Project Profiles

Table of Projects for Web Map

Specific implementation actions have been developed into proposed projects by local stakeholders and are described in these Project Profiles. These Project Profiles include the information needed, to the extent practical, as identified in the EPA guidance for nine critical elements for an endorsable watershed management plan. The projects are listed by the type of action.

Strategies to Protect and Improve Water Quality

Summary of Strategies

Source Water Protection Area Identification and Management

Source Water Protection Area Updates

Education and Outreach

Drinking Water Messages in Watershed Education
One Truckee River Month
Orphan Well Education and Outreach Program
Perennial Tributary Vegetation Resource Guide
Urban River Work Force Team
Watershed Education with Models
I am Truckee River Watershed Educational Video

Interagency Communication

Agency Coordination and Notification
Natural Resource Planning Coordination

Wildfire and Fuel Management

Truckee River Upper Watershed Agency Coordination

Resource Investigation and Planning

Assessment of Desert Soil Leaching Potential
DRASTIC Modeling for Source Water Protection
Individual Sewage Disposal System Solutions
Storm Drain Mapping
Vegetation Management and Restoration Planning

Water Quality Best Management Practices

River Restroom Project Phase II
Tributary Projects

Strategies to Protect and Improve Water Quality

Summary

Strategies to protect and improve water quality were developed for watersheds and source water protection areas (SWPAs) to address water quality concerns. These strategies are combined in this section from the Watershed Profiles and the Watershed Management and Protection Plan for Tributaries to the Truckee River by the Truckee Meadows Stormwater Permit Coordinating Committee for ease of reference.

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 within these areas can potentially 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. A description of how the SWPAs were developed is provided in Link to this SWPA technical document.

There are two types of boundaries: SWPAs and Critical SWPAs as illustrated by this figure: HUC-12 Watershed Overview Protection Areas Figure

Source Water Protection Area

A SWPA represents an area where the community has established a precautionary boundary to safeguard the water quality of its drinking water sources. Within this boundary, education, monitoring, and management of human activities can help protect surface and ground water from becoming contaminated. This includes areas of groundwater capture zones, areas important to aquifer recharge, and areas surrounding surface water. For surface water, there is a 1000-foot buffer from the centerline of the stream, including the Truckee River.

Critical Source Water Protection Area

A Critical SWPA represents the land close to a well or stream where the water quality is potentially more vulnerable to contamination from human activities, and where the community may adopt strategies to protect the quality of their drinking water supply source. This includes the 20-year time of travel for municipal wells and springs or a 750-foot minimum radius for small public water system wells that have not been modeled. There is also a 300-foot buffer from each side of the Truckee River centerline and a 150-foot buffer from the centerline of the perennial streams that are tributary to the Truckee River.

The following strategies 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 support Central Truckee Meadows Remediation District (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.
- Continue to work with Homeowners' Associations regarding source water pollution prevention measures.
- Develop outreach tools for presentations to boards and/or decision makers on the Program, Project Profiles and Procurement of Funding.
- Encourage coordination between landowners and County planners to consider the importance of SWPAs in project reviews.
- Engage residents in caring for their watershed.
- Increase knowledge about household and commercial chemical use, storage, and disposal.
- Increase knowledge of how to protect and preserve the pristine drinking water quality of this watershed.
- 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.
- Prepare training for users of the Flex Viewer (planning, emergency management, etc.)
- Support the Storm Water Committee outreach and education programs.
- Develop and implement a public education program to reduce non-point source pollution.
- Educate the public at annual events (such as Truckee River Clean-up Day, Storm Drain Stenciling, and Earth Day) on tributary-contributing watershed problems, tributary projects, and how to preserve and protect the watershed.
- Provide data from watershed assessments and water quality sampling events.
- Coordinate with partners to improve implementation of watershed and source protection strategies.
- Acquisition of conservation easements.

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), Nevada Division of Environmental Protection (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 major roads, the railroad, and the Reno-Tahoe International 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

Wildfire and Fuel Management

Wildland fire is a threat to water quality; 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:

- Consider expanding groundwater quality monitoring.
- Consider expanding the household hazardous waste collection program.
- Continue research for decreasing mercury in the Steamboat Valley watershed (WRWC, 2017).
- Development and implementation of integrated vegetation management programs.
- Development of the Mt. Rose Water Treatment Plant at Whites Creek.
- Efforts to increase the quantity and quality of groundwater recharge.
- Explore and engage funding sources available for small public water systems to expand monitoring, implement improvements, and develop contingency plans.
- Identify areas where septic systems may be impacting groundwater quality near municipal wells and identify solutions and funding.
- Provide technical assistance to host regular Team meetings (i.e. annually) to ensure this Plan is up to date including a list of active Team members.
- Research how to identify private wells that present a groundwater contamination risk and that might need to be repaired or abandoned.
- Research the potential for irrigation and seepage through desert soils to contribute to nitrate in groundwater.
- Research to assist federal and local agencies in managing for fire risk.
- Research to identify non-point pollutant sources in the watershed and options for treatment.
- Support existing and future groundwater sampling efforts in SWPAs for incorporation into GIS databases, ongoing or new groundwater studies, etc. (private wells in domestic and agricultural areas).
- Support Infrastructure Projects (green and gray) that will enhance SWPAs and focus on pollution prevention (i.e. well closure, well upgrades such as sanitary seal, fencing, and security).
- Water quality improvement planning for tributaries to the Truckee River.

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:

- Erosion reduction and sediment control measures.
- Fertilizer and pesticide management plans for irrigated green spaces.
- Invasive weed removal and integrated vegetation management for creek stabilization.
- Nutrient management measures for irrigated green spaces.
- Pet waste cleanup initiatives.
- Physical improvements prioritized in SWPAs for water quality improvement and protection.
- Proper abandonment of unused/orphaned wells.
- Recommendations in the tributary assessments.
- Support septic to sewer conversions.
- Water quality improvement projects.

Physical Improvements

Stakeholders may consider implementing physical improvements that may improve and prevent degradation to water quality resources:

- Implement channel restoration and stabilization such as:
  - Restore low flow channel
  - Reshape and stabilize channel banks
  - Restore channel floodplain
  - Control head-cut erosion
  - Design and implement erosion control projects
  - Improve sinuosity
  - Restore riparian vegetation
- Develop and enforce land use management such as:
  - Create riparian vegetation buffers
  - Control encroachment of development into riparian areas
  - Control impacts from vehicle/road encroachment
  - Reduce livestock impacts
  - Prohibit stockpiling of manure
  - Sweep streets
  - Waste management and reduction
- Implement integrated vegetation management practices such as:
  - Control invasive weeds
  - Restore upland vegetation
  - Remove litter debris
  - Reduce lawn care chemicals
  - Limit herbicide use
- Implement stormwater management actions such as:
  - Manage and/or treat stormwater runoff
  - Attenuate stormwater runoff
  - Design, construct, and maintain stormwater treatment basins
  - Enforce construction site BMPs
  - Reduce flooding to nearby street(s)
  - Replace culvert(s)

Project Profile

Source Water Protection Area Updates

Overview

Site Location Description	Updating Source Water Protection Areas within the Truckee River Watershed
Primary Contact	TBD

Part A: General Description

Groundwater Basin, #

All groundwater basins in Washoe County with Public Water Systems. Basins include but are not limited to:

- Spanish Springs Valley #085
- Sun Valley #086
- Truckee Meadows #087
- Pleasant Valley #088
- Washoe Valley #089
- Truckee Canyon Segment #091
- Lemmon Valley West #092A
- Lemmon Valley East #92B
- Cold Spring Valley #100
- Long Valley #100A

Tributary Name, HUC-12 Name, #

All watersheds in Washoe County in the Truckee Meadows area:

- Bull Ranch-Truckee River #160501020504
- Dog Creek-Truckee River #160501020503
- Dry Creek #160501020507
- Evans Creek-Truckee River #160501020508
- Franktown Creek-Frontal Washoe Lake #160501020301
- Galena Creek #160501020303
- Hidden Valley-Steamboat Creek #160501020304
- Hunter Creek-Truckee River #160501020505
- Peavine Creek-Truckee River #160501020506
- Steamboat Valley-Steamboat Creek #160501020306
- Thomas Creek #160501020305
- Washoe Lake #160501020302

PART A: GENERAL DESCRIPTION - *continued*

Source Water Protection Area

A Source Water Protection Area (SWPA) is a locally established management area surrounding a surface water or groundwater resource that supplies water for public consumption within Washoe County. Activities in these buffer areas can affect the quality of water downstream or underground. SWPAs and Critical SWPAs can be reviewed online using the local source water and watershed protection webtool at the following link: SWPAs and Critical SWPAs Webtool

All SWPAs in Washoe County are a focus for this coordination action, with particular concentration on mapping newly developed SWPAs in the watershed as they are realized.

Problem Statement and Causes of Pollution [a, c]

Preserving and protecting water sources with the quality and quantity to provide public drinking water are a high priority for communities in Washoe County. A multi-jurisdictional approach to balance the needs for public health, wildlife, stormwater control, flood control and other values associated with both groundwater and surface water is required. A main component of this approach is to provide an interactive, living map that shows where SWPAs and Critical SWPAs are located.

Project Summary

This Project will update the database detailing the location of SWPAs and Critical SWPAs as new water resources are brought online. Keeping the Webtool current provides information to the Washoe County community to avoid water pollution and disturbance in sensitive areas, specifically source water protection areas.

Reference Plan Implementation or Priority

- Truckee Meadows Water Authority 2020-2040 Water Resources Plan, 2020, Chapter 6 protecting the Watershed and the Environment
- Comprehensive Regional Water Management Plan, 2016-2015 Update.

PART B: PROJECT DETAILS

Project Goals and Tasks

The goal of this project is to provide SWPA information that is both accessible and current. The following tasks support this goal and provide the framework for keeping the Webtool up to date.

1) At minimum, review both SWPAs and Critical SWPAs annually to determine if any revisions need to be made to the Webtool.
2) Encourage communication on Webtool alterations to create the most accurate depiction of the SWPAs.
3) Provide technical review and comment to new mapping during partner review and development.
4) The Webtool should be considered a living resource by all partners that make alterations, in order to keep it as accurate as possible.

Pollutant Load Reductions Anticipated [b]

Load reductions will be realized through accurate mapping representations and alterations inherent in this proposed project.

PART B: PROJECT DETAILS - *continued*

Project Lead [f] and Partners

To be Determined (Project Lead)

Partners who will be requested in this Project include:

- City of Reno
- City of Sparks
- Washoe County
- Washoe County Health District
- Western Regional Water Commission
- Truckee Meadows Regional Planning Agency
- Truckee Meadows Flood Management District
- Truckee Meadows Storm Water Permit Coordinating Committee
- Resource Concepts, Inc.
- NDEP, Integrated Source Water Protection Program
- NDEP, 319(h) NPS Program
- Water purveyors in Washoe County

Monitoring and Evaluation with Criteria to Measure Goal Progress [h]

This project will increase the available information on both Critical SWPAs and SWPAs. This will be accomplished through updates to the Webtool that accurately represent the SWPAs. The progress of this project will be evaluated over time by the partners involved in the Webtool updates.

Information and Education [e]

Continuing communication between the appropriate partners regarding the need for accurate SWPA representation will be essential for this project. This will align with current education goals on water quality and water resource management, an integral piece of the Watershed Protection Plan.

Technical and Financial Assistance Needed [d]

Technical and financial assistance might be needed from NDEP and the various jurisdictions, including TMWA and TMRPA. Financial Assistance may be required to support Webtool alterations.

EPA Element	Description
a	Estimate the significant point and nonpoint sources, in addition to the natural background levels that make up the pollutant loads causing the problems in the watershed
b	Estimate load reductions expected from action
c	The nonpoint source management measures needed to achieve load reductions and the critical areas
d	Estimate the technical and financial assistance needed, with costs, match
e	Information and education component
f	Schedule implementing the measures
g	Interim measurable milestones for determining if the actions are being implemented
h	Criteria to determine if load reductions are being achieved
i	Monitoring to evaluate the effectiveness of the implementation efforts over time

REFERENCES

City of Reno, Reimagine Reno, The Master Plan, Goals and Policies GP 7.1D, IMP-7.1h & 7.1i, 2017. Available at: Reimagine Reno

City of Sparks, Sparks Comprehensive Plan 2030, Resiliency and Conservation Goals and Policies, Policy RC5, 2016. Available at: City of Sparks Master Plan 2016

NDEP BWQP, Nevada Division of Environmental Protection, 2016-2018. Nevada 2016-2018 Water Quality Integrated Report

Truckee Meadows Water Authority, DRAFT 2020-2040 Water Resources Plan, Chapter 6 protecting the Watershed and the Environment, Recommendation 2.6, 2020. Available at: TMWA Draft 2020-40 WRP.pdf

Washoe County, Washoe County Master Plan, Water Resources, Conservation and Open Space, Open Space and Natural Resources Management Plan, Goal 3.32008, 2008. Available at: Washoe County Management Plan 2008

Project Profile

Drinking Water Messages in Watershed Education

OVERVIEW

Site Location Description	Watershed Educational Entities in Washoe County
Primary Contact	TBD

PART A: GENERAL DESCRIPTION

Groundwater Basin, #

All groundwater basins in the Truckee Meadows area:

- Spanish Springs Valley #085
- Sun Valley #086
- Truckee Meadows #087
- Pleasant Valley #088
- Washoe Valley #089
- Truckee Canyon Segment #091

Tributary Name, HUC-12 Name, #

All watersheds within Washoe County in the Truckee Meadows area:

- Bull Ranch-Truckee River #160501020504
- Dog Creek-Truckee River #160501020503
- Dry Creek #160501020507
- Evans Creek-Truckee River #160501020508
- Franktown Creek-Frontal Washoe Lake #160501020301
- Galena Creek #160501020303
- Hidden Valley-Steamboat Creek #160501020304
- Hunter Creek-Truckee River #160501020505
- Peavine Creek-Truckee River #160501020506
- Steamboat Valley-Steamboat Creek #160501020306
- Thomas Creek #160501020305
- Washoe Lake #160501020302

Source Water Protection Area

A Source Water Protection Area (SWPA) is a management area surrounding a surface water or groundwater resource that supplies water for public consumption. A SWPA provides a buffer around the Truckee River included in this Project, as well as other perennial tributaries within the HUC-12s. Activities in these buffer areas can affect the quality of water downstream or underground. See HUC-12 Watershed Overview Protection Areas Figure.

There are two types of SWPA buffers that surround the Truckee River; they are distinguished by the size of the buffers. Critical SWPAs represent areas closer to perennial rivers, streams, and tributaries (SWPAs and Critical SWPAs Webtool).

PART A: GENERAL DESCRIPTION - *continued*

Problem Statement and Causes of Pollution [a, c]

There are numerous watershed education programs in Washoe County for the general public. These programs often include the water cycle and the biological aspects of the local watershed. In these presentations, the educational message is focused on protecting the environment, wildlife and fish to enhance the functions of the watershed. There is a need to correlate between the watershed and our sources of drinking water. Protecting drinking water is an educational message that is universal and clean drinking water is a priority for everyone.

The Truckee Meadows Water Authority (TMWA) is the leading water utility in Washoe County and is overseen by a Board comprised of elected officials from the City of Reno, Sparks, and Washoe County. TMWA is responsible for supplying water to 425,000 residents in the Truckee Meadows watersheds and is familiar with water treatment and distribution. The goal for this Project is to include source water protection and drinking water messages into existing watershed education programs.

Project Summary

The project lead will collaborate with educational entities to provide a drinking water message that may be incorporated with existing watershed education.

Reference Plan Implementation or Priority

- 2020 Source Water and 319(h) Watershed Protection Plan
- One Truckee River Management Plan, Phase I objective 2.3.j, and objectives 3.1 and 3.2 to create an aware and engaged community that protects and cares for the river.
- One Truckee River. *Watershed Education Plan*

PART B: PROJECT DETAILS

Project Goals and Tasks

The overall goal of this Project is to include drinking water messages for residents and youth in existing watershed educational programs. Existing watershed programs focus on the biological aspects of protecting surface and ground water.

Educational entities such as Sierra Nevada Journeys, Keep Truckee Meadows Beautiful, and OTR have public education programs regarding the Truckee Meadows watersheds. Adding where our sources of water are in the watershed, what treatments and transportation systems are involved with providing clean drinking water, what is the cost of doing this, where does this treated water get used, and what is the quality of the water we drink in the Truckee Meadows could be included in the drinking water protection messages. Combining a drinking water message with watershed education will expand the audience and focus group, which in turn will greatly benefit the watersheds and source water protection areas.

TMWA has informative resources regarding local drinking water sources, water quality, and treatment on their webpage. With the expertise of this leading water utility agency, accurate and detailed information can reach the public, youth and adults, through this Project.

PART B: PROJECT DETAILS - *continued*

Project Goals and Tasks *(continued)*

Goals:

- Meet with TMWA to discuss the best approach to providing the drinking water messages by either developing a way to inform educational entities about how to get a drinking water message into their existing watershed education programs or hiring an individual, a drinking water ambassador, to convey this message.
- Outline topics and discussions of the drinking water message. Determine how to present it to the public and what the message will look like.
- Research which educational entities have watershed programs and what each one looks like. Discuss ways to include a drinking water message.
- Communicate with teachers and organizations to utilize the watershed programs and incorporate a unique drinking water message.
- Schedule and plan when the presentations could occur.

Collaborate with educational organizations to present drinking water messages.

Estimated Existing Loads and Sources [a]

Source Water Protection education is about preventing future problems to drinking sources. This can save time and expenses from remediation of surface and groundwater contamination. Incorporation of drinking water protection into watershed stewardship will help to preserve and protect water quality.

Milestones, [g] **Schedule** [f] **and Cost Estimate** [d]

The following table summarizes the cost estimate and explains each task involved in the Project, the hours and rates. The table outlines two approaches for this Project: develop a way to inform educational entities about how to get a drinking water message into existing watershed education programs or hire an individual, a drinking water ambassador, to convey this message. Both approaches are quantified in the budget in Table 1.

	Time Frame	Tributaries Budget Estimate Tasks	Item	#	Unit	Rate	Subtotal
1	Month 1 to 3	Meet with TMWA to discuss the best approach to providing the drinking water messages	Vision	20	hours	$100	$2,000
2	Month 1 to 3	Outline topics and discussions of the drinking water message. Determine how to present it to the public and what the message will look like.	Gather information from TMWA	40	hours	$85	$3,400
3	Month 3 to 6	Research which educational entities have watershed programs and what each one looks like. Discuss ways to include a drinking water message.	Research existing watershed programs	20	hours	$100	$2,000
4	Month 3 to 6	Communicate with educational organizations to incorporate a unique drinking water message.	Coordinate with educational organizations	40	hours	$100	$4,000
5	Month 3 to 6	Schedule and plan when the presentations could occur.	Planning	10	hours	$85	$850
6*	Begin month 6 and continue yearly visiting each school/entity according to their planned schedule.	Collaborate with educational organizations to present drinking water message.	Presentation Hours and Travel Time	28	hours	$85	$2,380
6	Alternatively, month 6 to 9	Train the educational organizations the drinking water message presentation to share with the public.	Training	42	hours	$100	$4,200
				6*		**Total**	**$14,630**
				6		**Total**	**$16,450**

PART B: PROJECT DETAILS - *continued*

Pollutant Load Reductions Anticipated [b]

This Project will not directly quantify pollutant load reductions; however, it will spread awareness and develop a direct connection to the public. Clean drinking water is important to everyone and this message will reach a larger focus group and in turn they will also learn about the other aspects of their local watersheds. By educating the public and students about ways to reduce means of contamination to their drinking water and preserving nearby water sources we may prevent future contamination.

Project Lead [f] and Partners

Project Lead:

- TBD

Potential Partners:

- Friends of Nevada Wilderness
- Keep Truckee Meadows Beautiful
- NDEP Bureau of Safe Drinking Water and Bureau of Water Quality Planning
- Nevada Land Trust
- Sierra Nevada Journeys
- The Discovery-Terry Lee Wells Nevada Discovery Museum
- Truckee Meadows Parks Foundation
- Truckee Meadows Water Authority

Monitoring and Evaluation with Criteria to measure progress toward meeting watershed goals [h]

The lead on this Project with work with TMWA to propose the topics to be discussed in the drinking water message. They will coordinate with educators and find an approach to presenting the drinking water message with other watershed programs. If necessary, they will hire an individual to routinely visit these organizations to present about drinking water or they will train watershed educators to fit the drinking water message into their own program. If a drinking water ambassador is hired, then they will routinely visit educational organizations to collaborate with their watershed presentations.

Information and Education [e]

Public outreach and education are the primary goal of the Project. The purpose of the Project is to educate students and the public in Washoe County about drinking water in Washoe County.

Once the presentations are outlined and presented, the information will continue to improve by learning from the questions asked by students and the public.

Technical and Financial Assistance needed [d]

Technical and financial assistance will be needed. TMWA is the leading water utility in Washoe County and a good representative for knowledge of treatment and quality of local water sources. The various potential partners are familiar with presenting to students and the public and are familiar with interactive ways to engage these groups. Their expertise will be needed in developing an effective way to inform about drinking water.

Collaboration between OTR, TMWA and Washoe County educational organizations will be essential for the effectiveness of this Project.

Additional financial assistance needed is detailed under the Milestones, Schedule, and Cost Estimate section.

EPA Element	Description
a	Estimate the significant point and nonpoint sources in addition to the natural background levels that make up the pollutant loads causing the problems in the watershed
b	Estimate load reductions expected from action
c	The nonpoint source management measures needed to achieve load reductions and the critical areas
d	Estimate the technical and financial assistance needed, with costs, match
e	Information and education component
f	Schedule implementing the measures
g	Interim measurable milestones for determining if the actions are being implemented
h	Criteria to determine if load reductions are being achieved
i	Monitoring to evaluate the effectiveness of the implementation efforts over time

REFERENCES

One Truckee River. Proposal Vegetation Management and Restoration Planning. Submitted November 19th, 2019. One Truckee River Management Plan, Phase I, 2017

One Truckee River. Watershed Education Plan. OTR Watershed Education Plan, 2019

Project Profile

One Truckee River Month

OVERVIEW

Site Location Description	Truckee River Corridor in Washoe County
Primary Contact	Iris Jehle-Peppard One Truckee River Executive Director (775) 450-5489 iris@onetruckeeriver.org

PART A: GENERAL DESCRIPTION

Groundwater Basin, #

- Truckee Meadows #087

HUC-12 Name, #

- Evans Creek-Truckee River #160501020508
- Peavine Creek-Truckee River #160501020506

Source Water Protection Area

A Source Water Protection Area (SWPA) is a management area surrounding a surface water or groundwater resource that supplies water for public consumption. A SWPA provides a buffer around the Truckee River included in this Project, as well as other perennial tributaries within the HUC-12s. Activities in these buffer areas can affect the quality of water downstream or underground. See HUC-12 Watershed Overview Protection Areas Figure

There are two types of SWPA buffers that surround the Truckee River, they are distinguished by the size of the buffers. Critical SWPAs represent areas closer to perennial rivers, streams, and tributaries. The Truckee River SWPA buffers include a 1,000-foot buffer on both sides of the river and a critical SWPA buffer for 300 feet on each side of the river (SWPAs and Critical SWPAs Webtool).

The Truckee River corridor in Washoe County encompasses this Project area. The Truckee River specifically is within a Critical SWPA.

Problem Statement and Causes of Pollution [a, c]

The overarching goal of Truckee River Month, hereafter referred to as the Project, is to increase community involvement with the Truckee River, while also spreading awareness of how people can help keep it pollution free. This includes reducing urban area runoff and litter in the Truckee River through fun, interactive information and education. In doing so, One Truckee River (OTR) will achieve their vision to provide a cleaner, safer, and healthier river environment. Over time, more community engagement will benefit the river and the environment by transforming it into a healthier water source. This Project aligns closely with the specific goals and objectives in OTR's *Nine Highest Priority Action Items* which is a living document that evolves as new problems and priorities are identified.

PART A: GENERAL DESCRIPTION - *continued*

Problem Statement and Causes of Pollution [a, c] *(continued)*

In order to create and sustain a safe, beautiful and accessible river connecting people and places, priority action items are outlined. One of these items is to enhance cleanliness and access to the river, detailed as *Action Item 2.1.e. Enhance Truckee River visitor safety, access, public facilities (bathrooms) and education*. Partners who are engaged in this Project are:

- Truckee Meadows Water Authority
- Truckee River Fund
- Washoe County Parks and Open Space
- Washoe County Health District
- Renown Health
- Nevada Land Trust
- Nevada Division of Environmental Protection (NDEP)
- City of Reno

There are several pollution concerns that will be brought to the community's attention through public education and involvement in the Project. Specifically, trash pollution and urban area runoff have caused an influx of trash in and along the Truckee River.

The urban area runoff that poses the biggest problem to both groundwater and the river comes from household hazardous waste. This includes pesticides, fertilizers, prescription drugs, paint, solvents, cleaning agents, and other chemicals that are commonly used in homes and gardens. Improper use or disposal of the chemicals has the potential to impact water quality. By increasing public awareness through this Project, OTR expects that the impact on the Truckee River from this waste will decrease over time.

Additionally, illegal trash dumping sites and single-occurrence littering have increased the amount of garbage in and along the river. Trash in and along the Truckee River can impact water quality as well as the aesthetic value for the community. OTR hopes that by increasing community engagement, this Project will help reduce littering.

Addressing these issues requires innovative actions that involve the community to create a sense of pride for the river among Truckee Meadows residents. Part of finding a solution is to provide a more community friendly environment along the riverbank in order to dissuade use of the Truckee River as a trash or hazardous waste dumping site. This will increase community pride for and usage of the river, which will align with OTR's mission "to ensure a healthy, thriving, sustainable river connected to the hearts and minds of its community."

Project Summary

OTR works with the community to increase public awareness and engagement with the river. In 2018, the inaugural OTR Month inspired locals and visitors to participate in healthy and educational river-focused activities throughout the month of May. Now named Truckee River Month, the Project celebrates the river throughout the month of May, featuring free and low-cost events each day about, around, and on the Truckee River. These activities range from walking tours and running races, to Pilates and yoga classes, to learning experiences, art activities, history talks, community clean-ups, food, fun and more. The goal is to connect more people to the river, creating a healthier and more connected community, in addition to a healthier river in the process.

PART A: GENERAL DESCRIPTION - *continued*

Project Summary *(continued)*

The Truckee River has a long history of pollution, litter, and uses that damage the river ecology and water quality. Actions are needed to involve the community and effectuate changes for positive impacts to the river. Some of these actions are physical, like trash pick-up, while others focus on outreach and education, like the walking tours hosted in 2019. OTR intends to make the connection between the community's actions at home and the effect those actions have on the river. For example, explaining how hazardous waste infiltrates the ground and travels to the river will help people make responsible decisions in favor of Truckee River health.

By engaging the community in activities that are fun and beneficial, OTR hopes that more people will be active in keeping it healthy. Education and outreach are essential to the success of this Project. By having the community participate in positive events like the annual kickoff, OTR hopes that more volunteers will also be interested in helping with activities like trash cleanups and hosting family oriented small events along the river. Over time, these efforts will reduce pollution in the river.

Reference Plan Implementation or Priority

- One Truckee River Management Plan, Phase I
- One Truckee River Watershed Education Plan

PART B: PROJECT DETAILS

Project Goals and Tasks

The goal of this Project is to increase community engagement and thus, create a fun, healthy, and welcoming Truckee River environment. The River is intertwined throughout the city of Reno, city of Sparks, and Washoe County and involves a large community and cultural footprint. OTR hopes that by including the public in more events, they will take an active role in the management and maintenance of the river. It is crucial for the community to recognize that actions within their own homes influence the Truckee River's water quality. Education about properly disposing of hazardous materials and trash is important to the success of the Project.

Meaningful changes in the community takes many people and volunteers. One of OTR's *Nine Highest Priority Action Items* is to create and sustain a safe, beautiful and accessible river connecting people and places. The Project is a relatively new event and is evolving every year as OTR discovers which events and activities have the highest success within the Truckee Meadows community. Past activities include a River Walk, Keep Truckee Meadows Beautiful River Clean-Up, festivals, and historical tours. These methods have accomplished more public engagement and increased community pride and knowledge within the region.

The goals for this Project are community engagement and change in behavior. Achievement of the following items is anticipated:

- Increased Community Involvement: The Project tracks how many people attend every year to gauge the success of the events and activities. By getting more people involved, there will be an increased sense of pride, responsibility, and excitement within the community for the management and maintenance of the Truckee River. More involvement will also encourage people to change their practices when it comes to waste removal, due to education and seeing their neighbors make the right choices.

PART B: PROJECT DETAILS - *continued*

Project Goals and Tasks *(continued)*

- Increased Community and Truckee River Health: A growing body of evidence supports the idea that access to nature and wildlife is essential to the physical and emotional well-being of residents in urban areas. Access to natural environments also correlates with improved physical health and improved health for people with certain medical conditions. By getting the community closer to the river, they will begin to care for its health and appearance as well. Water quality will improve as residents take an active role in caring for the Truckee River.
- Decreased Trash Pollution: As trash clean-ups continue and more people in the community become active in litter control, trash quantities will decrease along the river. This will improve the aesthetic value of the area and general health of the Truckee River. This will also promote a sense of pride in both the river and the Truckee Meadows community.

Estimated Existing Loads and Sources [(a)]

Typical litter such as paper, plastic, and general trash from urban areas is commonly found in the river and varies depending on multiple factors. However, it is recognized that litter and trash dumping increases in the summer months. Once trash is dumped in a specific spot, more people use it as a dumping site since they are under the assumption that if someone else is doing it then continuing to litter will go unnoticed. Observations by the Downtown Reno Partnership Ambassadors and OTR indicate that certain areas along the river are more commonly found to be polluted by litter.

Most pollution in the Truckee River is from non-point sources in the surrounding community.

Milestones [(g)], Schedule [(f)] and Cost Estimate [(d)]

The types of assistance needed for the Project varies with the individual events and activities held during the Project. Some actions rely more on technical assistance while other activities have specific funding needs, although most need some degree of both financial and technical assistance. For example, kayak river tours require tour guides, marketing, and rental infrastructure. This involves both funding and technical assistance. Specific cost estimates are different annually due to the various activities that take place. However, it is realistic to budget approximately $16,000-$17,000 annually.

The schedule for implementing the Project begins with planning the events and activities which will be taking place, building on the successes and lessons learned from the prior year. Truckee River Month has been held during the month of May since its beginning in 2018. Coordination between partners, volunteers, and the community is pivotal to scheduling. Additionally, funding requirements and capabilities are assessed to help determine the most efficient way to channel financial resources.

Determining measurable milestones to monitor the success of the Project involves visible monitoring techniques and considering annual feedback evaluations. Increasing attendance is a key milestone that will be monitored annually.

PART B: PROJECT DETAILS - *continued*

Pollutant Load Reductions Anticipated [b]

To assess impacts to load reductions, visual observations will be recorded. A majority of the pollution that this Project aims to reduce is litter within and along the river, which is highly visible. This qualitative monitoring will rely on the recorded observations of both the public and the River Ambassador(s). This Project will also reduce the amount of trash dump sites along the river. Currently, the number of trash dump sites is highly variable, as is the unsheltered population along the river.

The general targets for the Project are described in the following bullets:

- Increased Community Involvement: The first target for this Project is to increase the amount of people involved with the Truckee River. By monitoring the number of attendees at events and activities annually, OTR will be able to assess what works best for the Reno community. Additionally, attendee feedback and continued involvement through the years will be instrumental in gauging the success of the Project.
- Increased Public Education: This target pertains to events that are focused on more public education regarding pollution. The Project will create activities and events that encourage the Truckee Meadows community to dispose of their hazardous waste and trash responsibly. Once these activities are accepted and have reached a large group of people, responsible practices will increase, and pollutant loads will decrease.
- Data Tracking: This Project relies on the existing data gathering network by the River Ambassadors, Desert Research Institute (DRI), and the NDEP. Ideally, this target will reflect a positive impact on water quality over time; although OTR recognizes that it will take some time for these numbers to reflect the change as the community becomes more active along the river, the ambassador outreaches specifically to the transient community, and trash dumping sites are reduced.

Project Lead [f] and Partners

Project Lead: One Truckee River

Project Partners:

- Keep Truckee Meadows Beautiful
- Renown

Monitoring and Evaluation with Criteria to Measure Goal Progress [h]

Monitoring the success of the Project will largely be based on public response and engagement, which will be gathered by OTR and the appropriate partners. By assessing which activities have the most attendance, collecting attendee feedback, volunteer observations, and professional experiences, OTR will have an accurate evaluation of which outreach efforts are most successful within the Reno community. Through these efforts, OTR can adapt the activities and events that occur annually to better educate the public.

The following criteria should be used as a guide to determine if load reductions are being achieved:

- Data Evaluation: As data becomes available, OTR will compare the information annually. This will be an effective way to evaluate if increased community usage of the river is reducing the amount of hazardous materials and trash in the water.

PART B: PROJECT DETAILS - *continued*

Monitoring and Evaluation with Criteria to Measure Goal Progress [h] *(continued)*

- Community Input: Due to the qualitative nature of the Project, public observations from the general community and the transient community will be essential to its success. By listening to the community and reviewing what is working and what is not, OTR will be able to better manage activities and events to reduce both garbage and urban area runoff during Truckee River Month. Over time, this input will increase community awareness and achieve a cleaner and safer river.

Participation data was gathered for each event during 2019. Sign-in sheets were provided for events that supported data-gathering or reporting protocol. A survey was sent to all participating businesses, agencies, and parties to evaluate the success of each event. Information gathered was and will continue to be used to improve future Truckee River Months by helping OTR support event hosts in the best way possible.

Truckee River Month 2020 was celebrated through a virtual format due to the COVID-19 pandemic and the directive that people stay home. Virtual events, community education, facts about the river, and ways for the public to share their experiences with the natural environment were offered through social media. Participation was tracked electronically.

For future Truckee River Months, OTR's vision for success consists of greater numbers of community members enjoying and benefiting from the Truckee River. Organizers hope to see greater levels of participation in river-based activities, greater understanding of the effects of individual choices, a greater sense of connection to the river, and responsibility for keeping it healthy. By continuing to monitor the number of people who attend specific events, OTR will evaluate which activities have the biggest turn-out and impact. The impact will be evaluated visually over time but may also be monitored through surveys that inquire how events and activities have changed the public's waste disposal practices in their own home.

Information and Education [e]

Information and education are integral parts of this Project. Activities and events during the month of May will increase public knowledge in an entertaining setting. Information will be and has been available throughout all of May and distributed by OTR annually since 2018. By having professionals available during fun experiences, the community will have a positive event that is correlated with increased public action on behalf of the river.

Additionally, increasing the awareness of pollution issues in the Truckee River and how the community can help, will bring more people to the river for recreational usage. The community will become aware that more eyes along the river will result in a cleaner environment that encourages people not to throw their trash away along the riverbanks. Additionally, fostering a sense of community surrounding the river will create incentive for the Truckee Meadows community to dispose of their hazardous materials responsibly. By educating the public through the Project, pollution sources will be better understood and stopped over time. Engagement is essential to start bringing more desirable activities to the river.

PART B: PROJECT DETAILS - *continued*

Information and Education [e] *(continued)*

For example, when OTR hosts river tours and walks, the Reno community gets a hands-on experience while also being educated about the challenges that need to be overcome. This entire Project has been organized to educate and inform the public on how they can help keep the Truckee River healthy. A growing body of evidence shows that access to nature and wildlife is essential to the physical and emotional well-being of residents in urban areas, which is a pivotal idea behind the Project.

Technical and Financial Assistance Needed [d]

The technical and financial assistance needed for this Project varies annually depending on what the specific needs are of the community and the Truckee River. For 2021, OTR's annual budget for Truckee River Month breaks down accordingly:

2021 Estimated Expenses	Pending WRWC Support	Renown Health Request	Total Budget
Staff			
Partnership Director *(5% time as an independent contractor for 5 months)*	$2,800		$2,800
Outreach Coordinator *(50% time as an employee for 5 months)*	$4,000		$4,000
Staff Sub-total:	**$6,800**		**$6,800**
Outreach Costs			
Educational items		$4,500	$4,500
Social media ads		$1,500	$1,500
Radio ads		$2,000	$2,000
Outreach Costs Sub-total:		**$8,000**	**$8,000**
Total Direct Expenses: *(Includes staff and outreach costs)*	**$6,800**	**$8,000**	**$14,800**
Indirect Expenses at 10%: *(Includes printing and reproductions, postage, supplies, payroll services, and insurance)*	**$680**	**$800**	**$1,480**
Total Direct and Indirect Expense:	**$7,480**	**$8,800**	**$16,280**

Note: It should be noted that these estimates rely on the projected assistance and potential costs. Additional funding would be a benefit to the events and activities and would be used accordingly.

EPA Element	Description
a	Estimate the significant point and nonpoint sources, in addition to the natural background levels that make up the pollutant loads causing the problems in the watershed
b	Estimate load reductions expected from action
c	The nonpoint source management measures needed to achieve load reductions and the critical areas
d	Estimate the technical and financial assistance needed, with costs, match
e	Information and education component
f	Schedule implementing the measures
g	Interim measurable milestones for determining if the actions are being implemented
h	Criteria to determine if load reductions are being achieved
i	Monitoring to evaluate the effectiveness of the implementation efforts over time

REFERENCES

Downtown Reno Partnership. Website. Accessed online 3/4/2020. Available at: Downtown Reno Partnership - Website

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One Truckee River. Watershed Education Plan. OTR Watershed Education Plan, 2019

Project Profile

Orphan Well Education and Outreach Program

OVERVIEW

Site Location Description	Washoe County
Primary Contact	Project Lead: To Be Determined Project Partners who may be engaged in this Project are: • Nevada Division of Water Resources • Nevada Division of Environmental Protection • Truckee Meadows Water Authority • Truckee Meadows Regional Planning Agency

PART A: GENERAL DESCRIPTION

Groundwater Basin, #	All groundwater basins in Washoe County in the Truckee Meadows area: • Spanish Springs Valley #085 • Sun Valley #086 • Truckee Meadows #087 • Pleasant Valley #088 • Washoe Valley #089 • Truckee Canyon Segment #091
HUC-12 Name, #	All watersheds in Washoe County in the Truckee Meadows area: • Bull Ranch- Truckee River #160501020504 • Dog Creek-Truckee River #160501020503 • Dry Creek #160501020507 • Evans Creek-Truckee River #160501020508 • Franktown Creek-Frontal Washoe Lake #160501020301 • Galena Creek #160501020303 • Hidden Valley-Steamboat Creek #160501020304 • Hunter Creek-Truckee River #160501020505 • Peavine Creek- Truckee River #160501020506 • Steamboat Valley-Steamboat Creek #160501020306 • Thomas Creek #160501020305 • Washoe Lake #160501020302

PART A: GENERAL DESCRIPTION - *continued*

Source Water Protection Area

A Source Water Protection Area (SWPA), is a management area surrounding a surface water or groundwater resource that supplies water for public consumption. A SWPA provides a buffer around the perennial tributaries to safeguard these drinking water sources within the HUC-12s included in this Project. Activities in these buffer areas can affect the quality of water downstream or underground. See HUC-12 Watershed Overview Protection Areas Figure.

There are two types of SWPA buffers that surround the perennial tributaries; they are distinguished by their size. Critical SWPAs represent areas closer to rivers, tributaries and public water system wells (Source Water and Watershed Protection Web Map).

Problem Statement and Causes of Pollution [a, c]

Wells that are no longer in use are called orphan wells. These wells can be a conduit for pollution to groundwater if they are not capped, locked or properly "abandoned". Groundwater quality may be compromised by contamination through illegal dumping and vandalizing of the well, including potential exposure to pesticides, fertilizers, and other contaminants.

An orphan well is typically an old unused well that has not been plugged and properly decommissioned. Private landowners may or may not be aware of an orphan well, a well that is no longer in use and has not yet been abandoned, on their property. These wells could be a safety hazard for small animals and children that could fall in the well. Therefore, it is required by regulation and the property owner's responsibility to properly abandon a well.

The Washoe County Health District Well Construction regulations describe specific requirements for abandonment. Proper well abandonment can be costly and is dependent on the depth and diameter of the well, the geology of the area, accessibility to the well, and the well condition (NGWA, 2017). Despite being required by regulation, property owners may be reluctant to abandon wells because it is expensive.

Locating these wells can be difficult due to the lack of precision of recorded drilled well locations and historical changes made to the property. In addition, water rights associated with the well must be considered.

Project Summary

It is important to inform landowners, who have the potential to have an orphan well on their property, about how to locate an unused well and why it is important to have the well properly plugged.

Researching the general location of orphan wells in Washoe County is the first step to targeting these landowners who potentially have orphan wells in order to prevent the degradation of ground water quality especially in high priority areas such as SWPAs.

The following three criteria can assist in narrowing down high priority areas where orphan wells are located:

1) Orphan wells in Critical SWPAs
2) Orphan wells in SWPAs
3) Historical and current areas of agriculture land; this may include areas with irrigation ditches
4) Locations with historically high septic system density and that previously had domestic wells but are now served by a municipal water system.

PART A: GENERAL DESCRIPTION - *continued*

Project Summary *(continued)*

Areas with past agricultural use or that have had septic systems and wells in the past, may become developed over time and brought on to public water systems leaving orphan wells behind, unused, and vulnerable to contamination. Orphan wells are vessels for groundwater contamination from pollutants from surface water.
This Project will involve locating areas where orphan wells may potentially be found, so these landowners can be prioritized for outreach and education. The outreach and education program will help inform these landowners about what an orphan well is and how to find it on their property, explain that properly abandoning or protecting the well will protect their health, safety and help to prevent groundwater contamination in the aquifer. The local regulations regarding well abandonment requirements will also be provided with contact information for reputable well closure companies.

Reference Plan Implementation or Priority

- One Truckee River Plan, Phase I
- Nevada Revised Statues Regulations
- Washoe County Health District Regulations of the Washoe County District Board of Health Governing Well Construction.

PART B: PROJECT DETAILS

Project Goals and Tasks

The overarching goal of this Project is to inform landowners, with the potential of having an orphan well, about why an exposed unused well is a health and safety hazard due to potential groundwater contamination. Potential areas of orphan wells can be located by specific criteria including priority areas in SWPA and critical SWPAs, where historical agricultural irrigation has occurred, and where developments previously had septic systems and wells and have now been converted to public water systems. Once these areas are identified then the corresponding landowners would be targeted for the education and outreach program.

One Truckee River (OTR) has outlined specific goals and objectives in their *Nine Highest Priority Action Items* which is a living document that evolves as new problems and priorities are identified. OTR's first goal is to protect water quality and ecosystem health in the Truckee River. By researching and identifying potential areas of orphan wells we may target the education and outreach message to the appropriate focus group. Spreading awareness of decommissioning orphan wells can begin the process of working towards abandoning these wells and protecting Critical SWPAs.

The Project will be accomplished through a series of goals/tasks with corresponding activities.

Goals:

- Using the defined criteria research and utilize GIS to locate potential orphan well areas and determine landowners.
- Collaborate with partners to develop education and outreach plan for these communities
- Schedule and plan outreach activities to the landowner focus group.

PART B: PROJECT DETAILS - *continued*

Project Goals and Tasks *(continued)*

Project Tasks:

- Gather resources from partners of historical data to determine which areas in Washoe County have converted from agriculture to residential, from septic to sewer, and from well water to a public water system.
- GIS mapping and evaluation of locations based on the three identified criteria:
  - Source Water Protection and Critical Source Water Protection areas.
  - Historical and current agricultural land (irrigation ditches).
  - Residential areas on septic and/or historical conversion from well water to the public water system.
- Organize a list of landowners that could potentially have a private unused well that requires abandoning.
- Develop outreach and education materials to inform landowners about orphan wells and regulation involving abandoning them:
  - Educate the landowners about the concerns and water quality risks of owning land with an orphaned well.
  - Coordinate with NDWR and Nevada Division of Environmental Protection (NDEP) Office of Financial Assistance for Drinking Water and Clean Water Projects to develop financial assistance programs for landowners.
  - The Washoe County Health District's (WCHD) role is to review the abandonment permit, approve the permit, and be available for inspection. All inspections must be scheduled with their office a minimum of 2 days prior to abandonment. According to the WCHD well construction regulations a licensed well driller is required to plug a well. There is a fee for an abandonment permit ($834 in 2020).

Estimated Existing Loads and Sources [(a)]

It is the responsibility of the domestic well owner to ensure the suitability of their water quality. This is done through testing for total coliform bacteria, nitrates, total dissolved solids, and pH levels. Well owners should test their water for other substances if nearby activities are occurring. The Environmental Protection Agency (EPA) lists a table of activities that could contaminate water and what to test for if these activities are occurring near a well:

Pollutant Load Reductions Anticipated [(b)]

This Project will not directly quantify pollutant load reductions; however, it will spread awareness and develop a direct connection to landowners who may have an orphan well on their property about protecting groundwater quality. To prevent groundwater contamination in their local water supply private landowners that no longer depend on a well on their property should consider closing and abandoning their wells for their health and safety. By educating this focus group about ways to reduce means of contamination in their drinking water and preserving their local aquifer we may prevent future contamination.

PART B: PROJECT DETAILS – *continued*

Conditions or Nearby Activities	Test for:
Recurring gastro-intestinal Illness	Coliform bacteria
Household plumbing or service lines that contain lead	pH, lead, copper
Radon in indoor air or region is radon rich	Radon
Corrosion of pipes, plumbing	Corrosion, pH, lead
Nearby areas of intensive agriculture	Nitrate, nitrite, pesticides, coliform bacteria
Coal or other mining operations nearby	Metals, pH, corrosion
Gas drilling operations nearby	Chloride, sodium, barium, strontium
Dump, junkyard, landfill, factory, gas station or dry-cleaning operation nearby	Volatile organic compounds, total dissolved solids, pH, sulfate, chloride, metals
Odor of gasoline or fuel oil, and near gas station or buried fuel tanks	Volatile organic compounds
Objectionable taste or smell	Hydrogen sulfide, corrosion, metals
Stained plumbing fixtures, laundry	Iron, copper, manganese
Salty taste and seawater, or a heavily salted roadway nearby	Chloride, total dissolved solids, sodium
Scaly residues, soaps don't lather	Hardness
Rapid wear of water treatment equipment	pH, corrosion
Water softener needed to treat hardness	Manganese, iron
Water appears cloudy, frothy or colored	Color, detergents

Milestones, Schedule, and Cost Estimate

The Project will take about six months to complete and the current cost estimate for the Project is $17,100 for the research. The following Table 1 includes milestones, activities/tasks, timeline deliverable, and costs.

Table 1. Proposed Milestones, Activities/Tasks, Timeline, Deliverables and Costs

Task	Time Frame	Tributaries Budget Estimate Tasks	Item	Subtotal
1	Month 1 to 3	Gather resources of historical well data	Research	$4,000
2	Month 1 to 3	GIS mapping and evaluation of locations based on criteria	GIS	$4,000
3	Month 1 to 3	Organize a list of landowners that could potentially have orphan wells	Collect landowner information	$850
4	Month 3 to 6	Communicate with landowners	Survey	$1,700
5	Month 3 to 6	Educate landowners about orphan well water quality concerns	Outreach and Education	$2,550
6	Month 3 to 6	Collaborate with partners to develop programs or utilize existing programs for financial assistance	Financial Assistance	$4,000
			Total:	$17,100

PART B: PROJECT DETAILS - *continued*

Project Lead [f] and Partners

Project Lead: To Be Determined

Project Partners who may be engaged in this Project are:

- Nevada Division of Water Resources
- Nevada Division of Environmental Protection
- Truckee Meadows Water Authority
- Truckee Meadows Regional Planning Agency

Monitoring and Evaluation with Criteria to Measure Goal Progress [h]

OTR's partnership coordinator will coordinate with the NDWR to gather GIS mapping and historical well log records. OTR will develop a way to communicate with the landowners and educate them about their orphan wells and how to effectively close them with the proper funding sources. Funding sources will be determined by OTR and the NDWR.

Information and Education [e]

Public outreach and education are the primary goal of this Project. The topics discussed in the education program include how to find out if their property has an orphan well and what type of well it is, the risks of people and animals accidently falling in to abandoned wells, the types of materials and contaminants that could enter an exposed well, and the regulatory process of properly abandoning a well with the WCHD.

Once the materials are outlined and refined, feedback from the public and the involved agencies will be used to determine appropriate funding sources.

Technical and Financial Assistance Needed [d]

Technical and financial assistance is needed as described in the Milestones, Schedule, And Cost Estimate section

EPA Element	Description
a	Estimate the significant point and nonpoint sources, in addition to the natural background levels that make up the pollutant loads causing the problems in the watershed
b	Estimate load reductions expected from action
c	The nonpoint sources management measures needed to achieve load reductions and the critical areas
d	Estimate the technical and financial assistance needed, with costs, match
e	Information and education component
f	Schedule implementing the measures
g	Interim measurable milestones for determining if the actions are being implemented
h	Criteria to determine if load reductions are being achieved
i	Monitoring to evaluate the effectiveness of the implementation efforts over time

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Project Profile

Perennial Tributary Vegetation Resource Guide

OVERVIEW

Site Location Description	Perennial Tributaries to the Truckee River in Washoe County between the State Line and Vista
Primary Contact	Project Lead: To be determined

PART A: GENERAL DESCRIPTION

Groundwater Basin, #

All groundwater basins in Washoe County in the Truckee Meadows area:

- Spanish Springs Valley #085
- Sun Valley #086
- Truckee Meadows #087
- Pleasant Valley #088
- Washoe Valley #089
- Truckee Canyon Segment #091

HUC-12 Name, #

All watersheds in Washoe County in the Truckee Meadows area:

- Bull Ranch-Truckee River #160501020504
- Dog Creek-Truckee River #160501020503
- Dry Creek #160501020507
- Evans Creek-Truckee River #160501020508
- Franktown Creek-Frontal Washoe Lake #160501020301
- Galena Creek #160501020303
- Hidden Valley-Steamboat Creek #160501020304
- Hunter Creek-Truckee River #160501020505
- Peavine Creek-Truckee River #160501020506
- Steamboat Valley-Steamboat Creek #160501020306
- Thomas Creek #160501020305
- Washoe Lake #160501020302

Source Water Protection Area

A Source Water Protection Area (SWPA), is a locally established management area surrounding a surface water or groundwater resource that supplies water for public consumption within Washoe County. A SWPA provides a buffer around the perennial tributaries to safeguard these drinking water sources within the HUC-12s included in this Project. Activities in these buffer areas can affect the quality of water downstream or underground. See HUC-12 Watershed Overview Protection Areas Figure.

There are two types of SWPA buffers that surround the perennial tributaries; they are distinguished by their size. Critical SWPAs represent areas closer to perennial rivers, streams, and tributaries (SWPAs and Critical SWPAs Webtool).

PART A: GENERAL DESCRIPTION - *continued*

Problem Statement and Causes of Pollution [a, c]

Washoe County code Article 418 regulates development activity within and adjacent to perennial streams to ensure they are protected and enhanced. The code established two types of buffer zones, a "critical stream zone buffer area" and a "sensitive stream zone buffer area". The goal of these buffer zones is to preserve, protect, and restore the natural functions of the existing perennial streams, to prevent flood hazard and erosion, and ensure natural flood control functions of perennial streams.

The Washoe County critical stream zone buffer area includes all land and water surface within 30 feet of the centerline of the perennial stream. The sensitive stream zone buffer area includes all land and water surface area between the boundary of 30 feet (critical stream zone) and 150 feet from the center line of the perennial stream.

The Washoe County Article 418 inspired the development of the SWPAs. For source water protection, there are two types of SWPA buffers (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, based on a 20-year time of travel for groundwater. These areas are illustrated on the Jurisdiction and Source Water Protection Areas Figure (Jurisdiction and Source Water Protection Areas Figure).

A Perennial Tributary Vegetation Resource Guide is necessary to help landowners with a perennial tributary on their property maintain the stream channel and native vegetation to help protect and enhance the water quality of the perennial streams. A Perennial Tributary Vegetation Resource Guide, hereafter referred to as the Project, would include 39 tributaries spanning 12 of Washoe County's HUC-12 watersheds.

Perennial tributaries were determined based on drainages identified as perennial by the US Geological Survey (USGS) National Hydrographic Database. In addition, streams which are currently perennial due to urban run-off water have been incorporated. Eight of the 39 creeks are currently impaired (see Table 1). Establishing native plants and removing invasive weeds will benefit the habitat surrounding the perennial streams and therefore improve water quality as well.

The required setback zones help to reduce erosion and the potential of contaminants from entering streams. Native plants in these zones will stabilize the stream banks and removal of invasive and noxious weeds will help stabilize stream banks and improve habitat. A reference guide will assist public and private owners with sustainable methods to maintain their property adjacent to a tributary.

Land ownership includes private residents and various public entities. A collaborative approach will be used to meet the goals of the partners in the Perennial Tributary Vegetation Resource Guide.

PART A: GENERAL DESCRIPTION - *continued*

Project Summary

The project entails development of a Perennial Tributary Vegetation Resource Guide for landowners including private and municipal land managers. Education and implementation of the plan will enhance stream form and function. This will in turn improve water quality through the maintenance of native vegetation and removal of noxious and invasive weeds.

Reference Plan Implementation or Priority

- Washoe County Code Article 418
- City of Reno Integrated Vegetation Management Plan (RCI, 2020)
- Washoe County Integrated Vegetation Management Plan (RCI, 2020)

PART B: PROJECT DETAILS

Project Goals and Tasks

The overarching goal of this Project is to develop a vegetation maintenance guide for landowners with properties adjacent to perennial tributaries. The establishment and maintenance of native vegetation can improve water quality by:

1) reducing flood hazard and erosion potential through stabilizing creek banks,
2) improving impaired water temperature and turbidity,
3) restoring areas impacted by noxious and invasive weeds, and
4) supporting natural water quality functions of streams such as nutrient storage and recycling, groundwater recharge, pollutant and sediment filtering.

One Truckee River (OTR) has outlined specific goals and objectives in their *Nine Highest Priority Action Items* which is a living document that evolves as new problems and priorities are identified. OTR's first goal is to protect water quality and ecosystem health in the Truckee River. To accomplish this goal, priority action items are outlined.

Goals:

- Determine the owners of the land near perennial tributaries, and from this group, expand and diversify OTR partnerships.
- Gather information about native plant management and invasive and noxious weed eradication.
- Develop guidelines and recommendations for landowners. Identify questions and solutions.
- Describe effective maintenance methods for preserving native vegetation and eradicating noxious weeds with partners. Outline different areas along perennial streams that require more attention (steep slopes, south facing stream vs. north facing stream).
- Meet with a technical working group to develop sessions where the public can learn from partners and professionals about proper ways to care for streams in setback zones. Appoint a person to oversee questions and feedback from the public about maintaining their properties adjacent to tributaries.
- Create a framework of how to support the landowners and the actions toward implementation.
- Create a rich and diverse vegetation ecosystem within the buffer areas.

PART B: PROJECT DETAILS - *continued*

Project Goals and Tasks *(continued)*

The Project includes these major activities:

- compile and synthesize requirements, goals, objectives, and needs for vegetation maintenance
- identify Best Management Practices (BMPs) for vegetation maintenance
- develop consensus around a vegetation resource guide
- identify next steps toward implementing the guide

The plan will focus on Integrated Vegetation Management Techniques and include:

1) background and historical information,
2) regulatory framework and guidance from existing plans and stakeholder needs,
3) BMPs for vegetation management,
4) noxious and invasive weed management techniques,
5) desirable plant lists for restoration

Estimated Existing Loads and Sources [(a)]

Table 1 includes the HUC-12, tributary, location of impairment, and the water quality impairments of the tributary.

Table 1. Impaired Waters in Truckee Meadows

HUC-12	Tributary	Location	Impairments	
Peavine Creek-Truckee River	Alum Creek	From its origin to the Truckee River	• pH • Phosphorus • Temperature	• TDS • TSS
Hunter Creek-Truckee River	Chalk Creek	From its origin to the Truckee River	• Nitrate • Phosphorus • Temperature • TDS	• TSS • Selenium • Sulfates
Dry Creek	Dry Creek	From its origin to its confluence with Boynton Slough	• *E. coli*	
Evans Creek-Truckee River	Evans Creek	From its intersection with Highway 395 to Boynton Slough	• *E. coli*	
Galena Creek	Galena Creek, middle	From the east line of Sec. 18, T17N, R19E, MDBM to gaging station #10348900 located in the SW ¼ SW ¼ of Sec 2, T17N, R19E, MDBM	• pH	
Steamboat Valley-Steamboat Creek	Steamboat Creek, at the gaging station	From Little Washoe Lakes to gaging station #10349300 located in the S ½ of Sec 33, T18N, R20E, MDBM	• Arsenic • Boron • *E. coli*	• Iron • Manganese • Silver
	Steamboat Creek, at the Truckee River	From gaging station # 10349300 located in the S ½ of Sec 33, T18N, R20E, MDBM, to its confluence with the Truckee River	• Arsenic • Boron • *E. coli*	• Iron • Manganese • Silver
Thomas Creek	Thomas Creek	Below Steamboat Ditch	• Arsenic	• Boron
	Whites Creek, at Steamboat Ditch	Below the east line of Sec 33, T18N, R19E, MDBM to Steamboat Ditch, including north and south forks	• *E. coli* • Iron	• Phosphorus
	Whites Creek, Middle Fork at Steamboat Creek	South fork of Whites Creek to Steamboat Creek	• *E. coli* • Iron	• Phosphorus
	Whites Creek, north fork at Steamboat Creek	Below Steamboat Ditch	• *E. coli* • Iron	• Phosphorus

Reference: Nevada Department of Environmental Protection, Bureau of Water Quality Planning. *NV 2016-2018 Integrated Water Quality Report.*

PART B: PROJECT DETAILS - *continued*

Estimated Existing Loads and Sources [(a)]

Eight of the 39 tributaries in Washoe County are impaired for numerous beneficial uses including support of "aquatic life", municipal or domestic supply, recreation with contact, irrigation, and watering of livestock (water quality standards NAC 445A.1668, NDEP BWQP 2016-2018). Establishment of native vegetation can improve habitat, provide shade, reduce erosion and flood potential, and increase nutrient cycling.

The scope of this Project includes the land within the critical and sensitive zones surrounding the tributaries to the Truckee River. Properties with invasive and noxious weeds may be assisted to eradicate weeds and to establish healthy habitat with native vegetation.

Milestones, Schedule, and Cost Estimate

This Project will require approximately nine months to complete depending on partner availability. A Tributary Ambassador will be available to answer questions or concerns from the landowners about the Vegetation Resource Guide for at least a year. Table 2 includes the time frame, tributary budget estimate tasks and corresponding items, the hourly rates, and the total cost.

Table 2. Project Schedule and Cost Estimate

Task	Time Frame	Tributaries Budget Estimate Tasks	Item
1	Month 1 to 3	Determine the owners of the land near perennial tributaries.	Research
			GIS mapping
2	Month 1 to 3	Identify native plants and noxious weeds near perennial tributaries. Gather information about native plant management and invasive and noxious weed eradication.	Research
3	Month 3 to 6	With partners, outline effective methods for preserving native vegetation and eradicating noxious weeds.	Organize a framework and gather information from multiple entities.
4	Month 3 to 6	Develop guidelines and recommendations for landowners. Identify questions and solutions.	Research and develop methods based on previous plans.
5	Month 6 to 9	Meet with technical working group to develop sessions where the public can learn from partners and professionals about proper ways to care for streams in setback zones.	Prepare an education plan
6	Month 6 to 9	Create a framework of how to support the landowners and the actions toward implementation.	Research and develop a framework
7	Begin Month 9 and continue for a year.	Appoint a person to oversee questions and feedback from the public about maintaining their properties adjacent to tributaries.	Tributary Ambassador
		Estimated Cost:	$40,000 to $60,000

PART B: PROJECT DETAILS - *continued*

Pollutant Load Reductions Anticipated [b]

This Project will not directly quantify the effects that vegetation has on the Truckee River tributary water quality. Instead, it begins the process of anticipated load reduction by introducing private and municipal landowners to properly care for their property near streams. This information will come from professional partners that are knowledgeable about the native vegetation and their maintenance.

Project Lead [f] and Partners

Project Lead: The lead is to be determined

Partners who will be requested to participate in this Project include:

- UNR Cooperative Extension Programs
  - Nevada's Creeks and Communities
  - Nevada Nuisance Weed Field Guide
  - The Biggest Little Pollinator Garden
  - Northern Nevada's Green Industry Training Program
  - Master Gardeners of Washoe County
  - Weed Warriors Invasive Weed Training
- Local Commercial Native Plant Nurseries:
  - Comstock Seed Company
- Nevada Department of Wildlife
- Washoe/Storey Cooperative Weed Management Area
- private resident and business representatives who own land along the tributaries and recreational groups
- City of Reno
- City of Sparks
- One Truckee River
- the Reno-Sparks Indian Colony
- Washoe County

Monitoring and Evaluation with Criteria to Measure Goal Progress [h]

The Project coordinator will gather a team to conduct preliminary research and mapping. The team will coordinate with requested partners and gather information on vegetation maintenance and care, and guidelines for the Vegetation Resource Guide. Technical working groups will be established from the list of partners, and they will develop sessions where the public can learn about the actions of the Guide. The Tributary ambassador will monitor questions and feedback from the public.

Information and Education [e]

Public outreach and education will be essential in executing the Project. The purpose of the Guide is to inform landowners, public and private, on properly maintaining their land near tributaries. The Project will focus on receiving feedback on the proper care and maintenance of different types of native vegetation from the partner entities. This information will be developed into the Resource Guide.

Technical and Financial Assistance Needed [d]

Technical and financial assistance will be needed. A vegetative specialist familiar with the Truckee Meadows area and a communications specialist would be helpful for this Project. The financial assistance needed is detailed under the Milestones, Schedule, and Cost Estimate section.

EPA Element	Description
a	Estimate the significant point and nonpoint sources in addition to the natural background levels that make up the pollutant loads causing the problems in the watershed
b	Estimate load reductions expected from action
c	The nonpoint source management measures needed to achieve load reductions and the critical areas
d	Estimate the technical and financial assistance needed, with costs, match
e	Information and education component
f	Schedule implementing the measures
g	Interim measurable milestones for determining if the actions are being implemented
h	Criteria to determine if load reductions are being achieved
i	Monitoring to evaluate the effectiveness of the implementation efforts over time

REFERENCES

NDEP BWQP, Nevada Division of Environmental Protection, 2016-2018. Nevada 2016-2018 Water Quality Integrated Report

One Truckee River. Proposal Vegetation Management and Restoration Planning. Submitted November 19th, 2019. One Truckee River Management Plan, Phase I, 2017

Resource Concepts, Inc. (RCI), 2020. City of Reno Public Works Vegetation Management Plan, Phase 2: Development of First Generation IVM Best Management Practices and a Cooperative ARS Plant Materials Testing Program. February 26th, 2020.

Resource Concepts, Inc. (RCI), 2020. Washoe County Regional Parks and Open Space. Regional Parks and Open Space Integrated Vegetation Management Plan. April 2020.

Washoe County Code, Article 418. Significant Hydrologic Resources.

Project Profile

Urban River Work Force Team

OVERVIEW

Site Location Description	Truckee River
Primary Contact	Iris Jehle-Peppard One Truckee River Executive Director (775) 450-5489 iris@onetruckeeriver.org

PART A: GENERAL DESCRIPTION

Groundwater Basin, #	• North Truckee Meadows, #160501020508
HUC-12 Name, #	• Evans Creek-Truckee River #160501020508 • Peavine Creek-Truckee River #160501020506
Source Water Protection Area	A Source Water Protection Area (SWPA) is a locally established management area surrounding a surface water or groundwater resource that supplies water for public consumption within Washoe County. A SWPA provides a buffer around the Truckee River included in this Project, as well as other perennial tributaries within the HUC-12s. Activities in these buffer areas can affect the quality of water downstream or underground (HUC-12 Watershed Overview Protection Areas Figure). There are two types of SWPA buffers that surround the Truckee River. They are distinguished by the size of the buffers. Critical SWPAs represent areas closer to perennial rivers, streams, and tributaries (SWPAs and Critical SWPAs Webtool). The Truckee River SWPA buffers include a 1,000-foot buffer on both sides of the river and a critical SWPA buffer for 300 feet on each side of the river.
Problem Statement and Causes of Pollution [a, c]	While the area has aesthetic value, its potential for recreational use has not been realized. It features the scenic hiking/walking Truckee River Path east of downtown Reno that includes three public parks, Brodhead Park, John Champion Park, and Fisherman's Park. In addition to hiking opportunities, the Path offers access to the river for fishing, other water sports, and connects to the Tahoe-Pyramid Trail, a popular bicycle thoroughfare. Government agencies, including the Truckee Meadows Water Authority (TMWA) and Nevada Division of Environmental Protection (NDEP), routinely record elevated levels of *Escherichia coli* (*E. coli*) and total coliform in the Truckee River. While the source of these pollutants has not been linked directly to a single source, human waste is a probable contributor, as it is estimated that 150+ people live in the SWPA area along the river east of downtown Reno with no access to sanitation and hygiene facilities. This Project aims to address trash, impaired temperature, elevated levels of *E. coli*, and total coliform present in the river.

PART A: GENERAL DESCRIPTION - *continued*

Problem Statement and Causes of Pollution [a, c] *(continued)*

Emergency shelters in the Truckee Meadows region are filled-to-capacity nearly every day, leaving many with no other alternative than to sleep outdoors. According to the 2020 Point-In-Time Count directed by the U.S. Department of Housing and Urban Development, there were 459 adults and youth sleeping outdoors in Washoe County on January 30th. In 2019, the Housing Our Future - Truckee Meadows Regional Strategy for Housing Affordability led by the Truckee Meadows Regional Planning Agency reported the Truckee Meadows region needs 26,062 more affordable rental units to meet its current need. Lack in affordable rental units creates a challenge for individuals working to move out of emergency shelters and transitional housing to permanent housing. This challenge limits the number of unsheltered people agencies can serve. In summary, agencies' clients need the inventory of affordable rental units to increase so their clients can move out of their programs to serve new clients.

In addition, concerns are arising from the current pandemic: 1) more people will be unsheltered in the near future with the closure and limited ability for businesses to function as usual, leading many companies to lay off employees. This will leave many without jobs that could lead to more individuals becoming unsheltered, and 2) the additional attention to the significant public health risks arising from the lack of public sanitation and hygiene facilities, trash receptacles and on-going trash removal services at the level needed for the volume of waste along the Truckee River.

Project Summary

The One Truckee River (OTR) Management Plan includes 103 Action Items to protect the Truckee River. In 2017, the OTR Partnership Council prioritized nine Action Items to focus their efforts on. One of those nine is Action Item 2.6.a) "*Expand the continuum of housing options, including a permanent overflow shelter, transitional housing, and access to permanent, supportive housing, including the wrap around services needed to support residents.*" Numerous efforts are currently underway regionally to address this Action Item, many efforts led by OTR partners. Yet, OTR doesn't have a collaborative project underway now to contribute to Action Item 2.6.a.

OTR staff will participates in the recently created Built-for-Zero Initiative, a community-wide collaboration of more than 30 government and non-profit organizations led by City of Reno and Washoe County staff and supported by the Community Homelessness Advisory Board. The Initiative is based on a national model that has been successful in communities throughout the U.S. to decrease and end homelessness. Currently, the local Initiative is creating a comprehensive, accessible database that will provide complete data on all programs and services available to unsheltered individuals in the Truckee Meadows region.

There are efforts that can immediately address public safety concerns now present along the Truckee River SWPA and contribute to Action Item 2.6.a. These efforts include increasing public facilities and improving natural habitat along the Truckee River. These efforts are also essential building blocks to increase recreational use. Under Project Profile – River Restroom Project Phase II, OTR partners work to increase public facilities.

PART A: GENERAL DESCRIPTION - *continued*

Project Summary *(continued)*

This Project's focus is to build a collaborative OTR program that will work to improve the natural habitat in the Truckee River SWPA, from Brodhead Park to Fisherman's Park, while increasing wrap round services to residents in need with the objective to engage with the unsheltered individuals currently living in the area. The Project entails building an Urban River Restoration Workforce Program that will be a collaboration between an environmental nonprofit with expertise in river habitat restoration and a human service nonprofit with expertise in supporting marginalized individuals to gain skills, get back into the work force and move beyond homelessness, a shelter bed, or transitional housing.

Reference Plan Implementation or Priority

- One Truckee River Management Plan, Phase I
- Built-for-Zero Initiative

PART B: PROJECT DETAILS

Project Goals and Tasks

The Project goals are to build an Urban River Work Force Team that will:

- Support marginalized individuals to gain skills and experience in habitat restoration helping them get back into the work force that will support them in securing permanent housing.
- Provide relevant educational and engagement opportunities to the unsheltered population along the Truckee River SWPA to keep it clean and cared for in the focus areas of Brodhead Park to Fisherman's Park.

The Urban River Work Force team's tasks will be to:

- Support the City of Reno Parks and Recreation Department with the on-going task of trash removal.
- Encourage and work with individuals donating items and food to unsheltered individuals and give them the ability to provide that service without adding trash along the river.
- Identify areas in need of habitat restoration and develop and execute restoration efforts in collaboration with human service outreach efforts to support re-vegetation along the Truckee River SWPA.
- Collaborate with Keep Truckee Meadows Beautiful Illegal Dumping Program to address illegal dumping in the focus area.

Urban River Work Force Team members will be paid a stipend, made up of individuals who are or have experienced homelessness and will be supervised by two professionals, one from the habitat restoration sector and another from the human services sector, as a provider.

Estimated Existing Loads and Sources **(a)**

The qualitative characteristics of the existing data for this Project makes quantifying the pollution issues difficult. Specific sources of *E. coli* and total coliform pollution along the Truckee River change over time as the unsheltered communities along the riverbanks move from one location to another. The human feces pollution is considered to be a nonpoint source (NPS), due to the impossibility of tracking each incident.

PART B: PROJECT DETAILS - *continued*

Estimated Existing Loads and Sources [a] *(continued)*

Multiple agencies have collected data on *E. coli* and total coliform pollution levels at specific points along the Truckee River. This data has revealed that pollution amounts are highest in the summer months, specifically in June and July. Although this finding cannot be quantified, these heightened pollution levels correlate with the number of people using the river in the summer for restroom needs.

Milestones [g], Schedule [f] and Cost Estimate [d]

The exact technical and financial needs are difficult to determine for this Project since the course of action is yet to be decided. Creating a set list of milestones that can be completed on a flexible schedule will help the Project stay on track, even if the precise details are not known at this time.

These milestones are most likely to be similar, if not exact, to those described above in the Project Goals and Tasks. By closely monitoring the success of these milestones, stakeholders will be able to gauge where changes should be made, and which actions are successful. This will help guide the progress of the Project.

Pollutant Load Reductions Anticipated [b]

The Project will reduce trash along the river, improve the water temperature and reduce the levels of *E. coli*.

There are approximately ten million fecal coliform bacteria in one gram (one milliliter) of human waste. The average daily defecation is about 400 grams which equates to four billion fecal coliform bacteria per person per day. Assuming three people find stable living situations, the Project would prevent 12 billion fecal coliform bacterial from polluting the river per day, or over four trillion per year from entering the Truckee River.

For perspective, the Environmental Protection Agency (EPA) rules state that acceptable levels of *E. coli* are measured in cfu and commonly include both a 30 day mean (126 cfu/100mL) and a single sample number (235 cfu/100mL – 575 cfu/100mL). Suitable levels in fresh water should be less than 33 cfu/100mL for a 30 day mean and 61 – 151 cfu/100 mL as a single sample reading (EPA, 2012).

The indicators of success for the Project will be qualitative through visual assessment and recorded by the personnel who will most likely be monitoring, informing, and conducting education and engagement opportunities to the unsheltered population along the focus area. Over time, the water quality data may reflect the transition of the unsheltered population into shelters and/or permanent homes. Both qualitative and quantitative data will be recorded as it becomes available to OTR.

General Project Targets and Projected Results:

- Improvements to the Truckee River's watershed and ecosystem through the efforts of the Urban River Work Force Team
- Urban River Work Force Team members gain habitat restoration skills and experience

Data Tracking: OTR will continue to communicate with NDEP on the recorded data for *E. coli* pollution. Ideally, this will positively impact water quality over time, although OTR acknowledges that it will take some time for the numbers to reflect the changes.

PART B: PROJECT DETAILS - *continued*

Pollutant Load Reductions Anticipated [b] *(continued)*

Observations made by the entire Truckee Meadows community, both housed and unsheltered, in addition to OTR, will be key to understanding the impact of this Project. This data, although qualitative, is essential to supplement quantitative data for the Project. Further criteria of the Project are outlined below.

Project Lead [f] and Partners

Project Lead: One Truckee River

Project Partners include:

- Habitat Restoration
- Human Services Organizations TBD

Monitoring and Evaluation with Criteria to measure goal progress [h]

Monitoring for this Project will be largely visual since quantitative data is not readily available. The Reno community and the Urban Work Force Team are essential to monitoring the success of this Project. While some NDEP data is available, it will likely be some time before those numbers reflect the positive changes. Seeing how the riverbank aesthetic value improves over time will be a good indicator of the pollution status.

There are several criteria that could help determine if load reductions are being achieved:

- Movement of Unsheltered Encampments: Monitoring where communities move to, why these movements are taking place, and approximately how many people remain in areas along the river.
- Use of public facilities: restrooms and trash reciprocal by the unsheltered population along the river.
- Visual Monitoring: As more opportunities become available to the unsheltered population along the river, river encampment will decrease, and the river will become less polluted with typical trash that can be expected from daily life. The Urban River Work Force Team will be evaluated for success. It is predicted that employing crews to regularly clean areas along the river will contribute to a greater sense of pride and stewardship that will ultimately decrease pollution of all types.

Information and Education [e]

Public outreach and education are a primary goal of the Project. The Urban River Work Force Team will provide relevant educational and engagement opportunities to the unsheltered population along the Truckee River SWPA to keep it clean and cared for in the focus area of Brodhead Park to Fisherman's Park.

Technical and Financial Assistance needed [d]

The technical and financial assistance needed will be identified after the scope and duration of the Project is determined. Because OTR is a partnership organization comprised of a wide array of community stakeholders, it is certain that several of OTR's traditional stakeholders, and perhaps new partners, will have key roles in the success of this Project.

EPA Element	Description
a	Estimate the significant point and nonpoint sources in addition to the natural background levels that make up the pollutant loads causing the problems in the watershed
b	Estimate load reductions expected from action
c	The nonpoint source management measures needed to achieve load reductions and the critical areas
d	Estimate the technical and financial assistance needed, with costs, match
e	Information and education component
f	Schedule implementing the measures
g	Interim measurable milestones for determining if the actions are being implemented
h	Criteria to determine if load reductions are being achieved
i	Monitoring to evaluate the effectiveness of the implementation efforts over time

REFERENCES

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One Truckee River Management Plan, Phase I, 2017

Project Profile

Watershed Education with Models

OVERVIEW

Site Location Description	Washoe County Schools, 5th or 6th grade science classes in the Truckee River Basin
Primary Contact	Sean Hill Sierra Nevada Journeys (775) 355-1688 sean@sierranevadajourneys.org

PART A: GENERAL DESCRIPTION

Groundwater Basin, #

All groundwater basins in Washoe County in the Truckee Meadows area:

- Spanish Springs Valley #085
- Sun Valley #086
- Truckee Meadows #087
- Pleasant Valley #088
- Washoe Valley #089
- Truckee Canyon Segment #091

HUC-12 Name, #

All watersheds in Washoe County in the Truckee Meadows area:

- Bull Ranch-Truckee River #160501020504
- Dog Creek-Truckee River #160501020503
- Dry Creek #160501020507
- Evans Creek-Truckee River #160501020508
- Franktown Creek-Frontal Washoe Lake #160501020301
- Galena Creek #160501020303
- Hidden Valley-Steamboat Creek #160501020304
- Hunter Creek-Truckee River #160501020505
- Peavine Creek-Truckee River #160501020506
- Steamboat Valley-Steamboat Creek #160501020306
- Thomas Creek #160501020305
- Washoe Lake #160501020302

Source Water Protection Area

A Source Water Protection Area (SWPA) is a management area surrounding a surface water or groundwater resource that supplies water for public consumption. A SWPA provides a buffer around the Truckee River included in this project, as well as other perennial tributaries within the HUC-12s. Activities in these buffer areas can affect the quality of water downstream or underground. See HUC-12 Watershed Overview Protection Areas Figure.

There are two types of SWPA buffers in the Truckee Meadows that are distinguished by the size of the buffers. Critical SWPAs represent areas closer to perennial rivers, streams, tributaries, and wells (SWPAs and Critical SWPAs Webtool).

All SWPAs would be considered in this project.

PART A: GENERAL DESCRIPTION - *continued*

Problem Statement and Causes of Pollution [a, c]

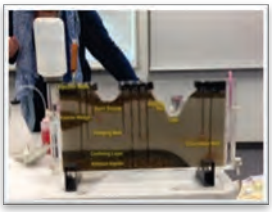
School teachers have curriculum that covers the water cycle around the 5th or 6th grade level. Sierra Nevada Journeys have existing relationships with the schools for watershed curriculum including field days where they take water quality samples and learn about their local watershed. Learning tools such as the watershed and groundwater models show students a bird's-eye view of the watershed and demonstrates to them how water flows on the surface and underground.

Most instructors and educational institutions do not have the funding and/or are not aware of these models and their effectiveness at teaching students. The Nevada Division of Environmental Protection (NDEP) has partnered with Resource Concepts, Inc. (RCI) for a few years presenting these models in various schools in different counties throughout Nevada. Students in the classrooms are engaged and have questions and are excited to learn about the models and see the demonstrations. This project can assist with hiring a watershed outreach coordinator who presents the models in the classrooms and at educational events, further spreading the important message of water flow and potential contamination in the local watershed and groundwater in Washoe County.

Project Summary

Watershed and groundwater models are an effective way to inform students about their local watershed and how to protect their drinking water sources. School 5th or 6th grade classes are particularly targeted because it supports the existing curriculum at that grade level.

Presentations involve demonstrations of each of the models. While demonstrating the watershed model, the presenter discusses activities that can contribute to water pollution such as pesticides and fertilizers, and accidental spills at factories that use metals and construction site equipment. The presenter applies "chemicals" using representative materials such as vegetable oil for grease from construction equipment and green Kool-Aid for fertilizer. After applying these "chemicals" the model is sprayed with water which represents a rain event. Water flows to the lake gathering up the pollutants along the way. The color of the water changes from the dyes in the "chemicals", demonstrating to the students the degradation in water quality due to misuse of these activities.



The groundwater model represents underground aquifers and the flow of water in the ground. Presenters discuss the different types of wells (observation, pumping, and injection wells) and their uses, and the layers of the aquifer and how water flows differently between each layer. This model has an area to add a point source "contaminant" that you can fill which drains into the aquifer. Using the vacuum pump, you can demonstrate pumping out drinking water and how it may get contaminated with a nearby point source.

Teaching students about the Truckee Meadows watersheds in Washoe County will educate them regarding the impacts of different types of activities and how water quality in the watersheds can be affected through the misuse of these activities. Surface water and groundwater models help demonstrate to students where contamination comes from and how it reaches nearby sources of water.

This project will pay for a watershed outreach team who will coordinate with teachers and will help develop an organized presentation using the models.

PART A: GENERAL DESCRIPTION - *continued*

Reference Plan Implementation or Priority

- Washoe County education programming
- Past source water protection education outlines for other counties in Nevada
- One Truckee River Watershed Education Plan
- One Truckee River Management Plan, Phase I

PART B: PROJECT DETAILS

Project Goals and Tasks

The overarching goal of this Project is to develop consistent watershed education presentations using the watershed and groundwater models in Washoe County's schools, specifically for 5th or 6th grade students. At this grade level, students are learning about the water cycle. It is a good opportunity to educate them about the watershed, anthropogenic activities in the watershed that may contribute to non-point source and point source pollution, roles of a scientist and engineer, and ways to prevent pollution and to protect our drinking water sources.

One Truckee River (OTR) has outlined specific goals and objectives in their *Nine Highest Priority Action Items* which is a living document that evolves as new problems and priorities are identified. One of OTR's primary goals includes building an aware community. To accomplish this goal, priority action items and objectives are outlined. One of which is to increase student education and participation related to the Truckee River.

Goal: Incorporate watershed and drinking water education into 5th or 6th grade classes in the Washoe County School District using the watershed and groundwater models.

Tasks:

- Hire the watershed outreach team to present the watershed and groundwater models.
- Use past presentations from NDEP, Bureau of Safe Drinking Water, and RCI to develop a written presentation that includes questions to ask the students, topics to cover, and how to demonstrate with the models.
- Train the watershed outreach team to present to the science and STEM classes and to use the models effectively.
- Communicate with teachers about a schedule so the watershed outreach coordinator team can visit the schools in a timely manner.
- Purchase the models
- Conduct presentations for 5th or 6th grade students at Washoe County schools.

Estimated Existing Loads and Sources [(a)]

Activities in the Truckee Meadows Watershed including residential horticulture and lawn care, transportation, recreation, commercial, industrial and agriculture uses are potential contributors to non-point source pollution. Residents in Washoe County are exposed to these activities and by educating young students and spreading awareness about sources of non-point sources of pollution they may prevent future contamination in the watershed.

PART B: PROJECT DETAILS - *continued*

Milestones, [g] Schedule [f] and Cost Estimate [d]

	Time Frame	Tributaries Budget Estimate Tasks	Item	#	Unit	Rate	Subtotal
1	Month 1 to 3	Hire individuals, the watershed outreach team from OTR to present the watershed and groundwater models.	Develop education team	20	hours	$100	$2,000
2	Month 1 to 3	Use past presentations from NDEP, Bureau of Safe Drinking Water, and RCI to develop a written presentation that includes questions to ask the students, topics to cover, and how to demonstrate the models.	Outline the presentation	40	hours	$85	$3,400
3	Month 3 to 6	Train the watershed outreach team to present to the science and STEM classes and to use the models effectively.	Training from RCI	20	hours	$100	$2,000
			Training for new hires	20	40	$30	$600
4	Month 3 to 6	Communicate with teachers about a schedule so the watershed outreach team can visit the schools in a timely manner.	Coordinate with Washoe County teachers	40	hours	$30	$1,200
5	Month 3 to 6	Purchase the models	Buy supplies	10	hours	$30	$300
		GW and SW Models and Case Costs		1	ea		$2,000
6	Begin month 6 and continue yearly visiting each school according to their planned schedule.	Conduct presentations for students at Washoe County schools.	Presentation Hours and Travel time	324	hours	$30	$9,720
				475		**Total**	**$21,220**

Pollutant Load Reductions Anticipated [b]

This Project will not directly quantify pollutant load reductions; however, it will spread awareness in schools about watershed and drinking water education. This is important for protecting existing higher quality water. In the OTR Watershed Education Plan, they explain how learning about how we are connected to the watershed teaches students how maintaining a clean watershed can protect their drinking water sources.

Project Lead [f] and Partners

Project Lead:

- Sierra Nevada Journeys

Partners:

- Washoe County School District science classes and STEM programs
- Kim Rigdon, Bureau of Safe Drinking Water, NDEP
- Resource Concepts, Inc.

PART B: PROJECT DETAILS - *continued*

Monitoring and Evaluation with Criteria to measure progress toward meeting watershed goals [(h)]	OTR's partnership coordinator will gather and hire individuals to present the watershed and groundwater models in Washoe County schools. They will work with NDEP and their contractors to develop an outline of topics to cover in the presentations. The watershed outreach coordinator team and RCI will coordinate with the schedules of school teachers to plan dates for presentations. Watershed outreach coordinator teams will be responsible for meeting at schools, conducting presentations, and training other educational entities.
Information and Education [(e)]	Public outreach and education are the primary goal of the Project. The purpose of the Project is to educate students in Washoe County about their watershed using the watershed and groundwater models. Once the presentations are outlined and used in schools, we may continue to improve them by asking the students appropriate questions and getting them engaged.
Technical and Financial Assistance needed [(d)]	Technical and financial assistance will be needed. NDEP and their contractors are familiar with conducting these presentations at schools in various counties in Nevada and their expertise will be useful. We will need financial assistance for training the team and buying the models. Additional financial assistance needed is detailed under the Milestones, Schedule, and Cost Estimate section.

EPA Element	Description
a	Estimate the significant point and nonpoint sources, in addition to the natural background levels that make up the pollutant loads causing the problems in the watershed
b	Estimate load reductions expected from action
c	The nonpoint source management measures needed to achieve load reductions and the critical areas
d	Estimate the technical and financial assistance needed, with costs, match
e	Information and education component
f	Schedule implementing the measures
g	Interim measurable milestones for determining if the actions are being implemented
h	Criteria to determine if load reductions are being achieved
i	Monitoring to evaluate the effectiveness of the implementation efforts over time

REFERENCES

One Truckee River. Proposal Vegetation Management and Restoration Planning. Submitted November 19th, 2019. One Truckee River Management Plan, Phase I, 2017

One Truckee River. Watershed Education Plan. OTR Watershed Education Plan, 2019

JT&A, Inc. EnviroScape. Watershed/Nonpoint Source Pollution User's Guide. 2007. EnvironScape Watershed/Nonpoint Source Pollution User's Guide 2007

Woldt, Wayne. Sand-Tank Ground Water Flow Model Manual. University of Nebraska Lincoln. 2007. Sand-Tank Ground Water Flow Model Manual 2007

Back to: Project Profiles Table of Projects

Project Profile

I am Truckee River Watershed Educational Video

Overview

Site Location Description	Between Lake Tahoe and Pyramid Lake, to be determined by One Truckee River education team
Primary Contact	Iris Jehle-Peppard One Truckee River Executive Director (775) 450-5489 iris@onetruckeeriver.org

Part A: General Description

Groundwater Basin, #

Groundwater basins including the main stem of the Truckee River in the Truckee Meadows:

- Truckee Meadows, #87
- Truckee Canyon Segment, #91

HUC-12 Name, #

Watersheds in the Truckee Meadows and Truckee River Canyon area:

- Bronco Creek-Truckee River #160501020502
- Bull Ranch Creek-Truckee River #160501020504
- Dog Creek #160501020503
- Evans Creek-Truckee River #160501020508
- Gray Creek-Truckee River #160501020501
- Hunter Creek-Truckee River #160501020505
- Peavine Creek-Truckee River #160501020506

Source Water Protection Area

All Source Water Protection Areas (SWPAs) in the Truckee Meadows area are included.

A Source Water Protection Area (SWPA) is a management area surrounding a surface water or groundwater resource that supplies water for public consumption. A SWPA provides a buffer around the Truckee River. Activities in these buffer areas can affect the quality of water downstream or underground. HUC-12 Watershed Overview Protection Areas Figure

There are two types of SWPA buffers that surround the Truckee River; they are distinguished by the size of the buffers. Critical SWPAs represent areas closer to the river and to public water system wells. The Truckee River SWPA buffers include a 1,000-foot buffer on both sides of the river and a critical SWPA buffer for 300 feet on each side of the river. SWPAs and Critical SWPAs Webtool

PART A: GENERAL DESCRIPTION - *continued*

Problem Statement and Causes of Pollution [a, c]

The public is generally not aware of what a watershed is, where the perennial rivers and creeks are, and how their local watershed contributes to their water quality and quality of life. Watersheds are the primary means of how we access our drinking water, utilize water for irrigation for crops, use water for daily household uses, and benefit from outdoor recreation. Watersheds include processes flood attenuation and water filtering to reduce pollutants. These processes are important for the public to learn about so they can better understand where their water comes from and why it is important to preserve and protect the watershed. Becoming aware of how our activities contribute to the watershed will benefit the health of our overall community.

Project Summary

The Carson Water Subconservancy District recently created and designed a video with assistance from the advertising company, NEON AGENCY, of a presenter walking through different areas of the Carson Valley to show how the Carson River watershed is interconnected and how its processes relate to the everyday lives of the residents who live there. Both an English and Spanish version of this video was created. This project was funded by the Carson Water Subconservancy District and the Nevada Division of Environmental Protection (NDEP) through the US Environmental Protection Agency (EPA) Clean Water Act Section 319 (h) grant. Developing a similar video for the Truckee River Watershed would help inform residents about their source of water and the path that it takes from Lake Tahoe to Pyramid Lake.

The Truckee River begins its journey in California, flowing out from Lake Tahoe and traveling to multiple reservoirs and downstream to Nevada and finally ending at Pyramid Lake. The Truckee River is Western Nevada's largest river, traveling 2,720 square miles and supplying 80-85% of the drinking water to nearly 425,000 people in the Truckee Meadows Water Authority (TMWA) service area which constitutes the cities of Reno and Sparks. The Truckee River watershed also includes 273,920 acres in California, upstream of the Highland diversion providing water to the communities of Tahoe City, Alpine Meadows, Squaw Valley, Truckee, Hirschdale, and Floriston. This Project involves developing an educational public video showing 15-24 locations along the path of the Truckee River and describing the corresponding watershed. The presenter would explain the watershed and describe how precipitation during the different seasons of the year impact the flow of water into perennial streams which lead into the Truckee River, the different processes of the watershed and the areas that those occur, the uses of water in the community, and how to maintain water quality by following water conservation and awareness practices.

Reference Plan Implementation or Priority

The I am Carson River Watershed video produced by the Carson Water Subconservancy District, NDEP, and NEON AGENCY

One Truckee River Management Plan, Phase I

PART B: PROJECT DETAILS

Project Goals and Tasks

The overarching goal of this Project is to educate and inform the public about their local Truckee River watershed through a video presentation. The presenter can describe where the water flows to and what aspects of a watershed benefit the community, how the residents in the area utilize the water, and how to keep it clean.

One Truckee River (OTR) has outlined specific goals and objectives in their *Nine Highest Priority Action Items* which is a living document that evolves as new problems and priorities are identified. One of OTR's goals is to build an aware community. In order to accomplish this goal, priority action items are outlined. One of which is to promote awareness and education of the river's natural, cultural, and recreational resources and the important role the river plays in our community.

Project Goals:

- Determine where and which locations to record the video. Identify priority parts of the watershed that are the most important to show and describe.
- Develop the message and key topics to present. Write the script for the presenter.

  Possible Topics Include:

  - Where 85% of drinking water in the Truckee Meadows comes from
  - How precipitation reaches the Truckee River
  - Different habitat and landscapes that the river flows through, including floodplains and meadows
  - The towns that the Truckee River flows through
  - Perennial streams and reservoirs that stem from the river
  - Recreational activities along the river and the two Lakes that connect the river
  - Pollutants that may be degrading the river's water quality
  - Actions we can take to improve or protect the quality of the river water
- Travel to each location and shoot the video.
- Advertise the video online and provide bumper stickers to residents throughout the region's water purveyors.

Project Tasks:

- Hire a videography company, such as NEON AGENCY, and a presenter
- Collaborate with partners to determine locations to shoot
- Decide the core message for the audience and write the script
- Plan and schedule the shoot
- Shoot the video
- Work with the videographer and presenter to edit the video
- Advertise the "I am Truckee River" video to the public

PART B: PROJECT DETAILS - *continued*

Estimated Existing Loads and Sources [a]

The Truckee River runs through multiple HUC-12 watersheds in both California and Nevada, and has Total Maximum Daily Loads (TMDLs), total suspended solids, total nitrogen, and total phosphorus. Four out of the six reaches in Nevada are categorized as a category 5 water body. The reaches that are assessed for water quality are listed in Table 1 with their corresponding EPA category, and beneficial uses that are not supported (water quality standards NAC 445A.1682, 1684, 1686, 1688, 1692, 1694, NDEP BWQP 2016-2018). The scope of this Project will depend on the Project team and the funding provided.

Table 1. EPA Water Quality Categories for the Truckee River

Truckee River Reach	HUC-12 Watershed	EPA Category	Beneficial Use-Not Supported*
At the Nevada-California Stateline	Bull Ranch Creek-Truckee River	5	AQL
At the Nevada-California Stateline to Idlewild	Bull Ranch Creek-Truckee River, Hunter Creek-Truckee River, Peavine Creek-Truckee River	1	
From Idlewild to East McCarran Blvd	Peavine Creek-Truckee River, Evans Creek-Truckee River	5	AQL
From East McCarran Blvd to Lockwood	Evans Creek-Truckee River	4a	AQL, RWC
Lockwood to Derby Dam	Giants Throne Canyon-Truckee River, Derby Dam-Truckee River	5	AQL, IRR, RWC
Pyramid Lake Paiute Reservation- From Derby Dam to Wadsworth	Derby Dam-Truckee River, Dead Ox Wash-Truckee River, Coal Creek-Truckee River	5	AQL, RWC

* Beneficial Use Acronyms: AQL (Aquatic Life), IRR (Irrigation), RWC (Recreation with Contact)

Milestones [g], Schedule [f] and Cost Estimate [d]

This Project will take about two to three months to complete. The filming of the video will take about three-four days. The video may be about three minutes long. The current cost estimate for the Project is listed in Table 2. Table 2 includes the time frame, description of the tasks, the number of hours, rate, and cost of each task.

PART B: PROJECT DETAILS – *continued*

Table 2. Project Schedule and Cost Estimate

Task	Time Frame	Tasks	Item	#	Unit	Rate	Subtotal
1	Month 1	Hire a videographer and newscaster	Gather Team	10	hours	$130	$1,300
2	Month 1	Collaborate with partners to determine where the locations for the video shoot will be along the Truckee River	Location	40	hours	$130	$5,200
3	Month 1	Develop the message of the video and topics to discuss. Write up of the script	Brainstorming and Script Writing	60	hours	$130	$7,800
4	Month 1	Plan and schedule the shoot	Planning and Scheduling	60	hours	$130	$7,800
5	Month 2 about 3-4 days to shoot the video	Travel to locations and shoot the video	Shooting the Video	60	hours	$130	$7,800
6	Month 2	Review and edit the video	Editing	40	hours	$130	$5,200
7	Month 2 to 3	Advertise the Video	Advertising	40	hours	$130	$5,200
						Total	$40,300

Pollutant Load Reductions Anticipated [(b)]

The health of the Truckee River watershed can improve by educating the residents that are local to the Truckee River. Environmental conscious stewardship actions will evolve from learning about different areas of the watershed and spreading awareness of using or being exposed to potential pollutants in the watershed and how to avoid these contaminants. After watching the video, the audience should have a clear understanding of where the Truckee River flows and what the watershed looks like. They will also be familiar with how their lifestyle choices are interconnected with the overall health of the watershed.

Project Lead [(f)] and Partners

Project Lead: One Truckee River

Partners include:

- TMWA
- Truckee River Fund
- Truckee River Watershed Council (California side of the Truckee)

Monitoring and Evaluation with Criteria to measure goal progress [(h)]

Monitoring for the Project will largely be completed by OTR. A schedule and plan of where the video will be shot and what each scene will entail will be addressed at the beginning of the Project and this discussion will be led by OTR. Communication and collaboration between the presenter, advertising agency, the Truckee River Watershed Council, and other agencies familiar with the area of the Truckee River will be necessary for the Project.

PART B: PROJECT DETAILS - *continued*

Information and Education [e]

Public outreach and education are the final goal of the Project. This "I am Truckee River Watershed" video will educate the public about their local watershed. This video will inform the public about areas of the watershed that contribute important processes such as meadows, riparian areas, and wetlands. The presenter will discuss our needs from the watershed, including providing clean drinking water, and how we can better protect and care for our watershed by being aware of where the Truckee River travels and how it benefits overall water quality.

Technical and Financial Assistance needed [d]

Technical and financial assistance would be needed as summarized in the table listed in the Cost Estimate and Schedule section.

Technical assistance would be needed by OTR and the Truckee River Watershed Council who are familiar with the regions of the Truckee River to develop the script and determine the appropriate locations for the video. Expertise from the videographer and the presenter will be needed to shoot the video.

EPA Element	Description
a	Estimate the significant point and nonpoint sources in addition to the natural background levels that make up the pollutant loads causing the problems in the watershed
b	Estimate load reductions expected from action
c	The nonpoint source management measures needed to achieve load reductions and the critical areas
d	Estimate the technical and financial assistance needed, with costs, match
e	Information and education component
f	Schedule implementing the measures
g	Interim measurable milestones for determining if the actions are being implemented
h	Criteria to determine if load reductions are being achieved
i	Monitoring to evaluate the effectiveness of the implementation efforts over time

REFERENCES

California Water Boards: State Water Resources Control Board. 2014-2016 Integrated Report- The CURRENT 3030 (d) list. Available at: 2014-2016 Integrated Report 303 (d) list.

California Water Boards: State Water Resources Control Board. Watershed Management Initiative. 2002. Excerpt available at: Section 2.1 (Lower) Truckee River Watershed (1 of 5 Focus Watersheds)

Carson Water Subconservancy District. I am Carson River Watershed video. Available at I am Carson River Watershed.

NDEP BWQP, Nevada Division of Environmental Protection, 2016-2018. Nevada 2016-2018 Water Quality Integrated Report

One Truckee River. Proposal Vegetation Management and Restoration Planning. Submitted November 19th, 2019. One Truckee River Management Plan, Phase I, 2017

Project Profile

Agency Coordination and Notification

OVERVIEW

Site Location Description

Truckee Meadows Water Authority (TMWA) Service Area

Primary Contact

Christian Kropf
Senior Hydrogeologist
Truckee Meadows Water Authority
1355 Capital Blvd. I Reno, NV 89502
O: (775) 834-8016, C: (775) 813-0263
ckropf@tmwa.com I www.tmwa.com

PART A: GENERAL DESCRIPTION

Groundwater Basin, #

All groundwater basins in Washoe County with Public Water Systems. Basins include but are not limited to:

- Spanish Springs Valley #085
- Sun Valley #086
- Truckee Meadows #087
- Pleasant Valley #088
- Washoe Valley #089
- Truckee Canyon Segment #091
- Lemmon Valley West #092A
- Lemmon Valley East #92B
- Cold Spring Valley #100
- Long Valley #100A

HUC-12 Name, #

All watersheds in Washoe County in the Truckee Meadows area:

- Bull Ranch-Truckee River #160501020504
- Dog Creek-Truckee River #160501020503
- Dry Creek #160501020507
- Evans Creek-Truckee River #160501020508
- Franktown Creek-Frontal Washoe Lake #160501020301
- Galena Creek #160501020303
- Hidden Valley-Steamboat Creek #160501020304
- Hunter Creek-Truckee River #160501020505
- Peavine Creek-Truckee River #160501020506
- Steamboat Valley-Steamboat Creek #160501020306
- Thomas Creek #160501020305
- Washoe Lake #160501020302

PART A: GENERAL DESCRIPTION - *continued*

Source Water Protection Area

A Source Water Protection Area (SWPA) is a locally established management area surrounding a surface water or groundwater resource that supplies water for public consumption within Washoe County. Activities in these buffer areas can affect the quality of water downstream or underground. HUC-12 Watershed Overview Protection Areas Figure. SWPAs and Critical SWPAs can be reviewed online using the local source water and watershed protection webtool at the following link: SWPAs and Critical SWPAs Webtool

All SWPA areas in Washoe County are a focus for this action.

Problem Statement and Causes of Pollution [a, c]

A list of "Potential Contributory Activities" was developed by the local source water protection team. These activities may present existing and/or potential risks to source water quality, particularly when located in SWPAs. Typically, the potential risks are leaks or spills that could release fuel, chemicals, or wastes to the environment. For example, water supply wells in the Truckee Meadows have been affected by past releases of solvents and hydrocarbons, resulting in costly long-term groundwater remediation and monitoring obligations.

Project Summary

TMWA's intent is to increase awareness of the importance of our drinking water supplies in SWPAs. Specifically, the goal is to increase coordination with permitting agencies to recognize and implement protection of important public drinking water supplies from contamination at the planning and permitting stage. For example, existing regulations which cover the storage, handling and disposal of hazardous materials become critically important in areas where a leak or spill could threaten drinking water sources, such as the Truckee River or aquifers in the Truckee Meadows. Awareness of the potential risks to drinking water sources could help ensure implementation of and compliance with existing requirements, such as designs for secondary containment or protocols for emergency response.

To achieve this intent, TMWA proposes to coordinate with the planning staff of Washoe County, the City of Reno, and the City of Sparks to devise methods of incorporating "source water protection" into the development review process.

Reference Plan Implementation or Priority

- Reimagine Reno, The Master Plan, 2017, Goals and Policies GP 7.1D, IMP-7.1h & 7.1i
- Washoe County Master Plan, 2008, Water Resources, Conservation and Open Space, Open Space and Natural resources Management Plan, Goal 3.3
- Sparks Comprehensive Plan, Resiliency and Conservation Goals and Policies, Policy RC5
- Truckee Meadows Water Authority 2020-2040 Water Resources Plan, 2020, Chapter 6 protecting he Watershed and the Environment, Recommendation 2.6

PART B: PROJECT DETAILS

Project Goals and Tasks

The goal of this project is to incorporate the consideration of "source water protection" into the development review processes of Washoe County, the City of Sparks, the City of Reno, and the Washoe County Health District. Tasks include:

1) Coordinate with staff to identify "Use Types" as defined in local Development Code that correlate with the "Potential Contributory Activities".
2) Provide planning and other staff easy access to GIS-based SWPA information.
3) Identify where TMWA is currently or could be notified to review possible effects on water sources in the agency planning/permitting process.
4) Develop internal TMWA processes to monitor and provide timely comments to other reviewing agencies.
5) Implement measures to improve communication between TMWA and development review agencies regarding source water protection.

Pollutant Load Reductions Anticipated [(b)]

Load reductions will be realized through better communication and education inherent in this proposed project. .

Timeline [(f)]

Q1 2021 – Develop lists of "Use Types" correlated to "Potential Contributory Activities" and review with planning/public works staff for Washoe County and Sparks.

Q2 2021 – Coordinate with jurisdictions for format and access to SWPA mapping and database content.

Q1/Q2 2021 – Identify TMWA's existing and potential role in review process, and identify information/tools, if needed, to facilitate communication.

Q2 2021 – Review TMWA internal processes and provide additional information/tools, if needed, to facilitate communication.

Q3 2021 – Coordinate with agencies regarding potential modifications needed to successfully include source water protection in the review processes and make recommendations for next steps.

Project Lead [(f)] and Partners

TMWA (Project Lead)

Partners who will be requested in this Project include:

- City of Reno
- City of Sparks
- Washoe County
- Washoe County Health District
- NDEP, Integrated Source Water Protection Program
- NDEP, 319(h) NPS Program

Monitoring and Evaluation with Criteria to Measure Goal Progress [(h)]

Document materials developed and shared between entities.

TMWA would track notifications received and comments provided regarding source water protection for projects within each entity's jurisdiction.

PART B: PROJECT DETAILS - *continued*

Information and Education [(e)]	Continuing communication between TMWA and each agency regarding the need for source water protection and the process for development review. Comments on development projects would be provided to applicants by the local development review agency.
Technical and Financial Assistance Needed [(d)]	Technical and financial assistance will be needed from NDEP and the various jurisdictions.

EPA Element	Description
a	Estimate the significant point and nonpoint sources, in addition to the natural background levels that make up the pollutant loads causing the problems in the watershed
b	Estimate load reductions expected from action
c	The nonpoint source management measures needed to achieve load reductions and the critical areas
d	Estimate the technical and financial assistance needed, with costs, match
e	Information and education component
f	Schedule implementing the measures
g	Interim measurable milestones for determining if the actions are being implemented
h	Criteria to determine if load reductions are being achieved
i	Monitoring to evaluate the effectiveness of the implementation efforts over time

REFERENCES

City of Reno, Reimagine Reno, The Master Plan, Goals and Policies GP 7.1D, IMP-7.1h & 7.1i, 2017. Available at: Reimagine Reno

City of Sparks, Sparks Comprehensive Plan 2030, Resiliency and Conservation Goals and Policies, Policy RC5, 2016. Available at: City of Sparks Master Plan 2016

NDEP BWQP, Nevada Division of Environmental Protection, 2016-2018. Nevada 2016-2018 Water Quality Integrated Report

Truckee Meadows Water Authority, DRAFT 2020-2040 Water Resources Plan, Chapter 6 protecting he Watershed and the Environment, Recommendation 2.6, 2020. Available at: TMWA Draft 2020-40 WRP pdf

Washoe County, Washoe County Master Plan, Water Resources, Conservation and Open Space, Open Space and Natural Resources Management Plan, Goal 3.32008, 2008. Available at: Washoe County Management Plan 2008

Project Profile

Natural Resource Planning Coordination

OVERVIEW

Site Location Description	Truckee Meadows Water Authority (TMWA) Service Area
Primary Contact	Kara Steeland Hydrologist Truckee Meadows Water Authority 1355 Capital Blvd. I Reno, NV 89502 O: (775) 834-8204 ksteeland@tmwa.com I www.tmwa.com

PART A: GENERAL DESCRIPTION

Groundwater Basin, #	Groundwater basins entirely or partly within: • TMWA Service Area • Western Regional Water Commission (WRWC) jurisdictional area
HUC-12 Name, #	All watersheds contributing flow to: • TMWA Service Area • WRWC Jurisdictional Area
Source Water Protection Area	A Source Water Protection Area (SWPA) is a locally established management area surrounding a surface water or groundwater resource that supplies water for public consumption within Washoe County. Activities in these buffer areas can affect the quality of water downstream or underground. SWPAs and Critical SWPAs are shown in the HUC-12 Watershed Overview Protection Areas Figure), and can be reviewed online using the local source water and watershed protection webtool at the following link: SWPAs and Critical SWPAs Webtool The focus area for this project is all SWPAs located entirely or partly within the TMWA Service Area and/or the WRWC jurisdictional area.
Problem Statement and Causes of Pollution [a, c]	Water sources with suitable quality and quantity to provide public drinking water are a high priority for communities in Washoe County to preserve and protect. Regional natural resource management requires a multi-jurisdictional approach to balance the needs for public health, wildlife, stormwater control, flood control and other values associated with both groundwater and surface water.

PART A: GENERAL DESCRIPTION - *continued*

Project Summary

TMWA's intent is to increase awareness of SWPAs and to ensure that actions, which promote protection of important public drinking water supplies from contamination, are recognized and implemented with consistency across multiple jurisdictions.

To achieve this intent, TMWA proposes to coordinate with the appropriate agency staff to review and comment on elements related to source water protection during on-going Master Plan and/or Development Code updates. A consistent regional approach will facilitate support for measures to implement source water protection.

Reference Plan Implementation or Priority

- Reimagine Reno, The Master Plan, 2017, Goals and Policies GP 7.1D, IMP-7.1h & 7.1i
- Washoe County Master Plan, 2008, Water Resources, Conservation and Open Space, Open Space and Natural Resources Management Plan, Goal 3.3
- Sparks Comprehensive Plan, Resiliency and Conservation Goals and Policies, Policy RC5
- TMWA 2020-2040 Water Resources Plan, 2020, Chapter 6 protecting he Watershed and the Environment, Recommendation 2.6
- Natural resource, Resiliency, and sustainability components of local administrative code

PART B: PROJECT DETAILS

Project Goals and Tasks

The goal of this project is to provide timely information and technical support to Truckee Meadows Regional Planning Agency (TMRPA), WRWC, Washoe County, the City of Sparks, the City of Reno, and the Washoe County Health District to develop consistent and reliable approaches to implement "source water protection".
Tasks include:

1) Review schedules identified by various jurisdictions for updates of guidance, Master Plan elements, or administrative code with natural resource components.
2) Provide planning and other staff access to GIS based SWPA information.
3) Provide technical review and comment to agencies during their plan review and development period.

Pollutant Load Reductions Anticipated [(b)]

This Project will not directly quantify the benefits of developing consistent approaches to preserve and protect surface and groundwater sources from pollution. Instead, it discourages load increases related to development activities.

Timeline[(f)]

The timeline will be determined as plan updates are initiated by each jurisdiction. Current opportunities include:

- TMRPA proposed Natural Resource Management Plan – 2022
- WRWC Comprehensive Regional Water Plan Update – 2020/2021
- Washoe County Master Plan Update – 2021

PART B: PROJECT DETAILS - *continued*

Project Lead [f] and Partners	TMWA (Project Lead), Partners may include: • City of Reno • City of Sparks • Washoe County • Washoe County Health District • Western Regional Water Commission • Truckee Meadows Regional Planning Agency • Truckee Meadows Flood Management District • Truckee Meadows Storm Water Permit Coordinating Committee • NDEP, Integrated Source Water Protection Program • NDEP, 319(h) NPS Program
Monitoring and Evaluation with Criteria to Measure Goal Progress [h]	Track the materials developed and shared between entities during plan or code updates. Track adoption of plans or code updates that improve source water protection.
Information and Education [e]	Continue communication between TMWA and each agency regarding the need for coordinated source water protection.
Technical and Financial Assistance Needed [d]	Technical assistance is required from NDEP) and the various jurisdictions. Financial Assistance may be required to support other local agencies (TMRPA, TMSWPCC, etc.) and/or their consultants to provide technical studies.

EPA Element	Description
a	Estimate the significant point and nonpoint sources, in addition to the natural background levels that make up the pollutant loads causing the problems in the watershed
b	Estimate load reductions expected from action
c	The nonpoint source management measures needed to achieve load reductions and the critical areas
d	Estimate the technical and financial assistance needed, with costs, match
e	Information and education component
f	Schedule implementing the measures
g	Interim measurable milestones for determining if the actions are being implemented
h	Criteria to determine if load reductions are being achieved
i	Monitoring to evaluate the effectiveness of the implementation efforts over time

REFERENCES

City of Reno, Reimagine Reno, The Master Plan, Goals and Policies GP 7.1D, IMP-7.1h & 7.1i, 2017. Available at Reimagine Reno

City of Sparks, Sparks Comprehensive Plan, Resiliency and Conservation Goals and Policies, Policy RC5, 2016. Available at City of Sparks Master Plan 2016

NDEP BWQP, Nevada Division of Environmental Protection, 2016-2018. Nevada 2016-2018 Water Quality Integrated Report

Truckee Meadows Water Authority, DRAFT 2020-2040 Water Resources Plan, Chapter 6 protecting he Watershed and the Environment, Recommendation 2.6, 2020. Available at TMWA Draft 2020-40 WRP

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

Washoe County, Washoe County Master Plan, Water Resources, Conservation and Open Space, Open Space and Natural Resources Management Plan, Goal 3.32008, 2008. Available at Washoe County Management Plan 2008

Project Profile

Truckee River Upper Watershed Agency Coordination

OVERVIEW

Site Location Description

Truckee River Watershed Coordination with the United States Forest Service

Primary Contact

Christian Kropf
Senior Hydrogeologist
Truckee Meadows Water Authority
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O: (775) 834-8016, C: (775) 813-0263
ckropf@tmwa.com I www.tmwa.com

PART A: GENERAL DESCRIPTION

Groundwater Basin, #

All groundwater basins in Washoe County with Public Water Systems. Basins include but are not limited to:

- Spanish Springs Valley #085
- Sun Valley #086
- Truckee Meadows #087
- Pleasant Valley #088
- Washoe Valley #089
- Truckee Canyon Segment #091
- Lemmon Valley West #092A
- Lemmon Valley East #92B
- Cold Spring Valley #100
- Long Valley #100A

Tributary Name, HUC-12 Name, #

All watersheds in Washoe County in the Truckee Meadows area:

- Bull Ranch-Truckee River #160501020504
- Dog Creek-Truckee River #160501020503
- Dry Creek #160501020507
- Evans Creek-Truckee River #160501020508
- Franktown Creek-Frontal Washoe Lake #160501020301
- Galena Creek #160501020303
- Hidden Valley-Steamboat Creek #160501020304
- Hunter Creek-Truckee River #160501020505
- Peavine Creek-Truckee River #160501020506
- Steamboat Valley-Steamboat Creek #160501020306
- Thomas Creek #160501020305
- Washoe Lake #160501020302

PART A: GENERAL DESCRIPTION - *continued*

Source Water Protection Area

A Source Water Protection Area (SWPA) is a locally established management area surrounding a surface water or groundwater resource that supplies water for public consumption within Washoe County. Activities in these buffer areas can affect the quality of water downstream or underground (see HUC-12 Watershed Overview Protection Areas Figure). SWPAs and Critical SWPAs can be reviewed online using the local source water and watershed protection webtool at the following link: SWPAs and Critical SWPAs Webtool.

All SWPA areas in Washoe County are a focus for this coordination action, with particular concentration on the upper watershed SWPAs in the Humboldt-Toiyabe National Forest, under the jurisdiction of the Carson Ranger District.

Problem Statement and Causes of Pollution [a, c]

Dense forest located on public lands surrounds the upper Truckee River Watershed is managed by the United States Forest Service (USFS). One of the greatest concerns for water quality in this portion of the watershed is wildfire, a serious issue throughout the western United States. Wildfire takes down trees that have strong root systems, allowing sediment that would have previously been held in place to wash downstream and pollute the rest of the watershed. This is a concern in both SWPAs and critical SWPAs where erosion and sediment can be detrimental to water quality.

Project Summary

The USFS is currently working with the American Water Works Association to protect drinking water at the source. Truckee Meadows Water Authority (TMWA) intends to follow that example by increasing coordination and communication with the USFS Carson Ranger District regarding wildfire and erosion control through this project. The overall goal is to increase communication between TMWA and the USFS to prompt innovative erosion control after wildfire.

To achieve this intent, TMWA proposes to coordinate with the USFS to incorporate source water protection into fire management, control, and recovery. This could be accomplished through annual meetings between the USFS and TMWA, most likely in the winter months prior to fire season.

Reference Plan Implementation or Priority

- Reimagine Reno, The Master Plan, 2017, Goals and Policies GP 7.1D, IMP-7.1h & 7.1i
- Washoe County Master Plan, 2008, Water Resources, Conservation and Open Space, Open Space and Natural resources Management Plan, Goal 3.3
- Sparks Comprehensive Plan, Resiliency and Conservation Goals and Policies, Policy RC5
- Truckee Meadows Water Authority 2020-2040 Water Resources Plan, 2020, Chapter 6 protecting he Watershed and the Environment, Recommendation 2.6

PART B: PROJECT DETAILS

Project Goals and Tasks

The goal of this project is to reduce erosion and sediment deposition from wildfire in the upper SWPAs. Through coordination, TMWA and the USFS can discuss management options for the upcoming year that would help maintain water quality. These tasks could include:

1) Annual coordination meetings to discuss the previous fire season, wildfire management, and the upcoming year.
2) Evaluate erosion and sediment pollution over time, with increased observation after major wildfire events.
3) Implement measures to improve communication between TMWA and federal agencies regarding source water protection.

Pollutant Load Reductions Anticipated [(b)]

Load reductions will be realized through better communication and strategic land management inherent in this proposed project. This project involves coordination and communication, but the active measures would be implemented by the USFS. Through the communication with the USFS in regards to source water protection, presumably the Truckee River watershed would have high priority to achieve and maintain resilient forest and watershed health.

Project Lead [(f)] and Partners

Project Lead: TMWA

Partners who will be requested in this project include:

- USFS Carson Ranger District
- Washoe County
- Nevada Division of Environmental Protection (NDEP), Integrated Source Water Protection Program
- NDEP, 319(h) Nonpoint Source (NPS) Program

Monitoring and Evaluation with Criteria to Measure Goal Progress [(h)]

The goal of this project is to increase communication and coordination between TMWA and USFS in an effort to reduce water pollution from sediment and erosion. An analysis of the annual coordination meetings will help determine the efficiency of these meetings, and how they could be improved.

Monitoring sediment and erosion would be completed on a project by project specific basis according to the goals of the forest and watershed resiliency implementation project.

Information and Education [(e)]

Continuing communication between TMWA and USFS regarding the need for source water protection and wildfire management. Pertinent information developed through this partnership would be shared with the public as part of the education and outreach programs described separately.

Technical and Financial Assistance Needed [(d)]

Technical and financial assistance will be needed from NDEP and the various jurisdictions. Financial Assistance may be required to support wildfire management by the USFS and/or their consultants to provide technical studies.

EPA Element	Description
a	Estimate the significant point and nonpoint sources, in addition to the natural background levels that make up the pollutant loads causing the problems in the watershed
b	Estimate load reductions expected from action
c	The nonpoint source management measures needed to achieve load reductions and the critical areas
d	Estimate the technical and financial assistance needed, with costs, match
e	Information and education component
f	Schedule implementing the measures
g	Interim measurable milestones for determining if the actions are being implemented
h	Criteria to determine if load reductions are being achieved
i	Monitoring to evaluate the effectiveness of the implementation efforts over time

REFERENCES

American Water Works Association, USDA United States Forest Service, Protecting Drinking Water at the Source: Working with the USDA Forest Service, Brochure, August 4, 2020. Available at: USDA FS Brochure Protecting Drinking Water at the Source

City of Reno, Reimagine Reno, The Master Plan, Goals and Policies GP 7.1D, IMP-7.1h & 7.1i, 2017. Available at: ReimagineReno the City of Reno Master Plan

City of Sparks, Sparks Comprehensive Plan 2030, Resiliency and Conservation Goals and Policies, Policy RC5, 2016. Available at: City of Sparks Master Plan 2016

NDEP BWQP, Nevada Division of Environmental Protection, 2016-2018. Nevada 2016-2018 Water Quality Integrated Report

Truckee Meadows Water Authority, DRAFT 2020-2040 Water Resources Plan, Chapter 6 protecting the Watershed and the Environment, Recommendation 2.6, 2020. Available at: TMWA-Draft-2020-40-WRP.pdf

United States Geological Survey, Water Quality After Wildfire, Water Resources. Available at: USGS Water Quality After Wildfire Water Resources

Washoe County, Washoe County Master Plan, Water Resources, Conservation and Open Space, Open Space and Natural Resources Management Plan, Goal 3.32008, 2008. Available at: Washoe County Management Plan 2008

Project Profile

Assessment of Desert Soil Leaching Potential

OVERVIEW

Site Location Description

Specific areas to be determined. Areas of concern include the areas of new development in Sun Valley, Spanish Springs, and Verdi

Primary Contact

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PART A: GENERAL DESCRIPTION

Groundwater Basin, #

Locations to be determined and may include any of the following:

- Spanish Springs Valley, #85
- Sun Valley, #86
- Truckee Meadows, #87
- Washoe Valley, #89
- Truckee Canyon Segment, #91

Tributary Name; HUC-12 Name, #

Locations to be determined and may include any of the following:

- Bronco Creek-Truckee River 160501020502
- Bull Ranch Creek-Truckee River #160501020504
- Dog Creek #160501020503
- Dry Creek #160501020507
- Evans Creek-Truckee River #160501020508
- Franktown Creek-Frontal Washoe Lake #160501020301
- Galena Creek, #160501020303
- Gray Creek-Truckee River #160501020503
- Hidden Valley-Steamboat Creek #160501020304
- Hunter Creek-Truckee River #160501020505
- Peavine Creek-Truckee River #160501020506
- Spanish Springs #160501020402
- Steamboat Valley-Steamboat Creek #160501020306
- Thomas Creek #160501020305
- Washoe Lake #160501020302

PART A: GENERAL DESCRIPTION - *continued*

Source Water Protection Area

A Source Water Protection Area (SWPA) is a management area surrounding a surface water or groundwater resource that supplies water for public consumption. A SWPA provides a buffer around the Truckee River included in this project, as well as other perennial tributaries within the HUC-12s. Activities in these buffer areas can affect the quality of water downstream or underground. See HUC-12 Watershed Overview Protection Areas Figure.

There are two types of SWPA buffers in the Truckee Meadows that are distinguished by the size of the buffers. Critical SWPAs represent areas closer to perennial rivers, streams, tributaries and wells (SWPAs and Critical SWPAs Webtool).

Problem Statement and Causes of Pollution [a, c]

Residential development results in irrigation of lawns and landscaping, which changes the rates and frequency of water infiltration through desert soils. Depending on the soil type, nitrate and other salts can be mobilized and carried to groundwater and/or surface water. Chalk Creek is one example of an ephemeral drainage that has become perennial due to urbanization. Salts leached from the soils cause water quality to be impaired in Chalk Creek which is a tributary to the Truckee River upstream of the Chalk Bluff Water Treatment Plant (WTP). Spanish Springs provides a second example where studies suggest sources of nitrate impacting groundwater quality include naturally occurring desert soils in addition to residential septic systems.

Project Summary

The potential for mobilization of naturally occurring salts and/or nitrates that could contaminate groundwater and surface water would be assessed in a phased approach. Phase I would be to develop criteria to prioritize locations for detailed investigation. Initial criteria are anticipated to include: soils, geology, groundwater and surface water quality, existing and potential sources of infiltration (irrigation, septic systems, etc.), and potential threats to source water. Subsequent phases would be dependent on the outcome of Phase I, but ultimately result in identification of source waters vulnerable to contamination and potential mitigation measures to protect source water quality.

Reference Plan Implementation or Priority

Balance Hydrologics, Truckee Meadows Storm Water Monitoring Annual Report. Prepared for City of Reno, 2016,2017,2018. 2018 Truckee Meadows Storm Water Monitoring Annual Report

Truckee Meadows Water Authority, DRAFT 2020-2040 Water Resource Plan, Recommended Actions, Recommendations 2.6. TMWA-Draft-2020-40-WRP.pdf

PART B: PROJECT DETAILS

Project Goals and Tasks

- The goal of the project is to predict where water quality may be affected by mobilization of salts/nitrates from desert soils and identify potential mitigation measures.
- Review literature regarding naturally occurring nitrates and salts in desert soils and examples of groundwater and surface water contamination.
- Identify local criteria that could be used to assess risks to source water.
- Coordinate with local water managers on their water supply priorities.
- Identify and map areas of concern.

PART B: PROJECT DETAILS - *continued*

Project Goals and Tasks *(continued)*	• The deliverables produced at Phase I completion would include results of literature review, description of key criteria, preliminary mapping of areas of concerns, and recommendations for next steps.
Estimated Existing Loads and Sources [(a)]	With regard to Non-Point Source pollution of surface water, water quality monitoring indicates that Chalk Creek contains relatively high levels of total dissolved solids (at approximately 2,600 mg/L) and flows year-round at approximately 240 gallons per minute. The concentration of total dissolved solids (TDS) in the Truckee River is of significance since the loading affects long-term water quality downstream in the Truckee River. By itself, Chalk Creek is not a major contributor of TDS to the Truckee River, but control of TDS here and elsewhere would have positive implications throughout the watershed (ECO:LOGIC Consulting Engineers, 2009).
Milestones [(g)], **Schedule** [(f)]	The schedule for this project would be vetted. Likely Phase I of the project could be completed within one year of funding being allocated and made available to the project.
Pollutant Load Reductions Anticipated [(b)]	There are no pollutant load reductions anticipated for Phase I. Subsequent phases would be focused on pollutant load reductions.
Project Lead [(f)] **and Partners**	Christian Kropf Senior Hydrogeologist Truckee Meadows Water Authority 1355 Capital Blvd. I Reno, NV 89502 O: (775) 834-8016, C: (775) 813-0263 ckropf@tmwa.com I www.tmwa.com
Monitoring and Evaluation with Criteria to Measure Goal Progress [(h)]	Phase I is data gathering and assessment and does not include monitoring or evaluation criteria.
Information and Education [(e)]	Phase I will include outreach and education to local water managers regarding their priorities and areas of greatest concern. Future phases would include outreach and education regarding the water's quality risks and development of potential mitigation measures.
Technical and Financial Assistance needed [(d)]	Technical and financial assistance would be roughly $40,000 for Phase I to review the soils, geology, hydrology and areas of concern, collect and analyze the results, compile useful mapping, and develop steps for subsequent phases.

EPA Element	Description
a	Estimate the significant point and nonpoint sources, in addition to the natural background levels that make up the pollutant loads causing the problems in the watershed
b	Estimate load reductions expected from action
c	The nonpoint source management measures needed to achieve load reductions and the critical areas
d	Estimate the technical and financial assistance needed, with costs, match
e	Information and education component
f	Schedule implementing the measures
g	Interim measurable milestones for determining if the actions are being implemented
h	Criteria to determine if load reductions are being achieved
i	Monitoring to evaluate the effectiveness of the implementation efforts over time

REFERENCES

Balance Hydrologics, Truckee Meadows Storm Water Monitoring Annual Report. Prepared for City of Reno, 2016,2017,2018. 2018 Truckee Meadows Storm Water Monitoring Annual Report

ECO:LOGIC, Consulting Engineers. Technical Memorandum Chalk Creek Treatment Feasibility Assessment. Prepared for City of Reno Public Works, 2009. Technical Memorandum Chalk Creek Treatment Feasibility Assessment

JBR Environmental Consultants, Inc. Chalk Creek Pilot Treatment Wetland. Prepared for City of Reno, 2011. Chalk Creek Pilot Treatment Wetland 2011

JBR Environmental Consultants, Inc. Chalk Creek Watershed Characterization. Prepared for City of Reno Public Works, 2010.

Truckee Meadows Water Authority, DRAFT 2020-2040 Water Resource Plan, Recommended Actions, Recommendations 2.6. TMWA-Draft-2020-40-WRP.pdf

Project Profile

DRASTIC Modeling for Source Water Protection

Overview

Site Location Description	Locations to be determined by project lead	
Primary Contact	Christian Kropf Senior Hydrogeologist Truckee Meadows Water Authority 1355 Capital Blvd. I Reno, NV 89502	O: (775) 834-8016 C: (775) 813-0263 ckropf@tmwa.com www.tmwa.com

Part A: General Description

Problem Statement and Causes of Pollution

Aquifers in the Truckee Meadows Water Authority (TMWA) service territory have become contaminated by nitrates. The sources of the nitrates are likely anthropogenic sources such as septic systems and fertilized green spaces. Some wells have been taken off-line due to water quality contamination.

Descriptions of aquifer vulnerability to contamination would allow for better water resource management including forecasting for future well locations, well rehabilitation and closures, septic to sewer conversions, and land management practices. With an improved understanding of aquifer vulnerability, effort can be focused on preventing and reducing contamination of valuable groundwater supplies.

Project Summary

This project involves developing site-specific modeling to determine the relative vulnerability of source water aquifers to contamination.

The results of this type of study can be used in managing groundwater resources by policy makers, natural resources protection practitioners, and groundwater-related researchers. It also can be used as a screening tool in conjunction with existing numerical groundwater models for more detailed aquifer analysis.

A modified "DRASTIC" approach may be adapted to local conditions and used to model priority aquifers in existing and future service areas for TMWA.

Part B: Project Details

Project Goals and Tasks

The goal of this project is to evaluate vulnerability for aquifers used for existing and future drinking water supply.

A calibrated DRASTIC model is described in *Aquifer Vulnerability Assessment for Sustainable Groundwater Management Using DRASTIC* in Water 2017, 9, 792 by Won Seok Jang, Bernard Engel, Jon Harbor and Larry Theller. The following criteria calibrated to local conditions are used in the DRASTIC model:

- Depth to water
- Recharge

PART B: PROJECT DETAILS - *continued*

Project Goals and Tasks *(continued)*

- Aquifer Material
- Soil Type
- Topography
- Impact of Vadose Zone
- Conductivity

Aquifer vulnerability can be used for prioritization of source water protection activities and strategies. GIS tools are needed to help select and represent parameters geographically and then calculate the relative vulnerability to various existing and potential sources of contamination.

Initial review of parameters to consider (starting with prior recharge studies):

- Well vulnerability (construction, age, depth, seal, etc.)
- Soils (Infiltration capacity)
- Soils (solubility of naturally occurring constituents after development)
- Existing good groundwater quality
- Well capture zones
- Surface water locations/buffers – (irrigation ditch, streams, and storm water potentially can convey to groundwater by infiltration)
- Geology/Lithology
- Depth to groundwater (data available in the Truckee Meadows, prior studies, State Engineer)
- Vertical groundwater gradient (upward or downward)
- Land Cover/Vegetation (national data set), represents degree of ground and surface water interaction

Parameter weighting, safety factors, and other criteria (for example, existing nitrate contamination data) may be incorporated into the assessment to represent local conditions.

The deliverable would be a series of maps or GIS layers for use by decision makers.

Timeline

This research project will be completed as time and funding allows. Ideally priority aquifers would be modeled within the next five years.

Project Lead and Partners

Truckee Meadows Water Authority (www.tmwa.com)

Technical and Financial Assistance needed

Technical and financial assistance will be needed for this research project. Potentially, TMWA could team with University of Nevada, Reno researchers to assist in the modeling and analysis effort. The amount of funding needed will be determined.

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Project Profile

Storm Drain Mapping

Overview

Site Location Description	Truckee Meadows Water Authority Service Area
Primary Contact	Iris Jehle-Peppard One Truckee River Executive Director (775) 450-5489 iris@onetruckeeriver.org

Part A: General Description

Groundwater Basin, #	• Truckee Meadows #087
HUC-12 Name, #	• Dry Creek #160501020507 • Evans Creek-Truckee River #160501020508 • Galena Creek #160501020303 • Hunter Creek-Truckee River #160501020505 • Peavine Creek- Truckee River #160501020506 • Thomas Creek #160501020305
Source Water Protection Area	A Source Water Protection Area (SWPA), is a management area surrounding a surface water or groundwater resource that supplies water for public consumption. A SWPA provides a buffer around the perennial tributaries to safeguard these drinking water sources within Washoe County. Activities in these buffer areas can affect the quality of water downstream or underground. See HUC-12 Watershed Overview Protection Areas Figure. There are two types of SWPA buffers that surround the perennial tributaries; they are distinguished by their size. Critical SWPAs represent areas closer to perennial rivers, streams, and tributaries (SWPAs and Critical SWPAs Webtool). All SWPAs entirely or partly within the watersheds listed above are included.
Problem Statement and Causes of Pollution [a, c]	Storm drains discharge directly into the Truckee River. Some of the storm drains do not have mapped watersheds. Mapped watersheds would assist in understanding where pollutants are coming from. Otherwise, it is difficult to address point and non-point sources of pollution to the river.

PART A: GENERAL DESCRIPTION - *continued*

Project Summary	Truckee Meadows Regional Planning Agency (TMRPA) would create geospatial data of reported storm drain locations and conduct analysis identifying the highest-volume storm drains. Utilizing GIS tools and elevation data, contributing watershed areas can be delineated. Once mapped, data can be shared via an online web viewer. The TMRPA GIS department will build on existing data. Digital elevation models or recently acquired Light Detection and Ranging (LIDAR) data would be used in conjunction with ArcGIS hydro modeling tools to calculate the watersheds contributing to the stormwater drains. Stormwater drains will be ranked by contributing area.
Reference Plan Implementation or Priority	• One Truckee River Management Plan Phase I, Objective 1.2 Assure that storm drains are delivering the cleanest water to the river. • Truckee Meadows Stormwater Monitoring Annual Report Fiscal Year 2019.

PART B: PROJECT DETAILS

Project Goals and Tasks	The goal of this project is to develop a map of the contributing watersheds to the storm drains discharging into the Truckee River. Tasks include: 1) Review of existing data 2) Modeling 3) GIS mapping
Estimated Existing Loads and Sources [(a)]	Data are available in the Truckee Meadows Stormwater Monitoring Annual Report Fiscal Year 2019. Data indicate that Total-P concentrations ranged between 0.09 mg/L and 4.7 mg/L. Highest storm event Total-P concentrations were measured from most stormwater urban outfalls. Total-P concentrations in tributary baseflow ranged between 0.03 mg/L to as high as 0.4 mg/L.
Milestones [(g)], Schedule [(f)] and Cost Estimate [(d)]	The project would be completed within a year once funding is secured. The project mapping could be completed for $5,000
Pollutant Load Reductions Anticipated [(b)]	This project will allow for a better understanding of the contributing areas to the river and will allow for more accurate loading estimates.
Project Lead [(f)] and Partners	Although One Truckee River is the project lead, the TMRPA would complete the work.
Monitoring and Evaluation with Criteria to Measure Goal Progress [(h)]	The mapping product will determine if this action is complete. There may be validation needed if areas are unclear.

PART B: PROJECT DETAILS - *continued*

Information and Education [(e)]	The mapping will help to inform residents of their role in helping to protect water quality. The information may help other education and outreach initiatives.
Technical and Financial Assistance needed [(d)]	Financial assistance will be needed for the TMRPA mapping services. Roughly $5,000 would be needed to complete this mapping project.

EPA Element	Description
a	Estimate the significant point and nonpoint sources, in addition to the natural background levels that make up the pollutant loads causing the problems in the watershed
b	Estimate load reductions expected from action
c	The nonpoint source management measures needed to achieve load reductions and the critical areas
d	Estimate the technical and financial assistance needed, with costs, match
e	Information and education component
f	Schedule implementing the measures
g	Interim measurable milestones for determining if the actions are being implemented
h	Criteria to determine if load reductions are being achieved
i	Monitoring to evaluate the effectiveness of the implementation efforts over time

REFERENCES

Balance Hydrologics, Truckee Meadows Storm Water Monitoring Annual Report. Prepared for City of Reno, 2015,2016,2017,2018. 2018 Truckee Meadows Storm Water Monitoring Annual Report

One Truckee River. Proposal Vegetation Management and Restoration Planning. Submitted November 19th, 2019. One Truckee River Management Plan, Phase I, 2017

Project Profile

Vegetation Management and Restoration Planning

OVERVIEW

Site Location Description

- Along the urban stretch of the Truckee River from Dorostkar Park to the Truckee River Water Reclamation Facility within the city of Reno, Sparks, and Washoe County, Nevada. The Project area is in HUC-8 (16050102). See location map.
- Dorostkar Park: Washoe County, southwest of I-580 and north of Mayberry Drive.
- Truckee River Water Reclamation Facility: Washoe County, southeast of I-580 and east of Veterans Parkway.

Primary Contact

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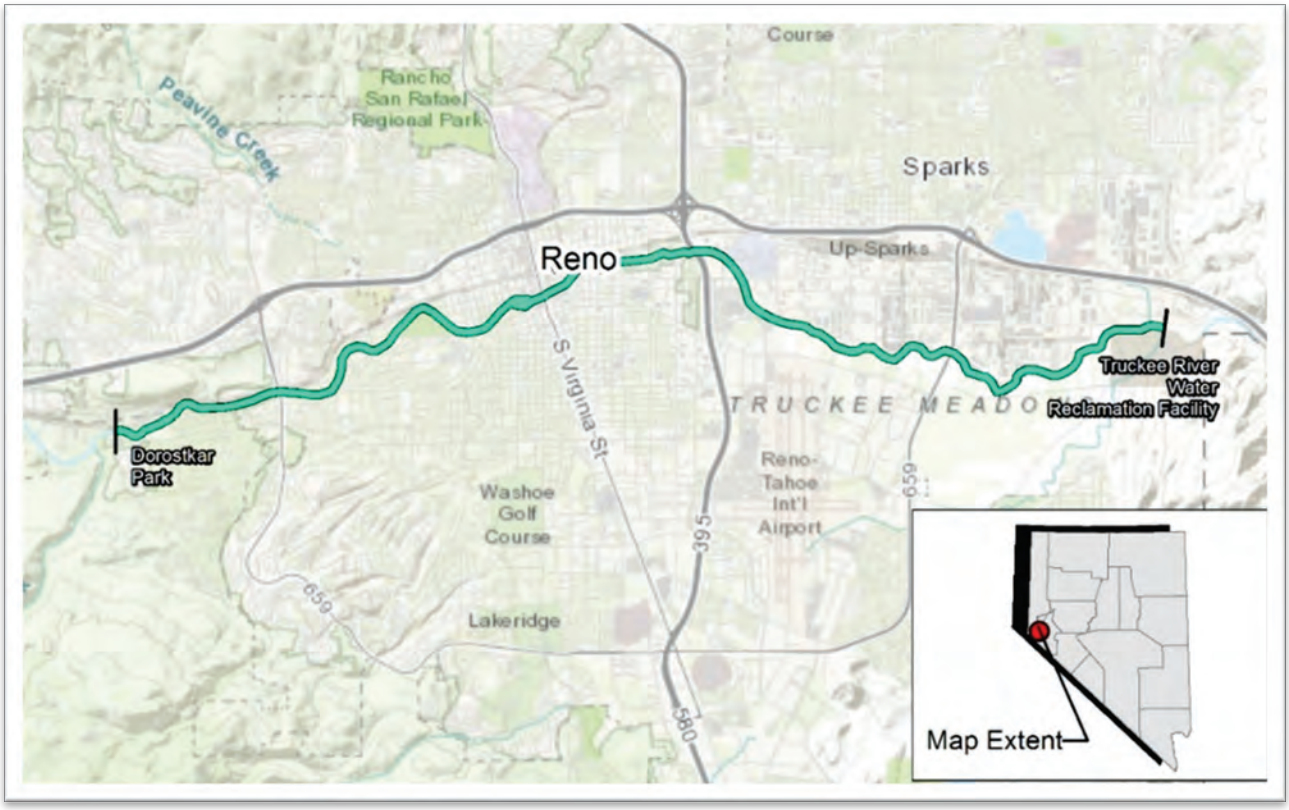

Figure 1: Project Area Location
(shown in green highlight)

PART A: GENERAL DESCRIPTION

Groundwater Basin, #

- Sun Valley #086
- North Truckee Meadows #087
- Truckee Canyon Segment #091

HUC-12 Name, #

- Hunter Creek-Truckee River #160501020505
- Peavine Creek-Truckee River #160501020506
- Evans Creek-Truckee River #160501020508
- Steamboat Valley-Steamboat Creek #160501020306

Source Water Protection Area

A Source Water Protection Area (SWPA) is a management area surrounding a surface water or groundwater resource that supplies water for public consumption. A SWPA provides a buffer around the Truckee River included in this project, as well as other perennial tributaries within the HUC-12s. Activities in these buffer areas can affect the quality of water downstream or underground. See HUC-12 Watershed Overview Protection Areas Figure.

There are two types of SWPA buffers that surround the Truckee River; they are distinguished by the size of the buffers. Critical SWPAs represent areas closer to perennial rivers, streams, and tributaries (SWPAs and Critical SWPAs Webtool). The Truckee River SWPA buffers include a 1,000-foot buffer on both sides of the river and a critical SWPA buffer for 300 feet on each side of the river.

Problem Statement and Causes of Pollution [a, c]

Many partners have been involved with vegetation management, yet no comprehensive vegetation and restoration plan has been developed for the Truckee River. The development of a vegetation management and restoration plan, hereafter referred to as the Project, for the urban Truckee River Corridor is needed for guidance to river partners.

The Truckee River is impaired for support of aquatic life beneficial use due to water temperature between Idlewild Park and East McCarran (NDEP, 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.

Limited vegetation cover also reduces the habitat needs of two federally endangered fish species, including the cui-ui and the Lahontan cutthroat trout. In correlation with this Project, there are a variety of municipalities with jurisdictions along the urban Truckee River corridor that have their own unique needs, goals, and ordinances for vegetation management.

This Project area is heavily urbanized causing the limitation of vegetative growth. The region along the river is owned by multiple entities and a collaborative vegetation management plan is necessary to improve vegetative cover along the corridor.

Project Summary

The Project will incorporate the goals and priorities of the municipalities with jurisdictions along the river. Restoring the Truckee River Corridor and establishing vegetation will potentially improve the water temperature of the Truckee River and develop beneficial habitat for federally listed fish.

Reference Plan Implementation or Priority

- One Truckee River Plan, Phase I

PART B: PROJECT DETAILS

Project Goals and Tasks

The overarching goal of this Project is to advance vegetation management and riparian restoration planning within the Project area of the Truckee River. Vegetation management can improve water quality by 1) improving habitat for threatened and endangered species, 2) addressing impaired water temperature and turbidity, and 3) restoring areas impacted by noxious and invasive weeds.

One Truckee River (OTR) has outlined specific goals and objectives in their *Nine Highest Priority Action Items* which is a living document that evolves as new problems and priorities are identified. OTR's first goal is to protect water quality and ecosystem health in the Truckee River. In order to accomplish this goal, priority action items are outlined; one of which is to create a rich and diverse vegetation ecosystem.

The Project will be accomplished through a series of goals/tasks with corresponding activities. There are three major activities for the first goal which include expansion and diversification of OTR's partnership base, engagement of new and current OTR partners and stakeholders, and restoration and riparian vegetation management pre-planning. Along with current partners, OTR plans to engage the Carson-Truckee Water Sub Conservancy District, Washoe/Storey Cooperative Weed Management Area, private residents and business representatives who own land along the Truckee River and recreational groups, local municipalities, and nonprofit organizations.

The Project includes four major activities:

- compile and synthesize requirements, goals, objectives, and needs for riparian vegetation management and restoration,
- identify, prioritize, and best management practices (BMPs) for vegetation management and restoration,
- develop consensus around a framework vegetation management and restoration plan, and
- identify next steps for vegetation management and restoration, planning and implementation.

In order to understand the needs of the Technical Working Group (TWG) members, OTR and its contractors will distribute a questionnaire "Thought Sheet" regarding the TWG's requirements, needs, and goals. Upon completing the questionnaire, the TWG members will also be interviewed for clarification. Based on feedback from TWG members, a plan will be developed that focuses on Integrated Vegetation Management Techniques, which includes (but are not limited to):

1) background and historical information,
2) regulatory framework and guidance from existing plans and stakeholder needs,
3) BMPs for riparian vegetation management,
4) noxious and invasive weed management techniques,
5) desirable plant lists for restoration, and
6) outstanding issues not addressed by a framework plan.

PART B: PROJECT DETAILS - *continued*

Estimated Existing Loads and Sources [(a)]

The section of the Truckee River, within the Project area that runs through Peavine Creek-Truckee River HUC-12 and Evans Creek-Truckee River HUC-12 watersheds is impaired for support of "aquatic life" due to water temperature between Idlewild Park and East McCarran (water quality standards NAC 445A. 1668, 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. Water temperatures have potential to exceed the standard during summer months under drought conditions.

The scope of this Project lies in the middle portion of the Truckee River watershed, which is heavily impacted by urban development and housing, industrial use, recreation, and urban runoff. While Total Maximum Daily Loads (TMDLs) are not listed based on the impairments of "aquatic life" due to water temperature, water quality issues have arisen due to the removal of riparian vegetation. Even though current development has constrained the alignment and morphology of the Truckee River within the Project area, there are strategic techniques that can be used to help restore native and adaptive riparian vegetation. Along the Truckee River corridor near the freeway, railroads, trails, and the river, there are invasive and noxious weeds that outcompete native vegetation. Integrated vegetation management strategies can help reduce the competition.

Pollutant Load Reductions Anticipated [(b)]

This Project will not directly quantitatively measure the effects that vegetation and restoration has on the river. Instead, it begins the process of anticipated load reduction by gathering partners that influence the Truckee River corridor to collaborate on a vegetation and restoration plan that addresses their requirements, needs, and goals.

This plan will help establish next steps for restoration and vegetation management planning implementation. A report will be created from the goals that may include future tasks such as: strategies to integrate the Framework Vegetation and Restoration Plan into local municipality plans or guidelines, pilot projects for implementation, strategies to engage the public, regulatory requirements and potential funding sources.

The Project will take two years to complete and the current cost estimate for the Project is $107,089. The Project will be funded by the support of both Reclamation through WaterSMART Cooperative Watershed Management Program Phase 1 grants and third-party contributions. There are no written third-party contributions currently. It is expected that a representative from each of the TWG partners will attend all three TWG meetings. It is expected that they will also donate their time to participate in proposed Project activities. The following Table 1 includes milestones, activities/tasks, timelines deliverables, and costs.

Table 1: Proposed Milestones, Activities/Tasks, Timeline, Deliverables and Costs

Milestones [g], Schedule [f] and Cost Estimate [d]	**Year, Milestones**	**Activity/Task, Description**	**Timeline**	**Outcomes & Deliverables**	**Reclamation Costs**
	Year 1 Project Management and Administration	**Support all activities/tasks**			**$17,042**
	Project management time	General Project coordination	Months 1–12	Project emails/notes	$4,390
	Financial reporting Year 1	Financial administration and reporting	Months 3, 6, 9, 11	4 financial reports (SF-425)	$8,020
	Interim performance report preparation	Track and report performance	Months 3, 6, 9, 12	4 interim performance reports	$2,558
	270-day sufficiency report	Track and report performance	Month 9	1 sufficiency report	$2,074
	Year 1 Stakeholder Engagement and Preliminary Planning	**Task 1: Activities 1A, 1B, 1C Task 2: Activities 2A, 2B**			**$21,929**
	Kick-off meeting	Initial coordination of Project team (including contractors)	Month 1	Meeting notes, attendance list	$673
	Partner/TWG member coordination	General coordination and follow-up with stakeholders throughout Year 1	Months 1–12	Partner/TWG member emails/notes	$378
	Initial partner contact	OTR makes initial contact with potential partners to confirm their commitment to participate in the TWG.	Month 2	Partner/TWG member emails/notes	$683
	Meeting logistics (initial TWG meeting)	OTR coordinates logistics for TWG meeting venue, timing, and attendees	Month 2	Meeting venue secured and attendees confirmed	$130
	Initial TWG meeting	Initial TWG meeting (3 hours) to solidify Project needs, goals/ objectives, and constraints	Month 3	Meeting notes, attendance list	$2,407
	TWG member interviews	Preparation of a "Thought sheet" for TWG members; one-on-one interviews with each member	Months 4–6	Interview notes, attendance list	$6,292
	Research regulations/documents	OTR and contractors to review/research all regulations and documents and prepare a summary report of needs, goals/objectives, and constraints	Months 7–8	Summary document	$8,610
	Meeting logistics (TWG meeting before plan developed)	OTR coordinates logistics for TWG meeting venue, timing, and attendees	Month 7	Meeting venue secured and attendees confirmed	$130
	TWG meeting (before plan developed)	Initial TWG meeting (3 hours) to identify and work through issues and needs for the Framework Vegetation Management and Restoration Plan	Month 9	Meeting notes, attendance list	$2,626

Milestones [g], Schedule [f] and Cost Estimate [d]

Year, Milestones	Activity/Task, Description	Timeline	Outcomes & Deliverables	Reclamation Costs
Year 1 Framework Vegetation Management and Restoration Plan Preliminary Development	**Task 2: Activity 2C**			**$10,987**
Preliminary development of Framework Vegetation Management and Restoration Plan	Begin initial steps to develop the draft Framework Vegetation Management and Restoration Plan (to be completed in Year 2)	Months 9–12	Draft Framework Vegetation Management and Restoration Plan under development	$10,987
Year 2 Project Management and Administration	**Support all activities/tasks**			**$17,627**
Project management time	General Project coordination	Months 13–24	Project emails/notes	$4,391
Financial Reporting Year 1	Financial administration and reporting	Months 15, 18, 20	4 financial reports (SF-425)	$8,020
Interim performance report preparation	Track and report performance	Months 15, 18, 21	3 interim performance reports	$1,828
Final Performance Report	Track and report performance for the entire Project (Years 1 and 2); report will address future tasks (as described for Activity 2D)	Months 22–24	Final Performance Report	$3,388
Year 2 Framework Vegetation Management and Restoration Plan Development and Stakeholder Consensus	**Task 2: Activity 2C**			**$32,404**
Partner/TWG member coordination	General coordination and follow-up with partners/TWG members throughout Year 2	Months 13–24	Partner/TWG Member emails/notes	$378
Development of draft Framework Vegetation Management and Restoration Plan (Year 2)	Complete draft Framework Vegetation Management and Restoration Plan	Months 13–18	Draft Framework Vegetation Management and Restoration Plan	$24,601
Meeting logistics (TWG meeting to present plan)	OTR coordinates logistics for TWG meeting venue, timing, and attendees	Month 18	Meeting venue secured and attendees confirmed	$130
TWG meeting to present draft Framework Vegetation Management and Restoration Plan	TWG meeting (3 hours): present and solicit feedback from TWG members on the draft Framework Vegetation Management and Restoration Plan	Month 19	Meeting notes, attendance list	$2,625
Prepare Final Framework Vegetation Management and Restoration Plan	Prepare Final Framework Vegetation Management and Restoration Plan and circulate with TWG members to gain consensus around the plan	Months 19–22	Final Framework Vegetation Management and Restoration Plan	$4,670
			Total Estimated Project Costs:	**$99,989**

PART B: PROJECT DETAILS - *continued*

Project Lead [f] and Partners

Project Lead: One Truckee River

Partners who are engaged in this Project are:

- Carson-Truckee Water Conservancy District
- Washoe/Storey Cooperative Weed Management Area
- Private residents and business representatives who own land along the Truckee River and recreational groups
- City of Reno
- City of Sparks
- The Reno-Sparks Indian Colony
- Washoe County
- Nevada Land Trust
- Truckee Meadows Parks Foundation
- The Nature Conservancy

The Carson-Truckee Water Conservancy District (District) is the local sponsor of the US Army Corps of Engineers Martis Creek Lake O&M Agreement, and as such must prevent encroachment within the 14,000 cubic feet per second (cfs) capacity of the Truckee River above the Glendale Bridge at the border of Reno and Sparks. Downstream of the Glendale Bridge, the 6,000 cfs channel capacity is managed by the Nevada Division of Water Resources. The flow capacity requirements designated to specific sections of the Truckee River may have the potential to limit the growth of certain types of vegetation and restrict the presence of debris.

Monitoring and Evaluation with Criteria to measure goal progress [h]

OTR's partnership coordinator will be responsible for engaging new and existing stakeholders and ensure TWG commitment to participation. The Principal Investigator and Meeting Investigator will lead TWG meetings and stakeholder interviews and will guide the development of the Framework Vegetation Management and Restoration Plan. The Senior Restoration Ecologist will be a technical expert at the TWG meetings, participate in stakeholder interviews and be the lead author on the Plan. A principal Hydrologist/Ecologist will provide high technical oversight for the entire Project. Technical Editor/Formatter will copy, edit, and format all documents and performance reports used for this Plan. Collaboration between partners and stakeholders, in addition to strong communication will be essential in this Project and its success.

Information and Education [e]

Public outreach and education will play a role in executing the Framework Vegetation and Restoration Plan. The Project will focus on OTR receiving documents, plans and other information from TWG entities. This information will become public on the OTR website so all partners can access this information and the public can also be aware and involved.

Technical and Financial Assistance needed [d]

Currently, 7% of funding will come from third-party contributions. OTR is requesting funding for the other 93% from the Bureau of Reclamation which is estimated to be $99,989. Funding will be necessary to support the salary of those leaders who are working on the Project, travel expenses, supplies for meetings, and contractual labor.

EPA Element	Description
a	Estimate the significant point and nonpoint sources, in addition to the natural background levels that make up the pollutant loads causing the problems in the watershed
b	Estimate load reductions expected from action
c	The nonpoint source management measures needed to achieve load reductions and the critical areas
d	Estimate the technical and financial assistance needed, with costs, match
e	Information and education component
f	Schedule implementing the measures
g	Interim measurable milestones for determining if the actions are being implemented
h	Criteria to determine if load reductions are being achieved
i	Monitoring to evaluate the effectiveness of the implementation efforts over time

REFERENCES

Map of Project Locations. Google Earth Pro. Screenshotted photo. Accessed 3/6/2020

NDEP BWQP, Nevada Division of Environmental Protection, 2016-2018. Nevada 2016-2018 Water Quality Integrated Report. NV 2016-2018 Integrated Water Quality Report

One Truckee River. Proposal Vegetation Management and Restoration Planning. Submitted November 19th, 2019. One Truckee River Management Plan, Phase I, 2017

Project Profile

River Restroom Project Phase II

OVERVIEW

Site Location Description	• John Champion Park: City of Reno, east of I-580 and south of Kietzke Lane • Fisherman's Park: City of Reno, west of I-580 and north of Kuenzli Lane • Or a downtown location to be determined
Lat/Long	• John Champion Park: 39°31'47.45"N 119°47'35.60"W • Fisherman's Park: 39°31'51.26"N 119°46'54.06"W • Or a downtown location to be determined
Primary Contact	Iris Jehle-Peppard One Truckee River Executive Director (775) 450-5489 iris@onetruckeeriver.org

PART A: GENERAL DESCRIPTION

Groundwater Basin, #	• North Truckee Meadows #087
HUC-12 Name, #	• Evans Creek-Truckee River #160501020508
Source Water Protection Area	A Source Water Protection Area (SWPA) is a management area surrounding a surface water or groundwater resource that supplies water for public consumption. A SWPA provides a buffer around the Truckee River included in this Project, as well as other perennial tributaries within the HUC-12s. Activities in these buffer areas can affect the quality of water downstream or underground. See HUC-12 Watershed Overview Protection Areas Figure. There are two types of SWPA buffers that surround the Truckee River; they are distinguished by the size of the buffers. Critical SWPAs represent areas closer to perennial rivers, streams, and tributaries (SWPAs and Critical SWPAs Webtool). The Truckee River SWPA buffers include a 1,000-foot buffer on both sides of the river and a critical SWPA buffer for 300 feet on each side of the river.
Problem Statement and Causes of Pollution [a, c]	The current lack of public restrooms and consequent human waste along the Truckee River is likely a significant contributing source to the increasing amount of *Escherichia coli* (*E. coli*) in the river. Admittedly, *E. coli* has not been tied to a single source, although human waste is thought to be the probable contributor due to the large unsheltered populations that frequent the banks of the river. Unfortunately, the current capacity of public restrooms along the river is far exceeded by the need of both the general and unsheltered community.

PART A: GENERAL DESCRIPTION - *continued*

Problem Statement and Causes of Pollution [a, c] *(continued)*

The River Restroom Project's Phase II, hereafter referred to as the Project, focuses on providing more restrooms in two specific areas, Fisherman's Park and John Champion Park, although a downtown location may be prioritized over one of these locations. The locations are of significant pollution concern due to the high usage by unsheltered communities in both areas, and the location upstream of the Glendale Water Treatment Plant.

These sites were determined through evaluation and observation by One Truckee River (OTR), the data available from the Nevada Division of Environmental Protection (NDEP), and general community observations over time. Additionally, OTR would like to partner with different stakeholders to hire a River Ambassador who would conduct outreach to the unsheltered community along the river. A similar action recently began through a partnership between OTR, the Downtown Reno Partnership, and funding from the NDEP near Brodhead Park as part of Phase I of the River Restroom Project.

Project Summary

The large unsheltered population and the lack of public restrooms along the Truckee River have created a human waste issue that impacts the water quality of the river. The river is a drinking water source, recreational water source, irrigation water source, and habitat for federally listed fish.

The Truckee Meadows Water Authority (TMWA) and other agencies have recorded elevated E. coli in the river. The NDEP notes in their data that the Total Coliform counts in the Truckee River vary over time but are consistently elevated at discrete locations. These locations coincide with local observations of human waste occurrences, therefore further illustrating the need for more restroom infrastructure.

Reference Plan Implementation or Priority

One Truckee River Management Plan, Phase I

PART B: PROJECT DETAILS

Project Goals and Tasks

The overarching goal of this Project is to reduce *E. coli* in the Truckee River to provide a cleaner, safer, and healthier river environment. In doing so, the community will benefit from a healthier water source and increased restroom facilities. OTR has outlined specific goals and objectives in their *Nine Highest Priority Action Items* which is a living document that evolves as new problems and priorities are identified. OTR's first goal is to ensure and protect water quality and ecosystem health in the Truckee River. In order to accomplish this goal, priority action items are outlined. One of which is to ensure that there are enough public restrooms along the river, detailed within the River Restroom Project as Action Item 1.3.c. Partners who are engaged in this Project are TMWA, Truckee River Fund, Washoe County Parks and Open Space and Health District, Renown Health, Nevada Land Trust, NDEP, and the city of Reno.

PART B: PROJECT DETAILS - *continued*

Project Goals and Tasks *(continued)*

The River Restroom Project will be accomplished through a series of tasks, as summarized in Phases I-IV. This plan analyzes Phase II, which is essentially the development of two restrooms. The development of the restrooms entails restroom purchases, installation, maintenance, repair costs and a River Ambassador to monitor the area and restroom usage. These methods will lead to an overall reduction in *E. coli* pollution in the Truckee River over time by offering appropriate infrastructure to both park visitors and the unsheltered community.

The restroom purchases, installation, maintenance, repair costs and River Ambassador are the most immediate and tangible deliverables of the Project. Other deliverables are more abstract in nature due to the qualitative nature of the Project. It is not feasible to accurately quantify the occurrence of human feces in the Truckee River. While several agencies collect data on the *E. coli* pollution, it is not feasible to identify a point source for the bacteria. However, this Project will deliver cleaner water to the community and the data that is being collected will reflect that over time.

Estimated Existing Loads and Sources [(a)]

Due to the qualitative characteristics of the existing data for this Project, quantifying the problem is difficult. The specific sources of *E. coli* pollution along the Truckee River changes over time as the unsheltered communities along the riverbanks are forced to move. Thus, the human feces pollution is considered to be a nonpoint source.

Observations by the Downtown Reno Partnership Ambassadors and OTR indicate that certain areas along the river are more commonly found to be polluted. Based on these observations, new restroom locations were chosen to accommodate the ever-increasing usage in these specific places. For the Project, the Fisherman's Park and John Champion Park restrooms will ideally add enough infrastructure that the bushes along the Truckee River are no longer used as a restroom.

Several agencies have collected data on the levels of *E. coli* pollution at certain points along the Truckee River. This data shows that pollution amounts are highest in the summer months, and more specifically June and July. It is commonly accepted that this is due to the increased number of people using the river in the summer for restroom needs, although this finding cannot be quantified.

Map of Project Locations via Google Earth Pro

PART B: PROJECT DETAILS - *continued*

Estimated Existing Loads and Sources [a] *(continued)*

In addition to the elevated pollution levels during the summer months, there are certain sites along the river that have continuously shown high numbers. Both Fisherman's Park and John Champion Park were selected for Phase II because of the high level of pollution that occurs at both locations. Both parks are within a mile of each other and are located near the conjunction of I-80 and I-580. Consequently, these areas attract large unsheltered communities which inevitably results in higher instances of human feces pollution.

Milestones [g], Schedule [f] and Cost Estimate [d]

The current cost estimate for the Project is $488,670. This includes the restroom purchases, installation, maintenance, repair costs and a River Ambassador to monitor the area and restroom usage. The following table outlines the estimated costs for Phase II as of April 2020.

Table 1. Funding Required – Phase II – Start June 2021

Expenses	Total
Restroom purchase	$204,666
Installation at Fisherman's Park and John Champion Park	$110,000
Maintenance	$79,668
Repair costs	$30,000
River Ambassador	$64,336
Total:	$488,670

Phase II is set to begin in June of 2021 with the caveat that Phase I is successful in the spring of 2020. It is OTR's hope that Phase II would be complete by June of 2022. While there are factors of Phase II that would last longer, such as restroom maintenance and the River Ambassador position, the construction of the Project should be completed within the year.

Determining measurable milestones to monitor the success of the Project largely has to do with visible monitoring techniques.

The Project's proposed metrics (data to collect, track, and analyze quarterly) include:

1) surrounding area DRP Street Intelligence feces data,
2) water usage,
3) number of related complaints, and
4) number of repairs

Pollutant Load Reductions Anticipated [b]

How much the river water quality will benefit depends on how many unsheltered individuals are living on the banks of the river at the time. This varies by the economic situation, season, and encampment removal by law enforcement.

There are roughly ten million fecal coliform bacteria in one gram (one milliliter) of human waste. The average daily defecation is about 400 grams which equates to four billion fecal coliform bacteria per person per day. Assuming three people near the restroom use it, rather than the river, then the restroom would prevent 12 billion fecal coliform bacterial per day or over four trillion per year from entering the Truckee River.

PART B: PROJECT DETAILS - *continued*

Pollutant Load Reductions Anticipated [(b)] *(continued)*

The data gathered by NDEP shows that total *E. coli* numbers in the Fisherman's Park area during June's peak pollution in 2013 were at approximately 11,000 colony-forming units (cfu) per 100 grams or milliliter.

For perspective, the US Environmental Protection Agency (EPA) rules state that acceptable levels of E. coli are measured in cfu and commonly include both a 30 day mean (126 cfu/100mL) and a single sample number (235 cfu/100mL – 575 cfu/100mL). Suitable levels in fresh water should be less than 33 cfu/100mL for a 30 day mean and 61 – 151 cfu/100 mL as a single sample reading (EPA, 2012).

Most indicators of success for the Project will be qualitative through visual assessment and recorded by the personnel monitoring, maintaining, and repairing the restrooms. Eventually, the NDEP data may reflect the improvements along the river. Qualitative and quantitative data will be recorded as it becomes available to OTR.

The general targets for the Project are described in the following bullets, which are listed chronologically:

- Restroom Installation: The first target is to install both restrooms at Fisherman's Park and John Champion Park. This task will be closely monitored for proper installation so that it meets the identified needs of the community and initiates the remediation of E. coli occurrences.
- Restroom Maintenance/Reparations: The maintenance of the restrooms is essential to the success of this Project. Not only will maintenance keep the restrooms clean, thus reinforcing responsible usage, it will also promote more use by the unsheltered community and the general public. In turn, this will reduce the current pollution from human feces.
- River Ambassador Position: This third target pertains to the River Ambassador full-time position and the objectives of their work. The Ambassador would be reaching out to the unsheltered community in the area as well as monitoring the use of the restrooms. They will observe the management strategies that are working or not working, the community response to the public restrooms, and if human feces along the river in those areas is reduced. The success of this target depends on the ambassador's diligent monitoring of the events occurring in both restroom locations. These records will be instrumental in adjusting management activities to better fit the needs of the community. To ensure that this task is being appropriately fulfilled, OTR will communicate frequently with the ambassador.
- Data Tracking: OTR will continue to communicate with NDEP regarding the recorded data on *E. coli* pollution. Ideally, this target will reflect a positive impact on water quality over time, although OTR recognizes that it will take some time for these numbers to reflect the change as the community becomes more aware of the restrooms, the ambassador outreaches specifically to the unsheltered community, and the restrooms are maintained to invite public usage.

PART B: PROJECT DETAILS - *continued*

Pollutant Load Reductions Anticipated [b] *(continued)*

Observations made by the community, OTR, and the River Ambassador will be key to understanding how impactful the restrooms are. This qualitative data is essential to supplement the quantitative data for the Project, otherwise the big picture will not be understood. The successful actions and lessons learned will be useful for the future Phases that are projected to be completed as part of the overall River Restroom Project. The load reductions will be understood through the observations of the River Ambassador, OTR, and the NDEP. Further criteria of the Project are outlined below.

Project Lead [f] and Partners

Iris Jehle-Peppard
One Truckee River Coordinator
(775) 851-5180
iris@onetruckeeriver.org

Monitoring and Evaluation with Criteria to Measure Goal Progress [h]

Monitoring for the Project will largely be completed by the River Ambassador, with general support from OTR and the community. The quantitative data will come from the NDEP in their water quality monitoring program. Other monitoring techniques will focus on the observed quality of the Project. Close communication between partners and stakeholders, in addition to thorough documentation will be essential in this Project and its success.

The following criteria should be used as a guide to determine if load reductions are being achieved:

- Site Quality Observations: The River Ambassador should assess daily what the condition is of the general area in and around the Fisherman's Park and John Champion Park restrooms. These observations help paint the picture of what's happening on the ground at the sites. Over time, these observations will ideally become more positive as unsheltered communities use the restrooms and not the Truckee River or the vicinity. The River Ambassador should also record any required maintenance or repairs needed.
  - Maintenance should involve tasks ranging from cleaning the restrooms, restocking bathroom tissue or other materials, and clearing trash from the restroom.
  - Repairs would likely require removing graffiti and other vandalism incidents in addition to standard wear and tear from daily use.
- NDEP Data Evaluation: As the data becomes available, the OTR will collect and compare the reports after the restroom construction. This will be an effective way to evaluate if the public restrooms are reducing the amount of *E. coli* in the Truckee River. This data should be reviewed annually after the restroom construction at both Fisherman's Park and John Champion Park is completed.
- Community Input: After the restrooms are constructed, the community's input will be important to assess the public outreach, perception, and education associated with the new public restrooms. Due to the qualitative nature of the River Restroom Project, public observations from the general community and the unsheltered community will be essential to its success. By listening to the community and reviewing what is working and what is not, OTR will be able to better manage the restrooms along the river to reduce *E. coli* pollution.

PART B: PROJECT DETAILS - *continued*

Information and Education [(e)]

Public outreach and education are essential to the success of the River Restroom Project. The Downtown Reno Partnership Ambassadors, who are tied to OTR and recognized as essential collaborative stakeholders, are hired to achieve four specific goals in downtown Reno:

1) cleaning,
2) safety,
3) hospitality, and
4) connecting unsheltered individuals to specific social outreach (DRP, 2020).

Ensuring that unsheltered community are informed about the new restrooms and keeping the ambassadors up to date on the construction and usability of the new restrooms will be essential in OTR's goal to reduce *E. coli* pollution in the Truckee River.

The general public will also benefit from this outreach about increased public restroom infrastructure. The current options for bathrooms along the Truckee River are very limited for everyone, not just the unsheltered community. By informing the public of the new restrooms, more responsible public usage will occur.

Technical and Financial Assistance Needed [(d)]

Currently, Phase II is approximately 50% paid for with the support of TMWA and Washoe County. OTR is requesting the funding for the other 50%, which is estimated to be $221,409. Technical assistance will be necessary when the restroom construction is finished, largely to monitor usage, maintain cleanliness and functionality, and repair any damages that might occur. OTR also recognizes that there is a concern for vandalism and overall degradation of public restrooms and, as such, sees this as another type of technical assistance need. Table 1, above, also clearly illustrates the current financial situation of the Project.

EPA Element	Description
a	Estimate the significant point and nonpoint sources, in addition to the natural background levels that make up the pollutant loads causing the problems in the watershed
b	Estimate load reductions expected from action
c	The nonpoint source management measures needed to achieve load reductions and the critical areas
d	Estimate the technical and financial assistance needed, with costs, match
e	Information and education component
f	Schedule implementing the measures
g	Interim measurable milestones for determining if the actions are being implemented
h	Criteria to determine if load reductions are being achieved
i	Monitoring to evaluate the effectiveness of the implementation efforts over time

REFERENCES

Downtown Reno Partnership. Website. Accessed online 3/4/2020. Available at: Downtown Reno Partnership - Website

Environmental Protection Agency. 2012 Recreational Water Quality Criteria. Accessed online 3/4/2020. Available at: EPA 2012 Recreational Water Quality Criteria

Map of Project Locations. Google Earth Pro. Screenshotted photo. Accessed 3/6/2020

One Truckee River. Proposal Vegetation Management and Restoration Planning. Submitted November 19th, 2019. One Truckee River Management Plan, Phase I, 2017

Source Water Inventory

An inventory of PWSs was developed to identify facilities and the "source water" used by each water system.

> "Source Water" in Nevada means an untreated source of water used to supply drinking water to the general public. For example, "source water" is groundwater before it is pumped out by a well and surface water flowing to the Truckee River before it is diverted to one to TMWA's treatment plants.

This information was obtained from multiple references and databases, including:

- Databases and information maintained by TMWA
- The Nevada Drinking Water Information System (https://ndwis.ndep.nv.gov/DWW/)
- BSDW surveys (Source Water Assessment and Vulnerability Assessment Program)
- WCHD surveys and personal communication
- Previous Wellhead Protection Plan
- On-line mapping resources supported through windshield surveys conducted by RCI.

Where appropriate geodatabases were constructed with available information about these facilities, such as location, construction, and water use rates, in order to develop criteria to delineate community source water protection areas.

Source Water Protection Areas

The Local Planning Team formed two technical subcommittees to review sources of water and develop criteria to delineate SWPAs. The Groundwater Focus Group and the Surface Water Focus Group met multiple times 2018 through 2019. Two Types of SWPAs were developed SWPAs and "Critical" SWPAs. The types of SWPAs and the basis for these delineation criteria are outlined in Table 1.

> Source Water Protection Area
> Source Water Protection Area" (SWPA) represents an area where the community has established a precautionary boundary to safeguard the water quality of its drinking water sources. Within this boundary, education, monitoring, and management of human activities can help protect surface and ground water from becoming contaminated.
>
> Critical Source Water Protection area
> "Critical Source Water Protection Area" represents the land surrounding a well or stream where the water quality is potentially more vulnerable to contamination from human activities and where the community may adopt strategies to protect the quality of their drinking water supply source.

Table 1. SWPA Delineation Criteria in Washoe County

	Source Water Protection Areas Precautionary Boundary	**Critical Source water Protection Area** Boundary in Proximity to Source Water
Groundwater " Capture Zones" and Aquifer Recharge	Topographic boundaries that correspond the intersection of unconsolidated valley or alluvial fill with consolidated (or bedrock) formations in local valleys where groundwater aquifers are extensively used to supply drinking water to communities in the Truckee Meadows. 20-year fixed radius capture zones for wells outside the topographic boundaries of the key valley fill aquifers.	20-year Time-of-Travel groundwater "captures zones" for existing and potential future wells in the Truckee Meadows based on TMWA MODflow models for key aquifers: Truckee Meadows (North and South), Spanish Springs Valley, Lemmon Valley, and Cold Springs Valley. 20-year calculated Time-of Travel radius or 1000-foot minimum radius for municipal system wells (TMWA and Great Basin Water Company) or 750-foot minimum radius for small PWS wells if not included in regional models Existing Wellhead Protection Areas for small systems with an existing approved Wellhead Protection Plan (Silver Knolls and Washoe Valley Christian Church). Upgradient watershed area for spring developments.
Surface Water Buffers	1000-foot buffers from the Truckee River and its tributaries upstream of the TMWA Glendale treatment plant, as well as other perennial streams that contribute to aquifer recharge in the Truckee Meadows or are potential future "source water".	A 300-foot buffer from the Truckee River and a 150-foot buffer from perennial streams tributary to the Truckee River that are located upstream of the Truckee Meadows Water Authority (TMWA) Glendale Water Treatment Plant in Washoe County. 150-foot buffers from other perennial streams along the Sierra Front in watersheds that contribute to aquifer recharge in the Truckee Meadows or that are potential future "source water".

Back to: Project Profiles Table of Projects

Appendix C

Tributary Project Template
Status of Tributary Projects
City of Reno Project

Tributary Project Template

Project Title: _____

Footnotes ([a-i]) correspond to the EPA's nine elements to be included in the watershed plan. Please answer each section in a one to two paragraph response to the prompt.

	Overview
Site Location Description	City, NV, Specific Location (Purpose)
Latitude/Longitude	
Primary Contact	Entity, Contact Name, Phone Number
	PART A: General Description
Tributary Name; HUC 12 Watershed Number	
Problem Statement and Causes of Pollution [a, c]	• *EPA Element a: Identify sources that need to be controlled and the extent of the sources* • *EPA Element c: Describe the NPS management measures needed to achieve load reductions and the critical areas* • A succinct description of the water quality problem addressed by the project
Reference Plan Implementation or Priority	• *Reference the documents or programs that pointed to this project*
	PART B: Project Details
Project Goals and Tasks	• Define the overall goal(s) of the project • Describe the methods used to complete the tasks • List deliverables produced at task completion
Estimated Existing Loads and Sources [a]:	• *EPA Element a: Include an estimate of the significant point and nonpoint sources in addition to the natural background levels that make up the pollutant loads causing the problems in the watershed* • *Include explanation of loads: continuous, storm events, seasonal* • *Include how pollutant loads were estimated*
Milestones [g], and Federal Fiscal Year Schedule [f]	• *EPA Element f: Schedule implementing the measures* • *EPA Element g: Description of interim measurable milestones for determining if the actions are being implemented*
Pollutant Load Reductions Anticipated [b]	• *EPA Element b: Estimate load reductions expected from action* • *Include indicators and targets* • *Include how pollutant load reduction estimates were calculated*
Project Lead [f] and Partners	Name, Agency, Department Office Phone Number: Email:
Monitoring [i] and Evaluation with Criteria to Measure Progress Toward Meeting Watershed Goals [h]	• *EPA Element i: Monitoring component to evaluate the effectiveness of the implementation efforts over time* • *EPA Element h: A set of criteria used to determine if load reductions are being achieved*
Information and Education [e]	• *EPA Element e: Information and education component*
Technical and Financial Assistance Needed [d]	• *EPA Element d: Estimate the technical and financial assistance needed, with costs and match*

Attach location and project maps, photos, Region 5 Model for Estimating Pollutant Load Reductions, BMP plans, conceptual plans, and any other supplemental information.

Tributary Project Template

Project Title: _____

Footnotes ([a-i]) correspond to the EPA's nine elements to be included in the watershed plan. Please answer each section in a one to two paragraph response to the prompt.

EPA Nine Elements
EPA Element a. Identification of causes of impairment and pollutant sources that need to be controlled.
EPA Element b. An estimate of the load reductions expected from management measures.
EPA Element c. A description of the non-point source management measures to achieve load reductions.
EPA Element d. An estimate of the amounts of technical and financial assistance needed, costs, and/or authorities that will be relied upon.
EPA Element e. An information and education component used to enhance public understanding of the project.
EPA Element f. Schedule for implementing the non-point source management measures.
EPA Element g. A description of interim measurable milestones for determining whether actions are being implemented.
EPA Element h. A set of criteria that can be used to determine whether loading reductions are being achieved over time.
EPA Element i. A monitoring component to evaluate the effectiveness of the implementation efforts over time, measured against the criteria.

Tributary Project Template

Project Title: _____

Footnotes ([a-i]) correspond to the EPA's nine elements to be included in the watershed plan. Please answer each section in a one to two paragraph response to the prompt.

Overview	
Site Location Description	
Latitude/Longitude	
Primary Contact	
PART A: General Description	
Tributary Name; HUC 12 Watershed Number	
Problem Statement and Causes of Pollution [a, c]	
Reference Plan Implementation or Priority	
PART B: Project Details	
Project Goals and Tasks	
Estimated Existing Loads and Sources [a]:	
Milestones [g], and Federal Fiscal Year Schedule [f]	
Pollutant Load Reductions Anticipated [b]	
Project Lead [f] and Partners	
Monitoring [i] and Evaluation with Criteria to Measure Progress Toward Meeting Watershed Goals [h]	
Information and Education [e]	
Technical and Financial Assistance Needed [d]	

Attach location and project maps, photos, the Region 5 Model for Estimating Pollutant Load Reductions, BMP plans, conceptual plans, and any other supplemental information.

Appendix C - Status of Tributary Projects (Each of the projects contained in the table must be further developed if they are to be submitted for 319(h) funding)

Project Count	Entity	Creek	Approximate Location	Water Quality Issue	Proposed Management Measures	Comments	Date Submitted to NDEP 319(h) funding	Status of 319(h) Funding (TBD, Submitted, Accepted, Denied)	Status (Proposed, Drafted, Submitted, Approved for Funding, Constructed)
1	City of Reno	Chalk	Saphire Ridge Way to West 7th Street	Soils and hydromodification has caused severe bank incision, resulting in erosion and sediment loading.	Restore and stabilize channel through erosion and grade control measures.	This is City property. The erosion blanket in place has failed and there is an alternative intake upstream of TMWA Chalk Bluff.	TBD	TBD	Drafted
2	City of Reno	Chalk	Valleywood to Mae Ann	This is a vegetation project with a section devoid of vegetation and subject to erosion.	Remove white top and restore vegetation. A stormwater basin may need to be created. Bank stabilization near multiuse path may be needed.	This is City property. There is an alternative intake upstream of TMWA Chalk Bluff.	TBD	TBD	Proposed

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3	City of Reno	Alum	Within Caughlin Ranch HOA Property	Persistent severe incision/erosion is present and lawn landscaping has effected the stream channel.	Restore channel and establish grade controls may be needed.	Most of the restoration is located on a anHOA property. There is potential for a partnership with Nevada Land Trust.	TBD	TBD	Proposed
4	City of Reno	Alum	Chrissie Caughlin Park	Flooding contributes sediment load from upstream and causes erosion though the park. There is a direct connection to Truckee River immediately downstream.	Provide sediment capture and stormwater treatment on City property with the use of a constructed wetland or stormwater basin.	One limitation is that this project likely requires projects to address upstream reaches of Alum Creek before addressing this location.	TBD	TBD	Proposed

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5	City of Reno	Weed Mitigation	Areas identified in assessments	Areas of invasive weeds maybe due to reduction of native materials and therefore erosion concern and herbicide use.	Chanel restoration by stabilization materials or revegetation. Volunteer based weed abatement. Adopt a section.	Potential to engage community and partners in community wide effort. Possibilities include weeding day, adopt a reach, and restoration projects.	TBD	TBD	Proposed
6	City of Reno	MS4 Outlet Erosion Mitigation Project	Multiple locations as identified in assessments	Erosion is present at the end of the pipe where the storm drain discharges into each respective tributary.	Rip rap or energy dissipation at multiple outfalls.	This could be a lumped contract with several locations identified for correction.	TBD	TBD	Proposed

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7	City of Sparks	North Truckee Drain	Spanish Springs Dam to I-80 box culvert	High flow events have caused erosion and sediment loading throughout the tributary.	Erosion and sediment control improvements are needed as well as a reestablishment of the flowline.	This would be a multiphase project.	TBD	TBD	Proposed
8	City of Sparks	North Truckee Drain	Spanish Springs Dam to I-80 box culvert	Invasive weeds and vegetation are present throughout the tributary.	Weed and vegetation abatement, as well as channel stabilization are needed.	This would be a multiphase project. There is an opportunity for public outreach regarding water quality and education about the tributary and river system.	TBD	TBD	Drafted

Appendix C - Status of Tributary Projects (Each of the projects contained in the table must be further developed if they are to be submitted for 319(h) funding)

Project Count	Entity	Creek	Approximate Location	Water Quality Issue	Proposed Management Measures	Comments	Date Submitted to NDEP 319(h) funding	Status of 319(h) Funding (TBD, Submitted, Accepted, Denied)	Status (Proposed, Drafted, Submitted, Approved for Funding, Constructed)
9	City of Sparks	North Truckee Drain	Baring Drive to Lillard Drive	Sediment and debris impacts from storm drain outfalls are located throughout high density residential areas.	Stormwater treatment devices should be installed at major outfalls.	Project would include establishing a maintenance schedule to inspect and clean the treatment vaults periodically and before storm events.	TBD	TBD	Proposed
10	Washoe County	South Evans	Through Anderson Park, Del Monte Lane to Bonde Lane	Historical hydromodification causes frequent flooding, resulting in erosion and sediment loading.	Restore channel and floodplain through park setting.	The downstream reach was previously restored. Water rights and diversions from the creek could pose potential challenge to this project.	TBD	TBD	Proposed

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Project Count	Entity	Creek	Approximate Location	Water Quality Issue	Proposed Management Measures	Comments	Date Submitted to NDEP 319(h) funding	Status of 319(h) Funding (TBD, Submitted, Accepted, Denied)	Status (Proposed, Drafted, Submitted, Approved for Funding, Constructed)
11	Washoe County	Galena	Lower Reach – I-580 bridge to Steamboat Creek	Erosion, undercutting, noxious weeds, hydromodification, and sediment loading are present along the project site.	Restore reach, channel and floodplain.	There are opportunities for a public/private partnership. This is likely a large, multiphase project.	TBD	TBD	Proposed
12	Washoe County	Jones	Callahan Ranch Road to Galena Creek	Persistent severe incision/erosion are present.	A restoration of the channel and an establishment of grade controls are likely needed.	There are opportunities for a public/private partnership.	TBD	TBD	Proposed

Appendix C - Status of Tributary Projects (Each of the projects contained in the table must be further developed if they are to be submitted for 319(h) funding)

Project Count	Entity	Creek	Approximate Location	Water Quality Issue	Proposed Management Measures	Comments	Date Submitted to NDEP 319(h) funding	Status of 319(h) Funding (TBD, Submitted, Accepted, Denied)	Status (Proposed, Drafted, Submitted, Approved for Funding, Constructed)
13	Washoe County	Alum	Through Betsy Caughlin Donnelly Park	Flooding contributes sediment loading from upstream and causes erosion through the park. There is also a direct connection to Truckee River immediately downstream.	Controlling upstream sediment and restoring the channel and floodplain through the park setting are likely needed.	It is likely that the upstream reaches of Alum Creek need to be addresed before addressing this location.	TBD	TBD	Proposed

Appendix C - Status of Tributary Projects (Each of the projects contained in the table must be further developed if they are to be submitted for 319(h) funding)

Project Count	Entity	Creek	Approximate Location	Water Quality Issue	Proposed Management Measures	Comments	Date Submitted to NDEP 319(h) funding	Status of 319(h) Funding (TBD, Submitted, Accepted, Denied)	Status (Proposed, Drafted, Submitted, Approved for Funding, Constructed)
14	Washoe County	Whites	Timberline Drive to Legend Trail	High flows cause erosion and sediment loading in multiple tributary drainages to Whites Creek.	Erosion and sediment control and drainage improvements are likely needed.	Continuing development in this area will likely exacerbate issues. Sediment loading may also have impacts on a new TMWA treatment plant on Whites Creek.	TBD	TBD	Proposed

Tributary Project Template

Project Title: Sapphire Ridge Chalk Creek Stabilization

Footnotes ([a-i]) correspond to the EPA's nine elements to be included in the watershed plan. Please answer each section in a one to two paragraph response to the prompt.

	Overview
Site Location Description	Reno, NV, @Sapphire Ridge to W. Seventh St
Latitude/Longitude	39.537265, -119.8811550
Primary Contact	City of Reno, Nick Brothers, P.E., 775-399-8135
	PART A: General Description
Tributary Name; HUC 12 Watershed Number	Hunter Creek - Truckee River HUC#160501020505
Problem Statement and Causes of Pollution [a, c]	Chalk Creek does not meet the water quality standards for nitrogen, phosphorous, temperature, TDS, total suspended solids (TSS), selenium, and sulfates. At this project location severe channel incision and continuing erosion are contributing to the impairment of several of the listed pollutants.
Reference Plan Implementation or Priority	Regional watershed plan Appendix C project list includes this project. The City of Reno maintains this as a top priority project. (see Part A)
	PART B: Project Details
Project Goals and Tasks	The project goal includes elimination of further channel degradation. Tasks include design and construction of improvements. (see Part B)
Estimated Existing Loads and Sources [a]:	See attached load reduction estimates using the region 5 load reduction model. (see Appendix A)
Milestones [g], and Federal Fiscal Year Schedule [f]	The project will be broken into two phases: design and construction. It is estimated that the phased approach will span a 2 year period.
Pollutant Load Reductions Anticipated [b]	Total load reduction anticipated includes 48 tons of sediment, 40.6 lbs of phosphorous, and 81.4 lbs of nitrogen per year.
Project Lead [f] and Partners	Project lead will be the City of Reno. Contact is Nick Brothers, P.E., brothersn@reno.gov. Current partner includes One Truckee River org.
Monitoring [i] and Evaluation with Criteria to Measure Progress Toward Meeting Watershed Goals [h]	There will be post project monitoring at end of construction and one year post construction to ensure success in this segment of Chalk Creek. A post construction monitoring form will be utilized standard form can be found in the watershed management plan.
Information and Education [e]	Outreach will include mailers to neighboring properties, online project description, and a post construction placard. Websites including reno.gov, tmstormwater.com, and otr.org may be used to post educational materials.
Technical and Financial Assistance Needed [d]	Technical assistance will be obtained via engineer/constultant. (see Part B)

Attach location and project maps, photos, the Region 5 Model for Estimating Pollutant Load Reductions, BMP plans, conceptual plans, and any other supplemental information.

SUPPORTING SECTIONS – TRIBUTARY PROJECT – SAPPHIRE RIDGE/CHALK CREEK STABILIZATION

Part A – General Description

Chalk Creek lies within the HUC 12 #160501020505 watershed known as Hunter Creek – Truckee River. ENTER INFO FROM WATERSHED PROFILES.

Chalk Creek is listed as an impaired surface water on the 2016-2018 NDEP 303d impaired waters list or nitrogen, phosphorous, temperature, TDS, total suspended solids, selenium, and sulfates. While some of these constituents seem to be naturally occurring, increased runoff from urbanization has increased the hydromodification rate and led to severe erosion at some sites. During development of subdivisions in this area of Reno drainage improvements were required. The improvements at the proposed project site address failed erosion measures installed during development of the subdivision Sapphire Ridge Phase 1.

The City of Reno maintains this as a top priority project based on severity of the erosion, the protection of private property, and the ownership status of the project location. In the 2020 Watershed Plan for Tributaries to the Truckee River, Appendix C contains a status list of projects identified throughout the Truckee Meadows. The Sapphire Ridge erosion control project is listed as a City of Reno project and has a high priority for implementation. The erosion at this site threatens private property as the Chalk Creek drainageway meanders between residential properties where property boundaries and fencing is threatened. The channel is located within City of Reno Parcels (204-570-03, 204-570-01, and 204-680-05) and has access for maintenance equipment. These parcels are registered open space.

Part B – Project Details

Project goals include channel stabilization and reduction of sediments discharged to the Truckee River.

The Sapphire Ridge Chalk Creek Stabilization project will consist of two phases; design development and construction implementation. The design phase will be broken into several tasks including obtaining consulting services for site evaluation, bmp selection and design, including delivery of 30%, 60%, 90% final and as built plan sets. Construction phase will include selection of a contractor who will be responsible for executing a acquiring materials and implementing selected design per the bid contract.

Estimated pollutant load reduction was done using the EPA region 5 estimating load reductions tool. Bank stabilization methods were utilized. Bank recession coefficients were estimated based on visual inspection of the current condition. The project was broken into two sections, upper and lower, which have different dimensions and condition within the affected area. The upper section is represented by deep bank incision extending from channel vegetation down to a sedimentation basin above upstream of the Sapphire ridge culvert. The lower section extends from the downstream side of the Sapphire Ridge culvert to 7th Street. Soils are estimated as mixed loam based on Natural Resources Conservation Survice web soil survey tool. BMP efficiency is assumed 95% and thus remains default 0.95. Soil Nitrogen and Phosphorus values are left as default values in the model due to lack of site specific soil tests. Successful bank stabilization is estimated to reduce annual loads by 41 tons of sediment, 35 lbs of total phosphorous, and 69.6 lbs of total nitrogen.

Technical assistance will include engineering consulting services for the design phase, estimated to require one year for completion. Financial assistance to complete this project will require City of Reno sewer fund allocation for drainage capital projects to provide match for any acquired grant funding. Grants which may be available and pursued include the EPA 319 grant program administered by the

NDEP, One Truckee River funds and the Truckee River Fund (TRF) administered by the Truckee Meadows Water Authority. A 50% match would be required for 319 funds and the TRF grant.

Photos:

Photo 1, Section 1 above Sapphire Ridge culvert

Photo 2, Section 1 close up

Photo 3, Section 3 below Sapphire Ridge culvert

Legend

- Proposed Project Area
- Hydrology

NCE

City of Reno Proposed Project

Chalk Creek

Sapphire Ridge Way to West 7th Street

N

1 in. = 150ft.

0 75 150 Feet

FIGURE 1

SOURCE	JOB NUMBER	DRAWN	DATE	REVISED	APPROVED
Bing Aerial Basemap; NCE	167.15.25	sbryan	7/25/2019	-	-

Document Path: P:\Active Projects\Reno City - A167\A167.15.25 - Truckee River Tributaries Watershed Management Plan\GIS\AGP\Reno- sbryan.aprx

Bank Stabilization

If estimating for just one bank, put "0" in areas for Bank #2.

Please select a soil textural class:

○ Sands, loamy sands	○ Silty clay loam, silty clay
○ Sandy loam	○ Clay loam
○ Fine sandy loam	○ Clay
◉ Loams, sandy clay loams, sandy clay	○ Organic
○ Silt loam	

Please fill in the gray areas below:

Parameter	Bank #1	Bank #2	Example	
Length (ft)	130	130	500	
Height (ft)	6	6	15	
Lateral Recession Rate (ft/yr)*	0.5	0.5	0.5	
Soil Weight (tons/ft^3)	0.045	0.045	0.04	
Soil P Conc (lb/lb soil)** DEFAULT	0.0005	0.0005	0.0005	**
Soil N Conc (lb/lb soil)** DEFAULT	0.001	0.001	0.001	**

** If not using the default values, users must provide input (in red) for Total P and Total N soil concentrations

*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgement may be required to estimate the LRR. Please refer to the narrative descriptions in Table 1.

Estimated Load Reductions

	BMP Efficiency* Bank #1	BMP Efficiency* Bank #2	Bank #1	Bank #2	Example
Sediment Load Reduction (ton/year)	0.95	0.95	16.7	16.7	**143**
Phosphorus Load Reduction (lb/year)			14.2	14.2	**143**
Nitrogen Load Reduction (lb/yr)			28.3	28.3	**285**

Bank Stabilization

If estimating for just one bank, put "0" in areas for Bank #2.

Please select a soil textural class:

○ Sands, loamy sands	○ Silty clay loam, silty clay
○ Sandy loam	○ Clay loam
○ Fine sandy loam	○ Clay
◉ Loams, sandy clay loams, sandy clay	○ Organic
○ Silt loam	

Please fill in the gray areas below:

Parameter	Bank #1	Bank #2	Example	
Length (ft)	300	300	**500**	
Height (ft)	1.5	1.5	**15**	
Lateral Recession Rate (ft/yr)*	0.2	0.2	**0.5**	
Soil Weight (tons/ft^3)	0.045	0.045	**0.04**	
Soil P Conc (lb/lb soil)** DEFAULT	0.0005	0.0005	**0.0005**	**
Soil N Conc (lb/lb soil)** DEFAULT	0.001	0.001	**0.001**	**

** If not using the default values, users must provide input (in red) for Total P and Total N soil concentrations

*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgement may be required to estimate the LRR. Please refer to the narrative descriptions in Table 1.

Estimated Load Reductions

	BMP Efficiency* Bank #1	BMP Efficiency* Bank #2	Bank #1	Bank #2	Example
Sediment Load Reduction (ton/year)	0.95	0.95	3.8	3.8	**143**
Phosphorus Load Reduction (lb/year)			3.3	3.3	**143**
Nitrogen Load Reduction (lb/yr)			6.5	6.5	**285**

Soil Map—Washoe County, Nevada, South Part

Map Scale: 1:3,450 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Washoe County, Nevada, South Part
Survey Area Data: Version 16, Jun 11, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 1, 2018—Oct 1, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
652	Chalco stony loam, 4 to 8 percent slopes	23.1	46.8%
780	Bieber stony sandy loam, 0 to 4 percent slopes	3.0	6.1%
782	Bieber stony sandy loam, 8 to 15 percent slopes	5.0	10.0%
994	Badland-Chalco-Verdico complex, 8 to 30 percent slopes	18.3	37.1%
Totals for Area of Interest		**49.4**	**100.0%**