Very Low	2.6 Low-Moderate	1 Direct	1.8 Low
Water treatment plants	Organic/Inorganic Chemicals, Chlorine	1.2 Very Low	1.2 Very Low	1.0 Very Low	1 Direct	1.0 Very Low
Wildlife and livestock	Nitrate, Ammonia, Phosphate, Chloride, Pesticides, Pathogens (e.g., Fecal coliform)	1.8 Very Low-Low	2.0 Low	1.9 Very Low-Low	2 Direct/Indirect	1.9 Low

Table 5. Other Issues of Concern for the Zone A – Phoenix Spring Infiltration Gallery. This table also shows what types of control the Village and its partners have over these Issues and assigns a Priority Ranking to them. *The values are the result of averaging the assessed numbers as provided by Elena Fernandez, Brian Rupp, Craig Taggart, Patrick Nicholson, and Paul Drakos. While this approach probably is not mathematically sound it serves to reflect the (usually minor) individual variation.*

Other Issues of Concern	Comments	Impact on Source water	Probability of Impact	Risk to Source water	Control	Priority
Avalanche	Damage to infrastructure; very low risks of PSOCs from avalanche control measures	2.8 Low-Moderate	1.0 Very Low	1.5 Very Low	3 Direct/Indirect/ No	2.0 Low
Flood	Floods and erosion can contribute to nonpoint source pollution of surface waters and damage infrastructure	3.4 Moderate	1.0 Very Low	2.2 Low	3 Direct/Indirect/ No	2.5 Moderate
Landslides	Typically, can occur on slopes steeper than 10-15 degrees. Damage to infrastructure, may affect water quality issues	3.0 Moderate	1.0 Very Low	2.0 Low	3 Direct/Indirect/ No	2.5 Moderate
Wildfire and postfire impacts	Damage to infrastructure through fire and postfire debris flows, heightened levels of turbidity, increases in heavy metals, possible water quality and quantity effects.	5.0 Very High	3.5 Moderate	4.3 High	3 Direct/Indirect/ No	3.6 High
Land development*	All land development is regulated w/in the VTSV.	4.0 High	3.0 Moderate	2.8 Low-Moderate PN: High	2 Direct/Indirect	2.6 Moderate PN: High

**SWP Team members have differing views as to whether to distinguish between all land development or unregulated land development, the extent to which either type of land development poses a risk to source water, and how effective BMPs are at avoiding, minimizing, or mitigating these risks.*

Table 6. Other Issues of Concern for the Zone B – Phoenix Spring Infiltration Gallery. This table also shows what types of control the Village and its partners have over these Issues and assigns a Priority Ranking to them. *The values are the result of averaging the assessed numbers as provided by Elena Fernandez, Brian Rupp, Craig Taggart, Patrick Nicholson, and Paul Drakos. While this approach probably is not mathematically sound it serves to reflect the (usually minor) individual variation.*

Other Issues of Concern	Comments	Impact on Source Water	Probability of Impact	Risk to Source Water	Control	Priority
Avalanche	Damage to infrastructure; very low risks of PSOCs from avalanche control measures	1.5 Very Low-Low	2.6 Low-Moderate	2.0 Low-Moderate	3 Direct/Indirect /No	2.5 Moderate
Flood	Floods and erosion can contribute to nonpoint source pollution of surface waters and damage infrastructure	3.0 Moderate	1.0 Very Low	2.0 Low	3 Direct/Indirect /No	2.5 Moderate
Landslides	Typically, can occur on slopes steeper than 10-15 degrees. Damage to infrastructure, may affect water quality issues	3.0 Moderate	1.0 Very Low	2.0 Low	3 Direct/Indirect /No	2.5 Moderate
Wildfire and postfire impacts	Damage to infrastructure through fire and postfire debris flows, heightened levels of turbidity, increases in heavy metals, possible water quality and quantity effects.	5.0 Very High	4.0 High	4.5 High	3 Direct/Indirect /No	3.8 High
Land development*	Possible cumulative and/or compounded effects from the PSOCs and natural disasters.	3.0 Moderate	3.0 Moderate	2.4 Low PN: Moderate	3 Direct/Indirect /No	2.7 Moderate

**SWP Team members have differing views as to whether to distinguish between all land development or unregulated land development, the extent to which either type of land development poses a risk to source water, and how effective BMPs are at avoiding, minimizing, or mitigating these risks.*

Table 7. Potential Sources of Contamination for the Zone A – Gunsite Spring. This table also shows what types of control the Village and its partners have over the PSOCs and assigns a Priority Ranking to them. *The values are the result of averaging the assessed numbers as provided by Elena Fernandez, Brian Rupp, Craig Taggart, Patrick Nicholson, and Paul Drakos. While this approach probably is not mathematically sound it serves to reflect the (usually minor) individual variation.*

Potential Source of Contamination	Types of Contaminants	Impact on Source water	Probability of Impact	Risk to Source water	Control	Priority
Agriculture and farming practices	Pesticides, Herbicides, Fertilizers, Nitrate, Ammonia, Chloride, Phosphate, Pathogens (e.g., Fecal coliform)	3.0 Moderate	1.0 Very Low	2.0 Low	1 Direct	1.5 Low
Animal corrals /pens and watering/feeding areas	Nitrate, Ammonia, Phosphate, Chloride, Pathogens (e.g., Fecal coliform), Pharmaceuticals, Fungicides	4.5 High	2.0 Low	3.0 Moderate	2 Direct/Indirect	3.0 Moderate
Avalanche control (e.g., in the dynamite shack below the spring and unexploded ordnance)	Explosives	1.0 Very Low	2.0 Low	1.1 Very Low	2 Direct/Indirect	1.6 Low
Equipment and machinery– storage, and maintenance (including snow cats, etc.) minor spills (less than 50 gallons)	Automotive Wastes, Welding Wastes, Fuels, Oils, Lubricants, Solvents, Gasoline, Diesel Fuels, Wood Treatment Chemicals, Paints, Varnishes, Explosives, Road Salt, Asphalt	2.8 Low-Moderate	2.5 Low	2.5 Low	2 Direct/Indirect	2.0 Low
Equipment and machinery– use (including snow cats, etc.) minor spills (less than 50 gallons)	Automotive Wastes, Welding Wastes, Fuels, Oils, Lubricants, Solvents, Gasoline, Diesel Fuels, Wood Treatment Chemicals, Paints, Varnishes, Explosives, Road Salt, Asphalt	2.0 Low	2.0 Low	2.0 Low	2 Direct/Indirect	2.3 Low
Hazardous household waste	Chlorine, Potassium Chloride, Pharmaceuticals, Household Chemicals	3.0 Moderate	1.3 Very Low	2.3 Low	2 Direct/Indirect	2.1 Low
Historic mining	Metals, Inorganic Chemicals, Acids, Bases, Radiological Materials	3.0 Moderate	1.5 Very Low	1.5 Very Low	4 Indirect	2.8 Moderate
Illegal dumping (especially in/near arroyos, drainages, and streams)	Organic/Inorganic Chemicals, Automotive Wastes, Oil, Gasoline, Runoff from Adjacent Sites	4.0 High	3.0	Moderate 4.1 High	2 Direct/Indirect	3.6 High
Outdoor recreation (general) • Hiking, skiing, hunting, and fishing • Camping and trailhead parking • Horseback riding and mountain biking	• Nitrate, Ammonia, Phosphate, Chloride, Pesticides, Pathogens • Septage, Gasoline, Pesticides, Organic/Inorganic Chemicals	2.0 Low	3.5	1.8 Very Low 3.0 Moderate	2 Direct/Indirect	2.5 Moderate

Table 7

Potential Source of Contamination	Types of Contaminants	Impact on Source water	Probability of Impact	Risk to Source water	Control	Priority
	• Runoff, Pesticides, Fertilizer, Pathogens, Nitrate, Phosphate, Oil					
Outdoor recreation (winter) • Snowmaking • Ski area facilities • Over-snow vehicles	• Runoff • Gasoline, Pesticides, Organic/Inorganic Chemicals, Runoff • Runoff, Pathogens, Fuels, Oils. Gasoline	2.0 Low		1.9 Very Low-Low	2 Direct/Indirect	1.9 Low
Pesticide application	Pesticides, Herbicides, Fertilizers, Nitrate, Ammonia, Chloride, Phosphate, Pathogens	3.3 Moderate	1.0 Very Low	1.8 Very Low-Low	2 Direct/Indirect	1.9 Low
Petroleum storage tanks (UST and AST)	Gasoline, Diesel Fuel, Organic/Inorganic Chemicals	5.0 Very High	1.0 Very Low	2.5 Low	2 Direct/Indirect	2.3 Low
Roads	Pesticides, Gasoline, Diesel Fuels, Automotive Wastes, Organic/Inorganic Chemicals, PCB's, Sewage, Metals, Storm water Runoff, Pathogens	3.0 Moderate	1.0 Very Low	1.8 Very Low-Low	2 Direct/Indirect	1.9 Low
Stormwater runoff	Pesticides, Herbicides, Fertilizers, Nitrate, Pathogens, Organic/Inorganic Chemicals, Automotive Wastes, Oil, Gasoline, Runoff from Adjacent Sites	2.3 Low	2.0 Low	2.0 1.8	2 Direct/Indirect	2.0 Low
Trails	Septage, Gasoline, Pesticides, Organic/Inorganic Chemicals, Runoff, Fertilizer, Pathogens, Nitrate, Phosphate, Oil	2.3 Low	2.3 Low	2.0 Low	2 Direct/Indirect	2.0 Low
Wastewater systems (septic systems, sewer lines)	Septage, Septic Effluent, Pathogens, Nitrate, Ammonia, Chloride, Sewage, Pathogens, Metals, Organic/Inorganic Chemicals	4.0 High	1.0 Very Low	1.6 Very Low-Low	1 Direct	1.3 Very Low
Water treatment plants	Organic/Inorganic Chemicals, Chlorine	2.8 Low-Moderate	1.8 Very Low-Low	1.9 Very Low-Low	1 Direct	1.4 Very Low
Wildlife and livestock	Nitrate, Ammonia, Phosphate, Chloride, Pesticides, Pathogens (e.g., Fecal coliform)	1.8 Very Low-Low	2.0 Low	1.5 Very Low	2 Direct/Indirect	1.8 Low

Table 8. Potential Sources of Contamination for the Zone B – Gunsite Spring. This table also shows what types of control the Village and its partners have over the PSOCs and assigns a Priority Ranking to them. *The values are the result of averaging the assessed numbers as provided by Elena Fernandez, Brian Rupp, Craig Taggart, Patrick Nicholson, and Paul Drakos. While this approach probably is not mathematically sound it serves to reflect the (usually minor) individual variation.*

Potential Source of Contamination	Types of Contaminants	Impact on Source water	Probability of Impact	Risk to Source water	Control	Priority
Agriculture and farming practices	Pesticides, Herbicides, Fertilizers, Nitrate, Ammonia, Chloride, Phosphate, Pathogens (e.g., Fecal coliform)	2.5 Low	1.0 Very Low	1.5 Very Low	1 Direct	1.6 Low
Animal corrals /pens and watering/feeding areas	Nitrate, Ammonia, Phosphate, Chloride, Pathogens (e.g., Fecal coliform), Pharmaceuticals, Fungicides	4 High	1.75 Very Low-Low	2.5 Low	2 Direct/Indirect	1.9 Low
Avalanche control (e.g., in the dynamite shack below the spring and unexploded ordnance)	Explosives	1 Very Low	2 Low	1.125 Very Low	2 Direct/Indirect	2.1 Low
Equipment and machinery– storage, and maintenance (including snow cats, etc.) minor spills (less than 50 gallons)	Automotive Wastes, Welding Wastes, Fuels, Oils, Lubricants, Solvents, Gasoline, Diesel Fuels, Wood Treatment Chemicals, Paints, Varnishes, Explosives, Road Salt, Asphalt	2.3 Low	2.0 Low	2.3 Low	2 Direct/Indirect	1.8 Low
Equipment and machinery– use (including snow cats, etc.) minor spills (less than 50 gallons)	Automotive Wastes, Welding Wastes, Fuels, Oils, Lubricants, Solvents, Gasoline, Diesel Fuels, Wood Treatment Chemicals, Paints, Varnishes, Explosives, Road Salt, Asphalt	1.75 Very Low-Low	2 Low	1.75 Very Low-Low	2 Direct/Indirect	2.0 Low
Hazardous household waste	Chlorine, Potassium Chloride, Pharmaceuticals, Household Chemicals	2.75 Low-Moderate	1.5 Very Low	2.375 Low	2 Direct/Indirect	3.3 Moderate
Historic mining	Metals, Inorganic Chemicals, Acids, Bases, Radiological Materials	2.5 Low	1.0 Very Low	1.3 Very Low	Indirect	2.4 Low
Illegal dumping (especially in/near arroyos, drainages, and streams)	Organic/Inorganic Chemicals, Automotive Wastes, Oil, Gasoline, Runoff from Adjacent Sites	3.75 Moderate-High	3 Moderate	3.625 Moderate-High	3 Direct/Indirect /No	1.3 Very Low
Outdoor recreation (general) • Hiking, skiing, hunting, and fishing • Camping and trailhead parking • Horseback riding and mountain	• Nitrate, Ammonia, Phosphate, Chloride, Pesticides, Pathogens • Septage, Gasoline, Pesticides,	1.75 Very Low-Low	3.5 Moderate	2.75 Low-Moderate	2 Direct/Indirect	2.2 Low

Table 8

Potential Source of Contamination	Types of Contaminants	Impact on Source water	Probability of Impact	Risk to Source water	Control	Priority
biking	Organic/Inorganic Chemicals • Runoff, Pesticides, Fertilizer, Pathogens, Nitrate, Phosphate, Oil					
Outdoor recreation (winter) • Snowmaking • Ski area facilities • Over-snow vehicles	 • Runoff • Gasoline, Pesticides, Organic/Inorganic Chemicals, Runoff • Runoff, Pathogens, Fuels, Oils. Gasoline	1.75 Very Low-Low	1.5 Very Low	1.875 Very Low-Low	2 Direct/Indirect	2.6 Low
Pesticide application	Pesticides, Herbicides, Fertilizers, Nitrate, Ammonia, Chloride, Phosphate, Pathogens	3.25 Moderate	1 Very Low	2 Low	2 Direct/Indirect	1.9 Low
Petroleum storage tanks (UST and AST)	Gasoline, Diesel Fuel, Organic/Inorganic Chemicals	5 Very High	1 Very Low	2.75 Low-Moderate	2 Direct/Indirect	2.0 Low
Roads	Pesticides, Gasoline, Diesel Fuels, Automotive Wastes, Organic/Inorganic Chemicals, PCB's, Sewage, Metals, Storm water Runoff, Pathogens	3 Moderate	1 Very Low	2 Low	2 Direct/Indirect	2.4 Low
Stormwater runoff	Pesticides, Herbicides, Fertilizers, Nitrate, Pathogens, Organic/Inorganic Chemicals, Automotive Wastes, Oil, Gasoline, Runoff from Adjacent Sites	2.3 Low	1.3 Very Low	1.9 Very Low-Low	2 Direct/Indirect	2.0 Low
Trails	Septage, Gasoline, Pesticides, Organic/Inorganic Chemicals, Runoff, Fertilizer, Pathogens, Nitrate, Phosphate, Oil	2.0 Low	2.0 Low	1.6 Very Low-Low	2 Direct/Indirect	1.9 Low
Wastewater systems (septic systems, sewer lines)	Septage, Septic Effluent, Pathogens, Nitrate, Ammonia, Chloride, Sewage, Pathogens, Metals, Organic/Inorganic Chemicals	4 High	1.25 Very Low	2.375 Low-Moderate	1 Direct	1.7 low
Water treatment plants	Organic/Inorganic Chemicals, Chlorine	3 Moderate	1 Very Low	1.875 Very Low-Low	1 Direct	1.4 Very Low
Wildlife and livestock	Nitrate, Ammonia, Phosphate, Chloride, Pesticides, Pathogens (e.g., Fecal coliform)	1.75 Very Low-Low	2 Low	2 Low	2 Direct/Indirect	2.3 Low

Table 9. Other Issues of Concern for the Zone A – Gunsite Spring. This table also shows what types of control the Village and its partners have over these Issues and assigns a Priority Ranking to them. *The values are the result of averaging the assessed numbers as provided by Elena Fernandez, Brian Rupp, Craig Taggart, Patrick Nicholson, and Paul Drakos. While this approach probably is not mathematically sound it serves to reflect the (usually minor) individual variation.*

Other Issues of Concern	Comments	Impact on Source water	Probability of Impact	Risk to Source water	Control	Priority
Avalanche	Damage to infrastructure; very low risks of PSOCs from avalanche control measures	2.8 Low-Moderate	2.2 Low	2.5 Low	3 Direct/Indirect/No	2.8 Moderate
Flood	Floods and erosion can contribute to nonpoint source pollution of surface waters and damage infrastructure	3.4 Moderate	2 Low	2.7 Low-Moderate	3 Direct/Indirect/No	2.9 Moderate
Landslides	Typically, can occur on slopes steeper than 10-15 degrees. Damage to infrastructure, may affect water quality issues	3 Moderate	2 Low	2.5 Low	3 Direct/Indirect/No	2.8 Moderate
Wildfire and postfire impacts	Damage to infrastructure through fire and postfire debris flows, heightened levels of turbidity, increases in heavy metals, possible water quality and quantity effects.	5 Very High	3.6 Moderate-High	4.3 High	3 Direct/Indirect/No	3.7 High
Land development*		4 High	3 Moderate	2.8 Low-Moderate	2 Direct/Indirect	2.4 Low PN: High

**SWP Team members have differing views as to whether to distinguish between all land development or unregulated land development, the extent to which either type of land development poses a risk to source water, and how effective BMPs are at avoiding, minimizing, or mitigating these risks.*

Table 10. Other Issues of Concern for the Zone B – Gunsite Spring. This table also shows what types of control the Village and its partners have over these Issues and assigns a Priority Ranking to them. *The values are the result of averaging the assessed numbers as provided by Elena Fernandez, Brian Rupp, Craig Taggart, Patrick Nicholson, and Paul Drakos. While this approach probably is not mathematically sound it serves to reflect the (usually minor) individual variation.*

Other Issues of Concern	Comments	Impact on Source water	Probability of Impact	Risk to Source water	Control	Priority
Avalanche	Damage to infrastructure; very low risks of PSOCs from avalanche control measures	2.8 Low-Moderate	2.6 Low-Moderate	2.8 Low-Moderate	3 Direct/Indirect/No	2.9 Moderate
Flood	Floods and erosion can contribute to nonpoint source pollution of surface waters and damage infrastructure	3.0 Moderate	2.0 Low	2.6 Low-Moderate	3 Direct/Indirect/No	2.8 Moderate
Landslides	Typically, can occur on slopes steeper than 10-15 degrees. Damage to infrastructure, may affect water quality issues	3.0 Moderate	2.0 Low	2.6 Low-Moderate	3 Direct/Indirect/No	2.8 Moderate
Wildfire and postfire impacts	Damage to infrastructure through fire and postfire debris flows, heightened levels of turbidity, increases in heavy metals, possible water quality and quantity effects.	5.0 Very High	4.0 High	4.6 High-Very High	3 Direct/Indirect/No	3.8 High
Land development*	Possible cumulative and/or compounded effects from the PSOCs and natural disasters.	3.3 Moderate	2.8 Low-Moderate	2.4 Low	3 Direct/Indirect/No	2.7 Moderate

**SWP Team members have differing views as to whether to distinguish between all land development or unregulated land development, the extent to which either type of land development poses a risk to source water, and how effective BMPs are at avoiding, minimizing, or mitigating these risks.*

4.3 Discussion of Potential Contaminant Sources and Issues of Concern

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

BMPs (*best management practices*) are actions that can be taken within the SWP Area to help reduce the potential risks of contamination to the community's source water. Prioritizing potential contaminant sources or issues of concern might be affected by the feasibility of implementing the BMPs that the SWP Team identified.

Agricultural and farming practices

Affects in SWP Areas are virtually non-existent. The Gunsite Spring is in areas zoned for "Recreation and Agriculture" according to the Village of Taos Ski Valley Comprehensive Plan 2017. It is unlikely that agricultural practices are occurring in this area currently. Future development around the spring will preclude agricultural practices. There is no agriculture around the Phoenix Spring Infiltration Gallery.

The use of pesticides, herbicides, fertilizers, and manures on agricultural lands can cause field leaching or runoff into surface and ground water. The two main components of fertilizer that are of greatest concern to source water quality are nitrogen and phosphorus. Nitrogen fertilizer is biologically transformed to nitrate that is highly soluble in water and can readily be absorbed and used by plants. Soluble nitrate is highly mobile and can move with water through the soil. Excess fertilizer uses and poor application methods on these fields can cause fertilizer movement into surface and groundwater.

Any chemicals should be properly selected and applied appropriately. Time the application of chemicals with periods of greatest crop uptake. Avoid using the chemicals near wells, drainages, and any type of surface waters. Store and dispose of the materials properly by following the directions on the label. Avoid bulk storage of these substances. Manage irrigation water so that runoff and leaching can be minimized.

Animal corrals/pens and watering/feeding areas

It is unlikely that any SWP Areas are affected; effects are virtually non-existent.

The USFS has permitted a guide and outfitter to conduct horseback rides on Carson NF lands. The horses (2 or 3) are typically held in a temporary corral on private lands in the Taos Ski Valley area.

Corrals, pens, and areas where livestock are kept can concentrate their waste. The environment can be affected by livestock waste through direct discharges, open feedlots, animal housing, and pastures. The greatest health concern from animal waste consists of pathogens such as Fecal coliform, Cryptosporidium and Giardia lamblia. These pathogens may cause serious gastrointestinal illness in healthy individuals but may be fatal in people who have weak immune systems. Animal waste may also have solids that increase turbidity and decrease the aesthetic

value of water. There is increasing evidence to suggest that domesticated animals in concentrated numbers may be responsible for elevated levels of hormones in some water sources.

Avalanche control

Impacts to SWP Areas are possible. Taos Ski Valley is a Class A Site: High Avalanche Hazard, meaning that the site has at least one high intermittent avalanche slide path or ten or more low intermittent avalanche areas. The Village also identifies three avalanche zones: Red (High Hazard), Blue (Moderate Hazard), and [TSVI] Control Area (VTSV 2017, e.g., Map 7). The Kachina Tank is at the base of an avalanche path.

Numerous avalanche paths of medium size or larger exist within the TSVI's SUP. These require constant monitoring and control work throughout the season. According to the *Forest Service Handbook No. 194, Snow Avalanches* (cited in TSV 2010), many of the slopes at TSVI have been classified as *low intermittent hazard,* having occasional exposure to avalanches of dangerous size. This rating is because of the protective measures that TSVI routinely applies.

TSVI uses multiple methods of avalanche control work. The ski patrol staff conduct testing and protective skiing over the terrain. Avalauncher guns control inaccessible areas and expedite control work done on skis. Blasting may be used in conjunction with the Avalauncher. Bombs are made of pentolite and TNT and use 90-second fuses and weigh between two and five pounds. In May 2018, the Carson NF approved TSVI's proposed Gazex Avalanche Mitigation System. The Gazex system operates by generating an explosion that produces carbon dioxide and water steam, creating a gaseous shockwave capable of releasing an avalanche. Neither waste nor noxious gas is discharged into the environment during this process.

According to the EPA (2014) most of a TNT charge degrades in the surface soil at the impact site. TNT has low water solubility, which limits its migration to water. Small quantities can reach shallow groundwater, although once released to surface waters TNT undergoes rapid transformation processes into byproducts.

Equipment and machinery – storage and maintenance

Impacts to SWP Areas are possible. Equipment and machinery typically are stored and maintained below any of the SWP Areas, making this an unlikely source of contamination. However, equipment is allowed in the SWP Areas to perform various maintenance tasks and forest treatments (see section on use below). Short-term on-site equipment storage might occur during these activities.

No construction equipment is stored or maintained within the VTSV Region SWP Areas. Facilities to store and maintain construction equipment are below the SWP Areas.

Chemicals stored or disposed of at a construction equipment facility could include motor and hydraulic oils, gasoline and diesel fuels, salt, magnesium chloride, paint, herbicides, and antifreeze. The storage, use, and disposal of these chemicals can pose a potential threat to water. Even small amounts of the chemicals can contaminate large amounts of surface or groundwater if not

contained or stored properly. Leaks and spills from storage tanks and pipes can contaminate water, rendering the water unfit for consumption.

On-site storage of equipment and machinery is discouraged. The conditions under which short-term on-site storage occurs – for example, when developing the Gunsite Spring or conducting forest treatments in the SWP Areas – should be explicitly identified and BMPs outlined and implemented. Safety protocols and BMPs should always be followed.

Equipment and machinery – use

Impacts to SWP Areas are possible. Snow cats groom the area adjacent, or on, a portion of the Phoenix Spring Infiltration Gallery. Equipment is allowed for maintenance and forest treatments within the SWP Areas. The use of equipment or machinery as part of development activities – for example in the development of the Gunsite Spring – needs to be carefully planned with explicit reference to how possible impacts to the source water will be avoided. Safety protocols and BMPs should always be followed.

Motor and hydraulic oils, gasoline and diesel fuels, salt, magnesium chloride, paint, herbicides, and antifreeze are chemicals that could be used by construction and snow grooming equipment. These chemicals can pose a potential threat to water. Even small amounts of the chemicals can contaminate large amounts of surface or groundwater if not contained or stored properly.

Special concern was expressed for snow grooming equipment that might travel near or over the infiltration gallery. Johnson and Brownell agreed to review the path of snow cats in this area and develop a strategy for establishing a boundary line for the snow cats.

Household hazardous waste

Impacts to the SWP Areas are possible where they overlap with residential areas. Generally, household hazardous waste occurs in relatively small amounts, making this an unlikely source of contamination.

Household products including motor oil, pesticides, left-over paint or paint cans, mothballs, flea collars, weed killers, household cleaners, and CFL light bulbs contain materials that can be harmful to drinking water. If these products are improperly used, stored, or disposed of, they may inadvertently contaminate the water. Leftover household products that can catch fire, react, or explode under certain circumstances, or that are corrosive or toxic, are considered household hazardous waste. Products such as paints, cleaners, oils, batteries, and pesticides can contain hazardous ingredients and require special care when disposing of them and are also considered household hazardous waste.

Pharmaceuticals – over-the-counter drugs and prescription medications, particularly hormones, antibiotics, and cancer medications – are most frequently detected in water in parts per trillion. Typically, wastewater treatments are not required, or designed, to address these drugs. The effect of pharmaceuticals in drinking water is a relatively new field of study, and there are still huge data gaps. There is growing concern among some about the effects of these pharmaceuticals on humans,

wildlife, and aquatic organisms. Pharmaceuticals can enter the environment through several routes. Unmetabolized drugs can pass through humans and animals and enter the environment. People have been advised to flush unused and expired medications down sinks or toilets. Drug users may flush drug stashes if they fear authorities may discover the stash.

Follow product instructions for storing and disposing of household chemicals. Contact *Earth911* for information on locations that receive or recycle various materials. Some pharmacies/drug stores and local police stations accept old or unused pharmaceuticals. Walgreens provides this service in several parts of New Mexico. The Drug Enforcement Agency organizes *Drug Take Back* Days twice yearly.

Historic mining

Impacts to SWP Areas appear to be minimal. All the mines in Taos Ski Valley are historic and inactive. None of the mines appear to be located where they could affect source water for the Phoenix Spring Infiltration Gallery or the Gunsite Spring. The Highline Prospect, an above ground test pit above the Bull of the Woods Spring, is the mining venture closest to the water sources included here.

Early mining practices allowed mine owners to abandon their mines without consideration of the impact on streams, water quality, slope stability and safety. Active and inactive mining operations have the potential to contaminate drinking water supplies from either point source discharges (i.e. mine drainage tunnels or flowing adits) or NPS discharges from run-off over waste rock or tailing piles.

The historic mining towns of Twining and Amizette are encompassed by the area now known as the Village of Taos Ski Valley. Copper and lode gold were the primary minerals mined. Except for some mine workings and open mine shafts, little evidence of mining remains in Taos Ski Valley. The concern about these abandoned mines would not be from active mining or tailings. Hazards would be more likely to come from flooding in abandoned tunnels that could cause landslides, or a wildfire event that could introduce radionuclides and heavy metals from ash, soils, and geologic sources in the burned area.

Illegal dumping in arroyos, drainages, and streams

Most illegal dumping occurs in less open areas, such as arroyos and drainages. Arroyos, drainages, and streams occur in the SWP Areas, but impacts to source water in Taos Ski Valley are minimal. Drainages near the Phoenix Spring Infiltration Gallery are unlikely to affect this source water. The Gunsite Spring is above most of these waterways and in an area of limited access and use. While impacts to source water might be minimal, the SWP Team identified this as one of its highest priorities, possibly because it is a greater concern in other parts of Taos County and the high value that SWP Team members and residents and visitors to Taos Ski Valley give to outdoor experiences.

Arroyos, riverside drains, ditches, acequias, and streams are intimately linked with their adjacent groundwater formations (groundwater under the influence of surface water). They are also convenient locations to illegally dump sewage and trash. Therefore, it is possible for contaminants to enter the aquifer through these waterways. Pesticides, fertilizers, salts, automotive and

refrigerant fluids, and human waste are contaminants associated with activities that typically occur close to waterways.

Within the VTSV Region SWP Areas, the most likely contaminants are human and animal waste and the illegal dumping of materials associated with camping and other outdoor activities. As entities in Taos Ski Valley expand outdoor recreation to more motorized vehicles, there will be an increase in the potential for accidental spills of automotive fluids and illegal dumping in or near arroyos and streams.

Outdoor recreation (general)

Various forms of outdoor recreation occur throughout the SWP Areas.

Outdoor recreational activities include camping, hiking, horseback riding, skiing, mountain biking, and off-road-vehicle or snow-mobile use where legal. These activities can pose threats to forested lands and streams. Potential impacts could include severely eroded soils, user-created unplanned roads, disrupted wetland ecosystems, and general habitat destruction and degraded water quality throughout forested lands. Untreated human and pet waste can enter and contaminate the water system.

The greater the proportion of National Forest System lands in a source water area, the greater the potential to be directly affected by USFS land use and management activities. The USFS Service has a mandate to manage lands for multiple use. This mandate requires balancing present and future resource use of domestic water supply needs with outdoor recreation; preservation of wildlife habitat, air and water, and other scenic and historical values; and environmentally responsible commercial development of the land and its resources. A substantial portion of the Taos Ski Valley – including parts of the SWP Areas – is under the Carson NF's management, most of it designated as wilderness. Motorized vehicles and equipment are not permitted in designated Wilderness areas. TSVI operates its ski resort and other recreational activities under a SUP with the Carson NF.

Generally, the impact of recreationists on water biology and chemistry is limited spatially to the areas closest to the recreation sites and temporally, occurring only during occupation of the sites. However, these impacts continue as long as the activities do. Camping sites along streams can be associated with physical and chemical impacts to the water regime, including increased soil compaction and a loss of vegetative cover that can result in higher runoff, and erosion rates. Biological and chemical changes from camping and hiking activities on water resources also can impact water quality. Specifically, studies have monitored levels of bacteria (e.g., fecal coliform bacteria), protozoans, and viruses such as Giardia, or Cryptosporidium. Improper disposal of human and pet waste can contaminate drinking water or harm human health through direct contact or through transmission of bacteria and viruses, although studies suggest that this potential is relatively small.

Outdoor recreation (winter)

Various forms of winter outdoor recreation occur throughout the SWP Areas. Some of TSVI ski resort and facilities are near the Phoenix Spring Infiltration Gallery, and snow cats groom near, or on its

edge. Outdoor recreating in the Gunsite Spring SWP Area is limited to non-motorized activities and does not include any of the specific activities listed in this section.

Snowmaking

TSVI draws water from the East Fork and does not use the municipal drinking water for its snowmaking. Snowmaking by TSVI may improve the downstream water supply, as water that normally would flow downstream in winter becomes part of the spring runoff instead. This spring runoff is available to irrigators (EPA 1981). TSVI has confirmed that no chemicals are used in its snowmaking operations (Peter Johnson, personal communication 2018).

Ski area facilities, including runs and lifts

A ski area and its operation are complex and can result in a variety of adverse effects to soil, water quality, and riparian resources. Ski area facilities include buildings, sanitary facilities, and other infrastructure. These facilities can be located at the base of the ski area, mid-slope, or at the top of the ski hill. Because downhill ski runs tend to be steep, extra precautions are needed to avoid or minimize accelerated erosion and resulting sedimentation. All TSVI ski related activities within the SUP area are closely regulated for environmental compliance by the Carson NF and NMED.

Over-snow vehicles

An over-snow vehicle is a motor vehicle that is designed for use over snow. It runs on a track(s) or ski(s). Over-snow vehicles include snowmobiles, snow cats, and snow grooming machines. Snowmobiles and snow cats are used for access and recreational activities. Snow grooming machines are used to prepare snow on trails for downhill or cross-country skiing or snowmobile use.

In use, over-snow vehicles result in different impacts to soil and water resources than do motor vehicles traveling over the ground. Unlike other motor vehicles traveling cross-country, over-snow vehicles generally do not create a permanent trail or have direct impact on soil and ground vegetation when snow depths are sufficient to protect the ground surface. Emissions from over-snow vehicles, particularly two-stroke engines on snowmobiles, release pollutants such as ammonium, sulfate, benzene, polycyclic aromatic hydrocarbons, and other toxic compounds that are stored in the snowpack. During spring snowmelt runoff, these accumulated pollutants are released and may be delivered to surrounding waterbodies.

As discussed above, TSVI and VTSV will work to minimize the likelihood that leaks of hydraulic or other fluids could affect the source water at the infiltration gallery, particularly with reference to grooming equipment at the base of the El Funko ski run..

Pesticide application

Excessive application of pesticides by a home or building owner could be of concern in the SWP Areas. More likely, pesticide applications that could affect source water would be pest abatement treatments designed to address beetle infestations that affect forest health or herbicides to treat noxious weeds. Most of the Phoenix Spring Infiltration Gallery's SWP Area is managed by the Carson NF, and the

Village and TSVI should coordinate with Forest managers on applying pesticides or herbicides in this area.

Property owners and government agencies use pesticides to protect forests, grasslands and meadows from damage or loss due to insects, weeds, and diseases. The major groups of pesticides include insecticides, herbicides, and fungicides. Herbicides are the most widely used class of agricultural and urban use pesticides, and so they are the pesticides most frequently found in ground and surface water. In areas with bark beetle infestations, other insecticides can also be present. Improper pesticide use has led to related illness in humans, wildlife losses, and water quality degradation. Commonly used management practices are not always BMPs and may result in small amounts of the pesticides contaminating ground and surface water supplies. Pesticide users need to exercise a high level of care and sound pesticide use management to avoid environmental and self-contamination.

Petroleum storage tanks

Permitted above ground storage tanks (AST) in the Village are beyond the limits of both SWP Areas. No one on the SWP Team expressed knowledge of any private aboveground gasoline storage tanks.

Releases from gasoline storage tanks are a serious concern because of their potential to contaminate public and private water supply sources. Gasoline contains a variety of compounds that pose serious health risks. It only takes a small amount of petroleum to contaminate ground or surface water. Gasoline can leak from tanks and descend through the unsaturated soil zone. Gasoline is lighter than water and generally floats on the water table, potentially closer to drinking water sources. Besides the potential for being consumed in drinking water, volatile organic compounds (VOCs) such as benzene, toluene, ethylbenzene, and xylene (BTEX) can enter nearby buildings. If buildings are poorly ventilated, the compounds can accumulate and pose additional health risks.

Privately owned ASTs that store vehicular fuel could be a concern because they may be old and subject to leakage. Farmers and business owners must report on-site storage of gasoline, fuel oil, or diesel totaling 10,000 pounds or more (1,333 gallons). As far as the SWP Team knows, there are no private ASTs in the SWP Areas.

Prevention of fuel spills and leaks is the most important management tactic in minimizing pollution. AST holders must also manage precipitation that falls into containment structures to avoid releasing contaminated runoff. While clean water may be released into the environment, contaminated water may not.

Roads

Currently only a few unpaved roads are near the Phoenix Spring Infiltration Gallery and the Gunsite Spring. Parking lots are significant distances below the water sources. Snow removal is accomplished through blading rather than using de-icing chemicals. The old Williams Lake Trail and the access road to the Phoenix Spring Infiltration Gallery and chlorination station are the only roads in Zone A of the Phoenix Spring Infiltration Gallery SWP Area. Blue Jay Ridge Road lies within Zone B of the

Phoenix Spring. An access road to the old avalanche gun site is in the Gunsite Spring SWP Area. Access to these roads is limited.

Both paved and unpaved road surfaces accumulate pollutants deposited from vehicles during travel. Typical pollutants associated with roads are nutrients, metals, oils and grease, salts, and VOCs. Road drainage systems also collect contaminants from atmospheric deposition, soil erosion, street dirt and liter, leaf litter and animal waste. Many of the substances that accumulate on roadways are toxic and have negative health effects on humans and the environment. When a storm event happens, these pollutants are washed from the road surface into nearby surface waters, or infiltrate groundwater. This is true especially for paved, impervious roads, but pollutants also accumulate and run from dirt roads. Potential spills of hazardous materials and fuels during transport or vehicular accidents are also a risk to water quality.

Stormwater runoff

All developed areas subject to the greatest stormwater runoff are below the Phoenix Spring Infiltration Gallery and the Gunsite Spring. As land development in the Village continues, aspects of the development that may contribute to stormwater runoff need to be taken into consideration and addressed, possibly through the Village's implementation of a stormwater management ordinance.

The need to manage stormwater is created by increased land development – residential, commercial and industrial – as impervious surfaces prevent rain from soaking into the soil and allow pollutants to accumulate. Development dramatically alters the local hydrologic cycle. During construction, trees and meadow grasses that intercept and absorb rainfall are removed and natural depressions that temporarily pond water are graded to a uniform slope. Cleared and graded sites are often severely compacted and reduce storm water infiltration into the ground surface. Construction and development also result in an increase in impervious surfaces such as rooftops, driveways, parking lots, and streets that prevent the stormwater from naturally soaking into the ground.

Stormwater management is the use of specific practices, constructed or natural, to reduce, temporarily detain, slow down and/or remove pollutants from stormwater runoff. Stormwater management focuses on controlling the volume and peak discharge-rate that increase dramatically when impervious surfaces cover an area.

Trees and forests improve stream quality and watershed health primarily by decreasing the amount of stormwater runoff and pollutants that reach local waters. Trees and forests reduce stormwater runoff by capturing and storing rainfall in the canopy and releasing water into the atmosphere through evapotranspiration. Tree roots and leaf litter create soil conditions that promote the infiltration of rainwater into the soil, which replenishes groundwater supplies and maintains streamflow. The most effective way to minimize the impacts of stormwater runoff is to limit the amount of impermeable surface and preserve the natural topography and vegetation to the greatest extent possible.

Trails

Trails are an important year-round recreational component in Taos Ski Valley. Pedestrian and horse trails have been a part of the area for some time. More recently, trails for motorized and non-motorized vehicles have become more common. Impacts to SWP Areas are likely. Appropriate design, use, and maintenance will minimize impacts.

Hiking, horseback riding, trail running, and mountain biking can cause ground compaction, gullying of tracks, increased ground and vegetation damage. Mountain bikes and ATVs can damage trails more than pedestrians or horses, and trails should be designed accordingly.

Excessive disturbance of vegetation and topsoil on the forest floor destroys filtering capacity, and soil compaction affects surface water infiltration. When surface water flows onto roads and trails, it creates man-made stream channels. Runoff increases in speed and volume as it flows downstream. Concentrated runoff: undermines slopes, tears away soil, destroys roads, overloads streams with sediment, damages streambanks and destroys aquatic habitat.

Healthy soils have soil aggregate stability and are resistant to the erosive forces of water and wind. These soils reduce nutrient loading and sediment runoff, increase efficiencies, and sustain wildlife habitat. Good vegetation cover and soil organic matter/structure and depth increase the infiltration rate. The water that flows across and through healthy soils from the upslope as runoff and subsurface flow to springs and aquifers is "clean" and is slowly released down slope.

Wastewater systems

Currently, only a few known single home septic systems may be within SWP Areas. The Village has a list of liquid waste permits from NMED for the area of Taos Ski Valley to review for accuracy and to confirm that there are no households on septic systems within the SWP Areas.

Improperly maintained or poorly constructed wastewater systems, including septic systems, are a potential source of ground water contaminants. Contaminants include, but are not limited to, coliform bacteria, nitrates, and household hazardous waste. Ground water contamination from septic tanks can cause waterborne disease outbreaks and other serious health effects. Bacteria and viruses present in the effluent can cause gastrointestinal illness, cholera, hepatitis A, blue baby syndrome, and typhoid if consumed. Inadequate operation and maintenance of septic systems can cause them to fail even if they have been installed properly.

The Clean Water Act (CWA) §402 establishes the NPDES permit program. The NPDES program is administered by the EPA in the State of New Mexico. The NMED Surface Water Quality Bureau, Point Source Regulation Section provides information about NPDES permits in New Mexico.

The Village operates and maintains the VTSV Wastewater Treatment Plant (WTP) under an NPDES permit. The plant is within the Arroyo Hondo Headwaters sub watershed but below the VTSV Region SWP Areas. The NMED regulates the treatment of this wastewater and the quality of water released after treatment. Past incidents involving the wastewater treatment plant affected water quality for communities downstream of VTSV. As a result, these communities have concerns about the quality of water coming from VTSV. Information on these incidents is publicly available. The

VTSV Director of Public Works is coordinating with the Rio Hondo Acequia Community (RHAC) directly to provide RHAC with information about water quality.

The VSTV Ordinance 2015-37 addresses septic tank and sewer use and regulations within the Village for liquid waste. The VSTV Ordinance mandates that residential lots located within 150 feet of a Village sewer line, including lots with existing septic systems, must connect to the Village sewer system. Residential lots located more than 150 feet from the Village may install an NMED approved septic system or connect to the Village system depending on development and installation fees. All septic systems must be properly maintained. The Village prohibits the use of non-NMED approved septic systems. According to the NMED's Environmental Health Bureau's online database, there are approximately 30 liquid waste permits in Taos Ski Valley. The NMED recognizes that this database is very unreliable; however, two permits that Graham checked are presently available in NMED's current logs.

Residents and businesses within the subdivision of Amizette are on individual septic systems. Members of the SWP Team have expressed concern about whether these systems are adequate, however no waste water problems are noted as of this date. This issue is a concern for the downstream communities as well. While this area is below the SWP Areas for both the Gunsite Spring and Phoenix Spring Infiltration Gallery, Mayor Brownell has expressed the Village's commitment to having the water that leaves the Village be of at least the same quality that it was when it entered.

VTSV also maintains portable toilets at the Williams Lake Trail parking lot. The SWP Team has discussed the feasibility and effectiveness of composting-toilets as an alternative to these portable toilets.

Water treatment plant

The only water treatment plant for the Village is below the Phoenix Spring Infiltration Gallery.

Wildlife and livestock

All SWP Areas are affected by wildlife, while most are not affected by livestock. The risk of either affecting VTSV's current or future drinking water sources is minimal.

Taos Ski Valley is home to many types of wildlife including bird, small mammals such as beaver and rodent species, and large mammals including deer, elk, and bear. These animals can impact riparian health, stream-channel conditions and water quality, although impacts from their activities are a very low risk to the VTSV Region's source water. The most common water quality impacts include pathogen contamination, sedimentation, and increased water temperatures from loss of vegetative stream coverage. 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 steep, erosive topography that is prone to gully formation. Wild birds and small mammals also can introduce microorganisms into a water supply through direct contact or from watershed runoff. Wildlife commonly associated with

microbial contamination of drinking water supplies includes deer, beavers, muskrats, rodents, and geese.

Livestock operators are authorized to graze on areas called allotments through an approved USFS grazing permit. Livestock is permitted on Carson NF lands adjacent to the Taos Ski Valley, outside of both Zones A and the expected impacts are low.

Generally, cattle grazing can impact riparian integrity, 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. 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.

4.4 Other Issues of Concern

In addition to PSOCs, the SWP Team has identified other issues of concern that could affect Taos Ski Valley's drinking water

4.4.1 Natural disasters

According to the 2017 Village of Taos Ski Valley Comprehensive Plan (VTSV 2017), Taos Ski Valley risks avalanches, extreme weather, floods and erosion, forest fires, and landslides as natural disasters. Of these, the SWP Team believes that wildfires and postfire impacts pose the greatest natural threats to Taos Ski Valley's drinking water, while avalanches, floods, and landslides are other natural disasters that could affect the Phoenix Spring Infiltration Gallery and the Gunsite Spring. Generally, these natural disasters can bury, damage, or destroy critical drinking water infrastructure. They can also affect water quality and quantity.

Avalanche

The diverse terrain features, varied aspects of the slopes, and about 3,000 feet total vertical relief are all factors contributing to Taos Ski Valley's classification as a Class A Site: High Avalanche Hazard. Mears, who conducted an avalanche study for the Village stated that: "The high elevations and steep topography (upper slopes range from 30-degree to 45-degree inclinations) are an ideal topographic setting for snow avalanches" (Mears 2000 cited in VTSV 2017).

Based on Mears's study, the Village identifies three Avalanche Zones – the Red Zone (High Hazard), Blue Zone (Moderate Hazard), and [TSVI] Control Area (VTSV 2017). TSVI initiates regular avalanche control in the [TSVI] Control Area. The Red Zone is the highest avalanche hazard, and "is effectively a no build zone" (VTSV 2017). Construction is permitted in the Blue Zone if appropriate design and avalanche prevention measures are taken.

The Phoenix Spring Infiltration Gallery appears to be outside of the identified avalanche zones. The new underground Kachina Tank is at the base of an active avalanche chute. The Gunsite Spring could be in the Blue Zone. The Village has permitting requirements in place for development in the Blue Zone.

Flood and erosion

While there is no flood hazard map for the Village, areas prone to flooding listed in the Village Plan appear to be below the SWP Areas for the Phoenix Spring Infiltration Gallery and the Gunsite Spring (VTSV 2017; see also Cunico 1980 cited in EPA 1981).

Landslides

Landslides are not uncommon in the Village. Slopes steeper than 10-15 degrees are most prone to landslides. The Phoenix Spring Infiltration Gallery is not vulnerable to landslides. Development of the Gunsite Spring would likely require addressing the potential for landslides. The Bureau of Geology has a 1:750,000-scale landslide susceptibility map that categorizes the VTSV area as "moderately likely susceptible" (https://geoinfo.nmt.edu/publications/openfile/details.cfml?Volume=594).

The Village has a variety of strategies regarding land development that would minimize the likelihood of the development contributing to landslides (VTSV 2017). These include clustering development and minimizing development that implements cut and fill. The Village discourages development on steep slopes and requires professional geotechnical engineering for structures on slopes greater than 15 percent.

A composite risk (historic mining, flooding, and landslides) that Pattison (R. Pattison, personal communication 2018) first raised is noted here. The priority of concern for this risk remains low or very low:

> A large landslide, apparently reactivated by seepage from abandoned mine workings, affected a number of homes near the Taos Ski Valley in 1979; remedial measures included installation of horizontal drains and diversion of surface water, which increased the preslide factor of safety of 0.92 to 1.28 (Haneberg 1992 citing Bennett 1979)

Wildfire and postfire impacts

All SWP Areas are vulnerable to wildfire and its postfire impacts. The Phoenix Spring Infiltration Gallery and the associated water treatment plant are of particular concern, since currently this spring is the sole drinking water source for the Village and its visitors. Forest treatments that TSVI undertook in 2018 around the Phoenix Spring Infiltration Gallery have significantly reduced the threat of wildfire and its impacts in this area, however. The area of the Gunsite Spring is also at risk, and as of September 2019, had not undergone any treatments.

Within the last decade, New Mexico has experienced wildfires for the greatest acreage burned and most property destroyed in its recorded history. The potential of catastrophic wildfire also means potential damage to infrastructure. Initial postfire impacts typically include flooding, landslides, and debris flows. A *debris flow* is basically a fast-moving, gravity-driven mixture consisting of a liquified, unconsolidated, and saturated mass of loose particles that move independently within the flow. Debris flows often behave like viscous slurries as they flow down slope. They are often of high-density solids – 60-80 percent by weight (Hutchinson 1988; Varnes 1978). As a debris flow picks up speed, it takes on the characteristics of a basic river system. The faster the water flows the

more mud and rocks the water can pick up, until it begins to resemble a fast-flowing river of mobilized solids that is similar in consistency and density to uncured concrete slurry. This wall of debris can move rapidly and can pick up large boulders and launch them along the path of the flow. The speed and enormity of carried materials is what makes a debris-flow very dangerous.

The *wildland/urban interface (WUI)* is the area where urban development and wildlands meet or intermingle, with the potential for human-environment conflicts. The WUI presents several opportunities for potential contamination of drinking water systems.

Sham, Tuccillo, and Rooke (2013) surveyed representatives of fire-impacted water systems in the United States, Canada, and Australia. Wildfire impacts are most devastating on drinking water systems whose source water is surface water. Wildfire can affect groundwater systems negatively, too. Figures 8 and 9 are taken from Sham, Tuccillo, and Rooke's Figures 3.6 and 3.7 (2013:56 and 57 respectively). These figures illustrate the types of long- and short-term damages that a drinking water system can sustain due to wildfire.

Wildfire and postfire debris-flow effects on a water system are highly variable, depending on factors ranging from the severity of the fire on the topography to the nature of the water system. Surface water systems are likely to experience more immediate and more long-term effects than are groundwater systems, although the infrastructure of both types of systems are vulnerable.

Effects after wildfire might be in the form of debris-flows affecting reservoirs, intakes, and other water treatment facilities (Sham, Tuccillo, and Rooke 2013). The first heavy rains could significantly affect water quality. Affects to water quality could include elevated turbidity, dissolved organic carbon, increased nitrogen and phosphorous, increased pH and alkalinity, and elevation of some heavy metals and minerals. One possible outcome of wildfire would be changes in how, or whether, the source water is treated. The water system may see watershed and water quality effects that last for over a year (Sham, Tuccillo, and Rooke 2013, citing Clark 2010).

New Mexico's recent fires and the resulting postfire debris flows have demonstrated that the aftereffects of wildland fire can be severe, and even more devastating than the fires themselves. The issues of wildland fire and postfire debris flows may not be limited to the upper reaches of the watershed or specific SWP Area zones.

Taos Ski Valley is extremely vulnerable to the threat of wildland fire and postfire debris flows. Much of Taos Ski Valley is in "subalpine conifer and aspen forests that historically burned with large (>640 ha) patches of high-severity fire" (Johnson and Margolin 2019). Some parts of Taos Ski Valley are known to have burned in a high-severity fire in 1842, but other parts do not show evidence of extensive burning since the 1650s (Johnson and Margolin 2019). While practices of fire prevention and suppression have changed in recent years, the accumulated fuel loads in Taos Ski Valley remain. Moreover, acres that are upslope in the SWP Areas are in the Wheeler Peak Wilderness area, with fewer options for proactive thinning or mechanical treatments to reduce fire hazard.

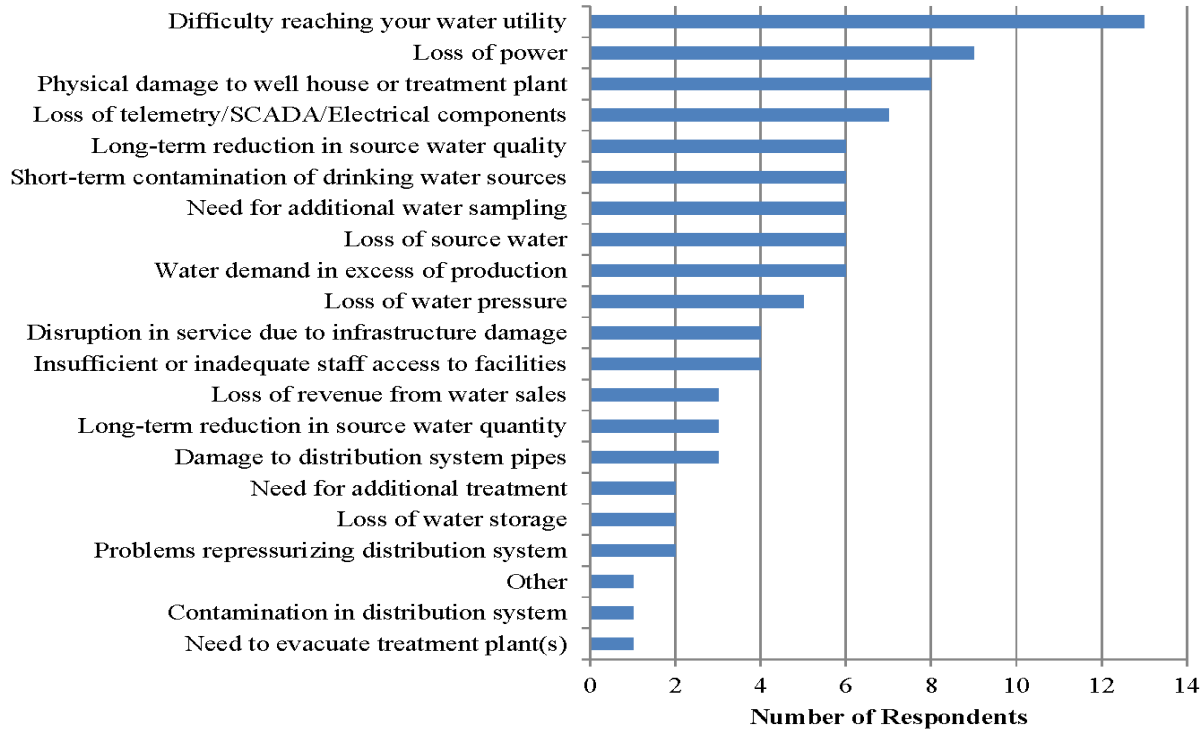

Figure 8. Damages Sustained by Drinking Water Utilities during a Wildfire (Sham et al. 2013).

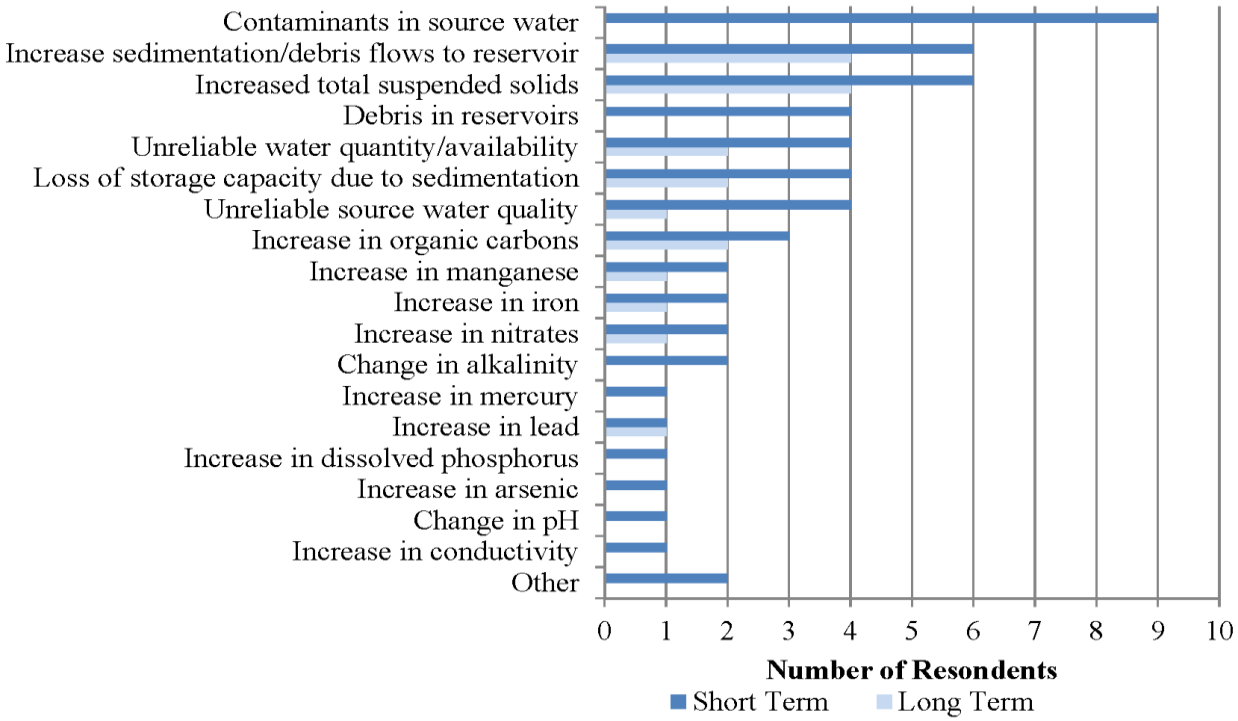

Figure 9. Short Term and Long-Term Impacts Resulting from Wildfire (Sham et al. 2013).

The Village has been proactive in addressing the threat of catastrophic wildfire in recent years. The Village received Firewise USA® status in 2014. It completed its Community Wildfire Protection Plan (CWPP) in 2016 (VTSV 2016). The Firewise Board is primarily responsible for monitoring implementation, including any new development in the WUI, and the wildfire prevention techniques used in the development's design. It has drafted a Firewise ordinance for the Village.

The CWPP focuses on the existing footprint of the Village (VTSV 2016). Map #12 (Fire Risk Assessments) "identifies all properties within the Village that are classified as extreme, high, medium, or low based on the degree of defensible space created within each property." Fire Risk in the currently developed part of the Kachina area, including the location of the Phoenix Spring Infiltration Gallery, is generally high to extreme, based on the pre-treatment conditions in 2016.

Currently, fire risk in the Village's undeveloped and recreational areas, which include the area of the Gunsite Spring, are unassessed. Base Maps #13 through #16 model aspects of fire behavior for the Village. These maps show the area of the Gunsite Spring as having the potential for higher (i.e., more extreme or more severe) fire behavior than some other parts of the Village. In planning development in these areas, the Village should consider when and how it addresses the issue of potential wildfire.

The VTSV Region SWP Plan incorporates currently undeveloped areas around the Gunsite Spring and the Phoenix Spring Infiltration Gallery into its SWP Areas. It appears that all SWP Areas would have about a 25-50% post-fire debris flow probability (Taos Valley Watershed Coalition 2015).

Amizette is below and outside of the SWP Areas for the Phoenix Spring Infiltration Gallery and the Gunsite Spring. The public and private wells in Amizette could also be affected by wildfire and its aftereffects, as could the wastewater (septic) systems in the subdivision. In 2018, the Carson NF treated this area as part of its Highway 150 Project (e.g., VTSV 2016, Map #3).

4.4.2 Land development

Land development may include various PSOCs and result in a cumulative impact on the water source. However, the Village has established both legal and procedural controls over development and maintains an active review of all proposed development. TSVI has no plans for land development in areas above and adjacent to the Phoenix Spring Infiltration Gallery. The Village plans to develop the Gunsite Spring as a drinking water source. Shopoff plans development on its lands in the Gunsite Spring Zone B downgradient of the Gunsite Spring, which could include recreational, residential, and commercial uses.

Of concern here is the possibility that land development could alter the landscape significantly and generate NPS pollution that could affect source water. Many of the PSOCs in Tables 3-10 can be associated with both short- and long-term land development, although individually they do not address specific long-term or cumulative effects that unregulated land development might have on a watershed. Land development by its very nature, generates increased access and human activity, which can lead to the introduction and accumulation of PSOCs. Regulatory approaches and BMPs play an important role in minimizing and mitigating these effects.

Protective ground water contamination prevention strategies are based in an understanding of geohydrologic and other processes. The strategies range from local regulations or ordinances to public education and voluntary action. A combination of regulatory and nonregulatory methods can manage PSOCs identified within VTSV Region SWP Areas.

From January 2019 to present, VTSV Region SWP meetings have spent considerable time discussing land development and its risk to the valley's source water, without coming to consensus on how to reconcile the various aspects of this issue. All members of the SWP Team have expressed their commitment to protecting the source water, including in the context of land development.

While the Village has indicated that it is considering various measures including overlays, permitting procedures, and ordinances to protect source water, many of these measures are not in place currently and cannot provide guidance for this SWP Plan. At the same time, the land developers may have pre-existing development and contractual entitlement rights that they could be reluctant to relinquish or jeopardize in this context.

As of the completion of the VTSV Region SWP Plan (February 27, 2020), there remains disagreement between the Village and some landowners on these issues. Addressing the authorities and limits of land use regulation are beyond the scope of the VTSV Region SWP Plan. Nevertheless, these issues have been a persistent source of discussion in SWP meetings, along with the fundamental definition of "land development,". The VTSV Region SWP Plan is not the place to resolve these differences.

4.5 Regulatory Approaches

Regulatory methods can include zoning ordinances that address land uses, design standards on new or existing facilities, and mandatory use of certain practices that reduce or prevent pollution. These existing Village Ordinances address aspects of source water protection, directly or indirectly:

- 5-37 Adopting regulations for septic tanks & sewer
- 15-38 Adopting regulations for water use
- 17-30 Adopting zoning regulations and a zoning map
- 10-25 Adopting comprehensive subdivision regulations

Additional regulatory considerations could be developed to aid in furthering the goals and implementation of the SWP Plan. Several communities in New Mexico have adopted water conservation and drought emergency resolutions or proclamations that help protect source water; for example, prohibiting the cleaning of hard surfaces limits runoff and minimizes this NPS pollution that might affect drinking water sources.

4.5.1 Regulatory approaches to land development and watershed protection

A viable community needs safe drinking water. The issue of land development and its possible impacts on the Village's drinking water sources is a consideration that the SWP Team discussed at length. Members of the SWP Team and participants in the SWP Team meetings are in accord that protecting Taos Ski Valley's water is essential. We also agreed that new development within Zone A at the Phoenix Spring Infiltration Gallery and Gunsite Spring (once developed as a drinking water source) should be avoided. Both TSVI and Shopoff committed to this. Parties did not agree,

however, on whether, or when, BMPs could adequately protect the source water from various types of land development in Zone B. The Village is considering a permitting process, implementing protective measures, and a new source water protection overlay zone in Zone B of the SWP Areas to address any proposed new development.

Watershed protection ordinances are becoming more common throughout the United States. Planning for Water-Wise Development in the Sierra (Anderson and Hickson 2008) and Best Practices for Watersheds & Recreation (Headwaters Economics 2018) are useful resources addressing the connection between development and water. Funding is available to develop watershed coalitions and design and implement watershed protection measures.

4.5.2 Federal and State regulatory measures

Federal rules state that all public drinking water systems must monitor their water supply for public health threats. In accordance with Federal and State regulatory statutes, the Village samples its drinking water system monthly for bacterial analysis and annually for listed SDWA analytes for Consumer Confidence Reporting.

The Village also complies with Federal and State regulations regarding the operation and treatment of its wastewater facilities (NPDES Permit NM0022101). The wastewater treatment plant is below the SWP Areas for the Phoenix Infiltration Gallery and the Gunsite Spring. All other regulated and permitted facilities are beyond the SWP Areas too.

Tampering with public water facilities is a federal crime. The NMRWA has warning signs for a low cost that the Village can post in prominent locations such as the chlorination station and water tanks.

4.6 Nonregulatory Approaches

Nonregulatory approaches rely on voluntary implementation to be effective. At the core of any nonregulatory method is information and education. The goal of public education is to inform the public so they can support drinking water protection efforts. Nonregulatory management approaches are intended to reach as broad a spectrum of the community as possible. Protection of the Taos Ski Valley's drinking water is possible only if the whole community cooperates to achieve protection.

4.6.1 Public outreach and education

Public education is an essential tool for drinking water protection. Most of the nonregulatory approaches discussed below rely on public education for effective implementation. The NMRWA's Source Water Protection Specialist is available to answer any questions, help in coordinating community outreach, and to give onsite technical help to the system.

Information on the VTSV Region SWP Plan can be made available to Village personnel; the public; major landholders, including the Carson National Forest, Shopoff, TSVI, and Taos Land and Cattle I Company, LLC; and the Village's business community to help raise awareness and promote the necessity of protecting the water supply. Public education activities can include newspaper articles, drinking water protection messages attached to water bills, and school district activities. Signage

identifying Source Water Protection Areas could be placed strategically to inform the public of best management practices (e.g., regarding outdoor recreational activities). Appendix C contains educational and outreach materials for the Village.

The Village could work with the Carson NF and landowners on public outreach efforts. NMRWA's Source Water Protection Specialist and Circuit Riders are available to answer questions and to provide onsite technical assistance to the Village.

4.6.2 Best Management Practices

Best management practices are practices or combinations of practices found to be the most effective and practicable means of preventing or reducing pollution. BMPs are applicable to both point source and NPS contamination. BMPs often are most effective in combination with public outreach. Table 11 lists BMPs for the PSOCs that the VTSV Region SWP Team and meeting participants identified.

The SWP Team supports a common-sense approach in identifying and selecting the most feasible source water management activities to implement locally. The BMPs were obtained from multiple sources including the Colorado Rural Water Association, EPA, Natural Resources Conservation Service, TSVI, the Water Research Foundation, USFS, the Village, and other source water protection plans.

The BMPs in Table 11 apply to both the Phoenix Spring Infiltration Gallery and the Gunsite Spring. All BMPs listed for Zone B also apply in Zone A, with additional practices for Zone A in some cases. The SWP Team recommends the BMPs listed in Table 11 be considered a general standard that might need to be modified to the extent practicable in response to specific circumstances.

Table 11. Best Management Practices for PSOC and Other Issues of Concern Identified in the VTSV Region SWP Zones. All BMPs in Zone B also apply to Zone A. Any additional BMPs in Zone A are noted in that column.

PSOC	Zone B BMPs	Zone A Additional BMPs	Partners
Agriculture and farming practices	1. Cut excess use of agricultural chemicals by planting native plants and grasses. 2. Time the application of chemicals with periods of greatest crop uptake 3. Avoid applying chemicals near wells, drainages, and any type of surface waters. 4. Store and dispose of chemicals properly, following the directions on the label. 5. Avoid bulk storage of these substances 6. Prohibit use of petrochemical-based pesticides and herbicides except as part of an Integrated Pest Management (IPM) Program		VTSV Carson NF
Animal corrals/pens and watering/feeding areas	1. Divert clean water away from manure piles to avoid contaminating runoff that might enter water sources. 2. Compost to eliminate and reduce the volume of manure. To the extent practical, compost sites should be located away from SWP Areas and bermed to prevent runoff and leaching during precipitation events.	3. No animal corrals or pens 4. No compost/manure piles	VTSV TSVI Carson NF
Equipment and machinery – storage and maintenance	1. Check construction equipment and follow establish protocols 2. Maintain standard operating procedures and protocols for general practices and emergencies 3. Follow established protocols and State and Federal guidelines. 4. Coordinate on best practices and emergency responses between VTSV, TSVI, USFS, and contractors.	5. Establish protocols for when and how equipment could be stored in Zone A. 6. Develop contingency plans that include step- by-step instructions in case of a spill or any other type of emergency. 7. Share contingency and emergency response plans between other relevant entities, e.g., Village, TSVI, USFS. 8. Keep response/cleanup materials on site.	VTSV TSVI Shopoff Carson NF

Table 11

PSOC	Zone B BMPs	Zone A Additional BMPs	Partners
Equipment and machinery – use	1. Check construction equipment and follow establish protocols 2. Maintain standard operating procedures and protocols for general practices and emergencies 3. Carry spill kits and follow established protocols and State and Federal guidelines. 4. Coordinate on best practices and emergency responses between VTSV, TSVI, USFS, and contractors.	5. Minimize heavy equipment in infiltration gallery except as needed for gallery and forest maintenance.	VTSV TSVI Shopoff Carson NF
Historic mining	1. Coordinate with the USFS, NMBOG, EMNRD regarding any mine workings, tailings or open shafts and evaluate their potential to affect source water. 2. Consider having an inventory of abandoned mines location to assess potential impacts for future development.		VTSV Carson NF
Household hazardous waste	1. Follow label instructions on household products for use, storage, and disposal 2. Before you buy, read labels and watch for products that indicate they might need special handling (e.g., caution, flammable, toxic, corrosive, explosive, poison). 3. After you buy, follow directions, use recommended amounts, recycle/dispose of properly. 4. Reuse and recycle when possible. Contact Earth 911 (http://earth911.com/recycling/) to locate places that will dispose of or recycle household hazardous waste. 5. Contact local officials before pouring products down the drain or for instructions on handling corroding containers		VTSV TSVI Shopoff Carson NF
Illegal dumping in arroyos, drainages, and streams	1. Enforce “leave no trace” litter and trash removal 2. Recruit local residents to conduct outreach activities regarding source water protection. 3. The Village, in cooperation with entities such as TSVI, the Carson NF, and other landowners should monitor the condition of arroyos and drainages.		VTSV TSVI Shopoff Carson NF
Land development	Development activities are addressed below under the specific activities conducted as part of land development.		VTSV TSVI Shopoff

Table 11

PSOC	Zone B BMPs	Zone A Additional BMPs	Partners
Natural disasters (Avalanche, Flood, Landslide)	1. Monitor weather forecasts and other hazardous weather outlooks from National Oceanic and Atmospheric Administration/National Weather Service (NOAA/NWS). Enact the Village's Emergency Response Plan when flooding or other natural disasters threaten water infrastructure. 2. Share electronic and hard copies of the VTSV Region SWP Plan and GIS shapefiles of the SWP Areas with the Taos County Office of Emergency Management and Carson NF. 3. Request to be included in the Taos County Office of Emergency's notification procedures for emergencies & disasters. 4. Refer to the Village's Emergency Response Plan and Taos County All Hazard Mitigation Plan for disaster response. 5. TSVI has an Avalanche Control Safety Plan, reviewed and approved by the Carson NF. 6. Any TSVI employee who conducts avalanche control operations must have training in use, storage and transportation of explosives, as well as special training in avalanche blasting techniques.		
Outdoor recreation (general)	1. Work with the Carson NF, Questa Ranger District and the Leave No Trace Principles to educate campers and hikers. Consider working with the RGWF and TNC to develop signage about the SWP Areas and protecting the watershed. 2. Request Forest Service require toilet kit waste bags (e.g., WAG bags) in Williams Lake basin and watershed below basin (and wag bags must be packed out) for disposal of human waste https://thedyrt.com/magazine/gear/wag-bag-camping-waste/ 3. No unauthorized camping on private property. 4. Provide educational materials about the appropriate disposal of human and pet waste. 5. No use of internal combustion-driven motorized recreational vehicles. Design roads and trails appropriately, post signage regarding access, restrict motorized vehicles to designated roads and trails. 6. Advise permittees on appropriate BMPs for their activities.		VTSV TSVI Shopoff Carson NF

Table 11

PSOC	Zone B BMPs	Zone A Additional BMPs	Partners
Outdoor recreation (winter)	1. Manage snowmaking and snow farming to avoid or minimize slope failures and gully erosion on the hillslopes and excessive bank erosion and sediment in receiving streams. 2. Design snowmaking systems to return runoff water to the stream system from which it was removed. 3. Locate ski area facilities on stable geology and soils to minimize risk of slope failures. 4. Avoid locating facilities on wetlands and riparian areas wherever practicable. 5. Incorporate suitable measures in the design and construction of ski facilities, including consideration of runoff of additional water from snowmaking, to avoid or minimize undesirable increases in runoff. 6. Use suitable measures to direct overland flow on slopes into areas with intact soil horizons to encourage infiltration and disconnect overland flow from waterbodies. 7. Use applicable BMPs to provide erosion and stormwater controls. Prohibit traffic on disturbed areas during periods of excessive soil moisture, precipitation, or runoff. Treat disturbed soil to promote onsite water capture and infiltration. 8. Allow over-snow vehicle use cross-country or on trails when snow depths are sufficient to protect the underlying vegetative cover and soil or trail surface. 9. No vehicle staging areas allowed. 10. Use applicable BMPs when constructing and operating over-snow vehicle trailheads, parking, and staging areas. 11. Avoid contaminating return water with chemicals or other pollutants. 12. Use suitable public relations and information tools and enforcement measures to encourage the public to use over-snow vehicle use on trails in a manner that will avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources. 13. Use applicable BMPs when locating, designing, constructing, and maintaining trails for over-snow vehicle use. 14. Snow cats will carry spill kits and follow written procedures for spills	15. Limit grooming equipment (e.g., snow cats) to existing trails. VTSV and TSVI to work together to establish guidelines for snow cat operators. See Figure 10. 16. Discourage use of snowmobiles on the Phoenix Spring Infiltration Gallery.	VTSV TSVI Carson NF

Table 11

PSOC	Zone B BMPs	Zone A Additional BMPs	Partners
Pesticide application	1. Minimize pesticide and herbicide use. 2. Implement education program and notification program for spraying by the public within the SWP Area. Education outreach may include mailings and personal communication to promote watershed stewardship to minimize water quality impacts. 3. Review and monitor the BMP's and regulations that agencies and other organizations use (e.g. USFS, VTSV, TSVI, and Northside at Taos Ski Valley). 4. Encourage timing herbicide application in relation to soil moisture, anticipated weather conditions, and recommended measures to protect water supplies. Monitor the weather (temperature, wind speed, wind direction, and humidity) and avoid application of herbicide when heavy rains are forecast to prevent runoff of herbicide into nearby waterways. Avoid application during windy weather to prevent drift of herbicide into waterways or buffer zone. 5. Prohibit use of petrochemical-based pesticides and herbicides except as part of an IPM Program	6. Herbicide and pesticide use prohibited. 7. Monitor at the intake for pesticides (specifically Carbaryl).	VTSV TSVI Shopoff Carson NF
Petroleum storage tanks	1. No USTs allowed 2. No ASTs >55 gal allowed 3. Secondary containment required for all ASTs	4. Develop contingency plans that include step- by-step instructions in case of a spill or any other type of emergency. 5. Share contingency and emergency response plans between other relevant entities, e.g., Village, TSVI, USFS. 6. Keep response/cleanup materials on site. 7. Permanent storage of ASTs <55 gal prohibited. 8. Be aware that a petroleum spill into "waters of the United States" requires additional response and clean up.	VTSV TSVI Shopoff

Table 11

PSOC	Zone B BMPs	Zone A Additional BMPs	Partners
Post Fire Impacts	1. Contact the NOAA/NWS to watch weather patterns and issue warnings for the Taos Ski Valley. 2. Install test plots to see which postfire treatments worked best/better to keep soil in place. 3. Work within the emergency managers group, downstream communities' emergency managers, and Federal and State partners to develop a protocol for addressing any evacuation/notification. One approach is to break up areas into zones that might transcend jurisdictional boundaries so that the focus is on communication methods available in these remote areas. 4. Develop tabletop exercises to practice emergency response. 5. Document current conditions (e.g., water quality) as a baseline.		VTSV TSVI Shopoff Carson NF RHACs
Roads	1. All new roads must meet Village development requirements and standards 2. Consider permeable pavement if roads are to be paved to minimize runoff 3. Limit routes for off-road vehicles to avoid accidental spills within SWP Areas. 4. Control stormwater runoff with BMPs for new roads 5. Maintain roads and trails to minimize erosion and control runoff 6. Implement water quality BMPs for new road construction	7. No parking lots. 8. No new roads.	VTSV TSVI Shopoff Carson NF
Stormwater runoff	1. Meet Village development requirements and standards 2. To the extent practical, protect existing forest during construction and managed forested areas as conservation lands. 3. To the extent practical, minimize disturbance to natural vegetative cover during land development. 4. Increase the tree canopy over paved surfaces to minimize the impacts of stormwater runoff and increase interception of rainfall. 5. Employ BMPs that manage runoff, such as healthy soil development and vegetative filter strips that trap sediment, nutrients, pesticides and bacteria that could end up in streams or other waterways	6. No new trails	VTSV TSVI Shopoff Carson NF

Table 11

PSOC	Zone B BMPs	Zone A Additional BMPs	Partners
Trails	1. Install signage at trailheads and other areas associated with high recreational use on non-Federal lands that notifies users they are in a SWP Area and explains the importance of protecting the Village's sources of drinking water. 2. Locate, relocate, or modify trails to conform to the terrain, provide suitable drainage, provide adequate pollutant filtering between the trail and nearby waterbodies, and reduce potential adverse effects to soil, water quality, or riparian resources, particularly for trails designed for motorized vehicles. 3. Minimize sensitive areas, such as riparian areas, wetlands, stream crossings, inner gorges, and unstable areas to the extent practicable. 4. Use suitable measures to mitigate trail impacts to the extent practicable where sensitive areas are unavoidable. 5. Use suitable measures to hydrologically disconnect trails from waterbodies to the extent practicable, particularly for trails designed for motorized vehicles. 6. Manage activities to maintain ground cover, maintain soil quality, control runoff, and provide needed sanitary facilities to minimize discharge of NPS pollutants and maintain streambank and riparian area integrity, particularly for trails designed for motorized vehicles. 7. Provide signage identifying SWP Areas and appropriate treatment of trash, human and dog waste, and other possible pollutants	8. No new trails.	VTSV TSVI Shopoff Carson NF
Wastewater systems	1. Prohibit septic systems for any new development. 2. All new development in Zone B/C to be connected to Village sewer 3. Consider replacing portable toilets at trailheads with composting toilets. 4. Locate portable toilets on level ground, and away from drainages. 5. Clean and maintain portable toilets on an established schedule. Check for leaks or damage regularly.		VTSV RHAC
Water treatment plant	1. Ensure that the treatment plant is free of PSOCs 2. Follow Federal and State guidelines for storing chemicals used to treat drinking water.		VTSV

Table 11

PSOC	Zone B BMPs	Zone A Additional BMPs	Partners
Wildfire and its impacts	1. Maintain the Village as a Firewise USA® community 2. Implement the 2016 CWPP 3. Develop and implement forest treatment plans to thin private and national forests to prevent catastrophic wildfire and high-severity burns. 4. Restrict campfires.	5. Test plots established upgradient of infiltration gallery by TSVI after implementing forest treatment plan in 2018. 6. Mechanized forest treatments to address forest health allowed	VTSV TSVI Shopoff Carson NF RHACs
Wildlife and livestock	1. Increase landowner/permittee consciousness about water quality and land use 2. Address land management measures to minimize high impacts around water sources 3. Adopt pasture or grazing management methods that keep livestock from concentrating around bodies of water. Fencing can prevent damage to stream banks and keep livestock from defecating in or near streams and intakes. Providing alternate water sources and hardened stream crossings for livestock can assist in reducing the impact on water quality.	4. No livestock allowed, except for pack animals or trail horses.	VTSV TSVI Carson NF

Figure 10. Phoenix Spring Infiltration Gallery Zone A showing approximate route of El Funko ski run.

4.6.3 Water Conservation and Sustainability

Two other nonregulatory management approaches are to encourage water conservation efforts and develop a robustly sustainable system. The most cost-effective way for most of New Mexico's public water systems to maintain their systems is through conservation efforts that decrease demand and increase operating efficiency. In the context of public water systems, sustainability refers to the system's long-term ability to meet the current and future needs of its members.

Water conservation can be considered any action or technology that reduces the amount of water withdrawn from water supply sources, reduces consumptive use, reduces the loss or waste of water, improves the efficiency of water use, increases recycling and reuse of water, or prevents the pollution of water. The New Mexico Office of the State Engineer (OSE) Interstate Stream Commission's Water Conservation Program has resources and activities directed to various user groups. The New Mexico Natural Resource Conservation Service (NRCS) conducts workshops on irrigation efficiency and using drought tolerant landscape designs. Appendix D contains some of these resources and links to the website containing this and other information.

A sustainable public water system needs to have enough technical capabilities, financial wherewithal, and the ability to meet challenges such as public health and safety requirements and an adequate distribution and treatment system. Factors that the system cannot control, such as community income and water quantity or quality, can further challenge a system's sustainability. Achieving sustainability is a continuous effort rather than a one-time achievement.

4.6.4 Fire Adapted Water System

Weather, topography, and fuel are the three factors controlling wildfire behavior. Only the fuel factor can be effectively influenced. Even in this context, control is limited, and usually does not extend beyond an individual landowners' property. The Carson National Forest and TSVI, along with the Village and various private landowners already have projects underway or completed, including the collaborative Highway 150 Project. The Village recently completed a draft CWPP and is a Firewise USA® Community (VTSV 2016). The SWP Team concurs with the 2016 CWPP and awaits a resolution of the current draft plan's recommendations. Once successfully resolved with the community stakeholders, the revised CWPP should provide the basis for a fire adapted water system.

5 Source Water Protection for the Watershed

> A watershed is "that area of land, a bounded hydrologic system, within which all living things are inextricably linked by their common water course and where, as humans settled, simple logic demanded that they become part of a community." John Wesley Powell

As demonstrated by the various individuals, communities, and entities listed in Table 1, interest in Taos Ski Valley's water spans the length and breadth of the Rio Hondo watershed, and extends beyond these borders. This larger community has an interest in both the water quality and

quantity of the Valley. As Mayor Brownell often says, the Village has the goal and responsibility to ensure that water quality below the Village is as good as it is in and above the Village.

- The downstream communities rely on the surface water to irrigate their fields. They rely on the groundwater to replenish the aquifer, which provides their drinking water. Having high quality and quantity of water are paramount for their survival. Carlos Miera has pointed out that their attachment, and that of Taos Pueblo, is also cultural – Taos Ski Valley is part of their heritage.
- Taos Pueblo includes the area now known as Taos Ski Valley as part of its aboriginal territory. The Pueblo's reservation boundary more-or-less follows the boundary of the Headwaters Arroyo Hondo (HUC 12) watershed.
- There is a symbiosis between the Village and entities who are bringing growth and business to it. Based on discussions in the context of the VTSV SWP Plan, these relationships are not always easy. Concerns range from sustainability to retaining the character and integrity of the Valley while ensuring the viability of the community.
- The Carson NF surrounds the Village. The Carson NF manages the forest for multiple purposes. Being the largest land manager in the watershed, it has the primary responsibility for managing for forest health. This is particularly important in the context of wildfire and postfire. The Columbine Hondo and Wheeler Peak wilderness areas constrain how the Carson manages this part of the forest.
- Taos Ski Valley is a world class ski area, and a year-round destination for fishing, hiking, and other outdoor recreation. While it is known internationally, it is especially valued locally.

The diverse interests reflected in these various communities and entities are united by their shared stewardship of the watershed. While VTSV Region SWP Plan focuses on water quality, concerns expressed by participants of the SWP meetings also extend to water quantity. Some issues

Although different from the watershed in terms of a variety of factors, Polk County, Iowa's Metro Waste Authority succinctly captures the Watershed Protection Approach (http://mwatoday.spinutech.com/resources/growing-green-communities/what-is-a-watershed.aspx, accessed January 6, 2020.)

A Watershed Protection Approach is a strategy for effectively protecting and restoring aquatic ecosystems and protecting human health. This strategy has as its premise that many water quality and ecosystem problems are best solved at the watershed level rather than at the individual waterbody or discharger level.

Major features of a Watershed Protection Approach are:

- Targeting priority problems,
- Promoting a high level of stakeholder involvement,
- Integrated solutions that make use of the expertise and authority of multiple agencies
- Measuring success through monitoring and other data gathering.

Community growth and management strategies should allow for the following:

- Periodic revision of master plans to reflect evolving community visions and goals
- Mainstreaming of innovative landscape design modifications, such as low-impact development techniques, and traditional patterns of development (i.e., New Urbanism) that help to achieve watershed protection goals.
- Updating of zoning ordinances that use outdated justifications or rely on historical conventions, such as parking lot requirements that have excess capacity in areas that offer transit alternatives.

regarding "land development" that have proven to be obstacles to consensus by the SWP Team are due as much to concerns about possible impacts on water quantity as water quality.

The primary focus of the VTSV Region SWP Plan is on protecting the Village's drinking water supply for its residents and visitors. Some of the larger issues that the SWP Team has encountered, however, relate to these larger questions of how the Village and other interested parties can move forward with viable and sustainable development that doesn't disadvantage other communities or entities. Addressing such considerations at the watershed (or landscape) scale is beyond the scope of the VTSV Region SWP Plan. There are monies available, however, to fund such planning. Graham can provide a list of funding possibilities and contacts, including possible facilitators, if requested.

6 Contingency and Emergency Planning

The fifth step in the SWP planning process is contingency planning. The PSOC Inventory and BMPs provide the SWP Team with a starting point to discuss drinking water protection. The inventory of contaminants pinpoints contaminant sources within SWP Areas. However, to mitigate these contaminants, the Village and SWP Team need to work with the community and landowners to eliminate contaminants or prevent land use practices that could threaten drinking water.

A contingency plan is a blueprint outlining roles and responsibilities if the Village experiences a disruption in its water supply or services. The contingency plan will help the Village and its community partners make well thought-out, educated decisions about the drinking water system under the most adverse conditions, such as power outages, accidental hazardous spills, or natural disasters such as fire or flooding within the SWP Areas.

Emergency Response Plans are now a regulatory requirement for all community water systems. Updating, or completing, its Emergency Response Plan will improve the Village's compliance at its water utility's next Sanitary Survey. Appendix E contains Contingency Plan templates, sample Emergency Response and Vulnerability Assessment Plans, and Boil Water Notices. NMRWA staff are available to help the Village's water utility complete these plans.

The Village's Emergency Response and Hazard Mitigation Plans may cover everything that would be included in a contingency plan. TSVI, Shopoff, and Taos Land and Cattle I Company, LLC should also have standard operating procedures and emergency response plans that address contingencies of the PSOCs discussed here. Contingency and Emergency Response Plans help a water system make well thought-out, educated decisions about the drinking water system under the most adverse conditions. The implementation of these plans increases the likelihood that correct and immediate action will be taken and that any disruption, damage, or potential health risk, both in the long and short term, will be minimized. The availability of some emergency funding is contingent on the Village's having a plan in place and ready to implement.

The Village should consider joining New Mexico Water/Wastewater Agency Response Network (NM WARN). NM WARN is a private, voluntary agreement between systems to help each other out in emergency situations. The main concept of NM WARN is "utilities helping utilities" with assistance being strictly voluntary. The agreement sets out rules that will govern the request and

help processes for NM WARN drinking water and wastewater members. Membership will allow any utility to request, or provide, assistance during any kind of emergency (man-made or natural).

7 Conclusions

Table 12 is the list of actions that are recommended based on the PSOCs and priorities in the VTSV Region SWP Plan. The actions are listed alphabetically by PSOC. This table could be modified to sort by priority. A column indicating scheduling – e.g., timing to initiate or to complete – the action could be added.

The Village and its partners have developed this SWP Plan to ensure a safe and reliable drinking water supply for Taos Ski Valley and VTSV. We recognize that the most effective way to protect the Village's water supply is to prevent contamination. This plan serves the interests of the people who live, work, and play in Taos Ski Valley as well as downstream communities by protecting the Village's drinking water supply at minimal cost to consumers, while supporting compliance with drinking water program regulations. With the continued dedication of the Village's staff and a heightened awareness of source water protection by residents and local businesses, the Village is likely to have a clean, reliable water supply for years to come.

Table 12. Priority Actions to Implement to VTSV Region SWP Plan. The table is ordered alphabetically by type of PSOC but could be changed to be ordered by priority.

Type of PSOCs	Action	Responsible Party(ies)	Comments
Equipment/machinery – use	Develop guidance for heavy machinery use in SWP areas, especially Zone A (e.g., construction of Gunsite Spring infiltration gallery, machinery used in forest treatments, route for snow cats at the base of El Funko ski run)	Shopoff TSVI VTSV Carson NF Taos Land and Cattle Company, I, LLC (TL&C)	
	Work to develop a plan to minimize the likelihood that leaks of hydraulic or other fluids could affect the source water. at the base of El Funko.	TSVI and VTSV	Already done? Ongoing?
Household hazardous waste /Petroleum storage tanks /Herbicides /Pesticides	Public education regarding household hazardous waste, above-ground storage tanks, herbicides and pesticides	VTSV	See Appendix C
Illegal dumping	Identify places where illegal dumping occurs, and types (e.g., human/pet waste vs. trash dumping). Develop appropriate outreach materials.	VTSV Carson NF?	See Appendix C Amigos Bravos has a successful campaign and likely could offer useful suggestions. WAG bags?
	Signage indicating SWP Areas		TNC offered this in 2018; don't know if it is still a possibility
Land development /Wildfire and postfire impacts	Additional VTSV regulations as appropriate, that address source water protection	VTSV with stakeholders and interested parties including TSVI, Shopoff, TL&C (see Table 1)	Work with landowners to ensure that these regulatory approaches do not unreasonably constrain pre-existing agreements, etc.

Table 12

Type of PSOCs	Action	Responsible Party(ies)	Comments
	Consider developing a watershed/landscape protection plan as the basis of informed decisions on water use and conservation, "sustainable tourism," development, etc.	Entities listed in Table 1 reflect many of the interested parties	Monies available through grants and matches for planning and implementing these types of plans (e.g., through SWQB, EPA, Bureau of Rec.) Paid facilitator recommended
Outdoor recreation (general)	Investigate the possibility of installing composting toilets at the Williams Lake Trailhead Parking Lot	VTSV Carson NF?	VTSV maintains portable toilets at the Williams Lake Trail parking lot. The SWP Team discussed the feasibility and effectiveness of composting-toilets as an alternative to these portable toilets.
Pesticides /Herbicides	Pesticides and herbicides – work with the Carson NF regarding the appropriate timing and locations for applying pesticides and herbicides so that the Carson NF is aware of the locations of the Village's drinking water sources, etc.	VTSV Carson NF	
SWP Planning	Contingency Plan	VTSV Public Works? Planning Dept.?	Templates provided in Appendix E
	Share contingency and emergency response plans between other relevant entities, e.g., Village, TSVI, USFS.		
Wastewater systems /water treatment plants	Develop a plan for assessing water quality standards below Amizette (e.g., use State standards, establish how they will be measured, where and how often, determine funding; request the help of Amigos Bravos and/or NMED SWQB)	Public Works as lead Amigos Bravos? SWQB	

Table 12

Type of PSOCs	Action	Responsible Party(ies)	Comments
	Incorporate Amizette into water and wastewater system. A needs assessment needs to be conducted exploring all option. EPA 832-f-00-0073 9-200 clearly states that ALL alternatives need to be investigated prior to employing lift station technology in sensitive areas eg Rio Hondo and protected forests.	VTSV Amizette businesses and residents	Already identified in VTSV Capital Improvement Plan. (What about St. Bernard?)
	Review liquid waste permits from NMED for accuracy and to confirm that there are no households on septic systems within the SWP Areas.	VTSV Planning, VTSV Public Works, Don Scheiber	Graham forwarded the list to VTSV Planning per discussions at SWP meetings.
Wildfire and postfire impacts	Implement recommendations of the 2016 CWPP	VTSV Firewise committee Carson NF? TSVI Shopoff? TL&C NM State Forestry	
	Update CWPP as appropriate to include the area for the Resort at Taos Ski Valley and Taos Land and Cattle Company I, LLC	VTSV Firewise Committee Shopoff TL&C TSVI	
	Provide the Carson NF (Ray Corral) with GPS coordinates and descriptions for critical water infrastructure, including the Gunsite Spring, once developed. Make sure the Carson NF knows that these are the Village's drinking water resources so it can plan accordingly.	VTSV Carson NF	

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