Elko County
Water Resource Management Plan
Water Resource Management
Section 2

Lamoille Church & Ruby Mountains

SECTION 2
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EXECUTIVE SUMMARY

The Elko County Water Resource Management Plan has been prepared to guide the development, management, and use of water resources within the County during the next twenty-five years. Use by decision makers of information contained within this plan will help ensure that the environment of the County is sustained while at the same time enabling the expansion and diversification of the local economy. Implementation of the Elko Water Resources Management Plan will assist in maintaining the quality of life enjoyed by residents and visitors to the County now and in the future. Achievement of goals outlined in the Plan will result in water resources found within Elko County being utilized in a manner beneficial to the residents of Elko County and the State of Nevada.

Preparation of the Elko County Water Resource Plan has involved extensive consultation with residents of the County, Local Governments, State and Federal agencies. The Elko County Water Planning Commission reaches conclusions, which differ, from what the State of Nevada may indicate on population growth and water resource utilization. This plan envisions continued population growth in Elko County, and in irrigated agricultural production and related water requirements. Thus water usage staying generally the same.

Studies by the United States Geological Survey are underway to update groundwater resource budgets in select groundwater basins in Elko County. Although research to date is characterized by considerable uncertainty and additional work is required, the results of these studies suggest that the perennial groundwater yield may be significantly greater than previously thought. The implications of this water plan are that more water than previously considered possible may be available for development and use within Elko County

The Nevada Division of Water Resources has reviewed draft versions of this plan and has offered important comments and guidance leading to the completion of the Elko County Water Resource Management Plan. The Elko County Water Resource Management Plan is to be adopted as an element to the Elko County Master Plan as per Nevada Revised Statutes 278.150 through 278.265 inclusive.

Currently, water use (for all uses including domestic, commercial, industrial, mining, livestock and irrigated agriculture) in Elko County is estimated at ***933,041*** acre feet per year. Based upon the forecasted growth of population within the west, and given the abundance of natural resources in Elko County, we have developed seven key areas to focus future planning activities:

1. Integrate Water Planning with Elko County Master Planning and Zoning.
2. Identifying and Maintaining Forecasts of reasonably Foreseeable Future Water Demands.
3. Encourage City-County cooperation on growth issues in the I-80 Corridor between Carlin and Ryndon.
4. Obtaining Water Rights at Key Locations to ensure water for growth in rural areas.
5. Support USGS and NDWR Activities, such as hydrogeological studies and Spring and Well Monitoring
6. Encourage more recreational lakes/wildlife areas that the citizens of Elko County can enjoy and sustain our economy.
7. Encourage Elko County in hiring a Natural Resources Manager.

INTRODUCTION

Development of water resources within Elko County include both surface water and groundwater. Principal municipal supplies in the communities of Jarbidge, Jackpot, Midas, Montello and Mountain City are provided by both groundwater and surface water sources. Most all of rural Elko County has experienced slower growth rates versus the higher growth rates occurring in the City of Elko, West Wendover, Osino, Ryndon, Spring Creek and South Fork areas during the last decade. Although rapid development of the rural areas has not occurred in the past, emphasis has been placed on development, management and protection of water resources in rural Elko County.

While rural areas have remained virtually un-developed, areas such as Jackpot, Jarbidge, Midas, Montello, Mountain City and West Wendover have experienced light to heavy development. West Wendover being an incorporated City has by far experienced the fastest and heaviest population and development increases while the other areas have experienced light to moderate increases. The largest water usage in rural Elko County is from ranches and farms utilizing surface and groundwater sources for irrigation, stock watering and domestic use. Elko County is the largest water user in the State at approximately 24.4% of all usage. Agricultural use in Elko County accounts for approximately 97% of our total water usage. Rural water resource development dates back to original settlement of the area along the California Trail in the 1840's. Groundwater development didn't occur until the early 1900's.

With an arid climate, Elko County has always been dependent upon the successful development of water resources. During the early development of the State, settlement locations were restricted to areas with readily available water. Now population locations in Elko County have many more options than these early pioneers. Technologic advances have made it possible to deliver water to once remote areas, develop a variety of water sources, and meet the water needs of a growing population. Water is a primary ingredient for the continued prosperity of Elko County, but its availability is limited. The challenge is to wisely develop and use our most precious renewable natural resource. With a limited water supply, conservation and wastewater reclamation become more essential for responsible water management.

Education of the public about water, its use and conservation is necessary for wise water management in the future. It is the intent of this section to provide the public with a brief introduction to our water resources. This Section provides an aspect of our available water resources, followed by current and future water use estimates, forecasts and related information.

In 1998, The *Nevada Division of Water Planning* developed elements of a State Water Plan. The Draft State Water Plan included historic, geographic, hydrologic, water use, and socioeconomic trends and conditions for the State of Nevada, including Elko County. In response to recommendations and information presented in the Draft Water Plan, Elko County appointed a Water Planning Commission to review and make recommendations to the Elko County Commission on water related issues within the County's jurisdiction.

NEVADA WATER LAW

The water in Nevada on the surface and below the ground surface belongs to the people of the State. Entities within the State can apply for the right to use that water. Nevada Water Law is founded on the doctrine of prior appropriation - **"first in time, first in right."** Under the appropriation doctrine, the first user of water from a water course acquired a priority right to the use and to the extent of its use (Shamberger, H.A., Evolution of Nevada's Water Laws, as Related to the Development and Evaluation of the State's Water Resources from 1866 to about 1960, U.S. Geological Survey Water Resources Bulletin 46, 1991).

Nevada Water Law is set forth in Nevada Revised Statutes (NRS), Chapters 533 and 534. In addition, there are numerous court decisions which have helped define Nevada Water Law. The State Engineer is the water rights administrator and is responsible for the appropriation, adjudication, distribution and management of water in the State. To carry out these duties he is vested with broad discretionary powers.

As part of the duties of the office, the State Engineer reviews applications for new water rights appropriations. In approving or rejecting an application, the State Engineer considers the following questions as set forth in NRS 533.370: 1) is there unappropriated water in the proposed source?; 2) would the proposed use impair existing rights?; and 3) will the proposed use prove detrimental to the public interest? Public interest is not defined by statute and the State Engineer can consider different issues, depending upon the individual application.

All water rights are considered real property and thus are conveyed by deed. Water rights can be bought and sold, and the location and type of use changed. The attributes of appropriative water rights in Nevada are: 1) beneficial use is the measure and the limit of the right to the use of the water; 2) rights are stated in terms of definite quantity, manner of use, and period of use; and 3) a water right can be lost by abandonment or forfeiture. Abandonment is determined by the intent of the water user to forsake the use of the water. A water right is lost by forfeiture if the right is not used for 5 years. Water lost through abandonment or forfeiture reverts back to the public and is subject to future appropriation.

The Nevada Division of Water Resources is responsible for administering and enforcing Nevada Water Law, which includes the adjudication and appropriation of groundwater and surface water in the state. The appointed administrative head of this division is the State Engineer, whose office was created by the Nevada Legislature in 1903. The purpose of the 1903 legislation was to account for all of the existing water use according to priority. The 1903 act was amended in 1905 to set out a method for appropriation of water not already being put to a beneficial use.

It was not until the passage of the Nevada General Water Law Act of 1913 that the Nevada Division of Water Resources was granted jurisdiction over all wells tapping artesian water or water in definable underground aquifers. The 1939 Nevada Underground Water Act granted the Nevada Division of Water Resources total jurisdiction over all groundwater in the state.

The 1913 and 1939 acts have been amended a number of times, and Nevada's Water Law is considered one of the most comprehensive water laws in the West. The above-mentioned acts provide that all water within the boundaries of the state, whether above or beneath the surface of the ground, belongs to the public, as referenced in NRS 533.025 and is subject to appropriation for beneficial use under the laws of the state (NRS 533.030 and NRS 534.020).

SOCIOECONOMIC CHARACTERISTICS

In terms of socioeconomic characteristics, a large percentage of Elko County's population tends to be concentrated in or vicinity of the incorporated City of Elko. The 2000 census estimated the county's total population at 45,291 persons. As of 2006, the state of Nevada Demographer estimated the county's population at 48,339. The county's population is divided by cities and communities as follows: City of Elko (18,183 persons, or 37.6 percent of the county's estimated 2006 total population); West Wendover (4,871 persons, or 10.0 percent of total county population); Carlin (2,281 persons, or 4.7 percent of county population); and Wells (1,449 persons, or 3.0 percent of Elko County's total population). Another important population and growth area is centered in the Spring Creek/ Lamoille / Southfork areas, located approximately fifteen miles east southeast of Elko. It is estimated that these areas have a population of 13,000 persons or 26.9 percent of the county's total estimated 2006 population.

Between 1990 and 1997, the county's population growth averaged 5.1 percent per year. By decade, Elko County's population has grown at annual average rates as follows: 1950's—0.3 percent per year; 1960's—1.5 percent per year; 1970's—2.2 percent per year) and 1980's—6.9 percent per year. During the entire 1950–1997 time period, Elko County's population has averaged a rate of growth of 3.0 percent per year as compared to a 5.2 percent annual rate of population growth for the entire state. The relatively slower rate of population growth in Elko County, particularly during the decades of the 1950's, 1960's, and 1970's, was due to the agrarian nature of the economy and the existence of little economic diversification. Beginning in the late 1980's, however, the mining boom along the Carlin Trend, particularly in adjoining Eureka County, began a period of rapid growth as the City of Elko served as a primary base of operations for many of the mining endeavors. Following the mining boom and resultant population increase, Elko also expanded rapidly in casino gaming, both in the City of Elko, Jackpot located on the Nevada-Idaho Border and in West Wendover, located on the Nevada-Utah border.

In 1997, Elko County's average age of its population was estimated at 31.7 years, significantly below the 35.6 years for Nevada's overall population's average age, making Elko County the second "youngest" of Nevada seventeen counties. Based on 2006 populations, Elko County's population density was approximately 2.8 persons per square mile, the eighth least dense of any county in Nevada. This figure compares to an average population density of 16.1 persons per square mile for the entire state.

Elko County's ratio of its 1997 covered employment (i.e., workers covered under state and federal unemployment insurance programs) to its 1997 total population (a proxy measure of the county's labor force participation rate) stood at 42.3 percent, the seventh highest of any county in Nevada. This compared to a statewide average labor force participation rate estimated at 49.9 percent. One explanation of the county's comparatively low ranking is due to the large portion of the county's population counted as being employed in the mining industry in bordering Eureka County, thereby causing the county's population to be overstated relative to local county jobs.

Based on Elko County's total covered employment of 20,182 workers (excluding agriculture) in1997, the 8,298 jobs in the county's service industry accounted for the greatest portion of total employment at 41.1 percent. Mining's 1,427 jobs in 1997 accounted for 7.1 percent of total employment. Elko County's service industry jobs also accounted for the greatest percentage of the county's payrolls at 33.0 percent while the county's mining jobs accounted for 14.5 percent of total payrolls, over twice as great as their share of employment. The highest

average annual salary in Elko County in 1997 was in the mining industry which, at $52,154 per worker per year, was 105.6 percent greater than the county average annual salary of $25,369 per worker. Based on U.S. Department of Commerce job classifications of full and part-time employment, Elko County's farming and agricultural services industry was estimated to have 942 workers in 1996, comprising 3.8 percent of all employment within the county as opposed to 1,002 workers, or 14.4 percent of all jobs in 1970.

In 1995, when Elko County's population was estimated to be 43,050 persons, it was estimated that total water withdrawals were approximately 936,593 acre-feet, or 23.2 percent of estimated total water withdrawals within Nevada. This makes Elko County the largest water user among all of Nevada's seventeen counties. Estimated water use in Elko County in 1995 was 2.1 percent greater than in 1990, but 11.5 percent below total water use in 1985. Of the total 1995 total water withdrawals, public supplied (i.e., municipal and industrial, or M&I) water withdrawals were estimated at 14,920 acre-feet, or 1.6 percent of the county's total water withdrawn for all purposes. Most of the water withdrawals in Elko County have been used for irrigation purposes (97.0 percent of total water withdrawals in 1995) while water withdrawals for domestic purposes, i.e., residential use from all sources, constituted only 1.2 percent of total water withdrawals in 1995. Based on the 1995 water use data, along with comparable period population and employment figures, it is estimated that Elko County's public supplied water use per person (also referred to as municipal and industrial, or M&I, water use per capita), based only on the estimated population served by public supply water systems, was 332 gallons per person per day as compared to a usage rate of 456 gallons per person per day in 1985 and 348 gallons per person per day in 1990. Table 1 below presents a number of estimated water usage rates for Elko County for the years 1985, 1990, and 1995 based on water use per person, per worker, and per occupied household or housing unit.

Table 1 - Water Usage Rates by Type/Sector

	1985	1990	1995
Municipal & Industrial Water Use per Person	456	348	332
Domestic Public Supplied Water Use per Person	307	267	242
Total Domestic (Residential) Water Use per Person	303	263	240
Total Commercial & Industrial Water Use per Worker	178	504	415
Total Domestic Water Use per Household	868	754	690

From a 1995 survey, it was estimated that 213,903 acres were irrigated in Elko County (243,960 irrigated acres in 1985 and 210,150 irrigated acres in 1990). This amount of irrigated acreage comprised approximately 29.9 percent of the state's total 1995 irrigated acreage of 715,439 acres (843,760 acres in 1985 and 728,650 acres in 1990). This 1995 level of irrigated acreage placed Elko County as the highest in terms of county irrigated acreage in Nevada at that time (and well above the second-place county of Humboldt with 142,558 irrigated acres).

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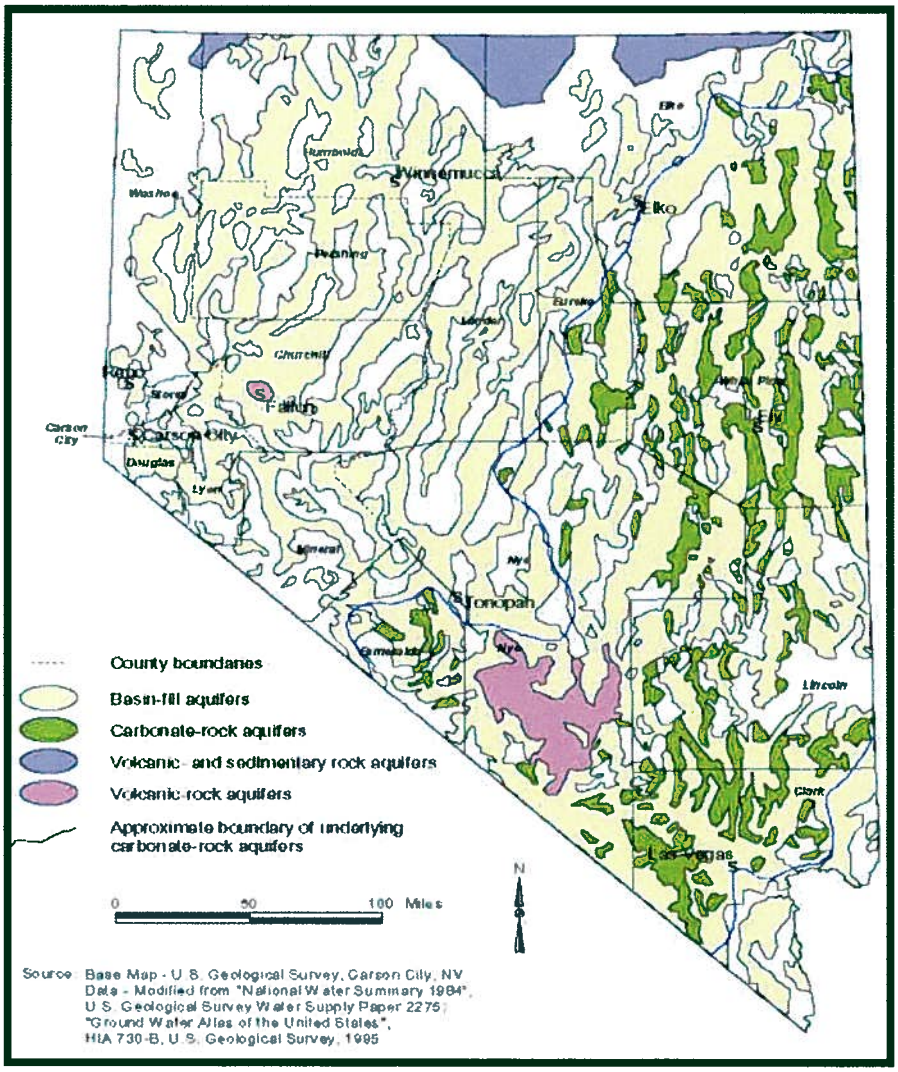
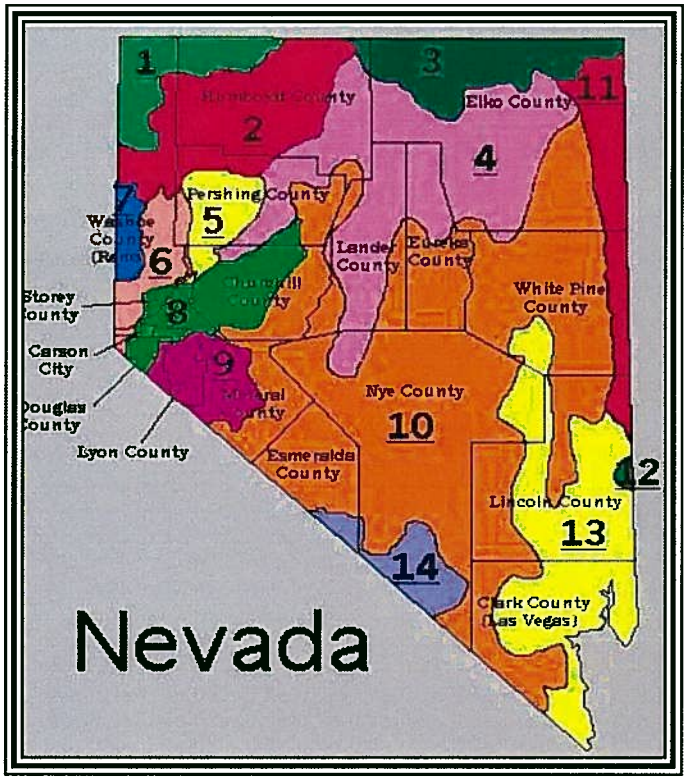
Based on 1995 estimates of both total irrigated acreage and total irrigation water withdrawals, the average water use (withdrawals) on irrigated acres in Elko County was estimated at approximately 4.2 acre-feet per acre per year. Elko County's 1995 irrigation conveyance losses were estimated at 0.9 acre-feet per acre per year, thereby leaving irrigation water available for consumptive use of 3.3 acre-feet per acre per year. Considered in its entirety, the Humboldt River system represents a highly efficient irrigation water conveyance and distribution mechanism. Agricultural water users along this river system, stretching from the river's headwaters in Elko County through Eureka, Lander, Humboldt, Churchhill and into Pershing County, benefit from a continuous process of water diversion, application, return flow, and reuse. Consequently, measures of irrigation conveyance losses and water withdrawals do not fully reflect the actual workings of the overall river system.

In 1995, the value of total farm marketings for Elko County was $40.527 million, down 23.6 percent from $53.071 million in farm marketings in 1990, but up 21.4 percent over $33.379 million in total farm marketings in 1985.

Figure 1 – Nevada Major Aquifers



REGIONAL HYDROGRAPHIC DATA



[1] Northwest Region
[2] Black Rock Desert Region
[3] Snake River Basin
[4] Humboldt River Basin
[5] West Central Region
[6] Truckee River Basin
[7] Western Region
[8] Carson River Basin
[9] Walker River Basin
[10] Central Region
[11] Great Salt Lake Basin
[12] Escalante Desert Basin
[13] Colorado River Basin
[14] Death Valley Basin

Figure 2 - Nevada Hydrographic Regions

REGIONAL HYDROGEOLOGIC FEATURES

The U.S. Geological Survey (Harrill and Prudic, 1998) has identified 20 flow systems and 282 hydrographic areas within the Great Basin Region of the southwestern United States. Of these, 14 flow systems and 252 hydrographic areas are wholly or partially within Nevada. Four flow systems are located in Elko County, three within the Great Basin (Humboldt River, Great Salt Lake Basin, and Central Region), with the fourth within the Snake River Plain (Figure 2). Within these four flow systems, there are 50 hydrographic areas in the county. The eight (8) hydrographic areas currently under evaluation by Elko County in partnership with the U.S.G.S. are within the Humboldt River Flow System, specifically identified by the USGS as the Upper Humboldt River Basin.

Although most flow systems are confined to one or two areas in the Basin and Range area, several areas are linked together in an extended ground-water flow system in places. In the majority of the areas, flow passes through the basin-fill sediments that cover the valley floors, as in the Humboldt system. However, where carbonate rocks underlie the basins, data indicate that some basins are hydrologically linked by the carbonate rocks and that large quantities of ground water flow through them and discharge through the overlying basin-fill sediments to large springs. Because few wells are drilled into the carbonate rocks, data is scarce and several assumptions have been made to account for flow in these rocks.

One assumption is that the carbonate rocks and the basin-fill deposits form a single hydrologic unit. At locations where wells have been drilled in both rock types, the water levels in each aquifer have been similar. Another piece of evidence that the two rock types act as one hydrologic unit comes from the Ash Meadows area in southern Nevada. Irrigation wells in that area that withdrew water from the basin-fill deposits drew down water levels in the carbonate-rock aquifers more than 1 foot from 1969 to 1972 (Harrill and Prudic, 1998).

The topography of the drainage area within each hydrographic area controls the movement of ground water at a regional scale. Because of the topographic effect of the mountains, the amount of precipitation increases as the altitude increases (Maxey and Eakin, 1958; and Avon and Durbin, 1992). Conversely, the amount of evapotranspiration decreases as altitude increases, as a consequence of lower temperatures at higher altitudes (Robinson, 1970). The distribution of recharge and discharge is additional evidence of interbasin flow.

Large local flow systems are characterized by predominantly interbasin flow and flow paths that are confined to a single basin. Springs connected to these systems have moderate to large discharges and moderate seasonal ranges in discharge. Very short flow paths generally characterize small local flow systems, usually no more than a few miles in length. Springs connected to these systems have highly variable annual ranges in discharge. (USGS, 2001).

REGIONAL HYDROGRAPHIC BASINS & AREAS

[3] Snake River Basin — Covers 5,230 square miles (13,546 square kilometers or 3,347,200 acres) in parts of Elko and Humboldt counties and includes eight hydrographic areas; extends into the states of Oregon and Idaho to the north and the State of Utah to the east.

Figure 3- Regional Flow System **Snake River Basin**

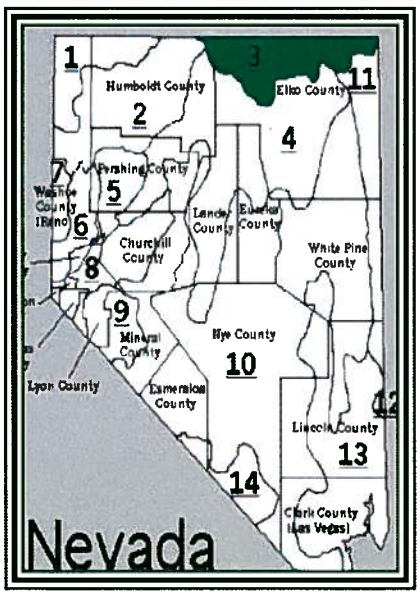


Table 2 - Snake River Basin Hydrographic Areas

Basin Num [1]	Area Num [2]	Size (sq mi) [3]	Size (acres) [4]	Hydrographic Area/Sub-Area Name	Counties Included [5]	Nearest Cities	Desig [6]
3	34	716	458,240	Little Owyhee River Area	Elko, Humboldt	McDermitt	No
3	35	1,310	838,400	South Fork Owyhee River Area	Elko	Jack Creek, Tuscarora	No
3	36	345	220,800	Independence Valley	Elko	Tuscarora	No
3	37	533	341,120	Owyhee River Area	Elko	Owyhee, Mountain City	No
3	38	514	328,960	Bruneau River Area	Elko	Mountain City, Jarbidge	No
3	39	278	177,920	Jarbidge River Area	Elko	Jarbidge	No
3	40	1,218	779,520	Salmon Creek Area	Elko	Jackpot, Contact	Yes
3	41	316	202,240	Goose Creek Area	Elko	Jackpot	No
	Total	5,230	3,347,200	Square miles/acres			

[4] Humboldt River Basin — Covers 16,843 square miles (43,623 square kilometers or 10,779,520 acres) in parts of eight counties — Elko, White Pine, Eureka, Humboldt, Lander, Nye, Pershing, and Churchill — and the largest river (Humboldt River) wholly contained within Nevada. This basin contains 34 hydrographic areas and one hydrographic sub-area and is one of only two that are wholly contained within the State of Nevada. It originates in the Ruby, Jarbidge, Independence, and East Humboldt Mountain ranges (Elko County) and terminates in the Humboldt Lake and Sink (Pershing and Churchill counties). During particularly wet years, the Humboldt Sink may drain into the Carson Sink by means of the Humboldt Slough.

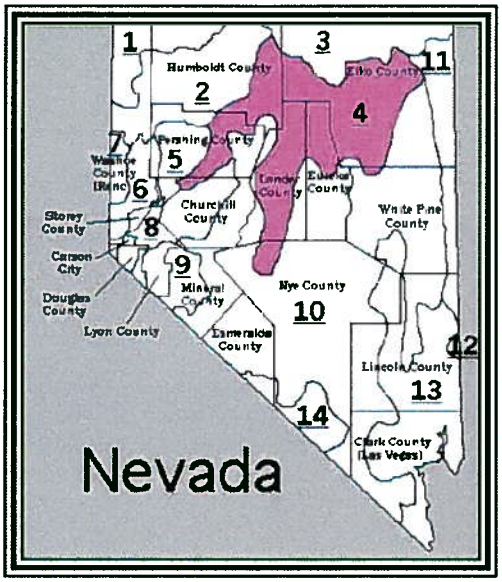


Figure 4 - Regional Flow System
Humboldt River Basin

Table 3 - Humboldt River Basin Hydrographic Areas

Basin Num [1]	Area Num [2]	Size (sq mi) [3]	Size (acres) [4]	Hydrographic Area/Sub-Area Name	Counties Included [5]	Nearest Cities	Derig [6]
4	42	1,073	686,720	Marys River Area	Elko	Wells, Deeth	Yes
4	43	332	212,480	Starr Valley	Elko	Halleck, Deeth	Yes
4	44	1,110	710,400	North Fork Area	Elko	North Fork, Halleck	Yes
4	45	257	164,480	Lamoille Valley	Elko	Lamoille, Elko	Yes
4	46	99	63,360	South Fork Area	Elko	Lamoille, Jiggs	Yes
4	47	787	503,680	Huntington Valley	Elko, White Pine	Jiggs	Yes
4	48	392	250,880	Dixie Creek Area-Tenmile Creek Area	Elko	Elko, Spring Valley	Yes
4	49	314	200,960	Elko Segment	Elko, Eureka	Elko	Yes
4	50	223	142,720	Susie Creek Area	Elko, Eureka	Carlin	Yes
4	51	396	253,440	Maggie Creek Area	Elko, Eureka	Carlin	Yes
4	52	61	39,040	Marys Creek Area	Eureka, Elko	Palisade, Carlin	Yes
4	53	1,002	641,280	Pine Valley	Eureka, Elko	Carlin	Yes
4	61	544	348,160	Boulder Flat	Eureka, Lander, Elko	Beowawe, Battle Mountain	Yes
4	62	444	284,160	Rock Creek Valley	Elko, Lander, Eureka	Battle Mountain	No
4	63	405	259,200	Willow Creek	Elko	Midas	No
4	64	720	460,800	Clovers Area	Humboldt, Lander, Elko	Battle Mountain	Yes
4	65	299	191,360	Pumpernickel Valley	Humboldt, Pershing	Golconda, Valmy	No
4	66	301	192,640	Kelley Creek Valley	Humboldt, Elko	Golconda	Yes
4	67	975	624,000	Little Humboldt Valley	Humboldt, Elko	Paradise Valley	No
4	68	167	106,880	Hardscrabble Area	Humboldt	Paradise Valley	No
4	69	600	384,000	Paradise Valley	Humboldt	Paradise Valley, Winnemucca	Yes
4	70	435	278,400	Winnemucca Segment	Humboldt	Winnemucca, Golconda	Yes
4	71	520	332,800	Grass Valley	Pershing, Humboldt	Winnemucca	Yes
4	72	771	493,440	Imlay Area	Pershing	Imlay, Humboldt, Mill City	Yes
4	73	635	406,400	Lovelock Valley	Pershing, Churchill	Rye Patch, Lovelock	Yes
4	73A	98	62,720	Lovelock Valley/Greana Sub-Area	Pershing	Lovelock, Toulon	No
4	74	164	104,960	White Plains	Churchill, Pershing	Lovelock, Fernley	Yes

[10] Central Region — By far the largest hydrographic region in Nevada covering 46,783 square miles (121,167 square kilometers or 29,941,120 acres) in thirteen Nevada counties—Nye, Elko, White Pine, Lincoln, Clark, Humboldt, Pershing, Churchill, Lander, Eureka, Lyon, Mineral, and Esmeralda. This region includes 78 hydrographic areas, ten of which are divided into two sub-areas and one into three sub-areas; extends to the south and west into the State of California.

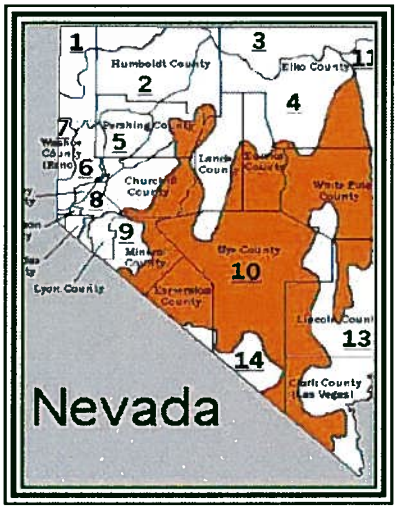


Figure 5 - Regional Flow System
Central Region

Table 4 - Central Region Hydrographic Areas

Basin Num [1]	Area Num [2]	Size (sq mi) [3]	Size (acres) [4]	Hydrographic Area/Sub-Area Name	Counties Included [5]	Nearest Cities	Desig [6]
10	175	651	416,640	Long Valley	White Pine, Elko	Ely, Eureka	No
10	176	1,004	642,560	Ruby Valley	Elko, White Pine	Elko, Ruby Valley	Yes
10	177	464	296,960	Clover Valley	Elko	Wells, Ruby Valley	Yes
10	178A	271	173,440	Butte Valley/Northern Part	Elko	Currie, Ruby Valley	No
10	178B	739	472,960	Butte Valley/Southern Part	White Pine, Elko	Cherry Creek, Ely	No
10	179	1,942	1,242,880	Steptoe Valley	White Pine, Elko	Ely, Cherry Creek	Yes

11] Great Salt Lake Basin — Covers 3,807 square miles (9,860 square kilometers or 2,436,480 acres) of the easternmost portions of Elko, White Pine, and Lincoln counties; includes eight hydrographic areas, one of which is divided into four hydrographic sub-areas; extends to the east into the State of Utah.

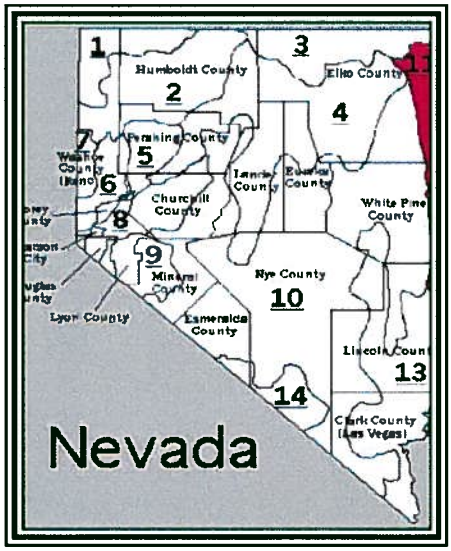


Figure 6 - Regional Flow System
Great Salt Lake Basin

Table 5 - Great Salt Lake Basin Region Hydrographic Areas

Basin Num [1]	Area Num [2]	Size (sq mi) [3]	Size (acres) [4]	Hydrographic Area/Sub-Area Name	Counties Included [5]	Nearest Cities	Desig [6]
11	189A	163	104,320	Thousand Springs Valley/ Herrill Siding-Brush Creek Area	Elko	Wells, Contact	Yes
11	189B	618	395,520	Thousand Springs Valley/ Toano-Rock Spring Area	Elko	Jackpot, Wells	Yes
11	189C	183	117,120	Thousand Springs Valley/ Rocky Butte Area	Elko	Montello, Jackpot	Yes
11	189D	482	308,480	Thousand Springs Valley/ Montello-Crittenden Creek Area	Elko	Montello	Yes
11	190	55	35,200	Grouse Creek Valley	Elko	Grouse Creek, Jackpot	No
11	191	326	208,640	Pilot Creek Valley	Elko	Wendover	Yes
11	192	507	324,480	Great Salt Lake Desert	Elko	Wendover	No
11	193	208	133,120	Deep Creek Valley	White Pine, Elko	Wendover	No

ELKO COUNTY HYDROGRAPHIC BASINS, AREAS & SUB-AREAS

Figure 7 - Elko County

Table 6 - Hydrographic Areas

[3] SNAKE RIVER BASIN (Hydrographic Basin 3):							
3	34	716	458,240	Little Owyhee River Area	Elko, Humboldt	Mcdermitt	No
3	35	1,310	838,400	South Fork Owyhee River Area	Elko	Jack Creek, Tuscarora	No
3	36	345	220,800	Independence Valley	Elko	Tuscarora	No
3	37	533	341,120	Owyhee River Area	Elko	Owyhee, Mountain City	No
3	38	514	328,960	Bruneau River Area	Elko	Mountain City, Jarbidge	No
3	39	278	177,920	Jarbidge River Area	Elko	Jarbidge	No
3	40	1,218	779,520	Salmon Creek Area	Elko	Jackpot, Contact	Yes
3	41	316	202,240	Goose Creek Area	Elko	Jackpot	No
	Total	**5,230**	**3,347,200**	**Square miles/acres**			
[4] HUMBOLDT RIVER BASIN (Hydrographic Basin 4):							
4	42	1,073	686,720	Marys River Area	Elko	Wells, Deeth	Yes
4	43	332	212,480	Starr Valley	Elko	Halleck, Deeth	Yes
4	44	1,110	710,400	North Fork Area	Elko	North Fork, Halleck	Yes
4	45	257	164,480	Lamoille Valley	Elko	Lamoille, Elko	Yes
4	46	99	63,360	South Fork Area	Elko	Lamoille, Jiggs	Yes
4	47	787	503,680	Huntington Valley	Elko, White Pine	Jiggs	Yes
4	48	392	250,880	Dixie Creek Area-Tenmile Creek Area	Elko	Elko, Spring Valley	Yes
4	49	314	200,960	Elko Segment	Elko, Eureka	Elko	Yes
4	50	223	142,720	Susie Creek Area	Elko, Eureka	Carlin	Yes
4	51	396	253,440	Maggie Creek Area	Elko, Eureka	Carlin	Yes
4	52	61	39,040	Marys Creek Area	Eureka, Elko	Palisade, Carlin	Yes
4	53	1,002	641,280	Pine Valley	Eureka, Elko	Carlin	Yes
4	62	444	284,160	Rock Creek Valley	Elko, Lander, Eureka	Battle Mountain	No
4	63	405	259,200	Willow Creek	Elko	Midas	No
4	64	720	460,800	Clovers Area	Humboldt, Lander, Elko	Battle Mountain	Yes
4	66	301	192,640	Kelley Creek Valley	Humboldt, Elko	Golconda	Yes
4	67	975	624,000	Little Humboldt Valley	Humboldt, Elko	Paradise Valley	No
	Total	**16,843**	**10,779,520**	**Square miles/acres**			
[10] CENTRAL REGION (Hydrographic Basin 10):							
10	176	1,004	642,560	Ruby Valley	Elko, White Pine	Elko, Ruby Valley	Yes
10	177	464	296,960	Clover Valley	Elko	Wells, Ruby Valley	Yes
10	178A	271	173,440	Butte Valley/Northern Part	Elko	Currie, Ruby Valley	No
10	178B	739	472,960	Butte Valley/Southern Part	White Pine, Elko	Cherry Creek, Ely	No
10	179	1,942	1,242,880	Steptoe Valley	White Pine, Elko	Ely, Cherry Creek	Yes
10	186A	125	80,000	Antelope Valley/Southern Part	Elko, White Pine	Wendover, Ely	No
10	186B	270	172,800	Antelope Valley/Northern Part	Elko, White Pine	Wendover, Ely	No
10	187	954	610,560	Goshute Valley	Elko	Oasis, Shafter	Yes
10	188	562	359,680	Independence Valley (Pequop Valley)	Elko	Wells, Oasis	Yes
	Total	**46,783**	**29,941,120**	**Square miles/acres**			
[11] GREAT SALT LAKE BASIN (Hydrographic Basin 11):							
11	189A	163	104,320	Thousand Springs Valley/Herrill Siding-Brush Creek Area	Elko	Wells, Contact	Yes
11	189B	618	395,520	Thousand Springs Valley/Toano-Rock Spring Area	Elko	Jackpot, Wells	Yes
11	189C	183	117,120	Thousand Springs Valley/Rocky Butte Area	Elko	Montello, Jackpot	Yes
11	189D	482	308,480	Thousand Springs Valley/Montello-Crittenden Creek Area	Elko	Montello	Yes
11	190	55	35,200	Grouse Creek Valley	Elko	Grouse Creek, Jackpot	No
11	191	326	208,640	Pilot Creek Valley	Elko	Wendover	Yes
11	192	507	324,480	Great Salt Lake Desert	Elko	Wendover	No
11	193	208	133,120	Deep Creek Valley	White Pine, Elko	Wendover	No
	Total	**3,807**	**2,436,480**	**Square miles/acres**			

Hydrographic Regions, Areas, and Sub-Areas Table Notes:
A Basin is defined as a geographic area drained by a single major stream or an area consisting of a drainage system comprised of streams and often natural or man-made lakes. Also referred to as Drainage Basin, Watershed, or Hydrographic Region. The U.S. Geological Survey and the Nevada Division of Water Resources, Department of Conservation and Natural Resources, have divided the state into discrete hydrologic units for water planning and management purposes. These have been identified as 232 Hydrographic Areas (256 areas and sub-areas, combined) within 14 major Hydrographic Regions or Basins.

[1] Nevada Hydrographic Basin Number (1-14).

[2] Nevada Hydrographic Area/Sub-Area Number (1-232; hydrographic sub-areas designated A, B, C, etc.). There are a total of 256 hydrographic areas and sub-areas.

[3] and [4] Hydrographic areas and sub-areas in square miles and acres, respectively, and include acreage only contained within Nevada.
[5] Counties are listed in order of their share of the hydrographic area/sub-area.

[6] Desig = Designated Groundwater Basin (Area or Sub-Area). Designated groundwater basins are basins where permitted ground water rights approach or exceed the estimated average annual recharge and the water resources are being depleted or require additional administration. Under such conditions, a state's water officials will so designate a groundwater basin and, in the interest of public welfare, declare preferred uses (e.g., municipal and industrial, domestic, agriculture, etc.). Also referred to as Administered Groundwater Basins. For Nevada, in the interest of public welfare, the Nevada State Engineer, Division of Water Resources, Department of Conservation and Natural Resources, is authorized by statute (Nevada Revised Statute 534.120) and directed to designate a groundwater basin and declare preferred uses within such designated basin. The State Engineer has additional authority in the administration of the water resources within a designated groundwater basin. *source Data:* Office of the State Engineer, NDWR Department of Conservation and Natural Resources.

Elko County Hydrographic Basins, Areas & Sub-Areas (Continued)

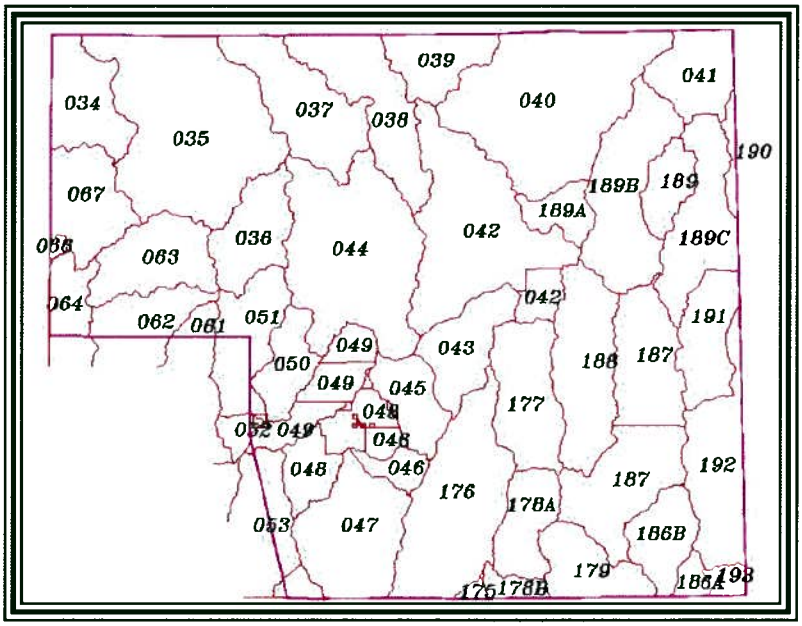


Figure 8 – Map of Elko County Hydrographic Areas

Central Region

153	-	Diamond Valley
175	-	Long Valley
176	-	Ruby Valley
177	-	Clover Valley
178A	-	Butte Valley North
178B	-	Butte Valley South
179	-	Steptoe Valley
186A	-	Antelope Valley South
186B	-	Antelope Valley North
187	-	Goshute Valley
188	-	Independence Valley

Great Salt Lake Basin

189	-	Rock Butte Area
189A	-	Herill Siding - Brush Creek Area
189B	-	Toano - Rock Spring Area
189C	-	Montello - Crittenden Creek Area
190	-	Grouse Creek Valley
191	-	Pilot Creek Valley
192	-	Great Salt Lake Desert
193	-	Deep Creek Valley

Snake River Basin

034	-	Little Owyhee River Area
035	-	South Fork Owyhee River Area
036	-	Independence Valley
037	-	Owyhee River Area
038	-	Bruneau River Area
039	-	Jarbidge River Area
040	-	Salmon Falls Creek Area

Humboldt River Basin

042	-	Mary's River Area
043	-	Starr Valley Area
044	-	North Fork Area
045	-	Lamoille Valley
046	-	South Fork Area
047	-	Huntington Valley
048	-	Dixie Creek - Tenmile Creek area
049	-	Elko Segment
050	-	Susie Creek Area
051	-	Maggie Creek Area
052	-	Mary's Creek Area
053	-	Pine Valley
061	-	Boulder Flat
062	-	Rock Creek Valley
063	-	Willow Creek Valley
064	-	Clover's Area
066	-	Kelly Creek Area
067	-	Little Humboldt Valley

Table 7 - Elko County Hydrographic Areas

REGIONAL & LOCAL DATA

COMMITTED & UN-COMMITTED GROUNDWATER RESOURCES

To acquire a water permit, an application must be made on an approved form and filed with the State Engineer (NRS 533.325). Pursuant to Nevada Water Law, the application must be supported by a map prepared in a prescribed form by a water rights surveyor. The supporting map must show the point of diversion and place of use of the water within the proper legal subdivisions. No application shall be for the water of more than one source to be used for more than one purpose (NRS 533.330).

When the application and map are properly completed, a notice must be sent to a newspaper of general circulation in the area where the application was filed. This notice is published for approximately 30 days (NRS 533.360). Interested parties may file a formal protest up until 30 days after the last day of publication explaining their objections to the application and requesting denial of the application or other appropriate action by the State Engineer (NRS 533.365).

After the expiration of the protest period, the application is ready for action by the State Engineer. When considering an application for approval or denial, the State Engineer must consider the following:

- Is there unappropriated water at the source?
- Will the use of the water under the proposed application conflict with existing rights?
- Will the use of the water under the proposed application prove detrimental to the public interest?
- Will the use of the water under the proposed application adversely impact domestic wells?

In addition to these items, other criteria within NRS 533.370 deal with impacts within irrigation districts, the good faith intent of the applicant to construct the works of diversion and put the water to beneficial use, and the financial ability and reasonable expectation to construct the works of diversion and put the water to beneficial use.

The State Engineer may require any additional information needed prior to approval or rejection of an application (NRS 533.375). The State Engineer also has the discretion to hold a hearing prior to any decision.

The State Engineer reviews any pertinent information and either approves or denies the application. When an application is denied, the State Engineer notifies the applicant of denial, retains the denied application for the record and will not pursue any further action under the application. The denial may be appealed in the appropriate court of jurisdiction within 30 days after the denial action (NRS 533.450). When a water permit is approved, the permit terms and limitations are specified as part of the permit. A fee is also required for any permit issued in accordance with NRS 533.435. Once a permit is issued, the applicant may initiate the work to divert and use the water established as the beneficial use.

Once granted, water rights in Nevada have the standing of both real and personal property - meaning they are conveyed as an appurtenance to real property unless they are specifically excluded in the deed of conveyance. When water rights are purchased or sold as personal property or treated as a separate appurtenance in a realestate transaction, the water rights are conveyed specifically by a deed of conveyance. It is possible to buy or sell water rights and change the water's point of diversion, manner of use and place of use by filing the appropriate application with the State Engineer.

Table 8 - Basin Resource Summary Perennial-Yield, Permitted Water and Pending Applications - **January 2006**

SNAKE RIVER DRAINAGE	Perennial-Yield AF/An USGS	Permitted GW AF/An	Pending Appl AF/An
Little Owyhee River - No. 34	1,400	28	0
South Fork Owyhee River - No. 35	8,000	3,317	11,424
Independence Valley - No. 36	12,000	12,905	4,917
Owyhee River - No. 37	7,000	5,439	320
Bruneau River - No. 38	10,000	16	0
Jarbidge River - No. 39	12,000	72	0
Salmon Falls Creek - No. 40	10,000	6,114	0
Goose Creek - No. 41	1,700	990	0

HUMBOLDT RIVER DRAINAGE	Perennial-Yield AF/An USGS	Permitted GW AF/An	Pending Appl AF/An
Marys River - No. 42	32,000	26,136	32
Starr Valley - No. 43	10,000	3,281	0
North Fork - No. 44	33,000	8,898	22
Lamoille Valley - No. 45	8,000	6,402	0
South Fork - No. 46	2,000	68	0
Huntington Valley - No. 47	15,000	9,133	53
Dixie Cr. / Tenmile Cr. - No. 48	8,000	16,027	302
Elko Segment - No. 49	11,000	25,874	1086
Suzie Creek - No. 50	2,200	765	31
Maggie Creek - No. 51	3,800	14,264	0
Marys Creek - No. 52	2,000	1,940	0
Pine Valley - No. 53	20,000	15,892	0
Rock Creek - No. 62	1,500	2,158	0

Willow Creek - No. 63	1,300	5,281	0
Clovers Area - No. 64	40,000		
Kelly Creek - No. 66	16,000		
Little Humboldt River - No. 67	19,000	10,215	0

CENTRAL REGION	Perennial-Yield AF/An USGS	Permitted GW AF/An	Pending Appl AF/An
Long Valley - No. 175	6,000	4,729	0
Ruby Valley - No. 176	53,000	32,559	8,985
Clover Valley - No. 177	20,000	17,568	0
Butte Valley - North - No. 178A	6,000	63	0
Butte Valley - South - No. 178B	14,000	298	26,064
Steptoe Valley - No. 179	70,000	95,111	13,926
Antelope Valley - South - No. 186A	800	638	0
Antelope Valley - North - No. 186B	1,700	629	7
Goshute Valley - No. 187	11,000	11,722	25
Pequop V.- No. 188	9,000	792	12

GREAT SALT LAKE BASIN	Perennial-Yield AF/An USGS	Permitted GW AF/An	Pending Appl AF/An
Thousand Springs V. - No. 189A	1,800	3,453	0
Thousand Springs V. - No. 189B	2,600	7,493	0
Thousand Springs V. - No. 189C	1,400	452	0
Thousand Springs V. - No. 189D	14,000	20,293	1,600
Grouse Creek - No. 190	350	33	0
Pilot Creek Valley - No. 191	4,500	1,701	0
Great Salt Lake - No. 192	5,000	2,901	0
Deep Creek - No. 193	2,000	0	0

Figure 9 - Nevada Committed Groundwater Resources

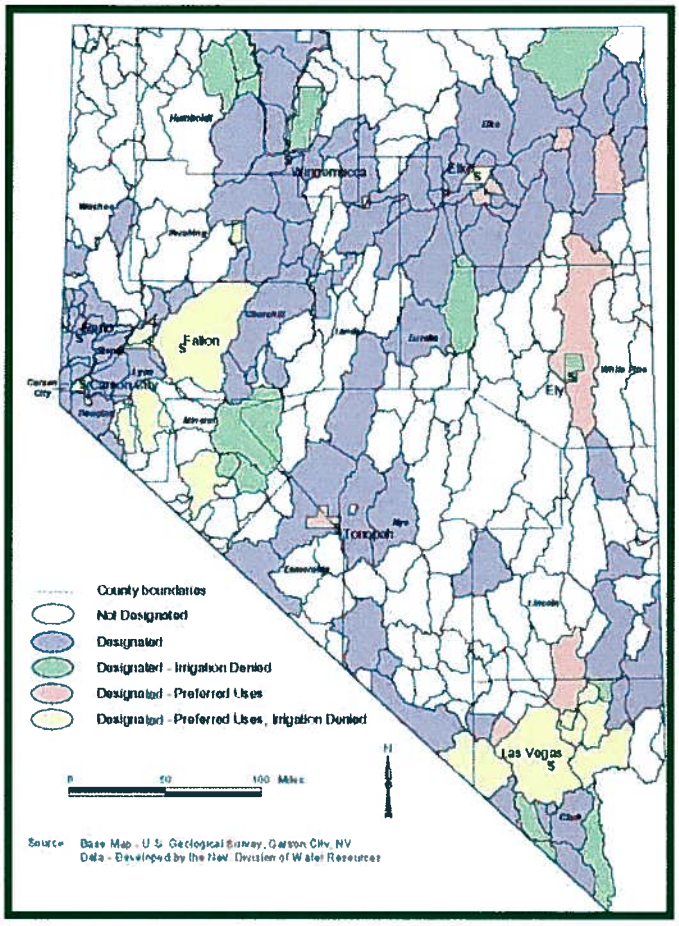
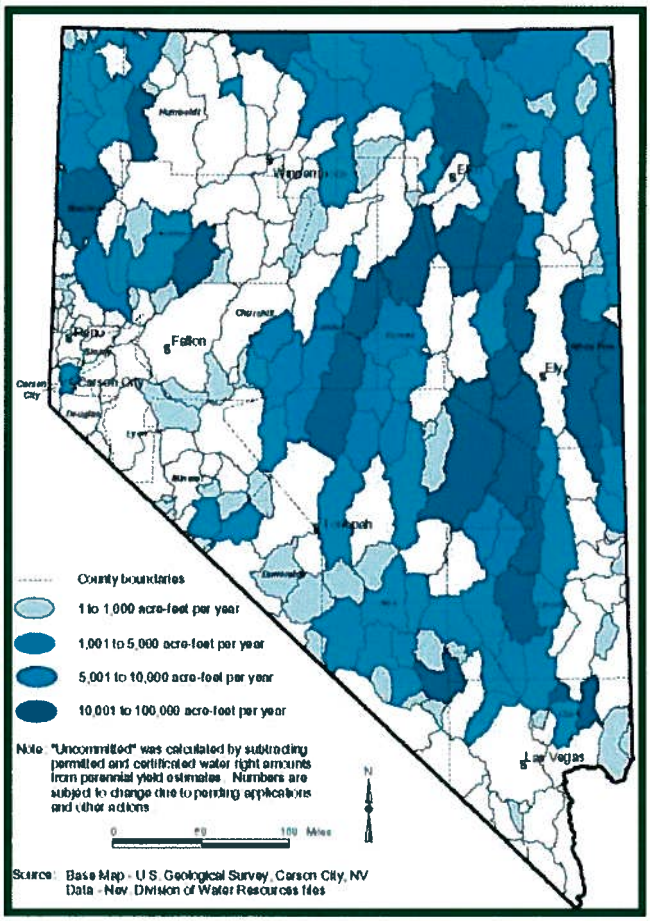


Figure 10 - Nevada Un-Committed Groundwater



As shown in **Figure 10,** the State of Nevada has identified sub-areas of available or un-committed water resources within the watershed or flow systems. The un-committed areas shown in Elko County are primarily located within rural un-developed areas of the county. Primarily the uses within the un-committed areas are agricultural irrigation or stock water. The un-committed water in the sub-areas represent potential future use whether for extended agricultural uses or for the transfer to adjacent areas of development.

Table 8 Depicts an inventory conducted by the Elko County Planning Division representing all sub-basins within Elko County. The inventory concerns Basin Resource Summary Perennial-Yield as per the U.S.G.S. and the State Engineer, Permitted Water and Pending Applications through 2005 as per the State of Nevada Division of Water Resources. As the table represents, many of the highly developed areas in Elko County are over allocated. The table also identifies areas adjacent to the developed areas as potential resources for future sustainability and growth.

Table 9 Represents all developed Domestic Wells in Elko County. Each domestic well represents 2.02 acre feet annually. Currently Elko County has 2,363 domestic wells equaling 4,773 acre feet of water annually.

ELKO COUNTY INVENTORY DATA

Table 9 - Domestic Well Inventories - **January 2004**

Hydrographic Basin	Sub Basin Number & Name	Domestic Wells
Snake River	034 - Little Owyhee River Area	0
	035 - South Fork Owyhee River Area	1
	036 - Independence Valley	5
	037 - Owyhee River Area	30
	038 - Bruneau River Area	0
	039 - Jarbidge River Area	3
	040 - Salmon Falls Creek Area	12
	041 - Goose Creek Area	0
	Total Basin	**51**
Humboldt River	042 - Mary's River Area	100
	043 - Starr Valley Area	19
	044 - North Fork Area	285
	045 - Lamoille Valley	185
	046 - South Fork Area	13
	047 - Huntington Valley	29
	048- Dixie Creek / Tenmile	307
	049 - Elko Segment	767
	050 - Susie Creek Area	9
	051 - Maggie Creek Area	12
	052 - Mary's Creek Area	8
	053 - Pine Valley	10
	061 - Boulder Flat	9
	062 - Rock Creek Valley	1
	063 - Willow Creek Valley	3
	064 - Clovers Area	49

	066 - Kelly Creek Area	4
	067 - Little Humboldt Valley	0
	Total Basin	**1,810**
Central Region	175 - Long Valley	1
	176 - Ruby Valley	71
	177 - Clover Valley	16
	178A - Butte Valley North	1
	178B - Butte Valley South	0
	186A - Antelope Valley South	333
	186B - Antelope Valley North	0
	187 - Goshute Valley	1
	188 - Independence Valley	2
	Total Basin	**425**
Great Salt Lake	189 - Rocky Butte Area	0
	189A - Herrill Siding - Brush Creek Area	2
	189B - Toano - Rock Spring Area	2
	189C - Montello - Crittenden Creek Area	0
	190 - Grouse Creek Valley	0
	191 - Pilot Creek Valley	73
	192 - Great Salt Lake Desert	0
	193 - Deep Creek Valley	0
	Total Basin	**77**
	Totals All Basins	**2,363**

Domestic Wells in Nevada are not required to be a permitted water right. The permitted consumption of a Domestic Well is 2.02 acre feet annually or 1,800 gallons per day as per N.R.S. 534.180.

Estimated yield from each Domestic Well is 275 gallons per day (gpd) during non - irrigation months, November - March, and 650 gallons per day (gpd) during irrigation months, April - October.

The estimated daily average yield from each Domestic Well is 493.75 gallons per day (gpd) or 180,219 gallons per year. Total estimated use for 2,363 domestic wells is 1,166,730 gallons per day (gpd) or 425,856,709 gallons per year. The total estimated use is1,307 acre feet, the permitted use at 2.02 (1,800 gpd) acre feet annually per well is 4,773 acre feet.

Table 10 - Elko County Population Estimates 1996 - 2005

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Elko County	46,543	46,818	45,727	45,633	46,668	46,577	45,805	46,499	47,586	48,339
Carlin	2,614	2,311	2,159	2,395	2,215	2,074	2,045	2,240	2,261	2,281
Elko	19,189	17,518	16,721	17,191	17,093	16,690	16,354	17,140	17,850	18,183
Wells	1,502	1,427	1,364	1,348	1,191	1,389	1,373	1,406	1,423	1,449
Wendover	4,192	4,421	4,518	4,814	4,614	4,839	4,732	4,830	4,848	4,871
Jackpot	1,005	951	1,120	1,204	1,287	1,288	1,271	1,281	1,273	1,293
Montello	195	200	191	199	181	181	181	179	181	175
Mt. City	146	143	136	138	132	127	125	123	121	125
Rural (1)	17,700	19,847	19,518	18,344	19,955	19,989	19,724 (2)	19,300 (3)	19,629 (3)	19,662 (3)

(1) County estimations approximately 13,000 people occupy the Spring Creek, Lamoille and South Fork Areas.
(2) 2003 Rural 19,724 - 13,000 = 6,962 estimated population Elko County Rural
(3) Calculated by Elko County Division of Planning, Zoning, Building & Safety

Table 11A - Forecasted Elko County Population 2005 - 2025
Data provided www.nsbdc.org/demographer/pubs/

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Elko County	47,586 Est.	48,339 Est.	*46,850 -0.6%*	*46,583 -0.6%*	*46,346 -0.5%*	*46,139 -0.4%*	*45,981 -0.3%*	*45,854 -0.3%*	*45,730 -0.3%*	*45,075 -1.4%*	*44,560 -1.1%*
Year	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Elko County	*43,657 -2.0%*	*42,984 -1.5%*	*42,470 -1.2%*	*42,105 -0.9%*	*41,877 -0.5%*	*41,733 -0.3%*	*41,698 -0.1%*	*41,739 +0.1%*	*41,844 +0.3%*	*41,998 +0.4%*	*41,656 -0.8%*

Population Forecast from State of Nevada Demographer **July 21, 2006** - www.nsbdc.org/demographer/pubs/
2006 State Demographer estimates represent a 1.6% increase from 2005.

Table 11B - Forecasted Elko County Population 2006 - 2026
Data provided Elko County

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Elko County	47,586	48,339 +1.6%	*48,301 +0.5%*	*48,543 +0.5%*	*48,786 +0.5%*	*48,981 +0.4%*	*49,128 +0.3%*	*49,275 +0.3%*	*49,423 +0.3%*	*49,571 +0.3%*	*49,695 +0.25*
Year	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**
Elko County	*49,819 +0.25*	*49,969 +0.3%*	*50,069 +0.2%*	*50,169 +0.2%*	*50,219 +0.1%*	*50,319 +0.2%*	*50,369 +0.1%*	*50,419 +0.1%*	*50,570 +0.3%*	*50,773 +0.4%*	*50,874 +0.2%*

Population Forecast from Elko County Division of Planning & Zoning
2006 State Demographer estimates represent a 1.6% increase from 2005.

Top of Merritt Mountain Viewing Westward

Table 12 - 2000 Census Housing Data

Subject	Number	Percent	Subject	Number	Percent
Total housing units	**18,456**	**100.0**	**OCCUPANTS PER ROOM**		
UNITS IN STRUCTURE			**Occupied housing units**	**15,638**	**100.0**
1-unit, detached	9,330	50.6	1.00 or less	14,459	92.6
1-unit, attached	287	1.6	1.01 to 1.50	707	4.5
2 units	510	2.8	1.51 or more	472	3.0
3 or 4 units	1,230	6.7			
5 to 9 units	745	4.0	**Specified owner-occupied units**	**6,387**	**100.0**
10 to 19 units	185	1.0	**VALUE**		
20 or more units	308	1.7	Less than $50,000	329	5.2
Mobile home	5,636	30.5	$50,000 to $99,999	1,344	21.0
Boat, RV, van, etc.	227	1.2	$100,000 to $149,999	3,239	50.7
			$150,000 to $199,999	920	14.4
YEAR STRUCTURE BUILT			$200,000 to $299,999	406	6.4
1999 to March 2000	531	2.9	$300,000 to $499,999	107	1.7
1995 to 1998	3,352	18.2	$500,000 to $999,999	22	0.3
1990 to 1994	2,509	13.6	$1,000,000 or more	20	0.3
1980 to 1989	5,002	27.1	Median (dollars)	123,100	(X)
1970 to 1979	2,883	15.6			
1960 to 1969	1,307	7.1	**MORTGAGE STATUS AND SELECTED MONTHLY OWNER COSTS**		
1940 to 1959	1,739	9.4			
1939 or earlier	1,133	6.1	With a mortgage	4,958	77.6
			Less than $300	63	1.0
ROOMS			$300 to $499	158	2.5
1 room	367	2.0	$500 to $699	346	5.4
2 rooms	1,089	5.9	$700 to $999	1,367	21.4
3 rooms	1,835	9.9	$1,000 to $1,499	2,263	35.4
4 rooms	3,338	18.1	$1,500 to $1,999	618	9.7
5 rooms	4,220	22.9	$2,000 or more	141	2.2
6 rooms	2,990	16.2	Median (dollars)	1,088	(X)
7 rooms	2,029	11.0	Not mortgaged	1,429	22.4
8 rooms	1,266	6.9	Median (dollars)	257	(X)
9 or more rooms	1,322	7.2			
Median (rooms)	5.1	(X)	**SELECTED MONTHLY OWNER COSTS AS A PERCENTAGE OF HOUSEHOLD INCOME IN 1999**		
Occupied housing units	**15,638**	**100.0**			
YEAR HOUSEHOLDER MOVED INTO UNIT			Less than 15.0 percent	2,154	33.7
1999 to March 2000	3,884	24.8	15.0 to 19.9 percent	1,447	22.7
1995 to 1998	5,400	34.5	20.0 to 24.9 percent	961	15.0
1990 to 1994	2,767	17.7	25.0 to 29.9 percent	592	9.3
1980 to 1989	2,215	14.2	30.0 to 34.9 percent	306	4.8
1970 to 1979	812	5.2	35.0 percent or more	892	14.0
1969 or earlier	560	3.6	Not computed	35	0.5
VEHICLES AVAILABLE			**Specified renter-occupied units**	**4,589**	**100.0**
None	767	4.9	**GROSS RENT**		
1	4,780	30.6	Less than $200	198	4.3
2	6,403	40.9	$200 to $299	279	6.1
3 or more	3,688	23.6	$300 to $499	1,074	23.4
			$500 to $749	1,921	41.9
HOUSE HEATING FUEL			$750 to $999	581	12.7
Utility gas	6,151	39.3	$1,000 to $1,499	198	4.3
Bottled, tank, or LP gas	4,258	27.2	$1,500 or more	24	0.5
Electricity	3,393	21.7	No cash rent	314	6.8
Fuel oil, kerosene, etc.	486	3.1	Median (dollars)	583	(X)
Coal or coke	-	-			
Wood	1,116	7.1	**GROSS RENT AS A PERCENTAGE OF HOUSEHOLD INCOME IN 1999**		
Solar energy	-	-			
Other fuel	223	1.4	Less than 15.0 percent	1,144	24.9
No fuel used	11	0.1	15.0 to 19.9 percent	828	18.0
			20.0 to 24.9 percent	632	13.8
SELECTED CHARACTERISTICS			25.0 to 29.9 percent	497	10.8
Lacking complete plumbing facilities	162	1.0	30.0 to 34.9 percent	318	6.9
Lacking complete kitchen facilities	110	0.7	35.0 percent or more	828	18.0
No telephone service	608	3.9	Not computed	344	7.5

Table 13 - Un-Incorporated Town Rural Communities Municipal

Elko County Un-Incorporated Towns / Rural Communities Municipal / Quasi-Municipal / Domestic Well Water & Sanitary Sewer Sources - 2005							
Town / Community / Area	**Municipal Water System**	**Individual Domestic Wells**	**Sanitary Sewer System**	**Individual Septic System**	**High Projected Growth**	**Moderate Projected Growth**	**Low Projected Growth**
Jackpot (1)	✘		✘			✘	
Jarbidge (2)	✘			✘			✘
Midas (4)	✘			✘			✘
Montello (1)	✘		✘				✘
Mountain City	✘		✘				✘
Tuscarora (4)	✘			✘			✘
Clover Valley (5)		✘		✘		✘	
North Adobe (5)		✘		✘			✘
Pilot Valley (5)		✘		✘			✘
I-80 Corridor (5) Elburz - Wendover		✘		✘		✘	
Ryndon (5)		✘		✘		✘	
Wendover (3)	✘		✘		✘		

(1) Un-Incorporated Town Limits
(2) Un-Incorporated Water / Sewer Service
(3) Incorporated City Limits
(4) Private Water User Association or General Improvement District
(5) Rural Area no systems

Note: Projected Growth rates are based on growth patterns from the years 2000 - 2006

Table 14 - Elko County Un-Incorporated Towns / Rural Communities Municipal / Quasi-Municipal / Domestic Well Water Resources

Elko County Un-Incorporated Towns / Rural Communities Municipal Water Resources - 2005						
Town / Community / Area	**Current Certificated Municipal Ground Water (afa)**	**Current Certificated Municipal Surface Water (afa)**	**Current Annual Duty(afa)**	**Potential Residential Build-out (residential lots)**	**Potential Addition to Municipal Annual Duty (afa)**	**Current Potential Total Municipal Annual Duty (afa)**
Jackpot (1)	10,458	0	5,340.5	50	33.6	5,374.1
Jarbidge (1)	0	4,048.5	4,099.6	50	33.6	4,133.2
Lamoille (3)	1,810.6	0	233.6	25	16.8	250.4
Midas (1)	166.6	14.5	55.9	25	16.8	72.7
Montello (1)	0	5,967.7	5,882.4	50	33.6	5,916
Mountain City (1)	0	2,983.9	2,982.4	50	33.6	3,016
Tuscarora (3)	181.1	724.2	742.2	25	16.8	759
Wendover (2)	23,023	1,882	10,949	300	446.4	11,395.4

(1) Un-Incorporated Town System Limits
(2) Incorporated City System Limits
(3) Private Water User Association or General Improvement District (GID)

Notes:
(afa) - Acre Feet Annually
Information provided by State of Nevada Division of Water Resources

Table 15 - Elko County Rural Communities and Areas Domestic Water Resources

Elko County Un-Incorporated Towns / Rural Communities Domestic Well Water Resources - 2005					
Rural Area (Hydrographic) Sub-Area)	**Domestic Self Service Wells**	**Current Annual Allocation**	**Potential Residential Lots Build-out**	**Potential Increase Allocation**	**Potential Total Allocation at Build Out**
Jackpot (040)	3	6.1	50	101	107.1
Jarbidge (039)	3	6.1	25	50.5	56.6
Midas (061-064) (066, 067)	66	133.3	25	50.5	183.8
Montello (189C)	0	0	50	101	101
Mountain City (037)	30	60.6	50	101	161.6
Tuscarora (036)	5	10.1	25	50.5	60.6
Clover Valley (177)	16	32.3	100	202	234.3
North Adobe (050)	9	18.2	100	202	220.2
Pilot Creek Valley (191)	73	147.5	1,800	3,636	3,783.5
I-80 Corridor Elburz - Wendover (042,043,182, 187, 188)	122	246.4	900	1,818	2,064.4
Ryndon (044)	285	575.7	2,300	4,646	5,221.7
Remainder County	479	967.6	2,000	4,040	5,007.6
TOTALS	**1,091**	**2,203.9**	**7,425**	**14,998.5**	**17,202.4**

Note: All Information Shown in **Table 15** pertains to areas outside water system limits within the specified Hydrographic Area or Sub-Area

SECTION 2
Elko County Water Resource Management Plan
Water Resource Management

Municipal, Domestic, Commercial, Industrial & Agricultural Water Use Forecast

Rapid population growth in Elko County has been due in large part to trends in the mining industry, especially since the late 1980's. Between 1950 and 1970, Elko County's population grew by only 2,243 persons. However, over the next 27 years the population grew by nearly 30,000 persons. Much of this growth was due to mining, in Elko County and neighboring Eureka County. While gaming and tourism have had significant impacts on growth in Clark and Washoe counties, mining has had major influences on many of the rural counties' population and employment growth, demographic trends, and economic development. Since 1989, gold mining in Nevada has made a major contribution to a number of rural counties' economic growth, or specifically Elko, Eureka, Humboldt, Lander, Nye, and Pershing counties.

Table 11A and **Table 16A** represent forecasts prepared by the State of Nevada Demographer. In both tables a decline in population is represented. **Table 16A** also reflects a loss of agriculture use. However, trends and data recorded by Elko County from 1998 - 2005 reflects a steady increase in population and limited minimal loss of agricultural lands (Tables **11B** and **16B**). These discrepancies make long term land use and water resource management difficult. The representation of a constant loss of population and decrease in water consumption also promotes the approximation that Elko County may currently have, and will have a future surplus of water resources. The State of Nevada Water Plan utilizes data provided by the State Demographer in 1997. This data represented increased population forecast in Elko County through 2020. Since that time the State Demographer has revised the data base and is now reflecting decreases in Elko County population. Therefore, total consumption data reflected herein does not concur with the total consumptive use tables of the State Water Plan.

The forecast methodology developed for the Elko County Water Resource Management Plan uses a forecast of key socioeconomic variables multiplied by a water use factor or coefficient to produce a water withdrawal forecast. This process is depicted in its simplest form in Flow Chart below, Basic Forecasting Methodology. Specifically, forecasts of population, employment (which itself is derived from the population forecast), and irrigated acreage provide the means to develop a number of water withdrawal forecasts by water use category, including withdrawals for domestic (both public and self-supplied), municipal and industrial (M&I), public use and losses, commercial and industrial, irrigation and livestock water withdrawals.

Table 16 - Water Withdrawal Forecast Equation

Table 17A - Estimated & Forecasted M&I, Domestic, Commercial, Industrial & Agricultural Water Use as per **State of Nevada Demographer 2006**

Elko County	Estimated 2005	Forecast 2010	Forecast 2015	Forecast 2020	Forecast 2025
Resident Population (persons) (3)	**47,586**	**46,139**	**44,560**	**41,877**	**41,998**
Percent Population on Public Supply (2)	93.30%	93.28%	93.27%	93.27%	93.27%
Population on Public Supply (2) (4)	44,398	43,038	41,606	39,059	39,172
Population being Self Supplied (3) (4)	3,188	3,100	2,954	2,818	2,826
Total Municipal & Industrial Use (1) (2) (4)	**16,493**	**15,991**	**15,444**	**14,514**	**14,556**
Public Use and Losses (2) (4)	**1,498**	**1,452**	**1,402**	**1,318**	**1,321**
As a Percent of Total M&I Water Use (2)	9.08%	9.08%	9.08%	9.08%	9.08%
Total Domestic Water Use (1) (2) (4)	**16,729**	**16,238**	**15,681**	**14,740**	**14,780**
Public Water Supply Use (1) (2) (4)	11,956	11,590	11,192	10,520	10,550
Domestic Wells (1)(4) 2.02 af each	4,773	4,648	4,489	4,220	4,230
Total Agricultural Withdrawals (1) (2)	**898,321**	**882,655**	**863,951**	**845,248**	**830,610** (4)
Irrigation Water Withdrawals (1) (2)	896,621	880,992	862,325	843,658	829,056 (4)
Livestock Water Use (1) (2)	1,700	1,663	1,626	1,590	1,554 (4)
Total Water Withdrawals (1) (2) (4)	**933,041**	**916,336**	**896,478**	**875,820**	**861,267** (4)

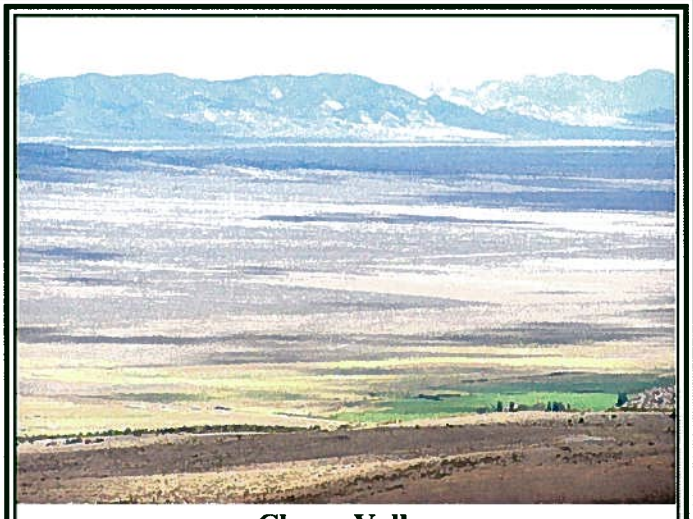
(1) Acre Feet Annually
(2) Information From State of Nevada Division of Water Planning
(3) Population Estimates & Forecast from State of Nevada Demographer
(4) Estimated, Forecasted and Calculated by Elko County Division of Planning & Zoning

Merritt Mountain Viewing Northeasterly

Table 17B - Estimated & Forecasted M&I, Domestic, Commercial, Industrial & Agricultural Water Use as per **Elko County Planning & Zoning Division 2006**

Elko County	Estimated 2005	Forecast 2010	Forecast 2015	Forecast 2020	Forecast 2025
Resident Population (persons) (3)	**47,586**	**48,981**	**49,695**	**50,219**	**50,773**
Percent Population on Public Supply (2)	93.30%	93.28%	93.27%	93.27%	93.27%
Population on Public Supply (2) (4)	44,398	45,689	46,351	46,839	47,356
Population being Self Supplied (3) (4)	3,188	3,292	3,344	3,380	3,417
Total Municipal & Industrial Use (1) (2) (4)	**16,493**	**16,976**	**17,224**	**17,405**	**17,597**
Public Use and Losses (2) (4)	**1,498**	**1,541**	**1,564**	**1,580**	**1,598**
As a Percent of Total M&I Water Use (2)	9.08%	9.08%	9.08%	9.08%	9.08%
Total Domestic Water Use (1) (2) (4)	**16,729**	**17,214**	**17,465**	**17,649**	**17,844**
Public Water Supply Use (1) (2) (4)	11,956	12,303	12,482	12,614	12,753
Domestic Wells (1)(4) 2.02 af each	4,773	4,911	4,983	5,035	5,091
Total Agricultural Withdrawals (1)(4)	**898,321**	**893,829**	**889,360**	**884,913**	**880,489** (4)
Irrigation Water Withdrawals (1) (4)	896,621	892,138	887,677	883,239	878,823 (4)
Livestock Water Use (1) (4)	1,700	1,691	1,683	1,674	1,666 (4)
Total Water Withdrawals (1) (2) (4)	**933,041**	**929,560**	**925,613**	**921,547**	**917,528** (4)

(1) Acre Feet Annually
(2) Information From State of Nevada Division of Water Planning
(3) Population Estimates & Forecast from Elko County Division of Planning & Zoning
(4) Estimated, Forecasted and Calculated by Elko County Division of Planning & Zoning



Clover Valley

DEVELOPMENT CONSIDERATIONS

WATER RESOURCE & CONSERVATION EDUCATION

As the driest state in the nation and one of the fastest growing, it is important that Elko County residents understand the fundamental science of water, how water is managed in the state, and the issues affecting water management. An educated populace is clearly a key to future management of water resources, and therefore, water education must become a priority.

Benefits of Water Education: The overall goal of water education is to develop more knowledgeable citizens who can participate in public discussion and debate about water issues. Information improves people's ability to examine and evaluate information presented and the information that is not presented. With a basic understanding of water, residents can respond intelligently to issues such as the need to develop water supplies or wastewater treatment facilities, the benefits and costs of conservation, the dangers associated with leaking contaminants, the risks posed by poor water quality and the benefits and costs of river restoration or flood control.

It is especially important that Elko County's young adults and children learn about water so that they develop an appreciation for the unique role water plays in the development of our state and become informed citizens who can think critically and evaluate information intelligently throughout their lives. Water as a topic has natural links to science, math, social studies, and language and is an excellent unifying curricular theme. Water attracts children and learning about it can be interesting and fun, encouraging both a greater appreciation of the environment and a greater interest in selecting science and math oriented careers.

Jarbidge Mountains Viewing West

STATUTORY PLANNING PROVISIONS

Planning and Development of Water Resources

NRS 540.011 Legislative declaration.

1. The Legislature, determines that it is the policy of the State of Nevada to continue to recognize the critical nature of the States limited water resources. It is acknowledged that many of the State's surface water resources are committed to existing uses, under existing water rights, and that in many areas of the State the available groundwater supplies have been appropriated for current uses. It is the policy of the State of Nevada to recognize and provide for the protection of these existing water rights. It is also the policy of the State to encourage efficient and non-wasteful use of these limited supplies.

2. The Legislature further recognizes the relationship between the critical nature of the State's limited water resources and the increasing demands placed on these resources as the population of the State continues to grow.

3. The Legislature further recognizes the relationship between the quantity of water and the quality of water, and the necessity to consider both factors simultaneously when planning the uses of water.

4. The Legislature further recognizes the important role of water resource planning and that such planning must be based upon identifying current and future needs for water. The Legislature determines that the purpose of the State's water resource planning is to assist the State, its local governments and its citizens in developing effective plans for the use of water.

NRS 540.051 Duties of Section. The Section shall:

1. Include in its planning:
(a) Recognition and protection of existing water rights consistent with chapters 533 and 534 of NRS; and
(b) Consideration of the factors relating to the quality of water in this State and the importance of considering the issues of quantity and quality simultaneously, but the State Environmental Commission and Division of Environmental Protection of the Department retain full responsibility for the management of water quality.

2. Suggest to the Legislature changes in water policy which may be necessary to meet new requirements of law or of the people of the State.

3. Assist the State Engineer in dealings with the Federal Government and other states, but the State Engineer is solely responsible for the allocation of water resources and litigation.

4. Review local and federal documents regarding water planning that are relevant to the use of water in Nevada, including, without limitation, local water and resource plans. Reviews conducted pursuant to this subsection must consider, without limitation:
(a) The accuracy of information relating to water use and water planning;
(b) Compliance with the water law of this State; and
(c) General advice relating to water planning.

5. Compile and update summarized data relating to hydrographic basins to support decisions that the State Engineer makes regarding such basins, and provide summarized information regarding such basins to the public. The Section shall cause to be generated and updated a summary for each hydrographic basin to show critical information regarding that basin, including, without limitation:
(a) Whether the basin is designated;
(b) All appurtenant or associated studies related to the availability of water;
(c) Rulings and orders affecting new appropriations of water;
(d) The availability of crop and pumpage inventories;
(e) The availability of data regarding water levels; and
(f) Current commitments of water from the basin that are attributable to existing water rights.
The information described in this subsection must, insofar as practicable, be provided in an electronic format and made available on the website of the State Engineer on the Internet or its successor.

6. Upon request, provide technical assistance to the Board for Financing Water Projects created by NRS 349.957, including, without limitation, the review of letters of intent and applications for grants.

7. Promote water conservation by:
(a) Consulting with suppliers of water concerning:
(1) Community water conservation plans; and
(2) The content and scope of water plans; and
(b) Reviewing plans for compliance with the applicable provisions of NRS 540.121 to 540.151, inclusive.

8. Assist federal, state and local governments and the general public in obtaining information regarding water planning, the availability of water and issues relating to water rights.

9. Support activities in response to drought as provided for under the drought plan established for the State.

10. Administer the statewide program established for the management of floodplains.

11. Upon request, provide updates to local governments on water issues relevant to this State, changes in policy and the availability of new information concerning water resources.
(Added to NRS by 1977, 1170; A 1987, 2280; 1991, 173; 1993, 1703; 1995, 2499; 2005, 2566)

NRS 534.0105 "Aquifer" defined. "Aquifer" means a geological formation or structure that stores or transmits water, or both.
(Added to NRS by 1987, 1770)

NRS 534.0115 "Area of hydrologic effect" defined. "Area of hydrologic effect" means the surface area of land covering the extent of hydrologic response of water recharged pursuant to a project to recharge.
(Added to NRS by 1987, 1770)

NRS 534.020 Underground waters belong to public and are subject to appropriation for beneficial use; declaration of legislative intent.

Transfer of Water From County of Origin to Another County

NRS 533.438 Imposition of fee on certain transfers of water by county of origin; review by State Engineer; limitation on use of money collected from fee. [Effective through December 31, 2006.]

1. Except as otherwise provided in subsection 4, if an appropriation of groundwater pursuant to a permit to appropriate groundwater results in the transfer to and beneficial use of water in a county in this State other than the county in which the water is appropriated or in another state, the county of origin may impose a fee of $6 per acre-foot per year on the transfer.

2. A county of origin shall not impose a fee pursuant to subsection 1 without the prior approval of the State Engineer. The county of origin shall notify the State Engineer in writing of its intent to impose the fee. The State Engineer shall review the notice of intent to impose the fee to determine:

(a) Whether the appropriation of groundwater pursuant to the permit specified in subsection 1 results in a transfer to and beneficial use of water in a county in this State other than the county of origin or in another state; and
(b) The amount of water, if any, that is:
(1) Subject to the proposed fee because of that transfer and beneficial use; or
(2) Not subject to the proposed fee pursuant to subsection 4.

3. Within 30 days after reviewing the notice of intent to impose the fee, the State Engineer shall send a written notice to the county of origin that includes the results of his review. If the State Engineer determines that the appropriation of groundwater pursuant to the permit results in a transfer to and beneficial use of water in a county in this State other than the county of origin or in another state, the State Engineer shall include in the notice the amount of water that is subject to the proposed fee. The county may, upon such a determination, impose the fee on the transfer.

4. A fee may not be imposed pursuant to this section on water that is appropriated and beneficially used pursuant to a permit to appropriate groundwater which is issued for a point of diversion and a place of beneficial use in the county of origin and which, after the water is diverted and beneficially used, is discharged or migrates into a county in this State other than the county of origin or into another state.

5. All money collected from a fee imposed pursuant to this section must be deposited in a trust fund for the county. The principal and interest of the trust fund may be used by the county only for the purposes of economic development, health care and education.

6. For the purposes of this section, if a basin includes land lying in more than one county, each county any part of whose land is included is a county of origin to the extent of the proportionate amount of water transferred from it. The State Engineer shall determine the respective proportions.

7. As used in this section:
(a) A "basin" is one designated by the State Engineer for the purposes of chapter 534 of NRS.
(b) "Origin" means the place where water is taken from underground.
(Added to NRS by 1991, 1368; A 2001, 1933; 2005, 497)

NRS 533.438 Imposition of fee on certain transfers of water by county of origin; review by State Engineer; limitation on use of money collected from fee. [Effective January 1, 2007.]

1. Except as otherwise provided in subsection 4, if an appropriation of groundwater pursuant to a permit to appropriate groundwater results in the transfer to and beneficial use of water in a county in this State other than the county in which the water is appropriated or in another state, the county of origin may impose a fee of $10 per acre-foot per year on the transfer.

2. A county of origin shall not impose a fee pursuant to subsection 1 without the prior approval of the State Engineer. The county of origin shall notify the State Engineer in writing of its intent to impose the fee. The State Engineer shall review the notice of intent to impose the fee to determine:
(a) Whether the appropriation of groundwater pursuant to the permit specified in subsection 1 results in a transfer to and beneficial use of water in a county in this State other than the county of origin or in another state; and
(b) The amount of water, if any, that is:
(1) Subject to the proposed fee because of that transfer and beneficial use; or
(2) Not subject to the proposed fee pursuant to subsection 4.

3. Within 30 days after reviewing the notice of intent to impose the fee, the State Engineer shall send a written notice to the county of origin that includes the results of his review. If the State Engineer determines that the appropriation of groundwater pursuant to the permit results in a transfer to and beneficial use of water in a county in this State other than the county of origin or in another state, the State Engineer shall include in the notice the amount of water that is subject to the proposed fee. The county may, upon such a determination, impose the fee on the transfer.

4. A fee may not be imposed pursuant to this section on water that is appropriated and beneficially used pursuant to a permit to appropriate groundwater which is issued for a point of diversion and a place of beneficial use in the county of origin and which, after the water is diverted and beneficially used, is discharged or migrates into a county in this State other than the county of origin or into another state.

5. All money collected from a fee imposed pursuant to this section must be deposited in a trust fund for the county. The principal and interest of the trust fund may be used by the county only for the purposes of economic development, health care and education.

6. For the purposes of this section, if a basin includes land lying in more than one county, each county any part of whose land is included is a county of origin to the extent of the proportionate amount of water transferred from it. The State Engineer shall determine the respective proportions.

7. As used in this section:
(a) A "basin" is one designated by the State Engineer for the purposes of chapter 534 of NRS.
(b) "Origin" means the place where water is taken from underground.
(Added to NRS by 1991, 1368; A 2001, 1933; 2005, 497, 498, effective January 1, 2007)

NRS 533.4385 Plan to mitigate adverse economic effects caused by transfer of water; contents of plan; modification of plan by State Engineer.

1. If a county of origin has not imposed a fee on the transfer of water pursuant to NRS 533.438, an applicant and the governing body of the county of origin may execute a plan to mitigate the adverse economic effects caused by the transfer of water from the county of origin to another county. If such a plan is executed, the plan is binding on the county of origin and the applicant or his successor.
2. A plan to mitigate the adverse economic effects caused by the transfer of water from the county of origin to another county may include, but is not limited to, provisions concerning:
(a) The reservation of designated water rights to the county of origin; and
(b) Compensation for the foreseeable effects of the transfer.

3. If a plan is executed pursuant to subsection 1, the applicant shall submit the plan to the State Engineer. The State Engineer may modify a plan executed pursuant to subsection 1 if a provision of the plan:
(a) Violates a specific statute; or
(b) Becomes impossible or impracticable to put into effect.
(Added to NRS by 1991, 1368; A 2005, 499)

1. All underground waters within the boundaries of the State belong to the public, and, subject to all existing rights to the use thereof, are subject to appropriation for beneficial use only under the laws of this State relating to the appropriation and use of water and not otherwise.
2. It is the intention of the Legislature, by this chapter, to prevent the waste of underground waters and pollution and contamination thereof and provide for the administration of the provisions thereof by the State Engineer, who is hereby empowered to make such rules and regulations within the terms of this chapter as may be necessary for the proper execution of the provisions of this chapter.
[1:178:1939; 1931 NCL § 7993.10]

DROUGHT CONDITIONS

As Nevada is the driest State in the Nation, drought is relatively common and expected. Every 6 out of 10 years, the major rivers in the State experience below average flows. For most of Nevada, which depends mostly on streamflow for water supply, a drought is considered to be a period of 2 or more consecutive years in which streamflow is much less than average. The most significant droughts were during 1928-37, 1953-55, 1959-62, 1976-77, and 1987-92. Droughts can magnify quality problems for surface and ground-water sources. By decreasing streamflow, droughts tend to lessen the quality of remaining water for human and wildlife uses. Droughts also can cause more reliance on ground-water sources which may stress the resource beyond its long-term potential.

In 1987 Governor Bryan formed the Drought Review and Reporting Committee (DRRC) to inform the citizens of Nevada about climatological conditions and the severity of the current drought. As the drought progressed, the DRRC helped produce a State Drought Plan that outlines the State and Federal actions that can be taken during various stages of drought. *(1987-1992 Drought Impact Summary)*

Smaller communities in Elko County have done very well coping with drought conditions. Midas and Tuscarora have had their springs dry up resulting in temporary water hauling operations to provide drinking water. Both of these towns are switching to more reliable ground-water supplies. Water management and water conservation efforts have allowed the citizens of Elko, Spring Creek and West Wendover to continue outdoor watering, even with their main source of water greatly reduced. Agriculture has also been severely impacted by the drought.

Fish and wildlife have been significantly stressed due to the drought conditions. Many of Elko County's wetland areas are either dry or are severely diminished. These wetlands are important resting stops for migratory birds. The limited availability of food and habitat will stress the birds during migration and increase mortality rates. The drought has resulted in minimum pools in most of our reservoirs. The fisheries in these pools are significantly stressed due to increases in temperature and oxygen depletion.

Water-based recreation has been severely impacted at Wild Horse Reservoir, South Fork Reservoir, Ruby Marshes and several other smaller reservoirs. Visitor counts at these reservoirs are lower than previous non-drought years, and boating access is limited or nonexistent.

The State of Nevada Division of Water Planning has created and implemented a State Drought Plan outlined as follows:

STATE OF NEVADA DROUGHT PLAN

PLAN SUMMARY:

Plan Title: State of Nevada Drought Plan

Type: The Drought Plan is a strategic operations plan that describes the procedural framework for initiating and maintaining State-level actions under three different stages of drought. Natural resources identified in the Drought Plan include water resources (e.g., stream flow, reservoir storage), fish and wildlife and soil.

Plan Description: (Purpose, Goals and Guiding Principles)

The Drought Plan establish an administrative coordinating and reporting system between agencies that should be involved in providing assistance to help mitigate drought impacts. Goals of the plan include:

To establish a formal framework for state agency response to drought impacts.
To establish a system for determining drought severity.
To establish a process for allocating state and for obtaining federal assistance, as determined to be necessary by the Governor.
To help provide an orderly system for activating the state response to drought.
To define state policies, procedures, intergovernmental assessment and response responsibilities for different drought scenarios and different impact mitigation needs.
To notify farmers and ranchers of potential drought conditions, assess and project likely impacts, identify alternative responses and sources of assistance and report data and recommendations to the Drought Review and Reporting Committee or Drought Response Center.
To address drought-related impacts to wildlife due to the threat of water reduction and wildfire.
To establish procedures and an organization to assess drought-related economic impacts and recommend and undertake specific responses.

Planning/Guiding Principles:

The following principles are inferred from the Plan.

The primary responsibility for drought response must remain with the individual, followed by local cooperative actions and the then state and federal assistance.

State resources will be used to supplement private and local resources. Federal resources will be necessary to supplement private, local and state resources under certain qualifying conditions.
The plan does not establish specific conservation measures for local entities.
The plan does not affect existing water rights.
Develop State response scenarios based on three stages of drought - Drought Warning Stage; Severe Drought Stage, and Emergency Drought Stage.
The Governor provides policy and resource allocation direction. However, the Drought Response Center makes policy recommendations and resource allocation requests to the Governor.
Three Drought Impact Task Forces will be set up as needed to make recommendations to the Governor.

Geographic Scope: -- Statewide (However, drought conditions often exist in a limited area, so the geographic scope of drought mitigation actions can be region specific).

Legislative Authority and/or Administrative Policies: Information in the Drought Plan indicates that the Governor of Nevada called for the establishment of a Drought Review and Reporting Committee in the late 1980's. Apparently the Division of Water Planning with the Division of Emergency Management were directed to coordinate the development of a State Drought Plan.

Cooperating Agencies: Involvement of agencies depends on the drought stage and impacted resources. State Climatologist is the lead responsible agency. Other directly involved agencies include the Department of Emergency Management, divisions in the State Department of Conservation and Natural Resources, agencies within the U.S. Departments of Agriculture and of the Interior, agricultural trade organizations, tribes, Natural Resources Conservation Service, irrigation and water (sub)conservancy districts, and the largest utility companies.

Participating Stakeholders: (See Cooperating Agencies above)

Public Communication and/or Participation Process: Task Force is only convened at the recommendation of the DRRC and under the direction of the Governor when severe or emergency drought stages exist. Each Task Force is to be made up of representatives of industry trade organizations, state agencies, federal agencies, tribal agencies, and local agencies.

Date Completed: Completed January 1991. Next update - not determined

Planning Process & Data Collection: The Drought Plan is a static process document. The actions laid out in the plan become implemented in reaction to the occurrence of a drought and subsequent impacts. Implementation of the Drought Plan begins once the Governor receives and concurs with a recommendation from the State Climatologist that conditions are sufficiently dry to declare that a drought warning stage exists.

Data Types Required and Used: Reservoir storage, precipitation, snowpack, stream flow, ground water levels, soil moisture, temperatures, and long term weather predictions. Data on the impact to crop production, livestock production, and fish and wildlife (game and nongame and endangered species) would be collected by the respective Task Forces. During the drought, Task Force agencies would also estimate potential impacts (losses) to fish and wildlife, especially on state controlled land and waters, and then recommend mitigation measures involving reservoir conservation pools, instream flows, construction of water ponds, etc. Funding and logistic resources needed would also be estimated, including an assessment of state held water rights and the need for additional resources.

Data Sources: It is the responsibility of the Division of Water Planning to insure that the required hydrologic data are being collected to effectively evaluate potential droughts and drought severity. Determination of drought stages are made by the State Climatologist after evaluating the hydrologic and climatic data.

Natural Resource or Environmental Indicators: Palmer Drought Severity Index (a measure of soil moisture deficiency or excess) is used to determine whether a drought exists and the stage, or degree of severity, of the drought conditions. Stages of drought are: a drought warning (Palmer Index between -1.0 to -2.0), severe drought (Palmer Index between -2.0 and -3.0) and emergency drought (Palmer index below -3.0) stage.

Funding Sources: Funding needs are considered special, and will be addressed at the time funds are requested. The Nevada Division of Emergency Management is the agency designated in NRS 414 that coordinates all state and federal assistance to jurisdictions in federally declared and non-declared emergency situations.

Figure 10 - Short Term Drought Indicator Map - April 2007

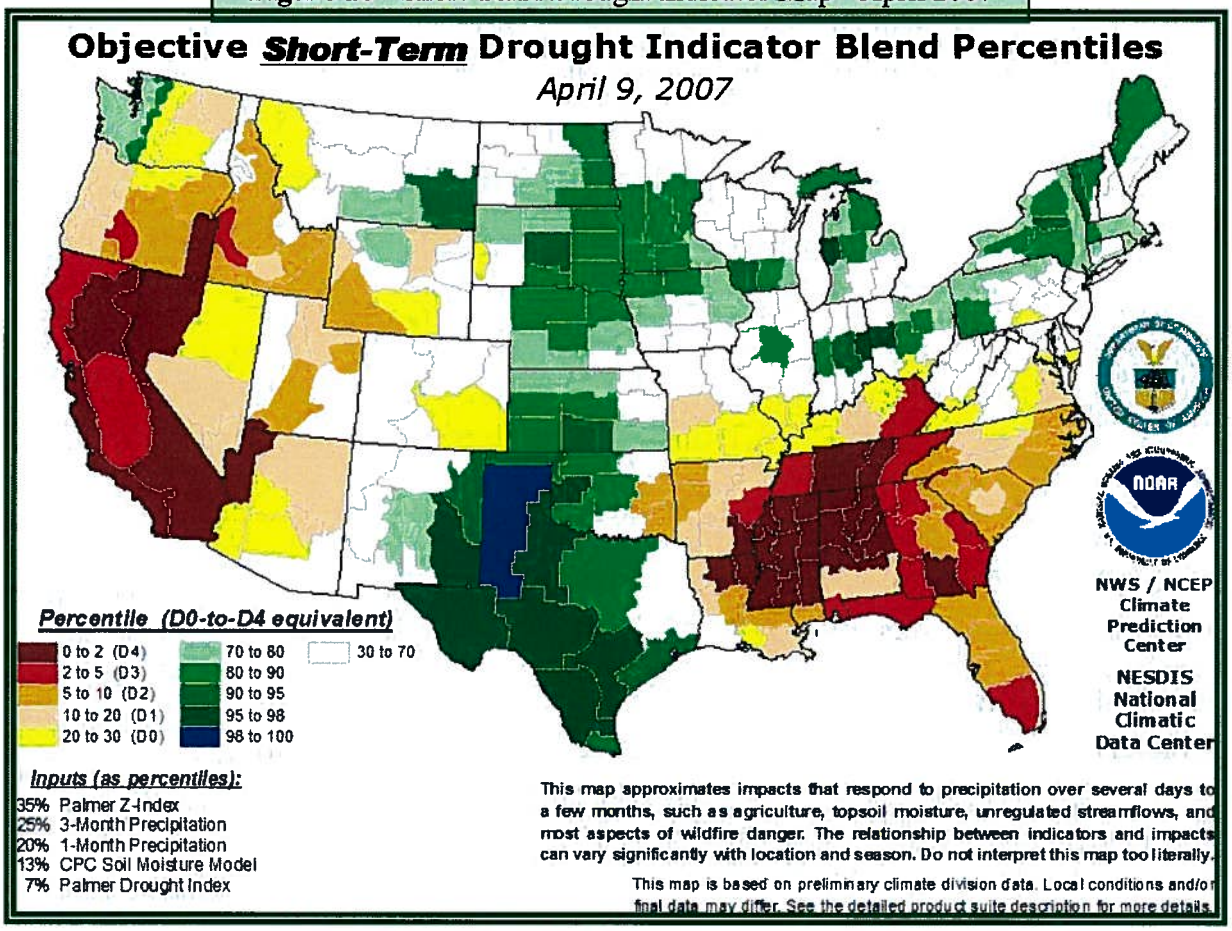
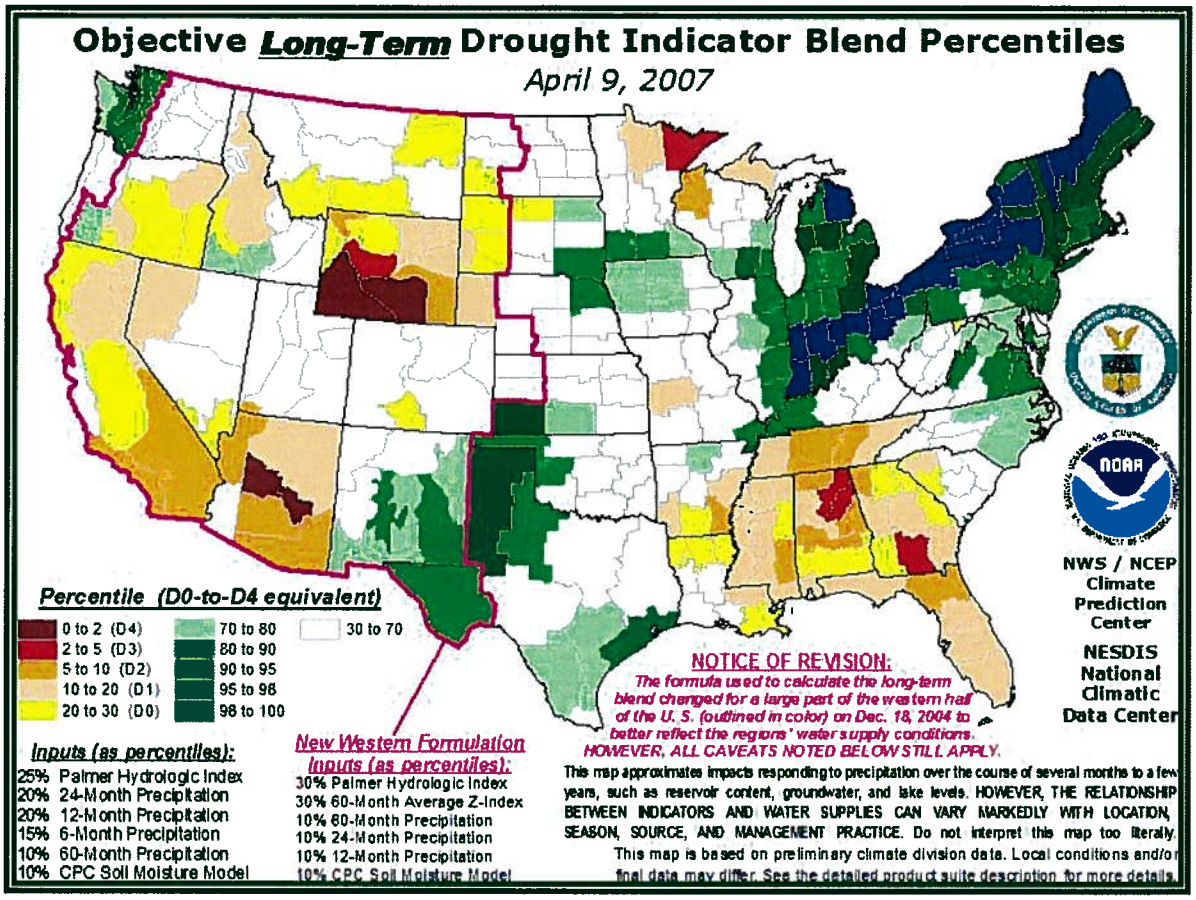


Figure 11- Long Term Drought Indicator Map - April 2007



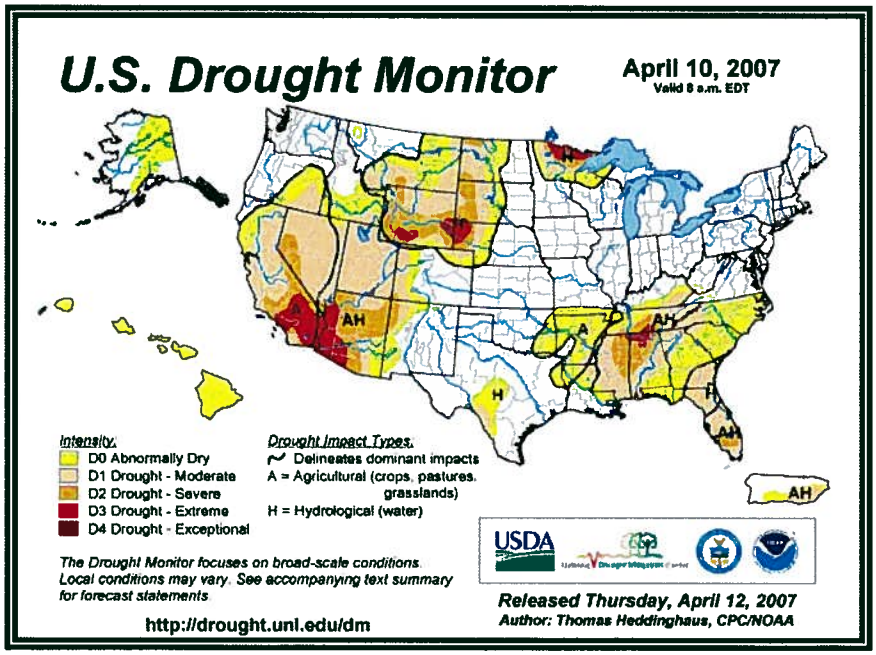


Figure 12- U.S. Drought Monitor Map - April 2007

WATER RESOURCE CONSERVATION

The growing population and economy of Elko County will require ever increasing amounts of water in the future, however available sources for meeting these needs are limited. Part of the solution is the implementation of water conservation measures. The ability of conservation measures to extend supplies, and delay and/or reduce the need for future supply development has been documented.

Water conservation will continue to be a critical component of overall water management. As William O. Maddaus ("Integrating Water Conservation Into Total Water Management", *American Water Works Association Journal*, Vol. 82, No. 5, May 1990) notes, "the time is past when [water supply] needs can be met simply by building more water storage and delivery systems." The challenge facing water suppliers in today's political, environmental, and economic climate is to fully integrate our findings on demand management into long-range water supply planning." For Elko County this means understanding population and development trends and matching current and future water conservation practices and policies.

Recognizing the need for conservation, the 1991 State Legislature passed Assembly Bill (AB) 359 and Senate Bill (SB) 360. AB 359 requires each county and city to impose certain minimum standards for plumbing fixtures, by building codes or ordinance, for new residential, commercial, or industrial construction beginning on or after March 1, 1992 (*NRS 278.580, 244.3675, 444.340 through 444.430, 268.413*). In accordance with the amended Nevada Revised Statutes, each supplier of water for municipal, industrial or domestic purposes is required to adopt a water conservation plan based on the climate and the living conditions of its service area. The plan is to include provisions relating to:

1. Increasing public awareness of the State's limited water supply and the need to conserve;

2. Identifying and reducing leakage in water supplies, inaccuracies in water meters, and high pressure situations;

3. Increasing the reuse of wastewater treatment plant effluent;

4. Contingency plan for drought conditions that ensures an adequate supply of potable water; and

5. Adoption of a plan to provide incentives to encourage water conservation; to retrofit existing structures with reduced flow plumbing fixtures; and for installation of landscaping that uses a minimal amount of water.

Increasingly stringent wastewater discharge requirements coupled with scarce supplies of freshwater are inducing municipalities and industries to seek alternative uses of wastewater rather than treatment and subsequent discharge to a stream or to a ground-water aquifer. The most common use of treated wastewater is land application for irrigation of agricultural land or urban areas, such as golf courses.

The reuse of wastewater treatment plant effluent has increased in Nevada in recent years. In 1979 there were approximately 12 reuse application sites (Nevada Division of Water Planning, *Land Application of Wastewater in Nevada*, Information Series Water Planning Report 2, Carson City, Nevada, September 1979). By 1990 the

number had increased to over 20. Current uses of reclaimed wastewater effluent in Nevada include agricultural irrigation, golf course and landscape irrigation, industrial uses, wetlands applications, and construction water. In 1990 public wastewater treatment facilities discharged approximately 150 mgd (170,000 af/year). Of this amount, only about 9 percent was reclaimed directly for the above uses. However, if one takes into account the effluent that is discharged to a river, such as the Truckee and Colorado Rivers, and later diverted by other users, the effluent reuse percentage exceeds 90 percent.

EFFECTS OF GROUNDWATER PUMPING

Any withdrawal of ground water results in removal of water from storage. Large-scale withdrawals in many areas in the Southwest have resulted in wide spread lowering of water tables (**Figure 15**) which reflects a quantity of ground water that is no longer available. Several other aspects of lowered water tables affect future water availability. Lowering of watertables results in increased costs to lift water a greater distance. For some water uses such as agriculture, pumping costs from deep aquifers could be prohibitively high. Lowered water tables can result in loss of well productivity and adversely effect water quality. In most basins, shallower sediments are less compacted and more readily release water to wells than deeper sediments. Lowered water tables can result in the need to drill more and deeper wells to maintain a desired rate of ground-water withdrawal.

Figure 13- Effects of Groundwater Pumping Water Level Decline in Feet

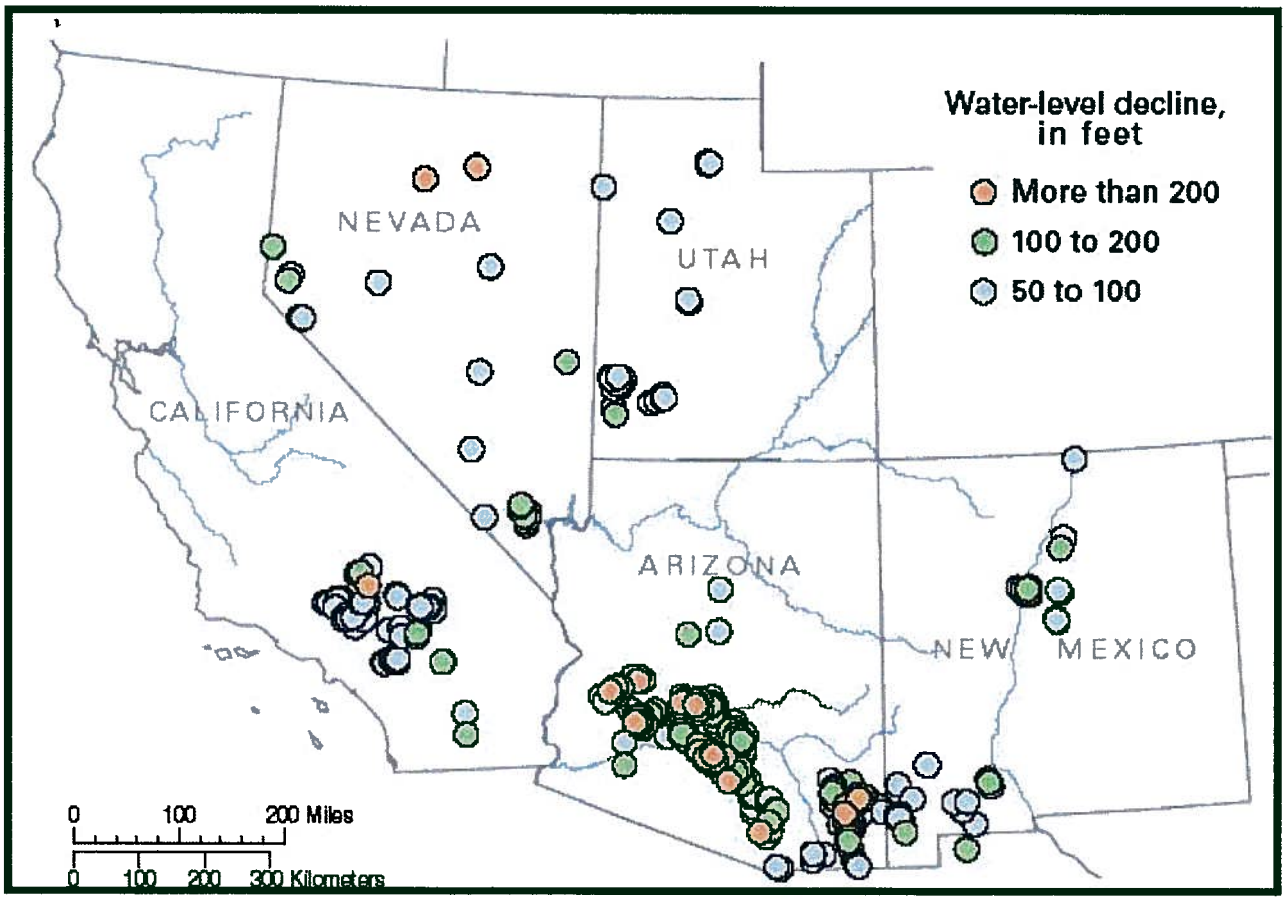
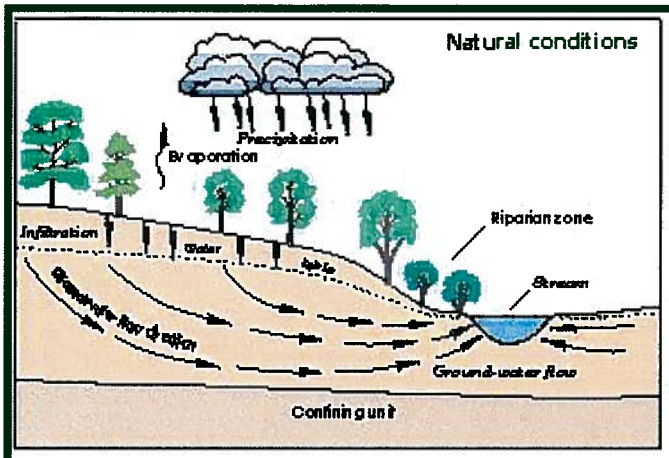
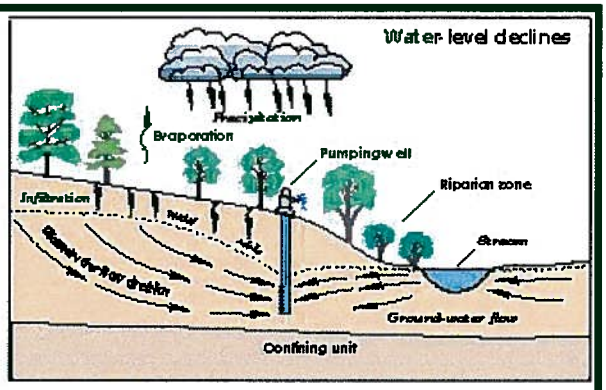


Figure 14A - Effects of Groundwater Pumping Natural Conditions



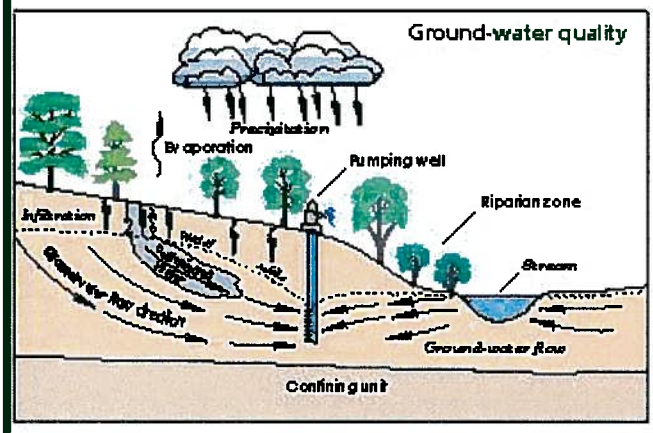
Water is recharged to the ground-water system by percolation of water from precipitation and then flows to the stream through the ground-water system.

Figure 14B- Effects of Groundwater Pumping Water Level Declines



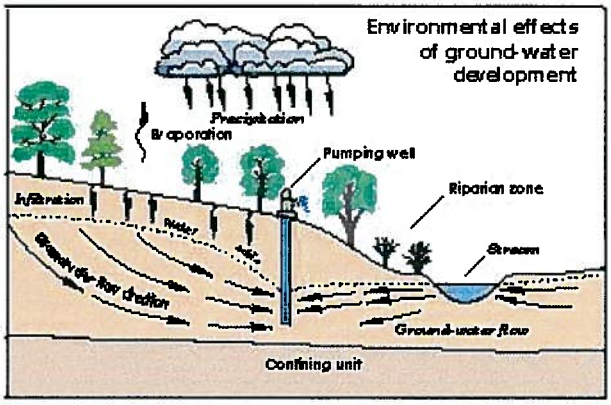
Water pumped from the ground-water system causes the water table to lower and alters the direction of ground-water movement. Some water that flowed to the stream no longer does so and some water may be drawn in from the stream into the ground-water system, thereby reducing the amount of streamflow.

Figure 14C - Effects of Groundwater Pumping Groundwater Quality



Contaminants introduced at the land surface may infiltrate to the water table and flow towards a point of discharge, either the well or the stream. (Not shown, but also important, is the potential movement of contaminants from the stream into the ground-water system.)

Figure 14D - Effects of Groundwater Pumping Environmental Effects



Water-level declines may affect the environment for plants and animals. For example, plants in the riparian zone that grew because of the close proximity of the water table to the land surface may not survive as the depth to water increases. The environment for fish and other aquatic species also may be altered as the stream level drops.

WELLHEAD PROTECTION

The Wellhead Protection (WHP) Program was established by the 1986 Amendments to the Safe Drinking Water Act (SDWA). The purpose of the program is to protect public ground-water supplies from contamination and prevent the need for costly treatment of water to meet drinking water standards. The program is based upon the concept that the development and application of land-use controls and other preventative measures can protect groundwater. A comprehensive WHP Program comprises several distinct and essential elements:

1. Specification of roles and duties of State agencies, local government entities, and public water suppliers;
2. Delineation of the wellhead protection area (WHPA) for each well;
3. Identification of potential sources of contaminants within each WHAP;
4. Development of management approaches to protect the water supply within the WHAP;
5. Contingency planning for the provision of alternate drinking water supplies in the event of well or well field contamination;
6. Consideration of all potential contaminant sources within the expected wellhead area of a new water well; and
7. Provisions for public participation.

The Nevada Division of Environmental Protection (NDEA) is encouraging water purveyors in the State to develop a WHOP Program for their area. As part of this voluntary program, NDEA is providing technical and possibly financial support for WHOP Program development. Well Head Protection Programs have been implemented in Jackpot, West Wendover, Wells, Carlin, Montello and the City of Elko. This Plan endorses and implements the State of Nevada Well Head Protection Program in and for Elko County.

NONPOINT SOURCE POLLUTION

Clean water is essential to all life. Yet every-day activities impair water quality and thus reduce the availability of good water supplies. Throughout the U.S. and Nevada water resource experts and agencies are finding that the leading cause of water quality impairment is nonpoint source (NRS)pollution. Pollution from nonpoint, or diffuse, sources is more difficult to control than pollution from point sources, which are discharges through pipes or channels from a distinct source. Almost any activity can increase runoff and add to NPS pollution. Commonly identified sources, activities and facilities such as mining, construction, grading, roads and trails, septic systems, underground storage tanks, modified water courses, feed lots, grazing and timber harvesting are commonly identified sources. These widespread activities can stir up, produce and release pollutants which are then picked up by runoff from melting snow, rain fall, or irrigation and deposited downstream in pulses.

NPS pollution occurs wherever water flowing across the land or underground picks up nutrients, salts, metals, organic material, soil, or chemicals and delivers the accumulated pollutants to streams, lakes, wetlands or ground water aquifers in amounts greater than natural background levels. The excess pollutants may result in impacts such as nutrient enrichment, undesirable algae growth, higher total dissolved solids, turbidity, lower dissolved oxygen, pH changes, higher temperatures and increases in pathogenic microorganisms. These conditions

negatively affect water supplies by fouling water systems and increasing treatment requirements and operation and maintenance costs. Aquatic ecosystems may also be impacted by diffuse sources.

The presence of wetlands and water availability are important factors determining the degree of NPS impact to water quality. One of the reasons wetlands and riparian zones are valued and protected by regulation is their treatment capacity, which is the ability to detain, trap, convert and assimilate sediment, nutrients, and organic wastes. The actual relationship between stream flow and water quality is complex, but in general where river flows are lowered by drought and/or up stream diversions and nonpoint pollution is present, the negative water quality impacts can be amplified.

An innovative approach to improving water quality with increased stream flow is the Water Quality Settlement Agreement for the Truckee River. State, local, tribal and federal agencies cooperatively developed a plan in 1996 to increase flows and dilute point and nonpoint source pollutant concentrations, primarily in the Lower Truckee River. Federal and local governments have agreed to share the cost of acquiring water and reservoir storage rights in the upper Truckee River system. The acquired water is intended to increase stream flow during periods when low water levels are likely to contribute to poor water quality conditions.

The dry climate, infrequency of rainfall events, and diversions from streams often are significant factors influencing the degree of nonpoint pollution impacts on water resources. For example, Steamboat Creek, a tributary of the Truckee River, collects urban and agricultural drainage. Below the creek's confluence with the Truckee River, water quality conditions deteriorate in late summer because river flows are lower, so the nonpoint source pollutant load from Steamboat Creek has a larger influence on river water quality. In the case of a large storm water runoff event that occurs after a long dry spell, larger quantities of NPS pollutants from urban development and suburban ranches can be mobilized and thus cause not only a short term water quality impact but also contribute to longer term levels of lower water quality as more solids become deposited in the creekand river channels. Circumstances vary on each river, so intensive field investigations are helpful in explaining site specific cause and effect relationships between nonpoint sources and hydrologic conditions that contribute to NPS pollutant discharges and water quality impairment.

Preventing and controlling NPS pollution is accomplished primarily by implementing Best Management Practices (BMPs). BMPs work on the principles that materials belonging on the land should be kept there, and that decreasing the distance runoff travels from the source minimizes control costs. Some general categories of BMPs applicable to many source activities are soil conservation, revegetation of disturbed areas, erosion and storm water controls, fertilizer management planning, integrated pest management, wetland protection and enhancement, and storm water treatment cells. Land use planning practices such as open space master plan designations, zoning controls, and subdivision development ordinances also have been used to ameliorate nonpoint source pollution potential of land development.

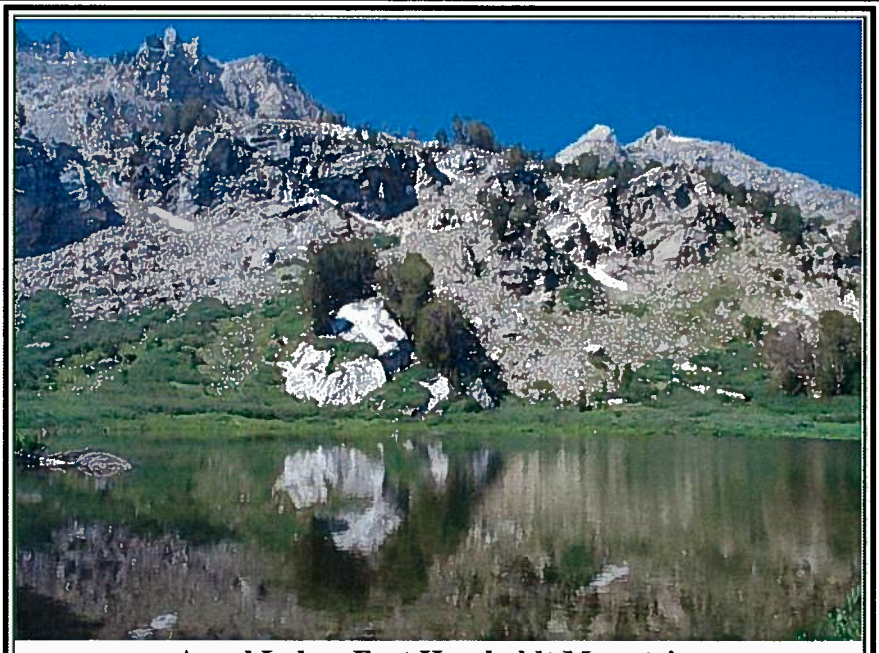
State agency water quality assessments, more fully described below, have found that urban areas, irrigation, grazing, and flow regulation practices are the largest nonpoint pollutant contributors. Statewide, the most common NPS pollutants of concern include suspended solids, total dissolved solids (salinity and chlorides), total phosphates, nitrogen species, turbidity, and thermal energy. In some waters, arsenic, boron, selenium, lead, and iron levels are elevated. These elements are areas associated with geothermal sources, and become concentrated in closed basins by high evaporation rates. Runoff and subsurface flow from irrigated agricultural land may

increase the amount of these contaminants. A special concern is mercury in the Carson River from historic mining and milling operations. Rapid population growth, changing land uses, urbanization, and changing public expectations regarding water quality add to the complexity of managing NPS pollution.

Given the prevalence of these factors in Nevada, it is not surprising that all major rivers are impacted to some degree by NPS pollution. Much is being done cooperatively by state, local, federal agencies and land owners to manage nonpoint source pollution through education. Encouraging and funding implementation of pollution prevention and BMP retrofit projects, installation of control technologies, monitoring and assessment of nonpoint sources, improving our understanding of the cause and effect relationships between water quality impairment and pollutant sources. Researching and implementing new, more effective strategies is an ongoing effort of all agencies within the Department of Conservation and Natural Resources.

Local Agencies Involvement with Nonpoint Sources

Nevada's nonpoint source control program places an emphasis on local management and enforcement. Local governments have a variety of tools available to accomplish this, including: 1)identifying environmentally sensitive lands during the Master Land Use Planning process; 2) adopting development ordinances with design criteria intended to minimize soil disturbance and erosion, retain wetlands and riparian zones, and preserve natural drainages and stream channels; 3) acquiring open space to achieve environmental objectives; and 4) adoption of ordinances requiring application of BMPs. Cities and counties also collaborate with conservation districts and the University of Nevada Cooperative Extension offices to enhance public education efforts on pollution prevention and to review development plans for NPS concerns. The two largest metropolitan areas located in Washoe and Clark Counties hold permits from NDEP for discharges from their municipal storm water systems. Under these permits, agencies within the metropolitan areas agree to monitor water quality, apply BMPs, correct illegal discharges to storm drains, and work to alleviate significant NPS discharges to storm drainage system segments within their jurisdiction.



Angel Lake - East Humboldt Mountains

SAFE DRINKING WATER ACT

The Safe Drinking Water Act of 1974 provides for the safety of drinking water supplies throughout the United States by establishing and enforcing national drinking water quality standards. Congress authorized the Environmental Protection Agency (EPA) to support State and local community drinking water programs by providing financial and technical assistance to undertake research and study efforts.

Under the Safe Drinking Water Act SDWA, EPA has the primary responsibility of establishing the national standards; the States are responsible for enforcing the standards and otherwise supervising public water supply systems and sources of drinking water.

In response to mandates of the 1986 amendments to SDWA, EPA is developing, proposing, and adopting new drinking water regulations that are significantly changing water treatment practices and water utility operations. Since passage of the 1986 amendments, regulations for volatile organic chemicals, fluoride, surface water treatment, total coliform bacteria, synthetic organic and inorganic chemicals, and lead and copper have been promulgated by EPA. Additional regulations regarding radionuclides (radon), other synthetic organic and inorganic chemicals, and disinfection are anticipated.

The cost of these new regulations to water systems in Nevada is significant. It has been estimated that $100 to $170 million in capital improvements are needed throughout the State for compliance with these latest regulations. Financial assistance for (SDWA) compliance projects is available through a State loan/grant program established by NAC and NRS. This program is administered by the State Board for Financing Water Projects.

NEW SYSTEM AUTHORITY: By October 1, 1999, each State must obtain the authority to ensure that new community water systems and non-transient, non-community water systems have the technical, financial, and managerial capacity to meet National Primary Drinking Water Regulations. A State will receive only 80% of its DWSRF allotment unless the State has such authority. [1420(a)] Sec. 119

SYSTEMS IN SIGNIFICANT NONCOMPLIANCE: States must prepare and submit to EPA by August 6, 1997 (and periodically update) a list of community water systems and non-transient, non-community water systems that have a history of significant noncompliance, and the reasons for their noncompliance. States must report to EPA in 5 years on the success of efforts to assist small systems in improving capacity. [1420(b)] Sec.119

STATE CAPACITY DEVELOPMENT STRATEGIES: States are required to establish capacity development strategies to assist systems in developing and maintaining technical, financial and management capacity. States not developing and implementing a strategy receive only 90% of their DWSRF allotment in Fiscal Year 2001; 85% in 2002; and 80% in each subsequent fiscal year. [1420(c)] Sec. 119. The total withholding for all capacity development provisions may not exceed 20%. [1452(a)(1)(G)]. Sec. 130

CONTENT OF STATE STRATEGY: In preparing its capacity development strategy, each State shall: consider the criteria it will use to identify public water supplies most in need of improved capacity; describe factors that encourage or impair capacity development; describe how the State will use its authorities to assist systems in complying, encourage partnerships between systems, and assist in training/certification of operators; describe how the State will measure progress; and identify parties interested in capacity development, [1420(c)] Sec. 119

CLEAN WATER ACT (CWA) The Water Quality Act is a 1987 amendment to the Clean Water Act of 1977, which amended the Federal Water Pollution Control Act of 1972, and is the primary legislative vehicle for federal water pollution control programs. The Water Quality Act is often referred to as the Clean Water Act (CWA). This Act was established to "restore and maintain the chemical, physical, and biological integrity of the nation's waters" and set goals to eliminate discharges of pollutants into navigable water, protect fish and wildlife, and prohibit the discharge of toxic pollutants in quantities that could adversely affect the environment.

The State Environmental Commission (SEC), established by State law, has adopted regulations which define State programs to carry out the provisions of Nevada's Water Pollution Control Laws. These laws, contained in Chapter 445A of the Nevada Revised Statutes (NRS), establish the authority to implement portions of the CWA and the Safe Drinking Water Act in addition to several non-federal water pollution control programs. In addition to adopting regulations, the SEC establishes fee schedules for permits, advises, consults and cooperates with other governmental agencies regarding water pollution matters, establishes qualifications for sewage treatment plant operators, and holds hearings regarding the actions of the Nevada Division of Environmental Protection (NDEP). The powers and duties of the SEC are listed primarily in NRS 445A.425, and also in NRS 445A.135, 445A.160, 445A.180, 445A.428, 445A.430, 445A.605, and 445A.610.

NDEP has been delegated the authority to implement aspects of the CWA in Nevada. Following is a summary of major sections of the CWA and their application to water quality management in Nevada.

OTHER STATE PROGRAMS (NDEP) In addition to the federal CWA and Safe Drinking Water Act programs delegated to NDEP, numerous state programs exist to protect, control and restore the quality of the waters of the State. Apart from the NPDES permits issued under the CWA, NDEP issues Water Pollution Control Permits with a zero-discharge performance standard for certain mining facilities, and State Ground Water Permits for infiltration basins, land application of treated effluent, large septic systems and industrial facilities. In addition to these permitting processes, NDEP reviews subdivision plans to ensure that wastewater is disposed of adequately. Also, NDEP regulates highly hazardous substances under the chemical accident prevention program. Remediation of polluted soil and/or groundwater falls under the State Corrective Actions Program which includes authorities under two federal acts: the Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

OTHER FEDERAL PROGRAMS (NDEP) Management of solid waste, hazardous waste and underground storage tanks are covered by the Resource Conservation and Recovery Act (RCRA) programs delegated to NDEP. Nevada also has a program under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) to perform spill reporting and tracking, assessments, investigations and remedial activities as necessary.

FLOOD PLAIN MANAGEMENT

Flood plain management experience indicates that the best damage reduction plans are occurring in those counties that have provided leadership strong enough to stay the course between high profile flood events. The WGA Floods Task Force concludes that pre-disaster flood planning and floodplain management are "essential" elements in reducing flood risk. All levels of government should place greater emphasis on these two policy areas. Detailed local planning will play an essential role in river-basin management in the future. Leadership must focus on a balance of structural and non-structural flood plain management tools. With urbanization rapidly expanding in the west, decision makers must recognized that storm-water management planning is an integral component of an overall strategy to reduce flood losses.

Conditions for flooding in the west are much different than those in eastern states. The mountainous regions provide the environment for flash flooding, high velocity flows, excessive erosion, and torrent storm patterns. The gradual flood build-up of major rivers that devour small towns and remain high for weeks is a condition that exist primarily in the east. Alluvial fans, a common topographic feature in the west, will continue to present a tremendous challenge to local planners until an effective model for mapping alluvial fan flooding is developed and accepted by those in the engineering, urban and rural planning, and flood plain management professions. The great number of homes and businesses on alluvial fans pose high risk to western communities, a risk that must be better understood and mitigation strategies developed.

Accurate maps are vital to the local flood plain administrator to make sound management decisions. These maps are used by the flood plain administrator to determine if and how a structure can be built in a flood plain. In some western states, the Flood Insurance Rate Maps were last updated in the late 1970's and 1980's. FEMA is currently working to improve and modernize the flood mapping process. Currently, all maps are needed to reflect new growth and changes in flood plains to correct inaccuracies in the original maps and to show the annexation of new land that is not mapped.

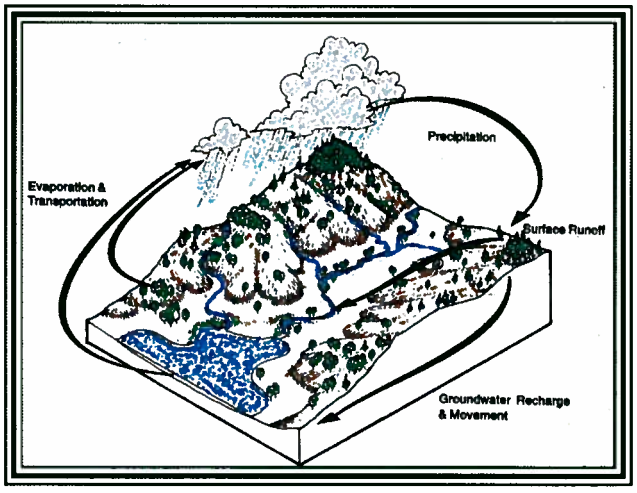


Figure 15 - Groundwater Recharge & Movement

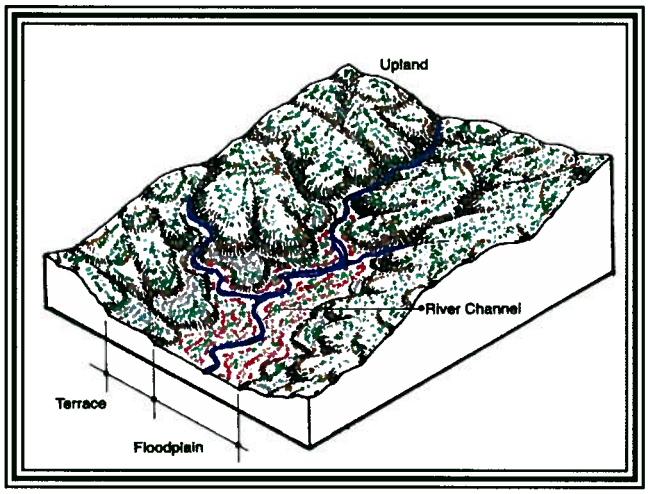


Figure 16 - Flood Plain & Terrace diagram

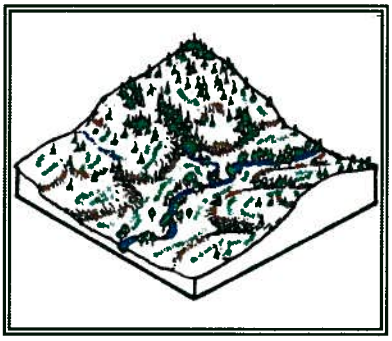


Figure 17A - Every community must recognize that decisions about flood plain resources are decisions about the communities future. With careful consideration and planning, rivers and streams can be aesthetic and functional assets that reflect community pride and ingenuity. However, a community that ignores the importance of natural flood plain functions may ultimately face flood losses and deteriorating water quality. In the end it would be less costly to plan well now.

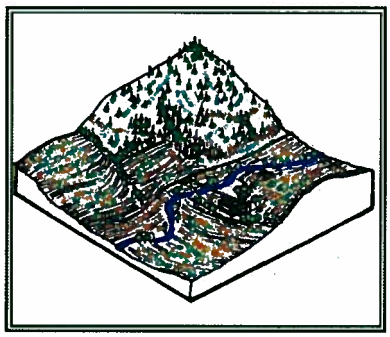


Figure 17B - Well placed parks and recreation areas that include vegetation are often ideal for maintaining flood plain storage capacity that help support flood plain functions that protect water quality and sustain wildlife habitat. Open space areas, such as agricultural lands, can help to rally functioning flood plains, such as protecting or planting vegetated buffer strips and creating channel alterations for fish habitat improvement.

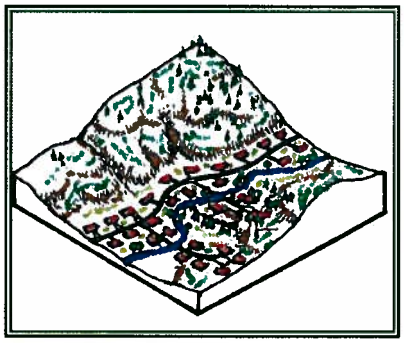


Figure 17C - Development within flood plains often occurs without consideration of the effects on flood plain natural resource functions. If an area is built up during a period when there have been few floods, the need for flood storage capacity of a naturally functioning flood plain may have been overlooked. The loss of natural flood plain functions in heavily developed areas not only impedes flood storage, but can also increase erosion and reduces the mitigating effects that vegetated areas can have on the pollution of water ways.

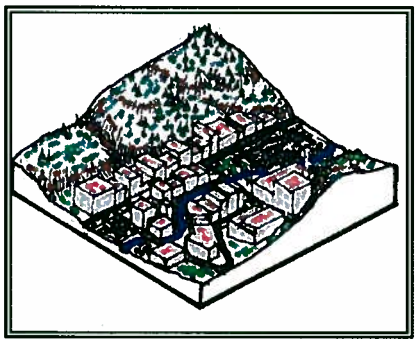


Figure 17D - Impermeable surfaces such as buildings and pavements replace vegetation as ground cover, increasing the runoff that would have infiltrated in a natural flood plain. The removal of vegetation, destruction of wetlands and paving in urban and suburban settings can thus increase the risk of flooding. Upstream development outside the floodplain can also increase erosion and sedimentation, which may cover spawning areas and bury food sources in streams. Loss of vegetation also removes sources of shelter and food for wildlife and human made structures may present barriers to migration and reproductive activity.

SECTION 2
Elko County Water Resource Management Plan
Water Resource Management

REPORT FINDINGS

POPULATION FORECAST: Most all of rural Elko County has experienced slower growth rates versus the higher growth rates occurring in the City of Elko, West Wendover, Osino, Ryndon, Spring Creek and South Fork areas during the last decade. The 2006 *State of Nevada Demographer* population **forecast** indicate a 11.5% decrease in county population for the years 2006 through 2022 . Beginning in 2023 a 0.8% increase per year is projected through 2026. However, population **estimates** from the *State of Nevada Demographer* show that the years 2003 through 2004 have depicted a positive growth rate of 1.5% and the years 2004 through 2005 have depicted a positive growth rate of 2.3%. In addition, Elko County development patterns indicate that the county will continue to experience positive growth through 2026. (**Table 11B**)

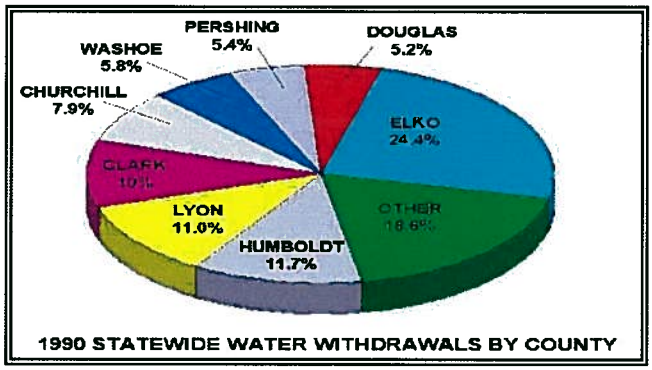


Figure 18 - Statewide Water Withdrawal by User/County

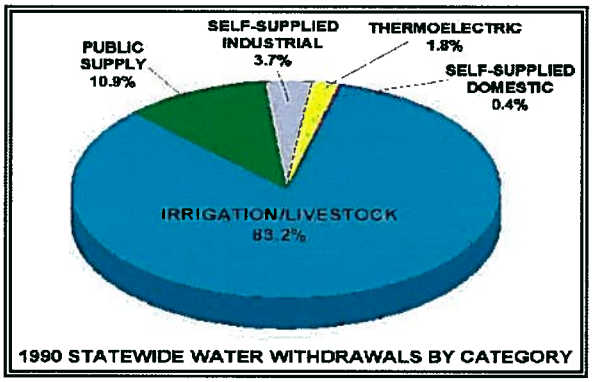


Figure 19 - Statewide Water Withdrawal by Type of Use

AGRICULTURAL WATER USE FORECAST: Elko County is currently the largest water user in the State of Nevada at 24.4%, predominantly due to agricultural uses. Agricultural uses in the State of Nevada is currently 83.2% of all waters within the state, by far the largest water user group. 2005 information from the Nevada Division of Water Resources indicates that Elko County withdraws approximately 898,321 acre feet annually for agricultural uses. Growth and development patterns indicates that agricultural uses in Elko County will minimally decrease or hold steady through 2025. It is estimated by the *State Division of Water Planning* that by the year 2025 Elko County total agriculture water uses will withdraw 830,610 acre feet annually. This represents a decrease from total water use in 2005 of 898,321 acre feet annually or a total loss of -7.5 %. **Elko County** data forecasts that by the year 2025 total agriculture uses will withdraw **880,489** acre feet annually a loss of 0.1 % annually or a total loss of 2.0%.

DOMESTIC WATER USE: It is estimated by the City of Elko, and other water purveyors as well as the Elko County Planning & Zoning Division that domestic water users of Elko County use approximately 250 gallons per day per person, including interior and exterior use. The State of Nevada Water Plan indicates that every person in Nevada uses 240 gallons of water per day. Nevada Revised Statutes (NRS) stipulates that every new and existing parcel in Nevada that utilizes an individual domestic well uses 1,800 gpd or 2.02 acre feet of water annually. The 2000 Census cites that households in Elko County equates to 2.6 persons per household. Using 250 gallons per day per person this would equate to 650 gallons per day per household, approximately one third of the water allocated for each domestic well by the State Engineer.

The *State of Nevada Demographer* and the *State of Nevada Division of Water Planning*, estimates total domestic water uses, including M & I, in **2005** are **16,729** acre feet. The forecasted domestic uses for **2025** will be **14,780** acre feet annually. This represents a decline in domestic uses of 1,949 acre feet or -11.65%. **Elko County** forecasts that over the same period domestic uses, including M & I, will increase by 6.67% or **17,844** acre feet annually in **2025**.

Table 18 - Household Water Usage	**Without Water Saving Fixtures**	**With Water Saving Fixtures**
Toilet, per flush	3.5 - 7 gallons	1.6 gallons
Showerhead, per 5 minutes	15 - 40 gallons	10 - 12.5 gallons
Kitchen/lavatory faucet, 5 minutes	14 - 35 gallons	11 gallons
Dishwasher, per load	14 gallons	9.5 - 12 gallons
Washing machine, per full load	55 gallons	42 - 47.5 gallons

Average annual residential use.....200 gpcd
Outdoor use.....110 gpcd
Indoor use..... 90 gpcd

Sources;
California Dept. of Water Resources, "Water Plan: Benefit/Cost Analysis Software for Water Management Planning - Water Conservation Assumptions", Oct. 1989.
Gupta, V.L. and D.E. Carlson, "Residential Water Consumption in Reno-Sparks, Nevada", Desert Research Institute Publication No. 41059, University of Nevada System, 1978.
Vickers, A., "Water-Use Efficiency Standards for Plumbing Fixtures: Benefits of National Legislation," American Water Works Association Journal, Vol. 82, No. 5, May 1990.
Westpac Utilities, "Water Conservation Plan for Reno/Sparks Metropolitan Area - Draft Report", Reno, Nevada, March 1992.

COMMERCIAL & INDUSTRIAL WATER USE FORECAST: Northeastern Nevada region is the third largest gold mining community in the world and is also home to many casinos, hotels/motels and recreational uses. While the mining industry is going to be a large part of this region's economy for the next 15 plus years, it is through strategic planning and forward-thinking that diversification will be accomplished. Economic diversify in this region while the economy is strong rather than relying on mining to be the prime underpinning of the region's economy is imperative. Mining and its supporting industries are a very important basis to begin from in diversifying the economy.

The City of Elko serves a five county area as a hub for retail, services, and housing, especially as it relates to the mining jobs located outside of this core area. Casinos or casino hotels employ approximately 4,800 persons in Elko County and are expanding. However, many of the people that work in Jackpot and West Wendover casinos live and/or spend their earnings in Idaho or Utah and exist to attract the target markets of those states for gambling. The City of Elko is experiencing moderate growth in the gaming industry. Forecast for

commercial and industrial uses in Elko County are primarily mining, transportation, recreation and gaming based types of business. Currently there are numerous vacant industrial and commercial lands. Industrial uses are anticipated to be primarily mining and transportation based due to our proximity to resources necessary for manufacture, including water.

Potentially, incorporated cities could provide necessary resources, such as water for manufacturing or beverage production. However, location and transportation issues have caused the manufacturing companies to locate elsewhere. The Elko County Board of Commissioners and the Elko County Economic Diversification Authority have implemented plans of a Multi-Modal Trans-loading Facility. The development of this facility could potentially open rail and transportation corridors to help establish Elko County as a manufacturing and transportation hub for Northeastern Nevada.

Elko County estimates, based on current growth and development patterns, indicate that Commercial and Industrial uses in Elko County will increase or hold steady through 2025. It is estimated that by the year 2025 Elko County total Commercial & Industrial water uses will withdraw **17,597** acre feet annually. This represents an increase from total water use in 2005 of **16,493** acre feet annually, or 6.3 %.

WATER RIGHTS: The water in Nevada on the surface and below the ground surface belongs to the people of the State. Entities within the State can apply for the right to use that water. Nevada Water Law is founded on the doctrine of prior appropriation - "first in time, first in right." Under the appropriation doctrine, the first user of water from a water course acquired a priority right to the use and to the extent of its use.

Nevada Water Law is set forth in Nevada Revised Statutes (NRS), Chapters 533 and 534. In addition, there are numerous court decisions which have helped define Nevada water law. The State Engineer is the water rights administrator and is responsible for the appropriation, adjudication, distribution and management of water in the State. To carry out these duties he is vested with broad discretionary powers. As state statute cites, entities within Nevada are permitted to file and acquire water rights. Elko County should utilize this as a tool to potentially protect exportation of ground and surface waters from the county as well as ensure that water rights are available for future uses. Filing for ground and surface water should be made and held by the county for application of future needs. It should not be the intention of the county to hold water rights for any other reason other than the protection of Elko County water for municipal uses associated with specific uses. The application and acquisition of water rights by Elko County will require the development of a county Water Resource Manager / Water Master or Natural Resource Manager.

DROUGHT MANAGEMENT: As Nevada is the driest State in the Nation, drought is relatively common and expected. Every 6 out of 10 years, the major rivers in the state experience below average flows. For most of Nevada, which depends mostly on stream flow for water supply, a drought is considered to be a period of 2 or more consecutive years in which stream flow is much less than average. The most significant droughts were during 1928-37, 1953-55, 1959-62, 1976-77, and 1987-92. Droughts can magnify quality problems for surface and ground-water sources. By decreasing stream flow, droughts tend to lessen the quality of remaining water for human and wildlife uses. Droughts also can cause more reliance on ground-water sources which may stress the resource beyond its long-term potential.

SECTION 2
Elko County Water Resource Management Plan
Water Resource Management

Communities in Elko County have done very well coping with drought conditions. Midas and Tuscarora have had their springs dry up resulting in temporary water hauling operations to provide drinking water. Both of these towns are switching to more reliable ground-water supplies. Water management and water conservation efforts have allowed the citizens of Elko, Carlin, Wells, Spring Creek and West Wendover to continue outdoor watering, even with their main source of water greatly reduced. Agriculture has also been severely impacted by drought conditions. The Elko County Water Resources Management Plan, by the document, adopts and implements the State of Nevada Drought Plan. The enforcement of all conservation methods and policies provided herein will require the development of a county Water Resource Manager / Water Master or Natural Resource Manager.

RURAL LAND USE AND WATER MANAGEMENT PLANNING: Historically, rural planning in Elko County has been based on development patterns and ***Local Area Master Plans***; Spring Creek / Lamoille Master Plan, South Fork Master Plan, Jackpot Master Plan and the 1971 Elko County General Plan and land use zoning. Land use patterns in Elko County now commands that a full comprehensive Land Use Master Plan be created that addresses Urban and Rural Development as well as to implement elements of the Water Resource Management Plan. Future land use planning and development criteria will ultimately need to address water consumption and usage. Most residential or domestic development in rural Elko County consists of the development of larger parcels between 2.5 acres and 40 acres. Specific build out Master Plans should be required prior to development to help identify the potential total water consumption of a proposed development along with the potential impacts to a specific area or basin.

Certain aspects of the Elko County Code, Titles 4 (zoning) and Title 5 (subdivision), require review and amendment to examine and provide methods of proper rural planning. Currently, NRS 278 subdivision code provides methods and provisions that permit local government to require land use / water planning and review during the planning process. These provisions should be included in the Elko County Code pertaining to zoning, subdivision and building criteria.

Water Resource Management and Conservation practices should be implemented within the development criteria. Elko County should also take an active role in the management of waters in Elko County. A share of this would be accomplished by the development and implementation of a Water Master position or a Natural Resources Manager. An active role in the protection of water in Elko County will require the filing of water rights applications by the governing body, either the county or specific incorporated city / unincorporated town. Filing and developing water rights for domestic/municipal/agricultural use for the future growth of Elko County will help promote orderly and affirmative development and will help discourage future loss of agricultural lands. Potentially the acquisition of water rights by Elko County will provide for a sustained growth in specific areas that currently provide infrastructure and will support future development. This concept would help to control the pocket, or spot development, that creates hardships to local services such as fire protection, police protection and emergency services.

CONSERVATION & MANAGEMENT: Conservation in Elko County has historically been utilized on a voluntary basis. Most of Elko County's incorporated cities have ordinances that employ water conservation methods as well as contain verbiage that mandates specific water conservation provisions. Current Elko County development criteria does not address water conservation issues. The development of specific mandatory and voluntary water conservation policies and standards code in Elko County is imperative for future development and protection of existing uses. As with all conservation issues, public education, acceptance and implementation are necessary. Ordinance and planning provisions should require a public education process that will promote the need of water conservation during development phases of all subdivisions and structures.

Implemented conservation programs have a potential to influence the State Engineer's policy of requiring 1,800 gpd or 2.02 acre feet annually per domestic well. As previously stated, the *Nevada State Water Plan* cites that per capita a person in Nevada uses 200 gallons of water per day. As cited by **Elko County Planning & Zoning Division**, 250 gallons per day for 2.6 persons per household equates to 650 gallons per day per household,. approximately 1/3 of the total allocated for a domestic well. This would indicate that the State Engineer could revise the state statute, thus, providing the potential of higher densities in areas currently restricted by local and state policies and/or ordinance.

Other conservation techniques include the re-use of treated wastewater for irrigation purposes. For the most part, the use of treated wastewater requires the development of sanitary sewer facilities or retrofitting exiting facilities to treat the water for irrigation use. This is a potential in several outlying areas and un-incorporated towns and communities such as Jackpot, Montello, Mountain City and Spring Creek. The City of Elko currently utilizes the use of grey water for irrigation of several agricultural fields as well as the municipal golf course.

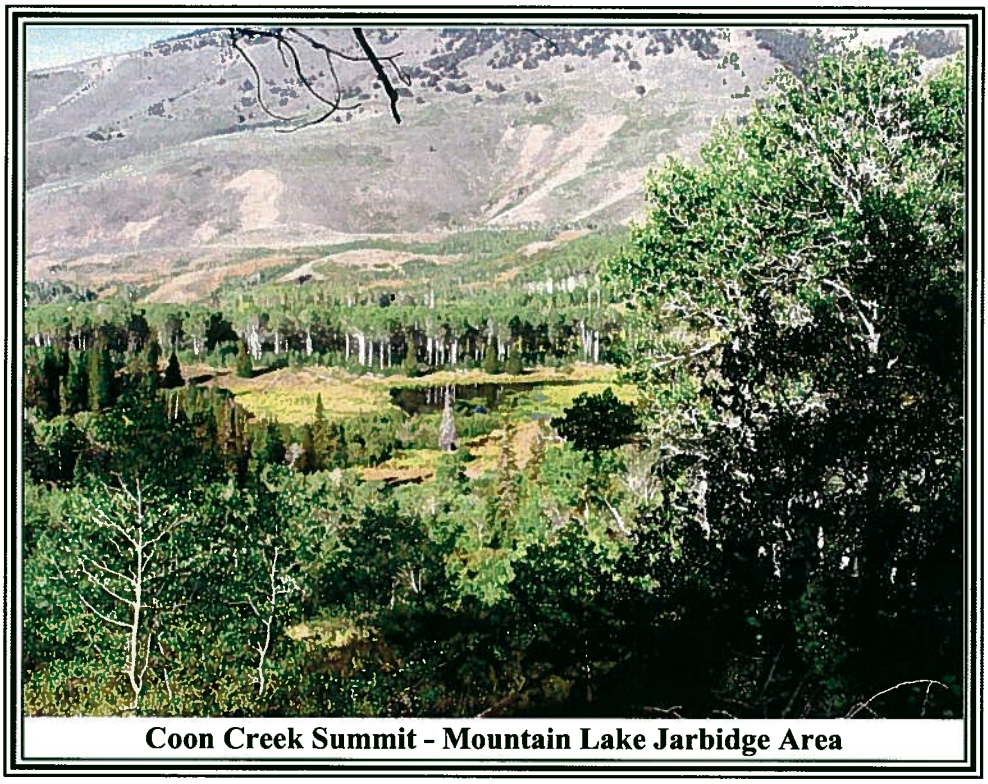
Conservation programs and policies have been implemented and are enforced by the Incorporated Cities in Elko County. Education and voluntary conservation programs are to be developed and implemented by Elko County including, Planning, Zoning and Building Codes that encourage conservation in residential and commercial plumbing fixtures. The Elko County Water Resources management plan promotes that Elko County develop, adopt and implement a water conservation ordinance as well as enforcement policies and procedures. This is to be included within Title 4 and Title 5 of Elko County Code. Conservation should also be promoted within the policies and procedures of the adopted Elko County building code.

FLOOD PLAIN MANAGEMENT: Flood hazards in Nevada are typically underestimated due to the arid climate, few perennial streams, and low precipitation. This state is subject to two types of flooding; rivers overtopping their banks and alluvial fan or flash flooding. Alluvial fan/ flash flooding (*dry mantle*) is potentially more dangerous than riverine (*wet mantle*) flooding because it is unpredictable and the threat is often not apparent, particularly to new residents in the state unfamiliar with the desert environment.

Accurate maps are vital to the local flood plain administrator to make sound management decisions. These maps are used by the flood plain administrator to determine if and how a structure can be built in a flood plain. In some western states, the Flood Insurance Rate Maps were last updated in the late 1970's and 1980's. FEMA is currently working to improve and modernize the flood mapping process. Currently, all maps are needed to

reflect new growth and changes in flood plains to correct inaccuracies in the original maps and to show the annexation of new land that is not mapped.

Elko County Code Title 4 Chapter 13 adopts the Flood Plain Management Ordinance as approved by the State of Nevada Flood Plain Administrator. The ordinance provides procedures for aspects of development in a flood plain. Historically, enforcement of Title 4 Chapter 13 has been through the Building Permit process. This process is reactionary to a building permit application. As demonstrated through flooding of annual and perennial flow streams and rivers in Elko County, it is imperative that a pro-active approach be made to administration of flood plains in Elko County. Detailed local planning will play an essential role in river-basin management in the future. Leadership must focus on a balance of structural and non-structural flood plain management tools.



Coon Creek Summit - Mountain Lake Jarbidge Area

Recognition In Memory Of:

During the ten year development of the Plan two members of the Elko County Water Plan passed away. The two members were Mr. Jeffery Borhauer a representative from Carlin and Mr.Jerry Parker an Elko County at large representative. These two members provided a great deal of knowledge, experience and stimulus into the development of this document. Thank you Mr. Borhauer and Mr. Parker for all that you have provided to this document and to Elko County.

Elko County Water Planning Commission
Elko County Board of County Commissioners

SECTION 2
Elko County Water Resource Management Plan
Water Resource Management

SECTION 2 SUMMARY

Section 2 of the Elko County Water Resource Management Plan offers information and data on a wide range of topics. The Section 2 Summary is intended to briefly offer the reader a compilation of the data and information provided. The data compiled covers information supplied by various entities, including the State of Nevada and county departments. The purpose of the data is to provide the reader a thought or solution to Water Resource Management by providing specific data on growth and development potentials in Elko County. The fundamentals of Nevada Water Law are also discussed in Section 2. This provides basic information to the reader as to how the State of Nevada Division of Water Resources manages water rights and usage throughout the state.

Socioeconomic characteristics specific to Elko County are provided in Section 2. This information provides the reader data pertaining to economic studies developed by the State of Nevada Division of Water Planning. Historical demographics are provided that identify the county's current usage of water and natural resources. This also provides data specific to the economics of Elko County including industry, agriculture, commercial and residential uses while providing estimates of overall consumptive uses of water for each individual demographic.

The Regional Hydrographic Data and Regional and Local Data of Section 2 provides information as to the four hydrographic regions and forty four hydrographic areas located in Elko County. This data is provided by the State of Nevada Division of Water Resources. The data provides data sets such as committed and uncommitted water resources, hydrographic area perennial yields, water right permits and pending applications. The information also provides information pertaining to domestic and municipal uses in the listed areas. Population estimates and projections are depicted from the State of Nevada Demographer and Elko County. The estimates and projections offer a separate and completely different conclusion of future water requirements and demands. Development considerations and statutory planning provisions offer information to assist land use planning considerations of future water requirements. These provisions also discuss the need for planning, considering drought conditions, conservation measures, effects of groundwater pumping, non-point source pollution, safe drinking water flood plain management and other federal, state and local programs related to water resource management.

Report findings summarize all of the data and information of Section 2. The findings address Agricultural, Domestic Commercial / Industrial and Municipal water use estimates and forecasts in the county over the 25 year life of the plan. The findings summarize water rights and water law as well as state programs such as drought management, flood plain management, local interest in the creation of conservation programs, and Rural Land Use.

Based on the data and information provided in Section 2, the Elko County Water Planning Commission and the Elko County Board of Commissioners have developed the following Conclusions and Plan Directives. The Conclusions and Plan Directives offer solutions to fulfill the mission of the Elko County Water Resource Management Plan. The Conclusions and Plan Directives offer a method of implementation of the programs and solutions outlined in Section 2. Future compiled data and information will be included to augment the nature and comprehensiveness of this plan, including hydrographic area analysis and findings utilizing current science and technology.

CONCLUSIONS AND PLAN DIRECTIVES

Preamble: Based on the data and information provided in Section 2, the Elko County Water Planning Commission and the Elko County Board of Commissioners have developed the following Conclusions and Plan Directives:

I. Elko County Water Resource Management Policy:

A) The protection of existing water rights, water uses and un-appropriated water within Elko County is of paramount importance to Elko County's economic and cultural prosperity. Therefore, transfers of water use shall be carefully reviewed and considered in relationship to history, traditions and culture of Elko County.

B) Elko County recognizes that the protection and development of water resources are essential to its short and long term economic base.

C) Elko County shall review and consider the impacts of all existing water users as well as future water rights for all uses including:

1) Agricultural
2) Municipal
3) Quasi-Municipal
4) Commercial / Industrial
5) Domestic
6) Geothermal
7) De-watering

D) Elko County shall encourage alternate methods of water uses including but not limited to:

A) Geothermal
B) Hydroelectric
C) Conservation

E) Inter-basin transfers of groundwater must be approved or rejected by the State of Nevada Engineer. As per State Statute the State Engineer shall consider:

1) Whether the applicant has justified the need to import the water from another basin;
2) If the State Engineer determines that a plan for conservation of water is advisable for the basin into which the water is to be imported, whether the applicant has demonstrated that such a plan has been adopted and is being effectively implemented and enforced;
3) Whether the proposed action is environmentally sound as it relates to the basin from which the water is exported;
4) Whether the proposed action is an appropriate long-term use which will not unduly limit the future growth and development in the basin from which the water is exported; and
5) Any other factor the State Engineer determines relevant.

F) Elko County generally agrees with these provisions regarding inter-basin and intra-basin transfers and hereby adopts them in development of the Elko County Water Resource Management Plan with the following reservations and provisions:

1) State & Private Ownership Monitoring Program
2) Inter-basin & Intra-basin Transfers Monitoring program

II. Elko County Natural Resource Management:

A) Development and implementation of an Elko County Division of Natural Resources including but not limited to the following duties and responsibilities:

1) Track and administrate all Surface and Groundwater water rights, usage, annual duties and withdrawals in Elko County.
   a) Governmental application and usage. (Surface / Groundwater / Other)
      1) Applications made by all governing entities.
         a) Local
         b) County
         c) State
         d) Federal
      2) Usage and annual duties
         a) Current allocation, usage and withdrawal
         b) Future forecasts of usage and withdrawal
         c) Commercial and Industrial uses and annual duties
         d) Residential uses and duties
         e) Municipal uses and duties
         f) Municipal recharges and alternate uses

   b) Private application and usage. (Surface / Groundwater / Other)
      1) Applications made by private parties.
         a) Domestic Well
         b) Quasi-Municipal
         c) Commercial / Industrial
         d) Agricultural
      2) Usage and annual duties
         a) Current allocation, usage and withdrawal
         b) Future forecasts of usage and withdrawal
         c) Agricultural uses and duties

   c) Identify and track all water rights applications, requests for inter-basin or inter-county transfers and other considerations that would have any impacts to the hydrographic basins of Elko County.
      1) Correspond and provide guidance to the Elko County Board of Commissioners and county staff regarding future impacts or potential withdrawals of ground or surface water within Elko County hydrographic areas.

2) Coordinate all planning efforts of all governmental agencies including:

a) Elko County

1) Public Works
2) Planning & Zoning
3) Assessor

b) City of Elko

1) Public Works
2) Planning
3) Engineering

c) City of Carlin

1) Public Works
2) Planning
3) Engineering

d) City of Wells

1) Public Works
2) Planning
3) Engineering

e) Bureau of Land Management

f) United States Forest Service

g) State of Nevada Land Use Planning

h) State of Nevada Division of Water Resources

3) Coordinate and track all Water Right applications made and certificated by and for Elko County.

a) Identify hydrographic areas with available ground or surface water rights.

b) Advise the Elko County Board of Commissioners of potential filings.

c) Coordinate, develop and implement a Public Education Program concerning Elko County filings for the acquisition of water rights.

4) Safe Drinking Water Act Compliance:

a) Track all Quasi-Municipal and Municipal water delivery systems for compliance with the Safe Drinking Water Act.

III. Elko County Land Use Planning:

A) Develop and implement a comprehensive Land Use Master Plan with the following considerations:

1) Land use development patterns
   a) Identify existing and potential areas of growth and development
   b) Identify existing local master plans (public & private)
      1) Review and identify master plans that may have conflicting or negative impacts to their respective plan areas concerning water usage, annual duties or projected forecasts.

2) Forecasted or designated land uses and population densities
   a) Commercial / Industrial
   b) Residential
   c) Domestic
   d) Agricultural
   e) Recreation

3) Hydrographic Areas
   a) Current allocation and annual duties
   b) Projected annual duties and necessities for development
   c) Perennial Recharge rates
      1) Hydrology studies or assessment
         a) Recharge rates as per study
         b) Recharge rates as per Nevada State Engineer

4) Flood Plains
   a) Identification of Flood Plains as per FIRM and FEMA
      1) Methods of mitigation
      2) Active enforcement of Flood Plain management as per Elko County Code.

5) Water Resource Conservation Programs:
   a) Develop and implement a county conservation education program
   b) Develop and implement a comprehensive county conservation program
      1) Building codes utilizing conservation materials
      2) Irrigation and outdoor use water conservation program

B) Adopt and implement the State of Nevada Drought Management Plan within all planning activities including:

1) Private Development Master Plan

2) Local Area Public Master Plan

3) County Land Use Master Plan

4) Any method of Subdivision or Re-division of Private Lands

C) Review and amendment of existing Subdivision and Zoning actions within Elko County Code, Title 4 and Title 5.

1) Title 4: all chapters of Land Use Zoning
   a) Create and implement conservation program

2) Title 5: all chapters of Land Subdivision
   a) Create and implement conservation program
   b) Identify potential water use impacts
   c) Identify potential impacts to the hydrographic area
   d) Develop and implement water right allocation and dedication program through the Natural Resources Division.

IV. Hydrographic Analysis:

A) Groundwater and Surface water Hydrographic Analysis Studies of all hydrographic areas of Elko County are to be conducted to provide water recharge rates and perennial yield rates using current technology and science.

B) Partner with the U.S.G.S. and the State Division of Water Resources to conduct and prepare comprehensive Hydrographic Analysis Studies of upper Humboldt River Basin.

C) The Elko County Water Resource Management Plan is to include and incorporate findings of all new studies upon completion and approval of the State of Nevada, the Elko County Water Planning Commission and the Elko County Board of Commissioners.

D) Provide presentation and representation of recharge rate and perennial yield rate data to the State of Nevada Engineer and Division of Water Resources.