Our Lifeline in the Desert

Map features:

- Prominent Geographic Areas
- Human and Natural History
- Explanation of the Sources of our Water Supply
- Agricultural and Urban Uses of Water
- Guiding Principles for the Carson River Watershed
- A Look at Future Challenges for Our Community
What is the Carson River Watershed?

The Carson River Watershed is the land in Nevada and California that captures, stores, and releases rain and snowmelt to the Carson River. Its boundaries are defined by the mountain ridgelines that form a huge bowl or drainage basin. Distributed across the mountainous uplands, many springs and tributary streams form the headwaters for the Carson River. The Sierra Nevada snowpack is the principal source for both surface water and underground aquifers.

Unlike most rivers, the water of the Carson River never reaches an ocean. Instead, it flows northeast from the Sierra Nevada out onto the floor of the Great Basin, where the remaining water evaporates from farmlands and wetlands including the Stillwater National Wildlife Refuge in the Carson Sink. Most of Nevada, much of western Utah including the Great Salt Lake, and parts of California, Oregon, and Idaho lie in the Great Basin. No rivers drain to the ocean from this enormous, enclosed high desert between the Rockies and the Sierra Nevada range.

The Carson River Watershed is slightly larger than the Truckee River Watershed to the north and the Walker River Watershed to the south. These three watersheds are quite similar in climate, topography and ecosystem characteristics. The Carson River Watershed encompasses portions of six counties: Alpine, Douglas, Carson City, Storey, Lyon, and Churchill. The Carson River is 184 miles long from the headwaters on the East Fork to the end point in the Carson Sink, and its watershed encompasses 3,966 square miles. Precipitation that falls within the watershed supports the plant and animal life, provides water for diverse human needs, and recharges groundwater basins.

The Carson River Watershed is located east of the Sierra Nevada range. Elevations below 5,000 feet in the watershed are located in the rain shadow of the Sierra Nevada. This is an area of low precipitation because Pacific storms drop most of their moisture as they pass from west to east over the high mountains. The Carson River is an important lifeline for all residents from its headwaters in Alpine County, California, to the Newlands Irrigation Project surrounding Fallon, Nevada. The rapidly-growing towns of Minden, Gardnerville, Carson City, Dayton, and Fallon all rely on the natural resources of the watershed as do all farmers and ranchers in the region.
During the last ice age, from 12,000 to 75,000 years ago, the climate was so wet that the lower portion of the Carson River Watershed was covered by the immense prehistoric Lake Lahontan, which was created by meltwater from numerous glaciers. During the wettest period, the surface level of Lake Lahontan at the site of today’s Stillwater Wildlife Refuge was approximately 700 feet above the current ground level! For the last 12,000 years, the climate has varied, but the region has settled into a desert environment with wetlands fed by snowmelt from the Sierra headwaters. The average annual precipitation at Carson City is seven inches to eight inches. Ten inches per year is often used to define the maximum precipitation for a desert climate.

The first humans arrived more than 12,000 years ago. By the early 1800s, the Northern Paiute Tribe lived near the lower Carson River and the present Stillwater Wildlife Refuge, while the Washoe Tribe inhabited the upper watershed region.

The Carson River Watershed was home to the first permanent European settlements in what is now Nevada. In 1851 settlements were established at Mormon Station (Genoa) and at the mouth of Gold Canyon (Dayton). Roughly ten years later the Carson River Watershed was home to the world’s greatest silver rush, the Comstock mining boom. The Carson Valley provided food and forage for the silver miners and their livestock.

The Comstock mining boom critically impacted the watershed and its water quality by causing deforested slopes, mine tailings, and steep raw riverbanks above channels cut into the valley floor in many places. For many years, professionals involved with natural resources management, as well as private landowners practicing land stewardship, have worked to restore the Carson River and its watershed.
The Carson River Watershed has a long history of river uses, alterations, and restoration projects. The first documented river/watershed restoration occurred in the 1930s by Civilian Conservation Corps crews. Watershed restoration efforts accelerated in the 1990s. Local communities teamed up with state and federal agencies, conservation districts, county governments, and ranchers to establish local river restoration groups in the six counties and two states of the watershed. People from many backgrounds bring important ideas for cooperative work and a shared vision of a restored river.

These groups design restoration projects to reestablish channel shape, floodplain accessibility, and meander patterns in various locations. Floodplains and vegetation trap sediment and reduce the erosive power of a river during flood events. Floodwaters soak into the ground to replenish streams and rivers later in the year. State-of-the-art bioengineering restoration practices use native vegetation for long-term bank stabilization. Vegetation serves to enhance water quality by holding soil in place, filtering pollutants, and cooling the water.

River restoration activities include:

- Nonpoint source pollution reduction projects that provide bank stabilization with follow-up water quality monitoring
- Wetlands enhancement and protection
- Fencing of river pastures and controlled grazing to stimulate willow and grass growth, which helps hold banks together and prevent erosion
- Working with natural processes to restore floodplain access for the river
- Noxious weed management to prevent takeover by aggressive and destructive weeds
- Carson River workdays that involve thousands of volunteers in planting willows, wire wrapping the base of trees to prevent beaver damage, mounting duck nesting boxes, picking up trash, and planting fish
Watershed Challenges of the 21st Century

The Carson River Watershed faces multiple challenges in the years ahead. One concern is the limited water supply for a growing population. In a Water Resources Analysis prepared in 2000, population figures for local communities were estimated for the next 50 years. If the Carson Valley’s population grows at 3.5% annually, its population would increase from 31,000 in 2000 to 173,000 by 2050. If Lyon County’s population grows at 4% per year, its population would grow from 12,500 in 2000 to 90,700 in 2050. The estimate for the entire watershed predicts growth from a population of 122,226 in 2000 to 456,264 in 2050.

Current growth rates suggest that the annual urban water demand in the watershed will exceed the existing supply of approximately 74,183 acre-feet by the year 2035. As counties foresee that water demand will exceed their permitted water rights, they will look for water elsewhere, including increasing conservation and transferring water from irrigated farmlands to urban subdivisions.

The watershed receives a widely-varying amount of precipitation in any year. There are frequent floods and droughts. One way of illustrating the wide variation of our water supply is by comparing the annual flow of the Carson River at Carson City between 1940 and 1995. The average annual flow at this site during this period was 290,310 acre-feet. In the wettest year, 1983, the annual flow was 826,770 acre-feet, while in the driest year, 1977, the annual flow was 42,350 acre-feet (Carson River Chronology, Nevada Division of Water Planning, 1997).

Given the frequency of multiyear droughts, which occur about every 10 to 15 years, both urban and agricultural water users are likely to experience severe water shortages in dry years prior to 2035. In Nevada, a drought is defined as a “water year of 70% or less of the average annual precipitation.” In a recent 20-year period, the Carson River Watershed has experienced drought in 1981, 1987, 1988, 1990, 1991, 1992, 1994, and 2001.

An additional challenge arises from urban and suburban growth that may reduce agricultural lands and open space. This change of land use may make maintaining water quality more difficult. If we continue to lose our river’s buffer zones and its natural wetlands and floodplain areas, the quality of runoff from cities and the overall environment will be further impaired. If land use practices continue to prevent natural flooding and river functions, then water quality and fish and wildlife habitats will decline even more.
Since 1997, a large group of citizens and agency representatives have met monthly as the Carson River Coalition (CRC). This group is dedicated to integrated watershed management. Its purpose is to build relationships among people throughout the watershed to address watershed problems and opportunities in a spirit of communication and cooperation.

In 2000, the CRC created a set of 11 watershed guiding principles or rules to live by, which have been adopted by more than 30 federal, state, and local organizations.

### Watershed Guiding Principles

1. Respect private and public property rights to achieve economic sustainability.
2. Respect the watershed’s natural processes in land use decisions.
3. Improve water quality to support a variety of beneficial uses of water.
4. Protect the headwater regions as the system’s principal water source.
5. Respect all stakeholders by fostering collaborative relationships.
6. Maintain the watershed’s floodplains to accommodate flood events.
7. Protect uplands and wetlands to enhance water quality and wildlife habitat.
8. Promote water conservation by all water users in the watershed.
9. Encourage growth management and open space in floodplains.
10. Protect and support public recreational access to natural areas.
11. Promote awareness of watershed issues through public education.
Newlands Irrigation Project

In 1902, the U.S. Reclamation Service (now the U.S. Bureau of Reclamation) was formed to construct projects that would bring water to the arid West. The Newlands Project, named after U.S. Senator Francis G. Newlands from Nevada, who authored the Reclamation Act, was the first project built by the U.S. Reclamation Service. Construction of the Newlands Project began in 1903 and was completed in 1914.

The Lahontan Dam is the largest structure in the Newlands Project. It is an earthen dam measuring about 120 feet high and 1,300 feet wide and forms the Lahontan Reservoir. The reservoir is 23 miles long, covers 100,000 acres, has 70 miles of shoreline, and holds 320,000 acre-feet of water. The Lahontan Reservoir is part of the Lahontan Recreation Area that is operated by the Nevada Division of State Parks. It is located 9 miles west of Fallon and includes beaches for swimming, picnic areas, campsites, and boat-launching facilities.

The Newlands Irrigation Project provides water for farming in Churchill and Lyon Counties. Water from the Truckee River is diverted into the Truckee Canal at Derby Dam, and water from the Truckee Canal and the Carson River flow into Lahontan Reservoir. The water from the Newlands Project, now operated by the Truckee-Carson Irrigation District, is used to irrigate more than 60,000 agricultural acres.
Habitats and Vegetation

Wildlife habitats, also known as ecological communities, range from dry, salt desert shrub lands to lush, high mountain meadows, forests, and aspen groves. Many wildlife species thrive in their preferred habitats throughout the watershed. Rangelands, farmlands, and riparian vegetation along the Carson River and on tributary streams provide abundant wildlife habitat as well.

The salt desert shrub habitats in the lower end of the watershed are dominated by plants that survive in very dry or salty soils with an annual rainfall of four inches or less. These plants include black greasewood, shadscale, fourwing saltbush, and squirreltail. The salt marshes sustain cattails, bullrush, numerous sedges, and saltgrass. These species occur mostly east of Dayton in Lyon and Churchill counties. Desert shrub lands support Wyoming big sagebrush, Nevada ephedra or squaw tea, rabbitbrush, desert peach, Indian ricegrass, and desert needlegrass. Pinyon/juniper woodlands are found in the foothills and mountains on shallow, rocky soils.

Forest habitats support ponderosa, Jeffrey, lodgepole and sugar pine, incense cedar, and white and red fir. Along the forest streams, black cottonwood, aspen, alder, and willows flourish. The high mountain habitats sustain quaking aspen groves, mountain meadows of grass and flowering plants, mountain big sagebrush, antelope bitterbrush, and numerous needlegrass and bluegrass species.

Gallery forests of Fremont cottonwood trees once lined parts of the Carson River from Woodfords, California, along the West Fork to the Stillwater Wildlife Refuge. Habitat loss dating back to the Comstock mining boom of the 1860s has reduced the cottonwood acreage to approximately 20% of its coverage before European settlement began.
The Carson River Watershed is the lifeline for a rich and unique biological heritage. The water gathered by the headwater drainages is, in most cases, as pure as can be found anywhere in nature. Mountain streams are home to rich aquatic communities, including native Lahontan cutthroat trout. Riparian or stream communities provide food for aquatic organisms, which in turn provide food for animals and birds living along the stream banks. From the high elevation Paiute cutthroat and the water ouzel, a songbird that flies underwater in search of insects, to the white pelicans of the marshes of Fallon and Stillwater, to the fastest birds on earth, Peregrine falcons, the Carson River Watershed supports a wide variety of fish and wildlife species. Listed below are some of the common species found in the watershed.

**Fish**
- Golden, rainbow, brown, and brook trout

**Rodents**
- Yellow-bellied marmot
- Kangaroo rat
- Deer mouse
- Meadow vole
- Flying and antelope squirrel
- Beaver

**Lagomorphs**
- Pika (small rabbit)
- Cottontail and black-tailed jackrabbit

**Avian Species**
- Coopers, redtail, roughleg, ferruginous, marsh, and sharp-shinned hawk
- Saw-whet, burrowing, great horned and spotted owl
- Bald and golden eagle
- Goshawk
- Kestrel
- Merlin
- Peregrine and prairie falcon
- Over 40 species of duck, geese, egret, heron, and shore birds

**Big Game Species**
- Desert bighorn sheep
- Mule deer
- Pronghorn antelope

**Predators**
- Mountain lion
- Bobcat
- Red and kit fox
- Badger
- Mink
- Black bear
- Coyote

**Reptiles**
- Diamondback rattlesnake, king, garter, gopher, and rubber boa snake
- Horned, sagebrush, and fence lizard
Ranching and farming are among the oldest businesses in the watershed, dating back to the 1840s when pioneers first settled in Carson Valley. Today, water from the Carson River Watershed helps to produce food, forage, and fiber.

Alfalfa and other hays are the most abundant crops produced in the watershed. Alfalfa is baled and shipped to neighboring states for dairy cattle and milk production. Alfalfa is also pressed and cubed and shipped to various parts of the world for livestock to eat.

Every valley in the watershed produces food supplies and supports a variety of livestock. Meat is harvested from beef cattle, sheep, poultry, and swine. Goats, ostriches, and emus are typically raised for meat and novelty. Alpacas, sheep, and angora and cashmere goats provide fiber for use in clothing and other materials. Horses, donkeys, mules, and llamas are used for recreation and packing. Livestock graze on private and public rangelands and irrigated pastures throughout the watershed. The watershed also supports dairies that produce milk and cheese for northern Nevada and eastern California.

Crops for human and livestock consumption range from garlic, onions, corn, and sunflowers to cantaloupes, melons, wheat, and oats. Modest truck farms have been established in most communities, raising over 100 kinds of fruits and vegetables and 200 varieties of cut flowers for local farmer's markets and restaurants.

The Washoe Tribe has harvested pine nuts for thousands of years from the mountain ranges of the Carson River Watershed. Harvested from pinyon pines, pine nuts have become famous in both Nevada and California as gourmet delicacies.
Recreational Opportunities

Whether you’re interested in visiting glittering casinos and resorts, attending small town festivals, viewing beautiful scenic attractions, or participating in any number of sporting activities, there are a wide variety of recreational opportunities available within the Carson River Watershed.

Snow skiing, snowboarding, and snowshoeing are popular sports in the mountains of the upper watershed. River-rafting is popular on the East Fork of the Carson River as is sport-fishing. Bird-watching opportunities abound throughout the watershed from the Carson Valley, where bald eagles congregate during the spring, to the Stillwater National Wildlife Area, famous for its diversity of resident and migratory bird species. Many local residents and visitors enjoy the use of hot springs located throughout the watershed. Among the most popular spots for soaking are Grover Hot Springs in Markleeville and the hot springs in Carson City and Genoa.

Carson Valley is a premier destination for soaring, ballooning, and hang gliding enjoyed by the more adventurous, while scenic drives through Hope Valley can provide for a relaxing day. The Tahoe Rim Trail, the Carson Iceberg Wilderness, and the Blue Lakes/Carson Pass area provide hikers and mountain bikers with miles of trails into pristine areas. Boaters and fishermen enjoy the lakes and streams available for day use or overnight camping. Lahontan Reservoir has miles of beaches and is a popular watersports destination. RV and tent camping opportunities are found in many locations throughout the watershed, as are golfing, bicycling, horseback riding, and four-wheel driving.

Residents and visitors can find a wealth of archeological sites to explore and study throughout the watershed. History buffs can spend many hours visiting the Nevada State Railroad Museum, the Children’s Museum and Natural History Museum in Carson City, and the Churchill County Museum and Archives in Fallon. The historical districts of cities and towns within the watershed provide a rustic western experience for time travelers. Piper’s Opera House and the Fourth Ward School in Virginia City and the restored Oaks School in Fallon are among many special destinations.
Resources and Cooperators

For more information regarding the Carson River Watershed, the integrated watershed planning process or the Carson River Coalition, please contact any of the following organizations.

**Carson Water Subconservancy District**
(775) 887-7450
www.cwsd.org

**Nevada Division of Environmental Protection**
(775) 687-4670
www.ndep.state.nv.us

**University of Nevada Cooperative Extension**
(775) 887-2252
(775) 782-9960
www.unce.unr.edu

**Western Nevada Resource, Conservation and Development, Inc.**
(775) 883-2292
www.nv.nrcs.usda.gov

Presented by the members of the Carson River Coalition, a watershed management and planning roundtable composed of conservation district representatives, ranchers, state and federal agency representatives, educators, Tribal members, resource managers, scientists, county planners, and interested public.

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