

Central Truckee Meadows Remediation District Program

2011 Annual Report



**Washoe County
Department of Water Resources**

Welcome

Welcome to the Central Truckee Meadows Remediation District (CTMRD) Program 2011 Annual Report.

This report is intended to provide information on the CTMRD program, tetrachloroethene (also known as PCE, Perc and perchloroethylene) and the local PCE groundwater problem, highlight some of the key accomplishments of 2011 and preview what is ahead. On the back is a map of the CTMRD, showing some of these features and activities. A glossary of terms is also located on the map side.

We hope that you will find this brochure useful and informative. For more information on the CTMRD program, including our 2011 Report Card, please visit our web site at www.washoecounty.us/water/ctmrd.htm.

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Central Truckee Meadows
Remediation District Program

What is the

CTMRD Program?

The CTMRD program was created by State statute and County ordinance in 1995 in order to address PCE contaminated groundwater in the Reno/Sparks area.

Work in the late 1980s showed that PCE contamination extended over 16 square miles, impacted five municipal water supply wells at levels exceeding the proposed drinking water standard, and threatened other wells. Groundwater wells are important parts of the local water supply system. The PCE contamination also represents a potential environmental liability for land owners who have property that overlies the problem.

The creation of the CTMRD program served three main purposes:

- Provide safe drinking water to custom-

ers served by wells in the impacted area;

- Provide liability relief for innocent property owners; and
- Prevent the central Truckee Meadows (CTM) from becoming a federal Superfund site.

Given the extent of the problem, the large volume of contaminated groundwater, and the numerous potential PCE sources, taking care of the PCE problem will be costly and take a long time.

The CTMRD program leads the efforts toward addressing the existing PCE contamination, preventing further contamination from occurring, and protecting uncontaminated portions of the aquifer. Stakeholder agencies work together to meet these goals. This type of community-based solution is the only one of its kind in Nevada.

"This type of community-based solution is the only one of its kind in Nevada."


What is PCE?

PCE is a man-made chemical, commonly used as a solvent in dry cleaning, auto repair and industrial operations. PCE can also be in some common household products (including cleaners, paint products, adhesives, insecticides, and automotive products). Industrial use of PCE was extensive from the 1940s through the 1980s, but has decreased since. PCE is a common environmental contaminant that has been closely monitored and regulated as a potential drinking water contaminant since 1991.

The improper use, storage and disposal of PCE can result in risks to human health. PCE is considered a probable human carcinogen by the International Agency for Research on Cancer. This means that exposure to PCE can result in an increased likelihood of developing cancer.


Did You Know?

A small amount of PCE contaminates a large amount of water. About 1 tablespoon of PCE would make fresh water filling 2 Olympic-sized swimming pools unfit to drink.



Did You Know?

The existence of the CTMRD program prevents much of the Reno/Sparks area from becoming a federal Superfund site (see the Benefit Groups section on the back for what this means).



Program Objectives

The CTMRD program has four key objectives (defined by the stakeholder agencies) that drive activities:

- Mitigate existing PCE contamination of our groundwater;
- Prevent additional groundwater PCE contamination from occurring;
- Protect the parts of the aquifer system that have not been contaminated by PCE; and
- Inform stakeholder agencies, the public, the business sector, and other interested parties of CTMRD program-related activities.

These objectives ensure the continued use of groundwater in the CTM as a vital component in the public water supply. The activities described below are performed in pursuit of these objectives.

Groundwater Monitoring Plan (GMP)
Regular and systematic groundwater monitoring of more than 200 wells takes place in order to track PCE distribution in groundwater and to identify any changes that constitute an increased threat to municipal water supply wells in the central Truckee Meadows.

Sewer Monitoring Program (SMP)
The SMP is a wastewater sampling program implemented by Reno, Sparks and Washoe County to verify compliance of PCE-using businesses with sewer discharge regulations. PCE disposal into the sewer is regulated for two key reasons: (1) PCE can interfere with the wastewater treatment process, and (2) if the sewer system leaks or has leaked, any PCE in the sewer can get into the environment and contaminate soil and groundwater.

Source Management
PCE releases originating both from historical activities and from active PCE-using businesses have contributed to soil and groundwater contamination in the CTM. Managing these sources of contamination and mitigating threats to groundwater resources and/or human health are fundamental objectives of the CTMRD program and regulatory actions administered by NDEP and/or WCHD. As described on the back of this report, source management includes a number of complex activities.

Stakeholder Agencies

The PCE problem in the central Truckee Meadows (CTM) is a regional issue that crosses jurisdictional and regulatory boundaries. This requires that multiple agencies be involved. Although the CTMRD program (administered by Washoe County) is responsible for spearheading these efforts, the solution to the PCE problem is community-based and requires broader participation in order to ultimately be successful. As a result, the CTMRD stakeholder group includes the following agencies.



Washoe County Department of Water Resources (WCDWR)
WCDWR is responsible for planning, implementing, and managing the CTMRD program on behalf of the Board of County Commissioners. Roles include: installation, operation and maintenance of groundwater treatment equipment; groundwater monitoring and PCE source identification programs; addressing PCE contamination that cannot be attributed to a specific source; stakeholder coordination; and, public outreach. WCDWR is also a municipal water service provider with one supply well located inside the CTMRD contaminant boundary.

(continued below)

Nevada Division of Environmental Protection (NDEP)
NDEP is responsible for protecting groundwater resources in Nevada. NDEP works with WCDWR and the Washoe County Health District to ensure that threats (like the PCE contamination in the CTM) to groundwater are effectively addressed. NDEP ensures that hazardous materials (including PCE) are properly stored, used, and disposed of. NDEP also directly oversees actions to address any environmental contamination that threatens groundwater where the responsible party has been identified.

Washoe County Health District (WCHD)
WCHD is responsible for protecting human health in Washoe County. WCHD works with WCDWR and NDEP to ensure that threats (like PCE contamination in CTM) to human health are effectively addressed. WCHD ensures that hazardous materials (including PCE) are properly stored, used, and disposed of. WCHD also oversees actions to address any environmental contamination (including PCE) which can be attributed to a point of use source to ensure that threats to human health are eliminated.


Cities of Reno and Sparks
The cities of Reno and Sparks issue business licenses and other types of permits to PCE-using businesses. Reno and Sparks provide regulatory oversight to ensure that PCE storage, use, and disposal practices at those businesses are in compliance with those licenses and permits. This oversight includes sampling, inspection, education, and in the event of non-compliance (such as a release of PCE to the environment or to the sewer system), enforcement action.

Truckee Meadows Water Authority (TMWA)
TMWA is a major water purveyor in southern Washoe County. The TMWA water system includes twelve municipal water supply wells located inside the CTMRD contaminant boundary, five of which have been equipped with treatment equipment to remove PCE directly at the well. TMWA works with NDEP and WCHD to ensure that safe drinking water is delivered to water users. TMWA also coordinates with WCDWR to address the potential threat to TMWA wells posed by PCE contamination that cannot be attributed to a responsible party.

Did You Know?

The cost difference between proper PCE disposal and cleaning it up from the Truckee Meadows groundwater is staggering.

It costs approximately \$5 to \$10 per gallon of PCE for the user to properly dispose of it as a hazardous waste. In comparison, it costs approximately \$8,300 per gallon of PCE to remove it from our groundwater through treatment at the well.



Program Activities

A variety of activities are designed to meet the objectives outlined above. The major initiatives currently underway are outlined here.

Wellhead Treatment
When contaminated groundwater is pumped at a well equipped with wellhead treatment, PCE is removed before it enters the water supply system. Currently, five municipal water supply wells in the CTM have PCE treatment systems in place. These wells (High, Morrill, Kietzke, Mill, and Corbett) are shown on the map on the back of this report. Wellhead treatment is the most efficient and cost effective way of dealing with large volumes of groundwater contaminated with relatively low levels of PCE. In addition to ensuring the delivery of safe drinking water, wellhead treatment allows these wells to be used during periods of high water demand (such as hot summer months) or when Truckee River water is not available for any reason.

Wellhead treatment occurs according to the Pumping Plan (an agreement between Washoe County and TMWA), which specifies the amount of annual pumping by these wells to control the known PCE plumes (areas of known groundwater contamination, shown on the map on the back of this report). Controlling the plumes in this way helps to minimize the spread of contamination and protects other municipal water supply wells.



Wellhead Treatment System

2011 Accomplishments

Many of the goals achieved in 2011 provided a better understanding of the aquifer system and the PCE problem. Highlights of these accomplishments are included below. For additional detail, please review the 2011 Report Card, available on the CTMRD program web site.

Groundwater Treatment
Over 1.4 billion gallons of groundwater were treated and over 14 gallons of PCE were removed from the aquifer system.

Contaminant Boundary Changes
Changes in the contaminant boundary (to reflect a decrease in the size of the area where PCE contamination is present) were approved by the Board of County Commissioners. More detail is provided on the other side of this report.

Temporary Remediation Fee Reduction
Owners of water-using parcels within the CTMRD service area boundary pay an annual remediation fee on their property tax bill. This funds the activities of the CTMRD program. In 2011, process improvements allowed for the retirement of a reserve fund, resulting in the remediation fee rate being reduced by 50% for FY 11-12 and FY 12-13. This temporary fee reduction will save payers approximately \$2.5 million over the two-year period.

Groundwater Monitoring Plan (GMP)
GMP accomplishments are highlighted on the back side of this report.

Potential Source Area (PSA) Investigations
Work in five PSAs (shown on the other side of this report) have identified multiple "high mass areas" (HMAs), which are evidence of PCE contamination above the water table and at or near the land surface in areas near contaminated groundwater. These HMAs are potential sources that may be contributing PCE to the plumes. The goal of the PSA investigations is to determine if the HMAs pose a threat to groundwater and, if they do, to determine the most cost effective means of mitigating that threat. PCE mass removal closer to the source is likely to be more cost effective than wellhead treatment and may reduce the amount of time that wellhead treatment will be required. This can help reduce overall program costs.

Impacted Well Investigation (EI Rancho Well)
EI Rancho Well investigation accomplishments are highlighted on the back of this report.

Remediation Management Plan (RMP) Update
The RMP is required by state law and identifies program goals and objectives, and stakeholder agency roles and responsibilities. Work since the RMP was initially developed in 2002 has led to an improved understanding of the nature, extent, and causes of the PCE problem and the ways in which it can be more effectively addressed. An update to the RMP reflecting that understanding is currently underway. In 2011, a collaborative stakeholder process led to the completion of the CTMRD "activity table", which details program goals, objectives, metrics, targets, current levels of success, and agency roles and responsibilities.

What's Ahead?


Goals to be addressed and activities scheduled in 2012 (or beyond) include:

Groundwater Monitoring Plan
WCDWR will construct eleven new monitoring wells (shown on the map on the back) in the CTM. Two new wells will be part of the El Rancho well investigation (see below). Two new wells will provide early warning for potential impacts to the Longley Lane 1 municipal water supply well. Seven new wells are associated with the Downtown Reno plume (the largest PCE plume in the CTM) and will help us to:

- Evaluate a high concentration portion of the Downtown Reno plume;
- Determine if a possible PCE source area exists east of Downtown Reno on the south side of the Truckee River; and
- Verify that the Mill Street well contains the Downtown Reno plume, prevents it from moving east and protects downgradient wells.

WCDWR will conduct water quality and flow profiling at the Corbett and Kietzke municipal water supply wells to identify where PCE contamination enters those wells. Even though these wells are equipped with PCE treatment systems that ensure delivery of safe drinking water, this work will determine:

- Whether PCE entering these wells comes from recognized or new potential source areas (and whether new PSA investigations are needed); and
- Whether PCE contamination at these wells poses any threat to other nearby municipal water supply wells.



WCDWR will use pumping test data (information provided about the aquifer when a well is pumped for an extended period of time) to assess potential threats posed by contaminated groundwater located near four municipal water supply wells (Reno High, Poplar 2, Hidden Valley 5, and Longley Lane 1).

Potential Source Area Investigations
Plans for the PSA investigations are described on the other side of this report.

Impacted Well Investigation (EI Rancho Well)
The location and size of the EI Rancho plume has not been determined. Initially, two new monitoring wells will be drilled to help define the plume and additional wells may be needed. Options for dealing with the contamination in the EI Rancho well itself will also be evaluated for effectiveness and feasibility. As described on the back of this report, the EI Rancho PSA investigation will focus on identifying the sources for the EI Rancho plume.

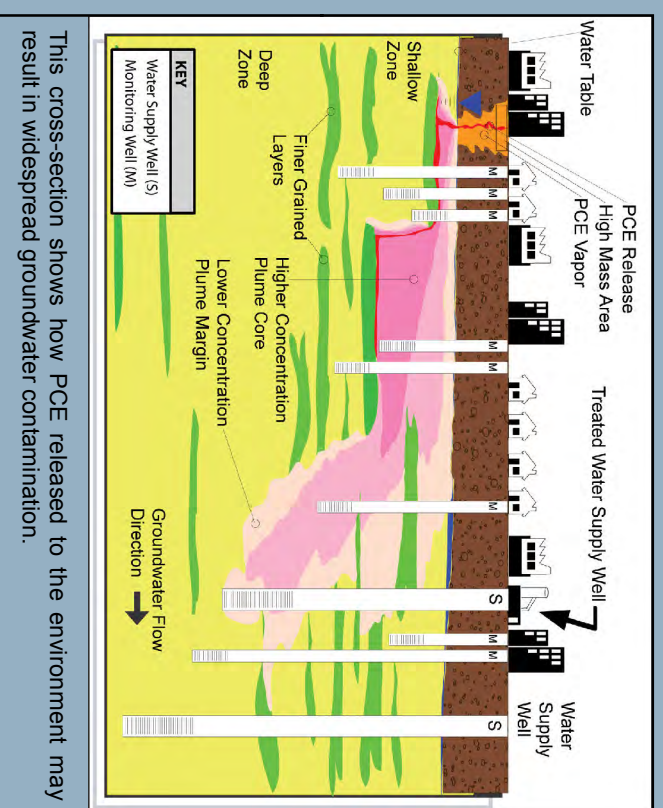
Remediation Management Plan Update
The RMP update is expected to undergo the review and approval process in mid-2012.

Source Management

The objective of source management is to define and put into place the most practical and cost-effective measures to prevent groundwater or risk to human health posed by a source of PCE contamination.

- A "source" of PCE can be:
- An active or recently active place of use where PCE is being released or has been released into the environment causing soil and/or groundwater contamination; or
 - A place where PCE that was released to the environment in the past remains in the soil (as residual contamination) and can contribute to groundwater contamination for a long time (tens of hundreds of years).

These sources represent places with high PCE concentration where contaminant mass can potentially be more cost-effectively removed. This is in contrast to wellhead treatment, where large volumes of groundwater with lower concentrations of PCE must be processed to remove contaminant mass.



Sources caused by a responsible party, (typically an active or recently active place where PCE is/was used and determined to be responsible for environmental contamination) are addressed by NDEP or WCHD through the corrective action process. Corrective actions administered by NDEP or WCHD to address such a source (and the associated contamination) are funded by the responsible party. Current and former corrective action sites are shown on the map.

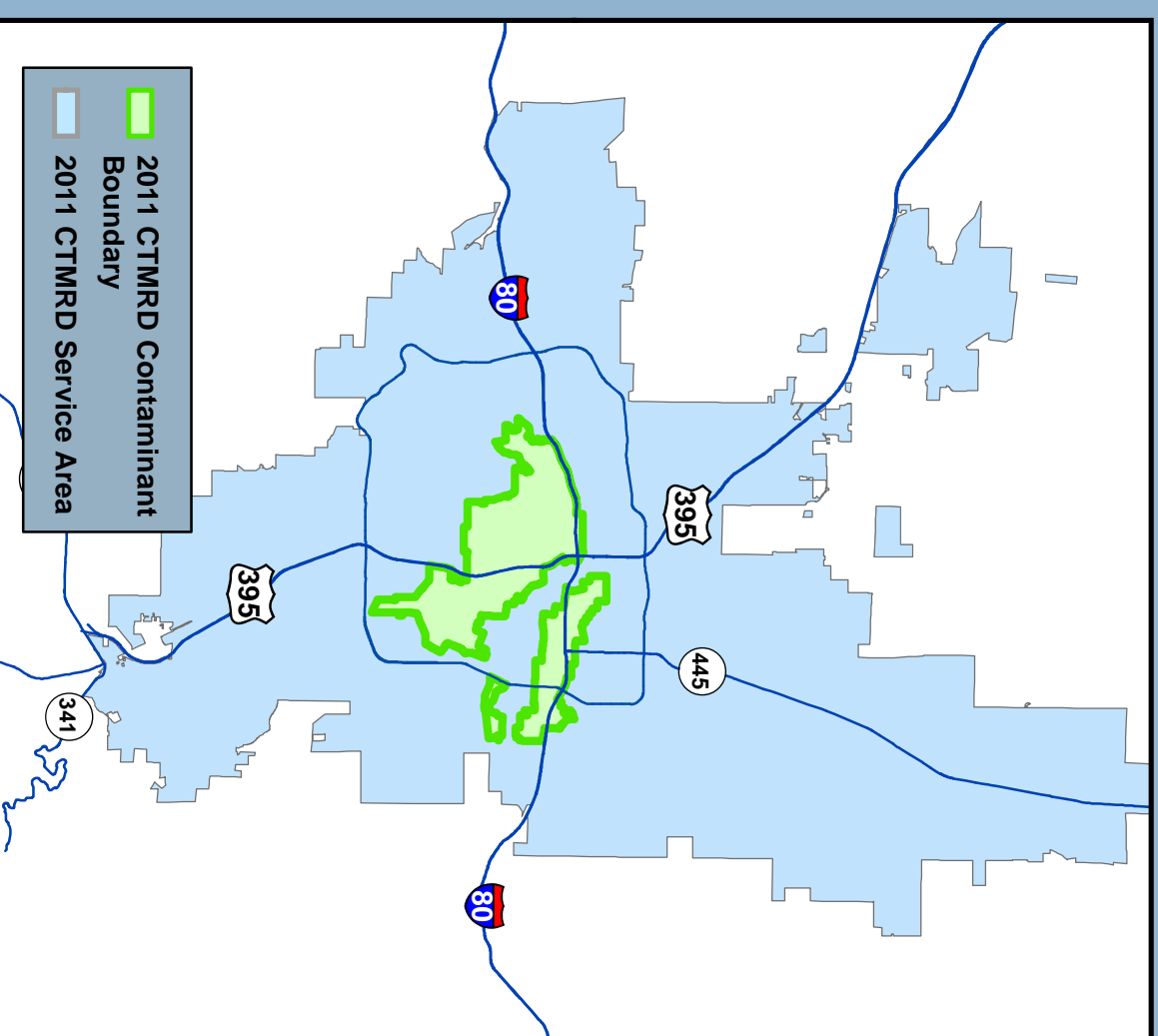
If a source (either associated with a responsible party OR residual contamination from a past release) for recognized groundwater contamination is initially unknown, a past release investigation (PSA) is conducted. The PSA is a series of investigations where shallow groundwater is sampled and analyzed for PCE. PSA investigations being implemented by WCDWR are shown on the map to the right.

In the event that activities funded by CTMRD program fees identify contamination that can be attributed to a responsible party, the costs of those activities can potentially be recovered from the responsible party through NDEP.

Groundwater Monitoring Plan 2011 Accomplishments

Results from groundwater sampling show that the PCE plumes are stable, which means that they stay in the same place and remain about the same size and shape. PCE plume hot spots (where high concentrations of PCE occur in shallow groundwater at levels higher than the rest of the plume) also remain persistent. This suggests that residual PCE sources (PCE that was released into the environment in the past and remains in the soil) are located near these hot spots and continue to add PCE to shallow groundwater. Results also show that PCE moves with the groundwater and is controlled by the same processes that control groundwater flow, including groundwater pumping and recharge (the natural or artificial addition of water to the aquifer). The interaction of these processes with PCE contamination results in the location, groundwater and extent of the plume. The many existing monitoring wells at the central Truckee Meadows aquifer system where the many existing municipal water supply wells produce water.

Results from pumping tests and groundwater sampling at PCE-impacted municipal water supply wells have helped show how and where PCE travels from the water table to the impacted well. These results help us find potential source areas so that near-surface PCE can be investigated for clean up. Results also have identified the depth where PCE enters impacted municipal water supply wells. This contributes to finding better ways to protect both municipal water supply wells and the deeper, water-producing parts of the aquifer system.

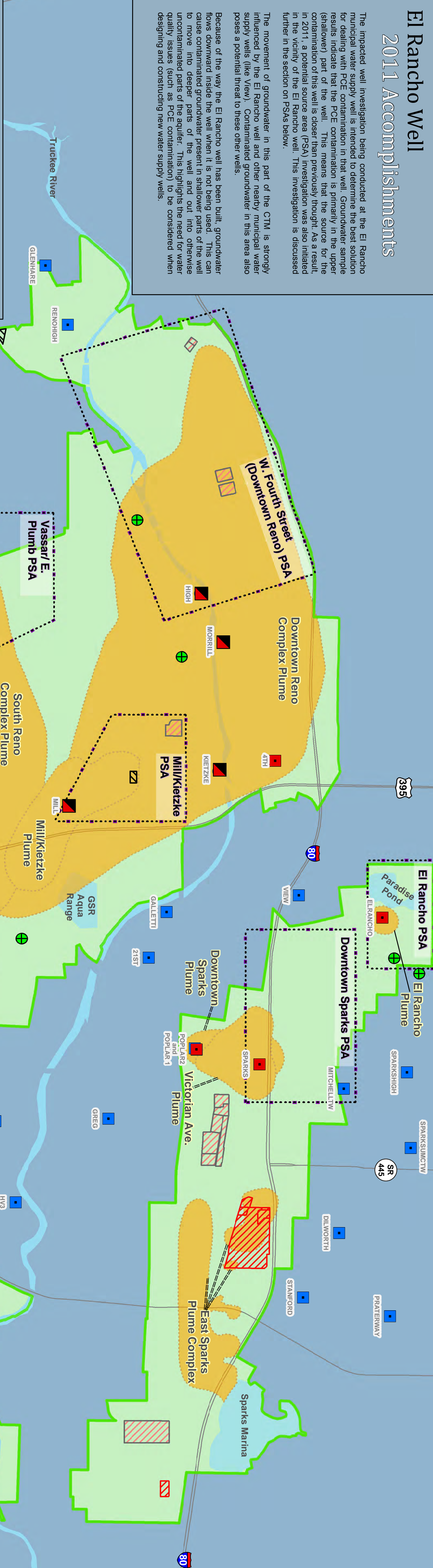


El Rancho Well 2011 Accomplishments

The impacted well investigation being conducted at the El Rancho municipal water supply well is intended to determine the best solution for dealing with PCE contamination in that well. Groundwater sample results indicate that the PCE contamination is primarily in the upper (shallower) part of the well. This means that the source for the contamination of this well is closer than previously thought. As a result, in 2011, a potential source area (PSA) investigation was also initiated in the vicinity of the El Rancho well. This investigation is discussed further in the section on PSAs below.

The movement of groundwater in the part of the CTM is strongly influenced by the El Rancho well and other nearby municipal water supply wells (like View). Contaminated groundwater in this area also poses a potential threat to these other wells.

Because of the way the El Rancho well has been built, groundwater flows downward inside the well when it is not being used. This can cause contaminated groundwater present in shallower parts of the well to move into deeper parts of the well and out into otherwise uncontaminated parts of the aquifer. This highlights the need for water quality issues (such as PCE contamination) to be considered when designing and constructing new water supply wells.



Glossary of Terms

Aquifer – a volume of rock through which groundwater readily flows and can be recovered. Wells pump groundwater from aquifers, and compounds such as PCE can eventually make their way into aquifers, contaminating groundwater.

Corrective actions – regulatory activities by the Nevada Division of Environmental Protection (NDEP) or Washoe County Health District (WCHD) to mitigate contamination where a responsible party has been identified. CTM – the acronym for the central Truckee Meadows, which includes much of Reno and Sparks.

Drinking water standard – set by the U.S. Environmental Protection Agency and NDEP to ensure that drinking water is safe for human consumption.

High mass area – places where PCE has been identified in the ground above the water table.

Impacted well – a well that is affected by PCE contaminated groundwater.

Municipal water supply wells – wells that are used to supply water for human consumption to the public.

PCE plumes – parts of the aquifer where PCE contaminated groundwater is located (shown in plan view on the map).

Plume hot spots – where higher PCE concentrations are present in shallow groundwater. These may be near a source of contamination.

PSA or potential source area – an area where the potential source(s) of PCE contamination of groundwater are likely to be present.

Pumping – the process of removing groundwater from a well.

Recharge – the process (natural or artificial) of adding water to the aquifer above the water table.

Soil gas concentration – the amount of a substance (ex. PCE) that is in a specified volume of soil gas.

Soil gas surveys or wells – methods for identifying the presence of contaminants in soil gas near areas of groundwater contamination.

Treatment system – equipment that removes PCE (or other contaminants) from groundwater as it is pumped.

Benefit Groups

The CTMRD program provides benefits for water users in the service area boundary and property owners in the contaminant boundary. The service area boundary includes the area served by water purveyors with wells located within the contaminant boundary. The contaminant boundary includes the area where PCE contamination currently exists or is expected to migrate if not contained. The CTMRD boundaries are shown on the map to the left. The CTMRD benefits are defined and defined by land use and the CTMRD boundary within which they are located.

1. Water users within the service area boundary benefit from having a safe and sustainable water supply.

2. Owners of residential property located inside the contaminant boundary benefit from ongoing actions to eliminate or reduce PCE-contaminated soils and groundwater underlying their property, protection of property values by avoiding a CERCLA ("Superfund") listing, which may contribute to a decreased property value, and having a safe and sustainable water supply.

3. Owners of non-residential property located inside the contaminant boundary receive the same benefits provided to residential property owners, along with the additional assurance of limitation on liability for remediation of PCE-contaminated soils and groundwater underlying their property.

All those benefiting from the CTMRD program are required by law to pay a remediation fee that is used to pursue program objectives. The benefits that each group receives are distinct, therefore, a tiered fee structure is used to assess remediation fees based on the benefits received. The fee structure is detailed in the CTMRD Remediation Fee Schedule. Find out more at www.washobecounty.gov/water/ctmrdbenefits.htm

Potential Source Area (PSA) Investigations

What's Ahead?

Future plans for the ongoing PSA investigations are outlined below. The PSA symbol on the map represents the ongoing PSA investigation areas.

W. Fourth Street (Downtown Reno) PSA
Five PCE high mass areas have been identified in the area up gradient from the High and North wells. These wells were equipped with PCE treatment systems in 1986 and deliver safe drinking water. During 2012, evaluation activities will primarily focus on defining the extent of the PCE high mass areas. The PSA investigation will continue to be conducted in the W. Fourth Street high mass area. Depending on what is identified at the W. Fourth high mass area, additional activities in 2012 may be focused there or also include the other high mass areas in this PSA.

El Rancho PSA
A high mass area identified northeast of the El Rancho well is located in an area where contaminated groundwater could move toward the well. Specific plans for this PSA will depend on the results from two new groundwater monitoring wells (to the northeast of the well) scheduled for construction in early 2012. Additional plans may include more soil gas sampling and the construction of additional groundwater wells.

Vassar/E Plumb PSA
WCDWR will continue to evaluate the five identified high mass areas in this PSA to determine the threat they pose to the Corbett well. The evaluation of high mass areas (and any associated sources) will include the determination of whether it would be more cost-effective to pursue source remediation or to continue to remove PCE from groundwater using the treatment systems at the Corbett well. In 2012, this assessment will begin with the construction of wells that measure soil gas in three of the five high mass areas to assess potential threats to the Corbett well. The other two recognized high mass areas are associated with ongoing corrective actions being administered by NDEP.

Mill/Kietzke PSA
PCE soil gas concentrations in three of the five known high mass areas in this PSA are high enough to cause groundwater PCE concentrations that could exceed the drinking water standard. Additional soil gas and groundwater wells will be installed to evaluate the magnitude of the threat associated with the Kietzke high mass area. Depending on what is identified at the Kietzke high mass area, additional activities may be focused there or also include the other high mass areas in this PSA. WCDWR will continue to collect and assess information from the existing soil gas wells in all five high mass areas.

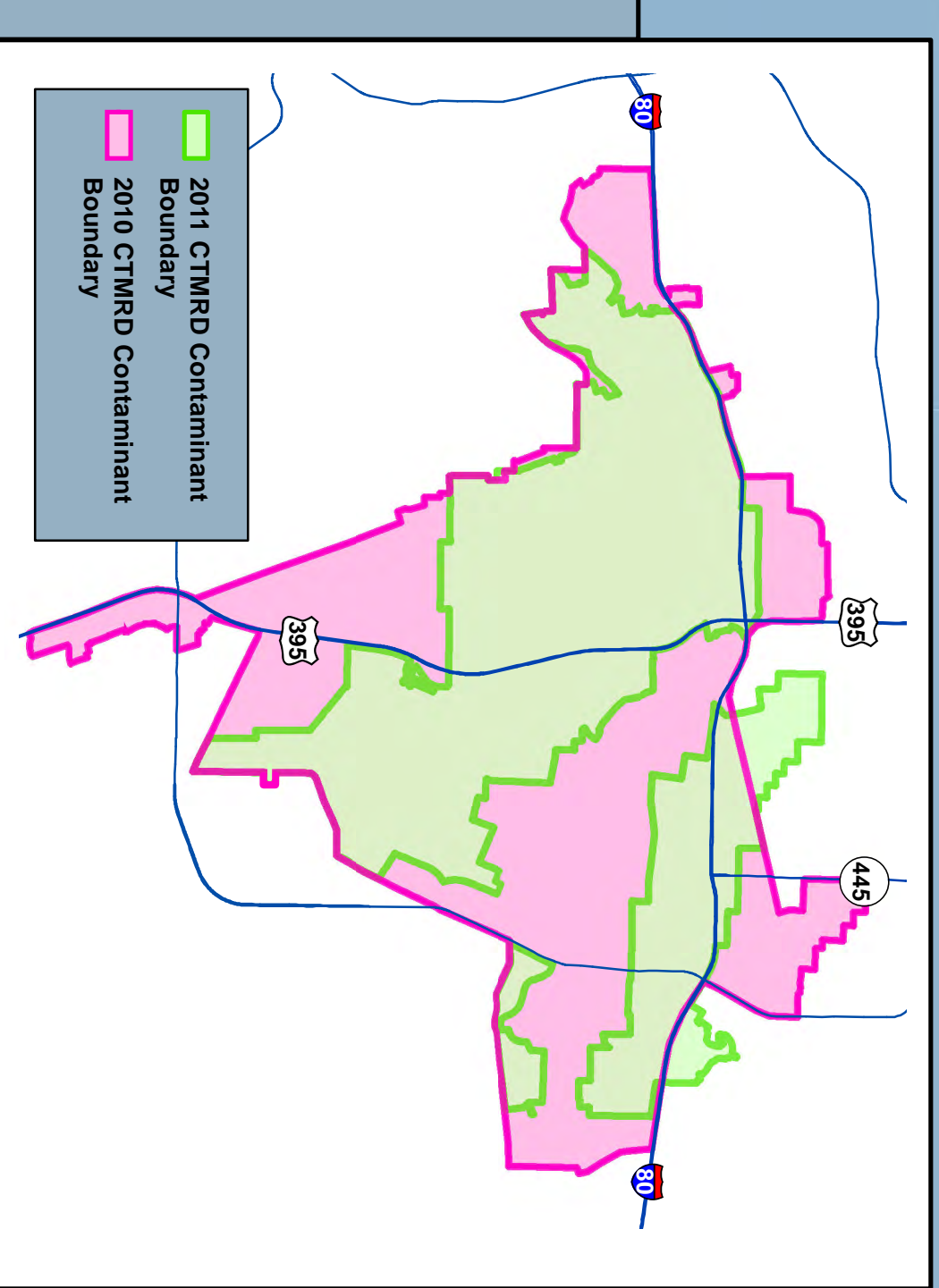
Downtown Sparks PSA
Five PCE high mass areas have been identified in Sparks in the area between the View well and the Proflar 2 and Sparks wells. In 2012, WCDWR will continue to evaluate these high mass areas to determine the potential threat they pose to the three wells. PCE treatment systems for the Proflar 2 and Sparks Avenue wells have been designed and can be constructed in the event they are needed. These wells continue to produce water that meets safe drinking water requirements but they may be treated by any PCE contamination present in this area.

Contaminant Boundary Changes

The PCE contamination in the central Truckee Meadows is now not as extensive as it was when the CTMRD contaminant boundary was first defined in 2001. However, three new contaminated areas have been identified that were not included in the 2001 boundary. The 2010 contaminant boundary was revised to accurately reflect the current extent of the impacted area.

The map to the right shows the 2010 contaminant boundary in comparison to the 2011 contaminant boundary area that is now approximately 9.5 square miles (a reduction in size by approximately 7 square miles).

More information about the contaminant boundary changes can be found on the CTMRD program web site at www.washobecounty.us/water/2011_boundary_changes.htm



WASHOE COUNTY

Department of
WATER RESOURCES

CENTRAL TRUCKEE MEADOWS REMEDIATION DISTRICT

2011 Contaminant Boundary

PCE Plume (< 0.5 µg/L)

Potential Source Area (PSA) Under Investigation

Current Corrective Action Site

Former Corrective Action Site

PSA

Municipal Water Supply Well with PCE Treatment

Other Municipal Water Supply Well

Locations of Proposed New Monitoring Wells (1-3 ea. location)

PCE Detected in Sewer (> 100 µg/L) Downstream from PCE-using Business

(Note: Not all corrective action sites and sites with PCE detected in the sewer are visible on this map. Follow-up activities at these locations are handled by other stakeholder agencies.)

Municipal Water Supply Well with PCE Treatment

Municipal Water Supply Well with PCE Detected

0 0.1 0.2 Miles

Central Truckee Meadows
Remediation District Program

NOTE: The scale and configuration of all maps and maps included in a PSA are for informational purposes only. The information presented in this PSA is not intended to be used for any purpose other than the remediation of PCE contamination in the Central Truckee Meadows Remediation District.