Water Quality Challenges Facing Our Community

Nevada is the fastest growing state in the nation, and much of that growth is occurring in the Truckee Meadows. Along with growth come many benefits, but also many challenges. The Truckee River is a vital source of drinking water, recreation, tourism, wildlife habitat, and irrigation water in our area. Water quality in the Truckee River is reflecting the stress that results from increases in population and development. Groundwater quality impacts are also becoming apparent, such as nitrates detected in water wells in Washoe Valley and the Spanish Springs areas. In part, these impacts on water quality can be traced to natural factors, such as our high desert climate, desert soils and watershed configuration. There is also increasing pressure from federal, state and local regulations to protect and improve local water quality. The combination of these factors results in a special set of challenges facing the Truckee Meadows.

Regulations and Mandates

There are a number of federal regulations that affect our community with respect to local water quality. Water quality is regulated by the Safe Drinking Water Act (SDWA) and the Clean Water Act (CWA).

**THE SAFE DRINKING WATER ACT APPLIES TO DRINKING WATER ONLY.**

It requires the United States Environmental Protection Agency (US EPA) to set limits for contaminants that may pose a health hazard in public drinking water. These limits are in the form of maximum contaminant levels (MCLs). The SDWA applies only to municipal drinking water suppliers serving 15 or more connections or 25 or more people for at least 60 days per year. It does not regulate water quality from domestic wells.

Individual domestic water wells are not currently regulated in Nevada by any federal, state or local entity. Owners of private wells are free to use the water as they see fit, regardless of quality. This may soon change. In 2002, New Jersey passed the Private Well Testing Act. This act requires well testing for properties with certain types of private drinking water wells before they can be sold or rented. The first month of well testing showed a failure rate double what New Jersey Department of Environmental Protection expected. The Washoe County Groundwater Task Force has begun to explore the potential for a similar local program to protect domestic well water users.

**THE CLEAN WATER ACT REGULATES THE QUALITY OF ALL WATER.**

The second federal regulation affecting water quality is the Clean Water Act. This fact sheet focuses on the CWA, since it regulates the quality of all waters of the U.S. as defined by the CWA, not just drinking water.
The CWA has several different sections that cover specific water quality issues.

Section 303 of the Clean Water Act requires states to establish water quality standards based on the beneficial uses established for a given water body. Standards must be set at a level needed to protect these beneficial uses. Section 303(d) requires each state to assess its waters and determine if the water is meeting the water quality standards. If a water body does not meet water quality standards, it is placed on the 303(d) list of impaired or threatened waters. The state is then required to address the impaired waters by establishing Total Maximum Daily Loads (TMDLs), which are specific, quantifiable limits for individual pollutants. The goal is to allocate pollution control responsibilities among the pollution sources in a watershed.

Water quality standards are based on the beneficial uses (see left) designated for that segment of the water body, as well as on existing water quality data. TMDLs provide a specific numerical limit for individual pollutants, generally in pounds per day. A given TMDL is calculated as the sum of all allocated loads of a pollutant, set at a level necessary to meet water quality standards, including inputs from wastewater treatment (wasteload allocation), loads from nonpoint sources (load allocation), and natural background conditions. Each TMDL must include a margin of safety as well as a consideration of seasonal variations. For example, the TMDL for total nitrogen in the Truckee River at Lockwood is 1,000 pounds per day, with 500 pounds allocated to the municipal wastewater treatment plant that serves the Reno–Sparks area. The remaining 500 pounds is allocated to wasteload allocations for two small point source discharges (Vista Canyon Group and Sparks Marina), as well as NPS and background sources. This includes nonpoint source pollution (NPS), tributary inputs, storm water runoff, and natural background conditions.

After formulation of the load and wasteload allocations, the EPA approves the TMDLs. The TMDLs are then used to develop National Pollutant Discharge Elimination System (NPDES) permit limits for point sources and Best Management Practices (BMPs) for nonpoint sources.

TMDLs are one of the limiting factors at the Truckee Meadows Water Reclamation Facility (TMWRF), which treats wastewater in the urban Truckee Meadows. TMWRF is the major point source discharger to the Truckee River. Its permit includes waste load allocations for total nitrogen, total phosphorus, and total dissolved solids. Continuing our example, TMWRF has been given a load allocation of 500 pounds per day for nitrogen. This means that they can only discharge treated wastewater into the Truckee River until that limit is reached. If the limit does not change as we grow and produce more waste, we will be faced with some difficult and expensive choices to make regarding wastewater treatment. Alternatives include costly high-tech innovations and expansions to the facility, application of effluent to golf courses and landscapes, or pollutant trading.

WHAT IS POLLUTANT TRADING?

If a point source of pollution regularly exceeds its allocation of the TMDL, there are two possible solutions. The point source that is exceeding its allocation can be fined and will be required to improve

Further degradation of local water quality will lead to more scenes like this one.
their water treatment, regardless of cost. Or, one pollution source will have to reduce its load to allow the other pollution source to increase its load. This type of pollutant trading could occur if local water quality in tributaries and ditches is improved by better practices at the source to reduce NPS, or restoration of stream form and function to allow for enhanced pollutant uptake and decreased erosion and sedimentation. Wetland creation is also used as a method of NPS reduction. It may be more cost effective to control NPS than to impose additional point source controls.

Not only must our community adhere to TMDL limitations, there is some fear that we may be subject to increasingly onerous and costly federal and state regulations in the future if voluntary reductions in NPS and improvement in surface water quality are not achieved. Voluntary actions implemented now help protect our community from incurring future federal mandates and the associated costs.

Section 208 of the Clean Water Act authorizes or requires the preparation of an areawide wastewater management plan, including urban storm water treatment systems. In accordance with Section 208, if an area within the state is identified as having substantial water quality control problems as a result of urban or industrial concentrations (or other factors), this area becomes a “Designated Area.” The Governor sets the boundaries of the designated area and appoints a single representative organization to be responsible for developing a wastewater treatment management plan for that designated area. Nevada has four designated areas: Carson River Basin, managed by the Carson Water Subconservancy District; Clark County, managed by Clark County Comprehensive Planning Agency; Lake Tahoe Basin (bistate), managed by the Tahoe Regional Planning Agency; and Washoe County (except for the Pyramid Lake Paiute Reservation), managed by the Truckee Meadows Regional Planning Agency. The rest of the state falls into the nondonated area status and is managed by the Nevada Division of Environmental Protection (NDEP).

State Section 208 Plans are updated as needed. Water Quality Management Plans are used to direct implementation to priority point and nonpoint source water quality problems, consider alternative solutions, and recommend control measures. One of the requirements of a 208 plan is a process to identify agricultural (crops or livestock) and silvicultural (forest) nonpoint sources of pollution and set forth procedures and methods, including land-use requirements, to control these pollution sources. The state of Nevada requires TMDLs as elements of 208 Plans when they are needed to address water quality problems.

Section 319 of the Clean Water Act, which was added with the 1987 amendments to the CWA, provides for more specific planning related to control of NPS. It requires the state to develop a Nonpoint Source Management Plan. This plan should contain a management program for controlling NPS pollution and improving water quality in waters affected by NPS pollution. The NPS program focus has shifted over the past several years to concentrating on a watershed-based approach that primarily addresses 303(d) listed waters and implementation of TMDLs. NDEP implements voluntary Section 319 programs, which focus on reducing NPS, improving water resources, educating the community and coordinating water quality protection activities.

Groundwater Quality Concerns

Without careful planning and design, continued urbanization of the Truckee Meadows will have an impact on groundwater quality. Major concerns include nitrogen, bacteria, and virus contamination of groundwater resources due to poorly planned, operated and maintained on-site septic systems. Careful planning is needed so that we can avoid the nitrogen problems experienced by Washoe Valley, the North Valley communities, and other parts of the Truckee Meadows. Research has also indicated that pharmaceuticals and personal care products that are disposed of in on-site septic systems may be impacting groundwater quality.

On-site septic systems are not the only challenge to local groundwater; however. With urbanization comes the construction of additional gas stations and other potential sources of groundwater contamination. More pavement means more storm water runoff and the need for construction of additional storm water management strategies.

For more information on threatened (303d) waters in Nevada, check these websites

www.wcei.org/nevada/rv-list.html
www.ndep.nv.gov/bwqp/303dlist.htm
www.epa.gov/region09/water/tmdl/303d.html
oaspub.epa.gov/waters/state_rept.control?p_state=NV
Storm water detention or retention ponds that can reduce impacts to rivers and streams could also increase the risk to the groundwater below them. While we have already measured accumulated pollutants in our surface water bodies, the eventual effect of this polluted water recharging our groundwater supply has probably not yet been felt. Groundwater recharge occurs slowly. As a result, any contaminants carried in groundwater also move slowly. Impacts can take many years to materialize. Unfortunately, these impacts also take far longer to reverse or correct than do impacts to surface water. Remediation of contaminated groundwater is an expensive and lengthy process, often lasting for decades. Reduction of pollution at the source is still the most efficient and cost-effective way to improve water quality.

Other concerns relate to Nevada’s geology. For example, arsenic is a metal that occurs naturally in Nevada soil and groundwater. The federal MCL for arsenic in public sources of drinking water has been reduced from 50 parts per billion (ppb) to 10 ppb. This new standard, effective January 2006, will limit areas and aquifers that can be tapped for additional drinking water needed for a growing county.

State and local source water protection programs are designed to educate the public and businesses about where their drinking water comes from and how they can join the effort to protect it. However, these programs are voluntary. Local ordinances regarding land use around these sources may be needed to bolster protection of these critically important areas.

### High Desert Water Regime

In addition to mandates and regulations, our unique local conditions add complexity to our ability to maintain good water quality. In our area, the high desert climate, soils, and geomorphology add a special set of circumstances to the water cycle.

#### PRECIPITATION

The Truckee Meadows receives, on average, about 7 inches to 9 inches of rain per year. While 80 percent of the rainfall in our area occurs in one-half inch or less events, the time between these events can be significant, with dry periods lasting months at a time.

This time lag between precipitation events results in an accumulation of pollutants on roads, roofs, and other impervious surfaces. While the amount of actual precipitation is relatively minor, the concentration of pollutants in the storm water runoff can be quite high, depending on the amount of accumulation on surfaces. Areas with more frequent precipitation events have much shorter pollutant accumulation times. This means that storm water runoff in these areas is relatively dilute when it comes to built-up pollutants. Precipitation events in the high desert may flush two or three months of accumulated pollutants. This high concentration of contaminants can seriously affect TMDLs for individual pollutants in the Truckee River, strain the capability of water treatment plants and have a detrimental affect on aquatic life and recreation. Controlling storm water runoff from these nonpoint sources improves the health of the river and reduces community costs.

#### SOILS

Desert soils are somewhat impermeable, or resistant to water infiltration. When they are very dry, they may even behave hydrophobically – that is, they almost seem to repel water. Although it seems unlikely, surface runoff of storm water may actually increase in these dry soils. As the water is shed across the soil surface, there is little opportunity for natural pollutant uptake and decontamination by the soil. The effect increases when there is a lack of vegetative cover. Major storm events erode some of the soil away, along with accumulated surface pollutants. This results in water high in sediment and other pollutants.

#### WATERSHEDS

The Truckee Meadows is a unique watershed, in that all water remains...
The Truckee River begins at Lake Tahoe and flows through Reno and Sparks, as it travels to Pyramid Lake. Water also enters the river from streams and agricultural ditches. Water from the Truckee River does not flow to the ocean, since the Truckee River watershed is an enclosed basin. The Truckee Meadows Water Reclamation Facility (TMWRF) returns treated wastewater to the Truckee River via Steamboat Creek. The river is designated impaired from the Idlewild sampling station to Pyramid Lake. While Nevada has regulations for Truckee River quality within the Pyramid Lake Paiute Reservation, the State’s standards do not apply. For that reason, the Nevada 303(d) list only includes the Truckee River from Idlewild to the Pyramid Lake Paiute Reservation near Wadsworth.
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Funding provided by:

Nevada Division of Environmental Protection,
Nonpoint Source Pollution Management branch.

within the basin rather than eventually draining to an ocean. We refer to the Truckee Meadows as a closed basin. Water leaves Lake Tahoe via the Truckee River and flows into Pyramid Lake, staying entirely within the basin (see map, previous page). There are many smaller closed subbasins within the Truckee Meadows, including Lemmon Valley, Spanish Springs, and Cold Springs. The pollution entering a closed basin stays within the closed basin. Our actions affect downstream users as well as our own communities.

The water quality of Truckee River tributaries historically has been good, with a few exceptions. As growth proceeds into upper watershed areas along tributaries, however, roads and development affect tributary form and function. Buffer areas along streams that improve water quality are impaired by construction activities. Streams become confined and no longer function naturally, interfering with their ability to protect water quality. Flows decrease as water is diverted to meet the needs of growth, and remaining in-stream flows become a source of concentrated pollutants. Watershed planning is essential to protect these critical elements of our community water system.

Summary

As our community grows, the strain on local water resources will continue. Water quality suffers from the increase in population and development. A number of federal mandates are in place to ensure water quality is protected, but these regulations come with a cost to the taxpayer. While the amount of nonpoint source pollution that enters the water system is partially dependent on a number of natural factors that are beyond our control, there are many things that we can do to avoid or minimize inputs related to growth and development.

Homeowners can employ best management practices to maintain on-site septic systems, protect recharge areas, and decrease nutrient and other pollutant inputs.

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Developers, city/county planners and decision makers have a major role to play in avoiding or reducing nonpoint source pollution. During plan development and review, ask:

- Does the development plan meet the local storm water nonpoint source pollution prevention ordinances?
- Does the development plan make every effort to avoid producing nonpoint source pollution? Could the plan be improved to further minimize NPS sources?

- Does the development plan include provisions for groundwater recharge? Retention, detention, and infiltration best management practices can and do reduce nonpoint source pollution related to development. The reduction occurs when vegetation and soils naturally process limited amounts of certain pollutants.
- Does the development plan minimize disturbances to existing drainages and adjacent vegetation? Does the plan avoid altering or straightening the channel? If these natural systems are left in place, natural processing of nonpoint source pollution occurs. This helps lessen the impacts of development.

Consequences of continued impairment of local water quality include increasing federal mandates, expensive infrastructure, increasing costs of wastewater and drinking water treatment, and ever-increasing taxpayer burdens. By avoiding or reducing nonpoint source pollution through better planning, minimization, and mitigation, we can make the most efficient use of limited funds while continuing to maintain healthy communities.