Regional Economic Impact Model of Owyhee County

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Background

Two previous studies (Rimbey et al. 2003; Darden, Rimbey, and Wulfhorst 2003) have looked at the socio-economic nature of Owyhee County and its surrounding counties. Owyhee County, located in the Southwestern corner of Idaho, spans over 4.9 million acres with approximately 83% managed by federal or state government agencies and 17% private and tribal owned lands. Given the large percentage of land under federal management, these studies have been useful for the county to demonstrate the economic impact various federal decisions can have on the county. Similarly, this study will look at the economic impacts caused by a decrease in the number of animals allowed on the federal lands. The county has undergone several shifts since these previous studies

Demographic and Economic Trends

Owyhee County's annual population growth rate has been variable since 1970. Over 1970-2012, the county's population grew at an annual average rate of 1.39% (Figure 1). It is below the Idaho's annual growth rate of 1.92%, but over the U.S annual growth rate of 1.04%. The county's highest growth was in 1972 (5.15%) and its lowest growth was in 1982 (-2.21%).
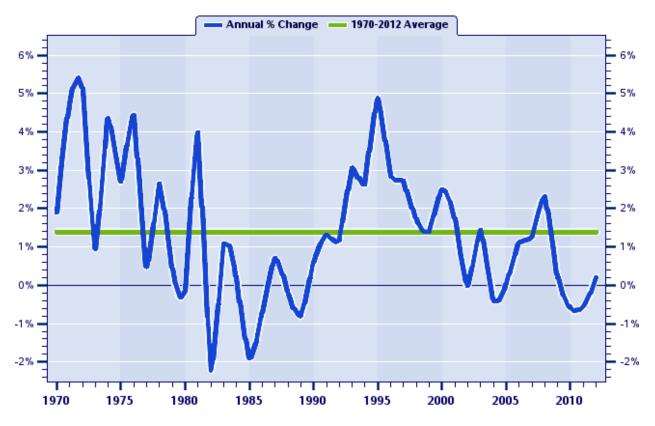

Figure 1. Owyhee County population; Annual percentage change, 1970-2012
Source: Idaho.REAProject.org; Data: Bureau of Economic Analysis, BEA

Figure 2 shows Owyhee County population growth compare with the population growth of Idaho and the U.S. To make this comparison possible among regions that differ vastly in size, we use indices. The indices express each region's population in 1969 as a base figure of 100. The population in later years is expressed as a percentage of the 1969 base figure.

Between 1969 and 2012, Owyhee County's population rose from 6,372 to 11,439 people. This indicates the total population growth for the county over 1969-2012 was 79.5%. Owyhee County population grew at a slightly faster pace than Idaho until the late 1970s, when it slowed and then lagged behind the growth rate of the state. Idaho's population growth rate was 125.7% for the period 1969-2012. Both the county and the state levels of population growth outpaced the growth of the U.S. for this period, which was 55.9% (Figure 2).
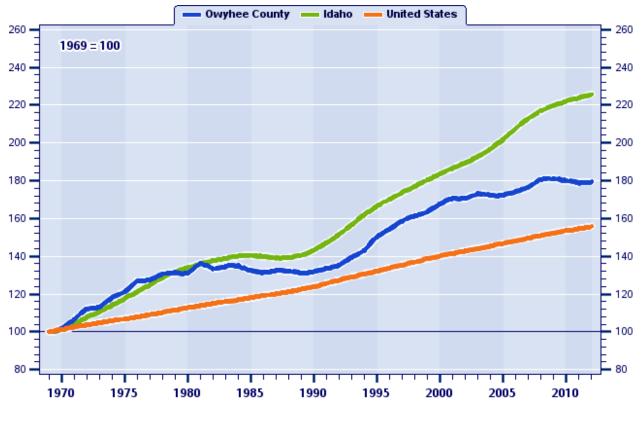

Figure 2. Population indices 1969-2012 (1969=100)
Source: Idaho.REAProject.org; Data: Bureau of Economic Analysis, BEA

The following employment data represent both full- and part-time jobs by place of work. As one person can hold more than one job, the numbers are not necessarily the number of people employed. Also, some of the jobs in the county are hold by people from outside the county.

Employment in Owyhee County's grew from 2,647 jobs in 1969 to 4,292 jobs in 2012, for a net gain of 1,645 or 62.1%. This job growth was insufficient to keep pace with Idaho, which grew 182.1%, and the U.S., which grew 97.3% (Figure 3).
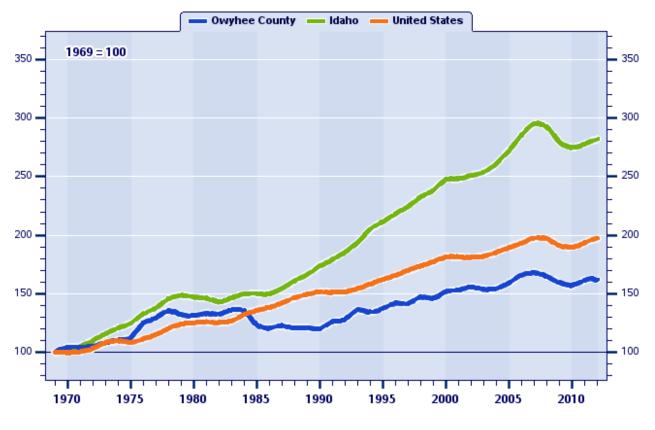
Figure 3. Total employment indices 1969-2012 (1969=100)
Source: Idaho.REAProject.org; Data: Bureau of Economic Analysis, BEA

Most people in Owyhee County's labor force are employed outside the county. In 2011 about 79.3% of the workers in the county worked outside of it. This percentage has grown over time. In 2002, the percentage of workers who lived in the county but worked somewhere else was 64.2% (On the map, 2014). These workers that live in Owyhee County but commute to work normally go to Boise, Nampa, Caldwell and Homedale (On the map, 2014). Also, in 2011, approximately 64% of the jobs in Owyhee County were occupied for workers that live out side the county in Boise-Nampa-Caldwell area. This percentage has kept almost constant over 2002-2011 period (On the map, 2014).

The use of constant 2009 dollars, to adjust for inflation, allows for comparison of changes in the real purchasing power of Owyhee County over time. The real average earning per job in the county has been quite variable since 1969 (Figure 4). Yet, it advances 68.1%, from $24,630 in 1969 to $41,409 in 2012 outpaced Idaho's increase of 37% and the U.S. increases of 54.3%. This outcome, however, is affected by the impressive growth (8.9%) of Owyhee County's real average earning per job during 2010-2012 period. Owyhee County's real average earnings per job ranked 11th among the 44 Idaho counties in 2012, but Idaho's ranked 50th among the 50 states.
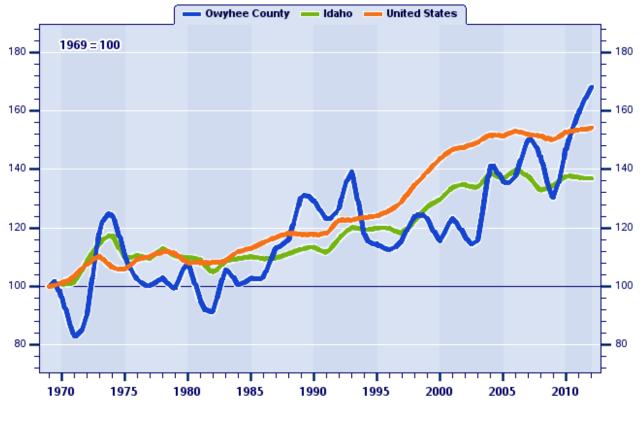
Figure 4. Real average earning per job indices 1969-2012 (1969=100)
Source: Idaho.REAProject.org; Data: Bureau of Economic Analysis, BEA

Real per capita personal income in Owyhee County rose from $14,340 in 1969 to 30,596 in 2012 (dollars of 2009), an increase of 113.4%. It outpaced Idaho increase of 112.4%, but fell below the U.S. increases of 129.2% (Figure 5). On average, Owyhee County's real per capita personal income grew at an annual rate of 1.96% over 1970-2012, while Idaho did it at an annual rate of 1.80%. In 2012, Owyhee County's real per capita personal income ranked 27th among the 44 counties, however Idaho's ranked 50th among the 50th states.
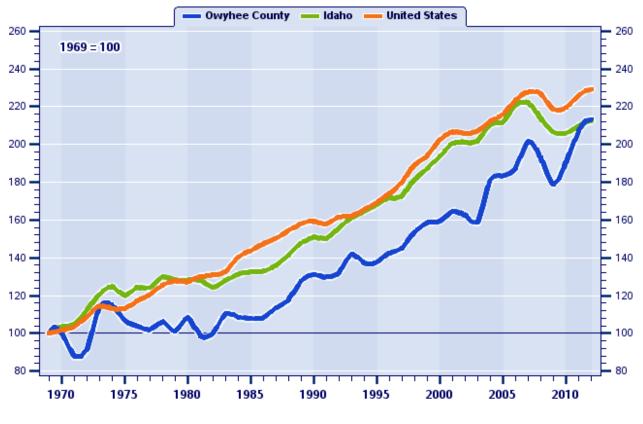
Figure 5. Real per capita personal income indices 1969-2012 (1969=100)
Source: Idaho.REAProject.org; Data: Bureau of Economic Analysis, BEA

Owyhee County is primarily a natural resource based economy. In 2012, farm employment represented 26.5% of total employment in the county. In addition, the forestry, fishing, and hunting industry and the mining industry represented 4.0% and 2.3%, respectively of total employment. Thus, the agriculture and natural resource extraction sector provides about 33% of Owyhee County's jobs (Figure 6). The economic importance of agriculture in Owyhee County's economy has kept almost constant over 2001-2012 period

The percentage of jobs in agriculture in Owyhee County is 18.2 times bigger than the percentage of jobs in agriculture in the U.S. This means Owyhee County is more specialized in farming than the nation. Also, the size of this number (bigger than 1) indicates that agriculture is a basic industry, which exports beyond the county.
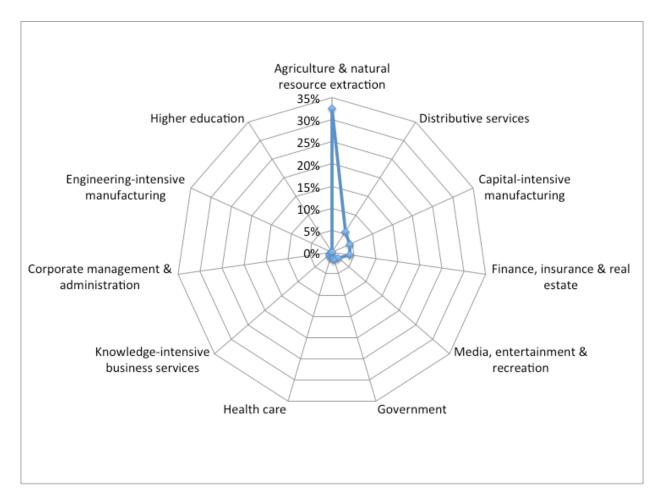
Methods and Procedures

Model Background

For this study, a social accounting matrix (SAM) model was created for Owyhee County using the IMPLAN software. A SAM model is a mathematical representation of the purchase and sales patterns within a given economy at a point in time. The model estimates total regional economic impacts of exogenous "shocks" to an economy in terms of output, personal income (wages, salaries, and proprietor income), and employment. This model was then adjusted and validated following steps provided by Holland and Beleiciks (2006). Those steps will be discussed more fully below.

SAM models originated from the input-output (IO) framework developed by Wassily Leontief. Essentially the model uses systems of linear equations to describe the flow of income and product, represented as purchases and sales, within an economy. SAM model uses strict assumptions such as (Shaffer et al., 2004):

- The economy represented by a balanced SAM model is in an equilibrium state (i.e. the value of output produced in a sector is equal to the value of inputs purchased by that sector;
- The sector expansion path is linear and has constant returns to scale (i.e. doubling inputs leads to doubling outputs);
- Changes in relative factor prices do not affect the proportion of inputs used (i.e. there are not input substitutions, inputs are used in fix proportions);
- The way each sector produces output is simplified into an aggregated representation of production (i.e. similar firms combined into the same economic sector use similar production process).

The underlying assumption within the model is that supply (endogenous variables) responds to demand (exogenous variables, or "shocks"). The model can then be used to determine the economic impact those shocks have on the economy. Different types of models can be constructed which will provide different impacts. For example, in a Type 1 model, the personal consumption of the household sector is considered exogenous and would thus be part of the final demand. This will provide different multipliers compared to a Type 2 model where the household sector is considered endogenous. In this study, we use a Type 2 model.

A SAM model is derived through algebraic manipulation of the regional A-matrix, or matrix of technical coefficients, which represents the production functions of all of the industries in the model. It is from here that the often cited multipliers are calculated. Multipliers measure the total production requirements within the region for every unit of production sold to final demand. A multiplier can be broken into three different categories: *direct effects*, or changes to industries where a final demand change was made; *indirect effects*, inter-sector purchase changes as industries respond to new demands by the directly affected industries; and *induced effects*, changes in household consumption as a result of changes in production from the direct and indirect effects (Holland and Beleiciks 2006). As an example, the direct effects would stem from changes to animal production due to a reduced number of animals allowed on federally managed lands. This would then lead to indirect effects as a reduced number of animal production results in reduced demand for certain feed products and transportation industries. The direct and indirect effects will then have implications, or induced effects, on household consumption within the county as less money is spent within those industries.

Model Construction

An IO model for Owyhee County was constructed using IMPLAN[1] software and enterprise budgets for cattle ranching and cattle feeding. The IMPLAN software helps to alleviate the cost of obtaining primary data, which can transfer easily into spreadsheet format for model and program construction. We do not directly use the IMPLAN software to simulate the economic impact of reducing the allocation of public forage because IMPLAN's economic linkages are based on national transaction, consumption, and employment patterns, which may result in a misspecification of the local economy (Darden et al. 2001).

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[1] IMPLAN is produced by the Minnesota Implan Group, Inc. (www.implan.com)

Thus, as discussed by Coupal and Holland (1995) and Willis and Holland (1997), we used cattle ranching and cattle feedlot enterprise budgets to customize the production function of the cattle ranching and farming sectors from IMPLAN.

To account for different production practices and their respective cost and returns in Owyhee County, we updated enterprise budgets from producer panel interviews. For cattle ranching, we created four cow-calf enterprise budgets, one for each production area: Bruneau, Jordan Valley, Three Creek, and Marsing. We weighted the budget values using our estimates of the number of cows represented by each budget area. The weighting is: Bruneau, 50%; Jordan Valley, 28%; Three Creek, 11% and Marsing, 11%. For cattle feedlots, we used two enterprise budgets: one for calf and the other for yearling, both of which are fed through the slaughter period. We weighted the budget values considering the turnover and feedlots' capacity information gathered from Owyhee Cattlemen's Association board members. The weighting we used in the analysis was: calf to slaughter, 24%; and yearling to slaughter, 76%.

To build the vector of IO sectors, we mapped or organized the value/cost per head items from the enterprise budgets into standard IO sector sectors. When enterprise budget items contained bundled inputs, we mapped the input into more than one IO sector.

IO models require each sector account value to be reported in producer prices. Thus, after developing the preliminary sector IO budgets, we converted values reported in purchaser prices to producer prices using margin information from the IMPLAN software. This transformation allowed us to directly account for the payment to intermediate industries responsible for the production of the good (Willis and Holland 1997). For example, the purchase of feed by cattle producers is accounted for by the value of the feed at the producer price plus the marketing and transportation margins necessary to move the feed to the purchaser. This was done following procedures explained by Holland and Beleiciks (2006).

After applying margins, we converted the margined IO budget from a cost-based structure to a revenue-based structure. For this, we created three new accounts: other proprietor income, total value added, and total sector outlay; and we deleted the total cost entry and adjusted the proprietor income. Specific details about this transformation can be found in Willis and Holland (1997).

The next step was to isolate each sector's purchases of imports into Owyhee County from each sectorial account. The imported purchases are summarized in a separate imports account. To remove the import portion from a sector's purchase on inputs, we used regional purchased coefficients (RPCs) from the IMPLAN software. An RPC "measures the percent of regional commodity demand for the output from a specific sector that is supplied by firms within the region" (Willis and Holland 1997). Thus, the inter-sector account values exclusively represent purchases of goods and services produced by industries in Owyhee County. The last step for creating the IO vector is to scale each input value in the sector production vector by the number of cattle. This scales the Total Sector Outlay to the appropriate regional level.

Model Results

The basic components that make up the Owyhee County economic model are the employment, output, and value added generated from each sector in the economy. The total employment figures measured in terms of full or part-time employees are based on IMPLAN (2011). Output is then defined as the gross sales for non-agricultural industries and gross value of production for agricultural products. Value added is compensation of employees, taxes on production and imports, and gross operating surplus. Table 1 displays the economic composition of the Owyhee County model in terms of employment, output, and value added per sector.

Table 1. Employment, Output, and Value Added, Owyhee County Model

Description	Employment	Output	Total Value Added
Crop Farming	378.4	$187,595,024	$57,067,988
Cattle ranching	237	$29,732,578	$7,461,373
Cattle feedlot	71	$100,133,495	$21,958,577
Dairy cattle and milk production	218	$76,739,056	$27,867,156
Misc. Livestock	36.6	$5,665,192	$2,822,742
Ag & forestry services	836.2	$18,164,478	$12,463,420
Mining	30.7	$12,429,790	$8,316,613
Utilities	9.4	$6,557,229	$3,718,458
Construction	217.7	$21,216,272	$9,681,016
Food & Beverage	4	$1,160,110	$86,300
Wood paper & printing prod	94.6	$30,482,400	$8,231,325
Petroleum chemical & plastic prod	4.1	$3,665,201	$31,627
Nonmetal mineral prod	24.5	$6,259,239	$1,315,831
Primary & fabricated metal mfg.	3.9	$500,923	$179,913
Machinery mfg.	3.7	$2,213,739	$654,487
Computer electrical & transportation equip.	70.9	$17,422,342	$2,429,600
Miscellaneous mfg.	2	$335,387	$139,302
Wholesale Trade	124.2	$18,280,338	$12,314,657
Retail trade	210.6	$13,662,518	$9,144,570
Transportation & Warehousing	74.4	$9,240,797	$4,333,604
Information	21.2	$5,124,778	$2,045,387
Finance & insurance	30.5	$6,644,207	$3,675,610
Real estate & rental	136.9	$48,840,984	$32,179,668
Professional- scientific & tech services	6.6	$872,023	$596,458
Management of companies	1	$288,802	$210,029
Administrative & waste services	105.6	$16,178,635	$7,948,462
Educational services	4.1	$294,351	$162,878
Health & social services	147.9	$8,470,071	$4,973,428

Arts- entertainment & recreation	22.2	$1,094,175	$432,947
Accommodation & food services	177.1	$8,321,874	$3,691,717
Other services	145.8	$6,141,818	$3,889,954
Government & non NAICs	791.6	$44,321,868	$39,979,512
Total	**4,242.4**	**$708,049,694**	**$290,004,609**

Source: Own calculation and IMPLAN (2011)

Table 1 reveals that the main sector in Owyhee County is agriculture. The economic contribution of the agriculture sector includes cash receipts of $418 million. The agriculture sector employs 1,777 people, with employee compensation of $159 million. The value added to the Owyhee County economy from agriculture is $130 million.

Agriculture accounts for 42% of employment in Owyhee County. The agricultural service sector accounts for 20% of total employment followed by crop farming, cattle ranching and feedlot, and dairy with 9%, 7%, and 5% respectively. The other important sector in Owyhee County's employment is government, which contributes 19% of the total employment.

Agriculture accounts for 60% of cash receipts in the county. Among the agriculture-related sectors, crop farming contributes 26.5% of total output, while livestock and dairy are responsible for 18% and 11% respectively.

Agriculture also accounts for 46% of Owyhee County's gross product. Crop farming provides 20% of the county's value added followed by cattle ranching and feedlots (10%) and dairy (10%). Other important industries for Owyhee County's gross product are government and real estate, which account for 14% and 11%, respectively.

Trade

Owyhee County produces goods for consumption within the county and for exports. It also imports goods to meet the demand of industries and consumers. In the case of this model, exports and imports imply both domestic and foreign exports and imports.

The local demand that is fulfilled by local producers is very important, because, the higher the proportion of demand fulfilled by local producers, the greater the amount of economic impact that is generated in the county (Holland and Beleiciks 2006). Similarly, exports are central for growth since they allow an economy to cross the boundaries of its local demand, and import wealth ("new money") from other communities into its local economy. Exports allow businesses to become "scalable" and grow beyond the limitations of local markets.

Owyhee County has a negative trade balance (i.e. the total value of imports is higher than the value of exports). The county imports $510 million, with the largest imports coming from the petroleum

chemical and plastic manufacturing sector (19.5%); finance and insurance services (10.8%); and health and social services (9.3%).

Total exports in Owyhee County are $389.5 million. The $323.7 million (83.1%) in agriculture is the single largest export from the county. Among the agricultural-related sectors, three of them represent 81% of the county's exports. These sectors are crop farming, dairy, and cattle ranching and feedlots, which account for 35%, 26% and 20% of exports, respectively.

Economic Base

An alternative method to measure the importance of a sector to an economy is a base measure, which gives credit to the sector that brings new dollars into the region through exports for the economic activity that it supports in the regional economy. A base measure is different from a gross measure (Table 1), which simply counts all the measures of economic activity (output, employment, and value-added) that are generated from all sales within a sector. "For example, in a gross analysis, if a tire merchant sells a tire to a local agricultural producer, the value of this transaction (and the associated employment, wages, and value added) would be counted in the "tire store" or retail sector. However, because this sale is only possible because of the new dollars that are brought into the region by the agricultural producer (exports), the base analysis gives credit for this transaction to the agricultural sector" (Watson et al, 2006). In other words, a base measure allows us to answer the question "What is the total output of the Owyhee County economy across all sectors that is generated by agricultural output?" (Watson et al, 2006).

Agriculture is the most important economic driver in Owyhee County. Its base contribution is $511.6 million or 70% of the Owyhee County total output and $178.1 million or 60% of the Owyhee County total value added. Similarly, its base employment is about 2,313 jobs or 54% of Owyhee County total employment. This base measure equals the sum of agricultural output, value added, and employment for exports and the indirect output, value added, and employment from other sectors needed by the agricultural sector to produce these exports.

The most critical agriculture-related sectors in Owyhee County's economic base are: crop farming, dairy, and cattle ranching and feedlot. These three sectors represent 68.8% of the base output; 59% of the base value added; and 52% of the base employment.

Economic Impact of Grazing

The Owyhee County economic model was used to estimate the economic impact of decreases in the number of Animal Unit Months (AUM) of public forage available. An AUM is a measure of the amount of forage that 1 animal unit (a cow or cow with calf) will consume in one month. It is common for public and private land grazing leases to be charged based upon the number of AUMs consumed or allotted for the parcel of land. The first step to estimate the direct impact of AUM losses is to calculate a value of output lost per AUM. We calculated that each cow in Owyhee County needs approximately 7.72 AUMs

of public land forage and there are 45,660 cows in the cattle ranching sector. Multiplying the number of cows by the number of AUMs per cow yields approximately 352,439 AUMs of public land forage in Owyhee County. This estimate is consistent with the Bureau of Land Management (BLM) estimate of permitted AUMs within the county. Each cow requires 1 AUM of forage each month of the year. So the total demand for forage is 547,920 AUMs. With 352,439 AUMs coming from public lands, the dependency on public lands is thus 64 percent. In other words, 64 percent of the forage for the Owyhee County cowherd is coming from public lands. The direct output impact of an AUM lost (regardless of land ownership) is $54.26 per AUM.

A critical assumption of the IO model is that there are no substitutes for inputs used in the production process. Using the ranching sector as an example, if public land forage is reduced, livestock producers will have to adapt to the new scenario with fewer AUMs available and adjust herd size to the new level of inputs. This seems to be in contrast to work done by Van Tassell and Richardson (1998) that suggested that ranchers will do all that they can to maintain herd size in the face of federal grazing reductions. However, our interviews with Owyhee County ranchers revealed a tendency to maintain herd size in the short run through increased hay purchases and leasing of private pasture or rangelands. Yet, in the long run, herd size would have to be reduced due to the fact that the new inputs of hay and/or leased forage dramatically increased operating costs and these new costs could not be maintained in the long run. Thus, the only long-term, economically viable alternative was to reduce herd size in the face of federal grazing allotment reductions.

Recent studies and economic analyses indicate the magnitude of the potential and real economic impacts of ranching in the area. These studies also indicate that relative reductions in federal grazing do not equate to percentage reductions in income and output at the ranch level.

McClain (2013) studied the ranch-level economic impact of Western Juniper (*Juniperus occidentalis*) encroachment into the sagebrush steppe ecosystems of the county. As the tree density increases, there is a loss of forage that is experienced by the ranches. McClain found that this loss of forage has dramatic long-term economic impacts to area ranches, with the present value of the net income stream (over 40 years) declining over 33 percent with declines in cattle numbers. This decline in net income amounted to nearly $11 for each AUM displaced due to the juniper encroachment. This also amounted to an estimate of the value of the grazing permit associated with the lost AUMs of $111.74/AUM.

Torell et al. (2014) used similar modeling techniques to estimate ranch-level economic impacts of alternative management strategies to deal with protection for the Greater sage-grouse (*Centrocercus urophasianus*) in four western states (Idaho, Oregon, Nevada and Wyoming). These authors estimated the economic impacts of losing 1 month of spring BLM forage, 1 month of fall BLM forage, losing both spring and fall forage and also the impacts of 25, 50, 75 and 100 percent reductions in BLM forage. For the Idaho ranch model used in this analysis, annual net income declined by $17.04 for each AUM lost during the spring, $12.54 for each AUM lost in the fall and $17.15/AUM for losing both spring and fall forage resources. The analysis of percentage reductions (regardless of season of grazing) showed declines ranging from $13.21/AUM (for 25 percent reduction) to $29.76/AUM (100 percent reduction). Implied grazing permit values ranged from $133/AUM (loss of fall forage) to $324/AUM (100 percent

reduction in BLM forage). The output impact to Owyhee County's economy from one AUM of grazing is $114.74. This impact includes the direct change in the cattle ranching sector ($54.26); the indirect change in other industries ($52.29) as they respond adjusting their inter-sector purchases to the new demand from the cattle ranching sector; and the induced change in household consumption ($8.2) as a result of changes in production from the cattle ranching sector and the other industries in the economy. The employment impact from 10,000 AUM of grazing is 4.1 jobs, of which 1.3 jobs are the direct employment impact to the range cattle sector. The value added impact, which includes wages and salaries, proprietors' income, other proprietor income, and indirect business taxes, is $3.4 per AUM.

If the permitted grazing within the Owyhee County's public land forage decreases by 10% (i.e. 35,244 AUMs) the county would loss $4,043,956 of output, 14.6 jobs, and $1,197,823 of value added. These total impacts include the direct, indirect and induced effects (Table 2).

Table 2: Economic impact a reduction of 35,244 AUMs of grazing in Owyhee County, Idaho.

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	4.4	$443,909	$446,590	$1,912,334
Indirect Effect	7.5	$493,510	$581,212	$1,842,783
Induced Effect	2.7	$87,234	$170,020	$288,839
Total Effect	14.6	$1,024,653	$1,197,823	$4,043,956

Model Comparisons

Based on Idaho agriculture statistics, observations of Owyhee County, and U of I Extension personnel, the IMPLAN model underestimates the value of the cattle ranching and feedlot sector. The IMPLAN model estimates the size of cattle ranching and feedlot sector to be $94.7 million in output, while our estimation of this sector is approximately $129.9 million. Further, the IMPLAN model overestimated the feedlot sector and under estimated the cattle ranching sector. This is due primarily to procedures employed by IMPLAN, which does not allow one to produce calves and finish the cattle (Darden et al, 2001). Thus, in the IMPLAN model a large portion of the cattle are finished in the feedlot sector.

In addition, IMPLAN assumes standard national production practices, which are not consistent with the Owyhee County and the cattle ranching and feedlot sector. For example, unlike the cattle ranching sector in the nation, the range cattle sector in Owyhee County uses a large amounts of state, federal, and private rangeland and purchased and produced hay. Similarly, the cattle feedlot sector in Owyhee County uses a large amount of potatoes waste (39% of its finishing ration), which is not commonly used by cattle feedlots across the nation.

Finally, sole proprietors or family corporations are the dominant form of industry organization among Owyhee cattle ranching and feedlots businesses. Thus, the other property income account, which in IMPLAN is positive and large, is zero in our model.

Implications for Owyhee County

Agriculture is the most important sector for Owyhee County's economy. It accounts for 43% of employment, 60% of cash receipts, 47% of the county gross product, and 87% of exports. Further, the agriculture base contribution is 54% of total employment, 70% of total output and 60% of total value added. The most critical agriculture-related sectors in Owyhee County's economy are: crop farming, dairy, and cattle ranching and feedlot.

Specifically, the cattle ranching and feedlot sector contributes significantly toward the economic well-being of Owyhee County. This sector accounts for 7.1% of employment, 17.7% of cash receipts, 9.8% of county gross product, and 20.4% of exports. Further, the cattle ranching and feedlot sector provides a stable long-term economic base for agriculture-based communities. Livestock exports from generate additional economic activity, through its economics linkages, that support several industries, communities and families in the county. Cattle ranching and feedlot sector's base contribution is: 13.7% of total employment; 22.5% of total cash receipts; and 16% of county gross product. The base output of the cattle ranching and feedlot sector is the sum of its exports plus the economic activity it generates across all sectors that it touches as it creates livestock products for export and brings new revenue into the county.

If the lifestyle of rural Owyhee residents is to continue, it is important for the public to understand the contribution that cattle production provides to rural economies. The loss of public land grazing in Owyhee County will significantly reduce the opportunities for its rural residents. Public land grazing is a vital component of Owyhee County's economy. A reduction in livestock numbers is not an isolated incident with few repercussions. There are many other individuals and sectors that will feel the economic impacts. The estimated potential annual loss to Owyhee County's economy resulting from a 10% reduction in grazing AUMs is $4,043,956 of output, 14.6 jobs and $1,024,653 of value added. Out of the $4 million loss in output, $1.9 million corresponds to economic loss to the livestock sector, $1.8 relates to economic loss in other industries as they adjust their inter-sector purchases to the new smaller demand from the livestock sector, and $0.2 million relates to economic loss in household consumption as a result of change in production from the livestock and the other industries in the economy.

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