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Financial Performance of Idaho's Endowment Rangelands

by

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ABSTRACT

The Idaho State Board of Land Commissioners (Land Board) is reviewing the rate charged for livestock grazing on 1.8 million acres of state endowment rangelands. Part of the Land Board's considerations is the historic and possible future financial performance of those rangelands.

This analysis used an income capitalization approach, land expectation value (LEV), to compare the value of endowment rangelands for livestock grazing over time and at different grazing lease rates. For the period FY 2011 to FY 2015, LEV at a 4% discount rate for Idaho's endowment rangelands averaged \$41.4 million. Return on Assets (ROA), which is the financial return divided by the value of the assets, for the same time period averaged 3.8% with 1.7% from grazing program income and 2.1% from increases in land value. State lease rates during this time period averaged \$6.08 per animal unit month (AUM). A sensitivity analysis using the FY 2015 federal lease rate of \$1.69 per AUM lowered average ROA based on grazing fees to -2.5%. Using the FY 2016 average private lease rate for Idaho of \$17.00 per AUM, raised ROA based on grazing fees to 7.2%.

Three future scenarios were analyzed for their effects on LEV and ROA by varying assumptions about future cattle market impacts on grazing fee rates, and the impact of the Idaho Department of Lands "bonus bid" program that allows leasees to extend contracts to 20 years. The bonus bid program was assumed to be fully subscribed by FY 2020 and led to decreased income for the state grazing program. After FY 2020, net income and ROA from the endowment rangelands grazing program was reduced by almost half.

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Introduction

In June 2015, the Idaho State Board of Land Commissioners (Land Board) voted to move forward with a review of the existing methodology for determining the rate charged for livestock grazing on state endowment lands, and to develop possible changes to the methodology for Land Board consideration (Land Board 2015a). To facilitate the review, the Land Board established a subcommittee and an advisory group to that subcommittee made up of state officials and interest group leaders (Appendix A). A group of consultants to the subcommittee, with a wide variety of expertise related to economics, policy, and livestock production also was asked to provide input to the review process. The Policy Analysis Group at the University of Idaho was invited as a consultant to provide an historical look at the financial performance of endowment lands leased for grazing and to provide context for assessing financial performance. This report includes information presented to the Land Board subcommittee and advisory group at the December 10, 2015 meeting. Additional information is provided on the financial calculations, key assumptions, and data used to derive the financial performance measures.

This report is based on a previous analysis conducted by the Policy Analysis Group on the financial performance of forest and rangeland assets (PAG Report No. 21: O'Laughlin and Cook 2001). That report proposed the following questions used here to organize data analysis and reporting:

- What methods are appropriate for evaluating the financial performance of rangeland assets?
- What is the financial return of endowment rangelands?
- What is the return on the rangeland asset at different grazing fee rates?
- How will future factors affect return on the rangeland asset?

What methods are appropriate for evaluating the financial performance of rangeland assets?

The state of Idaho owns about 2.4 million acres of endowment lands, managed as a trust for the benefit of public schools and other beneficiaries (PAG Report No. 1: O'Laughlin et al. 2011). The goal of endowment land management as mandated in the Idaho Constitution (Article IX, Section 8) is to provide "maximum long term financial return" to the beneficiaries. The Land Board—made up of the Governor, Secretary of State, Attorney General, State Controller, and Superintendent of Public Instruction—and its administrative arm, the Idaho Department of Lands (IDL), are charged with meeting this financial mandate. Almost 1.8 million acres of endowment lands are rangelands—lands dominated by grasses, forbs, and shrubs—and leased by the state for livestock production (IDL annual reports).

To determine if IDL is meeting its fiduciary obligation to the endowment beneficiaries, a financial performance evaluation is needed of the endowment rangelands leased for livestock grazing. Assessment of financial performance is a function of a) the value of the range asset,

which includes income from grazing leases and the increase (or decrease) in land value; and b) a performance target.

Accepted methods for valuing rangeland assets typically fall into one of three categories: sales comparison, replacement cost, or income capitalization (Appraisal Institute 2008). Sales comparison methods examine recent competitive sales of comparable properties or goods and services and use these market-based price signals to estimate value. The sales comparison method is preferred where comparable sales are available. However, many rangelands in Idaho are government-owned and not bought or sold frequently in the marketplace. Another challenge is the differences in the quality and extent of improvements made on public and private rangelands. Variability in fencing, water access, noxious weed control, and other improvements often prohibit direct comparison of public and private lease rates. The other significant challenge is that grazing fees on public rangelands do not reflect market value and thus can distort sale or lease rates.

Replacement cost methods estimate the cost of purchasing resources or production inputs that can serve as a replacement or substitute for the property being valued. These methods include production analyses or contributory value methods where property value is equal to the sum of the value of inputs used to produce a commodity. Detailed knowledge of farm and ranch budgets is required to determine the value of inputs across a range of properties. Cattle price share is another replacement cost method and can be a useful measure if grazing fees change relative to the market price of livestock.

Income capitalization methods consider the net income that a property might generate and capitalize it by discounting the projected cash flow at an appropriate target discount rate. The value of rangeland is the present value of cash flows over a period of years discounted at a target interest rate. The annual equivalent of the capital value is the rental rate. The challenges with using the income capitalization method include selecting an appropriate discount rate, accurately predicting the amount and timing of future revenues and costs, and accounting for revenues (grazing fees) that may not represent fair market value. Despite these challenges, income capitalization is considered the most practical and sound method for valuing endowment rangelands (O'Laughlin and Cook 2001; Becker-Wold et al. 2014). Key assumptions of the income capitalization method are described in the following subsections.

Land Expectation Value (LEV)

The income capitalization formula used for valuing rangelands is a standard net present value (NPV) formula, also called land expectation value (LEV):

$$V_0 = A / i$$

where: V_0 = value in year 0 (present value),

A = uniform series of annual revenues or payments, and

i = interest or discount rate.

The rangeland LEV is equivalent to the more complex formula used in forestry to evaluate a perpetual series of periodic harvests. The rangeland formula can be simplified because rangelands produce income on an annual basis (O'Laughlin and Cook 2001). LEV is a general estimate of overall land value based on expected revenues from continuing the current land use and similar management activities, e.g., livestock grazing (Becker-Wold et al. 2014).

LEV and Fair Market Value

LEV relies on the assumption that anticipated revenues, in this case grazing fees, are at fair market value. For private rangelands, lease rates are assumed to be priced at fair market value; however, both state and federal lease rates are set by formulas that result in rates lower than private leases. In addition, private leases often are not comparable to public lands leases because private landowners often provide rights and services (landlord services) that public land agencies do not.

Researchers have attempted to value differences in landlord services between public and private leases (see Bartlett et al. 2002). Several studies in New Mexico, one in Idaho, and another for all western states found that landlord services account for about 30% of the average private lease price. Although these studies were conducted in the early 1990s, the 30% value is accepted by rangeland economists as an approximation for the current value of landlord services on private leases. Therefore, this analysis uses 70% of the private land lease rate to represent the fair market value of endowment lands grazing fees.

Return on Assets (ROA)

Return on assets (ROA) is a widely used measure of financial performance. It is expressed as a percentage of financial returns from a property divided by the value of the asset. For rangeland, financial returns each year come from two sources: net income from grazing leases and change in the market value of the rangelands themselves. Specifically, the formula for ROA from grazing (ROA_G) is:

$$ROA_G = I_t / LEV_{t-1}$$

where: I_t = net income from grazing (i.e., total income from grazing – expenditures) for the current year (t), and

LEV_{t-1} = LEV for the previous year (t-1).

ROA from land value (ROA_L) is:

$$ROA_L = (LEV_t - LEV_{t-1}) / LEV_{t-1}$$

where: LEV_t = LEV for current year (t), and

LEV_{t-1} = LEV for the previous year (t-1).

Total ROA for rangelands (ROA_{G+L}) is equal to the sum of ROA_G and ROA_L (i.e., ROA_G + ROA_L). An appropriate ROA target for the endowment rangeland asset is discussed in a later section of this report.

Target Discount Rate

The choice of an interest or discount rate to use in computing LEV is important for determining the financial outcome. The target rate is a statement about how an investor values the future in relation to the present. The higher the discount rate the less the future is valued compared to the present. Higher discount rates favor shorter term investments with shorter payback periods.

The appropriate discount rate for evaluating any investment is the investor's opportunity cost of needed capital. A discount rate takes into account the time value of money (i.e., money available now is worth more than the same amount in the future due to its potential earning capacity) and the risk or uncertainty of future revenues. A chosen discount rate should reflect the desired rate of return from a substitute asset with similar risk.

The research literature is filled with theoretical and practical suggestions for selecting discount rates; a review of that literature is beyond the scope of this report. Instead, this report provides a sensitivity analysis of financial performance using discount rates from 2% to 6%.

What is the financial return of endowment rangelands?

Table 1 presents summary statistics and financial performance indicators for Idaho's endowment rangelands for FY 2011 through FY 2015. Similar information going back to FY 2006 is presented in Appendix B; however, earlier years are not directly comparable to more recent years for a variety of reasons outlined in the appendix. The following subsections below explain more about each row in Table 1.

Because financial analysis compares dollar amounts from different years, inflation must be accounted for. Dollars spent or received in different years have different buying power. Annual income and expenditures are expressed in "real" and "nominal" dollars in Table 1. Real dollar values have been adjusted for inflation to the base year, FY 2015. Nominal dollar values are the values of the reporting year and have not been adjusted for inflation. The annual rate of inflation for FY 2011 through FY 2015 averaged 1.65% (Bureau of Labor Statistics 2015).

(a) Acres leased for grazing – total number of acres of endowment lands leased for grazing each year. The number has remained fairly consistent, averaging 1.78 million acres over the FY 2011 to FY 2015 period (IDL annual reports).

(b) Animal unit months (AUMs) authorized – AUMs are the measurement unit for the amount of grazing forage consumed by livestock. Each lease has a maximum AUM amount authorized each year by IDL. For all endowment lands, the average yearly authorized grazing AUMs for FY2011 to FY 2015 was 258,663 (IDL annual reports).

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Table 1. Summary statistics and financial performance indicators, Idaho endowment rangeland, FY 2011-2015

Statistics and Performance Indicators (2015 \$)	FY2011	FY2012	FY2013	FY2014	FY2015	FY13-FY15 Average	FY11-FY15 Average
(a) Acres leased for grazing	1,765,301	1,765,301	1,789,596	1,785,843	1,793,615	1,789,685	1,779,931
(b) Animal unit months (AUMs) authorized	256,886	260,000	258,324	258,946	259,157	258,809	258,663
(c) Grazing fee, Idaho endowment land (\$/AUM)	\$5.13	\$5.25	\$6.36	\$6.89	\$6.77	\$6.67	\$6.08
(d) Cash income from grazing	\$1,986,605	\$1,409,895	\$1,973,146	\$2,170,499	\$2,265,606	\$2,136,417	\$1,961,150
Nominal cash income from grazing (with bonus bid)	\$1,878,863	\$1,439,217	\$1,932,652	\$2,160,442	\$2,265,606	\$2,119,567	\$1,935,356
Nominal direct income from bonus bids	\$561,038	\$74,217	\$289,711	\$376,304	\$511,113	\$392,376	\$362,477
(e) Cash expenditures for management	\$1,014,024	\$1,306,061	\$1,279,569	\$1,391,850	\$1,454,532	\$1,375,317	\$1,289,207
Nominal case expenditures for management	\$959,029	\$1,260,790	\$1,253,309	\$1,385,401	\$1,454,532	\$1,364,414	\$1,262,612
(f) Net income	\$972,581	\$103,834	\$693,577	\$778,649	\$811,074	\$761,100	\$671,943
Nominal net income	\$919,834	\$178,427	\$679,343	\$775,041	\$811,074	\$755,153	\$672,744
(g) Net income per AUM	\$3.79	\$0.40	\$2.68	\$3.01	\$3.13	\$2.94	\$2.60
(h) Net income per acre	\$0.55	\$0.06	\$0.39	\$0.44	\$0.45	\$0.43	\$0.38
(i) Idaho private land grazing fee (\$/AUM)	\$15.86	\$16.06	\$15.82	\$16.58	\$17.00	\$16.47	\$16.26
Nominal Idaho private land grazing fee (\$/AUM)	\$15.00	\$15.50	\$15.50	\$16.50	\$17.00	\$16.33	\$15.90
(j) Fee adjustment factor, private to public	0.7	0.7	0.7	0.7	0.7	0.7	0.7
(k) Fair market value public land grazing fee (\$/AUM)	\$11.10	\$11.24	\$11.07	\$11.61	\$11.90	\$11.53	\$11.38
(l) Attainable net income from grazing ¹	\$1,837,924	\$1,616,859	\$1,581,111	\$1,613,477	\$1,629,436	\$1,608,008	\$1,655,762
(m) Land expectation value (LEV) @ 4% ²	\$45,948,109	\$40,421,475	\$39,527,774	\$40,336,932	\$40,735,908	\$40,200,205	\$41,394,040
(n) LEV per acre @ 4%	\$26.03	\$22.90	\$22.09	\$22.59	\$22.71	\$22.46	\$23.26
(o) Return on assets, grazing income (ROAG) ³	0.2%	0.2%	1.7%	2.0%	2.0%	1.9%	1.7%
(p) Return on assets, land value (ROAL) ⁴	-12.0%	-12.0%	-2.2%	2.0%	1.0%	0.3%	2.1%
(q) Total return on assets (ROAG+L)	-11.8%	-11.8%	-0.5%	4.0%	3.0%	2.2%	3.8%
(r) Land expectation value (LEV) @ 6% ²	\$30,632,073	\$26,947,650	\$26,351,850	\$26,891,288	\$27,157,272	\$26,800,136	\$27,596,026
(s) LEV per acre @ 6%	\$17.35	\$15.27	\$14.73	\$15.06	\$15.14	\$14.97	\$15.51
(t) Return on assets, grazing income (ROAG) ³	0.3%	0.3%	2.6%	3.0%	3.0%	2.8%	2.5%
(u) Return on assets, land value (ROAL) ⁴	-12.0%	-12.0%	-2.2%	2.0%	1.0%	0.3%	2.1%
(v) Total return on assets (ROAG+L)	-11.7%	-11.7%	0.4%	5.0%	4.0%	3.1%	4.6%

¹ (b) x (k) - (e)

² (l) / "discount rate"

³ (f) / (m)_{t-1} from previous year) x 100

⁴ ((m) - (m)_{t-1} for previous year) / ((m)_{t-1} for previous year) x 100

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(c) Grazing fee, Idaho endowment land (\$/AUM) – grazing fee for Idaho's endowment lands is set by a formula based on private land lease rates in Idaho and the western U.S., a producer price index, and a cattle price index (Rimbey 2014). The fee averaged \$6.08 per AUM from FY 2011 to FY 2015 (IDL annual reports).

(d) Cash income from grazing – total cash income generated from the grazing program on all endowment lands displayed in real dollars. Income for the grazing program comes from two sources: grazing fees and bonus bids. Grazing fee income is based on the number of AUMs (b) multiplied by the grazing fee (c). Bonus bids were introduced in FY 2010 and allow a leaseholder to secure a 20-year lease by offering a premium above the annual lease rate set for 10 years. Total cash income from grazing fees averaged \$1,961,150 (real) annually between FY 2011 and FY 2015. Nominal values are presented in the next row for comparison. Annual direct income generated from bonus bids is also presented, in nominal dollars. This is computed by subtracting grazing fee income, i.e., the number of AUMs (b) times the grazing fee (c), from the nominal cash income from grazing. Direct income from bonus bids averaged \$362,477 (nominal) annually between FY 2011 and FY 2015.

(e) Cash expenditures for management – the endowment lands grazing program incurs expenditures for administration, monitoring, and management activities. Between FY 2011 and FY 2015 grazing program expenditures averaged \$1,289,207 (real) annually. Nominal values are presented in the next row for comparison.

(f) Net income – net income is equal to total income (d) minus expenditures (e). Net income averaged \$671,943 (real) per year between FY 2011 and FY 2015. Nominal values are presented in the next row for comparison.

(g) Net income per AUM – net income per AUM is equal to total net income (f) divided by total authorized AUMs (b). Between FY 2011 and FY 2015 net income per AUM averaged \$2.60 (real).

(h) Net income per acre – net income per acre is equal to total net income (f) divided by the number of acres of endowment lands leased for grazing (a). Net income per acre averaged \$0.38 between FY 2011 and FY 2015.

(i) Idaho private land grazing fee (\$/AUM) – the LEV calculation requires that grazing fees (revenue) represent fair market value, which they do not in the case of state endowment lands. Therefore, an estimated fair market value is computed based on the average grazing fee for private grazing land in Idaho. The most recent assessment of private lease rates for grazing in Idaho found an average rate of \$16.04 in 2011 (Rimbey et al. 2014). This analysis uses an unpublished update to that report, which results in an average private land grazing fee for the

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period FY 2011 to FY 2015 of \$16.26 per AUM. Nominal values are presented in the next row for comparison.

(j) Fee adjustment factor, private to public – an adjustment factor of 70% is used based on analysis by Bartlett et al. (2002). This is the estimated difference in landowner services provided in private and public grazing leases, which is held constant throughout the current analysis.

(k) Fair market value public land grazing fee (\$/AUM) – fair market grazing fee estimate is computed by multiplying the private grazing fee (i) by the fee adjustment factor (j). The fair market value public land grazing fee averaged \$11.38 (real) per AUM for the period FY 2011 to FY 2015.

(l) Attainable net income from grazing – estimate of net income if endowment lands received fair market value public land grazing fees. It is computed by multiplying the fair market fee (k) by the number of AUMs authorized (b) then subtracting expenditures for management (e). For the FY 2011 to FY 2015 period, attainable net income was estimated to be \$1,655,762 (real) annually, which is almost one million dollars more annually than actual net income (f).

(m) Land expectation value (LEV) @ 4% – LEV was computed using a discount rate of 4.0%. For the FY 2011 to FY 2015 period, LEV for endowment grazing lands averaged \$41,394,040 (real).

(n) LEV per acre @ 4% – LEV per acre is computed by dividing the LEV estimate (m) by the number of acres of grazing land (a). It represents what the grazing fee would be if endowment lands charged fair market value. The average LEV per acre for the period FY 2011 to FY 2015 was \$23.26 (real).

(o) Return on assets, grazing income (ROA_G) – return on assets is a common financial performance measure that compares year over year financial returns with the overall value of the asset. The grazing portion of return on assets (ROA_G) is computed by dividing net grazing program income (f) for a current year by the LEV (m) of the previous year. The average ROA_G using a 4.0% discount rate for FY 2011 to FY 2015 was 1.7% (real).

(p) Return on assets, land value (ROA_L) – land value portion of return on assets (ROA_L) is computed by dividing the change in LEV (m) from the previous year to the current year by the LEV of the previous year. The average ROA_L using a 4.0% discount rate for FY 2011 to FY 2015 was 2.1% (real).

(q) Total return on assets (ROA_{G+L}) – sum of returns for grazing income (o) plus returns from land value (p). The average ROA_{G+L} using a 4.0% discount rate for FY 2011 to FY 2015 was 3.8% (real).

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Rows (r) through (v) in Table 1 replicate the LEV and ROA calculations using a 6.0% discount rate for the period FY 2011 to FY 2015. The average LEV per acre was \$15.51 (real). The average ROA_G was 2.5% (real), the average ROA_L was 2.1% (real), and the average ROA_{G+L} was 4.6% (real).

What is the return on the rangeland asset at different grazing fee rates?

A sensitivity analysis was conducted to examine how different grazing fee rates affect LEV and ROA for endowment rangelands. Five different grazing fee rates (columns A-E), two time periods (FY 2015 and FY 2011-2015), and five different discount rates (2%-6%) were examined in Table 2. In all the scenarios, management costs were based on those incurred for endowment lands (IDL cash expenditures) and held constant.

Column A presents a scenario where state endowment lands are leased for the same grazing fees as federal lands. The federal land grazing rate (column A) is determined by formula (43 U.S. Code § 1905 and Executive Order 12548) and is used here to illustrate a grazing fee rate significantly below that used currently on state endowment lands. In FY 2015, the federal land grazing rate was \$1.69 per AUM and the state grazing fee was \$6.77 per AUM.

Column B is the base case or current state grazing fee, which is reported in Table 1. Column C uses the current year's (FY 2016) grazing fee rate for endowment lands, which is \$8.09 per AUM (Land Board 2015b). Column D examines the scenario where state grazing fees are set at the fair market value computed in Table 1. And column E sets grazing fees at the estimated Idaho private grazing lands lease rate (Table 1; Rimbey et al. 2014). For FY 2015, the fair market value grazing rate and the Idaho private lands grazing rate were \$11.90 and \$17.00, respectively.

By holding the FY 2011 to FY 2015 cash expenditures constant, there was no increase or decrease in LEV attributable to changes in grazing program management costs. Thus, the ROA values in Table 2 reflect net income only from grazing leases and demonstrate the effect of grazing fees independent of other factors. Predictably, higher grazing fees produce higher LEVs and ROAs, and higher discount rates produce lower LEVs and higher ROAs for a given grazing fee. The federal grazing fee generates negative LEVs and ROAs at all discount rates examined (2%-6%), which means it does not cover the costs of managing endowment rangelands. The average Idaho state grazing fee (B) generates an ROA ranging from 0.4% to 1.1%, at target discount rates of 2% to 6%.

Table 2. Sensitivity analysis of different grazing rates*

Statistics and Performance Indicators (2015 dollars)		(A) Federal lands	(B) Idaho state trust lands	(C) Effective 2016 Grazing Rate	(D) Fair Market Value	(E) Idaho private lands
Net Income Calculation: 2015 Actual Values (\$/AUM)						
(a) Grazing fee		\$1.69	\$6.77	\$8.09	\$11.90	\$17.00
(b) IDL cash expenditures (\$/AUM)		\$5.61	\$5.61	\$5.61	\$5.61	\$5.61
(c) Net income from grazing (\$/AUM)		\$(3.92)	\$1.16	\$2.48	\$6.29	\$11.39
Net Income Calculation: 2011-2015 Actual Values (\$/AUM)						
(d) Grazing fee		\$1.42	\$6.08	\$8.09	\$11.38	\$16.26
(e) IDL cash expenditures (\$/AUM)		\$4.98	\$4.98	\$4.98	\$4.98	\$4.98
(f) Net income from grazing (\$/AUM)		\$(3.56)	\$1.10	\$3.11	\$6.40	\$11.28
Land Expectation Value (LEV) Calculation: 2011-2015 Net Income Average Values (\$/acre)						
(g) LEV @ 2% discount interest rate		\$(25.90)	\$7.96	\$22.57	\$46.51	\$81.96
(h) LEV @ 3% discount interest rate		\$(17.26)	\$5.31	\$15.05	\$31.01	\$54.64
(i) LEV @ 4% discount interest rate		\$(12.95)	\$3.98	\$11.28	\$23.25	\$40.98
(j) LEV @ 5% discount interest rate		\$(10.36)	\$3.19	\$9.03	\$18.60	\$32.78
(k) LEV @ 6% discount interest rate		\$(8.63)	\$2.65	\$7.52	\$15.50	\$27.32
Return on Assets (ROA) Calculation: 2015 Grazing Net Income / Fair Market Value (LEV)						
(l) ROA with LEV @ 2% interest rate		-1.2%	0.4%	0.8%	2.0%	3.6%
(m) ROA with LEV @ 3% interest rate		-1.9%	0.6%	1.2%	3.0%	5.4%
(n) ROA with LEV @ 4% interest rate		-2.5%	0.7%	1.6%	4.0%	7.2%
(o) ROA with LEV @ 5% interest rate		-3.1%	0.9%	2.0%	5.0%	9.1%
(p) ROA with LEV @ 6% interest rate		-3.7%	1.1%	2.4%	6.0%	10.9%

*Return on grazing fee income only

How will future factors affect return on the rangeland asset?

Table 3 examines future financial performance of endowment rangelands under three different market scenarios affecting the private land grazing fee rates for FY 2016 to FY 2022. Each scenario is based on input from Idaho cattle grazers about projected future cattle prices and subsequent impacts on grazing fees. Scenario 1 assumes cattle prices will continue to fall and herds will be sold off over the next few years resulting in lower future grazing fees. This scenario models the impact of private land grazing fees falling from \$17.00 per AUM in FY 2016 to \$13.25 per AUM in FY 2022. Scenario 2 assumes private land grazing fees will fall to \$13.60 per AUM in FY 2018 before recovering to \$15.50 per AUM by FY 2022. Scenario 3 assumes private land grazing fees stay constant at the estimated FY 2015 value of \$17.00 per AUM. Projected rates are provided for comparison purposes only and should be used with caution, especially given the volatility of world markets and unpredictable nature of cattle prices.

Future rates of return are dependent upon assumptions about acres leased, authorized AUMs, expenditures, and program income. Acres leased for grazing (a), AUMs authorized (b), and cash expenditures for management (e) were based upon the FY 2011 to FY 2015 averages presented in Table 1. Cash income from grazing (d) is a function of bonus bid amounts, which averaged \$362,477 during the FY 2011 to FY 2015 period. As described earlier, bonus bids allow a leaseholder to secure a 20-year lease by offering an amount above the annual lease rate. Because the 20-year cycle of bonus bid opportunities was initiated in FY 2010 and IDL anticipates that all endowment rangelands will be under 20-year leases by FY 2020, all three scenarios assume that beginning in FY 2020 grazing program income will only come from grazing fees. Each value for future years is in real dollars, adjusted for inflation at a 2.5% rate.

As one would expect, higher grazing fees result in higher LEVs in future years. Because ROA relies on changes in value from year to year, only under Scenario 2 with increasing private land grazing fees in years FY 2019 to FY 2022 are ROA measures positive. In all three scenarios, net income per acre and per AUM decrease to almost half their FY 2019 rates in FY 2020 and beyond when bonus bids no longer provide annual income to the grazing program. Return on grazing on the rangeland asset benefits initially from the bonus bid program but will be significantly affected in subsequent years.

Table 3. Projected LEV and ROA based on future grazing rate scenarios (FY2015-FY2022) (no bonus bids post FY 2019)

Statistics and Performance Indicators	FY2015	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021	FY2022
(a) Acres leased for grazing	1,793,615	1,779,931	1,779,931	1,779,931	1,779,931	1,779,931	1,779,931	1,779,931
(b) Animal unit months (AUMs) authorized	259,157	258,663	258,663	258,663	258,663	258,663	258,663	258,663
Direct income from grazing (no bonus bids) (FY11-15 avg)	\$1,754,493	\$1,572,879	\$1,572,879	\$1,572,879	\$1,572,879	\$1,572,879	\$1,572,879	\$1,572,879
(d) Cash income from grazing	\$2,265,606	\$1,983,740	\$2,033,333	\$2,084,167	\$2,136,271	\$1,779,569	\$1,824,058	\$1,869,659
(e) Cash expenditures for management	\$1,454,532	\$1,294,178	\$1,326,532	\$1,359,695	\$1,393,688	\$1,428,530	\$1,464,243	\$1,500,849
(f) Net income	\$811,074	\$689,562	\$706,801	\$724,471	\$742,583	\$351,039	\$359,815	\$368,810
(g) Net income per AUM	\$3.13	\$2.67	\$2.73	\$2.80	\$2.87	\$1.36	\$1.39	\$1.43
(h) Net income per acre	\$0.45	\$0.39	\$0.40	\$0.41	\$0.42	\$0.20	\$0.20	\$0.21
Scenario 1 - Market adjustment with herd self-off								
(i) Idaho private land grazing fee (\$/AUM) - Scenario 1	\$17.00	\$17.00	\$15.90	\$13.60	\$13.60	\$13.50	\$13.25	\$13.25
(k) Fair market value public land grazing fee (\$/AUM)	\$11.90	\$11.90	\$11.13	\$9.52	\$9.52	\$9.45	\$9.28	\$9.28
(l) Attainable net income from grazing ¹	\$1,629,436	\$1,783,907	\$1,552,383	\$1,102,773	\$1,068,780	\$1,015,832	\$934,853	\$898,246
(m) Land expectation value (LEV) @ 4% ²	\$40,735,908	\$44,597,686	\$38,809,570	\$27,569,318	\$26,719,508	\$25,395,794	\$23,371,314	\$22,456,162
(n) LEV per acre @ 4%	\$22.71	\$25.06	\$21.80	\$15.49	\$15.01	\$14.27	\$13.13	\$12.62
(o) Return on assets, grazing income (ROA _G) ³	1.7%	1.7%	1.6%	1.9%	2.7%	1.3%	1.4%	1.6%
(p) Return on assets, land value (ROA _L) ⁴	9.5%	9.5%	-13.0%	-29.0%	-3.1%	-5.0%	-8.0%	-3.9%
(q) Total return on assets (ROA _{G+L})	11.2%	11.2%	-11.4%	-27.1%	-0.4%	-3.6%	-6.6%	-2.3%
Scenario 2 - Market adjustment followed by reentry								
(i) Idaho private land grazing fee (\$/AUM) - Scenario 2	\$17.00	\$17.00	\$15.90	\$13.60	\$14.00	\$14.50	\$15.00	\$15.50
(k) Fair market value public land grazing fee (\$/AUM)	\$11.90	\$11.90	\$11.13	\$9.52	\$9.80	\$10.15	\$10.50	\$10.85
(l) Attainable net income from grazing ¹	\$1,629,436	\$1,783,907	\$1,552,383	\$1,102,773	\$1,141,206	\$1,196,896	\$1,251,714	\$1,305,640
(m) Land expectation value (LEV) @ 4% ²	\$40,735,908	\$44,597,686	\$38,809,570	\$27,569,318	\$28,530,146	\$29,922,389	\$31,292,856	\$32,641,002
(n) LEV per acre @ 4%	\$22.71	\$25.06	\$21.80	\$15.49	\$16.03	\$16.81	\$17.58	\$18.34
(o) Return on assets, grazing income (ROA _G) ³	1.7%	1.7%	1.6%	1.9%	2.7%	1.2%	1.2%	1.2%
(p) Return on assets, land value (ROA _L) ⁴	9.5%	9.5%	-13.0%	-29.0%	3.5%	4.9%	4.6%	4.3%
(q) Total return on assets (ROA _{G+L})	11.2%	11.2%	-11.4%	-27.1%	6.2%	6.1%	5.8%	5.5%
Scenario 3 - Flat rate								
(i) Idaho private land grazing fee (\$/AUM) - Scenario 3	\$17.00	\$17.00	\$17.00	\$17.00	\$17.00	\$17.00	\$17.00	\$17.00
(k) Fair market value public land grazing fee (\$/AUM)	\$11.90	\$11.90	\$11.90	\$11.90	\$11.90	\$11.90	\$11.90	\$11.90
(l) Attainable net income from grazing ¹	\$1,629,436	\$1,783,907	\$1,751,553	\$1,718,390	\$1,684,397	\$1,649,555	\$1,613,842	\$1,577,236
(m) Land expectation value (LEV) @ 4% ²	\$40,735,908	\$44,597,686	\$43,788,825	\$42,959,742	\$42,109,933	\$41,238,878	\$40,346,047	\$39,430,895
(n) LEV per acre @ 4%	\$22.71	\$25.06	\$24.60	\$24.14	\$23.66	\$23.17	\$22.67	\$22.15
(o) Return on assets, grazing income (ROA _G) ³	1.7%	1.7%	1.6%	1.7%	1.7%	0.8%	0.9%	0.9%
(p) Return on assets, land value (ROA _L) ⁴	9.5%	9.5%	-1.8%	-1.9%	-2.0%	-2.1%	-2.2%	-2.3%
(q) Total return on assets (ROA _{G+L})	11.2%	11.2%	-0.2%	-0.2%	-0.2%	-1.2%	-1.3%	-1.4%

¹ ((b) x (k)) - (e)

² (l) / "discount rate"

³ (f) / ((m)_{t-1} from previous year) x 100

⁴ ((m) - (m)_{t-1} for previous year) / ((m)_{t-1} for previous year) x 100

What is an appropriate benchmark rate of return for the endowment rangeland asset?

Idaho's endowment rangelands produce a variety of non-financial values in addition to livestock forage that also are considered in managerial decisions (O'Laughlin and Cook 2001). For example, these lands provide wildlife habitat and other environmental benefits as well as add to the quality of life for people. Financial analysis provides a starting point for taking these non-financial values into consideration by identifying the values of market products. Calculating the potential financial returns for endowment rangelands from grazing allows the Land Board to weigh opportunities forgone (opportunity costs) against alternative investments to determine the best use of trust resources.

Every investment opportunity has a unique set of characteristics including the amount and timing of revenues and costs and the risks involved. Rangeland grazing has historically provided lower rates of return than other investment classes, but it is also a relatively low-risk and stable investment.

Recent recommendations for benchmark rates of return for Idaho's endowment rangelands have included:

- A benchmark real ROA of 1.25% (nominal ROA of 3.5%) in the Callan Report (Becker-Wold et al. 2014) based on average 10-year bond rates from the Farm Credit System Bank;
- A benchmark range ROA of 0.5%-5.0% in the *State Trust Lands Asset Management Plan* (Land Board 2011) based on ROAs obtained by other western states; and
- A benchmark of 6.0% ROA in a citizen's committee report to the Idaho Governor (Curtis et al. 2001) based on return objectives for most pension fund real estate programs.

Variability in recommended benchmarks reflects both the complexity of evaluating future returns and the difficulty comparing returns at different points in time relative to existing opportunity costs. Selecting an appropriate benchmark or target rate of return for the endowment rangeland asset is a political decision for the Land Board.

Conclusion

Financial performance evaluation provides guidance to the Land Board about meeting its fiduciary obligation for endowment rangelands. LEV, an income capitalization technique, is an accepted and practical method for valuing rangelands based on their cash income and management expenditures. ROA allows for comparison of returns from the rangeland asset with other investment opportunities.

Results from LEV and ROA calculations are sensitive to input values. For example, the LEV calculation in this analysis assumes that 70% of the private land lease rate represents the fair market value for endowment land grazing. Varying this assumption would significantly affect results. The scenarios analyzed herein about future ROA from endowment rangelands also include assumptions about the future of cattle prices and IDL's bonus bid program. Higher or

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lower cattle prices, which affect state grazing rates, and unforeseen changes to the bonus bid program that lead to the revenue drop-off in FY 2020 would both significantly affect the results obtained in this analysis.

The appropriateness of a particular level of grazing fee can be viewed from numerous perspectives. Viewed strictly from a financial asset perspective, returns to endowment beneficiaries are below benchmark rates of return obtained by other investment classes. This is in part because it is not possible to attain targeted rates of return from grazing net income (ROA_G) when fees are set below the fair market value (LEV is indexed to fair market value). From this perspective a higher grazing fee would be warranted. However, rangeland valuation involves more than just the value of livestock production, and these values may be considered in setting grazing fees. They include the value of improvements made on state endowment lands, keeping ranches operational for rural investments and livelihoods, and other values that are difficult to quantify. Ultimately, setting an appropriate grazing fee for endowment rangelands is a political decision of the Land Board taking these different values into consideration.

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Appendix A. 2015-2016 Grazing Rate Review Land Board Subcommittee and Advisory Group

Subcommittee

Secretary of State Lawrence Denney, Subcommittee Chair

Tim Hurst, Chief Deputy

Governor Butch Otter

Stephen Goodson, Special Assistant for Natural Resources

Subcommittee Advisory Group

Wyatt Prescott, Executive Director - Idaho Cattle Association

Jim Hagenbarth, Livestock Producer/Operator

Russ Hendricks, Director of Governmental Affairs – Idaho Farm Bureau

Clive Strong, Natural Resources Division Chief - Office of Attorney General

Tim Corder, Special Assistant to the Superintendent – Department of Education

Scott Phillips, Deputy Controller – State Controller's Office

Michael Gibson, Executive Director – Idaho Wildlife Federation

Mark Davidson, Director of Conservation Initiatives – The Nature Conservancy

Diane French, Deputy Director Lands & Waterways - Idaho Department of Lands

Subcommittee Consultants

Dr. Dennis Becker, Director of Policy Analysis Group - U. of Idaho

Dr. Neil Rimbey, Agricultural Economics and Rural Sociology - U. of Idaho Extension
Resource Dimensions – 2012 IDL Market Rent Study

Dr. Julie Ann Gustanski, CEO

Dr. Roger Coupal, Department Head of Agricultural & Applied Economics – U. of
Wyoming

Dr. John Ritten, Associate Professor, Agricultural & Applied Economics – U. of Wyoming
U. of Montana; Bioeconomics, Inc.

Dr. John Duffield, Natural Resource Economics & Policy

Chris Neher, Senior Economist, Natural Resource Economics & Policy

Idaho Department of Lands

Tom Schultz, Director

Mike Murphy, Bureau Chief Endowment Leasing

Facilitator

Marsha Bracke, Certified Professional Facilitator

Bracke & Associates, Inc

(Source: IDL 2015)

Appendix B. Summary statistics and financial performance indicators, FY 2006 to FY 2015

Table B-1 includes similar information to Table 1 with more years included. Historic data is included only back to FY 2006 because before then financial information available from IDL lumped agricultural lands with rangelands. In addition, the Idaho Office of the Controller changed the AUM expenditure method in FY 2006. Therefore, years prior to FY 2006 are not directly comparable to more recent years and have not been included. There was also some concern about the accuracy of IDL data records from FY 2006 to FY 2010 for the total number of acres, AUM authorizations, and annual costs and revenues, which is why these data reside in the appendix and not Table 1. Caution should be used when comparing these values to previous values.

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Table B-1. Summary statistics and financial performance indicators, Idaho endowment rangeland, FY 2006-2015 (2015 dollars)

Statistics and Performance Indicators (2015 \$)	FY2006	FY2007	FY2008	FY2009	FY2010
(a) Acres leased for grazing	1,738,695	1,789,014	1,778,280	1,783,814	1,786,744
(b) Animal unit months (AUMs) authorized	258,355	261,537	258,963	258,506	260,711
(c) Grazing fee, Idaho endowment land (\$/AUM)	\$6.02	\$5.96	\$6.01	\$5.99	\$5.12
(d) Cash income from grazing	\$1,964,865	\$1,823,114	\$1,734,447	\$1,689,526	\$1,671,694
Nominal cash income from grazing (with bonus bid)	\$1,665,490	\$1,589,351	\$1,570,109	\$1,524,003	\$1,532,652
Nominal direct income from bonus bids	\$1,555,297	\$1,558,761	\$1,556,368	\$1,548,451	\$1,334,840
(e) Cash expenditures for management	\$1,774,578	\$1,737,687	\$1,507,004	\$1,628,239	\$1,274,059
Nominal case expenditures for management	\$1,504,196	\$1,514,878	\$1,364,216	\$1,468,720	\$1,168,090
(f) Net income	\$190,287	\$85,427	\$227,443	\$61,287	\$397,635
Nominal net income	\$161,294	\$74,473	\$205,893	\$55,283	\$364,562
(g) Net income per AUM	\$0.74	\$0.33	\$0.88	\$0.24	\$1.53
(h) Net income per acre	\$0.11	\$0.05	\$0.13	\$0.03	\$0.22
(i) Idaho private land grazing fee (\$/AUM)	\$15.93	\$16.75	\$15.58	\$15.52	\$15.27
Nominal Idaho private land grazing fee (\$/AUM)	\$13.50	\$14.60	\$14.10	\$14.00	\$14.00
(j) Fee adjustment factor, private to public	0.7	0.7	0.7	0.7	0.7
(k) Fair market value public land grazing fee (\$/AUM)	\$11.15	\$11.73	\$10.91	\$10.86	\$10.69
(l) Attainable net income from grazing ¹	\$1,106,339	\$1,328,834	\$1,317,246	\$1,180,170	\$1,512,681
(m) Land expectation value (LEV) @ 4% ²	\$27,658,465	\$33,220,858	\$32,931,162	\$29,504,255	\$37,817,022
(n) LEV per acre @ 4%	\$15.91	\$18.57	\$18.52	\$16.54	\$21.17
(o) Return on assets, grazing income (ROA _G) ³		0.3%	0.7%	0.2%	1.3%
(p) Return on assets, land value (ROA _L) ⁴		20.1%	-0.9%	-10.4%	28.2%
(q) Total return on assets (ROA _{G+L})		20.4%	-0.2%	-10.2%	29.5%
(r) Land expectation value (LEV) @ 6% ²	\$18,438,977	\$22,147,239	\$21,954,108	\$19,669,503	\$25,211,348
(s) LEV per acre @ 6%	\$10.61	\$12.38	\$12.35	\$11.03	\$14.11
(t) Return on assets, grazing income (ROA _G) ³		0.5%	1.0%	0.3%	2.0%
(u) Return on assets, land value (ROA _L) ⁴		20.1%	-0.9%	-10.4%	28.2%
(v) Total return on assets (ROA _{G+L})		20.6%	0.2%	-10.1%	30.2%

¹ ((b) x (k)) - (e)

² (l) / "discount rate"

³ ((f) / ((m)_{t-1} from previous year) x 100

⁴ (((m) - (m)_{t-1} for previous year) / ((m)_{t-1} for previous year) x 100

Financial Performance of Idaho's Endowment Rangelands

Table B-1. (continued)

Statistics and Performance Indicators (2015 \$)	FY2011	FY2012	FY2013	FY2014	FY2015	FY13-FY15 Average	FY11-FY15 Average
(a) Acres leased for grazing	1,765,301	1,765,301	1,789,596	1,785,843	1,793,615	1,789,685	1,779,931
(b) Animal unit months (AUMs) authorized	256,886	260,000	258,324	258,946	259,157	258,809	258,663
(c) Grazing fee, Idaho endowment land (\$/AUM)	\$5.13	\$5.25	\$6.36	\$6.89	\$6.77	\$6.67	\$6.08
(d) Cash income from grazing	\$1,986,605	\$1,409,895	\$1,973,146	\$2,170,499	\$2,265,606	\$2,136,417	\$1,961,150
Nominal cash income from grazing (with bonus bid)	\$1,878,863	\$1,439,217	\$1,932,652	\$2,160,442	\$2,265,606	\$2,119,567	\$1,935,356
Nominal direct income from bonus bids	\$561,038	\$74,217	\$289,711	\$376,304	\$511,113	\$392,376	\$362,477
(e) Cash expenditures for management	\$1,014,024	\$1,306,061	\$1,279,569	\$1,391,850	\$1,454,532	\$1,375,317	\$1,289,207
Nominal case expenditures for management	\$959,029	\$1,260,790	\$1,253,309	\$1,385,401	\$1,454,532	\$1,364,414	\$1,262,612
(f) Net income	\$972,581	\$103,834	\$693,577	\$778,649	\$811,074	\$761,100	\$671,943
Nominal net income	\$919,834	\$178,427	\$679,343	\$775,041	\$811,074	\$755,153	\$672,744
(g) Net income per AUM	\$3.79	\$0.40	\$2.68	\$3.01	\$3.13	\$2.94	\$2.60
(h) Net income per acre	\$0.55	\$0.06	\$0.39	\$0.44	\$0.45	\$0.43	\$0.38
(i) Idaho private land grazing fee (\$/AUM)	\$15.86	\$16.06	\$15.82	\$16.58	\$17.00	\$16.47	\$16.26
Nominal Idaho private land grazing fee (\$/AUM)	\$15.00	\$15.50	\$15.50	\$16.50	\$17.00	\$16.33	\$15.90
(j) Fee adjustment factor, private to public	0.7	0.7	0.7	0.7	0.7	0.7	0.7
(k) Fair market value public land grazing fee (\$/AUM)	\$11.10	\$11.24	\$11.07	\$11.61	\$11.90	\$11.53	\$11.38
(l) Attainable net income from grazing ¹	\$1,837,924	\$1,616,859	\$1,581,111	\$1,613,477	\$1,629,436	\$1,608,008	\$1,655,762
(m) Land expectation value (LEV) @ 4% ²	\$45,948,109	\$40,421,475	\$39,527,774	\$40,336,932	\$40,735,908	\$40,200,205	\$41,394,040
(n) LEV per acre @ 4%	\$26.03	\$22.90	\$22.09	\$22.59	\$22.71	\$22.46	\$23.26
(o) Return on assets, grazing income (ROAG) ³		0.2%	1.7%	2.0%	2.0%	1.9%	1.7%
(p) Return on assets, land value (ROAL) ⁴		-12.0%	-2.2%	2.0%	1.0%	0.3%	2.1%
(q) Total return on assets (ROAG+L)		-11.8%	-0.5%	4.0%	3.0%	2.2%	3.8%
(r) Land expectation value (LEV) @ 6% ²	\$30,632,073	\$26,947,650	\$26,351,850	\$26,891,288	\$27,157,272	\$26,800,136	\$27,596,026
(s) LEV per acre @ 6%	\$17.35	\$15.27	\$14.73	\$15.06	\$15.14	\$14.97	\$15.51
(t) Return on assets, grazing income (ROAG) ³		0.3%	2.6%	3.0%	3.0%	2.8%	2.5%
(u) Return on assets, land value (ROAL) ⁴		-12.0%	-2.2%	2.0%	1.0%	0.3%	2.1%
(v) Total return on assets (ROAG+L)		-11.7%	0.4%	5.0%	4.0%	3.1%	4.6%

¹ ((b) x (k)) - (e)

² (l) / "discount rate"

³ ((f) / ((m)_{t-1} from previous year) x 100

⁴ ((m) - (m)_{t-1} from previous year) / ((m)_{t-1} from previous year) x 100