December 2014

Community Source Water Protection Plan

For Public Water Systems in Carson City, Nevada

Prepared by:

The CSWP Local Planning Team In Carson City

Carson City Public Works

Cottonwood Mobile Home Park

Millhouse Inn Motel

State of Nevada, Stewart Complex & Marlette–Hobart Water System

Terrace Garden Apartments

Nevada Division of Environmental Protection

Carson City Community Development

Carson City Fire Department

Carson City Parks & Recreation Administration

Carson Water Subconservancy District

Douglas County GIS

Resource Concepts, Inc.

Prepared by:

The Community Source Water Protection Local Planning Team in Carson City, Nevada

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Acknowledgements

The Carson City Community Source Water Protection Team wishes to acknowledge the technical assistance provided by Resource Concepts, Inc., the US Geological Survey, the Carson Water Subconservancy District, and funding and technical assistance from the Nevada Division of Environmental Protection. The team would like to recognize the following organizations that made development of this document possible. Contact Carson City Public Works for information about the Community Source Water Protection Plan in your area, or contact the Nevada Division of Environmental Protection for general information about Nevada's Integrated Source Water Protection Program.

Organizations	Phone Numbers	Contact Information
Public Water Systems		
Carson City Public Works	775-887-2355	dbruketta@carson.org
Cottonwood Mobile Home Park	775-882-6028	Albert & Mary Fischer, Proprietors
Millhouse Inn Motel	775-882-2715	Marie Etchemendy, Proprietor
State of Nevada, Stewart Complex & Marlette–Hobart Water System	775-687-1022	jerrywalker@admin.nv.gov
Terrace Garden Apartments	775-720-7357	skeetv@sbcglobal.net
Nevada Division of Environmental Protection		
Bureau of Water Pollution Control	775-687-9503	kborgzinner@ndep.nv.gov
Planning and Technical Resources		
Carson City Community Development	775-887-2180	lplemel@carson.org
Carson City Fire Department	775-887-2210	ttarulli@carson.org
Carson City Parks & Recreation Administration	775-887-2262	rmoellendorf@carson.org
Carson Water Subconservancy District	775-887-7456	edjames@cwsd.org
Douglas County GIS	775-782-9045	eschmidt@co.douglas.nv.us
Resource Concepts, Inc.	775-883-1600	jill@rci-nv.com lynn@rci-nv.com

List of Acronyms

BHPS	Bureau of Health Protection Services (State/presently Bureau of Safe Drinking Water, NDEP)
BLM	U.S. Bureau of Land Management (Federal)
BOR	U.S. Bureau of Reclamation (Federal)
BSDW	Bureau of Safe Drinking Water (State/NDEP)
BWPC	Bureau of Water Pollution Control (State/NDEP)
CSWP	Community Source Water Protection
CWSD	Carson Water Subconservancy District
DCNR	Department of Conservation and Natural Resources (State)
DHHS	Department of Health and Human Services (State)
EPA	U.S. Environmental Protection Agency (Federal)
FT	Feet
FT/D	Feet per day
FT2/D	Feet Squared per Day
GIS	Geographic Information System
GPM	Gallons per Minute
GPS	Global Positioning System
HA(s)	Hydrographic Area(s)
ISWPP	Integrated Source Water Protection Program
MCL	Maximum Contaminant Level
NAC	Nevada Administrative Code
NAD	North American Datum
NDWIS	Nevada Drinking Water Information System
NDEP	Nevada Division of Environmental Protection (State)
NRS	Nevada Revised Statutes
NvRWA	Nevada Rural Water Association
PCS	Potential Contaminant Source
PWS	Public Water System
SWAP	Source Water Assessment Program
SWPA	Source Water Protection Area
Team	Local Planning Team
USDI	United States Department of the Interior
USGS	United States Geological Survey
WhEAM	Wellhead Analytical Element Model
WHPA	Wellhead Protection Area
WHP Plan	Wellhead Protection Plan

Executive Summary

The purpose of this Community Source Water Protection Plan for Public Water Systems in Carson City (CSWP Plan) is to document the public drinking water resources in Carson City and the measures that the public water suppliers intend to implement in order to protect those resources. This CSWP Plan is a tool to facilitate cooperation and education between water purveyors, local and State agencies, industry, community leaders, as well as citizens to aid in the protection and continued safety of public drinking water sources in Carson City.

In October 2012, the Carson City Board of Supervisors was provided with an overview of the State of Nevada's Integrated Source Water Protection Program (ISWPP). The ISWP Program is voluntary, and is focused on preventing the pollution of community drinking water sources, including ground water, lakes, rivers, springs, and streams. At that time, the Board of Supervisors requested participation in the ISWPP.

This CSWP Plan includes the public water systems managed by Carson City Public Works, the Cottonwood Mobile Home Park, the Millhouse Inn Motel, the Terrace Garden Apartments, and the State of Nevada Stewart Complex. This CSWP Plan provides a framework for the long-term protection of public drinking water supply sources. Maps of the specific areas are provided in Appendix A.

The Local Planning Team (Team) responsible for creating this document was composed of representatives from the various public water systems in Carson City and from local and state government. The Team met frequently over the course of a year to develop this plan. Summaries of the meetings, the agendas and meeting materials are provided in Appendix B.

The Team identified goals and objectives to protect drinking water to guide the CSWP Plan development as well as to implement this plan.

Goal 1: Update the existing Wellhead Protection Program(s) into a readily accessible Community Source Water Protection Plan (CSWP Plan).

Goal 1 Objectives:

1) Form a Local Planning Team.
2) Inventory current public water supply sources.
3) Update of Source Water Protection Area boundaries.
4) Prepare a Potential Contaminant Source inventory.
5) Develop source water protection management strategies and actions that are specific, measurable, achievable, reasonable, and timely.
6) Obtain CSWP Plan endorsement from Nevada Division of Environmental Protection.

Goal 2: Implement and maintain the Community Source Water Protection Plan.

Goal 2 Objectives:

1) Establish a schedule and process to review and update the CSWP Plan.
2) Inform and educate city departments, industry, landowners and the public about their role in source water protection.
3) Manage and share information communitywide.
4) Use GIS and other digital tools to communicate and maintain the CSWP Plan.
5) Identify management strategies within 2-year and 10-year planning implementation windows.
6) Apply different strategies: countywide, within SWPAs, or to specific potential contaminant source concerns.
7) Develop a schedule to implement priority projects or actions.

Source water in Carson City consists of surface water, groundwater, and water delivered from outside of the City via water transmission interties. Surface water comes from two watershed areas on the west side of Carson City. Groundwater is pumped from 34 active public wells in the City. The regional water transmission interties are connected with Lyon County and with Douglas County.

Source Water Protection Areas (SWPAs) are composed of the land surrounding water supply sources where activities are managed to protect the water supply from becoming contaminated. These management area boundaries were developed by the Team based on the land uses and well "capture zones" described in the Capture Zone Delineation Summary Report provided in Appendix C. Mapping of the SWPAs is provided in Appendix A.

Potential sources of contaminants were identified through an inventory of the existing wellhead protection plans, initial meetings with water system operators, evaluation of the local hydrogeology, review of existing on-line databases, and review of the ISWP Program guidance. Potential contaminant sources (PCSs) that occur in Carson City include high nitrates from septic systems and hazardous or poisonous materials from commercial, industrial and manufacturing areas, homes and agriculture. Summary tables of the inventory are included in Appendix D.

Source water protection strategies and actions were developed in order to prevent contaminants from being released in the SWPAs. Prevention avoids costly and/or irreversible damage to the water sources. The source water protection strategies detailed in Section 3.4 include developing public education programs, waste disposal programs, development standards, interagency coordination, monitoring and some new infrastructure projects. The Team developed an Action Plan, provided in Appendix E that lists specific actions to be implemented as funding, staff and time allow. Details regarding public education and outreach are provided in Appendix F.

This CSWP Plan should be revisited on a regular basis to ensure its continued success. The public water providers may identify new sources of contamination or experience an event that changes the characteristics of the water supply. Regular updates will ensure that the CSWP Plan incorporates significant or future changes.

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Appendix D Potential Contaminant Source Summary *(Separate pdf file)*
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Appendix G Contingency Plans

1.0 INTRODUCTION

1.1 Overview

Community Source Water Protection involves voluntary actions to prevent the pollution of community drinking water sources, including groundwater, lakes, rivers, springs and streams. It includes developing and implementing a Community Source Water Protection Plan (CSWP Plan) to manage land uses and "man-made" sources of contamination in the vicinity of public water supplies. Local plans are long-term commitments by the communities to protect their drinking water (NDEP, 2010).

Source Water Protection Areas (SWPA) are comprised of the land surrounding a water supply source where activities should be managed to protect the water quality. Defined SWPAs are tools that allow communities to plan for and respond to situations before contamination occurs. The SWPAs in Carson City are described later in this document and in the technical appendices.

1.2 Background

Development of and content in the CSWP Plan is based on the guidance document entitled Nevada Integrated Source Water Protection Program (ISWPP), which was prepared by the Nevada Division of Environmental Protection (NDEP) in February 2010 as an update to the State Wellhead Protection Program developed in 1994. The guidance document sets the framework for local plan development and outlines the criteria required for a CSWP Plan to receive State endorsement. With a State-endorsed plan, the local community may be eligible to receive additional technical assistance from NDEP to continue implementing the management strategies outlined in the CSWP Plan. This CSWP Plan has been prepared with the intention of achieving NDEP endorsement.

There are five active Public Water Systems (PWSs) considered in the CSWP Plan that are classified as follows:

> The Carson City municipal system, the Terrace Garden Apartments, and the Cottonwood Mobile Home Park are "Community water systems"; public water systems that have at least 15 service connections used by year-round residents of the area served by the system or regularly serves at least 25 year-round residents of the area served by the system (NRS 445A.808). The largest is the Carson City municipal water system, operated by Carson City Public Works, and serving the majority of the population in the area.
>
> The Stewart Complex is a "Non-transient non-community water system"; a public water system that is not a community water system, but regularly serves at least 25 of the same persons for more than 6 months per year (NRS 445A.829).
>
> The Mill House Inn Motel is a "Non-community water system"; a public water system that is not a community water system (NRS 445A.828), but has at least fifteen service connections or regularly serves an average of at least twenty-five individuals daily at least 60 days out of the year.

The CSWP Plan has a broad, community-wide perspective, building upon the results of previous wellhead protection plans (WHP Plans). Carson City and the Cottonwood Mobile Home Park each have a prior approved WHP Plan, which were used in developing the management strategies and updating the SWPA boundaries for this document.

1.3 Plan Purpose

The purpose of this CSWP Plan is to document the public drinking water resources in Carson City and the measures that the community intends to implement to protect those resources. The CSWP Plan is a tool to facilitate cooperation between water purveyors, local and State agencies, industry, community leaders, and citizens to aid in the management and continued safety of the public water resources in Carson City, Nevada.

1.4 Description of Planning Area and Source Water

1.4.1 Location and Setting

Carson City is located in west central Nevada and is the smallest of the state's 17 counties. Carson City totals 156 square miles of land and 12 square miles of water (Lake Tahoe). Carson City is bordered on the north by Washoe, Storey, and Lyon counties, to the west by Lyon County, on the south by Douglas County, and to the east by the State of California (Figure 1, page 3).

Prior to 1969, Carson City was the county seat of Ormsby County. In 1969, the county was abolished and Carson City and a few small surrounding settlements within the former county were merged into a newly formed independent city, officially called Carson City Consolidated Municipality.

1.4.2 Source Water in Carson City

The five public water systems in Carson City are operated by Carson City Public Works, Cottonwood Mobile Home Park (Cottonwood MHP), Terrace Garden Apartments, Mill House Inn Motel (Mill House Inn) and the State of Nevada. Carson City utilizes both surface water and groundwater, while the other water systems use groundwater only.

Surface Water

The Carson City municipal system obtains roughly 30 percent of its water supply annually from surface water supplied by: springs and creek intakes in Kings Canyon and Ash Canyon (operated by Carson City Public Works); and the Marlette–Hobart distribution system (operated by the State of Nevada). These surface waters originate within the areas designated Watershed 1 and Watershed 2, respectively, in Figure 2, page 4. Surface water is collected and then treated at the Quill Surface Water Treatment Plant prior to distribution.

Carson City also has an active groundwater recharge program. When excess surface water is available, the City can utilize infiltration basins located in the Vicee Canyon area, as well as three production wells, to recharge the aquifer and store the water as groundwater.

Figure 1. Location Map

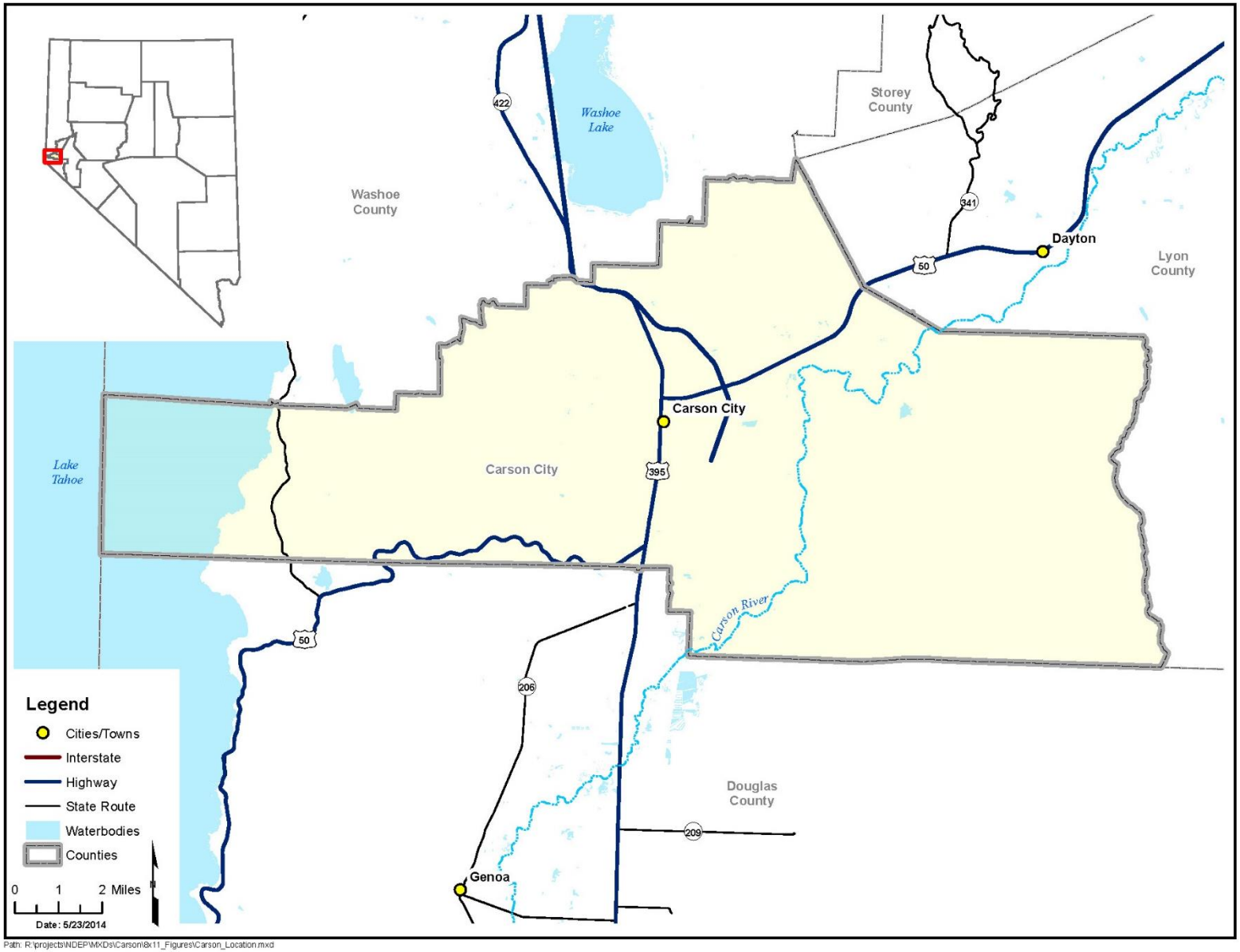
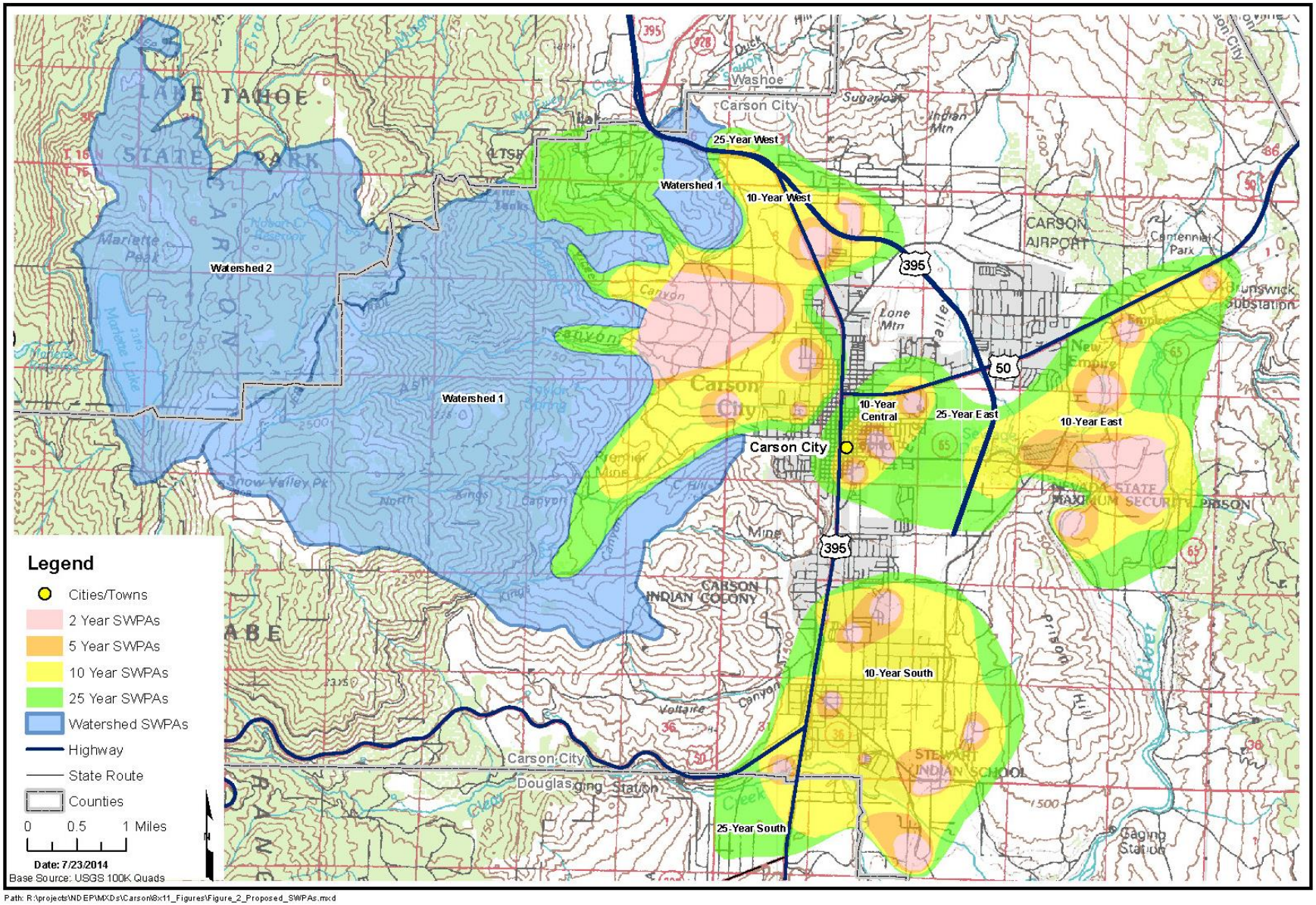


Figure 2. Source Water Protection Areas



Groundwater

Groundwater from Eagle Valley is a source of drinking water for all five of the public water systems in Carson City. The active wells are listed in Table 1-1. Wells are distributed throughout the Carson City area as represented by the 25-Year SWPA boundary shown in Figure 2, page 4. The four smaller PWSs within Carson City use 100% groundwater. They include the Cottonwood Mobile Home Park (three existing and two future wells), the Millhouse Inn Motel (one well), the Terrace Garden Apartments (one well), and the State of Nevada Stewart Complex (one well). The Carson City municipal system utilizes 28 active wells.

Table 1-1. Water Systems and Sources Considered in this Plan

Water System Name and Primary Contact [1/]	Water Sources		
	Groundwater (Active Wells)		Surface Water
NV0000015			
Carson City Public Works *Public Works Director or Designee*	Well 3, Winnie Ln. Well 5, Bath, St. Well 6, Foothill Well 7, N. Carson St. Well 8, Silver Sage Well 9, Snyder Well 10B, College Pkwy Well 11A, Second St. Well 16B, Lakeview Well 24B, E. 5th St. Well 25B E. 5th St. Well 33, Brunswick Well 34, Mills Park Well 38B, S. Edmonds Well 40, Morgan Mill	Well 41B Well 43, Bennet St. Well 44, Empire Ranch Rd. Well 45, Sonoma St. Well 46, Silver Oak Well 47, Hidden Meadows Well 48, Thames Ln. Well 49, Stewart St. Well 50, Bigelow, S. Carson Well 51, Foothill Well 53, Sunset Well 54, Fuji Well 55, WNCC Regional Water Interties with Lyon and Douglas Counties	Ash Canyon Creek North Kings Canyon Creek Springs in Kings Canyon Marlette–Hobart System
	Groundwater (Active Wells)		**Groundwater (Future Wells)**
NV0000017			
Cottonwood Mobile Home Park *Proprietor*	Cottonwood MHP, North Well Cottonwood MHP, Middle Well Cottonwood MHP, South Well		Cottonwood MHP, Well 1 Future Cottonwood MHP, Well 2 Future
NV0000028			
Terrace Garden Apartments *Proprietor*	Terrace Garden Well 1		
NV00002006			
Mill House Inn Motel *Proprietor*	Millhouse Inn Motel Well 1		
NV00004084			
Stewart Complex State of Nevada *Water Systems Manager*	Stewart Complex Well 6		

[1/] The water system numbers are from the Bureau of Safe Drinking Water (NDWIS, June 2014).

Table 1-2 lists the inactive wells that are part of the Carson City municipal water system. These inactive wells are abandoned or scheduled to be abandoned by the public water system and are not intended to be potable water sources in the foreseeable future. There are also several inactive water systems listed in the NDWIS database for the Carson City area. These facilities were previously served by an on-site well, but are now connected to Carson City's municipal system. Inactive wells and inactive water systems have not been further evaluated in this document.

Table 1-2. Inactive Wells

Water System Name and Primary Contact	Inactive Well Name
NV0000015 Carson City Public Works *Public Works Director or Designee*	Well 4B Elaine St Well 10A College Ave. Well 12 Lakeview Well 16 Monitoring Well 24A E. 5th Street Well 41A E. 5th Street

Water Transmission Interties

The Carson City municipal system also has regional water interties with Douglas County and Lyon County. Within the past three to four years the Town of Minden, Indian Hills GID, Carson City, and Douglas County have constructed regional water infrastructure to produce, store, pump and move water from the Minden area through Douglas County and into Carson City. Carson City and Lyon County also have worked cooperatively to interconnect their municipal water systems to accommodate planned growth as well as to meet peak demands. Both Douglas County and Lyon County have recently adopted CSWP Plans to help protect their water resources.

1.4.3 Public Water System Descriptions

Carson City Public Works

Carson City Public Works Water Division oversees municipal water production, distribution and metering for approximately 56,066 persons (Carson City Consumer Confidence Report, 2013). Carson City manages both groundwater and surface water resources (Table 1-1, page 5). Carson City uses groundwater supplied from a combination of the City's 28 wells and the regional interties with Douglas and Lyon Counties. The City also obtains roughly 30 percent of its municipal water from surface water sources: Ash Canyon Creek, North Kings Canyon Creek, the Marlette–Hobart system, and several springs in Kings Canyon.

The customer water demand in the winter is approximately 128 million gallons per month. During the winter, the system operates mostly with water supplied from the Quill Surface Water Treatment Plant and one or two wells. During peak use in the summer the water demand is over 550 million gallons per month. This rise in water demand, as well as the slowing of the runoff from the mountains, increases groundwater use from the City wells and the regional interties during the summertime.

Cottonwood Mobile Home Park

The Cottonwood Mobile Home Park is located in the northwest part of Carson City. The water system serves approximately 92 connections and 200 people. The system has a capacity of approximately 160 gpm from three wells. Wells 1 and 2 are equipped with a 1,000-gallon pressure tank and Well 3 is equipped with a 500-gallon pressure tank (Aquifer Science Inc., 2001). There is no treatment equipment within the system. Cottonwood Mobile Home Park is approximately 100 feet away from a Carson City water distribution line.

Mill House Inn Motel

The Millhouse Inn Motel is located at 3251 South Carson Street in south Carson City. There is one well at the facility serves the motel. Surrounding development is served by the Carson City municipal system.

Terrace Garden Apartments

The Terrace Garden Apartments are located at 1111 E. Fifth Street in City. The one well at the facility serves the apartment complex. Surrounding development is served by the Carson City municipal system.

State of Nevada

The State of Nevada operates its own well for the Stewart Complex PWS. The well serves houses and facilities for training and administration in the area formerly known as the Stewart Indian School. The State of Nevada also manages the Marlette–Hobart supply system that delivers water from Marlette Lake to the Carson City municipal system at the Quill Surface Water Treatment Plant.

1.5 Existing Plans and Studies

There are several existing investigations that are relevant to and or used in the development of this CSWP Plan. Documents that were critical to the process are described in the following sections and tables.

1.5.1 Existing Wellhead Protection Plans

Carson City and Cottonwood MHP maintained existing wellhead protection plans (WHP Plans) plans. The existing WHP Plans are the foundation of this CSWP Plan. Pertinent information in these plans was extracted and updated for inclusion in this CSWP Plan. Table 1-3 summarizes the WHP Plans used in development of this CSWP Plan (Table 1-3).

Table 1-3. Existing Well Head Protection Plans Used in this CSWP Plan

Entity	Date	Prepared by
Carson City	December 1999	Wateresource Consulting Engineers, Inc. Reno, NV
Cottonwood Mobile Home Park	April 2001	Aquifer Science Inc., Salt Lake City, UT

1.5.2 The Vulnerability Assessment and Source Water Assessment Programs

The Vulnerability Assessment Program and Source Water Assessment Program are both programs administered by the State of Nevada Bureau of Safe Drinking Water (BSDW). These two programs are summarized below and additional information is available at http://ndep.nv.gov/bsdw/.

The Vulnerability Assessment Program investigates and assesses the vulnerability to contamination of public water system sources. Pertinent information from the completed Vulnerability Assessments has been used for the development of this report. Information includes well ownership, location, name, diameter, depth, and pumping rates.

The Source Water Assessment Program is required by the federal Safe Drinking Water Act (SDWA) Amendments of 1996 to analyze existing and potential threats to the quality of the public drinking water throughout the state. This program contains all of the following components:

1. The areas that are sources of public drinking water are delineated,
2. Potential contaminant sources within the delineated area are identified,
3. The water systems' susceptibility to contamination is assessed, and
4. The public is informed of the results.

Where applicable, the well information gathered through these programs has been used to update PWS evaluations. The well risk rating has also been used in assessing potential contaminant sources in the CSWP Plan development.

1.5.3 Other Studies

There are a number of studies regarding groundwater hydrology that were used in the development of the capture zone models. All studies are referenced at the end of this document. The following studies were the primary information sources to characterize groundwater movement and aquifer parameters:

- US Geological Survey (USGS) Reports: The regional report for the Carson River basin prepared by the USGS was key in the selection of groundwater parameters such as transmissivity values, flow direction, and gradient.
- The Nevada Division of Water Resources Bulletins provided useful geohydrology information for the modeling effort.

2.0 TEAM FORMATION & PROGRAM GOALS

2.1 Team Formation Summary

2.1.1 Initial Stakeholder and PWS Owner Outreach

In August 2012, the NDEP sent letters of introduction to all involved well owners listed in Table 1-1 regarding the role of RCI in the ISWPP in Carson City. RCI called well owners in the fall of 2012 to introduce them to the project, request pertinent well information, and solicit participation in the Local Planning Team.

In October 2012, the ISWPP staff presented the plan development process and assistance opportunity to the Carson City Board of Supervisors. As a result Carson City, requested participation in the program and committed staff to provide support during development of the CSWP Plan.

In August 2013, public water purveyors in Carson City were contacted on the phone and invited to join the Local Planning Team effort in developing the CSWP Plan. The Carson City Public Works and State Buildings and Grounds staff participated regularly in the meetings. The Cottonwood Mobile Home Park also provided comments on the CSWP Plan.

2.1.2 Meetings and Workshops

RCI met with the Local Planning Team to introduce them to the program, garner information, and get preliminary input for management strategies. Meeting agendas and summaries are provided in Appendix B. Invitations to all public water well owners were provided either via e-mail, regular mail or phone call prior to meetings. Agendas and meeting materials were typically provided at least one week in advance of the meetings.

RCI developed a web page (www.rci-nv.com/source_water_protection) containing all pertinent project information including team members, meeting minutes, working documents, and maps. In addition, all digital mapping information was made available to team members through an online interactive GIS mapping tool referred to as the Carson City CSWP Flex Viewer

2.2 Local Planning Team Members and Roles

The CSWP Plan team was formed following phone calls and letters to each of the perspective source water managers, planners, emergency responders, and school representatives. The team members listed in Table 2-1 were involved in the plan preparation.

Table 2-1. Local Planning Team Members and Roles

Team Member	Contact Information	Planning Effort Responsibilities
Carson Water Subconservancy District *General Manager*	775-887-7456	Coordination and context with other Carson River watershed communities.
Carson City Public Works *Water Operations Manager* *Utility Director* *Environmental Control Supervisor* *Chief Stormwater Engineer*	775-887-2355	Provided details for operations, goals, and management strategy development.
Carson City Fire Department *Assistant Fire Chief* *Fire Chief*	775-887-2210	Coordination with emergency response procedures and personnel training.
Carson City Parks & Open Space Department *Open Space Manager*	775-887-2262	Coordination for watershed protection.
Carson City Planning Department *Director*	775-887-2180	Planning coordination and management strategy development.
Cottonwood Mobile Home Park *Proprietor*	775-883-8823	Privately owned PWS protection input
Douglas County GIS *GIS Supervisor*	775-782-9045	GIS CSWP Flex Viewer development.
Marlette-Hobart Water System State of Nevada *Water Systems Manager*	775-687-1022	Coordination and details regarding the Marlette-Hobart Water System and Stewart Complex well.
Nevada Division of Environmental Protection, Bureau of Water Pollution Control, ISWPP *Program Coordinator*	775-687-9503	Plan development guidance.
Resource Concepts, Inc. *Technical staff*	775-883-1600	Plan coordination and technical assistance.

2.3 Source Water Protection Goals

The Team identified goals to protect drinking water. These goals were developed during a series of meetings and build on the goals in the existing WHP Plans. The following plan goals were used to guide the development of this CSWP Plan as well as implementation of this plan. The objectives to achieve these goals are the management strategies and action plan discussed in Section 3.4.

Goal 1:

Update the existing Wellhead Protection Program(s) into a readily accessible Community Source Water Protection Plan (CSWP Plan).

Goal 1 Objectives:

1) Form a Local Planning Team.
2) Inventory current public water supply sources.
3) Update of Source Water Protection Area boundaries.
4) Prepare a Potential Contaminant Source inventory.
5) Develop source water protection management strategies and actions that are specific, measurable, achievable, reasonable, and timely.
6) Obtain CSWP Plan endorsement from NDEP.

Goal 2:

Implement and maintain the Community Source Water Protection Plan.

Goal 2 Objectives:

1) Establish a schedule and process to review and update the CSWP Plan.
2) Inform and educate city departments, industry, landowners and the public about their role in source water protection.
3) Manage and share information communitywide.
4) Use GIS and other digital tools to communicate and maintain the CSWP Plan.
5) Identify management strategies within 2-year and 10-year planning implementation windows.
6) Apply different strategies: countywide, within SWPAs, or to specific potential contaminant source concerns.
7) Develop a schedule to implement priority projects or actions.

3.0 PLAN DEVELOPMENT

3.1 Source Inventory and Planning

3.1.1 Plan Area Setting

Public water systems in Carson City are located in four groundwater basins: Carson Valley, Eagle Valley, Dayton Valley, and Washoe Valley within the Carson City area. The east side of the Carson Range is a source of groundwater recharge for the wells on the west side of Carson City (Figure 2, page 4). Drinking water is also supplied directly by surface water from Ash Canyon Creek, Kings Canyon Creek, and the Marlette–Hobart water systems. The Carson River provides a major source of groundwater recharge on the east side of Carson City. Geologic and hydrologic details for each well are provided in the Well Capture Zone Delineation Report provided as Appendix C.

3.1.2 Historical, Current and Projected Future Source Water Conditions

Groundwater conditions near public supply wells Carson City currently appear relatively stable although water levels in the northwestern part of Eagle Valley have dropped as much as 70 feet since 1964. The decline is likely the result of municipal pumping on the western side of the valley. The wells to the east near the Carson River are recharged by the river and water levels have remained stable.

Use of eight Carson City's wells are impacted by uranium levels exceeding the drinking water standards and seven are impacted by arsenic levels over the standard. Carson City completed an arsenic treatment facility several years ago, but this could not resolve the long term issues of uranium levels and increasing for future water demand.

Recently a large diameter (18-36") transmission main was completed that supplies Carson City with water from the Carson Valley as a part of a regional water system. With this project, it is anticipated that Carson City's future water supplies are secure. In addition, Carson City and Lyon County each have a transmission main to a shared water tank. Water is shared between the two entities based on the time of year, demand and water availability.

Ash Canyon Creek and North Kings Canyon Creek are important surface water sources and provide roughly 90 percent of the municipal water in Carson City during the winter months. The water quality is excellent. However, since the 2004 waterfall fire which burned the majority of the watershed, sediment has limited the City's use of these streams because the treatment facility is not designed to handle large amounts of sediment.

The Marlette–Hobart Water Supply System is operated by the State of Nevada. The historical system of impoundments was originally developed in the 1870's to transmit water to the Comstock region of Nevada. Today the system also serves Carson City. The system includes Marlette Lake, Hobart Reservoir, and a system of pipelines and tanks. The Marlette–Hobart Water Supply System was recently upgraded (in 2009) with an improved pump and transmission system.

3.1.3 Current measures for protecting groundwater from contaminant sources

Public well purveyors in Carson City have implemented a number of measures to protect groundwater from contaminant sources using the existing wellhead protection plans. The various actions of each entity to protect groundwater are summarized in the following tables.

Table 3-1. Actions Implemented by Carson City to Protect Source Water

Physical Actions	> Wellhead protection signage > Maintenance activities > Water transmission pipeline
Education and Outreach	> School and adult workshops > Public Information brochures > Video presentations
Coordination, Ordinances and Other Plans	> Pre-Treatment program > Commercial septic tank program > Domestic septic tank program > Industrial waste Disposal Program > Solid waste management program > Household Hazardous Waste program > Underground storage tank program > Shallow groundwater monitoring > Spills and Complaints response > Ordinances

Table 3-2. Actions Implemented by Cottonwood Mobile Home Park to Protect Source Water

Physical Actions	> Wellhead protection signage > Maintenance activities
Education and Outreach	> Public Information brochures

3.2 Source Water Protection Areas and Delineation

3.2.1 Source Water Protection Area Development Considerations

Source Water Protection Areas (SWPAs) in Carson City were developed for both groundwater and surface water resources through a step-wise process that involved GIS mapping, team discussions, and management considerations. SWPAs for groundwater resources delineate the land surrounding a well where activities should be managed to protect the public water supply. SWPAs for surface water resources include the watersheds contributing to those surface waters.

The first step in defining the groundwater SWPAs involved mapping the existing 10 and 25-year Wellhead Protection Areas from previous plans, then overlaying the maps with geology and topography mapping. The well capture zones were calculated using a hydrologic model, which predicts

conservative travel times for groundwater to local wells influenced by pumping. The capture zones were developed for a 2, 5, 10, and 25-year time of travel for each well using an EPA model and approved methods. In-depth descriptions of the data used and the modeling process are provided in the Capture Zone Delineation Summary Report provided in Appendix C.

Surface water SWPAs were established along boundaries of watersheds that supply surface water directly to the Carson City public water system and in areas that provide significant recharge to the Eagle Valley aquifers. These SWPAs were presented and vetted at Team meetings and are illustrated by Figure 2, page 4.

Table 3-3 below summarizes the steps used by the Local Planning Team in delineating the SWPA boundaries. Maps of the SWPAs are illustrated by Figure 2, page 4, and are also provided in the Appendix A.

Table 3-3. SWPA Delineation Steps

Step	Details
Step 1: Gather Data	Map available data: > Wellhead locations. > Existing 10 and 25 Year Wellhead Protection Area boundaries. > Map local geology, faults, and topography. > Update well operating characteristics.
Step 2: Delineate Protection Areas By Groundwater Time of Travel	> Calculate 2, 5, 10, and 25-year well capture zones for active wells and potential future wells. > Compare capture zone results to existing SWPA boundaries. > Update boundaries to reflect calculated capture zones where operations have changed. > Combine overlapping boundaries as needed to establish management areas.
Step 3: Delineate Protection Areas By Hydrogeology	> For west side wells, review faults and geologic characteristics. > Delineate 2 and 5-year capture zones for west side wells based on local hydrogeology and topography.
Step 4: Delineate Protection Areas By Watershed	> Follow up on Local Team concerns for protecting surface water sources of drinking water. > Considered groundwater recharge areas for Carson City. > Delineated watershed/recharge areas critical to Carson City's public water supply system using hydrographic boundaries.
Step 5: Map Preparation	> The delineated SWPA boundaries were reviewed by the Local Planning Team. > The maps are made available through the Flex Viewer site as well as via PDF copies available on the web.

3.2.2 SWPA Extent and Characteristics

The Local Planning Team delineated SWPAs that include all of the active and planned PWS wells in Carson City, the surface water resources and the recharge areas (Figure 2, page 4). The wells are captured within three large 25-year SWPAs. Key surface water and groundwater recharge areas are captured within two large water watershed areas.

There are four different SWPAs that represent different planning timeframes for the City. The 25-year SWPAs represent long-term planning areas for Carson City whereas the 2-year SWPAs are more immediate management areas. The 5 and 10 year SWPAs are intermediate planning areas allowing for time to identify and respond to new sources or clean up actions if a contamination event occurs. The 10-year SWPA also corresponds with the cycle identified by Carson City for updates to the CSWP Plan as well as other City planning documents. Private land or land owned by Carson City comprises the majority of the 10-year SWPA acreage.

The two watershed areas are indicated in Figure 2, page 4, as Watershed 1 and Watershed 2. Watershed 1 encompasses the North Kings Canyon and Ash Canyon surface water resources and the important recharge areas on the west side of Carson City. The majority of Watershed 1 (69%) is within land managed by the U.S. Forest Service. Watershed 2 encompasses the area that contributes to the Marlette–Hobart water system. Over 90 percent of Watershed 2 is within the Lake Tahoe Nevada State Park and 88 percent of the watershed is also within Washoe County.

3.3 Potential Contaminant Source Inventory

3.3.1 Summary

A potential contaminant source (PCS) inventory was performed to identify potential hazards to the quality of the public drinking water supply. PCSs in the SWPAs were identified through an inventory of the existing wellhead protection plans, meetings with water system operators, evaluation of the local hydrogeology, review of existing on-line databases, and review of the ISWPP guidance. The PCS results assisted the Team in designing management tools to prevent future contamination. Appendix D provides detailed information about the methodology used to develop and evaluate the PCS inventory, based on PCS information current during the development of this CSWP Plan.

3.3.2 PCS Inventory

The Team conducted an inventory of the PCSs in and near the source water protection areas. The inventory was initiated first through discussions amongst Team members and utility operators to identify primary concerns. Other PCSs were identified and mapped using data from existing regulatory databases, previous surveys and prior endorsed plans. Finally, the 2-year and portions of the 10-year source water protection areas were reviewed by driving reconnaissance to observe the known and possible PCSs.

The existing databases that were mapped and provided to the Team for review of PCSs using the Flex Viewer tool including:

- Existing Wellhead Protection Area boundaries (10 and 25-year).
- Proposed SWPA boundaries (2, 5, 10 and 25 year areas; and watershed areas)

- Nevada Division of Environmental Protection interactive map resources available for facilities regulated by the Bureaus of Corrections, Regulation and Reclamation, Water Pollution Control, and Waste Management.
- Nevada Division of Environmental Protection aboveground and underground storage tank databases.
- Nevada Department of Motor Vehicles (DMV) Licensed Businesses including: repair shops, registered garages and wreckers.
- US Environmental Protection Agency regulatory databases available through the Geospatial Data Access Project.
- Carson City Assessor parcel record information locations of individual septic system and private wells.
- Carson City Pretreatment Program facility inventory.
- Carson City Public Works databases of sanitary sewer lift stations and stormwater basins.
- Nevada Employer Directory Database provided sorted by North American Industry Classification System (NAICS) Code.
- Available mapping of geology, floodplain, land use, zoning, and aerial photography.

3.3.3 Potential Contaminant Source Evaluation

The Team identified three broad categories of PCSs in Carson City. Each of these PCS categories require different considerations for control, management, and monitoring; therefore it is helpful to consider them in the following groups:

1. Facilities that store and handle hazardous materials, nutrients, or chemicals. Discharge to the environment from these facilities is not anticipated, but could potentially occur in accidental or catastrophic situations. These types of sources throughout Carson City include industrial facilities, commercial facilities, and residential activities.
2. Facilities or activities that by their nature or by design distribute materials to the environment. These types of sources in the SWPAs include residential and commercial septic systems, wastewater treatment systems, irrigation systems, stormwater systems, weed and pest control activities, firefighting chemicals, and unused or “orphaned” well casings.
3. Facilities or activities that convey polluting materials from one point to another. Discharge to the environment from these facilities occurs over time through leakage, spills or in accidental or catastrophic situations. These types of sources in the SWPAs include pipelines and pump stations, local roads and highways.

Planning windows identified by the Team were then used to select the corresponding SWPAs for evaluation of the PCSs in Carson City. The evaluation focused on the following areas:

- 2-Year SWPAs that represent the highest risk from spills, leaks, or other short term releases, because of the short travel time to the well.
- 10-Year SWPAs that require comprehensive management and planning activities to address potential contaminants; and the window is also consistent with the State ISWP program for revisiting source water protection issues in each county on a 10-year rotating basis.

- 25-Year SWPAs in order to review and manage long-term continuous releases from septic systems.
- Watershed SWPAs introduced to the CSWP Plan to protect surface waters that directly supply Carson City's municipal system and are significant sources of recharge to Eagle Valley aquifers.

Summary tables and the key characteristics of each SWPA, including potential sources, are presented in Appendix D.

3.3.4 Potential Contaminant Sources

The PCSs vary considerably across Carson City (Appendix D). The PCSs for each SWPA are summarized in the following paragraphs by 10-year SWPA, 2-year SWPA, and "Watershed" SWPA.

10-Year SWPA Summary

The 10-Year East SWPA lies mostly within the Riverview Subbasin and is bordered by the Carson River to the east. It combines capture zones for seven municipal wells and includes roughly 2000 acres. It has some newer residential developments, irrigated golf course and agriculture areas, and concentrated commercial/industrial development along East Hwy 50. It has the greatest number of PCSs classed as industrial, automotive, and construction. About 45% of the total 10-Year East SWPA is designated as FEMA mapped 100-Year floodplain.

The 10-Year Central SWPA generally has commercial and public facilities, as well as some older residential areas, encompassing the neighborhoods from Mills Park to the north side of the Carson Plaza shopping mall. It is the smallest 10-year SWPA (about 440 acres) and encompasses the capture zones for four municipal wells and the Terrace Garden Apartments. The 10-Year Central SWPA has the greatest number of PCSs per acre when compared to the other SWPAs. The most numerous PCSs are commercial, automotive, and facilities with environmental regulatory oversight.

The 10-Year South SWPA is the one of the two largest SWPAs (roughly 3000 acres) and combines the capture zones for seven of Carson City's wells, the Mill House Inn Motel and the State Stewart Complex. The existing development is mostly residential, but also includes the commercial corridor along Hwy 395 south to Topsy Lane, as well as the future I-580 highway alignment. There are three neighborhoods served by septic systems. The 10-Year South SWPA also has irrigated agricultural areas with related PCSs. The most numerous PCSs are classed as stormwater basins, storage, and automotive.

The 10-Year West SWPA includes the area from North Carson Street and the Cottonwood Mobile Home Park reaching east up into the drainages along the west slope of the Sierras (Eagle Valley Creek, Vicee Canyon, Ash Canyon and Kings Canyon). The area is roughly 3,000 acres (comparable to the 10-Year South SWPA) and includes the largest number of public water system wells: eleven belonging to Carson City and five (three existing and two proposed locations) belonging to the Cottonwood Mobile Home Park. It has an irrigated golf course, the largest number of PCSs classed as "medical/educational" and 48 mapped stormwater basins primarily for flood control. There are three neighborhoods served by septic systems in the 10-year SWPA, as well as the upgradient Lakeview Area served by septic systems, which lies in the 25-Year SWPA.

2-Year SWPA Summary

The characteristics of the 2-Year SWPAs vary significantly throughout the Carson City area. In general, risks identified for most of the 2-year SWPAs were low to moderate. Carson City's activities to remove municipal underground storage tanks and provide environmental oversight through the local pretreatment program contribute to reduce concerns in the 2-Year SWPAs. PCS concerns related to a few 2-Year SWPAS are:

- 75 to 100% "moderate risk" land uses (combined commercial, industrial, mixed use commercial, high density residential, mixed use residential, and public/quasi-public land use categories)
- Wellheads located in 100-year floodplain or are more than 30% in the 100-Year floodplain.
- Higher "density" of septic systems (greater than 0.25 systems/acre).
- Occurrence of facilities that potentially use and store fuel or hazardous materials that require environmental regulatory oversight (registered UST/AST, EPA regulated, Pretreatment Permit).

Watershed SWPA Summary

For the Watershed SWPAs, PCS concerns identified by the Team are related to: erosion along access routes (trails and roads), potential chemical spills from vehicle accidents in the canyons, increasing recreational use (hikers, bikers, pets, camping), and potential wildland fires (erosion and firefighting chemicals). Lands in these SWPAs are managed by several local, State, and Federal agencies. The coordination between the agencies to recognize PCS concerns and manage for water quality protection was identified as a component of the CSWP Plan.

3.4 Source Water Protection Management Strategies

The following sections summarize the management strategies prioritized by the Local Planning Team for the Carson City area. These management strategies are broad and will be implemented using project specific action plans as a guide (Section 4.0 with additional detail in Appendix E).

3.4.1 Carson City

In the past, Carson City has actively managed a robust wellhead protection program with a dozen or more management strategies to protect source water. The Team evaluated these existing strategies with the results of the PCS survey. As a result, the Team updated the management strategies to manage the PCSs in Carson City and also developed actions for implementation (Section 4.0 and Appendix E). The management strategies will help to avoid contaminants from being released in SWPAs, which in turn could avoid costly and/or irreversible damage to the water sources.

Coordination and Planning

Coordination and planning is important with the parties having jurisdiction over lands or the activities on those lands contained in the SWPAs, such as: private landowners, Carson City, the US Forest Service, the BLM, Nevada State Parks, or the NDEP. Coordination promotes cooperation in protecting the drinking water resources.

This strategy contributes to source water protection where State or Federal agencies are significant land managers in SWPAs, or where agencies have regulatory authority, by requesting them to prioritize source water protection as a key component of their resource protection measures.

Domestic Septic Tank Program

The City will continue to limit septic tank proliferation and to extend municipal sewage facilities. This strategy contributes to source water protection by limiting new sources of groundwater contaminants from septic systems, particularly nitrates.

Fuel Storage Tank Program

Carson City has decommissioned its underground fuel storage tanks, with only one still scheduled. Management strategies directed at above ground storage tanks will contribute to source water protection particularly through awareness, proper fuel handling procedures, emergency contact information and training in the use of materials for minor spills.

Household Hazardous Waste Program

The Carson City Household Hazardous Waste (HHW) Collection Facility provides Carson City residents with waste disposal services. The program contributes to Source Water Protection by encouraging proper disposal of hazardous household products that might otherwise be dumped and create sources of water contamination.

Maintenance

Carson City conducts street cleaning, and performs erosion control activities to reduce the conveyance of sediments to detention basins and storm drain systems. Regular maintenance reduces contamination of stormwater runoff that can directly affect the quality of surface drinking water sources and the aquifer recharge for ground water resources.

Open Space Management

Carson City has acquired lands to be managed as open space. Carson City will coordinate between departments to ensure source water protection is a key component of natural resource protection in local land management plans.

This strategy contributes to source water protection by recognizing that these lands are needed to preserve drinking water quality, in addition to providing wildlife habitat, view protection, and recreational opportunities.

Pretreatment Program

Carson City Public Works ensures that the pretreatment systems are a part of construction plans for regulated facilities. The pretreatment program helps protect source water quality by giving Carson City oversight at facilities that handle, store, and treat materials that are potential sources of pollution.

Public Education and Outreach

Communication about source water protection continues to be a key component of the management strategies for Carson City. The public education and outreach plan provided in Appendix F details the Carson City program.

Regulatory Measures

There are several areas in the municipal code that have been adopted to implement Carson City's 1998 Wellhead Protection Plan. These included:

- Health and welfare code (Title 9);
- Water, sewage, and drainage code (Title 12);
- Buildings and construction code (Title 15);
- Subdivisions (Title 17); and
- Zoning (Title 18).

These regulatory measures continue to help preserve source water quality through the established pretreatment program, designating standards for abandoning septic systems and connecting to sanitary sewer, and controlling the construction of new septic systems.

Shallow Groundwater Monitoring

Monitoring can contribute to source water protection by identifying groundwater quality, tracking boundaries of groundwater contamination, locating sources of contamination, and/or defining local aquifer characteristics.

Solid Waste Management

Solid waste management includes regulatory compliance, daily operation of the Carson City landfill, recycling, waste diversion, and public education. Groundwater monitoring wells and methane test probes are routinely monitored to detect any indication of an adverse impact to the environment. Daily inspections are performed to ensure that the landfill is meeting regulatory obligations. Programs are in place to discourage illegal dumping and encourage proper disposal of medical waste. Recycling efforts are also in place by recycling used oil, antifreeze, metal, tires, batteries, cardboard and glass. Additionally, there are public outreach programs such as free dump days, Christmas tree recycling and the Household Hazardous Waste disposal program.

The program contributes to source water protection by discouraging improper disposal practices (such as illegal dumping) that might create sources of source water contamination.

Spills and Leak Complaints

Carson City responds to all complaints and reports of spills received from the general public, businesses, Sheriff's Dispatch, other City departments, the State Office of Emergency Management, and the NDEP. Coordinated responses to spills and complaints contributes to source water protection by proactively investigating potential sources of contamination, and implementing control and disposal procedures for leaks or spills to minimize impacts to public drinking water sources.

3.4.2 Private and State Water Systems

The Carson City management strategies identified Section 3.4.1 are applicable throughout the SWPAs (Figure 2, page 4), which incorporate the capture zones of the four smaller water systems. However, unique needs and concerns were also identified for pursuit by the individual PWSs for their local areas. Their specific strategies and implementation actions are summarized within this document, which can assist them in seeking future collaboration and potential funding sources. The following strategies are specific to the individual water systems.

State of Nevada Stewart Complex

State Building and Grounds also identified a need to manage or abandon unused wells in the vicinity of the Stewart Complex water system. Poorly constructed or maintained wells can provide a direct conduit for pollutants to reach groundwater.

Cottonwood Mobile Home Park

The Cottonwood MHP has previously adopted management strategies and actions for implementation in their NDEP approved WHP Plan (Aquifer Science Inc., 2001). The strategies are generally consistent with Section 3.4.1., though in addition, Cottonwood MHP identifies encouraging maintenance of residential wells and abandonment of unused wells in their vicinity as a management strategy. Their unique actions to implement these strategies are referenced in Section 4.0 and Appendix E.

3.5 Contingency Plan

3.5.1 Introduction

Contingency planning within the context of this CSWP Plan provides guidance and direction to Carson City and the PWSs in the event the aquifer or main source of drinking water is significantly contaminated. The contingency plan demonstrates a community's planning capacity to address a long-term emergency situation. The contingency plan considers the time frames needed to switch to an alternate source, the quantity and quality of the alternate water sources, and the local resources. The contingency plan also includes conservation measures intended to prolong the use and availability of water supplies (e.g., during periods of interim decision making, remediation, or new source development).

3.5.2 Existing Plans Relating to Contingency Measures

Contingency plans are included in the previously developed WHP Plans for the public water systems in Carson City. Several related plans are required by the Nevada Administrative Code (NAC) to address short term and long term contingencies for impacts to water quality and quantity. These plans include an emergency plan, cross-connection control plan, operation and maintenance manual and a water conservation plan. Some or all of these plans will be used in conjunction with this Contingency Plan depending on the situation.

Emergency Plan

The Emergency Plan contains short-term solutions to an immediate shutdown, either due to quantity problems, response to contaminant threat, or natural disaster. Public water suppliers in Nevada work with the Nevada Division of Emergency Management (DEM) through County emergency management representatives if an emergency response is required. The DEM

assists with short-term problems, such as spill response and coordinating the trucking of water to the afflicted community. The plan contains a list of available resources, emergency notifications, hypothetical scenarios and affected facilities including water sources, distribution systems, pump stations, storage tanks and covered reservoirs.

Cross Connection Control Plan

The Cross Connection Control Plan provides information on how to prevent unauthorized connections to the PWS that could potentially contaminate the system during a loss of pressure. This plan identifies all activities needed to ensure that no unprotected service connections exist between the water system and sources of pollution or contamination.

Operation and Maintenance Manual

Each PWS maintains an O & M Manual that provides information on the purpose, function, operation and interaction of facilities of the system, describes the capabilities and limitations of the system, and identifies procedures to control system processes. This manual is required under NAC 445A, 6667 and must be maintained at each facility of the water system for use by the operators and other personnel of the facility.

Water Conservation Plan

The Water Conservation Plan outlines procedures to be followed in the event of water shortages due to drought, overuse, or contamination. Water conservation plans require an analysis of the effectiveness of proposed water conservation measures, as well as an analysis of the effectiveness of utilizing a conservation-based water rate structure. The Water Conservation Plans also outline proposed water conservation enforcement measures.

3.5.3 Short-Term Contingency

Short-term water supply options provide temporary relief until permanent solutions can be implemented. The Emergency Plans for each PWS describe actions for short term contingencies in detail. A list of potential alternate supply options is included below; however, the emergency water supply options listed here are not intended to provide permanent solutions.

- Operational Adjustments: In the event that one of the wells becomes contaminated, municipal public water suppliers should be able to meet system demands by making some operational adjustments such as using other wells and using stored water.
- Boiled Water: Boiled water may be ordered at the discretion of the well manager or as directed by the Bureau of Safe Drinking Water.
- Bottled Water or Potable Water Trucks: Bottled water is available in the immediate area at local stores. Potable water trucks may be brought in from adjacent communities.
- Water Conservation and Rationing: In the event that demand cannot be met, conservation and rationing orders may be given.

The existing contingency plan from Carson City is included in Appendix G. The existing contingency plan for the Cottonwood MHP is Section 7.0 of their WHP Plan (Aquifer Science Inc., 2001).

3.5.4 Long-Term Contingency

In the event of significant contamination of a drinking water source, the water providers with wells in the particular contaminated aquifer region may be subject to long-term deficits in their water supplies. However, Carson City is a centralized municipal system with multiple wells that provide a level of flexibility in pumping from alternate groundwater sources.

- Douglas County, Carson City, and Lyon County Utilities have been coordinating regarding water transmission between Douglas County, Carson City and the Dayton area.
- Multiple wells and transmission options provide alternative sources in the event of local aquifer contamination.
- Interconnection may also benefit the other public water purveyors in that they are located close enough to Carson City water lines to connect to the system.

3.6 New Well Siting and New Water Sources

Recently a large diameter (18-36”) transmission main was completed that supplies Carson City with water from the Carson Valley as a part of a regional water system. With this project, it is anticipated that Carson City’s future water supplies are secure in the foreseeable future.

No new well siting is planned by Carson City Public Works in Eagle Valley, primarily due to natural sources of arsenic or uranium that require costly water treatment.

Cottonwood MHP has no plans to construct additional wells for its system but has located two possible future well locations as listed in Table 1-1. These well locations are included in this CSWP Plan and are depicted on all of the appropriate maps. The management strategies to protect these future locations have been developed in this CSWP Plan and their WHP Plan (Aquifer Science Inc., 2001).

4.0 PLAN IMPLEMENTATION

4.1 Action Plan Implementation

The CSWP Plan will be implemented through Action Plans. The Action Plans were built to achieve the goals and objectives of this CSWP Plan, to address the identified PCSs, and to implement the management strategies described in Section 3.4 of this document.

The Action Plan projects are organized in Appendix E by management strategy. The action plan projects were identified and compiled from the existing WHP plans and as outcomes of Team meetings. Each item in the Carson City Action Plan lists the relative priority, applicable area location and the key department or group to lead action implementation. The Action Plan for Cottonwood MHP summarizes items described in Section 5.0 of the WHP Plan (Aquifer Science Inc., 2001) and comments received during the CSWP Plan development.

Action Plan implementation is dependent upon resource availability and the actions will be implemented as funding and time allows by the respective PWSs. Technical or funding assistance will be needed to complete the action plan projects. While some actions have a higher priority than others, implementation will depend, to a large extent, on the resource and teaming opportunities that are available. The PWSs will take advantage of grants and other funding sources for implementation.

4.2 Potential Funding Opportunities

There are a variety of potential funding sources that may be considered to implement the action plan. A key component for most funding sources is to build relationships and leverage resources. The Local Planning Team benefits from each other's knowledge and contacts. Table 4-1 lists some of the potential funding sources available.

Table 4-1. Potential Funding Considerations

Funding Agency	Program Name
Bureau of Reclamation	> Water and Energy Efficiency > Rural Water Supply > Water for America > System Optimization Review
EPA	> Advancing Public Health Protection through Water Infrastructure Sustainability > Clean Water State Revolving Fund > Drinking Water State Revolving Fund
USDA	> Water and Waste Disposal and > Water, Sewer, and Solid Waste Disposal Management > Rural Development Solid Waste Planning > Community Facilities Loan and Grant Program
FEMA	> Flood Mitigation Assistance

Funding Agency	Program Name
State of Nevada	> AB 198 Grants > CWA 319 NPS Grants > Solid Waste Program > ISWPP Implementation Grants
USGS	> On-going groundwater research efforts

4.3 Updates

The CSWP Plan is a dynamic living document. The Team will meet at least once per year to revisit the plan, assess the plan update needs, follow-up on implementation, coordination and progress. This meeting will be coordinated by Carson City Public Works. The invitation to revisit and update the CSWP Plan will include owner/operators of the four smaller PWSs in the area:

- Cottonwood Mobile Home Park Water System
- Mill House Inn Motel Water System
- Stewart Complex and Marlette–Hobart Water Systems (State Buildings and Grounds)
- Terrace Garden Apartments Water System

5.0 PUBLIC PARTICIPATION

Public education is an important tool as identified in the Management Strategies and the Action Plan to promote voluntary protection actions and to build public support for plan implementation. In this case, taking action refers to changing practices and behaviors that could be detrimental to source waters. The objective of the CSWP Public Education Plan is to present water providers, residents and other stakeholders with a set of tools and tactics that can be used to promote source water protection outreach and education.

The implementation actions, provided in Appendix E, identify several specific audiences for targeted education and outreach to promote proper care and maintenance when potential contaminants are involved. These target audiences for this Education Plan are residents, businesses classified as PCSs, well owners, and septic system owners because their actions may impact water quality. School students in or near the 6th grade level are also a specified audience because they are receptive, the messages blend well with their existing curriculums and because children often provide pressure on their parents and relatives to “do the right thing”. Finally, community leaders are targeted because they make decisions regarding development and regulations that may impact water quality.

Proposed methods for educating the target audiences range from watershed and groundwater model presentations at public meetings and community events to flyers and posters. The appropriate educational tools depend on the extent of the community’s communication resources and the audience. Although the audiences range from community leaders, to business managers, to schoolchildren, the primary messages are the same. The following are the highlights of the public education plan provided in Appendix F.

What is source water protection?

Source water protection is a way to prevent drinking water from becoming polluted. Much can be done to prevent pollution, such as the informed use of land and disposal of chemicals.

Why is it important to protect water at the source?

Protecting public drinking water supplies at the source before pollution enters our drinking water supply lessens potential health issues, as well as the high costs associated with water treatment and source water development. Public water users can help protect our community’s source water. Managing land uses and human-caused sources of contamination are the keys to preventing pollution before it enters our drinking water supply at the source.

What contaminates the water we drink?

There are numerous types of pollutants that can contaminate surface and ground water. Some contaminants are a result of improper disposal of common household products such as cleaning products, waste oil, pet waste, fertilizers and pesticides. Disposal of human waste (septic tanks and wastewater treatment facilities) can under certain conditions also pose a risk to groundwater. Other products may be used or generated by businesses, such as dry cleaners, film processing centers, salons, cemeteries, petroleum storage and handling, that when improperly disposed of may threaten to contaminate our drinking water.

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