

RANCH-LEVEL ECONOMIC IMPACTS OF GRAZING POLICY CHANGES: A CASE STUDY FROM OWYHEE COUNTY, IDAHO

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ABSTRACT

Economic impacts often are cited as justification both for and against changes in grazing policy on public lands. A recent study conducted in Owyhee County, Idaho, illustrates a process to gather ranch-level economic information, develop economic models for different ranching systems, and use the models to estimate economic impacts of grazing policy changes. Ranch-level models were developed from producer panels and interviews within the county. Costs and returns, livestock production information, dependency on public lands, and other factors relative to ranch-level economics were gathered in four meetings with livestock producers and other interested parties. Results indicate that, as dependency on federal lands rise, both costs and returns fall. Ranch-level economic impacts of alternative grazing policy scenarios also are detailed.

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BACKGROUND

Owyhee County is a large, rural county situated in the southwestern corner of Idaho (Fig. 1). Bordered on the west by Oregon and the south by Nevada, it is a sparsely populated, high desert area that traditionally has depended upon ranching and mining for its economic base. It has become popular for recreational pursuits by residents of the metropolitan Ada and Canyon counties (Boise area) to the north. This influx of recreationists and others from outside the county has resulted in real and perceived conflicts with the traditional resource users within the county.

The Bureau of Land Management (BLM) recently prepared a Resource Management Plan (RMP) for the Owyhee Resource Area. This RMP sets public policy for more than 1.3 million acres of public land for at least the next 10 years in the western third of the county. Decisions made under the RMP will affect recreational users, ranchers, miners, and others.

The RMP is not without controversy. The Idaho Watershed Project and the Committee for Idaho's High Desert (groups representing environmental interests concerned about environmental issues related to grazing) brought suit in U.S. District Court against the BLM in 1997 to force the complete closure of public lands to grazing until the completion of the RMP. The judge's decision (Winmill 1998) did not halt grazing on the Owyhee Resource Area and allowed livestock turnout in 1998. Yet, the decision mandated completion of the RMP in "a timely fashion." The final RMP was released in July 1999 (USDI-BLM 1999). Key components of the RMP were economic and social assessments of the county. The University of Idaho was contracted by the BLM and other parties to perform this analysis.

The University of Idaho study estimated ranch-level cost and returns, developed a regional input-output (I/O) model that was linked to the cost-and-return estimates, and conducted an assessment of the county's social environment. This paper reports on the development of ranch-level cost and return estimates and illustrates their potential use in assessing the economic impacts from changes in BLM grazing policy.

PROCEDURES

Ranch cost-and-return estimates were obtained using a series of four producer panels in Owyhee County. Panel members were identified through the County Extension faculty, BLM permittee lists, and the local livestock association. Invitations were mailed with background material prior to the scheduled meetings. Four sessions were held during May and June 1998 at Pleasant Valley School near Jordan Valley, Oregon, and Marsing, Bruneau, and Three Creek, Idaho. At the scheduled meetings, input was solicited about ranch resources (feed, labor, land, and equipment), livestock classes, sale weights and numbers, and operating procedures (veterinary program, production practices, and marketing procedures), along with potential adjustments to the operations



Figure 1. Location of Owyhee County, ID.

resulting from increases and decreases in federal grazing permits. This information was used to develop ranch budgets for "typical" ranch operations in each area in the county. The resulting estimates were returned by mail to individuals on the respective producer panels for review and modification. Final budgets were prepared during the fall of 1998 and were reported earlier in Rimbey et al. (1999a) and Smathers et al. (2000a, b).

Based upon input from the four groups, budgets for four different management scenarios were prepared. These included: a 300-head cow-calf operation using federal, state, and private rangeland resources and winter feeding (budget subsequently designated as Jordan); a 500-head cow-calf operation using federal, state, and private rangeland resources and winter feeding (Marsing); and two separate budgets for a 500-head cow-calf operation using federal, state, and private rangelands, with winter grazing permits on federal lands (Bruneau and Three Creek). Three Creek also used U.S. Forest Service forage during the summer. The smaller (300-head) operation was most prevalent on the west side of the county (Owyhee Resource Area). The larger operations were centered from the middle of the county (Owyhee and Bruneau Resource areas) through the eastern half of the county, with winter grazing permits most prevalent in the eastern third of the county (Bruneau and Jarbidge Resource areas). Livestock prices represented a five-year average (1993-1997) of prices received in the Pacific Northwest markets for each class of livestock included in the budgets (Fig. 2).

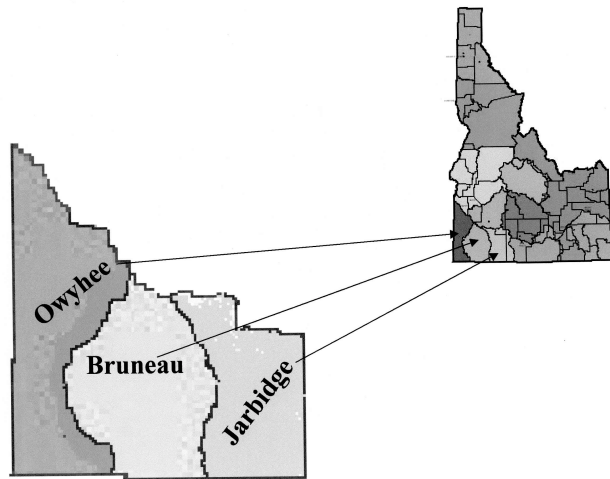


Figure 2. Owyhee County BLM resource areas.

Dependency upon public forage was estimated for each ranch budget by dividing total forage demanded (AUMs) into actual grazing use on public lands. Additional detail is provided below for one of the ranch budgets (Jordan Valley) to show how changes in forage allocations and management strategies affect the operating costs of the example ranch. Also included is a detailed description of costs and returns, and management and marketing practices.

RESULTS

There are approximately 45,000 beef cows, or slightly less than 10% of Idaho's beef cow herd, in Owyhee County (USDA-NASS 1998). It is uncertain how the cattle are distributed within the county and the three BLM resource areas. After a review of BLM resource area permittee lists, focus panel input, interviews conducted as part of the social survey, and USDA Census of Agriculture data, we developed the allocation of cattle numbers and ranches for the resource areas (Table 1).

Livestock budgets defined for use in the analysis, along with average herd size, numbers of ranches, total number of cattle, AUMs of BLM grazing use, and total AUMs of grazing are presented under each resource area name. The Owyhee Resource Area (ORA) includes 25 ranches with an average herd size of 280 cows. There are 7,000 head of cows in this size category in the ORA that consume an average of 6.99 AUMs per cow per year (see Table 2, Jordan Valley budget). Total BLM forage used by these 25 operations was estimated to be 48,930 AUMs per year. There also are 12 ranches with slightly larger herd sizes (350 cows) using the Jordan Valley budget, eight operations with an average herd size of 450 cows (Marsing), and two large operations (1,000 cows each) using the Bruneau budget. The last column in the table summarizes BLM's reported permitted grazing use for each resource area in the county. Estimates of grazing use

derived through the livestock budgets (Est. AUMs) are very similar to BLM's permitted grazing use (Permitted AUMs). Allocations of cattle and AUMs of livestock use for the other two resource areas also are included in this table. Based upon this allocation process and the budget used, total BLM grazing in the county is estimated to be about 347,500 AUMs per year consumed by 44,700 head of beef cows.

The following section provides a detailed description of one of the budgets (Jordan Valley) as an example to show the information collected and summarized, along with management and marketing practices.

Jordan Budget Description

Table 2 presents a modified cash-operating budget for the Jordan Valley model ranch. The receipts and variable operating costs sections of the budget show the sources and uses of cash generated by the business. Ownership costs show the potential uses of cash for equipment replacement (capital recovery or depreciation), livestock investment, overhead, and other items. In terms of receipts, the ranch sells 131 steer calves and 69 heifer calves each year, which amounts to 71% of the total gross receipts of \$102,000 (\$340/cow). Receipts from the sale of cull cows, bulls, and replacement heifers contribute 29% of the gross for the model ranch (\$30,000 or \$99/cow).

Operating expenses include feed, labor, veterinary expenses, interest, and other miscellaneous expenses that vary with production level. Total operating expenses are \$85,000 (\$283/cow). Feed expenses associated with winter feed amount to nearly half of total operating costs (\$134/cow). Range, pasture, and aftermath grazing account for another 13% of total operating expenses. Total feed expenses account for 60% of the variable operating expenses of this enterprise, with federal and state land grazing fees/leases being 4% of the total. Income above variable operating costs (gross margin) is about \$17,100 (\$57/cow). This amount is available to pay fixed costs associated with capital recovery (depreciation), taxes, insurance, and overhead.

Ownership or fixed expenses do not vary with production levels. These non-cash expenses are faced by the operation whether the ranch produces cattle or not. Purchased breeding livestock, housing and improvements, machinery, equipment, and vehicles are depreciable assets. An annual capital recovery cost can be assessed against them to allow for replacement of depreciable assets over time. Capital recovery values are based on the initial values of the items, salvage values, and useful life of the assets. Insurance, taxes, and overhead amounts were derived from a database of individual ranch analyses conducted over the past five years in the University of Idaho FINPACK program (Center for Farm Financial Management 1994). The Idaho FINPACK program is an educational program on financial analysis that has resulted in a database of detailed individual farm and ranch financial statements.

Table 1. Estimated number of ranches, beef cows, and public land grazing use by resource area and budget category, Owyhee County, Idaho. 1998.

BLM Resource area/ budget category	Avg. herd size	No. of ranches	Beef cows	AUM/cow	Est. AUMs	Permitted AUMs
1. Owyhee						
Jordan	280	25	7,000	6.99	48,930	
Jordan	350	12	4,200	6.99	29,358	
Marsing	450	8	3,600	5.18	18,662	
Bruneau	1,000	2	2,000	9.07	18,144	
Total		47	16,800		115,094	115,144
2. Bruneau						
Bruneau	300	10	3,000	9.07	27,216	
Bruneau	500	14	7,000	9.07	63,504	
Bruneau	1,000	3	3,000	9.07	27,216	
Marsing	400	3	1,200	5.18	6,221	
Total		30	14,200		124,157	124,528
3. Jarbidge						
Three Creek	500	10	5,000	5.86	29,300	
Bruneau	300	4	1,200	9.07	10,886	
Bruneau	500	7	3,500	9.07	31,752	
Bruneau	1,000	4	4,000	9.07	36,288	
Total		25	13,700		108,226	108,796
4. County total		102	44,700		347,477	348,468

Total ownership expense amounts to \$45,000 (\$150/cow). Total expenses (direct operating and indirect ownership expenses) amount to \$130,000 and returns to land, risk, and management amount to -\$28,000 (-\$93/cow). It should be stressed that this does not mean that the model ranch lost \$93/cow. Rather, it shows that the ranch fell \$93/cow short of paying the owners of the capital invested in the ranch a fair return for management and risk. Replacement of depreciable assets (capital recovery) will not take place on an annual basis.

Table 3 presents the monthly feed requirements, by livestock class, for the model ranch. Winter feeding takes place from mid-December through mid-April. Federal and state range resources are grazed by cows, calves, replacement heifers, and bulls from mid-April through mid-October. Grazing of crop aftermath (hay meadows) occurs from mid-October through the start of winter feeding of replacement heifers in mid-November. Feeding of the cow herd starts in mid-December. Feed used in this table is presented in terms of the units appropriate to the commodity fed (tons of hay, hundred weight of grain, AUMs of grazing, etc.).

Table 4 converts all feeds used from a commodity basis (in Table 3) to an AUM basis, and indicates potential feed shortages or surpluses during the year. In addition, this table can be used to calculate dependency on federal and state forage resources. Total feed demanded by the livestock, converted to an AUM basis, amounts to 4,615 AUMs. Forage demanded by the livestock from federal and state resources (April through October) amounts to 2,239 AUMs. Thus, the

dependency on federal and state forage is calculated at 48.5%. Nearly half of the total AUMs of livestock use are coming from federal and state land range resources (45% dependency on BLM). Seasonally, dependency on public forage rises in the spring through fall, with over 85% of the forage coming from public sources during that timeframe. This table also forms the basis for developing ranch-level tools (budgeting and linear or dynamic programming models) for use in assessing the economic impacts of changes in the availability of feed resources, ranch management and marketing alternatives, and others.

Although not covered in detail here, the budgets for the other three management scenarios show similar federal forage dependencies and gross margins (Table 5). Annual dependency on BLM forage calculated from the forage balance table for each management scenario was 34.7% for Marsing, 59.8% for Bruneau, and 33.9% for Three Creek. Dependency on all public grazing was 39.8% for Marsing, 58% for Three Creek, and not changed for Bruneau. As the dependency on federal forage increased, revenue and operating expenses both declined. Economies of scale, the use of winter grazing permits on public lands, and reduced animal performance associated with the larger ranches all contributed to the increase in gross margin.

Policy Analysis

Torell et al. (1998) noted five potential ranch-level economic impacts of changes in grazing policies: 1) public land

Table 2. Cow-calf operation, summer on federal and state range, winter on harvested feeds and crop aftermath. Jordan Valley model.

	Weight each	Unit	Total number of head or units	Price or cost/unit	Total value	Revenue or cost/cow
1. Gross receipts						
Steer calves	4.40	cwt	131	\$88.36	\$50,930.70	\$169.77
Heifer calves	3.90	cwt	69	79.58	21,414.98	71.38
Cull replacement heifer	8.00	cwt	5	67.87	2,714.80	9.05
Aged bull	18.00	cwt	4	42.00	3,024.00	10.08
Cull cows	11.00	cwt	54	40.14	23,843.16	79.48
Total receipts					\$101,927.64	\$339.76
2. Operating costs						
Alfalfa hay		ton	71	70.00	4,970.00	16.57
Feed barley		cwt	249	5.30	1,319.70	4.40
Meadow hay		ton	484	60.00	29,040.00	96.80
Protein supplement - 20%		cwt	552	8.75	4,830.00	16.10
Federal range		AUM	2,095	1.35	2,828.25	9.43
State range		AUM	144	4.80	691.20	2.30
Crop aftermath		AUM	747	10.00	7,470.00	24.90
Salt		lb	6,120	0.06	367.20	1.22
Checkoff/brand inspection		head	264	2.00	528.00	1.76
Commission		head	64	7.27	465.28	1.55
Freight/trucking		head	64	6.00	384.00	1.28
Veterinary medicine		\$	4,890	1.00	4,890.00	16.30
Machinery (fuel, lubrication, repair)		\$	1,849	1.00	1,849.00	6.16
Vehicles (fuel, repair)		\$	5,523	1.00	5,523.00	18.41
Equipment (repair)		\$	637	1.00	637.00	2.12
Housing and improvements (repair)		\$	1,201	1.00	1,201.00	4.00
Hired labor		hour	480	6.75	3,240.00	10.80
Owner labor		hour	3,000	4.00	12,000.00	40.00
Interest on operating capital		\$	28,830	0.09	2,594.70	8.65
Total operating costs					\$84,828.33	\$282.75
3. Income above operating costs					\$17,099.31	\$57.00
4. Ownership costs						
Capital recovery						
Purchased livestock		\$	9,965.23	1.00	9,965.23	33.22
Housing and improvements		\$	9,677.72	1.00	9,677.72	32.26
Machinery		\$	2,370.16	1.00	2,370.16	7.90
Equipment		\$	1,776.91	1.00	1,776.91	5.92
Vehicles		\$	9,023.36	1.00	9,023.36	30.08
Insurance		\$	3,786.00	1.00	3,786.00	12.62
Taxes		\$	1,681.94	1.00	1,681.94	5.61
Overhead		\$	11,000.00	0.60	6,600.00	22.00
Total ownership costs					\$44,881.32	\$149.61
5. Total costs					\$129,709.65	\$432.36
6. Returns to land, risk, and management					-\$27,782.01	-\$92.60

Table 3. Monthly feed requirements, Jordan Valley model.

Feed	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Alfalfa hay													
Replacement heifers	ton	18	17	18	9	0	0	0	0	0	0	0	9
Feed barley													
Replacement heifers	cwt	55	50	55	27	0	0	0	0	0	0	35	27
Meadow hay													
Cows	ton	116	105	102	50	0	0	0	0	0	0	0	56
Bulls	ton	12	11	12	6	0	0	0	0	0	0	0	6
Horses	ton	2	2	2	1	0	0	0	0	0	0	0	1
Protein supplement - 20%													
Cows	cwt	186	0	0	0	0	0	0	0	0	0	180	186
Federal range													
Cows	AUM	0	0	0	138	276	276	276	276	276	138	0	0
Replacement heifers	AUM	0	0	0	24	47	47	47	47	47	24	0	0
Bulls	AUM	0	0	0	13	26	26	26	26	26	13	0	0
State range													
Cows	AUM	0	0	0	12	24	24	24	24	24	12	0	0
Crop aftermath													
Cows	AUM	0	0	0	0	0	0	0	0	0	150	300	150
Bulls	AUM	0	0	0	0	0	0	0	0	0	13	26	13
Replacement heifers	AUM	0	0	0	0	0	0	0	0	0	24	47	24
Salt	lb	510	510	510	510	510	510	510	510	510	510	510	510

Table 4. Forage balance (AUMs per month), Jordan Valley model.

Feed	Units	AUM/ Unit	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Alfalfa hay														
Replacement heifers	ton	3.75	67.5	67.8	67.5	33.8								33.8
Feed barley														
Replacement heifers	cwt	0.19	10.4	9.5	10.4	5.1							6.7	5.1
Meadow hay														
Cows	ton	2.50	290.0	262.5	255.0	125.0								140.0
Bulls	ton	2.50	30.0	27.5	30.0	15.0								15.0
Horses	ton	2.50	5.0	5.0	5.0	2.5								2.5
Protein supplement - 20%														
Cows	cwt	0.19	35.3										34.2	35.3
Federal range														
Cows	AUM	1.00				138.0	276.0	276.0	276.0	276.0	276.0	138.0		
Replacement heifers	AUM	1.00				24.0	47.0	47.0	47.0	47.0	47.0	24.0		
Bulls	AUM	1.00				13.0	26.0	26.0	26.0	26.0	26.0	13.0		
State range														
Cows	AUM	1.00				12.0	24.0	24.0	24.0	24.0	24.0	12.0		
Crop aftermath														
Cows	AUM	1.00										150.0	300.0	150.0
Bulls	AUM	1.00										13.0	26.0	13.0
Replacement heifers	AUM	1.00										24.0	47.0	24.0
Total AUMs			438.2	368.3	367.9	369.4	373.0	373.0	373.0	373.0	373.0	374.0	413.9	418.7

Table 5. Owyhee County ranch budget information and dependency on public range. 1998.

Budget model	Dependency ⁴ (%)	Revenue ⁵	Operating cost	Gross margin
Jordan	48.5	\$340	\$283	\$57
Marsing	39.8	355	293	62
Bruneau	59.8	338	266	72
Three Creek	58.0	311	203	108

⁴AUMs from public sources divided by total AUMs of the ranch

⁵Revenue, operating cost, and gross margin expressed on a \$/cow basis. Gross margin is the difference between revenue and operating cost.

grazing costs, 2) the number of AUMs of federal forage available, 3) changes in the season of livestock grazing use, 4) changing the class of livestock allowed to graze, and, 5) the uncertainty created by changing grazing policies. With the possible exception of uncertainty, the economic impact of grazing policy changes can be estimated using budgeting techniques and economic models.

The following section uses budgeting to estimate the economic impacts of a reallocation of federal forage. The basis of the analysis is the forage balance table (Table 4), along with the budget described earlier. In the final RMP, the BLM suggested an end to “hot season grazing” of riparian areas on several grazing allotments within the Owyhee Resource Area. An example of this situation will serve as the case study for this analysis. The example allotment has three permittees currently running about 1,000 head of cattle from April 15 through October 15. The BLM proposal calls for cattle to be removed by July 15 each year to protect woody vegetation and leave a six-inch minimum stubble height on riparian herbaceous vegetation near several streams that run through the allotment. Producer panels identified several alternatives for dealing with this situation of allotment reductions. These included gathering cattle to home ranches where they would be fed hay, grazed on hay meadows (thus reducing the winter hay supply or reducing hay aftermath grazing in the fall), securing private leased pasture, or reducing herd size and not grazing BLM rangelands. This example involves the replacement of three months (July 15 through October 15) of BLM forage with purchased meadow hay. Cows are fed an average of 700 pounds of meadow hay per month (23 pounds/day). It is assumed that there is no change in sale weights of the animals (i.e. no change in revenue) or marketing of animals, and that public land grazing costs do not change (i.e. the gathering in June and July is equal to the gathering costs

in September and October). The change in forage allocation for July through mid-October results in increased expenses for meadow hay and reduced expenses for federal and state rangeland. The other management strategy is the leasing of private pasture for three months at a lease rate of \$10.76/AUM (5-year average of Idaho private land lease rates), with no change in revenue or other operating costs.

Table 6 presents the impacts of these strategies on expenses and gross margin of the example ranch budget. “Existing” is the situation depicted by the current Jordan Valley budget. “Hay purchase” is the alternative of replacing lost federal forage with meadow hay purchases. “Private lease” replaces lost forage with leased pasture or rangeland from private lands. The most expensive alternative for the ranches is to replace the lost forage with purchased meadow and alfalfa hay. Hay expenses increase by \$83/head, federal grazing fees decline to \$4.72/head, and gross margin is reduced by \$80/head. Replacing federal forage with private leased pasture increases costs and reduces gross margin by \$33/head. The “no grazing” alternative was not considered in this analysis.

CONCLUSIONS

Producer panels proved an effective means of collecting cost-and-return estimates for Owyhee County, Idaho, cattle ranches. Four panels of livestock producers helped derive and validate estimates of costs and returns for four separate management scenarios in the county. Our estimates of cattle numbers and the number of federal AUMs consumed by BLM resource area were compared with other estimates for validation.

Estimates of dependency on federal and state rangelands were developed from the budgets. Dependency on public

Table 6. Changes in ranch costs and gross margin with no federal grazing after July 15. 1998. (\$/cow).

Management	Federal forage	Hay	Private pasture	Total cost	Gross margin
Existing	\$9.43	\$113	\$0.00	\$283	\$57
Hay purchase	4.72	196	0.00	363	-23
Private lease	4.72	113	38	316	24

forage ranged from 40 to 60%, with winter range operations exhibiting the higher levels. As federal dependency rises, operating expenses and gross revenues fall.

An example analyzing the costs of replacing federal forage with two alternatives also was presented. Purchasing hay to replace three months of federal forage added \$83/cow to ranch costs and reduced the gross margin by \$80/cow. Leasing private pasture added \$38/cow to ranch costs and reduced gross margin by \$33/cow.

Prologue

After the research for this project was conducted, budgets developed, and analysis conducted, three ranches were ordered to stop grazing an allotment on the North Fork of the Owyhee River by July 15. It was too late in the season for them to secure alternative private leased pasture. They brought cattle to their home ranches, grazed crop aftermath from hay meadows from mid-July through September, then started feeding hay. Although somewhat different than the alternatives explored here, the estimates of costs presented here were validated by the ranchers. These ranches are in the process of developing alternative management plans for the 2001 grazing season and methods of dealing with potential reductions in public land grazing.

Budgets developed in this project will continue to be refined and modified. A western regional research project is currently using budgets from Idaho, New Mexico, Colorado, Nevada, Utah, and Oregon to develop dynamic economic models and to use them to analyze public land policy alternatives. This will allow researchers to use common budgets, economic models, and other techniques to address policy issues across many of the western states.

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