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Economic Development Report

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THE ECONOMIC BASE OF MOFFAT COUNTY, COLORADO

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Introduction

This report is intended to provide information regarding economic conditions in Moffat County in order to help to inform economic development planning in the county. Data were synthesized from a variety of governmental and nongovernmental sources to create this report. Focal areas of information presented here include: principal land uses, population trends, employment, income, agriculture as a primary driver of county economic activity and private land use, and commuting patterns of county residents and nonresidents. In addition, an economic base analysis provides improved understanding of the interconnectedness of the economic sectors of the Moffat County economy. Data are presented in visually accessible manner, with detailed supplementary figures and tables included as appendices. A time series of information is provided where appropriate and available. Land use and economic development scenarios illustrating the use of these data in community planning were informed and guided substantially through community presentations and work sessions to identify issues of particular interest.

It is important to note that these numbers do not tell the whole story about the Moffat County economy, nor do policy prescriptions automatically fall from the numbers. Specifically, these economic data do not provide a precise view of community welfare nor do they pro-

vide any indicator of past, current or future environmental value or quality, which may have important implications for local standard of living and economic opportunity. Complementary sources of information, local knowledge and civic dialogue must be combined with information found in this report in order to arrive at public policies that will reach the long term social and economic objectives of the people of Moffat County. We submit this report with these goals and caveats in mind.

Land Use

Moffat County covers an area of 4,742 square miles or 3,043,411 total acres, an area roughly the size of the state of Connecticut. The county has an average of 300 days of sunshine per year. The city of Craig is both the County Seat and the largest city in the county. Craig is located at the junction of U.S. Route 40 and Colorado State Highway 13. According to City of Craig data, the land is characterized as semi-arid with an average annual precipitation of 13.5 inches.

The federal government is the principal land manager in the county, controlling 56% of the land (Figures 1 and 3). Private ownership accounts for 37% of the land and the remaining 7% is controlled by the State of Colorado. Of the 1,733,326 federally managed acres of land in Moffat County, the Bureau of Land Management controls 88%, 9% are managed by the National

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Park Service, the National Forest Service owns 2%, and 1% are owned by the Fish and Wildlife Service (Figure 2).

Dinosaur National Monument is primarily located in Moffat County and, according to a Federal Transit Administration report, draws on average 450,000 visitors annually. However, roughly half of these visitors spend no more than two hours in the monument and only visit the quarry, which is not located in Moffat County. Moffat County also has many square miles of national forest, special recreation areas and areas of critical environmental concern (Figure 1).

Agriculture accounts for 34% of the total land use in the county and 93% of the private land use. The acreage in farms decreased 11% from 1,159,813 acres in 1992 to 1,031,091 acres in 1997. Despite this decrease, the 15-year trend in agricultural acres has remained fairly stable and the amount of land in farms in 1982 is roughly equivalent to the land in farms in 1997. Agricultural activity tends to be located along the rivers in the county, including the Little Snake, Vermillion, Yampa, and White Rivers.

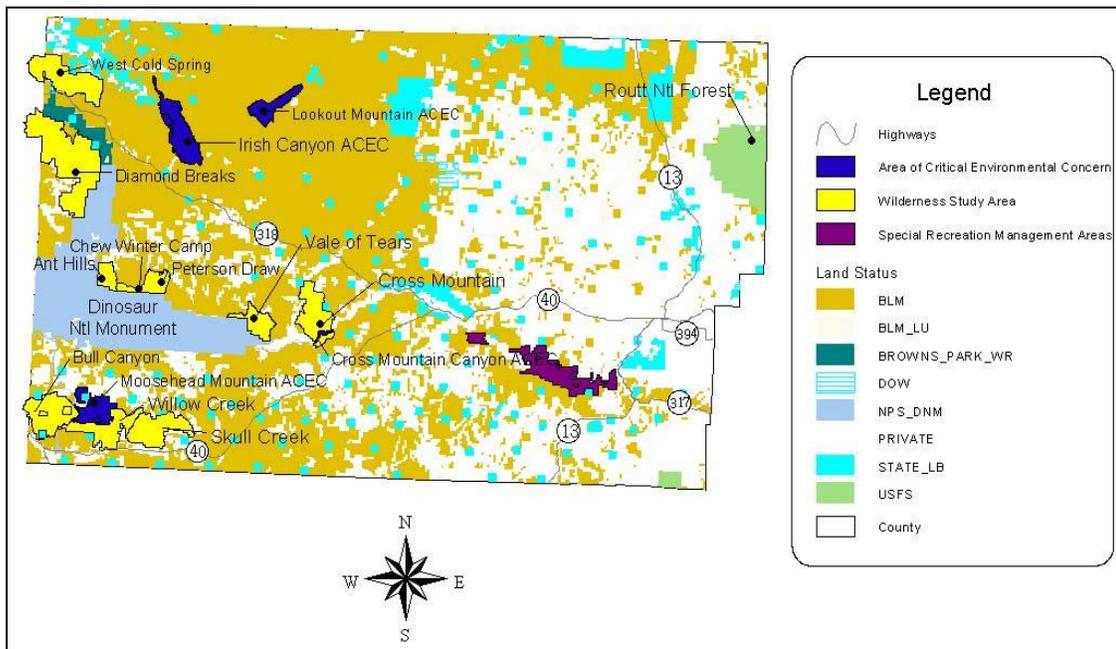


Figure 1 - Land Use in Moffat County (Source: Moffat County Government)

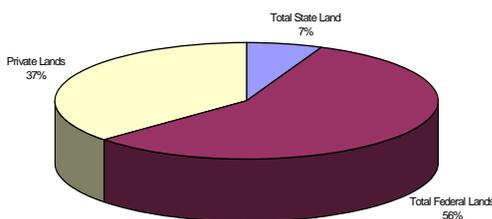


Figure 2 - Total Land Use in Moffat County (Source: Colorado Department of Agriculture)

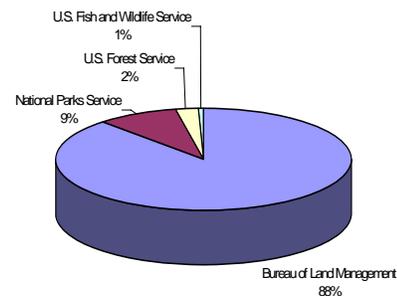


Figure 3 - Federal Land Ownership in Moffat County (Source: Colorado Department of Agriculture)

Population

Moffat County is relatively sparsely populated with a population density of 2.8 persons per square mile. By comparison, the state of Connecticut, which is similar in land area, has a population density of 679 persons per square mile and the state of Colorado has an average population density of 41.5 persons per square mile.

The population of Moffat County was estimated as just over 13,200 people in 2001, ranking it 32nd out of the 63 (now 64) counties in the state of Colorado. The population in the county has grown steadily over the 1990s, up from around 11,400 people in 1990, representing a 16% growth over the past decade (Figure 4). The average population growth rate through the 1990's was about 2% per year. This trend, however has leveled off over the past three years and population growth has been flat for 1999, 2000, and 2001. Population growth estimates from the Colorado Bureau of Local Affairs predict that the population of the county will grow by an average rate of 1.2% annually over the next 20 years.

Females make up 48.1% of the county's population. By comparison, females make up 51% of the U.S. population and 49.6% of Colorado's population.

Ethnically, Whites comprise 93.6% of the county's population, while people of Hispanic descent make up 9.5%. Native Americans represent 0.9% of the population, followed by Asians (0.3%), and African Ameri-

cans (0.2%). An estimated 4% of the county's population is foreign born (United States Census, 2000).

According to the 2000 Census, 6.8% of the county's population is under 5 years old and 28.5% of the population is under 18 years old (Figure 5), slightly above the state level of 25.6%. The majority of the county's inhabitants are ages 25 to 44 yrs and the median age was 35.4 yrs in 2000 (Figure 6). Of the county's total population, 23% was under the age of 15 yrs, 14% was 15 to 24 yrs, 29.9% was between 25 and 44 yrs, 23.8% was between 45 and 65 yrs, and 9.4% of the population was over the age of 65 yrs.

According to the 2000 Census, 79.6% of the population has a high school diploma, compared to 86.9% of the statewide population. Twelve and a half percent of the county has a bachelor's degree or higher, while 32.7% of the state's population has earned a bachelor's degree.

In 2000, Moffat County had 4,983 households in 5,635 housing units with an average of 2.58 people per household. The home ownership rate in the county was 72.1% and 16.4% of the housing units were in multi-unit structures. According to the 2000 Census, the median value of owner occupied housing units was \$104,600, which is considerably lower than the state median home value of \$166,600. The median residential monthly rent in the county was \$453, which was well below the state median of \$671 a month.

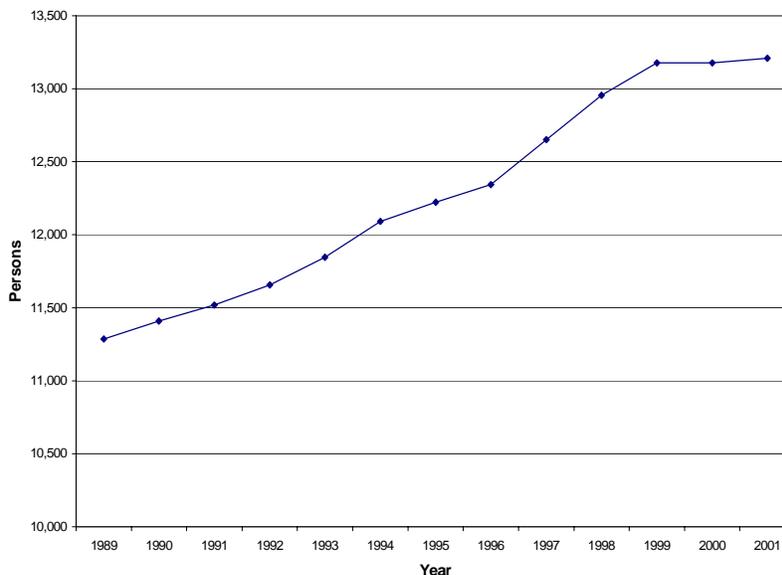


Figure 4 - Population Trend in Moffat County

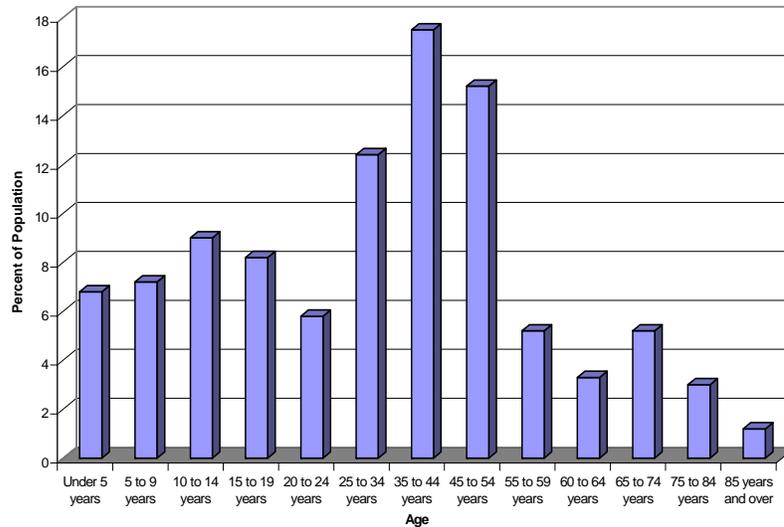


Figure 5 - Persons by Age in Moffat County
(Source: U.S. Bureau of Economic Analysis)

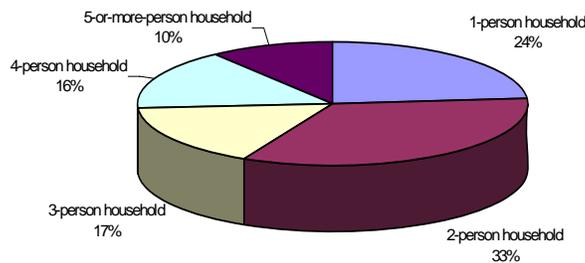


Figure 6 - Households by Size in Moffat County
(Source: U.S. Bureau of Economic Analysis)

According to the 2000 U.S. Census, the majority of the households in Moffat County were characterized as two-person, accounting for a third of all households (Figure 6). The next largest designation were single-person households, which accounted for 24% of the total, followed by three-person households (17%), four-person (16%), and households with five or more people (10%).

Employment

Based on U.S. Bureau of Economic Analysis data, total full and part time employment in Moffat County in

2000 was 7,388, up from 6,395 in 1990 (Figure 7). The majority of these jobs were wage and salary employment (people who work for someone else). Self-employment (an indication of entrepreneurship and a quality workforce) accounted for the remaining 30% of employment. The percentage of self-employment in Moffat County has risen by 11% since 1989. Private non-farm employment represented 75% of the total jobs in the county during 2000 (Figure 8). Government and government enterprises supplied 17% of the jobs in the county and farm employment comprised the remaining 8% of the total county employment.

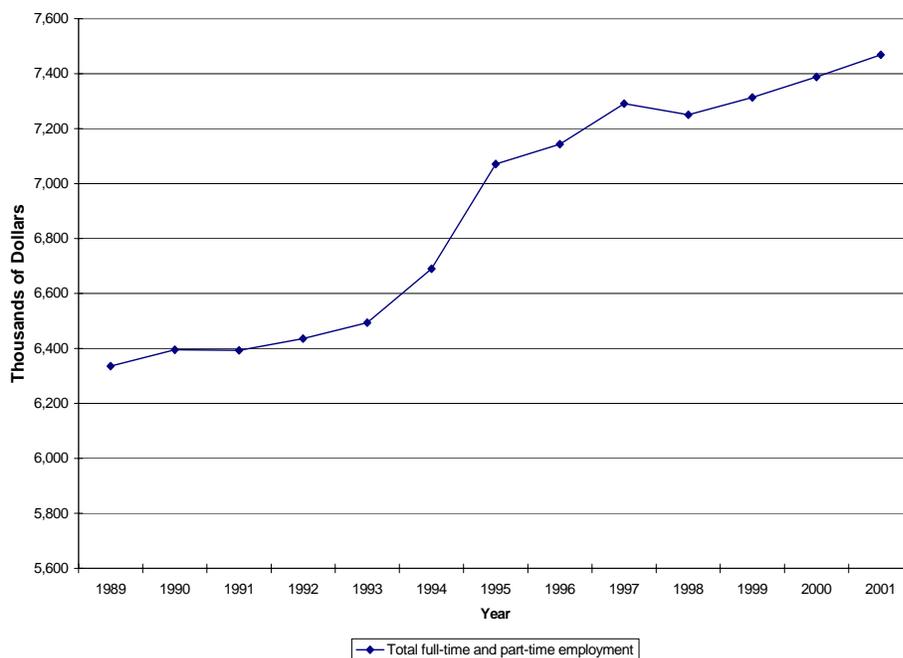


Figure 7 - Total Full and Part Time Employment in Moffat County (Source: U.S. Bureau of Economic Analysis)

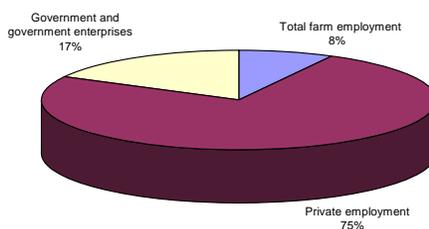


Figure 8 - Farm, Private, and Government Employment in Moffat County (Source: U.S. Bureau of Economic Analysis)

Based on Bureau of Economic Analysis data, the largest private sector employer sector in the county was the service sector (Figure 9), generating 1,756 jobs (32% of private employment). Retail trade was the next largest private employer, generating 1,354 jobs (24% of total private employment), followed by mining (549 jobs and 10% of private employment), and public utilities (545 jobs). Local government (862 jobs) and farming (581)

would be the third and fourth largest employers when looking at total county employment and not just private employment.

According to the 2000 Census, of the 6,499 employed civilians aged 16 yrs and over, 1,356 were employed in management, professional and related occupations, 1,125 in service occupations, 1,443 in sales and office

occupations, 123 in farming, fishing and forestry occupations, 1,513 in construction, extraction, and maintenance occupations, and 939 were employed in production, transportation, and material moving occupations.

Of all the sectors, the service sector is the most diverse in its composition. It is comprised of professions from doctors, lawyers, and engineers to hotel workers, cleaners, and mechanics. It not only provides the most private employment, but it has been the fastest growing sector over the past decade.

In 2000, there were 390 private non-farm business establishments in the county, which accounted for

3,692 jobs. This was up from 364 establishments and 3,246 jobs in 1999 and represented an increase of 30% in private non-farm employment from 1990 to 2000.

Unemployment in the county is highly seasonal and has peaked every year since 1990 during the winter and spring and hits its lowest points during September and October (Figure 10). Over the past 13 years, unemployment hit its highest level of 10.7% in June of 1992. Unemployment reached its 13-year minimum of 3.5% in September of 1990. The average unemployment level over this time period has been 6.1%.

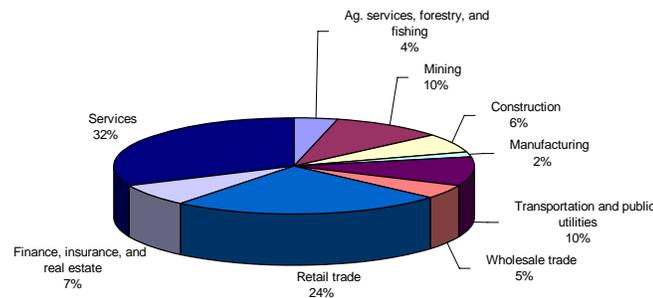


Figure 9 – Private Employment by Sectors in Moffat County (Source: U.S. Bureau of Economic Analysis)

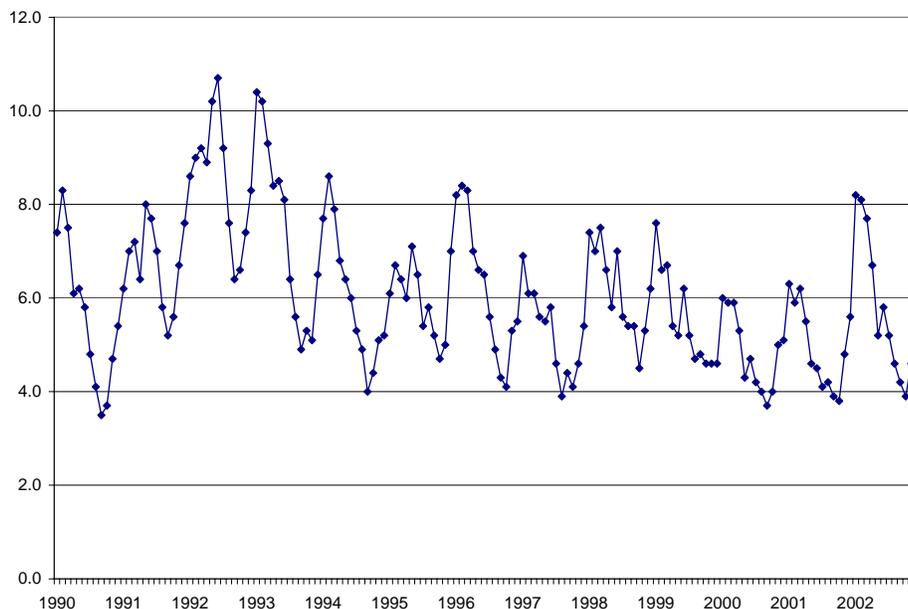


Figure 10 - Monthly Unemployment Rate in Moffat County (Source: U.S. Department of Labor)

Income

According to the 2000 Census, the per capita income in Moffat County was \$18,540 and the median household income was \$41,528. Both of these figures are lower than the state average of \$24,049 and \$47,203 respectively. However, the percentage of people living below the poverty line in the county was 8.3%, lower than the state average of 9.3%. Household income shows relatively little variation with the middle incomes representing most of the households (Figure 11).

According to the Bureau of Economic Analysis (BEA), total personal income in Moffat County has increased steadily throughout the 1990s, keeping pace with population growth (Figure 12). Personal income is the income that is received by people from participation in production, from both government and business transfer payments, and from government interest (which is treated like a transfer payment). It is calculated as the sum of wage and salary disbursements, other labor income, proprietors' income with inventory valuation and capital consumption adjustments, rental income of people with capital consumption adjustment, personal dividend income, personal interest income, and transfer payments to persons, less personal contributions for social insurance.

Over the period of 1989 to 2001 as a whole, per capita income in Moffat County showed virtually no growth.

Per capita personal income, which is a better indicator of personal economic welfare than total personal income, increased through the middle of the decade, but returned to earlier levels by decade's end (Figure 13). Per capita personal income is calculated as the personal income of the residents of a given area divided by the resident population of the area.

The components of labor income shifted somewhat from 1990 to 2000. In 1990, the sectors that contributed the most to the county's payrolls were mining (32%) government and government enterprises (21%), transportation and public utilities (16%), and services (11%) (Figure 14). In 2000, the largest contributor to labor income in the county were government payrolls, which represented 24% of total personal income and totaled \$44,518,000; with local government being the largest supplier of income in the government sector (Figure 15). The services sector was the second largest contributor to personal income in 2000 and generated \$34,751,000 in wages, or 18% of all wages in the county. The third largest contributor to wages in the county was mining, which generated \$32,725,000 in wages, and represented about 17% of total personal income. The next largest contributors to labor income in the county were transportation and public utilities (15%) and retail trade (12%). In 2000, private earnings accounted for half of all the income in the county and non-labor income accounted for over a quarter of the

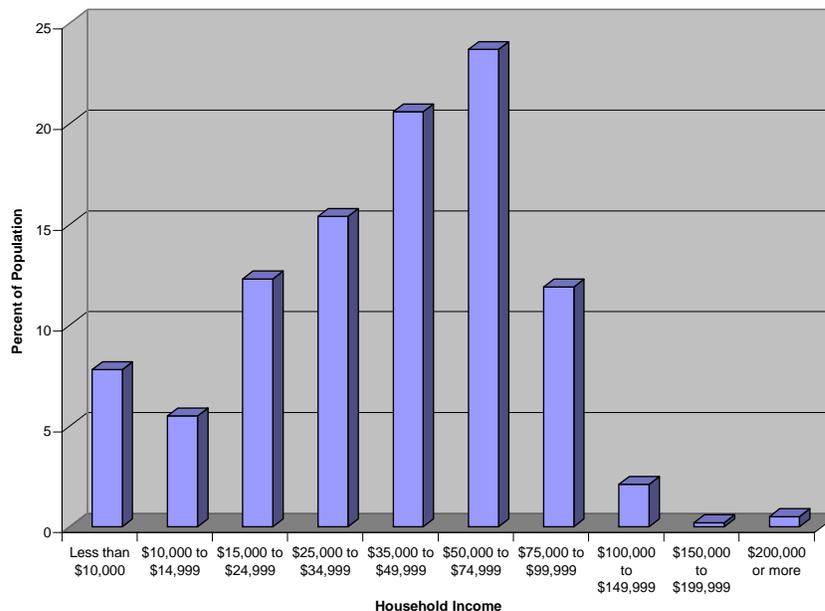


Figure 11 - Household Income Groups in Moffat County (Source: U.S. Bureau of Economic Analysis)

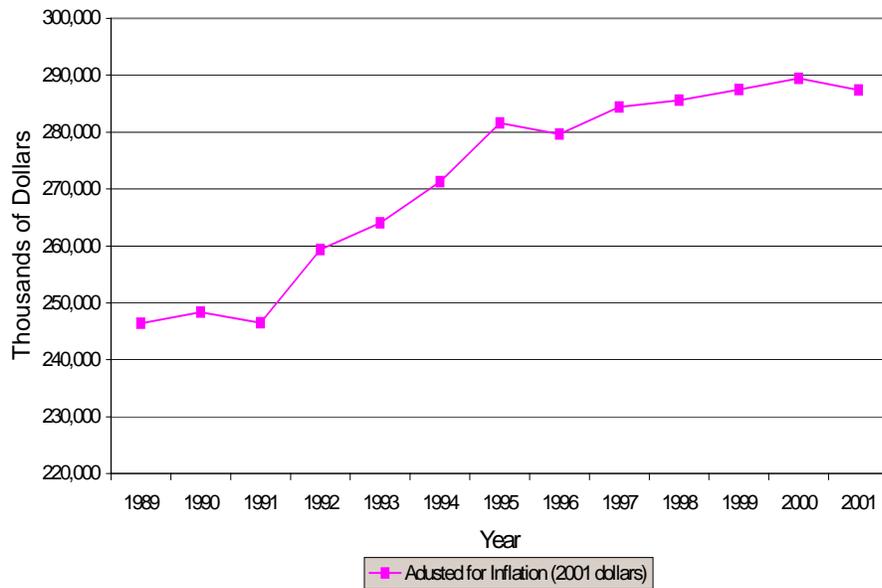


Figure 12 - Total Personal Income Trend in Moffat County (Source: U.S. Bureau of Economic Analysis)



Figure 13 - Per Capita Personal Income Trend in Moffat County (Source: U.S. Bureau of Economic Analysis)

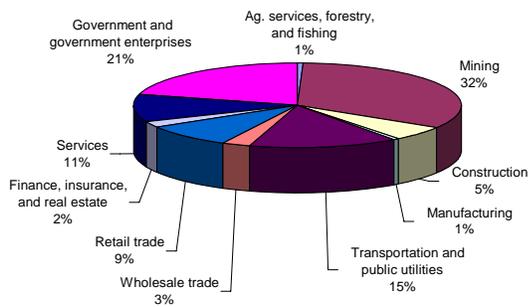


Figure 14 - Moffat County Wages by Sector in 1990 (Source: U.S. Bureau of Economic Analysis)

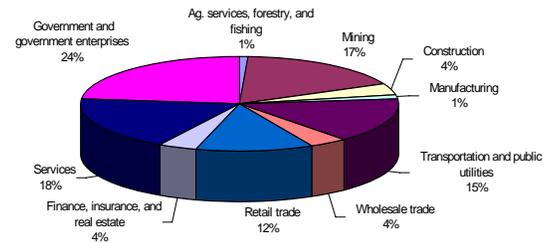


Figure 15 - Moffat County Wages by Sector in 2000

total income. Government and government enterprises provided 15% of the income while proprietors' income contributed 9%. Net farm income was negative in 2000 so it did not contribute positively to total personal income in Moffat County (Figure 16).

Proprietors' income, a measure of entre-preneurial success, was \$18,391 in 2001, which was 10% of the total work income in the county (Figure 17). The percentage of total work income coming from proprietors' income has remained fairly steady over the 1990s.

Total non-labor income is income that is earned from past work that has been saved or invested. Non-labor income includes income from dividends, interest, rent, and transfer payments such as retirement, unemployment, and welfare. Earnings from non-labor income totaled \$81,715 in 2001. After adjusting for inflation, earnings from non-labor income have increased slightly faster than personal income as a whole. Non-labor income accounted for 28% of the total personal income in the county in 2001. As a percentage of total income, non-labor income has increased steadily from 25% in 1989 to 28% 2001 (Figure 18). Over half of the non-labor income in the county is comprised of federal transfer payments (including retirement, medical payments, and unemployment benefits), with the remaining amount consisting of dividends, interest, and rent income (Figure 19).

After adjusting for inflation, income in the service sector is up 56% over the past decade. The service sector,

along with non-labor income, has grown the most over the past decade. The largest component of the services sector is by far health services (Figure 20). The average wage earned in the service sector is widely divergent depending on the different components. For example, in 1997 the average income of people in automotive repair services was almost \$21,000 as compared to the average wage in the hotel and lodging service of just over \$8,350. Even wages within the various services vary a great deal. The average wage for people in the health services was \$18,162, which included doctors, nurses, orderlies, and cleaners. This segment of the economy is expected to continue to grow in importance both in Moffat County and in the nation as a whole.

Agriculture

Agriculture accounted for 8% of the county's employment in 2001. Total farm employment in 2000 reached almost 600 people, roughly two-thirds of which was represented by farm proprietors. Total agricultural production expenses have consistently outstripped total farm cash receipts for the period of 1989 to 2000 (Figure 21). In 2000, total farm receipts totaled \$14 million and total agricultural production expenses totaled over \$30 million. The scenario was slightly better during the 1990s when, in 1994, total farm receipts totaled \$20 million and total agricultural production expenses totaled just over \$30 million. Of the almost \$20 million in total farm receipts in 2000, \$17.5 million was generated in livestock operations and the remaining \$2.5 million was generated in crops (Figure 22).

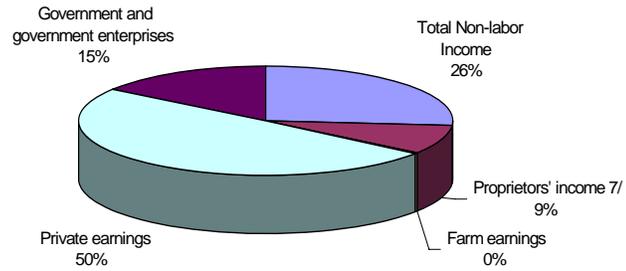


Figure 16 - Components of Total Personal Income in Moffat County (Source: U.S. Bureau of Economic Analysis)

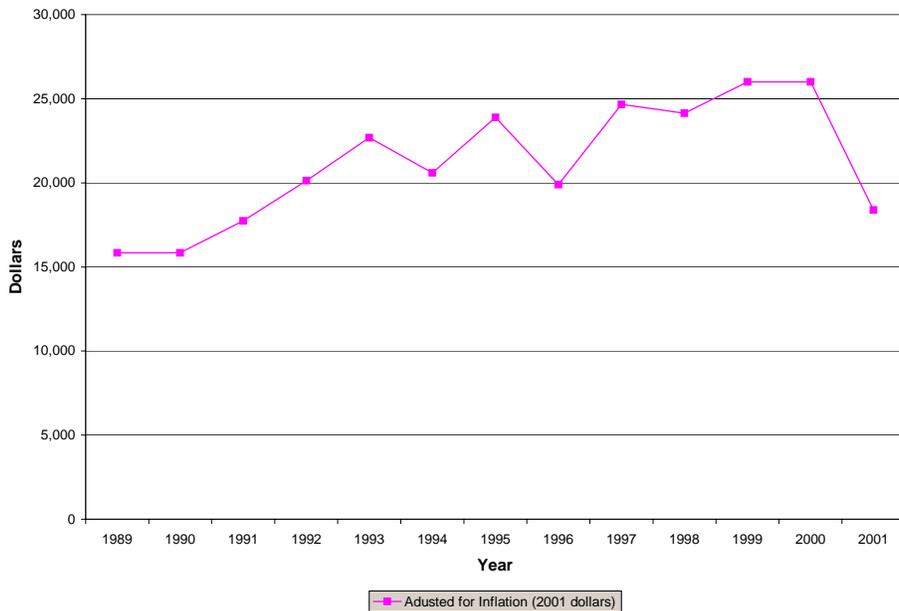


Figure 17 - Proprietor's Income Trend in Moffat County (Source: U.S. Bureau of Economic Analysis)

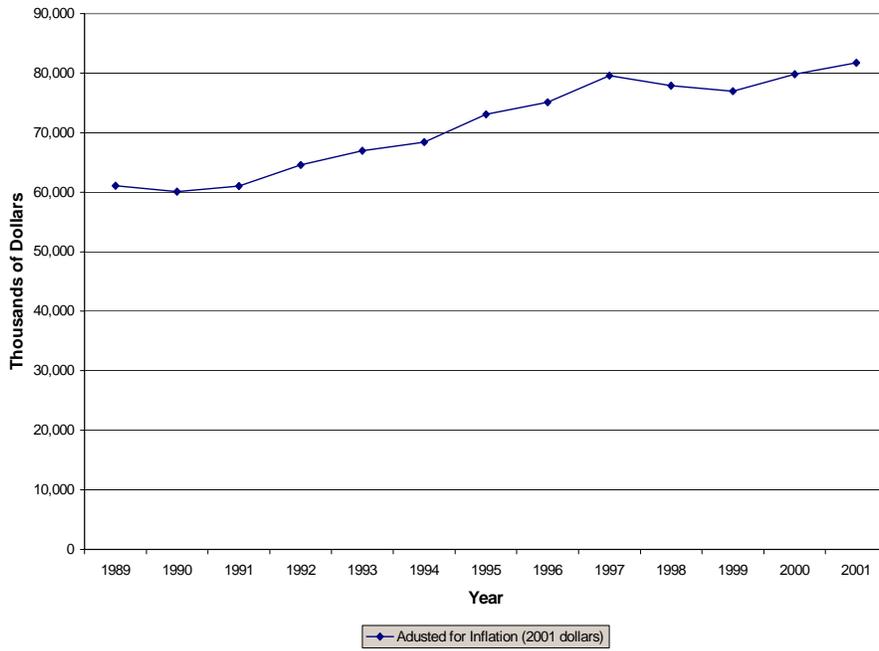


Figure 18 - Non-labor Income Trend in Moffat County
 (Source: U.S. Bureau of Economic Analysis)

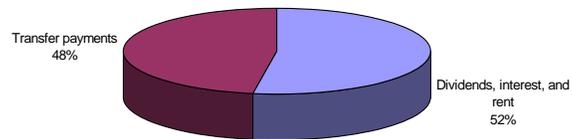


Figure 19 - 2001 Components of Non-labor Income in
 Moffat County (Source: U.S. Bureau of Economic Analysis)

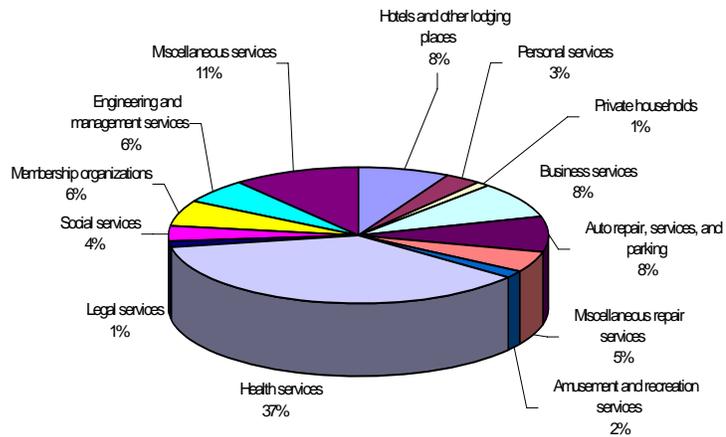


Figure 20 - Components of the Service Sector in Moffat County (Source: U.S. Bureau of Economic Analysis)

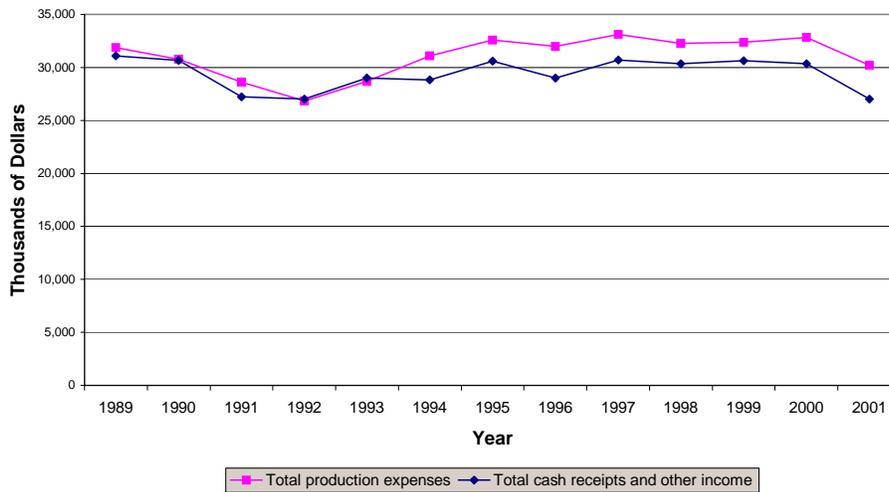


Figure 21 - Total Agricultural Income and Expenses Trend in Moffat County (Source: U.S. Bureau of Economic Analysis)

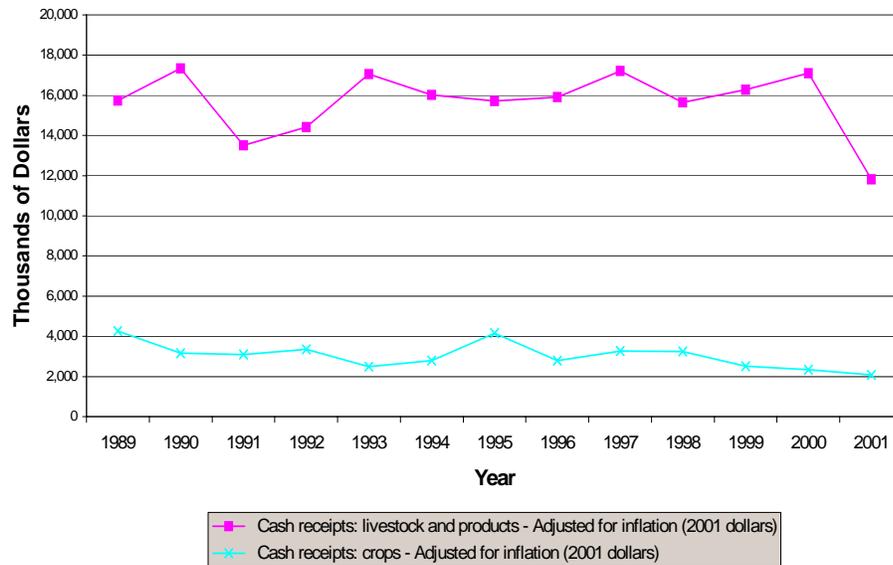


Figure 22 - Cash Receipts for Livestock and Crop Production in Moffat County (Source: U.S. Bureau of Economic Analysis)

Net farm income in Moffat County has been consistently negative over the past decade (Figure 23). Net farm income is calculated by subtracting total income minus total expenses. Total income includes farm production receipts, government payments, and other incomes such as rents and machine hire. Total production expenses include all expenses involved in running the farm. Net farm incomes may have been consistently negative in large part due to the distorting influence of many small lifestyle farms in the county, which would be expected to lose money, or be less profitable than commercial operations.

According to the 1997 U.S. Census of Agriculture, the average size of farms in Moffat County has been decreasing over the past decade and fell 20% from 3,314 acres in 1992 to 2,651 acres in 1997. The median sized farm in the county is 405 acres, much lower than the average size, indicating that there are many smaller farms and a few large farms that skew the average. This can also be seen in the number of farms by value of sales in 1997 (Figure 24). The largest category of farms was comprised of farms that had a total value of sales of less than \$2,500. These are likely to be farms that are not primary income sources for the household and serve to skew the county estimates of net farm income.

Total government payments to agriculture have generally been declining from \$5 million in 1989 to just over \$2 million in 2000 before increasing to almost \$4 million in 2001 (Figure 25). Federal government payments to farmers are payments made to farm operators under several federal government farm subsidy programs during a given calendar year. These payments include deficiency payments under price support programs for specific commodities, disaster payments, conservation payments, and direct payments to farmers under federal appropriations legislation. Government payments to agriculture are not included in farm cash receipts but do factor into realized net agricultural income.

For the years 1989 through 2001, realized net agricultural income has been negative for all years except 1992 and 1993 when farm proprietors' income was slightly positive. Consistently negative net farm incomes might be because most farms in the county are small and generate less than \$25,000 dollars in revenue. These are most likely farms where the primary household income is not provided by agriculture and is not farm dependent. The majority of Colorado farm households report off-farm as well as on-farm income.

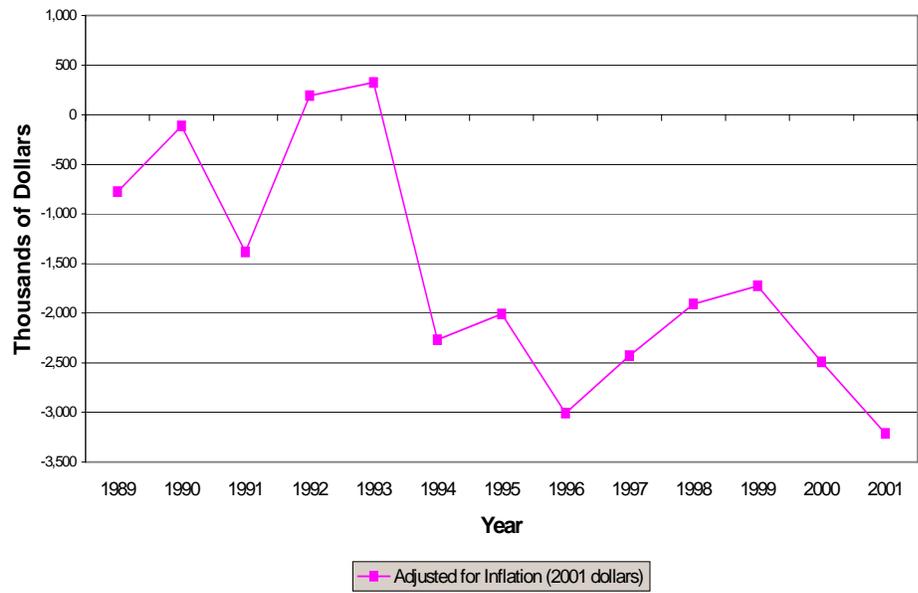


Figure 23 - Net Farm Income Trend in Moffat County (Source: U.S. Bureau of Economic Analysis)

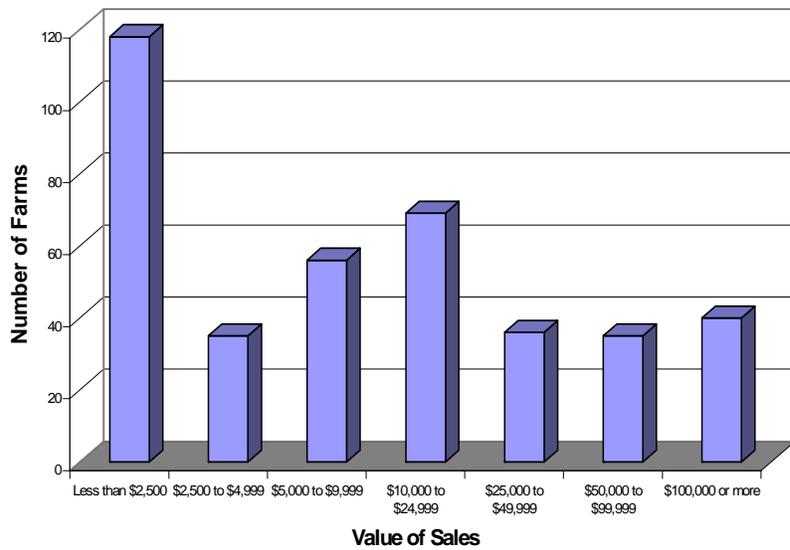


Figure 24 – Farms by Value of Sales in Moffat County

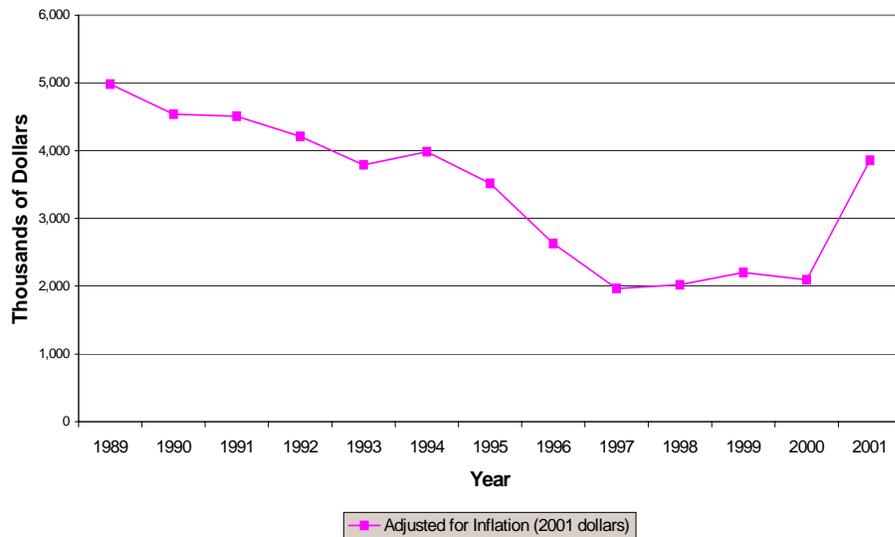


Figure 25 - Government Payments to Agriculture Trend in

The number of farms in Moffat County grew to 389 in 1997, up from 350 in 1992 and 330 in 1987. The value of the agricultural lands in the county has risen sharply in recent years. The estimated market value of land and buildings in 1997 was \$69,630,611 with an average of \$1,789,919 per farm or \$668 per acre. These numbers were up substantially from 1992 and 1987 when the average value of agricultural land and buildings were \$821,493 and \$565,564 per farm and \$239 and \$182 per acre for the respective years. The total value of farm machinery and equipment in Moffat County in 1997 was \$14,580,498, which averaged to \$37,482 per farm.

Total cropland has decreased in recent years to 104,144 acres in 1997, down from 124,325 acres in 1992 and 124,947 in 1982. The total cropland harvested in any given year, however, has remained steady since 1992 at 54,366.

Shift-Share Analysis

Shift-share analysis is a tool that breaks down economic growth into its component parts: a national growth component (growth due to the overall national economy's growth), an industry mix component (growth due to the national growth rate in the industry), and a regional shift (growth in the industry that is specific to the region). Shift-share is used to determine how much each of these components contributes to local economic growth. For example, if an industry grows by 10%, it is unknown if the growth is due to economic expansion of

the nation as a whole, the national growth of the industry, or due to regional growth in that industry. Shift-share provides a framework for identifying leading and lagging industries in a region and can inform policy decisions. Table 1 presents the shift-share analysis for 11 sectors of Moffat County's economy.

The national growth component measures by how much the employment of an industry in Moffat County increased due to growth in the overall national economy from 1990 to 2000. It represents the number of regional jobs that would be in a given industry if that regional industry grew at the same rate as the overall national economy. The overall national economy grew by almost 20% over the 1990s, so the national growth component for each of the industries is a 20% increase in employment over the employment in 1990.

The industry mix adjusts the national component of Moffat County's respective industries based on the national growth rate for these industries. For example, mining in Moffat County shows a negative industrial mix, this means that nationally this sector declined and, if Moffat County's mining industry declined at the same rate as the national mining industry then the employment number from the national growth component would be adjusted down by 437 jobs. Likewise, if the service industry in Moffat County had grown at the same rate as the national service industry, it would have gained 199 jobs. If the total industrial mix for all

Table 1 – Shift share analysis from input-output model (Source: IMPLAN) *millions of dollars

Industry	Moffat Employment			National Employment			Shift-Share			
	1990	2000	% Change	1990	2000	% Change	Total Shift	National Growth	Industry Mix	Regional Shift
Farm employment	547	581	6.22	3,153,000	3,110,000	-1.36	581	656	-117	41
Ag. Services, forestry, fishing	102	214	109.80	1,453,000	2,141,100	47.36	214	122	28	64
Mining	970	549	-43.40	1,044,100	782,200	-25.08	549	1,164	-437	-178
Construction	257	356	38.52	7,260,800	9,523,300	31.16	356	308	29	19
Manufacturing	110	104	-5.45	19,697,200	19,107,800	-2.99	104	132	-25	-3
Transportation and public utilities	600	531	-11.5	6,568,600	8,262,400	25.79	531	720	35	-224
Wholesale trade	158	270	70.89	6,711,500	7,582,100	12.97	270	190	-11	92
Retail trade	1,045	1,354	29.57	22,920,500	27,387,300	19.49	1,354	1,254	-5	105
Finance, insurance, and real estate	317	407	28.39	10,712,600	13,206,800	23.28	407	380	10	16
Services	1,100	1,756	59.64	38,709,600	53,440,800	38.06	1,756	1,320	199	237
Government and government enterprises	1,100	1,266	15.09	21,196,000	22,740,000	7.28	1,266	1,320	-140	86
Total	6,395	7,388	15.53	139,426,900	167,283,800	19.98	7,388	7,566	-434	256

sectors of Moffat County were zero, then the county has an economic base proportionate to the rest of the United States.

The total industrial mix for Moffat County was -434, which indicates that the county had a disproportionate amount of employment in declining industries relative to the rest of the United States. The decline in the mining industry, however, accounts for a great deal of the negative industrial mix.

The regional shift may be the most telling component of the shift-share analysis. The regional shift compares Moffat County's growth rate in an industry sector with the growth rate for that same sector at the U.S. level. A regional shift is zero for a given industry indicates that the sector grew at the same level as the national rate for that industry. A positive value indicates that the regional sector grew more rapidly than it did nationwide.

The industries that had the greatest regional shift in Moffat County over the period were services, trade, and public utilities. These sectors grew faster in Moffat County than would be expected by national trends. This positive regional component in services, trade, and utilities indicate a potential building block for future growth. If a few favorable aspects of the local economy can be determined, they could be used to help market

the community to other similar firms that might consider locating to the area.

The county economy as a whole grew at a slightly slower rate than the nation for the period 1990 to 2000. If the county's economy grew at the national rate the county's employment would have been 7,566, rather than the actual 2000 employment of 7,388.

Export Base Analysis

Export Base analysis divides the regional economy into two broad sectors, basic and non-basic. The non-basic sector is composed of those firms that depend largely upon local business conditions. For example, a local grocery store sells its goods to local households, businesses, and individuals. Its clientele is locally based and, therefore, its products are consumed locally. Almost all local services (like drycleaners, restaurants, and drug stores) are identified as non-basic because they depend almost entirely on local factors. Non-basic industries tend to recycle dollars within the local economy.

The basic sector, in contrast, is made up of local businesses that depend upon sales outside of the region. For example, Boeing builds and sells large airplanes to companies and countries located throughout the world. Their sales are dependent almost entirely upon non-local firms. Boeing does not sell planes to families or

households locally, so their business is very much dependent upon exporting their goods. Manufacturing and local resource-oriented firms (like logging or mining) are usually considered to be basic sector firms because their fortunes depend largely upon non-local factors; they usually export their goods. Basic industries bring in dollars from outside the region to be spent on nonbasic industries within the region. The greater the proportion of basic industry purchases among non-basic regional industries, the higher the local impact, or multiplier.

The base industries in Moffat County are agribusiness, mining, manufacturing, regional and national services, tourism, government, households, and indirect or unassigned industries (Colorado Department of Local Affairs). The largest of these base industries, in terms of income generation, is mining, which comprises 30% of the base income (Figure 26). The second largest is household income (28%), which is comprised of retirement pensions and payments, commuter dollars, households with public assistance, and households with dividend, interest, and rent income. Agriculture only comprises 3% of the total base income, but 17% of the base employment. This indicates that it is an exporter of agricultural goods and services. However, this sector tends to be a low income generator per job in comparison to other industries.

The base analysis indicates that although mining employment and total wages have been declining over the past decade, it is still very important in its ability to introduce new dollars into the county's economy. The base analysis also underscores the relative and increase-

ing importance of non-labor income to the county's economy. Household income, which is primarily generated through retirement and government transfer payments is not only a large source of income in the county, it is a major economic base and a supplier of new dollars to Moffat County.

Location Quotient

The location quotient (LQ) is a technique for assessing Moffat County's specialization in an industry. An LQ is the ratio of the percentage of Moffat County's employment in a particular industry to the comparable percentage in the United States. For example, if 12% of Moffat County's workforce were employed in a given industry, it may not be immediately evident if that is a high or low figure. An LQ puts the local employment percentages in relation to a benchmark of the U.S. employment. If an industry sector has a LQ of one, then the regional employment in the given industry is at the same percentage as the national employment. If it is below one then the regional concentration is lower than the nation and if the LQ is over one then the regional concentration is greater than the nation as a whole.

Location quotients are also useful in estimating export employment. If a location has an LQ of one, then it is producing at the national average and is considered to be self-sufficient in that industry. If a region has an LQ of greater than one for a given industry then it is considered that the product or service is overproduced locally and is exported. Conversely, if a region has an LQ of less than one then it produces less than the self-sufficient level and is considered to then be an importer of that good or service.

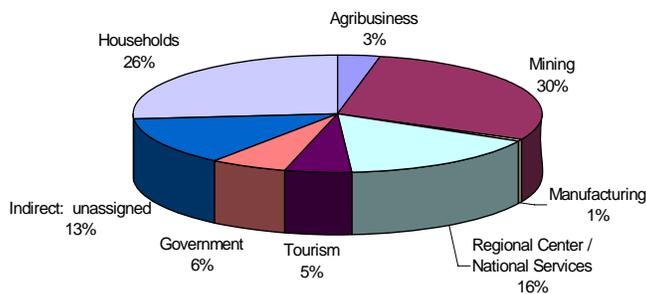


Figure 26 - Base Income in Moffat County by Industry (Source: Colorado Department of Local Affairs)

From this analysis it can be seen that Moffat County is a net exporter of agricultural products and services and a net exporter of mining (Table 2). This supports the export base analysis, which determined that mining is an important export for Moffat County and a generator of new dollars from outside the region. Agriculture is also an important export for the county, however its importance is complicated by the fact that it employs a great number of people in the county, but does not generate a great deal of income and, therefore, does not have as great an effect.

Moffat County also employs at greater than the national average in transportation and public utilities and in the government sector. Both of these are important employers in the state due to the power generation industry and due to the large concentration of federal lands, respectively.

Moffat County is a net importer of general services and manufactured goods. It is estimated from this analysis that the county does not produce enough of these locally to supply local demand and, therefore, must import these goods and services. This may be due to a relative comparative disadvantage of these industries in Moffat County or it may be a potential avenue for import substitution and industry development.

Input/Output Model

In addition to direct economic impacts that accrue from sales and employment from economic sectors, industries also have indirect and induced economic impacts on a region. Indirect effects are those that result from the interaction of industries.

An industry may purchase inputs from one industry and may provide inputs to another industry. The impact of the original industry, therefore, is felt by all other industries that are input suppliers or output demanders from that industry. The industries are interdependent and having one industry affects the other. An example of this might be crop production and fertilizer suppliers and cattle feedlots. The fertilizer suppliers are dependent on the crop producers for their economic activity and the crop producers and feedlots are at least partially interdependent as the crop production provides inputs for the feedlots and the feedlots provide a market for the crop production. The linkages between crop production and these other industries are an example of an indirect effect.

Induced effects are formed by introducing households into the economic model as a demand for goods and services and a supplier of labor. Employees receive a wage, which is then used to purchase goods and services for the household. An industry has an economic impact that exceeds its own output and affects other industries in the region. It also has an effect on regional household spending, which then cycles through the economy and impacts industries such as grocery and hardware stores. The full impact of an industry on the regional economy, then, includes its direct output and employment, the indirect effect on other related industries, and the induced impacts on household spending from employee payrolls.

IMPLAN is a commonly used input/output modeling system to estimate direct, indirect, and induced economic impacts of given industries on a regional

Table 2 – Location quotients (LQ) for Moffat County industries (Source: U.S. Bureau of Economic Analysis)

Industry	LQ	Self Sufficient	Actual Employment	Import/ Export
Farm employment	4.23	137	581	444
Ag. Services, forestry, fishing	2.26	95	214	119
Mining	15.89	35	549	514
Construction	0.85	421	356	-65
Manufacturing	0.12	844	104	-740
Transportation and public utilities	1.46	365	531	166
Wholesale trade	0.81	335	270	-65
Retail trade	1.12	1,210	1,354	144
Finance, insurance, and real estate	0.70	583	407	-176
Services	0.74	2,360	1,756	-604
Government and government enterprises	1.26	1,004	1,266	262
Total		7,388	7,388	0

economy. Direct impacts are estimated by employment, payroll, and industry output data. Indirect and induced effects are established through the calculation of economic multipliers. Multipliers are calculated by analyzing the regional absorption coefficients, which represent where an industry spends the money it receives from sales. This spending represents the recycling of money through the local economy.

According to IMPLAN, the total direct economic output for Moffat County is over \$722.5 million (Table 3). Based on 2000 data, the largest segment of the economy is transportation, communications, and public utilities, which generated over \$176 million in economic output. Mining was the second largest sector, generating \$144.8 million, followed by services, which generated almost \$89 million in industry output. The top five local industries was rounded out by financial services, investment and real estate (FIRE), generating

\$76.7 million, and trade (retail and wholesale), accounting for \$75.3 million in industry output sales.

Multipliers measure how much additional impact one dollar's worth of output has in the economy through its secondary and tertiary impacts. For example, mining has an estimated multiplier of 1.9, which means that for every dollar of direct output from the mining industry, an additional \$0.90 is generated in the region due to indirect and induced effects. The indirect effects are due to other industries benefiting from mining activity in the region. Power equipment retailers attribute a portion of their sales to mining being in the region. Therefore, mining has an indirect effect on power equipment retailers. Mining also employs laborers and pays them wages. These wages are then spent in the local economy on things like groceries and home furnishings. The wages paid by a given industry that filter through the local economy constitute the induced effects of an industry.

Table 3: Output, employment, and value added summary from input-output model (Source: IMPLAN) *millions of dollars

Industry	Industry Output*	Employment	Employee Compensation*	Proprietor Income*	Other Property Income*	Indirect Business Tax*	Total Value Added*
Agriculture	31.355	699	5.395	3.715	4.385	1.886	15.381
Mining	164.824	583	34.058	9.277	5.309	18.203	66.847
Construction	45.723	416	8.940	4.133	1.577	0.309	14.959
Manufacturing	24.142	118	3.492	0.119	1.711	0.176	5.498
TCPU	176.392	456	25.366	10.451	73.294	19.163	128.274
Trade	75.313	1,591	31.090	2.517	10.019	10.181	53.806
FIRE	76.746	362	5.353	4.269	37.283	7.736	54.634
Services	88.979	1,822	28.431	11.083	7.054	1.987	48.556
Government	58.706	1,322	47.180	0	7.490	0	54.670
Other	0.346	56	0.474	0	-0.187	0	0.287
Total	742.525	7,425	189.779	45.558	147.934	59.641	442.192

Table 4 - Output multipliers and total multiplier adjusted industry output for Moffat County (Source: IMPLAN)

	Direct Effects	Indirect Effects	Induced Effects	Type II Multiplier	Total Output (\$ millions)
Agriculture	1	0.426	0.361	1.787	56.028
Mining	1	0.541	0.367	1.907	276.211
Construction	1	0.412	0.376	1.788	81.752
Manufacturing	1	0.434	0.256	1.690	40.802
TCPU	1	0.242	0.240	1.482	261.451
Trade	1	0.239	0.459	1.697	127.821
FIRE	1	0.264	0.177	1.440	110.532
Services	1	0.374	0.506	1.880	167.295
Government	1	0.056	0.702	1.758	103.222
Other	1	0	1.166	2.166	0.7494
Total					1,225.863

The multiplier adjusted total industry output shows mining is the largest sector in the Moffat County economy with an adjusted output of \$276.2 million. Transportation, communications, and public utilities has the second largest adjusted output at \$261.5 million, followed by services with an adjusted output of \$167.3 million. These three industries have the greatest total impact on the county's economy.

The largest employer in the county in 2000 was the service sector, generating 1,822 proprietor and wage jobs, followed by retail and wholesale trade, which generated 1,591 total jobs. The government sector was also a large employer, generating 1,322 jobs. The largest generator of wage earnings in the county was the government sector, followed by mining, retail and wholesale trade, and services.

Economic impact scenarios

IMPLAN can also be used to estimate the total economic impacts of changes to economic sectors due to policy changes or other external shocks. Focus groups, working sessions and public meetings in Moffat County reveal that there is interest in understanding the economic implications of proposed land use changes. Changes include several proposed private to federal public land conversions or changes in allowable uses on public lands, Colorado Division of Wildlife policies for hunting licenses, and federal Endangered Species Act protected habitat designation, for example. By means of illustration, we estimated the effect of a potential change in allowable public land use and one nonlocal policy-driven economic shock as suggested and informed by a local steering committee.

First, it has been proposed to create a 280,000 acre Vermillion National Monument out of about 2,000 acres of private land, 6,000 acres of state land, 13,400 acres of US Fish and Wildlife lands and the rest from lands currently administered by the U.S. Bureau of Land Management, adjacent to the 211,000 acre Dinosaur National Monument (154,000 ac in Moffat County), located in northwest Moffat County. The principle concern with this proposal is with regard to the potential loss of private livestock grazing rights under the new designation. Some concern also has been voiced regarding potential energy and mineral extraction that would no longer be permitted on the state lands under the new designation.

There are about 926,950 acres of range and pasture land in the county. This coupled with the 1,527,188 acres

controlled by the U.S. Bureau of Land Management (BLM) makes a total of 2,454,135 acres of land that is primarily used for range cattle (The national forest service only controls a small amount of the county in the extreme eastern edge). Though the precise numbers remain uncertain, a consensus of local stakeholders agreed that approximately 210,000 acres of the proposed Vermillion National Monument could have their private grazing rights rescinded. This potential reduction in grazing represents a 9% reduction in total rangelands in the county, which translates into a loss of 9 range cattle jobs due to the county possessing 97 jobs range cattle jobs.

This land use change is estimated to have a direct negative impact of \$877,399 to range fed cattle production and a direct positive impact of \$232,750 to federal land management. With multiplier effects this translates into a loss of \$1,265,585 per year in revenues to the county as this ripples through the economy. The sectors hardest hit are range fed cattle (\$1.1 million in total annual impact), wholesale trade (\$39 thousand in total annual impact), real estate (\$36 thousand in total annual impact), and state and local governments (\$34 thousand in total annual impact).

These estimated negative effects on cattle ranching and related industries would be mitigated or even pushed to positive by factors such as a potential for boost to tourism that could come from the formation of a new national wildlife area. They would also be lower if the lands were to lose their grazing rights were of less than average agricultural productivity or profitability relative to the rest of the county. The negative effects would be exacerbated were significant mining and drilling rights lost due to the designation. Objective information regarding this potential remains scarce, but it does not appear that this is likely to be a major economic cost of the proposed designation.

In addition, potential positive and negative effects on residents are not revealed by these calculations. That is, many of the reasons why second home development and retirees are an important driver of the local economy, like rural lifestyle and outdoor recreation opportunities, are not picked up by an export base analysis (unlike a valuation study) because they are somewhat diffuse and because they accrue to residents (and are not, therefore, new income generating, but existing income distributing activities). The potential effects of tourism and outdoor recreation are explored more fully below.

Elk hunting is an important part of the outdoor recreation sector. The number of resident and nonresident hunting licenses available, as determined by the Colorado Division of Wildlife, largely dictates the size of the economic contribution of elk hunting to the local economy. According to the Colorado Division of Wildlife, the Craig-Meeker area had 30,000 licenses granted in 2003. On average a hunter is expected to generate about \$842 in total output per license granted for big game (US Dept of the Interior, 2002). This would translate into \$25 million in direct economic activity generated by big game hunting in the Meeker-Craig area. If estimated expenditures are pared down to likely local direct expenditures, big game hunters are expected to spend about \$550 per person-trip locally. This translates to total local expenditures of \$16.5 million with \$8.3 million spent on food and lodging, \$3.6 million spent on equipment, and \$4.6 spent on other hunting related expenditures. For illustrative purposes, a 10% reduction in licenses, potentially due to herd sizes or concerns over Chronic Wasting Disease, for example, would translate into an annual loss of about \$1.65 million direct and \$2.9 million with multiplier effects.

Changes in extensively managed lands from private to public stewardship, or restrictions in currently held rights (e.g., grazing permits, endangered species designation, predatory species reintroduction) tend to negatively impact agriculture, but have a potentially positive effect on outdoor recreation. Farming and ranching have a long tradition in Moffat County, but represents a declining economic sector in the region. Outdoor recreation represents an industry with growth potential and provides additional benefits to local residents such as increased environmental quality, aesthetic appeal, open space preservation, and increased recreational opportunities. Some of these land attributes are also provided by traditional agricultural practices and some aspects of traditional working landscapes, such as cattle and cowboys are not provided by public land stewardship. These potentially important attributes do not translate

well into secondary data and standard economic impact analysis. As a result, civic dialogue is needed to establish which among the potential features of the socio-cultural and biophysical landscape are important to local community welfare and lifestyle.

Noteworthy Sectors: Coal Mining and Outdoor Recreation

Input-output analysis and IMPLAN can also be used to illustrate the relative importance of individual sectors to the local economy. Focus groups, working sessions, and public meetings in Moffat County revealed particular interest in the role of infrastructure (transportation and communications), the oil, gas and mining industry, efforts at historic preservation, (second) home construction, tourism and outdoor recreation in the overall local economy. We provide information about the coal mining industry and outdoor recreation by means of illustration.

The coal mining industry is the largest single sector in the Moffat County economy, contributing almost \$153 million in direct economic activity and employing 540 people in 2002 (Table 5). The industry paid over \$34 million in wages and had a total value added component of over \$58 million. The top industries from which coal mining purchase inputs are mostly involved in the direct operations of the mines, coal processing, and coal transportation.

Coal mining represents a full 20% of the total county's direct industry output and 17% of the county's wages, while only employing 7% of the county's workforce. The mining industry jobs tend to be very high paying with an average salary of over \$60 thousand.

IMPLAN estimates indicate that coal mining has a Type II output multiplier of 1.61 (Table 6), meaning that the real impact on the Moffat County economy is \$246 million. The employment multiplier is 2.6 meaning that for every direct job in industry sales, an

Table 5 – Output, Employment, and Value Added for the Coal Mining and Outdoor Recreation sectors in Moffat County (Source: IMPLAN) *millions of dollars

	Industry Output*	Employment	Wages*	Proprietor Income*	Other Income*	Indirect Business Taxes*	Total Value Added*
Coal Mining	152.639	540	32.408	7.278	2.971	15.74	58.397
Outdoor Recreation	20.1	350	3.51	1.37	1.771	0.642	7.293

Table 6 – Multipliers for Coal Mining and Outdoor Recreation Sectors (Source: IMPLAN)

	Direct	Indirect	Induced	Total	Type I	Type II	Total Impact (\$ Millions)
Coal Mining Multipliers							
Output	1.00	0.42	0.19	1.61	1.42	1.61	246.03
Employment	3.54	2.71	2.93	9.18	1.77	2.60	
Outdoor Rec. Multipliers							
Output	1.00	0.38	0.21	1.59	1.38	1.59	32.01
Employment	17.41	10.07	3.15	30.64	1.58	1.76	

additional 1.6 jobs are created in the local economy. For every million dollars of output sales, 3.5 direct and 9.2 total jobs are created.

The Moffat County outdoor recreation industry, which includes hunting, fishing, and wildlife watching, was found to contribute just over \$20 million in direct revenues and provide 350 jobs (Table 5). The industry paid over \$3.5 million in wages and had a total value added component of almost \$7.3 million.

The top industries that provided inputs for the outdoor recreation industry were primarily tourist and service industries such as retail, hotels, restaurants, and transportation. Outdoor recreation contributed about 3% of the total county output and was responsible for employing about 4.5% of the county's jobs. This sector, however, tends to be relatively low wage and contributes less than 2% of the county's wages and the average wage in the industry is just over \$10 thousand.

Outdoor recreation had an output multiplier of 1.59, making its total impact on the county's economy just over \$39 million (Table 6). The employment multiplier related to output for this industry was 30.64, meaning that for every million-dollars in industry sales; an additional 30.64 jobs are created. Also, for every job in outdoor recreation an additional an additional 0.76 jobs is created in the local economy (1.76 employment multiplier). So, the outdoor recreation industry is labor intensive relative to mining, but the jobs created are lower paying and the induced labor market spinoffs are relatively lower.

One issue that has not directly been accounted for in this study, however, is externalities. Mining may tend to create negative externalities such as environmental

degradation while outdoor recreation may create positive externalities such as environmental protection. Moreover, mining is exclusively a base industry. That is, mining brings in a lot of jobs and money to Moffat County. However, it would be hard to argue that residents benefit from mining beyond these jobs, income and tax revenues, though they may be. On the other hand, residents do benefit from community services and resources dedicated to the outdoor recreation base industry. These nonbasic benefits are not included in economic base calculations since they accrue to local people and do not, therefore, create "new" money. The likely presence of externalities and local benefits to outdoor recreation as an economic driver works to undercount the sector's local contribution, while the potential for negative externalities and few nonbasic benefits of mining serves to overcount the contribution of the mining industry to the local economy and community welfare. These are real economic goods that must be accounted for in assessing the true economic impacts of these two industries to Moffat County and in guiding the future of the local economy.

Commuting Characteristics

The personal income of an area is the income that is received by, or on behalf of, all the individuals who live in the area; therefore, the estimates of personal income are presented by the place of residence of the income recipients. Employees who commute from Moffat County to another jurisdiction bring additional income into the community. However, their expenditure patterns influence the extent to which these funds actually arrive and multiply in the county. Average travel time to work in Moffat County in 2000 was 23.4 minutes, which is close to the state mean of 24.3 minutes. The use of public transportation is minimal in Moffat County with only

1.4% of the workforce using public transportation to get to work. Two percent of the county's population walks to work and 3% work at home, the remaining 92% commute to work in personal vehicles. Of the 6,357 Moffat County residents who commute to work, 4,604 commute within the county and 1,327 people commute to neighboring Routt County (Table 7). There were 147 people who commuted to Moffat County from Routt County in 2000 and 120 people who commuted to Moffat County from Rio Blanco County.

Summary and Conclusions

Moffat County is a primarily rural county in the northwest corner of Colorado. Directly or indirectly the county economy is based upon its natural resource base. Directly, the economy is largely dependent on the base industries of mining and power generation. These base industries generate new dollars in the Moffat County economy and fuel a growing service sector. Service and trade industries represent the fastest growing segments of the Moffat County economy and seem poised to continue their growth in the coming years. Another important generator of outside dollars is the large non-labor income generated from government transfer payments and retirement incomes. The growth of the service sector through tourism and retirees as engines of economic

development are largely due to the richness of the natural resource base and rural lifestyle Moffat County offers. Thus, the natural resource base indirectly drives the economic base in this case. The primary drivers of this economy may, therefore, be at cross purposes.

Economic development strategies for Moffat County must consider both private and public lands management alternatives and pay close attention to the direct, indirect, induced and the nonpecuniary costs and benefits of economic development alternatives. As such, any long term economic development plan for the county must take the role of mining, agriculture, outdoor recreation and amenity migrants into explicit consideration. There is no silver bullet for community prosperity. Community values and objectives must be explicit in establishing an approach to the future economic development of the county and collaborative, inclusive, democratic processes are likely the most effective strategy to establish and to reach collective community goals. The data, analysis and tools provided here provide a necessary, but insufficient, step toward nurturing that dialogue and establishing a community economic development plan that Moffat County can be proud to follow.

Table 7 - Moffat County Commuting Patterns (Source: U.S. Census Bureau)

Commuting from Moffat County to work in _____ County & State		Commuting to Moffat County from _____ County & State	
	Count		Count
Denver Co. CO	7	Arapahoe Co. CO	12
Eagle Co. CO	4	Denver Co. CO	4
Garfield Co. CO	5	El Paso Co. CO	6
Mesa Co. CO	24	Garfield Co. CO	19
Moffat Co. CO	4,604	Grand Co. CO	4
Montrose Co. CO	8	Jefferson Co. CO	4
Morgan Co. CO	7	Mesa Co. CO	7
Rio Blanco Co. CO	201	Moffat Co. CO	4,604
Routt Co. CO	1,327	Montrose Co. CO	2
Clinton Co. IL	5	Rio Blanco Co. CO	120
Jefferson Co. IL	9	Routt Co. CO	147
Marion Co. IL	12	Worcester Co. MA	9
Moultrie Co. IL	4	Charlevoix Co. MI	4
Johnson Co. KS	4	Koochiching Co. MN	2
Brown Co. SD	21	Mora Co. NM	9
Duchesne Co. UT	6	Chemung Co. NY	3
Uintah Co. UT	14	Dauphin Co. PA	2
Wasatch Co. UT	6	Custer Co. SD	7
Carbon Co. WY	81	Duchesne Co. UT	2
Fremont Co. WY	6	Uintah Co. UT	20
Uinta Co. WY	2	Albemarle Co. VA	7
Total	6,357	Big Horn Co. WY	2
		Carbon Co. WY	23
		Total	5,019

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