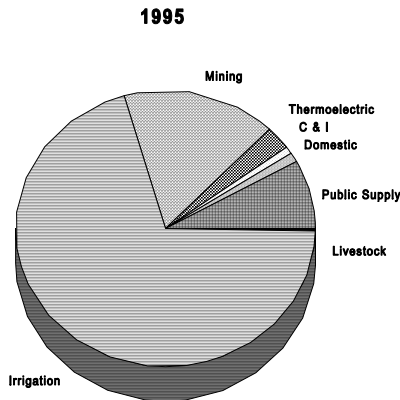


## NEVADA GROUND WATER CONDITIONS

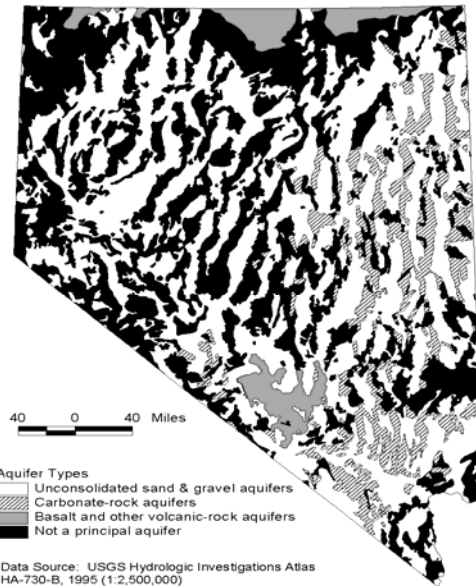
### Ground Water Use in Nevada



**Ground Water Importance:** As the most arid state in the nation, Nevada and its citizens are acutely aware of the importance of its water resources. Nevada manages ground water withdrawals by ground water basin. Due to ground water withdrawals approaching the yield of the basin, portions of 45% of the basins in Nevada have been designated by the State Engineer as needing additional administration with respect to the granting of new ground water rights.

Most ground water withdrawals in Nevada are for agricultural irrigation. However, approximately 9% of ground water withdrawals are for public supply and domestic use. There are about 676 public water systems in Nevada. Community systems comprise about 282 of the total and serve approximately 1,493,850 people. The urban centers of Nevada (Reno/Sparks and Las Vegas) are supplied predominantly with surface water sources augmented by ground water sources. Most systems (~654) are smaller rural systems supplied solely by ground water sources. For these systems and private domestic well owners, protecting ground water quality is critical.

**Where is it?** Hydrogeologic conditions in Nevada vary according to the statewide distribution of three basic aquifer types: basin-fill, carbonate rock, and volcanic rock. Basin-fill aquifers supply most of the ground water currently withdrawn in Nevada. These aquifers consist of alluvial and lake deposits, and are generally contained within closed basins. Basin-fill aquifers may be hydraulically connected to aquifers in adjacent basins via inter-basin flow. An extensive



carbonate rock terrain covers much of the southern and eastern two-thirds of Nevada. Carbonate rock comprises much of the mountain ranges. Hydraulic connections between adjacent basins have been documented in this area, very likely through the carbonate rock aquifers that separate the basins. Volcanic rock aquifers are located in several isolated sections of the State, but only a relatively small amount of ground water is withdrawn from them. There are also areas that are indicated "not a principal aquifer". However, portions of the area mapped as such may provide water for small water systems, commonly through springs or wells in highly fractured bedrock.

**How good is the water?** Ground water quality in Nevada is generally good enough for most uses of ground water. Some of the basin-fill aquifers in closed basins may contain naturally occurring, poor quality, saline waters. Naturally occurring contaminants, such as arsenic, are commonly associated with volcanic rock aquifers and/or regional geothermal areas. The most common drinking water standards exceeded for naturally occurring contaminants are those for arsenic, fluoride, and total dissolved solids. Relatively few public water systems served by ground water have detected contaminants introduced by human activities. Even fewer have had detections that exceeded drinking water standards. Nitrate is the most common contaminant to exceed drinking water standards. Sources of nitrate include septic systems and livestock in suburban areas. In more rural areas, fertilizer over-application and

poor management of animal waste may be the primary sources. Other contaminants detected in public water system wells include petroleum-related compounds and commonly used solvents.

**Costs of Contamination:** While millions of dollars have been spent in Nevada to clean up ground water contamination, the money has been divided between many relatively small, inexpensive leaking underground storage tank sites and a few large sites involving several types of contaminants. The Nevada Petroleum Fund has spent approximately \$70.1 million since 1990 to clean up 868 leaking underground storage tank cases. Additionally, the U.S. Department of Defense and Department of Energy are responsible for the clean up of several facilities located in Nevada, the most notable of which is the Nevada Test Site. It is also important to note naturally occurring contaminants have big financial impacts. The new arsenic drinking water standard set to take affect in 2006 will require treatment system upgrades to many water systems in Nevada costing in the tens of millions of dollars.

**Efforts to Protect Ground Water:** Nevada's Comprehensive State Ground Water Protection Program (CSGWPP) was endorsed by U.S. EPA in 1997. The core of the CSGWPP is existing pollution control programs that address potential ground water quality impacts from mining, underground storage tanks, underground injection wells, discharges to ground water, landfills, and hazardous waste storage, transport and disposal. These programs are funded primarily with State generated fees and implement strict design and performance standards to achieve pollution prevention. CSGWPP goals and priorities are dictated in State legislation and policies.

The CSGWPP uses a multi-agency group, the Nevada Ground Water Protection Task Force, to facilitate communication and coordination between the federal, State and local agencies that have ground water protection concerns. A statewide ground water resource assessment is also a component of the CSGWPP. The assessment is being conducted using a Geographic Information System (GIS) and may be used in setting priorities for hydrographic basins needing additional attention in terms of coordination between programs and targeting pollution prevention efforts. Nevada is implementing the other sensitive ground water areas project under the Underground Injection Control Program. This project will provide critical

GIS data sets for understanding aquifer vulnerability throughout the State.

#### **An Example of Clean up Costs**

A plume of perchloroethylene (PCE) in downtown Reno has been attributed to historic disposal practices, therefore no Potentially Responsible Party exists. The plume has impacted 5 community wells and has the potential to impact several others. The water system has spent about \$6 million for wellhead treatment. A special assessment district has been created to raise the \$7 million needed for initial clean up. The price tag could rise to as much as \$14 million to complete the clean up.

An important part of Nevada's CSGWPP is the Wellhead Protection Program (WHPP). Nevada's WHPP is voluntary. The State provides program, technical and financial assistance to local entities to facilitate local WHPP development and implementation. About 23 public water systems, serving approximately 50% of Nevada's population, are involved in wellhead or aquifer protection efforts.

**What else is needed?** Nevada's experiences have shown that ground water protection and management are most effective when implemented at the State and local levels. Nevada's strategy includes protecting all ground water as a potential source of drinking water and using strict contaminant source controls and monitoring. Nevada has been protecting its ground water quality effectively under current State and federal legislation. Additional federal legislation is not needed. However, additional resources are required if these efforts are to be enhanced. Nevada programs need additional funding to accelerate assessment of impacts of agrichemicals on Nevada's ground water quality (currently funded through FIFRA), to accelerate the statewide ground water resource assessment, to facilitate critical source water protection efforts, to provide for additional scientific research in support of protection programs and to develop and maintain a useful ground water quality database.