
**TECHNICAL REPORT
UCED 2005/06-14**

**UPDATED ECONOMIC LINKAGES IN THE ECONOMY OF
EUREKA COUNTY**



UNIVERSITY OF NEVADA, RENO

Updated Economic Linkages in the Economy of
Eureka County

Study Conducted by

Elizabeth Fadali
William W. Riggs
Kim Dorris
and
Thomas R. Harris

Elizabeth Fadali is a Research Associate in the University Center for Economic Development and the Department of Resource Economics at the University of Nevada, Reno.

Kim Dorris is a Graduate Research Student in the University Center for Economic Development in the Department of Resource Economics at the University of Nevada, Reno.

William W. Riggs is the County Extension Educator at Eureka County Cooperative Extension

Thomas R. Harris is a Professor in the Department of Applied Economics and Statistics and Director of the University Center for Economic Development at the University of Nevada, Reno.

July 2005

UNIVERSITY
OF NEVADA
RENO

The University of Nevada, Reno is an Equal Opportunity/Affirmative Action employer and does not discriminate on the basis of race color religion sex age creed national origin veteran status physical or mental disability and in accordance with university policy sexual orientation in any program or activity it operates. The University of Nevada employs only United States citizens and aliens lawfully authorized to work in the United States.

This publication, *Updated Economic Linkages in the Economy of Eureka County*, was published by the University of Nevada Economic Development Center. Funds for the publication were provided by the United States Department of Commerce Economic Development Administration under University Centers Program contract #07-66-0567. Also funds for research for this project were provided by the Eureka County Commissioners. This publication's statements, findings, conclusions, recommendations, and/or data represent solely the findings and views of the authors and do not necessarily represent the views of the United States Department of Commerce, the Economic Development Administration, Eureka County Commissioners, the State of Nevada Commission on Economic Development, University of Nevada, or any reference sources used or quoted by this study. Reference to research projects, programs, books, magazines, or newspaper articles does not imply an endorsement or recommendation by the authors unless otherwise stated. Correspondence regarding this document should be sent to:

Thomas R. Harris, Director
University Center for Economic Development
University of Nevada, Reno
Department of Applied Economics and Statistics
Mail Stop 204
Reno, Nevada 89557-0105



UCED
University of Nevada, Reno
Nevada Cooperative Extension
Department of Applied Economics and Statistics

UPDATED ECONOMIC LINKAGES IN THE ECONOMY OF EUREKA COUNTY

EXECUTIVE SUMMARY

Introduction

During the 1990's and 2000's Eureka County has realized rapid economic expansion and instability. The primary impetus for this expansion has been the creation and expansion of local gold mining industries. However, most of these gold mining firms are located in northern Eureka County and the employees of these firms live in Elko County, Nevada. Therefore, the impacts to the local economy from increased household expenditures are lost to Eureka County.

Understanding the interrelationships of the local economy and impacts of external factors on Eureka County requires knowledge of socioeconomic trends, economic base and economic linkages within the county. Additional knowledge pertaining to the use of economic linkages to estimate impacts on economic activity, employment and income is also helpful. This report provides that information.

Major Findings

- Eureka County's average of annual population growth rates from 1969 to 2004 was fourteenth among the seventeen counties in Nevada. During this thirty-five year period, Eureka County's average of annual percentage growth rates was 1.69 percent. However, for the last two years of this period, 2002 to 2004, Eureka County's population growth rate was the fifth highest of Nevada's seventeen counties, at 3.55 percent. During the thirty-five year period, Eureka County was the third highest in population growth instability.
- Per capita personal income in 2003 for Eureka County was \$25,830, approximately 24 percent less than the state's \$31,910 and approximately 22 percent less than the national average of \$31,472.
- Approximately 65 percent of Eureka County's total income was received from net earnings while approximately 35 percent was in the form of dividends, interest and rents and transfer payments.

- Total personal income in Eureka County realized an average annual growth rate of 1.9 percent ranking Eureka County fifteenth among Nevada's seventeen counties for the thirty-four year period from 1969 to 2004.
- Approximately 79 percent of the land in Eureka County is federally owned with the Bureau of Land Management managing approximately 73 percent of total Eureka County acreage. Local government and private lands make up only 20 percent of Eureka County's land area.
- In 2000, Eureka County's median age of population is 38.3 years, which is older than the state's median age of 35 years and the U.S. median age of 35.3 years.
- In 1999, Eureka County's percentage of the population living below the federal poverty level was 12.6 percent. This was the fourth highest value of all of Nevada's seventeen counties.
- Using location quotient procedures, Eureka County's major export sectors are the agricultural and mining sectors.
- Using shift-share analysis for 2nd quarter 2002 to 2nd quarter 2004, analysis of total county and sectoral employment change in Eureka County was completed.
- Using shift-share analysis, the gold mining industry was a major contributor to employment decreases in Eureka County. However, given that the gold mining industry throughout the nation lost employment from 2nd quarter 2002 to 2nd quarter 2004, the decrease in mining industry employment for Eureka County was less than it was nationally and signifies a competitive advantage Eureka County experienced for this sector.
- A hybrid input-output model for Eureka County was developed to incorporate the agricultural sector for Eureka County and validation by Eureka County business people.
- Using the Eureka County input-output model, it was estimated that a \$1,000,000 increase in export sales by the local Alfalfa Hay Sector would yield increased total county economic activity of \$1,659,100, employment increase of 8.7 jobs, and Eureka County household income increase of \$471,700.
- Using the Eureka County input-output model, it was estimated that a \$1,000,000 increase in export sales by the local Gold Sector would yield increased total county economic activity of \$1,708,600, employment increase of 5.4 jobs, and Eureka County household income increase of \$609,800.

Interpretation and Implications

Eureka County, unlike many counties in Nevada, has experienced some population increases and declines and economic growth and decline during the 1990's and 2000's.

Population growth in Eureka County during this time period has been below the state average but close to the national average. Also population and economic growth in Eureka County has been somewhat unstable.

The Eureka County economy is dependent upon the activities of its local mining industry. However, mining operations are impacted by gold prices which are determined by international markets. Any changes in activity by the local mining firms will greatly impact the economy of Eureka County.

Table of Contents

Introduction.....	12
Basic Concepts of Community Economics.....	13
Socioeconomic Trends in Eureka County	15
Population	15
Personal Income.....	22
Land Ownership.....	28
Demographics	29
Income.....	31
Economic Base of Eureka County	33
Location Quotient Analysis	33
Results of Location Quotient Analysis	34
The Changing Economic Base of Eureka County	36
National Growth Component.....	36
Industrial Mix Component.....	36
Competitive Share Component.....	37
Results of Shift-Share Analysis	37
Interindustry Analysis.....	40
Transaction Table	40
Direct Requirements	42
Final Demand Interindustry Coefficients	42
Output Interindustry Coefficients	43
Employment Effects.....	44
Household Income Effects.....	44
Eureka County Input-Output Model.....	45
Final Demand, Employment, and Household Income Multipliers	47
Impact Analysis	49
Impact Analysis Example	50
Summary	51
References.....	53
Appendix A: Listing of Economic Sectors	55
Appendix B: Sources of Data for Eureka County	
Input-Output Model.....	57

Appendix C: Private Sector, Local Government and Non-Market
Impacts from Economic Changes.....59

List of Tables

	Page
Table 1. Population and Rank by Population of Nevada Counties 2000 to 2004	16
Table 2. County Patterns of Population Growth, Average Annual Percentage Growth and Instability Index, Twenty-Five Year Period from 1969 to 2004.....	18
Table 3. County Patterns of Population Growth, Average Annual Percentage Growth and Instability Index Ten Year Period 1994 to 2004	19
Table 4. County Patterns of Population Growth, Average Annual Percentage Growth and Instability Index Five Year Period 1999 to 2004	20
Table 5. County Patterns of Population Growth, Average Annual Percentage Growth and Instability Index Two Year Period 2002 to 2004.....	21
Table 6. Personal Income of Eureka County Residents, 2003.....	22
Table 7. Comparison of Personal Income Sources between Eureka County, State of Nevada and United States, 2003.....	24
Table 8. County Real Personal Income Growth Rate and Instability Index, Thirty-four Year Period, 1969-2003	25
Table 9. County Real Personal Income Growth Rate and Instability Index, Two Year Period, 2001-2003.....	27
Table 10. Federal and State Lands, Eureka County 2000.....	28
Table 11. Location Quotient Analysis Results for Eureka County, 2 nd quarter 2002 and 2 nd quarter 2004.....	35
Table 12. Shift-Share Analysis Results for Eureka County, 2 nd quarter 2002 and 2 nd quarter 2004.....	39

Table 13. Final Demand, Employment, and Income Multipliers for Eureka County, 2002	48
Table 14. Total Impacts from a \$1,000,000 Increase in Export Sales by the Alfalfa Hay Sector and the Gold Mining Sector, Respectively in Eureka County	51

List of Figures

	Page
Figure 1: Overview of Community Economic System.....	14
Figure 2: State of Nevada, Eureka County	15
Figure 3: Demographic Pyramid of Eureka County, 2000	29
Figure 4: Median Age for All Nevada Counties, 2000.....	30
Figure 5: Per Capita Income All Counties, 1999	31
Figure 6: Percent of Households below Poverty Line, 1999	36
Figure 7: A Classification of Transactions	41

Introduction

From 1999 to 2003, Eureka County experienced a decrease in population and an increase in real per capita income. County real per capita income increased by 6.1 percent while county population decreased from 1,726 in 1999 to 1,420 in 2003 or a decrease of 17.7 percent. The Eureka County economy, however, is based on a single industry, mining. In 1999 the mining sector was 85.5 percent of total Eureka County employment which has declined to 82.3 percent of total Eureka County employment in 2003. Any changes in mining activity will greatly impact the economy of Eureka County. Providing information to help local decision makers understand how external factors could impact the Eureka County economy is the primary objective of this study.

The general objective of this study is to perform an interindustry analysis and develop an input-output model for the Eureka County economy. This input-output model calculates the economic interrelationships, more commonly called linkages, between economic sectors in the county economy. These linkages are then used to estimate economic impacts on economic activity, employment, and income in Eureka County from a selected sectoral change in economic activity. Specific objectives are to:

- 1) Review the basic concept of community economics;
- 2) Investigate the socioeconomic trends in Eureka County;
- 3) Analyze the economic base of Eureka County;
- 4) Determine the economic linkages within Eureka County; and
- 5) Perform an impact analysis estimating economic impacts on Eureka County from increased export sales in the local Alfalfa Hay and Gold Mining Sectors.

The organization of this report follows the sequence of these specific objectives.

Basic Concepts of Community Economics

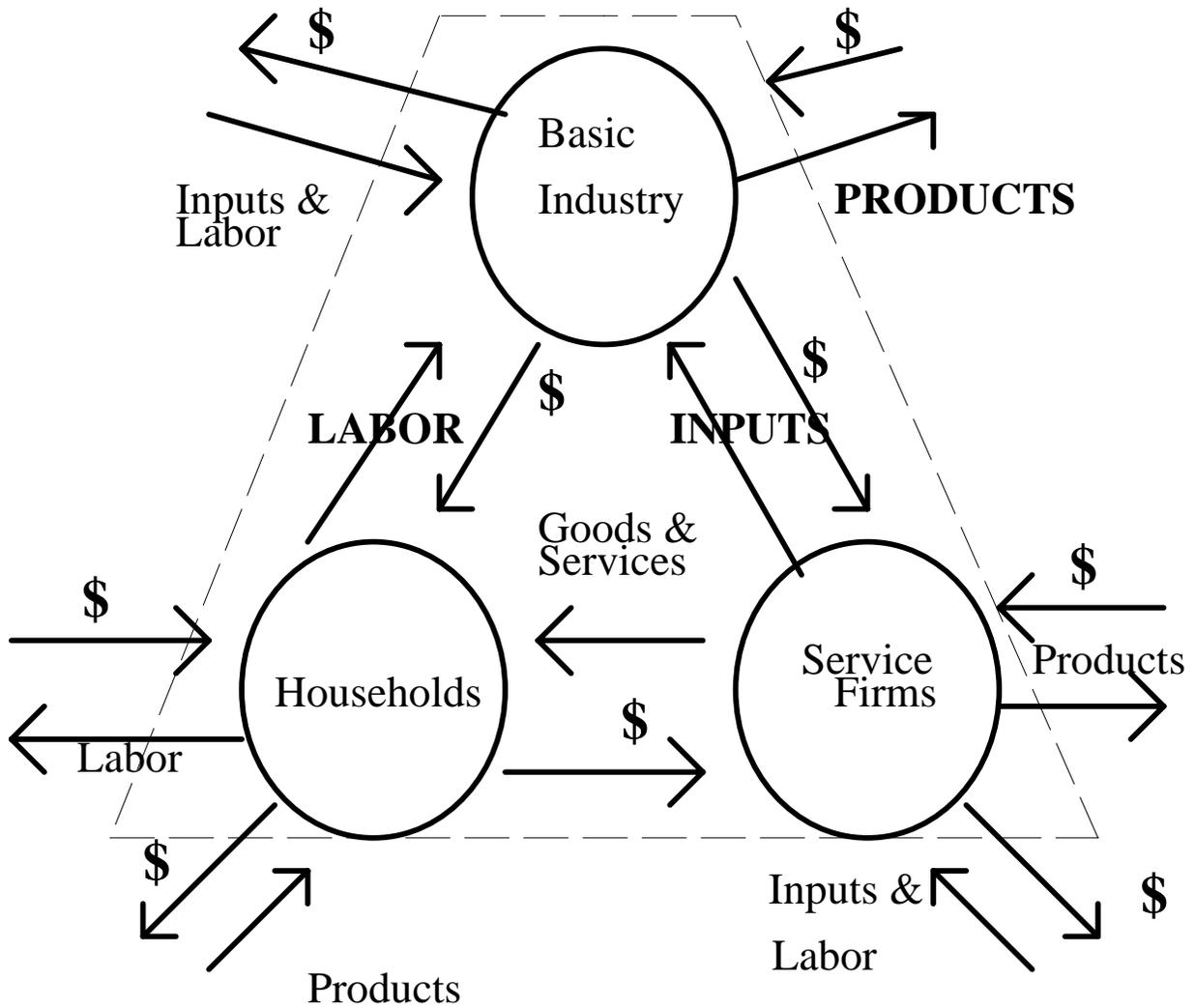
Community economics is an applied field of economics that investigates the interrelationships, more commonly called linkages that exist among economic sectors within a local economy. An overview of a community economic system is presented in Figure 1. Economic sectors shown are basic industries, households and service firms. The linkages that exist among these sectors are depicted by Figure 1.

Basic industries are those industries which produce goods and services primarily for sale outside the economy. These industries are usually involved in agriculture, mining, manufacturing, or casino gaming. Household and service firms support basic industries. Labor is purchased from households and inputs are purchased from service firms. Service firms also provide goods and services to households (consumers). Of course, each of these three sectors purchase products, inputs and labor from outside the community borders. Local transactions determine the relationship that exists among the various types of firms in an economy. These three sectors are also linked with the rest of the economy through inflow and outflow of income, inputs and labor, goods and services and finished products.

The total impact of any basic industry on an economy consists of direct, indirect and induced impacts. Direct impacts are the activities or changes in production level of the impacted industry. Indirect impacts occur in the local business sector as a result of providing inputs to the impacted industry. For example, the increased output of local firms providing inputs for a local mining operation represent the indirect impacts of a basic industry. Induced impacts consist of the economic activity caused by household consumption in a local economy from the direct and indirect effects.

The relationships discussed above indicate how basic industries serve as the foundation of an economy and how households and service firms are necessary to make the economy function. Service industries account for a substantial part of the output of most economies, but, as shown in Figure 1, much of service industry's output goes to support local basic industries and households. Mathematical techniques, such as input-output analysis, can be used to measure the relationships between basic industries, households and service firms.

Figure 1: Overview of Community Economic System



Socioeconomic Trends in Eureka County

Socioeconomic trends within Eureka County are provided to give a socioeconomic perspective of Eureka County in comparison to other Nevada counties, as well as state and national trends. Population, personal income, land ownership, demographics and per capita income trends are identified in this section.

Population

Eureka County is located in Northeast Nevada approximately 115 miles southwest of Elko and 240 miles east of Reno. The county is bordered to the west by Lander County, to the north and east by Elko County, to the east by White Pine County and the south by Nye County. This location is shown in figure 2. Eureka is the county seat and the primary population center for the county. Population was estimated to be 1,484 in 2004 which ranks Eureka County sixteenth of seventeen counties in Nevada. In 2000, Eureka was also ranked sixteenth of seventeen Nevada counties. (Nevada State Demographer, 2005)

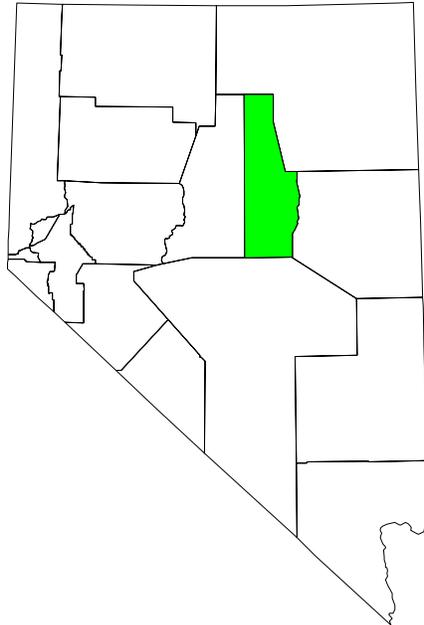


Figure 2. State of Nevada, Eureka County

Table 1. Population and Rank by Population of Nevada Counties in 2000 and 2004.

County	2004		2000	
	Population	Rank	Population	Rank
Clark	1,715,337	1	1,394,440	1
Washoe	383,453	2	341,935	2
Carson	56,146	3	53,208	3
Douglas	47,803	4	41,674	5
Elko	46,499	5	45,633	4
Lyon	44,646	6	35,685	6
Nye	38,181	7	32,978	7
Churchill	26,106	8	24,157	8
Humboldt	16,692	9	16,197	9
White Pine	8,966	10	9,181	10
Pershing	6,631	11	7,057	11
Lander	5,357	12	5,794	12
Mineral	4,673	13	5,071	13
Lincoln	3,822	14	4,165	14
Storey	3,797	15	3,491	15
Eureka	1,484	16	1,651	16
Esmeralda	1,176	17	1,061	17

Source: Nevada State Demographer's Office. "Population of Nevada's Counties and Incorporated Cities." College of Business Administration, University of Nevada, Reno, June 2005.

To investigate trends, population growth was estimated from 1969 to 2004 (a thirty-five year period), 1994 to 2004 (a ten year period), 1999 to 2004 (a five year period) and 2002 to 2004 (a two year period). The year 1969 was chosen because it aligns with the historical data series provided by the Regional Economic Information System population, employment, and income data (U.S. Department of Commerce, 2005). The most recent data available from the demographer's office was for the year 2004. Also different periods of analysis were analyzed to discern if any changes in trends have occurred.

From Table 2, Eureka County ranked fourteenth among Nevada's seventeen counties in the average of annual percentage growth rates. However, Eureka County ranked second highest in instability of population growth during the thirty-five year study period.

For the ten year period from 1994 to 2004, Eureka County ranked thirteenth among Nevada's seventeen counties in average of annual growth rates (Table 3). However, during this ten year period, Eureka County ranked third highest in instability of growth rates.

For the five year time period from 1999 to 2005, the average of annual growth rates for Eureka County was negative and ranked sixteenth among Nevada's seventeen counties (Table 4). During this five year study period; Eureka County had the fifth highest rank in instability of annual growth rates.

From 2002 to 2004, Eureka County experienced a positive average annual population growth rate again. The county's average of annual growth rates was 3.55 percent (Table 5). The instability index for annual growth rates ranked Eureka County as tenth highest of Nevada's seventeen counties during this two year study period.

Table 2. County Patterns of Population Growth, Average Annual Percentage Growth and Instability Index, Thirty-five Year Period (1969-2004).

County	1969-2004		Instability	
	Average of Annual Growth Rates	Rank	Index	Rank
Nye	6.07	1	1.06	10
Douglas	5.85	2	0.64	14
Clark	5.52	3	0.26	17
Storey	5.26	4	1.06	11
Lyon	5.05	5	0.51	15
Carson City	3.80	6	0.85	12
Elko	3.68	7	1.09	8
Washoe	3.42	8	0.32	16
Humboldt	2.91	9	1.07	9
Pershing	2.80	10	1.37	7
Churchill	2.69	11	0.79	13
Esmeralda	2.46	12	4.78	3
Lander	2.30	13	2.97	5
Eureka	1.69	14	4.94	2
Lincoln	1.30	15	2.99	4
White Pine	-0.28	16	14.05	1
Mineral	-1.13	17	2.40	6
Nevada	4.77		0.22	
United States	1.06		0.37	

Source: Nevada State Demographer's Office. "Population of Nevada's Counties and Incorporated Cities." College of Business Administration, University of Nevada, Reno, Various Issues.

Table 3. County Patterns of Population Growth, Average Annual Percentage Growth and Instability Index, Ten Year Period (1994 - 2004)

County	Average Annual % Change	County Rank	Instability Index	County Rank
Lyon	5.91	1	0.25	16
Nye	5.71	2	0.43	14
Clark	5.65	3	0.15	17
Douglas	3.11	4	0.44	12
Washoe	2.72	5	0.25	15
Churchill	2.36	6	0.71	11
Pershing	2.12	7	2.31	7
Carson City	1.78	8	0.44	13
Storey	1.77	9	2.00	8
Esmeralda	1.36	10	3.79	4
Elko	1.29	11	1.95	9
Humboldt	1.28	12	2.58	6
Eureka	1.23	13	7.93	3
White Pine	0.17	14	24.20	1
Lincoln	-0.25	15	11.36	2
Lander	-1.63	16	2.70	5
Mineral	-2.43	17	0.95	10
Nevada	4.68		0.16	
United States	1.22		0.58	

Source: Nevada State Demographer's Office. "Population of Nevada's Counties and Incorporated Cities." College of Business Administration, University of Nevada, Reno, Various Issues.

Table 4. County Patterns of Population Growth, Average Annual Percentage Growth and Instability Index, Five Year Period (1999 - 2004).

County	Average Annual % Change	County Rank	Instability Index	County Rank
Lyon	5.66	1	0.30	15
Clark	5.27	2	0.18	17
Nye	3.96	3	0.30	16
Douglas	3.20	4	0.42	12
Washoe	2.77	5	0.30	14
Esmeralda	2.64	6	1.64	8
Churchill	1.59	7	0.83	11
Carson City	1.30	8	0.35	13
Storey	1.23	9	2.99	3
Elko	0.35	10	4.51	2
Humboldt	-0.45	11	6.11	1
Pershing	-1.15	12	2.15	6
Lincoln	-1.50	13	2.54	4
White Pine	-1.65	14	2.01	7
Mineral	-2.59	15	1.13	10
Eureka	-2.82	16	2.16	5
Lander	-2.83	17	1.15	9
Nevada	4.37		0.18	
United States	1.50		0.64	

Source: Nevada State Demographer's Office. "Population of Nevada's Counties and Incorporated Cities." College of Business Administration, University of Nevada, Reno, Various Issues.

Table 5. County Patterns of Population Growth, Average Annual Percentage Growth and Instability Index, Two Year Period (2002 – 2004)

County	Average Annual % Change	County Rank	Instability Index	County Rank
Lyon	7.31	1	0.18	15
Clark	5.21	2	0.17	16
Nye	4.39	3	0.07	17
Douglas	3.99	4	0.30	13
Eureka	3.55	5	0.38	10
Washoe	3.29	6	0.24	14
Esmeralda	2.29	7	1.91	5
Storey	2.15	8	0.34	11
Churchill	1.95	9	0.58	8
Carson City	1.18	10	0.59	7
Humboldt	1.17	11	0.31	12
White Pine	0.58	12	1.99	4
Elko	-0.07	13	31.52	1
Mineral	-0.23	14	0.39	9
Lincoln	-0.70	15	5.34	2
Lander	-1.68	16	2.69	3
Pershing	-2.20	17	1.69	6
Nevada	4.54		0.14	
United States	0.99		0.00	

Source: Nevada State Demographer's Office. "Population of Nevada's Counties and Incorporated Cities." College of Business Administration, University of Nevada, Reno, Various Issues.

Personal Income

In 2003, Eureka County residents received approximately \$38.4 million in personal income. Approximately \$289.7 million was total earnings in the form of wages and salaries, other labor income, and proprietor's income. This number is adjusted to net earnings of approximately \$24.9 million by taking into account social security contributions and commuting adjustments. Approximately \$8.6 million was in the form of unearned income from dividends, interest and rent; and approximately \$5.0 million from transfer payments such as social security, food stamps, unemployment payments, and veteran benefits. These income figures are shown in Table 6.

Table 6. Personal Income of Eureka County Residents, 2003

Income Category	(\$1,000)	(\$1,000)
Wages and Salaries	\$232,287	
Supplements to wages and salaries	\$55,185	
Proprietor's Income	\$2,262	
Total Earnings in Eureka County		\$289,734
Personal Social Security Contributions	-\$33,176	
Residence/Commuting Adjustments	-\$231,689	
Net Earnings of Eureka County Residents		\$24,869
Dividends, Interest, and Rent	\$8,559	
Transfer Payments	\$4,981	
Total Personal Income, Eureka County Residents		\$38,409
Per Capita Personal Income (dollars)		\$25,830

Source: U.S. Department of Commerce. *Regional Economic Information System*. Bureau of Economic Analysis, Washington, D.C., April 2005.

To more accurately measure income available to Eureka County residents before income taxes (a concept called personal income by economists), approximately \$33.2 million of personal contributions to social insurance programs such as Social Security, Medicare, Unemployment, etc. paid by workers of Eureka County must be subtracted. Subtracting personal insurance contributions and resident adjustments leaves net earnings of Eureka County residents of over \$24.9 million, or approximately 65 percent of total personal income.

A commuting adjustment is made to total earnings since some people who earn income in Eureka County are not county residents. These people commute into the county to work and take their paycheck back home. Some Eureka County residents also work outside the county and bring income back to the county. The difference between what is earned outside Eureka County and injected back into the county and what is earned in Eureka County and leaves the county is over \$231.7 million. The large negative net residence adjustment factor for Eureka County is due to the Mining Sector workers who work in northern Eureka County but live in Elko.

Table 7 gives the percentage breakdown of Eureka County's income by source and presents similar data for the state of Nevada and the nation. Eureka County's breakdown differs from the state of Nevada and nation. Net earnings by residents for Eureka County are approximately 65% of total personal income as opposed to approximately 69% and 69% for the state of Nevada and the United States, respectively. Dividends, interest and rents account for a larger percentage of total Eureka County income. The proportional share of total personal income from transfer payments is lower for Eureka County when compared to the nation but higher when compared to the state share.

Eureka County's per capita income is lower than that of the state or nation. At \$25,830 Eureka County's 2003 income per capita was approximately 24% less than the state's \$31,910 and approximately 22% less than the national average of \$31,472.

Table 7. Comparison of Personal Income Sources between Eureka County, State of Nevada, and United States, 2003.

Personal Income Source	Eureka County (%)	Nevada (%)	United States (%)
Wages and Salaries	604.77	56.78	55.71
Other Labor Income	143.68	12.15	12.87
Proprietor's Income	5.89	8.28	9.15
Less Personal Social Insurance Contributions	-86.38	-7.79	-8.43
Plus Residence/Commuting Adjustments	-603.22	-0.54	-0.01
Net Earnings of Residents	64.75	68.88	69.29
Dividends, Interest and Rents	22.28	19.78	16.12
Transfer Payments	12.97	11.33	14.59
Total Personal Income	100.0	100.0	100.0
Per Capita Personal Income	\$25,830	\$31,910	\$31,472

Source: U.S. Department of Commerce. *Regional Economic Information System*. Bureau of Economic Analysis, Washington, D.C., April 2005.

The thirty-four year pattern of real personal income growth is provided in Table 8. Total personal income for Eureka County had an average of annual growth rates of 1.87 percent for the period of 1969 to 2003.¹ This ranks the county fifteenth among Nevada's seventeen counties. This average of annual growth rates was lower than the average for the state of Nevada and the national average. Eureka County also ranks second highest of the seventeen Nevada counties according to the instability index. This high instability statistic signifies that Eureka County has had a somewhat unstable economy when compared to other Nevada counties. Being so dependent upon one economic sector contributes to this instability.

Table 8. County Real Personal Income Average of Annual Changes and Instability Index, Thirty-four Year Period (1969 to 2003).^a

County	Average of Annual	County Rank	Instability Index	County Rank
Douglas	7.23	1	0.68	15
Clark	6.95	2	0.38	17
Storey	6.52	3	0.84	12
Nye	6.41	4	0.86	11
Lyon	5.85	5	0.68	14
Carson City	5.68	6	0.76	13
Washoe	5.43	7	0.60	16
Churchill	5.05	8	1.00	10
Elko	4.83	9	1.18	9
Humboldt	4.21	10	1.63	8
Lander	3.77	11	2.34	6
Esmeralda	3.53	12	3.85	4
Lincoln	3.06	13	1.99	7
Pershing	2.66	14	3.61	5
Eureka	1.87	15	5.28	2
White Pine	1.47	16	4.39	3
Mineral	0.32	17	16.79	1
Nevada	6.30		0.41	
United States	3.13		0.59	

^a Real incomes determined using the Implicit Price Deflator for Personal Consumption Expenditures, 2000 = 100. Source: U.S. Department of Commerce. *Regional Economic Information System*. Bureau of Economic Analysis, Washington, D.C. April 2005.

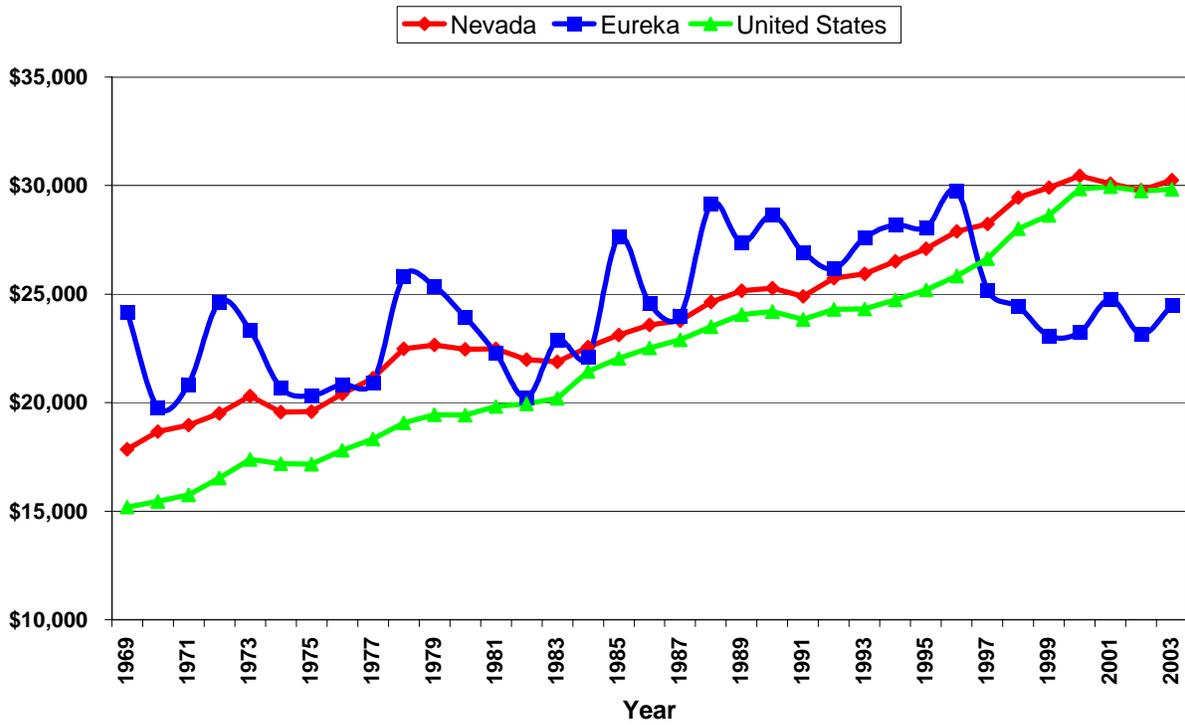
¹ The average is calculated with the following formula:
$$\frac{\sum_{t=1969}^{2003} \left(\frac{population_{t+1} - population_t}{population_t} \right)}{2003 - 1969}$$
. This incorporates information from the entire 34 year series of changes in personal income. It will not be the same as the compound growth rate over the period. For example, the compound growth rate for Eureka County personal income from 1969 to 2003 is 1.42 percent.

Real Per Capita Personal Income

Figure 2 illustrates the 35 year pattern of real per capita personal income in Eureka County in comparison to the state of Nevada and the nation. Since per capita statistics give the amount of personal income divided by the population, the statistics net out the effects of population growth. The real per capita personal income statistic represents the amount of income available to each person in the region. Since a large share of Eureka County's workforce commutes from Elko County, Eureka personal income estimates may be particularly sensitive to how the Census Bureau journey-to-work data is used to make residence adjustments.

The peaks and troughs in Figure 2 show the dramatic instability of real per capita income in Eureka County when compared to the state and the nation. Eureka County has often experienced real per capita income above the national and Nevada state average previous to the period beginning in 1997. Since 1997 Eureka County has had a real per capita personal income below the state and national averages. Steady gains for the state and the nation mean that 2003 real per capita income had increased by 69 percent and 96 percent, respectively, since 1969. Eureka County real per capita income increased by approximately one percent over the same period.

Real Per Capita Personal Income



Real incomes determined using the Implicit Price Deflator for Personal Consumption Expenditures, 2000 = 100.

Source: U.S. Department of Commerce. *Regional Economic Information System*. Bureau of Economic Analysis, Washington, D.C., April 2005.

Land Ownership

In terms of land area, Eureka County ranks eleventh largest in the state with 2,676,480 acres. Approximately 79 percent of the land in Eureka County is administered by the federal government with the Bureau of Land Management managing approximately 73 percent of total Eureka County acreage. Table 10 shows the proportionate share of total Eureka County acreage by ownership: federal and state government, local government and private ownership. It is of interest that only approximately 20 percent of Eureka County acreage is owned by local government and private individuals.

Table 10. Federal and State Lands, Eureka County, 1994.

Categories	Acreage	Share of Total (%)
Federal Agency		
Bureau of Land Management	21,958,380	73.17
Forest Service	147,742	5.52
Other Federal Agencies	<u>20,341</u>	<u>0.76</u>
Total Federal Lands	2,126,463	79.45
State Government	6,423	0.24
Local Government and Private Lands	543,593	20.31
TOTAL ACREAGE	2,676,480	100.00

Source: Zimmerman, J. and T. Harris. *An Update of Federal and State Land-Based Payments in Nevada*. University of Nevada, Reno: Reno, Nevada, University Center for Economic Development Technical Report UCED 2000/01-06, 2000.

Demographics

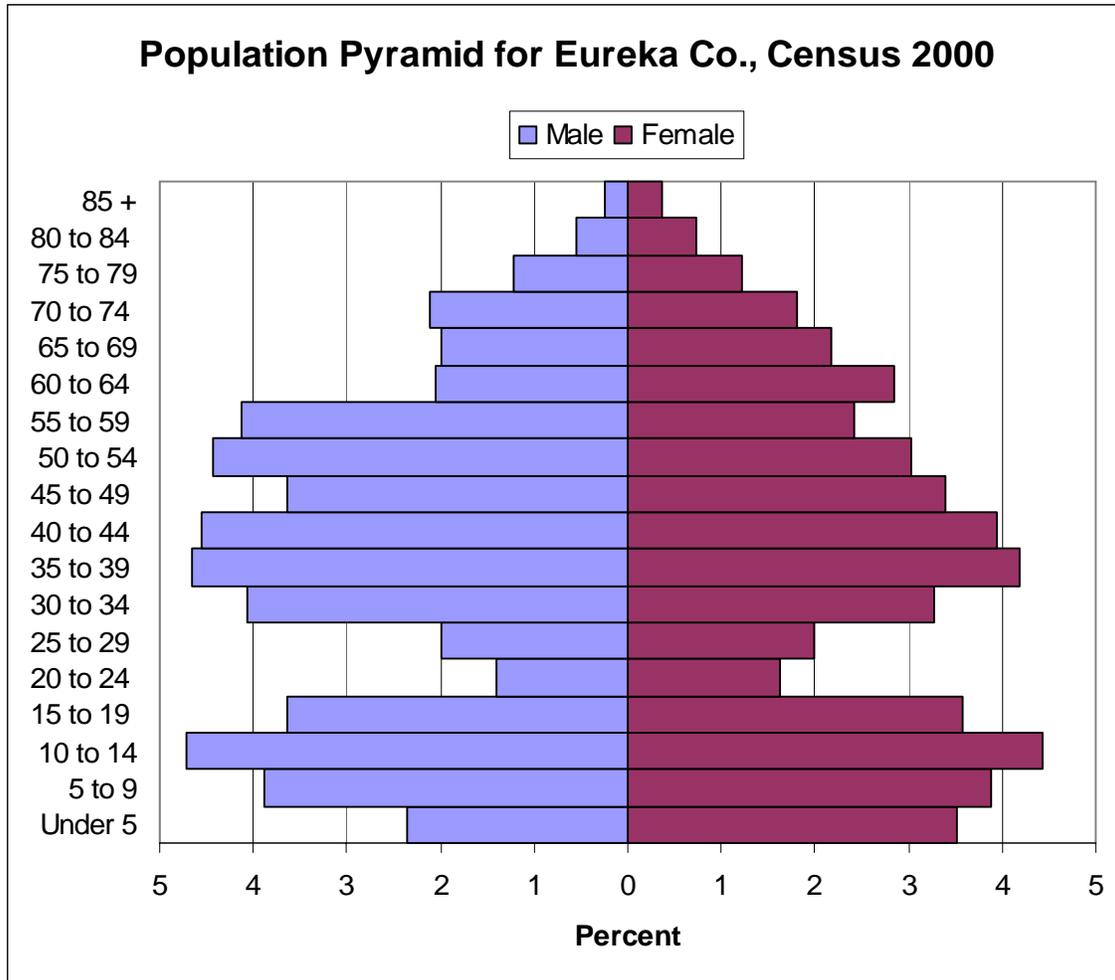


Figure 3. Demographic Pyramid for Eureka County

Demographic characteristics of a county refer to the age and gender composition of its residents. Demographic composition changes slowly over time as new residents are added through birth and immigration, and as previous residents are lost through death and outmigration. The demographic composition of an area is important because it determines the makeup of the labor force, the demands for private goods and services and public services, and the ratio of dependents to employed residents. The demographic composition of an area is usually pictured as a pyramid with the number or percent of males on one side and females on the other, and with the youngest age groups at the bottom and oldest at the top.

Figure 3 shows the demographic pyramid for Eureka County in 2000. There is a bulge in the middle for age groups from 35 to 44 years of age, part of the baby boom generation. The largest 5 year cohort is the group from 10 to 14 years of age who are likely a part of the baby boom “echo”, that is, the children of the large baby boom generation. The small fraction of the

population in the age groups from 20 to 29 is likely because of the national “baby bust” generation of those years as well as outmigration of this age group because of lack of opportunity.

Another aspect of demographics for Eureka County is the median age of population. In Figure 4, the median age for Eureka County is 38.3 years, which is older than the state’s median age of 35 years.

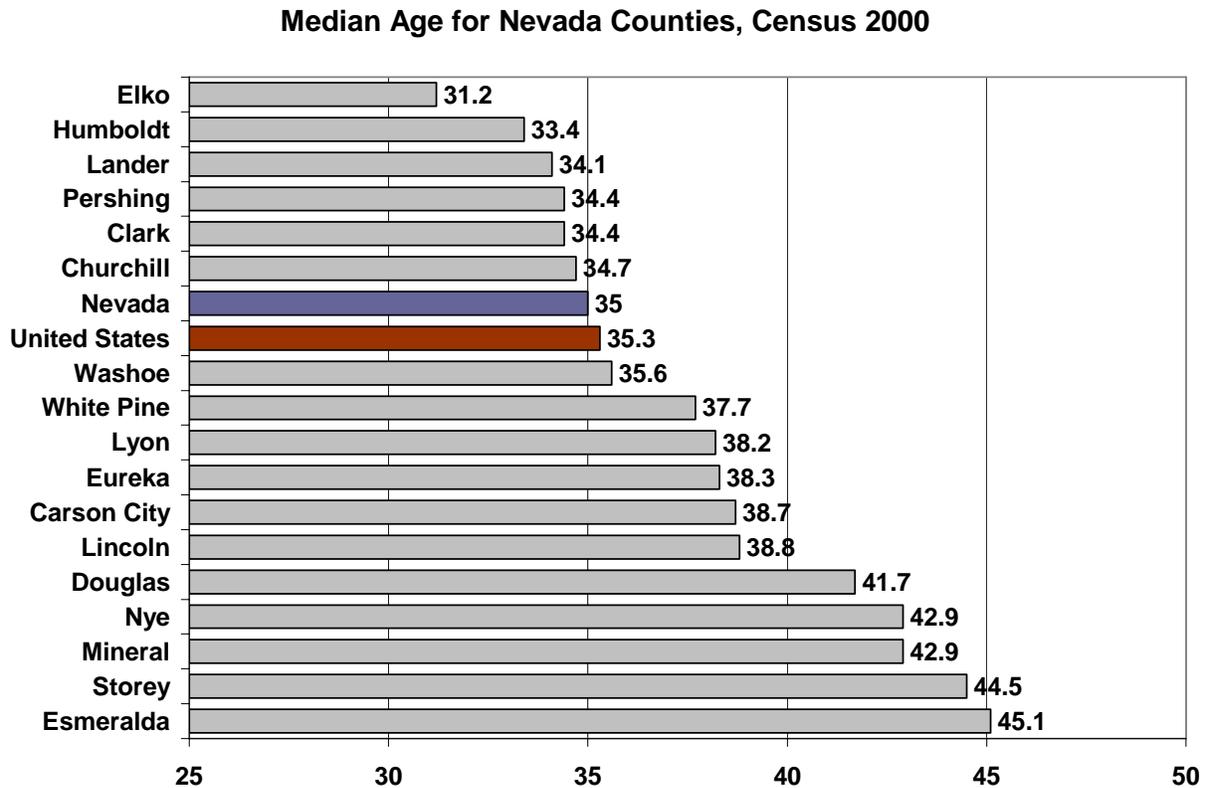


Figure 4. Median Age for All Nevada Counties, Census 2000

The demographic characteristics of Eureka County are somewhat similar to many rural counties in the nation. Often rural counties have higher median age values because the young people with the best education and health, and the most marketable skills and abilities, leave the rural area to realize their potential. With them go some of the area’s future leaders, innovators, and entrepreneurs. Taxes collected in the county, to invest in their education, are now earning dividends for people and economies in other counties and states.

Income

Economic quality of life is difficult to measure because of differences in cost of living and non-monetary income between locations. However, per capita income is still an important basis for comparing economic quality of life, especially among geographically similar areas. On this basis, the economic quality of life in Eureka County was relatively low in 1999. In Figure 5, the per capita income of each county is shown. Eureka County had a per capita income of \$18,629 which was 32 percent lower than the highest per capita income of \$27,288 in Douglas County.

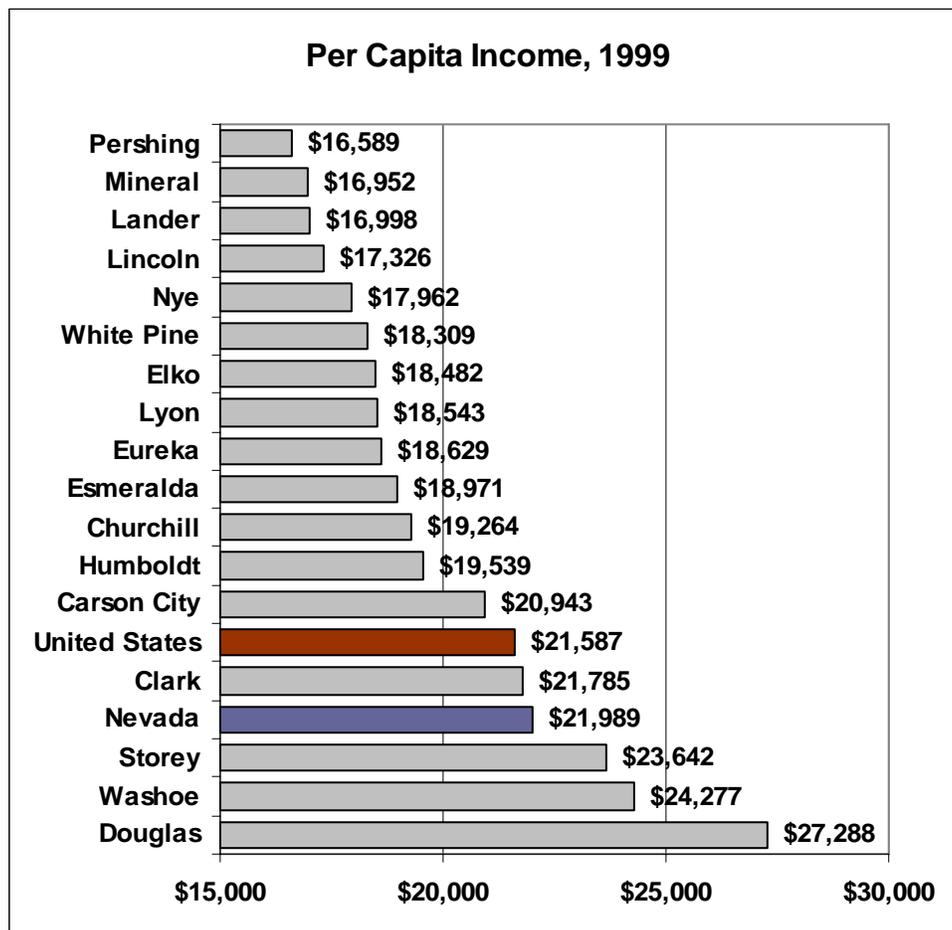


Figure 5. Per Capita Income All Counties, 1999 (in 1999 dollars)

Source for underlying data: U.S. Census Bureau, Census 2000 Summary File 4. GCT-P14. Income and Poverty in 1999, Washington, D.C., 2000.

Another useful measure of economic quality of life is the percent of households below the poverty line. The Census Bureau uses a set of poverty thresholds to classify families as under the poverty level depending on the number of people and children under 18 in the

household. No adjustments are made in the thresholds to account for regional differences in the cost of living.

From Figure 6, Eureka County in 1999 had shown a level of poverty that was higher than many of Nevada’s other counties. The percentage of the population living below the poverty line in Eureka County in 1999 was 12.6 percent. This ranked Eureka County as the fourth highest county in percent of population below the poverty line. As a comparison, the percentage of the population living below the poverty line was 10.5 percent for the state, while the nation’s percentage of the population living below the poverty line was 12.4 percent in 1999. If the cost of living in Eureka County is much lower than the national average, the poverty level statistic may somewhat exaggerate conditions in Eureka County.

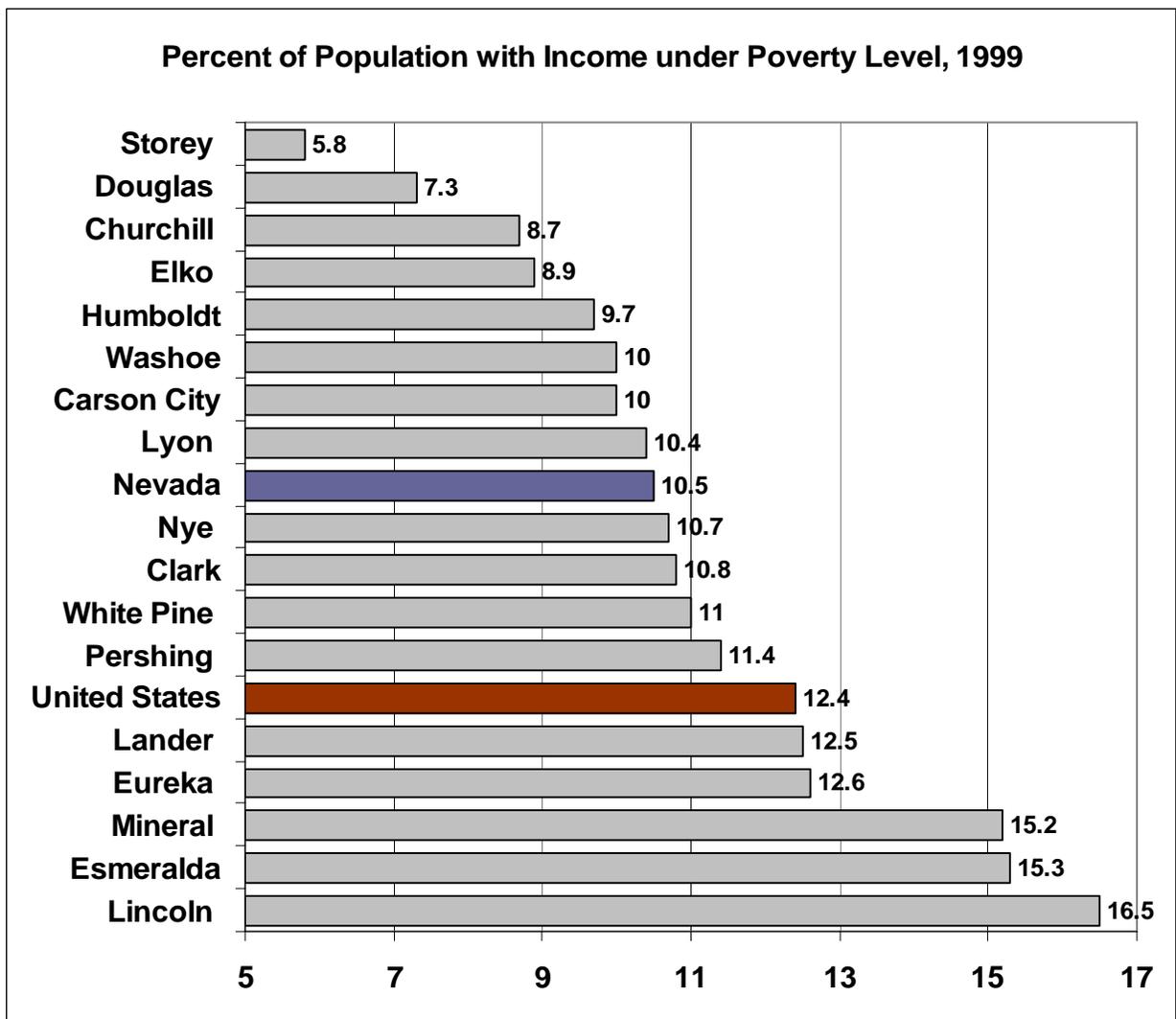


Figure 6. Percent of Population below Poverty Line, 1999

Source for underlying data: U.S. Census Bureau, Census 2000 Summary File 4. GCT-P14. *Income and Poverty in 1999*, Washington, D.C., 2000.

The Economic Base of Eureka County

The economic base of a county refers to the relative size of its industries. A county is said to have a diversified economic base if several industries are relatively large. Conversely, if one or a few industries dominate a local economy, the economy is said to have a concentrated economic base. There are two techniques used to measure economic base and changes in economic base. These are location quotient analysis and shift-share analysis.

Location Quotient Analysis

The degree of concentration of Eureka County industries is determined by calculating location quotients for individual economic sectors. Location quotients indicate the economic importance of each regional industry relative to the same industry at the national level. Location quotients usually use employment as an indicator of an industry's size and importance. The primary focus of location quotients is to identify the industries which are either more important or less important locally than nationally. A broad economic base is indicated by high location quotients in several sectors. The more sectors with high location quotients an economy has, the more stable the economy of a community is likely to be. On the other hand, very low location quotients represent industries that are largely underdeveloped and may offer an opportunity for future development.

An industry's location quotient is the ratio of the industry's share of employment in the county to the industry's share of employment in the nation. It is calculated as follows:

$$LQ_i = \frac{e_i / E}{n_i / N}$$

where:

i = Economic Sector

LQ_i = Location quotient for economic sector i

e_i = County employment in economic sector i

E = Total county employment

n_i = National employment in economic sector i

N = Total national employment

The interpretation of location quotients are as follows:

1. Every industry's output can be divided into two uses: export and local consumption (use).

2. The amount consumed (used) by a community is proportionate to the amount consumed nationally.
3. If the location quotient for an economic sector is less than one, goods and services must be imported to satisfy local demands.
4. If the location quotient for an economic sector is equal to one, then the economy is approximately fulfilling the requirements of the local household and firms.
5. Finally, if the location quotient is greater than one, for that particular economic sector, the community is producing more than it consumes and is capable of exporting excess goods for the purposes of bringing income into the community.

Results of Location Quotient Analysis

Location quotients shown in Table 11 were derived from employment levels in each economic sector at county and national levels using data on covered employment from the Department of Training, Employment and Rehabilitation for 2nd quarters 2002 and 2004².

Given the interpretation of location quotients, economic sectors in Eureka County can be classified as export sectors (that is, they market much of their output outside the county in which they are located) or import industries (that is, a large portion of the demand for goods and services is satisfied by producers outside the county).

The location quotient analysis for Eureka County's economic base for 2nd quarters 2002 and 2004 indicates that the county is highly dependent on the Gold Ore Mining, and Hay Farming Sectors³. The Gold Ore Mining Sector had the highest location quotient value of 14,065 in 2nd quarter 2004 showing the importance of the Gold Ore Mining Sector to the local economy. Also of interest is that despite the decrease in employment in the Gold Ore Mining sector during the period, the location quotient increased because national activity in gold mining decreased more elsewhere. Note that because of disclosure problems, not all sectors can be included in the analysis below.

² Covered employment includes all workers covered by state or federal unemployment insurance.

³ Confidentiality requirements did not permit data on the cattle ranching sector to be displayed. Therefore, no location quotient for this agricultural sub-sector can be calculated.

Table 11. Location Quotient Analysis Results for Eureka County, 1990 and 1995.

Economic Sector	Location Quotient 2 nd quarter 2002	Location Quotient 2 nd quarter 2004
Agriculture, Forestry, Fishing & Hunting	0.89	0.63
Hay Farming	55.12	45.20
Mining	229.52	224.26
Gold Ore Mining	13,143.57	14,065.43
Trade, Transportation and Utilities	0.06	0.07
Retail Trade	0.08	0.08
Transportation and Warehousing	0.03	0.01
Financial Activities	0.03	0.05
Accommodation and Food Services	0.10	0.14
Food Services and Drinking Places	0.11	0.09

Source: Nevada Department of Training, Employment and Rehabilitation. *Quarterly Employment and Wages Series*, Carson City, Nevada, 2005.

Indentation denotes that the indented sector is a sub-sector of the sector above it.

From Table 11, Eureka County imports most of its goods and services. The location quotient analysis can be used to target new industries or businesses for the county and to develop economic strategies for the future. One strategy, for example, might be to encourage the location of input suppliers for the mining and/or agricultural sectors. Also, strategies to strengthen the local retail sector in order to reduce retail sales leakages may be another appropriate economic development strategy.

The Changing Economic Base of Eureka County

The location quotient results indicate the nature of the area's economy for a specific time period. Of additional interest is the change occurring in the county's economic base. Shift-share analysis is performed to measure these changes.

Shift-share analysis, like location quotients, is a measure of a county's economic condition relative to other communities and to the nation as a whole. The data used in this analysis are the same as that used for the location quotient analysis. For this study, the shift in economic base was studied from 2nd quarter 2002 to 2nd quarter 2004.

The purpose of shift-share analysis is to determine the county's competitiveness and changing employment patterns in the industrial market place. Shift-share analysis assumes that there are three components to changes in employment: national growth, industrial mix and competitive share.

National Growth Component

The sum of employment in all industries in all communities makes up national employment. One would expect that if a community's economy was maintaining its relative competitiveness, changes in the level of national employment would be reflected in proportionately equal changes in the local employment. The calculation of the national growth component, therefore, measures how much of the local employment change is due to the national growth trend. The calculation is as follows:

$$\text{National Growth Component} = (\text{rate of change in } N * e_i)$$

where:

$$\text{rate of change in } N = \frac{N_{2qtr2004} - N_{2qtr2002}}{N_{qtr2002}}$$

e_i = county employment in economic sector i

Industrial Mix Component

On a national level, each industry grows or declines at some rate, at least partially independent of the rate of growth in the national economy. A local economy's performance will depend, on its mix of industries, that is, on whether its economic base is concentrated in faster or slower growing industries. The industrial mix calculation indicates the expected growth in local

industries if they grow at the same rate as their national counterparts. The expected local share of the particular industry is determined using the following equation:

$$\text{Industrial Mix Component} = (\text{rate of change in } n_i - \text{rate of change in } N) * e_i$$

n_i = national employment in economic sector i

N = total national employment

e_i = county employment in economic sector i

$$\text{rate of change in } n_i = \frac{n_{i2qtr2004} - n_{i2qtr2002}}{n_{i2qtr2002}}$$

Competitive Share Component

A local industry's employment grows or declines for a number of reasons, including changes in the national employment level, changes in employment by the same industry at the national level, and changes in local conditions. After the first two components have been calculated, the residual change, if any, is attributed to changes in the competitiveness of the local industry. The competitive share component measures this latter factor in employment change.

The competitive share component is measured as follows:

$$\text{Competitive Share} = (\text{rate of change in } e_i - \text{rate of change in } n_i) * e_i$$

where:

e_i = county employment in economic sector i

$$\text{rate of change in } e_i = \frac{e_{i2qtr2004} - e_{i2qtr2002}}{e_{i2qtr2002}}$$

$$\text{rate of change in } n_i = \frac{n_{i2qtr2004} - n_{i2qtr2002}}{n_{i2qtr2002}}$$

Results of Shift-Share Analysis

A local industry's employment grows or declines for a number of reasons, including changes in the national employment level, changes in employment by the same industry at the national level, and changes in local conditions. After the national component and industrial mix component have been calculated, the residual change, if any, is attributed to changes in the competitiveness of the local industry. Tables 12 shows the results of the shift-share analysis for Eureka County for the period from 2nd quarter 2002 to 2nd quarter 2004.

From Table 12, Eureka County overall covered employment decreased by 200 jobs (net) from 2nd quarter 2002 to 2nd quarter 2004. The Gold Ore Mining Sector accounted for 194 lost jobs. Nationally, the Gold Ore Mining Sector also lost employment over the period, decreasing from 8,835 to 8,271 or about 6.4 percent. It is this industrial mix component that accounts for the loss of jobs in this sector, indicating that Eureka County lost these jobs because nationally all Gold Ore Mining Sector employment was decreasing.

For the agricultural sector, changes in the competitiveness of local sectors led to job losses. An economic development strategy would be to investigate the causes for this negative competitive component and, if possible, correct the non-competitiveness of this sector.

Overall, Eureka County realized a decrease in employment over the period from 2nd quarter 2002 to 2nd quarter 2004. National growth component impacted Eureka County employment positively for this study period. The Mining Sector was a major contributor to the decrease in county employment. Analyzing results of both the location quotients and shift-share analysis, Eureka County is highly dependent on the Mining Sector. By diversifying the economic base of Eureka County, it may be possible to lower cyclical swings in the local economy. However, in pursuing the goal of economic diversification, the goal of economic growth must also be addressed.

Table 12. Shift-Share Analysis Results for Eureka County, 2nd quarter 2002 to 2nd quarter 2004.

Economic Sector	(jobs)			
	National Component	Industrial Mix	Competitive Share	Total
Agriculture, Forestry, Fishing & Hunting	0	0	-11	-10
Hay Farming	0	2	-3	-1
Mining	21	47	-278	-210
Gold Ore Mining	21	-232	17	-194
Trade, Transportation and Utilities	0	0	4	4
Retail Trade	0	0	-1	-1
Transportation and Warehousing	0	1	-2	-1
Financial Activities	0	0	3	3
Accommodation and Food Services	0	1	10	11
Food Services and Drinking Places	0	1	-5	-4
Total, All Industries	23	0	-223	-200

Source: Nevada Department of Training, Employment and Rehabilitation. *Quarterly Employment and Wages Series*. Carson City, Nevada, 2005.

Indentation denotes that the indented sector is a sub-sector of the sector above it.

Interindustry Analysis

Within a regional economy, there are numerous economic sectors performing different tasks. All sectors are dependent on each other to some degree. A change in activities will directly or indirectly affect the response or level of production of the other regional sectors. The amount of economic activity among economic sectors shows the degree of interrelationships or linkages between sectors. That is, an increase in production by the regional Cattle Sector would directly increase purchases of alfalfa hay. With increased alfalfa hay purchases, farm workers will have greater incomes which would increase their purchases from the Trade Sector. The Trade Sector would experience increased economic activity because of its indirect relationship with the Cattle and Alfalfa Hay Sectors. These interdependencies among regional economic sectors can be estimated through interindustry analysis.

Transaction Table

An interindustry analysis is based on the transactions of the sectors in an economy, i.e., purchases of inputs and sales of outputs. A transaction table present in Figure 7 shows the monetary flows of goods and services through a regional economy. Transactions can be delineated into four major classifications. One classification (Quadrant I) is the processing section which produces goods and services. Processing sectors in Quadrant I produce and buy products and/or services from other processing sectors to be used in their production process. Goods and services used in the processing section are intermediate goods which are used in the production of goods and services which are ultimately sold to final consumers.

Another classification (Quadrant II) includes sales to final demand of goods and services. The Final Demand Section includes net inventory change, exports, government purchases, capital formation and purchases by households. The third classification (Quadrant III) is the Final Payment Section. The Final Payments Section includes the non-processing supply sectors such as imports, depreciation, and households. Quadrant IV represents direct inputs of final demand which are not produced by industries in the processing sector.

Direct Requirements

The logic of interindustry analysis is to establish the structural relationships among the processing sectors of the model. These relationships can be seen throughout the direct requirements table. A direct requirement coefficient is computed from the processing section (Quadrant I) of the transaction table by dividing the value in a column cell by total output of the column. This can be expressed as:

$$a_{ij} = \frac{x_{ij}}{X_j} \quad i, j = 1, 2, \dots, n$$

where a_{ij} is the purchase by sector j from sector i to produce one dollar of output by sector j , x_{ij} is the dollar value of transactions between sector i and sector j , and X_j is the value of total output for sector j .

The a_{ij} is a direct requirement coefficient which shows how much a given sector purchases from another sector within the same regional economy in order to produce one dollar's worth of output. Direct requirement coefficients are only calculated for the processing sectors.

The column sum of the direct requirements coefficients of a given sector show the direct effects of changes in the volume of output of a given sector upon other sectors of the economy. The direct effect or "first round" effects show how much a given sector has to increase its purchases of output from other processing sectors when there is an increase in demand for the output of the given sector.

Final Demand Interindustry Coefficients

Due to the direct effect of additional output for a given industry, other processing sectors must supply additional inputs. To supply these additional outputs, the directly affected sectors must increase their output levels which means increased purchases from their input supply sectors. This expansion of output by sectors directly and indirectly related to the principal sector that increased its output to meet final demand sales is referred to as a final demand interindustry coefficient. The column sum of final demand interindustry coefficients derives the final demand multiplier for a given economic sector. The final demand multiplier estimates the increase in regional economic activity required for a particular economic sector to increase sales to final demand by one dollar.

Final demand multipliers are calculated for both "open" and "closed" input-output models. An "open" model does not contain a non-processing sector in the processing section of

the transaction table. The final demand multiplier of an “open” model derives both direct and indirect effects of a one dollar increase in sales to final demand for a given sector. Indirect effects are those increases in levels of output for the regional economy that meet the output levels of the directly related industries.

A “closed” input-output model contains at least one non-processing sector in the processing section of the transactions model. Usually the Household Sector is incorporated into the processing section of the transactions table to produce a closed model. The final demand multiplier from a “closed” model derives direct, indirect, and induced effects from a one dollar increase in sales to final demand for a given sector. Induced effects are the effects of new incomes to households upon the individual sectors of the economy from increased sales to final demand by a given sector.

Output Interindustry Coefficients

Final demand interindustry coefficients derive the effects to the regional economy from sales to final demand for a given sector. In order to meet these final demand sales, the given sector must increase production by purchases from itself. This intrasectoral purchasing increases output response by a factor greater than one. In order to estimate economic effects from total production rather than from deliveries outside the processing sectors, output interindustry coefficients are required.

Output interindustry coefficients are calculated by dividing each column entry in the final demand interindustry coefficient matrix by the given sector’s intrasectoral interindustry coefficient. This will derive intrasectoral coefficients equal to one. The other entries in the final demand interindustry coefficients matrix are adjusted similarly to refer to production rather than external end product deliveries by dividing all entries in each row by the entry at the intersection with the corresponding column or the intrasectoral coefficient.

Direct and indirect output multiplier coefficients are derived from an “open” model. Indirect effects are the increased purchases in the regional economy created by the purchases of the directly affected sectors from a given sector’s increase in production. Direct, indirect, and induced output interindustry coefficients are derived from a “closed” model. Induced effects are the increase in regional economic activity from increases in household incomes created by production increases for a given sector.

Employment Effects

Interindustry analysis is used to determine the effects on the regional economy from changes in a given sector's level of output or sales to final demand. Interindustry analysis also can be used to derive the effects on regional employment from changes in a given sector's sales to final demand or output level. Studies by Elrod and Laferney (1972) and Osborn et al. (1973) have derived procedures to determine regional employment impacts from input-output models.

To determine employment effects, it is first required that the direct labor effects for each of the n processing sectors be derived, or:

$$L_j = \frac{E_j}{X_j} \quad j = 1, 2, \dots, n$$

where L_j is the number of employees required per dollar of output by sector j ; E_j is the number of workers employed by sector j ; and X_j is the dollar value of production by sector j .

From the direct employment requirements vector for each processing sector in the region, direct and indirect labor requirements from a one dollar sale to final demand by a given sector can be derived by premultiplying the direct labor coefficients matrix by the "open" final demand interindustry coefficient matrix. Indirect labor effects are the number of workers employed elsewhere in the regional economy to produce the direct and indirect inputs used by each sector.

Premultiplying the direct labor requirements matrix by the "closed" interindustry coefficients matrix derives the direct, indirect, and induced employment effects in the region from a given sector's change in sales to final demand interindustry coefficients matrix. Direct and indirect employment effects and direct, indirect, and induced employment effects from changes in a given sector's level of output can be derived from the "open" or "closed" output interindustry coefficients matrix.

Household Income Effects

The effects on regional household incomes from changes in sectoral sales to final demand and levels of output can be derived through interindustry analysis. If households are exogenous to the model, that is, the model is “open”; the derivation of direct and indirect household income effects requires the determination of a direct household income vector. The direct household income vector is the division of the Household Sector row value for each processing sector by the total output of that sector. Direct and indirect household income effects from changes in sales to final demand by a given sector are derived by multiplying the direct household income requirements by the “open” final demand interindustry coefficient matrix. The indirect income effects are those increases in regional income created by increased production activities from those sectors indirectly related to the direct resources supply sectors.

When the Household Sector is made endogenous to the processing section or what is referred to as a “closed” model, direct, indirect, and induced household income effects are derived. Induced income effects are the changes in regional incomes created by the additional purchases of regional households created by the change in a given sector’s sale to final demand. Direct, indirect, and induced household income effects can be read directly off the “closed” final demand interindustry coefficients matrix. The coefficients are the values from the household row in the interindustry coefficients matrix for each given processing sector. Using the output interindustry coefficients matrix, the effects on household income from changes in a given sector’s level of production can be derived.

Eureka County Input-Output Model Development

An input-output model for Eureka County was developed using the microcomputer IMPLAN model and supplemented by primary data at the local level. The Micro IMPLAN model was originally developed by the U.S. Forest Service to estimate sectoral and regional impacts of alternative forest management scenarios (Alward et al. 1989). The update and further development of the Micro IMPLAN have been conducted by the Minnesota IMPLAN Group, Inc. (1999).

County input-output models can be developed from either primary or secondary data. County input-output models derived through primary data sources are time consuming and very costly. Secondary data procedures use publicly available data sources to estimate county level

interindustry models from the national input-output model. IMPLAN uses regional purchase coefficients to estimate regional or county level input-output models. Numerous studies have examined differences between primary and secondary data input-output models (Round, 1983; Schaffer and Chu, 1969; Stevens et al., 1983). Studies have shown differences between these models when compared to primary models, and it has been found that hybrid models provide the best compromise between accuracy and affordability (Miller and Blair, 1985).

The input-output model developed for Eureka County is a hybrid model. An IMPLAN model for Eureka County was first developed. The IMPLAN model was then modified to reflect the agricultural economy of Eureka County through the use of University of Nevada Cooperative Extension budgets (Curtis, et al. 2005a; Curtis, et al., 2005b). Procedures developed by Coupal and Holland (1998) were used.

Procedures outlined by Lahr (1993) were employed to validate IMPLAN data and values for the other sectors in the Eureka County model. Business owners were interviewed to ascertain proportion of total value of sales that were export and the proportion of total input costs that were imports. If necessary the original Eureka County input-output model was modified to incorporate the values elicited from Eureka County firms.

From the modified IMPLAN Eureka County input-output model proper Eureka County economic linkages were developed. From this model sectoral economic, employment, and household income multipliers were estimated.

Final Demand, Employment and Household Income Multipliers

The total of interindustry (direct, indirect and induced) effects per one dollar change in sales to final demand for forty sectors in Eureka County is shown in Table 13 (column 1). These are called final demand multipliers. The final demand multiplier for the Cattle Sector is 2.0283. The multiplier indicates that if sales of the Cattle Sector to final demand increase by one dollar, total Eureka County economy would increase by \$2.0283. Using the final demand coefficient matrix, the individual sectoral impacts can be derived from changes in sales to final demand. Final demand multipliers values range from 1.1671 for the Manufacturing Sector to 2.1477 for the Local Government Sector. The large multiplier for the Cattle Sector is indicative of this sector's economic linkages with other sectors in the Eureka County economy. As for sectors with lower multipliers, these results may indicate a need for local economic development initiatives to strengthen economic linkages of these sectors with others in the local economy.

Table 13 also shows employment and household income multipliers. Employment multipliers indicate the total number of jobs added in Eureka County when a given sector increases employment by one employee. Therefore, for the Cattle Sector, the employment multiplier is 1.4439. This means that when the Cattle Sector increases employment by one employee, total employment in Eureka County increases by 1.4439 employees. Employment multipliers range from 1.0409 for the Leisure and Hospitality Sector to 1.6170 for the Timothy Hay Sector.

Income multipliers indicate the amount that household income in Eureka County increases when a given sector increases income by \$1. For example, household income in Eureka County will increase by \$1.6812 when the Cattle Sector increases household income by \$1.00. Household income multipliers range from 1.1017 for the Utilities Sector to 1.6812 for the Cattle Ranching Sector.

Table 13. Final Demand, Employment, and Income Multipliers for Eureka County, 2002.

SECTOR	FINAL DEMAND MULTIPLIER	EMPLOYMENT MULTIPLIER	HOUSEHOLD INCOME MULTIPLIER
Timothy Hay	1.6951	1.6170	1.2793
Alfalfa Hay	1.6591	1.3844	1.2854
Cattle Ranching	2.0283	1.4439	1.6812
All Other Agriculture	1.7953	1.0606	1.1963
Gold, Silver, and Other			
Metal Ore Mining	1.7086	1.1350	1.1128
All Other Mining	1.6758	1.0670	1.1171
Utilities	1.7406	1.3134	1.1017
Construction	1.6217	1.1099	1.1523
Manufacturing	1.1671	1.1467	1.3538
Transportation	1.5392	1.1468	1.1967
Wholesale and Retail			
Trade	1.7780	1.0480	1.1362
Communications	1.8804	1.2777	1.1998
Financial Services	1.8593	1.1565	1.1616
Other Education and			
Health	1.9582	1.0726	1.1394
Leisure and Hospitality	1.6318	1.0409	1.2235
All Other Services	1.5698	1.1562	1.2722
Local Government	2.1477	1.0711	1.1102

Impact Analysis

What will be the economic impact of a proposed project or development? What will be the total regional impact on income and employment resulting from the establishment of a new plant? What type of industry, if established, will create the most economic activity? These are questions which are difficult to answer, but leaders in business and government require such information for purposes of evaluating how various projects and program will affect the economic activity in a region.

Community leaders are asking for information on the different abilities of various industries to generate new jobs. Decision makers need to know how the available resources in a region can best be used for further development and economic growth.

There are similar types of questions constantly facing Nevada businessmen and government leaders. Before expanding their facilities, businessmen attempt to evaluate the demand for increased production of goods and services. Others in the region are interested in the impact that new or expanded industries will have on businesses. Those who finance a new plant in an area want to know the impact the new facility will have on the economic activity of the state.

Information is also needed to measure declines in economic activity as well as increases. For example, what will be the effect on the economy if a plant or department of defense base closes its doors? What will be the total regional impact on income and employment resulting from lower levels of production activities by the agricultural or mining sector from changes in public land management policies? Employment and income would directly decline by the size of the employed labor force or payroll of the closed plant or affected industry. Other businesses in the region however would also feel the effects as lesser amounts of their goods and services would be demanded. Impact analysis can be used to estimate the regional impacts of increased or decreased economic activity in a regional economy. (Key items to be considered when a county anticipates economic change are shown in Appendix C).

Impact analysis is a technique which uses the economic linkages between and among local economic sectors for household income, employment and industry output. This technique requires an input-output model of the local economic sectors to be developed showing the

relationship between inputs and output of various sectors. The model numerically calculates the linkages between various economic sectors. The model solution shows impacts on local economic activity, employment, and income from a given sector's change in sales or level of production. From these impact estimates, the community gains an understanding of potential overall impacts to a local economy from alternative economic development and governmental policies.

A Eureka County input-output model was developed with nineteen economic sectors. The model is used to estimate the economic linkages within Eureka County and to derive impacts to the Eureka County economy from various policies. Input-output multipliers that calculate sectoral linkages are also derived from the model solution.

Impact Analysis Example

The following example illustrates how impact analysis is used for estimating economic impacts. For illustrative purposes, assume that export sales for the Gold Mining Sector and the Alfalfa Hay Sector in Eureka County increased by \$1,000,000, respectively. Assume that these increased levels of export are the result of local economic development efforts. Economic impacts are estimated for economic activity, employment, and household income using the input-output model. These impacts are discussed with regard to total impacts, sectoral impacts, and distributional impacts. Table 14 shows the estimated total impacts on economic activity, employment and income that would occur in Eureka County.

Table 14. Total Impacts from a \$1,000,000 Increase in Export Sales by the Alfalfa Hay Sector and the Gold Mining Sector, Respectively, in Eureka County.

Economic Sector	Economic Activity Impact (\$1,000)	Employment Impact (Jobs)	Income Impact (\$1,000)
Alfalfa Hay Sector	1,659.1	8.7	471.7
Gold Mining Sector	1,708.6	5.4	609.8

Eureka County is estimated to realize an increase in economic activity of approximately \$1,659,100 with corresponding increase in employment and income of 9 jobs and \$471,700, respectively, from a \$1,000,000 increase in export sales by the Alfalfa Hay Sector. Also the county realizes an increase in export sales by the Gold Mining Sector of a \$1,000,000 which increases economic activity by approximately \$1,708,600 with corresponding increases in employment and income of 5.4 jobs and \$609,800, respectively.

In addition, input-output models can derive distributional impacts by sectors. Results of the distributional impacts can derive the linkages of Eureka County economic sectors and assist in estimation county fiscal impacts.

Summary

During the 1990's and early 2000's, Eureka County experienced periods of rapid economic growth with some instability and downturns in the economy as well. The rapid growth of the local Gold Mining Sector has been the primary impetus for economic growth. However, most of these gold mining operations are located in northern Eureka County with substantial numbers of workers living in Elko County. Therefore, the economic impacts of expanded household consumption are lost somewhat to Eureka County. Gold prices decreased from 1996 to 2002 with the consequence of reduced income to the gold mining industry and potential decreases in gold mining production.

To help local decision makers understand economic linkages in the local economy and provide analysis regarding alternative economic diversification strategies, an input-output model for Eureka County was developed. This model shows the economic linkages among county economic sectors and can be used to estimate regional activity, employment and income impacts to Eureka County from alternative changes in the local economy.

Final demand, employment, and income multipliers are estimated for each sector in Eureka County. The individual sectoral multipliers are presented in this report. Both public and private sector decision makers can readily use these multipliers to estimate economic impacts of changes in final demand sales or changes in production caused by changes in product market export sales, natural resource supplies, or government policy. The model can also be expanded to estimate potential impacts of a new economic sector locating in Eureka County.

References

- Alward, G., E. Siverts, D. Olson, J. Wagner, D. Senf, and S. Lindall. "Micro IMPLAN: Software Manual." U.S. Forest Service, Colorado State University, Fort Collins, Colorado, 1989.
- Coupal, R. and D. Holland. "The Economic Contributions of the Wheat Industry to Eastern Washington Economy." Agricultural Economics Staff Paper, A.E. 95-4, Department of Agricultural Economics, Washington State University, Pullman, Washington, 1998.
- Curtis, K, A. Mori, and W. Riggs. *Eureka County Cow-Calf Production Costs and Returns, 2004*. University of Nevada Cooperative Extension Fact Sheet, FS-05, 2005.
- Curtis, K., R. Koewler, and W. Riggs. *Eureka County Forage Establishment and Production Costs, 2004*. University of Nevada Cooperative Extension Fact Sheet, FS-05, 2005.
- Elrod, R. and P. Laferney. "Sector Income and Employment Multipliers-Their Interactions on the National Economy." U.S. Department of Agriculture, ERS, Technical Bulletin No. 1421, Washington, D.C., 1972.
- Lahr, M. "A Survey of Literature Supporting the Hybrid Approach to Constructing Regional Input-Output Models", *Economic Systems Research*, 5(1993): 277-293.
- Minnesota IMPLAN User's Group, Inc., *User's Guide, Analysis Guide, and Data Guide: IMPLAN Professional, Version 2.0*, Minnesota IMPLAN User's Group: Stillwater, Minnesota, 1999.
- Nevada Department of Training, Employment, and Rehabilitation. *Quarterly Employment Series*, Carson City, Nevada, 2005.
- Nevada State Demographer's Office. *Population of Nevada's Counties and Incorporated Cities*. College of Business Administration, University of Nevada, Reno, 2005.
- Osborn, J., H. Grubb, T. Harris, and T. Swan. "An Input-Output Model Analysis of the Texas High Plains Labor Employment Potentials to 1980." Office of Information Services, Austin, Texas, Technical Report T-1-116, 1973.
- Round, J. "Nonsurvey Techniques: A Critical Review of the Theory and Evidence." *International Regional Science Review* 8:189-212, 1983.
- Schaffer, W. and K. Chu. "Non-Survey Techniques for Constructing Regional Interindustry Models." *Regional Science Association Paper* 23:83-101, 1969.

Stevens, B., G. Treyz, D. Ehrlich, and J. Bower. "A New Technique for Construction of Non-Survey Regional Input-Output Models." *International Regional Science Review* 8:271-286, 1983.

U.S. Census Bureau. Census 2000 Summary File 4. GCT-P14. *Income and Poverty in 1999*. Washington, D.C., 2000.

U.S. Department of Commerce. *Regional Economic Information System*. Bureau of Economic Analysis: Washington, D.C., 2005.

Zimmerman, J. and T. Harris. *An Update of Federal and State-Land Based Payments in Nevada*. University of Nevada, Reno, University Center for Economic Development Technical Report UCED 2000/01-06, 2000.

**APPENDIX A:
LISTING OF ECONOMIC
SECTORS**

Table A.1. Sectors and Sector Definitions for the Eureka County Interindustry Model.

	Eureka Industries IMPLAN #	IMPLAN Description
Timothy	9*	Timothy Hay
Alfalfa	10*	Alfalfa Hay
Cattle Ranching	11	Cattle ranching and farming
All Other Agriculture	2	Grain farming
	13	Animal production, except cattle and poultry
	18	Agriculture and forestry support activities
Gold Mining	23	Gold, silver, and other metal ore mining
Other Mining	26	Other nonmetallic mineral mining
	29	Support activities for other mining
Utilities	30	Power generation and supply
Construction	33	New residential 1-unit structures, nonfarm
	34	New multifamily housing structures, nonfarm
	35	New residential additions and alterations, nonfarm
	38	Commercial and institutional buildings
	39	Highway, street, bridge, and tunnel construction
	40	Water, sewer, and pipeline construction
	41	Other new construction
Manufacturing	43	Maintenance and repair of nonresidential buildings
	47	Other animal food manufacturing
Transportation	207	Steel wire drawing
	394	Truck transportation
	396	Pipeline transportation
	398	Postal service
Trade	390	Wholesale trade
	401	Motor vehicle and parts dealers
	404	Building material and garden supply stores
	405	Food and beverage stores
	407	Gasoline stations
Communications	412	Nonstore retailers
	422	Telecommunications
Financial Services	430	Monetary authorities and depository credit intermediation
	431	Real estate
Other Education/Health	463	Other educational services
	465	Offices of physicians, dentists, and other health practitioners
Leisure and Hospitality	479	Hotels and motels, including casino hotels
	481	Food services and drinking places
Other Services	434	Machinery and equipment rental and leasing
	485	Commercial machinery repair and maintenance
	492	Grantmaking and giving and social advocacy organizations
Local Government	499	Other State and Local government enterprises
	503	State & Local Education
	504	State & Local Non-Education

* Sectors 9 and 10 were modified from original IMPLAN sectors.

APPENDIX B:
SOURCES OF DATA FOR EUREKA COUNTY
INPUT-OUTPUT MODEL

Sources

- Curtis, Kynda R., R. Koewler, W.W. Riggs. 2005. Eureka County Forage Establishment and Production Costs, 2004. Draft Fact Sheet FS-05. University of Nevada, Reno, Cooperative Extension.
- Curtis, Kynda R., R. Koewler, W.W. Riggs. 2005. Eureka County Cow-Calf Production Costs and Returns, 2004. Draft Fact Sheet FS-05. University of Nevada, Reno, Cooperative Extension.
- Minnesota IMPLAN Group, Inc. IMPLAN Professional Version 2.0: Social Accounting and Impact Analysis Software. Minnesota IMPLAN Group, Inc.: Stillwater, Minnesota, 2004.
- Minnesota IMPLAN Group, Inc. IMPLAN Professional Version 2.0: User's Guide, Analysis Guide, Data Guide. Minnesota IMPLAN Group, Inc.: Stillwater, Minnesota, 2004.
- U.S. Department of Agriculture. National Agricultural Statistics Service. Nevada Agricultural Statistics for 2003-2004. Nevada Agricultural Statistics Service. Reno Nevada. Selected 2002-2003 Statistics Tables.
- U.S. Department of Commerce. Bureau of Economic Analysis. Regional Economic Information System. Washington, D.C.: Bureau of Commerce, 2005.

APPENDIX C:
PRIVATE SECTOR, LOCAL GOVERNMENT, AND NON-MARKET
IMPACTS FROM ECONOMIC CHANGES

Table C.1. Impacts of Economic Change on the Private Sector - Important Consideration

1. How many workers will be hired by the new business activity? What is the dollar value of the anticipated payroll? What will be the value of production or sales from the new business activity?
 2. What is the "multiplier" effect and how can it be appraised in a community?
 3. When will the new workers be hired? When will the payroll be generated? And when will the new purchases and sales be made in the local economy?
 4. Is the new economy activity associated with construction or operation of the business?
 5. Will the new economic activity stimulate construction in related businesses, housing, and service and trade sectors of the economy?
 6. Do the changes in employment, income, and sales represent net or gross additions to the community's economic base?
 7. How does the new economic activity compliment the local economic situation?
 8. What will be the incidence of the impacts? More specifically which people and businesses are likely to benefit, and which people and businesses are likely to bear the costs of the economic development.
-

Source: Gordon, John. "Considering Economic Change in the Community's Private Sector", in How Extension Can Help Communities Conduct Impact Analysis, University of Wisconsin Extension, 1982.

Table C. 2. Impacts of Economic Change on the Local Government Sector-Important Considerations.

1. Within what governmental jurisdictions will new families live?
 2. How many in-migrant families are expected, and what is their anticipated income level?
 3. How many school-age children are expected?
 4. Do the public services and schools have excess capacity, or would expansions be required to maintain the quality of service at predevelopment levels?
 5. Are there migration fees to cover additional public service costs?
 6. Will state and federal aid increase as population grows?
 7. When will the project be completed?
 8. Does the expenditure estimation procedure used include only the additional costs associated with the new growth?
 9. Will new revenues be divided among more than one governmental unit, such as city, county, and school district? If so, how much additional revenue will each receive?
 10. When will the public Expenditures for the project begin and when will the community begin receiving project-generated revenues? How will these change over time?
 11. Will projected demands for service require a change in tax rates or a change in the level of service?
 12. Who benefits and who loses from the development?
 13. Will tax abatements or other publicly supported inducements be used to encourage this growth?
 14. Is the project capital-or labor-intensive?
 15. What is the probability that the firm will remain in the area and operate successfully over a five, 10, or 20 year period?
 16. What are the income and employment multiplier effects of the new industry?
 17. How will this development and associated population growth affect state aid to education and local property tax revenues in your state?
-

Source: Morse, George and George McDowell, "Estimating the Impacts of Growth on Local Governments", in How Extension Can Help Communities Conduct Impact Analysis, University of Wisconsin-Extension, 1982.

Table C.3. Nonmarket Impacts of Economic Change-Important Considerations

- I. Distribution: Who Will Be Affected?
 - A. Will effects vary among geographic sectors of the community?
 - B. What income groups will be affected and in what ways?
 - C. Will all or just certain economic sectors of the community have to make adjustments?
 - D. Will the impacts vary over time?

 - II. Employment-Related Impacts.
 - A. Will the new jobs be satisfying to workers?
 - B. Effects on commuting time and distance. How far must local residents travel to their new jobs?
 - C. Will the jobs be permanent or will they be highly sensitive to managerial decision and economic trends?
 - D. Will the workers perceive the new jobs as an improvement over previous conditions?

 - III. Population-Related Impacts.
 - A. Demographic.
 - 1. How much in-migration will occur?
 - 2. Will the newcomers and their families match or be different from the prevalent age and family structure of the community?
 - 3. What value changes might occur?
 - 4. Can the newcomers easily be integrated into the community social structure or will adjustments be needed?
 - B. Housing.
 - 1. How will the value of housing change?
 - 2. How will the quality of housing change?
 - 3. What changes in housing ownership will occur?
 - 4. What type of new housing will be needed?

 - IV. Community Ecology.
 - A. How will communication networks be affected?
 - B. How will religious organizations be affected?
 - C. How will participation in community affairs be affected?
 - D. What different internal-external linkages will appear?
 - E. Will satisfaction with the community change?

 - V. Political and Local Government.
 - A. Political
 - 1. What leadership changes will occur?
 - 2. Will voter participation change?
 - B. How will public recreation facilities and use be altered?
 - C. Will physical safety of workers and residents change?
 - D. What short-and long-term health effect could occur?
-

Source: Shaffer, Ron. "Nonmarket Impacts from Economic Development", in How Extension Can Help Communities Conduct Impact Analysis, University of Wisconsin-Extension, 1982.99