

**Nevada State Water Plan
SUMMARY**

**Section 4
Socioeconomic Assessment and Forecasts**

Introduction

This section of the Summary of the *Nevada State Water Plan* presents population and economic trends and forecasts for the Nevada economy to develop a basis for statewide water demand projections. The socioeconomic forecasts, particularly as they relate to population and employment, are used to predict state and county future water needs over a planning horizon extending through the year 2020. Population forecasts for each county and the total state are contained in Appendix 2 of the Appendices of the water plan. Appendix 3 of the Appendices presents state and county employment forecasts, which are derived from population forecasts through estimated employment-to-population ratios. Forecasts for irrigated acreage, which drive the irrigation and livestock water withdrawals, are presented in Appendix 4 of the Appendices.

Population Trends and Forecasts

Over the planning horizon, the rate of growth in Nevada's population is expected to slow, but the state's population is expected to continue to become increasingly concentrated in the primary urban areas of Las Vegas (Clark County), Reno/Sparks (Washoe County) and Carson City. The growth in population in these three principal geographic areas will have varied spillover effects on neighboring counties, such as Nye County for Clark County (Las Vegas) and Churchill, Douglas, Lyon, and Storey counties for Washoe County (Reno) and Carson City. Population forecasts incorporated into this water plan for Clark and Washoe counties were provided by the Clark County Department of Comprehensive Planning and the Washoe County Department of Community Development, respectively. The population forecasts for Washoe County were modified slightly by the Nevada Division of Water Planning (NDWP) to better smooth the intervening period forecasts, matching Washoe County's population forecast for the year 2020. Other county population forecasts developed by the NDWP were based on an extension and general moderation of recent historical growth trends. Also incorporated in the state and county population forecasts are estimates of commercial and industrial development and employment forecasts based on inputs provided by the Nevada Department of Employment, Training and Rehabilitation (DETR).

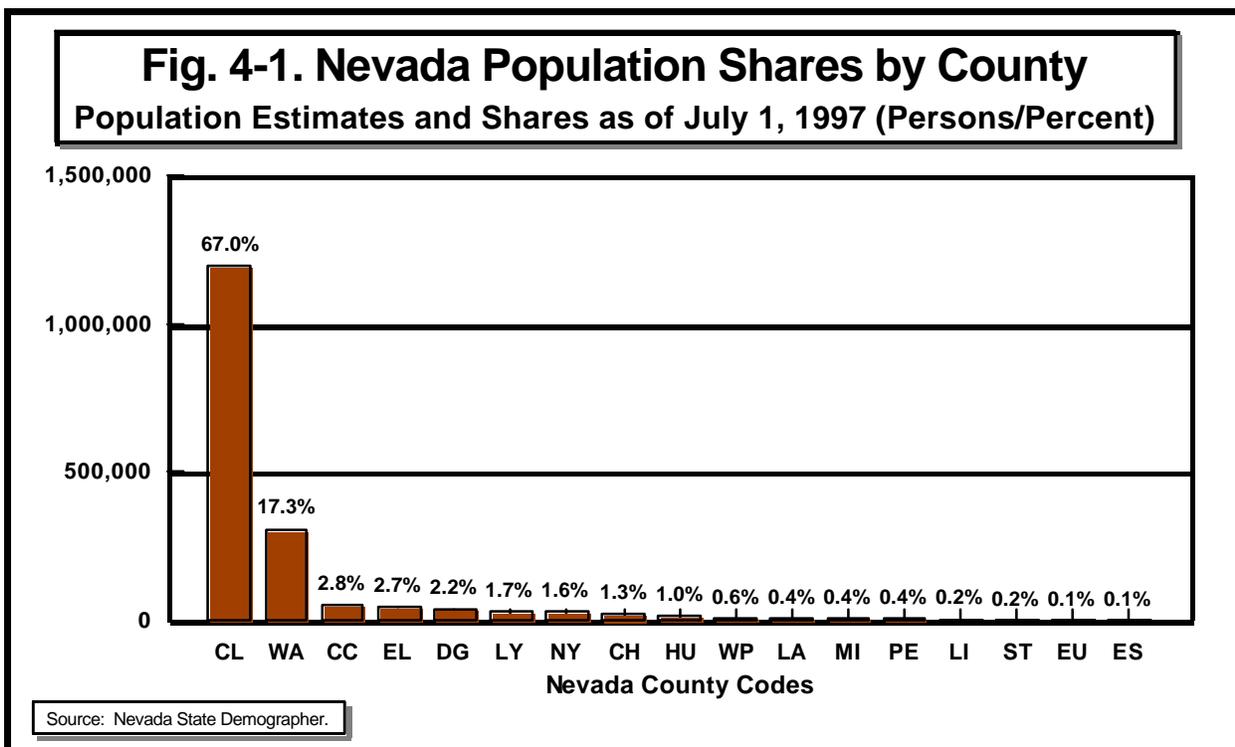
Table 4-1. Nevada Population Analysis, presents historical populations and population shares (in terms of county percent shares of the total state's population) for Nevada and its seventeen counties for selected years from 1950 to 1997. This table shows that in 1997, Nevada's total resident population was estimated to be 1,779,850 persons, up 1,618,705 persons since 1950.

Table 4–1. Nevada Population Analysis — 1950–1997
Shares Based on Percent of Total State Population (Persons/Percent of Total State)

State/County	1950	1960	1970	1980	1990	1997
NEVADA	161,145	287,660	494,990	800,508	1,236,130	1,779,850
Carson City	4,198	8,020	16,054	32,022	40,950	50,410
Statewide Share	2.61%	2.79%	3.24%	4.00%	3.31%	2.83%
Churchill County	6,188	8,505	10,650	13,917	18,100	23,860
Statewide Share	3.84%	2.96%	2.15%	1.74%	1.46%	1.34%
Clark County	48,811	128,734	277,230	463,087	770,280	1,192,200
Statewide Share	30.29%	44.75%	56.01%	57.85%	62.31%	66.98%
Douglas County	2,023	3,575	7,067	19,421	28,070	39,590
Statewide Share	1.26%	1.24%	1.43%	2.43%	2.27%	2.22%
Elko County	11,703	12,051	13,946	17,269	33,770	47,710
Statewide Share	7.26%	4.19%	2.82%	2.16%	2.73%	2.68%
Esmeralda County	611	634	623	777	1,350	1,460
Statewide Share	0.38%	0.22%	0.13%	0.10%	0.11%	0.08%
Eureka County	897	775	938	1,198	1,550	1,660
Statewide Share	0.56%	0.27%	0.19%	0.15%	0.13%	0.09%
Humboldt County	4,870	5,723	6,380	9,449	13,020	17,520
Statewide Share	3.02%	1.99%	1.29%	1.18%	1.05%	0.98%
Lander County	1,860	1,580	2,653	4,076	6,340	7,030
Statewide Share	1.15%	0.55%	0.54%	0.51%	0.51%	0.39%
Lincoln County	3,850	2,378	2,526	3,732	3,810	4,110
Statewide Share	2.39%	0.83%	0.51%	0.47%	0.31%	0.23%
Lyon County	3,703	6,245	8,437	13,594	20,590	30,370
Statewide Share	2.30%	2.17%	1.70%	1.70%	1.67%	1.71%
Mineral County	5,588	6,329	6,961	6,217	6,470	6,860
Statewide Share	3.47%	2.20%	1.41%	0.78%	0.52%	0.39%
Nye County	3,101	4,642	5,459	9,048	18,190	27,610
Statewide Share	1.92%	1.61%	1.10%	1.13%	1.47%	1.55%
Pershing County	3,122	3,178	2,656	3,408	4,550	6,600
Statewide Share	1.94%	1.10%	0.54%	0.43%	0.37%	0.37%
Storey County	657	571	696	1,503	2,560	3,520
Statewide Share	0.41%	0.20%	0.14%	0.19%	0.21%	0.20%
Washoe County	50,484	84,988	122,574	193,623	257,120	308,700
Statewide Share	31.33%	29.54%	24.76%	24.19%	20.80%	17.34%
White Pine County	9,479	9,732	10,140	8,167	9,410	10,640
Statewide Share	5.88%	3.38%	2.05%	1.02%	0.76%	0.60%

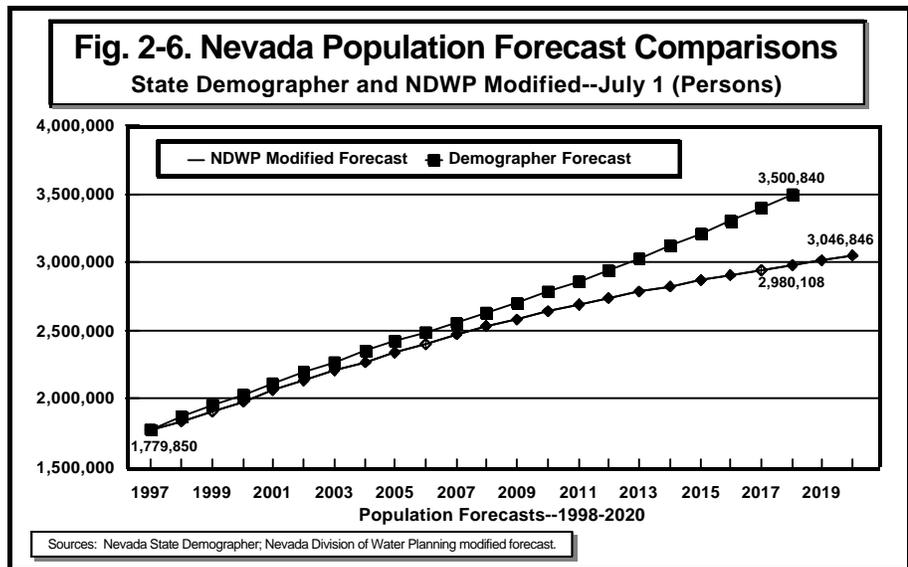
Source Data: Nevada State Demographer.

Clark County’s total resident population was estimated at 1,192,200 persons in 1997 and accounted for 67.0 percent of the state’s total population. This represented an increase of 36.7 percentage points in Clark County’s share of the state’s total population since 1950. Washoe County’s population was estimated at 308,700 persons in 1997, accounting for 17.3 percent of Nevada’s total population, a decline of 14.0 percentage points in its share of statewide population since 1950. Carson City’s 1997 population of 50,410 persons comprised 2.8 percent of the state’s total population, an increase of just over 0.2 percentage point in its population share since 1950. Together, these three Nevada urban areas accounted for 87.2 percent of the state’s total population in 1997. Elko County, representing the other principal population center in Nevada, had an estimated 1997 population of 47,710 persons, accounting for 2.7 percent of the state’s population and representing a decline of 4.6 percent points in state population share since 1950.



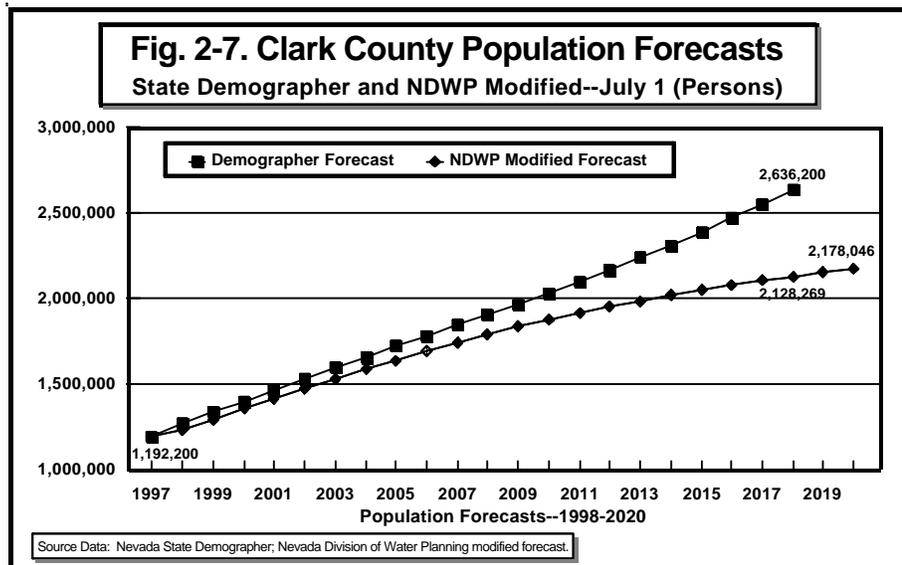
With the exception of Carson City and Clark and Douglas counties, every county in Nevada, while growing in terms of its total resident population, has actually declined in terms of its share of statewide population between 1950 and 1997. Douglas County’s population trends have been strongly influenced by the county’s increasing status as a “bedroom” community for neighboring Carson City, and thus Carson City and Douglas County tend to act as an integrated economic unit. These two counties have shown a slight increase in their joint population share from 3.9 percent of statewide population in 1950 to 5.1 percent in 1997. Unique population trends exist for other Nevada counties as well. For example, rapid population growth in Elko County has been due in large part to the mining industry. Between 1950 and 1970, Elko County’s population grew by only 2,243 persons. However, over the next 27 years its population increased by nearly 30,000 persons.

Much of this growth was due to mining, both in Elko County and neighboring Eureka County. Lyon County represents another county where growth in neighboring Carson City, primarily, has affected its population growth. Similarly, recent rapid growth in Nye County has been primarily centered in the southern part of the county at Pahrump, which has been strongly influenced by rapid growth in nearby Las Vegas.



Two separate population forecasts are presented in the state water plan. Every year the Nevada State Demographer estimates the current population and, following this estimation process, produces a twenty-year population forecast for all counties and the total state. All state agencies are required by the Governor’s Executive Order to utilize the population forecasts of the State Demographer in their budgeting and planning activities. Under an agreement with the state’s population contracting agency, the Nevada Department of Taxation, the NDWP has developed an alternate set of county and state population forecasts based on inputs received from the individual counties, inputs from the Nevada Department of Employment, Training and Rehabilitation (DETR), and from the NDWP’s own best forecast scenarios. These alternate forecasts are used as a basis for projecting municipal and industrial, domestic and commercial and industrial water uses.

Overall, the NDWP’s statewide population forecast predicts a more moderate population growth than that of the State Demographer. The reason for this is that Nevada’s total population is largely influenced by the trends in Clark County, which currently accounts for over two-thirds of the state’s total population. Based on infrastructure requirements and current



resource limitations, local planners in Clark County expect slower growth over the plan’s forecast horizon than does the State Demographer. The State Water Plan incorporates both sets of population forecasts, as shown in Table 4–2. Nevada Population Forecast Comparisons to present an anticipated “range of expected growth.” However, only the NDWP’s forecasts are incorporated into the water plan’s future water withdrawal projections. A complete set of population forecasts and related graphical analysis for each county is presented in Appendix 2 of the Appendices. This appendix also contains a comparative analysis of population forecasts for all individual counties.

Table 4–2. Nevada Population Forecast Comparisons
Nevada State Demographer and Nevada Division of Water Planning (NDWP)

Nevada Forecasts by Source	2000	2005	2010	2015	2018	2020
State Demographer						
Resident Population (persons)	2,034,020	2,421,020	2,783,700	3,313,260	3,500,840	n.a.
Nevada Division of Water Planning						
Resident Population (persons)	1,986,257	2,341,374	2,640,306	2,868,979	2,980,108	3,046,846
Difference (persons)	47,763	79,646	143,394	343,281	520,732	–
Percent Difference	2.4%	3.3%	5.2%	10.7%	14.9%	–

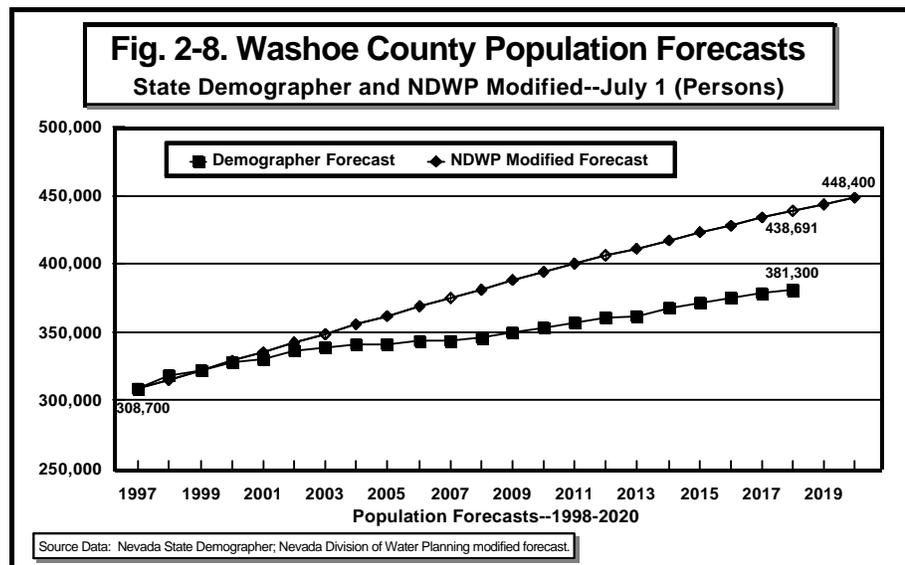
Note: The population forecasts of the State Demographer currently extend only through the year 2018. The “Difference” row in the table represents the difference between the forecasts of the State Demographer and NDWP. NDWP population forecasts for Clark and Washoe counties are based on population forecast inputs from those counties.

Source Data: Nevada State Demographer; Nevada Division of Water Planning (NDWP).

The Nevada State Demographer has forecast a total resident population for Nevada for the year 2018 of 3,500,840 persons, primarily based on a continuation of the more recent virtual exponential growth in Las Vegas (Clark County). The State Demographer’s forecast represents an overall increase in statewide population of 1,720,990 persons between 1997 and 2018, a near doubling of Nevada’s population over the next

20 years. The State Demographer’s forecast scenario results in an average annual rate of growth of statewide population of 3.3 percent per year for the overall forecast period of 1998 to 2018, with a sub-period average annual rate of growth of 3.6 percent between 1998 and 2008 and 2.9 percent between 2008 and 2018.

The State



Demographer’s forecasted population for the year 2018 is approximately 15 percent higher than that of the NDWP.

The NDWP forecast scenario, based primarily on the expectation of slower population growth in Clark County, assumes a 2.5 percent overall annual rate of population growth for Nevada between the years 1998 and 2018, with sub-period average annual rates of 3.2 percent per year for 1998 through 2008 and 1.6 percent per year for 2008 through 2018. Based on this “range” of population forecasts developed independently by the State Demographer and the NDWP, Nevada is projected to grow at a rate of between 2.5–3.3 percent per year through 2018 at which time the population is expected to be between 3.0 and 3.5 million persons. Table 4–3. Nevada Population Forecast Summary, 1997–2020, presents a summary of the population forecasts made by the NDWP for those Nevada counties expected to equal or exceed a total resident population of 50,000 persons by the year 2020. Complete population estimates, forecasts and analysis for all Nevada’s counties may be found in the Appendices, Appendix 2.

**Table 4–3. NDWP Nevada Population Forecast Summary
Population Forecasts and Shares for Larger Nevada Counties — 1997–2020
(For counties expected to exceed 50,000 persons by the year 2020)**

State/County	1997	2000	2005	2010	2015	2020
Nevada						
Resident Population (persons)	1,779,850	1,986,257	2,341,374	2,640,306	2,868,979	3,046,846
Carson City						
Resident Population (persons)	50,410	54,445	60,703	66,041	70,099	72,587
Percent of Total State	2.83%	2.74%	2.59%	2.50%	2.44%	2.38%
Clark County (Las Vegas)						
Resident Population (persons)	1,192,200	1,355,368	1,640,444	1,874,431	2,046,229	2,178,046
Percent of Total State	66.98%	68.24%	70.06%	70.99%	71.32%	71.49%
Douglas County						
Resident Population (persons)	39,590	42,834	48,180	53,272	57,900	61,854
Percent of Total State	2.22%	2.16%	2.06%	2.02%	2.02%	2.03%
Elko County						
Resident Population (persons)	47,710	51,665	57,857	63,224	67,408	70,113
Percent of Total State	2.68%	2.60%	2.47%	2.39%	2.35%	2.30%
Lyon County						
Resident Population (persons)	30,370	33,721	39,377	44,878	49,914	54,170
Percent of Total State	1.71%	1.70%	1.68%	1.70%	1.74%	1.78%
Washoe County (Reno)						
Resident Population (persons)	308,700	329,021	362,260	393,884	422,917	448,400
Percent of Total State	17.34%	16.56%	15.47%	14.92%	14.74%	14.72%

Note: Counties included are only those that are forecast to equal or exceed a resident population of 50,000 persons by the end of the forecast period (2020).

Source Data: Nevada State Demographer (1997 estimate); Nevada Division of Water Planning (2000–2020 forecasts).

Economic Trends and Forecasts

In the following analysis, principal sectors of the Nevada economy are reviewed in terms of recent trends and their probable effects on Nevada's and individual counties' future growth patterns. These primary economic sectors include gaming, which is the principal driving economic force in both Clark and Washoe counties, mining, which impacts a number of more rural counties including Elko, Eureka, Lander, Humboldt, Pershing and Nye, and agriculture, which affects a number of counties including principally Elko, Humboldt, Pershing, Douglas, Churchill and Lyon.

Gaming. Casino gaming and tourism in Nevada represents the primary “driving” economic force most affecting the state's overall population trends. While growth in tourism visitation and gaming win (revenues) has slowed over the last several years in the state's principal northern Nevada casino gaming markets of Reno-Sparks (Washoe County) and South Lake Tahoe (Douglas County), this trend has been more than off-set by high rates of growth in the southern Nevada gaming market of Las Vegas (Clark County), and specifically by trends within the Las Vegas Strip gaming sub-market. The introduction of the mega-resort complex among the Las Vegas Strip gaming properties beginning in late 1989 established a trend of rapid casino and support industry employment growth, population expansion, and gaming win growth that characterized this market throughout the 1990's. The mega-resort casino complex, with individual property employment frequently exceeding 5,000-6,000 workers (Mirage Resorts' Bellagio Resort opened in October 1998 with over 9,300 employees), had significant impacts on population growth, support service businesses, infrastructure requirements, and particularly water demands. Further, new resort complexes opening in this market through 1999 and into 2000 will extend these trends into the next century.

In contrast to the relatively strong growth expected to continue in the near term for Clark County, the Washoe County and Carson City areas, and in fact much of northern Nevada, are beginning to see significantly slower growth due to more intense competition in the gaming and tourism industry. Based on the growth in legalized gaming in other jurisdictions, especially the rise of Indian gambling on reservation lands, particularly in California and the Pacific Northwest, it is reasonable to expect a continued slowdown in the growth of gaming and tourism throughout Nevada from approximately the year 2005 onward.

The November 1998 passage of “Proposition 5”, which legalized certain slot devices in Indian reservation casinos in California, is destined to have profound impacts on gaming in that state. While a constitutional challenge to this proposition has already been filed, the California voters appear to have changed their attitude towards some form of legalized casino gaming in the state and further moves in this direction may be reasonably expected. Furthermore, in January 1999, the governor of California withdrew the state's participation in any constitutional challenge to Proposition 5 and expressed the state's desire to begin negotiations on Indian gaming compacts.

While many of Nevada's tourism and gaming attractions, both man-made and natural, continue to be unrivaled in competitive markets, studies have shown that proximity has an important influence over player patronage. As a result, Nevada's casino gaming industry will have to work especially hard to compete effectively with developing gaming markets located closer to population centers throughout the U.S. The anticipated slowing in the growth in Nevada's gaming industry, however, is not expected to be uniform and will be greater in those gaming markets which do not offer features of a distinctive nature to lure consumers from more proximate gaming venues.

Mining. 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, most especially Elko, Eureka, Humboldt, Lander, Nye, and Pershing counties. However, more recently this industry has come under growing economic and financial stress. Beginning in late 1997 and extending into 1998, due primarily to European monetary reform and Asian economic and financial problems, gold prices realized by Nevada mines have slipped dramatically. The average price of gold fell from \$387.87 per (troy) ounce in 1996 to \$331.29 per ounce in 1997, and by mid-1998 the price received by Nevada's mining interests was well below \$300 per ounce. By late 1998, gold's price had rebounded somewhat to "around" \$300 an ounce. Some of this price decline has, for the time being, been mitigated through the mining industry's use of "forward" contracts wherein the mining companies have locked in to committed prices for future gold sales.

Over the plan's forecast period, international economic and financial conditions are expected to continue to affect the nature and structure of mining operations in Nevada, thereby influencing the demographic and economic growth prospects of the rural, mining-dependent Nevada counties. Over the long-term, however, conditions within the mining industry are expected to stabilize at a price of \$280–\$350 per ounce for gold, which has become incorporated into the levels of forecast production for the industry and particularly the amount of economically recoverable reserves.

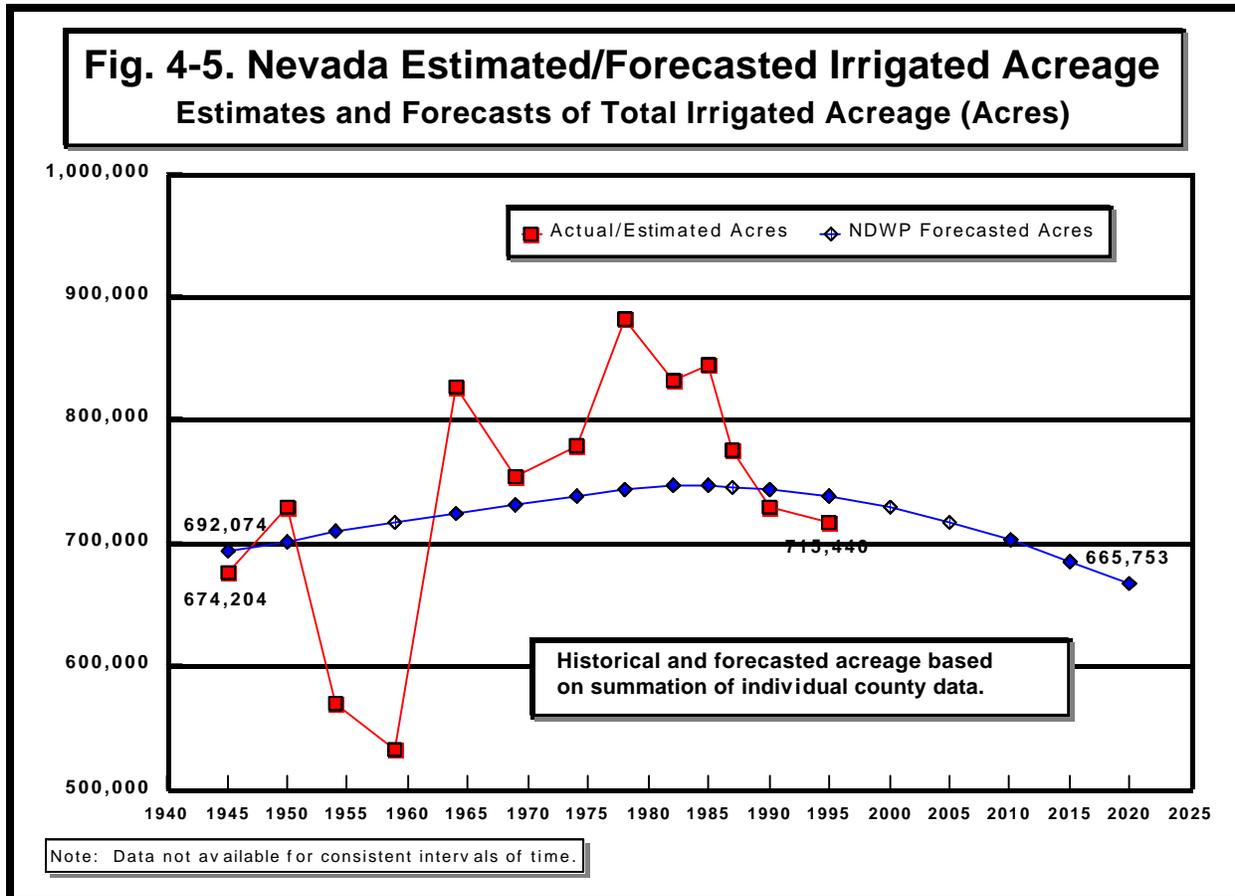
Agriculture. Agriculture represents one of Nevada's oldest and most lasting economic activities. Since the first settlements were established in the 1850's, agriculture in Nevada has continued to survive and even prosper. Today, agriculture remains a fundamental socioeconomic underpinning for a number of rural Nevada counties and, no doubt, will remain an integral part of these counties' economies irrespective of trends in other economic sectors. While on the whole agriculture may appear to have only a slight impact on Nevada's overall economic trends, the importance of agriculture for a number of rural counties cannot be overstated.

In viewing the individual county agricultural-related figures (which are presented in the Appendices, Appendix 4), particularly with respect to the amount of irrigated acreage, wide fluctuations appear typical in the estimated levels of irrigated acreage. Such fluctuations tend to indicate both highly volatile irrigation and crop production cycles based on variations in water availability and basic problems in reporting and gathering accurate data on this industry sector.

The volatility in historical measures of this industry, particularly with respect to irrigated acreage, makes forecasting irrigation and livestock water use especially difficult. However, there does appear to be a trend towards no increase in agricultural lands being brought under cultivation. In fact, some counties, Carson City, Churchill, Douglas, and Washoe in particular, it appears that encroaching urbanization and the transfer of water rights from irrigation to M&I uses is causing the level of irrigated lands to decline. Given new and growing demands for limited water resources in the state, particularly for municipal and industrial use, wildlife protection and fishery restoration, instream flows and recreation, the future amount of irrigated acreage is uncertain.

Figure 4–5. Nevada Estimated and Forecasted Irrigated Acreage, shows both estimates of historical

irrigated acreage since 1945 and the Division of Water Planning’s forecasts for Nevada’s total irrigated acreage through the year 2020 based on individual county forecasts which are aggregated to the statewide total. Detailed forecasts for all counties and the total state appear in the Appendices, Appendix 4. Forecasts were based on the approximation of a non-linear “best fit” line which tracked



individual county historical trends and then was extrapolated (extended) out to the year 2020 based upon estimates of agricultural trends and other factors such urban encroachment.

Employment Trends and Forecasts

Employment trends and forecasts constitute an important underpinning to understanding and forecasting water withdrawals by Nevada’s businesses and industry. Employment-to-population ratios, which measure the ratio of total employment to total resident population, are crucial in forecasting future employment levels from a county’s resident population. This analysis, and related statistical tests of confidence which gauge the suitability of this methodology, are presented in the Appendices for each county and aggregated for the total state (Appendix 3). Forecasts of county total employment, when combined with estimated historical commercial and industrial water use factors (gallons per worker per day), are used to forecast each county’s commercial and industrial water withdrawals and, through aggregation, these same water withdrawals for the total state.

Omitting the effects of national economic recessions, Nevada’s ratio of its total covered employment (i.e., employment covered under state and federal unemployment insurance programs) to its total resident population has tended to be relatively stable over time. For the period of 1980-1997, Nevada’s overall employment-to-population ratio has averaged 48.2 percent. Omitting recessionary periods (i.e., 1980-82 and 1990-91), the statewide average employment-to-population ratio has tended to be closer to 50 percent. Nevada’s relatively high employment-to-population ratio is typical of an economy that is being driven primarily by commercial (casino) expansion and related strong employment growth. Also evident from an analysis of these trends is that Nevada’s employment-to-population ratio has shown marked sensitivity to national business cycle fluctuations, notably the national recessionary periods of 1980-82 and 1990-91. While this point needs to be recognized, forecasts of future recessions are not explicitly incorporated in the forecasts of future employment.

Table 4–4. Nevada Population and Employment Forecasts, shows historical and forecasted population, employment and employment-to-population ratios for Nevada for selected years from 1997 through 2020. A more extensive presentation of this information for the total state and all Nevada counties for all years from 1980 through 2020 can be found in the Appendices, Appendix 3. The information and forecasts in this appendix were based on historical levels and omit possible effects of future national and local recessions.

Table 4–4. Nevada Population and Employment Forecasts
Population/Employment Estimates — 1997, NDWP Forecasts — 2000–2020
(Annual Averages — Persons and Workers)

NEVADA	1997	2000	2005	2010	2015	2020	1997-2020 Change	1997-2020 Percent Change*
Population	1,779,850	1,986,257	2,341,374	2,640,306	2,868,979	3,046,846	1,266,996	71.2%
Employment	888,574	987,950	1,162,764	1,310,176	1,423,256	1,511,617	623,043	70.1%
Employment-to- Population Ratio	49.9%	49.9%	49.8%	49.7%	49.7%	49.7%	–	-0.20%

Note: Changes to the employment-to-population ratios over time are measured in percentage points. The Nevada figure is based on the aggregation of individual county estimates (1997) and forecasts (2000–2020) and was not forecasted independently.

Source Data: Population estimates (1997) – Nevada State Demographer; Employment estimates (1997) – Department of Employment, Training and Rehabilitation (DETR); Population and employment forecasts (2000–2020) – Nevada Division of Water Planning (NDWP). Population forecasts incorporated into the Nevada total for Clark County are from forecasts adopted by the Clark County Department of Comprehensive Planning; Population forecasts for Washoe County are from the Washoe County Department of Community Development.

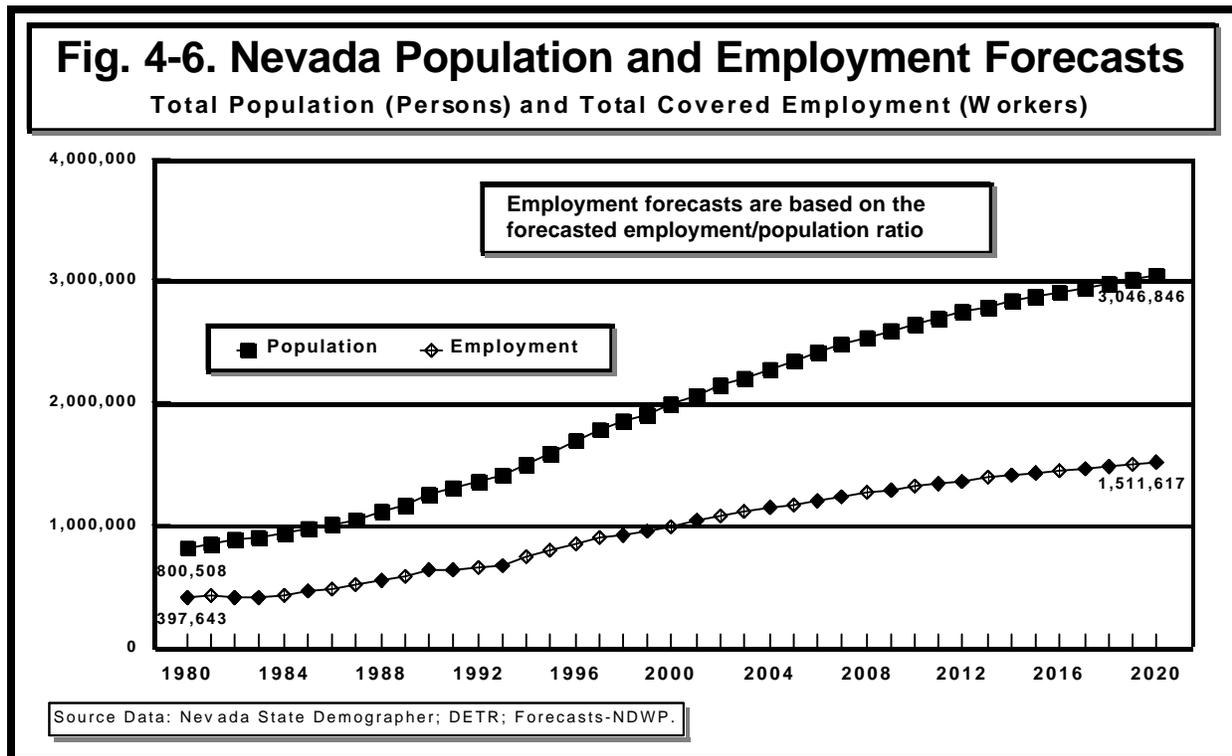
Fig. 4–6. Nevada Population and Employment Forecasts, shows the relationship between the state and county population forecasts and the employment forecasts derived through the estimates and forecasts of individual county employment-to-population ratios. The Nevada figures presented in Table 4–4 and Fig. 4–6 represent the aggregation of those county forecasts.

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