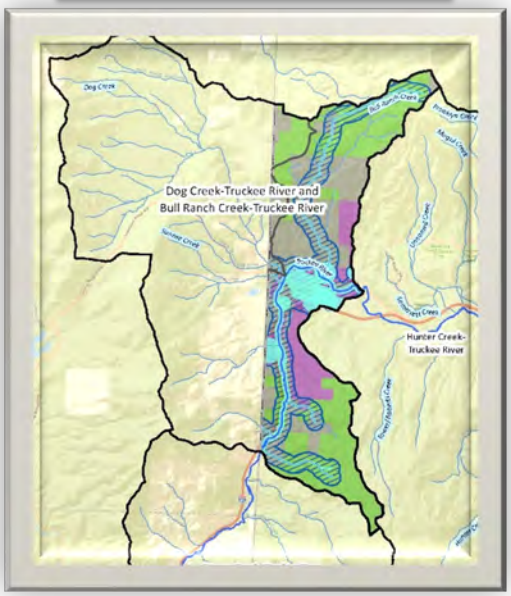
Bull Ranch Creek & Dog Creek – Truckee River

HUC-12 Watershed #160501020504 & #160501020503 Profiles

Click here for complete HUC-12 Watersheds Map



Contents

Introduction

The Bull Ranch Creek-Truckee River and Dog Creek HUC-12 Watersheds profile is a component of the 2020 Integrated Source Water and 319(h) Watershed Protection Plan for Public Water Systems and the Truckee River in the Truckee Meadows (Plan), as well as the Watershed Management and Protection Plan for Tributaries to the Truckee River. This document is a part of the on-line watershed mapping tool.

This watershed description is intended to be a guide and resource for organizations working within the watersheds, and an educational tool for those interested in learning more about the watershed in which they live. This Plan can be used to support funding for a multitude of water quality projects in these watersheds. Note that only non-regulated activities are eligible for the Nevada Division of Environmental Protection Source Water Protection Program or the 319 Non-Point Source Program funding.

Summary

This profile focuses on the watersheds water quality. It includes potential and existing concerns, types of land uses, watershed management strategies and projects, and the involved stakeholders and their corresponding plans with water quality components.

The mountainous Bull Ranch Creek-Truckee River and Dog Creek watersheds lie in both California and Nevada. High elevation snowmelt and runoff from Peavine Peak, the Carson Range, the Verdi Range, and Dog Valley supply water to the Truckee River. The Bull Ranch Creek-Truckee River HUC-12 Watershed includes the Truckee River segment downstream from the Nevada State line, through Verdi, to just above the Highland Canal Diversion Dam. River water is diverted at the dam to the Chalk Bluff Water Treatment Plant operated by the Truckee Meadows Water Authority (TMWA). The river provides about 80-85% of the drinking water to nearly 425,000 people in TMWA's service area. The river and tributaries in these watersheds host excellent water quality.

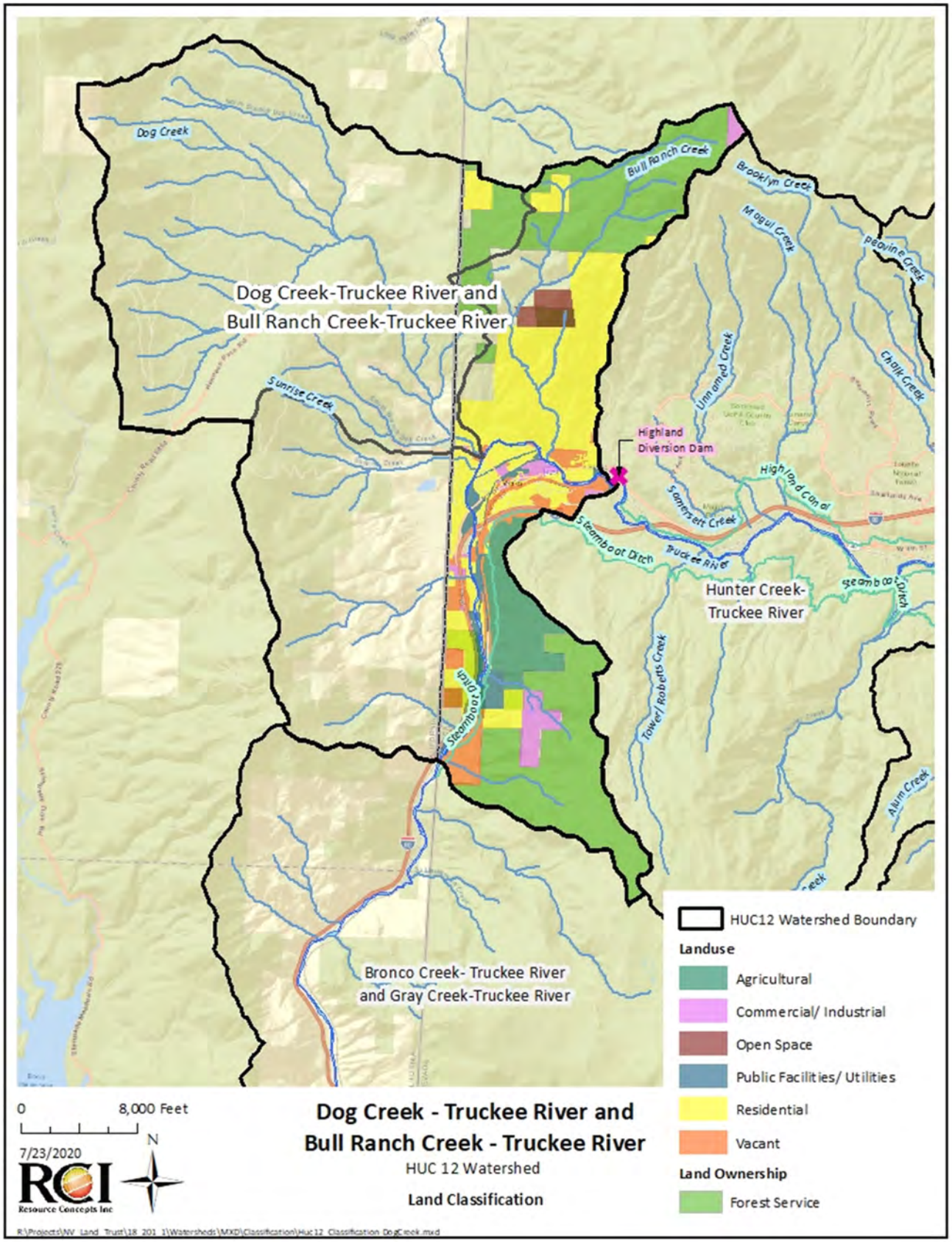
Source Water Protection Areas (SWPAs) for this watershed were developed by stakeholders to help protect drinking water sources. A narrow band of existing and new development in the Truckee River canyon, which is also a significant road and rail transportation corridor. Shallow groundwater and springs along the river corridor in Verdi supply water to ten small public water systems. Because groundwater locally and surface water regionally are both important sources of public drinking water, the Truckee River corridor and tributaries are a SWPA. The following table summarizes key water quality aspects of the watersheds.

Watersheds Summary	
Basins	• Bull Ranch Creek-Truckee River HUC-12 Watershed #160501020504. • Dog Creek HUC-12 Watershed #160501020503. • Groundwater Basin: 091 (Truckee Canyon).
Water Bodies & Water Quality	• Truckee River, not impaired, see NAC 445A.1684. • Sunrise Creek, not assessed. • Bull Ranch Creek, not impaired, see NAC 445A.1684. • Dog Creek, not impaired, see NAC 445A.1684. • Four unnamed creeks, not assessed. • Irrigation ditches: Coldron and Steamboat.
Source Water Protection Areas	• SWPAs create buffers along perennial streams throughout the watersheds. These areas represent a precautionary indicator to safeguard drinking water sources. • Critical SWPAs represent areas closer to perennial streams, the Truckee River, and public water system wells. • Ten wells and two springs in the Bull Ranch HUC-12 Watershed managed by ten different public water systems. • 4,000 acres, or approximately 36% of the watersheds in Nevada are in Source Water Protection Areas. • 1,900 acres, or about 17% of the watersheds in Nevada are in Critical Source Water Protection Areas.
Special Considerations & Issues	• Watersheds are in Nevada (11,100 acres) and in California (19,600 acres). • Upstream of the Highland Ditch diversion that sends Truckee River water to the Chalk Bluff Water Treatment Plant. • Potential for wildfire in the Carson and Verdi Range, resulting in turbidity in Truckee River. • Increasing urbanization in the adjacent to the river in the Truckee Canyon. • Travel corridors: I-80 and the railroad.

	Type	Acres	%
Land Jurisdiction In Nevada	City of Reno: Washoe County Non-Federal: USFS:	1,800 4,400 4,850	16% 40% 43%
Land Use In Nevada	Agricultural: Commercial/Industrial: Open Space: Residential: Public Facility/Utilities: Vacant: Federally Managed:	800 400 200 3,400 350 800 4,850	7% 3% 2% 29% 3% 6% 43%

Land uses and jurisdictions in the watersheds are summarized in the adjacent table and illustrated by the Land Classification Figure. Note that the acreages are provided only for Nevada.

Within California, these watersheds are mostly public land managed by the U.S. Forest Service (USFS). Within Nevada, land use is primarily residential with on-going expansion. The railroad and Interstate 80 (I-80) parallel the Truckee River. The potential and existing water quality concerns from these activities are primarily hazardous materials from spills or leaks, pollution from urban area runoff, and sediment/turbidity from erosion.


Dog Creek
Bull Ranch Creek
Brooklyn Creek
Mogul Creek
Peavine Creek
Dog Creek-Truckee River and
Bull Ranch Creek-Truckee River
Sunrise Creek
Unnamed Creek
Chalk Creek
Highland
Diversion Dam
Highland Canal
Sommerset Creek
Steamboat Ditch
Truckee River
Hunter Creek-
Truckee River
Steamboat Ditch
Tower/ Roberts Creek
Steamboat Ditch
Alum Creek
Bronco Creek- Truckee River
and Gray Creek-Truckee River
HUC12 Watershed Boundary
Landuse
Agricultural
Commercial/ Industrial
Open Space
Public Facilities/ Utilities
Residential
Vacant
Land Ownership
Forest Service
0
8,000 Feet
N
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RCI
Resource Concepts Inc
Dog Creek - Truckee River and
Bull Ranch Creek - Truckee River
HUC 12 Watershed
Land Classification
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Water Quality Standards and Beneficial Uses

Water quality standards for surface water in the state of Nevada are established by Nevada Administrative Code (NAC) NAC 445A.11704 through NAC 445A.2234. Standards applicable to beneficial uses are generally described under NAC 445A.122. The Nevada Division of Environmental Protection (NDEP) Bureau of Water Quality Planning Nevada 2016-2018 Water Quality Integrated Report identifies the beneficial uses and the surface water quality conditions in these watersheds, as summarized below:

- The Truckee River, Bull Ranch Creek, and Dog Creek water quality supports all beneficial uses (water quality standards NAC 445A.1684).
- None of the other drainages are assessed.

Groundwater and surface water are both important sources of drinking water for public water systems in this watershed area. Known groundwater contamination concerns have included nitrate and fuel/solvents.

Potential and Existing Water Quality Concerns

The primary potential and existing water quality concerns in the watersheds are listed below and described in the following paragraphs. The information focuses on the Nevada portions of the watersheds:

- Hazardous Materials from Spills or Leaks
- Pollution from Urban Areas
- Nitrate from Individual Sewage Disposal System
- Sediment from Erosion

Hazardous Materials from Spills or Leaks

A concern in the Bull Ranch Creek – Truckee River HUC-12 Watershed is potential spills from accidents along the railroad and I-80. The railroad and I-80 parallel the Truckee River and, in several locations, spilled materials could easily and quickly enter the Truckee River upstream of the diversion to the Chalk Bluff Water Treatment Plant. To this date, no major toxic spill has occurred on the Truckee River; however, toxic spills in other waterways have reduced the supply of water for extended periods of time (WRWC, 2017).

The U.S. Department of Transportation accumulated a list of commonly transported hazardous materials within the Truckee River watershed (WRWC, 2017). These include:

- Ammonia perchlorate
- Anhydrous ammonia
- Chlorine
- Cyanide
- Hydrochloric acid
- Hydrogen sulfide
- Nitro cellulose (wet)
- Propane
- Petroleum naphtha
- Phosphoric acid
- White phosphorous
- Propargyl alcohol
- Sulfuric acid
- Sodium hydroxide

Though limited in number, there are also commercial and industrial businesses adjacent to this segment of the river. In 2019, TMWA and the Washoe County Health District worked with the Arconic facility to improve material storage and handling that would reduce the potential for an accidental release to contaminate river water above Truckee River diversions to the Chalk Bluff Water Treatment Plant. The travel time to the water intake and contaminant concentration at the intake depends primarily on the level of the river flows during and shortly after the time of the spill (Rivord et al. 2014).

Underground chemical and fuel storage tanks have had a history of leaks that can cause contamination of soil and groundwater. There are several active and closed corrective action sites associated with solvents, gasoline, and heating oil in the urban area near the river.

Pollution from Urban Area Runoff

Groundwater, surface water, and irrigation ditches may be vulnerable to polluted runoff from urban areas. Potential contaminants include:

- Nutrients from fertilizers
- Bacteria from animal waste
- Trash
- Pollution from household waste
- Runoff from roads and parking lots
- Dissolved salts from excess irrigation

Excessive fertilization in green areas such as yards, fields, golf courses or parks are potential sources of nutrients from runoff. These areas may also contribute *Escherichia coli* (*E. coli)* from animal waste such as from horses, dogs and geese. Crystal Peak Park is in Verdi and provides direct access to the Truckee River.

In the Verdi area, there is potential for new urban development along the south flank of Peavine Mountain. Excess irrigation of green areas can also create persistent “dry weather” flows, due to direct discharge to storm drains and/or seepage through shallow soil layers to existing natural drainages. Irrigation seepage through desert soils, that were not previously irrigated, can mobilize salts (TDS), which in turn can lead to perennial flows with poor water quality in drainages that were originally

ephemeral. Water quality concerns in Chalk Creek (impaired for Total Dissolved Solids, Sulfate, Selenium, and Nitrate), which is located to the east in similar underlying geologic formations, may be related to this type of seepage (JBR, 2010).

Nitrate from Individual Sewage Disposal Systems

Individual Sewage Disposal Systems, or septic systems, are associated with nitrate contamination of groundwater if there are large numbers concentrated in a small area, for example, neighborhoods with lot sizes less than one-acre, or if they are not maintained properly (WRWC, 2017). Septic systems are located throughout the Verdi area. The Bull Ranch Creek watershed has 377 parcels with septic systems and the Dog Creek watershed has 18 parcels with septic systems. Past concerns about potential nitrate contamination in groundwater and surface water warranted extension of municipal sanitary sewer service (Lawton/Verdi Interceptor) to decommission small wastewater treatment plants in the area, as well as build capacity to serve new developments in the Truckee River canyon. One small wastewater treatment facility remains in the Bull Ranch Creek watershed.

Sediment from Erosion

Sediment from erosion conveys pollution, such as phosphorous, and degrades downstream water with suspended sediment. The primary causes of erosion and sedimentation in this watershed include wildland fire, noxious weeds, and drainage and landscape modifications.

TMWA has identified increased turbidity, and sediment from watersheds upstream of the Highland Ditch diversion as potential risks to their surface water treatment systems. TMWA can allow short term flood/runoff events that elevate turbidity in the Truckee River to bypass diversion to the treatment plant. However, there is a need to prevent long term increases in turbidity that might result from catastrophic fires or landslides.

High-severity wildfires alter the overall structure of the ecosystem through the removal of vegetation leaving limited ground cover. Severe fires also create a waxy, water-repellant layer over the soil which increases water and soil runoff (NDF, 2011). In 1994, the Sunrise Creek area burned the vegetation on the hillside and the riparian area leaving it susceptible to erosion until the vegetation grew back and stabilized the soil (Jesch, 2007). In the lower reach of Sunrise Creek, close to the Truckee river, invasive and noxious weeds are found including tall whitetop (Lepidium latifolium), musk thistle (Carduus nutans), and poison hemlock (Conium maculatum) (CDM Smith, 2017).

There are a few locations along Sunrise Creek that show erosion and deposition near roads (CDM Smith, 2017). According to the CDM Smith reports, the entire creek appears healthy and the riparian corridors are in good condition (2017). There are adequate setbacks form the creek in the residential area it meanders through (CDM Smith, 2017). There are some areas with noxious weeds and some areas of localized erosion, but neither were excessive (CDM Smith, 2017).

Additionally, areas that are disturbed during construction projects can represent a potential risk of erosion and downstream sedimentation. Protection of stormwater runoff from contamination by construction in the Truckee Meadows is regulated under the regional stormwater management plan (Truckee Meadows MS4). There are many Best Management Practice (BMP) resources available to construction projects to help keep soil on-site and to reduce runoff.

Strategies to Protect and Improve Water Quality

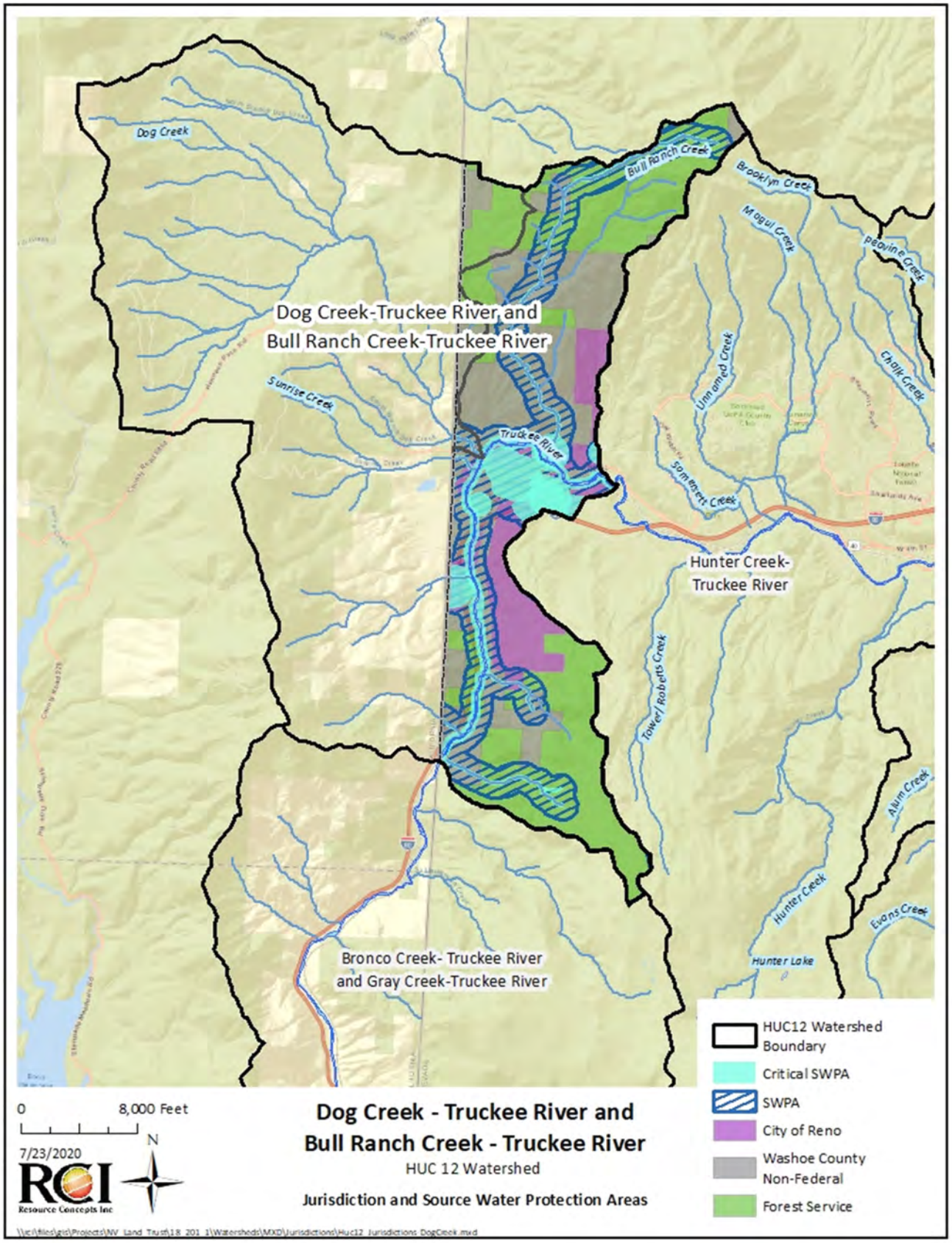
The water quality concerns identified in both watersheds can be addressed through management strategies described in this section, the proposed projects detailed in the Project Profiles, as well as applicable on-going water quality projects and programs described under Stakeholders and Plans. These strategies pertain to the entirety of both watersheds but may be prioritized in SWPAs.

Source Water Protection Area Identification and Management

A SWPA is a management area surrounding a surface water or groundwater resource that supplies water for public consumption. Human activities in these buffer areas can affect the quality of water downstream or underground. These management strategies acknowledge the value of these SWPAs to help prevent future contamination of our sources of drinking water.

There are two types of buffers in these watersheds (RCI, 2020). One buffer encompasses the perennial tributaries, which represents a precautionary indicator to safeguard groundwater recharge areas. The second type of buffer surrounds critical areas closer to streams, water system wells or springs, and the Truckee River. These areas are illustrated on the Jurisdiction and Source Water Protection Areas Figure. The following objectives are significant in both future and on-going SWPA management:

- Inform landowners in SWPAs about their proximity to a valuable drinking water source and how they can help protect their water quality.
- Encourage coordination between landowners and city or county planners to consider the importance of SWPAs in project reviews.


Dog Creek
Bull Ranch Creek
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Dog Creek-Truckee River and
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Sunrise Creek
Truckee River
Unnamed Creek
Chalk Creek
Somerset Creek
Hunter Creek-
Truckee River
Tower/Roberts Creek
Alum Creek
Hunter Creek
Evans Creek
Hunter Lake
Bronco Creek- Truckee River
and Gray Creek-Truckee River
HUC12 Watershed Boundary
Critical SWPA
SWPA
City of Reno
Washoe County Non-Federal
Forest Service
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RCI
Resource Concepts Inc
Dog Creek - Truckee River and
Bull Ranch Creek - Truckee River
HUC 12 Watershed
Jurisdiction and Source Water Protection Areas
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- Explore collaborative funding for water quality and watershed improvements and support the resource investigations needed to develop viable projects within SWPAs.
- Prioritize physical improvements in SWPAs to protect and improve source water quality.

Education and Outreach

The following education and outreach objectives are intended to help effectuate positive actions to protect water quality:

- Engage residents in caring for their watershed.
- Increase knowledge about excess irrigation and the potential for creating TDS and nutrient discharge to the Truckee River from the residential areas.
- Increase knowledge of water quality protection and the pollution in stormwater runoff through local outreach efforts.
- Inform landowners and developers residing in Critical SWPAs about the importance of avoiding contamination and their proximity to a valuable drinking water source.

Interagency Communication

The following interagency communication objectives are important tools to both reinvigorate and invest additional resources in water quality, as well as utilize existing resources and programs:

- Each agency may evaluate how to improve lines of communication within and between jurisdictions regarding water quality issues; i.e. Washoe County, TMWA, NDEP, U.S. Department of Agriculture (USDA) Forest Service, Reno Sparks Indian Colony, and California entities.
- Continue to increase coordination and communication between the appropriate agencies regarding spills and corrective actions along I-80 and the railroad.
- Collaborate with the Washoe/Storey Cooperative Weed Management Area to support their efforts in noxious weed management (WSCWMA Website).
- Evaluate how to collaborate with the Storm Water Committee in their public outreach and education efforts.
- Evaluate how to collaborate with stakeholders such as TMWA and the Storm Water Committee on incorporating drinking water source protection into community outreach and education strategies.

Wildfire and Fuel Management

Wildland fire is a threat to water quality and coordinated fuel management on wildlands can help reduce risks to water quality. Stakeholders and partners may consider the following objectives as they pertain to wildfire and fuel management:

- Encourage development, maintenance, and implementation of the Community Wildfire Protection Plans.
- Support and collaborate with the Nevada Cohesive Strategy effort and the Shared Stewardship Agreement, the blueprint to address Nevada's wildland fire issues.
- Support for the Nevada Network of Fire Adapted Communities and their local chapters for people in high fire threat locations to fully prepare themselves, their homes, and the landscape where they reside to survive the destructive force of wildfire.
- Encourage the development of wildland fire risk reduction and emergency recovery plans to reduce the risk of wildfire, quickly restore burned areas, and reduce the risk of catastrophic post-fire erosion and sedimentation.
- Collaborate and coordinate to treat invasive and noxious weeds pre- and post-fire to reduce risk of wildfire and watershed destabilization.

Resource Investigation and Planning

Stakeholders may consider supporting the following resource investigations and planning, which can help fill data gaps, inform implementation designs and prioritize projects:

- Research to identify non-point pollutant sources in the watersheds and options for treatment.
- Water quality improvement planning for tributaries to the Truckee River.
- Development and implementation of integrated vegetation management programs.

Water Quality Best Management Practices

Stakeholders may consider supporting the following Water Quality BMPs, that may improve and prevent degradation to water quality resources:

- Erosion reduction and sediment control measures.
- Invasive and noxious weed removal and integrated vegetation management.
- Recommendations in the tributary assessments.
- Pet waste cleanup initiatives.

- Proper abandonment of unused/orphaned wells.
- Physical improvements prioritized in SWPAs for water quality improvement and protection.
- Fertilizer and pesticide management plans for irrigated green spaces.

Proposed Implementation Projects

Proposed implementation actions are generally described under the Strategies to Protect and Improve Water Quality. Specific implementation actions have been developed into proposed projects by local stakeholders and are described in Project Profiles. These Project Profiles include the information needed, as identified in the Environmental Protection Agency (EPA) guidance for nine critical elements, for an endorsable watershed management plan. Future projects could also be brought forward to funding agencies through:

- Demonstrating advancement of the strategies identified for this watershed in the Source Water and Watershed Protection Plan.
- Using the Project Profile format to establish consistency with the nine critical elements of an EPA endorsed plan.

As discussed in the following Stakeholders and Plans section, municipality and agency projects are also incorporated by reference.

Stakeholders and Plans

Stakeholder information and existing plans were used extensively in development of the Source Water Protection and Watershed Management Plan for Washoe County. These municipalities and agencies each have unique strategies and capital improvement plans that include water quality protection or improvement projects. These are updated regularly at differing timeframes (i.e. annually, every five years, etc.) according to their specific budgeting and planning processes. The applicable planning documents are briefly described and referenced in this section. Those projects pertaining to water quality protection and improvement in the watersheds are incorporated by reference.

Nevada Project Stakeholders	
• City of Reno	• Truckee Meadows Storm Water Permit Coordinating Committee
• USDA Forest Service	• Truckee Meadows Water Authority
• Nevada Department of Transportation	• Truckee River Fund
• Nevada Division of Environmental Protection	• Washoe County
• Nevada Division of Forestry	• Washoe County Health District
• One Truckee River	• Western Regional Water Commission

City of Reno

The City of Reno 2017 Master Plan goals and policies provide the framework for decision-making in the community. Drinking water protection is addressed in the Master Plan's guiding principle to promote a safe and more resilient community. The City works with TMWA and other partners to ensure clean drinking water. Water quality is also addressed in the guiding principle for quality places and outdoor recreation opportunities in the sections on hydrologic resources, major drainageways and no net loss of wetlands, stream environments, playas, spring fed stands of riparian vegetation, and non-404 wetlands in the City, in terms of both acreage and value. The Design Principles for Sustainable Development also contain sections related to water quality.

The following articles from the Master Plan discuss several water-related items that are applicable to this Source Water Protection and Watershed Management Plan:

- Article I: Section 18.12.105 describes setbacks from the Truckee River.
- Article XVIII: Section 18.12.1801 to 1808 describes wetlands and stream environment protection standards established for the review of development proposals within wetlands, stream environments, and areas of significant hydrologic resources.
- Article XIX: Section 18.12.1902 to 1907 Drainage Way Protection Standards carries out the provisions of the City of Reno Major Drainageways Plan, an element of the City of Reno Master Plan, and establishes standards for the review of development proposals within major drainage ways to, among other actions, maintain, preserve, or enhance the quality of the water in both the Truckee River and Stead basins.

The city of Reno also provides comprehensive services for construction and maintenance roads, landscaping and drainage facilities, citywide planning and code compliance, and emergency response services for fire and hazardous materials. All these roles contribute to preserving and improving water quality in the watersheds.

Additionally, the city of Reno is divided into five Neighborhood Advisory Board Wards. Each Ward has one representative on the Reno City Council that is specifically focused on the needs of their part of the City. These Wards provide opportunities for

citizens to engage in important community issues and is the most efficient way for citizens to communicate their concerns and ask questions prior to any large decisions or projects. As such, these Wards and their input are essential in the implementation and success of projects and plans within the community. Source water and watershed protection for these watersheds falls within Ward 5.

USDA Forest Service

The Humboldt-Toiyabe National Forest within the watersheds is managed by the Carson Ranger District. Natural resource projects, including projects undergoing NEPA documentation, are listed on the Forest Service website. The Humboldt National Forest and Toiyabe National Forest Biannual 2018 Monitoring Report describes the conditions of the watersheds and present monitoring information.

Additionally, the Forest Service has created Land and Resource Management Plans (LRMP) to guide management decisions within the Humboldt-Toiyabe National Forest. Water resources are outlined in the LRMP along with management actions including maintenance, monitoring and enhancement of water quality:

- Humboldt National Forest Land and Resource Management Plan:

  Section IV.C.5 is "Soil and Water within the Forest-Wide Standards and Guidelines". This outlines the goals for the soil and resources on Forest Service managed land.

  Section V.A is the "Implementation Direction of the Forest Plan". This describes how the LRMP will be analyzed for its level of success.

- Toiyabe National Forest Land and Resource Management Plan:

  Section IV is the "Forest Management Direction with Forest-wide Standards and Guidelines" for soil and water as well as riparian areas. These sections outline the goals for the forest.

  Section V is the "Implementation of the Forest Plan" including the direction of the LRMP which also outlines the goals for the Forest.

Nevada Department of Transportation

The Nevada Department of Transportation (NDOT) has developed their Stormwater Management Program to reduce stormwater pollution from NDOT managed facilities and roads. The program BMPs and annual report outline the specific measures that NDOT will take to reduce stormwater pollutant discharges from its owned and operated storm drain system:

- Stormwater Management Program (2013):

  The overall goal of the NDOT Stormwater Management Program is to reduce pollution associated with stormwater from NDOT's MS4 to the maximum extent practicable, as well as to protect surface and groundwater resources within the MS4 permit area. The Stormwater Management Program addresses stormwater pollution control as it relates to the planning, design, construction, and maintenance of NDOT's highway infrastructure statewide.

- Stormwater Management Program: Annual Report (2017):

  These watersheds are impacted or has the potential to be impacted by I-80 and the railroad. The Stormwater Management Program provides a helpful planning outline on handling and mitigating pollution from the roads.

Nevada Division of Environmental Protection

NDEP has a goal to preserve and enhance the environment of the State in order to protect public health, sustain healthy ecosystems, and contribute to a vibrant economy. These HUC-12 Watersheds have several challenges facing source water protection, so the NDEP is an essential stakeholder and planning partner. Specifically, there are two programs under the NDEP that were involved in the Source Water Protection and Watershed Management Plan in Washoe County. Both programs provide education and outreach and offer funding opportunities for water quality protection and improvement:

- Integrated Source Water Protection Program under the Safe Drinking Water Bureau:

  This program offers technical assistance for source water protection projects. The program coordinates source water protection activities at the local, state, and federal levels, and encourages community-based protection and preventive management strategies to ensure all public drinking water resources are kept safe from future contamination.

  The 2010 Nevada Integrated Source Water Protection Program guidance document details the program components as well as the requirements for a State-endorsed Community Source Water Protection Plan.

- 319 Nonpoint Source Pollution Management Program under the Bureau of Water Quality Planning:

  This Program can provide matched grant funding for projects that improve water quality.

The 2015-2019 State of Nevada Nonpoint Source Management Plan establishes how NDEP will work with partners to address NPS pollution. The Plan formalizes Nevada's approach for protecting and improving water quality and describes the goals, short- and long-term objectives, milestones and timeframes to guide activities, and measures for tracking success.

Nevada Division of Forestry

The Nevada Division of Forestry (NDF) is a State agency that uses a collaborative process to deliver science based natural resource management and protection to promote resilient landscapes, fire adapted communities, and safe, effective wildfire response provided by employees that embrace the core values of duty, respect, and integrity.

NDF provides professional natural resource and wildland fire management services to Nevada citizens and visitors to enhance, conserve and protect forest, rangeland and watershed values, endangered plants and other native flora. Protection of these resources helps to preserve and improve water quality:

- Community Wildfire Protection Plans:

  Community Wildfire Protection Plans (CWPPs) are authorized and defined in Title I of the Healthy Forests Restoration Act of 2003 (HFRA). CWPPs represent the best opportunity that communities have to address the challenges of the Wildland-Urban Interface. A CWPP helps communities define their priorities for the protection of life, property, and shared assets-at-risk from wildfires. Developing a CWPP encourages community members and leaders to have valuable discussions about wildfire preparedness, evacuation planning, and local fire district capabilities. The CWPP increases grant funding opportunities by prioritizing fuel reduction projects around and within the community.

- Nevada Wildland Fire Cohesive Strategy:

  The Nevada Fire Board Oversight Body is the custodian of the 2015 Nevada Wildland Fire Cohesive Strategy Summit's Action Plan to ensure goal achievement and identify emerging topics. This oversight body acts as an "advisory" body and is charged with taking the Nevada Cohesive Strategy Summit report and its Action Steps, ensuring that goal achievement is accomplished and monitoring emerging topics through the Nevada Fire Board. This body monitors progress, develops issue resolution, and addresses emerging issues such as protecting water quality.

One Truckee River

According to the One Truckee River website, "One Truckee River is a collaboration of public and private partners working together to realize a Truckee River that flows clean and clear, quenches our thirst, sustains the river's natural ecology, cultural resources and wildlife, and connects residents and visitors to unparalleled opportunities for recreation and regeneration":

- The One Truckee River Management Plan (2017) addresses actions to accomplish four primary goals, including protection of water quality and ecosystem health.

The following stakeholders were instrumental in compiling the plan and in implementing the plan action items:

- Truckee River Flood Management Authority
- Pyramid Lake Paiute Tribe
- Truckee Meadows Water Authority
- Resource Concepts, Inc.
- Nevada Division of Environmental Protection
- Renown
- Truckee Meadows Regional Planning Agency
- Keep Truckee Meadows Beautiful AmeriCorps
- Keep Truckee Meadows Beautiful
- Washoe County Health District
- City of Reno Public Works

Truckee Meadows Regional Planning Agency

The Truckee Meadows Regional Planning Agency (TMRPA) fosters coordination among Reno, Sparks and Washoe County. TMRPA facilitates land-use, infrastructure provision and resource management conversations among public and private decision makers. The agency also serves as a collaborative information and data warehouse, coordinating regional data collection and delivering advanced geospatial analytics for regional solutions. TMRPA includes a Regional Planning Governing Board and a Regional Planning Commission.

The TMRPA Regional Plan (2012 as amended) provides goals and policies for multiple plans and programs, including those with watershed related and well head protection components. The plan was revised in 2019-2020 and is considered a living document that will evolve over time.

Truckee Meadows Storm Water Permit Coordinating Committee

The Truckee Meadows Storm Water Permit Coordinating Committee (Storm Water Committee) is responsible for implementing the Truckee Meadows Storm Water Management Program to protect the water quality of the region's waterways, streams and the Truckee River. The Storm Water Committee continues to guide the development of numerous plans and assessments relevant to source water and watershed protection as summarized below.

Ordinance and Guidance Changes for Construction and Post-Construction Programs

The Storm Water Committee updated and joined the Structural Controls Design Manual and the Low Impact Development Manual, as well as updated the Truckee Meadows Construction Site BMP Handbook. These documents are referenced in the code for the city of Reno, city of Sparks, and Washoe County.

Watershed Assessments

Watershed assessment reports prepared for the Storm Water Committee were completed by Jesch et al. from 2002-2011 that include the Evans Creek and North Truckee Drain. These reports provide general watershed descriptions and can be used to track historical changes in creek condition and water quality over time. The reports do not include water quality data.

Hillside Design completed a comprehensive Watershed Assessment for Tributaries to the Truckee River in 2012 for these tributaries in this watershed: Evans Creek and North Truckee Drain.

The assessment included:

- Stream reach descriptions with numerous photo points,
- Proper Functioning Condition rating,
- List of restoration and management efforts needed to improve stream conditions, and
- Water chemistry for temperature, pH, specific conductivity, dissolved oxygen, turbidity, and flow.

CDM Smith was contracted in 2015 through 2017 to conduct watershed assessments. The following table lists the report year and the respective drainages and reaches that were assessed in this watershed:

Stream Reaches Addressed in Watershed Assessment Reports in the Bull Ranch Creek-Truckee River and Dog Creek Watersheds by Report Year

Stream Name	Lower Reach	Middle Reach	Upper Reach
	2017	2017	2017
Sunrise	X		
Dog	X		

Watershed Management and Protection Plan for Tributaries to the Truckee River

The Watershed Management and Protection Plan for Tributaries to the Truckee River (NCE, 2020) is an update to the 2003 Watershed Management and Protection Plan for Tributaries to the Truckee River, which has been implemented for more than 15 years by the regional MS4 through the Storm Water Committee. The 2003 plan described an approach for on-going watershed assessment studies and monitoring to protect and improve the water quality in the stream corridors and drainages tributary to the Truckee River. The 2020 Plan update provides a process and framework for identifying, developing, and implementing projects originated through the Storm Water Committee that are consistent with the guidelines for an EPA approved Watershed Management Plan. The 2020 plan by NCE and the 2020 Integrated Source Water and 319(h) Watershed Protection Plan for Public Water Systems and the Truckee River in the Truckee Meadows, are mutually complementary and work together to address the broad scope of potential strategies to improve drinking water and surface water quality in Washoe County.

Truckee Meadows Watershed Protection Manual

This manual contains a Summary of the Watershed Protection Activities and Programs Developed in Conjunction with the Watershed Management Facilitator Scope of Work (Kennedy/Jenks, 2005). This document provides a reference and compendium of the various watershed protection activities and programs that were developed in 2004 and 2005 for Reno, Sparks and Washoe County.

Truckee Meadows Water Authority

TMWA is responsible for almost all municipal water delivery in the greater Reno-Sparks area. TMWA also owns and operates the municipal wells in this watershed. The following program and plans guide the management of these water resources:

- TMWA Water Resources Plan (2016-2035):

  This plan describes water quality issues and goals for the water resources managed by TMWA. Special focus is placed on changes in future water supply and demand and how those changes will impact the region's water resources. This plan provides useful Truckee River watershed information.

- Source Water Quality Assurance Program (2016-2035):

  TMWA's objective is to deliver high-quality potable water to its customers in a cost-effective manner. To achieve this objective, TMWA has established a water quality assurance program. The components that make up the program are source water quality protection, potable water treatment, maintenance of distribution system water quality, and cross connection control.

- Wellhead Protection Plan (2016):

  The purpose of the Wellhead Protection Plan is to protect groundwater that serves as a source for public drinking water supplies. This plan is intended to be a tool used by TMWA to assist in protecting drinking water sources.

Truckee River Fund

TMWA established the Truckee River Fund in 2004 (Truckee River Fund). The purpose of the Fund is to "protect and enhance water quality or water resources of the Truckee River, or its watershed." The Fund provides a way to respond to the requests from outside groups and organizations that are involved in promoting and improving the health of the Truckee River System and watershed. This in turn benefits the primary water source for the community and, in the long run, benefits TMWA customers. Currently, no projects have been funded through the Truckee River Fund in these watersheds.

Washoe County

Activities in Washoe County are reviewed according to the Master Plan Planning Areas. The Truckee River watershed includes nine planning areas. The Watersheds are included in the three planning areas: northeast Truckee Meadows, southeast and southwest Truckee Meadows. The County has Citizens Advisory Boards (CABs) which provide important community perspectives on local issues to the Washoe County Board of Commissioners. These watersheds are within the West Truckee Meadows/Verdi CAB (CAB Boundaries).

The Washoe County Master Plan (2008) has Goals and Policies for Public Services and Facilities, and Open Space and Natural Resource Management. Applicable sections include:

- Article 418, Significant Hydrologic Resources, which regulates development activity within and adjacent to perennial streams to ensure that these resources are protected and enhanced. (Note: this does not apply to the Truckee River)
- Article 420, Storm Drainage Standards, sets forth standards for ensuring that both private and public development provides adequate protection for citizens and property. Therefore, it minimizes and controls erosion and pollution impacts on the natural environment, and additionally minimizes maintenance costs for drainage and flood control systems.
- Article 421, the Storm Water Discharge Program, which protects and enhances the water quality of watercourses, water bodies, groundwater and wetlands in a manner pursuant to and consistent with the Clean Water Act.
- Article 810, Special Use Permits, which provides a method of reviewing certain uses to determine if they have the potential to adversely affect public facilities in the vicinity.

Washoe County also provides comprehensive services for construction and maintenance roads, landscaping and drainage facilities; county-wide planning and code compliance; and emergency response services for fire and hazardous materials. All of these roles contribute to preserving and improving water quality in these watersheds.

Washoe County Health District

The Washoe County Health District has regulatory authority over a wide variety of programs and services in the Truckee Meadows including underground storage tanks, septic systems, all public water systems, domestic wells, water projects and community development, grading permits, solid waste management and emergency preparedness. The Health District regulations are provided in several documents as listed below:

- Regulations of the Washoe County District Board of Health Governing Sewage, Wastewater and Sanitation. These regulations provide the minimum requirements to be followed by any person developing property served by an on-site sewage disposal system. These requirements are promulgated to prevent the spread of disease, protect the water quality of this county and ensure the on-site sewage disposal systems function properly.
- Regulations of the Washoe County District Board of Health Governing Well Construction. These regulations provide minimum requirements to be followed by any person when drilling and plugging specific kinds of wells. A well construction permit is required to drill a well for consumptive use or monitoring wells. These requirements are primarily promulgated to protect the quantity and quality of the waters of this county from waste and contamination, and to provide public protection by enforcing proper construction and plugging of wells.
- Regulations of the Washoe County District Board of Health Governing Solid Waste Management. These regulations protect water quality through the regulation of municipal solid waste landfills.

Western Regional Water Commission and the Northern Nevada Water Planning Commission

The Western Regional Water Commission (WRWC) focuses on improving water resource planning at the regional level and facilitating coordinated resource management among city of Reno, city of Sparks, Washoe County, TMWA, Truckee Meadows Water Reclamation Facility, South Truckee Meadows GID and Sun Valley GID.

The Northern Nevada Water Planning Commission (NNWPC) is a technical advisory panel that reports to the WRWC. The NNWPC develops and updates a Comprehensive Regional Water Management Plan (RWMP) and makes recommendations to the WRWC for adoption. In addition, the NNWPC develops priorities and an annual budget for the Regional Water Management Fund, also for recommendations to the WRWC.

The Comprehensive Regional Water Management Plan includes several applicable objectives:

- Objective 1.2 Provide for a Sustainable Water Supply and an Acceptable Level of Service to the Community (including protecting groundwater recharge areas).
- Objective 1.3 Implement measures to protect and enhance water quality for a sustainable water supply (including source water protection).
- Objective 2.1 Promote Efficient Use of Resources (Reduction of Non-Point Source Pollution for TMWRF Pollutant Credit).
- Objective 2.2 Manage wastewater for protection and enhancement of water quality.
- Objective 3.1 Effective and integrated watershed management (protection of human health, property, water quality including storm water).

California Entities

Most of these watersheds are in the state of California. Watershed issues can also be coordinated with the appropriate agency or organization.

California Project Stakeholders	
• Sierra County • Truckee River Watershed Council	• Caltrans

Sierra County

Sierra County has a Small Public Water Supply program that is regulated by the California Department of Public Health, Division of Drinking Water and Environmental Management. This includes a small northern portion of Bronco Creek. Sierra County, California Drinking Water Quality

Truckee River Watershed Council

The Truckee River Watershed Council is a non-profit organization that partners with private and public agencies. Their projects involve restoration of the Truckee River watershed in California. Their focus is to improve floodplains and restore riparian habitats to improve the water supply and wildlife habitat. Truckee River Watershed Council

Caltrans

The California Department of Transportation Stormwater Management Program's (SW Program) goal is to provide water quality monitoring and best management practices under the compliance of the Statewide Storm Water Permit Discharge Requirements in order to protect groundwater and surface water from stormwater runoff.

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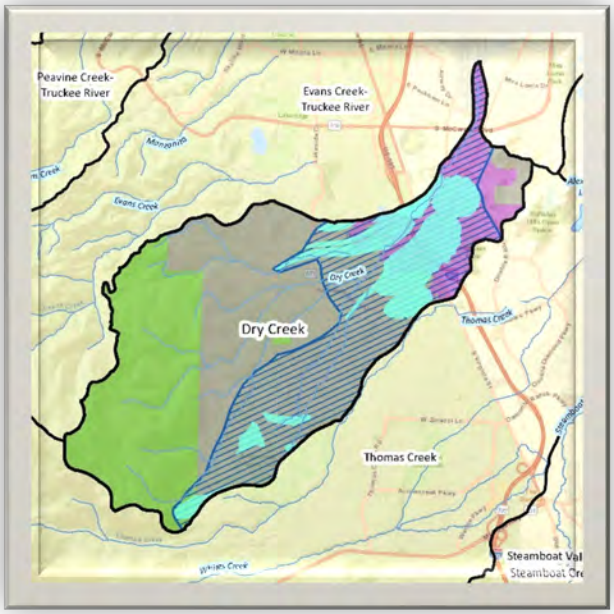
Dry Creek

HUC-12 Watershed #160501020507 Profile

Click here for complete HUC-12 Watersheds Map



Contents

Introduction

The Dry Creek-Truckee River HUC-12 Watershed Profile is a component of the 2020 Integrated Source Water and 319(h) Watershed Protection Plan for Public Water Systems and the Truckee River in the Truckee Meadows (Plan), as well as the Watershed Management and Protection Plan for Tributaries to the Truckee River. This document is a part of the on-line watershed mapping tool.

This watershed description is intended to be a guide and resource for organizations working within the watershed and an educational tool for those interested in learning more about the watershed in which they live. This Plan can be used to support funding for a multitude of water quality projects in the watershed. Note that only non-regulated activities are eligible for the Nevada Division of Environmental Protection Source Water Protection Program or the 319 Non-Point Source Program funding.

Summary

This profile focuses on the watershed's water quality. It includes potential and existing concerns, types of land uses, watershed management strategies and projects, and the involved stakeholders and their corresponding plans with water quality components.

The Dry Creek-Truckee River HUC-12 Watershed is the smallest watershed out of all the Truckee River watersheds in the Truckee Meadows consisting of 10,621 acres. This watershed is a part of the Truckee Meadows Groundwater Basin and hosts seven public water wells. The upper portion of this watershed is forested and relatively undeveloped but was disturbed by the 2000 Arrowcreek Fire. Ranches and residential communities make up the central watershed area, while commercial development is dominant closer to I-580. Dry Creek, the primary drainage in this watershed, is fed from springs and collects irrigation runoff before it flows into culverts. These culverts pass under the Reno-Tahoe International Airport, and outlet into Boynton Slough in the adjacent watershed.

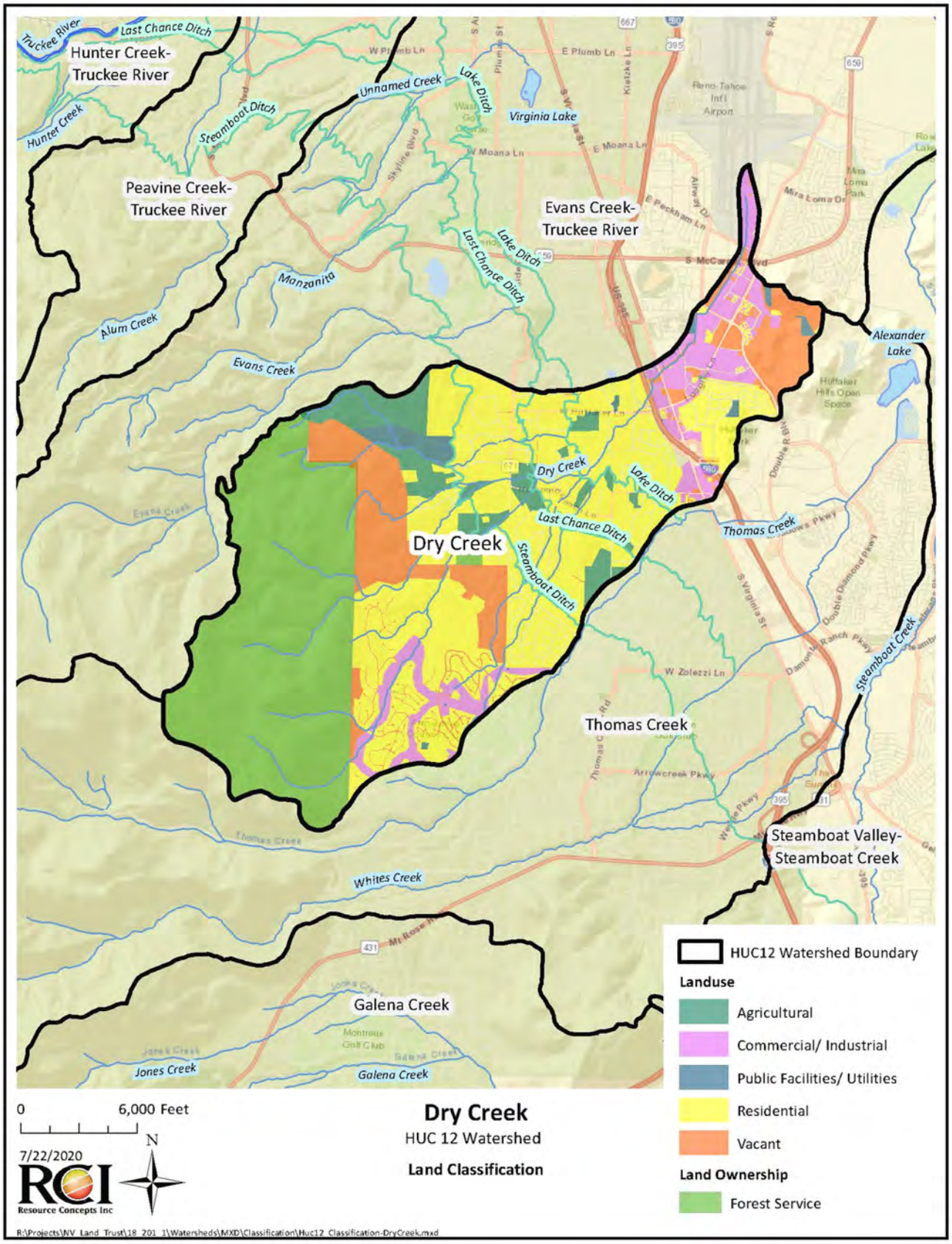
Source Water Protection Areas (SWPAs) for this watershed were developed by stakeholders to help protect drinking water sources. This watershed is an important area for groundwater recharge and hosts seven public water system wells and, as a result, a little less than half of this watershed is in a SWPA. Surface water bodies include Dry Creek and three irrigation ditches. The following table summarizes key water quality aspects in this watershed.

Watershed Summary	
Basins	• Dry Creek-Truckee River HUC-12 Watershed #160501020507. • Groundwater Basin: 087 (Truckee Meadows) underlies this watershed.
Water Bodies & Water Quality	• Dry Creek, impaired for *E. coli*, see NAC 445A.1726. • Steamboat, Last Chance, Lake and Cochran ditches.
Source Water Protection Areas	• A SWPA encompasses approximately half of the watershed with buffers along the Sierra Front, an important groundwater recharge area. It represents a precautionary indicator to safeguard the drinking water sources. • Critical SWPAs represent areas closer to water system wells. • 4,340 total acres, or roughly 40% of the watershed is within a Source Water Protection Area. • 1,460 total acres, or approximately 10% of the watershed is in a Critical Source Water Protection Area.
Special Considerations & Issues	• 2000 Arrowcreek Fire: fire susceptibility, erosion and invasive weed concerns. • Channel encroachment and vegetation removal threatens Dry Creek channel stability. • The upper half of the watershed is undeveloped and forested, while the lower is urbanized with commercial/industrial development near the airport. • Irrigated pastureland alongside Dry Creek. • 7 public wells that are important drinking water sources. • Many residential communities on septic systems. • I-580 is a major transportation corridor.

	Type	Acres	%
Land Jurisdiction	City of Reno:	1,686	16%
	Washoe County Non-Federal:	5,755	54%
	USFS:	3,175	30%
Land Use	Agriculture:	660	6%
	Commercial/Industrial:	820	8%
	Residential:	4,060	38%
	Public Facilities/Utilities:	165	2%
	Vacant:	1,350	13%
	Roads and Easements:	385	4%
	State of Nevada:	10	<1%
	Federally Managed:	3,175	30%

Land uses and jurisdictions in the watershed are summarized in the adjacent table and illustrated by the Land Classification Figure.

The upper 30% of the watershed is federally managed National Forest. The mid portion, outside the city of Reno boundary, has residential and vacant (Ballardini and Arrow Creek Open Space) land uses that characterize the private land in Washoe County. Commerical / industrial uses occur along the transportation corridors within the city of Reno boundary. The potential and existing water quality concerns associated with these types of land uses are primarily hazardous materials from accidental spills or leaks, pollution from urban area runoff, and sediment from watershed disturbance (wildland fire, noxious weeds, etc.).


Truckee River
Last Chance Ditch
Hunter Creek-
Truckee River
Hunter Creek
Steamboat Ditch
Unnamed Creek
Lake Ditch
Virginia Lake
Peavine Creek-
Truckee River
Evans Creek-
Truckee River
Manzanita
Alum Creek
Evans Creek
Alexander
Lake
Dry Creek
Thomas Creek
Steamboat Creek
Steamboat Valley-
Steamboat Creek
Whites Creek
Galena Creek
Jones Creek
HUC12 Watershed Boundary
Landuse
Agricultural
Commercial/ Industrial
Public Facilities/ Utilities
Residential
Vacant
Land Ownership
Forest Service
0
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N
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RCI
Resource Concepts Inc
Dry Creek
HUC 12 Watershed
Land Classification
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Water Quality Standards and Beneficial Uses

Water quality standards for surface water in the State of Nevada are established by Nevada Administrative Code (NAC) NAC 445A.11704 through NAC 445A.2234. Standards applicable to beneficial uses are generally described under NAC 445A.122. The Nevada Division of Environmental Protection (NDEP) Bureau of Water Quality Planning Nevada 2016-2018 Water Quality Integrated Report identifies the beneficial uses and the surface water quality conditions in this watershed, as summarized below:

- Dry Creek is a tributary to Steamboat Creek (water quality standards NAC 445A.1726) and is impaired for "recreation involving contact with water" due to concentrations of the *Escherichia coli (E. coli)* bacteria.

Groundwater is an important source of drinking water for public water systems in this watershed. There are no known contaminants within this watershed caused by human activities to groundwater. Arsenic and tetrachloroethylene (PCE) occur in the groundwater basin to the north in the Evans Creek-Truckee River HUC-12 watershed.

Potential and Existing Water Quality Concerns

The primary potential and existing water quality concerns in this watershed are listed below and described in the following paragraphs:

- Hazardous Materials from Spills or Leaks
- Pollution from Urban Areas
- Sediment from Erosion
- Nitrate from Individual Sewage Disposal Systems

Hazardous Materials from Spills or Leaks

Transportation corridors within the lower part of the Dry Creek watershed have typical commercial and industrial development (Land Classification Figure) along routes I-580, US Hwy 395, and Longley Lane. The use and storage of chemicals, fuels, and other materials in commercial/industrial areas, as well as transportation along highway corridors, creates an increased risk for accidental spills and leaks that have the potential to contaminate both groundwater and stormwater runoff.

The U.S. Department of Transportation accumulated a list of commonly transported hazardous materials within the Truckee River watershed (WRWC, 2017). These include:

- Ammonia perchlorate
- Anhydrous ammonia
- Chlorine
- Cyanide
- Hydrochloric acid
- Hydrogen sulfide
- Nitro cellulose (wet)
- Propane
- Petroleum naphtha
- Phosphoric acid
- White phosphorous
- Propargyl alcohol
- Sulfuric acid
- Sodium hydroxide

Several gas stations with underground fuel storage tanks are located along the transportation corridors, which are also within Critical SWPA for several public water system wells. Based on NDEP and Washoe County Health District records, there are also numerous underground storage tank sites associated with residential heating oil in the older residential neighborhoods in the mid-portion of the watershed. Jurisdiction and Source Water Protection Areas Figure

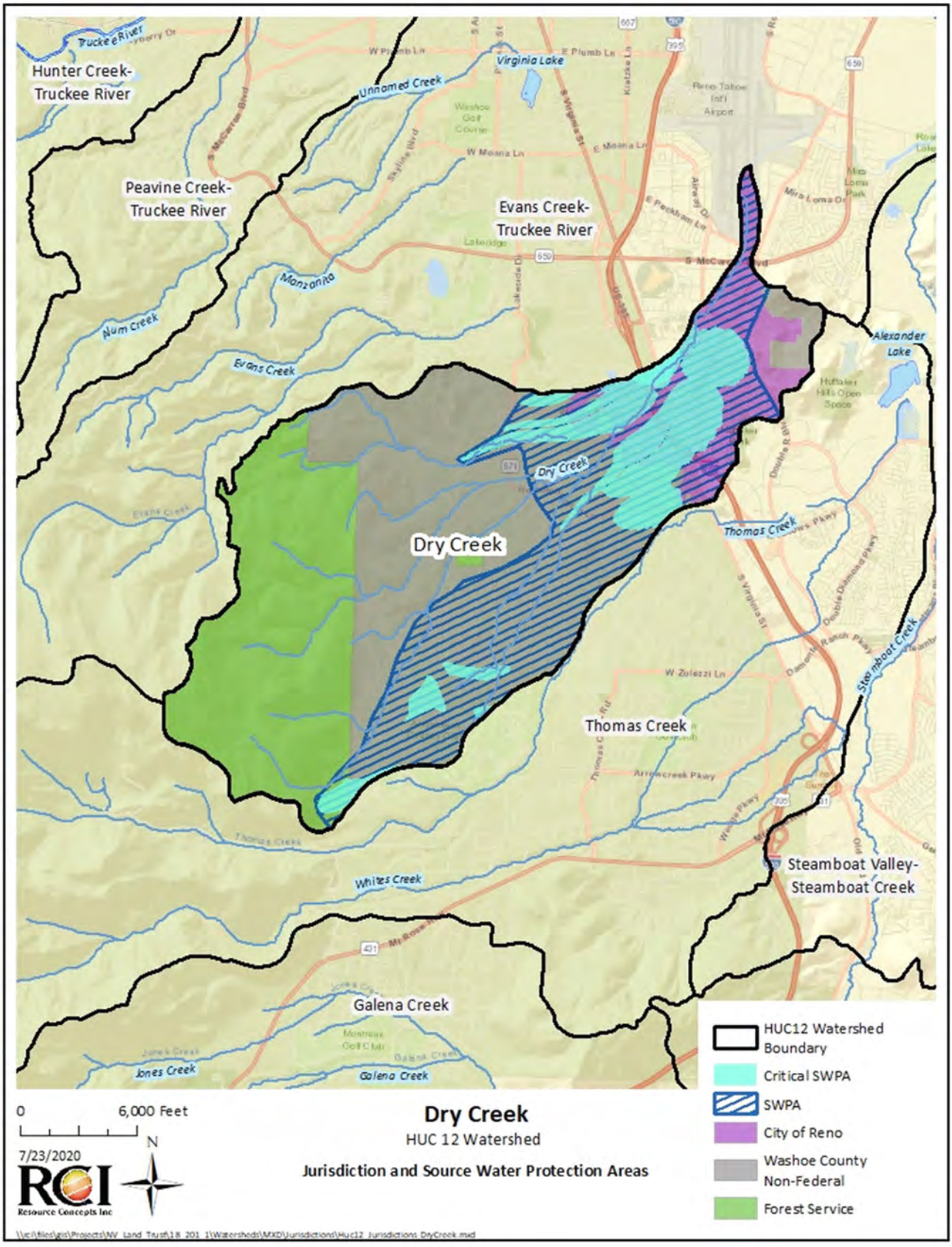
Pollution from Urban Area Runoff

The middle reach of Dry Creek is characterized by residential and some commercial development. The Arrowcreek Country Club makes up a significant part of the south western portion of the watershed. Huffaker and Crystal Lake parks are located on the north side of the watershed. Both parks are for public recreational use and provide walking trails. Pet feces, if not disposed of properly, could be contributing sources of *E. coli*. Excessive fertilization and irrigation of green areas, such as yards, fields, parks, and golf course are potential sources of nutrients that can present a groundwater quality concern.

In the central portion of the Dry Creek HUC-12 Watershed, irrigated pasture is dispersed throughout the community which consists of two to ten acres (and larger) residential parcels. Well maintained green areas provide healthy riparian habitat in most locations along the creek. However, these areas may also contribute to water quality issues from fertilizers, herbicides and livestock waste, which are commonly associated with agriculture (CDM Smith, 2015). Livestock feces might also contribute to *E. coli*. concentrations in surface waters.

Nitrate from Individual Sewage Disposal Systems

Individual Sewage Disposal Systems, or septic systems, are associated with nitrate contamination of groundwater if there are large numbers concentrated in a small area, for example, neighborhoods with lot sizes less than one-acre, or if they are not maintained properly (WRWC, 2017). There are about 494 parcels on septic systems in this watershed, generally associated with parcels larger than one-acre in the mid-portion of the watershed. This area is upgradient of the Critical SWPAs for several public water system wells. These parcels are also typically served by private wells. It is noted that private wells, if not correctly maintained or abandoned, can potentially introduce pollutants to groundwater.


Hunter Creek-
Truckee River
Peavine Creek-
Truckee River
Evans Creek-
Truckee River
Dry Creek
Thomas Creek
Steamboat Valley-
Steamboat Creek
Galena Creek
Truckee River
Unnamed Creek
Virginia Lake
Manzanita
Alum Creek
Evans Creek
Alexander Lake
Whites Creek
Jones Creek
Steamboat Creek
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RCI
Resource Concepts Inc
Dry Creek
HUC 12 Watershed
Jurisdiction and Source Water Protection Areas
HUC12 Watershed Boundary
Critical SWPA
SWPA
City of Reno
Washoe County Non-Federal
Forest Service

Sediment from Erosion

Sediment from erosion conveys pollution, such as phosphorous, and degrades downstream water with suspended sediment. The primary causes of erosion and sedimentation in this watershed include wildland fire, noxious weeds, and drainage and landscape modifications.

High-severity wildfires alter the overall structure of the ecosystem through the removal of vegetation leaving limited ground cover. Severe fires also create a waxy, water-repellant layer over the soil which increases water and soil runoff (NDF, 2011). The Arrowcreek Fire burned along all three tributaries in the upper Dry Creek HUC-12 Watershed in 2000. Washoe County helped restore the riparian corridors through reseeding and weed removal efforts (CDM Smith, 2015). The removal of vegetation in a fire can lead to erosion and sediment accumulation in creeks. Upslope of the creek, the desirable vegetation has not recovered from the fire due to encroachment from invasive weeds (CDM Smith, 2015).

Areas invaded by noxious weeds are more susceptible to erosion and sedimentation in several ways. Noxious weeds do not have a root structure to retain soil and resist erosion due to wind or water. The fire risk is also increased because noxious weeds are more flammable than native species. Noxious weeds are spread throughout the upper reach of the watershed. These weeds are primarily tall whitetop, yellow star thistle, medusahead, and cheatgrass (CDM Smith, 2015). Along channel banks in the middle reach there are musk thistle and bull thistle (CDM Smith, 2015). Herbicide treatments and cutting and removal of weeds has been used to prevent their encroachment (Hillside Design, 2012).

New residential and commercial development have also contributed sediment to Dry Creek, as steep channel banks have led to erosion near the confluence with Boynton Slough (CDM Smith, 2015). The lower reach is a narrow flood control channel, and, as a result, there is significant bank erosion and sedimentation (CDM Smith, 2015) despite some erosion control projects. Dry Creek channel encroachment and removal of desirable riparian vegetation may result in channel degradation and sediment transport.

Areas that are disturbed during construction projects can represent a potential risk of erosion and downstream sedimentation. Protection of stormwater runoff from contamination by construction in the Truckee Meadows is regulated under the regional stormwater management plan (Truckee Meadows MS4). There are many Best Management Practice (BMP) resources available to construction projects to help keep soil on-site and to reduce runoff.

Strategies to Protect and Improve Water Quality

The water quality concerns identified in this watershed can be addressed through management strategies described in this section, the proposed projects detailed in the Project Profiles, as well as applicable on-going water quality projects and programs described under Stakeholders and Plans. These strategies pertain to the entire watershed but may be prioritized in SWPAs.

Source Water Protection Area Identification and Management

A SWPA is a management area surrounding a surface water or groundwater resource that supplies water for public consumption. Activities in these buffer areas can affect the quality of water downstream or underground. These management strategies acknowledge the value of these SWPAs to prevent future contamination of our sources of drinking water.

A SWPA encompasses approximately half of the watershed with buffers along the Sierra Front, an important groundwater recharge area (RCI, 2020). This buffer represents a precautionary indicator to safeguard drinking water sources. Critical SWPAs represent areas closer to streams and water system wells (based on a 20-year time of travel for groundwater). The areas are illustrated on the Jurisdiction and Source Water Protection Areas Figure. The following objectives are significant in both future and on-going SWPA management:

- Inform landowners in critical SWPAs about their proximity to a valuable drinking water source and how they can help protect their water quality.
- Encourage coordination between Public Water Systems, landowners, and City or County planners to consider the importance of SWPAs in project reviews.
- Explore collaborative funding for water quality and watershed improvements and support the resource investigations needed to develop viable projects.
- Prioritize physical improvements in SWPAs to protect and improve source water quality.

Education and Outreach

Education and outreach can be used to help effectuate positive actions to protect water quality:

- Increase knowledge of how to protect and preserve the pristine drinking water quality of this watershed.
- Increase knowledge of water quality protection and the pollution in stormwater runoff through local outreach efforts.
- Increase knowledge about household and commercial chemical use, storage and disposal.

- Inform landowners and developers for parcels in Critical SWPAs about the importance of avoiding contamination and their proximity to a valuable drinking water source.

Interagency Communication

The following interagency communication objectives are important tools to both reinvigorate and invest additional resources in water quality, as well as utilize existing resources and programs:

- Each agency may evaluate how to improve lines of communication within and between jurisdictions regarding water quality issues, i.e. Washoe County, Truckee Meadow Water Authority (TMWA), NDEP, Washoe County Health District, and the Forest Service.
- Collaborate with the Washoe/Storey Cooperative Weed Management Area to support their efforts in noxious weed management (WSCWMA Website).
- Continue to increase coordination and communication between the appropriate agencies regarding spills and corrective actions along Hwy 395 and I-580.
- Evaluate how to collaborate with stakeholders such as TMWA and the Storm Water Committee on incorporating drinking water protection into community outreach and education strategies.

Wildfire and Fuel Management

Wildland fire is a threat to water quality and coordinated fuel management on wildlands can help reduce risks to water quality. Stakeholders and partners may consider the following objectives as they pertain to wildfire and fuel management:

- Encourage development, maintenance, and implementation of the Community Wildfire Protection Plans.
- Support and collaborate with the Nevada Cohesive Strategy effort and the Shared Stewardship Agreement, the blueprint to address Nevada's wildland fire issues.
- Support for the Nevada Network of Fire Adapted Communities and their local chapters for people in high fire threat locations to fully prepare themselves, their homes, and the landscape where they reside to survive the destructive force of wildfire.
- Encourage the development of wildland fire risk reduction and emergency recovery plans to reduce the risk of wildfire, quickly restore burned areas, and reduce the risk of catastrophic post-fire erosion and sedimentation.
- Collaborate and coordinate to treat invasive and noxious weeds pre- and post-fire to reduce risk of wildfire and watershed destabilization.

Resource Investigation and Planning

Stakeholders may consider supporting the following resource investigations and planning, which can help fill data gaps, inform implementation designs and prioritize projects:

- Efforts to increase the quantity and quality of groundwater recharge.
- Consider expanding groundwater quality monitoring.
- Research how to identify private wells that present a groundwater contamination risk and that might need to be repaired or abandoned.

Water Quality Best Management Practices

Stakeholders may consider supporting or encouraging the following Water Quality BMPs that may improve and prevent degradation to water quality resources:

- Erosion reduction and sediment control measures.
- Invasive and noxious weed removal and integrated vegetation management.
- Recommendations in the tributary assessments.
- Pet waste cleanup initiatives.
- Proper abandonment of unused/orphaned wells.
- Physical improvements prioritized in SWPAs for water quality improvement and protection.
- Nutrient management plans for irrigated green spaces.

Proposed Implementation Projects

Proposed implementation actions are generally described under the Strategies to Protect and Improve Water Quality. Specific implementation actions have been developed into proposed projects by local stakeholders and are described in Project Profiles. These Project Profiles include the information needed, as identified in the Environmental Protection Agency (EPA) guidance for nine critical elements, for an endorsable watershed management plan. Future projects could also be brought forward to funding agencies through:

- demonstrating advancement of the strategies identified for this watershed in the Source Water and Watershed Protection Plan.
- using the Project Profile format to establish consistency with the nine critical elements of an EPA endorsed plan.

As discussed in the following Stakeholders and Plans section, municipality and agency projects are also incorporated by reference.

Stakeholders and Plans

Stakeholder information and existing plans were used extensively in development of the Plan for Washoe County. These municipalities and agencies each have unique strategies and capital improvement plans that include water quality protection or improvement projects. These are updated regularly at differing timeframes (i.e. annually, every five years, etc.) according to their specific budgeting and planning processes. The applicable planning documents are briefly described and referenced in this section. Those projects pertaining to water quality protection and improvement in the watershed are incorporated by reference.

Project Stakeholders	
• City of Reno • Bureau of Land Management • USDA Forest Service • Nevada Department of Transportation • Nevada Division of Environmental Protection • Nevada Division of Forestry	• Truckee Meadows Storm Water Permit Coordinating Committee • Truckee Meadows Regional Planning Agency • Truckee Meadows Water Authority • Truckee River Fund • Washoe County • Washoe County Health District • Western Regional Water Commission

City of Reno

The City of Reno 2017 Master Plan goals and policies provide the framework for decision-making in the community.

Drinking water protection is addressed in the Master Plan's guiding principle to promote a safe and more resilient community. The City works with TMWA and other partners to ensure clean drinking water.

Water quality is also addressed in the guiding principle for quality places and outdoor recreation opportunities in the sections on hydrologic resources, major drainageways and no net loss of wetlands, stream environments, playas, spring fed stands of riparian vegetation, and non-404 wetlands in the City, in terms of both acreage and value. The Design Principles for Sustainable Development also contain sections related to water quality.

The following articles from the Master Plan discuss several water-related items that are applicable to this Plan:

- Article I: Section 18.12.105 describes setbacks from the Truckee River.
- Article XVIII: Section 18.12.1801 to 1808 describes wetlands and stream environment protection standards established for the review of development proposals within wetlands, stream environments, and areas of significant hydrologic resources.
- Article XIX: Section 18.12.1902 to 1907 Drainage Way Protection Standards carries out the provisions of the City of Reno Major Drainageways Plan, an element of the City of Reno Master Plan, and establishes standards for the review of development proposals within major drainage ways to, among other actions, maintain, preserve, or enhance the quality of the water in both the Truckee River and Stead basins.

The city of Reno also provides comprehensive services for construction and maintenance roads, landscaping and drainage facilities; citywide planning and code compliance; and emergency response services for fire and hazardous materials. All these roles contribute to preserving and improving water quality in the watershed.

Additionally, the city of Reno is divided into five Neighborhood Advisory Board Wards. Each Ward has one representative on the Reno City Council that is specifically focused on the needs of their part of the City. These Wards provide opportunities for citizens to engage in important community issues and is the most efficient way for citizens to communicate their concerns and ask questions prior to any large decisions or projects. As such, these Wards and their input are essential in the implementation and success of projects and plans within the community. Source water and watershed protection for this watershed falls within Wards 2 and 3.

Bureau of Land Management

The Nevada BLM has Resource Advisory Councils (RACs) which allow community members to be involved in natural resource planning and management issues on BLM managed public land. Washoe County is a part of the Sierra Front-Northwestern Great

Basin RAC which is administered through the BLM-Carson City and Winnemucca District offices (BLM Resource Advisory Councils-Nevada).

The BLM also has specific Resource Management Plans (RMPs), that apply to this watershed. These plans generally outline the way that the BLM currently manages and intends to manage the multiple resources on public land. Within this watershed, the following plans and sections are applicable:

- Carson City Consolidated Resource Management Plan (2001):

  RIP-1: Riparian Management discusses how riparian areas on BLM land should be managed, monitored, and maintained. The desired outcome in this section is to protect and maintain existing and potential fisheries and riparian areas in good or better condition.
  SWA-1: Soils, Watershed and Air Quality describes specific techniques and goals for all watersheds within the planning area such as reducing soil loss, flood damage, and sediment damage from human activities.
  WAT-1: Water Resources discusses management for good water quality on public lands such as watershed management plans as an important administrative action.

- Carson City Fire Management Plan (2016):

  The Fire Management Plan (FMP) goal is to restore sagebrush ecosystems throughout the planning area. In doing so, the risk of wildfire and its negative effects should eventually decrease. Since wildfire is a significant issue in this watershed, management to reduce its risk is a key planning component.

USDA Forest Service

The Humboldt-Toiyabe National Forest within this watershed is managed by the Carson Ranger District. Natural resource projects, including projects undergoing NEPA documentation, are listed on the Forest Service website. The Humboldt National Forest and Toiyabe National Forest Biannual 2018 Monitoring Report describes the conditions of the watershed and present monitoring information.

Additionally, the Forest Service has created Land and Resource Management Plans (LRMP) to guide management decisions within the Humboldt-Toiyabe National Forest. Water resources are outlined in the LRMP with management actions including maintenance, monitoring and enhancement of water quality:

- Humboldt National Forest Land and Resource Management Plan:

  Section IV.C.5 is "Soil and Water within the Forest-Wide Standards and Guidelines." This outlines the goals for the soil and resources on Forest Service managed land.
  Section V.A is the "Implementation Direction of the Forest Plan." This describes how the LRMP will be analyzed for its level of success.

- Toiyabe National Forest Land and Resource Management Plan:

  Section IV is the "Forest Management Direction with Forest-wide Standards and Guidelines" for soil and water as well as riparian areas. These sections outline the goals for the forest.
  Section V is the "Implementation of the Forest Plan" including the direction of the LRMP which also outlines the goals for the Forest.

Nevada Department of Transportation

The Nevada Department of Transportation (NDOT) has developed their Stormwater Management Program to reduce stormwater pollution from NDOT managed facilities and roads. The program BMPs and annual report outline the specific measures that NDOT will take to reduce stormwater pollutant discharges from its owned and operated storm drain system:

- Stormwater Management Program (2013):

  The overall goal of the NDOT Stormwater Management Program is to reduce pollution associated with stormwater from NDOT's MS4 to the maximum extent practicable, as well as to protect surface and groundwater resources within the MS4 permit area. The Stormwater Management Program addresses stormwater pollution control as it relates to the planning, design, construction, and maintenance of NDOT's highway infrastructure statewide.

- Stormwater Management Program: Annual Report (2017):

  This watershed is impacted or has the potential to be impacted by Hwy 395. The Stormwater Management Program provides a helpful planning outline on handling and mitigating pollution from the roads.

Nevada Division of Environmental Protection

The NDEP has a goal to preserve and enhance the environment of the State in order to protect public health, sustain healthy ecosystems, and contribute to a vibrant economy. The Dry Creek HUC-12 Watershed has several challenges facing source water protection, so the NDEP is an essential stakeholder and planning partner. Specifically, there are two programs under the NDEP that were involved in the Plan in Washoe County. Both programs provide education and outreach and offer funding opportunities for water quality protection and improvement:

- Integrated Source Water Protection Program under the Safe Drinking Water Bureau:

  This program offers technical assistance for source water protection projects. The program coordinates source water protection activities at the local, state, and federal levels, and encourages community-based protection and preventive management strategies to ensure all public drinking water resources are kept safe from future contamination.

  The 2010 Nevada Integrated Source Water Protection Program guidance document details the program components as well as the requirements for a State-endorsed Community Source Water Protection Plan.

- 319 Nonpoint Source Pollution Management Program under the Bureau of Water Quality Planning:

  This Program can provide matched grant funding for projects that improve water quality.

  The 2015-2019 State of Nevada Nonpoint Source Management Plan establishes how NDEP will work with partners to address Nonpoint Pollution Source (NPS) pollution. The Plan formalizes Nevada's approach for protecting and improving water quality and describes the goals, short- and long-term objectives, milestones and timeframes to guide activities, and measures for tracking success.

Nevada Division of Forestry

The Nevada Division of Forestry (NDF) is a State agency that uses a collaborative process to deliver science based natural resource management and protection promoting resilient landscapes, fire adapted communities, and safe, effective wildfire response provided by employees that embrace the core values of duty, respect, and integrity.

NDF provides professional natural resource and wildland fire management services to Nevada citizens and visitors to enhance, conserve and protect forest, rangeland and watershed values, endangered plants and other native flora. Protection of these resources helps to preserve and improve water quality:

- Community Wildfire Protection Plans:

  Community Wildfire Protection Plans (CWPPs) are authorized and defined in Title I of the Healthy Forests Restoration Act of 2003 (HFRA). CWPPs represent the best opportunity for communities to address the challenges of the Wildland-Urban Interface. A CWPP helps communities define their priorities for the protection of life, property, and shared assets-at-risk from wildfires. Developing a CWPP encourages community members and leaders to have valuable discussions about wildfire preparedness, evacuation planning, and local fire district capabilities. The CWPP increases grant funding opportunities by prioritizing fuel reduction projects around and within the community.

- Nevada Wildland Fire Cohesive Strategy:

  The Nevada Fire Board Oversight Body is the custodian of the 2015 Nevada Wildland Fire Cohesive Strategy Summit's Action Plan to ensure goal achievement and identify emerging topics. This oversight body acts as an "advisory" body and is charged with taking the Nevada Cohesive Strategy Summit report and its Action Steps, ensuring that goal achievement is accomplished and monitoring emerging topics through the Nevada Fire Board. This body should meet annually or as needed to monitor progress, develop issue resolution, address emerging issues and report out. They shall also determine the re-occurrence of the Nevada Cohesive Strategy Summit process.

- Arrow Creek Hazardous Fuels Reduction (funded 2015-2019):

  The 3,200-acre Arrow Creek community in the south west portion of the Dry Creek watershed is surrounded by 1,700 acres of open space. This area burned in 2000 and in order to prevent future wildfires this project attempts to reduce hazardous fuels. 178 acres of land was treated and continues to be monitored. Treatments included thinning brush species and removal of annual grasses through mechanical, biological, and chemical treatments. Funds for this project came from the Nevada Division of Forestry, USFS, and the community and county. Nearby creeks will benefit from reducing fuels and preventing wildfires and therefore erosion.

Truckee Meadows Regional Planning Agency

The Truckee Meadows Regional Planning Agency (TMRPA) fosters coordination among Reno, Sparks and Washoe County. TMRPA facilitates land-use, infrastructure provision and resource management conversations among public and private decision makers. The agency also serves as a collaborative information and data warehouse, coordinating regional data collection and

delivering advanced geospatial analytics for regional solutions. TMRPA includes a Regional Planning Governing Board and a Regional Planning Commission.

The TMRPA Regional Plan (2012 as amended) provides goals and policies for multiple plans and programs, including those with watershed related and well head protection components. The plan was revised in 2019-2020 and is considered a living document that will evolve over time.

Truckee Meadows Storm Water Permit Coordinating Committee

The Truckee Meadows Storm Water Permit Coordinating Committee (Storm Water Committee) is responsible for implementing the Truckee Meadows Storm Water Management Program to protect the water quality of the region's waterways, streams and the Truckee River. The Storm Water Committee continues to guide the development of numerous plans and assessments relevant to source water and watershed protection as summarized below.

Ordinance and Guidance Changes for Construction and Post-Construction Programs

The Storm Water Committee updated and joined the Structural Controls Design Manual and the Low Impact Development Manual, as well as updated the Truckee Meadows Construction Site BMP Handbook. These documents are referenced in the code for the city of Reno, city of Sparks, and Washoe County.

Watershed Assessments

Watershed assessment reports prepared for the Storm Water Committee were completed by Jesch et al. from 2002-2011 that include the Dry Creek Drain. These reports provide general watershed descriptions and can be used to track historical changes in creek condition and water quality over time. The reports do not include water quality data.

Hillside Design completed a comprehensive Watershed Assessment for Tributaries to the Truckee River in 2012 for these tributaries in this watershed: Dry Creek Drain.

The assessment included:

- Stream reach descriptions with numerous photo points,
- Proper Functioning Condition rating,
- List of restoration and management efforts needed to improve stream conditions, and
- Water chemistry for temperature, pH, specific conductivity, dissolved oxygen, turbidity, and flow.

CDM Smith was contracted in 2015 through 2017 to conduct watershed assessments. The following table lists the report year and the respective drainages and reaches that were assessed in this watershed:

Stream Reaches Addressed in Watershed Assessment Reports in the Dry Creek Watershed by Report Year

Stream Name	Lower Reach	Middle Reach	Upper Reach
	2015	2015	2015
Dry	X	X	X

Watershed Management and Protection Plan for Tributaries to the Truckee River

The Watershed Management and Protection Plan for Tributaries to the Truckee River (NCE, 2020) is an update to the 2003 Watershed Management and Protection Plan for Tributaries to the Truckee River, which has been implemented for more than 15 years by the regional MS4 through the Storm Water Committee. The 2003 plan described an approach for on-going watershed assessment studies and monitoring to protect and improve the water quality in the stream corridors and drainages tributary to the Truckee River. The 2020 Plan update provides a process and framework for identifying, developing, and implementing projects originated through the Storm Water Committee that is consistent with the guidelines for an EPA approved Watershed Management Plan. The 2020 plan by NCE and the 2020 Integrated Source Water and 319(h) Watershed Protection Plan for Public Water Systems and the Truckee River in the Truckee Meadows, are mutually complementary and work together to address the broad scope of potential strategies to improve drinking water and surface water quality in Washoe County.

Truckee Meadows Watershed Protection Manual

This manual contains a Summary of the Watershed Protection Activities and Programs Developed in Conjunction with the Watershed Management Facilitator Scope of Work (Kennedy/Jenks, 2005). This document provides a reference and compendium of the various watershed protection activities and programs that were developed in 2004 and 2005 for Reno, Sparks and Washoe County.

Truckee Meadows Water Authority

TMWA is responsible for almost all municipal water delivery in the greater Reno-Sparks area. TMWA also owns and operates the municipal wells in this watershed. The following program and plans guide the management of these water resources:

- TMWA Water Resources Plan (2016-2035):

  This plan describes water quality issues and goals for the water resources managed by TMWA. Special focus is placed on changes in future water supply and demand and how those changes will impact the region's water resources. Additionally, this plan provides useful Truckee River watershed information.

- Source Water Quality Assurance Program (2016-2035):

  TMWA's objective is to deliver high-quality potable water to its customers in a cost-effective manner. To achieve this objective, TMWA has established a water quality assurance program. The components that make up the program are source water quality protection, potable water treatment, maintenance of distribution system water quality, and cross connection control.

- Wellhead Protection Plan (2016):

  The purpose of the Wellhead Protection Plan is to protect groundwater that serves as a source for public drinking water supplies. This plan is intended to be a tool used by TMWA to assist in protecting drinking water sources.

Truckee River Fund

TMWA established the Truckee River Fund in 2004 (Truckee River Fund). The purpose of the Fund is to "protect and enhance water quality or water resources of the Truckee River, or its watershed." The Fund provides a way to respond to the requests from outside groups and organizations that are involved in promoting and improving the health of the Truckee River System and watershed. This in turn benefits the primary water source for the community and, in the long run, benefiting TMWA customers. For example, the Truckee River Fund has been the financial source for a portion of the following project:

- Truckee Meadows Nature Study Area Project: Planning Phase; (funded 2018-2019):

  This project involves the repurposing of the Rosewood Lakes Golf Course into a public recreational park and learning center. This specific area in the Dry Creek watershed has high quality wetland habitat. Funding, granted to the Truckee Meadows Parks Foundation, has helped create this outdoor classroom which will support volunteer and educational programs related to restoration and spreading awareness of water quality and watershed protection. Funding from TRF has also helped weed removal at the Truckee Meadows Nature Study Area where weeds like tall whitetop, poison hemlock, and purple loosestrife will be removed, and techniques and success of removal will be monitored. Efforts from developing this wetland area will potentially reduce total nitrogen loading on the Truckee River, and reduce erosion and weed encroachment near Steamboat Creek.

Washoe County

Activities in Washoe County are reviewed according to the Master Plan Planning Areas. The Truckee River watershed includes nine planning areas. The Dry Creek HUC-12 Watershed is included in the three planning areas: Northwest Truckee Meadows, Southeast and Southwest Truckee Meadows. The County has Citizens Advisory Boards (CABs) which provide important community perspective on local issues to the Washoe County Board of Commissioners. This watershed includes portions of the North Valleys CAB, West Truckee Meadows/Verdi CAB, and the South Truckee Meadows Washoe Valley CAB (CAB Boundaries).

The Washoe County Master Plan (2008) has Goals and Policies for Public Services and Facilities, and Open Space and Natural Resource Management. Applicable sections include:

- Article 418, Significant Hydrologic Resources, which regulates development activity within and adjacent to perennial streams to ensure that these resources are protected and enhanced. (Note: this does not apply to the Truckee River)
- Article 420, Storm Drainage Standards, sets forth standards for ensuring that both private and public development provides adequate protection for citizens and property. Therefore, it minimizes and controls erosion and pollution impacts on the natural environment, and additionally minimizes maintenance costs for drainage and flood control systems.
- Article 421, the Storm Water Discharge Program, which protects and enhances the water quality of watercourses, water bodies, groundwater and wetlands in a manner pursuant to and consistent with the Clean Water Act.
- Article 810, Special Use Permits, which provides a method of reviewing certain uses to determine if they have the potential to adversely affect public facilities in the vicinity.

Washoe County also provides comprehensive services for construction and maintenance roads, landscaping and drainage facilities; county-wide planning and code compliance; and emergency response services for fire and hazardous materials. All of these roles contribute to preserving and improving water quality in the watershed.

Washoe County Health District

The Washoe County Health District has regulatory authority over a wide variety of programs and services in the Truckee Meadows including underground storage tanks, septic systems, all public water systems, domestic wells, water projects and community development, grading permits, solid waste management and emergency preparedness. The Health District regulations are provided in several documents as listed below:

- Regulations of the Washoe County District Board of Health Governing Sewage, Wastewater and Sanitation. These regulations provide the minimum requirements to be followed by any person developing property served by an on-site sewage disposal system. These requirements are promulgated to prevent the spread of disease, protect the water quality of this county and ensure the on-site sewage disposal systems function properly.
- Regulations of the Washoe County District Board of Health Governing Well Construction. These regulations provide minimum requirements to be followed by any person when drilling and plugging specific kinds of wells. A well construction permit is required to drill a well for consumptive use or monitoring wells. These requirements are primarily promulgated to protect the quantity and quality of the waters of this County from waste and contamination, and to provide public protection by enforcing proper construction and plugging of wells.
- Regulations of the Washoe County District Board of Health Governing Solid Waste Management. These regulations protect water quality through the regulation of municipal solid waste landfills.

Western Regional Water Commission and the Northern Nevada Water Planning Commission

The Western Regional Water Commission (WRWC) focuses on improving water resource planning at the regional level and facilitating coordinated resource management among city of Reno, city of Sparks, Washoe County, TMWA, Truckee Meadows Water Reclamation Facility, South Truckee Meadows GID and Sun Valley GID.

The Northern Nevada Water Planning Commission (NNWPC) is a technical advisory panel that reports to the WRWC. The NNWPC develops and updates a Comprehensive Regional Water Management Plan (RWMP) and makes recommendations to the WRWC for adoption. In addition, the NNWPC develops priorities and an annual budget for the Regional Water Management Fund, also for recommendations to the WRWC.

The Comprehensive Regional Water Management Plan includes several applicable objectives:

- Objective 1.2 Provide for a Sustainable Water Supply and an Acceptable Level of Service to the Community (including protecting groundwater recharge areas).
- Objective 1.3 Implement measures to protect and enhance water quality for a sustainable water supply (including source water protection).
- Objective 2.1 Promote Efficient Use of Resources (Reduction of Non-Point Source Pollution for TMWRF Pollutant Credit).
- Objective 2.2 Manage wastewater for protection and enhancement of water quality.
- Objective 3.1 Effective and integrated watershed management (protection of human health, property, water quality including storm water).

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Evans Creek-Truckee River

HUC-12 Watershed #160501020508 Profile

Click here for complete HUC-12 Watersheds Map

Contents

Introduction

The Evans Creek-Truckee River HUC-12 Watershed profile is a component of the 2020 Integrated Source Water and 319(h) Watershed Protection Plan for Public Water Systems and the Truckee River in the Truckee Meadows (Plan), as well as the Watershed Management and Protection Plan for Tributaries to the Truckee River. This document is a part of the on-line watershed mapping tool.

This watershed description is intended to be a guide and resource for organizations working within the watershed, and an educational tool for those interested in learning more about the watershed in which they live. This Plan can be used to support funding for a multitude of water quality projects in the watershed. Note that only non-regulated activities are eligible for the Nevada Division of Environmental Protection Source Water Protection Program or the 319 Non-Point Source Program funding.

Summary

This profile focuses on the watershed's water quality. It includes potential and existing concerns, types of land uses, watershed management strategies and projects, and the involved stakeholders, and their corresponding plans with water quality components.

The Evans Creek-Truckee River HUC-12 watershed encompasses much of the developed area in Reno south of the river, the bulk of the industrial area in Sparks, and the Reno-Tahoe International Airport. The upper watershed begins near 9,000 feet in the Carson Range on the west and the outside edge of Steamboat Creek to the east. All runoff from this watershed flows to the Truckee River or Steamboat Creek downstream of the Glendale Water Treatment Plant.

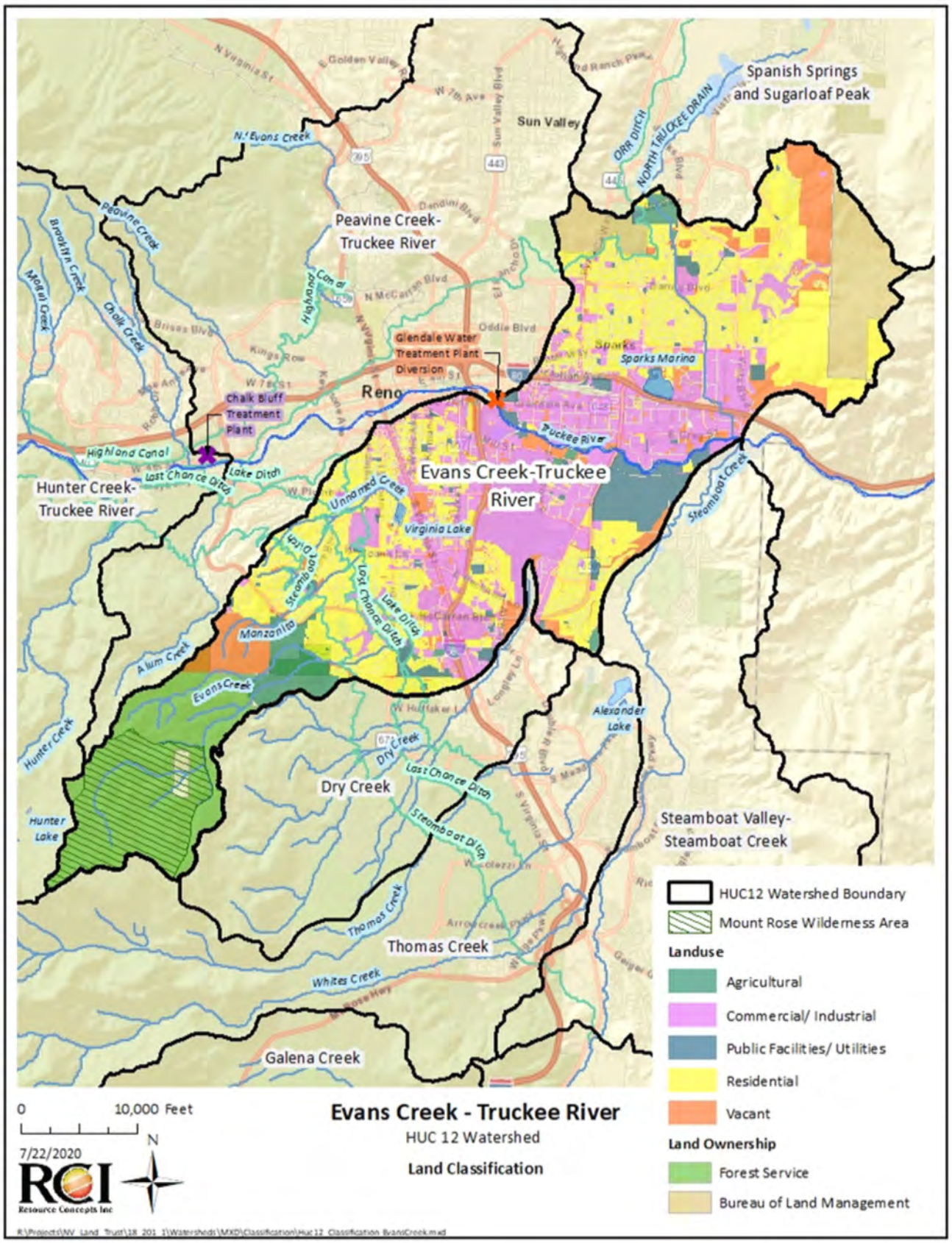
Source Water Protection Areas (SWPAs) for this watershed were developed by stakeholders to help protect drinking water sources. This watershed is an important area for groundwater recharge and hosts 18 public water system wells; as a result, more than half of this watershed is in a SWPA. Surface water bodies include creeks, irrigation ditches, reservoirs, the Truckee River, and the North Truckee Drain. The following table summarizes key water quality aspects this watershed.

Watershed Summary	
Basins	• Evans Creek-Truckee River HUC-12 Watershed #160501020508. • Groundwater Basin: 087 (Truckee Meadows) underlies all of this watershed.
Water Bodies & Water Quality	• Truckee River, impaired for temperature, see NAC 445A-1686. • Evans Creek, impaired for *E. coli*, see NAC 445A-1726. • Manzanita Creek, not assessed. • Sparks Marina, impaired for Nitrogen, Phosphorus, TDS, DO, barium, Manganese, see NAC 445-1688. • An unnamed creek, not assessed. • Virginia Lake, not impaired, see NAC 445A-1726. • North Truckee Drain, not assessed. • Irrigation ditches: Steamboat, Last Chance, Lake, Cochran, Pioneer, Boynton Slough, Spice Island, Glendale, and Orr.
Source Water Protection Areas	• A SWPA encompasses the central valley of the watershed with buffers along perennial streams. It represents a precautionary indicator to safeguard the drinking water sources. • Critical SWPAs represent areas closer to perennial streams and water system wells. • 18 public water system wells managed by 2 different public water systems. • 18,400 total acres, or roughly half the watershed is Source Water Protection Area. • 2,700 total acres or about 8% of the watershed is Critical Source Water Protection Area.
Special Considerations & Issues	• Urbanized, including large portions of the Cities of Reno and Sparks, as well as all of the Reno-Tahoe International Airport. • 2011 Caughlin Fire: fire susceptibility, erosion and invasive weed concerns. • Invasive noxious weeds. • Groundwater is locally contaminated by PCE and hydrocarbons. • Residential community septic systems have potential for nitrate leaching. • A portion of the upper watershed is within the Mt. Rose Wilderness area and therefore access is limited. • Major transportation corridors: I-80, I-580, Hwy 395, Hwy 431, and the railroad.

	Type	Acres	%
Land Jurisdiction	BLM:	2,010	7%
	City of Reno:	12,730	38%
	City of Sparks:	11,130	33%
	Washoe County Non-Federal:	3,060	9%
	USFS:	4,540	13%
Land Use	Agriculture:	1,045	3%
	Commercial/Industrial:	7,130	21%
	Residential:	10,215	30%
	Public facility/Utilities:	1,805	5%
	Vacant:	2,875	9%
	Roads and Easements:	3,860	11%
	State of Nevada:	135	<1%
	Federally Managed:	4,540	20%

Land uses and jurisdictions in the watershed are summarized in the adjacent table and illustrated by the Land Classification Figure.

Commercial, industrial, and residential land uses in Reno and Sparks are the dominant activities in this watershed. The potential and existing water quality concerns from these activities are primarily hazardous materials from spills or leaks and pollution from urban area runoff.


Spanish Springs and Sugarloaf Peak
Sun Valley
N. Evans Creek
Peavine Creek-Truckee River
Glendale Water Treatment Plant Diversion
Reno
Sparks
Sparks Marina
Chalk Bluff Treatment Plant
Truckee River
Highland Canal
Lake Ditch
Last Chance Ditch
Hunter Creek-Truckee River
Evans Creek-Truckee River
Unnamed Creek
Virginia Lake
Steamboat Creek
Steamboat Ditch
Manzanita
Alum Creek
Evans Creek
Hunter Creek
Alexander Lake
Dry Creek
Hunter Lake
Steamboat Valley-Steamboat Creek
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7/22/2020
RCI
Resource Concepts Inc
Evans Creek - Truckee River
HUC 12 Watershed
Land Classification
HUC12 Watershed Boundary
Mount Rose Wilderness Area
Landuse
Agricultural
Commercial/ Industrial
Public Facilities/ Utilities
Residential
Vacant
Land Ownership
Forest Service
Bureau of Land Management

Water Quality Standards and Beneficial Uses

Water quality standards for surface water in the State of Nevada are established by Nevada Administrative Code (NAC) NAC 445A.11704 through NAC 445A.2234. Standards applicable to beneficial uses are generally described under NAC 445A.122. The Nevada Division of Environmental Protection (NDEP) Bureau of Water Quality Planning Nevada 2016-2018 Water Quality Integrated Report identifies the beneficial uses and the surface water quality conditions in this watershed, as summarized below:

- The section of the Truckee River that runs through the Evans Creek-Truckee River HUC-12 Watershed is impaired for support of "aquatic life" due to water temperature between Idlewild Park and East McCarran (water quality standards NAC 445A.1686).
- Evans Creek east of Hwy 580 is tributary to Steamboat Creek (water quality standards NAC 445A.1726) and impaired for "recreation involving contact with water" due to concentrations of the *Escherichia coli* (*E. coli*) bacteria. West of Hwy 395/I- 580, Evans Creek supports all beneficial uses.
- The Sparks Marina, tributary to the Truckee River, is impaired for the beneficial uses: "aquatic life", "irrigation"," recreation involving contact with water", and "municipal or domestic supply". Total nitrogen, total phosphorus, barium, manganese, dissolved oxygen, and total dissolved solids have been outside water quality standards (NAC 445A.1688).
- Virginia Lake is tributary to Steamboat Creek (water quality standards NAC 445A.1726). Beneficial uses including "aquatic life" are fully supported, though "recreation involving contact with water" has not been assessed.

Groundwater is an important source of drinking water for public water systems in this watershed. Known contaminants within the watershed caused by human activity include PCE (perchloroethylene), hydrocarbon fuel, and organic solvents. Sources for these contaminants are described under Hazardous Materials from Spills or Leaks.

Potential and Existing Water Quality Concerns

The primary potential and existing water quality concerns in this watershed are listed below, and described in the following paragraphs:

- Hazardous Materials from Spills or Leaks
- Pollution from Urban Areas
- Nitrate from Individual Sewage Disposal System
- Sediment from Erosion
- High Temperature due to Low or Slow Moving Water

Hazardous Materials from Spills or Leaks

Substantial areas of the watershed have commercial and industrial businesses (Land Classification Figure), for example, the commercial/industrial area in Sparks, the Sparks Tank Farm and the Airport. Accidental spills or leaks from chemical storage or underground piping common to industrial areas have potential to contaminate groundwater or discharge to the Truckee River. Additionally, the railroad, Hwy 395, I-580, Hwy 431, and I-80 are in this watershed. Chemicals and materials commonly moving along these transportation corridors have the potential for accidental spills and leaks.

The U.S. Department of Transportation accumulated a list of commonly transported hazardous materials within the Truckee River watershed (WRWC, 2017). These include:

- Ammonia perchlorate
- Anhydrous ammonia
- Chlorine
- Cyanide
- Hydrochloric acid
- Hydrogen sulfide
- Nitro cellulose (wet)
- Propane
- Petroleum naphtha
- Phosphoric acid
- White phosphorous
- Propargyl alcohol
- Sulfuric acid
- Sodium hydroxide

PCE contaminated groundwater was identified in 1987 associated with commercial dry cleaning, paint manufacturing, and auto repair businesses (TMWA, 2016). The Environmental Protection Agency (EPA) has identified PCE as a potential human carcinogen (EPA, 2016). Central Truckee Meadows Remediation District (CTMRD) is responsible for the on-going groundwater treatment program to keep the extent of PCE contamination from moving or growing (Central Truckee Meadows Remediation District).

A plume of hydrocarbon fuel and organic solvents is located between the Sparks Tank Farm and the Sparks Marina Lake (WRWC, 2017). The plume is contained through use of extraction wells and remediation is monitored by the NDEP (WRWC, 2017).

Gas stations with underground fuel storage tanks can be found throughout the urban area of the Evans Creek – Truckee River watershed. Older underground fuel storage tanks have had a history of leaking. Based on NDEP and Washoe County Health District records, there are numerous sites with past or active remediation of soils and groundwater in this watershed.

The Reno-Tahoe International Airport is located on the south side of the Truckee River and is crossed by Boynton Slough.

Accidental releases of chemicals or fuels used at the Airport could have potential to reach groundwater and/or enter Boynton Slough, a tributary to Steamboat Creek.

Pollution from Urban Area Runoff

Groundwater, surface water, and irrigation ditches may be vulnerable to polluted runoff in urban areas. Potential contaminants include:

- Nutrients from fertilizers
- Bacteria from animal waste
- Trash
- Pollution from household waste
- Runoff from roads and parking lots

Excessive fertilization in irrigated green areas such as yards, fields, golf courses, or parks are potential sources of nutrients from fertilizers. These areas may also contribute *E. coli* from animal waste such as from horses, dogs and geese. As noted, the lowest reach of Evans Creek is listed as impaired for *E. coli*. Green areas located in this watershed near perennial streams include Bartley Ranch, Anderson Regional Park, Lakeridge Golf Course, and Washoe Golf Course. The Sparks Marina is surrounded by urban uses and does not meet water quality standards for phosphorus and nitrogen.

While not extensive, agricultural activities at the University of Nevada, Reno field station and smaller properties in this watershed include raising livestock and growing various crops. Fertilizers, herbicides, and livestock waste commonly associated with agriculture can have water quality concerns.

The water quality of the Truckee River in this watershed, as well as the adjacent upstream watershed, is also affected by homeless camps along the river. There is a lack of easy access to sanitary facilities and trash collection. Trash and human waste are often deposited directly into the river.

Nitrate from Individual Sewage Disposal Systems

Individual Sewage Disposal Systems, or septic systems, are associated with nitrate contamination of groundwater if there are large numbers concentrated in a small area, for example, neighborhoods with lot sizes less than 1-acre, or if they are not maintained properly (WRWC, 2017). There are about 400 parcels on septic systems in this watershed largely on lots greater than 1-acre, though they are generally located away from current and planned public water system wells.

Sediment from Erosion

Sediment from erosion conveys pollution, such as phosphorous, and degrades downstream water with suspended sediment. The primary causes of erosion and sedimentation in this watershed include wildland fire, noxious weeds, and drainage and landscape modifications.

High-severity wildfires alter the overall structure of the ecosystem through the removal of vegetation leaving limited ground cover. Severe fires also create a waxy, water-repellant layer over the soil which increases water and soil runoff (NDF, 2011). Approximately 1,000 acres of upland and riparian vegetation around Evans Creek and 650 acres surrounding Manzanita Creek burned in the 2011 Caughlin Fire (CDM Smith, 2016). Following the fire, check dams, sediment logs, willow wattles and willow stakes were installed or planted to help restore the burned area (Hillside Design, 2012). Since then, the creeks have recovered and restoration efforts have been successful at limiting channel degradation (CDM Smith, 2016).

Areas invaded by noxious weeds are more susceptible to erosion and sedimentation in several ways. Noxious weeds do not have a root structure to retain soil and resist erosion due to wind or water. The fire risk is also increased because noxious weeds are more flammable than native species. Noxious weeds near drainages are common in this watershed. There are dense tall whitetop and purple loosestrife stands at the lower reach of the North Truckee Drain (CDM Smith, 2016). Along Manzanita Creek there is a large infestation of cheatgrass and medusa head (CDM Smith, 2016). The Evans Creek area has moderate concentrations of weeds, including punctureVine and purple loosestrife, particularly near its confluence to Dry Creek at the edge of this watershed (CDM Smith, 2016).

Drainages are often modified, such as straightened, diverted or combined, to accommodate development. Much of the drainage modifications are designed to reduce the flood hazard on the adjacent areas. However, they result in higher water velocities which lead to headcuts, other bed and bank erosion, and downstream sedimentation. Evans Creek and North Truckee Drain are conveyed through flood control channels in the residential areas of Reno and Sparks, respectively. Evans Creek is incised 2-3 feet upstream of Steamboat Ditch and there are bare soil banks (CDM Smith, 2016).

Areas that are disturbed during construction projects can represent a potential risk of erosion and downstream sedimentation. Protection of stormwater runoff from contamination by construction in the Truckee Meadows is regulated under the regional stormwater management plan (Truckee Meadows MS4). There are many best management practice resources available to construction projects to help keep soil on-site and to reduce runoff.

High Temperature due to Low or Slow-Moving Water

The Truckee River is impaired for support of aquatic life beneficial use due to water temperature between Idlewild Park and East McCarran (NDEP BWQP, 2016-2018). During periods of low flow in the summer months, due to extended droughts or water diversions, the river can be too warm to support aquatic life in this area. Implementation of the finalized 2015 Truckee River Operating Agreement may help to improve ecological conditions and overall river health through more efficient use of available reservoir storage. However, water temperatures have potential to exceed the standard during summer months under drought conditions.

Strategies to Protect and Improve Water Quality

The water quality concerns identified in this watershed can be addressed through management strategies described in this section, the proposed projects detailed in the Project Profiles, as well as applicable on-going water quality projects and programs described under Stakeholders and Plans. These strategies pertain to the entire watershed but may be prioritized in SWPAs.

Source Water Protection Area Identification and Management

A SWPA is a management area surrounding a surface water or groundwater resource that supplies water for public consumption. Activities in these buffer areas can affect the quality of water downstream or underground. These management strategies acknowledge the value of these SWPAs to prevent future contamination of sources of drinking water.

There are two types of buffers in this watershed (RCI, 2020). One buffer encompassing the central valley of the watershed and extending along perennial tributaries, which represents a precautionary indicator to safeguard groundwater recharge areas. The second type of buffer surrounds critical areas closer to streams and water system wells (based on a 20-year time of travel for groundwater). These areas are illustrated on the Jurisdiction and Source Water Protection Areas Figure. The following objectives are significant in both future and on-going SWPA management:

- Inform landowners in SWPAs about their proximity to valuable drinking water sources and how they can help protect their water quality.
- Encourage coordination between Public Water Systems, landowners, and City or County planners to consider the importance of SWPAs in project reviews.
- Explore collaborative funding for water quality and watershed improvements and support the resource investigations needed to develop viable projects.
- Prioritize physical improvements in SWPAs to protect and improve source water quality.

Education and Outreach

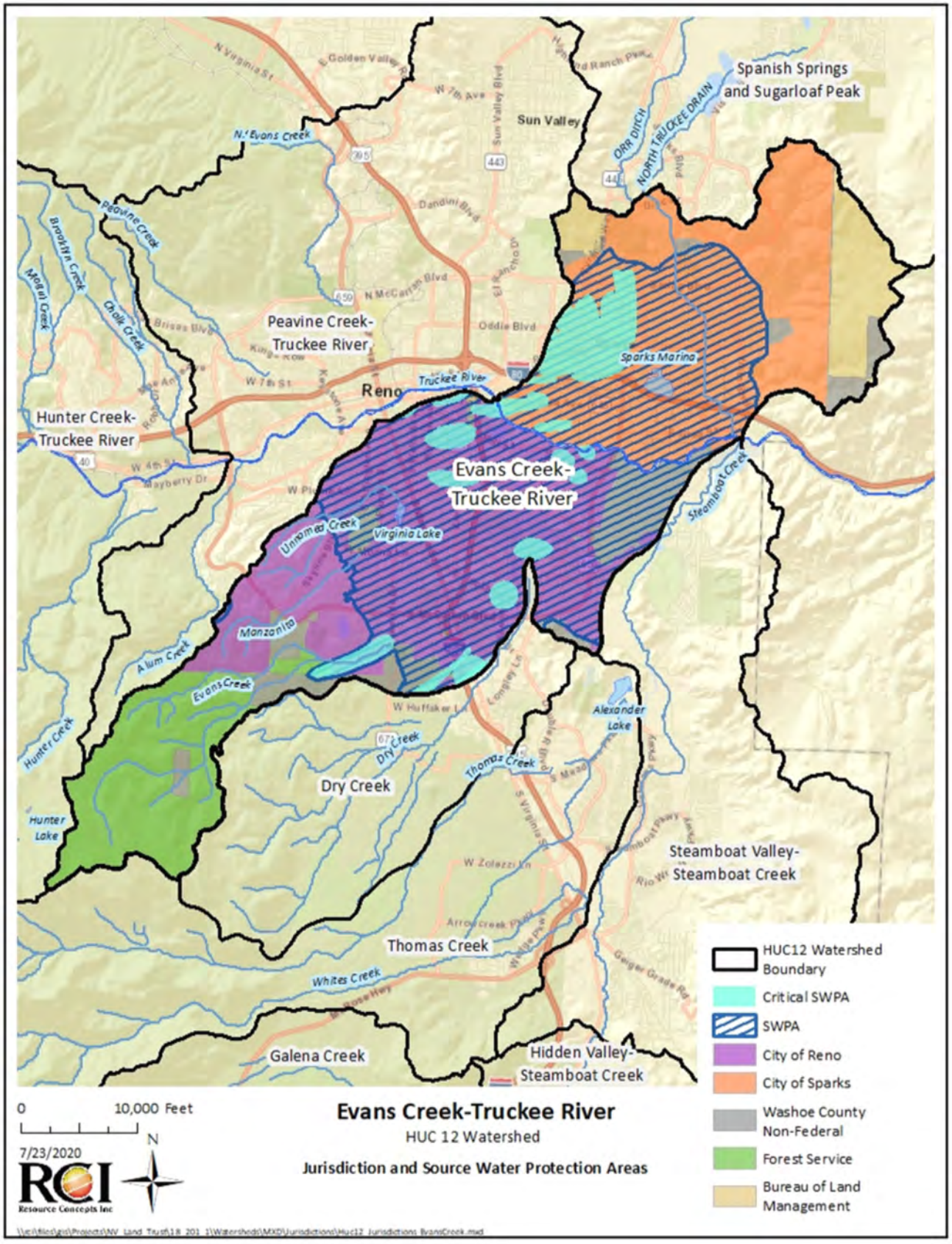
The following education and outreach objectives are intended to help effectuate positive actions to protect water quality:

- Continue to work with Homeowners' Associations regarding source water pollution prevention measures.
- Continue to support CTMRD in education regarding tetrachloroethene (PCE) contamination in groundwater.
- Continue to support the Truckee Meadows Storm Water Permit Coordinating Committee (Storm Water Committee) outreach and education programs.
- Increase knowledge of water quality protection and the pollution in stormwater runoff through local outreach efforts.
- Increase knowledge about household and commercial chemical use, storage and disposal through local outreach efforts.
- Inform landowners and developers residing in critical SWPAs about the importance of avoiding contamination and their proximity to a valuable drinking water source.

Interagency Communication

The following interagency communication objectives are important tools to both reinvigorate and invest additional resources in water quality, as well as utilize existing resources and programs:

- Each agency may evaluate how to improve lines of communication within and between jurisdictions regarding water quality issues; i.e. city of Reno, city of Sparks, Washoe County, Truckee Meadows Water Authority (TMWA), NDEP, Washoe County Health District, Forest Service, Bureau of Land Management (BLM), and Reno-Sparks Indian Colony.
- Continue to increase coordination and communication between the appropriate agencies regarding spills and corrective actions along I-80, Hwy 395, I-580, Hwy 431, the railroad, and the Airport.
- Evaluate how to collaborate with stakeholders such as TMWA and the Storm Water Committee on incorporating drinking water protection into community outreach and education strategies.
- Collaborate with the Washoe/Storey Cooperative Weed Management Area to support their efforts in noxious weed management (WSCWMA Website).


Spanish Springs and Sugarloaf Peak
Sun Valley
N. Evans Creek
Peavine Creek
Broadhan Creek
Mogul Creek
Chalk Creek
Peavine Creek-Truckee River
Reno
Truckee River
Sparks Marina
Hunter Creek-Truckee River
Evans Creek-Truckee River
Unnamed Creek
Virginia Lake
Steamboat Creek
Manzanita
Alum Creek
Evans Creek
Hunter Creek
Alexander Lake
Dry Creek
Thomas Creek
Hunter Lake
Steamboat Valley-Steamboat Creek
Thomas Creek
Whites Creek
Galena Creek
Hidden Valley-Steamboat Creek
HUC12 Watershed Boundary
Critical SWPA
SWPA
City of Reno
City of Sparks
Washoe County Non-Federal
Forest Service
Bureau of Land Management
0
10,000 Feet
N
7/23/2020
RCI
Resource Concepts Inc
Evans Creek-Truckee River
HUC 12 Watershed
Jurisdiction and Source Water Protection Areas

Wildfire and Fuel Management

Wildland fire is a threat to water quality and coordinated fuel management on wildlands can help reduce risks to water quality. Stakeholders and partners may consider the following objectives as they pertain to wildfire and fuel management:

- Encourage development, maintenance, and implementation of the Community Wildfire Protection Plans.
- Support and collaborate with the Nevada Cohesive Strategy effort and the Shared Stewardship Agreement, the blueprint to address Nevada's wildland fire issues.
- Support for the Nevada Network of Fire Adapted Communities and their local chapters for people in high fire threat locations to fully prepare themselves, their homes, and the landscape where they reside to survive the destructive force of wildfire.
- Encourage the development of a wildland fire risk reduction and emergency recovery plans to reduce the risk of wildfire, quickly restore burned areas, and reduce the risk of catastrophic post-fire erosion and sedimentation.
- Collaborate and coordinate to treat invasive and noxious weeds pre- and post-fire to reduce risk of wildfire and watershed destabilization.

Resource Investigation and Planning

Stakeholders may consider supporting the following resource investigations and planning, which can help fill data gaps, inform implementation designs and prioritize projects:

- Research to identify non-point pollutant sources in the watershed and options for treatment.
- Water quality improvement planning for tributaries to the Truckee River.
- Development and implementation of integrated vegetation management programs.

Water Quality Best Management Practices

Stakeholders may consider supporting the following Water Quality Best Management Practices (BMPs), that may improve and prevent degradation to water quality resources:

- Water quality improvement projects.
- Invasive weed removal and integrated vegetation management for creek stabilization.
- Recommendations in the tributary assessments.
- Proper abandonment of wells.
- Physical improvements prioritized in SWPAs for water quality improvement and protection.
- Nutrient management measures for irrigated green spaces.

Proposed Implementation Projects

Proposed implementation actions are generally described under the Strategies to Protect and Improve Water Quality. Specific implementation actions have been developed into proposed projects by local stakeholders and are described in Project Profiles. These Project Profiles include the information needed, as identified in the EPA guidance for nine critical elements for an endorsable watershed management plan. Future projects could also be brought forward to funding agencies through:

- Demonstrating advancement of the strategies identified for this watershed in the Source Water and Watershed Protection Plan.
- Using the Project Profile format to establish consistency with the nine critical elements of an EPA endorsed plan.

As discussed in the following Stakeholders and Plans section, municipality and agency projects are also incorporated by reference.

Stakeholders and Plans

Stakeholder information and existing plans were used extensively in development of the Plan for Washoe County. These municipalities and agencies each have unique strategies and capital improvement plans that include water quality protection or improvement projects. These are updated regularly at differing timeframes (i.e. annually, every five years, etc.) according to their specific budgeting and planning processes. The applicable planning documents are briefly described and referenced in this section. Those projects pertaining to water quality protection and improvement in the watershed are incorporated by reference.

Project Stakeholders	
• Central Truckee Meadows Remediation District	• One Truckee River
• City of Reno	• Truckee Meadows Storm Water Permit Coordinating Committee
• City of Sparks	• Truckee Meadows Regional Planning Agency
• Bureau of Land Management	• Truckee Meadows Water Authority
• USDA Forest Service	• Truckee River Fund
• Nevada Department of Transportation	• Washoe County
• Nevada Division of Environmental Protection	• Washoe County Health District
• Nevada Division of Forestry	• Western Regional Water Commission

Central Truckee Meadows Remediation District

The CTMRD was created by State statute and County ordinance in 1995 in order to address the presence of tetrachloroethene (PCE) in groundwater around Reno and Sparks. The CTMRD is administered by the Washoe County Community Services Department on behalf of the Board of County Commissioners. It is the only program of its kind in Nevada and focuses on collaborative, community-based solution implementation.

PCE is a human-made chemical that is commonly used as a solvent in dry cleaning, auto repair, and industrial operations which are all concerns within this watershed. The CTMRD has four specific, interrelated objectives regarding the proactive management of PCE. All of these objectives are pertinent to this watershed:

- Mitigate existing PCE contamination of groundwater.
- Prevent additional PCE contamination from occurring.
- Protect those parts of the aquifer system that are not contaminated with PCE.
- Inform stakeholder agencies, the public, the business sector, and other interested parties of CTMRD program activities.

City of Reno

The City of Reno 2017 Master Plan goals and policies provide the framework for decision-making in the community. Drinking water protection is addressed in the Master Plan's guiding principle to promote a safe and more resilient community. The City works with TMWA and other partners to ensure clean drinking water. Water quality is also addressed in the guiding principle for quality places and outdoor recreation opportunities in the sections on hydrologic resources, major drainageways and no net loss of wetlands, stream environments, playas, spring fed stands of riparian vegetation, and non-404 wetlands in the City, in terms of both acreage and value. The Design Principles for Sustainable Development also contain sections related to water quality.

The following articles from the Master Plan discuss several water-related items that are applicable to this Plan:

- Article I: Section 18.12.105 describes setbacks from the Truckee River.
- Article XVIII: Section 18.12.1801 to 1808 describes wetlands and stream environment protection standards established for the review of development proposals within wetlands, stream environments, and areas of significant hydrologic resources.
- Article XIX: Section 18.12.1902 to 1907 Drainage Way Protection Standards carries out the provisions of the City of Reno Major Drainageways Plan, an element of the City of Reno Master Plan, and establishes standards for the review of development proposals within major drainage ways to, among other actions, maintain, preserve, or enhance the quality of the water in both the Truckee River and Stead basins.

The city of Reno also provides comprehensive services for construction and maintenance roads; landscaping and drainage facilities; citywide planning and code compliance; and emergency response services for fire and hazardous materials. All these roles contribute to preserving and improving water quality in the watershed.

Additionally, the city of Reno is divided into five Neighborhood Advisory Board Wards. Each Ward has one representative on the Reno City Council that is specifically focused on the needs of their part of the City. These Wards provide opportunities for citizens to engage in important community issues and is the most efficient way for citizens to communicate their concerns and ask questions prior to any large decisions or projects. As such, these Wards and their input are essential in the implementation and success of projects and plans within the community. Source water and watershed protection for this watershed falls within Wards 1, 2, and 3.

City of Sparks

The city of Sparks has a Comprehensive Plan (2016) that encompasses the growth of the City and development projects. Areas are identified in the Comprehensive Plan according to the unique topics that influence each region. The Comprehensive Plan contains goals and policies for resiliency and conservation. The following policies are applicable to water quality and source water protection:

- Policy RC2: Protect the water quality of the Truckee River, drainages, lakes and aquifers.
- Policy RC4: Reduce pollution from stormwater runoff, overflow and other non-point sources.
- Policy RC5: Protect groundwater quality through land use management that safeguards recharge areas from inappropriate disturbances and contamination.
- Policy RC6: Implement "Best Management Practices," including but not limited to Low Impact Development Practices (LID), to control urban stormwater runoff.

The city of Sparks also provides comprehensive services for construction and maintenance roads, landscaping and drainage facilities; citywide planning and code compliance; and emergency response services for fire and hazardous materials. All of these roles contribute to preserving and improving water quality in the watershed.

The city of Sparks additionally has five Neighborhood Advisory Board Wards, led by council members that contribute to community planning and decision making. Each Ward has a representative on the Sparks City Council that voices the concerns and needs of that area. These Wards are the most efficient way for citizens to communicate their concerns and ask questions prior to any large decisions or projects, as well as engage in important community issues. This watershed is in Wards 1 and 3.

Bureau of Land Management

The Nevada BLM has Resource Advisory Councils (RACs) which allow community members to be involved in natural resource planning and management issues on BLM managed public land (BLM Resource Advisory Councils-Nevada). Washoe County is a part of the Sierra Front-Northwestern Great Basin RAC which is administered through the BLM Carson City and Winnemucca District offices.

The BLM also has specific Resource Management Plans (RMPs), that apply to this watershed. These plans generally outline the way that the BLM currently manages and intends to manage the multiple resources on public land. Within this watershed, the following plans and sections are applicable:

- Carson City Consolidated Resource Management Plan (2001):
  RIP-1: Riparian Management discusses how riparian areas on BLM land should be managed, monitored, and maintained. The desired outcome in this section is to protect and maintain existing and potential fisheries and riparian areas in good or better condition.
  SWA-1: Soils, Watershed and Air Quality describes specific techniques and goals for all watersheds within the planning area such as reducing soil loss, flood damage, and sediment damage from human activities.
  WAT-1: Water Resources discusses management for good water quality on public lands such as watershed management plans as an important administrative action.
- Carson City Fire Management Plan (2016):
  The Fire Management Plan (FMP) goal is to restore sagebrush ecosystems throughout the planning area. In doing so, the risk of wildfire and its negative effects should eventually decrease. Since wildfire is a significant issue in this watershed, management to reduce its risk is a key planning component.

USDA Forest Service

The Humboldt-Toiyabe National Forest within this watershed is managed by the Carson Ranger District. Natural resource projects, including projects undergoing NEPA documentation, are listed on the Forest Service website. The Humboldt National Forest and Toiyabe National Forest Biannual 2018 Monitoring Report describe the conditions of the watershed and present monitoring information.

Additionally, the Forest Service has created Land and Resource Management Plans (LRMP) to guide management decisions within the Humboldt-Toiyabe National Forest. Water resources are outlined in the LRMP along with management actions including maintenance, monitoring and enhancement of water quality:

- Humboldt National Forest Land and Resource Management Plan:
  Section IV.C.5 is "Soil and Water within the Forest-Wide Standards and Guidelines". This outlines the goals for the soil and resources on Forest Service managed land.
  Section V.A is the "Implementation Direction of the Forest Plan". This describes how the LRMP will be analyzed for its level of success.
- Toiyabe National Forest Land and Resource Management Plan:
  Section IV is the "Forest Management Direction with Forest-wide Standards and Guidelines" for soil and water as well as riparian areas. These sections outline the goals for the forest.
  Section V is the "Implementation of the Forest Plan" including the direction of the LRMP which also outlines the goals for the Forest.

Nevada Department of Transportation

The Nevada Department of Transportation (NDOT) has developed their Stormwater Management Program to reduce stormwater pollution from NDOT managed facilities and roads. The program BMPs and annual report outline the specific measures that NDOT will take to reduce stormwater pollutant discharges from its owned and operated storm drain system:

- Stormwater Management Program (2013):

  The overall goal of the NDOT Stormwater Management Program is to reduce pollution associated with stormwater from NDOT's MS4 to the maximum extent practicable, as well as to protect surface and groundwater resources within the MS4 permit area. The Stormwater Management Program addresses stormwater pollution control as it relates to the planning, design, construction, and maintenance of NDOT's highway infrastructure statewide.

- Stormwater Management Program: Annual Report (2017):

  This watershed is impacted or has the potential to be impacted by I-80, I-580, Hwy 395, and Hwy 431. The Stormwater Management Program provides a helpful planning outline on handling and mitigating pollution from the roads.

Nevada Division of Environmental Protection

The NDEP has a goal to preserve and enhance the environment of the State in order to protect public health, sustain healthy ecosystems, and contribute to a vibrant economy. The Evans Creek-Truckee River HUC-12 Watershed has several challenges facing source water protection, so the NDEP is an essential stakeholder and planning partner. Specifically, there are two programs under the NDEP that were involved in the Plan in Washoe County. Both programs provide education and outreach and offer funding opportunities for water quality protection and improvement:

- Integrated Source Water Protection Program under the Safe Drinking Water Bureau:

  This program offers technical assistance for source water protection projects. The program coordinates source water protection activities at the local, state, and federal levels, and encourages community-based protection and preventive management strategies to ensure all public drinking water resources are kept safe from future contamination.

  The 2010 Nevada Integrated Source Water Protection Program guidance document details the program components as well as the requirements for a State-endorsed Community Source Water Protection Plan.

- 319 Nonpoint Source Pollution Management Program under the Bureau of Water Quality Planning:

  This Program can provide matched grant funding for water quality improvement projects.

  The 2015-2019 State of Nevada Nonpoint Source Management Plan establishes how NDEP will work with partners to address NPS pollution. The Plan formalizes Nevada's approach for protecting and improving water quality and describes the goals, short- and long-term objectives, milestones and timeframes to guide activities, and measures for tracking success.

Nevada Division of Forestry

The Nevada Division of Forestry (NDF) is a State agency that uses a collaborative process to deliver science based natural resource management and protection to promote resilient landscapes, fire adapted communities, and safe, effective wildfire response provided by employees that embrace the core values of duty, respect, and integrity.

NDF provides professional natural resource and wildland fire management services to Nevada citizens and visitors to enhance, conserve and protect forest, rangeland and watershed values, endangered plants and other native flora. Protection of these resources helps to improve water quality.

- Community Wildfire Protection Plans:

  Community Wildfire Protection Plans (CWPPs) are authorized and defined in Title I of the Healthy Forests Restoration Act of 2003 (HFRA). CWPPs represent the best opportunity that communities have to address the challenges of the Wildland-Urban Interface. A CWPP helps communities define their priorities for the protection of life, property, and shared assets-at-risk from wildfires. Developing a CWPP encourages community members and leaders to have valuable discussions about wildfire preparedness, evacuation planning, and local fire district capabilities. The CWPP increases grant funding opportunities by prioritizing fuel reduction projects around and within the community.

- Nevada Wildland Fire Cohesive Strategy:

  The Nevada Fire Board Oversight Body is the custodian of the 2015 Nevada Wildland Fire Cohesive Strategy Summit's Action Plan to ensure goal achievement and identify emerging topics. This oversight body acts as an "advisory" body and is charged with taking the Nevada Cohesive Strategy Summit report and its Action Steps, ensuring that goal achievement is accomplished and monitoring emerging topics through the Nevada Fire Board. This body monitors progress, develops issue resolution, and addresses emerging issues such as protecting water quality.

One Truckee River

According to the One Truckee River website, "One Truckee River is a collaboration of public and private partners working together to realize a Truckee River that flows clean and clear, quenches our thirst, sustains the river's natural ecology, cultural resources and wildlife, and connects residents and visitors to unparalleled opportunities for recreation and regeneration":

- The One Truckee River Management Plan (2017) addresses actions to accomplish four primary goals, including protection of water quality and ecosystem health.

The following stakeholders were instrumental in compiling the plan and in implementing the plan action items:

- Truckee River Flood Management Authority
- Pyramid Lake Paiute Tribe
- Truckee Meadows Water Authority
- Resource Concepts, Inc.
- Nevada Division of Environmental Protection
- Renown
- Truckee Meadows Regional Planning Agency
- Keep Truckee Meadows Beautiful AmeriCorps
- Keep Truckee Meadows Beautiful
- Washoe County Health District
- City of Reno Public Works

Truckee Meadows Regional Planning Agency

The Truckee Meadows Regional Planning Agency (TMRPA) fosters coordination among Reno, Sparks and Washoe County. TMRPA facilitates land-use, infrastructure provision and resource management conversations among public and private decision makers. The agency also serves as a collaborative information and data warehouse, coordinating regional data collection and delivering advanced geospatial analytics for regional solutions. TMRPA includes a Regional Planning Governing Board and a Regional Planning Commission.

The TMRPA Regional Plan (2012 as amended) provides goals and policies for multiple plans and programs, including those with watershed related and well head protection components. The plan was revised in 2019-2020 and is considered a living document that will evolve over time.

Truckee Meadows Storm Water Permit Coordinating Committee

The Storm Water Committee is responsible for implementing the Truckee Meadows Storm Water Management Program to protect the water quality of the region's waterways, streams and the Truckee River. The Storm Water Committee continues to guide the development of numerous plans and assessments relevant to source water and watershed protection as summarized below.

Ordinance and Guidance Changes for Construction and Post-Construction Programs

The Storm Water Committee updated and joined the Structural Controls Design Manual and the Low Impact Development Manual, as well as updated the Truckee Meadows Construction Site BMP Handbook. These documents are referenced in the code for the city of Reno, city of Sparks, and Washoe County.

Watershed Assessments

Watershed assessment reports prepared for the Storm Water Committee were completed by Jesch et al. from 2002-2011 that include the Evans Creek and North Truckee Drain. These reports provide general watershed descriptions and can be used to track historical changes in creek condition and water quality over time. The reports do not include water quality data.

Hillside Design completed a comprehensive Watershed Assessment for Tributaries to the Truckee River in 2012 for these tributaries in this watershed: Evans Creek and North Truckee Drain.

The assessment included:

- Stream reach descriptions with numerous photo points,
- Proper Functioning Condition rating,
- List of restoration and management efforts needed to improve stream conditions, and
- Water chemistry for temperature, pH, specific conductivity, dissolved oxygen, turbidity, and flow.

CDM Smith was contracted in 2015 through 2017 to conduct watershed assessments. The following table lists the report year and the respective drainages and reaches that were assessed in this watershed:

Stream Reaches Addressed in Watershed Assessment Reports in the Evans Creek-Truckee River Watershed by Report Year			
Stream Name	Lower Reach	Middle Reach	Upper Reach
	2016	2015	2016
Evans	X	X	X
Manzanita	X		
North Truckee Drain	X	X	X

Watershed Management and Protection Plan for Tributaries to the Truckee River

The Watershed Management and Protection Plan for Tributaries to the Truckee River (NCE, 2020) is an update to the 2003 Watershed Management and Protection Plan for Tributaries to the Truckee River, which has been implemented for more than 15 years by the regional MS4 through the Storm Water Committee. The 2003 plan described an approach for on-going watershed assessment studies and monitoring to protect and improve the water quality in the stream corridors and drainages tributary to the Truckee River. The 2020 Plan update provides a process and framework for identifying, developing, and implementing projects originated through the Storm Water Committee that is consistent with the guidelines for an EPA approved Watershed Management Plan. The 2020 plan by NCE and the 2020 Integrated Source Water and 319(h) Watershed Protection Plan for Public Water Systems and the Truckee River in the Truckee Meadows, are mutually complementary and work together to address the broad scope of potential strategies to improve drinking water and surface water quality in Washoe County.

Water Quality Monitoring

Balance Hydrologics has conducted water quality analyses on tributaries and stormwater outfalls since 2016. The following table lists the report years and the respective drainages that were assessed in this watershed:

Streams Addressed in Stormwater Monitoring Annual Reports in the Evans Creek-Truckee River Watershed by Report Year			
Stream Name	Entire Reach		
	2016	2017	2018
North Truckee Drain	X	X	X

Truckee Meadows Watershed Protection Manual

This manual contains a Summary of the Watershed Protection Activities and Programs Developed in Conjunction with the Watershed Management Facilitator Scope of Work (Kennedy/Jenks, 2005). This document provides a reference and compendium of the various watershed protection activities and programs that were developed in 2004 and 2005 for Reno, Sparks and Washoe County.

Truckee Meadows Water Authority

TMWA is responsible for almost all municipal water delivery in the greater Reno-Sparks area. TMWA also owns and operates the municipal wells in this watershed. The following program and plans guide the management of these water resources:

- TMWA Water Resources Plan (2016-2035):

  This plan describes water quality issues and goals for the water resources managed by TMWA. Special focus is placed on changes in future water supply and demand and how those changes will impact the region's water resources. Additionally, this plan provides useful Truckee River watershed information.

- Source Water Quality Assurance Program (2016-2035):

  TMWA's objective is to deliver high-quality potable water to its customers in a cost-effective manner. To achieve this objective, TMWA has established a water quality assurance program. The components that make up the program are source water quality protection, potable water treatment, maintenance of distribution system water quality, and cross connection control.

- Wellhead Protection Plan (2016):

  The purpose of the Wellhead Protection Plan is to protect groundwater that serves as a source for public drinking water supplies. This plan is intended to be a tool used by TMWA to assist in protecting drinking water sources.

Truckee River Fund

TMWA established the Truckee River Fund in 2004 (Truckee River Fund). The purpose of the Fund is to "protect and enhance water quality or water resources of the Truckee River, or its watershed." The Fund provides a way to respond to the requests from outside groups and organizations that are involved in promoting and improving the health of the Truckee River System and watershed. This in turn benefits the primary water source for the community and, in the long run, benefits TMWA customers. For example, The Truckee River Fund has helped finance the following projects:

- Caughlin Fire Emergency Watershed Stabilization & Restoration Effort (funded 2011):

  This effort focused on remediating damage from the Caughlin Fire. The activities included in this effort included typical fire reconstructive efforts such as debris removal, reseeding, and other BMPs. Water quality in the watershed has benefited and will continue to benefit from these activities by reducing sedimentation and decreasing the future wildfire potential in the area.

- Virginia Lake Water Quality Improvements (funded 2015):

  This project constructed a new, primary outlet at the south end of Virginia Lake. This outlet increases circulation throughout the lake and supports healthy flows through Boynton Slough and Steamboat Creek. In doing so, the watershed has been positively impacted.

Washoe County

Activities in Washoe County are reviewed according to the Master Plan Planning Areas. The Truckee River watershed includes nine planning areas. The Evans Creek-Truckee River HUC-12 Watershed is included in the three planning areas: Northeast Truckee Meadows, Southeast and Southwest Truckee Meadows. The County has Citizens Advisory Boards (CABs) which provide important community perspectives on local issues to the Washoe County Board of Commissioners. This watershed includes portions of the West Truckee Meadows/Verdi CAB, the South Truckee Meadows Washoe Valley CAB, and the Spanish Springs CAB (CAB Boundaries).

The Washoe County Master Plan (2008) has Goals and Policies for Public Services and Facilities, and Open Space and Natural Resource Management. Applicable sections include:

- Article 418, Significant Hydrologic Resources, which regulates development activity within and adjacent to perennial streams to ensure that these resources are protected and enhanced. (Note: this does not apply to the Truckee River).
- Article 420, Storm Drainage Standards, sets forth standards for ensuring that both private and public development provides adequate protection for citizens and property. Therefore, it minimizes and controls erosion and pollution impacts on the natural environment, and additionally minimizes maintenance costs for drainage and flood control systems.
- Article 421, the Storm Water Discharge Program, which protects and enhances the water quality of watercourses, water bodies, groundwater and wetlands in a manner pursuant to and consistent with the Clean Water Act.
- Article 810, Special Use Permits, which provides a method of reviewing certain uses to determine if they have the potential to adversely affect public facilities in the vicinity.

Washoe County also provides comprehensive services for construction and maintenance roads; landscaping and drainage facilities; county-wide planning and code compliance; and emergency response services for fire and hazardous materials. All of these roles contribute to preserving and improving water quality in the watershed.

Washoe County Health District

The Washoe County Health District has regulatory authority over a wide variety of programs and services in the Truckee Meadows including underground storage tanks, septic systems, all public water systems, domestic wells, water projects and community development, grading permits, solid waste management and emergency preparedness. The Health District regulations are provided in several documents as listed below:

- Regulations of the Washoe County District Board of Health Governing Sewage, Wastewater and Sanitation. These regulations provide the minimum requirements to be followed by any person developing property served by an on-site sewage disposal system. These requirements are promulgated to prevent the spread of disease, protect the water quality of this County and ensure the on-site sewage disposal systems function properly.
- Regulations of the Washoe County District Board of Health Governing Well Construction. These regulations provide minimum requirements to be followed by any person when drilling and plugging specific kinds of wells. A well construction permit is required to drill a well for consumptive use or monitoring wells. These requirements are primarily promulgated to protect the quantity and quality of the waters of this County from waste and contamination, and to provide public protection by enforcing proper construction and plugging of wells.
- Regulations of the Washoe County District Board of Health Governing Solid Waste Management. These regulations protect water quality through the regulation of municipal solid waste landfills.

Western Regional Water Commission and the Northern Nevada Water Planning Commission

The Western Regional Water Commission (WRWC) focuses on improving water resource planning at the regional level and facilitating coordinated resource management among city of Reno, city of Sparks, Washoe County, TMWA, Truckee Meadows Water Reclamation Facility, South Truckee Meadows GID and Sun Valley GID.

The Northern Nevada Water Planning Commission (NNWPC) is a technical advisory panel that reports to the WRWC. The NNWPC develops and updates a Comprehensive Regional Water Management Plan (RWMP) and makes recommendations to the WRWC for adoption. In addition, the NNWPC develops priorities and an annual budget for the Regional Water Management Fund, also for recommendations to the WRWC.

The Comprehensive Regional Water Management Plan includes several applicable objectives:

- Objective 1.2 Provide for a Sustainable Water Supply and an Acceptable Level of Service to the Community (including protecting groundwater recharge areas).
- Objective 1.3 Implement measures to protect and enhance water quality for a sustainable water supply (including source water protection).
- Objective 2.1 Promote Efficient Use of Resources (Reduction of Non-Point Source Pollution for Truckee Meadows Wastewater Reclamation Facility (TMWRF) Pollutant Credit).
- Objective 2.2 Manage wastewater for protection and enhancement of water quality.
- Objective 3.1 Effective and integrated watershed management (protection of human health, property, water quality including storm water).

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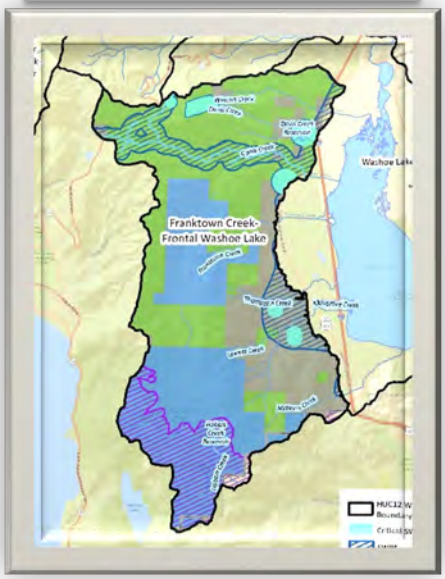
Franktown Creek – Frontal Washoe Lake

HUC-12 Watershed #160501020301 Profiles

Click here for complete HUC-12 Watersheds Map



Contents

Introduction

The Franktown Creek-Frontal Washoe Lake HUC-12 Watershed Profile is a component of the 2020 Integrated Source Water and 319(h) Watershed Protection Plan for Public Water Systems and the Truckee River in the Truckee Meadows (Plan), as well as the Watershed Management and Protection Plan for Tributaries to the Truckee River. This document is a part of the on-line watershed mapping tool.

This watershed description is intended to be a guide and resource for organizations working within the watershed, and an educational tool for those interested in learning more about the watershed in which they live. This Plan can be used to support funding for a multitude of water quality projects in the watershed. Note that only non-regulated activities are eligible for the Nevada Division of Environmental Protection Source Water Protection Program or the 319 Non-Point Source Program funding.

Summary

This profile focuses on the watershed's water quality. It includes potential and existing concerns, types of land uses, watershed management strategies and projects, the involved stakeholders, and their corresponding plans with water quality components.

The Franktown Creek-Frontal Washoe Lake HUC-12 Watershed includes the east side of the Carson Range along the mountain crest, from Tamarack Peak (9905 feet msl) past Marlette Peak (8772 feet msl). The watershed includes Little Valley and the portion of Washoe Valley west of Old US Hwy 395. There are nine perennial streams with exceptional water quality that flow toward Washoe Lake (Washoe Lake HUC-12 Watershed) from the Carson Range. This watershed is mostly forested and managed by the U.S. Forest Service (USFS) and Nevada State Parks. Development in this watershed includes the "slide side" of the Mt. Rose Ski Area and a narrow band of residential and agricultural properties in Washoe Valley.

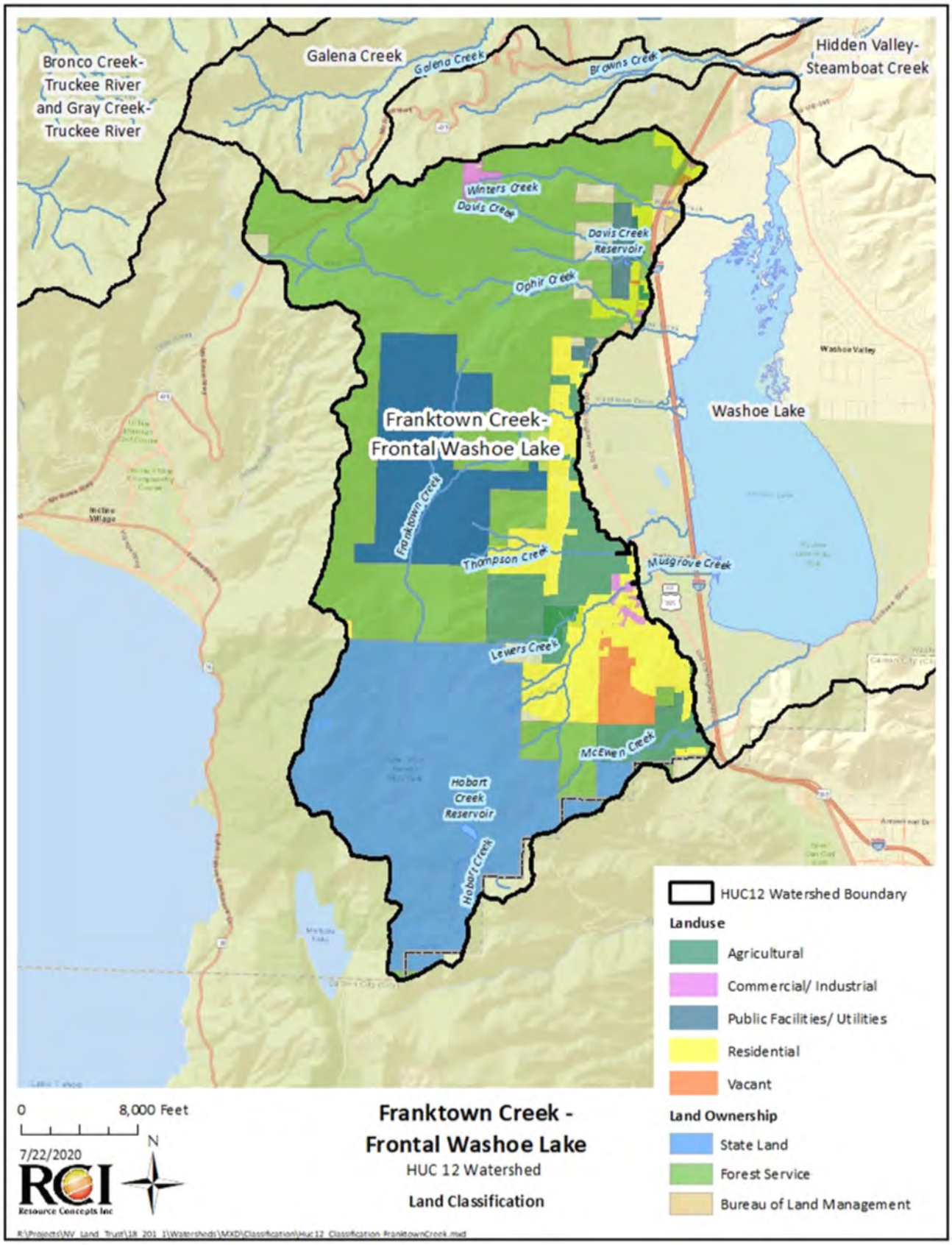
Source Water Protection Areas (SWPAs) for this watershed were developed by stakeholders to help protect drinking water sources. Surface water bodies include springs, creeks, and two small impoundments (Hobart Reservoir and Davis Lake). The watershed hosts several small public water systems. At high elevation, the Slide Mountain Ski Area has three springs, a USFS campground has one well, and the historic Marlette Lake Water System intercepts surface water that is piped to Virginia City and Carson City. In the valley, Bower's Mansion and Davis Creek Park each have one well, and Truckee Meadow Water Authority (TMWA) operates three wells for the Lightning W water system. The following table summarizes key water quality aspects in this watershed.

Watershed Summary	
Basins	• Franktown Creek-Frontal Washoe Lake HUC-12 Watershed #160501020301. • Groundwater Basin: 089 (Washoe Valley) underlies all this watershed.
Water Bodies & Water Quality	• Davis Creek and Lake, not impaired, see NAC 445A.1744. • Franktown Creek, not impaired, see NAC 445A.1728 and NAC 445A.1732. • Hobart Creek and Reservoir, not impaired, see NAC 445A.1734. • Lewers Creek, not impaired, see NAC 445A.1722. • McEwen Creek, not impaired, see NAC 445A.1722. • Musgrove Creek, not impaired, see NAC 445A.1722. • Ophir Creek, see NAC 445A.1736 and NAC 445A.1738. • Thompson Creek, not assessed. • Winters Creek, not impaired, see NAC 445A.1722.
Source Water Protection Areas	• A SWPA buffer is identified for Ophir Creek (potential as a direct drinking water supply source) and the valley floor (groundwater recharge area) that represents a precautionary indicator to safeguard the drinking water sources. • Critical SWPAs represent areas closer to perennial streams and water system wells. • The watershed uphill of the Marlette Water System has been designated a source water protection area by Carson City (2014). • 3 springs and 6 wells are managed by 5 different public water systems. • 7,000 acres, or roughly 30% of the watershed, is in a Source Water Protection Area. • 900 acres, or about 3.5% of the watershed, is in Critical Source Water Protection Area.
Special Considerations & Issues	• This watershed is relatively undeveloped and forested with streams having excellent water quality. • Little Valley Fire 2016; fire susceptibility, erosion, and invasive weed concerns. • A large undeveloped parcel, part of Little Valley, is owned by the University of Nevada, Reno.

	Type	Acres	%
Land Jurisdiction	BLM:	100	<1%
	State of Nevada:	6,200	24%
	USFS:	10,500	41%
	Washoe County Non-Federal:	5,400	21%
Land Use	Agricultural:	1,800	7%
	Industrial/Commercial:	200	1%
	Multi-Residential & Single Family:	2,600	10%
	Public Facilities/Utilities:	2,900	11%
	Vacant:	400	2%
	State of Nevada:	6,200	24%
	Federally Managed:	10,600	42%

Land uses in the watershed are summarized in the adjacent table and illustrated by the Land Classification Figure.

More than 75% of this watershed is managed as undeveloped forest by the USFS, Lake Tahoe Nevada State Park, and University of Nevada, Reno (Public Facility). Rural residential and agriculture land uses occur at a lower elevation in Washoe Valley. The water quality concerns generated are primarily associated with sediment from erosion related to risk of wildland fire. Protecting the high quality of existing and potential sources of drinking water in this watershed is a key consideration.


Bronco Creek-Truckee River and Gray Creek-Truckee River
Galena Creek
Galena Creek
Browns Creek
Hidden Valley-Steamboat Creek
Winters Creek
Davis Creek
Davis Creek Reservoir
Ophir Creek
Washoe Valley
Washoe Lake
Franktown Creek-Frontal Washoe Lake
Franktown Creek
Thompson Creek
Musgrove Creek
Lewers Creek
McEwen Creek
Hobart Creek Reservoir
Hobart Creek
HUC12 Watershed Boundary
Landuse
Agricultural
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Public Facilities/ Utilities
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Land Ownership
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Franktown Creek - Frontal Washoe Lake
HUC 12 Watershed
Land Classification

Water Quality Standards and Beneficial Uses

Water quality standards in the State of Nevada are promulgated in Nevada Administrative Code (NAC) NAC 445A.11704 through NAC 445A.2234. Standards applicable to beneficial uses are generally described under NAC 445A.122. The Nevada Division of Environmental Protection (NDEP) Bureau of Water Quality Planning Nevada 2016-2018 Water Quality Integrated Report identifies the beneficial uses and the surface water quality conditions in this watershed summarized below:

- Davis Creek and Lake fully support beneficial uses (water quality standards NAC 445A.1744).
- Franktown Creek fully supports beneficial uses (water quality standards NAC 445A.1732).
- Hobart Creek and Reservoir fully support beneficial uses (water quality standards NAC 445A.1734).
- Lewers Creek fully supports beneficial uses (water quality standards NAC 445A.1722).
- McEwen Creek fully supports beneficial uses (water quality standards NAC 445A.1722).
- Musgrove Creek fully supports beneficial uses (water quality standards NAC 445A.1722).
- Ophir Creek fully supports beneficial uses (water quality standards NAC 445A.1736 and NAC 445A.1738).
- Winters Creek fully supports beneficial uses (water quality standards NAC 445A.1722).

Ground and surface water in this watershed are both sources of drinking water for public water systems. Water quality is high, and the watershed is important for groundwater recharge.

Potential and Existing Water Quality Concerns

The primary potential and existing water quality concerns in this watershed are listed below:

- Hazardous Materials from Spills or Leaks
- Pollution from Urban Area Runoff
- Sediment from Erosion

Hazardous Materials from Spills or Leaks

Rural residential and agricultural activities may utilize aboveground storage or underground storage tanks for fuel, pesticides, or fertilizers. Leaks/spills of chemicals or fuel could potentially affect surface water and groundwater quality.

Pollution from Urban Area Runoff

Groundwater and surface quality are potentially vulnerable to runoff from residential and agricultural areas. Potential contaminants include:

- Nutrients from fertilizers
- Bacteria from animal waste
- Trash
- Pollution from household waste
- Runoff from roads and parking lots

Excessive fertilization in irrigated green areas, such as yards, fields, golf courses or parks, can be a potential source of nutrients affecting water quality. Green areas may also contribute *Escherichia coli (E. coli)* from animal waste such as from livestock, dogs, and geese. The watershed includes Bowers Mansion Regional Park near Davis Creek and the Toiyabe Golf Club. Franktown and Thompson Creek are channelized at the lower reaches into irrigation ditches for agricultural use (CDM Smith, 2017). There are some small ranching pastures where streams flow toward Washoe Lake.

Sediment from Erosion

Sediment from erosion conveys pollution, such as phosphorous, and degrades downstream water with suspended sediment. The primary causes of erosion and sedimentation in this watershed include wildland fire, noxious weeds, and drainage and landscape modifications.

High-severity wildfires alter the overall structure of the ecosystem through the removal of vegetation leaving limited ground cover. Severe fires also create a waxy, water-repellant layer over the soil which increases water and soil runoff (NDF, 2011). In 2016 the Little Valley Fire burned along the entire channel of Thompson Creek. After the fire, the creek banks and upslope were at risk of erosion and sedimentation transport (CDM Smith, 2017). Vegetation is slowly reestablishing, but it is slow to recover and therefore straw wattles were used to protect the creek banks (CDM Smith, 2017). Due to the disturbance of the fire and lack of riparian vegetation Thompson Creek has a two three-foot headcut which could create channel incision and a six eight-foot bank erosion (CDM Smith, 2017). A portion of Franktown Creek also burned.

This watershed being immersed within the Carson Range is susceptible to fire. Depending on the exposure to the fire and the steepness of the slope the severity of removal of riparian and upland vegetation can increase erosion and sedimentation transport which can cause flooding and poor turbidity downstream.

CDM Smith reports that no noxious weeds were observed during the assessments for either of the burned creeks. However, areas with bare soil could allow for establishment of weeds in the future. This is a concern, since areas invaded by noxious weeds are more susceptible to erosion and sedimentation in several ways. Noxious weeds do not have a root structure to retain soil and resist erosion due to wind or water. The fire risk is also increased because noxious weeds are more flammable than native species.

Strategies to Protect and Improve Water Quality

The water quality concerns identified in this watershed can be addressed through management strategies described in this section, the proposed projects detailed in the Project Profiles, as well as applicable on-going water quality projects and programs described under Stakeholders and Plans. These strategies pertain to the entire watershed but may be prioritized in SWPAs.

Source Water Protection Area Identification and Management

A SWPA is a management area surrounding a surface water or groundwater resource that supplies water for public consumption. Activities in these buffer areas can affect the quality of water downstream or underground. These management strategies acknowledge the value of these SWPAs to prevent future contamination of sources of drinking water.

There are three types of SWPAs in this watershed (RCI, 2020). The first type represents a precautionary indicator to safeguard surface waters and groundwater recharge areas. It encompasses the floor of Washoe Valley and a 1,000-foot buffer for Ophir Creek, which has been identified as a possible surface water source for public drinking water. The second type of buffer surrounds critical areas closer to Ophir Creek (150 feet from stream centerline) and to public water system wells (based on a 20-year time of travel for groundwater). In addition, a SWPA has been previously identified for the watershed area uphill of the Marlette Lake Water System facilities at Hobart Reservoir (Community Source Water Protection Plan for Public Water Systems in Carson City, 2014), which is operated by the State of Nevada Public Works Division and supplies drinking water to Virginia City and Carson City. These areas are illustrated on the Jurisdiction and Source Water Protection Areas Figure. The following objectives are significant in both future and on-going SWPA management:

- Inform landowners in SWPAs about their proximity to a valuable drinking water source and how they can help protect their water quality.
- Encourage coordination between Public Water Systems, landowners, and city or county planners to consider the importance of SWPAs in project reviews.
- Explore collaborative funding for water quality and watershed improvements and support the resource investigations needed to develop viable projects.
- Prioritize physical improvements in SWPAs to protect and improve source water quality.

Education and Outreach

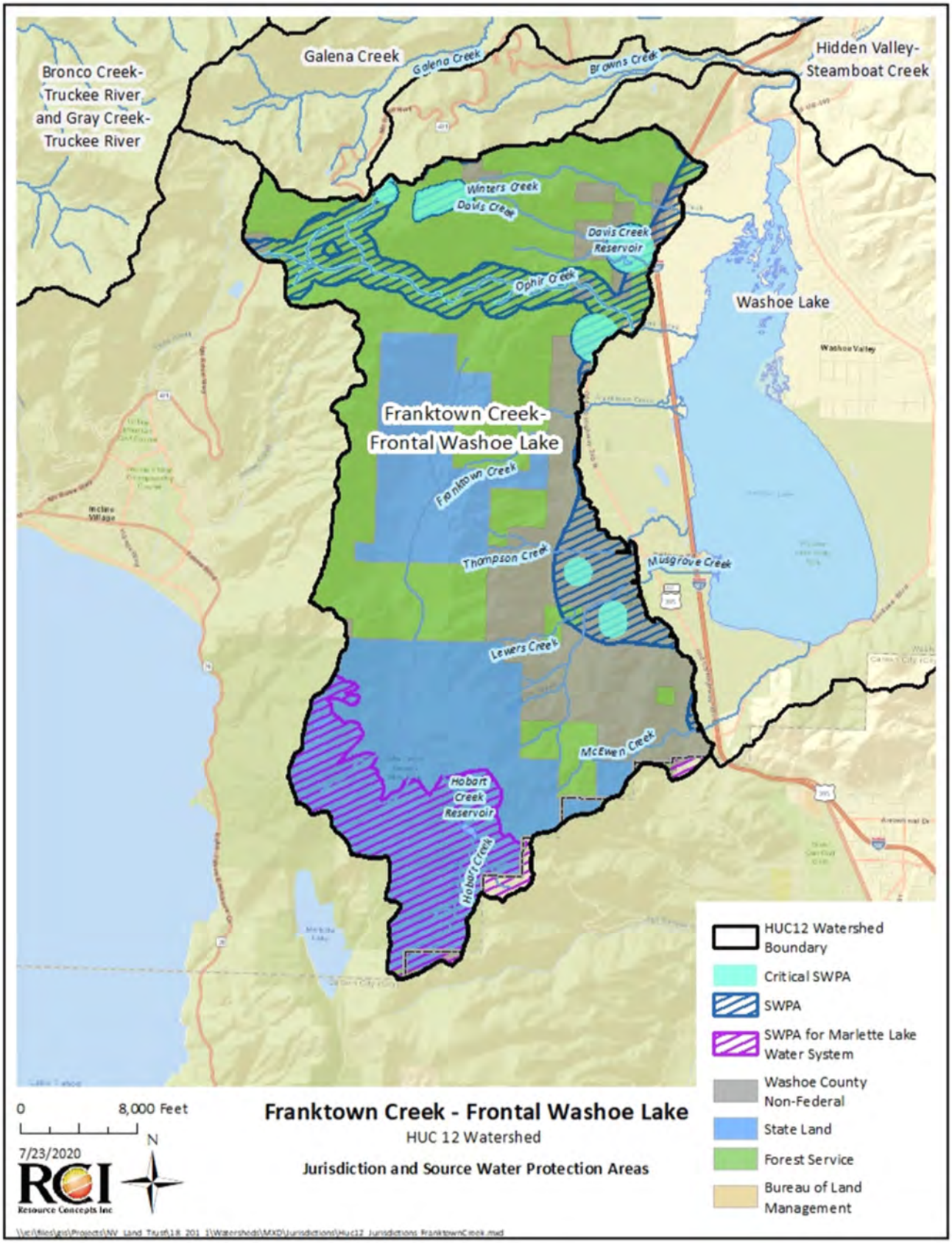
The following education and outreach objectives are intended to help effectuate positive actions to protect water quality:

- Increase knowledge of how to protect and preserve the pristine drinking water quality of this watershed.
- Increase knowledge of water quality protection and the pollution in stormwater runoff through local outreach efforts.
- Increase knowledge about household and commercial chemical use, storage, and disposal through local outreach efforts.
- Inform landowners and developers residing in critical SWPAs about the importance of avoiding contamination and their proximity to a valuable drinking water source.

Interagency Communication

The following interagency communication objectives are important tools to both reinvigorate and invest additional resources in water quality, as well as utilize existing resources and programs:

- Each agency may evaluate how to improve lines of communication within and between jurisdictions regarding water quality issues; i.e. Washoe County, TMWA, NDEP, Washoe County Health District, and the USFS.
- Collaborate with the Washoe/Storey Cooperative Weed Management Area to support their efforts in noxious weed management WSCWMA Website.


Bronco Creek-Truckee River and Gray Creek-Truckee River
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Galena Creek
Browns Creek
Hidden Valley-Steamboat Creek
Winters Creek
Davis Creek
Davis Creek Reservoir
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Franktown Creek
Thompson Creek
Musgrove Creek
Lewers Creek
McEwen Creek
Hobart Creek Reservoir
Hobart Creek
HUC12 Watershed Boundary
Critical SWPA
SWPA
SWPA for Marlette Lake Water System
Washoe County Non-Federal
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Jurisdiction and Source Water Protection Areas

Wildfire and Fuel Management

Wildland fire is a threat to water quality and coordinated fuel management on wildlands can help reduce risks to water quality. Stakeholders and partners may consider the following objectives as they pertain to wildfire and fuel management:

- Encourage development, maintenance, and implementation of the Community Wildfire Protection Plans.
- Support and collaborate with the Nevada Cohesive Strategy effort and the Shared Stewardship Agreement, the blueprint to address Nevada's wildland fire issues.
- Support for the Nevada Network of Fire Adapted Communities and their local chapters for people in high fire threat locations to fully prepare themselves, their homes, and the landscape where they reside to survive the destructive force of wildfire.
- Encourage the development of a wildland fire risk reduction and emergency recovery plans to reduce the risk of wildfire, quickly restore burned areas, and reduce the risk of catastrophic post-fire erosion and sedimentation.
- Collaborate and coordinate to treat invasive and noxious weeds pre- and post-fire to reduce risk of wildfire and watershed destabilization.

Resource Investigation and Planning

Stakeholders may consider supporting the following resource investigation and planning, which can help fill data gaps, inform implementation designs and prioritize projects:

- Development and implementation of integrated vegetation management programs.

Water Quality Best Management Practices

Stakeholders may consider supporting the following Water Quality Best Management Practices (BMPs) that may improve and prevent degradation to water quality resources:

- Water quality improvement projects.
- Invasive weed removal and integrated vegetation management for creek stabilization.
- Recommendations in the tributary assessments.
- Proper abandonment of wells.
- Physical improvements prioritized in SWPAs for water quality improvement and protection.
- Nutrient management measures for irrigated green spaces.

Proposed Implementation Projects

Proposed implementation actions are generally described under the Strategies to Protect and Improve Water Quality. Specific implementation actions have been developed into proposed projects by local stakeholders and are described in Project Profiles. These Project Profiles include the information needed, as identified in the Environmental Protection Agency (EPA) guidance for nine critical elements, for an endorsable watershed management plan. Future projects could also be brought forward to funding agencies through:

- Demonstrating advancement of the strategies identified herein for this watershed.
- Using the Project Profile format to establish consistency with the nine critical elements of an EPA endorsed plan.

As discussed in the following Stakeholders and Plans section, municipality and agency projects are also incorporated by reference.

Stakeholders and Plans

Stakeholder information and existing plans were used extensively in development of this Plan for Washoe County. These municipalities and agencies each have unique strategies and capital improvement plans that include water quality protection or improvement projects. These are updated regularly at differing timeframes (i.e. annually, every 5 years, etc.) according to their specific budgeting and planning processes. The applicable planning documents are briefly described and referenced in this section. Those projects pertaining to water quality protection and improvement in the watershed are incorporated by reference.

Project Stakeholders	
• Bureau of Land Management • USDA Forest Service • Nevada Department of Transportation • Nevada Division of Environmental Protection • Nevada Division of Forestry • Truckee Meadows Regional Planning Agency	• Truckee Meadows Storm Water Permit Coordinating Committee • Truckee Meadows Water Authority • Washoe County • Washoe County Health District • Western Regional Water Commission and the Northern Nevada Water Planning Commission

Bureau of Land Management

The Nevada Bureau of Land Management (BLM) has Resource Advisory Councils (RACs) which allow community members to be involved in natural resource planning and management issues on BLM managed public land. Washoe County is a part of the Sierra Front-Northwestern Great Basin RAC which is administered through the BLM Carson City and Winnemucca District offices. BLM Resource Advisory Councils-Nevada

The BLM also has specific Resource Management Plans that apply to this watershed. These plans generally outline the way that the BLM currently manages and intends to manage the multiple resources on their land. Within this watershed, the following plans and sections are applicable:

- Carson City Consolidated Resource Management Plan (2001):

  RIP-1: Riparian Management discusses how riparian areas on BLM land should be managed, monitored, and maintained. The desired outcome in this section is to protect and maintain existing and potential fisheries and riparian areas in good or better condition.

  SWA-1: Soils, Watershed and Air Quality describes specific techniques and goals for all watersheds within the planning area such as reducing soil loss, flood damage, and sediment damage from human activities.

  WAT-1: Water Resources discusses management for good water quality on public lands such as watershed management plans as an important administrative action.

- Carson City Fire Management Plan (2016):

  The Fire Management Plan (FMP) goal is to restore sagebrush ecosystems throughout the planning area. In doing so, the risk of wildfire and its negative effects should eventually decrease. Since wildfire is a significant issue in this watershed, management to reduce its risk is a key planning component.

USDA Forest Service

The Humboldt-Toiyabe National Forest within this watershed is managed by the Carson Ranger District. Natural resource projects, including projects undergoing NEPA documentation, are listed on the USFS website. The Humboldt National Forest and Toiyabe National Forest Biannual 2018 Monitoring Report describes the conditions of the watershed and monitoring information.

Additionally, the USFS has created Land and Resource Management Plans (LRMP) to guide management decisions within the Humboldt-Toiyabe National Forest. Water resources are outlined within the LRMP with management actions including maintenance, monitoring and enhancement of water quality:

- Humboldt National Forest Land and Resource Management Plan:

  Section IV.C.5 is Soil and Water within the Forest-Wide Standards and Guidelines. This outlines the goals for the soil and resources on USFS managed land.

  Section V.A is the Implementation Direction of the Forest Plan. This describes how the LRMP will be analyzed for its level of success.

- Toiyabe National Forest Land and Resource Management Plan:

  Section IV is the Forest Management Direction with Forest-wide Standards and Guidelines for Soil and Water as well as Riparian Areas. These sections outline the goals for the forest.

  Section V is the Implementation of the Forest Plan including the Direction of the LRMP which also outlines the goals for the forest.

Nevada Department of Transportation

The Nevada Department of Transportation (NDOT) has developed their Stormwater Management Program to reduce stormwater pollution from NDOT managed facilities and roads. The program BMPs and annual report outline the specific measures that NDOT will take to reduce stormwater pollutant discharges from its owned and operated storm drain system:

- Stormwater Management Program (2013):

  The overall goal of the NDOT Stormwater Management Program is to reduce pollution associated with stormwater from NDOT's MS4 to the maximum extent practicable, as well as to protect surface and groundwater resources within the MS4 permit area. The Stormwater Management Program addresses stormwater pollution control as it relates to the planning, design, construction, and maintenance of NDOT's highway infrastructure statewide.

- Stormwater Management Program: Annual Report (2017):

  This watershed is impacted or has the potential to be impacted by I-80, I-580, Hwy 395, and Hwy 431. The Stormwater Management Program provides a helpful planning outline on handling and mitigating pollution from the roads.

Nevada Division of Environmental Protection

The NDEP has a goal to preserve and enhance the environment of the State in order to protect public health, sustain healthy ecosystems, and contribute to a vibrant economy. The Franktown Creek-Frontal Washoe Lake HUC-12 Watershed has several challenges facing source water protection, so the NDEP is an essential stakeholder and planning partner. Specifically, there are two programs under the NDEP that were involved in the Plan in Washoe County. Both programs provide education and outreach and offer funding opportunities for water quality protection and improvement:

- Integrated Source Water Protection Program under the Safe Drinking Water Bureau:

  This program offers technical assistance for source water protection projects. The program coordinates source water protection activities at the local, state, and federal levels, and encourages community-based protection and preventive management strategies to ensure all public drinking water resources are kept safe from future contamination.

  The 2010 Nevada Integrated Source Water Protection Program guidance document details the program components as well as the requirements for a State-endorsed Community Source Water Protection Plan.

- 319 Nonpoint Source Pollution Management Program under the Bureau of Water Quality Planning:

  This Program can provide matched grant funding for projects that improve water quality.

  The 2015-2019 State of Nevada Nonpoint Source Management Plan establishes how NDEP will work with partners to address NPS pollution. The Plan formalizes Nevada's approach for protecting and improving water quality and describes the goals, short- and long-term objectives, milestones, and timeframes to guide activities, and measures for tracking success.

Nevada Division of Forestry

The Nevada Division of Forestry (NDF) is a State agency that uses a collaborative process to deliver science based natural resource management and protection to promote resilient landscapes, fire adapted communities, and safe, effective wildfire response provided by employees that embrace the core values of duty, respect, and integrity.

NDF provides professional natural resource and wildland fire management services to Nevada citizens and visitors to enhance, conserve and protect forest, rangeland, and watershed values, endangered plants, and other native flora. Protection of these resources helps to improve water quality:

- Community Wildfire Protection Plans:

  Community Wildfire Protection Plans (CWPPs) are authorized and defined in Title I of the Healthy Forests Restoration Act of 2003 (HFRA). CWPPs represent the best opportunity that communities have to address the challenges of the Wildland-Urban Interface. A CWPP helps communities define their priorities for the protection of life, property, and shared assets-at-risk from wildfires. Developing a CWPP encourages community members and leaders to have valuable discussions about wildfire preparedness, evacuation planning, and local fire district capabilities. The CWPP increases grant funding opportunities by prioritizing fuel reduction projects around and within the community.

- Nevada Wildland Fire Cohesive Strategy:

  The Nevada Fire Board Oversight Body is the custodian of the 2015 Nevada Wildland Fire Cohesive Strategy Summit's Action Plan to ensure goal achievement and identify emerging topics. This oversight body acts as an "advisory" body and is charged with taking the Nevada Cohesive Strategy Summit report and its Action Steps, ensuring that goal achievement is accomplished and monitoring emerging topics through the Nevada Fire Board. This body monitors progress, develops issue resolution, and addresses emerging issues such as protecting water quality.

Truckee Meadows Regional Planning Agency

The Truckee Meadows Regional Planning Agency (TMRPA) fosters coordination among Reno, Sparks and Washoe County. TMRPA facilitates land-use, infrastructure provision and resource management conversations among public and private decision makers. The agency also serves as a collaborative information and data warehouse, coordinating regional data collection and delivering advanced geospatial analytics for regional solutions. TMRPA includes a Regional Planning Governing Board and a Regional Planning Commission.

The TMRPA Regional Plan (2012 as amended) provides goals and policies for multiple plans and programs, including those with watershed related and well head protection components. The plan was revised in 2019-2020 and is considered a living document that will evolve over time.

Truckee Meadows Storm Water Permit Coordinating Committee

The Truckee Meadows Storm Water Permit Coordinating Committee (Storm Water Committee) is responsible for implementing the Truckee Meadows Storm Water Management Program to protect the water quality of the region's waterways, streams, and the Truckee River. The Storm Water Committee continues to guide the development of numerous plans and assessments relevant to source water and watershed protection as summarized below.

Ordinance and Guidance Changes for Construction and Post-Construction Programs

The Storm Water Committee updated and joined the Structural Controls Design Manual and the Low Impact Development Manual, as well as updated the Truckee Meadows Construction Site BMP Handbook. These documents are referenced in the code for the city of Reno, city of Sparks, and Washoe County.

Watershed Assessments

Watershed assessment reports prepared for the Storm Water Committee were completed by Jesch et al. from 2002-2011 that include the Franktown Creek-Frontal Washoe Lake. These reports provide general watershed descriptions and can be used to track historical changes in creek condition and water quality over time. The reports do not include water quality data.

Hillside Design completed a comprehensive Watershed Assessment for Tributaries to the Truckee River in 2012 for these tributaries in this watershed: Franktown Creek-Frontal Washoe Lake.

The assessment included:

- Stream reach descriptions with numerous photo points,
- Proper Functioning Condition rating,
- List of restoration and management efforts needed to improve stream conditions, and
- Water chemistry for temperature, pH, specific conductivity, dissolved oxygen, turbidity, and flow.

CDM Smith was contracted in 2015 through 2017 to conduct watershed assessments. The following table lists the report year and the respective drainages and reaches that were assessed in this watershed:

Stream Reaches Addressed in Watershed Assessment Reports in the Franktown Creek-Frontal Washoe Lake HUC-12 Watershed by Report Year

Stream Name	Upper Reach		
	2015	2016	2017
Franktown			X
Thompson			X

Watershed Management and Protection Plan for Tributaries to the Truckee River

The Watershed Management and Protection Plan for Tributaries to the Truckee River (NCE, 2020) is an update to the 2003 Watershed Management and Protection Plan for Tributaries to the Truckee River, which has been implemented for more than 15 years by the regional MS4 through the Storm Water Committee. The 2003 plan described an approach for on-going watershed assessment studies and monitoring to protect and improve the water quality in the stream corridors and drainages tributary to the Truckee River. The 2020 plan update provides a process and framework for identifying, developing, and implementing projects originated through the Storm Water Committee that is consistent with the guidelines for an EPA approved Watershed Management Plan. The 2020 plan by NCE and the 2020 Integrated Source Water and 319(h) Watershed Protection Plan for Public Water Systems and the Truckee River in the Truckee Meadows, are mutually complementary and work together to address the broad scope of potential strategies to improve drinking water and surface water quality in Washoe County.

Truckee Meadows Watershed Protection Manual

This manual contains a Summary of the Watershed Protection Activities and Programs Developed in Conjunction with the Watershed Management Facilitator Scope of Work (Kennedy/Jenks, 2005). This document provides a reference and compendium of the various watershed protection activities and programs that were developed in 2004 and 2005 for Reno, Sparks and Washoe County.

Truckee Meadows Water Authority

TMWA is responsible for almost all municipal water delivery in the greater Reno-Sparks area. TMWA also owns and operates the municipal wells in this watershed. The following program and plans guide the management of these water resources:

- TMWA Water Resources Plan (2016-2035):

  This plan describes water quality issues and goals for the water resources managed by TMWA. Special focus is placed on changes in future water supply and demand and how those changes will impact the region's water resources. Additionally, this plan provides useful Truckee River watershed information.

- Source Water Quality Assurance Program (2016-2035):

  TMWA's objective is to deliver high-quality potable water to its customers in a cost-effective manner. To achieve this objective, TMWA has established a water quality assurance program. The components that make up the program are source water quality protection, potable water treatment, maintenance of distribution system water quality, and cross connection control.

- Wellhead Protection Plan (2016):

  The purpose of the Wellhead Protection Plan is to protect groundwater that serves as a source for public drinking water supplies. This plan is intended to be a tool used by TMWA to assist in protecting drinking water sources.

Washoe County

Activities in Washoe County are reviewed according to the Master Plan Planning Areas. The Truckee River watershed includes nine planning areas. The Franktown Creek-Frontal Washoe Lake HUC-12 Watershed is included in two planning areas: Forest and South Valleys. The County has Citizens Advisory Boards (CABs) which provide important community perspectives on local issues to the Washoe County Board of Commissioners. This watershed is completely within the South Truckee Meadows Washoe Valley CAB (CAB Boundaries).

The Washoe County Master Plan (2008) has Goals and Policies for Public Services and Facilities, and Open Space and Natural Resource Management. Applicable sections include:

- Article 418, Significant Hydrologic Resources, which regulates development activity within and adjacent to perennial streams to ensure that these resources are protected and enhanced. (Note: this does not apply to the Truckee River)
- Article 420, Storm Drainage Standards, sets forth standards for ensuring that both private and public development provides adequate protection for citizens and property. Therefore, it minimizes and controls erosion and pollution impacts on the natural environment, and additionally minimizes maintenance costs for drainage and flood control systems.
- Article 421, the Storm Water Discharge Program, which protects and enhances the water quality of watercourses, water bodies, groundwater, and wetlands in a manner pursuant to and consistent with the Clean Water Act.
- Article 810, Special Use Permits, which provides a method of reviewing certain uses to determine if they have the potential to adversely affect public facilities in the vicinity.

Washoe County also provides comprehensive services for construction and maintenance roads, landscaping, and drainage facilities; county-wide planning and code compliance; and emergency response services for fire and hazardous materials. All these roles contribute to preserving and improving water quality in the watershed.

Washoe County Health District

The Washoe County Health District has regulatory authority over a wide variety of programs and services in the Truckee Meadows including underground storage tanks, septic systems, all public water systems, domestic wells, water projects and community development, grading permits, solid waste management and emergency preparedness. The Washoe County Health District regulations are provided in several documents as listed below:

- Regulations of the Washoe County District Board of Health Governing Sewage, Wastewater and Sanitation. These regulations provide the minimum requirements to be followed by any person developing property served by an on-site sewage disposal system. These requirements are promulgated to prevent the spread of disease, protect the water quality of this County and ensure the on-site sewage disposal systems function properly.
- Regulations of the Washoe County District Board of Health Governing Well Construction. These regulations provide minimum requirements to be followed by any person when drilling and plugging specific kinds of wells. A well construction permit is required to drill a well for consumptive use or monitoring wells. These requirements are primarily promulgated to protect the quantity and quality of the waters of this County from waste and contamination, and to provide public protection by enforcing proper construction and plugging of wells.
- Regulations of the Washoe County District Board of Health Governing Solid Waste Management. These regulations protect water quality through the regulation of municipal solid waste landfills.

Western Regional Water Commission and the Northern Nevada Water Planning Commission

The Western Regional Water Commission (WRWC) focuses on improving water resource planning at the regional level and facilitating coordinated resource management among city of Reno, city of Sparks, Washoe County, TMWA, Truckee Meadows Water Reclamation Facility, South Truckee Meadows GID and Sun Valley GID.

The Northern Nevada Water Planning Commission (NNWPC) is a technical advisory panel that reports to the WRWC. The NNWPC develops and updates a Comprehensive Regional Water Management Plan (RWMP) and makes recommendations to the WRWC for adoption. In addition, the NNWPC develops priorities and an annual budget for the Regional Water Management Fund, also for recommendations to the WRWC.

The Comprehensive Regional Water Management Plan includes several applicable objectives:

- Objective 1.2 Provide for a Sustainable Water Supply and an Acceptable Level of Service to the Community (including protecting groundwater recharge areas).
- Objective 1.3 Implement measures to protect and enhance water quality for a sustainable water supply (including source water protection).
- Objective 2.1 Promote Efficient Use of Resources (Reduction of Non-Point Source Pollution for TMWRF Pollutant Credit).
- Objective 2.2 Manage wastewater for protection and enhancement of water quality.
- Objective 3.1 Effective and integrated watershed management (protection of human health, property, water quality including storm water).

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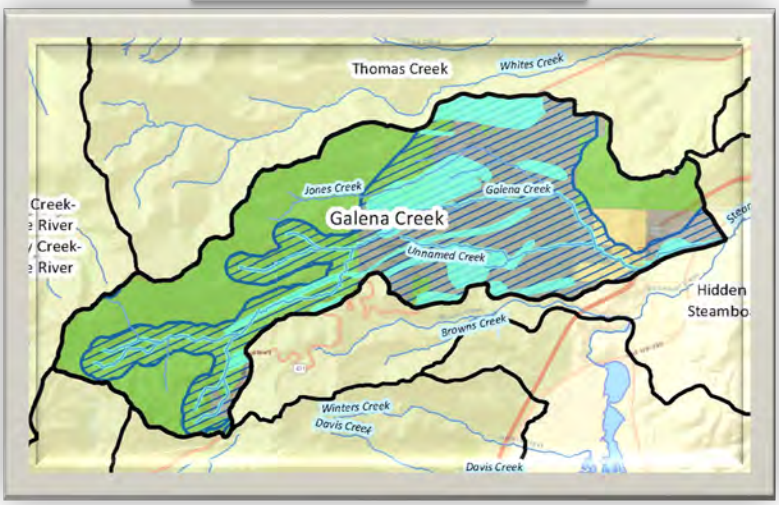
Galena Creek

HUC-12 Watershed #160501020303 Profile

Click here for complete HUC-12 Watersheds Map



Contents

Introduction

The Galena Creek HUC-12 Watershed profile is a component of the 2020 Integrated Source Water and 319(h) Watershed Protection Plan for Public Water Systems and the Truckee River in the Truckee Meadows (Plan) as well as the Watershed Management and Protection Plan for Tributaries to the Truckee River. This document is a part of the on-line watershed mapping tool.

This watershed description is intended to be a guide and resource for organizations working within the watershed and an educational tool for those interested in learning more about the watershed in which they live. This Plan can be used to support funding for a multitude of water quality projects in the watershed. Note that only non-regulated activities are eligible for the Nevada Division of Environmental Protection Source Water Protection Program or the 319 Non-Point Source Program funding.

Summary

This profile focuses on the watershed's water quality. It includes potential and existing concerns, types of land uses, watershed management strategies and projects, and the involved stakeholders and their corresponding plans with water quality components.

The Galena Creek HUC-12 Watershed reaches up to Mt. Rose summit at 10,775 feet in elevation in the west and extends down to Steamboat Creek in the east. There is moderate urban development near the middle of the watershed including residential and commercial, a golf course, and park. This is a uniquely small watershed, about 12,290 acres, with excellent water quality due to its close proximity to the Carson Range (NDF, 2011).

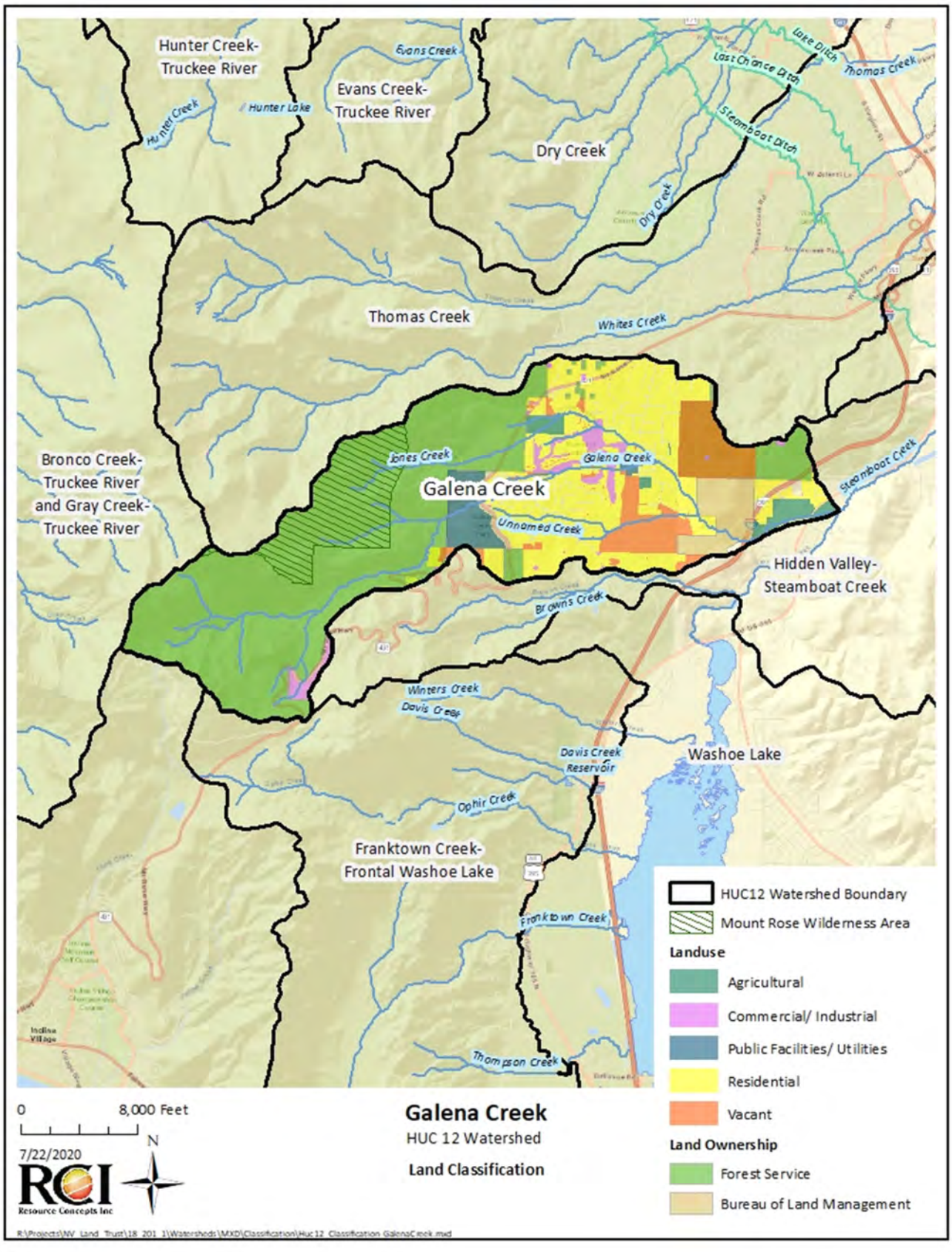
Source Water Protection Areas (SWPAs) for this watershed were developed by stakeholders to help protect drinking water sources. This watershed is an important area for groundwater recharge and hosts 15 public water system wells, and as a result, more than half of this watershed is in a SWPA. There are three perennial creeks in this watershed, Galena, Jones, and an unnamed creek south of Galena. The following table summarizes key water quality aspects of this watershed.

Watersheds Summary	
Basins	• Galena Creek HUC-12 Watershed #160501020303. • Groundwater Basin: 088 (Pleasant Valley West) underlies all of this watershed.
Water Bodies & Water Quality	• Galena Creek, impaired for pH in middle segment, see NAC 445A.1746, NAC 445A.1748, and NAC 445A.1752. • Jones Creek, not assessed. • An unnamed creek south of Galena, not assessed.
Source Water Protection Areas	• A SWPA follows along the Sierra Front with buffers along perennial streams. It represents a precautionary indicator to safeguard drinking water sources. • Critical SWPAs represent areas closer to perennial streams and water system wells. • 15 public water system wells managed by one public water system. • 7,800 total acres, or roughly 63% of the watershed is in a Source Water Protection Area. • 2,000 total acres, or about 16% of the watershed is in a Critical Source Water Protection Area.
Special Considerations & Issues	• The upper half of the watershed is undeveloped and forested while the lower is moderately urbanized. • 2012 Washoe Fire: fire susceptibility, erosion and invasive weed concerns. • Invasive noxious weeds. • Galena and Jones Creek exhibit stream alteration and channelization. • Residential community septic systems have potential for nitrate leaching. • Major transportation crossings: Hwy 395 and Mt. Rose Highway. • A portion of the upper watershed is in the Mt. Rose Wilderness and therefore access is limited.

	Type	Acres	%
Land Jurisdiction	BLM:	440	4%
	USFS:	6,900	56%
	Washoe County Non-Federal:	4,960	40%
Land Use	Agricultural:	250	2%
	Industrial/Commercial:	330	3%
	Residential:	3,140	25%
	Public Facilities/Utilities:	365	3%
	Vacant:	1,015	8%
	State of Nevada:	15	<1%
	Federally Managed:	7,340	60%

Land uses and jurisdictions in the watershed are summarized in the adjacent table and illustrated by the Land Classification Figure.

More than half of this watershed is in federally managed national forest. Residential land uses dominate activities at lower elevations. The potential and existing water quality concerns from these activities are primarily sediment from erosion due to wildfire and potential nitrate contamination in groundwater.


Hunter Creek-
Truckee River
Evans Creek-
Truckee River
Dry Creek
Thomas Creek
Bronco Creek-
Truckee River
and Gray Creek-
Truckee River
Galena Creek
Hidden Valley-
Steamboat Creek
Washoe Lake
Franktown Creek-
Frontal Washoe Lake
Hunter Creek
Hunter Lake
Evans Creek
Lake Ditch
Last Chance Ditch
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Steamboat Ditch
Dry Creek
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Browns Creek
Winters Creek
Davis Creek
Davis Creek Reservoir
Ophir Creek
Franktown Creek
Thompson Creek
Incline Village
HUC12 Watershed Boundary
Mount Rose Wilderness Area
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Public Facilities/ Utilities
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Water Quality Standards and Beneficial Uses

Water quality standards for surface water in the state of Nevada are established by Nevada Administrative Code (NAC) NAC 445A.11704 through NAC 445A.2234. Standards applicable to beneficial uses are generally described under NAC 445A.122. The Nevada Division of Environmental Protection (NDEP) Bureau of Water Quality Planning Nevada 2016-2018 Water Quality Integrated Report identifies the beneficial uses and the surface water quality conditions in this watershed, as summarized below:

- The middle section of Galena Creek is impaired for support of aquatic life due to pH (water quality standards NAC 445A.1748). The upper and lower sections of Galena Creek are not impaired (water quality standards NAC 445A.1746 and 1752).
- Jones Creek and the unnamed creek are not assessed.

Groundwater and surface water are both important sources of drinking water for public water systems in this watershed. There are no known groundwater or surface water contaminants within the watershed.

Potential and Existing Water Quality Concerns

The primary potential and existing water quality concerns in this watershed are listed below and described in the following paragraphs:

- Hazardous Materials from Spills or Leaks
- Pollution from Urban Area Runoff
- Sediment from Erosion
- Nitrate from Individual Sewage Disposal Systems

Hazardous Materials from Spills or Leaks

Both Interstate 580 (I-580) and Mt. Rose Hwy pass through this watershed. Chemicals and materials commonly found moving along these transportation route corridors have the potential for accidental spills and leaks.

The U.S. Department of Transportation accumulated a list of commonly transported hazardous materials within the Truckee River watershed (WRWC, 2017). These include:

- Ammonia perchlorate
- Anhydrous ammonia
- Chlorine
- Cyanide
- Hydrochloric acid
- Hydrogen sulfide
- Nitro cellulose (wet)
- Propane
- Petroleum naphtha
- Phosphoric acid
- White phosphorous
- Propargyl alcohol
- Sulfuric acid
- Sodium hydroxide

Pollution from Urban Area Runoff

Groundwater and surface water may be vulnerable to polluted runoff in urban areas. Potential contaminants include:

- nutrients from fertilizers
- bacteria from animal waste
- trash
- pollution from household waste
- runoff from roads and parking lots

Excessive fertilization in irrigated green areas such as yards, fields, golf courses or parks are potential sources of nutrients from fertilizers. These areas may also contribute *Escherichia coli* (*E. coli)* from animal waste such as from horses, dogs and geese. Green areas located in this watershed include residential landscaping and the Montreux Golf Club.

Nitrate from Individual Sewage Disposal Systems

Individual Sewage Disposal Systems, or septic systems, are associated with nitrate contamination of groundwater if there are large numbers concentrated in a small area, for example neighborhoods with lot sizes less than one-acre, or if they are not maintained properly (WRWC, 2017). There are 1,186 predominantly residential parcels with septic systems in this watershed. These developed areas are along the mid to lower reaches of Galena and Jones Creeks, on the Mount Rose alluvial fan, a recharge area and critical source water protection area for drinking water wells. Preliminary sampling has shown some indication of elevated nitrate in groundwater in the Mount Rose area (WRWC, 2017).

Sediment from Erosion

Sediment from erosion conveys pollution and degrades downstream water with suspended sediment. The primary causes of erosion and sedimentation in this watershed include wildland fire, noxious weeds, and drainage and landscape modifications.

High-severity wildfires alter the overall structure of the ecosystem through the removal of vegetation leaving limited ground cover. Severe fires also create a waxy, water-repellant layer over the soil which increases water and soil runoff (NDF, 2011).

Upper reaches of the Galena Creek HUC-12 watershed are within the Humboldt-Toiyabe and Mount Rose Wilderness forested areas. The portion of the watershed near the housing developments in the wildland urban interface is at risk from wildland fire.

The lower reach of the watershed burned in the 2012 Washoe Fire. In order to stabilize the creek, the Nevada Land Conservancy installed sediment logs, willow wattles and stakes (CDM Smith, 2016). No long-term impacts have been noted, but future fires could re-damage the watershed. Buffer strips and riparian vegetation alongside creeks can help limit sediment transport and stabilize nutrients in the riparian areas (Water Research Foundation, 2013).

Areas invaded by noxious weeds are more susceptible to erosion and sedimentation in several ways. Noxious weeds do not have a root structure to retain soil and resist erosion due to wind or water. The fire risk is also increased because noxious weeds are more flammable than native species. Noxious weeds near drainages are common in this watershed. There are moderate noxious weed populations in the middle and lower reaches of Galena and Jones Creeks. Specific infestations around Galena Creek include cheatgrass, tall whitetop and water hemlock. Musk thistle grows along Jones Creek and if not managed will outcompete desirable riparian vegetation (CDM Smith, 2016).

Drainages are often modified, such as straightened, diverted or combined, to accommodate development. Much of the drainage modifications are designed to reduce the flood hazard on the adjacent areas. However, they result in higher water velocities which lead to headcuts, other bed and bank erosion, and downstream sedimentation. Galena Creek passes under the Mt. Rose Hwy through a degraded culvert that is often clogged by debris and could soon be rendered dysfunctional (CDM Smith, 2017).

Galena Creek also flows under Hwy 395 where it is channelized and there is severe bank incision and erosion downstream of the channelization. Galena Creek has also experienced high stream flows that have undercut the bridge walls (CDM Smith 2016). Both Galena and Jones Creeks suffer from bank erosion issues particularly at their confluence where they are disconnected from the natural floodplain (CDM Smith, 2015).

Areas that are disturbed during construction projects can represent a potential risk of erosion and downstream sedimentation. Protection of stormwater runoff from contamination by construction in the Truckee Meadows is regulated under the regional stormwater management plan (Truckee Meadows MS4). There are many Best Management Practice (BMP) resources available to construction projects to help keep soil on-site and to reduce runoff.

Strategies to Protect and Improve Water Quality

The water quality concerns identified in this watershed can be addressed through management strategies described in this section, the proposed projects detailed in the Project Profiles, as well as applicable on-going water quality projects and programs described under Stakeholders and Plans. These strategies pertain to the entire watershed but may be prioritized in SWPAs.

Source Water Protection Area Identification and Management

A SWPA is a management area surrounding a surface water or groundwater resource that supplies water for public consumption. Activities in these buffer areas can affect the quality of water downstream or underground. These management strategies acknowledge the value of these SWPAs to prevent future contamination of our sources of drinking water.

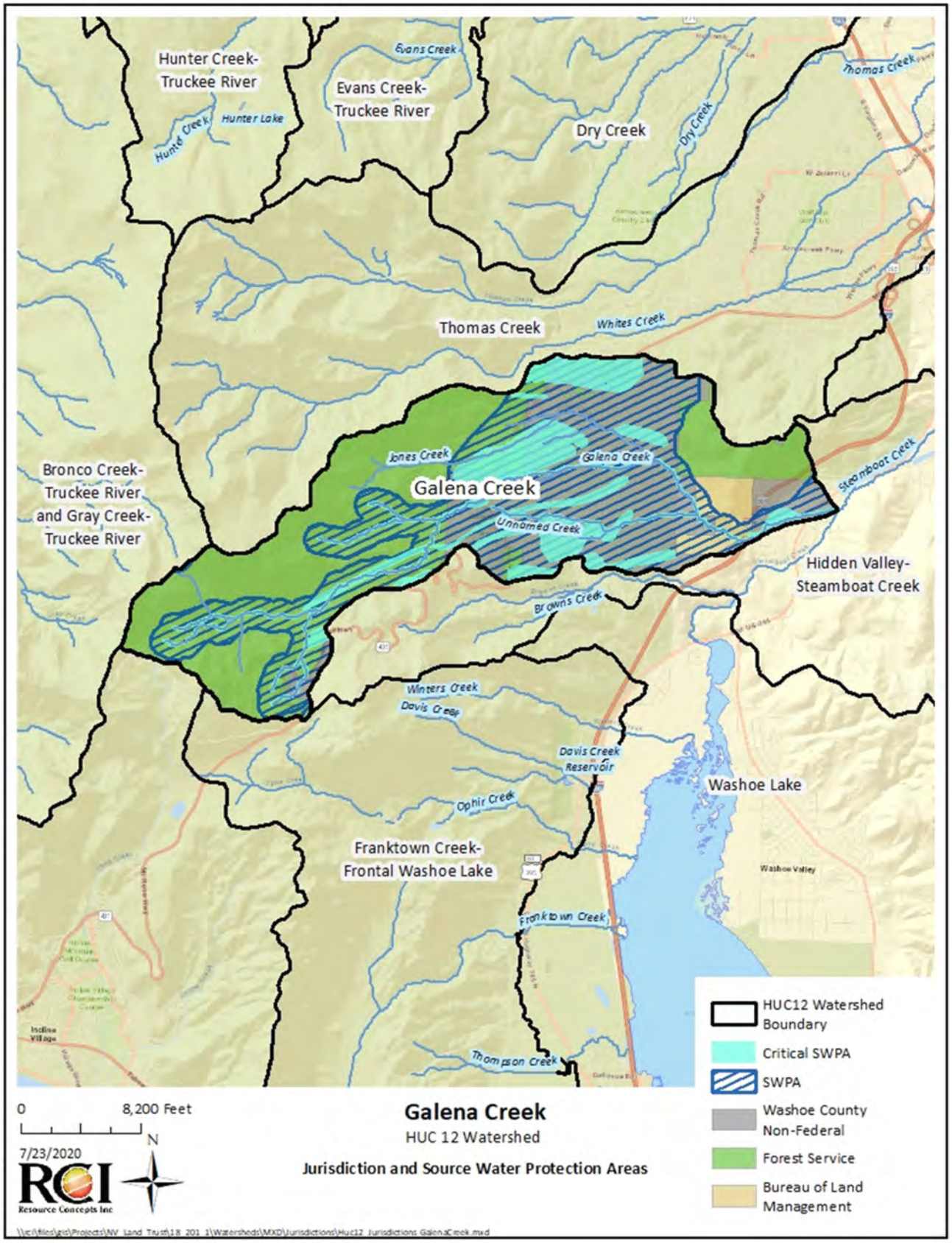
There are two types of buffers in this watershed (RCI, 2020). One provides a cautionary buffer along the Sierra Front, which includes a similar 1,000-foot buffer around each of the perennial tributaries. There are also smaller buffers surrounding high sensitivity areas, or Critical Source Water Protection Areas which include 150 feet on each side of perennial tributaries and the land surface surrounding the 20-year capture zones for water system wells. These areas are illustrated on the Jurisdiction and Source Water Protection Areas Figure. The following objectives are significant in both future and on-going SWPA management:

- Inform landowners in SWPAs about their proximity to a valuable drinking water source and how they can help protect their water quality.
- Encourage coordination between Public Water Systems, landowners, and City or County planners to consider the importance of SWPAs in project reviews.
- Explore collaborative funding for water quality and watershed improvements and support the resource investigations needed to develop viable projects.
- Prioritize physical improvements in SWPAs to protect and improve source water quality.

Education and Outreach

Education and outreach management strategies can be used to help effectuate positive actions to protect water quality:

- Continue to work with Homeowner Associations regarding source water pollution prevention measures.
- Continue to support the Truckee Meadows Storm Water Permit Coordinating Committee (Storm Water Committee) outreach and education programs.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Truckee River
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Galena Creek
Jones Creek
Galena Creek
Unnamed Creek
Steamboat Creek
Hidden Valley-
Steamboat Creek
Browns Creek
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Galena Creek
HUC 12 Watershed
Jurisdiction and Source Water Protection Areas
HUC12 Watershed Boundary
Critical SWPA
SWPA
Washoe County Non-Federal
Forest Service
Bureau of Land Management

- Increase knowledge of water quality protection and the pollution in stormwater runoff through local outreach efforts.
- Increase knowledge about household and commercial chemical use, storage and disposal through local outreach efforts.
- Inform landowners and developers residing in critical SWPAs about the importance of avoiding contamination and their proximity to a valuable drinking water source.

Interagency Communication

The following interagency communication objectives are important tools to both reinvigorate and invest additional resources in water quality, as well as utilize existing resources and programs:

- Each agency may evaluate how to improve lines of communication within and between jurisdictions regarding water quality issues; i.e. city of Reno, city of Sparks, Washoe County, Truckee Meadows Water Authority (TMWA), NDEP, Washoe County Health District, Forest Service, Bureau of Land Management (BLM), and Reno-Sparks Indian Colony.
- Continue to increase coordination and communication between the appropriate agencies regarding spills and corrective actions along I-80, Hwy 395, I-580, Hwy 431, the railroad, and the Airport.
- Evaluate how to collaborate with stakeholders such as TMWA and the Storm Water Committee on incorporating drinking water protection into community outreach and education strategies.
- Collaborate with the Washoe/Storey Cooperative Weed Management Area to support their efforts in noxious weed management (WSCWMA Website).

Wildfire and Fuel Management

Wildland fire is a threat to water quality and coordinated fuel management on wildlands can help reduce risks to water quality. Stakeholders and partners may consider the following objectives as they pertain to wildfire and fuel management:

- Encourage development, maintenance, and implementation of Community Wildfire Protection Plans.
- Support and collaborate with the Nevada Cohesive Strategy effort and the Shared Stewardship Agreement, the blueprint to address Nevada's wildland fire issues.
- Support for the Nevada Network of Fire Adapted Communities and their local chapters for people in high fire threat locations to fully prepare themselves, their homes, and the landscape where they reside to survive the destructive force of wildfire.
- Encourage the development of wildland fire risk reduction and emergency recovery plans to reduce the risk of wildfire, quickly restore burned areas, and reduce the risk of catastrophic post-fire erosion and sedimentation.
- Collaborate and coordinate to treat invasive and noxious weeds pre- and post-fire to reduce risk of wildfire and watershed destabilization.

Resource Investigation and Planning

Stakeholders may consider supporting the following resource investigations and planning, which can help fill data gaps, inform implementation designs and prioritize projects:

- Efforts to increase the quantity and quality of groundwater recharge.
- Consider expanding groundwater quality monitoring.
- Research how to identify private wells that present a groundwater contamination risk and that might need to be repaired or abandoned.

Water Quality Best Management Practices

Stakeholders may consider supporting the following Water Quality BMPs, that may improve and prevent degradation to water quality resources:

- Erosion reduction and sediment control measures.
- Invasive and noxious weed removal and integrated vegetation management.
- Recommendations in the tributary assessments.
- Pet waste cleanup initiatives.
- Proper abandonment of unused/orphaned wells.
- Physical improvements prioritized in SWPAs for water quality improvement and protection.
- Nutrient management plans for irrigated green spaces.

Proposed Implementation Projects

Proposed implementation actions are generally described under the Strategies to Protect and Improve Water Quality. Specific implementation actions have been developed into proposed projects by local stakeholders and are described in Project Profiles. These Project Profiles include the information needed, as identified in the Environmental Protection Agency (EPA) guidance for nine critical elements, for an endorsable watershed management plan. Future projects that fall within the strategies identified

for this watershed should be brought forward and incorporated into this Source Water and Watershed Protection Plan using the Project Profile format. As discussed in the Stakeholders and Plans section above, municipality and agency projects are also incorporated by reference.

Stakeholders and Plans

Stakeholder information and existing plans were used extensively in development of the Plan for Washoe County. These municipalities and agencies each have unique strategies and capital improvement plans that include water quality protection or improvement projects. These are updated regularly at differing timeframes (i.e. annually, every five years, etc.) according to their specific budgeting and planning processes. The applicable planning documents are briefly described and referenced in this section. Those projects pertaining to water quality protection and improvement in the watershed are incorporated by reference.

Project Stakeholders	
• Bureau of Land Management • USDA Forest Service • Nevada Department of Transportation • Nevada Division of Environmental Protection • Truckee Meadows Regional Planning Agency	• Truckee Meadows Storm Water Permit Coordinating Committee • Truckee Meadows Water Authority • Truckee River Fund • Washoe County • Western Regional Water Commission and the Northern Nevada Water Planning Commission

Bureau of Land Management

The Nevada BLM has Resource Advisory Councils (RACs) which allow community members to be involved in natural resource planning and management issues on BLM managed public land. Washoe County is a part of the Sierra Front-Northwestern Great Basin RAC which is administered through the BLM-Carson City and Winnemucca District offices. BLM Resource Advisory Councils-Nevada

The BLM also has specific Resource Management Plans (RMPs), that apply to this watershed. These plans generally outline the way that the BLM currently manages and intends to manage the multiple resources on public land. Within this watershed, the following plans and sections are applicable:

- Carson City Consolidated Resource Management Plan (2001):

  RIP-1: Riparian Management discusses how riparian areas on BLM land should be managed, monitored, and maintained. The desired outcome in this section is to protect and maintain existing and potential fisheries and riparian areas in good or better condition.

  SWA-1: Soils, Watershed and Air Quality describes specific techniques and goals for all watersheds within the planning area such as reducing soil loss, flood damage, and sediment damage from human activities.

  WAT-1: Water Resources discusses management for good water quality on public lands such as watershed management plans as an important administrative action.

- Carson City Fire Management Plan (2016):

  The Fire Management Plan (FMP) goal is to restore sagebrush ecosystems throughout the planning area. In doing so, the risk of wildfire and its negative effects should eventually decrease. Since wildfire is a significant issue in this watershed, management to reduce its risk is a key planning component.

USDA Forest Service

The Humboldt-Toiyabe National Forest within this watershed is managed by the Carson Ranger District. Natural resource projects, including projects undergoing NEPA documentation, are listed on the Forest Service website. The Humboldt National Forest and Toiyabe National Forest Biannual 2018 Monitoring Report describes the conditions of the watershed and present monitoring information.

Additionally, the Forest Service has created Land and Resource Management Plans (LRMP) to guide management decisions within the Humboldt-Toiyabe National Forest. Water resources are outlined in the LRMP along with management actions including maintenance, monitoring and enhancement of water quality:

- Humboldt National Forest Land and Resource Management Plan:

  Section IV.C.5 is “Soil and Water within the Forest-Wide Standards and Guidelines.” This outlines the goals for the soil and resources on Forest Service managed land.

Section V.A is the "Implementation Direction of the Forest Plan." This describes how the LRMP will be analyzed for its level of success.

- Toiyabe National Forest Land and Resource Management Plan:

  Section IV is the "Forest Management Direction with Forest-wide Standards and Guidelines" for soil and water as well as riparian areas. These sections outline the goals for the forest.

  Section V is the "Implementation of the Forest Plan" including the direction of the LRMP which also outlines the goals for the Forest.

Nevada Department of Transportation

The Nevada Department of Transportation (NDOT) has developed their Stormwater Management Program to reduce stormwater pollution from NDOT managed facilities and roads. The program BMPs and annual report outline the specific measures that NDOT will take to reduce stormwater pollutant discharges from its owned and operated storm drain system:

- Stormwater Management Program (2013):

  The overall goal of the NDOT Stormwater Management Program is to reduce pollution associated with stormwater from NDOT's MS4 to the maximum extent practicable, as well as to protect surface and groundwater resources within the MS4 permit area. The Stormwater Management Program addresses stormwater pollution control as it relates to the planning, design, construction, and maintenance of NDOT's highway infrastructure statewide.

- Stormwater Management Program: Annual Report (2017):

  This watershed is impacted or has the potential to be impacted by Hwy 395 and Mt. Rose Hwy. The Stormwater Management Program provides a helpful planning outline on handling and mitigating pollution from the roads.

Nevada Division of Environmental Protection

The NDEP has a goal to preserve and enhance the environment of the State in order to protect public health, sustain healthy ecosystems, and contribute to a vibrant economy. The Galena Creek HUC-12 Watershed has several challenges facing source water protection, so the NDEP is an essential stakeholder and planning partner. Specifically, there are two programs under the NDEP that were involved in the Plan in Washoe County. Both programs provide education and outreach and offer funding opportunities for water quality protection and improvement:

- Integrated Source Water Protection Program under the Safe Drinking Water Bureau:

  This program offers technical assistance for source water protection projects. The program coordinates source water protection activities at the local, state, and federal levels, and encourages community-based protection and preventive management strategies to ensure all public drinking water resources are kept safe from future contamination.

  The 2010 Nevada Integrated Source Water Protection Program guidance document details the program components as well as the requirements for a State-endorsed Community Source Water Protection Plan.

- 319 Nonpoint Source Pollution Management Program under the Bureau of Water Quality Planning:

  This Program can provide matched grant funding for projects that improve water quality.

  The 2015-2019 State of Nevada Nonpoint Source Management Plan establishes how NDEP will work with partners to address NPS pollution. The Plan formalizes Nevada's approach for protecting and improving water quality and describes the goals, short- and long-term objectives, milestones and timeframes to guide activities, and measures for tracking success.

Truckee Meadows Regional Planning Agency

The Truckee Meadows Regional Planning Agency (TMRPA) fosters coordination among Reno, Sparks and Washoe County. TMRPA facilitates land-use, infrastructure provision and resource management conversations among public and private decision makers. The agency also serves as a collaborative information and data warehouse, coordinating regional data collection and delivering advanced geospatial analytics for regional solutions. TMRPA includes a Regional Planning Governing Board and a Regional Planning Commission.

The TMRPA Regional Plan (2012 as amended) provides goals and policies for multiple plans and programs, including those with watershed related and well head protection components. The plan was revised in 2019-2020 and is considered a living document that will evolve over time.

Truckee Meadows Storm Water Permit Coordinating Committee

The Storm Water Committee is responsible for implementing the Truckee Meadows Storm Water Management Program to protect the water quality of the region's waterways, streams and the Truckee River. The Storm Water Committee continues to

guide the development of numerous plans and assessments relevant to source water and watershed protection as summarized below.

Ordinance and Guidance Changes for Construction and Post-Construction Programs

The Storm Water Committee updated and joined the Structural Controls Design Manual and the Low Impact Development Manual, as well as updated the Truckee Meadows Construction Site Best Management Practices (BMP) Handbook. These documents are referenced in the code for the city of Reno, city of Sparks, and Washoe County.

Watershed Assessments

Watershed assessment reports prepared for the Storm Water Committee were completed by Jesch et al. from 2002-2011 that include the Galena and Jones tributaries. These reports provide general watershed descriptions and can be used to track historical changes in creek condition and water quality over time. The reports do not include water quality data.

Hillside Design completed a comprehensive Watershed Assessment for Tributaries to the Truckee River in 2012 for these tributaries in this watershed: Galena and Jones Creeks.

The assessment included:

- stream reach descriptions with numerous photo points,
- Proper Functioning Condition rating, and
- list of restoration and management efforts needed to improve stream conditions, and water chemistry for temperature, pH, specific conductivity, dissolved oxygen, turbidity, and flow.

CDM Smith was contracted in 2015 through 2017 to conduct watershed assessments. The following table lists the report year and the respective drainages and reaches that were recently assessed in this watershed:

Stream Reaches Addressed in Watershed Assessment Reports in the Galena Creek Watershed by Report Year						
Stream Name	Lower Reach		Middle Reach		Upper Reach	
	2015	2016	2015	2017	2016	2017
Galena		X	X			X
Jones	X					

Watershed Management and Protection Plan for Tributaries to the Truckee River

The Watershed Management and Protection Plan for Tributaries to the Truckee River (NCE, 2020) is an update to the 2003 Watershed Management and Protection Plan for Tributaries to the Truckee River, which has been implemented for more than 15 years by the regional MS4 through the Storm Water Committee. The 2003 plan described an approach for on-going watershed assessment studies and monitoring to protect and improve the water quality in the stream corridors and drainages tributary to the Truckee River. The 2020 Plan update provides a process and framework for identifying, developing, and implementing projects originated through the Storm Water Committee that is consistent with the guidelines for an EPA approved Watershed Management Plan. The 2020 plan by NCE and the 2020 Integrated Source Water and 319(h) Watershed Protection Plan for Public Water Systems and the Truckee River in the Truckee, are mutually complementary and work together to address the broad scope of potential strategies to improve drinking water and surface water quality in Washoe County.

Truckee Meadows Watershed Protection Manual

Truckee Meadows Watershed Protection Manual: A Summary of the Watershed Protection Activities and Programs Developed in Conjunction with the Watershed Management Facilitator Scope of Work (Kennedy/Jenks, 2005). This document provides a reference and compendium of the various watershed protection activities and programs that were developed in 2004 and 2005 for Reno, Sparks and Washoe County.

Truckee Meadows Water Authority

TMWA is responsible for almost all municipal water delivery in the greater Reno-Sparks area. TMWA also owns and operates the municipal wells in this watershed. The following program and plans guide the management of these water resources:

- TMWA Water Resources Plan (2016-2035):

  This plan describes water quality issues and goals for the water resources managed by TMWA. Special focus is placed on changes in future water supply and demand and how those changes will impact the region's water resources. This plan provides useful Truckee River watershed information.

- Source Water Quality Assurance Program (2016-2035):

  TMWA's objective is to deliver high-quality potable water to its customers in a cost-effective manner. To achieve this objective, TMWA has established a water quality assurance program. The components that make up the program are source water quality protection, potable water treatment, maintenance of distribution system water quality, and cross connection control.

- Wellhead Protection Plan (2016):

  The purpose of the Wellhead Protection Plan is to protect groundwater that serves as a source for public drinking water supplies. This plan is intended to be a tool used by TMWA to assist in protecting drinking water sources.

Truckee River Fund

TMWA established the Truckee River Fund in 2004 (Truckee River Fund). The purpose of the Fund is to "protect and enhance water quality or water resources of the Truckee River, or its watershed." The Fund provides a way to respond to the requests from outside groups and organizations that are involved in promoting and improving the health of the Truckee River System and watershed. This in turn benefits the primary water source for the community and, in the long run, benefiting TMWA customers. For example, the Truckee River Fund has been the financial source for a portion of the following projects:

- Galena Creek Ecological Restoration and Demonstration Project (2019):

  This project is currently in progress and will establish restoration sites along Galena Creek and increase civic engagement through local student activities. Students will be challenged with inquiry-based field studies at Galena where students actively develop site plans, then participate in hands-on restoration and monitoring activities. A post-trip classroom visit will capture learning outcomes through testing. By increasing public engagement and restroom infrastructure, water quality will benefit.

- Washoe Drive Fire Emergency Watershed Stabilization and Restoration Effort (2012):

  This project entailed support for emergency treatments for burned areas impacted by the Washoe Drive Fire. Treatments included installation of sediment logs, hydro seeding of slopes, replanting of riparian vegetation, installation of willow waddles and willow stakes, and repairs to drainage systems. The groundwater quality in this watershed has benefitted from the restoration effort.

- Mt. Rose Water Treatment Plant at Whites Creek (Under construction; completion projected for 2020):

  This water treatment plant will treat surface water from Whites Creek, which will provide a supplemental water supply for the area. The new facility will further TMWA's ability to rest wells and store water in the local aquifer while improving supply reliability.

Washoe County

Activities in Washoe County are reviewed according to the Master Plan Planning Areas. The Truckee River watershed includes nine planning areas. The Galena Creek HUC-12 watershed is in the two planning areas: Southwest Truckee Meadows and Forest planning areas. The County has Citizens Advisory Boards (CABs) which provide important community perspective on local issues to the Washoe County Board of Commissioners. This watershed is encompassed within the South Truckee Meadows/Washoe Valley CAB. (CAB Boundaries)

The Washoe County Master Plan (2008) has Goals and Policies for Public Services and Facilities, and Open Space and Natural Resource Management. Applicable sections include:

- Article 418, Significant Hydrologic Resources, which regulates development activity within and adjacent to perennial streams to ensure that these resources are protected and enhanced. (Note: this does not apply to the Truckee River)
- Article 420, Storm Drainage Standards, sets forth standards for ensuring that both private and public development provides adequate protection for citizens and property. Therefore, it minimizes and controls erosion and pollution impacts on the natural environment, and additionally minimizes maintenance costs for drainage and flood control systems.
- Article 421, the Storm Water Discharge Program, which protects and enhances the water quality of watercourses, water bodies, groundwater and wetlands in a manner pursuant to and consistent with the Clean Water Act.
- Article 810, Special Use Permits, which provides a method of reviewing certain uses to determine if they have the potential to adversely affect public facilities in the vicinity.

Washoe County also provides comprehensive services for construction and maintenance roads, landscaping and drainage facilities; county-wide planning and code compliance; and emergency response services for fire and hazardous materials. All of these roles contribute to preserving and improving water quality in the watershed.

Western Regional Water Commission and the Northern Nevada Water Planning Commission

The Western Regional Water Commission (WRWC) focuses on improving water resource planning at the regional level and facilitating coordinated resource management among city of Reno, city of Sparks, Washoe County, TMWA, Truckee Meadows Water Reclamation Facility, South Truckee Meadows GID and Sun Valley GID.

The Northern Nevada Water Planning Commission (NNWPC) is a technical advisory panel that reports to the WRWC. The NNWPC develops and updates a Comprehensive Regional Water Management Plan (RWMP) and makes recommendations to the WRWC for adoption. In addition, the NNWPC develops priorities and an annual budget for the Regional Water Management Fund, also for recommendations to the WRWC.

The Comprehensive Regional Water Management Plan includes several applicable objectives:

- Objective 1.2 Provide for a Sustainable Water Supply and an Acceptable Level of Service to the Community (including protecting groundwater recharge areas).
- Objective 1.3 Implement measures to protect and enhance water quality for a sustainable water supply (including source water protection).
- Objective 2.1 Promote Efficient Use of Resources (Reduction of Non-Point Source Pollution for TMWRF Pollutant Credit).
- Objective 2.2 Manage wastewater for protection and enhancement of water quality.
- Objective 3.1 Effective and integrated watershed management (protection of human health, property, water quality including storm water).

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Bronco Creek & Gray Creek – Truckee River

HUC-12 Watershed #160501020502 & #160501020501 Profiles

Click here for complete HUC-12 Watersheds Map

Contents

Introduction

The Bronco Creek-Truckee River and Gray Creek-Truckee River HUC-12 Watersheds profile are a component of the 2020 Integrated Source Water and 319(h) Watershed Protection Plan for Public Water Systems and the Truckee River in the Truckee Meadows (Plan), as well as the Watershed Management and Protection Plan for Tributaries to the Truckee River. This document is a part of the on-line watershed mapping tool.

This watershed description is intended to be a guide and resource for organizations working within the watersheds, and an educational tool for those interested in learning more about the watershed in which they live. This Plan can be used to support funding for a multitude of water quality projects in these watersheds. Note that only non-regulated activities are eligible for the Nevada Division of Environmental Protection Source Water Protection Program or the 319 Nonpoint Source Program funding.

Summary

This profile focuses on the watershed's water quality. It includes potential and existing concerns, types of land uses, watershed management strategies and projects, and the involved stakeholders and their corresponding plans with water quality components.

Both the Gray Creek and Bronco Creek HUC-12 Watersheds in Nevada encompass forested land between 6,000 and 10,490 feet in elevation on the west side of the Sierra Nevada mountains. The eastern half of each watershed is in Nevada and the western half, including the Truckee River, is in California. This document focuses on the portion inside Nevada. Snowmelt and runoff from these watersheds to the Truckee River are upstream of the Highland Ditch diversion, the main water intake for the Truckee Meadows Water Authority (TMWA) and water source for the cities of Reno and Sparks. The water quality concern related to these watersheds is the potential for a wildfire to increase turbidity and sediment transport to the river.

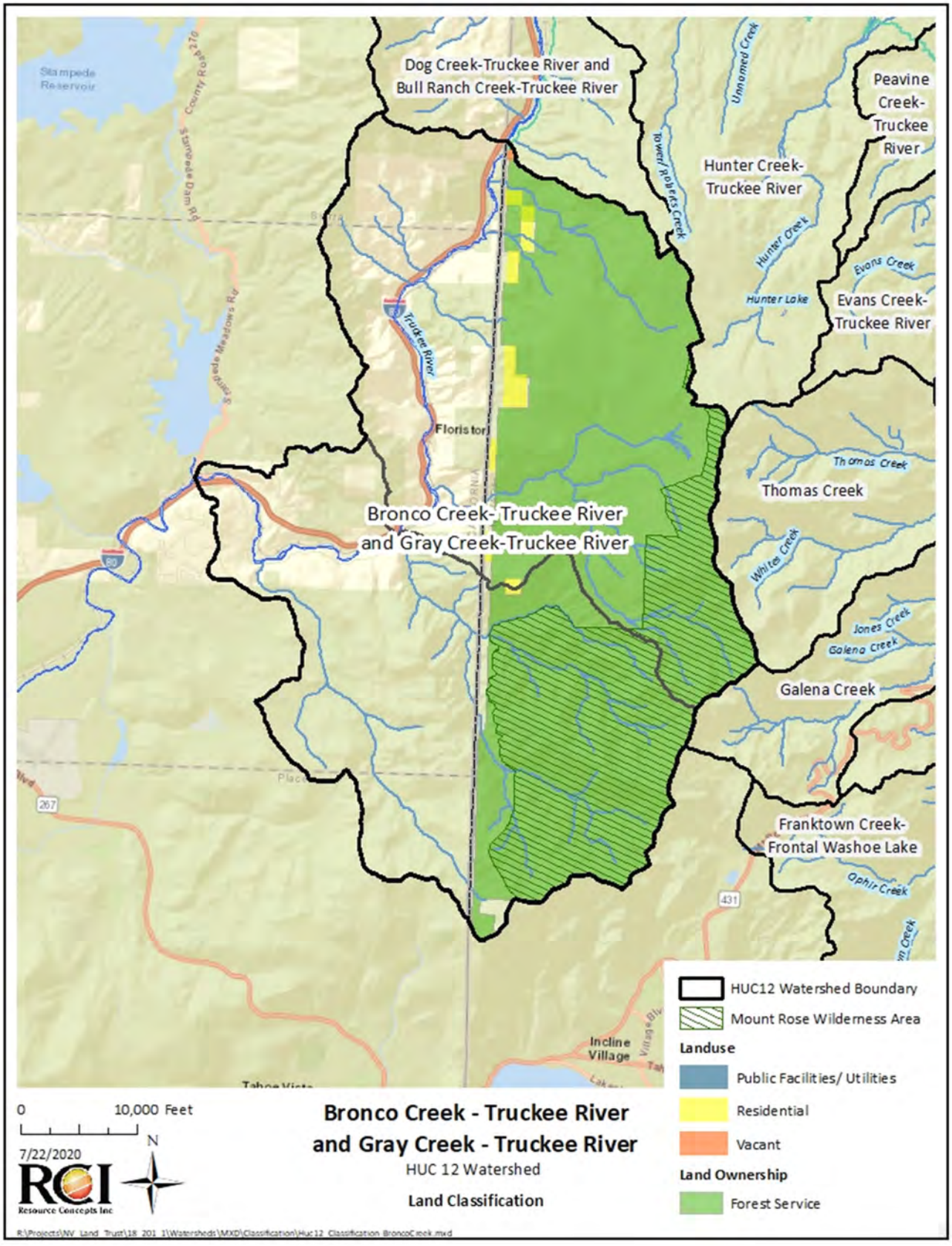
Source Water Protection Areas (SWPAs) for both watersheds were developed by stakeholders to help protect drinking water sources. Because these watersheds are important surface water sources, tributary creeks from these watersheds and the Truckee River are in a SWPA. The following table summarizes key water quality aspects in both watersheds.

Watersheds Summary	
Basins	• Gray Creek-Truckee River HUC-12 Watershed #160501020501. • Bronco Creek-Truckee River HUC-12 Watershed # 160501020502. • Groundwater Basin: 091 (Truckee Canyon).
Water Bodies & Water Quality	• Bronco Creek, not impaired, see NAC 445A.1698. • Deep Canyon Creek, not assessed. • Subterranean Creek, not assessed. • Mystic Canyon Creek, not assessed. • 2 unnamed creeks, not assessed. • Gray Creek, not impaired, see NAC 445A.1702. • Juniper Creek, not assessed. • 1 unnamed creek, not assessed.
Source Water Protection Areas	• SWPAs are buffers along perennial streams throughout the watersheds. These areas represent a precautionary indicator to safeguard drinking water sources. • Critical SWPAs represent areas closer to the perennial streams. • 9,600 acres, or approximately 39% of the watersheds in Nevada are in Source Water Protection Areas. • 1,550 acres, or about 6% of the watersheds in Nevada are in Critical Source Water Protection Areas.
Special Considerations & Issues	• Watersheds are in Nevada (24,550 acres) and California (23,770 acres). • Undeveloped land predominantly in Humboldt Toiyabe National Forest and Mt. Rose Wilderness Area, therefore vehicular access is limited. • Upstream of the Highland Ditch diversion and Chalk Bluff Water Treatment Plant. • Potential for wildfire in the Carson Range, resulting in turbidity and sediment transport to Truckee River. • Much of the watershed managed by the U.S. Forest Service is designated wilderness so access is limited.

	Type	Acres	%
Land Jurisdiction In Nevada	USFS: Washoe County Non- Federal:	24,000 550	98% 2%
Land Use In Nevada	Residential: Public Facility/Utilities: Vacant:	55 10 25	2% <1% <1%

Land uses and jurisdictions in the watersheds are summarized in the adjacent table and illustrated by the Land Classification Figure. Note that the acreages are provided only for Nevada.

Undeveloped federally managed public land is the dominant characteristic of the Nevada portions of these watersheds. The water quality concern is predominantly turbidity and sediment from erosion.


Dog Creek-Truckee River and Bull Ranch Creek-Truckee River
Peavine Creek-Truckee River
Hunter Creek-Truckee River
Evans Creek-Truckee River
Thomas Creek
Bronco Creek- Truckee River and Gray Creek-Truckee River
Galena Creek
Franktown Creek-Frontal Washoe Lake
Stampede Reservoir
Truckee River
Floriston
Hunter Lake
Incline Village
HUC12 Watershed Boundary
Mount Rose Wilderness Area
Landuse
Public Facilities/ Utilities
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Resource Concepts Inc
Bronco Creek - Truckee River and Gray Creek - Truckee River
HUC 12 Watershed
Land Classification

Water Quality Standards and Beneficial Uses

Water quality standards for surface water in the state of Nevada are established by Nevada Administrative Code (NAC) NAC 445A.11704 through NAC 445A.2234. Standards applicable to beneficial uses are generally described under NAC 445A.122. The Nevada Division of Environmental Protection (NDEP) Bureau of Water Quality Planning Nevada 2016-2018 Water Quality Integrated Report identifies the beneficial uses and the surface water quality conditions in these watersheds, as summarized below:

- Both Gray and Bronco creeks are tributary to the Truckee River and all beneficial uses are supported (water quality standards NAC 445A.1702 and NAC 445A.1698 respectively).
- During high flows or following disturbance, such as wildland fire, the turbidity is a water quality concern.

Potential and Existing Water Quality Concerns

The primary potential and existing water quality concerns in the watersheds in Nevada are from sediment and erosion.

Sediment from Erosion

Gray Creek and Bronco Creek HUC-12 Watersheds lie within the Truckee Canyon and the Nevada portions are almost entirely Humboldt Toiyabe National Forest. Snowmelt from the higher elevations of these steep undeveloped tributaries make them an important source of water for the Truckee River. Geographically located in the Carson Range, this area is susceptible to forest fires.

The 2001 Martis Fire burned through both Gray and Bronco watersheds. The Gray Creek HUC-12 Watershed was severely burned, leaving portions of the watershed with little vegetation (Northwest Hydraulic Consultants (NHC, 2006). Following the fire, studies showed the sediment yield increased significantly (NHC, 2006):

- Steep slopes and highly erosive soils are susceptible to frequent mass wasting (the downslope movement of soil and rock material due to gravity), which increases the sediment load in the streams (NHC, 2006).
- Erosion is mostly due to natural causes, the only anthropogenic activity that increases the risk of erosion is dirt roads (NHC, 2006). Dirt roadways could be improved to minimize the potential for erosion to the creeks and ultimately to the Truckee River.
- Historically, this location has been used for logging and grazing purposes, although neither are currently occurring in the watersheds.

TMWA has identified increased turbidity and sediment from watersheds upstream of the Highland Diversion as significant risks to their surface water treatment systems. TMWA can allow short term flood/runoff events that elevate turbidity in the Truckee River to bypass diversion to the treatment plant. However, there is a need to prevent long term increases in turbidity that might result from catastrophic fires or landslides.

Strategies to Protect and Improve Water Quality

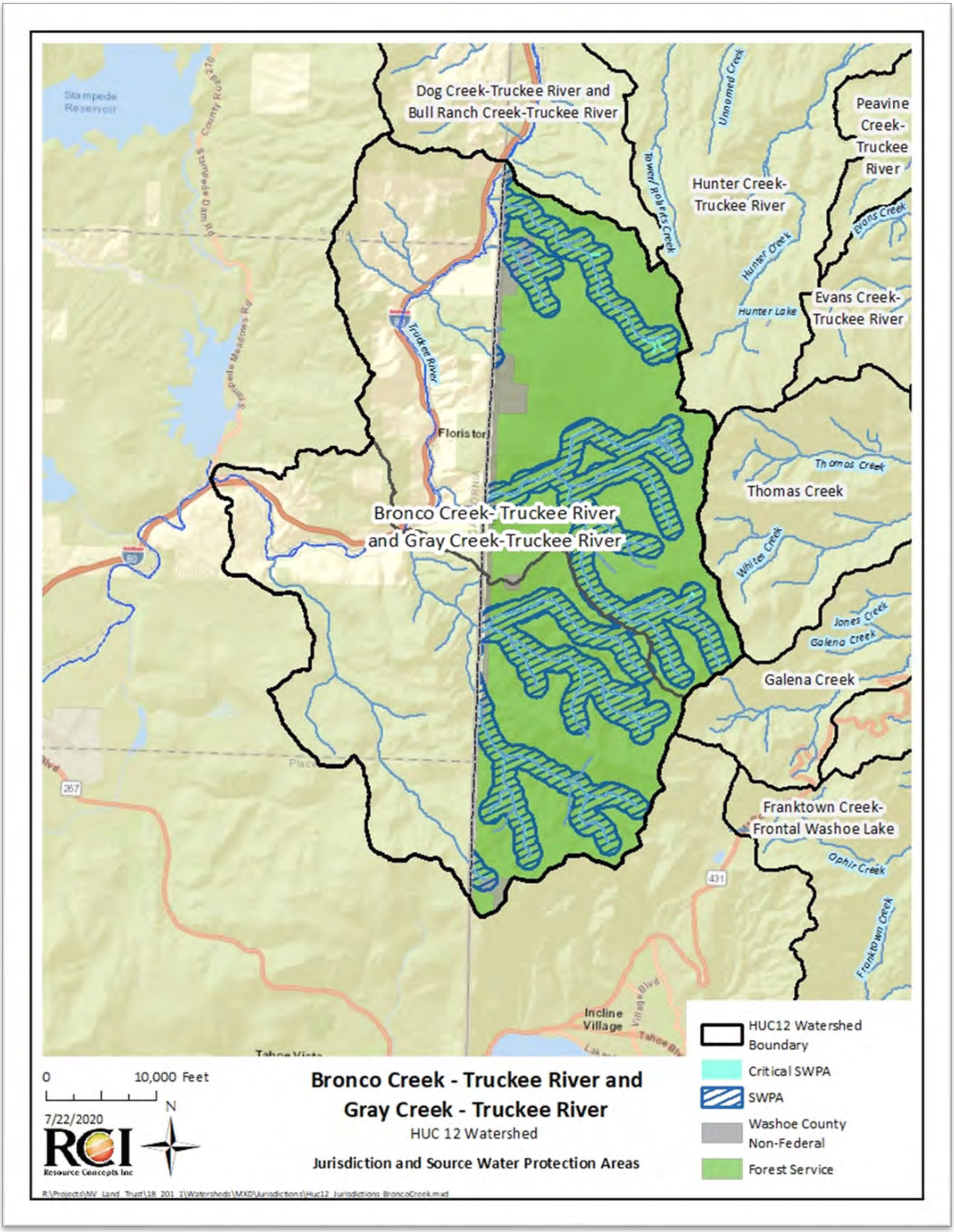
The water quality concerns identified in both watersheds can be addressed through management strategies described in this section, the proposed projects detailed in the Project Profiles, as well as applicable on-going water quality projects and programs described under Stakeholders and Plans. These strategies pertain to the entirety of both watersheds but may be prioritized in SWPAs.

Source Water Protection Area Identification and Management

A SWPA is a management area surrounding a surface water or groundwater resource that supplies water for public consumption. Human activities in these buffer areas can affect the quality of water downstream or underground. These management strategies acknowledge the value of these SWPAs to help prevent future contamination of our sources of drinking water.

There are two types of buffers in these watersheds (RCI, 2020). The first is a 1,000-foot buffer encompassing perennial tributaries, which represents a precautionary indicator to safeguard these water sources. The second type of 150-foot buffer identifies more critical areas closer to streams. These areas are illustrated on the Jurisdiction and Source Water Protection Areas Figure. The following objectives are significant in both future and on-going SWPA management:

- Inform landowners in SWPAs about their proximity to a valuable drinking water source and how they can help protect their water quality.
- Encourage coordination between landowners and County planners to consider the importance of SWPAs in project reviews.
- Explore collaborative funding for water quality and watershed improvements and support the resource investigations needed to develop viable projects within SWPAs.
- Prioritize physical improvements in SWPAs to protect and improve source water quality.


Dog Creek-Truckee River and
Bull Ranch Creek-Truckee River
Peavine
Creek-
Truckee
River
Hunter Creek-
Truckee River
Evans Creek-
Truckee River
Thomas Creek
Bronco Creek- Truckee River
and Gray Creek-Truckee River
Galena Creek
Franktown Creek-
Frontal Washoe Lake
Stampede Reservoir
Floriston
Incline Village
Hunter Lake
Unnamed Creek
Evans Creek
Hunter Creek
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Resource Concepts Inc
Bronco Creek - Truckee River and
Gray Creek - Truckee River
HUC 12 Watershed
Jurisdiction and Source Water Protection Areas
HUC12 Watershed
Boundary
Critical SWPA
SWPA
Washoe County
Non-Federal
Forest Service

Education and Outreach

The following education and outreach objectives are intended to help effectuate positive actions to protect water quality:

- Increase knowledge of water quality protection and the pollution in stormwater runoff through local outreach efforts.
- Inform landowners in nearby communities about Critical SWPAs regarding the importance of preventing wildland fire to help protect valuable drinking water sources.

Interagency Communication

The following interagency communication objectives are important tools to both reinvigorate and invest additional resources in water quality, as well as utilize existing resources and programs:

- Each agency may evaluate how to improve lines of communication within and between jurisdictions regarding water quality issues, i.e. Washoe County, TMWA, NDEP, U.S. Department of Agriculture (USDA) Forest Service, and California entities.
- Collaborate with the Washoe/Storey Cooperative Weed Management Area to support their efforts in noxious weed management (WSCWMA Website).

Wildfire and Fuel Management

Wildland fire is a threat to water quality and coordinated fuel management on wildlands can help reduce risks to water quality. Stakeholders and partners may consider the following objectives as they pertain to wildfire and fuel management:

- Encourage development, maintenance, and implementation of the Community Wildfire Protection Plans.
- Support and collaborate with the Nevada Cohesive Strategy effort and the Shared Stewardship Agreement, the blueprint to address Nevada's wildland fire issues.
- Support for the Nevada Network of Fire Adapted Communities and their local chapters for people in high fire threat locations to fully prepare themselves, their homes, and the landscape where they reside to survive the destructive force of wildfire.
- Encourage the development of wildland fire risk reduction and emergency recovery plans to reduce the risk of wildfire, quickly restore burned areas, and reduce the risk of catastrophic post-fire erosion and sedimentation.
- Collaborate and coordinate to treat invasive and noxious weeds pre- and post-fire to reduce risk of wildfire and watershed destabilization.

Resource Investigation and Planning

Stakeholders may consider supporting the following resource investigations and planning, which can help fill data gaps, inform implementation designs and prioritize projects:

- Research to assist federal and local agencies in managing for fire risk.
- Development and implementation of integrated vegetation management programs.

Water Quality Best Management Practices

Stakeholders may consider supporting the following Water Quality Best Management Practices, or BMPs, that may improve and prevent degradation to water quality resources:

- Invasive weed removal and integrated vegetation management for creek stabilization.
- Recommendations in the tributary assessments.
- Physical improvements prioritized in SWPAs for water quality improvement and protection.

Proposed Implementation Projects

Proposed implementation actions are generally described under the Strategies to Protect and Improve Water Quality. Specific implementation actions have been developed into proposed projects by local stakeholders and are described in Project Profiles. These Project Profiles include the information needed, as identified in the Environmental Protection Agency (EPA) guidance for nine critical elements, for an endorsable watershed management plan. Future projects could also be brought forward to funding agencies through:

- Demonstrating advancement of the strategies identified for this watershed in the Source Water and Watershed Protection Plan.
- Using the Project Profile format to establish consistency with the nine critical elements of an EPA endorsed plan.

As discussed in the following Stakeholders and Plans section, municipality and agency projects are also incorporated by reference.

Stakeholders and Plans

Stakeholder information and existing plans were used extensively in development of the Plan for Washoe County. These municipalities and agencies each have unique strategies and capital improvement plans that include water quality protection or improvement projects. These are updated regularly at differing timeframes (i.e. annually, every five years, etc.) according to their specific budgeting and planning processes. The applicable planning documents are briefly described and referenced in this section. Those projects pertaining to water quality protection and improvement in the watersheds are incorporated by reference.

Nevada Project Stakeholders	
• USDA Forest Service • Nevada Department of Transportation • Nevada Division of Environmental Protection • Nevada Division of Forestry • One Truckee River	• Truckee Meadows Regional Planning Agency • Truckee Meadows Water Authority • Truckee River Fund • Washoe County • Washoe County Health District • Western Regional Water Commission

USDA Forest Service

The Humboldt-Toiyabe National Forest within the watersheds is managed by the Carson Ranger District. Natural resource projects, including projects undergoing NEPA documentation, are listed on the Forest Service website. The Humboldt National Forest and Toiyabe National Forest Biannual 2018 Monitoring Report describes the conditions of the watersheds and present monitoring information.

Additionally, the Forest Service has created Land and Resource Management Plans (LRMP) to guide management decisions within the Humboldt-Toiyabe National Forest. Water resources are outlined in the LRMP, along with management actions including maintenance, monitoring and enhancement of water quality:

- Humboldt National Forest Land and Resource Management Plan:

  Section IV.C.5 is "Soil and Water within the Forest-Wide Standards and Guidelines". This outlines the goals for the soil and resources on Forest Service managed land.

  Section V.A is the "Implementation Direction of the Forest Plan". This describes how the LRMP will be analyzed for its level of success.
- Toiyabe National Forest Land and Resource Management Plan:

  Section IV is the "Forest Management Direction with Forest-wide Standards and Guidelines" for soil and water as well as riparian areas. These sections outline the goals for the forest.

  Section V is the "Implementation of the Forest Plan" including the direction of the LRMP which also outlines the goals for the Forest.

Nevada Department of Transportation

The Nevada Department of Transportation (NDOT) has developed their Stormwater Management Program to reduce stormwater pollution from NDOT managed facilities and roads. The program BMPs and annual report outline the specific measures that NDOT will take to reduce stormwater pollutant discharges from its owned and operated storm drain system:

- Stormwater Management Program (2013):

  The overall goal of the NDOT Stormwater Management Program is to reduce pollution associated with stormwater from NDOT's MS4 to the maximum extent practicable, as well as to protect surface and groundwater resources within the MS4 permit area. The Stormwater Management Program addresses stormwater pollution control as it relates to the planning, design, construction, and maintenance of NDOT's highway infrastructure statewide.
- Stormwater Management Program: Annual Report (2017):

  These watersheds are impacted or has the potential to be impacted by I-80 and the railroad. The Stormwater Management Program provides a helpful planning outline on handling and mitigating pollution from the roads.

Nevada Division of Environmental Protection

The NDEP has a goal to preserve and enhance the environment of the State in order to protect public health, sustain healthy ecosystems, and contribute to a vibrant economy. The Bronco Creek-Truckee River and Gray Creek-Truckee River HUC-12 Watersheds have several challenges facing source water protection, so the NDEP is an essential stakeholder and planning partner. Specifically, there are two programs under the NDEP that were involved in the Plan in Washoe County. Both programs provide education and outreach and offer funding opportunities for water quality protection and improvement:

- Integrated Source Water Protection Program under the Safe Drinking Water Bureau:

  This program offers technical assistance for source water protection projects. The program coordinates source water protection activities at the local, state, and federal levels, and encourages community-based protection and preventive management strategies to ensure all public drinking water resources are kept safe from future contamination.

  The 2010 Nevada Integrated Source Water Protection Program guidance document details the program components as well as the requirements for a State-endorsed Community Source Water Protection Plan.

- 319 Nonpoint Source Pollution Management Program under the Bureau of Water Quality Planning:

  This Program can provide matched grant funding for projects that improve water quality.

  The 2015-2019 State of Nevada Nonpoint Source Management Plan establishes how NDEP will work with partners to address Nonpoint Source pollution. The Plan formalizes Nevada's approach for protecting and improving water quality and describes the goals, short- and long-term objectives, milestones and timeframes to guide activities, and measures for tracking success.

Nevada Division of Forestry

The Nevada Division of Forestry (NDF) is a State agency that uses a collaborative process to deliver science based natural resource management and protection to promote resilient landscapes, fire adapted communities, and safe, effective wildfire response provided by employees that embrace the core values of duty, respect, and integrity.

NDF provides professional natural resource and wildland fire management services to Nevada citizens and visitors to enhance, conserve and protect forest, rangeland and watershed values, endangered plants and other native flora. Protection of these resources helps to preserve and improve water quality:

- Community Wildfire Protection Plans:

  Community Wildfire Protection Plans (CWPPs) are authorized and defined in Title I of the Healthy Forests Restoration Act of 2003 (HFRA). CWPPs represent the best opportunity that communities have to address the challenges of the Wildland-Urban Interface. A CWPP helps communities define their priorities for the protection of life, property, and shared assets-at-risk from wildfires. Developing a CWPP encourages community members and leaders to have valuable discussions about wildfire preparedness, evacuation planning, and local fire district capabilities. The CWPP increases grant funding opportunities by prioritizing fuel reduction projects around and within the community.

- Nevada Wildland Fire Cohesive Strategy:

  The Nevada Fire Board Oversight Body is the custodian of the 2015 Nevada Wildland Fire Cohesive Strategy Summit's Action Plan to ensure goal achievement and identify emerging topics. This oversight body acts as an "advisory" body and is charged with taking the Nevada Cohesive Strategy Summit report and its Action Steps, ensuring that goal achievement is accomplished and monitoring emerging topics through the Nevada Fire Board. This body monitors progress, develops issue resolution, and addresses emerging issues such as protecting water quality.

One Truckee River

According to the One Truckee River website, "One Truckee River is a collaboration of public and private partners working together to realize a Truckee River that flows clean and clear, quenches our thirst, sustains the river's natural ecology, cultural resources and wildlife, and connects residents and visitors to unparalleled opportunities for recreation and regeneration":

- The One Truckee River Management Plan (2017) addresses actions to accomplish four primary goals, including protection of water quality and ecosystem health.

The following stakeholders were instrumental in compiling the plan and in implementing the plan action items:

- Truckee River Flood Management Authority
- Pyramid Lake Paiute Tribe
- Truckee Meadows Water Authority
- Resource Concepts, Inc.
- Nevada Division of Environmental Protection
- Renown
- Truckee Meadows Regional Planning Agency
- Keep Truckee Meadows Beautiful AmeriCorps
- Keep Truckee Meadows Beautiful
- Washoe County Health District
- City of Reno Public Works

Truckee Meadows Regional Planning Agency

The Truckee Meadows Regional Planning Agency (TMRPA) fosters coordination among Reno, Sparks and Washoe County. TMRPA facilitates land-use, infrastructure provision and resource management conversations among public and private decision makers. The agency also serves as a collaborative information and data warehouse, coordinating regional data collection and

delivering advanced geospatial analytics for regional solutions. TMRPA includes a Regional Planning Governing Board and a Regional Planning Commission.

The TMRPA Regional Plan (2012 as amended) provides goals and policies for multiple plans and programs, including those with watershed related and well head protection components. The plan was revised in 2019-2020 and is considered a living document that will evolve over time.

Truckee Meadows Water Authority

TMWA is responsible for almost all municipal water delivery in the greater Reno-Sparks area. TMWA also owns and operates the municipal wells in this watershed. The following program and plans guide the management of these water resources:

- TMWA Water Resources Plan (2016-2035):

  This plan describes water quality issues and goals for the water resources managed by TMWA. Special focus is placed on changes in future water supply and demand and how those changes will impact the region's water resources. Additionally, this plan provides useful Truckee River watershed information.
- Source Water Quality Assurance Program (2016-2035):

  TMWA's objective is to deliver high-quality potable water to its customers in a cost-effective manner. To achieve this objective, TMWA has established a water quality assurance program. The components that make up the program are source water quality protection, potable water treatment, maintenance of distribution system water quality, and cross connection control.
- Wellhead Protection Plan (2016):

  The purpose of the Wellhead Protection Plan is to protect groundwater that serves as a source for public drinking water supplies. This plan is intended to be a tool used by TMWA to assist in protecting drinking water sources.

Truckee River Fund

TMWA established the Truckee River Fund in 2004 (Truckee River Fund). The purpose of the Fund is to "protect and enhance water quality or water resources of the Truckee River, or its watershed." The Fund provides a way to respond to the requests from outside groups and organizations that are involved in promoting and improving the health of the Truckee River System and watershed. This in turn benefits the primary water source for the community and, in the long run, benefits TMWA customers. Currently, no projects have been funded through the Truckee River Fund in these watersheds.

Washoe County

Activities in Washoe County are reviewed according to the Master Plan Planning Areas. The Truckee River watershed includes nine planning areas. The Bronco Creek-Truckee River and Gray Creek-Truckee River HUC-12 Watersheds are included in the three planning areas: northeast Truckee Meadows, southeast and southwest Truckee Meadows. The County has Citizens Advisory Boards (CABs) which provide important community perspectives on local issues to the Washoe County Board of Commissioners. These watersheds are within the West Truckee Meadows/Verdi CAB (CAB Boundaries).

The Washoe County Master Plan (2008) has Goals and Policies for Public Services and Facilities, and Open Space and Natural Resource Management. Applicable sections include:

- Article 418, Significant Hydrologic Resources, which regulates development activity within and adjacent to perennial streams to ensure that these resources are protected and enhanced. (Note: this does not apply to the Truckee River)
- Article 420, Storm Drainage Standards, sets forth standards for ensuring that both private and public development provides adequate protection for citizens and property. Therefore, it minimizes and controls erosion and pollution impacts on the natural environment, and additionally minimizes maintenance costs for drainage and flood control systems.
- Article 421, the Storm Water Discharge Program, which protects and enhances the water quality of watercourses, water bodies, groundwater and wetlands in a manner pursuant to and consistent with the Clean Water Act.
- Article 810, Special Use Permits, which provides a method of reviewing certain uses to determine if they have the potential to adversely affect public facilities in the vicinity.

Washoe County also provides comprehensive services for construction and maintenance roads, landscaping and drainage facilities; county-wide planning and code compliance; and emergency response services for fire and hazardous materials. All of these roles contribute to preserving and improving water quality in these watersheds.

Washoe County Health District

The Washoe County Health District has regulatory authority over a wide variety of programs and services in the Truckee Meadows including underground storage tanks, septic systems, all public water systems, domestic wells, water projects and community development, grading permits, solid waste management and emergency preparedness. The Health District regulations are provided in several documents as listed below:

- Regulations of the Washoe County District Board of Health Governing Sewage, Wastewater and Sanitation. These regulations provide the minimum requirements to be followed by any person developing property served by an on-site sewage disposal system. These requirements are promulgated to prevent the spread of disease, protect the water quality of this county and ensure the on-site sewage disposal systems function properly.
- Regulations of the Washoe County District Board of Health Governing Well Construction. These regulations provide minimum requirements to be followed by any person when drilling and plugging specific kinds of wells. A well construction permit is required to drill a well for consumptive use or monitoring wells. These requirements are primarily promulgated to protect the quantity and quality of the waters of this county from waste and contamination, and to provide public protection by enforcing proper construction and plugging of wells.
- Regulations of the Washoe County District Board of Health Governing Solid Waste Management. These regulations protect water quality through the regulation of municipal solid waste landfills.

Western Regional Water Commission and the Northern Nevada Water Planning Commission

The Western Regional Water Commission (WRWC) focuses on improving water resource planning at the regional level and facilitating coordinated resource management among city of Reno, city of Sparks, Washoe County, TMWA, Truckee Meadows Water Reclamation Facility, South Truckee Meadows GID and Sun Valley GID.

The Northern Nevada Water Planning Commission (NNWPC) is a technical advisory panel that reports to the WRWC. The NNWPC develops and updates a Comprehensive Regional Water Management Plan (RWMP) and makes recommendations to the WRWC for adoption. In addition, the NNWPC develops priorities and an annual budget for the Regional Water Management Fund, also for recommendations to the WRWC.

The Comprehensive Regional Water Management Plan includes several applicable objectives:

- Objective 1.2 Provide for a Sustainable Water Supply and an Acceptable Level of Service to the Community (including protecting groundwater recharge areas).
- Objective 1.3 Implement measures to protect and enhance water quality for a sustainable water supply (including source water protection).
- Objective 2.1 Promote Efficient Use of Resources (Reduction of Nonpoint Source Pollution for TMWRF Pollutant Credit).
- Objective 2.2 Manage wastewater for protection and enhancement of water quality.
- Objective 3.1 Effective and integrated watershed management (protection of human health, property, water quality including storm water).

California Entities

The lower half of these watersheds are in the state of California. Watershed issues can also be coordinated with the appropriate agency or organization.

California Project Stakeholders	
• Nevada County • Sierra County • Placer County	• Truckee River Watershed Council • Caltrans

Nevada County

Nevada County has supervisorial districts governed by a county chairman. These districts provide a valuable way for the community to get involved in county projects. Both Bronco and Gray HUC-12 Watersheds are a part of District 5 which includes Hirschdale, Floriston, and unincorporated areas along I-80.

Sierra County

Sierra County has a Small Public Water Supply program that is regulated by the California Department of Public Health, Division of Drinking Water and Environmental Management. This includes a small northern portion of Bronco Creek. Sierra County, California Drinking Water Quality

Placer County

Placer County has supervisorial districts governed by a county chairman. A small section in the southern portion of Gray Creek is included in this county. District 5 is the governing district at this location. On the county website there is a Truckee River Water Quality Monitoring Plan Prepared for Placer County in 2008 by 2nd Nature, LLC.

Truckee River Watershed Council

The Truckee River Watershed Council is a non-profit organization that partners with private and public agencies. Their projects involve restoration of the Truckee River watershed in California. Their focus is to improve floodplains and restore riparian habitats to improve the water supply and wildlife habitat. Truckee River Watershed Council

Caltrans

The California Department of Transportation Stormwater Management Program's (SW Program) goal is to provide water quality monitoring and best management practices under the compliance of the Statewide Storm Water Permit Discharge Requirements in order to protect groundwater and surface water from stormwater runoff.

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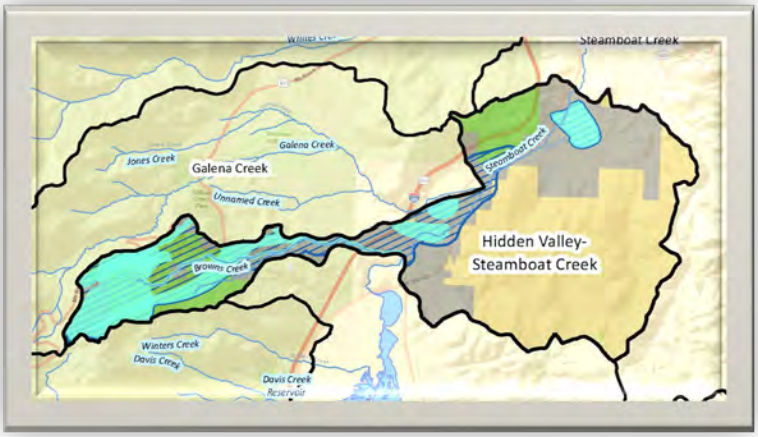
Hidden Valley-Steamboat Creek

HUC-12 Watershed #160501020304 Profile

Click here for complete
HUC-12 Watersheds Map



Profile Contents

Introduction

The Hidden Valley-Steamboat Creek HUC-12 Watershed profile is a component of the 2020 Integrated Source Water and 319(h) Watershed Protection Plan for Public Water Systems and the Truckee River in the Truckee Meadows (Plan), as well as the Watershed Management and Protection Plan for Tributaries to the Truckee River. This document is a part of the on-line watershed mapping tool.

This watershed description is intended to be a guide and resource for organizations working within the watershed, and an educational tool for those interested in learning more about the watershed in which they live. This Plan can be used to support funding for a multitude of water quality projects in the watershed. Note that only non-regulated activities are eligible for the Nevada Division of Environmental Protection Source Water Protection Program or the 319 Non-Point Source Program funding.

Summary

This profile focuses on the watershed's water quality. It includes potential and existing concerns, types of land uses, watershed management strategies and projects, and the involved stakeholders and their corresponding plans with water quality components.

The Hidden Valley-Steamboat Creek HUC-12 Watershed spans the segment of Steamboat Creek through Pleasant Valley between Washoe Valley and the Truckee Meadows. To the west, it includes Browns Creek, originating near the Mt. Rose Ski Resort in the Carson Range. To the east, it includes foothills of the Virginia Range and corresponds to the Pleasant Valley Groundwater Basin boundary. Galena Creek is also tributary to this segment of Steamboat Creek and is delineated as a separate HUC-12 watershed. Steamboat Creek flows to the north from Washoe Lake through south Reno and into the Truckee River, at which point it has a total watershed of 200 square miles. However, most of this HUC-12 area is undeveloped federally managed public upland. Low-density residential uses occur where the creek flows parallel to US Hwy 395 through the narrow confines of Pleasant Valley and Steamboat Valley.

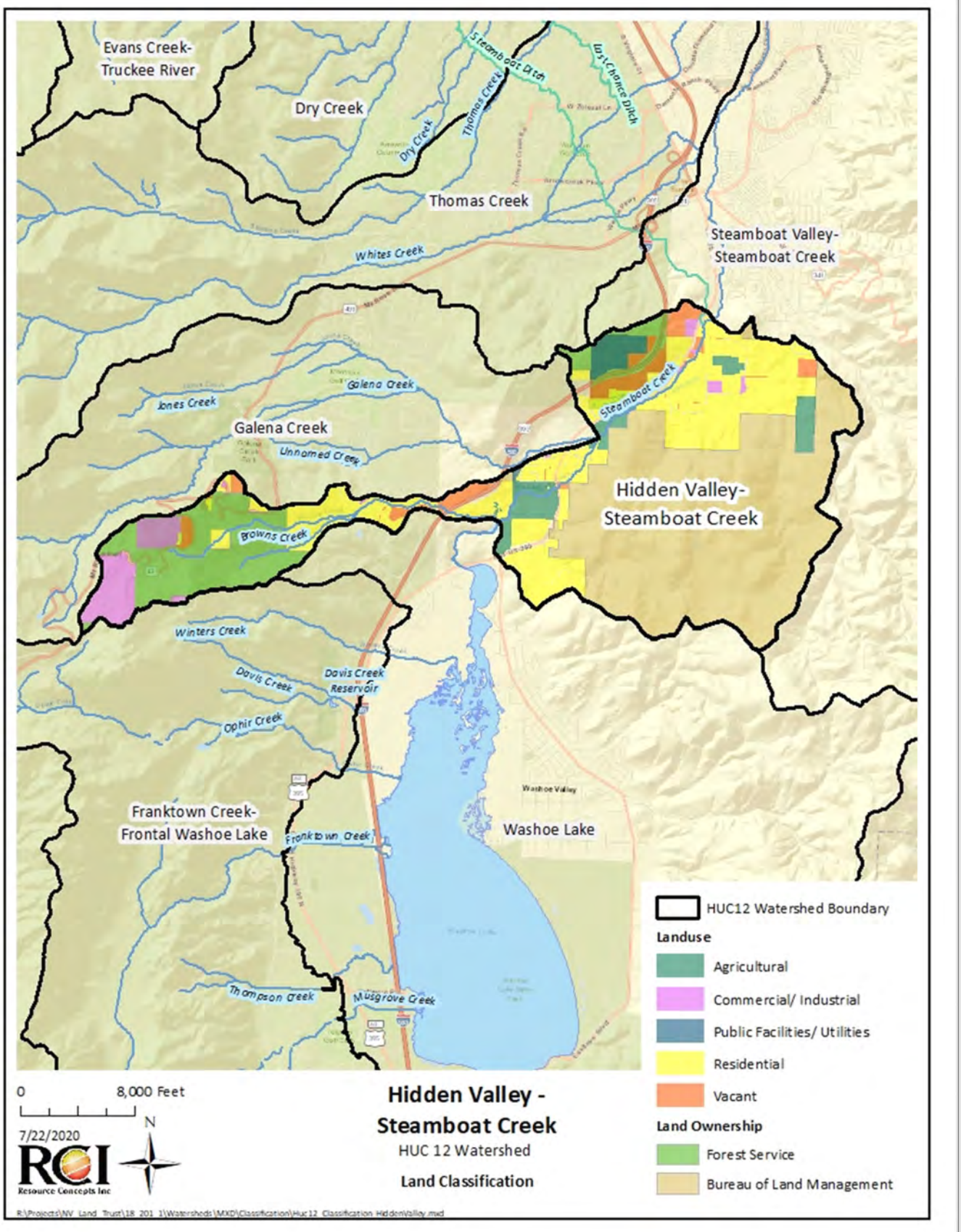
Source Water Protection Areas (SWPAs) for this watershed were developed by stakeholders to help protect drinking water sources. Four springs and a well at over 7000 feet elevation provide water to the ski resort and a small residential community near the Mt. Rose Hwy. Four other wells (three separate small water systems) provide water to communities in the valley along Steamboat Creek. Browns Creek and Galena Creek have excellent water quality. These tributary watersheds are important for surface water and groundwater recharge. The following table summarizes key water quality aspects in this HUC-12 area.

Watershed Summary	
Basin	• Hidden Valley-Steamboat Creek HUC-12 Watershed #160501020304. • Groundwater Basin: 088 (Pleasant Valley East) underlies all of this watershed.
Water Bodies & Water Quality	• Browns Creek, not impaired and fully supports beneficial uses, see NAC 445A.1724. • Steamboat Creek, impaired for *E. coli*, see NAC 445A.1724.
Source Water Protection Areas	• A SWPA encompasses the western portion of the watershed with buffers along perennial streams. It represents a precautionary indicator to safeguard the drinking water sources. • Critical SWPAs represent areas closer to perennial streams and water system wells. • Four springs and five wells managed by eight different public water systems. • 3,400 total acres, or roughly 27% of the watershed is in a Source Water Protection Area. • 1,640 total acres, or approximately 13% of the watershed is in a Critical Source Water Protection Area.
Special Considerations & Issues	• 2012 Washoe Fire: Lower reach of the watershed burned, return fire susceptibility, erosion and invasive/noxious weed concerns. • Stormwater discharges in the upper elevations of Browns Creek have resulted in erosion and sediment transport issues. • No municipal sanitary sewer services, communities rely on septic systems. • Transportation corridors include Interstate 580 (I-580), US Hwy 395, and State Route 431 (Mt. Rose Hwy). • Mercury from Comstock era mining may contaminate soils and sediment along segments of Steamboat Creek.

	Type	Acres	%
Land Jurisdiction	BLM:	5,600	46%
	City of Reno:	1	<1%
	Washoe County Non-Federal:	4,505	36%
	USFS:	1,400	11%
Land Use	Agricultural:	500	4%
	Industrial/Commercial:	550	4%
	Residential:	3,080	25%
	Public facility/Utilities:	200	2%
	Vacant:	500	4%
	Roads and Water:	500	4%
	Federally Managed:	7,000	56%

Land uses and jurisdictions in this watershed are summarized in the adjacent table and illustrated by the Land Classification Figure.

The dominant land uses are undeveloped public land managed by the Bureau of Land Management (BLM) and the U.S. Forest Service (USFS). Pleasant Valley and Steamboat Valley are primarily residential areas in Washoe County with some limited agricultural and commercial land use. The potential and existing water quality concerns in this HUC-12 include potential hazardous materials from spills or leaks, pollution from urban area runoff, sediment from erosion, and potential nitrate in groundwater related to septic systems.


Evans Creek-
Truckee River
Dry Creek
Steamboat Ditch
Last Chance Ditch
Thomas Creek
Dry Creek
Thomas Creek
Whites Creek
Steamboat Valley-
Steamboat Creek
Galena Creek
Jones Creek
Galena Creek
Unnamed Creek
Steamboat Creek
Hidden Valley-
Steamboat Creek
Browns Creek
Winters Creek
Davis Creek
Davis Creek
Reservoir
Ophir Creek
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Frontal Washoe Lake
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Washoe Valley
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Resource Concepts Inc
Hidden Valley -
Steamboat Creek
HUC 12 Watershed
Land Classification
HUC12 Watershed Boundary
Landuse
Agricultural
Commercial/ Industrial
Public Facilities/ Utilities
Residential
Vacant
Land Ownership
Forest Service
Bureau of Land Management
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Water Quality Standards and Beneficial Uses

Water quality standards for surface water in the State of Nevada are established by Nevada Administrative Code (NAC) NAC 445A.11704 through NAC 445A.2234. Standards applicable to beneficial uses are generally described under NAC 445A.122. The Nevada Division of Environmental Protection (NDEP) Bureau of Water Quality Planning Nevada 2016-2018 Water Quality Integrated Report identifies the beneficial uses and the surface water quality conditions in this watershed, as summarized below:

- Browns Creek is tributary to Steamboat Creek and all beneficial uses are supported (water quality standards NAC 445.1724).
- Steamboat Creek is tributary to the Truckee River and this segment is impaired for:
  - municipal and domestic supply due to beryllium
  - aquatic life due to cadmium
  - recreation involving contact with water due to *Escherichia coli (E. coli)*

Groundwater is an important source of drinking water for small public water systems using springs and wells in the watershed. There are no known groundwater contaminants within this watershed caused by human activities.

Potential and Existing Water Quality Concerns

The primary potential and existing water quality concerns in this watershed are listed below and described in the following paragraphs:

- Hazardous Materials from Spills or Leaks
- Pollution from Urban Area Runoff
- Nitrate from Individual Sewage Disposal Systems
- Sediment from Erosion

The Hidden Valley-Steamboat Creek HUC-12 Watershed has good water quality, but these concerns have the potential to affect water quality in the future.

Hazardous Materials from Spills or Leaks

Certain areas of the watershed have commercial and industrial businesses (Land Classification Figure). Accidental spills or leaks from chemical storage or underground piping common to industrial areas could contaminate groundwater or eventually discharge to the Truckee River. Additionally, sections of Hwy 395 and I-580 parallel Steamboat Creek in this watershed. Chemicals and materials commonly moving along these transportation corridors have the potential for accidental spills and leaks.

The U.S. Department of Transportation accumulated a list of commonly transported hazardous materials within the Truckee River watershed (WRWC, 2017). These include:

- Ammonia perchlorate
- Anhydrous ammonia
- Chlorine
- Cyanide
- Hydrochloric acid
- Hydrogen sulfide
- Nitro cellulose (wet)
- Propane
- Petroleum naphtha
- Phosphoric acid
- White phosphorous
- Propargyl alcohol
- Sulfuric acid
- Sodium hydroxide

Both the Mt. Rose Ski Area and the Sky Tavern Ski Area are located at high elevations in the Browns Creek drainage. There is the potential of contaminant leaks or spills from equipment fueling or maintenance. Risk is limited, provided handling and storage of hazardous materials are conducted in accordance with regulations. Based on NDEP and Washoe County Health District records, there are a few sites with past remediation related to residential heating oil tanks in the Pleasant Valley and Steamboat Valley neighborhoods. Older underground fuel storage tanks have had a history of leaking and can be sources of groundwater contamination.

Pollution from Urban Area Runoff

Groundwater, surface water, and irrigation ditches may be vulnerable to polluted runoff in urban areas in the future. Potential contaminants include:

- Nutrients from fertilizers
- Bacteria from animal waste
- Trash
- Pollution from household waste
- Runoff from roads and parking lots

Excessive fertilization of irrigated lawns are potential sources of nutrients, and residential areas may also contribute *E. coli* from animal waste such as from horses, dogs and other pets. Opportunities for urban development in this watershed are not currently extensive. While not extensive, agricultural activities also occur in the Hidden Valley-Steamboat Creek HUC-12 Watershed. Murray Ranch is in the middle reach of Steamboat Creek, where the creek exhibits good channel sinuosity and flood plain (CDM Smith,

2017). Pasture with active grazing is located along Steamboat Creek where there is little or no buffer with the creek. Fertilizers, herbicides, and livestock waste commonly associated with agriculture can be water quality concerns.

Nitrate from Individual Sewage Disposal Systems

Individual Sewage Disposal Systems, or septic systems, are associated with nitrate contamination of groundwater if there are large numbers concentrated in a small area, for example, neighborhoods with lot sizes less than one-acre, or if they are not maintained properly (WRWC, 2017). There is no municipal sanitary sewer for communities in this watershed and about 670 parcels, typically one-acre or larger, are served by septic systems. Septic systems are potential sources of nitrate contamination in the Critical SWPAs for the public water system wells in Pleasant Valley, Steamboat Valley, and along Browns Creek.

Sediment from Erosion

Sediment from erosion conveys pollution, such as phosphorous, and degrades downstream water with suspended sediment. The primary causes of erosion and sedimentation in this watershed include wildland fire, noxious weeds, and drainage and landscape modifications.

The 2016-2018 Draft Integrated Water Quality Report (NDEP, 2020) identifies Cadmium and Beryllium as examples of standards that need updating state-wide that would probably result in fewer water quality impairments. In the interim, this segment of Steamboat Creek is listed as impaired and the sources may be related to sediment from erosion. Historic Comstock era mining in the Washoe Lake area upstream is likely to be a source of mercury in Steamboat Creek related in erosion of mill tailings. Though highly mineralized and prone to erosion, it is not documented that tailings are a source of either cadmium or beryllium.

High-severity wildfires alter the overall structure of the ecosystem through the removal of vegetation leaving limited ground cover. Severe fires also create a waxy, water-repellant layer over the soil which increases water and soil runoff (NDF, 2011). The Washoe Drive Fire burned along Browns Creek below I-580 and the upper portion of Steamboat Creek. Burn intensity was the greatest in the upper portion of Steamboat Creek, and most of the vegetation in the 2,700 acres was burned. The Nevada Land Conservancy assisted with restoration measures to restore the burned area and improve the riparian corridor.

Areas invaded by noxious weeds are more susceptible to erosion and sedimentation in several ways. Noxious weeds do not have a root structure to retain soil and resist erosion due to wind or water. The fire risk is also increased because noxious weeds are more flammable than native species. Noxious weeds near drainages are common in this watershed. Cheatgrass remains present in the burn areas with musk thistle, tall whitetop, and poison hemlock in isolated areas (CDM Smith, 2017).

Drainages are often modified by being straightened, diverted or combined, to accommodate development. Much of the drainage modifications are designed to reduce the flood hazard on the adjacent areas. However, they result in higher water velocities which lead to headcuts, other bed and bank erosion, and downstream sedimentation. After heavy precipitation in 2017, stormwater discharges caused severe erosion and deposition in the flood plain area of Browns Creek and on the east bank of Steamboat Creek (CDM Smith, 2017). An access road used for the excavation of an irrigation ditch resulted in loose soil, rock, and debris transported into the creek. Other than these two occurrences, the stream appears stable with the appropriate and expected sinuosity as well as vegetation for beneficial channel stabilization. Moderate bank erosion is present at the upper reach of Steamboat Creek (CDM Smith, 2017).

Areas that are disturbed during construction projects can represent a potential risk of erosion and downstream sedimentation. Protection of stormwater runoff from contamination by construction in the Truckee Meadows is regulated under the regional stormwater management plan (Truckee Meadows MS4). There are many Best Management Practice (BMP) resources available to construction projects to help keep soil on-site and to reduce runoff.

Strategies to Protect and Improve Water Quality

The water quality concerns identified in this watershed can be addressed through management strategies described in this section, the proposed projects detailed in the Project Profiles, as well as applicable on-going water quality projects and programs described under Stakeholders and Plans. These strategies pertain to the entire watershed but may be prioritized in SWPAs.

Source Water Protection Area Identification and Management

A SWPA is a management area surrounding a surface water or groundwater resource that supplies water for public consumption. Activities in these buffer areas can affect the quality of water downstream or underground. These management strategies acknowledge the value of these SWPAs to prevent future contamination of sources of drinking water.

There are two types of buffers in this watershed (RCI, 2020). One buffer encompasses the western portion of the watershed and extends along perennial tributaries, which represents a precautionary indicator to safeguard groundwater recharge areas. The second type of buffer surrounds critical areas closer to streams and water system wells (based on a 20-year time of travel for

groundwater). These areas are illustrated on the Jurisdiction and Source Water Protection Areas Figure. The following objectives are significant in both future and on-going SWPA management:

- Inform landowners in SWPAs about their proximity to a valuable drinking water source and how they can help protect their water quality.
- Encourage coordination between Public Water Systems, landowners, and city or county planners to consider the importance of SWPAs in project reviews.
- Explore collaborative funding for water quality and watershed improvements and support the resource investigations needed to develop viable projects.
- Prioritize physical improvements in SWPAs to protect and improve source water quality.

Education and Outreach

The following education and outreach objectives are intended to help effectuate positive actions to protect water quality:

- Increase knowledge of how to protect and preserve the drinking water quality of this watershed.
- Increase knowledge of water quality protection and the pollution in stormwater runoff through local outreach efforts.
- Increase knowledge about household and commercial chemical use, storage and disposal through local outreach efforts.
- Inform landowners and developers residing in SWPAs about the importance of avoiding contamination due to their proximity to a valuable drinking water source.

Interagency Communication

The following interagency communication objectives are important tools to both reinvigorate and invest additional resources in water quality, as well as utilize existing resources and programs:

- Each agency may evaluate how to improve lines of communication within and between jurisdictions regarding water quality issues; i.e. Washoe County, Truckee Meadows Water Authority (TMWA), NDEP, Washoe County Health District, United States Department of Agriculture (USDA) Forest Service, and BLM.
- Continue to increase coordination and communication between the appropriate agencies regarding spills and corrective actions along Hwy 395, I-580 and Mt. Rose Hwy.
- Evaluate how to collaborate with stakeholders such as TMWA and the Truckee Meadows Storm Water Permit Coordinating Committee (Storm Water Committee) on incorporating drinking water protection into community outreach and education strategies.
- Collaborate with the Washoe/Storey Cooperative Weed Management Area to support their efforts in noxious weed management WSCWMA Website.

Wildfire and Fuel Management

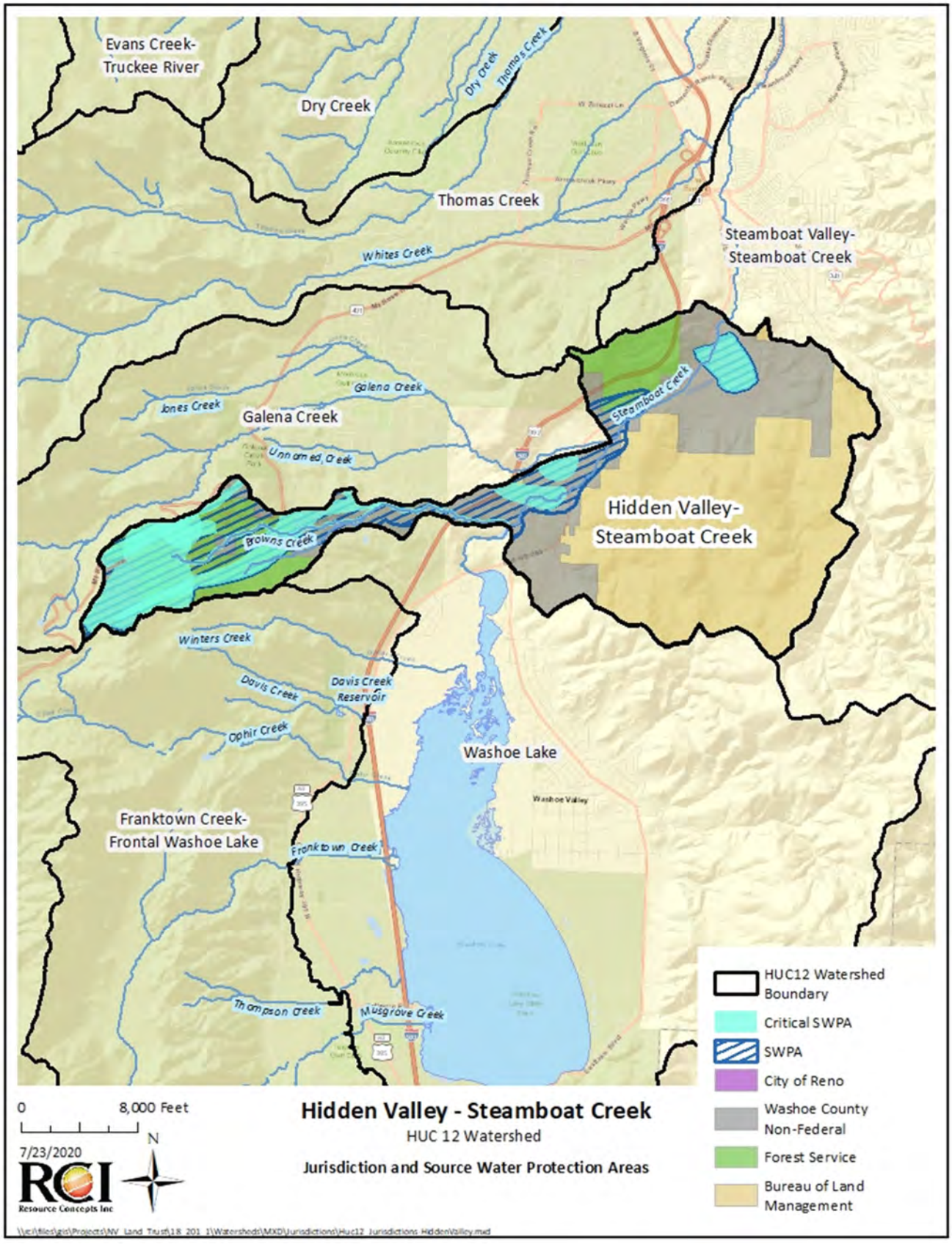
Wildland fire is a threat to water quality and coordinated fuel management on wildlands can help reduce risks to water quality. Stakeholders and partners may consider the following objectives as they pertain to wildfire and fuel management:

- Encourage development, maintenance, and implementation of the Community Wildfire Protection Plans.
- Support and collaborate with the Nevada Cohesive Strategy effort and the Shared Stewardship Agreement, the blueprint to address Nevada's wildland fire issues.
- Support for the Nevada Network of Fire Adapted Communities and their local chapters for people in high fire threat locations to fully prepare themselves, their homes, and the landscape where they reside to survive the destructive force of wildfire.
- Encourage the development of a wildland fire risk reduction and emergency recovery plan to reduce the risk of wildfire, quickly restore burned areas, and reduce the risk of catastrophic post-fire erosion and sedimentation.
- Collaborate and coordinate to treat invasive and noxious weeds pre- and post-fire to reduce risk of wildfire and watershed destabilization.

Resource Investigation and Planning

Stakeholders may consider supporting the following resource investigations and planning, which can help fill data gaps, inform implementation designs and prioritize projects:

- Research to identify non-point pollutant sources in the watershed and options for treatment.
- Water quality improvement planning for tributaries to the Truckee River.
- Development and implementation of integrated vegetation management programs.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Thomas Creek
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Whites Creek
Steamboat Valley-
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Galena Creek
Jones Creek
Galena Creek
Steamboat Creek
Unnamed Creek
Hidden Valley-
Steamboat Creek
Browns Creek
Winters Creek
Davis Creek
Davis Creek
Reservoir
Ophir Creek
Washoe Lake
Washoe Valley
Franktown Creek-
Frontal Washoe Lake
Franktown Creek
Thompson Creek
Musgrove Creek
HUC12 Watershed
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Hidden Valley - Steamboat Creek
HUC 12 Watershed
Jurisdiction and Source Water Protection Areas
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Water Quality Best Management Practices

Stakeholders may consider supporting the following Water Quality BMPs, that may improve and prevent degradation to water quality resources:

- Water quality improvement projects.
- Invasive weed removal and integrated vegetation management for creek stabilization.
- Recommendations in the tributary assessments.
- Proper abandonment of wells.
- Physical improvements prioritized in SWPAs for water quality improvement and protection.
- Nutrient management measures for irrigated green spaces.

Proposed Implementation Projects

Proposed implementation actions are generally described under the Strategies to Protect and Improve Water Quality. Specific implementation actions have been developed into proposed projects by local stakeholders and are described in Project Profiles. These Project Profiles include the information needed, as identified in the Environmental Protection Agency (EPA) guidance for nine critical elements, for an endorsable watershed management plan. Future projects could also be brought forward to funding agencies through:

- Demonstrating advancement of the strategies identified for this watershed in the Source Water and Watershed Protection Plan.
- Using the Project Profile format to establish consistency with the nine critical elements of an EPA endorsed plan.

As discussed in the following Stakeholders and Plans section, municipality and agency projects are also incorporated by reference.

Stakeholders and Plans

Stakeholder information and existing plans were used extensively in development of the Plan for Washoe County. These municipalities and agencies each have unique strategies and capital improvement plans that include water quality protection or improvement projects. These are updated regularly at differing timeframes (i.e. annually, every five years, etc.) according to their specific budgeting and planning processes. The applicable planning documents are briefly described and referenced in this section. Those projects pertaining to water quality protection and improvement in the watershed are incorporated by reference.

Project Stakeholders	
• Bureau of Land Management • USDA Forest Service • Nevada Department of Transportation • Nevada Division of Environmental Protection • Nevada Division of Forestry • One Truckee River • Truckee Meadows Regional Planning Agency	• Truckee Meadows Storm Water Permit Coordinating Committee • Truckee Meadows Water Authority • Truckee River Fund • Washoe County • Washoe County Health District • Western Regional Water Commission

Bureau of Land Management

The Nevada BLM has Resource Advisory Councils (RACs) which allow community members to be involved in natural resource planning and management issues on BLM managed public land. Washoe County is a part of the Sierra Front-Northwestern Great Basin RAC which is administered through the BLM-Carson City and Winnemucca District offices. BLM Resource Advisory Councils-Nevada

The BLM also has specific Resource Management Plans (RMPs), that apply to this watershed. These plans generally outline the way that the BLM currently manages and intends to manage the multiple resources on public land. Within this watershed, the following plans and sections are applicable:

- Carson City Consolidated Resource Management Plan (2001):

  RIP-1: Riparian Management discusses how riparian areas on BLM land should be managed, monitored, and maintained. The desired outcome in this section is to protect and maintain existing and potential fisheries and riparian areas in good or better condition.

  SWA-1: Soils, Watershed and Air Quality describes specific techniques and goals for all watersheds within the planning area such as reducing soil loss, flood damage, and sediment damage from human activities.

WAT-1: Water Resources discusses management for good water quality on public lands such as watershed management plans as an important administrative action.

- Carson City Fire Management Plan (2016):

  The Fire Management Plan (FMP) goal is to restore sagebrush ecosystems throughout the planning area. In doing so, the risk of wildfire and its negative effects should eventually decrease. Since wildfire is a significant issue in this watershed, management to reduce its risk is a key planning component.

USDA Forest Service

The Humboldt-Toiyabe National Forest within this watershed is managed by the Carson Ranger District. Natural resource projects, including projects undergoing National Environmental Policy Act (NEPA) documentation, are listed on the Forest Service website. The Humboldt National Forest and Toiyabe National Forest Biannual 2018 Monitoring Report describe the conditions of the watershed and present monitoring information.

Additionally, the Forest Service has created Land and Resource Management Plans (LRMP) to guide management decisions within the Humboldt-Toiyabe National Forest. Water resources are outlined in the LRMP along with management actions including maintenance, monitoring and enhancement of water quality:

- Humboldt National Forest Land and Resource Management Plan:

  Section IV.C.5 is "Soil and Water within the Forest-Wide Standards and Guidelines". This outlines the goals for the soil and resources on Forest Service managed land.

  Section V.A is the "Implementation Direction of the Forest Plan". This describes how the LRMP will be analyzed for its level of success.

- Toiyabe National Forest Land and Resource Management Plan:

  Section IV is the "Forest Management Direction with Forest-wide Standards and Guidelines" for soil and water as well as riparian areas. These sections outline the goals for the forest.

  Section V is the "Implementation of the Forest Plan" including the direction of the LRMP which also outlines the goals for the Forest.

Nevada Department of Transportation

The Nevada Department of Transportation (NDOT) has developed their Stormwater Management Program to reduce stormwater pollution from NDOT managed facilities and roads. The program BMPs and annual report outline the specific measures that NDOT will take to reduce stormwater pollutant discharges from its owned and operated storm drain system:

- Stormwater Management Program (2013):

  The overall goal of the NDOT Stormwater Management Program is to reduce pollution associated with stormwater from NDOT's MS4 to the maximum extent practicable, as well as to protect surface and groundwater resources within the MS4 permit area. The Stormwater Management Program addresses stormwater pollution control as it relates to the planning, design, construction, and maintenance of NDOT's highway infrastructure statewide.

- Stormwater Management Program: Annual Report (2017):

  This watershed is impacted or has the potential to be impacted by I-580 and Hwy 395. The Stormwater Management Program provides a helpful planning outline on handling and mitigating pollution from the roads.

Nevada Division of Environmental Protection

The NDEP has a goal to preserve and enhance the environment of the State in order to protect public health, sustain healthy ecosystems, and contribute to a vibrant economy. The Hidden Valley-Steamboat Creek HUC-12 Watershed has several challenges facing source water protection, so the NDEP is an essential stakeholder and planning partner. Specifically, there are two programs under the NDEP that were involved in the Plan in Washoe County. Both programs provide education and outreach and offer funding opportunities for water quality protection and improvement:

- Integrated Source Water Protection Program under the Safe Drinking Water Bureau:

  This program offers technical assistance for source water protection projects. The program coordinates source water protection activities at the local, state, and federal levels, and encourages community-based protection and preventive management strategies to ensure all public drinking water resources are kept safe from future contamination.

  The 2010 Nevada Integrated Source Water Protection Program guidance document details the program components as well as the requirements for a State-endorsed Community Source Water Protection Plan.

- 319 Nonpoint Source Pollution Management Program under the Bureau of Water Quality Planning:

  This Program can provide matched grant funding for projects that improve water quality.

  The 2015-2019 State of Nevada Nonpoint Source Management Plan establishes how NDEP will work with partners to address NPS pollution. The Plan formalizes Nevada's approach for protecting and improving water quality and describes the goals, short- and long-term objectives, milestones and timeframes to guide activities, and measures for tracking success.

Nevada Division of Forestry

The Nevada Division of Forestry (NDF) is a State agency that uses a collaborative process to deliver science based natural resource management and protection to promote resilient landscapes, fire adapted communities, and safe, effective wildfire response provided by employees that embrace the core values of duty, respect, and integrity.

NDF provides professional natural resource and wildland fire management services to Nevada citizens and visitors to enhance, conserve and protect forest, rangeland and watershed values, endangered plants, and other native flora. Protection of these resources helps to improve water quality:

- Community Wildfire Protection Plans:

  Community Wildfire Protection Plans (CWPPs) are authorized and defined in Title I of the Healthy Forests Restoration Act of 2003 (HFRA). CWPPs represent the best opportunity that communities have to address the challenges of the Wildland-Urban Interface. A CWPP helps communities define their priorities for the protection of life, property, and shared assets-at-risk from wildfires. Developing a CWPP encourages community members and leaders to have valuable discussions about wildfire preparedness, evacuation planning, and local fire district capabilities. The CWPP increases grant funding opportunities by prioritizing fuel reduction projects around and within the community.

- Nevada Wildland Fire Cohesive Strategy:

  The Nevada Fire Board Oversight Body is the custodian of the 2015 Nevada Wildland Fire Cohesive Strategy Summit's Action Plan to ensure goal achievement and identify emerging topics. This oversight body acts as an "advisory" body and is charged with taking the Nevada Cohesive Strategy Summit report and its Action Steps, ensuring that goal achievement is accomplished and monitoring emerging topics through the Nevada Fire Board. This body monitors progress, develops issue resolution, and addresses emerging issues such as protecting water quality.

Truckee Meadows Regional Planning Agency

The Truckee Meadows Regional Planning Agency (TMRPA) fosters coordination among Reno, Sparks and Washoe County. TMRPA facilitates land-use, infrastructure provision and resource management conversations among public and private decision makers. The agency also serves as a collaborative information and data warehouse, coordinating regional data collection and delivering advanced geospatial analytics for regional solutions. TMRPA includes a Regional Planning Governing Board and a Regional Planning Commission.

The TMRPA Regional Plan (2012 as amended) provides goals and policies for multiple plans and programs, including those with watershed related and well head protection components. The plan was revised in 2019-2020 and is considered a living document that will evolve over time.

Truckee Meadows Storm Water Permit Coordinating Committee

The Storm Water Committee is responsible for implementing the Truckee Meadows Storm Water Management Program to protect the water quality of the region's waterways, streams and the Truckee River. The Storm Water Committee continues to guide the development of numerous plans and assessments relevant to source water and watershed protection as summarized below.

Ordinance and Guidance Changes for Construction and Post-Construction Programs

The Storm Water Committee updated and joined the Structural Controls Design Manual and the Low Impact Development Manual, as well as updated the Truckee Meadows Construction Site BMP Handbook. These documents are referenced in the code for the city of Reno, city of Sparks, and Washoe County.

Watershed Assessments

Watershed assessment reports prepared for the Storm Water Committee were completed by Jesch et al. from 2002-2011 and include the Browns and Steamboat Creeks. These reports provide general watershed descriptions and can be used to track historical changes in creek condition and water quality over time. The reports do not include water quality data.

Hillside Design completed a comprehensive Watershed Assessment for Tributaries to the Truckee River in 2012 for these tributaries in this watershed: Browns Creek and Steamboat Creek.

The assessment included:

- Stream reach descriptions with numerous photo points,
- Proper Functioning Condition rating, and
- List of restoration and management efforts needed to improve stream conditions, and water chemistry for temperature, pH, specific conductivity, dissolved oxygen, turbidity, and flow.

CDM Smith was contracted in 2015 through 2017 to conduct watershed assessments. The following table lists the report year and the respective drainages and reaches that were recently assessed in this watershed:

Stream Reaches Addressed in Watershed Assessment Reports in the Hidden Valley-Steamboat Creek Watershed by Report Year			
Stream Name	Lower Reach	Middle Reach	Upper Reach
	2017	2017	2017
Browns Creek	X		
Steamboat Creek	X	X	X

Watershed Management and Protection Plan for Tributaries to the Truckee River

The Watershed Management and Protection Plan for Tributaries to the Truckee River (NCE, 2020) is an update to the 2003 Watershed Management and Protection Plan for Tributaries to the Truckee River, which has been implemented for more than 15 years by the regional MS4 through the Storm Water Committee. The 2003 plan described an approach for on-going watershed assessment studies and monitoring to protect and improve the water quality in the stream corridors and drainages tributary to the Truckee River. The 2020 plan update provides a process and framework for identifying, developing, and implementing projects originated through the Storm Water Committee that is consistent with the guidelines for an EPA approved Watershed Management Plan. The 2020 plan by NCE and the 2020 Integrated Source Water and 319(h) Watershed Protection Plan for Public Water Systems and the Truckee River in the Truckee Meadows, are mutually complementary and work together to address the broad scope of potential strategies to improve drinking water and surface water quality in Washoe County.

Water Quality Monitoring

Balance Hydrologics has conducted water quality analyses on tributaries and stormwater outfalls since 2016. The following table lists the report years and the respective drainages that were assessed in this watershed:

Streams Addressed in Stormwater Monitoring Annual Reports in the Hidden Valley-Steamboat Creek Watershed by Report Year			
Stream Name	Entire Reach		
	2016	2017	2018
Browns Creek			
Steamboat Creek	X	X	X

Truckee Meadows Watershed Protection Manual

This manual contains a Summary of the Watershed Protection Activities and Programs Developed in Conjunction with the Watershed Management Facilitator Scope of Work (Kennedy/Jenks, 2005). This document provides a reference and compendium of the various watershed protection activities and programs that were developed in 2004 and 2005 for Reno, Sparks and Washoe County.

Truckee Meadows Water Authority

TMWA is responsible for almost all municipal water delivery in the greater Reno-Sparks area. TMWA also owns and operates the municipal wells in this watershed. The following program and plans guide the management of these water resources:

- TMWA Water Resource Plan (2016-2035):

  This plan describes water quality issues and goals for the water resources managed by TMWA. Special focus is placed on changes in future water supply and demand and how those changes will impact the region's water resources. Additionally, this plan provides useful Truckee River watershed information.

- Source Water Quality Assurance Program (2016-2035):

  TMWA's objective is to deliver high-quality potable water to its customers in a cost-effective manner. To achieve this objective, TMWA has established a water quality assurance program. The components that make up the program are source water quality protection, potable water treatment, maintenance of distribution system water quality, and cross connection control.

- Wellhead Protection Plan (2016):

  The purpose of the Wellhead Protection Plan is to protect groundwater that serves as a source for public drinking water supplies. This plan is intended to be a tool used by TMWA to assist in protecting drinking water sources.

Truckee River Fund

TMWA established the Truckee River Fund in 2004 (Truckee River Fund). The purpose of the Fund is to "protect and enhance water quality or water resources of the Truckee River, or its watershed." The Fund provides a way to respond to the requests from outside groups and organizations that are involved in promoting and improving the health of the Truckee River System and watershed. This in turn benefits the primary water source for the community and, in the long run, benefits TMWA customers. For example, The Truckee River Fund has helped finance the following project:

- Washoe Drive Fire Emergency Watershed Stabilization & Restoration Effort (funded 2012):

  This effort focused on remediating damage from the Washoe Drive Fire. The activities in this effort included typical fire reconstructive efforts such as installation of sediment logs, hydro seeding of slopes, replanting of riparian vegetation, installation of willow waddles and willow stakes, and repairs to drainage systems. Water quality in the watershed will benefit and will continue to benefit from these activities by reducing sedimentation and decreasing the future wildfire potential in the area.

Washoe County

Activities in Washoe County are reviewed according to the Master Plan Planning Areas. The Truckee River watershed includes nine planning areas. The Hidden Valley-Steamboat Creek watershed is included in both the South Valleys and Forest planning areas. In addition, the county has Citizens Advisory Boards (CABs) which provide a community perspective on local issues to the Washoe County Board of Commissioners. This watershed is wholly within the South Truckee Meadows/Washoe Valley CAB. (CAB Boundaries).

The Washoe County Master Plan (2008) has Goals and Policies for Public Services and Facilities, and Open Space and Natural Resource Management. Applicable sections include:

- Article 418, Significant Hydrologic Resources, which regulates development activity within and adjacent to perennial streams to ensure that these resources are protected and enhanced. (Note: this does not apply to the Truckee River)
- Article 420, Storm Drainage Standards, sets forth standards for ensuring that both private and public development provides adequate protection for citizens and property. Therefore, it minimizes and controls erosion and pollution impacts on the natural environment, and additionally minimizes maintenance costs for drainage and flood control systems.
- Article 421, the Storm Water Discharge Program, which protects and enhances the water quality of watercourses, water bodies, groundwater, and wetlands in a manner pursuant to and consistent with the Clean Water Act.
- Article 810, Special Use Permits, which provides a method of reviewing certain uses to determine if they have the potential to adversely affect public facilities in the vicinity.

Washoe County also provides comprehensive services for construction and maintenance roads, landscaping and drainage facilities; county-wide planning and code compliance; and emergency response services for fire and hazardous materials. All of these roles contribute to preserving and improving water quality in the watershed.

Washoe County Health District

The Washoe County Health District has regulatory authority over a wide variety of programs and services in the Truckee Meadows including underground storage tanks, septic systems, all public water systems, domestic wells, water projects and community development, grading permits, solid waste management and emergency preparedness. The Health District regulations are provided in several documents as listed below:

- Regulations of the Washoe County District Board of Health Governing Sewage, Wastewater and Sanitation. These regulations provide the minimum requirements to be followed by any person developing property served by an on-site sewage disposal system. These requirements are promulgated to prevent the spread of disease, protect the water quality of this county, and ensure the on-site sewage disposal systems function properly.

- Regulations of the Washoe County District Board of Health Governing Well Construction. These regulations provide minimum requirements to be followed by any person when drilling and plugging specific kinds of wells. A well construction permit is required to drill a well for consumptive use or monitoring wells. These requirements are primarily promulgated to protect the quantity and quality of the waters of this county from waste and contamination, and to provide public protection by enforcing proper construction and plugging of wells.
- Regulations of the Washoe County District Board of Health Governing Solid Waste Management. These regulations protect water quality through the regulation of municipal solid waste landfills.

Western Regional Water Commission and the Northern Nevada Water Planning Commission

The Western Regional Water Commission (WRWC) focuses on improving water resource planning at the regional level and facilitating coordinated resource management among city of Reno, city of Sparks, Washoe County, TMWA, Truckee Meadows Water Reclamation Facility, South Truckee Meadows GID and Sun Valley GID.

The Northern Nevada Water Planning Commission (NNWPC) is a technical advisory panel that reports to the WRWC. The NNWPC develops and updates a Comprehensive Regional Water Management Plan (RWMP) and recommends it to the WRWC for adoption. In addition, the NNWPC develops priorities and an annual budget for the Regional Water Management Fund, also for recommendations to the WRWC.

The Comprehensive Regional Water Management Plan includes several applicable objectives:

- Objective 1.2 Provide for a Sustainable Water Supply and an Acceptable Level of Service to the Community (including protecting groundwater recharge areas).
- Objective 1.3 Implement measures to protect and enhance water quality for a sustainable water supply (including source water protection).
- Objective 2.1 Promote Efficient Use of Resources (Reduction of Non-Point Source Pollution for TMWRF Pollutant Credit).
- Objective 2.2 Manage wastewater for protection and enhancement of water quality.
- Objective 3.1 Effective and integrated watershed management (protection of human health, property, water quality including storm water).

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TMWA. Truckee River Fund. Truckee River Fund

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United States Forest Service Humboldt Toiyabe National Forest Carson District website. United States Forest Service Carson District

Washoe County Master Plan, 2008. Washoe County 2008 Master Plan, Washoe County Health District

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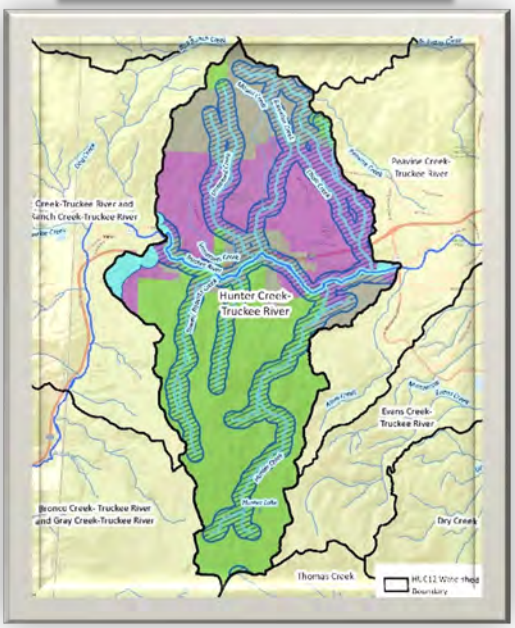
WRWC, Western Regional Water Commission, Comprehensive Regional Water Management Plan 2016-2035 Update, 2017. WRWC Comprehensive Regional Water Management Plan 2016-2035

Hunter Creek-Truckee River

HUC-12 Watershed #160501020505 Profile

Click here for complete HUC-12 Watersheds Map



Contents

Introduction

The Hunter Creek-Truckee River HUC-12 Watershed profile is a component of the 2020 Integrated Source Water and 319(h) Watershed Protection Plan for Public Water Systems and the Truckee River in the Truckee Meadows (Plan), as well as the Watershed Management and Protection Plan for Tributaries to the Truckee River. This document is a part of the on-line watershed mapping tool.

This watershed description is intended to be a guide and resource for organizations working within the watershed, and an educational tool for those interested in learning more about the watershed in which they live. This Plan can be used to support funding for a multitude of water quality projects in the watershed. Note that only non-regulated activities are eligible for the Nevada Division of Environmental Protection Source Water Protection Program or the 319 Non-Point Source Program funding.

Summary

This profile focuses on the watershed's water quality. It includes potential and existing concerns, types of land uses, watershed management strategies and projects, and the involved stakeholders and their corresponding plans with water quality components.

The Hunter Creek-Truckee River HUC-12 Watershed includes the south flank of Peavine Mountain, the north flank of the Carson Range and the Truckee River corridor. Residential development dominates the land use and is expanding on Peavine Mountain. Commercial development along I-80, US Hwy 40, and the railroad corridor parallel the Truckee River. The north flank of the Carson Range is mostly undeveloped public land with a few ranches and housing developments close to the south side of the river. The Highland Diversion Dam sends Truckee River water through the Highland Canal to the Chalk Bluff Water Treatment Plant operated by the Truckee Meadows Water Authority (TMWA). The river provides about 80-85% of the drinking water to over 425,000 people in TMWA's service area. There are five other perennial streams and four major irrigation ditches that traverse this watershed.

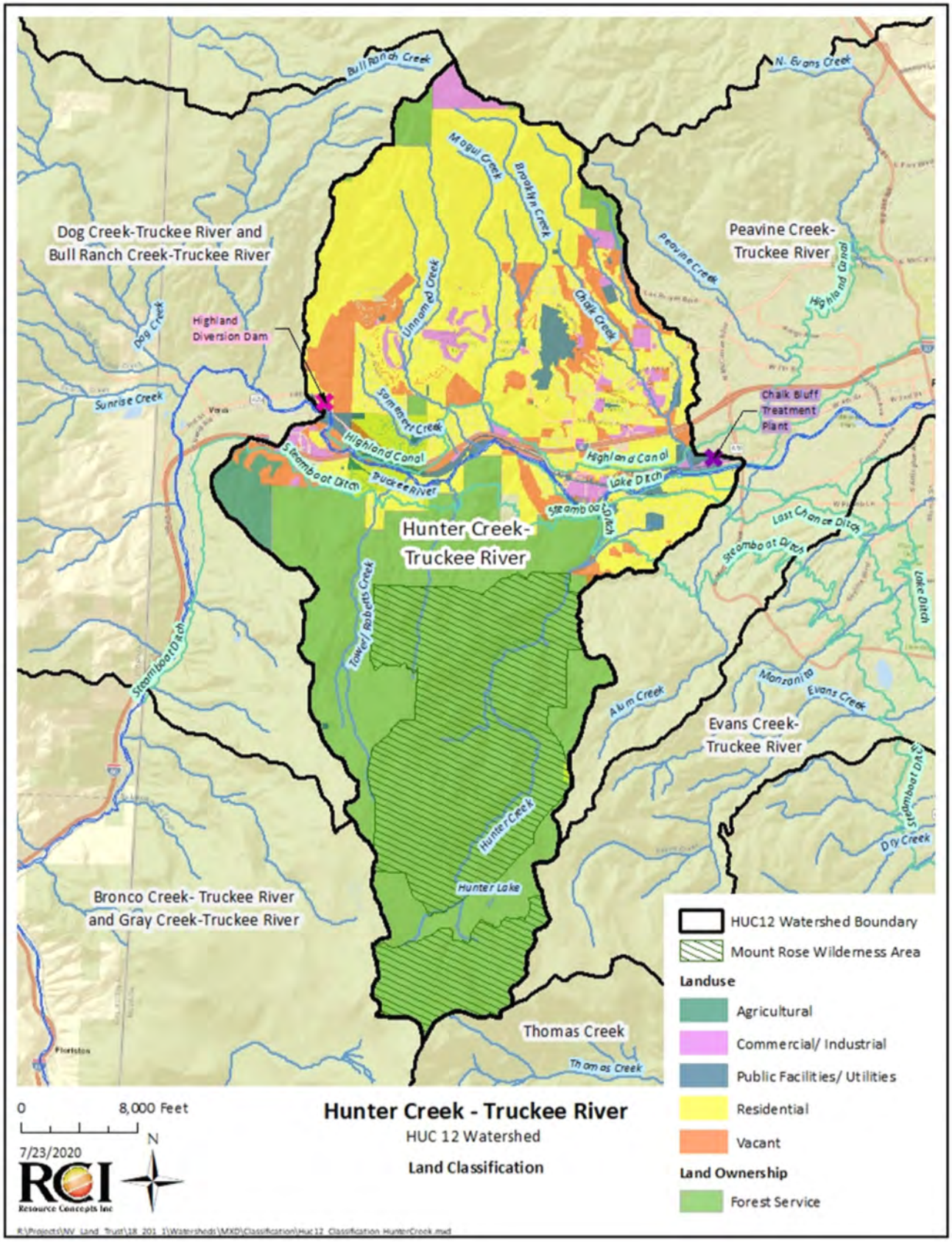
Source Water Protection Areas (SWPAs) for this watershed were developed by stakeholders to help protect drinking water sources. The perennial surface water resources in this watershed are in a SWPA because this watershed is upstream of surface water diversions for public drinking water and because it is an important area for groundwater recharge. It also hosts four small public water system wells near the river. The following table summarizes key water quality aspects of this watershed.

Watershed Summary	
Basins	• Hunter Creek-Truckee River HUC-12 Watershed #160501020505 • Groundwater Basins: 091 (Truckee Canyon Segment) 087 (Truckee Meadows)
Water Bodies & Water Quality	• Truckee River, not impaired in this watershed, see NAC 445A.1684. • Hunter Creek, not impaired, see NAC 445A.1708. • Chalk Creek, impaired for Nitrate, Phosphorous (total and Ortho), Temperature, Total Dissolved Solids (TDS), Total Suspended Solids (TSS), Selenium, Sulfates, see NAC 445A.1684. • Brooklyn Creek, Mogul Creek, Somersett Creek, Tower Creek (aka Roberts Creek), Unnamed Creek, east of Tower/Roberts Creek, Unnamed Creek west of Mogul Creek, not assessed. • Highland Canal and Orr Ditch, Steamboat Ditch, Last Chance Ditch, and Lake Ditch, not assessed.
Source Water Protection Areas	• A SWPA provides a buffer around perennial streams in this watershed, and it represents a precautionary indicator to safeguard the drinking water sources. • Critical SWPAs represent areas closer to perennial streams, tributaries, springs, and public water system wells. • 7 public water system wells managed by 4 different public water systems. • 11,900 total acres, or roughly 40% of the watershed is within the Source Water Protection Area. • 2,800 total acres, or approximately 10% of the watershed is within a Critical Source Water Protection Area.
Special Considerations & Issues	• Highland Diversion Dam diverts water from the Truckee River into the Highland Canal, which conveys water to the Chalk Bluff Water Treatment Plant. • New urbanization in the watershed has potential for increased pollution and leaching of dissolved nutrients and salts into tributaries and the Truckee River. • Potential for wildland fire in the large forested areas, making drainages and irrigation canals vulnerable to damage. • Residential community septic systems have potential for nitrate leaching. • Major transportation corridors: I-80, Hwy 40, and the railroad. • Much of the upper watershed managed by the U.S. Forest Service (USFS) is designated wilderness.

	Type	Acres	%
Land Jurisdiction	City of Reno:	8,680	30%
	Washoe County Non- Federal:	5,995	21%
	USFS:	13,900	49%
Land Use	Agriculture:	445	2%
	Commercial/Industrial:	940	3%
	Residential:	10,125	33%
	Public Facility/Utility:	390	3%
	Vacant:	1,950	8%
	Roads and Water:	1,140	4%
	Federally Managed:	13,900	47%

Land uses and jurisdictions in the watershed are summarized in the adjacent table and illustrated by the Land Classification Figure.

Residential and federally managed public land uses are the dominant acitivities in this watershed. The potential and existing water quality concerns generated are primarily due to risk of wildland fire, hazardous material spills or leaks, and pollution from urban area runoff or excessive irrigation.


Dog Creek-Truckee River and
Bull Ranch Creek-Truckee River
Peavine Creek-
Truckee River
Hunter Creek-
Truckee River
Evans Creek-
Truckee River
Bronco Creek- Truckee River
and Gray Creek-Truckee River
Thomas Creek
Bull Ranch Creek
N. Evans Creek
Mogul Creek
Brooklyn Creek
Unnamed Creek
Chalk Creek
Peavine Creek
Highland Canal
Dog Creek
Highland
Diversion Dam
Sunrise Creek
Sommerset Creek
Steamboat Ditch
Truckee River
Chalk Bluff
Treatment
Plant
Lake Ditch
Last Chance Ditch
Tower/ Roberts Creek
Alum Creek
Monzanita
Evans Creek
Hunter Creek
Hunter Lake
Dry Creek
Thomas Creek
HUC12 Watershed Boundary
Mount Rose Wilderness Area
Landuse
Agricultural
Commercial/ Industrial
Public Facilities/ Utilities
Residential
Vacant
Land Ownership
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Resource Concepts Inc
Hunter Creek - Truckee River
HUC 12 Watershed
Land Classification

Water Quality Standards and Beneficial Uses

Water quality standards for surface water in the State of Nevada are established by Nevada Administrative Code (NAC) NAC 445A.11704 through NAC 445A.2234. Standards applicable to beneficial uses are generally described under NAC 445A.122. The Nevada Division of Environmental Protection (NDEP) Bureau of Water Quality Planning Nevada 2016-2018 Water Quality Integrated Report identifies the beneficial uses and the surface water quality conditions in this watershed, as summarized below:

- Chalk Creek is tributary to the Truckee River just upstream of the river diversion at the Chalk Bluff Dam to the Chalk Bluff Water Treatment Plant. The creek is impaired for several beneficial uses (water quality standards NAC 445A.1684):
  - support of "aquatic life" due to Temperature, Selenium, and Nitrate.
  - support of "aquatic life" and "recreation involving water contact" due to Orthophosphate and Total Phosphorus.
  - "municipal or domestic supply" due to Total Dissolved Solids (TDS) and Sulfate.
- Hunter Creek fully supports beneficial uses (water quality standards NAC 445A.1708).
- The Truckee River fully supports beneficial uses through this segment of the watershed (water quality standards NAC 445A.1684).
- Other drainages in the watershed have not been assessed.

Groundwater and surface water are both important sources of drinking water for public water systems in this watershed. Known contaminants within the watershed include suspended sediments in the Truckee River and the contaminants identified in Chalk Creek. Sources for these contaminants are described under Pollution from Urban Area Runoff and Sediment from Erosion below.

Potential and Existing Water Quality Concerns

The primary potential and existing water quality concerns in this watershed are listed below and described in the following paragraphs:

- Hazardous Materials from Spills or Leaks
- Pollution from Urban Areas
- Nitrate from Individual Sewage Disposal System
- Sediment from Erosion
- High Temperature due to Low or Slow Moving Water

Hazardous Materials from Spills or Leaks

The railroad, US Hwy 40, and I-80 parallel the Truckee River in the Hunter Creek-Truckee River HUC-12 Watershed. The U.S. Department of Transportation accumulated a list of commonly transported hazardous materials within the Truckee River watershed (WRWC, 2017). These include:

- Ammonia perchlorate
- Anhydrous ammonia
- Chlorine
- Cyanide
- Hydrochloric acid
- Hydrogen sulfide
- Nitro cellulose (wet)
- Propane
- Petroleum naphtha
- Phosphoric acid
- White phosphorous
- Propargyl alcohol
- Sulfuric acid
- Sodium hydroxide

There are several locations where spilled materials could easily and quickly enter the Truckee River upstream of the Chalk Bluff Water Treatment Plant. Emergency response plans and protocols have been developed between TMWA and emergency management agencies along this corridor.

Though limited in number, there are also commercial and industrial businesses adjacent to this segment of the river. In 2019, TMWA and the Washoe County Health District worked with the Arconic facility to improve material storage and handling that would reduce the potential for an accidental release causing river water contamination above the Chalk Bluff Water Treatment Plant. The travel time to the water intake and contaminant concentration at the intake depends primarily on the level of the river flows during and shortly after the time of the spill (Rivord et al. 2014).

Pollution from Urban Area Runoff

Groundwater, surface water, and irrigation ditches may be vulnerable to polluted runoff in urban areas, particularly across the south flank of Peavine Mountain where there are expanding residential developments. Potential contaminants include:

- Nutrients from fertilizers
- Dissolved salts from excess irrigation
- Trash
- Bacteria from animal waste
- Pollution from household waste
- Runoff from roads and parking lots

Excessive fertilization in green areas such as yards, fields, golf courses or parks are potential sources of nutrients from runoff. These areas may also contribute *Escherichia coli* (*E. coli)* from animal waste such as from horses, dogs and geese. Agricultural properties in the area also have livestock and farming practices which may contribute to water quality issues from fertilizers, herbicides and livestock waste.

Excess irrigation of green areas can also create persistent "dry weather" flows due to direct discharge to storm drains and/or seepage through shallow soil layers to existing natural drainages. Irrigation seepage through desert soils, that were not previously irrigated, can mobilize salts (TDS), which in turn can lead to perennial flows with poor water quality in drainages that were originally ephemeral. Water quality concerns in Chalk Creek (TDS, Sulfate, Selenium, and Nitrate) maybe related to this type of seepage (JBR, 2010).

Nitrate from Individual Sewage Disposal Systems

Individual Sewage Disposal Systems, or septic systems, are associated with nitrate contamination of groundwater if there are large numbers concentrated in a small area, for example, neighborhoods with lot sizes less than one acre, or if they are not maintained properly (WRWC, 2017). There are about 1,000 parcels with septic systems in this watershed, some with lot sizes between 0.3 and 0.6 acres that are located near the Truckee River (for example, older neighborhoods in Mogul and along Mayberry Drive).

Sediment from Erosion

Sediment from erosion conveys pollution, such as phosphorous, and degrades downstream water with suspended sediment. The primary causes of erosion and sedimentation in this watershed include wildland fire, noxious weeds, and drainage and landscape modifications.

Wildfire is a concern in this watershed since it is directly upstream of the Chalk Bluff Water Treatment Plant, and excessive sediment from wildfires could require the surface water intakes to be shut down due to water turbidity. Severe fires create a waxy, water-repellant layer over the soil which increases the risk of erosion and reduces the ability for water to infiltrate the soil (NDF, 2011). This area is at the edge of the Peavine Mountain urban-wildland interface region and has been plagued by fires.

Areas invaded by noxious weeds are more susceptible to erosion and sedimentation in several ways. Noxious weeds do not have a root structure to retain soil and resist erosion due to wind or water. The fire risk is also increased because noxious weeds are more flammable than native species. Noxious weeds near drainages are common in this watershed. The City of Reno Public Works Department, City of Reno Parks Department, and Washoe County all work in this area to manage invasive weeds, such as tall whitetop, cheatgrass, bull thistle and musk thistle.

Drainages are often modified, such as straightened, diverted or combined, to accommodate development. Much of the drainage modifications are designed to reduce the flood hazard on the adjacent areas. The hydromodifications result in higher water velocities which cause headcuts and other bed and bank erosion and downstream sedimentation. Hunter Creek and Tower Creek are conveyed through flood control channels along the north flank of the Carson Range, respectively. The Highland Canal traverses the eastern two-thirds of the watershed in pipes and in an open canal. The Highland Canal provides water to the Chalk Bluff Water Treatment Plant.

Areas that are disturbed during construction projects can represent a potential risk of erosion and downstream sedimentation. Stormwater runoff from construction sites in the Truckee Meadows is regulated under the regional stormwater management plan (Truckee Meadows MS4). There are many best management practice resources available to construction projects to help keep soil on-site and to reduce runoff.

Strategies to Protect and Improve Water Quality

The water quality concerns identified in this watershed can be addressed through management strategies described in this section, the proposed projects detailed in the Project Profiles, as well as applicable on-going water quality projects and programs described under Stakeholders and Plans. These strategies pertain to the entire watershed but may be prioritized in SWPAs.

Source Water Protection Area Identification and Management

A SWPA is a management area surrounding a surface water or groundwater resource that supplies water for public consumption. Activities in these buffer areas can affect the quality of water downstream or underground. These management strategies acknowledge the value of these SWPAs to prevent future contamination of sources of drinking water.

There are two types of SWPA buffers in this watershed (RCI, 2020). The first is a 1,000-foot buffer surrounding perennial streams in the watershed and represents a precautionary indicator to safeguard these drinking water sources. The second type of buffer covers more critical areas close to streams; 150 feet on either side of perennial streams and 300 feet on either side of the

Truckee River. It also includes areas close to water system wells and springs near Verdi to the west and 4th Street to the east, based on a 20-year time of travel for groundwater. These areas are illustrated on the Jurisdiction and Source Water Protection Areas Figure. The following objectives are significant in both future and on-going SWPA management:

- Inform landowners in SWPAs about their proximity to a valuable drinking water source and how they can help protect their water quality.
- Encourage coordination between Public Water Systems, landowners, and City or County planners to consider the importance of SWPAs in project reviews.
- Explore collaborative funding for water quality and watershed improvements and support the resource investigations needed to develop viable projects.
- Prioritize physical improvements in SWPAs to protect and improve source water quality.

Education and Outreach

The following education and outreach objectives are intended to help effectuate positive actions to protect water quality:

- Increase knowledge of TDS leaching and nutrient discharge to the Truckee River from the residential areas to engage residents in caring for their watershed.
- Increase knowledge of water quality protection and the pollution in stormwater runoff (i.e. from dog and horse feces).
- Inform landowners and developers residing in critical SWPAs about the importance of avoiding contamination and their proximity to a valuable drinking water source.

Interagency Communication

The following interagency communication objectives are important tools to both reinvigorate and invest additional resources in water quality, as well as utilize existing resources and programs:

- Each agency may evaluate how to improve lines of communication within and between jurisdictions regarding water quality issues, i.e. City of Reno, Washoe County, TMWA, NDEP, Washoe County Health District, and USFS.
- Continue to increase coordination and communication between the appropriate agencies regarding spills and corrective actions along I-80, Hwy 40, and the railroad.
- Evaluate how to collaborate with the Truckee Meadows Storm Water Permit Coordinating Committee (Storm Water Committee) in their public outreach and education efforts.
- Evaluate how to collaborate with stakeholders such as TMWA and the Storm Water Committee on incorporating drinking water protection into community outreach and education strategies.
- Collaborate with the Washoe/Storey Cooperative Weed Management Area to support their efforts in noxious weed management (WSCWMA Website).

Wildfire and Fuel Management

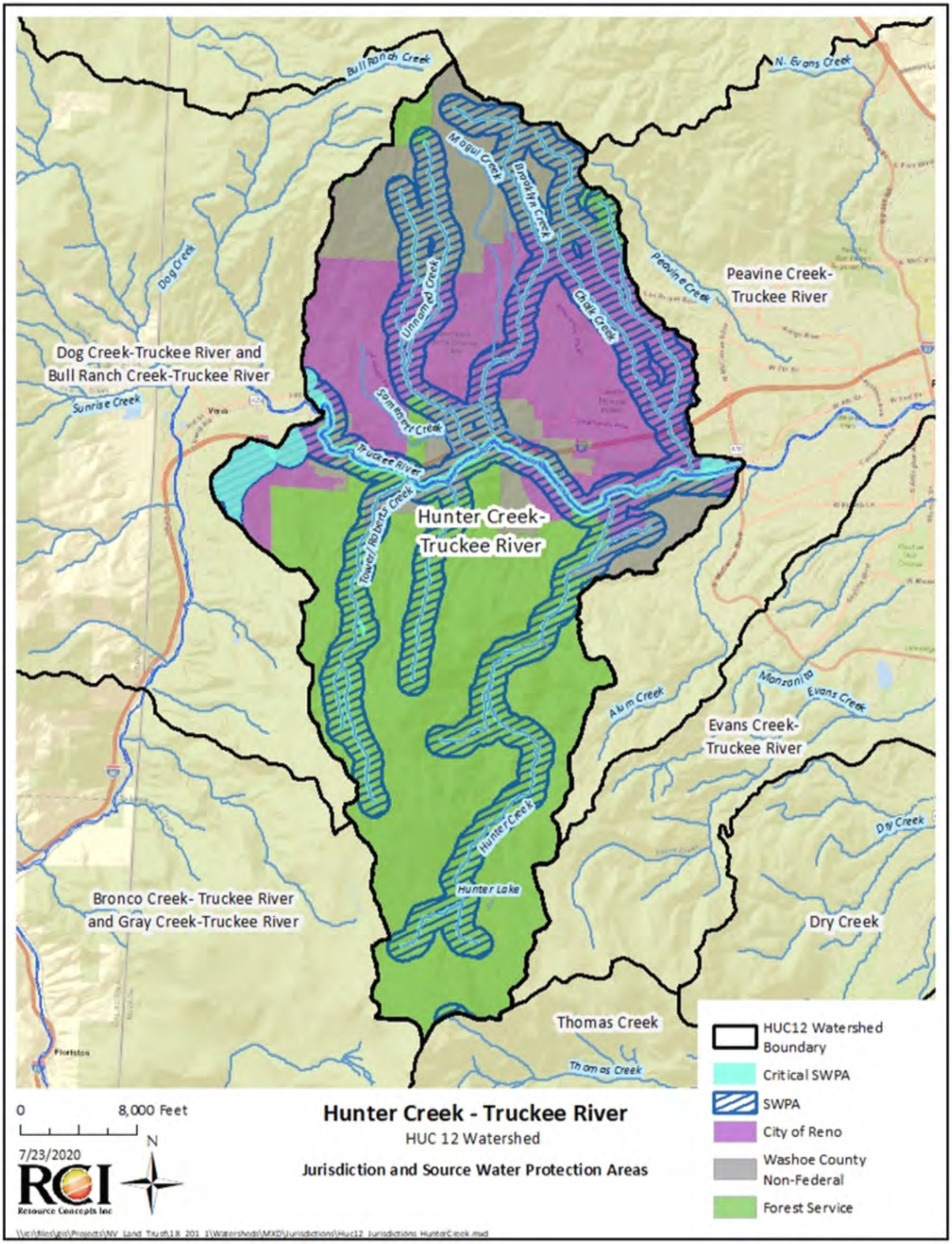
Wildland fire is a threat to water quality and coordinated fuel management on wildlands can help reduce risks to water quality. Stakeholders and partners may consider the following objectives as they pertain to wildfire and fuel management:

- Encourage development, maintenance, and implementation of the Community Wildfire Protection Plans.
- Support and collaborate with the Nevada Cohesive Strategy effort and the Shared Stewardship Agreement, the blueprint to address Nevada's wildland fire issues.
- Support for the Nevada Network of Fire Adapted Communities and their local chapters for people in high fire threat locations to fully prepare themselves, their homes, and the landscape where they reside to survive the destructive force of wildfire.
- Encourage the development of wildland fire risk reduction and emergency recovery plans to reduce the risk of wildfire, quickly restore burned areas, and reduce the risk of catastrophic post-fire erosion and sedimentation.
- Collaborate and coordinate to treat invasive and noxious weeds pre-and post-fire to reduce risk of wildfire and watershed destabilization.

Resource Investigation and Planning

Stakeholders may consider supporting the following resource investigations and planning, which can help fill data gaps, inform implementation designs and prioritize projects:

- Research to identify non-point pollutant sources in the watershed and options for treatment.
- Water quality improvement planning for tributaries to the Truckee River.
- Development and implementation of integrated vegetation management programs.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Mogul Creek
Brooklyn Creek
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Chalk Creek
Peavine Creek
Peavine Creek-
Truckee River
Dog Creek
Dog Creek-Truckee River and
Bull Ranch Creek-Truckee River
Sunrise Creek
Sommers Creek
Truckee River
Tower/Roberts Creek
Hunter Creek-
Truckee River
Alum Creek
Manzanita
Evans Creek
Evans Creek-
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RCI
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Hunter Creek - Truckee River
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Jurisdiction and Source Water Protection Areas

Water Quality Best Management Practices

Stakeholders may consider supporting the following Water Quality Best Management Practices, or BMPs, that may improve and prevent degradation to water quality resources:

- Water quality improvement projects.
- Invasive weed removal and integrated vegetation management for creek stabilization.
- Recommendations in the tributary assessments.
- Proper abandonment of wells.
- Physical improvements prioritized in SWPAs for water quality improvement and protection.
- Fertilizer and pesticide management measures for irrigated green spaces.

Proposed Implementation Projects

Proposed implementation actions are generally described under the Strategies to Protect and Improve Water Quality. Specific implementation actions have been developed into proposed projects by local stakeholders and are described in Project Profiles. These Project Profiles include the information needed, as identified in the Environmental Protection Agency (EPA) guidance for nine critical elements, for an endorsable watershed management plan. Future projects that fall within the strategies identified for this watershed should be brought forward and incorporated into this Plan using the Project Profile format. As discussed in the following Stakeholders and Plans section, municipality and agency projects are also incorporated by reference.

Stakeholders and Plans

Stakeholder information and existing plans were used extensively in development of this Plan for Washoe County. These municipalities and agencies each have unique strategies and capital improvement plans that include water quality protection or improvement projects. These are updated regularly at differing timeframes (i.e. annually, every five years, etc.) according to their specific budgeting and planning processes. The applicable planning documents are briefly described and referenced in this section. Those projects pertaining to water quality protection and improvement in the watershed are incorporated by reference.

Project Stakeholders	
• City of Reno	• Truckee Meadows Regional Planning Agency
• USDA USFS	• Truckee Meadows Storm Water Permit Coordinating Committee
• Nevada Department of Transportation	• Truckee Meadows Water Authority
• Nevada Division of Environmental Protection	• Truckee River Fund
• Nevada Division of Forestry	• Washoe County
• One Truckee River	• Western Regional Water Commission

City of Reno

The City of Reno Master Plan goals and policies provide the framework for decision-making in the community.

Drinking water protection is addressed in the Master Plan's guiding principle to promote a safe and more resilient community. The City works with TMWA and other partners to ensure clean drinking water.

Water quality is also addressed in the guiding principle for quality places and outdoor recreation opportunities in the sections on hydrologic resources, major drainageways and no net loss of wetlands, stream environments, playas, spring fed stands of riparian vegetation, and non-404 wetlands in the City, in terms of both acreage and value. The Design Principles for Sustainable Development also contain sections related to water quality.

The following articles from the Master Plan discuss several water-related items that are applicable to this Plan:

- Article I: Section 18.12.105 describes setbacks from the Truckee River.
- Article XVIII: Section 18.12.1801 to 1808 describes wetlands and stream environment protection standards established for the review of development proposals within wetlands, stream environments, and areas of significant hydrologic resources.
- Article XIX: Section 18.12.1902 to 1907 Drainage Way Protection Standards carries out the provisions of the City of Reno Major Drainageways Plan, an element of the City of Reno Master Plan, and establishes standards for the review of development proposals within major drainage ways to, among other actions, maintain, preserve, or enhance the quality of the water in both the Truckee River and Stead basins.

The City of Reno also provides comprehensive services for construction and maintenance roads, landscaping and drainage facilities, citywide planning and code compliance, and emergency response services for fire and hazardous materials. All these roles contribute to preserving and improving water quality in the watershed.

Additionally, the City of Reno is divided into five Neighborhood Advisory Board Wards. Each Ward has one representative on the Reno City Council that is specifically focused on the needs of their part of the City. These Wards provide opportunities for citizens to engage in important community issues and is the most efficient way for citizens to communicate their concerns and ask questions prior to any large decisions or projects. As such, these Wards and their input are essential in the implementation and success of any projects and plans within the community. Source water and watershed protection for this watershed falls within Wards 1 and 5.

USDA Forest Service

The Humboldt-Toiyabe National Forest within this watershed is managed by the Carson Ranger District. Natural resource projects, including projects undergoing NEPA documentation, are listed on the Forest Service website. The Humboldt National Forest and Toiyabe National Forest Biannual 2018 Monitoring Report describes the conditions of the watershed and present monitoring information.

Additionally, the Forest Service has created Land and Resource Management Plans (LRMP) to guide management decisions within the Humboldt-Toiyabe National Forest. Water resources are outlined in the LRMP along with management actions, including maintenance, monitoring and enhancement of water quality:

- Humboldt National Forest Land and Resource Management Plan:

  Section IV.C.5 is Soil and Water within the Forest-Wide Standards and Guidelines. This outlines the goals for the soil and resources on Forest Service managed land.

  Section V.A is the Implementation Direction of the Forest Plan. This describes how the LRMP will be analyzed for its level of success.

- Toiyabe National Forest Land and Resource Management Plan:

  Section IV is the "Forest Management Direction with Forest-wide Standards and Guidelines" for soil and water as well as riparian areas. These sections outline the goals for the forest.

  Section V is the "Implementation of the Forest Plan" including the direction of the LRMP which also outlines the goals for the Forest.

Nevada Department of Transportation

The Nevada Department of Transportation (NDOT) has developed their Stormwater Management Program to reduce stormwater pollution from NDOT managed facilities and roads. The program BMPs and annual report outline the specific measures that NDOT will take to reduce stormwater pollutant discharges from its owned and operated storm drain system:

- Stormwater Management Program (2013):

  The overall goal of the NDOT Stormwater Management Program is to reduce pollution associated with stormwater from NDOT's MS4 to the maximum extent practicable, as well as to protect surface and groundwater resources within the MS4 permit area. The Stormwater Management Program addresses stormwater pollution control as it relates to the planning, design, construction, and maintenance of NDOT's highway infrastructure statewide.

- Stormwater Management Program: Annual Report (2017):

  This watershed is impacted or has the potential to be impacted by I-80, I-580, Hwy 395, and Hwy 431. The Stormwater Management Program provides a helpful planning outline on handling and mitigating pollution from the roads.

Nevada Division of Environmental Protection

The NDEP has a goal to preserve and enhance the environment of the State in order to protect public health, sustain healthy ecosystems, and contribute to a vibrant economy. The Hunter Creek-Truckee River HUC-12 Watershed has several challenges facing source water protection, so the NDEP is an essential stakeholder and planning partner. Specifically, there are two programs under the NDEP that were involved in the Plan in Washoe County. Both programs provide education and outreach and offer funding opportunities for water quality protection and improvement:

- Integrated Source Water Protection Program under the Safe Drinking Water Bureau:

  This program offers technical assistance for source water protection projects. The program coordinates source water protection activities at the local, state, and federal levels, and encourages community-based protection and preventive management strategies to ensure all public drinking water resources are kept safe from future contamination.

  The 2010 Nevada Integrated Source Water Protection Program guidance document details the program components as well as the requirements for a State-endorsed Community Source Water Protection Plan.

- 319 Nonpoint Source Pollution Management Program under the Bureau of Water Quality Planning:

  This Program can provide matched grant funding for projects that improve water quality.

  The 2015-2019 State of Nevada Nonpoint Source Management Plan establishes how NDEP will work with partners to address nonpoint source (NPS) pollution. The Plan formalizes Nevada's approach for protecting and improving water quality and describes the goals, short- and long-term objectives, milestones and timeframes to guide activities and measures for tracking success.

Nevada Division of Forestry

The Nevada Division of Forestry (NDF) is a State agency that uses a collaborative process to deliver science based natural resource management and protection to promote resilient landscapes, fire adapted communities, and safe, effective wildfire response provided by employees that embrace the core values of duty, respect, and integrity.

NDF provides professional natural resource and wildland fire management services to Nevada citizens and visitors to enhance, conserve and protect forest, rangeland and watershed values, endangered plants and other native flora. Protection of these resources helps to improve water quality:

- Community Wildfire Protection Plans:

  Community Wildfire Protection Plans (CWPPs) are authorized and defined in Title I of the Healthy Forests Restoration Act of 2003 (HFRA). CWPPs represent the best opportunity for communities to address the challenges of the Wildland-Urban Interface. A CWPP helps communities define their priorities for the protection of life, property, and shared assets-at-risk from wildfires. Developing a CWPP encourages community members and leaders to have valuable discussions about wildfire preparedness, evacuation planning, and local fire district capabilities. The CWPP increases grant funding opportunities by prioritizing fuel reduction projects around and within the community.

- Nevada Wildland Fire Cohesive Strategy:

  The Nevada Fire Board Oversight Body is the custodian of the 2015 Nevada Wildland Fire Cohesive Strategy Summit's Action Plan to ensure goal achievement and identify emerging topics. This oversight body acts as an "advisory" body and is charged with taking the Nevada Cohesive Strategy Summit report and its Action Steps, ensuring that goal achievement is accomplished and monitoring emerging topics through the Nevada Fire Board. This body monitors progress, develops issue resolution, and addresses emerging issues such as protecting water quality.

One Truckee River

According to the One Truckee River website, "One Truckee River is a collaboration of public and private partners working together to realize a Truckee River that flows clean and clear, quenches our thirst, sustains the river's natural ecology, cultural resources and wildlife, and connects residents and visitors to unparalleled opportunities for recreation and regeneration":

- The One Truckee River Management Plan (2017) addresses actions to accomplish four primary goals, including protection of water quality and ecosystem health.

The following stakeholders were instrumental in compiling the plan and in implementing the plan action items:

- Truckee River Flood Management Authority
- Pyramid Lake Paiute Tribe
- Truckee Meadows Water Authority
- Resource Concepts, Inc.
- Nevada Division of Environmental Protection
- Renown
- Truckee Meadows Regional Planning Agency
- Keep Truckee Meadows Beautiful AmeriCorps
- Keep Truckee Meadows Beautiful
- Washoe County Health District
- City of Reno Public Works

Truckee Meadows Regional Planning Agency

The Truckee Meadows Regional Planning Agency (TMRPA) fosters coordination among Reno, Sparks and Washoe County. TMRPA facilitates land use, infrastructure provision and resource management conversations among public and private decision makers. The agency also serves as a collaborative information and data warehouse, coordinating regional data collection and delivering advanced geospatial analytics for regional solutions. TMRPA includes a Regional Planning Governing Board and a Regional Planning Commission.

The TMRPA Regional Plan (2012 as amended) provides goals and policies for multiple plans and programs, including those with watershed related and wellhead protection components. The plan was revised in 2019-2020 and is considered a living document that will evolve over time.

Truckee Meadows Storm Water Permit Coordinating Committee

The Storm Water Committee is responsible for implementing the Truckee Meadows Storm Water Management Program to protect the water quality of the region's waterways, streams and the Truckee River. The Storm Water Committee continues to guide the development of numerous plans and assessments relevant to source water and watershed protection as summarized below.

Ordinance and Guidance Changes for Construction and Post-Construction Programs

The Storm Water Committee updated and joined the Structural Controls Design Manual and the Low Impact Development Manual, as well as updated the Truckee Meadows Construction BMP Handbook. These documents are referenced in the code for the City of Reno, City of Sparks, and Washoe County.

Watershed Assessments

Watershed assessment reports prepared for the Storm Water Committee were completed by Jesch et al. from 2002-2011 that include the Chalk, Hunter, Mogul, Roberts, and Tower tributaries. These reports provide general watershed descriptions and can be used to track historical changes in creek condition and water quality over time. The reports do not include water quality data.

Hillside Design completed a comprehensive Watershed Assessment for Tributaries to the Truckee River in 2012 for these tributaries in this watershed: Chalk, Hunter, Mogul, and Somersett. The assessment included:

- Stream reach descriptions with numerous photo points,
- Proper Functioning Condition rating,
- List of restoration and management efforts needed to improve stream conditions, and
- Water chemistry for temperature, pH, specific conductivity, dissolved oxygen, turbidity, and flow.

CDM Smith was contracted in 2015 through 2017 to conduct watershed assessments. The following table lists the report year and the respective drainages and reaches that were recently assessed in this watershed:

Stream Reaches Addressed in Watershed Assessment Reports in the Hunter Creek-Truckee River Watershed by Report Year

Stream Name	Lower Reach		Middle Reach		Upper Reach	
	2015	2017	2015	2017	2016	2017
Chalk	X		X		X	
Hunter	X					
Mogul		X		X		X
Roberts		X				
Somersett		X		X		

Watershed Management and Protection Plan for Tributaries to the Truckee River

The Watershed Management and Protection Plan for Tributaries to the Truckee River (NCE, 2020) is an update to the 2003 Watershed Management and Protection Plan for Tributaries to the Truckee River, which has been implemented for more than 15 years by the regional MS4 through the Storm Water Committee. The 2003 plan described an approach for on-going watershed assessment studies and monitoring to protect and improve the water quality in the stream corridors and drainages tributary to the Truckee River. The 2020 Plan update provides a process and framework for identifying, developing, and implementing projects originated through the Storm Water Committee that is consistent with the guidelines for an EPA approved Watershed Management Plan. The 2020 plan by NCE and the 2020 Integrated Source Water and 319(h) Watershed Protection Plan for Public Water Systems and the Truckee River in the Truckee Meadows, are mutually complementary and work together to address the broad scope of potential strategies to improve drinking water and surface water quality in Washoe County.

Water Quality Monitoring

Balance Hydrologics has conducted water quality monitoring on tributaries and stormwater outfalls since 2016. The following table lists the report years and the respective drainages that were assessed in this watershed:

Streams Addressed in Stormwater Monitoring Annual Reports in the Hunter Creek-Truckee River Watershed by Report Year

Stream Name	Entire Reach		
	2016	2017	2018
Chalk	X	X	X

Tributary Assessments

Considerable information is available on Chalk Creek:

- Chalk Creek Treatment Feasibility Assessment (ECO:LOGIC, 2009)
- Chalk Creek Watershed Characterization (JBR, 2010)
- Chalk Creek Pilot Treatment Wetland (JBR, 2011)

Truckee Meadows Watershed Protection Manual

Truckee Meadows Watershed Protection Manual: A Summary of the Watershed Protection Activities and Programs Developed in Conjunction with the Watershed Management Facilitator Scope of Work (Kennedy/Jenks, 2005). This document provides a reference and compendium of the various watershed protection activities and programs that were developed in 2004 and 2005 for Reno, Sparks and Washoe County.

Truckee Meadows Water Authority

TMWA is responsible for almost all municipal water delivery in the greater Reno-Sparks area. TMWA also owns and operates the municipal wells in this watershed. The following program and plans guide the management of these water resources:

- TMWA Water Resources Plan (2016-2035):

  This plan describes water quality issues and goals for the water resources managed by TMWA. Special focus is placed on changes in future water supply and demand and how those changes will impact the region's water resources. Additionally, this plan provides useful Truckee River watershed information.

- Source Water Quality Assurance Program (2016-2035):

  TMWA's objective is to deliver high-quality potable water to its customers in a cost-effective manner. To achieve this objective, TMWA has established a water quality assurance program. The components that make up the program are source water quality protection, potable water treatment, maintenance of distribution system water quality, and cross connection control.

- Wellhead Protection Plan (2016):

  The purpose of the Wellhead Protection Plan is to protect groundwater that serves as a source for public drinking water supplies. This plan is intended to be a tool used by TMWA to assist in protecting drinking water sources.

Truckee River Fund

TMWA established the Truckee River Fund in 2004 (Truckee River Fund). The purpose of the Fund is to "protect and enhance water quality or water resources of the Truckee River, or its watershed." The Fund provides a way to respond to the requests from outside groups and organizations that are involved in promoting and improving the health of the Truckee River System and watershed. This in turn benefits the primary water source for the community and, in the long run, benefits TMWA customers. For example, the Truckee River Fund has helped finance the following projects:

- Mount Rose Noxious Weed Monitoring and Treatment (funded 2012-2019):

  This monitoring and treatment project began in 2012 with the goal of treating noxious, invasive weeds within the Mount Rose Wilderness Hunter Creek drainage area. This treatment has been done every year since. The noxious weed removal will improve the ecological conditions to more natural conditions and reduce potential erosion into the river system.

- Chalk Creek Watershed TDS/Sulfate Reducing Wetland Pilot Project (funded 2008):

  This project was a relatively small-scale pilot project for the bio-treatment of TDS, phosphorus, nitrogen, and selenium in Chalk Creek. By using bio-wetland treatment techniques, possible watershed-wide implementation was explored. This would directly benefit the Hunter Creek-Truckee River HUC-12 Watershed by removing pollutants and improving water quality at plant intakes.

- Alum Creek/Hunter Creek Watershed Remediation/Hawken Fire Restoration Effort (funded 2007):

  This remediation project happened on non-federal lands damaged by the Hawken Fire. Actions included hydroseeding 70 acres, removal of hazardous trees, construction of three debris basins, clearing channels of burn debris, installation of two gaging stations for flood early warning, and installation of fencing and signage. These efforts helped maintain water quality after the fire.

- Chalk Creek Watershed Management for Water Quality to Minimize Non-Point Source Pollution from Reaching the Truckee River (funded 2007):

  This project identified pollution sources, available options, and implementation of physical measures to reduce loading of non-point source pollution to the Truckee River from Chalk Creek. This is in the interest of both the Truckee River and the Chalk Bluff Treatment plant.

- Restoration of Riparian Vegetation in a Channel at Sapphire Ridge in Chalk Creek Watershed (2007):

  This restoration project involved riparian re-vegetation of a portion of the Chalk Creek-called Rainbow Creek. Upper sections of this sub-watershed have been restored but the lower section was and is still problematic. This project directly benefits water quality and the watershed of the Truckee River by reducing sediment and turbidity load.

- Truckee River White Top Eradication Project at Mogul and Steamboat Creeks (funded 2006):

  This project focused on the eradication of tall white top, which is a noxious weed, from approximately 20 acres of river corridor near the confluence of the Truckee River and the Steamboat and Mogul Creeks. The project involved spraying an environmentally suitable herbicide followed by the planting of cottonwoods, willows and native grasses. By removing tall white top and planting desirable vegetation, water quality to the intakes of TMWA's water treatment facilities was maintained.

Washoe County

Activities in Washoe County are reviewed according to the Master Plan Planning Areas. The Hunter Creek-Truckee River HUC-12 Watershed is included in both the Verdi and Northwest Truckee Meadows planning areas. The County has Citizen Advisory Boards (CABs) which provide important community perspective on local issues to the Washoe County Board of Commissioners. This watershed is wholly within the West Truckee Meadows/Verdi CAB (CAB Boundaries).

The Washoe County Master Plan (2008) has Goals and Policies for Public Services and Facilities, and Open Space and Natural Resource Management. Applicable sections include:

- Article 418, Significant Hydrologic Resources, which regulates development activity within and adjacent to perennial streams to ensure that these resources are protected and enhanced. (Note: this does not apply to the Truckee River).
- Article 420, Storm Drainage Standards, sets forth standards for ensuring that both private and public development provides adequate protection for citizens and property. Therefore, it minimizes and controls erosion and pollution impacts on the natural environment, and additionally minimizes maintenance costs for drainage and flood control systems.
- Article 421, the Storm Water Discharge Program, which protects and enhances the water quality of watercourses, water bodies, groundwater and wetlands in a manner pursuant to and consistent with the Clean Water Act.
- Article 810, Special Use Permits, which provides a method of reviewing certain uses to determine if they have the potential to adversely affect public facilities in the vicinity.

Washoe County also provides comprehensive services for construction and maintenance roads, landscaping and drainage facilities; county-wide planning and code compliance; and emergency response services for fire and hazardous materials. All of these roles contribute to preserving and improving water quality in the watershed.

Western Regional Water Commission and the Northern Nevada Water Planning Commission

The Western Regional Water Commission (WRWC) focuses on improving water resource planning at the regional level and facilitating coordinated resource management among City of Reno, City of Sparks, Washoe County, TMWA, Truckee Meadows Water Reclamation Facility, South Truckee Meadows GID and Sun Valley GID.

The Northern Nevada Water Planning Commission (NNWPC) is a technical advisory panel that reports to the WRWC. The NNWPC develops and updates a Comprehensive Regional Water Management Plan (RWMP) and makes recommendations to the WRWC for adoption. In addition, the NNWPC develops priorities and an annual budget for the Regional Water Management Fund, also for recommendations to the WRWC.

The Comprehensive Regional Water Management Plan includes several applicable objectives:

- Objective 1.2 Provide for a Sustainable Water Supply and an Acceptable Level of Service to the Community (including protecting groundwater recharge areas).
- Objective 1.3 Implement measures to protect and enhance water quality for a sustainable water supply (including source water protection).
- Objective 2.1 Promote Efficient Use of Resources (Reduction of Non-Point Source Pollution for TMWRF Pollutant Credit).
- Objective 2.2 Manage wastewater for protection and enhancement of water quality.
- Objective 3.1 Effective and integrated watershed management (protection of human health, property, water quality including storm water).

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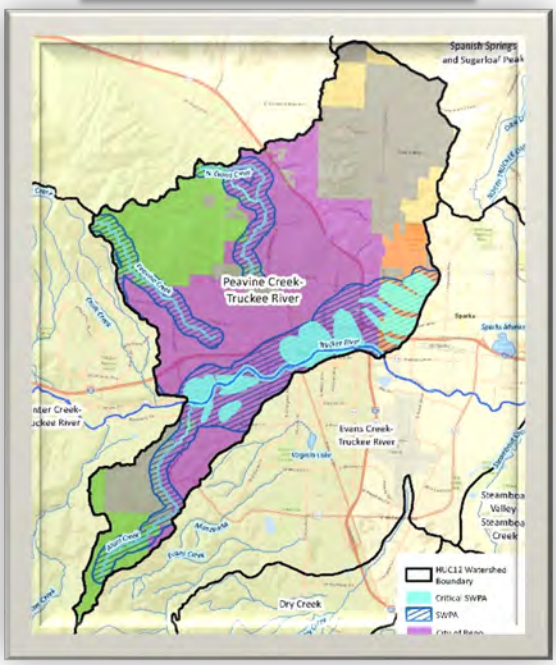
Peavine Creek-Truckee River

HUC-12 Watershed #160501020506 Profile

Click here for complete HUC-12 Watersheds Map



Contents

Introduction

The Peavine Creek-Truckee River HUC-12 Watershed profile is a component of the 2020 Integrated Source Water and 319(h) Watershed Protection Plan for Public Water Systems and the Truckee River in the Truckee Meadows (Plan), as well as the Watershed Management and Protection Plan for Tributaries to the Truckee River. This document is a part of the on-line watershed mapping too.

This watershed description is intended to be a guide and resource for organizations working within the watershed and an educational tool for those interested in learning more about the watershed in which they live. This Plan can be used to support funding for a multitude of water quality projects in the watershed. Note that only non-regulated activities are eligible for the Nevada Division of Environmental Protection Source Water Protection Program or the 319 Non-Point Source Program funding.

Summary

This profile focuses on the watershed's water quality. It includes potential and existing concerns, types of land uses, watershed management strategies and projects, and the involved stakeholders and their corresponding plans with water quality components.

The Peavine Creek-Truckee River HUC-12 watershed encompasses a large portion of the City of Reno and a small portion of the City of Sparks. The watershed spans from the top of Alum Creek in the Carson Range south of the Truckee River, to North Evans and Peavine creeks on Peavine Mountain north of the river. All runoff from this watershed discharges into the Truckee River upstream of the Glendale Water Treatment Plant and downstream from the Chalk Bluff Water Treatment Plant (Truckee Meadows Water Authority).

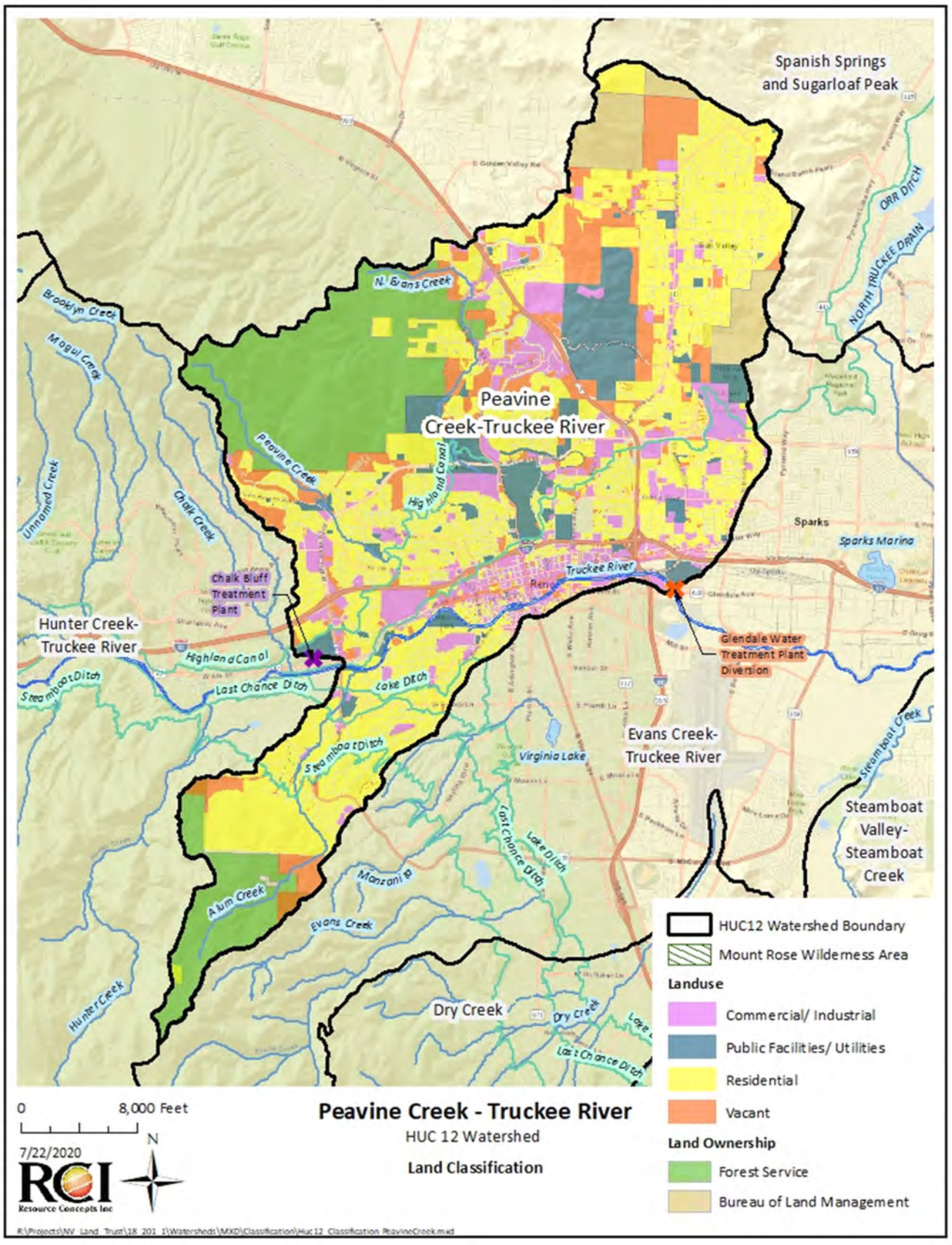
Source Water Protection Areas (SWPAs) for this watershed were developed by stakeholders to help protect drinking water sources. This watershed is an important area for groundwater recharge that hosts fifteen public water system wells and, as a result, more than half of this watershed is in a SWPA. Surface water bodies include creeks, irrigation ditches, and the Truckee River. The following table summarizes key water quality aspects in this watershed.

Watershed Summary	
Basins	• Peavine Creek-Truckee River HUC-12 Watershed #160501020506 • Groundwater Basins: 087 (Truckee Meadows) 086 (Sun Valley)
Water Bodies & Water Quality	• Alum Creek, impaired for pH, Total Phosphorus, Orthophosphate, Temperature, Total Dissolved Solids (TDS), and Total Suspended Solids (TSS), see NAC 445A.1684. • North Evans Creek, not assessed. • Peavine Creek, not assessed. • Truckee River, impaired for Temperature, see NAC 445A.1684. • Irrigation Ditches: Steamboat, Last Chance, Highland, Orr, Old English, Cochran, and Lake.
Source Water Protection Areas	• A SWPA encompasses the southernmost portion of the watershed with buffers along perennial streams. It represents a precautionary indicator to safeguard the drinking water sources. • Critical SWPAs represent areas closer to perennial streams and water system wells. • 15 public water system wells managed by 5 different public water systems. • Upstream of TMWA's drinking water intake on the Truckee River at the Glendale Water treatment Plant. • 8,000 acres, or approximately 28% of the watershed, is in a Source Water Protection Area. • 3,000 total acres, or roughly 10% of the watershed, is in a Critical Source Water Protection Area.
Special Considerations & Issues	• Directly upstream of the Glendale Water Treatment Plant on the Truckee River. • Urbanized including residential, commercial/industrial land uses. • Groundwater is locally contaminated by PCE and hydrocarbons. • Residential community septic systems have potential for nitrate leaching. • Major transportation corridors: I-80, Hwy 395, Hwy 430, and railroad.

	Type	Acres	%
Land Jurisdiction	BLM:	1,100	4%
	City of Reno:	13,820	49%
	City of Sparks:	1,515	5%
	Washoe County Non-Federal:	6,920	24%
	USFS:	4,880	17%
Land Use	Commercial/Industrial:	2,620	9%
	Residential:	10,700	38%
	Public Facilities/Utilities:	2,400	8%
	Vacant:	2,955	10%
	Federally Managed:	6,000	22%
	Roads and Easements:	3,475	12%

Land uses and jurisdictions in the watershed are summarized in the adjacent table and illustrated by the Land Classification Figure.

Land use in the Peavine Creek-Truckee River watershed is predominantly urban residential, encompassing a large portion of northwest Reno and Sun Valley. The watershed also includes the Truckee River corridor from West McCarran Boulevard through the whitewater park in downtown Reno to Glendale Avenue. All tributary drainages pass through residential and commercial development in their middle and lower reaches. Alum Creek in the south is the only creek with perennial flow directly to the river. Tributaries from the north become intermittent and are intercepted by the urban storm drain network. Potential and existing water quality concerns include pollution from urban area runoff, accidental chemical leaks or spills that could reach ground or surface water, and erosion and sedimentation.


Spanish Springs
and Sugarloaf Peak
Peavine
Creek-Truckee River
Hunter Creek-
Truckee River
Evans Creek-
Truckee River
Steamboat
Valley-
Steamboat
Creek
Sparks
Sparks Marina
Reno
Chalk Bluff
Treatment
Plant
Glendale Water
Treatment Plant
Diversion
N. Evans Creek
Brooklyn Creek
Magui Creek
Unnamed Creek
Chalk Creek
Peavine Creek
Highland Canal
Truckee River
Steamboat Ditch
Last Chance Ditch
Lake Ditch
Virginia Lake
Manzanita
Alum Creek
Evans Creek
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Resource Concepts Inc
Peavine Creek - Truckee River
HUC 12 Watershed
Land Classification
HUC12 Watershed Boundary
Mount Rose Wilderness Area
Landuse
Commercial/ Industrial
Public Facilities/ Utilities
Residential
Vacant
Land Ownership
Forest Service
Bureau of Land Management
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Water Quality Standards and Beneficial Uses

Water quality standards in the State of Nevada are established by Nevada Administrative Code (NAC) NAC 445A.11704 through NAC 445A.2234. Standards applicable to beneficial uses are generally described under NAC 445A.122. The Nevada Division of Environmental Protection (NDEP) Bureau of Water Quality Planning Nevada 2016-2018 Water Quality Integrated Report identifies the beneficial uses and the surface water quality conditions in this watershed, as summarized below:

- The section of the Truckee River that runs through the Peavine Creek-Truckee River HUC-12 Watershed fully supports beneficial uses upstream of Idlewild Park, and is impaired for support of "aquatic life" due to water temperature below Idlewild Park (water quality standards NAC 445A.1686).
- Alum Creek is tributary to the Truckee River from the south (water quality standards NAC 445A.1684). Due to elevated temperature and TSS it is impaired for support of "aquatic life". Due to Orthophosphate and Total Phosphorus, it is impaired for support of "aquatic life" and "recreation involving water contact". It is also impaired for "municipal or domestic supply" due to TDS.
- North Evans Creek and Peavine Creek, intermittent tributaries to the Truckee River from the north, have not been assessed.

Groundwater and surface water are both important sources of drinking water for public water systems in this watershed. Long-term remediation of PCE (perchloroethylene) contaminated groundwater is on-going to protect drinking water supply wells, as described under Hazardous Materials from Spills or Leaks.

Potential and Existing Water Quality Concerns

The primary potential and existing water quality concerns in this watershed are listed below and described in the following paragraphs:

- Hazardous Materials from Spills or Leaks
- Pollution from Urban Area Runoff
- Nitrate from Individual Sewage Disposal Systems
- Sediment from Erosion
- High Temperature due to Low or Slow Moving Water

Hazardous Materials from Spills or Leaks

PCE contaminated groundwater was identified in 1987 associated with commercial dry cleaning, paint manufacturing, and auto repair businesses (TMWA, 2016). The Environmental Protection Agency (EPA) has identified PCE as a potential human carcinogen (EPA, 2016). The Washoe County Central Truckee Meadows Erosion Control District (CTMRD) is responsible for the on-going groundwater treatment program to keep the extent of PCE contamination from moving or growing.

Underground chemical and fuel storage tanks have had a history of leaks that can cause contamination of soil and groundwater. Underground storage tanks, predominantly associated with gas stations and residential heating oil storage in older neighborhoods, are located throughout the urban area. The Bureau of Corrective Actions indicates multiple active and closed corrective action sites in the watershed.

Transportation corridors through the watershed include: the railroad, Hwy 395, I-580, Hwy 431, I-80, and McCarran Boulevard. Chemicals and materials commonly moving along these transportation corridors have the potential for accidental spills and leaks. The U.S. Department of Transportation accumulated a list of commonly transported hazardous materials within the Truckee River watershed (WRWC, 2017). These include:

- Ammonia perchlorate
- Anhydrous ammonia
- Chlorine
- Cyanide
- Hydrochloric acid
- Hydrogen sulfide
- Nitro cellulose (wet)
- Propane
- Petroleum naphtha
- Phosphoric acid
- White phosphorous
- Propargyl alcohol
- Sulfuric acid
- Sodium hydroxide

Pollution from Urban Area Runoff

Groundwater, surface water, and irrigation ditches may be vulnerable to polluted runoff in urban areas. Potential contaminants include:

- Nutrients from fertilizers
- Bacteria from animal waste
- Trash
- Pollution from household waste
- Runoff from roads and parking lots

The mid and lower reaches of the three main drainages (Peavine, Alum, and North Evans) are influenced by residential and commercial development. Flows from urban nuisance water (such as seepage from irrigation and other dry weather flow

created by human activity) and stormwater runoff affect these creeks. A study conducted by Stantec for the Nevada Land Trust found that fertilizers impact the water quality along the east branch of Alum Creek (Stantec, 2014).

Excessive fertilization in irrigated green areas, such as yards, fields, golf courses or parks, are potential sources of nutrients from fertilizers. Green areas located in this watershed include residential landscaping, Idlewild Park, San Rafael Park, the University of Nevada, Reno campus, Mountain View Cemetery, Chrissie Caughlin Park, Wild Creek Golf Course near Sparks, and several other small urban parks. The middle reach of Alum Creek passes through landscaped turf areas and small ponds in the Caughlin Ranch subdivision (CDM Smith, 2017), then discharges into the Truckee River. These areas may also contribute *Escherichia coli (E. coli)* from animal waste such as horses, dogs and geese. The Reno Sparks Livestock Event Center is also located in this watershed.

The Truckee River segment through downtown Reno is a valuable asset to the community for recreation, hosting the whitewater park and many other popular events along the river. Subsequently, this urban section of the watershed also attracts encampments of the homeless. The One Truckee River project (OTR, 2017) has identified the need for bathrooms on the river to preserve and protect water quality. There is a lack of sanitary facilities and in some locations trash collection. Human waste and trash can be deposited directly into this segment of the river, which is just upstream of TMWA's drinking water intake for the Glendale Treatment Plant Land Classification Figure.

Nitrate from Individual Sewage Disposal Systems

Individual Sewage Disposal Systems, or septic systems, are associated with nitrate contamination of groundwater if there are large numbers concentrated in a small area, for example neighborhoods with lot sizes less than one-acre, or if they are not maintained properly (WRWC, 2017). There are about 1,250 parcels with septic systems in this watershed, in various neighborhoods throughout the watershed, where with lot sizes range from 0.3 to five acres. They are generally located away from current and planned public water system wells, except for the cluster of small privately owned water systems for businesses along West 4th Street.

Sediment from Erosion

Sediment from erosion conveys pollution, such as phosphorous, and degrades downstream water with suspended sediment. The primary causes of erosion and sedimentation in this watershed include wildland fire, noxious weeds, and drainage and landscape modifications.

High-severity wildfires alter the overall structure of the ecosystem through the removal of vegetation leaving limited ground cover. Severe fires also create a waxy, water-repellant layer over the soil which increases water and soil runoff (NDF, 2011). Both Peavine and North Evans Creeks have headwaters at Peavine Mountain where the cycle of wildfire and weed growth is recurring. Approximately 1,000 acres in the upper reach of Alum Creek burned in the Hawken Fire in 2007. This was restored by Washoe County's American Recovery and Reinvestment Act (ARRA), which helped stabilize the soil and revegetate the landscape (CDM Smith, 2017).

Areas invaded by noxious weeds are more susceptible to erosion and sedimentation in several ways. Noxious weeds do not have a root structure to retain soil and resist erosion due to wind or water. The fire risk is also increased because noxious weeds are more flammable than native species. Noxious weeds near drainages are common in this watershed. Both Peavine and North Evans Creeks have heavy invasive weed infestations, such as tall whitetop, cheatgrass, bull thistle, and medusahead (CDM Smith, 2015). These invasive plants do not dissipate stream energy and are not effective at stabilizing streambanks.

Drainages are often modified, such as straightened, diverted or combined, to accommodate development. Much of the drainage modifications are designed to reduce the flood hazard on the adjacent areas. However, they result in higher water velocities which lead to headcuts, other bed and bank erosion, and downstream sedimentation. Peavine, Alum, and North Evans Creeks have erosion and channel stabilization issues:

- Alum Creek has been channelized, desirable riparian vegetation has been removed and replaced with turf grass, and flows have been diverted into landscape ponds (CDM Smith, 2017). This has caused sediment deposition, erosion and channel destabilization. Under the Caughlin Bridge the concrete footings are deteriorating, thus causing excessive sediment in Alum Creek (CDM Smith, 2017).
- North Evans Creek passes through residential development, where Best Management Practices (BMPs) appear insufficient to prevent erosion and sediment transport (CDM Smith, 2016). Urbanization has modified the channel making it less stable. For example, the upper reach of North Evans flows alongside North Virginia Street where there is a culvert with an eight-foot-high vertical bank that contains large concrete debris (CDM Smith, 2016) and headcuts are in the middle reach where the drainage crosses a gas pipeline. Rancho San Rafael Park has engineered wetlands and provides healthy riparian vegetation for channel stabilization near North Evans Creek (CDM Smith, 2016). The lower reach of Evans Creek is intercepted and piped through the city storm drain system.

- Peavine Creek also shows evidence of erosion and sediment deposition. Dirt roads on Forest Service lands alongside upper Peavine Creek have eroding gullies which cause sediment to be deposited in the channel (CDM Smith, 2015). The drainage has stormwater outfalls with partially effective grade controls (CDM Smith, 2015) that also show evidence of erosion and sediment transport. Headcuts in the channel can eventually impact roads and adjacent development when left untreated. The lower reach of Peavine Creek is intercepted and piped through the city storm drain system.

Areas that are disturbed during construction projects can represent a potential risk of erosion and downstream sedimentation. Protection of stormwater runoff from contamination by construction in the Truckee Meadows is regulated under the regional stormwater management plan (Truckee Meadows MS4). There are many BMP resources available to construction projects to help keep soil on-site and to reduce runoff.

High Temperature Due to Low or Slow Moving Water

The Truckee River is impaired for support of aquatic life beneficial use due to water temperature between Idlewild Park and East McCarran (NDEP BWQP, 2016-2018). During periods of low flow in the summer months, due to extended droughts or water diversions, the river can be too warm to support aquatic life in this area. Implementation of the finalized 2015 Truckee River Operating Agreement may help to improve ecological conditions and overall river health through more efficient use of available reservoir storage. However, water temperatures have potential to exceed the standard during summer months under drought conditions.

Strategies to Protect and Improve Water Quality

The water quality concerns identified in this watershed can be addressed through management strategies described in this section, the proposed projects detailed in the Project Profiles, as well as applicable on-going water quality projects and programs described under Stakeholders and Plans. These strategies pertain to the entire watershed but may be prioritized in Source Water Protection Areas (SWPAs).

Source Water Protection Area Identification and Management

A SWPA is a management area surrounding a surface water or groundwater resource that supplies water for public consumption. Activities in these buffer areas can affect the quality of water downstream or underground. These management strategies acknowledge the value of these SWPAs to prevent future contamination of sources of drinking water.

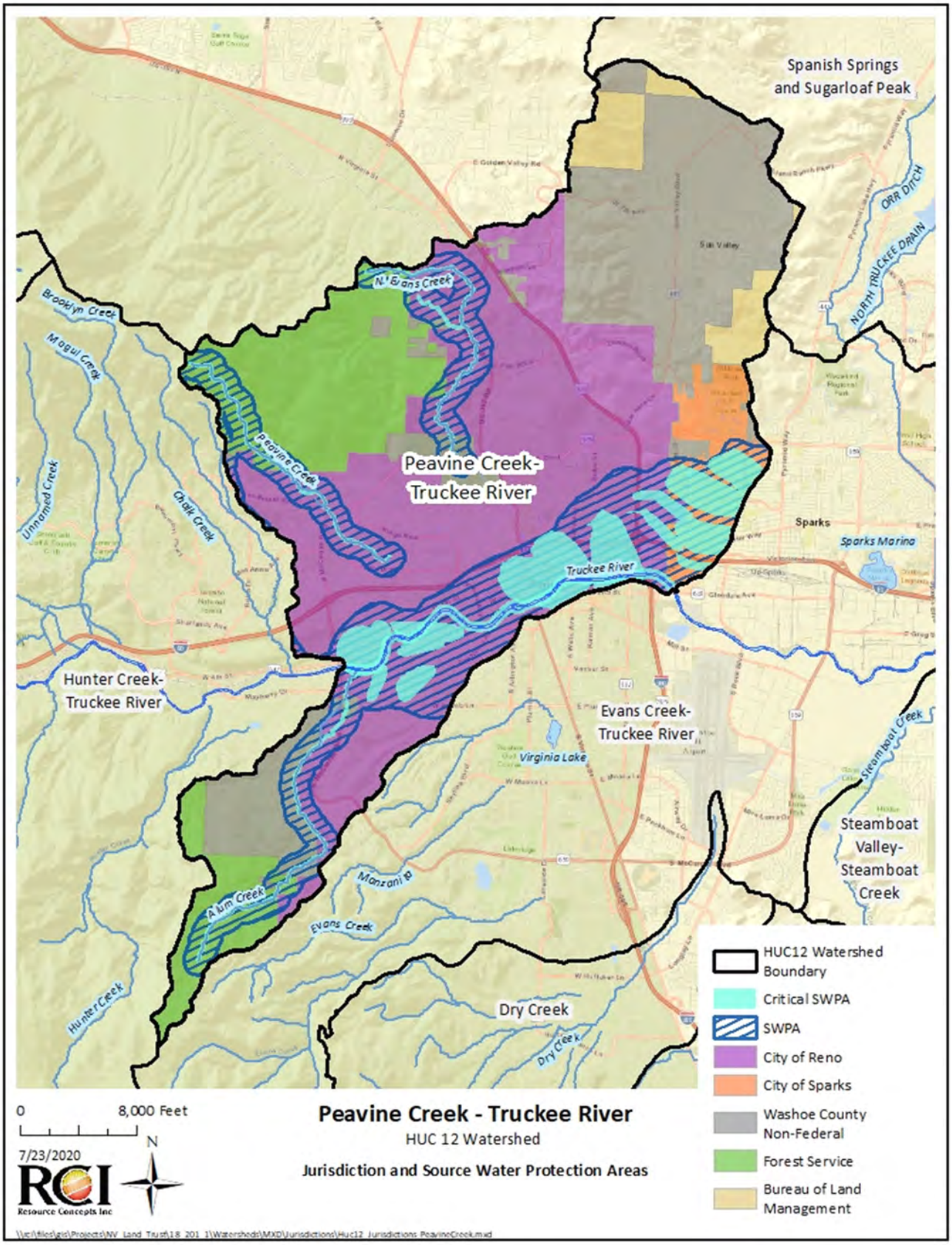
There are two types of SWPA buffers in this watershed (RCI, 2020). One buffer, encompassing the central portion of the watershed along the Truckee River corridor (an important groundwater recharge area with numerous wells), then extending along the three perennial tributaries (1,000 feet from stream centerline), that represents a precautionary indicator to safeguard the drinking water sources. The second type of buffer surrounds critical areas closer to perennial streams (150-feet), the Truckee River (300-feet), and water system wells (based on a 20-year time of travel for groundwater). These areas are illustrated on the Jurisdiction and Source Water Protection Areas Figure. The following objectives are significant in both future and on-going SWPA management:

- Inform landowners in SWPAs about their proximity to a valuable drinking water source and how they can help protect their water quality.
- Encourage coordination between Public Water Systems, landowners, and City or County planners to consider the importance of SWPAs in project reviews.
- Explore collaborative funding for water quality and watershed improvements and support the resource investigations needed to develop viable projects.
- Prioritize physical improvements in SWPAs to protect and improve source water quality.

Education and Outreach

Education and outreach management strategies will be used to help effectuate positive actions to protect water quality.

- Continue to work with Homeowner Associations regarding source water protection measures.
- Continue to support the Central Truckee Meadows Remediation District (CTMRD) in education regarding PCE contamination in groundwater.
- Continue to support the Truckee Meadows Storm Water Permit Coordinating Committee (Storm Water Committee) outreach and education programs.
- Increase knowledge of water quality protection and the pollution in stormwater runoff through local outreach efforts.
- Increase knowledge about household and commercial chemical use, storage and disposal through local outreach efforts.
- Inform landowners and developers residing in critical SWPAs about the importance of avoiding contamination and their proximity to a valuable drinking water source.


Spanish Springs and Sugarloaf Peak
Peavine Creek-Truckee River
Hunter Creek-Truckee River
Evans Creek-Truckee River
Steamboat Valley-Steamboat Creek
Sparks
Sparks Marina
Truckee River
Virginia Lake
Dry Creek
N Evans Creek
Peavine Creek
Chalk Creek
Unnamed Creek
Brooklyn Creek
Magul Creek
Alum Creek
Manzanita
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RCI
Resource Concepts Inc
Peavine Creek - Truckee River
HUC 12 Watershed
Jurisdiction and Source Water Protection Areas
HUC12 Watershed Boundary
Critical SWPA
SWPA
City of Reno
City of Sparks
Washoe County Non-Federal
Forest Service
Bureau of Land Management

Interagency Communication

The following interagency communication objectives are important tools to both reinvigorate and invest additional resources in water quality, as well as utilize existing resources and programs:

- Each agency may evaluate how to improve lines of communication within and between jurisdictions regarding water quality issues, i.e. city of Reno, Washoe County, TMWA, NDEP, Washoe County Health District, Forest Service, and Bureau of Land Management (BLM). For example, through multi-jurisdictional collaboration, site specific management and structural BMPs have been developed and installed for runoff from the Reno Sparks Livestock Event Center.
- Continue to increase coordination and communication regarding spills and corrective actions along I-80, Hwy 395, I-580, Hwy 430, McCarran Boulevard, and the railroad.
- Evaluate how to collaborate with the Storm Water Committee in their public outreach and education efforts.
- Evaluate how to collaborate with TMWA and the Storm Water Committee on incorporating drinking water source protection into their education plans.
- Collaborate with the Washoe/Storey Cooperative Weed Management Area to support their efforts in noxious weed management (WSCWMA Website).

Wildfire and Fuel Management

Wildland fire is a threat to water quality and coordinated fuel management on wildlands can help reduce risks to water quality. Stakeholders and partners may consider the following objectives as they pertain to wildfire and fuel management:

- Encourage development, maintenance, and implementation of the Community Wildfire Protection Plans.
- Support and collaborate with the Nevada Cohesive Strategy effort and the Shared Stewardship Agreement, the blueprint to address Nevada's wildland fire issues.
- Support for the Nevada Network of Fire Adapted Communities and their local chapters for people in high fire threat locations to fully prepare themselves, their homes, and the landscape where they reside to survive the destructive force of wildfire.
- Encourage the development of wildland fire risk reduction and emergency recovery plans to reduce the risk of wildfire, quickly restore burned areas, and reduce the risk of catastrophic post-fire erosion and sedimentation.
- Collaborate and coordinate to treat invasive and noxious weeds pre- and post-fire to reduce risk of wildfire and watershed destabilization.

Resource Investigation and Planning

Stakeholders may consider supporting the following resource investigations and planning, which can help fill data gaps, inform implementation designs and prioritize projects:

- Research to identify non-point pollutant sources in the watershed and options for treatment.
- Water quality improvement planning for tributaries to the Truckee River.
- Development and implementation of integrated vegetation management programs.

Water Quality Best Management Practices

Stakeholders may consider supporting the following Water Quality BMPs, that may improve and prevent degradation to water quality resources:

- Water quality improvement projects.
- Invasive and noxious weed removal and integrated vegetation management for creek stabilization.
- Recommendations in the tributary assessments.
- Proper abandonment of wells.
- Physical improvements prioritized in SWPAs for water quality improvement and protection.
- Fertilizer and pesticide management plans for irrigated green spaces.

Proposed Implementation Projects

Proposed implementation actions are generally described under the Strategies to Protect and Improve Water Quality. Specific implementation actions have been developed into proposed projects by local stakeholders and are described in Project Profiles. These Project Profiles include the information needed, as identified in the Environmental Protection Agency (EPA) guidance for nine critical elements, for an endorsable watershed management plan. Future projects that fall within the strategies identified for this watershed should be brought forward and incorporated into this Source Water and Watershed Protection Plan using the Project Profile format. As discussed in the following Stakeholders and Plans section, municipality and agency projects are also incorporated by reference.

Stakeholders and Plans

Stakeholder information and existing plans were used extensively in the development of the Plan for Washoe County. These municipalities and agencies each have unique strategies and capital improvement plans that include water quality protection or improvement projects. These are updated regularly at differing timeframes (i.e. annually, every five years, etc.) according to their specific budgeting and planning processes. The applicable planning documents are briefly described and referenced in this section. Those projects pertaining to water quality protection and improvement in the watershed are incorporated by reference.

Project Stakeholders	
• Central Truckee Meadows Remediation District • City of Reno • City of Sparks • Bureau of Land Management • USDA Forest Service • Reno-Sparks Indian Colony • Nevada Department of Transportation • Nevada Division of Environmental Protection • Nevada Division of Forestry	• Nevada Land Trust • One Truckee River • Sun Valley GID • Truckee Meadows Regional Planning Agency • Truckee Meadows Storm Water Permit Coordinating Committee • Truckee Meadows Water Authority • Truckee River Fund • Washoe County • Washoe County Health District • Western Regional Water Commission

Central Truckee Meadows Remediation District

The Central Truckee Meadows Remediation District, or CTMRD, was created by State statute and County ordinance in 1995 in order to address the presence of PCE in groundwater around Reno and Sparks. The CTMRD is administered by the Washoe County Community Services Department on behalf of the Board of County Commissioners. It is the only program of its kind in Nevada and focuses on collaborative, community-based solution implementation (Central Truckee Meadows Remediation District).

PCE is a human-made chemical that is commonly used as a solvent in dry cleaning, auto repair, and industrial operations which are all concerns within this watershed. The CTMRD has four specific, interrelated objectives regarding the proactive management of PCE. All of these objectives are pertinent to this watershed:

- Mitigate existing PCE contamination of groundwater
- Prevent additional PCE contamination from occurring
- Protect those parts of the aquifer system that are not contaminated with PCE
- Inform stakeholder agencies, the public, the business sector, and other interested parties of CTMRD program activities

City of Reno

The City of Reno 2017 Master Plan goals and policies provide the framework for decision-making in the community.

Drinking water protection is addressed in the Master Plan's guiding principle to promote a safe and more resilient community. The City works with TMWA and other partners to ensure clean drinking water.

Water quality is also addressed in the guiding principle for quality places and outdoor recreation opportunities in the sections on hydrologic resources, major drainageways and no net loss of wetlands, stream environments, playas, spring fed stands of riparian vegetation, and non-404 wetlands in the city, in terms of both acreage and value. The Design Principles for Sustainable Development also contain sections related to water quality:

- Article I: Section 18.12.105 describes setbacks from the Truckee River.
- Article XVIII: Section 18.12.1801 to 1808 describes wetlands and stream environment protection standards established for the review of development proposals within wetlands, stream environments, and areas of significant hydrologic resources.
- Article XIX: Section 18.12.1902 to 1907 Drainage Way Protection Standards carries out the provisions of the City of Reno Major Drainageways Plan, an element of the City of Reno Master Plan, and establishes standards for the review of development proposals within major drainage ways to, among other actions, maintain, preserve, or enhance the quality of the water in both the Truckee River and Stead basins.

The city of Reno also provides comprehensive services for construction and maintenance roads, landscaping and drainage facilities; citywide planning and code compliance; and emergency response services for fire and hazardous materials. All these roles contribute to preserving and improving water quality in the watershed.

Additionally, the city of Reno is divided into five Neighborhood Advisory Board Wards. Each Ward has one representative on the Reno City Council that is specifically focused on the needs of their part of the city. These Wards provide opportunities for citizens to engage in important community issues and is the most efficient way for citizens to communicate their concerns and ask questions prior to any large decisions or projects. As such, these Wards and their input are essential in the implementation and success of projects and plans within the community. Source water and watershed protection for this watershed falls within Wards 1, 3, 4, and 5.

City of Sparks

The city of Sparks has a Comprehensive Plan (2016) that encompasses the growth of the City and development projects. Areas are identified in the Comprehensive Plan according to the unique topics that influence each region. The Comprehensive Plan contains goals and policies for resiliency and conservation. The following policies are applicable to water quality and source water protection:

- Policy RC2: Protect the water quality of the Truckee River, drainages, lakes and aquifers.
- Policy RC4: Reduce pollution from stormwater runoff, overflow and other non-point sources.
- Policy RC5: Protect groundwater quality through land use management that safeguards recharge areas from inappropriate disturbances and contamination.
- Policy RC6: Implement "Best Management Practices," including but not limited to Low Impact Development Practices (LID), to control urban stormwater runoff.

The city of Sparks also provides comprehensive services for construction and maintenance roads, landscaping and drainage facilities; city-wide planning and code compliance; and emergency response services for fire and hazardous materials. All of these roles contribute to preserving and improving water quality in the watershed.

The city of Sparks additionally has five Neighborhood Advisory Board Wards, led by council members that contribute to community planning and decision making. Each Ward has a representative on the Sparks City Council that voices the concerns and needs of that area. These Wards are the most efficient way for citizens to communicate their concerns and ask questions prior to any large decisions or projects, as well as engage in important community issues. This watershed is in Wards 1 and 2.

Bureau of Land Management

The Nevada BLM has Resource Advisory Councils (RACs) which allow community members to be involved in natural resource planning and management issues on BLM managed public land. Washoe County is a part of the Sierra Front-Northwestern Great Basin RAC which is administered through the BLM-Carson City and Winnemucca District offices (BLM Resource Advisory Councils-Nevada).

The BLM also has specific Resource Management Plans (RMPs), that apply to this watershed. These plans generally outline the way that the BLM currently manages and intends to manage the multiple resources on public land. Within this watershed, the following plans and sections are applicable:

- Carson City Consolidated Resource Management Plan (2001):

  RIP-1: Riparian Management discusses how riparian areas on BLM land should be managed, monitored, and maintained. The desired outcome in this section is to protect and maintain existing and potential fisheries and riparian areas in good or better condition.

  SWA-1: Soils, Watershed and Air Quality describes specific techniques and goals for all watersheds within the planning area such as reducing soil loss, flood damage, and sediment damage from human activities.

  WAT-1: Water Resources discusses management for good water quality on public lands such as watershed management plans as an important administrative action.

- Carson City Fire Management Plan (2016):

  The Fire Management Plan (FMP) goal is to restore sagebrush ecosystems throughout the planning area. In doing so, the risk of wildfire and its negative effects should eventually decrease. Since wildfire is a significant issue in this watershed, management to reduce its risk is a key planning component.

USDA Forest Service

The Humboldt-Toiyabe National Forest within this watershed is managed by the Carson Ranger District. Natural resource projects, including projects undergoing NEPA documentation, are listed on the Forest Service website. The Humboldt National Forest and Toiyabe National Forest Biannual 2018 Monitoring Report describe the conditions of the watershed and present monitoring information.

Additionally, the Forest Service has created Land and Resource Management Plans (LRMP) to guide management decisions within the Humboldt-Toiyabe National Forest. Water resources are outlined in the LRMP along with management actions, including maintenance, monitoring and enhancement of water quality:

- Humboldt National Forest Land and Resource Management Plan:

  Section IV.C.5 is "Soil and Water within the Forest-Wide Standards and Guidelines." This outlines the goals for the soil and resources on Forest Service managed land.

  Section V.A is the "Implementation Direction of the Forest Plan." This describes how the LRMP will be analyzed for its level of success.

- Toiyabe National Forest Land and Resource Management Plan:

  Section IV is the "Forest Management Direction with Forest-wide Standards and Guidelines" for soil and water as well as riparian areas. These sections outline the goals for the forest.

  Section V is the "Implementation of the Forest Plan" including the direction of the LRMP which also outlines the goals for the Forest.

Nevada Department of Transportation

The Nevada Department of Transportation (NDOT) has developed their Stormwater Management Program to reduce stormwater pollution from NDOT managed facilities and roads. The program BMPs and annual report outline the specific measures that NDOT will take to reduce stormwater pollutant discharges from its owned and operated storm drain system:

- Stormwater Management Program (2013):

  The overall goal of the NDOT Stormwater Management Program is to reduce pollution associated with stormwater from NDOT's MS4 to the maximum extent practicable, as well as to protect surface and groundwater resources within the MS4 permit area. The Stormwater Management Program addresses stormwater pollution control as it relates to the planning, design, construction, and maintenance of NDOT's highway infrastructure statewide.

- Stormwater Management Program: Annual Report (2017):

  This watershed is impacted or has the potential to be impacted by I-80, I-580, Hwy 395, and Hwy 431. The Stormwater Management Program provides a helpful planning outline on handling and mitigating pollution from the roads.

Nevada Division of Environmental Protection

The NDEP has a goal to preserve and enhance the environment of the State in order to protect public health, sustain healthy ecosystems, and contribute to a vibrant economy. The Peavine Creek-Truckee River HUC-12 Watershed has several challenges facing source water protection, so the NDEP is an essential stakeholder and planning partner. Specifically, there are two programs under the NDEP that were involved in the Plan in Washoe County. Both programs provide education and outreach and offer funding opportunities for water quality protection and improvement:

- Integrated Source Water Protection Program under the Safe Drinking Water Bureau:

  This program offers technical assistance for source water protection projects. The program coordinates source water protection activities at the local, state, and federal levels, and encourages community-based protection and preventive management strategies to ensure all public drinking water resources are kept safe from future contamination.

  The 2010 Nevada Integrated Source Water Protection Program guidance document details the program components as well as the requirements for a State-endorsed Community Source Water Protection Plan.

- 319 Nonpoint Source Pollution Management Program under the Bureau of Water Quality Planning:

  This Program can provide matched grant funding for projects that improve water quality.

  The 2015-2019 State of Nevada Nonpoint Source Management Plan establishes how NDEP will work with partners to address Nonpoint Pollution Source (NPS) pollution. The Plan formalizes Nevada's approach for protecting and improving water quality and describes the goals, short-and long-term objectives, milestones and timeframes to guide activities and measures for tracking success.

Nevada Division of Forestry

The Nevada Division of Forestry (NDF) is a State agency that uses a collaborative process to deliver science based natural resource management and protection to promote resilient landscapes, fire adapted communities, and safe, effective wildfire response provided by employees that embrace the core values of duty, respect, and integrity.

NDF provides professional natural resource and wildland fire management services to Nevada citizens and visitors to enhance, conserve and protect forest, rangeland and watershed values, endangered plants and other native flora. Protection of these resources helps to preserve and improve water quality:

- Community Wildfire Protection Plans:

  Community Wildfire Protection Plans (CWPPs) are authorized and defined in Title I of the Healthy Forests Restoration Act of 2003 (HFRA). CWPPs represent the best opportunity that communities have to address the challenges of the Wildland-Urban Interface. A CWPP helps communities define their priorities for the protection of life, property, and shared assets-at-risk from wildfires. Developing a CWPP encourages community members and leaders to have valuable discussions about wildfire preparedness, evacuation planning, and local fire district capabilities. The CWPP increases grant funding opportunities by prioritizing fuel reduction projects around and within the community.

- Nevada Wildland Fire Cohesive Strategy:

  The Nevada Fire Board Oversight Body is the custodian of the 2015 Nevada Wildland Fire Cohesive Strategy Summit's Action Plan to ensure goal achievement and identify emerging topics. This oversight body acts as an "advisory" body and is charged with taking the Nevada Cohesive Strategy Summit report and its Action Steps, ensuring that goal achievement is accomplished and monitoring emerging topics through the Nevada Fire Board. This body monitors progress, develops issue resolution, and addresses emerging issues such as protecting water quality.

Nevada Land Trust

Nevada Land Trust commissioned a special study on Alum Creek water quality. The study was conducted between April and August of 2014 to document the current water quality of Alum Creek in order to determine whether the parameters included on the 303(d) list remain valid, if parameters should be included or removed, or if mitigation measures are warranted to improve the water quality of Alum Creek. The study concluded that the water quality issues on the creek are related to fertilizer, land management, and stormwater practices.

One Truckee River

According to the One Truckee River website, "One Truckee River is a collaboration of public and private partners working together to realize a Truckee River that flows clean and clear, quenches our thirst, sustains the river's natural ecology, cultural resources and wildlife, and connects residents and visitors to unparalleled opportunities for recreation and regeneration":

- The One Truckee River Management Plan (2017) addresses actions to accomplish four primary goals, including protection of water quality and ecosystem health.

The following stakeholders were instrumental in compiling the plan and in implementing the plan action items:

- Truckee River Flood Management Authority
- Pyramid Lake Paiute Tribe
- Truckee Meadows Water Authority
- Resource Concepts, Inc.
- Nevada Division of Environmental Protection
- Renown
- Truckee Meadows Regional Planning Agency
- Keep Truckee Meadows Beautiful AmeriCorps
- Keep Truckee Meadows Beautiful
- Washoe County Health District
- City of Reno Public Works

Sun Valley GID

The Sun Valley General Improvement District (District) was established in 1967 as Sun Valley's water and sanitation district. The District is a quasi-municipal entity established under Nevada Revised Statute, Chapter 318. It is chartered to provide water, sewer, garbage, and recreation services throughout the community. The District owns and maintains an estimated 100 miles of water mains, 120 miles of sewer mains, two sewer vaults, several pressure reducing vaults and pumping stations, and nine water storage water tanks.

Truckee Meadows Regional Planning Agency

The Truckee Meadows Regional Planning Agency (TMRPA) fosters coordination among Reno, Sparks and Washoe County. TMRPA facilitates land-use, infrastructure provision and resource management conversations among public and private decision makers. The agency also serves as a collaborative information and data warehouse, coordinating regional data collection and delivering advanced geospatial analytics for regional solutions. TMRPA includes a Regional Planning Governing Board and a Regional Planning Commission.

The TMRPA Regional Plan (2012 as amended) provides goals and policies for multiple plans and programs, including those with watershed related and well head protection components. The plan was revised in 2019-2020 and is considered a living document that will evolve over time.

Truckee Meadows Storm Water Permit Coordinating Committee

The Storm Water Committee is responsible for implementing the Truckee Meadows Storm Water Management Program to protect the water quality of the region's waterways, streams and the Truckee River. The Storm Water Committee continues to guide the development of numerous plans and assessments as summarized below.

Ordinance and Guidance Changes for Construction and Post-Construction Programs

The Storm Water Committee updated and joined the Structural Controls Design Manual and the Low Impact Development Manual, as well as updated the Truckee Meadows Construction Site BMP Handbook. These documents are referenced in the code for the city of Reno, city of Sparks, and Washoe County.

Watershed Assessments

Watershed assessment reports prepared for the Storm Water Committee were completed by Jesch et al. from 2002-2011 that include the North Evans, Peavine, and Alum tributaries. These reports provide general watershed descriptions that can be used to track historical changes in creek condition and water quality over time. However, the reports do not include water quality data.

Hillside Design completed a comprehensive Watershed Assessment for Tributaries to the Truckee River in 2012 for these tributaries in this watershed: Alum Creek, Peavine Creek, and North Evans Creek.

The assessment included:

- Stream reach descriptions with numerous photo points,
- Proper Functioning Condition rating,
- List of restoration and management efforts needed to improve stream conditions, and
- Water chemistry for temperature, pH, specific conductivity, dissolved oxygen, turbidity, and flow.

CDM Smith was contracted in 2015 through 2017 to conduct watershed assessments. The following table lists the report year and the respective drainages and reaches that were assessed in this watershed:

Stream Reaches Addressed in Watershed Assessment Reports in the Peavine Creek-Truckee River Watershed by Report Year				
Stream Name	Lower Reach	Middle Reach		Upper Reach
	2016	2015	2017	2016
Alum	X	X		
Peavine	X	X		X
North Evans	X	X	X	

Watershed Management and Protection Plan for Tributaries to the Truckee River

The Watershed Management and Protection Plan for Tributaries to the Truckee River (NCE, 2020) is an update to the 2003 Watershed Management and Protection Plan for Tributaries to the Truckee River, which has been implemented for more than 15 years by the regional MS4 through the Storm Water Committee. The 2003 plan described an approach for on-going watershed assessment studies and monitoring to protect and improve the water quality in the stream corridors and drainages tributary to the Truckee River. The 2020 Plan update provides a process and framework for identifying, developing, and implementing projects originated through the Storm Water Committee that is consistent with the guidelines for an EPA approved Watershed Management Plan. The 2020 plan by NCE and the 2020 Integrated Source Water and 319(h) Watershed Protection Plan for Public Water Systems and the Truckee River in the Truckee Meadows, are mutually complementary and work together to address the broad scope of potential strategies to improve drinking water and surface water quality in Washoe County.

Water Quality Monitoring

Balance Hydrologics has conducted water quality analyses on tributaries and stormwater outfalls since 2016. The following table lists the report years and the respective drainages that were assessed in this watershed:

Streams Addressed in Stormwater Monitoring Annual Reports in the Peavine Creek-Truckee River Watershed by Report Year			
Stream Name	Entire Reach		
	2016	2017	2018
Alum	X	X	X

Truckee Meadows Watershed Protection Manual

This manual contains a Summary of the Watershed Protection Activities and Programs Developed in Conjunction with the Watershed Management Facilitator Scope of Work (Kennedy/Jenks, 2005). This document provides a reference and compendium of the various watershed protection activities and programs that were developed in 2004 and 2005 for Reno, Sparks and Washoe County.

Truckee Meadows Water Authority

TMWA is responsible for almost all municipal water delivery in the greater Reno-Sparks area. TMWA also owns and operates the municipal wells in this watershed. The following program and plans guide the management of these water resources:

- TMWA Water Resources Plan (2016-2035):

  This plan describes water quality issues and goals for the water resources managed by TMWA. Special focus is placed on changes in future water supply and demand and how those changes will impact the region's water resources. Additionally, this plan provides useful Truckee River watershed information.

- Source Water Quality Assurance Program (2016-2035):

  TMWA's objective is to deliver high-quality potable water to its customers in a cost-effective manner. To achieve this objective, TMWA has established a water quality assurance program. The components that make up the program are source water quality protection, potable water treatment, maintenance of distribution system water quality, and cross connection control.

- Wellhead Protection Plan (2016):

  The purpose of the Wellhead Protection Plan is to protect groundwater that serves as a source for public drinking water supplies. This plan is intended to be a tool used by TMWA to assist in protecting drinking water sources.

Truckee River Fund

TMWA established the Truckee River Fund in 2004 (Truckee River Fund). The purpose of the Fund is to "protect and enhance water quality or water resources of the Truckee River, or its watershed." The Fund provides a way to respond to the requests from outside groups and organizations that are involved in promoting and improving the health of the Truckee River System and watershed. This in turn benefits the primary water source for the community and, in the long run, benefits TMWA customers. For example, the Truckee River Fund has helped finance the following projects:

- Rancho San Raphael Wetland and Water Quality Enhancement (funded 2007):

  This enhancement centered on invasive Russian Olive tree removal in the Rancho San Raphael wetlands north of McCarran Boulevard. The Russian Olive trees were replaced by native yellow willows to maintain bank stabilization. These enhancements have improved the capability of removing nutrients and sediment, thus improving the water quality of this tributary before it enters the Truckee River.

- Alum Creek/Steamboat Creek Watershed Remediation/Hawken Fire Restoration; 2007 Alum Creek/Hunter Creek Watershed Remediation/Hawken Fire Restoration Effort (funded 2007):

  This restoration effort included multiple actions that helped the watershed recover after the Hawken Fire. These actions included hydroseeding, removal of hazardous trees, construction of debris basins, clearing channels of burn debris, installation of gaging stations for flood early warning, and installation of fencing and signage. By completing this remediation, the watershed's water quality was maintained instead of degraded from increase d sediment and turbidity loading.

- Alum Creek Water Quality Improvement Project (2014):

  This project focused on sampling and testing water quality along Alum Creek to collect water quality information. This is essential data because the EPA and NDEP have listed Alum Creek as impaired due to high levels of TSS, TDS, Orthophosphate, and Total Phosphorus.

Washoe County

Activities in Washoe County are reviewed according to the Master Plan Planning Areas. The Truckee River watershed includes nine planning areas. The Peavine Creek-Truckee River HUC-12 watershed is included in both the Sun Valley and Northwest Truckee Meadows planning areas. The County has Citizens Advisory Boards (CABs) which provide important community perspectives on local issues to the Washoe County Board of Commissioners. This watershed is centered within a mix of three different CABs: Sun Valley, North Valley, and West Truckee Meadows/Verdi (CAB Boundaries).

The Washoe County Master Plan (2008) has Goals and Policies for Public Services and Facilities, and Open Space and Natural Resource Management. Applicable sections include:

- Article 418, Significant Hydrologic Resources, which regulates development activity within and adjacent to perennial streams to ensure that these resources are protected and enhanced. (Note: this does not apply to the Truckee River)
- Article 420, Storm Drainage Standards, sets forth standards for ensuring that both private and public development provides adequate protection for citizens and property. Therefore, it minimizes and controls erosion and pollution impacts on the natural environment, and additionally minimizes maintenance costs for drainage and flood control systems.
- Article 421, the Storm Water Discharge Program which protects and enhances the water quality of watercourses, water bodies, groundwater and wetlands in a manner pursuant to and consistent with the Clean Water Act.
- Article 810, Special Use Permits, which provides a method of reviewing certain uses to determine if they have the potential to adversely affect public facilities in the vicinity.

Washoe County also provides comprehensive services for construction and maintenance roads, landscaping and drainage facilities; county-wide planning and code compliance; and emergency response services for fire and hazardous materials. All of these roles contribute to preserving and improving water quality in the watershed.

Washoe County Health District

The Washoe County Health District has regulatory authority over a wide variety of programs and services in the Truckee Meadows including underground storage tanks, septic systems, all public water systems, domestic wells, water projects and community development, grading permits, solid waste management and emergency preparedness. The Health District regulations are provided in several documents as listed below:

- Regulations of the Washoe County District Board of Health Governing Sewage, Wastewater and Sanitation. These regulations provide the minimum requirements to be followed by any person developing property served by an on-site sewage disposal system. These requirements are promulgated to prevent the spread of disease, protect the water quality of this county and ensure the on-site sewage disposal systems function properly.
- Regulations of the Washoe County District Board of Health Governing Well Construction. These regulations provide minimum requirements to be followed by any person when drilling and plugging specific kinds of wells. A well construction permit is required to drill a well for consumptive use or monitoring wells. These requirements are primarily promulgated to protect the quantity and quality of the waters of this County from waste and contamination, and to provide public protection by enforcing proper construction and plugging of wells.
- Regulations of the Washoe County District Board of Health Governing Solid Waste Management. These regulations protect water quality through the regulation of municipal solid waste landfills.

Western Regional Water Commission and the Northern Nevada Water Planning Commission

The Western Regional Water Commission (WRWC) focuses on improving water resource planning at the regional level and facilitating coordinated resource management among city of Reno, city of Sparks, Washoe County, TMWA, Truckee Meadows Water Reclamation Facility, South Truckee Meadows GID and Sun Valley GID.

The Northern Nevada Water Planning Commission (NNWPC) is a technical advisory panel that reports to the WRWC. The NNWPC develops and updates a Comprehensive Regional Water Management Plan (RWMP) and makes recommendations to the WRWC for adoption. In addition, the NNWPC develops priorities and an annual budget for the Regional Water Management Fund, also for recommendations to the WRWC.

The Comprehensive Regional Water Management Plan includes several applicable objectives:

- Objective 1.2 Provide for a Sustainable Water Supply and an Acceptable Level of Service to the Community (including protecting groundwater recharge areas).
- Objective 1.3 Implement measures to protect and enhance water quality for a sustainable water supply (including source water protection).
- Objective 2.1 Promote Efficient Use of Resources (Reduction of Non-Point Source Pollution for TMWRF Pollutant Credit).
- Objective 2.2 Manage wastewater for protection and enhancement of water quality.
- Objective 3.1 Effective and integrated watershed management (protection of human health, property, water quality including storm water).

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Spanish Springs & Sugarloaf Peak

HUC-12 Watersheds #160501020402 & #160501020401 Profiles

Click here for complete HUC-12 Watersheds Map

Contents

Introduction

The combined Spanish Springs and Sugarloaf Peak HUC-12 Watershed profile is a component of the 2020 Integrated Source Water and 319(h) Watershed Protection Plan for Public Water Systems and the Truckee River in the Truckee Meadows (Plan), as well as the Watershed Management and Protection Plan for Tributaries to the Truckee River. These HUC-12 watersheds were combined due similarity and because they comprise the Spanish Springs Valley Groundwater Basin. This document is a part of the on-line watershed mapping tool.

This watershed description is intended to be a guide and resource for organizations working within the watershed, and an educational tool for those interested in learning more about the watershed in which they live. This Plan can be used to support funding for a multitude of water quality projects in the watershed. Note that only non-regulated activities are eligible for the Nevada Division of Environmental Protection Source Water Protection Program or the 319 Non-Point Source Program funding.

Summary

This profile focuses on the watersheds' water quality. It includes potential and existing concerns, types of land uses, watershed management strategies and projects, and the involved stakeholders and their corresponding plans with water quality components.

The Spanish Springs and Sugarloaf Peak HUC-12 Watersheds comprise the Spanish Springs Valley Groundwater Basin. The only drinking water supply source is groundwater from wells, there are no surface drinking water sources. The Orr Ditch carries surface water into the Spanish Springs watershed from the Truckee River, then the North Truckee Drain channels water back to the Truckee River, entering the river near Vista Boulevard in the adjacent Evans Creek HUC-12 Watershed. The agricultural land in Spanish Springs Valley has largely been replaced by residential, commercial, and industrial businesses along the main transportation route of Pyramid Highway. Land managed by the Bureau of Land Management (BLM) and the Reno Sparks Indian Colony surrounds the developable areas.

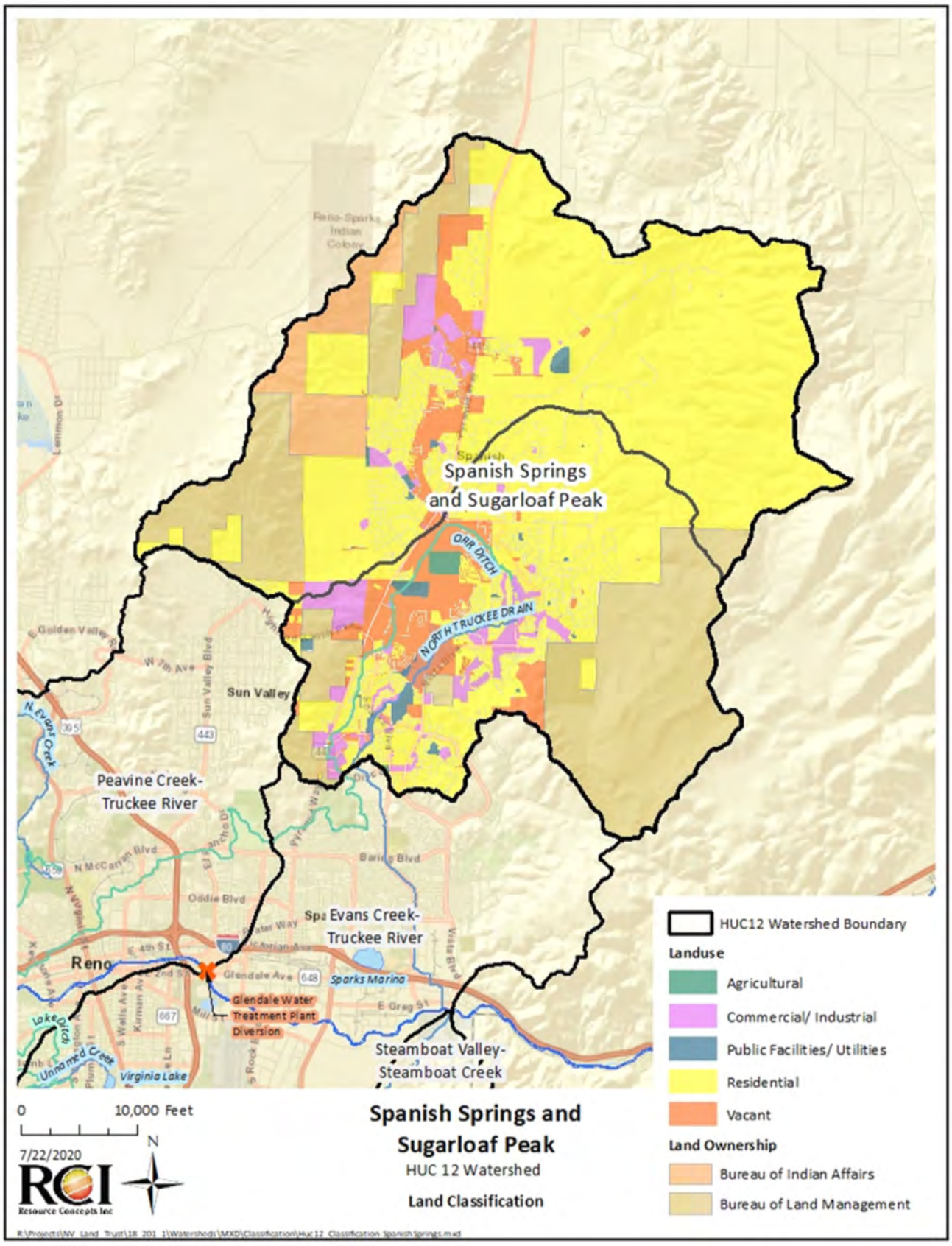
Source Water Protection Areas (SWPAs) for these watersheds were developed by stakeholders to help protect drinking water sources. This watershed is an important area for groundwater recharge, has on-going groundwater quality issues, and hosts eighteen public water system wells. As a result, most of the central valley is in a SWPA. The following table summarizes key water quality aspects in this watershed.

Watershed Summary	
Basins	• Spanish Springs HUC-12 Watershed #160501020402. • Sugarloaf Peak HUC-12 Watershed #160501020401. • Groundwater Basin: 085 (Spanish Springs Valley).
Water Bodies, & Water Quality	• North Truckee Drain, monitored but not assessed for beneficial uses standards. • Orr Ditch, not assessed.
Source Water Protection Areas	• A SWPA encompasses the central valley of the two watersheds. It represents a precautionary indicator to safeguard the drinking water sources. • Critical SWPAs represent areas closer to the water system wells. • 18 public water systems wells are managed by 2 different public water systems. • 11,820 acres, or roughly 25% of the watersheds, are Source Water Protection Areas. • 4,500 total acres, or approximately 9% of the watersheds, are Critical Source Water Protection Areas.
Special Considerations & Issues	• No natural perennial streams. • Nitrate contamination has affected groundwater quality in public water systems wells. • Existing high density of residential septic systems. • New urbanization has potential to increase contaminant sources for groundwater and surface water. • Invasive noxious weeds, erosion, and sediment deposition. • Major transportation corridor: Pyramid Highway.

	Type	Acres	%
Land Jurisdiction	City of Sparks:	9,520	20%
	BLM:	13,580	28%
	Bureau of Indian Affairs (BIA):	2,025	4%
	Washoe County Non-Federal:	25,800	53%
Land Use	Agriculture:	130	<1%
	Commercial/Industrial:	2,050	4%
	Residential:	26,300	54%
	Public facilities/Utilities:	430	1%
	Vacant:	3,700	8%
	Federally Managed:	15,605	32%

Land uses and jurisdictions are summarized in the adjacent table and illustrated by the Land Classification Figure.

Residential and federally managed public land uses are the dominant acitivities in this watershed, with some commercial and industrial development. The water quality concerns from these activities are groundwater contamination primarily from existing septic systems, potential for increase in other contaminant sources, and risk of drainage destabilization from wildfire and urban runoff. The residential areas in Spanish Springs are expected to expand rapidly in the near future.


Spanish Springs
and Sugarloaf Peak
ORR DITCH
NORTH TRUCKEE DRAIN
Sun Valley
Peavine Creek-
Truckee River
Evans Creek-
Truckee River
Reno
Sparks Marina
Glendale Water
Treatment Plant
Diversion
Steamboat Valley-
Steamboat Creek
Virginia Lake
0
10,000 Feet
N
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RCI
Resource Concepts Inc
Spanish Springs and
Sugarloaf Peak
HUC 12 Watershed
Land Classification
HUC12 Watershed Boundary
Landuse
Agricultural
Commercial/ Industrial
Public Facilities/ Utilities
Residential
Vacant
Land Ownership
Bureau of Indian Affairs
Bureau of Land Management

Water Quality Standards and Beneficial Uses

Water quality standards for surface water in the state of Nevada are established by Nevada Administrative Code (NAC) NAC 445A.11704 through NAC 445A.2234. Standards applicable to beneficial uses are generally described under NAC 445A.122. The Nevada Division of Environmental Protection (NDEP) Bureau of Water Quality Planning Nevada 2016-2018 Water Quality Integrated Report (Integrated Report) identifies the beneficial uses and the surface water quality conditions in the state of Nevada. There are no natural perennial streams in these watersheds, and Orr Ditch and North Truckee Drain are not assessed in the Integrated Report:

- The Orr Ditch traverses the north side of Sparks alongside Pyramid Highway through residential development, the Lazy 5 Regional Park, Wingfield Springs Golf Course, and the Red Hawk Golf Club. The Orr Ditch conveys water from the Truckee River for irrigation, but also intercepts stormwater runoff, irrigation return flows, and springs that may affect water quality.
- The North Truckee Drain continues where the Orr Ditch ends, then flows through the Wingfield Springs Golf Course into Pioneer Meadows Lake, the Kiley Ranch Wetlands, and through residential development. The Drain carries "tailwater" from flood irrigation, springs, and stormwater runoff back to the Truckee River. The vegetation along the North Truckee Drain is prone to wildfires and the resulting sedimentation issues are a water quality concern. Water quality is monitored and does not appear to be impaired in the watershed.

Groundwater is an important source of drinking water for public water systems in this watershed. The primary known contaminant within the groundwater basin is nitrate, which has affected water quality in public water systems and private wells. Sources for this contaminant are discussed below.

Potential and Existing Water Quality Concerns

The primary potential and existing water quality concerns in this watershed are listed below, illustrated by the on-line watershed mapping tool and described in the following paragraphs:

- Hazardous Materials from Spills or Leaks
- Pollution from Urban Areas
- Nitrate from Individual Sewage Disposal System
- Sediment from Erosion

Hazardous Materials from Spills or Leaks

Pyramid Highway is in this watershed and has the potential for accidental spills of hazardous materials that are typical of Nevada highways. The U.S. Department of Transportation accumulated a list of commonly transported hazardous materials within the Truckee River watershed (WRWC, 2017). These include:

- Ammonia perchlorate
- Anhydrous ammonia
- Chlorine
- Cyanide
- Hydrochloric acid
- Hydrogen sulfide
- Nitro cellulose (wet)
- Propane
- Petroleum naphtha
- Phosphoric acid
- White phosphorous
- Propargyl alcohol
- Sulfuric acid
- Sodium hydroxide

Underground chemical and fuel storage tanks have had a history of leaks that can cause contamination of soil and groundwater. There are underground storage tanks associated with several gas stations in the Spanish Springs valley. The Bureau of Corrective Actions indicates a few corrective sites related to heating oil or fuel spills. With future commercial and industrial development anticipated in Spanish Springs, the potential for accidental spills and leaks of hazardous materials may increase, which can become a groundwater quality concern particularly in Critical SWPAs.

Pollution from Urban Area Runoff

Groundwater, the Orr Ditch, Truckee Drain and ephemeral water in drainages may be vulnerable to pollution from urban areas. Potential contaminants include:

- Nutrients from fertilizers
- Dissolved salts from excess irrigation
- Trash
- Bacteria from animal waste
- Dumping household waste
- Runoff from roads and parking lots

Excessive fertilization in irrigated green areas such as yards, fields, golf courses or parks are potential sources of nutrients from fertilizers that can runoff or seep into groundwater. Where desert soils have not been previously irrigated, seepage from excess landscape irrigation can mobilize salts (TDS, Nitrate, etc.), which eventually might affect groundwater quality. Additional research is needed to evaluate if these activities contribute to existing groundwater quality issues in the Spanish Springs valley.

Residential development and commercial businesses span across Pyramid Highway in the central portion of the Spanish Springs basin between the two watersheds. Both the Orr Ditch and the North Truckee Drain meander through the housing developments and golf courses. Runoff from commercial and industrial sites, residential areas, golf courses, and park irrigation can transfer chemicals, trash, debris, and sediment downstream during a storm event.

Spanish Springs is the fastest growing residential area in Washoe County according to the Nevada Commercial Services in 2019. As development continues to increase around the outskirts of the city, the potential for urban runoff and related pollutants to affect water quality in the Orr Ditch and North Truckee drain may increase.

Nitrate from Individual Sewage Disposal Systems

Groundwater quality monitoring results in the Spanish Springs and Sugarloaf Peak watersheds over the past 15 years indicate increasing nitrate contamination in municipal wells that is likely due to septic systems (WRWC, 2017). The Spanish Springs watershed has septic system densities greater than 400 systems per square mile. The combination of these high densities with close proximity to domestic and public wells, permeable soil conditions, and shallow aquifers (WRWC, 2017) is an on-going concern. Wells and septic systems are closely interspersed; with 1,000 septic systems inside about 2,000 feet of a municipal well (WRWC, 2017). There are over 5,900 parcels with wells and 7,000 parcels with septic systems in Spanish Springs valley.

Sediment from Erosion

Sediment from erosion conveys pollution, such as phosphorous, and degrades downstream water with suspended sediment. The primary causes of erosion and sedimentation in this watershed include wildland fire, noxious weeds, and drainage and landscape modifications.

High-severity wildfires alter the overall structure of the ecosystem through the removal of vegetation leaving limited ground cover. Severe fires also create a waxy, water-repellant layer over the soil which increases water and soil runoff (NDF, 2011). Residential properties in these watersheds are surrounded by sagebrush steppe vegetation near BLM managed land. As a result, the upper and lower reaches of the North Truckee Drain were plagued by fires from 2000-2014 (CDM Smith, 2015).

The removal of vegetation due to fire can also lead to erosion and sediment accumulation in creeks. Upslope of the North Truckee Drain, the desirable vegetation has not fully recovered from the fire due to encroachment from invasive weeds (CDM Smith, 2015). Areas invaded by noxious weeds are more susceptible to erosion and sedimentation in several ways. Noxious weeds do not have a root structure to retain soil and resist wind or water erosion.

The fire risk is increased because noxious weeds are more flammable than native species. Noxious weeds are spread throughout the upper reach of the watershed. These weeds are primarily tall whitetop, cheatgrass, and purple loosestrife (CDM Smith, 2015). Herbicide treatments and cutting and removal of weeds has been used to prevent their encroachment (Hillside Design, 2012).

Drainages are often modified, such as straightened, diverted or combined, to accommodate development. Much of the drainage modifications are designed to reduce the flood hazard on the adjacent areas. The hydromodifications result in higher water velocities which causes headcuts and other bed and bank erosion and downstream sedimentation. Additionally, new residential and commercial development has increased sediment running into both North Truckee Drain and Orr Ditch, while steep channel banks have led to erosion (CDM Smith, 2015).

Areas that are disturbed during construction projects can represent a potential risk of erosion and downstream sedimentation. Protection of stormwater runoff from contamination by construction in the Truckee Meadows is regulated under the regional stormwater management plan (Truckee Meadows MS4). There are many Best Management Practice (BMP)resources available to construction projects to help keep soil on-site and to reduce runoff.

Strategies to Protect and Improve Water Quality

The water quality concerns identified in this watershed can be addressed through management strategies described in this section, the proposed projects detailed in the Project Profiles, as well as applicable on-going water quality projects and programs described under Stakeholders and Plans. These strategies pertain to the entire watershed but may be prioritized in SWPAs.

Source Water Protection Area Identification and Management

A SWPA is a management area surrounding a surface water or groundwater resource that supplies water for public consumption. Activities in these buffer areas can affect the quality of water downstream or underground. These management strategies acknowledge the value of these SWPAs to prevent future contamination of our sources of drinking water.

There are two types of buffers in this watershed (RCI, 2020). One buffer encompasses the central Spanish Springs valley. This buffer represents a precautionary indicator to safeguard the groundwater recharge area. The second type of buffer surrounds critical areas closer to the water system wells (based on a 20-year time of travel for groundwater). These areas are illustrated on

the Jurisdiction and Source Water Protection Areas Figure. The following objectives are significant in both future and on-going SWPA management:

- Inform landowners in SWPAs about their proximity to a valuable drinking water source and how they can help protect their water quality.
- Encourage coordination between Public Water Systems, landowners, and City or County planners to consider the importance of SWPAs in project reviews.
- Explore collaborative funding for water quality and watershed improvements and support the resource investigations needed to develop viable projects.
- Prioritize physical improvements in SWPAs to protect and improve source water quality.

Education and Outreach

The following education and outreach objectives are intended to help effectuate positive actions to protect water quality:

- Work with Homeowner Associations regarding source water pollution prevention measures.
- Support the Truckee Meadows Storm Water Permit Coordinating Committee (Storm Water Committee) outreach and education programs.
- Increase knowledge about household and commercial chemical use, storage, and disposal through local outreach efforts.
- Inform landowners and developers residing in critical SWPAs about the importance of avoiding contamination and their proximity to a valuable drinking water source.

Interagency Communication

The following interagency communication management objectives are important tools to both reinvigorate and invest additional resources in water quality, as well as utilize existing resources and programs:

- Each agency may evaluate how to improve lines of communication within and between jurisdictions regarding water quality issues; i.e. city of Sparks, Washoe County, Truckee Meadow Water Authority (TMWA), NDEP, Washoe County Health District, Reno-Sparks Indian Colony, and the BLM.
- Continue to increase coordination and communication between the appropriate agencies regarding spills and corrective actions along Pyramid Highway.
- Collaborate with the Washoe/Storey Cooperative Weed Management Area to support their efforts in noxious weed management (WSCWMA Website).
- Evaluate how to collaborate with stakeholders such as TMWA and the Storm Water Committee on incorporating drinking water source protection into community outreach and education strategies.

Wildfire and Fuel Management

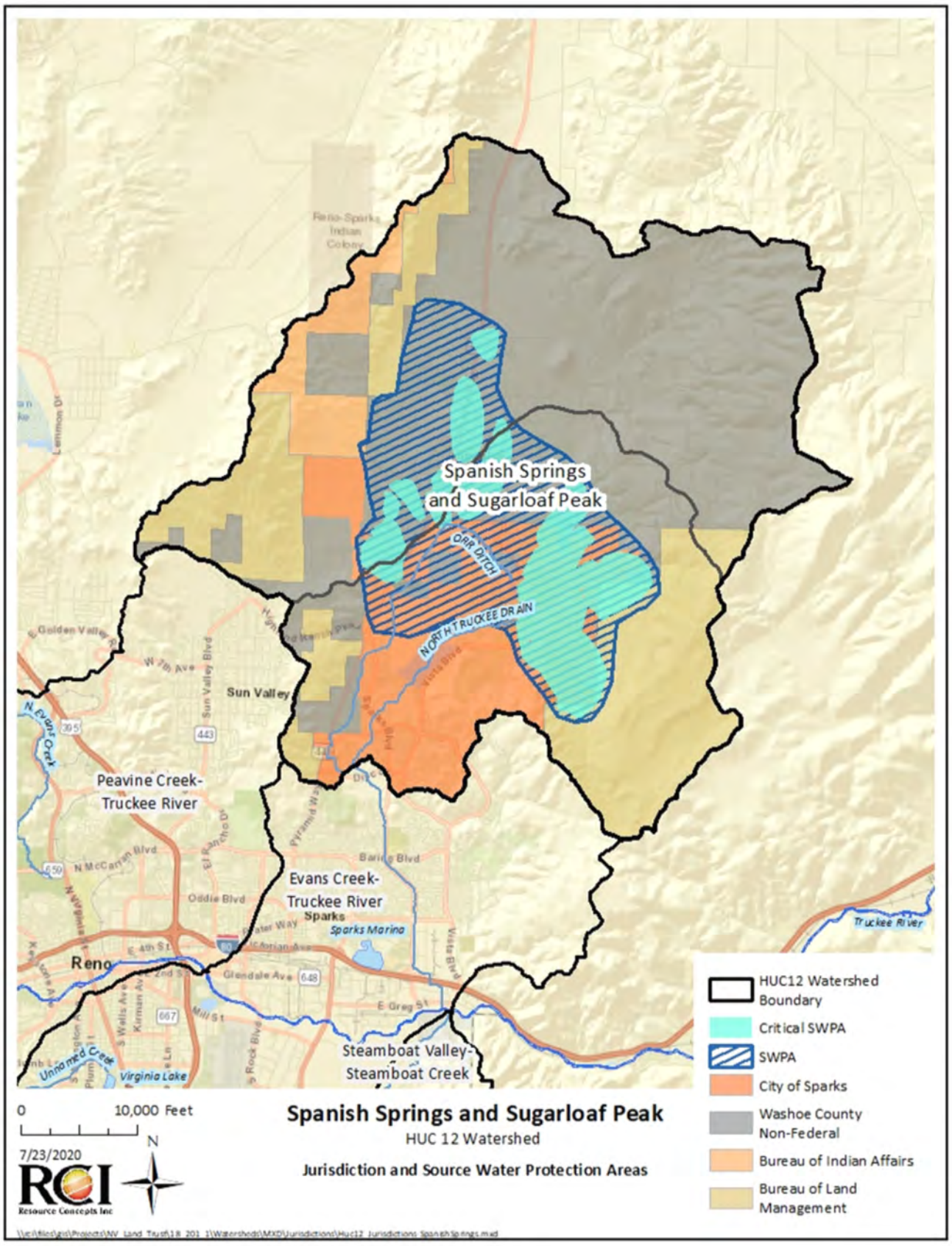
Wildland fire is a threat to water quality and coordinated fuel management on wildlands can help reduce risks to water quality. Stakeholders and partners may consider the following objectives as they pertain to wildfire and fuel management:

- Encourage development, maintenance, and implementation of the Community Wildfire Protection Plans.
- Support and collaborate with the Nevada Cohesive Strategy effort and the Shared Stewardship Agreement, the blueprint to address Nevada's wildland fire issues.
- Support for the Nevada Network of Fire Adapted Communities and their local chapters for people in high fire threat locations to fully prepare themselves, their homes, and the landscape where they reside to survive the destructive force of wildfire.
- Encourage the development of wildland fire risk reduction and emergency recovery plans to reduce the risk of wildfire, quickly restore burned areas, and reduce the risk of catastrophic post-fire erosion and sedimentation.
- Collaborate and coordinate to treat invasive and noxious weeds pre- and post-fire to reduce risk of wildfire and watershed destabilization.

Resource Investigation and Planning

Stakeholders may consider supporting the following resource investigations and planning, which can help fill data gaps, inform implementation designs and prioritize projects:

- Research the potential for irrigation and seepage through desert soils to contribute to nitrate in groundwater.
- Efforts to increase the quantity and quality of groundwater recharge.
- Consider expanding groundwater quality monitoring.
- Research how to identify private wells that present a groundwater contamination risk and that might need to be repaired or abandoned.


Spanish Springs
and Sugarloaf Peak
ORR DITCH
NORTH TRUCKEE DRAIN
Sun Valley
Peavine Creek-
Truckee River
Evans Creek-
Truckee River
Sparks
Sparks Marina
Reno
Steamboat Valley-
Steamboat Creek
Virginia Lake
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RCI
Resource Concepts Inc
Spanish Springs and Sugarloaf Peak
HUC 12 Watershed
Jurisdiction and Source Water Protection Areas
HUC12 Watershed Boundary
Critical SWPA
SWPA
City of Sparks
Washoe County Non-Federal
Bureau of Indian Affairs
Bureau of Land Management

Water Quality Best Management Practices

Stakeholders may consider supporting the following Water Quality BMPs that may improve and prevent degradation to water quality resources:

- Water quality improvement projects.
- Invasive and noxious weed removal and integrated vegetation management.
- Recommendations in the tributary assessments.
- Septic to sewer conversions.
- Proper abandonment of unused/orphaned wells.
- Physical improvements prioritized in SWPAs for water quality improvement and protection.
- Fertilizer, pesticide, and irrigation management plans for green spaces.

Proposed Implementation Projects

Proposed implementation actions are generally described under the Strategies to Protect and Improve Water Quality. Specific implementation actions have been developed into proposed projects by local stakeholders and are described in Project Profiles. These Project Profiles include the information needed, as identified in the Environmental Protection Agency's (EPA) guidance for nine critical elements, for an endorsable watershed management plan. Future projects that fall within the strategies identified for this watershed should be brought forward and incorporated into this Source Water and Watershed Protection Plan using the Project Profile format that meet management strategy criteria. As discussed in the following Stakeholders and Plans section, municipality and agency projects are also incorporated by reference.

Stakeholders and Plans

Stakeholder information and existing plans were used extensively in development of this Plan for Washoe County. These municipalities and agencies each have unique strategies and capital improvement plans that include water quality protection or improvement projects. These are updated regularly at differing timeframes (i.e. annually, every five years, etc.) according to their specific budgeting and planning processes. The applicable planning documents are briefly described and referenced in this section. Those projects pertaining to water quality protection and improvement in the watershed are incorporated by reference.

Project Stakeholders	
• City of Sparks	• Truckee Meadows Regional Planning Agency
• Bureau of Land Management	• Truckee Meadows Storm Water Permit Coordinating Committee
• Reno Sparks Indian Colony	• Truckee Meadows Water Authority
• Nevada Department of Transportation	• Truckee River Fund
• Nevada Division of Environmental Protection	• Washoe County
• Sun Valley General Improvement District	• Western Regional Water Commission

City of Sparks

The city of Sparks has a Comprehensive Plan (2016) that encompasses the growth of the City and development projects. Areas are identified in the Comprehensive Plan according to the unique topics that influence each region. The Comprehensive Plan contains goals and policies for resiliency and conservation. The following policies are applicable to water quality and source water protection:

- Policy RC4: Reduce pollution from stormwater runoff, overflow and other non-point sources.
- Policy RC5: Protect groundwater quality through land use management that safeguards recharge areas from inappropriate disturbances and contamination.
- Policy RC6: Implement "Best Management Practices," including but not limited to Low Impact Development Practices (LID), to control urban stormwater runoff.

The city of Sparks also provides comprehensive services for construction and maintenance roads, landscaping and drainage facilities, citywide planning and code compliance, and emergency response services for fire and hazardous materials. All of these roles contribute to preserving and improving water quality in the watershed.

The city of Sparks has five Neighborhood Advisory Board Wards, led by council members that contribute to community planning and decision making. Each ward has a representative on the Sparks City Council that voices the concerns and needs of that area. These Wards are the most efficient way for citizens to communicate their concerns and ask questions prior to any large decisions or projects, as well as engage in important community issues. This watershed is in Wards 4 and 5.

Bureau of Land Management

The Nevada BLM has Resource Advisory Councils (RACs) which allow community members to be involved in natural resource planning and management issues on BLM managed public land. Washoe County is a part of the Sierra Front-Northwestern Great Basin RAC which is administered through the BLM-Carson City and Winnemucca District offices. BLM Resource Advisory Councils-Nevada

The BLM also has specific Resource Management Plans (RMPs), that apply to this watershed. These plans generally outline the way that the BLM currently manages and intends to manage the multiple resources on public land. Within this watershed, the following plans and sections are applicable:

- Carson City Consolidated Resource Management Plan (2001):

  RIP-1: Riparian Management discusses how riparian areas on BLM land should be managed, monitored, and maintained. The desired outcome in this section is to protect and maintain existing and potential fisheries and riparian areas in good or better condition.

  SWA-1: Soils, Watershed and Air Quality describes specific techniques and goals for all watersheds within the planning area such as reducing soil loss, flood damage, and sediment damage from human activities.

  WAT-1: Water Resources discusses management for good water quality on public lands such as watershed management plans as an important administrative action.

- Carson City Fire Management Plan (2016):

  The Fire Management Plan (FMP) goal is to restore sagebrush ecosystems throughout the planning area. In doing so, the risk of wildfire and its negative effects should eventually decrease. Since wildfire is a significant issue in this watershed, management to reduce its risk is a key planning component.

Reno Sparks Indian Colony

The Reno Sparks Indian Colony (RSIC) governs 15,263 acres in Hungry Valley of which 2,025 acres are in this watershed. The RSIC is a vibrant, expanding organization which balances their traditional teachings and rich culture with contemporary business methods and innovative governmental practices. Regular, monthly meetings are held to discuss and vote on matters that affect the Colony, its membership, the community and any aspect of the tribal government. Resolution 2017-RS-28 describes the allowed and prohibited uses of the area.

Nevada Department of Transportation

The Nevada Department of Transportation (NDOT) has developed their Stormwater Management Program to reduce stormwater pollution from NDOT managed facilities and roads. The program BMPs and annual report outline the specific measures that NDOT will take to reduce stormwater pollutant discharges from its owned and operated storm drain system:

- Stormwater Management Program (2013):

  The overall goal of the NDOT Stormwater Management Program is to reduce pollution associated with stormwater from NDOT's MS4 to the maximum extent practicable, as well as to protect surface and groundwater resources within the MS4 permit area. The Stormwater Management Program addresses stormwater pollution control as it relates to the planning, design, construction, and maintenance of NDOT's highway infrastructure statewide.

- Stormwater Management Program: Annual Report (2017):

  This watershed is impacted or has the potential to be impacted by I-80, I-580, Hwy 395, and Hwy 431. The Stormwater Management Program provides a helpful planning outline on handling and mitigating pollution from the roads.

Nevada Division of Environmental Protection

The NDEP has a goal to preserve and enhance the environment of the State in order to protect public health, sustain healthy ecosystems, and contribute to a vibrant economy. The Spanish Springs and Sugarloaf Peak HUC-12 Watersheds have several challenges facing source water protection, so the NDEP is an essential stakeholder and planning partner. Specifically, there are two programs under the NDEP that were involved in this Plan in Washoe County. Both programs provide education and outreach and offer funding opportunities for water quality protection and improvement:

- Integrated Source Water Protection Program under the Safe Drinking Water Bureau:

  This program offers technical assistance for source water protection projects. The program coordinates source water protection activities at the local, state, and federal levels, and encourages community-based protection and preventive management strategies to ensure all public drinking water resources are kept safe from future contamination.

  The 2010 Nevada Integrated Source Water Protection Program guidance document details the program components as well as the requirements for a State-endorsed Community Source Water Protection Plan.

- 319 Nonpoint Source Pollution Management Program under the Bureau of Water Quality Planning:

  This Program can provide matched grant funding for projects that improve water quality.

  The 2015-2019 State of Nevada Nonpoint Source Management Plan establishes how NDEP will work with partners to address non-point source pollution. The Plan formalizes Nevada's approach for protecting and improving water quality and describes the goals, short- and long-term objectives, milestones and timeframes to guide activities, and measures for tracking success.

Sun Valley GID

The Sun Valley General Improvement District (District) was established in 1967 as Sun Valley's water and sanitation district. The District is a quasi-municipal entity established under Nevada Revised Statute, Chapter 318. It is chartered to provide water, sewer, garbage, and recreation services throughout the community. The District owns and maintains an estimated 100 miles of water mains, 120 miles of sewer mains, two sewer vaults, several pressure reducing vaults and pumping stations, and nine water storage water tanks.

Truckee Meadows Regional Planning Agency

The Truckee Meadows Regional Planning Agency (TMRPA) fosters coordination among Reno, Sparks and Washoe County. TMRPA facilitates land-use, infrastructure provision and resource management conversations among public and private decision makers. The agency also serves as a collaborative information and data warehouse, coordinating regional data collection and delivering advanced geospatial analytics for regional solutions. TMRPA includes a Regional Planning Governing Board and a Regional Planning Commission.

The TMRPA Regional Plan (2012 as amended) provides goals and policies for multiple plans and programs, including those with watershed related and well head protection components. The plan was revised in 2019-2020 and is considered a living document that will evolve over time.

Truckee Meadows Storm Water Permit Coordinating Committee

The Truckee Meadows Storm Water Permit Coordinating Committee (Storm Water Committee) is responsible for implementing the Truckee Meadows Storm Water Management Program to protect the water quality of the region's waterways, streams and the Truckee River. The Storm Water Committee continues to guide the development of numerous plans and assessments relevant to source water and watershed protection as summarized below.

Ordinance and Guidance Changes for Construction and Post-Construction Programs

The Storm Water Committee updated and joined the Structural Controls Design Manual and the Low Impact Development Manual, as well as updated the Truckee Meadows Construction Site BMP Handbook. These documents are referenced in the code for the city of Reno, city of Sparks, and Washoe County.

Watershed Assessments

Watershed assessment reports prepared for the Storm Water Committee were completed by Jesch et al. from 2002-2011 that include the North Truckee Drain. These reports provide general watershed descriptions and can be used to track historical changes in creek condition and water quality over time. The reports do not include water quality data.

Hillside Design completed a comprehensive Watershed Assessment for Tributaries to the Truckee River in 2012 which included the North Truckee Drain.

The assessment included:

- stream reach descriptions with numerous photo points,
- Proper Functioning Condition rating,
- list of restoration and management efforts needed to improve stream conditions, and
- water chemistry for temperature, pH, specific conductivity, dissolved oxygen, turbidity, and flow.

CDM Smith was contracted in 2015 through 2017 to conduct watershed assessments. The following table lists the report year and the respective drainages and reaches that were assessed in this watershed:

Stream Reaches Addressed in Watershed Assessment Reports in the Spanish Springs Watershed by Report Year							
Stream Name	Lower Reach			Middle Reach		Upper Reach	
	2015	2016	2017	2015	2017	2016	2017
North Truckee Drain		X		X		X	

Watershed Management and Protection Plan for Tributaries to the Truckee River

The Watershed Management and Protection Plan for Tributaries to the Truckee River (NCE, 2020) is an update to the 2003 Watershed Management and Protection Plan for Tributaries to the Truckee River, which has been implemented for more than 15 years by the regional MS4 through the Storm Water Committee. The 2003 plan described an approach for on-going watershed assessment studies and monitoring to protect and improve the water quality in the stream corridors and drainages tributary to the Truckee River. The 2020 Plan update provides a process and framework for identifying, developing, and implementing projects originated through the Storm Water Committee that is consistent with the guidelines for an EPA approved Watershed Management Plan. The 2020 plan by NCE and the 2020 Integrated Source Water and 319(h) Watershed Protection Plan for Public Water Systems and the Truckee River in the Truckee Meadows, are mutually complementary and work together to address the broad scope of potential strategies to improve drinking water and surface water quality in Washoe County.

Water Quality Monitoring

Balance Hydrologics has conducted water quality analyses on tributaries and stormwater outfalls since 2016. The following table lists the report years and the respective drainages that were assessed in this watershed:

Streams Addressed in Stormwater Monitoring Annual Reports in the Spanish Springs Watershed by Report Year			
Stream Name	Entire Reach		
	2016	2017	2018
North Truckee Drain	X	X	X

Truckee Meadows Watershed Protection Manual

This manual contains a Summary of the Watershed Protection Activities and Programs Developed in Conjunction with the Watershed Management Facilitator Scope of Work (Kennedy/Jenks, 2005). This document provides a reference and compendium of the various watershed protection activities and programs that were developed in 2004 and 2005 for Reno, Sparks and Washoe County.

Truckee Meadows Water Authority

TMWA is responsible for almost all municipal water delivery in the greater Reno-Sparks area. TMWA also owns and operates the municipal wells in this watershed. The following program and plans guide the management of these water resources:

- TMWA Water Resources Plan (2016-2035):

  This plan describes water quality issues and goals for the water resources managed by TMWA. Special focus is placed on changes in future water supply and demand and how those changes will impact the region's water resources. Additionally, this plan provides useful Truckee River watershed information.

- Source Water Quality Assurance Program (2016-2035):

  TMWA's objective is to deliver high-quality potable water to its customers in a cost-effective manner. To achieve this objective, TMWA has established a water quality assurance program. The components that make up the program are source water quality protection, potable water treatment, maintenance of distribution system water quality, and cross connection control.

- Wellhead Protection Plan (2016):

  The purpose of the Wellhead Protection Plan is to protect groundwater that serves as a source for public drinking water supplies. This plan is intended to be a tool used by TMWA to assist in protecting drinking water sources.

Truckee River Fund

TMWA established the Truckee River Fund in 2004 (Truckee River Fund). The purpose of the Fund is to "protect and enhance water quality or water resources of the Truckee River, or its watershed." The Fund provides a way to respond to the requests from outside groups and organizations that are involved in promoting and improving the health of the Truckee River System and watershed. This in turn benefits the primary water source for the community and, in the long run, benefits TMWA customers. Currently, the Truckee River Fund has not funded any projects in these watersheds.

Washoe County

Activities in Washoe County are reviewed according to the Master Plan Planning Areas. The Truckee River watershed includes nine planning areas. The Spanish Springs and Sugarloaf HUC-12 Watersheds are included in the three planning areas: Northeast Truckee Meadows, Southeast and Southwest Truckee Meadows. The County has Citizens Advisory Boards (CABs) which provide important community perspectives on local issues to the Washoe County Board of Commissioners. This watershed includes portions of the

West Truckee Meadows/Verdi CAB, the South Truckee Meadows Washoe Valley CAB, and the Spanish Springs CAB (CAB Boundaries).

The Washoe County Master Plan (2008) has Goals and Policies for Public Services and Facilities, and Open Space and Natural Resource Management. Applicable sections include:

- Article 418, Significant Hydrologic Resources, which regulates development activity within and adjacent to perennial streams to ensure that these resources are protected and enhanced. (Note: this does not apply to the Truckee River).
- Article 420, Storm Drainage Standards, sets forth standards for ensuring that both private and public development provides adequate protection for citizens and property. Therefore, it minimizes and controls erosion and pollution impacts on the natural environment, and additionally minimizes maintenance costs for drainage and flood control systems.
- Article 421, the Storm Water Discharge Program, which protects and enhances the water quality of watercourses, water bodies, groundwater and wetlands in a manner pursuant to and consistent with the Clean Water Act.
- Article 810, Special Use Permits, which provides a method of reviewing certain uses to determine if they have the potential to adversely affect public facilities in the vicinity.

Washoe County also provides comprehensive services for construction and maintenance roads, landscaping and drainage facilities; county-wide planning and code compliance; and emergency response services for fire and hazardous materials. All of these roles contribute to preserving and improving water quality in the watershed.

Western Regional Water Commission and the Northern Nevada Water Planning Commission

The Western Regional Water Commission (WRWC) focuses on improving water resource planning at the regional level and facilitating coordinated resource management among city of Sparks, Washoe County, TMWA, Truckee Meadows Water Reclamation Facility, South Truckee Meadows GID and Sun Valley GID.

The Northern Nevada Water Planning Commission (NNWPC) is a technical advisory panel that reports to the WRWC. The NNWPC develops and updates a Comprehensive Regional Water Management Plan (RWMP) and makes recommendations to the WRWC for adoption. In addition, the NNWPC develops priorities and an annual budget for the Regional Water Management Fund, also for recommendations to the WRWC.

The Comprehensive Regional Water Management Plan includes several applicable objectives:

- Objective 1.2 Provide for a Sustainable Water Supply and an Acceptable Level of Service to the Community (including protecting groundwater recharge areas).
- Objective 1.3 Implement measures to protect and enhance water quality for a sustainable water supply (including source water protection).
- Objective 2.1 Promote Efficient Use of Resources (Reduction of Non-Point Source Pollution for TMWRF Pollutant Credit).
- Objective 2.2 Manage wastewater for protection and enhancement of water quality.
- Objective 3.1 Effective and integrated watershed management (protection of human health, property, water quality including storm water).

In addition, the WRWC commissioned a nitrate study which includes this watershed:

- Strategies for Management of High Density Septic System Developments in Washoe County prepared for Western Regional Water Commission and Northern Nevada Water Planning Commission, 2013.

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Steamboat Valley-Steamboat Creek

HUC-12 Watershed #160501020306 Profile

Click here for complete HUC-12 Watersheds Map

Contents

Introduction

The Steamboat Valley-Steamboat Creek HUC-12 Watershed profile is a component of the 2020 Integrated Source Water and 319(h) Watershed Protection Plan for Public Water Systems and the Truckee River in the Truckee Meadows (Plan), as well as the Watershed Management and Protection Plan for Tributaries to the Truckee River. This document is a part of the on-line watershed mapping tool.

This watershed description is intended to be a guide and resource for organizations working within the watershed, and an educational tool for those interested in learning more about the watershed in which they live. This Plan can be used to support funding for a multitude of water quality projects in the watershed. Note that only non-regulated activities are eligible for the Nevada Division of Environmental Protection Source Water Protection Program or the 319 Non-Point Source Program funding.

Summary

This profile focuses on the watershed's water quality. It includes potential and existing concerns, types of land uses, watershed management strategies and projects, and the involved stakeholders and their corresponding plans with water quality components.

Steamboat Creek flows 17.5 miles from Little Washoe Lake to the Truckee River through residential, commercial, and agricultural areas, with an upgradient watershed of roughly 200 square miles (WSCD, 1998). This HUC-12 represents the segment of Steamboat Creek flowing north to the Truckee River from the point where it leaves Steamboat Valley. Tributary streams (with separate HUC-12 designations) flow into this segment of Steamboat Creek from the west, including White's Creek, Thomas Creek, Dry Creek, and portions of Evans Creek. To the east, this HUC-12 reaches to the crest of the arid Virginia.

The complex hydrology of Steamboat Creek has been highly altered by base level changes, channelization, impoundments, flow regulation and diversion. Surface water sources include irrigation return flows from the Truckee Meadows ditch system, tributary creeks, urban area runoff, groundwater, geothermal discharge (springs and groundwater), and periodic overflow from Washoe Lake. Surface water quality in Steamboat Creek, which discharges to the Truckee River, is impaired for beneficial uses by non-point pollution from sources within both this HUC-12 area and the larger upgradient watershed.

Shallow groundwater along Steamboat Creek supports natural and man-made wetlands. The mineralized groundwater in geothermal areas is typically not suitable and not developed for potable water supplies (WRWC, 2017). There are no public water system wells and very few domestic wells in this area. Source Water Protection Areas (SWPAs) developed by stakeholders to help protect drinking water sources only overlap very small portions of this HUC-12 watershed area. The following table summarizes key water quality aspects in this watershed.

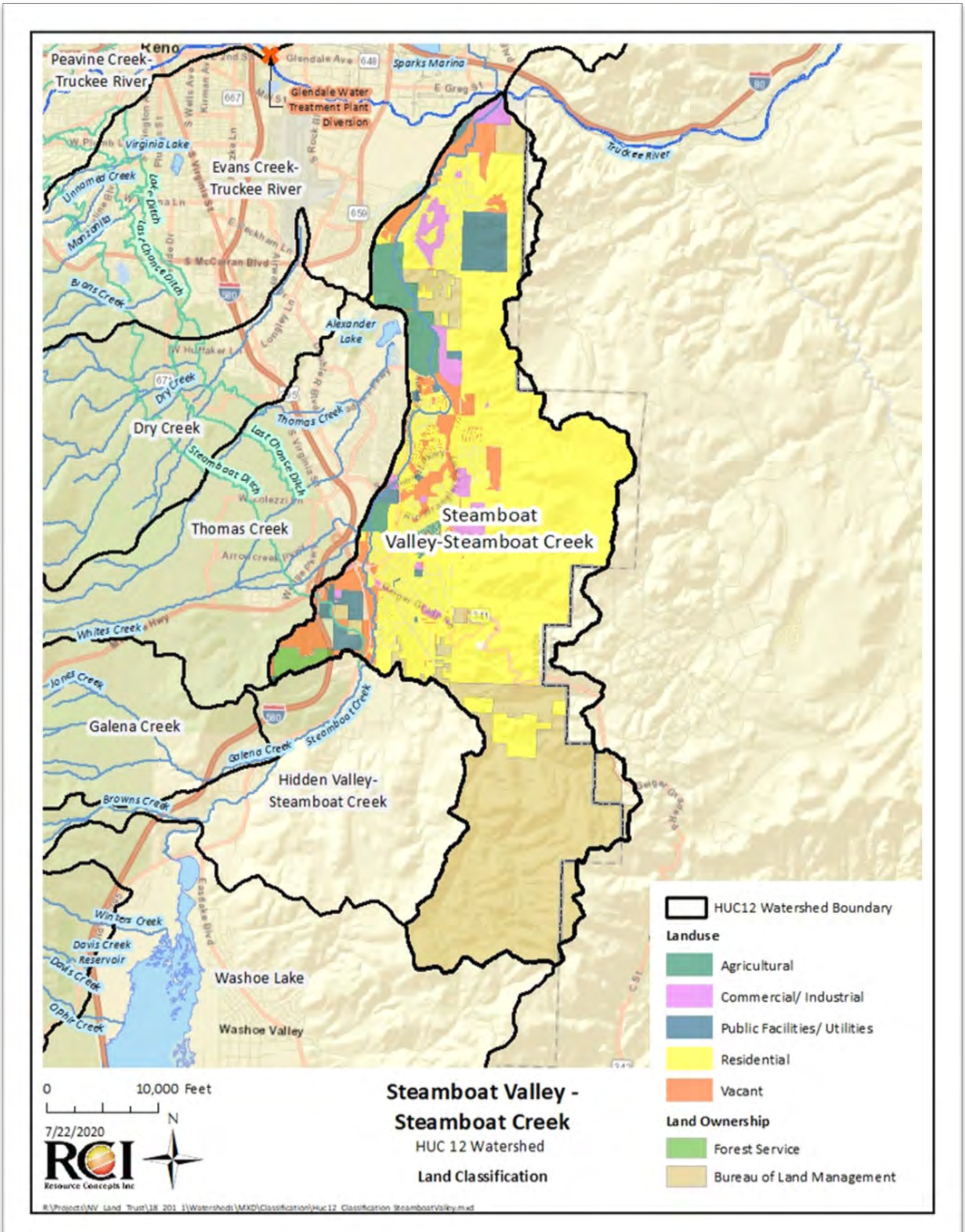
Watershed Summary	
Basins	• Steamboat Valley-Steamboat Creek HUC-12 Watershed #160501020306. • Groundwater Basin: 087 (Truckee Meadows) underlies this watershed.
Water Bodies & Water Quality	• Steamboat Creek, impaired for arsenic, boron, bacteria (*E. coli)*, iron, manganese, and silver, see NAC 445A.1726.
Source Water Protection Areas	• A SWPA includes the northern portion of Steamboat Creek. It represents a precautionary indicator to safeguard the quality of surface and groundwater resources. • Critical SWPAs represent areas closer to water system wells. • 900 total acres, or roughly 3% of the watershed is in a SWPA. • 60 total acres, or less than 0.3% of the watershed is in a Critical Source Water Protection Area.
Special Considerations & Issues	• Steamboat Creek drains a watershed of over 200 acres. • Truckee River water is diverted to and through Steamboat Creek by the extensive irrigation ditch system in the Truckee Meadows. • Mineralized water from the Steamboat Springs geothermal area effects groundwater and surface water quality in the HUC-12. • Southeast Connector/Veterans Parkway construction completed in 2018, both altered and restored sections of Steamboat Creek. • Residential development at Double Diamond, Damonte Ranch, Hidden Valley, and the Virginia Foothills has increased urban runoff. • Mercury from Comstock era mining and naturally occurring geothermal activity contaminates soils and sediment along this segment of Steamboat Creek.

	Type	Acres	%
Land Jurisdiction	BLM:	7,170	26%
	City of Reno:	5,610	21%
	City of Sparks:	150	<1%
	Washoe County Non-Federal:	13,425	49%
	USFS:	210	1%
Land Use	Agriculture:	1,055	4%
	Commercial/Industrial:	905	4%
	Residential:	12,150	45%
	Public Facility/Utility:	960	4%
	Vacant:	1,805	7%
	Roads and Water:	735	3%
	Federally Managed:	7,380	27%

Land uses and jurisdictions within this HUC-12 watershed are summarized in the adjacent table and illustrated by the Land Classification Figure.

Residential development in Reno and Washoe County is the dominant land use in this HUC-12 watershed. Transportation corridors include both Geiger Grade and the recently completed Veterans Parkway that parallels Steamboat Creek.

The potential and existing water quality concerns from these activities include urban area runoff and erosion/sediment from hydrologic alteration of Steamboat Creek.


Peavine Creek-
Truckee River
Evans Creek-
Truckee River
Glendale Water
Treatment Plant
Diversion
Sparks Marina
Truckee River
Virginia Lake
Alexander
Lake
Dry Creek
Thomas Creek
Steamboat
Valley-Steamboat Creek
Whites Creek
Jones Creek
Galena Creek
Hidden Valley-
Steamboat Creek
Browns Creek
Winters Creek
Davis Creek
Reservoir
Davis Creek
Ophir Creek
Washoe Lake
Washoe Valley
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RCI
Resource Concepts Inc
Steamboat Valley -
Steamboat Creek
HUC 12 Watershed
Land Classification
HUC12 Watershed Boundary
Landuse
Agricultural
Commercial/ Industrial
Public Facilities/ Utilities
Residential
Vacant
Land Ownership
Forest Service
Bureau of Land Management

Water Quality Standards and Beneficial Uses

Water quality standards for surface water in the State of Nevada are established by Nevada Administrative Code (NAC) NAC 445A.11704 through NAC 445A.2234. Standards applicable to beneficial uses are generally described under NAC 445A.122. The Nevada Division of Environmental Protection (NDEP) Bureau of Water Quality Planning Nevada 2016-2018 Water Quality Integrated Report identifies the beneficial uses and the surface water quality conditions in this watershed, as summarized below:

- Steamboat Creek (water quality standards NAC 445A.1726) is impaired for multiple beneficial uses:
  - impaired aquatic life, irrigation, and watering of livestock due to arsenic
  - impaired for watering livestock and irrigation due to arsenic and boron
  - impaired for recreation involving contact with water due to *Escherichia coli (E. coli)*
  - impaired for aquatic life due to iron and silver
  - impaired for irrigation due to manganese

Potential and Existing Water Quality Concerns

This segment of Steamboat Creek has a complex and partially urbanized upstream drainage area of over 200 square miles, which affects the water quality and quantity in this HUC-12. The adjacent upstream HUC-12 watersheds include Thomas Creek, Hidden Valley-Steamboat Creek, Galena Creek, Washoe Lake, and Franktown Creek-Frontal Washoe Lake. Each of these watershed descriptions also have information regarding management strategies to address water quality concerns.

The primary potential and existing water quality concerns within this HUC-12 are listed below and described in the following paragraphs:

- Pollution from Urban Areas
- Sediment from Erosion

Pollution from Urban Areas

Groundwater, surface water, and irrigation ditches may be vulnerable to polluted runoff in urban areas. Potential contaminants include:

- Nutrients from fertilizers
- Bacteria from animal waste
- Trash
- Pollution from household waste
- Runoff from roads and parking lots

Within the last 20 years, urban areas have replaced open land and irrigated fields in the Double Diamond and Damonte Ranch areas along Steamboat Creek. Development has primarily been residential neighborhoods, but also includes commercial with limited industrial areas. Detailed studies have been prepared to guide development and implementation of watershed protection measures along Steamboat Creek (Washoe-Story Conservation District, 1998). Older residential areas in this HUC-12 also include Hidden Valley to the north and the Virginia Foothills to the south at the base of Geiger Grade.

Excessive fertilization in irrigated green areas such as lawns, fields, golf courses or parks are potential sources of nutrients that can affect water quality. These areas may also contribute bacteria (*E. coli*) from animal waste from livestock, dogs and geese. Green areas located in this watershed include residential landscaping, agricultural fields, open space/greenways, ranchettes or stables with horses, and the golf course at Hidden Valley. It should be noted that the Truckee Meadows Parks Foundation (TMPF) is in the process of converting the Rosewood Golf Course into a new Nature Study Area for the community that protects and enhances the wetlands, and may provide water quality benefits.

Veterans Parkway is a primary north-south transportation corridor through this HUC-12 watershed. The most recently constructed segment, called the RTC Southeast Connector, installed 5.5 miles of bridges and roads, and a multi-use path (CDM Smith, 2017) parallel to Steamboat Creek. Environmental enhancements were also implemented including revegetation, connection of Steamboat Creek to a floodplain, wetland mitigation, contaminated soils management, and designating open space (CDM Smith, 2017). Cooperative on-going maintenance of drainage facilities and open space is key to achieving the anticipated water quality benefits.

The Truckee Meadows Water Reclamation Facility (TMWRF) is a regulated point source discharge to Steamboat Creek close to the Truckee River. Wastewater processed at the treatment plant is piped to Steamboat Creek about 700 feet upstream of the creek confluence with the Truckee River (OTR, 2015). TMWRF discharges are subject to the facility's NPDES Permit and Waste Load Allocations for the Truckee River.

Sediment from Erosion

Sediment from erosion conveys pollution, such as phosphorous, and degrades downstream water with suspended sediment. Erosion of highly mineralized soils unique to this area can also release other pollutants that impair water quality. The primary causes of erosion and sedimentation in this watershed are hydrologic and landscape modifications exacerbated by noxious weeds. High arsenic and boron concentrations related to geothermal activity are found in Steamboat Creek, as well as the downstream reaches of Whites and Thomas Creeks (adjacent Thomas Creek HUC-12 watershed). Mercury contaminated sediments in and around Steamboat Creek, from both Comstock era mining and the natural geothermal activity, is also a known contamination concern.

Areas invaded by noxious weeds are more susceptible to erosion and sedimentation in several ways. Noxious weeds do not have a root structure to retain soil and resist erosion due to wind or water. The wildfire risk is also increased because noxious weeds are more flammable than native species. Tall whitetop infestations are present at specific locations along the entire length of Steamboat Creek.

Steamboat Creek has been straightened, diverted, and combined to accommodate both historic irrigation of the Truckee Meadows and the more recent conversion to an urban landscape. Drainage modifications to reduce the flood hazards on the adjacent areas often result in higher water velocities, which lead to downcutting of the stream channel, other bed and bank erosion, and sediment accumulation. In some areas along Steamboat Creek, rock armoring secures the channel and stormwater channels are effective solutions to this issue (CDM Smith, 2017).

Areas that are disturbed during construction projects can also represent a potential risk of erosion and downstream sedimentation. Protection of stormwater runoff from contamination by construction in the Truckee Meadows is regulated under the regional stormwater management plan (Truckee Meadows MS4). There are many Best Management Practice (BMP) resources available to construction projects to help keep soil on-site and to reduce runoff.

Strategies to Protect and Improve Water Quality

The water quality concerns identified in this watershed can be addressed through management strategies described in this section, the proposed projects detailed in the Project Profiles, as well as applicable on-going water quality projects and programs described under Stakeholders and Plans. These strategies pertain to the entire watershed but may be prioritized in SWPAs.

Source Water Protection Area Identification and Management

A SWPA is a management area surrounding a surface water or groundwater resource that supplies water for public consumption. Human activities in these buffer areas can affect the quality of water downstream or underground. These management strategies acknowledge the value of these SWPAs to therefore prevent future contamination of our sources of drinking water.

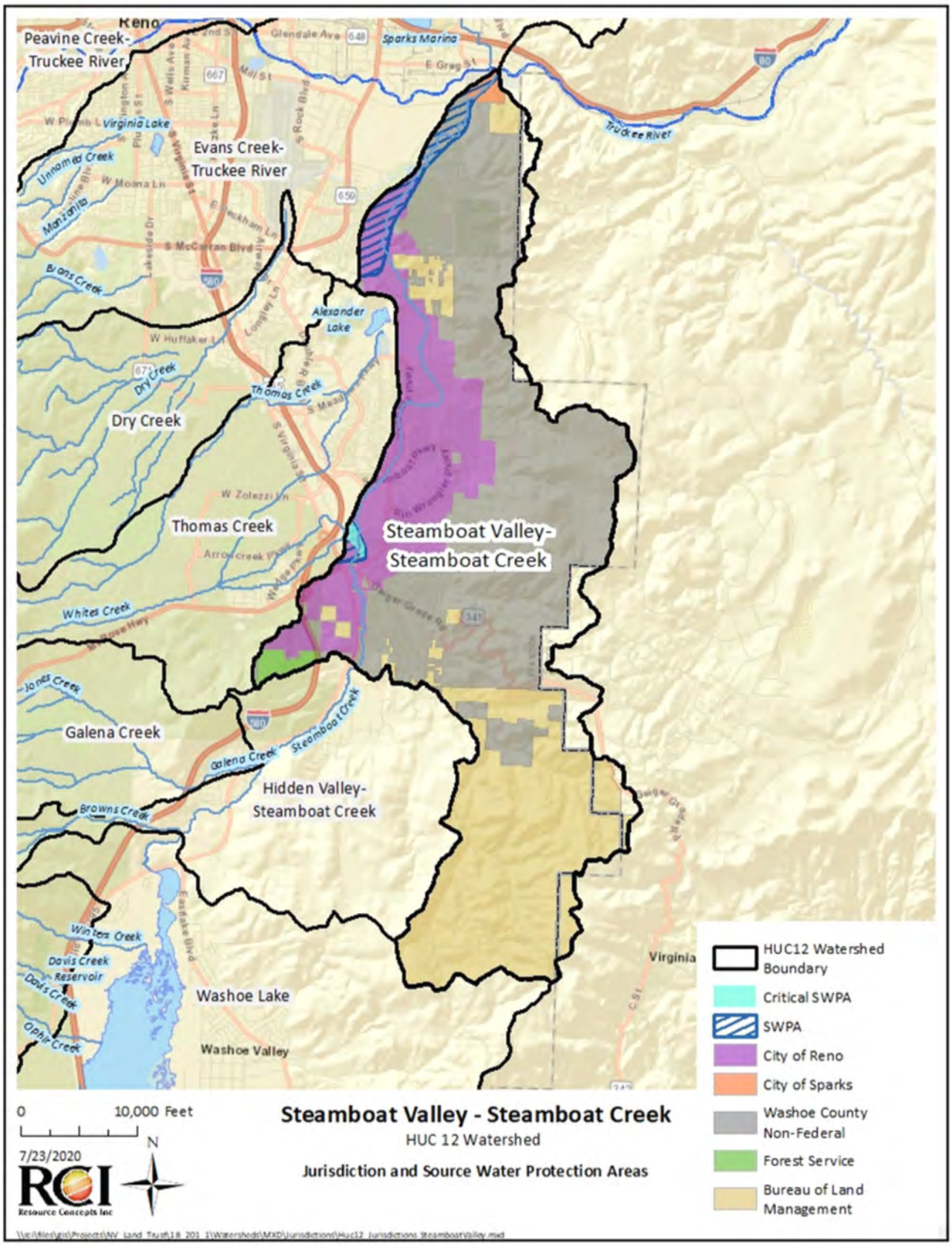
There are two small portions of SWPAs in this watershed (RCI, 2020). A portion of Steamboat Creek is within the eastern boundary of a larger area where groundwater is an important source of drinking water and the SWPA represents a precautionary indicator to safeguard groundwater recharge areas. The second location, near the base of Geiger Grade, represents part of a “capture zone” (based on a 20-year time of travel for groundwater) for one of the public water system wells in south Reno. These areas are illustrated on the Jurisdiction and Source Water Protection Areas Figure. The following objectives are significant in both future and on-going SWPA management:

- Encourage coordination between Public Water Systems, landowners, and city or county planners to consider the importance of SWPAs in project reviews.
- Explore collaborative funding for water quality and watershed improvements and support the resource investigations needed to develop viable projects.

Education and Outreach

The following education and outreach objectives are intended to help effectuate positive actions to protect water quality:

- Continue to work with homeowner associations regarding source water pollution prevention measures.
- Continue to support the Truckee Meadows Storm Water Permit Coordinating Committee (Storm Water Committee) outreach and education programs.
- Increase knowledge of water quality protection and the pollution in stormwater runoff through local outreach efforts.
- Increase knowledge about household and commercial chemical use, storage and disposal through local outreach efforts.


Reno
Peavine Creek-
Truckee River
Sparks Marina
Virginia Lake
Evans Creek-
Truckee River
Truckee River
Unnamed Creek
Manzanita
Brans Creek
Alexander
Lake
Dry Creek
Thomas Creek
Dry Creek
Thomas Creek
Steamboat Valley-
Steamboat Creek
Whites Creek
Jones Creek
Galena Creek
Galena Creek
Steamboat Creek
Hidden Valley-
Steamboat Creek
Browns Creek
Winters Creek
Davis Creek
Reservoir
Davis Creek
Ophir Creek
Washoe Lake
Washoe Valley
Virginia
HUC12 Watershed
Boundary
Critical SWPA
SWPA
City of Reno
City of Sparks
Washoe County
Non-Federal
Forest Service
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0
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RCI
Resource Concepts Inc
Steamboat Valley - Steamboat Creek
HUC 12 Watershed
Jurisdiction and Source Water Protection Areas

Interagency Communication

The following interagency communication objectives are important tools to both reinvigorate and invest additional resources in water quality, as well as utilize existing resources and programs:

- Each agency may evaluate how to improve lines of communication within and between jurisdictions regarding water quality issues; i.e. city of Reno, city of Sparks, Washoe County, Storey County, Truckee Meadows Water Authority (TMWA), NDEP, Washoe County Health District, and Bureau of Land Management (BLM).
- Evaluate how to collaborate with stakeholders such as TMWA and the Storm Water Committee on incorporating drinking water protection into community outreach and education strategies.
- Collaborate with the Washoe/Storey Cooperative Weed Management Area to support their efforts in noxious weed management. WSCWMA Website

Wildfire and Fuel Management

Wildland fire is not a significant threat to drinking water quality in this watershed; however, coordinated fuel management on wildlands can help reduce risks to water quality related to wildfire. Stakeholders and partners may consider the following objectives as they pertain to wildfire and fuel management:

- Encourage development, maintenance, and implementation of the Community Wildfire Protection Plans.
- Support and collaborate with the Nevada Cohesive Strategy effort and the Shared Stewardship Agreement, the blueprint to address Nevada's wildland fire issues.
- Support for the Nevada Network of Fire Adapted Communities and their local chapters for people in high fire threat locations to fully prepare themselves, their homes, and the landscape where they reside to survive the destructive force of wildfire.
- Encourage the development of a wildland fire risk reduction and emergency recovery plans to reduce the risk of wildfire, quickly restore burned areas, and reduce the risk of catastrophic post-fire erosion and sedimentation.
- Collaborate and coordinate to treat invasive and noxious weeds pre- and post-fire to reduce risk of wildfire and watershed destabilization.

Resource Investigation and Planning

Stakeholders may consider supporting the following resource investigations and planning, which can help fill data gaps, inform implementation designs and prioritize projects:

- Efforts to identify non-point sources in the watershed and contributing pollutant sources from other watersheds that drain to Steamboat Creek, and locations and options for treatment.
- Water quality improvement planning for tributaries to the Truckee River.
- Development and implementation of integrated vegetation management programs.
- Continued research for decreasing mercury in this watershed (WRWC, 2017).

Water Quality Best Management Practices

Stakeholders may consider supporting the following Water Quality BMPs that may improve and prevent degradation to water quality resources:

- Erosion reduction and sediment control measures.
- Invasive and noxious weed removal and integrated vegetation management.
- Recommendations in the tributary assessments.
- Pet waste cleanup initiatives.
- Proper abandonment of unused/orphaned wells.
- Physical improvements prioritized in SWPAs for water quality improvement and protection.
- Nutrient management plans for irrigated green spaces.

Proposed Implementation Projects

Proposed implementation actions are generally described under the Strategies to Protect and Improve Water Quality. Specific implementation actions have been developed into proposed projects by local stakeholders and are described in Project Profiles. These Project Profiles include the information needed, as identified in the Environmental Protection Agency (EPA) guidance for nine critical elements, for an endorsable watershed management plan. Future projects could also be brought forward to funding agencies through:

- Demonstrating advancement of the strategies identified for this watershed in the Source Water and Watershed Protection Plan.
- Using the Project Profile format to establish consistency with the nine critical elements of an EPA endorsed plan.

As discussed in the following Stakeholders and Plans section, municipality and agency projects are also incorporated by reference.

Stakeholders and Plans

Stakeholder information and existing plans were used extensively in development of the Plan for Washoe County. These municipalities and agencies each have unique strategies and capital improvement plans that include water quality protection or improvement projects. These are updated regularly at differing timeframes (i.e. annually, every five years, etc.) according to their specific budgeting and planning processes. The applicable planning documents are briefly described and referenced in this section. Those projects pertaining to water quality protection and improvement in the watershed are incorporated by reference.

Project Stakeholders	
• City of Reno • City of Sparks • Bureau of Land Management • USDA Forest Service • Nevada Department of Transportation • Nevada Division of Environmental Protection • Nevada Division of Forestry	• Truckee Meadows Regional Planning Agency • Truckee Meadows Storm Water Permit Coordinating Committee • Truckee Meadows Water Authority • Truckee River Fund • Storey County • Washoe County • Washoe County Health District • Western Regional Water Commission

City of Reno

The City of Reno 2017 Master Plan goals and policies provide the framework for decision-making in the community. Drinking water protection is addressed in the Master Plan's guiding principle to promote a safe and more resilient community. The City works with TMWA and other partners to ensure clean drinking water. Water quality is also addressed in the guiding principle for quality places and outdoor recreation opportunities in the sections on hydrologic resources, major drainageways and no net loss of wetlands, stream environments, playas, spring fed stands of riparian vegetation, and non-404 wetlands in the city, in terms of both acreage and value. The Design Principles for Sustainable Development also contain sections related to water quality.

The following articles from the Master Plan discuss several water-related items that are applicable to this Plan:

- Article I: Section 18.12.105 describes setbacks from the Truckee River.
- Article XVIII: Section 18.12.1801 to 1808 describes wetlands and stream environment protection standards established for the review of development proposals within wetlands, stream environments, and areas of significant hydrologic resources.
- Article XIX: Section 18.12.1902 to 1907 Drainage Way Protection Standards carries out the provisions of the City of Reno Major Drainageways Plan, an element of the City of Reno Master Plan, and establishes standards for the review of development proposals within major drainage ways to, among other actions, maintain, preserve, or enhance the quality of the water in both the Truckee River and Stead basins.

The city of Reno also provides comprehensive services for construction and maintenance roads, landscaping and drainage facilities; city-wide planning and code compliance; and emergency response services for fire and hazardous materials. All these roles contribute to preserving and improving water quality in the watershed.

Additionally, the city of Reno is divided into five Neighborhood Advisory Board Wards. Each Ward has one representative on the Reno City Council that is specifically focused on the needs of their part of the city. These wards provide opportunities for citizens to engage in important community issues and is the most efficient way for citizens to communicate their concerns and ask questions prior to any large decisions or projects. As such, these wards and their input are essential in the implementation and success of projects and plans within the community. Source water and watershed protection for this watershed falls within Wards 2 and 3.

City of Sparks

The city of Sparks has a Comprehensive Plan (2016) that encompasses the growth of the City and development projects. Areas are identified in the Comprehensive Plan according to the unique topics that influence each region. The Comprehensive Plan contains goals and policies for resiliency and conservation. The following policies are applicable to water quality and source water protection:

- Policy RC2: Protect the water quality of the Truckee River, drainages, lakes and aquifers.
- Policy RC4: Reduce pollution from stormwater runoff, overflow and other non-point sources.

- Policy RC5: Protect groundwater quality through land use management that safeguards recharge areas from inappropriate disturbances and contamination.
- Policy RC6: Implement "Best Management Practices," including but not limited to Low Impact Development Practices (LID), to control urban stormwater runoff.

The city of Sparks also provides comprehensive services for construction and maintenance roads, landscaping and drainage facilities; city-wide planning and code compliance; and emergency response services for fire and hazardous materials. All of these roles contribute to preserving and improving water quality in the watershed.

The city of Sparks additionally has five Neighborhood Advisory Board Wards, led by council members that contribute to community planning and decision making. Each ward has a representative on the Sparks City Council that voices the concerns and needs of that area. These wards are the most efficient way for citizens to communicate their concerns and ask questions prior to any large decisions or projects, as well as engage in important community issues. A portion of this watershed is in Ward 3.

Bureau of Land Management

The Nevada BLM has Resource Advisory Councils (RACs) which allow community members to be involved in natural resource planning and management issues on BLM managed public land. Washoe County is a part of the Sierra Front-Northwestern Great Basin RAC which is administered through the BLM-Carson City and Winnemucca District offices. BLM Resource Advisory Councils-Nevada

The BLM also has specific Resource Management Plans (RMPs) that apply to this watershed. These plans generally outline the way that the BLM currently manages and intends to manage the multiple resources on public land. Within this watershed, the following plans and sections are applicable:

- Carson City Consolidated Resource Management Plan (2001):

  RIP-1: Riparian Management discusses how riparian areas on BLM land should be managed, monitored, and maintained. The desired outcome in this section is to protect and maintain existing and potential fisheries and riparian areas in good or better condition.

  SWA-1: Soils, Watershed and Air Quality describes specific techniques and goals for all watersheds within the planning area such as reducing soil loss, flood damage, and sediment damage from human activities.

  WAT-1: Water Resources discusses management for good water quality on public lands such as watershed management plans as an important administrative action.

- Carson City Fire Management Plan (2016):

  The Fire Management Plan (FMP) goal is to restore sagebrush ecosystems throughout the planning area. In doing so, the risk of wildfire and its negative effects should eventually decrease. Since wildfire is a significant issue in this watershed, management to reduce its risk is a key planning component.

USDA Forest Service

The Humboldt-Toiyabe National Forest within this watershed is managed by the Carson Ranger District. Natural resource projects, including projects undergoing National Environmental Policy Act (NEPA) documentation, are listed on the Forest Service website. The Humboldt National Forest and Toiyabe National Forest Biannual 2018 Monitoring Report describe the conditions of the watershed and present monitoring information.

Additionally, the Forest Service has created Land and Resource Management Plans (LRMP) to guide management decisions within the Humboldt-Toiyabe National Forest. Water resources are outlined in the LRMP along with management actions, including maintenance, monitoring and enhancement of water quality:

- Humboldt National Forest Land and Resource Management Plan:

  Section IV.C.5 is "Soil and Water within the Forest-Wide Standards and Guidelines". This outlines the goals for the soil and resources on Forest Service managed land.

  Section V.A is the "Implementation Direction of the Forest Plan". This describes how the LRMP will be analyzed for its level of success.

- Toiyabe National Forest Land and Resource Management Plan:

  Section IV is the "Forest Management Direction with Forest-wide Standards and Guidelines" for soil and water as well as riparian areas. These sections outline the goals for the forest.

  Section V is the "Implementation of the Forest Plan" including the direction of the LRMP which also outlines the goals for the Forest.

Nevada Department of Transportation

The Nevada Department of Transportation (NDOT) has developed their Stormwater Management Program to reduce stormwater pollution from NDOT managed facilities and roads. The program BMPs and annual report outline the specific measures that NDOT will take to reduce stormwater pollutant discharges from its owned and operated storm drain system:

- Stormwater Management Program (2013):

  The overall goal of the NDOT Stormwater Management Program is to reduce pollution associated with stormwater from NDOT's MS4 to the maximum extent practicable, as well as to protect surface and groundwater resources within the MS4 permit area. The Stormwater Management Program addresses stormwater pollution control as it relates to the planning, design, construction, and maintenance of NDOT's highway infrastructure statewide.

- Stormwater Management Program: Annual Report (2017):

  This watershed is impacted or has the potential to be impacted by I-80, I-580, Hwy 395, and Hwy 431. The Stormwater Management Program provides a helpful planning outline on handling and mitigating pollution from the roads.

Nevada Division of Environmental Protection

The NDEP has a goal to preserve and enhance the environment of the State in order to protect public health, sustain healthy ecosystems, and contribute to a vibrant economy. The Steamboat Valley-Steamboat Creek HUC-12 Watershed has several challenges facing source water protection, so the NDEP is an essential stakeholder and planning partner. Specifically, there are two programs under the NDEP that were involved in this Plan in Washoe County. Both programs provide education and outreach and offer funding opportunities for water quality protection and improvement:

- Integrated Source Water Protection Program under the Safe Drinking Water Bureau:

  This program offers technical assistance for source water protection projects. The program coordinates source water protection activities at the local, state, and federal levels, and encourages community-based protection and preventive management strategies to ensure all public drinking water resources are kept safe from future contamination.

  The 2010 Nevada Integrated Source Water Protection Program guidance document details the program components as well as the requirements for a State-endorsed Community Source Water Protection Plan.

- 319 Nonpoint Source Pollution Management Program under the Bureau of Water Quality Planning:

  This Program can provide matched grant funding for projects that improve water quality.

  The 2015-2019 State of Nevada Nonpoint Source Management Plan establishes how NDEP will work with partners to address NPS pollution. The Plan formalizes Nevada's approach for protecting and improving water quality and describes the goals, short- and long-term objectives, milestones and timeframes to guide activities, and measures for tracking success.

Nevada Division of Forestry

The Nevada Division of Forestry (NDF) is a State agency that uses a collaborative process to deliver science based natural resource management and protection to promote resilient landscapes, fire adapted communities, and safe, effective wildfire response provided by employees that embrace the core values of duty, respect, and integrity.

NDF provides professional natural resource and wildland fire management services to Nevada citizens and visitors to enhance, conserve and protect forest, rangeland and watershed values, endangered plants and other native flora. Protection of these resources helps to preserve and improve water quality:

- Community Wildfire Protection Plans:

  Community Wildfire Protection Plans (CWPPs) are authorized and defined in Title I of the Healthy Forests Restoration Act of 2003 (HFRA). CWPPs represent the best opportunity that communities have to address the challenges of the Wildland-Urban Interface. A CWPP helps communities define their priorities for the protection of life, property, and shared assets-at-risk from wildfires. Developing a CWPP encourages community members and leaders to have valuable discussions about wildfire preparedness, evacuation planning, and local fire district capabilities. The CWPP increases grant funding opportunities by prioritizing fuel reduction projects around and within the community.

- Nevada Wildland Fire Cohesive Strategy:

  The Nevada Fire Board Oversight Body is the custodian of the 2015 Nevada Wildland Fire Cohesive Strategy Summit's Action Plan to ensure goal achievement and identify emerging topics. This oversight body acts as an "advisory" body and is charged with taking the Nevada Cohesive Strategy Summit report and its Action Steps, ensuring that goal achievement is accomplished and monitoring emerging topics through the Nevada Fire Board. This body monitors progress, develops issue resolution, and addresses emerging issues such as protecting water quality.

Truckee Meadows Regional Planning Agency

The Truckee Meadows Regional Planning Agency (TMRPA) fosters coordination among Reno, Sparks and Washoe County. TMRPA facilitates land-use, infrastructure provision and resource management conversations among public and private decision makers. The agency also serves as a collaborative information and data warehouse, coordinating regional data collection and delivering advanced geospatial analytics for regional solutions. TMRPA includes a Regional Planning Governing Board and a Regional Planning Commission.

The TMRPA Regional Plan (2012 as amended) provides goals and policies for multiple plans and programs, including those with watershed related and well head protection components. The plan was revised in 2019-2020 and is considered a living document that will evolve over time.

Truckee Meadows Storm Water Permit Coordinating Committee

The Storm Water Committee is responsible for implementing the Truckee Meadows Storm Water Management Program to protect the water quality of the region's waterways, streams and the Truckee River. The Storm Water Committee continues to guide the development of numerous plans and assessments relevant to source water and watershed protection as summarized below.

Ordinance and Guidance Changes for Construction and Post-Construction Programs

The Storm Water Committee updated and joined the Structural Controls Design Manual and the Low Impact Development Manual, as well as updated the Truckee Meadows Construction Site BMP Handbook. These documents are referenced in the code for the city of Reno, city of Sparks, and Washoe County.

Watershed Assessments

Watershed assessment reports prepared for the Storm Water Committee were completed by Jesch et al. from 2002-2011 and includes Steamboat Creek. These reports provide general watershed descriptions and can be used to track historical changes in creek condition and water quality over time. The reports do not include water quality data.

Hillside Design completed a comprehensive Watershed Assessment for Tributaries to the Truckee River in 2012 for Steamboat Creek in this watershed.

The assessment included:

- Stream reach descriptions with numerous photo points,
- Proper Functioning Condition rating,
- List of restoration and management efforts needed to improve stream conditions, and
- Water chemistry for temperature, pH, specific conductivity, dissolved oxygen, turbidity, and flow.

CDM Smith was contracted in 2015 through 2017 to conduct watershed assessments. The following table lists the report year and the respective drainages and reaches that were recently assessed in this watershed:

Stream Reaches Addressed in Watershed Assessment Reports in the Steamboat Valley-Steamboat Creek Watershed by Report Year			
Stream Name	**Lower Reach**	**Middle Reach**	**Upper Reach**
	2017	**2017**	**2017**
Steamboat Creek	**X**	**X**	**X**

Watershed Management and Protection Plan for Tributaries to the Truckee River

The Watershed Management and Protection Plan for Tributaries to the Truckee River (NCE, 2020) is an update to the 2003 Watershed Management and Protection Plan for Tributaries to the Truckee River, which has been implemented for more than 15 years by the regional MS4 through the Storm Water Committee. The 2003 plan described an approach for on-going watershed assessment studies and monitoring to protect and improve the water quality in the stream corridors and drainages tributary to the Truckee River. The 2020 plan update provides a process and framework for identifying, developing, and implementing projects originated through the Storm Water Committee that is consistent with the guidelines for an EPA approved Watershed Management Plan. The 2020 plan by NCE and the 2020 Integrated Source Water and 319(h) Watershed Protection Plan for Public Water Systems and the Truckee River in the Truckee Meadows, are mutually complementary and work together to address the broad scope of potential strategies to improve drinking water and surface water quality in Washoe County.

Water Quality Monitoring

Balance Hydrologics has conducted water quality analyses on tributaries and stormwater outfalls since 2016. The following table lists the report years and the respective drainages that were assessed in this watershed:

Streams Addressed in Stormwater Monitoring Annual Reports in the Steamboat Valley-Steamboat Creek Watershed by Report Year			
Stream Name	Entire Reach		
	2016	2017	2018
Steamboat Creek	X	X	X

Truckee Meadows Watershed Protection Manual

This manual contains a Summary of the Watershed Protection Activities and Programs Developed in Conjunction with the Watershed Management Facilitator Scope of Work (Kennedy/Jenks, 2005). This document provides a reference and compendium of the various watershed protection activities and programs that were developed in 2004 and 2005 for Reno, Sparks and Washoe County.

Truckee Meadows Water Authority

TMWA is responsible for almost all municipal water delivery in the greater Reno-Sparks area. TMWA also owns and operates the municipal wells in this watershed. The following program and plans guide the management of these water resources:

- TMWA Water Resource Plan (2016-2035):

  This plan describes water quantity issues and goals for the water resources managed by TMWA. Special focus is placed on changes in future water supply and demand and how those changes will impact the region's water sources. Additionally, this plan provides useful Truckee River watershed information.

- Source Water Quality Assurance Program (2016-2035):

  TMWA's objective is to deliver high-quality potable water to its customers at a cost-effective manner. To achieve this objective, TMWA established this water quality assurance program. The components that make up the program are source water quality protection, potable water treatment, maintenance of distribution system water quality, and cross connection control.

- Wellhead Protection Plan (2016):

  The purpose of the Wellhead Protection Plan is to protect groundwater that serves as a source for public drinking water supplies. This plan is intended to be a tool used by TMWA to assist in protecting drinking water sources.

Truckee River Fund

TMWA established the Truckee River Fund in 2004 (Truckee River Fund). The purpose of the Fund is to "protect and enhance water quality or water resources of the Truckee River, or its watershed." The Fund provides a way to respond to the requests from outside groups and organizations that are involved in promoting and improving the health of the Truckee River System and watershed. This in turn benefits the primary water source for the community and, in the long run, benefits TMWA customers. For example, the Truckee River Fund has helped finance the following projects:

- Caughlin Fire Emergency Watershed Stabilization & Restoration Effort (funded 2011):

  This effort focused on remediating damage from the Caughlin Fire. The activities included in this effort were typical fire reconstructive efforts such as debris removal, reseeding, and other BMPs. Water quality in the watershed has benefited and will continue to benefit from these activities by reducing sedimentation and decreasing the future wildfire potential in the area.

- Virginia Lake Water Quality Improvements (funded 2015):

  This project constructed a new, primary outlet at the south end of Virginia Lake. This outlet increases circulation throughout the lake and supports healthy flows through Boynton Slough and Steamboat Creek. In doing so, the watershed has been positively impacted.

Storey County

The Storey County 2016 Master Plan provides goals and objectives for the development of the county. These goals specifically address land usage, Public Services and Facilities, water, and natural resources. The following sections of the Master Plan are applicable to the watershed:

- Chapter 3, Land Use, is the principal guiding element of the Storey County Master Plan. It describes the county and each of its regions and sub-regions, discusses key land use patterns and challenges for those areas, and presents ways that land uses and patterns may continue or change. This chapter assigns land use designations across the county, with specific goals, objectives, and policies.
- Chapter 4, Public Lands, describes and regulates what current public land usages are in the county and what public land goals will be achieved in the future. Additionally, this chapter defines public land-related issues and needs in conjunction with the Master Plan.
- Chapter 9, Public Services and Facilities, describes public services and facilities provided by Storey County and other entities in the county, as well as areas where improvements or extra planning may be needed.
- Chapter 10, Water and Natural Resources, discusses the natural features and resources in the county. A majority of Storey County is undeveloped and has a history of open space and a population that enjoys the recreational use of that open space.

The east side of the Steamboat Valley-Steamboat Creek HUC-12 Watershed is partially within Storey County. This area includes the Virginia Mountains, which are managed by the BLM. As such, all of the above sections are applicable to this watershed.

Washoe County

Activities in Washoe County are reviewed according to the Master Plan Planning Areas. The Steamboat Valley-Steamboat Creek HUC-12 Watershed is included in the Southeast Truckee Meadows planning area. In addition, the county has Citizen Advisory Boards (CABs) which provide a community perspective on local issues to the Washoe County Board of Commissioners. This watershed is within the South Truckee Meadows/Washoe Valley CAB (CAB Boundaries).

The Washoe County Master Plan (2008) has Goals and Policies for Public Services and Facilities, and Open Space and Natural Resource Management. Applicable sections include:

- Article 418, Significant Hydrologic Resources, which regulates development activity within and adjacent to perennial streams to ensure that these resources are protected and enhanced. (Note: this does not apply to the Truckee River)
- Article 420, Storm Drainage Standards, which sets forth standards for ensuring that both private and public development provides adequate protection for citizens and property, minimizes and controls erosion and pollution impacts on the natural environment, and minimizes maintenance costs for drainage and flood control systems.
- Article 421, Storm Water Discharge Program which the intent is to protect and enhance the water quality of our watercourses, water bodies, groundwater and wetlands in a manner pursuant to and consistent with the Clean Water Act.
- Article 810, Special Use Permits, which the intent is to provide a method of reviewing certain uses to determine if they have the potential to adversely affect public facilities in the vicinity.

Washoe County also provides comprehensive services for construction and maintenance roads, landscaping and drainage facilities; county-wide planning and code compliance; and emergency response services for fire and hazardous materials. All of these roles contribute to preserving and improving water quality in the watershed.

Washoe County Health District

The Washoe County Health District has regulatory authority over a wide variety of programs and services in the Truckee Meadows including underground storage tanks, septic systems, all public water systems, domestic wells, water projects and community development, grading permits, solid waste management and emergency preparedness. The Health District regulations are provided in several documents as listed below:

- Regulations of the Washoe County District Board of Health Governing Sewage, Wastewater and Sanitation. These regulations provide the minimum requirements to be followed by any person developing property served by an on-site sewage disposal system. These requirements are promulgated to prevent the spread of disease, protect the water quality of this county, and ensure the on-site sewage disposal systems function properly.
- Regulations of the Washoe County District Board of Health Governing Well Construction. These regulations provide minimum requirements to be followed by any person when drilling and plugging specific kinds of wells. A well construction permit is required to drill a well for consumptive use or monitoring wells. These requirements are primarily promulgated to protect the quantity and quality of the waters of this county from waste and contamination, and to provide public protection by enforcing proper construction and plugging of wells.
- Regulations of the Washoe County District Board of Health Governing Solid Waste Management. These regulations protect water quality through the regulation of municipal solid waste landfills.

Western Regional Water Commission and the Northern Nevada Water Planning Commission

The Western Regional Water Commission (WRWC) focuses on improving water resource planning at the regional level and facilitating coordinated resource management among city of Reno, city of Sparks, Washoe County, TMWA, Truckee Meadows Water Reclamation Facility, South Truckee Meadows GID and Sun Valley GID.

The Northern Nevada Water Planning Commission (NNWPC) is a technical advisory panel that reports to the WRWC. The NNWPC develops and updates a Comprehensive Regional Water Management Plan (RWMP) and recommends it to the WRWC for adoption. In addition, the NNWPC develops priorities and an annual budget for the Regional Water Management Fund, also for recommendations to the WRWC.

The Comprehensive Regional Water Management Plan includes several applicable objectives:

- Objective 1.2 Provide for a Sustainable Water Supply and an Acceptable Level of Service to the Community (including protecting groundwater recharge areas).
- Objective 1.3 Implement measures to protect and enhance water quality for a sustainable water supply (including source water protection).
- Objective 2.1 Promote Efficient Use of Resources (Reduction of Non-Point Source Pollution for TMWRF Pollutant Credit).
- Objective 2.2 Manage wastewater for protection and enhancement of water quality.
- Objective 3.1 Effective and integrated watershed management (protection of human health, property, water quality including storm water).

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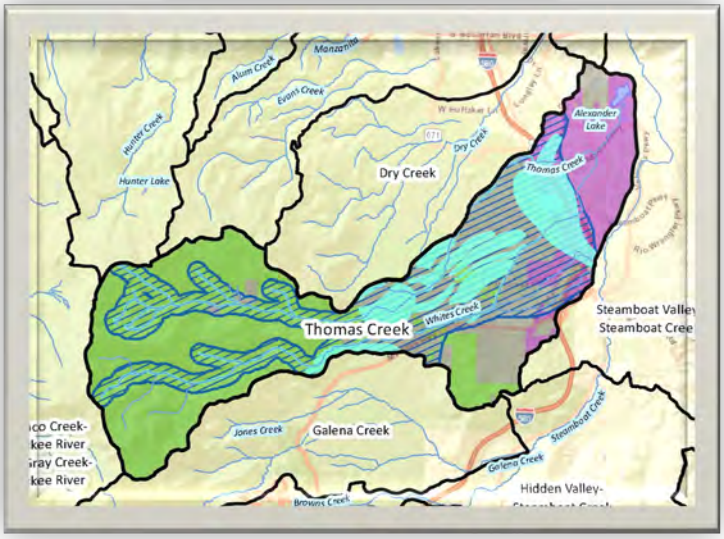
Thomas Creek

HUC-12 Watershed #160501020305 Profile

Click here for complete HUC-12 Watersheds Map



Contents

Introduction

The Thomas Creek HUC-12 Watershed profile is a component of the 2020 Integrated Source Water and 319(h) Watershed Protection Plan for Public Water Systems and the Truckee River in the Truckee Meadows (Plan), as the Watershed Management and Protection Plan for Tributaries to the Truckee River. This document is a part of the on-line watershed mapping tool.

This watershed description is intended to be a guide and resource for organizations working within the watershed, and an educational tool for those interested in learning more about the watershed in which they live. This Plan can be used to support funding for a multitude of water quality projects in the watershed. Note that only non-regulated activities are eligible for the Nevada Division of Environmental Protection Source Water Protection Program or the 319 Non-Point Source Program funding.

Summary

This profile focuses on the watershed's water quality. It includes potential and existing concerns, types of land uses, watershed management strategies and projects, and the involved stakeholders and their corresponding plans with water quality components.

The Thomas Creek HUC-12 Watershed reaches up to Mt. Rose summit (elevation 10,775 feet) in the west and extends down to, but does not include, Steamboat Creek (elevation 4430 feet) to the east. The watershed drains a portion of the Carson Range and is an important source of groundwater recharge. At higher elevations, this watershed is forested public land. In the mid to lower elevations, the watershed encompasses residential, commercial, and agricultural areas in Washoe County and south Reno.

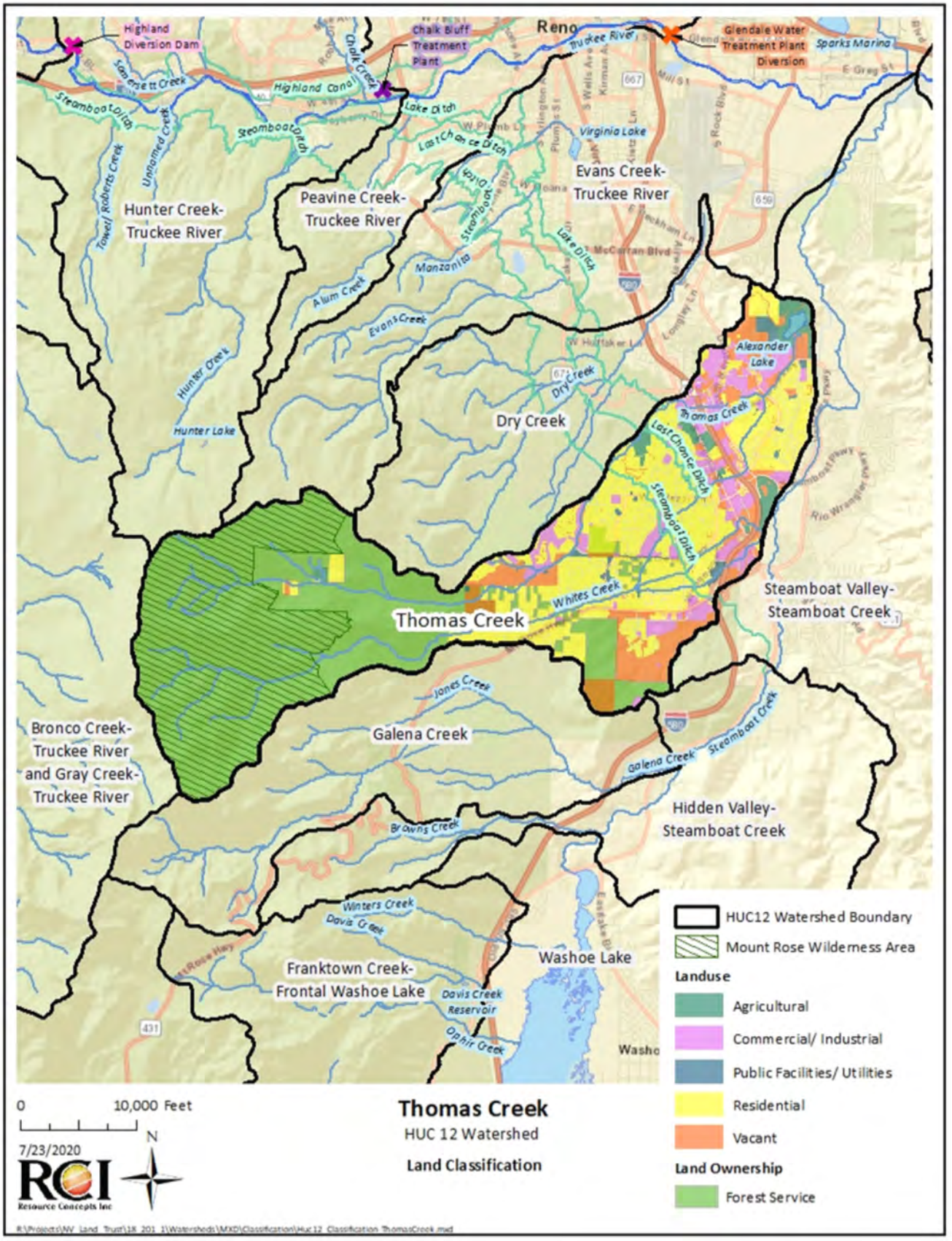
Source Water Protection Areas (SWPAs) for this watershed were developed by stakeholders to help protect drinking water sources. This watershed is an important area for drinking water supply hosting 27 public water system wells and the new Mt. Rose Water Treatment Plant which is located on the north side of Whites Creek. As a result, about half of this watershed is in a SWPA. Surface water bodies include Whites and Thomas Creeks, several main irrigation ditches, and a small reservoir. The following table summarizes key water quality aspects in this watershed.

Watershed Summary	
Basins	• Thomas Creek HUC-12 Watershed #160501020305. • Groundwater Basin: 087 (Truckee Meadows).
Water Bodies & Water Quality	• Thomas Creek, certain reaches impaired by *E. coli*, Arsenic and Boron, see NAC 445A.1726. • Whites Creek, impaired by *E. coli*, Iron, and Phosphorous, see NAC 445A.1754 and NAC 445A.1758. • Alexander Lake, not impaired. • Irrigation ditches: Steamboat, Last Chance, and Lake.
Source Water Protection Areas	• A SWPA follows along the Sierra Front with buffers along the perennial tributaries, Thomas and Whites Creek. It represents a precautionary indicator to safeguard drinking water sources. • Critical SWPAs represent areas closer to perennial streams and water system wells. • 27 public drinking water wells managed by three public water systems. • 11,200 total acres, or roughly half the watershed is in a Source Water Protection Area. • 2,100 total acres, or approximately 11% of the watershed is in a Critical Source Water Protection Area.
Special Considerations & Issues	• The upper half of the watershed is forested wilderness area while the lower part is urbanized. • Important groundwater recharge area. • Invasive noxious weeds. • Potential for wildfire in the Carson Range. • Thomas and Whites Creek exhibit stream alteration and channelization. • Residential community septic systems have potential for nitrate leaching. • Major transportation crossings: Hwy 395 and Mt. Rose Hwy. • Mt. Rose Water Treatment Plant at Whites Creek. • Much of the upper watershed is in the Mt. Rose Wilderness and therefore access is limited.

	Type	Acres	%
Land Jurisdiction	City of Reno:	4,125	19%
	Washoe County Non-Federal:	6,725	31%
	USFS:	11,000	50%
Land Use	Agriculture:	600	3%
	Commercial/Industrial:	1,700	8%
	Residential:	5,590	25%
	Public facility/Utility:	205	1%
	Vacant:	2,060	9%
	Roads and Water:	1,090	5%
	Federally Managed:	11,000	50%

Land uses and jurisdictions in the watershed are summarized in the adjacent table and illustrated by the Land Classification Figure.

The upper half of this watershed is federally managed national forest. Residential land uses dominate the activities in the lower half of this watershed, with commercial/ industrial activity along highway corridors. The potential and existing water quality concerns are primarily hazardous materials from spills or leaks, pollution from urban area runoff, nitrate from individual sewage disposal systems and sediment from erosion.


Highland Diversion Dam
Chalk Bluff Treatment Plant
Reno
Truckee River
Glendale Water Treatment Plant Diversion
Sparks Marina
Highland Canal
Steamboat Ditch
Lake Ditch
Last Chance Ditch
Virginia Lake
Hunter Creek-Truckee River
Peavine Creek-Truckee River
Evans Creek-Truckee River
McCarran Blvd
Manzanita
Alum Creek
Evans Creek
Hunter Creek
Hunter Lake
Dry Creek
Alexander Lake
Thomas Creek
Steamboat Valley-Steamboat Creek
Whites Creek
Jones Creek
Galena Creek
Steamboat Creek
Bronco Creek-Truckee River and Gray Creek-Truckee River
Hidden Valley-Steamboat Creek
Browns Creek
Winters Creek
Davis Creek
Franktown Creek-Frontal Washoe Lake
Davis Creek Reservoir
Washoe Lake
Thomas Creek
HUC 12 Watershed
Land Classification
HUC12 Watershed Boundary
Mount Rose Wilderness Area
Landuse
Agricultural
Commercial/ Industrial
Public Facilities/ Utilities
Residential
Vacant
Land Ownership
Forest Service
0
10,000 Feet
N
7/23/2020
RCI
Resource Concepts Inc

Water Quality Standards and Beneficial Uses

Water quality standards for surface water in the state of Nevada are established by Nevada Administrative Code (NAC) NAC 445A.11704 through NAC 445A.2234. Standards applicable to beneficial uses are generally described under NAC 445A.122. The Nevada Division of Environmental Protection (NDEP) Bureau of Water Quality Planning Nevada 2016-2018 Water Quality Integrated Report identifies the beneficial uses and the surface water quality conditions in this watershed, as summarized below:

- Segments of Whites Creek have been designated with different water quality standards:
  - Whites Creek from its origin to the Steamboat Ditch fully supports beneficial uses (water quality standards NAC 445A.1754 and NAC 445A.1756).
  - The North Fork of Whites Creek below the Steamboat Ditch to Steamboat Creek is impaired for recreation involving contact with water due to *Escherichia coli (E. coli)* (water quality standards NAC 445A.1758).
  - The South Fork of Whites Creek below the Steamboat Ditch to Steamboat Creek fully supports beneficial uses (water quality standards NAC 445A.1758.)
  - The Middle Fork of Whites Creek from the South Fork to Steamboat Creek is impaired for irrigation due to boron; recreation involving contact with water due to *E. coli* and Total Phosphorus; and support of aquatic life due to Total Phosphorus (water quality standards NAC 445A.1758).
- All segments of Thomas Creek are evaluated by the standards applied at Steamboat Creek at the Truckee River (NAC 445A.1726) under the Tributary Rule. As a result, municipal and domestic supply is not designated as a beneficial use for Thomas Creek, and those water quality standards are not applied:
  - Thomas Creek from its origin to the Forest Boundary fully supports beneficial uses.
  - Thomas Creek from the forest boundary to the Steamboat Ditch is impaired for recreation involving contact with water due to *E. coli*.
  - Thomas Creek from the Steamboat Ditch to Steamboat Creek is impaired for aquatic life, irrigation, and watering of livestock due to arsenic, as well as impaired for watering livestock and irrigation due to boron.

The water quality in the lower reaches of both Whites and Thomas Creeks may be influenced by the local geologic units around Steamboat Hot Springs. The high arsenic and boron concentrations also impact Steamboat Creek in the adjacent HUC-12 watershed.

Surface water from Thomas Creek and Whites Creek is important for groundwater recharge, particularly in the upper and middle reaches of this watershed. Groundwater is generally high quality toward the mountains, west of the I-580/395 corridor, and is an important source of drinking water, though some groundwater sampling near high density septic areas has shown elevated nitrate concentrations (WRWC, 2017).

Potential and Existing Water Quality Concerns

The primary potential and existing water quality concerns in this watershed are listed below and described in the following paragraphs:

- Hazardous Materials from Spills or Leaks
- Pollution from Urban Area Runoff
- Sediment from Erosion
- Nitrate from Individual Sewage Disposal Systems

Hazardous Materials from Spills or Leaks

Both Interstate 580 (I-580) and the Mt. Rose Hwy pass through this watershed. Chemicals and materials commonly moving along these transportation corridors have the potential for accidental spills and leaks. These are pollution concerns for both groundwater and stormwater runoff.

The U.S. Department of Transportation accumulated a list of commonly transported hazardous materials within the Truckee River watershed (WRWC, 2017). These include:

- Ammonia perchlorate
- Anhydrous ammonia
- Chlorine
- Cyanide
- Hydrochloric acid
- Hydrogen sulfide
- Nitro cellulose (wet)
- Propane
- Petroleum naphtha
- Phosphoric acid
- White phosphorous
- Propargyl alcohol
- Sulfuric acid
- Sodium hydroxide

Underground chemical and fuel storage tanks have had a history of leaks that can cause contamination of soil and groundwater. Underground storage tanks, predominantly associated with gas stations, are located along the highway corridors.

Pollution from Urban Area Runoff

Groundwater, surface water, and irrigation ditches may be vulnerable to polluted runoff in urban areas. Potential contaminants include:

- Nutrients from fertilizers
- Bacteria from animal waste
- Trash
- Pollution from household waste
- Runoff from roads and parking lots

The lower reaches of Thomas and Whites Creeks are influenced by residential and commercial developments. Flood channels concentrate the flows through development and prevent property damage. However, this channelization reduces sinuosity, reduces groundwater recharge and increases the vulnerability of channel erosion. Water quality appears to be affected where sediment deposition from urbanization occurs (CDM Smith, 2016).

Excessive fertilization in irrigated green areas such as yards, fields, golf courses or parks are potential sources of nutrients from fertilizers. These areas may also contribute *E. coli* from animal waste such as from horses, dogs and geese. Green areas located in this watershed include residential landscaping, Arrow Creek Golf Course, Wolf Run Golf Course, as well as some small irrigated fields and effluent reuse areas east of I-580.

Nitrate from Individual Sewage Disposal Systems

Individual Sewage Disposal Systems, or septic systems, are associated with nitrate contamination of groundwater if there are large numbers concentrated in a small area, for example neighborhoods with lot sizes less than one-acre, or if they are not maintained properly (WRWC, 2017). There are 1,353 parcels on septic systems in this watershed. Some these high-density septic areas are on the Mt. Rose alluvial fan in critical source water protection area for drinking water wells. Preliminary sampling has shown some indications of elevated nitrate concentrations in groundwater (WRWC) 2017).

Sediment from Erosion

Both Thomas and Whites Creek have been channelized and encroached along the banks by roads and development. Deterioration of a concrete retaining wall at the Thomas Creek Road culvert has resulted in bank erosion and sediment transport (CDM Smith, 2016). Turf grass landscaping encroaches on the banks of Thomas Creek in several locations which reduces bank stability and contributes to sediment transport. Thomas Creek is channelized and piped east of S. Virginia Street. The channel becomes progressively more channelized moving downstream toward Steamboat Creek in the Double Diamond Ranch Subdivision (CDM Smith, 2016).

The lower reaches of both creeks are constricted and straightened, resulting in incised banks and detached floodplains. Whites Creek flows through a narrow channel which continues to erode and incise behind Southtowne Crossing Shopping Center (CDM Smith, 2016). Culverts beneath Old Virginia Street and Sage Hill Road are accumulating sediment which can reduce flows and cause flooding (CDM Smith, 2019). Removal of riparian vegetation and stream bank encroachment from development can destabilize stream banks and lead to erosion and stream bank incision.

Wildfire is also a significant threat to water quality in the Thomas Creek HUC-12 Watershed since the western half of the watershed is forested and managed by the U.S. Forest Service (USFS). Previous fires have occurred, and severe fires reduce the ability for water to infiltrate the soil by creating a waxy, water repellant layer which also increases the risk of erosion (NDF, 2011).

Weeds are common along both Thomas and Whites Creek and, more specifically, noxious weeds are a severe problem at some locations (CDM Smith, 2016). Tall whitetop and musk thistle infestations are evident along incised channels and vacant field lots (CDM Smith, 2016). These invasive and noxious weeds can outcompete desirable riparian vegetation. This is an issue since these weeds lack the ability to remove nutrients and, due to their weak root systems, reduce the movement of sediment in contrast to the desirable riparian species.

Areas that are disturbed during construction projects can represent a potential risk of erosion and downstream sedimentation. Protection of stormwater runoff from contamination by construction in the Truckee Meadows is regulated under the regional stormwater management plan (Truckee Meadows MS4). There are many Best Management Practice (BMP) resources available to construction projects to help keep soil on-site and to reduce runoff.

Strategies to Protect and Improve Water Quality

The water quality concerns identified in this watershed can be addressed through management strategies described in this section, the proposed projects detailed in the Project Profiles, as well as applicable on-going water quality projects and programs described under Stakeholders and Plans. These strategies pertain to the entire watershed but may be prioritized in SWPAs.

Source Water Protection Area Identification and Management

A SWPA is a management area surrounding a surface water or groundwater resource that supplies water for public consumption. Activities in these buffer areas can affect the quality of water downstream or underground. These management strategies acknowledge the value of these SWPAs to prevent future contamination of sources of drinking water.

There are two types of buffers in this watershed (RCI, 2020). One buffer follows along the Sierra Front in the watershed and extending 1,000 feet each side of perennial tributaries, which represents a precautionary indicator to safeguard groundwater recharge areas. There are also smaller buffers surrounding high sensitivity areas, or Critical Source Water Protection Areas which include 150 feet on each side of perennial tributaries and the land surface surrounding the 20-year capture zones for water system wells. These areas are illustrated on the Jurisdiction and Source Water Protection Areas Figure. The following objectives are significant in both future and on-going SWPA management:

- Inform landowners in SWPAs about their proximity to a valuable drinking water sources and how they can help protect their water quality.
- Encourage coordination between Public Water Systems, landowners, and City or County planners to consider the importance of SWPAs in project reviews.
- Explore collaborative funding for water quality and watershed improvements and support the resource investigations needed to develop viable projects.
- Prioritize physical improvements in SWPAs to protect and improve source water quality.

Education and Outreach

Education and outreach management strategies can be used to help effectuate positive actions to protect water quality:

- Continue to work with Homeowner Associations regarding source water pollution prevention measures.
- Continue to support the Truckee Meadows Storm Water Permit Coordinating Committee (Storm Water Committee) outreach and education programs.
- Increase knowledge of how to protect and preserve the pristine drinking water quality of this watershed.
- Increase knowledge of water quality protection and the pollution in stormwater runoff (i.e. from dog and horse feces).
- Increase knowledge about household and commercial chemical use, storage and disposal.
- Inform landowners and developers residing in critical SWPAs about the importance of avoiding contamination and their proximity to a valuable drinking water source.

Interagency Communication

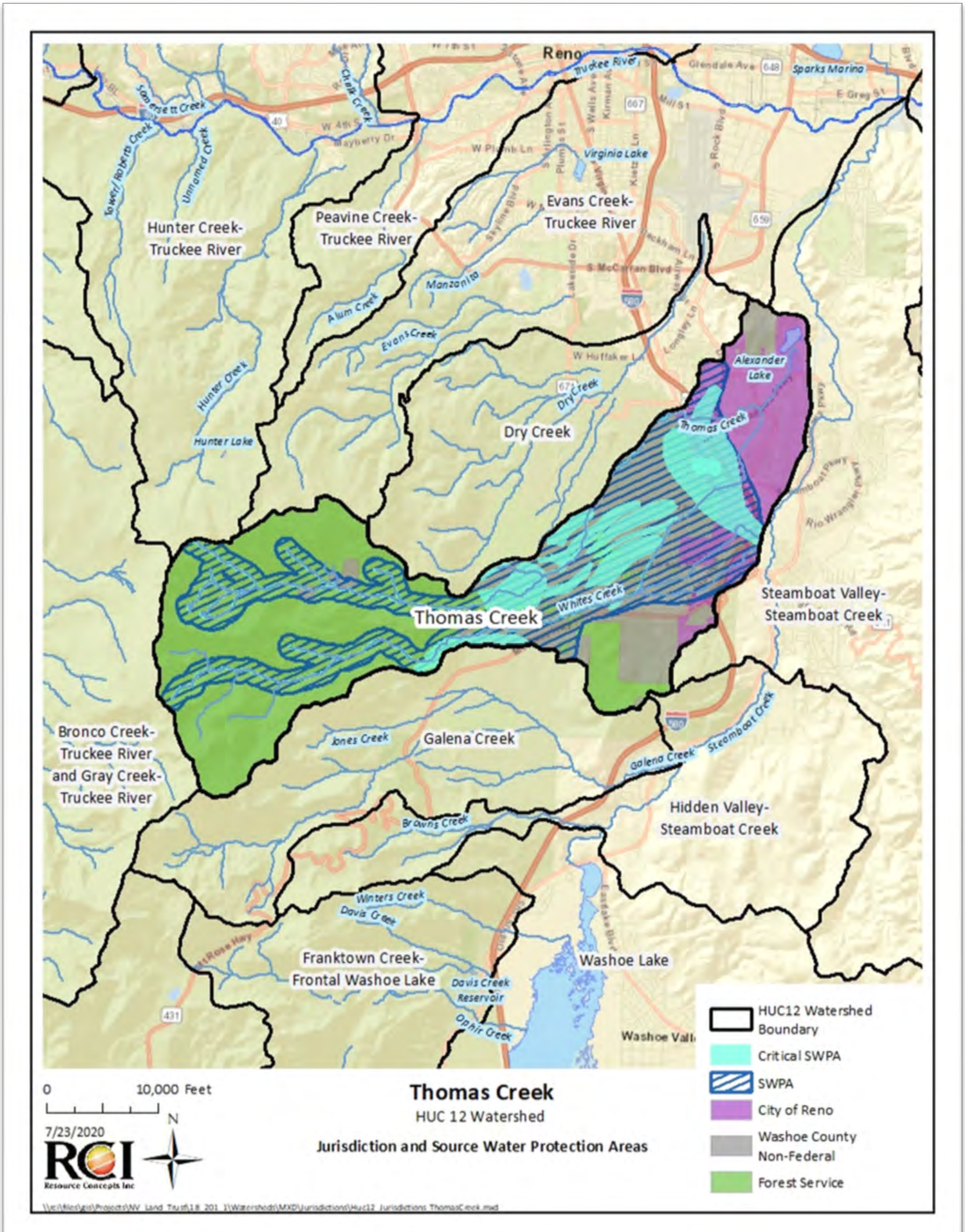
The following interagency communication objectives are important tools to both reinvigorate and invest additional resources in water quality, as well as utilize existing resources and programs:

- Each agency may evaluate how to improve lines of communication within and between jurisdictions regarding water quality issues; i.e. Washoe County, Truckee Meadow Water Authority (TMWA), NDEP, Washoe County Health District, and USFS.
- Continue to increase coordination and communication regarding spills and corrective actions along Hwy 395 and Mt. Rose Hwy.
- Evaluate how to collaborate with the Storm Water Committee in their public outreach and education efforts.
- Evaluate how to collaborate with TMWA and the Storm Water Committee on incorporating drinking water protection into their education plan.
- Collaborate with the Washoe/Storey Cooperative Weed Management Area to support their efforts in noxious weed management WSCWMA Website.

Wildfire and Fuel Management

Wildland fire is a significant threat to water quality and coordinated fuel management on wildlands can help reduce risks to water quality. Stakeholders and partners may consider the following objectives as they pertain to wildfire and fuel management:

- Encourage development, maintenance, and implementation of Community Wildfire Protection Plans.
- Support and collaborate with the Nevada Cohesive Strategy effort and the Shared Stewardship Agreement, the blueprint to address Nevada's wildland fire issues.
- Support for the Nevada Network of Fire Adapted Communities and their local chapters for people in high fire threat locations to fully prepare themselves, their homes, and the landscape where they reside to survive the destructive force of wildfire.
- Encourage the development of a wildland fire risk reduction and emergency recovery plan to reduce the risk of wildfire, quickly restore burned areas, and reduce the risk of catastrophic post-fire erosion and sedimentation.
- Collaborate and coordinate to treat invasive and noxious weeds pre- and post-fire to reduce risk of wildfire and watershed destabilization.


Thomas Creek
HUC 12 Watershed
Jurisdiction and Source Water Protection Areas
HUC12 Watershed Boundary
Critical SWPA
SWPA
City of Reno
Washoe County Non-Federal
Forest Service
0
10,000 Feet
N
7/23/2020
Hunter Creek-Truckee River
Peavine Creek-Truckee River
Evans Creek-Truckee River
Dry Creek
Thomas Creek
Steamboat Valley-Steamboat Creek
Bronco Creek-Truckee River and Gray Creek-Truckee River
Galena Creek
Hidden Valley-Steamboat Creek
Franktown Creek-Frontal Washoe Lake
Washoe Lake
Reno
Alexander Lake
Hunter Lake
Virginia Lake
Davis Creek Reservoir

Resource Investigation and Planning

Stakeholders may consider supporting the following resource investigations and planning, which can help fill data gaps, inform implementation designs and prioritize projects:

- Development of the Mt. Rose Water Treatment Plant at Whites Creek.
- Efforts to increase the quantity and quality of groundwater recharge.
- Consider expanding groundwater quality monitoring.
- Research how to identify private wells that present a groundwater contamination risk and that might need to be repaired or abandoned.

Water Quality Best Management Practices

Stakeholders may consider supporting the following Water Quality BMPs, that may improve and prevent degradation to water quality resources:

- Erosion reduction and sediment control measures.
- Invasive and noxious weed removal and integrated vegetation management.
- Recommendations in the tributary assessments.
- Pet waste cleanup initiatives.
- Septic to sewer conversions.
- Proper abandonment of unused/orphaned wells.
- Physical improvements prioritized in SWPAs for water quality improvement and protection.
- Nutrient management plans for irrigated green spaces.

Proposed Implementation Projects

Proposed implementation actions are generally described under the Strategies to Protect and Improve Water Quality. Specific implementation actions have been developed into proposed projects by local stakeholders and are described in Project Profiles. These Project Profiles include the information needed, as identified in the Environmental Protection Agency (EPA) guidance for nine critical elements, for an endorsable watershed management plan. Future projects that fall within the strategies identified for this watershed should be brought forward and incorporated into this Plan using the Project Profile format. As discussed in the following Stakeholders and Plans section, municipality and agency projects are also incorporated by reference.

Stakeholders and Plans

Stakeholder information and existing plans were used extensively in development of this Plan for Washoe County. These municipalities and agencies each have unique strategies and capital improvement plans that include water quality protection or improvement projects. These are updated regularly at differing timeframes (i.e. annually, every five years, etc.) according to their specific budgeting and planning processes. The applicable planning documents are briefly described and referenced in this section. Those projects pertaining to water quality protection and improvement in the watershed are incorporated by reference.

Project Stakeholders	
• City of Reno • USDA Forest Service • Nevada Department of Transportation • Nevada Division of Environmental Protection • Truckee Meadows Regional Planning Agency • Truckee Meadows Storm Water Permit Coordinating Committee	• Truckee Meadows Water Authority • Truckee River Fund • Washoe County • Western Regional Water Commission and the Northern Nevada Water Planning Commission

City of Reno

The City of Reno 2017 Master Plan goals and policies provide the framework for decision-making in the community.

Drinking water protection is addressed in the Master Plan's guiding principle to promote a safe and more resilient community. The City works with TMWA and other partners to ensure clean drinking water.

Water quality is also addressed in the guiding principle for quality places and outdoor recreation opportunities in the sections on hydrologic resources, major drainageways and no net loss of wetlands, stream environments, playas, spring fed stands of riparian vegetation, and non-404 wetlands in the City, in terms of both acreage and value. The Design Principles for Sustainable Development also contain sections related to water quality.

The following articles from the Master Plan discuss several water-related items that are applicable to this Plan:

- Article I: Section 18.12.105 describes setbacks from the Truckee River.
- Article XVIII: Section 18.12.1801 to 1808 describes wetlands and stream environment protection standards established for the review of development proposals within wetlands, stream environments, and areas of significant hydrologic resources.
- Article XIX: Section 18.12.1902 to 1907 Drainage Way Protection Standards carries out the provisions of the City of Reno Major Drainageways Plan, an element of the City of Reno Master Plan, and establishes standards for the review of development proposals within major drainage ways to, among other actions, maintain, preserve, or enhance the quality of the water in both the Truckee River and Stead basins.

The city of Reno also provides comprehensive services for construction and maintenance roads, landscaping and drainage facilities; citywide planning and code compliance; and emergency response services for fire and hazardous materials. All these roles contribute to preserving and improving water quality in the watershed.

Additionally, the city of Reno is divided into five Neighborhood Advisory Board Wards. Each Ward has one representative on the Reno City Council that is specifically focused on the needs of their part of the City. These Wards provide opportunities for citizens to engage in important community issues and is the most efficient way for citizens to communicate their concerns and ask questions prior to any large decisions or projects. As such, these Wards and their input are essential in the implementation and success of projects and plans within the community. Source water and watershed protection for this watershed falls within Ward 2.

USDA Forest Service

The Humboldt-Toiyabe National Forest within this watershed is managed by the Carson Ranger District. Natural resource projects, including projects undergoing NEPA documentation, are listed on the Forest Service website. The Humboldt National Forest and Toiyabe National Forest Biannual 2018 Monitoring Report describe the conditions of the watershed and present monitoring information.

Additionally, the Forest Service has created Land and Resource Management Plans (LRMP) to guide management decisions within the Humboldt-Toiyabe National Forest. Water resources are outlined in the LRMP along with management actions, including maintenance, monitoring and enhancement of water quality:

- Humboldt National Forest Land and Resource Management Plan:

  Section IV.C.5 is "Soil and Water within the Forest-Wide Standards and Guidelines." This outlines the goals for the soil and resources on Forest Service managed land.

  Section V.A is the "Implementation Direction of the Forest Plan." This describes how the LRMP will be analyzed for its level of success.

- Toiyabe National Forest Land and Resource Management Plan:

  Section IV is the "Forest Management Direction with Forest-wide Standards and Guidelines" for soil and water as well as riparian areas. These sections outline the goals for the forest.

  Section V is the "Implementation of the Forest Plan" including the direction of the LRMP which also outlines the goals for the Forest.

Nevada Department of Transportation

The Nevada Department of Transportation (NDOT) has developed their Stormwater Management Program to reduce stormwater pollution from NDOT managed facilities and roads. The program BMPs and annual report outline the specific measures that NDOT will take to reduce stormwater pollutant discharges from its owned and operated storm drain system:

- Stormwater Management Program (2013):

  The overall goal of the NDOT Stormwater Management Program is to reduce pollution associated with stormwater from NDOT's MS4 to the maximum extent practicable, as well as to protect surface and groundwater resources within the MS4 permit area. The Stormwater Management Program addresses stormwater pollution control as it relates to the planning, design, construction, and maintenance of NDOT's highway infrastructure statewide.

- Stormwater Management Program: Annual Report (2017):

  This watershed is impacted or has the potential to be impacted by Hwy 395 and Mt. Rose Hwy. The Stormwater Management Program provides a helpful planning outline on handling and mitigating pollution from the roads.

Nevada Division of Environmental Protection

The NDEP has a goal to preserve and enhance the environment of the State to protect public health, sustain healthy ecosystems, and contribute to a vibrant economy. The Thomas Creek HUC-12 Watershed has several challenges facing source water protection, so the NDEP is an essential stakeholder and planning partner. Specifically, there are two programs under the NDEP that were involved in this Plan in Washoe County. Both programs provide education and outreach and offer funding opportunities for water quality protection and improvement:

- Integrated Source Water Protection Program under the Safe Drinking Water Bureau:

  This program offers technical assistance for source water protection projects. The program coordinates source water protection activities at the local, state, and federal levels, and encourages community-based protection and preventive management strategies to ensure all public drinking water resources are kept safe from future contamination.

  The 2010 Nevada Integrated Source Water Protection Program guidance document details the program components as well as the requirements for a State-endorsed Community Source Water Protection Plan.

- 319 Nonpoint Source Pollution Management Program under the Bureau of Water Quality Planning:

  This Program can provide matched grant funding for projects that improve water quality.

  The 2015-2019 State of Nevada Nonpoint Source Management Plan establishes how NDEP will work with partners to address NPS pollution. The Plan formalizes Nevada's approach for protecting and improving water quality and describes the goals, short- and long-term objectives, milestones and timeframes to guide activities, and measures for tracking success.

Truckee Meadows Regional Planning Agency

The Truckee Meadows Regional Planning Agency (TMRPA) fosters coordination among Reno, Sparks and Washoe County. TMRPA facilitates land-use, infrastructure provision and resource management conversations among public and private decision makers. The agency also serves as a collaborative information and data warehouse, coordinating regional data collection and delivering advanced geospatial analytics for regional solutions. TMRPA includes a Regional Planning Governing Board and a Regional Planning Commission.

The TMRPA Regional Plan (2012 as amended) provides goals and policies for multiple plans and programs, including those with watershed related and well head protection components. The plan was revised in 2019-2020 and is considered a living document that will evolve over time.

Truckee Meadows Storm Water Permit Coordinating Committee

Storm Water Committee is responsible for implementing the Truckee Meadows Storm Water Management Program to protect the water quality of the region's waterways, streams and the Truckee River. The Storm Water Committee continues to guide the development of numerous plans and assessments relevant to source water and watershed protection as summarized below.

Ordinance and Guidance Changes for Construction and Post-Construction Programs

The Storm Water Committee updated and joined the Structural Controls Design Manual and the Low Impact Development Manual, as well as updated the Truckee Meadows Construction Site Best Management Practices (BMP) Handbook. These documents are referenced in the code for the city of Reno, city of Sparks, and Washoe County.

Watershed Assessments

Watershed assessment reports prepared for the Storm Water Committee were completed by Jesch et al. from 2002-2011 that include the Thomas and Whites tributaries. These reports provide general watershed descriptions and can be used to track historical changes in creek condition and water quality over time. The reports do not include water quality data.

Hillside Design completed a comprehensive Watershed Assessment for Tributaries to the Truckee River in 2012 for the Thomas Creek and Whites Creek tributaries in this watershed.

The assessment included:

- Stream reach descriptions with numerous photo points,
- Proper Functioning Condition rating,
- List of restoration and management efforts needed to improve stream conditions, and
- Water chemistry for temperature, pH, specific conductivity, dissolved oxygen, turbidity, and flow.

CDM Smith was contracted in 2015 through 2017 to conduct watershed assessments. The following table lists the report year and the respective drainages and reaches that were assessed in this watershed:

Stream Reaches Addressed in Watershed Assessment Reports in the Thomas Creek Watershed by Report Year				
Stream Name	Lower Reach	Middle Reach		Upper Reach
	2016	2015	2016	2015
Thomas	X		X	X
Whites	X	X		X

Watershed Management and Protection Plan for Tributaries to the Truckee River

The Watershed Management and Protection Plan for Tributaries to the Truckee River (NCE, 2020) is an update to the 2003 Watershed Management and Protection Plan for Tributaries to the Truckee River, which has been implemented for more than 15 years by the regional MS4 through the Storm Water Committee. The 2003 plan described an approach for on-going watershed assessment studies and monitoring to protect and improve the water quality in the stream corridors and drainages tributary to the Truckee River. The 2020 Plan update provides a process and framework for identifying, developing, and implementing projects originated through the Storm Water Committee that is consistent with the guidelines for an EPA approved Watershed Management Plan. The 2020 plan by NCE and the 2020 Integrated Source Water and 319(h) Watershed Protection Plan for Public Water Systems and the Truckee River in the Truckee Meadows, are mutually complementary and work together to address the broad scope of potential strategies to improve drinking water and surface water quality in Washoe County.

Water Quality Sampling

Balance Hydrologics has conducted water quality analyses on tributaries and stormwater outfalls since 2016. The following table lists the report years and the respective drainages that were assessed in this watershed:

Streams Addressed in Stormwater Monitoring Annual Reports in the Thomas Creek HUC-12 Watershed by Report Year				
Stream Name	Year Sampled			Location
	2016	2017	2018	
Thomas	X	X	X	Below Steamboat Ditch
Whites	X	X	X	North Fork

Truckee Meadows Watershed Protection Manual

Truckee Meadows Watershed Protection Manual: A Summary of the Watershed Protection Activities and Programs Developed in Conjunction with the Watershed Management Facilitator Scope of Work (Kennedy/Jenks, 2005). This document provides a reference and compendium of the various watershed protection activities and programs that were developed in 2004 and 2005 for Reno, Sparks and Washoe County.

Truckee Meadows Water Authority

TMWA is responsible for almost all municipal water delivery in the greater Reno-Sparks area. TMWA also owns and operates the municipal wells in this watershed. The following program and plans guide the management of these water resources:

- TMWA Water Resources Plan (2016-2035):

  This plan describes water quality issues and goals for the water resources managed by TMWA. Special focus is placed on changes in future water supply and demand and how those changes will impact the region's water resources. Additionally, this plan provides useful Truckee River watershed information.

- Source Water Quality Assurance Program (2016-2035):

  TMWA's objective is to deliver high-quality potable water to its customers in a cost-effective manner. To achieve this objective, TMWA has established a water quality assurance program. The components that make up the program are source water quality protection, potable water treatment, maintenance of distribution system water quality, and cross connection control.

- Wellhead Protection Plan (2016):

  The purpose of the Wellhead Protection Plan is to protect groundwater that serves as a source for public drinking water supplies. This plan is intended to be a tool used by TMWA to assist in protecting drinking water sources.

Truckee River Fund

TMWA established the Truckee River Fund in 2004 (Truckee River Fund). The purpose of the Fund is to "protect and enhance water quality or water resources of the Truckee River, or its watershed." The Fund provides a way to respond to the requests from outside groups and organizations that are involved in promoting and improving the health of the Truckee River System and watershed. This in turn benefits the primary water source for the community and, in the long run, benefits TMWA customers. For example, the Truckee River Fund has helped finance the following projects:

- Mt. Rose Water Treatment Plant at Whites Creek (Under construction; completion projected for 2020):

  This water treatment plant will treat surface water from Whites Creek, which will provide a supplemental water supply for the area. The new facility will further TMWA's ability to rest wells and store water in the local aquifer while improving supply reliability.

Washoe County

Activities in Washoe County are reviewed according to the Master Plan Planning Areas. The Truckee River watershed includes nine planning areas. The Thomas Creek HUC-12 Watershed is included in the Southwest and Southeast Truckee Meadows and Forest planning areas. The County has Citizens Advisory Boards (CABs) which provide important community perspectives on local issues to the Washoe County Board of Commissioners. This watershed is within the South Truckee Meadows/Washoe Valley CAB (CAB Boundaries).

The Washoe County Master Plan (2008) has Goals and Policies for Public Services and Facilities, and Open Space and Natural Resource Management. Applicable sections include:

- Article 418, Significant Hydrologic Resources, which regulates development activity within and adjacent to perennial streams to ensure that these resources are protected and enhanced. (Note: this does not apply to the Truckee River)
- Article 420, Storm Drainage Standards, sets forth standards for ensuring that both private and public development provides adequate protection for citizens and property. Therefore, it minimizes and controls erosion and pollution impacts on the natural environment, and additionally minimizes maintenance costs for drainage and flood control systems.
- Article 421, the Storm Water Discharge Program which the intent is to protect and enhance the water quality of our watercourses, water bodies, groundwater and wetlands in a manner pursuant to and consistent with the Clean Water Act.
- Article 810, Special Use Permits, provides a method of reviewing certain uses to determine if they have the potential to adversely affect public facilities in the vicinity.

Washoe County also provides comprehensive services for construction and maintenance roads, landscaping and drainage facilities; county-wide planning and code compliance; and emergency response services for fire and hazardous materials. All these roles contribute to preserving and improving water quality in the watershed.

Western Regional Water Commission and the Northern Nevada Water Planning Commission

The Western Regional Water Commission (WRWC) focuses on improving water resource planning at the regional level and facilitating coordinated resource management among city of Reno, city of Sparks, Washoe County, TMWA, Truckee Meadows Water Reclamation Facility, South Truckee Meadows GID and Sun Valley GID.

The Northern Nevada Water Planning Commission (NNWPC) is a technical advisory panel that reports to the WRWC. The NNWPC develops and updates a Comprehensive Regional Water Management Plan (RWMP) and makes recommendations to the WRWC for adoption. In addition, the NNWPC develops priorities and an annual budget for the Regional Water Management Fund, also for recommendations to the WRWC.

The Comprehensive Regional Water Management Plan includes several applicable objectives:

- Objective 1.2 Provide for a Sustainable Water Supply and an Acceptable Level of Service to the Community (including protecting groundwater recharge areas).
- Objective 1.3 Implement measures to protect and enhance water quality for a sustainable water supply (including source water protection).
- Objective 2.1 Promote Efficient Use of Resources (Reduction of Non-Point Source Pollution for TMWRF Pollutant Credit).
- Objective 2.2 Manage wastewater for protection and enhancement of water quality.
- Objective 3.1 Effective and integrated watershed management (protection of human health, property, water quality including storm water).

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Truckee Meadows Parks Foundation. Truckee Meadows Parks Foundation

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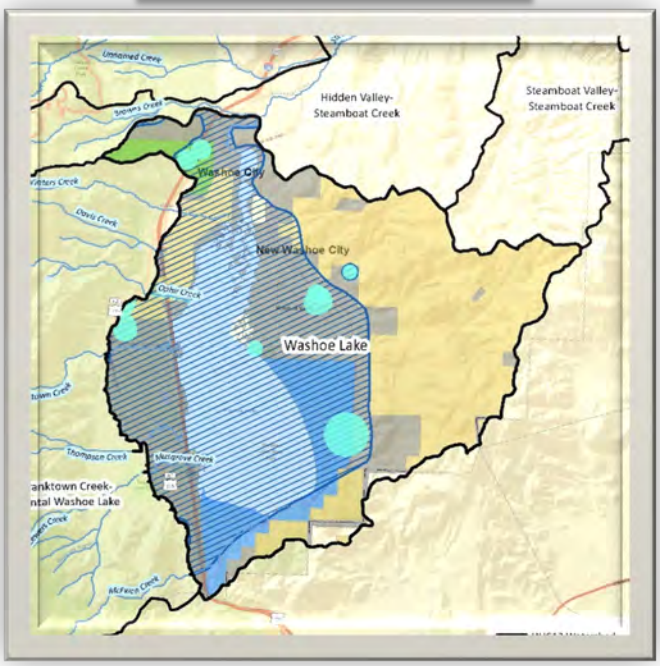
Washoe Lake

HUC-12 Watershed #160501020302 Profile

Click here for complete HUC-12 Watersheds Map



Contents

Introduction

The Washoe Lake HUC-12 Watershed profile is a component of the 2020 Integrated Source Water and 319(h) Watershed Protection Plan for Public Water Systems and the Truckee River in the Truckee Meadows (Plan), as well as the Watershed Management and Protection Plan for Tributaries to the Truckee River. This document is a part of the on-line watershed mapping tool.

This watershed description is intended to be a guide and resource for organizations working within the watershed, and an educational tool for those interested in learning more about the watershed in which they live. This Plan can be used to support funding for a multitude of water quality projects in the watershed. Note that only non-regulated activities are eligible for the Nevada Division of Environmental Protection Source Water Protection Program or the 319 Non-Point Source Program funding.

Summary

This profile focuses on the watershed's water quality. It includes potential and existing concerns, types of land uses, watershed management strategies and projects, and the involved stakeholders and their corresponding plans with water quality components.

The Washoe Lake HUC-12 Watershed encompasses Big Washoe, Little Washoe Lake, and surrounding wetlands (Washoe Lake State Park) and resides within the Washoe Valley Groundwater Basin. The watershed extends west, roughly to the alignment of Old US Hwy 395, through agricultural and rural residential areas. Five creeks on the west side originate in the Carson Range and then flow to Washoe Lake, crossing Interstate 580 (I-580). The watershed extends east, well into the arid Virginia Range, including the New Washoe City residential area. To the north, the HUC-12 extends past Washoe City, near to where Steamboat Creek flows out of Little Washoe Lake toward the Truckee River.

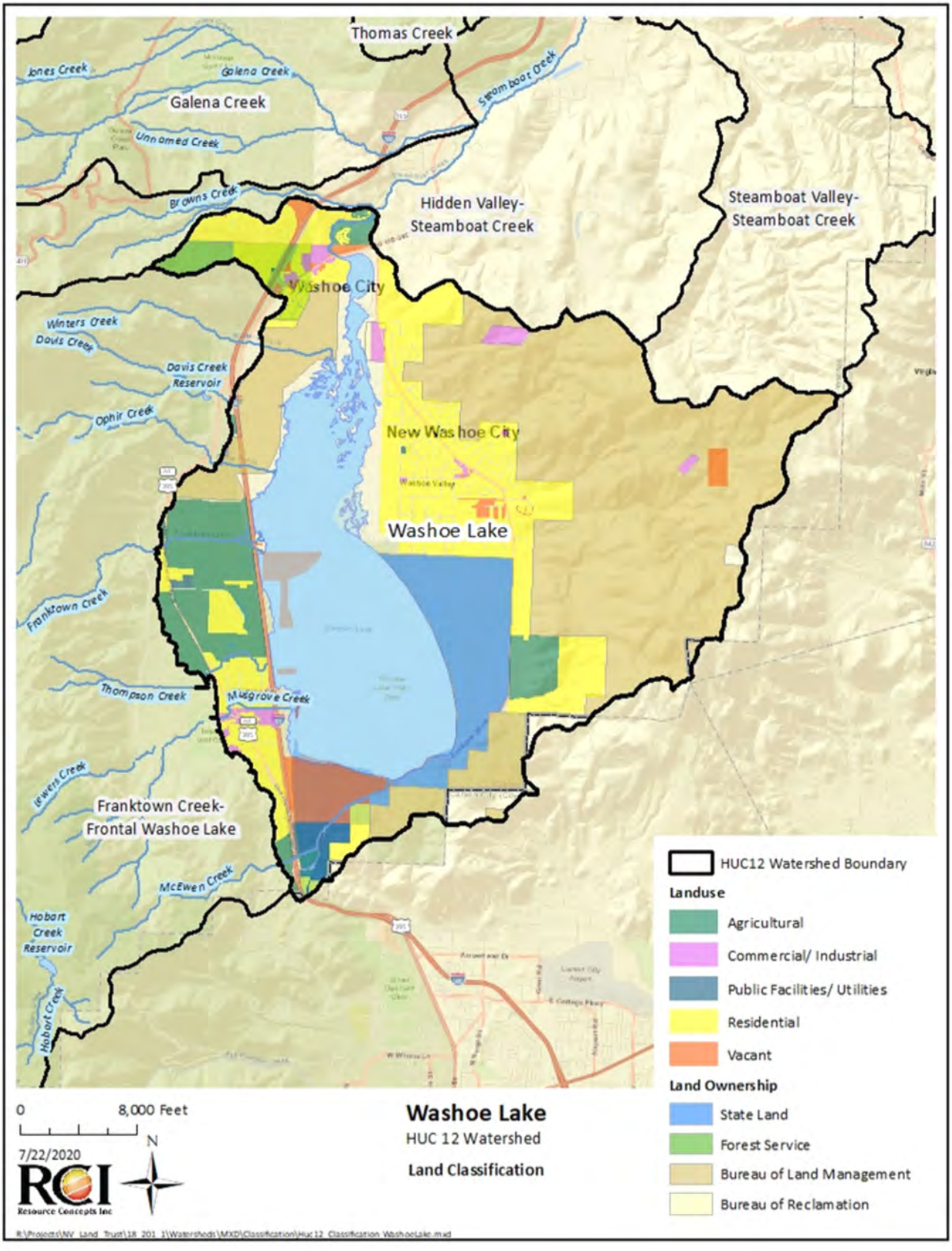
Source Water Protection Areas (SWPAs) for this watershed were developed by stakeholders to help protect drinking water sources. This hosts wells for eight small public water systems with ten wells, though the majority of the water supply in Washoe Valley is provided by individual domestic wells. The SWPA corresponds topographically to the "valley floor" where groundwater is an important source of drinking water, potentially vulnerable to contamination. The following table summarizes key water quality aspects in this watershed.

Watershed Summary	
Basins	• Washoe Lake HUC-12 Watershed #160501020302. • Groundwater Basin: 089 (Washoe Valley) underlies this watershed.
Water Bodies & Water Quality	• Franktown Creek, not impaired, see NAC 445A.1732. • McEwen Creek, not impaired, see NAC 445A.1722. • Musgrove Creek, not impaired, see NAC 445A.1722. • Ophir Creek, insufficient data, see NAC 445A.1738. • Steamboat Creek, impaired for *E. coli*, cadmium, and beryllium see NAC 445A.1724. • Washoe Lakes, impaired for iron, mercury in fish tissue, phosphorous, and TDS, see NAC 445A.1722. • Winters Creek, not impaired, see NAC 445A.1722.
Source Water Protection Areas	• A SWPA encompasses the "valley floor" of Washoe Valley. It represents a precautionary indicator to safeguard the water sources and recharge areas. • Critical SWPAs represent areas closer to perennial creeks and water system wells. • Ten public water system wells are managed by eight different public water systems. • 16,000 total acres, or roughly 56% of the watershed, is in a SWPA. • 800 total acres, or about 3% of the watershed, is within a Critical SWPA.
Special Considerations & Issues	• Wetlands surrounding Washoe Lake; Scripps Wildlife Management Area and Washoe Lake Wetland Project. • No municipal wastewater utility and communities rely on septic systems. • New Washoe City and Washoe City urbanized areas. • Agricultural properties. • Washoe Fire, 2012. • Historic mill tailings containing mercury at locations around Washoe Lake.

	Type	Acres	%
Land Jurisdiction	BLM:	10,520	41%
	BOR:	80	<1%
	State of Nevada	3,280	13%
	Washoe County Non-Federal:	11,310	45%
	USFS:	200	1%
Land Use	Agriculture:	1,930	8%
	Commercial/Industrial:	330	1%
	Residential:	5,200	21%
	Public facility/Utilities:	240	1%
	Vacant:	990	4%
	Lake:	5,570	22%
	Federally Managed:	10,800	43%

Land uses and jurisdictions in this watershed are summarized in the adjacent table and illustrated by the Land Classification Figure.

Undeveloped public land managed by the Bureau of Land Management (BLM) and State of Nevada is the dominant land use in this watershed. New Washoe City and Washoe City are the primary residential communities and are served entirely by septic systems. Agricultural pastureland is mixed in between the residential community around the perimeter of Washoe Lake. I-580 traverses the length of the watershed immediately adjacent to Washoe Lake. The potential and existing water quality concerns from these activities are nitrate levels in groundwater related to septic systems and hazardous materials from historic mill operations.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Browns Creek
Hidden Valley-
Steamboat Creek
Steamboat Valley-
Steamboat Creek
Washoe City
Winters Creek
Davis Creek
Davis Creek
Reservoir
Ophir Creek
New Washoe City
Washoe Lake
Franktown Creek
Thompson Creek
Mesgrove Creek
Lewers Creek
Franktown Creek-
Frontal Washoe Lake
McEwen Creek
Hobart
Creek
Reservoir
Hobart Creek
HUC12 Watershed Boundary
Landuse
Agricultural
Commercial/ Industrial
Public Facilities/ Utilities
Residential
Vacant
Land Ownership
State Land
Forest Service
Bureau of Land Management
Bureau of Reclamation
0
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Resource Concepts Inc
Washoe Lake
HUC 12 Watershed
Land Classification

Water Quality Standards and Beneficial Uses

Water quality standards for surface water in the State of Nevada are established by Nevada Administrative Code (NAC) NAC 445A.11704 through NAC 445A.2234. Standards applicable to beneficial uses are generally described under NAC 445A.122. The Nevada Division of Environmental Protection (NDEP) Bureau of Water Quality Planning Nevada 2016-2018 Water Quality Integrated Report identifies the beneficial uses and the surface water quality conditions in this watershed, as summarized below:

- Franktown Creek fully supports beneficial uses (water quality standards NAC 445A.1732).
- McEwen Creek fully supports beneficial uses (water quality standards NAC 445A.1722).
- Musgrove Creek fully supports beneficial uses (water quality standards NAC 445A.1722).
- Ophir Creek fully supports beneficial uses (water quality standards NAC 445A.1736 and NAC 445A.1738). The creek is within a SWPA.
- Winters Creek fully supports beneficial uses (water quality standards NAC 445A.1722).
- Steamboat Creek is impaired for several beneficial uses (water quality standards NAC 445A.1724):
  - Recreation involving contact with water due to the *Escherichia* (*E. coli*) bacteria
  - Aquatic life due to Cadmium
  - Municipal and domestic supply due to Beryllium
- Washoe Lakes (Big and Little) are impaired for several beneficial uses (water quality standards NAC 445A.1727):
  - Fish consumption due to Mercury
  - Aquatic life due to Iron and Total Phosphorus
  - Municipal and domestic supply due to Total Dissolved Solids (TDS)

Groundwater is an important source of drinking water for public water systems in this watershed. There are no known contaminants within this watershed caused by human activities to groundwater.

Potential and Existing Water Quality Concerns

The primary potential and existing water quality concerns in this watershed are listed below and described in the following paragraphs:

- Hazardous Materials from Spills or Leaks
- Pollution from Urban Areas
- Nitrate from Individual Sewage Disposal System
- Sediment from Erosion

Hazardous Materials from Spills or Leaks

I-580 runs through the length of this watershed. Chemicals and materials commonly moving along these transportation corridors have the potential for accidental spills and leaks.

The U.S. Department of Transportation accumulated a list of commonly transported hazardous materials within the Truckee River watershed (WRWC, 2017). These include:

- Ammonia perchlorate
- Anhydrous ammonia
- Chlorine
- Cyanide
- Hydrochloric acid
- Hydrogen sulfide
- Nitro cellulose (wet)
- Propane
- Petroleum naphtha
- Phosphoric acid
- White phosphorous
- Propargyl alcohol
- Sulfuric acid
- Sodium hydroxide

During the Comstock era, gold and silver mills used mercury to process ore that got transported along stream banks and into Washoe Lake (WRWC, 2017). Mercury in this area does not impact drinking water quality; instead, it is transferred through the food chain in fish by methylated mercury (WRWC, 2017).

Pollution from Urban Area Runoff

Groundwater, surface water, and irrigation ditches may be vulnerable to polluted runoff in urban areas. Potential contaminants include:

- Nutrients from fertilizers
- Bacteria from animal waste
- Trash
- Pollution from household waste
- Runoff from roads and parking lots

Excessive fertilization in irrigated green areas such as yards, fields, golf courses or parks are potential sources of nutrients from fertilizers. These areas may also contribute *E. coli* from animal waste such as from livestock, dogs and geese. As noted, the upper reach of Steamboat Creek is listed as impaired for *E. coli* (NDEP, 2016-2018). Washoe Lake State Park hosts equestrian facilities that include arenas and a horse washing station (Nevada State Park). There are small ranches as well as residential ranchettes surrounding Washoe Lake. Runoff livestock waste could carry bacteria and viruses into surface water (EPA, 2005).

Washoe City and New Washoe City are located near Washoe Lake. Impervious surfaces from residential development can lead to urban runoff and transport of household chemicals, lawn fertilizers, and sediment into the lake (EPA, 2003).

Nitrate from Individual Sewage Disposal Systems

Individual Sewage Disposal Systems, or septic systems, are associated with nitrate contamination of groundwater if there are large numbers concentrated in a small area; for example, neighborhoods with lot sizes less than one-acre, or if they are not maintained properly (WRWC, 2017).

In the Washoe Lake HUC-12 Watershed all development is served by septic systems. The highest concentrations of septic systems are within Washoe City and New Washoe City. There are about 2,000 parcels with septic systems in this watershed largely on lots one-acre or greater. The Septic Nitrate Baseline Data and Risk Assessment Study: Phase 2 took 83 groundwater samples in Washoe Valley to test for nitrate contamination near septic systems and found 22 samples above the Maximum Contaminant Level (MCL) of 10 mg/L (WRWC, 2017). The maximum nitrate level recorded for the Washoe Valley area was 50 mg/L (Northern Nevada Water Planning Commission). The cause of nitrate contamination around septic systems may be due to high concentrations of septic systems, permeable soil conditions, shallow groundwater, and distance to sensitive receptors (WRWC, 2017). The water supply for the majority of residences is also from private on-site domestic wells rather than public water systems.

Sediment from Erosion

Sediment from erosion conveys pollution, such as phosphorous, and degrades downstream water with suspended sediment. The primary causes of erosion and sedimentation in this watershed include wildland fire, noxious weeds, and drainage and landscape modifications.

High-severity wildfires alter the overall structure of the ecosystem through the removal of vegetation, leaving limited ground cover. Severe fires also create a waxy, water-repellant layer over the soil which increases water and soil runoff (NDF, 2011). The October 2016 Little Valley Fire burned 2,290 acres and destroyed 23 homes in the Washoe Lake and adjacent Franktown Creek-Frontal Washoe Lake HUC-12 watersheds. The fire burned extremely hot over a large area. Following the fire debris, flows were common along Franktown and Ophir Creeks. The decomposed granite sediment was deposited along the flat slopes near the lake.

Areas invaded by noxious weeds are more susceptible to erosion and sedimentation in several ways. Noxious weeds do not have a root structure to retain soil and resist erosion due to wind or water. The fire risk is also increased because noxious weeds are more flammable than native species. In this watershed specifically, cheatgrass has established upslope of the burned area (CDM Smith, 2017).

Since the 2012 Washoe Fire, some areas continue to display a lack of vegetation, and these locations show moderate erosion and bank incision has occurred (CDM Smith, 2017). This is a concern because increased sediment directly effects water quality.

Areas that are disturbed during construction projects can represent a potential risk of erosion and downstream sedimentation. Protection of stormwater runoff from contamination by construction in this watershed is almost entirely outside the Truckee Meadows regional stormwater management area (Truckee Meadows MS4). Therefore, construction disturbances are only regulated by the State of Nevada. However, the many Best Management Practice (BMP) references developed in the Truckee Meadows are readily available for construction projects to help keep soil on-site and to reduce runoff.

Strategies to Protect and Improve Water Quality

The water quality concerns identified in this watershed can be addressed through management strategies described in this section, the proposed projects detailed in the Project Profiles, as well as applicable on-going water quality projects and programs described under Stakeholders and Plans. These strategies pertain to the entire watershed but may be prioritized in SWPAs.

Source Water Protection Area Identification and Management

A SWPA is a management area surrounding a surface water or groundwater resource that supplies water for public consumption. Activities in these buffer areas can affect the quality of water downstream or underground. These management strategies acknowledge the value of these SWPAs to prevent future contamination of sources of drinking water.

There are two types of buffers in this watershed (RCI, 2020). One buffer encompasses the Washoe Lake and the valley floor, which represents a precautionary indicator to safeguard groundwater sources of drinking water potentially vulnerable to contamination. The second type of buffer surrounds critical areas closer to water system wells (based on a 20-year time of travel for groundwater). These areas are illustrated on the Jurisdiction and Source Water Protection Areas Figure. The following objectives are significant in both future and on-going SWPA management:

- Inform landowners in SWPAs about their proximity to a valuable drinking water source and how they can help protect their water quality.
- Encourage coordination between Public Water Systems, landowners, and county planners to consider the importance of SWPAs in project reviews.
- Explore collaborative funding for water quality and watershed improvements and support the resource investigations needed to develop viable projects.
- Prioritize physical improvements in SWPAs to protect and improve source water quality.

Education and Outreach

The following education and outreach objectives are intended to help effectuate positive actions to protect water quality:

- Increase knowledge of water quality protection and the pollution in stormwater runoff through local outreach efforts.
- Increase knowledge about household and commercial chemical use, storage and disposal through local outreach efforts.

Interagency Communication

The following interagency communication objectives are important tools to both reinvigorate and invest additional resources in water quality, as well as utilize existing resources and programs:

- Each agency may evaluate how to improve lines of communication within and between jurisdictions regarding water quality issues; i.e. Washoe County, Truckee Meadows Water Authority (TMWA), NDEP, Washoe County Health District, Forest Service, and BLM.
- Continue to increase coordination and communication between the appropriate agencies regarding spills and corrective actions along I-580.
- Evaluate how to collaborate with stakeholders such as TMWA and the Truckee Meadows Storm Water Permit Coordinating Committee (Storm Water Committee) on incorporating drinking water protection into community outreach and education strategies.
- Collaborate with the Washoe/Storey Cooperative Weed Management Area to support their efforts in noxious weed management WSCWMA Website.

Wildfire and Fuel Management

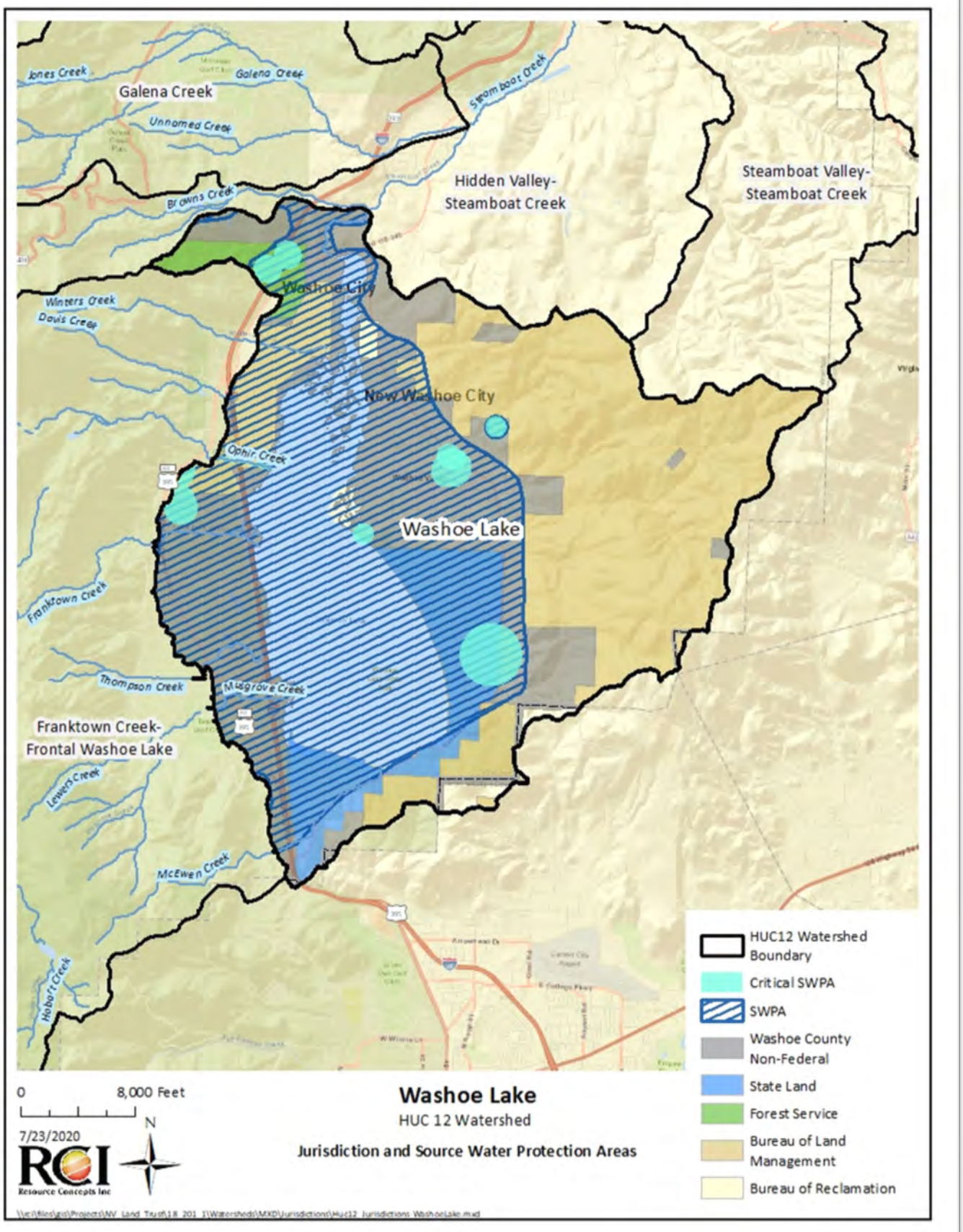
Wildland fire is a threat to water quality and coordinated fuel management on wildlands can help reduce risks to water quality. Stakeholders and partners may consider the following objectives as they pertain to wildfire and fuel management:

- Encourage development, maintenance, and implementation of the Community Wildfire Protection Plans.
- Support and collaborate with the Nevada Cohesive Strategy effort and the Shared Stewardship Agreement, the blueprint to address Nevada's wildland fire issues.
- Support for the Nevada Network of Fire Adapted Communities and their local chapters for people in high fire threat locations to fully prepare themselves, their homes, and the landscape where they reside to survive the destructive force of wildfire.
- Encourage the development of a wildland fire risk reduction and emergency recovery plan to reduce the risk of wildfire, quickly restore burned areas, and reduce the risk of catastrophic post-fire erosion and sedimentation.
- Collaborate and coordinate to treat invasive and noxious weeds pre- and post-fire to reduce risk of wildfire and watershed destabilization.

Resource Investigation and Planning

Stakeholders may consider supporting the following resource investigations and planning, which can help fill data gaps, inform implementation designs and prioritize projects:

- Research to identify non-point pollutant sources in the watershed and options for treatment.
- Water quality improvement planning for tributaries to the Truckee River.
- Development and implementation of integrated vegetation management programs.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Jurisdiction and Source Water Protection Areas
HUC12 Watershed Boundary
Critical SWPA
SWPA
Washoe County Non-Federal
State Land
Forest Service
Bureau of Land Management
Bureau of Reclamation

Water Quality Best Management Practices

Stakeholders may consider supporting the following Water Quality BMPs, that may improve and prevent degradation to water quality resources:

- Water quality improvement projects.
- Invasive weed removal and integrated vegetation management for creek stabilization.
- Recommendations in the tributary assessments.
- Proper abandonment of wells.
- Physical improvements prioritized in SWPAs for water quality improvement and protection.
- Nutrient management measures for irrigated green spaces.

Proposed Implementation Projects

Proposed implementation actions are generally described under the Strategies to Protect and Improve Water Quality. Specific implementation actions have been developed into proposed projects by local stakeholders and are described in Project Profiles. These Project Profiles include the information needed, as identified in the Environmental Protection Agency (EPA) guidance for nine critical elements, for an endorsable watershed management plan. Future projects could also be brought forward to funding agencies through:

- Demonstrating advancement of the strategies identified for this watershed in the Source Water and Watershed Protection Plan.
- Using the Project Profile format to establish consistency with the nine critical elements of an EPA endorsed plan.

As discussed in the following Stakeholders and Plans section, municipality and agency projects are also incorporated by reference.

Stakeholders and Plans

Stakeholder information and existing plans were used extensively in development of the Plan for Washoe County. These municipalities and agencies each have unique strategies and capital improvement plans that include water quality protection or improvement projects. These are updated regularly at differing timeframes (i.e. annually, every five years, etc.) according to their specific budgeting and planning processes. The applicable planning documents are briefly described and referenced in this section. Those projects pertaining to water quality protection and improvement in the watershed are incorporated by reference.

Project Stakeholders	
• Bureau of Land Management	• Truckee Meadows Regional Planning Agency
• USDA Forest Service	• Truckee Meadows Water Authority
• Nevada Department of Transportation	• Truckee River Fund
• Nevada Division of Environmental Protection	• Washoe County
• Nevada Division of Forestry	• Washoe County Health District
• Truckee Meadows Storm Water Permit Coordinating Committee	• Western Regional Water Commission

Bureau of Land Management

The Nevada BLM has Resource Advisory Councils (RACs) which allow community members to be involved in natural resource planning and management issues on BLM managed public land. Washoe County is a part of the Sierra Front-Northwestern Great Basin RAC which is administered through the BLM-Carson City and Winnemucca District offices. BLM Resource Advisory Councils-Nevada

The BLM also has specific Resource Management Plans (RMPs), that apply to this watershed. These plans generally outline the way that the BLM currently manages and intends to manage the multiple resources on public land. Within this watershed, the following plans and sections are applicable:

- Carson City Consolidated Resource Management Plan (2001):

  RIP-1: Riparian Management discusses how riparian areas on BLM land should be managed, monitored, and maintained. The desired outcome in this section is to protect and maintain existing and potential fisheries and riparian areas in good or better condition.

  SWA-1: Soils, Watershed and Air Quality describes specific techniques and goals for all watersheds within the planning area such as reducing soil loss, flood damage, and sediment damage from human activities.

  WAT-1: Water Resources discusses management for good water quality on public lands such as watershed management plans as an important administrative action.

- Carson City Fire Management Plan (2016):

  The Fire Management Plan (FMP) goal is to restore sagebrush ecosystems throughout the planning area. In doing so, the risk of wildfire and its negative effects should eventually decrease. Since wildfire is a significant issue in this watershed, management to reduce its risk is a key planning component.

USDA Forest Service

The Humboldt-Toiyabe National Forest within this watershed is managed by the Carson Ranger District. Natural resource projects, including projects undergoing National Environmental Policy Act (NEPA) documentation, are listed on the Forest Service website. The Humboldt National Forest and Toiyabe National Forest Biannual 2018 Monitoring Report describe the conditions of the watershed and present monitoring information.

Additionally, the Forest Service has created Land and Resource Management Plans (LRMP) to guide management decisions within the Humboldt-Toiyabe National Forest. Water resources are outlined in the LRMP along with management actions including maintenance, monitoring and enhancement of water quality:

- Humboldt National Forest Land and Resource Management Plan:

  Section IV.C.5 is "Soil and Water within the Forest-Wide Standards and Guidelines". This outlines the goals for the soil and resources on Forest Service managed land.

  Section V.A is the "Implementation Direction of the Forest Plan". This describes how the LRMP will be analyzed for its level of success.

- Toiyabe National Forest Land and Resource Management Plan:

  Section IV is the "Forest Management Direction with Forest-wide Standards and Guidelines" for soil and water as well as riparian areas. These sections outline the goals for the forest.

  Section V is the "Implementation of the Forest Plan" including the direction of the LRMP which also outlines the goals for the Forest.

Nevada Department of Transportation

The Nevada Department of Transportation (NDOT) has developed their Stormwater Management Program to reduce stormwater pollution from NDOT managed facilities and roads. The program BMPs and annual report outline the specific measures that NDOT will take to reduce stormwater pollutant discharges from its owned and operated storm drain system:

- Stormwater Management Program (2013):

  The overall goal of the NDOT Stormwater Management Program is to reduce pollution associated with stormwater from NDOT's MS4 to the maximum extent practicable, as well as to protect surface and groundwater resources within the MS4 permit area. The Stormwater Management Program addresses stormwater pollution control as it relates to the planning, design, construction, and maintenance of NDOT's highway infrastructure statewide.

- Stormwater Management Program: Annual Report (2017):

  This watershed is impacted or has the potential to be impacted by I-80, I-580, Hwy 395, and Hwy 431. The Stormwater Management Program provides a helpful planning outline on handling and mitigating pollution from the roads.

Nevada Division of Environmental Protection

The NDEP has a goal to preserve and enhance the environment of the State in order to protect public health, sustain healthy ecosystems, and contribute to a vibrant economy. The Washoe Lake HUC-12 Watershed has several challenges facing source water protection, so the NDEP is an essential stakeholder and planning partner. Specifically, there are two programs under the NDEP that were involved in this Plan in Washoe County. Both programs provide education and outreach and offer funding opportunities for water quality protection and improvement:

- Integrated Source Water Protection Program under the Safe Drinking Water Bureau:

  This program offers technical assistance for source water protection projects. The program coordinates source water protection activities at the local, state, and federal levels, and encourages community-based protection and preventive management strategies to ensure all public drinking water resources are kept safe from future contamination.

  The 2010 Nevada Integrated Source Water Protection Program guidance document details the program components as well as the requirements for a State-endorsed Community Source Water Protection Plan.

- 319 Nonpoint Source Pollution Management Program under the Bureau of Water Quality Planning:

  This Program can provide matched grant funding for projects that improve water quality.

The 2015-2019 State of Nevada Nonpoint Source Management Plan establishes how NDEP will work with partners to address NPS pollution. The Plan formalizes Nevada's approach for protecting and improving water quality and describes the goals, short- and long-term objectives, milestones and timeframes to guide activities, and measures for tracking success.

Nevada Division of Forestry

The Nevada Division of Forestry (NDF) is a State agency that uses a collaborative process to deliver science based natural resource management and protection to promote resilient landscapes, fire adapted communities, and safe, effective wildfire response provided by employees that embrace the core values of duty, respect, and integrity.

NDF provides professional natural resource and wildland fire management services to Nevada citizens and visitors to enhance, conserve and protect forest, rangeland and watershed values, endangered plants and other native flora. Protection of these resources helps to improve water quality:

- Community Wildfire Protection Plans:

  Community Wildfire Protection Plans (CWPPs) are authorized and defined in Title I of the Healthy Forests Restoration Act of 2003 (HFRA). CWPPs represent the best opportunity that communities have to address the challenges of the Wildland-Urban Interface. A CWPP helps communities define their priorities for the protection of life, property, and shared assets-at-risk from wildfires. Developing a CWPP encourages community members and leaders to have valuable discussions about wildfire preparedness, evacuation planning, and local fire district capabilities. The CWPP increases grant funding opportunities by prioritizing fuel reduction projects around and within the community.
- Nevada Wildland Fire Cohesive Strategy:

  The Nevada Fire Board Oversight Body is the custodian of the 2015 Nevada Wildland Fire Cohesive Strategy Summit's Action Plan to ensure goal achievement and identify emerging topics. This oversight body acts as an "advisory" body and is charged with taking the Nevada Cohesive Strategy Summit report and its Action Steps, ensuring that goal achievement is accomplished and monitoring emerging topics through the Nevada Fire Board. This body monitors progress, develops issue resolution, and addresses emerging issues such as protecting water quality.

Truckee Meadows Regional Planning Agency

The Truckee Meadows Regional Planning Agency (TMRPA) fosters coordination among Reno, Sparks and Washoe County. TMRPA facilitates land-use, infrastructure provision and resource management conversations among public and private decision makers. The agency also serves as a collaborative information and data warehouse, coordinating regional data collection and delivering advanced geospatial analytics for regional solutions. TMRPA includes a Regional Planning Governing Board and a Regional Planning Commission.

The TMRPA Regional Plan (2012 as amended) provides goals and policies for multiple plans and programs, including those with watershed related and well head protection components. The plan was revised in 2019-2020 and is considered a living document that will evolve over time.

Truckee Meadows Storm Water Permit Coordinating Committee

The Storm Water Committee is responsible for implementing the Truckee Meadows Storm Water Management Program to protect the water quality of the region's waterways, streams and the Truckee River. The Storm Water Committee continues to guide the development of numerous plans and assessments relevant to source water and watershed protection as summarized below.

Ordinance and Guidance Changes for Construction and Post-Construction Programs

The Storm Water Committee updated and joined the Structural Controls Design Manual and the Low Impact Development Manual, as well as updated the Truckee Meadows Construction Site BMP Handbook. These documents are referenced in the code for the city of Reno, city of Sparks, and Washoe County.

Watershed Assessments

Watershed assessment reports prepared for the Storm Water Committee were completed by Jesch et al. from 2002-2011 that includes Steamboat Creek. These reports provide general watershed descriptions and can be used to track historical changes in creek condition and water quality over time. The reports do not include water quality data.

Hillside Design completed a comprehensive Watershed Assessment for Tributaries to the Truckee River in 2017 for Steamboat Creek in this watershed.

The assessment included:

- Stream reach descriptions with numerous photo points,
- Proper Functioning Condition rating,

- List of restoration and management efforts needed to improve stream conditions, and
- Water chemistry for temperature, pH, specific conductivity, dissolved oxygen, turbidity, and flow.

CDM Smith was contracted in 2015 through 2017 to conduct watershed assessments. The following table lists the report year and the respective drainages and reaches that were assessed in this watershed:

Stream Reaches Addressed in Watershed Assessment Reports in the Washoe Lake HUC-12 Watershed by Report Year			
Stream Name	Lower Reach	Middle Reach	Upper Reach
	2017	2017	2017
Steamboat			X

Watershed Management and Protection Plan for Tributaries to the Truckee River

The Watershed Management and Protection Plan for Tributaries to the Truckee River (NCE, 2020) is an update to the 2003 Watershed Management and Protection Plan for Tributaries to the Truckee River, which has been implemented for more than 15 years by the regional MS4 through the Storm Water Committee. The 2003 plan described an approach for on-going watershed assessment studies and monitoring to protect and improve the water quality in the stream corridors and drainages tributary to the Truckee River. The 2020 Plan update provides a process and framework for identifying, developing, and implementing projects originated through the Storm Water Committee that is consistent with the guidelines for an EPA approved Watershed Management Plan. The 2020 plan by NCE and the 2020 Integrated Source Water and 319(h) Watershed Protection Plan for Public Water Systems and the Truckee River in the Truckee Meadows, are mutually complementary and work together to address the broad scope of potential strategies to improve drinking water and surface water quality in Washoe County.

Water Quality Monitoring

Balance Hydrologics has conducted water quality analyses on tributaries and stormwater outfalls since 2016. The following table lists the report years and the respective drainages that were assessed in this watershed:

Streams Addressed in Stormwater Monitoring Annual Reports in the Washoe Lake HUC-12 Watershed by Report Year			
Stream Name	Entire Reach		
	2016	2017	2018
Steamboat Creek	X	X	X

Truckee Meadows Watershed Protection Manual

This manual contains a Summary of the Watershed Protection Activities and Programs Developed in Conjunction with the Watershed Management Facilitator Scope of Work (Kennedy/Jenks, 2005). This document provides a reference and compendium of the various watershed protection activities and programs that were developed in 2004 and 2005 for Reno, Sparks and Washoe County.

Truckee Meadows Water Authority

The TMWA is responsible for almost all municipal water delivery in the city of Reno, city of Sparks and surrounding Washoe County. TMWA also owns and operates the municipal wells in this watershed. The following program and plans guide the management of these water resources:

- TMWA Water Resource Plan (2016-2035):

  This plan describes water quantity issues and goals for the water resources managed by TMWA. Special focus is placed on changes in future water supply and demand and how those changes will impact the region's water resources. Additionally, this plan provides useful Truckee River watershed information.

- Source Water Quality Assurance Program (2016-2035):

  TMWA's objective is to deliver high-quality potable water to its customers in a cost-effective manner. To achieve this objective, TMWA has established a water quality assurance program. The components that make up the program are source water quality protection, potable water treatment, maintenance of distribution system water quality, and cross connection control.

- Wellhead Protection Plan (2016):

  The purpose of the Wellhead Protection Plan is to protect groundwater that serves as a source for public drinking water supplies. This plan is intended to be a tool used by TMWA to assist in protecting drinking water sources.

Truckee River Fund

TMWA established the Truckee River Fund in 2004 (Truckee River Fund). The purpose of the Fund is to "protect and enhance water quality or water resources of the Truckee River, or its watershed." The Fund provides a way to respond to the requests from outside groups and organizations that are involved in promoting and improving the health of the Truckee River System and watershed. This in turn benefits the primary water source for the community and, in the long run, benefits TMWA customers. For example, The Truckee River Fund has helped finance the following project:

- Washoe Drive Fire Emergency Watershed Stabilization and Restoration Effort (funded 2012):

  This effort focused on remediating damage from the 2012 Washoe Fire. The activities in this effort included typical fire reconstructive efforts such as installation of sediment logs, hydro seeding of slopes, replanting of riparian vegetation, installation of willow waddles and willow stakes, and repairs to drainage systems. Water quality in the watershed has benefited and will continue to benefit from these activities by reducing sedimentation and decreasing the future wildfire potential in the area.

Washoe County

Activities in Washoe County are reviewed according to the Master Plan Planning Areas. The Truckee River watershed includes nine planning areas. The Washoe Lake HUC-12 Watershed is included in the South Valleys planning area. The County has Citizens Advisory Boards (CABs) which provide important community perspectives on local issues to the Washoe County Board of Commissioners. This watershed is within the South Truckee Meadows/Washoe Valley CAB (CAB Boundaries).

The Washoe County Master Plan (2008) has Goals and Policies for Public Services and Facilities, and Open Space and Natural Resource Management. Applicable sections include:

- Article 418, Significant Hydrologic Resources, which regulates development activity within and adjacent to perennial streams to ensure that these resources are protected and enhanced. (Note: this does not apply to the Truckee River)
- Article 420, Storm Drainage Standards, sets forth standards for ensuring that both private and public development provides adequate protection for citizens and property. Therefore, it minimizes and controls erosion and pollution impacts on the natural environment, and additionally minimizes maintenance costs for drainage and flood control systems.
- Article 421, the Storm Water Discharge Program, which protects and enhances the water quality of watercourses, water bodies, groundwater, and wetlands in a manner pursuant to and consistent with the Clean Water Act.
- Article 810, Special Use Permits, which provides a method of reviewing certain uses to determine if they have the potential to adversely affect public facilities in the vicinity.

Washoe County also provides comprehensive services for construction and maintenance roads, landscaping and drainage facilities; county-wide planning and code compliance, and emergency response services for fire and hazardous materials. All of these roles contribute to preserving and improving water quality in the watershed.

Washoe County Health District

The Washoe County Health District has regulatory authority over a wide variety of programs and services in the Truckee Meadows including underground storage tanks, septic systems, all public water systems, domestic wells, water projects and community development, grading permits, solid waste management and emergency preparedness. The Health District regulations are provided in several documents as listed below:

- Regulations of the Washoe County District Board of Health Governing Sewage, Wastewater and Sanitation. These regulations provide the minimum requirements to be followed by any person developing property served by an on-site sewage disposal system. These requirements are promulgated to prevent the spread of disease, protect the water quality of this county, and ensure the on-site sewage disposal systems function properly.
- Regulations of the Washoe County District Board of Health Governing Well Construction. These regulations provide minimum requirements to be followed by any person when drilling and plugging specific kinds of wells. A well construction permit is required to drill a well for consumptive use or monitoring wells. These requirements are primarily promulgated to protect the quantity and quality of the waters of this county from waste and contamination, and to provide public protection by enforcing proper construction and plugging of wells.
- Regulations of the Washoe County District Board of Health Governing Solid Waste Management. These regulations protect water quality through the regulation of municipal solid waste landfills.

Western Regional Water Commission and the Northern Nevada Water Planning Commission

The Western Regional Water Commission (WRWC) focuses on improving water resource planning at the regional level and facilitating coordinated resource management among city of Reno, city of Sparks, Washoe County, TMWA, Truckee Meadows Water Reclamation Facility, South Truckee Meadows GID and Sun Valley GID.

The Northern Nevada Water Planning Commission (NNWPC) is a technical advisory panel that reports to the WRWC. The NNWPC develops and updates a Comprehensive Regional Water Management Plan (RWMP) and makes recommendations to the WRWC for adoption. In addition, the NNWPC develops priorities and an annual budget for the Regional Water Management Fund, also for recommendations to the WRWC.

The Comprehensive Regional Water Management Plan includes several applicable objectives:

- Objective 1.2 Provide for a Sustainable Water Supply and an Acceptable Level of Service to the Community (including protecting groundwater recharge areas).
- Objective 1.3 Implement measures to protect and enhance water quality for a sustainable water supply (including source water protection).
- Objective 2.1 Promote Efficient Use of Resources (Reduction of Non-Point Source Pollution for TMWRF Pollutant Credit).
- Objective 2.2 Manage wastewater for protection and enhancement of water quality.
- Objective 3.1 Effective and integrated watershed management (protection of human health, property, water quality including storm water).

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