

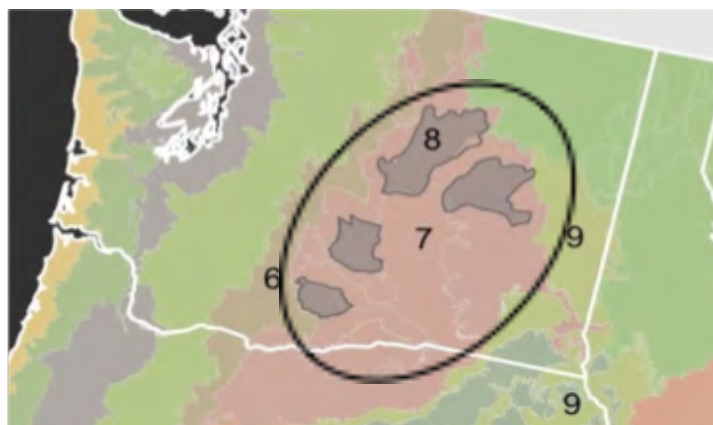


Enterprise budget for 50-head, cow-calf private land ranch

Columbia Plateau **MLRA 8**

Holly Dyer¹, Holly Kirkpatrick¹, Tom Hilken¹, Kendall Roberts¹,
Anna Maher¹, Nicolas Quintana Ashwell¹, Tipton Hudson²,
John Tanaka³, John Ritten⁴, and Kristie Maczko³

Washington counties: Adams, Douglas, Kittitas,
Klickitat, Lincoln, Walla Walla, Yakima



This budget represents typical cost and returns for a 50 head cow-calf operation in Major Land Resource Area (MLRA) 8, the Columbia Plateau region of Washington. A panel of producers from the area assisted with the information contained in this enterprise budget.

Feed Sources

Private rangeland pasture is provided for all livestock for five and a half months (April 16th to September 30th). All livestock then graze hay or crop aftermath (deeded/leased) for two months (October 1st to November 30th). Cattle are fed grass/alfalfa mix hay for four and a half

months (December 1st to April 15th). All hay is valued at market price of five-year averages in region (USDA-NASS, 2018). Salt and minerals are fed at the rate of four pounds per head per month and provided year-round. An annual outlook of activities calendar with feed sources is described below in Table 1.

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Table 1. Annual Outlook of Activities for this 50 Cow-Calf Operation in MLRA 8.

Management Activities	Calendar Date
Winter Feeding 70% Alfalfa / 30% Meadow Hay	December 1 - April 16
Calving Season	February 15 - April 30
Post-Calving (branding, vaccinating, castrating); Pre-breeding vaccinate heifers	April 1- May 1
Breeding Season (~75 Days)	May 6 - July 19
Graze Deeded/Leased Rangeland Pasture - All Livestock	April 16 - September 30
Pregnancy check/vaccinate cows & Pre-condition calves	September 30 - October 1
Wean calves; Market steer calves, culls & non-replacement heifer calves	October 15 - November 15
Graze Deeded/Leased Aftermath (Hay/Crop) - All Livestock	October 1 - December 1

*Note: overlap of dates may occur in this MLRA.

Land Cost

The cost of land is included in the budget on an AUM cost by land type. Deeded land rate is calculated using area rates by type and availability and published in the USDA-NASS Agricultural Prices reports (2018). Irrigated pasture and aftermath rates were assumed to be 30% higher than non-irrigated land rates.

Herd Characteristics

The livestock inventory consists of 50 brood cows, 3 bulls, and 2 horses. Two bulls are provided for the brood cows and one bull provided for the replacement heifers at a rate of 25 cows per bull. Bulls are purchased in the spring prior to breeding season, and in 3 out of 4 years a bull is replaced, which is reflected in this budget. But in 1 of 4 years, no culling or purchasing of a bull takes place (cull rate of 25% for this herd size). Bulls begin the breeding season from May 6th and are removed on July 19th. Cow death loss is 1% and 10% are culled annually resulting in replacement rate of 11%. The calving rate for all cows exposed is 98% and calf death loss is 1%. Calving season takes place from February 15th to April 30th.

All steer calves are sold and 50% of the heifer calves are sold after weaning. The remaining 50% are selected at weaning as the next year's replacement heifers. This consists of 12 head of replacements with minimal death loss. Six heifers are then culled following fall breeding evaluation. Five cows are culled from the herd due to older age and unsuccessful breeding. Steer calves, non-replacement heifer calves, cull cows, and

cull bulls are marketed before mid-November. Live-stock production and inventory is outlined in Table 4: Flow Chart of Livestock Production.

Gross Receipt

Gross receipts are 5-year average of prices received for livestock sold and indexed to 2017 dollars for the state of Washington (CattleFax, 2018; BLS, 2018). Livestock weights and prices received are shown in the Enterprise Budget (Table 3). These are assumed "typical" by the focus group and confirmed by market data in the state of Washington and Columbia Plateau area.

Animal Health (Veterinary and Medicine)

This includes vaccines, medicines, and all other veterinary services including pregnancy testing. Calves are given post-calving season vaccinations, are branded, dehorned, and bulls castrated in April. These vaccinations include 7-way, IBR/PI3/BVD/BRSV, and pour-on/wormer (Ivomec or Dectomax). Previous year's selected replacement heifers are given pre-breeding vaccinations including Vibriosis-Leptospirosis, 7-way, IBR/PI3/BVD/BRSV, and pour-on/wormer (Ivomec or Dectomax) before the May 6th bull turnout. Bulls will be tested for fertility and Trichomoniasis. Cows and replacement heifers are pregnancy tested in the fall as the cattle are gathered and heifer calves are given Bangs vaccinations. Table 2 below gives typical vaccinating and animal health practices and cost estimations by livestock class as provided by Forero et al (2017).

Table 2. Veterinary and Medication Costs

Activities	Cost per Unit	Number of Head	Total Cost
Cows - vaccine, wormer, etc.	\$9.00	50	\$450.00
Cows - Vet service (preg check, etc.)	\$2.25	50	\$112.50
Bulls - vaccine, wormer, etc.	\$15.50	3	\$38.75
Bulls - Vet service (trich, semen, etc)	\$40.00	3	\$100.00
Heifers - Vaccine, wormer, etc.	\$12.50	12	\$150.06
Heifers - Vet service (bangs, preg check)	\$7.25	12	\$87.04
Horses - wormer	\$15.00	2	\$30.00
Calves - dehorned, vaccine, boosters, dewormer, castrate (bulls calves only)	\$15.82	49	\$775.18
Total			\$1,743.53
cost per cow			\$34.87

Marketing and Transportation

Calves and cull animals are marketed through local auctions. Most operators of this size and scale will utilize transportation companies for delivery of cattle as the focus group indicated no ownership of a semi-truck and cattle pot. Trucking expenses are included in the budget as “Freight & Trucking” with a per mile cost of \$4.50 for an average of 150 miles for cull animals with two trips being required. “Marketing” is \$5.00 per head and incorporates auction sale commission, check-off fees, and brand inspections for all livestock sold. These three operating costs are listed under “Other Operating Costs” in the budget.

Labor

The focus group indicated no other employees or labor for a herd of this size and scale. The cost of owner labor and management are not included in the budget. The net returns in the budget are compensation to labor and management.

Taxes

Annual property tax costs are estimated following the tax rate of one percent on the assessed value of agriculture/farm land and personal property, as recommended by American Agriculture Economics Association (AAEA, 2000). Land values are averaged across an MLRA using rates provided by the U.S. Department of Agriculture in a 2017 Land Value Summary (USDA-NASS, 2017) by type of land, and pasture was valued in Washington at a rate of \$850 per acre. The 2012 Census of Agriculture (USDA-NASS, 2012) indicated that average farm size was 830 acres private land

with only the counties included in this MLRA (Adams, Douglas, Kittitas, Klickitat, Lincoln, Walla Walla, and Yakima).

Inventory and Capital Investments

Buildings and improvements include a set of corrals that incorporate portable panels and a loading chute, and a storage shop. A squeeze chute, two feed/hay bunks, tractor implements, veterinary equipment, storage tanks (fuel and water storage) and a livestock trailer were also included in the equipment inventory. Vehicles and machinery used for the cow-calf operation include two one-ton trucks, one ATV, and one 50-75 horsepower compact/utility tractor with a front-end loader. Other equipment was mentioned by focus group participants including tools and branding irons, and these are utilized in the cow-calf operation. The depreciation costs are calculated using straight-line method and applying a 5% interest rate on useful life of the asset, determined by the Modified Accelerated Cost Recovery System (MACRS) standards. The machinery salvage value calculations come from Iowa State University of Science and Technology’s Cooperative Extension Service (File A3-29, Edwards, 2015). General maintenance and repairs on machinery and vehicles was provided by the focus group in a lump sum under “Ownership Costs and Capital”.

Interest on Operating Capital and Retained Livestock

Interest on operating capital expenses is derived from the assumption that 50% of all annual operating costs are borrowed for a period of six months at 5% interest.

Interest on retained livestock is the value of the herd multiplied by the 2% interest rate (Yi and Zhang, 2016). This cost is the opportunity cost of keeping the herd and can be thought of as the amount a rancher could have made if the value of the herd had otherwise been invested at a 2% interest rate. The value of the herd is calculated using the January 1 herd size and market prices received for mature cows, bulls, and replacement heifers. Bull cost is valued at four times the budget's market price for a feeder steer (Meteer, 2014).

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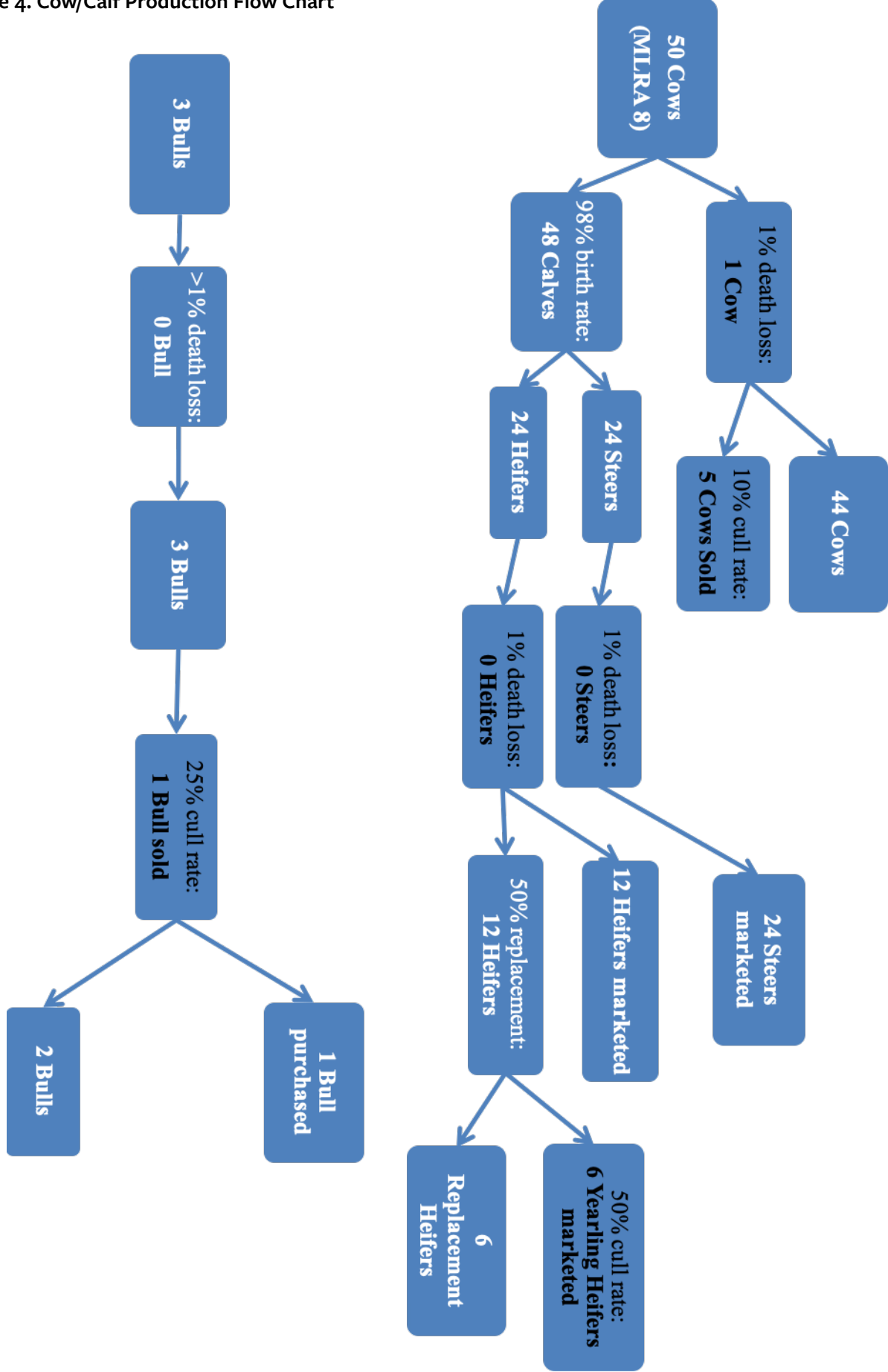
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Table 3: Enterprise Budget for 50 head Cow-Calf, Private Land ranch in MLRA 8.

MLRA 8: Columbia Plateau							
Private Land							
Herd Size: 50 head Cow-calf, 3 Bulls							
	Weight	Unit	Total Head or Unit	Price or Cost Per Unit	Total Value	Price or Cost Per Cow	Your Value
Gross Receipts							
Steer Calves	6.50	cwt	24	\$ 196.67	\$31,006.50	\$ 620.13	
Heifer Calves	6.00	cwt	12	\$ 177.51	\$12,916.52	\$ 258.33	
Cull Cows	12.00	cwt	5	\$76.37	\$4,582.20	\$91.64	
Cull Bulls	20.00	cwt	1	\$91.96	\$1,839.20	\$36.78	
Cull Yearling Heifers	7.00	cwt	6	\$ 161.09	\$6,837.67	\$ 136.75	
Total Receipts					\$57,182.08	\$ 1,143.64	
Operating Costs							
Deeded Land							
Rangeland Pasture		AUM	435	\$14.00	\$6,090.00	\$ 121.80	
Hay Aftermath		AUM	151	\$18.20	\$2,748.20	\$54.96	
Winter Feed							
Meadow Hay		ton	42	\$ 207.00	\$8,694.00	\$ 173.88	
Alfalfa		ton	97	\$ 180.00	\$17,460.00	\$ 349.20	
Supplement							
Salt & Mineral		ton	2	\$ 554.40	\$1,108.80	\$22.18	
Fuel & Lube					\$2,000.00	\$40.00	
Supplies & Fencing					\$1,000.00	\$20.00	
Utilities					\$1,000.00	\$20.00	
Veterinary					\$1,745.95	\$34.92	
Repairs					\$2,000.00	\$40.00	
Other Operating Costs*					\$1,915.00	\$38.30	
Interest on Operating Capital		%	0.025	\$22,880.97	\$572.02	\$11.44	
Total Operating Costs					\$45,761.95	\$ 915.24	
Income Above Operating Costs					\$11,420.13	\$ 228.40	
Ownership Costs and Capital							
Purchased Livestock		bull	1	\$ 5,113.42	\$5,113.42	\$ 102.27	
Interest on Retained Livestock		%	0.02	\$109,735.81	\$2,194.72	\$43.89	
Asset Depreciation		\$			\$6,940.86	\$ 138.82	
Taxes		\$			\$7,055.00	\$ 141.10	
Total Ownership Costs					\$21,304.00	\$ 426.08	
Total Costs					\$67,065.94	\$ 1,341.32	
Returns to Labor and Management					\$(9,883.86)	\$(197.68)	

* - Freight & Trucking \$675; Marketing \$240; Professional Fees \$1,000.

Table 4. Cow/Calf Production Flow Chart



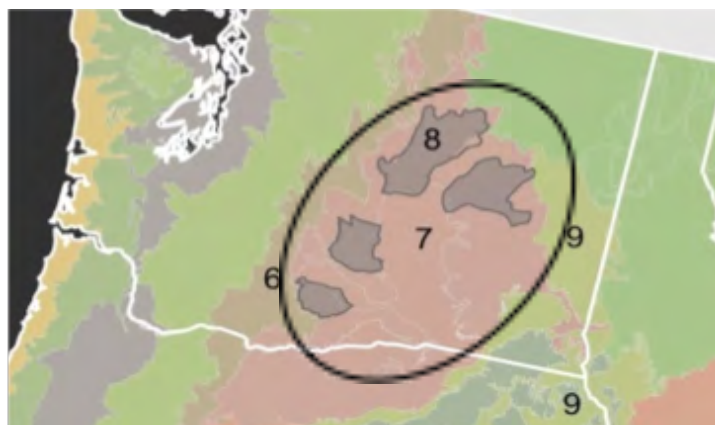


Enterprise budget for 50-head, cow-calf public land ranch

Columbia Plateau **MLRA 8**

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Washington counties: Adams, Douglas, Kittitas,
Klickitat, Lincoln, Walla Walla, Yakima



This budget represents typical cost and returns for a 50 head cow-calf operation in Major Land Resource Area (MLRA) 8, the Columbia Plateau region of Washington. A panel of producers from the area assisted with the information contained in this enterprise budget.

Feed Sources

Private rangeland pasture is provided for all livestock for five and a half months (April 16th to September 30th). Washington Department of Natural Resources (DNR) State Trust Lands are available for ranchers to use for one month in the early summer (June). The main cow herd and two bulls graze on these public/

state lands. The replacement heifers, one bull, and horses remain on the private rangeland when the brood cow herd grazes DNR land. All livestock then graze hay or crop aftermath (deeded/leased) for two months (October 1st to November 30th). Cattle are fed grass/alfalfa mix hay for four and a half months (December 1st to April 15th). All hay is valued at market

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Table 1. Annual Outlook of Activities for this 50 Cow-Calf Operation in MLRA 8.

Management Activities	Calendar Date
Winter Feeding 70% Alfalfa / 30% Meadow Hay	December 1 - April 16
Calving Season	February 15 - April 30
Post-Calving (branding, vaccinating, castrating); Pre-breeding vaccinate heifers	April 1- May 1
Breeding Season (~75 Days)	May 6 - July 19
Graze Public Lands (DNR) - Brood Cows and 2 Bulls	June 1 - June 30
Graze Deeded/Leased Rangeland Pasture - All Livestock	April 16 - September 30
Pregnancy check/vaccinate cows & Pre-condition calves	September 30 - October 1
Wean calves; Market steer calves, culls & non-replacement heifer calves	October 15 - November 15
Graze Deeded/Leased Aftermath (Hay/Crop) - All Livestock	October 1 - December 1

*Note: overlap of dates may occur in this MLRA.

price of five-year averages in region (USDA -NASS, 2018). Salt and minerals are fed at the rate of four pounds per head per month and provided year-round. An annual outlook of activities calendar with feed sources is described below in Table 1.

Land Cost

The cost of land is included in the budget on an AUM cost by land type. Deeded land grazing rate is calculated using USDA-NASS Agricultural Prices Release report for private, non-irrigated land by state (USDA-NASS, 2018). These rates are assumed at 70% of the value of irrigated or crop land. The irrigated or crop land is adjusted accordingly to find the per AUM rate. Public and state land rates also an AUM cost and are published their respective land management agencies.

Herd Characteristics

The livestock inventory consists of 50 brood cows, 3 bulls, and 2 horses. Two bulls are provided for the brood cows and one bull provided for the replacement heifers at a rate of 25 cows per bull. Bulls are purchased in the spring prior to breeding season, and in 3 out of 4 years a bull is replaced, which is reflected in this budget. But in 1 of 4 years, no culling or purchasing of a bull takes place (cull rate of 25% for this herd size). Bulls begin the breeding season from May 6th and are removed on July 19th. Cow death loss is 1% and 10% are culled annually resulting in replacement rate of 11%. The calving rate for all cows exposed is 98% and calf death loss is 1%. Calving season takes place from February 15th to April 30th.

All steer calves are sold and 50% of the heifer calves are sold after weaning. The remaining 50% are selected at weaning as the next year's replacement heifers. This consists of 12 head of replacements with minimal death loss. Six heifers are then culled following fall breeding evaluation. Five cows are culled from the herd due to older age and unsuccessful breeding. Steer calves, non-replacement heifer calves, cull cows, and cull bulls are marketed before mid-November. Livestock production and inventory is outlined in Table 4: Flow Chart of Livestock Production.

Gross Receipt

Gross receipts are 5-year average of prices received for livestock sold and indexed to 2017 dollars for the state of Washington (CattleFax, 2018; BLS, 2018). Livestock weights and prices received are shown in the Enterprise Budget (Table 3). These are assumed "typical" by the focus group and confirmed by market data in the state of Washington and Columbia Plateau area.

Animal Health (Veterinary and Medicine)

This includes vaccines, medicines, and all other veterinary services including pregnancy testing. Calves are given post-calving season vaccinations, are branded, dehorned, and bulls castrated in April. These vaccinations include 7-way, IBR/PI3/BVD/BRSV, and pour-on/wormer (Ivomec or Dectomax). Previous year's selected replacement heifers are given pre-breeding vaccinations including Vibriosis-Leptospirosis, 7-way, IBR/PI3/BVD/BRSV, and pour-on/wormer (Ivomec or

Table 2. Veterinary and Medication Costs

Activities	Cost per Unit	Number of Head	Total Cost
Cows - vaccine, wormer, etc.	\$9.00	50	\$450.00
Cows - Vet service (preg check, etc.)	\$2.25	50	\$112.50
Bulls - vaccine, wormer, etc.	\$15.50	3	\$38.75
Bulls - Vet service (trich, semen, etc)	\$40.00	3	\$100.00
Heifers - Vaccine, wormer, etc.	\$12.50	12	\$150.06
Heifers - Vet service (bangs, preg check)	\$7.25	12	\$87.04
Horses - wormer	\$15.00	2	\$30.00
Calves - dehorned, vaccine, boosters, dewormer, castrate (bulls calves only)	\$15.82	49	\$775.18
Total			\$1,743.53
cost per cow			\$34.87

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Marketing and Transportation

Calves and cull animals are marketed through local auctions. Most operators of this size and scale will utilize transportation companies for delivery of cattle as the focus group indicated potentially no ownership of a semi-truck and cattle pot. Trucking expenses are included in the budget as “Freight & Trucking” with a per mile cost of \$4.50 for an average of 150 miles for cull animals with two trips being required. “Marketing” is \$5.00 per head and incorporates auction sale commission, check-off fees, and brand inspections for all livestock sold. These three operating costs are listed under “Other Operating Costs” in the budget.

Labor

Day work and/or contract workers are considered in this budget as hired labor and are paid at a rate of \$100 per day for maximum of 10 days in the year. The focus group indicated no other employees or labor for a herd of this size and scale. Day work or contract workers assist with cattle drives, branding, cattle work days and additional calving season activities. The cost of owner labor and management are not included in the budget. The net returns in the budget are compensation to labor and management.

Taxes

Annual property tax costs are estimated following the tax rate of one percent on the assessed value of agriculture/farm land and personal property, as recommended by American Agriculture Economics Association (AAEA, 2000). Land values are averaged across an MLRA using rates provided by the U.S. Department of Agriculture in a 2017 Land Value Summary (USDA-NASS, 2017) by type of land, and pasture was valued in Washington at a rate of \$850 per acre. The 2012 Census of Agriculture (USDA-NASS, 2012) indicated that average farm size was 830 acres private land with only the counties included in this MLRA (Adams, Douglas, Kittitas, Klickitat, Lincoln, Walla Walla, and Yakima).

Inventory and Capital Investments

Buildings and improvements include a set of corrals that incorporate portable panels and a loading chute, and a storage shop. A squeeze chute, two feed/hay bunks, tractor implements, veterinary equipment, storage tanks (fuel and water storage) and a livestock trailer were also included in the equipment inventory. Vehicles and machinery used for the cow-calf operation include two one-ton trucks, one ATV, and one 50-75 horsepower compact/utility tractor with a front-end loader. Other equipment was mentioned by focus group participants including tools and branding irons, and these are utilized in the cow-calf operation. The depreciation costs are calculated using straight-line method and applying a 5% interest rate on useful life of the asset, determined by the Modified Accelerated Cost Recovery System (MACRS) standards. The machinery salvage value calculations come from Iowa State

University of Science and Technology's Cooperative Extension Service (File A3-29, Edwards, 2015). General maintenance and repairs on machinery and vehicles was provided by the focus group in a lump sum under "Ownership Costs and Capital".

Interest on Operating Capital and Retained Livestock

Interest on operating capital expenses is derived from the assumption that 50% of all annual operating costs are borrowed for a period of six months at 5% interest.

Interest on retained livestock is the value of the herd multiplied by the 2% interest rate (Yi and Zhang, 2016). This cost is the opportunity cost of keeping the herd and can be thought of as the amount a rancher could have made if the value of the herd had otherwise been invested at a 2% interest rate. The value of the herd is calculated using the January 1 herd size and market prices received for mature cows, bulls, and replacement heifers. Bull cost is valued at four times the budget's market price for a feeder steer (Meteer, 2014).

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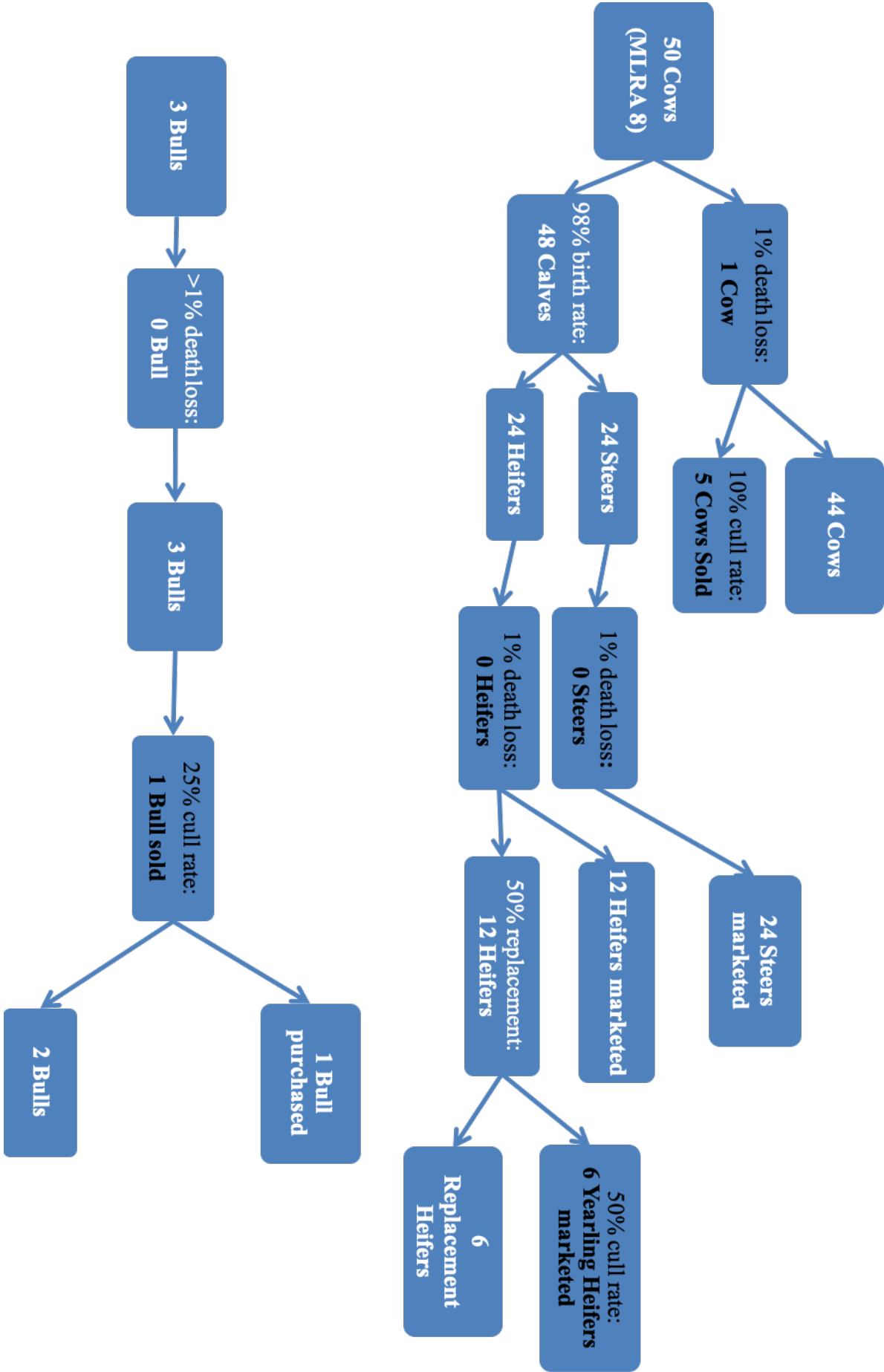
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- Yi, K. M., & Zhang, J. 2016." Real interest rates over the long run". *Economic Policy Papers, Federal Reserve Bank of Minneapolis*, (16-10).

Table 3: Enterprise Budget for 50 head Cow-Calf, Public Lands ranch in MLRA 8.

MLRA 8: Columbia Plateau							
Public Land							
Herd Size: 50 head Cow-calf, 3 Bulls							
	Weight	Unit	Total Head or Unit	Price or Cost Per Unit	Total Value	Price or Cost Per Cow	Your Value
Gross Receipts							
Steer Calves	6.50	cwt	24	\$196.67	\$31,006.50	\$620.13	_____
Heifer Calves	6.00	cwt	12	\$177.51	\$12,916.52	\$258.33	_____
Cull Cows	12.00	cwt	5	\$76.37	\$4,582.20	\$91.64	_____
Cull Bulls	20.00	cwt	1	\$91.96	\$1,839.20	\$36.78	_____
Cull Yearling Heifers	7.00	cwt	6	\$161.09	\$6,837.67	\$136.75	_____
Total Receipts					\$57,182.08	\$1,143.64	_____
Operating Costs							
DNR State Trust Lands		AUM	64	\$13.20	\$844.80	\$16.90	_____
Deeded Land							
Rangeland Pasture		AUM	371	\$14.00	\$5,194.00	\$103.88	_____
Hay Aftermath		AUM	151	\$18.20	\$2,748.20	\$54.96	_____
Winter Feed							
Meadow Hay		ton	42	\$207.00	\$8,694.00	\$173.88	_____
Alfalfa		ton	97	\$180.00	\$17,460.00	\$349.20	_____
Supplement							
Salt & Mineral		ton	2	\$554.40	\$1,108.80	\$22.18	_____
Fuel & Lube					\$2,000.00	\$40.00	_____
Supplies & Fencing					\$1,000.00	\$20.00	_____
Utilities					\$1,000.00	\$20.00	_____
Veterinary					\$1,745.95	\$34.92	_____
Repairs					\$2,000.00	\$40.00	_____
Hired Labor		day	10	\$100.00	\$1,000.00	\$20.00	_____
Other Operating Costs*					\$1,915.00	\$38.30	_____
Interest on Operating Capital		%	0.025	\$23,355.37	\$583.88	\$11.68	_____
Total Operating Costs					\$46,710.75	\$934.21	_____
<i>Income Above Operating Costs</i>					\$10,471.33	\$209.43	_____
Ownership Costs and Capital							
Purchased Livestock		bull	1	\$5,113.42	\$5,113.42	\$102.27	_____
Interest on Retained Livestock		%	0.02	\$109,735.81	\$2,194.72	\$43.89	_____
Asset Depreciation		\$			\$6,940.86	\$138.82	_____
Taxes		\$			\$7,055.00	\$141.10	_____
Total Ownership Costs					\$21,304.00	\$426.08	_____
Total Costs					\$68,014.74	\$1,360.29	_____
Returns to Labor and Management					<u>\$(10,832.66)</u>	<u>\$ (216.65)</u>	_____

* - Freight & Trucking \$675; Marketing \$240; Professional Fees \$1,000.

Table 4. Cow/Calf Production Flow Chart

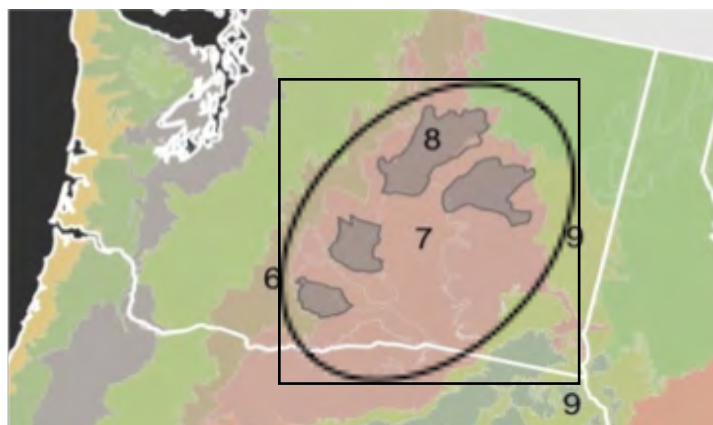




Columbia Plateau **MLRA 8**

Tom Hilken¹, Kendall Roberts¹, Holly Dyer¹, Holly Kirkpatrick¹, Anna Maher¹, Nicolas Quintana Ashwell¹, Tipton Hudson², John Tanaka³, John Ritten⁴, and Kristie Maczko³

Washington counties: Adams, Douglas, Kittitas, Klickitat, Lincoln, Walla Walla, Yakima



This budget represents typical cost and returns for a 400 head cow-calf operation in Major Land Resource Area (MLRA) 8, the Columbia Plateau Area of Central Washington. A panel of producers from the Area assisted with the information contained in this enterprise budget.

Feed Sources

Feed is supplied as deeded rangeland, pasture, and crop (corn, grain) and hay (alfalfa, grass) aftermath. Live-stock are grazed on spring, summer and fall rangeland from Mar. 15th to Nov.1st, and aftermath grazing occurs from Nov.1st to Dec.15th. Replacement heifers are kept on deeded irrigated pasture from March 15th to Nov.1st.

Purchased or raised alfalfa and native meadow is fed during the winter months (Dec.15th- March 15th) at a ratio of 70% alfalfa and 30% meadow hay. Salt and minerals are fed year-round, and protein tubs are available for a 90-day period during winter. A schedule of the grazing and ranch activities within a calendar year is listed in Table 1 below:

¹ Department of Ecosystem Science and Management, University of Wyoming.

² Washington State University Extension, Washington State University, Ellensburg, Washington

³ Wyoming Agricultural Experiment Station, University of Wyoming; Sustainable Rangelands Roundtable

⁴ Department of Agricultural and Applied Economics, University of Wyoming.

Table 1. Annual Outlook of Activities for this 50 Cow-Calf Operation in MLRA 8.

Management Activities	Calendar Date
Winter feeding; 70% alfalfa and 30% native meadow hay	December 15 - March 15
Calving season	February 1- May 1
Deeded rangeland grazing – Cows and calves are vaccinated, and calves are branded, earmarked, dehorned, and bull calves are castrated prior to turnout. Cows treated for external parasites. Twenty bulls are turned out May 1 for a 90 day breeding season.	March 15 – November 1
Replacement heifers on deeded irrigated pasture with a pre-breeding vaccine prior to turnout. Four bulls turned out May 1 for a 90 day breeding season.	March 15 – November 1
Mature cow herd and replacement heifers graze crop and hay aftermath	November 1 - December 15
Cows vaccinated, pregnancy tested, and calves weaned in the fall.	October - November
Cull cows, bulls, horses and open heifers are sold in early fall through local auction markets or private treaty	October
All calves sold in late fall through video marketing sales	November

Land Cost

The cost of land is included in the budget on an AUM cost by land type and ownership. Deeded land cost rates for Washington were obtained from USDA-NASS, Agricultural Prices (2018). Irrigated pasture and aftermath rates were assumed to be 30% higher than non-irrigated land rates.

Herd Characteristics

Livestock inventory consists of 400 cows, 24 bulls and 7 horses. Six replacement bulls are bought annually and have a useful life of 4 years with a 1% death loss. Bulls are turned into the herd for a 3 month breeding season from May 1 to July 30. The cow death loss is 1% and 15% are culled annually resulting in an annual replacement rate of 16%. The calving rate for all cows exposed is 93% with a 2% calf loss resulting in 91% of the mature cows weaning a calf in the fall. In the fall, all steer calves are sold and 60% of the heifer calves are sold. The remaining 40% of heifer calves are selected at weaning as potential replacement heifers and after death loss consist of 73 head. Nine yearling heifers are sold in the fall and 64 replacement yearling heifers are brought into the herd. Sixty mature cows are culled from the herd due to unsuccessful breeding or old age. Table 4 shows a cow-calf production flow chart.

Animal Health (Veterinary and Medicine)

Veterinary and medicine includes the value of vaccines, medicines, and veterinary services. Pre-breeding vaccinations are done on mature cows and replacement heifers in March prior to turnout onto irrigated pasture

and deeded rangeland. Calves are also vaccinated, dehorned and bull calves are castrated prior to turnout. Bulls are trichomoniasis and semen tested prior to turnout. Cows and replacement heifers are also preg checked and worked in Nov. when they come off deeded rangeland and irrigated pasture. Table 2 is summary of veterinary and medical costs by class of livestock (estimates from Forero et al 2017, and Neibergs and Nelson, 2008).

Marketing and Transportation

“Marketing Fees” are \$5.00 per head that includes marketing costs, brand inspection and checkoff. Calves are marketed through video marketing sales through the summer with a late fall or early winter delivery. Cull animals are marketed through local auction markets and private treaty in the fall. Trucking and shipping fees are \$4.50 per mile for an average of 150 miles for cull animals with 2 trips being required.

Labor

Labor is provided by the owner and his family with an additional 6 months of hired seasonal labor at \$2,500 per month. The ranch owner provides the seasonal employee free on-site housing and pays their utilities. The cost of owner labor and management are not included in this budget. The net returns provided in this budget are compensation to labor and management.

Taxes

Annual property tax costs are estimated following the tax rate of 1% on the assessed value of agricultural/

Table 2. Veterinary and Medication Costs

Activities	Cost per Unit	Number of Head	Total Cost
Cows - Vaccine (Lepto Vibrio, 7 Way, IBR P13 BVD) Wormer, and Pour On	\$9.00	400	\$3,600.00
Cows - Vet Service (Preg Check, Misc. Treatments)	\$5.00	400	\$2,000.00
Heifers - Vaccine (IBR P13 BVD), Wormer, and Pour On	\$12.50	73	\$912.50
Heifers - Vet Service (Bangs, Preg Check)	\$7.25	73	\$529.25
Bulls - Vaccine (7 Way), Wormer, and Pour On	\$15.50	24	\$372.00
Bulls - Vet Service (Trich and Semen tested)	\$40.00	24	\$960.00
Calves - Vaccine (7 Way, IBR P13 BVD), dewormer, dehorned, castrate bull calves, and fly tags	\$15.82	372	\$5,885.04
Grand Total			\$14,258.79

farm land as recommended by the American Agricultural Economics Association (AAEA, 2000). Land values are averaged across the MLRA using county values from USDA-NASS (2017) by deeded pasture land type at a rate of \$850 per acre. The USDA-NASS (2012) reported that average farm size was 830 acres private land for the counties included in this MLRA.

Inventory and Capital Investments

Buildings and equipment: 1 bunk house and shop including equipment: generators, welder, air compressor, hoist, floor jacks, and miscellaneous tools and equipment. Two permanent corrals and 2 set of portable corrals (20-12 foot panels), livestock water developments (including solar pump), fencing supplies, 1-portable squeeze chute, vet equipment, hydraulic post pounder, hay feeders, vet equipment including branding iron heaters and propane tanks, fuel and water storage tanks, electric fence materials, and 2 gooseneck trailers. Buildings and equipment are valued at 80% of new replacement cost.

Machinery and vehicles: 1-90 hp. tractor equipped with loader, another 100 hp tractor with backhoe attachment, 1 semi-truck and trailer, 1 flatbed pickup, 1-¾ and 1-1/2 4X4 pickups, 1 ATV with sprayer attachment, and 1 side by side. Values on these investments are calculated at 50% of new replacement cost to reflect typically aged but functional ranch vehicles and machinery.

Depreciation costs are calculated using straight-line method and assuming a 5% interest rate on useful life of the asset, as determined by the Modified Accelerat-

ed Cost Recovery System standards (IRS, 2017). The machinery salvage value calculations come from Iowa State University of Science and Technology's Cooperative Extension Service (Edwards, 2015).

Interest on Operating Capital and Retained Livestock

The interest amount on operating capital expenses was derived from the assumption that half of all operating costs are borrowed for a period of 6 months assuming a 5% annual percentage rate.

Interest on retained livestock is the value of the herd multiplied by the 2% interest rate (Yi and Zang, 2016). This cost is the opportunity cost of keeping the herd. The value of the herd is calculated using a January 1st herd size, the budget's current average weight, and the market value for bred cows, bred heifers, and horses before death loss. The market value of replacement bulls are estimated at 4 times the value of a steer (Meeteer, 2014).

Gross Receipts and Operating Expenditures

Livestock prices are 5 year (2013-2017) averages from the CattleFax data base (2018), while livestock weights are typical for this herd size and location. Hay and alfalfa prices are also 5 year (2013-2017) averages from USDA-NASS (2018). All prices were indexed to 2017 using the consumer price index prior to averages being calculated. Livestock average prices and weights, and average hay and alfalfa prices are shown under Total Receipts and Operating Costs in Table 3.

References Cited:

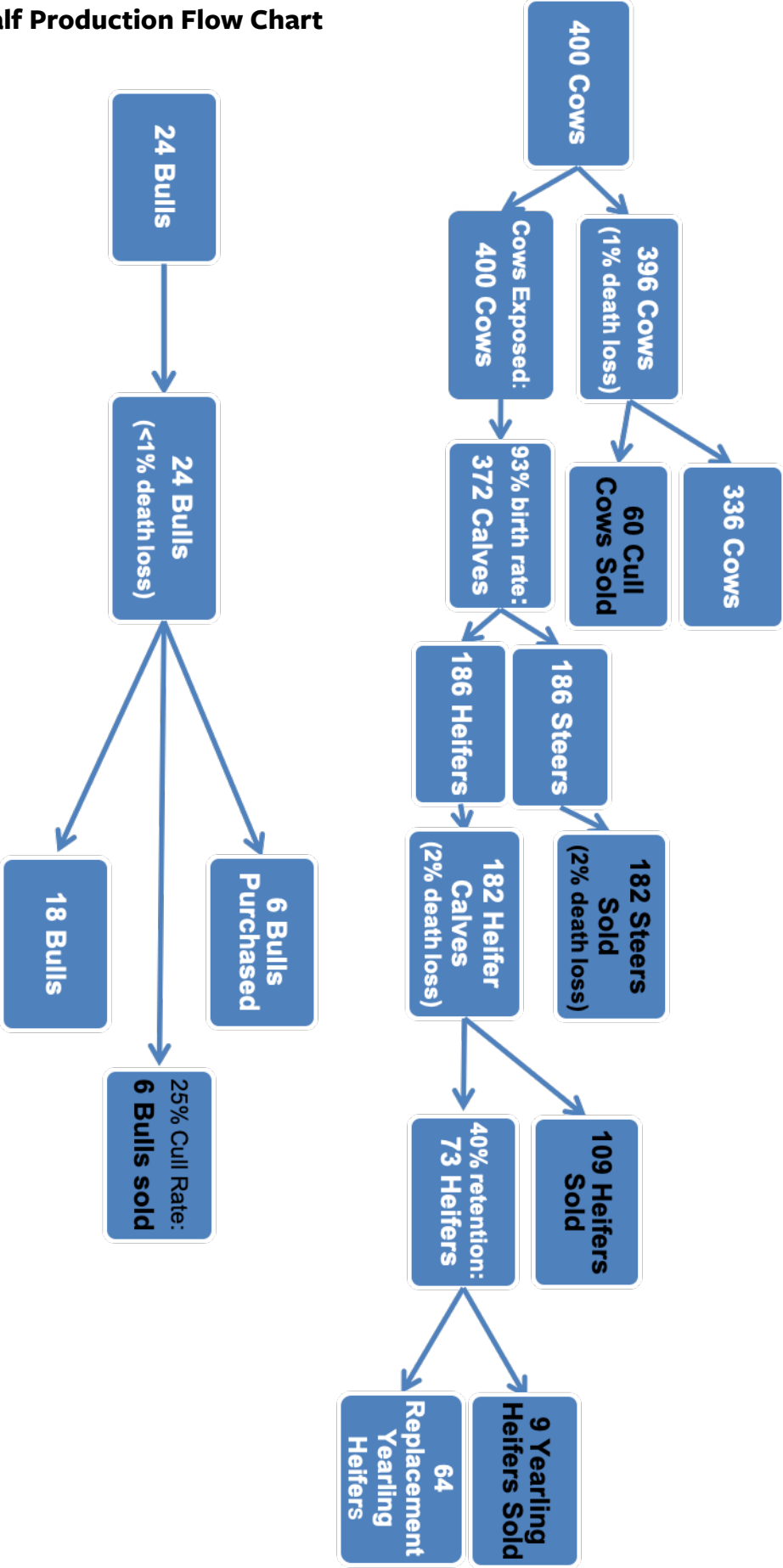
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- Yi, K. M., and J. Zhang (2016). Real interest rates over the long run. Economic Policy Papers, Federal Reserve Bank of Minneapolis, 16-10.

Table 3. Cow-Calf Operation Budget

MLRA 8: Columbia Plateau Area of Central Washington				Type: Large, private-400 cows, 24 bulls, 7 horses			Your Value
	Weight	Unit	Total Head or Units	Price or Cost per Unit	Total Value	Value or Cost/Cow	
Gross Receipts							
Steer Calves	5.50	cwt	182	\$196.67	\$196,866.67	\$492.17	
Heifer Calves	5.00	cwt	109	\$177.51	\$96,742.95	\$241.86	
Cull Cows	13.50	cwt	60	\$76.36	\$61,851.60	\$154.63	
Cull Bulls	16.00	cwt	6	\$91.96	\$8,828.16	\$22.07	
Cull Yearling Heifers	8.00	cwt	9	\$161.09	\$11,598.48	\$29.00	
Cull Horses	10.00	cwt	1	\$100.00	\$1,000.00	\$2.50	
Total Receipts					\$376,887.86	\$942.22	
Operating Costs							
Deeded:							
Rangeland		AUM	4,290	\$14.00	\$60,060.00	\$150.15	
Irrigated Pasture		AUM	691	\$18.20	\$12,576.20	\$31.44	
Hay/Crop Aftermath		AUM	933	\$18.20	\$16,980.60	\$42.45	
Winter Feed:							
Meadow Hay		ton	228	\$207.00	\$47,196.00	\$117.99	
Alfalfa Hay		ton	532	\$180.00	\$95,760.00	\$239.40	
Supplement:							
Salt/Mineral-Sele/Moly		ton	13	\$260.00	\$3,380.00	\$8.45	
Protein		ton	63	\$500.00	\$31,500.00	\$78.75	
Fuel and Lube				\$6,000.00	\$6,000.00	\$15.00	
Machinery/Equipment Repair				\$5,000.00	\$5,000.00	\$12.50	
Supplies-Misc.				\$2,500.00	\$2,500.00	\$6.25	
Fence Repair				\$2,500.00	\$2,500.00	\$6.25	
Utilities				\$4,000.00	\$4,000.00	\$10.00	
Veterinary Medicine:							
Cattle				\$14,259.00	\$14,259.00	\$35.65	
Horses		hd	7	\$500.00	\$3,500.00	\$8.75	
Hired Labor		month	6	\$2,500.00	\$15,000.00	\$37.50	
Other Operating Costs*				\$9,320.00	\$9,320.00	\$23.30	
Interest on Operating Capital			\$164,765.90	2.50%	\$4,119.15	\$10.30	
Total Operating Costs					\$333,650.95	\$834.13	
Income Above Operating Costs					\$43,236.91	\$108.09	
Ownership Costs and Capital Recovery:							
Purchased livestock-6 bulls, 1 horse					\$28,960.00	\$72.40	
Interest on Retained Livestock			\$958,426.00	2.00%	\$19,168.52	\$47.92	
Asset Depreciation					\$19,832.80	\$49.58	
Property Taxes					\$7,055.00	\$17.64	
Total Ownership Costs					\$75,016.32	\$187.54	
Total Costs					\$408,667.27	\$1,021.67	
Net Returns Above Costs					\$(31,779.41)	\$(79.45)	

*Other operating costs include: trucking (\$1,350), marketing (\$1,850), accounting (\$2,000) and tarp rental (\$4,120)

Table 4. Cow-Calf Production Flow Chart



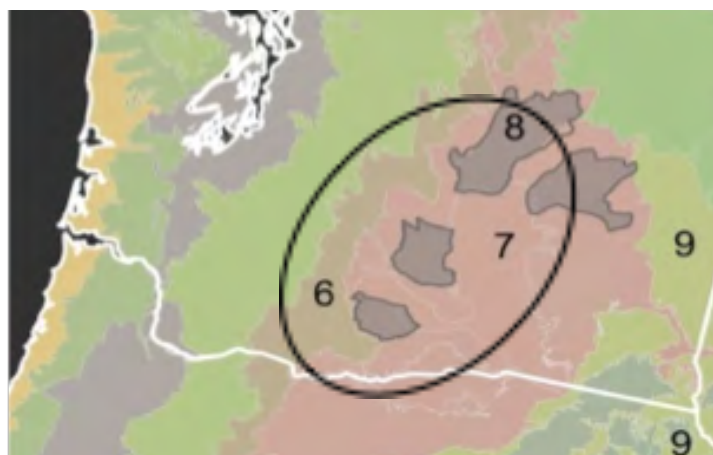


Enterprise budget for 400-head, cow-calf public land ranch

Columbia Plateau **MLRA 8**

Tom Hilken¹, Kendall Roberts¹, Holly Dyer¹, Holly Kirkpatrick¹, Anna Maher¹, Nicolas Quintana Ashwell¹, Tipton Hudson², John Tanaka³, John Ritten⁴, and Kristie Maczko³

Washington counties: Adams, Douglas, Kittitas, Klickitat, Lincoln, Walla Walla, Yakima



This budget represents typical cost and returns for a 400 head cow-calf operation in Major Land Resource Area (MLRA) 8, the Columbia Plateau Area of Central Washington. A panel of producers from the Area assisted with the information contained in this enterprise budget.

Feed Sources

Feed is supplied from: Bureau of Land Management (BLM) and Washington Dept. of Nature Resources (DNR) rangelands, deeded rangeland, irrigated pasture, and crop (corn and grain stalks) and hay (alfalfa, grass) aftermath. Livestock are grazed on deeded spring rangeland from Mar. 15th to June 1. DNR

rangeland is grazed during early summer (June 1 to July 1) and fall (Oct. 1 to Nov. 1) periods, while BLM rangeland is grazed from July 1 to Oct. 1. Replacement heifer are kept on deeded irrigated pasture from Mar 15th to Nov. 1. All livestock graze crop and hay aftermath from Nov.1 to Dec. 15th. Purchased or raised alfalfa and native meadow hay is fed during the winter

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Table 1. Annual Outlook of Activities for this 50 Cow-Calf Operation in MLRA 8.

Management Activities	Calendar Date
Winter feeding; 70% alfalfa and 30% native meadow hay	December 15 - March 15
Calving season	February 1- May 1
Deeded rangeland spring grazing – Cows and calves are vaccinated, and calves are branded, earmarked, dehorned, and bull calves are castrated prior to turnout. Twenty bulls are turned out May 1 for 90 days.	March 15 – June 1
Replacement heifers on deeded irrigated pasture with a pre-breeding vaccine prior to turnout. Four bulls turned out May 1 for a 90 day breeding season.	March 15 – November 1
Grazing on permitted summer and fall DNR rangeland.	June 1 to July 1 October 1 to November 1
Grazing on permitted BLM rangeland.	July 1 to October 1
Mature cow herd and replacement heifers graze crop and hay aftermath.	November 1 - December 15
Cows vaccinated, pregnancy tested, and calves weaned in the fall.	October - November
Cull cows, bulls, horses and open heifers are sold in early fall through local auction markets or private treaty	October
All calves sold in late fall through video marketing sales	November

months (Dec.15th- March 15th) at a ratio of 70% alfalfa and 30% meadow/rye grain hay. Salt and minerals are fed year-round, and protein tubs are available for a 90-day period during the winter. A schedule of activities within a calendar year is listed in Table 1 below:

Land Cost

The cost of land is included in the budget on an AUM cost by land type and ownership. In the case of federal and state lands, the AUM rate is published by their respective land management agencies. Deeded land rates for Washington were obtained from USDA-NASS, Agricultural Prices (2018). Irrigated pasture and aftermath rates were assumed to be 30% higher than non-irrigated land rates.

Herd Characteristics

Livestock inventory consists of 400 cows, 24 bulls, and 7 horses. Six replacement bulls are bought annually and have a useful life of 4 years with a 1% death loss. Bulls are turned into the herd for a 3 month breeding season from May 1 to July 30. The cow death loss is 1% and 15% are culled annually resulting in an annual replacement rate of 16%. The calving rate for all cows exposed is 93% with a 2% calf loss resulting in 91% of the mature cows weaning a calf in the fall. In the fall, all steer calves are sold and 60% of the heifer calves are sold. The remaining 40% of heifer calves are selected at weaning as potential replacements and after death loss consist of 73 head. Nine yearling heifers are sold in the

fall and 64 replacement yearling heifers are brought into the herd. Sixty mature cows are culled from the herd due to unsuccessful breeding or old age. Table 4 shows a cow-calf production flow chart.

Animal Health (Veterinary and Medicine)

Veterinary and medicine includes the value of vaccines, medicines, and veterinary services. Pre-breeding vaccinations are done on mature cows and replacement heifers in March prior to turnout onto irrigated pasture and deeded rangeland. Calves are also vaccinated, dehorned and bull calves are castrated prior to turnout. Bulls are trichomoniasis and semen tested prior to turnout. Cows and replacement heifers are also preg checked and worked in Nov. when they come off of DNR rangeland and irrigated pasture. Table 2 is a summary of veterinary and medical costs by class of livestock (estimates from Forero et al 2017, and Neibergs and Nelson, 2008).

Marketing and Transportation

“Marketing Fees” are \$5.00 per head that includes marketing costs, brand inspection and checkoff. Calves are marketed through video marketing sales through the summer with a late fall or early winter delivery. Cull animals are marketed through local auction markets and private treaty in the fall. Trucking and shipping fees are \$4.50 per mile for an average of 150 miles for cull animals with 2 trips being required.

Table 2. Veterinary and Medication Costs

Activities	Cost per Unit	Number of Head	Total Cost
Cows - Vaccine (Lepto Vibrio, 7 Way, IBR P13 BVD) Wormer, and Pour On	\$9.00	400	\$3,600.00
Cows - Vet Service (Preg Check, Misc. Treatments)	\$5.00	400	\$2,000.00
Heifers - Vaccine (IBR P13 BVD), Wormer, and Pour On	\$12.50	73	\$912.50
Heifers - Vet Service (Bangs, Preg Check)	\$7.25	73	\$529.25
Bulls - Vaccine (7 Way), Wormer, and Pour On	\$15.50	24	\$372.00
Bulls - Vet Service (Trich and Semen tested)	\$40.00	24	\$960.00
Calves - Vaccine (7 Way, IBR P13 BVD), dewormer, dehorned, castrate bull calves, and fly tags	\$15.82	372	\$5,885.04
Grand Total			\$14,258.79

Labor

Labor is provided by the owner and his family with an additional 6 months of hired seasonal labor at \$2,500 per month. The ranch owner provides the seasonal employee with free on-site housing and utilities. The cost of owner labor and management are not included in this budget. The net returns provided in this budget are compensation to labor and management.

Taxes

Annual property tax costs are estimated following the tax rate of 1% on the assessed value of agricultural/ farm land as recommended by the American Agricultural Economics Association (AAEA, 2000). Land values are averaged across the MLRA using county values from USDA-NASS (2017) by deeded pasture land type at a rate of \$850 per acre. The USDA-NASS (2012) reported that average farm size was 830 acres private land for the counties included in this MLRA.

Inventory and Capital Investments

Buildings and equipment: 1 bunk house and shop including equipment: generators, welder, air compressor, hoist, floor jacks, and miscellaneous tools and equipment. Two permanent corrals and 2 set of portable corrals (20-12 foot panels), livestock water developments (including solar pump), fencing supplies, 1-portable squeeze chute, vet equipment, hydraulic post pounder, hay feeders, vet equipment including branding iron heaters and propane tanks, fuel and water storage tanks, electric fence materials, and 2 gooseneck trailers. Buildings and equipment are valued at 80% of new replacement cost.

Machinery and vehicles: 1-90 hp. tractor equipped with loader, another 100 hp tractor with backhoe attachment, 1 semi-truck and trailer, 1 flatbed pickup, 1-³/₄ and 1-1/2 4X4 pickups, 1 ATV with sprayer attachment, and 1 side by side. Values on these investments are calculated at 50% of new replacement cost to reflect typically aged but functional ranch vehicles and machinery.

Depreciation costs are calculated using straight-line method and assuming a 5% interest rate on useful life of the asset, as determined by the Modified Accelerated Cost Recovery System standards (IRS, 2017). The machinery salvage value calculations come from Iowa State University of Science and Technology's Cooperative Extension Service (Edwards, 2015).

Interest on Operating Capital and Retained Livestock

The interest amount on operating capital expenses was derived from the assumption that half of all operating costs are borrowed for a period of 6 months assuming a 5% annual percentage rate.

Interest on retained livestock is the value of the herd multiplied by the 2% interest rate (Yi and Zang, 2016). This cost is the opportunity cost of keeping the herd. The value of the herd is calculated using a January 1st herd size, the budget's current average weight, and the market value for bred cows, bred heifers, and horses before death loss. The market value of replacement bulls are estimated at 4 times the value of a steer (Meeteer, 2014).

Gross Receipts and Operating Expenditures

Livestock prices are 5 year (2013-2017) averages from the CattleFax data base (2018), while livestock weights are typical for this herd size and location. Hay and alfalfa prices are also 5 year (2013-2017) averages from USDA-NASS (2018). All prices were indexed to 2017 using the consumer price index prior to averages being calculated. Livestock average prices and weights, and average hay and alfalfa prices are shown under Total Receipts and Operating Costs in Table 3.

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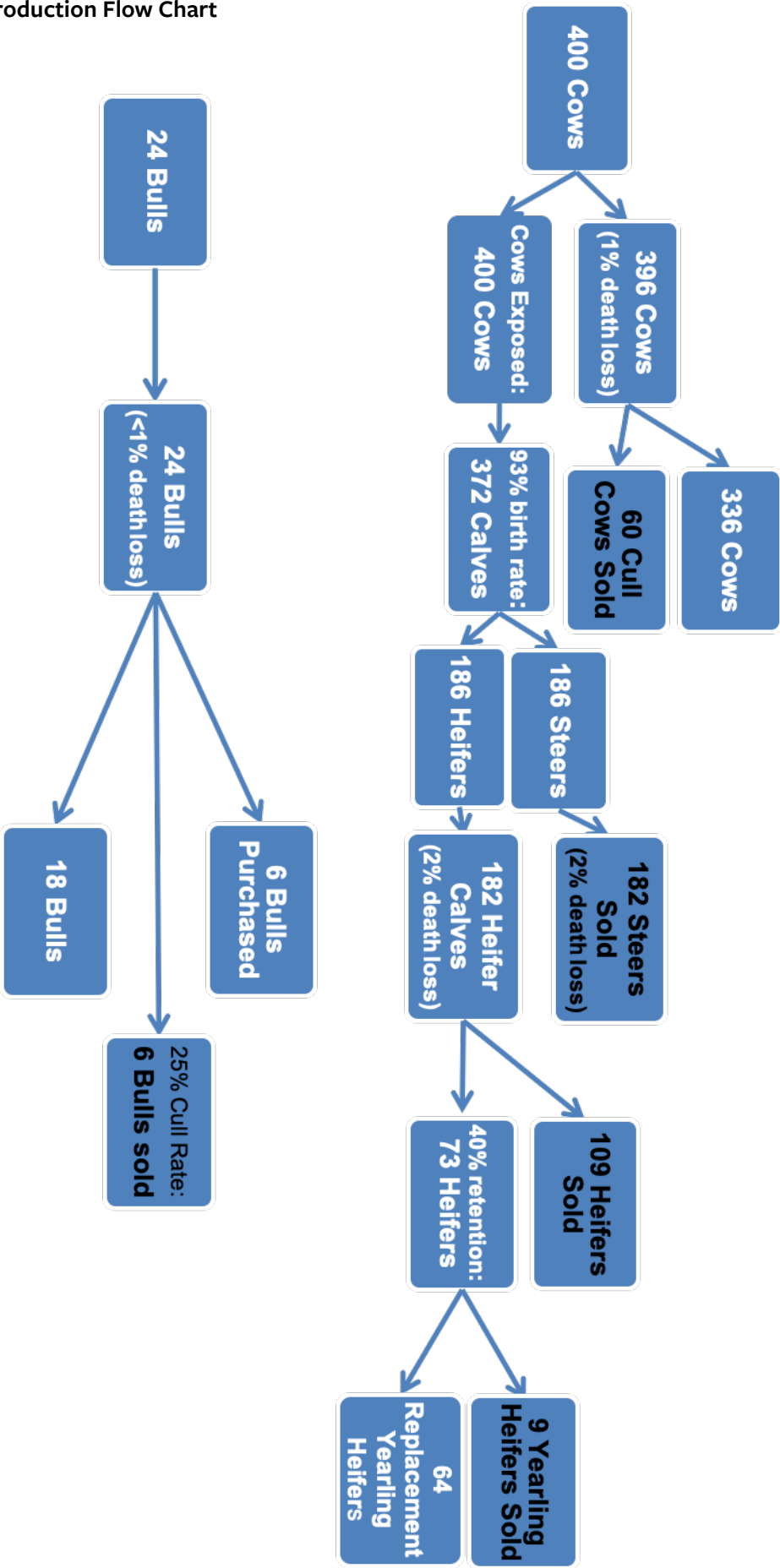
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Table 3. Total Receipts and Operating Costs for Cow-Calf Operation

MLRA 8: Columbia Plateau Area of Central Washington				Large, Public Land-400 Cows, 24 bulls, 7 horses			
	Weight	Unit	Total Head or Units	Price or Cost per Unit	Total Value	Value or Cost/Cow	Your Value
Gross Receipts							
Steer Calves	5.50	cwt	182	\$196.67	\$196,866.67	\$492.17	
Heifer Calves	5.00	cwt	109	\$177.51	\$96,742.95	\$241.86	
Cull Cows	13.50	cwt	60	\$76.37	\$61,859.70	\$154.65	
Cull Bulls	16.00	cwt	6	\$91.96	\$8,828.16	\$22.07	
Cull Yearling Heifers	8.00	cwt	9	\$161.09	\$12,887.20	\$32.22	
Cull Horses	10.00 cwt		1	\$100.00	\$1,000.00	\$2.50	
Total Receipts					\$378,184.68	\$945.46	
Operating Costs							
BLM		AUM	1716	\$1.87	\$3,208.92	\$8.02	
State-DNR		AUM	1144	\$13.20	\$15,100.80	\$37.75	
Deeded:							
Deeded/Leased-Rangeland		AUM	1430	\$14.00	\$20,020.00	\$50.05	
Deeded/Leased-Crop/Hay Aftermath		AUM	933	\$18.20	\$16,980.60	\$42.45	
Deeded/Leased-Irrigated Pasture		AUM	691	\$18.20	\$12,576.20	\$31.44	
Winter Feed:							
Meadow/Rye Grain Hay		ton	228	\$207.00	\$47,196.00	\$117.99	
Alfalfa Hay		ton	532	\$180.00	\$95,760.00	\$239.40	
Supplement:							
Salt/Mineral-Sele/Moly		ton	13	\$260.00	\$3,380.00	\$8.45	
Protein		ton	63	\$500.00	\$31,500.00	\$78.75	
Fuel and Lube				\$6,000.00	\$6,000.00	\$15.00	
Machinery and Equipment Repair				\$5,000.00	\$5,000.00	\$12.50	
Supplies-Misc				\$2,500.00	\$2,500.00	\$6.25	
Fence Repair				\$2,500.00	\$2,500.00	\$6.25	
Utilities				\$4,000.00	\$4,000.00	\$10.00	
Veterinary Medicine:							
Cattle				\$14,258.79	\$14,258.79	\$35.65	
Horse		hd	7	\$500.00	\$3,500.00	\$8.75	
Hired Labor		month	6	\$2,500.00	\$15,000.00	\$37.50	
Other Operating Costs*				\$9,320.00	\$9,320.00	\$23.30	
Interest on Operating Capital			\$153,900.66	2.50%	\$3,847.52	\$9.62	
Total Operating Costs					\$311,648.83	\$779.12	
<i>Income Above Operating Costs</i>					\$66,535.85	\$166.34	
Ownership Costs and Capital Recovery							
Purchased livestock-6 bulls, 1 horse					\$28,960.00	\$72.40	
Interest on Retained Livestock			\$958,246.00	2.00%	\$19,164.92	\$47.91	
Asset Depreciation					\$19,832.80	\$49.58	
Property Taxes					\$7,055.00	\$17.64	
Total Ownership Costs					\$75,012.72	\$187.53	
Total Costs					\$386,661.55	\$966.65	
Net Returns Above Costs					<u>\$(8,476.87)</u>	<u>\$(21.19)</u>	

*Other Operating Costs: trucking (\$1,350), marketing (\$1,850), accounting (\$2,000), and tarp rental (\$4,120)

Table 4. Cow-Calf Production Flow Chart





Enterprise budget for 150-head, cow-calf public land ranch

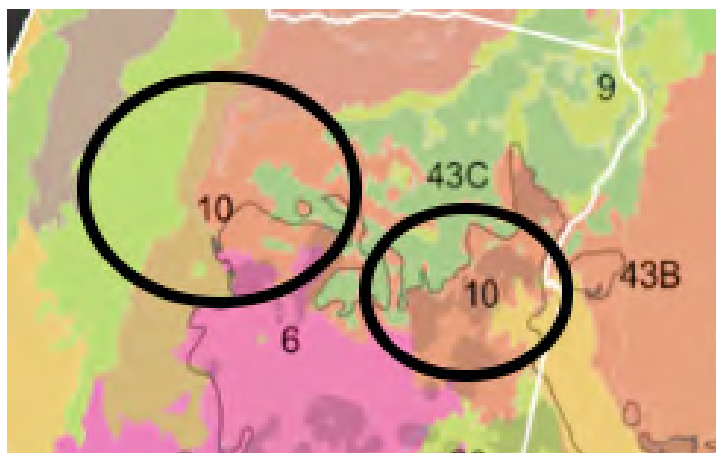
Blue Mountain Foothill Region

MLRA 10

Holly Dyer¹, Holly Kirkpatrick¹, Tom Hilken¹, Kendall Roberts¹, Anna Maher¹, Nicolas Quintana Ashwell¹, Tim Deboodt², John Tanaka³, John Ritten⁴, and Kristie Maczko³

Oregon counties: Baker, Northern Malheur, Crook, Wheeler, Jefferson

Idaho counties: Elmore, Camas, Blaine



This budget represents typical cost and returns for a 150-head, cow-calf operation in Major Land Resource Area (MLRA) 10, the Blue Mountain Foothill Region. A panel of producers from Wheeler, Crook, and Jefferson counties assisted with the information contained in this enterprise budget.

Feed Sources

Spring range is provided for all livestock April 1-May 14. United States Forest Service (FS) lands are available for ranchers to use May 15-September 30 for four and a half months total, and the grazing fee is assessed by the agency annually (USFS/BLM, 2017). Only 50 percent of the brood cow herd and 50 percent of the cow-breeding bulls graze on the USFS lands (bulls removed from USFS by July 5). The other 50 percent of brood cow herd and cow-breeding bulls, replacement

heifers, and heifer-breeding bulls, and horses graze on deeded (owned or leased) irrigated pasture May 15-September 30. All livestock then graze on improved or winter range October 1-December 1. All livestock are fed grass/alfalfa mix hay December 1-March 31. All hay is valued at market price of five-year averages in the region (USDA-NASS, 2018). Salt and minerals are fed at the rate of 4 pounds per-head per-month year-round. An annual outlook of activities calendar with feed sources is described in Table 1.

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³ Wyoming Agricultural Experiment Station, University of Wyoming; Sustainable Rangelands Roundtable.

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Table 1. Annual Calendar Activities for Cow-calf Operation in MLRA 10.

Activities	Calendar Date
Winter feeding – 20% alfalfa, 80% meadow hay	December 1-March 31
Calving season	February 1-April 15
Post-calving (branding, vaccinating, castrating); Pre-breeding vaccinate cows & heifers	April 15-May 14
Breeding season (75 Days)	April 20-July 5
Graze Spring Range - All livestock	April 1-May 14
Graze Public Lands (USFS) - Brood cows (50%) and bulls (until July 5)	May 15-September 30
Graze Deeded/Leased Irrigated Pasture - Brood cows (50%), heifers, bulls, horses	May 15-September 30
Remove cows from USFS; Pregnancy check/ vaccinate cows & pre-condition calves	September 30-October 1
Wean calves; Market steer calves, culls & non-replacement heifer calves	October 15-November 15
Graze Deeded/Leased Improved/Winter Range - All livestock	October 1-December 1

Land Cost

The cost of land is included in the budget on an AUM cost by land type. Deeded land rate is calculated using area rates by type and availability and published in the USDA-NASS Agricultural Prices reports (2018). Irrigated pasture and aftermath rates were assumed to be 30 percent higher than non-irrigated land rates.

Herd Characteristics

The livestock inventory consists of 150 brood cows, 9 bulls, and 6 horses. Seven bulls are provided for the brood cows, and two bulls are provided for the replacement heifers at a rate of 20 cows per bull. Two bulls are bought annually in the spring prior to breeding season, and all bulls have a useful life of five years (cull rate of 20 percent for this herd size). Bulls begin the breeding season from April 20 and are removed July 5. Cow death loss is 1 percent, and 10 percent are culled annually resulting in a replacement rate of 11 percent. The calving rate for all cows exposed is 98 percent, and calf death loss is 3 percent. Calving season is February 1-April 15.

All steer calves are sold, and 50 percent of the heifer calves are sold after weaning. The remaining 50 percent are selected at weaning as the next year's replacement heifers. This consists of 35 head of replacements with minimal death loss. Eighteen replacement heifers are then culled following fall breeding evaluation. Fifteen cows are culled from the herd due to older age and unsuccessful breeding. Steer calves, non-replacement heifer calves, cull cows, and cull bulls are marketed before mid-November. Livestock production and

inventory is outlined in Table 4. Cow-calf Production Flow Chart.

Gross Receipts

Gross receipts are the five-year average of prices received for livestock sold and indexed to 2017 dollars for the state of Oregon (CattleFax, 2018; BLS, 2018). Livestock weights and prices received are shown in Table 3. These are assumed "typical" by the focus group and confirmed by market data in the state of Oregon and in the Blue Mountain Foothill region.

Animal Health (Veterinary and Medicine)

This includes vaccines, medicines, and all other veterinary services including pregnancy testing. Pre-calving for mature cows and bred replacement heifers include scour prevention (ScourGard). Calves are given post-calving season vaccinations, are branded, dehorned, and bulls castrated between mid-April and mid-May. These vaccinations include 7-Way, IBR/PI3/BVD/BRSV, and Pour-On/wormer (Ivomec or Dectomax). Previous year's selected replacement heifers and mature cows are given pre-breeding vaccinations including Vibriosis-Leptospirosis, 7-Way, IBR/PI3/BVD/BRSV, and Pour-On/wormer (Ivomec or Dectomax) before the April 20 bull turnout. Bulls will be tested for fertility and trichomoniasis. Cows and replacement heifers are pregnancy tested in the fall as the cattle are gathered, and heifer calves are given Bangs vaccinations. Table 2 gives typical vaccinating and animal health practices and cost estimations by livestock class as provided by Forero et al. (2017).

Table 2. Veterinary and Health Costs.

Activity	Cost Per Unit	No. of Head	Total cost
Cows - Vaccine, wormer, etc.	\$ 9.00	150	\$1,350.00
Cows - Vet service (preg check, etc.)	\$ 2.25	150	\$337.50
Bulls - Vaccine, wormer, etc.	\$ 15.50	9	\$144.15
Bulls - Vet service (trich, semen, etc)	\$ 40.00	9	\$372.00
Heifers - Vaccine, wormer, etc.	\$ 12.50	36	\$450.00
Heifers - Vet service (bangs, preg check)	\$ 7.25	36	\$261.00
Horses - Wormer	\$ 15.00	6	\$90.00
Calves - Dehorned, vaccine, boosters, dewormer, castrate (bulls calves only)	\$ 15.82	144	\$2,278.08
Total			\$5,282.73
Cost per cow			\$35.22

Marketing and Transportation

Calves and cull animals are marketed through local auctions. Most operators of this size and scale will utilize transportation companies for delivery of cattle as the focus group indicated no ownership of a semi-truck and cattle pot. Trucking expenses are included in the budget as “Freight & Trucking” with a per mile cost of \$4.50 for an average of 300 miles for cull animals with two trips required. “Marketing” is \$5.00 per head and incorporates auction sale commission, checkoff fees, and brand inspections for all livestock sold. These three operating costs are listed under “Other Operating Costs” in the budget.

Labor

Day work and/or contract workers are considered in this budget as hired labor and are paid at a rate of \$125 per day for a maximum of 25 days in the year. The focus group indicated no other employees or labor for a herd of this size and scale. Day work or contract workers assist with cattle drives, branding, cattle work days, and additional calving season activities. The cost of owner labor and management are not included in the budget. The net returns in the budget are compensation to labor and management.

Taxes

Annual property tax costs are estimated following the tax rate of 1 percent on the assessed value of agriculture/farm land and personal property, as recommended by American Agriculture Economics Association (AAEA, 2000). Land values are averaged across an

MLRA using rates provided by the U.S. Department of Agriculture in a 2017 Land Value Summary (USDA-NASS, 2017) by land type, and pasture was valued in Oregon and Idaho at an average rate of \$1,025 per acre. The 2012 Census of Agriculture (USDA-NASS, 2012) indicated the average farm size was 1,523 acres private land with only the counties included in this MLRA (Oregon counties: Baker, Northern Malheur, Crook, Wheeler, Jefferson; Idaho counties: Elmore, Camas, Blaine).

Inventory and Capital Investments

Buildings, equipment, and improvements include a set of corrals that incorporate portable panels and a loading chute, a storage shop, a calving barn/facility, and water developments (portable and/or solar powered). A squeeze chute, calf table, feed/hay bunks, tractor implements, veterinary equipment, storage tanks (fuel and water storage), tools, and branding irons, and a livestock trailer were also included in the equipment inventory. Vehicles and machinery used for the cow-calf operation include one half-ton truck, one three-quarter ton truck, a 1-ton truck, one ATV, a 4WD tractor that ranges from 80 to 120 horsepower, and one 75 horsepower tractor with a front-end loader. The depreciation costs are calculated using straight-line method and applying a 5 percent interest rate on useful life of the asset, determined by the Modified Accelerated Cost Recovery System (MACRS) standards (IRS, 2017). Calculations of machinery salvage value come from Iowa State University of Science and Technology's Cooperative Extension Service (Edwards, 2015).

Interest on Operating Capital and Retained Livestock

Interest on operating capital expenses is derived from the assumption 50 percent of all annual operating costs are borrowed for a period of six months at 5 percent interest.

Interest on retained livestock is the value of the herd multiplied by the 2 percent interest rate (Yi and Zhang, 2016). This cost is the opportunity cost of keeping the herd and can be thought of as the amount a rancher could have made if the value of the herd had otherwise been invested at a 2 percent interest rate. The value of the herd is calculated using the January 1 herd size and market prices received for bulls, mature cows, and replacement heifers. Bull cost is valued at four times the budget's market price for a feeder steer (Meteer, 2014).

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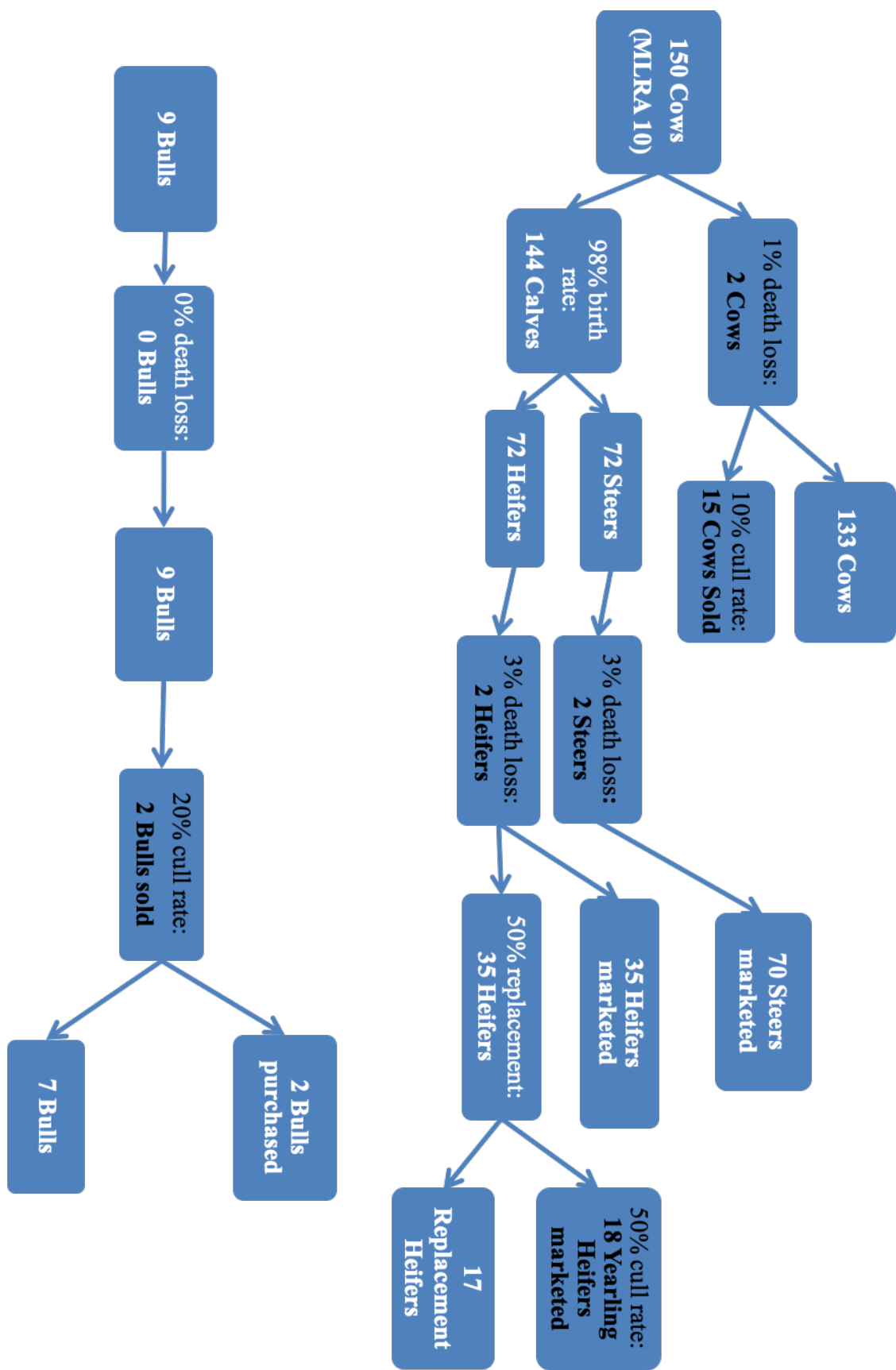
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Table 3. Enterprise Budget for a 150-head, Cow-calf Public Land Operation in MLRA 10.

MLRA 10: Blue Foothill Mountain Region							
Public Land							
Herd Size: 150 head, Cow-calf, 9 Bulls							
	Weight	Unit	Total Head or Unit	Price or Cost Per Unit	Total Value	Price or Cost Per Cow	Your Value
Gross Receipts							
Steer Calves	6.00	cwt	70	\$ 198.15	\$ 83,223.00	\$ 554.82	_____
Heifer Calves	5.50	cwt	35	\$ 178.99	\$ 34,455.58	\$ 229.70	_____
Cull Cows	12.00	cwt	15	\$ 76.89	\$ 13,840.20	\$ 92.27	_____
Cull Bulls	19.00	cwt	2	\$ 92.14	\$ 3,501.32	\$ 23.34	_____
Cull Yearling Heifers	9.50	cwt	18	\$ 162.61	\$ 27,806.31	\$ 185.38	_____
Total Receipts					\$ 162,826.41	\$ 1,085.51	_____
Operating Costs							
USFS		AUM	393	\$ 1.87	\$ 734.91	\$ 4.90	_____
Deeded Land							
Spring Range		AUM	334	\$ 16.50	\$ 5,511.00	\$ 36.74	_____
Irrigated Pasture		AUM	615	\$ 21.45	\$ 13,191.75	\$ 87.95	_____
Improved/Winter Range		AUM	426	\$ 16.50	\$ 7,029.00	\$ 46.86	_____
Winter Feed							
Meadow Hay		ton	292	\$ 187.00	\$ 54,604.00	\$ 364.03	_____
Alfalfa		ton	56	\$ 200.00	\$ 11,200.00	\$ 74.67	_____
Supplement							
Salt & Mineral		ton	6	\$ 554.40	\$ 3,326.40	\$ 22.18	_____
Fuel & Lube					\$ 6,000.00	\$ 40.00	_____
Supplies & Fencing					\$ 3,000.00	\$ 20.00	_____
Utilities					\$ 2,500.00	\$ 16.67	_____
Veterinary					\$ 5,282.73	\$ 35.22	_____
Repairs					\$ 5,000.00	\$ 33.33	_____
Hired Labor		day	25	\$ 125.00	\$ 3,125.00	\$ 20.83	_____
Other Operating Costs*					\$ 3,045.00	\$ 20.30	_____
Interest on Operating Capital		%	0.025	\$ 61,774.90	\$ 1,544.37	\$ 10.30	_____
Total Operating Costs					\$ 123,549.79	\$ 823.67	_____
<i>Income Above Operating Costs</i>					\$ 39,276.62	\$ 261.84	_____
Ownership Costs and Capital							
Purchased Livestock		bull	2	\$ 4,755.60	\$ 8,560.08	\$ 57.07	_____
Interest on Retained Livestock		%	0.02	\$334,911.77	\$ 6,698.24	\$ 44.65	_____
Asset Depreciation		\$			\$ 9,738.85	\$ 64.93	_____
Taxes		\$			\$ 15,610.75	\$ 104.07	_____
Total Ownership Costs					\$ 40,607.92	\$ 270.72	_____
Total Costs					\$ 164,157.71	\$ 1,094.38	_____
Returns to Labor and Management					<u>\$ (1,331.30)</u>	<u>\$ (8.88)</u>	_____

* Freight & Trucking \$1,350; Marketing \$695; Professional Fees \$1,000.

Table 4. Cow/calf Production Flow Chart.





Enterprise budget for 500-head, cow-calf private land ranch

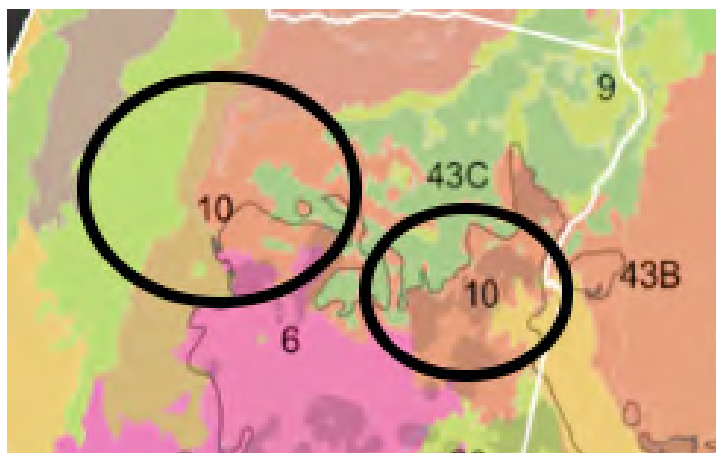
Blue Mountain Foothill Region

MLRA 10

Tom Hilken¹, Kendall Roberts¹, Holly Dyer¹, Holly Kirkpatrick¹, Anna Maher¹, Nicolas Quintana Ashwell¹, Sergio Arispe², Linda Rowe³, John Tanaka⁴, John Ritten⁵, and Kristie Maczko⁴

Oregon counties: Jefferson, Wheeler, Crook, Baker, and northern half of Malheur

Idaho counties: Elmore, Camas, Blaine



This budget represents typical cost and returns for a 500-head, cow-calf operation in Major Land Resource Area (MLRA) 10, the Blue Mountain Foothill Region. A panel of producers from Northern Malheur County assisted with the information contained in this enterprise budget.

Feed Sources

Feed is supplied as deeded (owned or leased) rangeland and pasture during spring, summer, and early fall periods. Hay (alfalfa and rye grain) aftermath is grazed during the late fall period. Livestock are turned onto deeded spring, summer, and fall rangeland April 15 and grazed until October 1. Hay aftermath is grazed October 1-December 1. Replacement yearling heifers

are grazed on deeded rangeland and irrigated pasture from April 15-December 1. Cattle are fed a mixture of rye grain and alfalfa hay at a ratio of 30 percent alfalfa and 70 percent rye grain hay for four and a half months. Salt and minerals (selenium and molybdenum) are fed for 365 days, and protein lick tubs are fed for a 90-period during the winter. A schedule of activities within a calendar year is listed in Table 1.

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² Extension Educator, Malheur County Extension, Oregon State University.

³ Malheur Soil and Water Conservation District, Malheur County.

⁴ Wyoming Agricultural Experiment Station, University of Wyoming; Sustainable Rangelands Roundtable

⁵ Department of Agricultural and Applied Economics, University of Wyoming.

Table 1. Annual Calendar Activities for Cow-calf Operation in MLRA 10.

Management Activities	Calendar Date
Winter feeding – 30% alfalfa, 70% rye grain hay	December 1-April 15
Calving season	February 15-April 30
Mature cows and calves graze deeded or leased rangeland; branding and vaccinations prior to turnout. Bull calves castrated.	April 15-October 1
Replacement heifers graze deeded pasture and vaccinated prior to turnout.	April 15-December 1
Bulls turned out May 15-August 1. Bulls trich-tested and vaccinated prior to turnout.	May 15-August 1
Mature cowherd graze on private/leased crop aftermath.	October 1-December 1
Cows and replacement heifers are vaccinated and pregnancy tested in the fall.	October
Open heifers sold in October. All calves and cull cows and bulls are sold in November. Cull animals are sold through auction and private treaty and calves are sold through video auction.	October-November

Land Cost

The cost of land is included in the budget on an AUM cost by land type and ownership. Deeded land rates for Oregon were obtained from USDA-NASS, Agricultural Prices (2018). Irrigated pasture and aftermath rates were assumed to be 30 percent higher than non-irrigated land rates.

Herd Characteristics

Livestock inventory consists of 500 cows, 23 bulls, and 10 horses. Five replacement bulls are bought most years, but only 4 are needed in other years. Bulls have a useful life of 5 years with a 1 percent death loss. Bulls are turned into the herd for the breeding season May 15-August 1. Cow death loss is 1 percent, and 13 percent are culled annually resulting in an annual replacement rate of 14 percent. The calving rate for all cows exposed is 95 percent with a 5 percent calf loss resulting in 90 percent of the mature cows weaning a calf in the fall. In the fall, all steer calves are sold, and 66 percent of the heifer calves are sold. The remaining 34 percent of heifer calves are selected at weaning as potential replacements and after death loss consist of 77 head. Seven yearling heifers are sold in the fall, and 70 replacement heifers are brought into the herd. Sixty-five mature cows are culled from the herd due to unsuccessful breeding or old age. Table 4 shows a cow-calf production flow chart.

Gross Receipts

Livestock prices are five-year (2013-2017) averages from the CattleFax database (2018), while livestock

weights are typical for this herd size and location. Hay and alfalfa prices are also five-year (2013-2017) averages from USDA-NASS (2018). All prices were indexed to 2017 using the consumer price index prior to averages being calculated. Livestock average prices and weights and average hay and alfalfa prices are shown under Total Receipts and Operating Costs in Table 3.

Animal Health (Veterinary and Medicine)

Veterinary and medicine includes the value of vaccines, medicines, and veterinary services. Veterinary care for calves includes viral treatments, 8-Way vaccinations (given twice during the year) and dehorning and castration of bull calves. Heifer calves are also vaccinated for brucellosis. Cows, bulls, and replacement heifers receive vaccinations for viral infections, vibriosis, and leptospirosis. The herd is treated annually for parasites. Cows are pregnancy checked in the fall. Bulls also receive a semen and trichomoniasis test. Table 2 is a summary of veterinary and medical costs by class of livestock (estimates from Forero et al., 2017).

Marketing and Transportation

“Marketing Fees” are \$5.00 per head that includes sale commission, beef checkoff, and brand inspection fees for all livestock sold. Calves are marketed through video marketing sales through the summer with a late fall or early winter delivery. Cull animals are marketed through local auction markets and private treaty in the fall. Trucking and shipping fees are \$4.50 per mile for an average of 100 miles for cull animals with three trips required.

Table 2. Veterinary and Medicine Costs.

Activities	Cost per Unit	Number of Head	Total Cost
Cows - Vaccine (Lepto Vibrio, 8-Way, IBR, P13, BVD) Wormer, and Pour On	\$9.00	500	\$4,500.00
Cows - Vet Service (Preg Check, Misc. Treatments)	\$5.00	500	\$2,500.00
Heifers - Vaccine (IBR, P13, BVD and 8 Way), Wormer, and Pour On	\$12.50	79	\$987.50
Heifers - Vet Service (Bangs, Preg Check)	\$7.25	79	\$572.75
Bulls - Vaccine (8 Way), Wormer, and Pour On	\$15.50	23	\$356.50
Bulls - Vet Service (Trich and Semen tested)	\$40.00	23	\$920.00
Calves - Vaccine (8 Way, IBR, P13, BVD), dewormer, dehorned, castrate bull calves, and fly tags	\$15.82	476	\$7,530.32
Grand Total			\$17,367.07

Labor

Labor is provided by the owner and his family with an additional 50 days of hired seasonal labor at \$120 per day. The ranch owner provides the seasonal employee free on-site housing and utilities. The cost of owner labor and management are not included in this budget. The net returns in this budget are compensation to labor and management.

Taxes

Annual property tax costs are estimated following the tax rate of 1 percent on the assessed value of agricultural/farm land as recommended by the American Agricultural Economics Association (AAEA, 2000). Land values are averaged across the MLRA using county values from USDA-NASS (2017) by deeded pasture land type at a rate of \$1,025 per acre. The USDA-NASS (2012) reported average farm size was 1,523 acres private land for the counties included in this MLRA.

Inventory and Capital Investments

Buildings and equipment: One bunkhouse, shop, and equipment (welder, air compressor, tools), one set of permanent and one set of portable corrals, livestock water developments (including one portable solar pump), two portable squeeze chutes, vet equipment, hydraulic post pounder, feed bunks, cake feeder, two branding iron heaters and propane tanks, fuel and water storage tanks, electric fence materials, and one gooseneck stock trailer. Buildings and equipment are valued at 80 percent of new replacement cost.

Machinery and vehicles: Two 125 horsepower tractors with front-end loaders, one flatbed, a one-ton 4X4 pickup, one $\frac{3}{4}$ -ton 4X4 pickup, one ATV, one ATV side-by-side, and one 2-ton feed truck. Values on these investments are calculated at 50 percent of new replacement cost to reflect typically aged but functional ranch vehicles and machinery.

Depreciation costs are calculated using straight-line method and assuming a 5 percent interest rate on useful life of the asset as determined by the Modified Accelerated Cost Recovery System standards (IRS, 2017). The machinery salvage value calculations come from Iowa State University of Science and Technology's Cooperative Extension Service (Edwards, 2015).

Interest on Operating Capital and Retained Livestock

The interest amount on operating capital expenses was derived from the assumption half of all operating costs are borrowed for a period of 6 months assuming a 5 percent annual percentage rate.

Interest on retained livestock is the value of the herd multiplied by the 2 percent interest rate (Yi and Zhang, 2016). This cost is the opportunity cost of keeping the herd. The value of the herd is calculated using a January 1 herd size, the budget's current average weights, and the market value for bred cows, bred heifers, and horses before death loss. The market value of replacement bulls are estimated at 4 times the value of a steer (Meteer, 2014).

Table 3. Enterprise Budget for 500-head, Cow-calf Private Land Operation in MLRA 10.

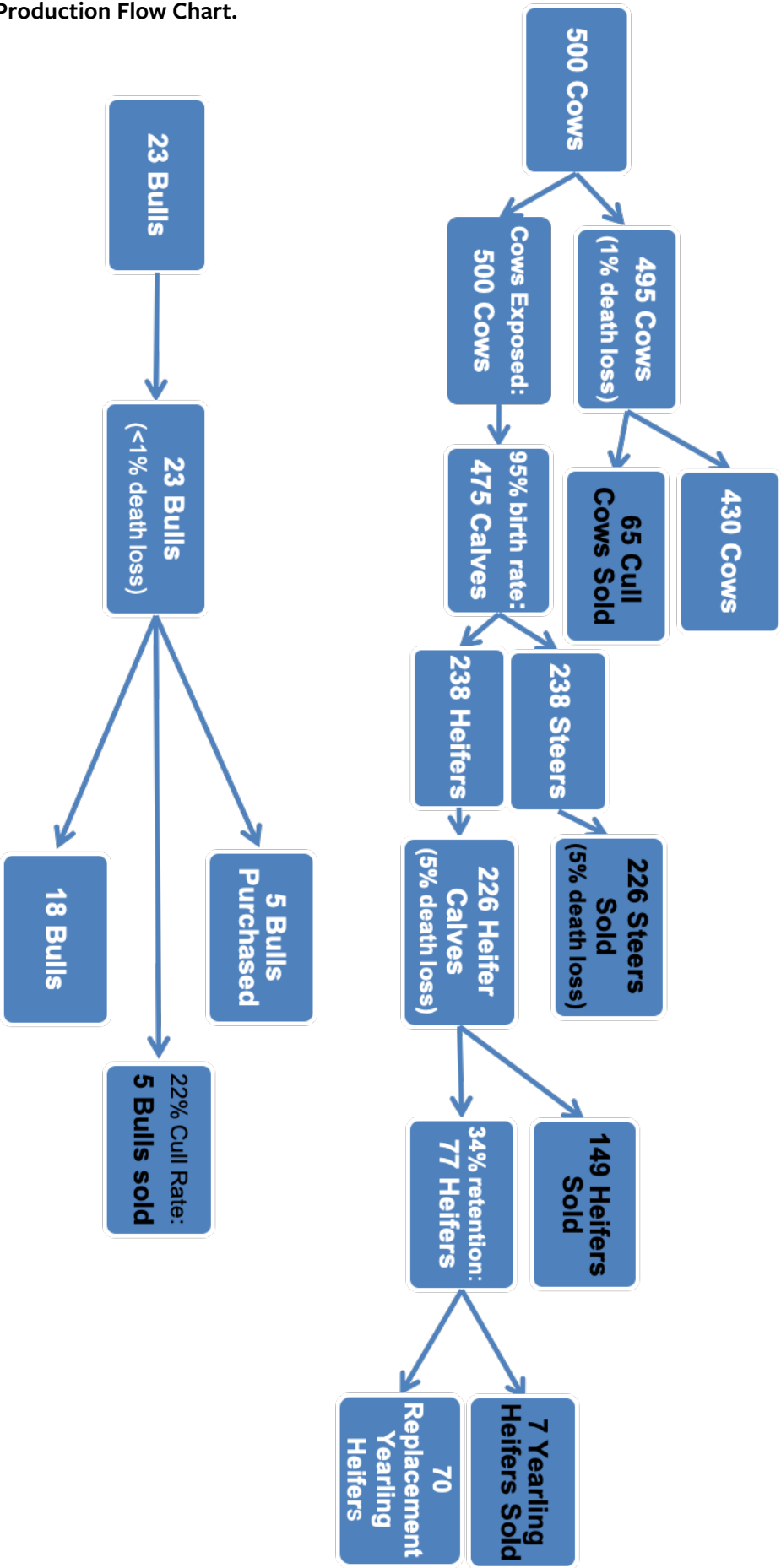
MLRA 10: Blue Mountain Foothill Region Private Land Herd Size: 500 head, Cow-calf, 23 Bulls, 10 Horses							
	Weight	Unit	Total Head or Units	Price or Cost per Unit	Total Value	Value or Cost/Cow	Your Value
Gross Receipts							
Steer Calves	5.45	cwt	226	\$198.15	\$ 244,061.36	\$488.12	_____
Heifer Calves	5.4	cwt	149	\$178.99	\$ 144,015.35	\$288.03	_____
Cull Cows	12.20	cwt	65	\$76.89	\$60,973.77	\$121.95	_____
Cull Bulls	18.50	cwt	5	\$92.14	\$8,522.95	\$17.05	_____
Cull Yearling Heifers	8.75	cwt	7	\$162.61	\$9,959.86	\$19.92	_____
Cull Horses	10.00	cwt	1	\$100.00	\$1,000.00	\$2.00	_____
Total Receipts					\$468,533.29	\$937.07	_____
Operating Costs							
Deeded Land:							
Rangeland		AUM	3608	\$16.50	\$59,532.00	\$119.06	_____
Crop Aftermath		AUM	1231	\$21.45	\$26,404.95	\$52.81	_____
Irrigated Pasture		AUM	827	\$21.45	\$17,739.15	\$35.48	_____
Winter Feed:							
Rye Grain Hay		ton	932	\$187.00	\$ 174,284.00	\$348.57	_____
Alfalfa Hay		ton	398	\$200.00	\$79,600.00	\$159.20	_____
Supplement:							
Protein		ton	68	\$500.00	\$34,000.00	\$68.00	_____
Salt/Mineral		ton	13	\$260.00	\$3,380.00	\$6.76	_____
Fuel and Lube				\$15,000.00	\$15,000.00	\$30.00	_____
Machinery and Equipment Repair				\$15,000.00	\$15,000.00	\$30.00	_____
Supplies-misc.				\$5,000.00	\$5,000.00	\$10.00	_____
Fence Repair				\$4,000.00	\$4,000.00	\$8.00	_____
Utilities				\$5,000.00	\$5,000.00	\$10.00	_____
Veterinary Medicine							
Cattle				\$17,367.07	\$17,367.07	\$34.73	_____
Horses		hd	10	\$400.00	\$4,000.00	\$8.00	_____
Hired Labor		day	50	\$125.00	\$6,250.00	\$12.50	_____
Other Operating costs*				\$11,660.00	\$11,660.00	\$23.32	_____
Interest on Operating Capital			\$239,108.59	2.5%	\$5,977.71	\$11.96	_____
Total Operating Costs					\$ 478,217.17	\$ 956.43	_____
<i>Income Above Operating Costs</i>					\$(9,683.88)	\$(19.37)	_____
Ownership Costs and Capital Recovery:							
Purchased livestock 5 bulls, 1 horse					\$24,595	\$49.19	_____
Interest on Retained Livestock			\$1,145,359.00	2.00%	\$22,907.18	\$45.81	_____
Asset Depreciation:					\$17,057.75	\$34.12	_____
Property Taxes					\$15,611.00	\$31.22	_____
Total Ownership Costs					\$80,171	\$ 160.34	_____
Total Costs					\$ 558,388.10	\$ 1,116.78	_____
Net Returns Above Costs					<u>\$ (89,854.81)</u>	<u>\$(179.71)</u>	_____

* Other operating costs include: trucking (\$1,350), marketing (\$2,310), and accounting (\$8,000)

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Table 4. Cow-calf Production Flow Chart.





Enterprise budget for 700-head, cow-calf public land ranch

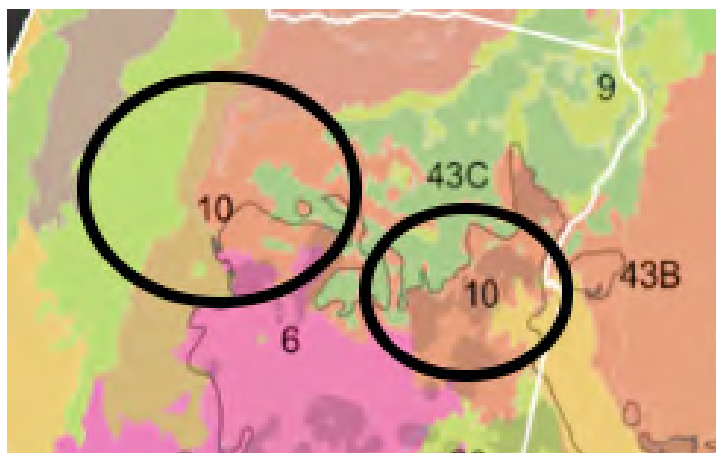
Blue Mountain Foothill Region

MLRA 10

Tom Hilken¹, Kendall Roberts¹, Holly Dyer¹, Holly Kirkpatrick¹, Anna Maher¹, Nicolas Quintana Ashwell¹, Tim Deboodt², John Tanaka³, John Ritten⁴, and Kristie Maczko³

Oregon and Idaho counties: Jefferson, Wheeler, Crook, Baker, and northern half of Malheur

Idaho counties: Elmore, Camas, Blaine



This budget represents typical cost and returns for a 700 head, cow-calf operation in Major Land Resource Area (MLRA) 10, the Blue Mountain Foothill Region. A panel of producers from Wheeler, Crook, and Jefferson counties assisted with the information contained in this enterprise budget.

Feed Sources

Feed is supplied as deeded pasture (owned or leased), and Bureau of Land Management (BLM) and Forest Service (FS) public rangelands during spring, summer, and early fall periods. Livestock are grazed on BLM rangeland April 1-July 1, and FS rangeland is grazed July 1-October 1. Replacement yearling heifers are grazed on irrigated deeded pasture April 1 to December 1. Hay aftermath (alfalfa and rye grain

hay) is grazed October 1 to December 1 by the mature cow herd. Cattle are fed a mixture of alfalfa and rye grain hay at a ratio of 20 percent alfalfa and 80 percent rye grain hay December 1-April 1. Salt and minerals (selenium and molybdenum) are fed year-round, and protein from lick tubs are available 90 days during the winter period. A schedule of activities within a calendar year is listed in Table 1.

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Table 1. Annual Calendar Activities for Cow-calf Operation in MLRA 10.

Management Activities	Calendar Date
Winter feeding – 20% alfalfa, 80% rye grain hay	December 1-April 1
Calving season	February 1-April 1
Spring grazing on BLM – Calves branded, vaccinated, and bull calves castrated prior to turnout. Cows are vaccinated and poured prior to turnout.	April 1-July 1
Bulls turned out May 1 for 60-day breeding season.	May 1-July 1
Summer grazing on FS rangelands.	July 1- October 1
Replacement heifers graze irrigated pasture/meadows and are vaccinated prior to turnout.	April 1-December 1
Mature cowherd graze on private/leased hay aftermath (alfalfa, rye grain).	October 1-December 1
Cows and replacement heifers are vaccinated and pregnancy tested in the fall.	October-November
Marketing of calves, culls, and non-selected replacement heifers. Cull animals are sold through auction, and private treaty and calves are marketed and sold through video auction.	October-November

Land Cost

The cost of land is included in the budget on an AUM cost by land type and ownership. In the case of public lands, the AUM rate is published by the land management agencies. Deeded land rates for Oregon were obtained from USDA-NASS, Agriculture Prices (2018). Irrigated pasture and aftermath rates were assumed to be 30 percent higher than non-irrigated land rates.

Herd Characteristics

Livestock inventory consists of 700 cows, 41 bulls, and 12 horses. Eight replacement bulls are bought most years, but only 7 are needed in other years. Bulls have a useful life of 5 years with a 1 percent death loss. Bulls are turned into the herd for the breeding season May 1-July 1. Cow death loss is 1 percent, and 14 percent are culled annually resulting in an annual replacement rate of 15 percent. The calving rate for all cows exposed is 93 percent with a 5 percent calf loss resulting in 88 percent of the mature cows weaning a calf in the fall. In the fall, all steer calves are sold and 59 percent of the heifer calves are sold. The remaining 41 percent of heifer calves are selected at weaning as potential replacements and after death loss consist of 127 head. Twenty-two yearling heifers are sold in the fall, and 105 replacement heifers are brought into the herd. Ninety-eight mature cows are culled from the herd due to unsuccessful breeding or old age. Table 4 shows a cow-calf production flow chart.

Animal Health (Veterinary and Medicine)

Veterinary and medicine includes the value of vaccines,

medicines, and veterinary services. Veterinary care for calves includes viral treatments, 8-Way vaccinations (given twice during the year) and dehorning and castration of bull calves. Heifer calves are also vaccinated for brucellosis. Cows, bulls, and replacement heifers receive vaccinations for viral infections, vibriosis and leptospirosis. The herd is treated annually for parasites. Cows are pregnancy checked in the fall. Bulls also receive a semen and trichomoniasis test. Table 2 is a summary of veterinary and medical costs by class of livestock (estimates from Forero et al., 2017).

Marketing and Transportation

“Marketing Fees” are \$6.00 per head and includes sale commission, beef checkoff, and brand inspection fees for all livestock sold. Calves are marketed through video marketing sales through the summer with a November delivery. Cull animals are marketed through local auction markets and private treaty in the fall. Trucking and shipping fees are \$4.75 per mile for an average of 100 miles for cull animals with 3 trips required.

Labor

Labor is provided by the owner and his family with an additional 50 days of hired seasonal labor at \$120 per day. The ranch owner provides the seasonal employee free on-site housing and utilities. The cost of owner labor and management are not included in this budget. The net returns provided in this budget are compensation to labor and management.

Taxes

Table 2. Veterinary and Medicine Costs.

Activities	Cost per Unit	Number of Head	Total Cost
Cows - Vaccine (Lepto Vibrio, 8-Way, IBR, P13, BVD) Wormer, and Pour-On	\$9.00	700	\$6,300.00
Cows - Vet service (preg check, misc. treatments)	\$5.00	700	\$3,500.00
Heifers - Vaccine (IBR, P13, BVD and 8-Way), wormer, and Pour-On	\$12.50	131	\$1,637.50
Heifers - Vet Service (Bangs, preg check)	\$7.25	131	\$949.75
Bulls - Vaccine (8-Way), wormer, and Pour-On	\$15.50	42	\$651.00
Bulls - Vet Service (trich and semen tested)	\$40.00	42	\$1,680.00
Calves - Vaccine (8-Way, IBR, P13, BVD), dewormer, dehorned, castrate bull calves, and fly tags	\$15.82	652	\$10,314.64
Grand Total			\$25,032.89

Other charts also have a Cost per Cow item

Annual property tax costs are estimated following the tax rate of 1 percent on the assessed value of agricultural/farm land as recommended by the American Agricultural Economics Association (AAEA, 2000). Land values are averaged across the MLRA using county values from USDA-NASS (2017) by deeded pasture land type at a rate of \$1,025 per acre. The USDA-NASS (2012) reported average farm size was 1,523 acres private land for the counties included in this MLRA.

Machinery and Equipment:

Buildings and equipment: one bunkhouse, shop, and equipment (welder, air compressor, tools), one set of permanent and one set of portable corrals, one calving barn, livestock water developments (including two solar pumps), approximately 30 miles of 3-wire fence, two hydraulic squeeze chutes and one set of scales, vet equipment, hydraulic post pounder, feed bunks or hay feeders, four branding iron heaters and propane tanks, fuel and water storage tanks, electric fence materials, and two gooseneck trailers. Buildings and equipment are valued at 80 percent of new replacement cost.

Machinery and vehicles: two 75 horsepower tractors with front end loaders, one 150 horsepower tractor 4X4 equipped, two flatbed one-ton 4X4 pickups, one ¾-ton 4X4 pickup, two ATVs, one ATV side-by-side, and one 2-ton feed truck. Values on these investments are calculated at 50 percent of new replacement cost to reflect typically aged but functional ranch vehicles and machinery.

Depreciation costs are calculated using straight-line method and assuming a 5 percent interest rate on useful life of the asset as determined by the Modified

Accelerated Cost Recovery System standards (IRS, 2017). The machinery salvage value calculations come from Iowa State University of Science and Technology's Cooperative Extension Service (Edwards, 2015).

Interest on Operating Capital and Retained Livestock

The interest amount on operating capital expenses was derived from the assumption that half of all operating costs are borrowed for a period of 6 months assuming a 5 percent annual percentage rate.

Interest on retained livestock is the value of the herd multiplied by the 2 percent interest rate (Yi and Zhang, 2016). This cost is the opportunity cost of keeping the herd. The value of the herd is calculated using a January 1 herd size, the budget's current average weights, and the market value for bred cows, bred heifers, and horses before death loss. The market value of replacement bulls is estimated at four times the value of a steer (Meteer, 2014).

Gross Receipts and Operating Expenditures

Livestock prices are five-year (2013-2017) averages from the CattleFax database (2018), while livestock weights are typical for this herd size and location. Hay and alfalfa prices are also five-year (2013-2017) averages from USDA-NASS (2018). All prices were indexed to 2017 using the consumer price index prior to averages being calculated. Livestock average prices and weights, and average hay and alfalfa prices are shown under Total Receipts and Operating Expenses in Table 3.

Table 3. Enterprise Budget for 700-head, Cow-calf Public Land Operation in MLRA 10.

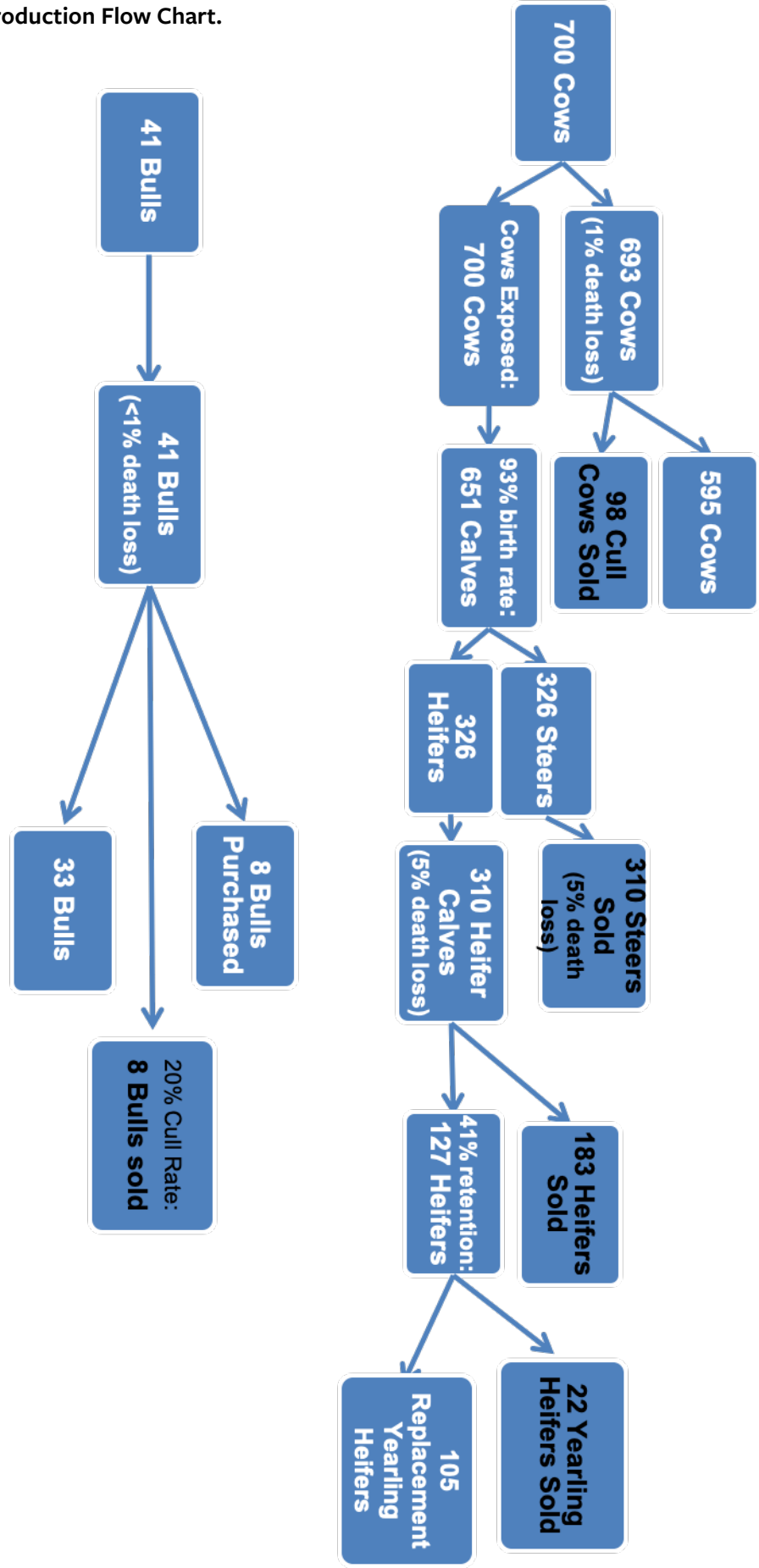
MLRA 10: Blue Mountain Foothill Region Public Land Herd Size: 700 head, Cow-calf, 41 Bulls, 12 Horses							
	Weight	Unit	Total Head or Unit	Price or Cost per Unit	Total Value	Value or Cost/ Cow	Your Value
Gross Receipts							
Steer Calves	5.45	cwt	310	\$198.15	\$334,774.43	\$478.25	_____
Heifer Calves	5.40	cwt	183	\$178.99	\$176,877.92	\$252.68	_____
Cull Cows	12.20	cwt	98	\$76.89	\$91,929.68	\$131.33	_____
Cull Bulls	18.50	cwt	8	\$92.14	\$13,636.72	\$19.48	_____
Cull Yearling Heifers	8.75	cwt	22	\$162.61	\$31,302.43	\$44.72	_____
Cull Horses	10.00	cwt	1	\$100.00	\$1,000.00	\$1.43	_____
Total Receipts					\$649,521.17	\$927.89	_____
Operating Costs							
USFS		AUM	2720	\$1.87	\$5,086.40	\$7.27	_____
BLM		AUM	2720	\$1.87	\$5,086.40	\$7.27	_____
Deeded:							
Crop aftermath		AUM	1700	\$21.45	\$36,465.00	\$52.09	_____
Irrigated pasture		AUM	1277	\$21.45	\$27,391.65	\$39.13	_____
Winter Feed:							
Rye Grain Hay		ton	1298	\$187.00	\$242,726.00	\$346.75	_____
Alfalfa Hay		ton	324	\$200.00	\$64,800.00	\$92.57	_____
Supplement:							
Salt/Mineral-Sele/Moly		ton	19	\$260.00	\$4,940.00	\$7.06	_____
Protein		ton	98	\$500.00	\$49,000.00	\$70.00	_____
Fuel and Lube				\$12,500.00	\$12,500.00	\$17.86	_____
Machinery and Equipment Repair				\$17,500.00	\$17,500.00	\$25.00	_____
Supplies-Misc.				\$10,000.00	\$10,000.00	\$14.29	_____
Fence Repair				\$10,000.00	\$10,000.00	\$14.29	_____
Utilities				\$9,500.00	\$9,500.00	\$13.57	_____
Veterinary Medicine:							
Cattle			12	\$25,032.89	\$25,032.89	\$35.76	_____
Horses		hd		\$400.00	\$4,800.00	\$6.86	_____
Hired Labor		day	50	\$125.00	\$6,250.00	\$8.93	_____
Other operating costs*				\$14,881.00	\$14,881.00	\$21.26	_____
Interest on Operating Capital			\$272,979.67	2.50%	\$6,824.49	\$9.75	_____
Total Operating Costs					\$545,959.34	\$779.94	_____
<i>Income Above Operating Costs</i>					\$103,561.83	\$147.95	_____
Ownership Costs and Capital Recovery:							
Purchased livestock-8 bulls, 1 horse					\$37,552	\$53.65	_____
Interest on Retained Livestock			\$1,675,159.00	2.00%	\$33,503.18	\$47.86	_____
Asset Depreciation					23,196.69	\$33.14	_____
Property Taxes					\$15,611.00	\$22.30	_____
Total Ownership Costs					\$109,863	\$156.95	_____
Total Costs					\$655,822.21	\$936.89	_____
Net Returns Above Costs					<u>\$(6,301.04)</u>	<u>\$(9.00)</u>	_____

* Other operating costs include: trucking (\$1,425), marketing (\$3,456), and accounting (\$10,000)

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Table 4. Cow-calf Production Flow Chart.





Enterprise budget for 100-head, cow-calf private land ranch

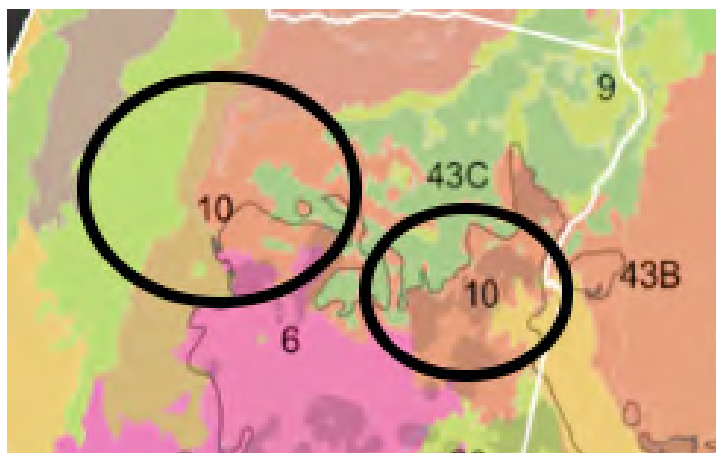
Blue Mountain Foothill Region

MLRA 10

Holly Dyer¹, Holly Kirkpatrick¹, Tom Hilken¹, Kendall Roberts¹
Anna Maher¹, Nicolas Quintana Ashwell¹, Tim Deboodt²,
John Tanaka³, John Ritten⁴, and Kristie Maczko³

Oregon counties: Baker, Northern Malheur, Crook, Wheeler, Jefferson

Idaho counties: Elmore, Camas, Blaine



This budget represents typical cost and returns for a 100-head, cow-calf operation in Major Land Resource Area (MLRA) 10, the Blue Mountain Foothill Region. A panel of producers from Wheeler, Crook, and Jefferson counties assisted with the information contained in this enterprise budget.

Feed Sources

Spring range is April 1-July 31 for the brood cow herd and cow-breeding bulls. Replacement heifers, heifer-breeding bulls, and horses graze on deeded (owned or leased) irrigated pasture April 1-July 31. All bulls are removed by July 5 from the breeding stock and graze deeded (owned or leased) irrigated pasture from July 5-July 31. All livestock then graze on improved or win-

ter range August 1-November 30. All livestock are fed alfalfa/grass mix hay December 1-March 31. All hay is valued at market price of five-year averages in the state of Oregon (USDA-NASS, 2018). Salt and minerals are fed at the rate of 4 pounds per-head per-month year-round. An annual outlook of activities calendar with feed sources is described in Table 1.

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Table 1. Annual Calendar Activities for Cow-calf Operation in MLRA 10.

Management Activities	Calendar Date
Winter feeding – 20% alfalfa, 80% meadow hay	December 1-March 31
Calving season	February 1-April 15
Post-calving (branding, vaccinating, castrating) – Pre-breeding vaccinate cows & heifers	April 15-May 14
Breeding season (~75 Days)	April 20-July 5
Graze Spring Range/dryland – Brood cows, bulls (5 head until July 5 with cows)	April 1-July 31
Graze Deeded/Leased Irrigated Pasture – Heifers, bulls (1 head until July 5), horses	April 1-July 31
Pregnancy check/vaccinate cows & pre-condition calves	September 30-October 1
Wean calves; Market steer calves, culls & non-replacement heifer calves	October 15-November 15
Graze Deeded/Leased Improved/Winter Range - All livestock	August 1-November 30

Land Cost

The cost of land is included in the budget on an AUM cost by land type. Deeded land rate is calculated using area rates by type and availability and published in the USDA-NASS Agricultural Prices reports (2018). Irrigated pasture and aftermath rates were assumed to be 30 percent higher than non-irrigated land rates.

Herd Characteristics

The livestock inventory consists of 100 brood cows, 6 bulls, and 4 horses. Five bulls are provided for the brood cows and one bull provided for the replacement heifers at a rate of 20 cows per bull. One bull is bought annually in the spring prior to breeding season, and all bulls have a useful life of six years (cull rate of 15 percent for this herd size). Bulls begin the breeding season from April 20 and are removed on July 5. Cow death loss is 1 percent and 10 percent are culled annually resulting in replacement rate of 11 percent. The calving rate for all cows exposed is 98 percent, and calf death loss is 3 percent overall. Calving season takes place from February 1-April 15.

All steer calves are sold, and 50 percent of the heifer calves are sold after weaning. The remaining 50 percent are selected at weaning as the next year's potential replacement heifers. This consists of 24 head of replacements with minimal death loss. Thirteen replacement heifers are then culled following fall breeding evaluation. Eleven cows are culled from the herd due to older age and unsuccessful breeding. Steer calves, non-replacement heifer calves, cull cows, and cull bulls are marketed before mid-November. Livestock production

and inventory is outlined in Table 4: Cow/Calf Production Flow Chart.

Gross Receipts

Gross receipts are five-year averages of prices received for livestock sold and indexed to 2017 dollars for the state of Oregon (CattleFax, 2018; BLS, 2018). Livestock weights and prices received are shown in the enterprise budget (Table 3). These are assumed "typical" by the focus group and confirmed by market data in the state of Oregon and in the Blue Mountain Foothill region.

Animal Health (Veterinary and Medicine)

This includes vaccines, medicines, and all other veterinary services including pregnancy testing. Pre-calving for mature cows and bred replacement heifers include scour prevention (ScourGard). Calves are given post-calving season vaccinations, are branded, dehorned, and bulls castrated between mid-April and mid-May. These vaccinations include 7-Way, IBR/PI3/BVD/BRSV, and Pour-On/wormer (Ivomec or Dec-tomax). Previous year's selected replacement heifers and mature cows are given pre-breeding vaccinations including Vibriosis-Leptospirosis, 7-Way, IBR/PI3/BVD/BRSV, and Pour-On/wormer (Ivomec or Dec-tomax) before the April 20 bull turnout. Bulls will be tested for fertility and trichomoniasis. Cows and replacement heifers are pregnancy tested in the fall as the cattle are gathered and heifer calves are given Bangs vaccinations. Table 2 below gives typical vaccinating and animal health practices and cost estimations by livestock class as provided by Forero et al. (2017).

Table 2. Veterinary and Medicine Costs.

Activities	Cost per Unit	Number of Head	Total Cost
Cows - Vaccine (Lepto Vibrio, 8-Way, IBR, P13, BVD) Wormer, and Pour On	\$9.00	100	\$900.00
Cows - Vet Service (Preg Check, Misc. Treatments)	\$2.25	100	\$225.00
Bulls - Vaccine (8 Way), Wormer, and Pour On	\$15.50	6	\$96.10
Bulls - Vet Service (Trich and Semen tested)	\$40.00	6	\$248.00
Heifers - Vaccine (IBR, P13, BVD and 8 Way), Wormer, and Pour On	\$12.50	24	\$300.00
Heifers - Vet Service (Bangs, Preg Check)	\$ 7.25	24	\$174.00
Horses - Wormer	\$15.00	4	\$60.00
Calves - Vaccine (8 Way, IBR, P13, BVD), dewormer, dehorned, castrate bull calves, and fly tags	\$15.82	96	\$1,518.72
Total			\$3,521.82
Cost per cow			\$35.22

Marketing and Transportation

Calves and cull animals are marketed through local auctions. Most operators of this size and scale will utilize transportation companies for delivery of cattle as the focus group indicated no ownership of a semi-truck and cattle pot. Trucking expenses are included in the budget as “Freight & Trucking” with a per mile cost of \$4.50 for an average of 300 miles for cull animals with two trips being required. “Marketing” is \$5.00 per head and incorporates auction sale commission, check-off fees, and brand inspections for all livestock sold. These three operating costs are listed under “Other Operating Costs” in the budget.

Labor

Day work and/or contract workers are considered in this budget as hired labor and are paid at a rate of \$125 per day for maximum of 25 days in the year. The focus group indicated no other employees or labor for a herd of this size and scale. Day work or contract workers assist with cattle drives, branding, cattle work days and additional calving season activities. The cost of owner labor and management are not included in the budget. The net returns in the budget are compensation to labor and management.

Taxes

Annual property tax costs are estimated following the tax rate of one percent on the assessed value of agriculture/farm land and personal property, as recommended by American Agriculture Economics Association (AAEA, 2000). Land values are aver-

aged across an MLRA using rates provided by the U.S. Department of Agriculture in a 2017 Land Value Summary (USDA-NASS, 2017) by type of land, and pasture was valued in Oregon and Idaho at an average rate of \$1,025 per acre. The 2012 Census of Agriculture (USDA-NASS, 2012) indicated average farm size was 1,523 acres private land with only the counties included in this MLRA (Oregon counties: Baker, Northern Malheur, Crook, Wheeler, Jefferson; Idaho counties: Elmore, Camas, Blaine).

Inventory and Capital Investments

Buildings, equipment, and improvements include a set of corrals that incorporate portable panels and a loading chute, a storage shop, a calving barn/facility, and water developments (portable and/or solar powered). A squeeze chute, calf table, feed/hay bunks, tractor implements, veterinary equipment, storage tanks (fuel and water storage), tools, and branding irons, and a livestock trailer were also included in the equipment inventory. Vehicles and machinery used for the cow-calf operation include one ½-ton truck, one ¾-ton truck, a one-ton truck, one ATV, one 4WD tractor ranging from 80- to 120-horsepower, and one 75 horsepower tractor with a front-end loader. The depreciation costs are calculated using straight-line method and applying a 5 percent interest rate on useful life of the asset, determined by the Modified Accelerated Cost Recovery System (MACRS) standards (IRS, 2017). Calculations of machinery salvage value come from Iowa State University of Science and Technology's Cooperative Extension Service (Edwards, 2015).

Interest on Operating Capital and Retained Livestock

Interest on operating capital expenses is derived from the assumption that 50 percent of all annual operating costs are borrowed for a period of six months at 5 percent interest.

Interest on retained livestock is the value of the herd multiplied by the 2 percent interest rate (Yi and Zhang, 2016). This cost is the opportunity cost of keeping the herd and can be thought of as the amount a rancher could have made if the value of the herd had otherwise been invested at a 2 percent interest rate. The value of the herd is calculated using the January 1 herd size and market prices received for bulls, mature cows, and replacement heifers. Bull cost is valued at four times the budget's market price for a feeder steer (Meteer, 2014).

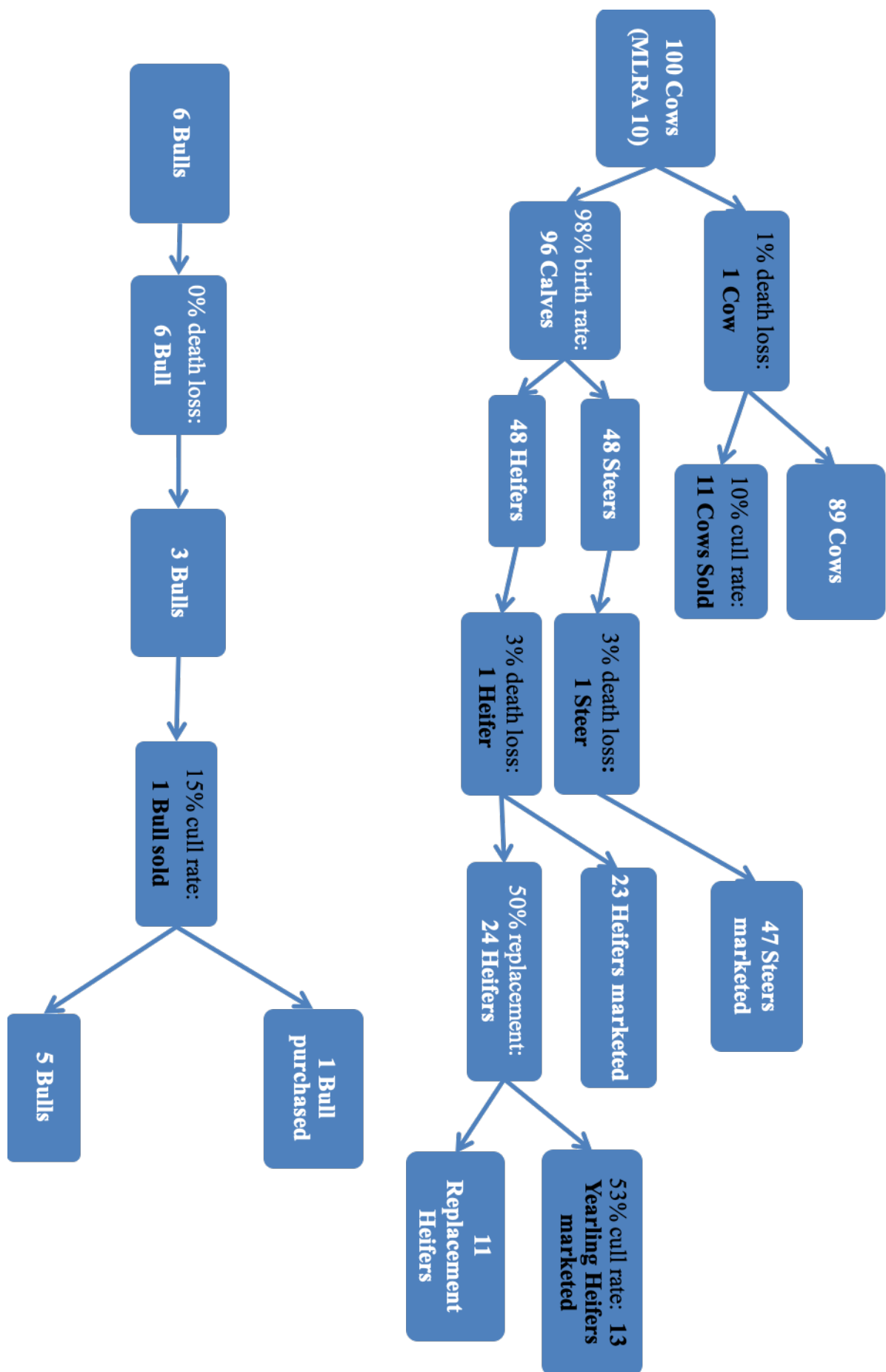
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Table 3. Enterprise Budget for a 100-head, Cow-calf Private Land Operation in MLRA 10.

MLRA 10: Blue Foothill Mountain Region							
Private Land							
Herd Size: 100 head, Cow-calf, 6 Bulls							
	Weight	Unit	Total Head or Unit	Price or Cost Per Unit	Total Value	Price or Cost Per Cow	Your Value
Gross Receipts							
Steer Calves	6.00	cwt	47	\$ 198.15	\$ 55,878.30	\$ 558.78	
Heifer Calves	5.50	cwt	23	\$ 178.99	\$ 22,642.24	\$ 226.42	
Cull Cows	12.00	cwt	11	\$ 76.89	\$ 10,149.48	\$ 101.49	
Cull Bulls	19.00	cwt	1	\$ 92.14	\$ 1,750.66	\$ 17.51	
Cull Yearling Heifers	9.50	cwt	13	\$ 162.61	\$ 20,082.34	\$ 200.82	
Total Receipts					\$ 110,503.01	\$ 1,105.03	
Operating Costs							
Deeded Land							
Spring Range		AUM	504	\$ 16.50	\$ 8,316.00	\$ 83.16	
Irrigated Pasture		AUM	92	\$ 21.45	\$ 1,973.40	\$ 19.73	
Improved/Winter Range		AUM	580	\$ 16.50	\$ 9,570.00	\$ 95.70	
Winter Feed							
Meadow Hay		ton	194	\$ 187.00	\$ 36,278.00	\$ 362.78	
Alfalfa		ton	37	\$ 200.00	\$ 7,400.00	\$ 74.00	
Supplement							
Salt & Mineral		ton	4	\$ 554.40	\$ 2,217.60	\$ 22.18	
Fuel & Lube					\$ 6,000.00	\$ 60.00	
Supplies & Fencing					\$ 3,000.00	\$ 30.00	
Utilities					\$ 2,500.00	\$ 25.00	
Veterinary					\$ 3,521.82	\$ 35.22	
Repairs					\$ 5,000.00	\$ 50.00	
Hired Labor		day	25	\$ 125.00	\$ 3,125.00	\$ 31.25	
Other Operating Costs*					\$ 2,825.00	\$ 28.25	
Interest on Operating Capital		%	0.025	\$ 45,863.41	\$ 1,146.59	\$ 11.47	
Total Operating Costs					\$ 91,726.82	\$ 917.27	
Income Above Operating Costs					\$ 18,776.19	\$ 187.76	
Ownership Costs and Capital							
Purchased Livestock		bull	1	\$ 4,755.60	\$ 4,755.60	\$ 47.56	
Interest on Retained Livestock		%	0.02	\$223,633.20	\$ 4,472.66	\$ 44.73	
Asset Depreciation		\$			\$ 9,738.85	\$ 97.39	
Taxes		\$			\$ 15,610.75	\$ 156.11	
Total Ownership Costs					\$ 34,577.87	\$ 345.78	
Total Costs					\$ 126,304.69	\$ 1,263.05	
Returns to Labor and Management					<u>\$ (15,801.68)</u>	<u>\$ (158.02)</u>	
* Freight & Trucking \$1,350; Marketing \$475; Professional Fees \$1,000.							

Table 4: Cow/calf Production Flow Chart.





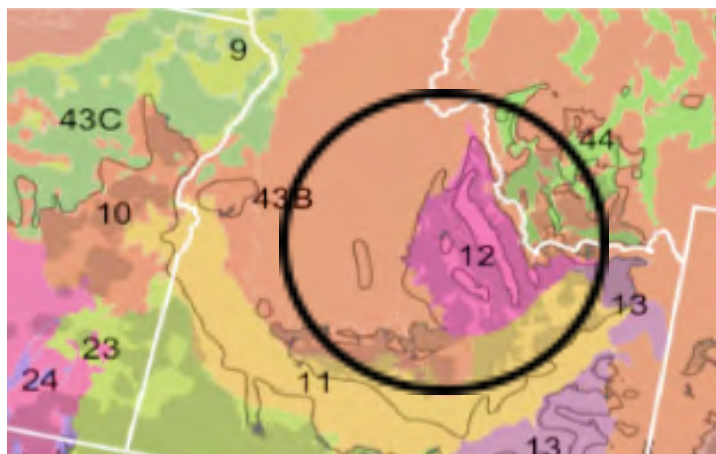
Enterprise budget for 300-head, cow-calf private land ranch

Lost River Valleys and Mountains

MLRA 12

Tom Hilken¹, Kendall Roberts¹, Holly Dyer¹, Holly Kirkpatrick¹, Anna Maher¹, Nicolas Quintana Ashwell¹, Sarah Baker², Shannon Williams², John Tanaka³, John Ritten⁴, and Kristie Maczko³

Idaho counties: Custer, Lemhi, Butte



This budget represents typical cost and returns for a 300-head, cow-calf operation in Major Land Resource Area (MLRA) 12, the Lost River Valleys and Mountains Region of North-Central Idaho.

Feed Sources

Feed is supplied as deeded rangeland and irrigated pasture and hay (alfalfa, grass) aftermath. Livestock are grazed on deeded rangelands May 15-October 15 and on hay aftermath from October 15-December 1. Replacement heifers are kept on deeded irrigated pasture May 15-December 1. Purchased or raised

alfalfa and native meadow hay is fed during the winter months (December 1- May 15) at a ratio of 40 percent alfalfa and 60 percent meadow hay. Salt and minerals are fed year-round, and protein tubs are available for a 90-day period during winter. A schedule of activities within a calendar year is listed in Table 1.

¹ Department of Ecosystem Science and Management, University of Wyoming.

² Extension Educator, University of Idaho Extension, Challis and Salmon, Idaho.

³ Wyoming Agricultural Experiment Station, University of Wyoming; Sustainable Rangelands Roundtable.

⁴ Department of Agricultural and Applied Economics, University of Wyoming.

Table 1. Annual Calendar Activities for Cow-Calf Operation in MLRA 12.

Management Activities	Calendar Date
Winter feeding – 40% alfalfa, 60% native meadow hay.	December 1-May 15
Calving season	February 15-May 15
Deeded rangeland is grazed spring, summer and fall – Cows and calves are vaccinated, and calves are branded, earmarked, dehorned, and bull calves are castrated prior to turnout in the spring.	May 15-October 15
Replacement heifers graze deeded irrigated pasture season long. Vaccinated and pregnancy checked prior to turnout.	May 15-December 1
Bulls turned out May 15 for 90-day breeding season.	May 15-August 15
Mature cow herd graze hay aftermath during fall.	October 15-December 1
Cows vaccinated, pregnancy tested, and calves weaned in fall.	October
Cull cows, bulls, horses and open heifers are sold in early fall through local auction markets or private treaty	October-November
All calves marketed through summer video marketing sale with a November delivery date.	November

Land Cost

The cost of land is included in the budget on an AUM cost by land type. Deeded land rates for Idaho were obtained from USDA-NASS (Agriculture Prices, 2018). Irrigated pasture and aftermath rates were assumed to be 30 percent higher than non-irrigated rangeland.

Herd Characteristics

Livestock inventory consists of 300 cows, 18 bulls, and 3 horses. Four replacement bulls are purchased most years, while only 3 are needed in other years. Bulls have a useful life of 4 years with a 1 percent death loss. The cow death loss is 1 percent, and 14 percent are culled annually resulting in an annual cow replacement rate of 15 percent. The calving rate for all cows exposed is 96 percent with a 2 percent calf death loss resulting in 94 percent of the mature cows weaning a calf in the fall. In the fall, all steer calves are sold, and 63 percent of the heifer calves are sold. The remaining 37 percent of heifer calves are selected at weaning as potential replacement heifers and after death loss, consist of 53 head. Five yearling heifers are sold in the fall, and 47 replacement yearling heifers are brought into the herd. Forty-two mature cows are culled from the herd due to unsuccessful breeding or old age. Table 4 shows a cow-calf production flow chart.

Animal Health (Veterinary and Medicine)

Veterinary and medicine includes the value of vaccines, medicines, and veterinary services. Veterinary care for

calves includes viral treatments, 8-Way vaccinations (given twice during the year) and dehorning and castration of bull calves. Heifer calves are also vaccinated for brucellosis. Cows, bulls, and replacement heifers receive vaccinations for viral infections, vibriosis, and leptospirosis. The herd is treated annually for parasites. Cows are pregnancy checked in the fall. Bulls also receive breeding soundness evaluation and a trichomoniasis test (Eborn et al., 2016). Table 2 is a summary of veterinary and medical costs by class of livestock (estimates from Forero et al. 2017).

Marketing and Transportation

“Marketing Fees” are \$2.96 per head and includes marketing costs, brand inspection, and checkoff fees. Calves are marketed through video marketing sales through the summer with a late fall or early winter delivery. Cull animals are marketed through local auction markets and private treaty in the fall. Trucking and shipping fees are \$4.35 per mile for an average of 175 miles for cull animals with two trips required.

Labor

Labor is provided by the owner and his family with an additional 50 days of hired seasonal labor at \$125 per day. The ranch owner provides the seasonal employee with free on-site housing and their utilities. The cost of owner labor and management are not included in this budget. The net returns provided in this budget are compensation to labor and management.

Table 2. Veterinary and Medication Costs

Activities	Cost per Unit	Number of Head	Total Cost
Cows - Vaccine (Lepto Vibrio, 8-Way, IBR P13 BVD) Wormer, and Pour-On	\$9.00	300	\$2,700.00
Cows - Vet service (preg check, misc. treatments)	\$5.00	300	\$1,500.00
Heifers - Vaccine (IBR P13 BVD), wormer, and Pour-On	\$12.50	52	\$650.00
Heifers - Vet service (Bangs, preg check)	\$7.25	52	\$377.00
Bulls - Vaccine (8-Way), wormer, and Pour-On	\$15.50	18	\$279.00
Bulls - Vet service (trich and semen tested)	\$40.00	18	\$720.00
Calves - Vaccine (7-Way, IBR P13 BVD), dewormer, dehorned, castrate bull calves, and fly tags	\$15.82	288	\$4,556.16
Grand Total			\$10,782.16

Taxes

Annual property tax costs are estimated following the tax rate of 1 percent on the assessed value of agricultural/farm land as recommended by the American Agricultural Economics Association (AAEA, 2000). Land values are averaged across the MLRA using county values from USDA-NASS (2017) by deeded pasture land type at a rate of \$1,350 per acre. The USDA-NASS (2012) reported the average farm size was 548 acres private land for the counties included in this MLRA.

Inventory and Capital Investments:

Buildings and Improvements include a shop, calving barn, 2 sets of corrals with working alleys and pens, portable panels, 2 squeeze chutes, a calf table, fuel storage tanks, and normal complement of veterinary equipment and branding iron heaters. Buildings and equipment are valued at 80 percent of new replacement cost.

Machinery and vehicles include a 1-ton and two $\frac{3}{4}$ -ton pickups (4X4), 2 tractors - one with a loader and backhoe attachments, 2 gooseneck trailers, bale processor/chopper, skid-steer and 2 ATVs. Values on these investments are calculated at 50 percent of new replacement cost to reflect typically aged but functional ranch vehicles and machinery.

Depreciation costs are calculated using straight-line method and assuming a 5 percent interest rate on useful life of the asset, as determined by the Modified Accelerated Cost Recovery System standards (IRS, 2017). The machinery salvage value calculations come from Iowa State University of Science and Technology's Cooperative Extension Service (Edwards, 2015).

Interest on Operating Capital and Retained Livestock

The interest amount on operating capital expenses was derived from the assumption half of all operating costs are borrowed for a period of 6 months assuming a 5 percent annual percentage rate.

Interest on retained livestock is the value of the herd multiplied by the 2 percent interest rate (Yi and Zang, 2016). This cost is the opportunity cost of keeping the herd. The value of the herd is calculated using a January 1 herd size, the budgets current average weight, and the market value for bred cows, bred heifers, and horses before death loss. The value of replacement bulls are estimated at 4 times the value of a steer (Meeter, 2014).

Gross Receipts and Operating Expenditures

Livestock prices are five-year (2013-2017) averages from the CattleFax database (2017), while livestock weights were typical for this herd size and location. Hay and alfalfa prices are also five-year (2013-2017) averages from USDA-NASS (2018). All prices were indexed to 2017 using the consumer price index prior to averages being calculated. Livestock average prices and weights, and average hay and alfalfa prices are shown under "Total Receipts and Operating Expenses" in Table 3.

References

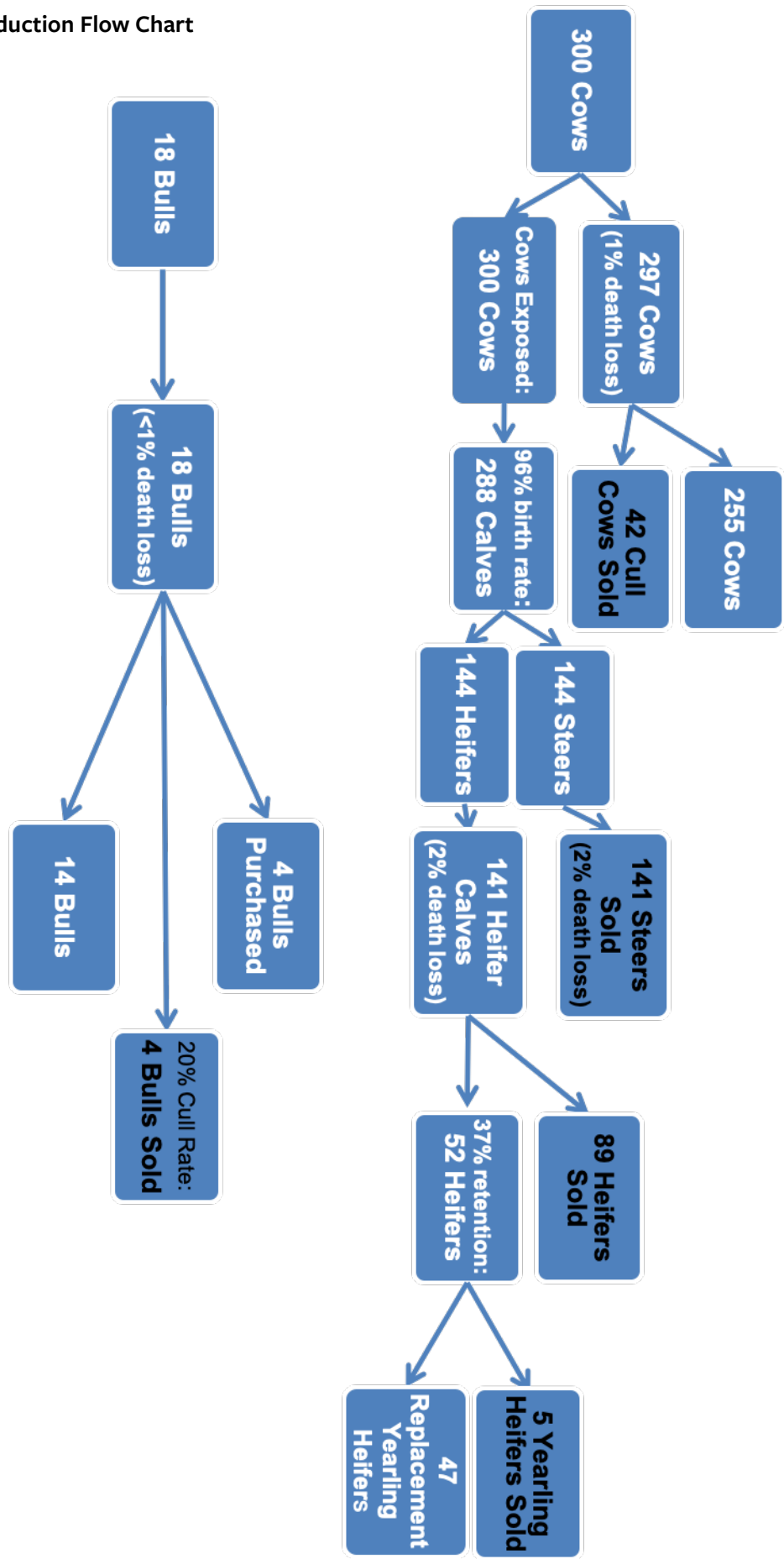
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Table 3. Enterprise Budget for 300-head, Cow-calf Private Land Ranch in MLRA 12.

MLRA 12: Lost River Valleys and Mountains Private Land Herd Size: 300-head, Cow-calf, 18 Bulls, 3 Horses							
	Weight	Unit	Total Head or Units	Price or Cost per Unit	Total Value	Value or Cost/Cow	Your Value
Gross Receipts							
Steer Calves	6.65	cwt	141	\$180.56	\$169,302.08	\$564.34	_____
Heifer Calves	6.00	cwt	89	\$166.83	\$89,087.22	\$296.96	_____
Cull Cows	12.15	cwt	42	\$78.74	\$40,181.02	\$133.94	_____
Cull Bulls	18.75	cwt	4	\$91.16	\$6,837.00	\$22.79	_____
Cull Yearling Heifers	9.80	cwt	5	\$159.78	\$7,829.22	\$26.10	_____
Total Receipts					\$313,236.55	\$1,044.12	_____
Operating Costs							
Deeded:							
Rangeland		AUM	1945	\$18.00	\$35,010.00	\$116.70	_____
Crop Aftermath		AUM	532	\$23.40	\$12,448.80	\$41.50	_____
Irrigated Pasture		AUM	497	\$23.40	\$11,629.80	\$38.77	_____
Winter Feed:							
Meadow Hay		ton	550	\$165.92	\$91,256.00	\$304.19	_____
Alfalfa Hay		ton	338	\$171.86	\$58,088.68	\$193.63	_____
Supplement:							
Protein		ton	45	\$500.00	\$22,500.00	\$75.00	_____
Salt/Mineral		ton	9	\$260.00	\$2,340.00	\$7.80	_____
Fuel and Lube				\$8,000.00	\$8,000.00	\$26.67	_____
Vehicle/Machinery Repair				\$15,000.00	\$15,000.00	\$50.00	_____
Supplies				\$2,500.00	\$2,500.00	\$8.33	_____
Fence Repair				\$2,500.00	\$2,500.00	\$8.33	_____
Utilities				\$10,000.00	\$10,000.00	\$33.33	_____
Veterinary Medicine:							
Cattle				\$10,782.00	\$10,782.00	\$35.94	_____
Horses		hd	3	\$500.00	\$1,500.00	\$5.00	_____
Hired Labor		day	50	\$125.00	\$6,250.00	\$20.83	_____
Other Operating costs*				\$6,867.00	\$6,867.00	\$22.89	_____
Interest on Operating Capital			\$148,336.14	2.50%	\$3,708.40	\$12.36	_____
Total Operating Costs					\$300,380.68	\$1,001.27	_____
<i>Income Above Operating Costs</i>					\$12,855.86	\$42.85	_____
Ownership Costs and Capital Recovery:							
Purchased livestock- 4 bulls					\$19,208	\$64.03	_____
Interest on Retained Livestock			\$710,606.00	2.00%	\$14,212.12	\$47.37	_____
Asset Depreciation:					\$16,567	\$55.22	_____
Property Taxes					\$7,398.00	\$24.66	_____
Total Ownership Costs					\$57,385	\$191.28	_____
Total Costs					\$357,765.80	\$1,192.55	_____
Net Returns Above Costs					<u>\$ (44,529.26)</u>	<u>\$ (148.43)</u>	_____

*Other operating costs include: trucking(\$1,523), marketing (\$844), and accounting (\$4,500)

Table 4. Cow-calf Production Flow Chart





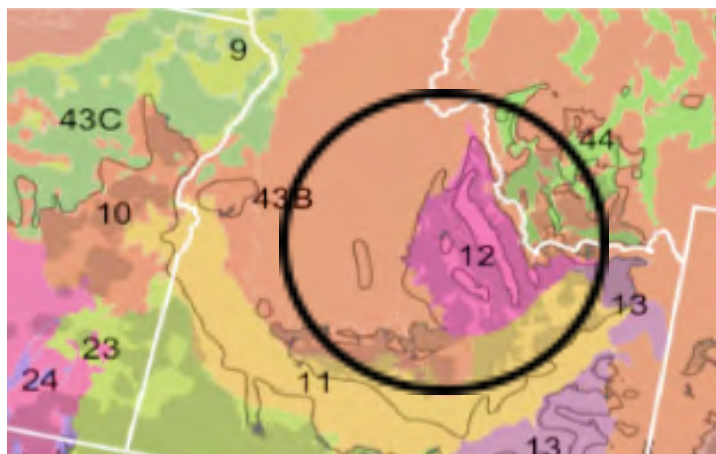
Enterprise budget for 400-head, cow-calf public land ranch

Lost River Valleys and Mountains

MLRA 12

Tom Hilken¹, Kendall Roberts¹, Holly Dyer¹, Holly Kirkpatrick¹, Anna Maher¹, Nicolas Quintana Ashwell¹, Sarah Baker², Shannon Williams³, John Tanaka³, John Ritten⁴, and Kristie Maczko³

Idaho counties: Custer, Lemhi, Butte



This budget represents typical cost and returns for a 400-head, cow-calf operation in Major Land Resource Area (MLRA) 12, the Lost River Valleys and Mountains Region of North-Central Idaho. A panel of ranchers from the MLRA provided most of the information contained in this enterprise budget.

Feed Sources

Feed is supplied as deeded irrigated pasture, Bureau of Land Management (BLM) and Forest Service (FS) rangelands, and hay (alfalfa, grass) aftermath. Live-stock are grazed on public rangelands (BLM and FS) May 15-October 15 and on hay aftermath from October 15-December 15. Replacement heifers are grazed on

deeded irrigated pasture May 15-December 15. Cattle are fed a mixture of alfalfa and native meadow hay at a ratio of 35 percent alfalfa and 65 percent meadow hay for 5 months. Salt and minerals are fed year-round, and protein tubs are available for a 90-day period during winter. A schedule of activities within a calendar year is listed in Table 1.

¹ Department of Ecosystem Science and Management, University of Wyoming.

² Extension Educator, University of Idaho Extension, Challis and Salmon, Idaho.

³ Wyoming Agricultural Experiment Station, University of Wyoming; Sustainable Rangelands Roundtable.

⁴ Department of Agricultural and Applied Economics, University of Wyoming.

Table 1. Annual Calendar Activities for Cow-Calf Operation in MLRA 12.

Management Activities	Calendar Date
Winter feeding – 35% alfalfa, 65% native meadow hay	December 15-May 15
Calving season	February 15-May 15
BLM rangeland is grazed spring and fall– Cows and calves are vaccinated, and calves are branded, earmarked, dehorned, and bull calves castrated prior to turnout in the spring.	May 15-June 15 September 15-October 15
FS rangeland is grazed during summer months.	June 15-September 15
Replacement heifers graze deeded irrigated pasture season long. Vaccinated and pregnancy checked prior to turnout.	May 15-December 15
Bulls turned out May 15 for a 90-day breeding season	May 15-August 15
Mature cow herd graze hay aftermath during fall.	October 15-December 15
Cows vaccinated, pregnancy tested, and calves weaned in fall.	October
Cull cows, bulls, horses, and open heifers are sold in early fall through local auction markets or private treaty	October-November
All calves marketed through summer video marketing sale with a November delivery date.	November

Land Cost

The cost of land is included in the budget on an AUM cost by land type. Public land rates are published by their respective land management agencies. Deeded land grazing rates for Idaho were obtained from USDA-NASS, Agriculture Prices (2018). Irrigated pasture and aftermath rates were assumed to be 30 percent higher than non-irrigated rates.

Herd Characteristics

Livestock inventory consists of 400 cows, 23 bulls, and 10 horses. Six replacement bulls are bought most years, but only 5 are needed in other years. Bulls have a useful life of 4 years with a 1 percent death loss. Bulls are turned into the herd for a three-month breeding season May 15-August 15. Cow death loss is 1 percent, and 14 percent are culled annually resulting in an annual replacement rate of 15 percent. The calving rate for all cows exposed is 92 percent with a 2 percent calf death loss resulting in 90 percent of the mature cows weaning a calf in the fall. In the fall, all steer calves are sold, and 63 percent of the heifer calves are sold. The remaining 37 percent of heifer calves are selected at weaning as potential replacement heifers and after death loss, consist of 67 head. Seven yearling heifers are sold in the fall, and 60 replacement yearling heifers are brought into the herd. Fifty-six mature cows are culled from the herd due to unsuccessful breeding or old age. Table 4 shows a cow-calf production flow chart.

Animal Health (Veterinary and Medicine)

Veterinary and medicine includes the value of vaccines, medicines, and veterinary services. Veterinary care for calves includes viral treatments, 8-Way vaccinations (given twice during the year) and dehorning and castration of bull calves. Heifer calves are also vaccinated for brucellosis. Cows, bulls, and replacement heifers receive vaccinations for viral infections, vibriosis and leptospirosis. The herd is treated annually for parasites. Cows are pregnancy checked in the fall. Bulls also receive breeding soundness evaluation and a trichomoniasis test (Eborn et al., 2016). Table 2 is a summary of veterinary and medical costs by class of livestock (estimates from Forero et al. 2017).

Marketing and Transportation

“Marketing Fees” are \$2.96 per head that include marketing costs, brand inspection and checkoff fees. Calves are marketed through video marketing sales through the summer with a late fall or early winter delivery. Cull animals are marketed through local auction markets and private treaty in the fall. Trucking and shipping fees are \$4.35 per mile for an average of 175 miles for cull animals with 2 trips required.

Labor

Labor is provided by the owner and his family with an additional 6 months of hired seasonal labor at \$2,500 per month. The ranch owner provides the seasonal employee with free on-site housing and utilities. The

Table 2. Veterinary and Medication Costs

Activities	Cost per Unit	Number of Head	Total Cost
Cows - Vaccine (Lepto Vibrio, 8-Way, IBR P13 BVD) wormer, and Pour-On	\$9.00	400	\$3,600.00
Cows - Vet service (preg check, misc. treatments)	\$5.00	400	\$2,000.00
Heifers - Vaccine (IBR P13 BVD), wormer, and Pour-On	\$12.50	67	\$837.50
Heifers - Vet service (Bangs, preg check)	\$7.25	67	\$485.75
Bulls - Vaccine (8-Way), wormer, and Pour-On	\$15.50	23	\$356.50
Bulls - Vet service (trich and semen tested)	\$40.00	23	\$920.00
Calves - Vaccine (7-Way, IBR P13 BVD), dewormer, dehorned, castrate bull calves, and fly tags	\$15.82	368	\$5,821.76
Grand Total			\$14,021.51

cost of owner labor and management are not included in this budget. The net returns provided in this budget are compensation to labor and management.

Taxes

Annual property tax costs are estimated following the tax rate of 1 percent on the assessed value of agricultural/farm land as recommended by the American Agricultural Economics Association (AAEA, 2000). Land values are averaged across the MLRA using county values from USDA-NASS (2017) by deeded pasture land type at a rate of \$1,350 per acre. The USDA-NASS (2012) reported the average farm size was 548 acres private land for the counties included in this MLRA.

Inventory and Capital Investments:

Buildings and equipment: A bunkhouse, shop and equipment (welder, air compressor, and tools), calving barn, 2 sets of permanent corrals and loading chutes, livestock water developments, 2 squeeze chutes (1 portable and 1 hydraulic), vet equipment, hydraulic post pounder, hay feed bunks (2.5 feet per head), 1 set of scales, 2 branding iron heaters and propane tanks, fuel and water storage tanks, electric fence materials, and 2 gooseneck trailers. Buildings and equipment are valued at 80 percent of new replacement cost.

Machinery and vehicles for this ranch type include one 125 horsepower tractor, one 90 horsepower tractor, two ¾-ton 4X4 pickups, one flatbed 1-ton 4X4 pickup, one 2-ton feed-truck, one 2,000-gallon water hauling truck, one semi cattle hauling truck, 2 ATVs, and one mini farm truck or skid-steer. Values on these investments are calculated at 50 percent of new replacement cost to

reflect typically aged but functional ranch vehicles and machinery.

Depreciation costs are calculated using straight-line method and assuming a 5 percent interest rate on useful life of the asset, as determined by the Modified Accelerated Cost Recovery System standards (IRS, 2017). The machinery salvage value calculations come from Iowa State University of Science and Technology's Cooperative Extension Service (Edwards, 2015).

Interest on Operating Capital and Retained Livestock

The interest amount on operating capital expenses was derived from the assumption that half of all operating costs are borrowed for a period of 6 months assuming a 5 percent annual percentage rate.

Interest on retained livestock is the value of the herd multiplied by the 2 percent interest rate (Yi and Zang, 2016). This cost is the opportunity cost of keeping the herd. The value of the herd is calculated using a January 1 herd size, the budget's current average weight, and the market value for bred cows, bred heifers, and horses before death loss. The market value of replacement bulls is estimated at 4 times the value of a steer calf (Meteer, 2014).

Gross Receipts and Operating Expenditures

Livestock prices are five-year (2013-2017) averages from the CattleFax data base (2018), while livestock weights are typical for this herd size and location. Hay and alfalfa prices are also five-year (2013-2017) averages from USDA-NASS (2018). All prices were

indexed to 2017 using the consumer price index prior to averages being calculated. Livestock average prices and weights, and average hay and alfalfa prices, are shown under “Total Receipts and Operating Costs” in Table 3.

References

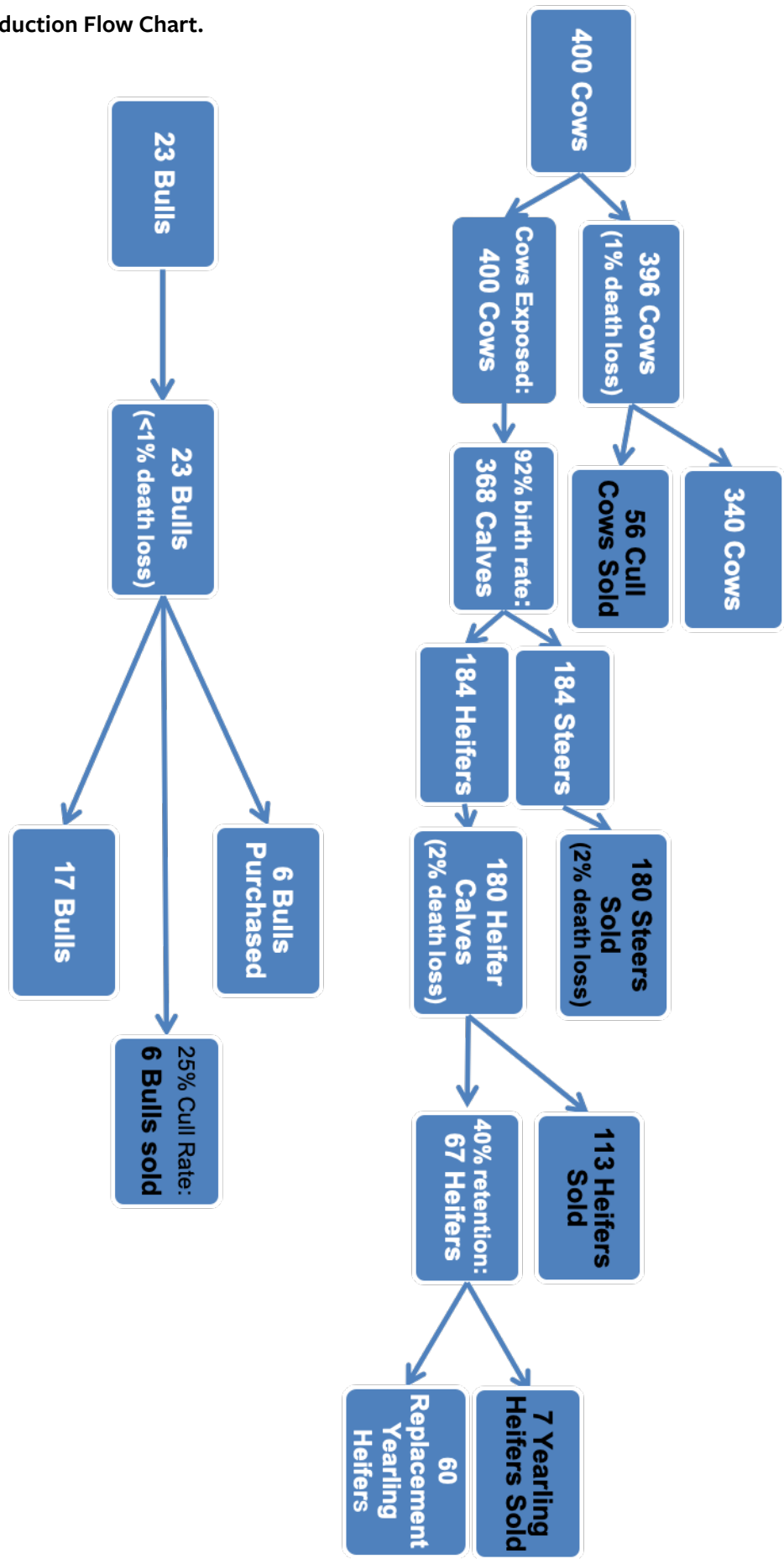
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Table 3. Enterprise Budget for 400-head, Cow-calf Public Land Ranch in MLRA 12.

MLRA 12: Lost River Valleys and Mountains Public Land Herd Size: 400-head, Cow-calf, 23 Bulls, 10 Horses							
	Weight	Unit	Total Head or Units	Price or Cost per Unit	Total Value	Value or Cost/Cow	Your Value
Gross Receipts							
Steer Calves	6.65	cwt	180	\$180.56	\$216,130.32	\$540.33	_____
Heifer Calves	6.00	cwt	113	\$166.83	\$113,110.74	\$282.78	_____
Cull Cows	12.15	cwt	56	\$78.74	\$53,574.70	\$133.94	_____
Cull Bulls	18.75	cwt	6	\$91.16	\$10,255.50	\$25.64	_____
Cull Yearling Heifers	9.80	cwt	7	\$159.78	\$10,960.91	\$27.40	_____
Cull Horses	10.00	cwt	1	\$100.00	\$1,000.00	\$2.50	_____
Total Receipts					\$405,032.16	\$1,012.58	_____
Operating Costs							
USFS		AUM	1581	\$1.87	\$2,956.47	\$7.39	_____
BLM		AUM	1054	\$1.87	\$1,970.98	\$4.93	_____
Deeded:							
Hay Aftermath		AUM	951	\$23.40	\$22,253.40	\$55.63	_____
Irrigated Pasture		AUM	741	\$23.40	\$17,339.40	\$43.35	_____
Winter Feed:							
Meadow Hay		ton	780	\$165.92	\$129,417.60	\$323.54	_____
Alfalfa Hay		ton	420	\$171.86	\$72,181.20	\$180.45	_____
Supplement:							
Protein		ton	60	\$500.00	\$30,000.00	\$75.00	_____
Salt/Mineral		ton	12	\$260.00	\$3,068.00	\$7.67	_____
Fuel and Lube				\$10,250.00	\$10,250.00	\$25.63	_____
Machinery and Equipment Repair				\$22,500.00	\$22,500.00	\$56.25	_____
Supplies				\$4,500.00	\$4,500.00	\$11.25	_____
Fence Repair				\$3,000.00	\$3,000.00	\$7.50	_____
Utilities				\$12,500.00	\$12,500.00	\$31.25	_____
Veterinary Medicine:							
Cattle				\$14,021.00	\$14,021.00	\$35.05	_____
Horses		hd	10	\$500.00	\$5,000.00	\$12.50	_____
Hired Labor		month	6	\$2,500.00	\$15,000.00	\$37.50	_____
Other Operating Costs*				\$12,371.00	\$12,371.00	\$30.93	_____
Interest on Operating Capital			\$189,164.53	2.50%	\$4,729.11	\$11.82	_____
Total Operating Costs					\$383,058.16	\$957.65	_____
<i>Income Above Operating Costs</i>					<i>\$21,974.00</i>	<i>\$54.94</i>	_____
Ownership Costs and Capital Recovery:							
Purchased livestock-6 bulls, 1 horse					\$31,812.00	\$79.53	_____
Interest on Retained Livestock			\$964,714.00	2.00%	\$19,294.28	\$48.24	_____
Asset Depreciation					\$22,858.87	\$57.15	_____
Taxes-real property					\$7,398.00	\$18.50	_____
Total Ownership Costs					\$81,363.15	\$203.41	_____
Total Costs					\$464,421.31	\$1,161.05	_____
Net Returns Above Costs					<u>\$(59,389.15)</u>	<u>\$(148.47)</u>	_____

*Other operating costs include trucking (\$1,523), marketing (\$1,098), and accounting (\$9,750)

Table 4. Cow-Calf Production Flow Chart.





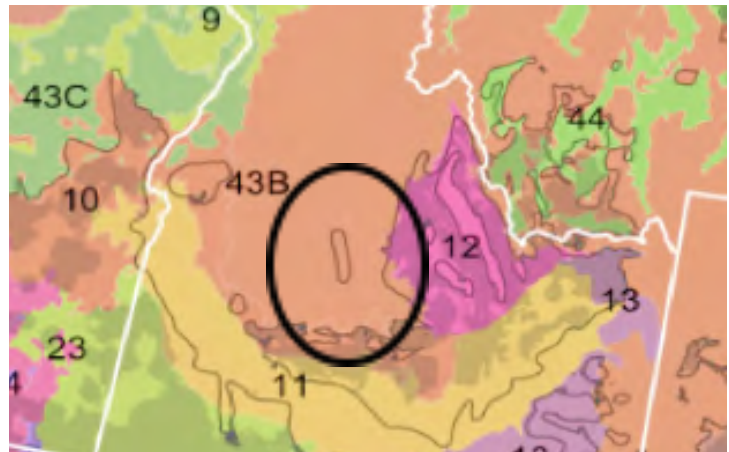
Enterprise budget for 200-head, cow-calf private land ranch

Lost River Valleys and Mountains

MLRA 12

Holly Dyer¹, Holly Kirkpatrick¹, Tom Hilken¹, Kendall Roberts¹, Anna Maher¹, Nicolas Quintana Ashwell¹, Sarah Baker², Shannon Williams³, John Tanaka³, John Ritten⁴, and Kristie Maczko³

Idaho counties: Custer, Lemhi, Butte



This budget represents typical cost and returns for a 200-head, cow-calf operation in Major Land Resource Area (MLRA) 12, the Lost River Valley and Mountains of Idaho. A panel of producers from Custer and Lemhi Counties assisted with the information contained in this enterprise budget.

Feed Sources

Brood cows and eight bulls graze private rangeland (deeded/leased) May 15-September 30. The replacement heifers, one bull, and horses remain on private irrigated pasture and meadows (deeded/leased) May 15-September 30. All livestock then graze crop/hay aftermath (deeded/leased) October 1-November 30.

Cattle are fed grass/alfalfa mix hay December 1-May 15. All hay is valued at market price of five-year averages in region (USDA-NASS, 2018). Salt and minerals are fed at the rate of four pounds per-head per-month and year-round. An annual outlook of activities calendar with feed sources is described below in Table 1.

¹ Department of Ecosystem Science and Management, University of Wyoming.

² Extension Educator, University of Idaho Extension, Challis and Salmon, Idaho.

³ Wyoming Agricultural Experiment Station, University of Wyoming; Sustainable Rangelands Roundtable.

⁴ Department of Agricultural and Applied Economics, University of Wyoming.

Table 1. Annual Calendar Activities for Cow-Calf Operation in MLRA 12.

Management Activities	Calendar Date
Winter feeding – 70% alfalfa, 30% meadow hay	December 1-May 15
Calving season	February 1-April 15
Post-calving (branding, vaccinating, castrating); pre-breeding vaccinate heifers	March 15-April 15
Breeding season (~75 days)	April 22-July 4
Graze Deeded/Leased Summer Rangeland - Brood cows and 8 bulls (bulls removed by July 4)	May 15-September 30
Graze Deeded/Leased Irrigated Pasture - Heifers, one bull and horses; all bulls after July 4	May 15-September 30
Pregnancy check/vaccinate cows & pre-condition calves	September 30-October 15
Wean calves; Market steer calves, culls & non-replacement heifer calves	October 15-November 15
Graze Deeded/Leased Aftermath (Crop/Hay) - All livestock	October 1-November 30

*Note: overlap of dates may occur in this MLRA.

Land Cost

The cost of land is included in the budget on an AUM cost by land type. Deeded land rate is calculated using area rates by type and availability and published in the USDA-NASS Agricultural Prices reports (2018). Irrigated pasture and aftermath rates were assumed to be 30 percent higher than non-irrigated land rates.

Herd Characteristics

The livestock inventory consists of 200 brood cows, 9 bulls, and 6 horses. Eight bulls are provided for the brood cows at 25 cows per bull, and one bull is provided for the replacement heifers at a rate of 35 heifers per bull. Two bulls are bought annually in the spring prior to breeding season, and all bulls have a useful life of five years (cull rate of 20 percent for this herd size). Bulls begin the breeding season

April 22 and removed July 4. Cow death loss is 1 percent, and 12 percent are culled annually resulting in replacement rate of 13 percent. The calving rate for all cows exposed is 92 percent, and calf death loss is 4 percent. Calving season is February 1-April 15.

All steer calves are sold, and 60 percent of the heifer calves are sold after weaning. The remaining 40 percent are selected at weaning as the next year's replacement heifers. This consists of 35 head of replacements with minimal death loss. Nine heifers are then culled following fall breeding evaluation. Twenty-four cows are culled from the herd due to older age and unsuccessful

breeding. Steer calves, non-replacement heifer calves, cull cows, and cull bulls are marketed before mid-November. Livestock production and inventory is outlined in Table 4: Flow Chart of Livestock Production.

Gross Receipt

Gross receipts are five-year average of prices received for livestock sold and indexed to 2017 dollars for the state of Idaho (CattleFax, 2018; BLS, 2018). Livestock weights and prices received are shown in the enterprise budget (Table 3). These are assumed "typical" by the focus group and confirmed by market data in the state of Idaho and the Lost River Valley and Mountains region.

Animal Health (Veterinary and Medicine)

This includes vaccines, medicines, and all other veterinary services, including pregnancy testing. Pre-calving for mature cows and bred replacement heifers include scour prevention (ScourGard). Calves are given post-calving season vaccinations, are branded, dehorned, and bulls castrated between mid-March and mid-April. These vaccinations include 7-Way, IBR/PI3/BVD/BRSV, and Pour-On/wormer (Ivomec or Dectomax). Previous year's selected replacement heifers are given pre-breeding vaccinations including Vibriosis-Leptospirosis, 7-Way, IBR/PI3/BVD/BRSV, and Pour-On/wormer (Ivomec or Dectomax) before the April 22 bull turnout. Bulls will be tested for fertility and trichomoniasis. Cows and replacement heifers are pregnancy tested in the fall as the cattle are gathered,

Table 2. Veterinary and Medication Costs

Activities	Cost per Unit	Number of Head	Total Cost
Cows - Vaccine, wormer, etc.	\$9.00	200	\$1,800.00
Cows - Vet service (preg check, etc.)	\$2.25	200	\$450.00
Bulls - Vaccine, wormer, etc.	\$15.50	9	\$139.50
Bulls - Vet service (trich, semen, etc)	\$40.00	9	\$360.00
Heifers - Vaccine, wormer, etc.	\$12.50	35	\$437.50
Heifers - Vet service (Bangs, preg check)	\$7.25	35	\$253.75
Horses - Wormer	\$15.00	6	\$90.00
Calves - Dehorned, vaccine, boosters, dewormer, castrate (bulls calves only)	\$15.82	184	\$2,910.88
Total			\$6,441.63
Cost per cow			\$32.21

and heifer calves are given Bangs vaccinations. Table 2 below gives typical vaccinating and animal health practices and cost estimations by livestock class as provided by Forero et al. (2017).

Marketing and Transportation

Calves and cull animals are marketed through local auctions. Most operators of this size and scale will utilize transportation companies for delivery of cattle as the focus group indicated no ownership of a semi-truck and cattle pot. Trucking expenses are included in the budget as “Freight & Trucking” with a per mile cost of \$4.35 for an average of 300 miles for cull animals with a minimum of three trips required. “Marketing” is \$5.00 per head and incorporates auction sale commission, checkoff fees, and brand inspections for all livestock sold. These three operating costs are listed under “Other Operating Costs” in the budget.

Labor

Day work and/or contract workers are considered in this budget as hired labor and are paid at a rate of \$100 per day for a maximum of 20 days in the year. The focus group indicated no other employees or labor for a herd of this size and scale. Day work or contract workers assist with cattle drives, branding, cattle work days, and additional calving season activities. The cost of owner labor and management are not included in the budget. The net returns in this budget are compensation to labor and management.

Taxes

Annual property tax costs are estimated following the tax rate of 1 percent on the assessed value of agricul-

ture/farm land and personal property, as recommended by American Agriculture Economics Association (AAEA, 2000). Land values are averaged across an MLRA using rates provided by the U.S. Department of Agriculture in a 2017 Land Value Summary (USDA-NASS, 2017) by land type, and pasture was valued in Idaho at a rate of \$1,350 per acre. The 2012 Census of Agriculture (USDA-NASS, 2012) indicated the average farm size was 548 acres private land with only the counties included in this MLRA (Custer, Lemhi, Butte).

Inventory and Capital Investments

Buildings and improvements include a set of corrals that incorporate portable panels and a loading chute, a storage shop, and water developments. The focus group indicated water development can be portable and/or solar powered. A squeeze chute, feed/hay bunks, tractor implements, veterinary equipment, storage tanks (fuel and water storage) and a livestock trailer were also included in the equipment inventory. Vehicles and machinery used for the cow-calf operation include one ½-ton truck, one ¾-ton truck, a 1-ton truck, one ATV, one 80 to 120 horsepower 4WD tractor, and one 75 horsepower tractor with front-end loader. Other equipment mentioned by focus group participants included tools and branding irons, and these are utilized in the cow-calf operation. The depreciation costs are calculated using straight-line method and applying a 5 percent interest rate on useful life of the asset, determined by the Modified Accelerated Cost Recovery System (MACRS) standards. The machinery salvage value calculations come from Iowa State University of Science and Technology’s Cooperative Extension Ser-

vice (File A3-29, Edwards, 2015). General maintenance and repairs on machinery and vehicles was provided by the focus group in a lump sum under “Ownership Costs and Capital”.

Interest on Operating Capital and Retained Livestock

Interest on operating capital expenses is derived from the assumption that 50 percent of all annual operating costs are borrowed for a period of six months at 5 percent interest.

Interest on retained livestock is the value of the herd and is assumed at a 2 percent interest rate (Yi and Zhang, 2016). This cost is the opportunity cost of keeping the herd and can be thought of as the amount a rancher could have made if the value of the herd had otherwise been invested at a 2 percent interest rate. The value of the herd is calculated using the January 1 herd size and market prices received for bulls, mature cows and replacement heifers. Bull cost is valued at four times the budget's market price for a feeder steer (Meteer, 2014).

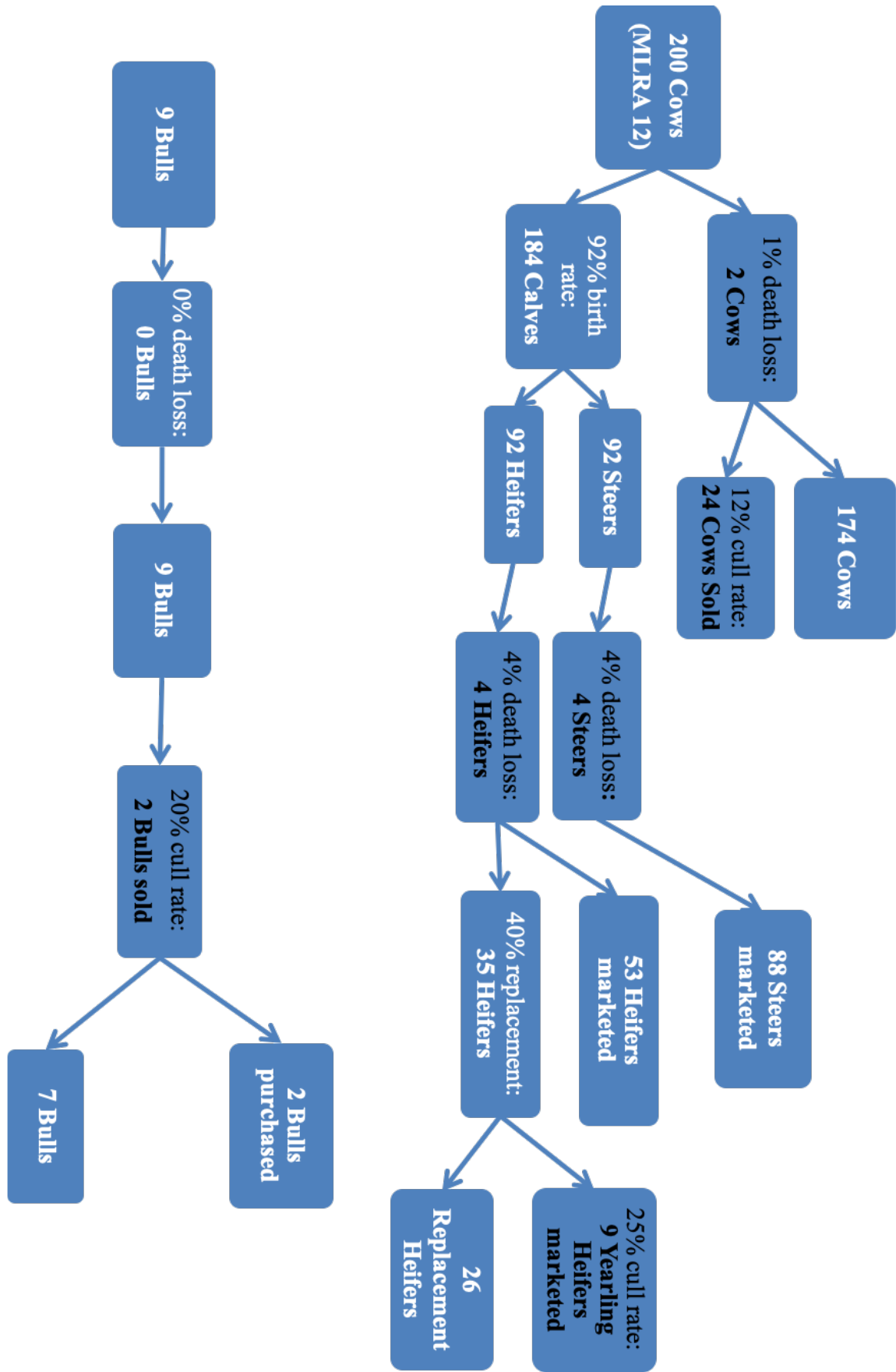
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MLRA 12: Lost River Valleys & Mountains							
Private Land							
Herd Size: 200-head, Cow-calf, 9 Bulls							
	Weight	Unit	Total Head or Unit	Price or Cost Per Unit	Total Value	Price or Cost Per Cow	Your Value
Gross Receipts							
Steer Calves	6.70	cwt	88	\$ 198.15	\$ 117,254.07	\$ 586.27	_____
Heifer Calves	6.25	cwt	53	\$ 178.99	\$ 59,290.44	\$ 296.45	_____
Cull Cows	12.50	cwt	24	\$ 76.89	\$ 23,067.00	\$ 115.34	_____
Cull Bulls	18.00	cwt	2	\$ 92.14	\$ 3,317.04	\$ 16.59	_____
Cull Yearling Heifers	9.00	cwt	9	\$ 162.61	\$ 12,922.62	\$ 64.61	_____
Total Receipts					\$ 215,851.17	\$ 1,079.26	_____
Operating Costs							
Deeded Land							
Summer Rangeland		AUM	1,146	\$ 18.00	\$ 20,626.16	\$ 103.13	_____
Irrigated Pasture		AUM	246	\$ 23.40	\$ 5,754.60	\$ 28.77	_____
Aftermath (Hay)		AUM	594	\$ 23.40	\$ 13,893.48	\$ 69.47	_____
Winter Feed							
Meadow Hay		ton	200	\$ 165.92	\$ 33,184.00	\$ 165.92	_____
Alfalfa		ton	465	\$ 171.86	\$ 79,914.90	\$ 399.57	_____
Supplement							
Salt & Mineral		ton	7	\$ 554.40	\$ 3,880.80	\$ 19.40	_____
Fuel & Lube					\$ 6,000.00	\$ 30.00	_____
Supplies & Fencing					\$ 3,000.00	\$ 15.00	_____
Utilities					\$ 2,500.00	\$ 12.50	_____
Veterinary					\$ 6,441.63	\$ 32.21	_____
Repairs					\$ 6,000.00	\$ 30.00	_____
Hired Labor		day	25	\$ 100.00	\$ 2,500.00	\$ 12.50	_____
Other Variable Costs					\$ 3,185.00	\$ 15.93	_____
Interest on Operating Capital		%	0.025	\$ 93,440.29	\$ 2,336.01	\$ 11.68	_____
Total Operating Costs					\$ 186,880.57	\$ 934.40	_____
<i>Income Above Operating Costs</i>					\$ 28,970.59	\$ 144.85	_____
Ownership Costs and Capital							
Purchased Livestock		bull	2	\$ 5,310.42	\$ 10,620.84	\$ 53.10	_____
Interest on Retained Livestock		%	0.02	\$442,948.98	\$ 8,858.98	\$ 44.29	_____
Asset Depreciation		\$			\$ 9,455.74	\$ 47.28	_____
Taxes		\$			\$ 7,398.00	\$ 36.99	_____
Total Ownership Costs					\$ 36,333.56	\$ 181.67	_____
Total Costs					\$ 223,214.13	\$ 1,116.07	_____
Returns to Labor and Management					<u>\$ (7,362.96)</u>	<u>\$ (36.81)</u>	_____

* Freight & Trucking \$1,305; Marketing \$880; Professional fees \$1,000.

Table 4. Cow-calf Production Flow Chart





Enterprise budget for 150-head, cow-calf public land ranch

Lost River Valleys and Mountains

MLRA 12

Holly Dyer¹, Holly Kirkpatrick¹, Tom Hilken¹, Kendall Roberts¹, Anna Maher¹, Nicolas Quintana Ashwell¹, Sarah Baker², Shannon Williams³, John Tanaka³, John Ritten⁴, and Kristie Maczko³

Idaho counties: Custer, Lemhi, Butte



This budget represents typical cost and returns for a 150-head, cow-calf operation in Major Land Resource Area (MLRA) 12, the Lost River Valley and Mountains of Idaho. A panel of producers from Custer and Lemhi counties assisted with the information contained in this enterprise budget.

Feed Sources

Bureau of Land Management (BLM) and United States Forest Service (USFS) lands are available for ranchers to use from May 15-September 30. The main cow herd and bulls graze on these public lands. The replacement heifers, one bull, and horses remain on private irrigated pasture and meadows (deeded/leased) May 15-Sep-

tember 30. All livestock then graze crop/hay aftermath (deeded/leased) October 1-November 30. Cattle are fed grass/alfalfa mix hay December 1-May 15. All hay is valued at market price of five-year averages in region (USDA -NASS, 2018). Salt and minerals are fed at the rate of 4 pounds per-head per-month and provided year-round. An annual outlook of activities calendar with feed sources is described below in Table 1.

¹ Department of Ecosystem Science and Management, University of Wyoming.

² Extension Educator, University of Idaho Extension, Challis and Salmon, Idaho.

³ Wyoming Agricultural Experiment Station, University of Wyoming; Sustainable Rangelands Roundtable.

⁴ Department of Agricultural and Applied Economics, University of Wyoming.

Table 1. Annual Calendar Activities for Cow-Calf Operation in MLRA 12.

Management Activities	Calendar Date
Winter feeding – 70% alfalfa, 30% meadow hay	December 1-May 15
Calving season	February 1-April 15
Post-calving (branding, vaccinating, castrating); Pre-breeding vaccinate heifers	March 15-April 15
Breeding Season (~60 Days)	April 20-July 4
Graze Public Lands (BLM) – Brood cows and 6 bulls	May 15-May 31
Graze Public Lands (USFS) – Brood cows and 6 bulls (bulls removed by July 4)	June 1-September 30
Graze Deeded/Leased Irrigated Pasture – Heifers, bulls (1 bull until July 4) and horses; all bulls after July 4	May 15-September 30
Pregnancy check/vaccinate cows & pre-condition calves	September 30-October 15
Wean calves; Market steer calves, culls & non-replacement heifer calves	October 15-November 15
Graze Deeded/Leased Aftermath (Hay) – All livestock	October 1-November 30

Note: Overlap of dates may occur in this MLRA.

Land Cost

The cost of land is included in the budget on an AUM cost by land type. Deeded land rate is calculated using area rates by type and availability and published in the USDA-NASS Agricultural Prices reports (2018). Irrigated pasture and aftermath rates were assumed to be 30 percent higher than non-irrigated land rates.

Herd Characteristics

The livestock inventory consists of 150 brood cows, 7 bulls, and 8 horses. Six bulls are provided for the brood cows, and one bull is provided for the replacement heifers at a rate of 25 cows per bull. Two bulls are bought annually in the spring prior to breeding season, and all bulls have a useful life of four years (cull rate of 28 percent for this herd size). Bulls begin the breeding season April 22 and are removed July 4. Cow death loss is 1 percent, and 12 percent are culled annually resulting in a replacement rate of 13 percent. The calving rate for all cows exposed is 92 percent, and calf death loss is 4 percent. Calving season is February 1-April 15.

All steer calves are sold, and 60 percent of the heifer calves are sold after weaning. The remaining 40 percent are selected at weaning as the next year's replacement heifers. This consists of 26 head of replacements with minimal death loss. Six heifers are then culled following fall breeding evaluation. Eighteen cows are culled from the herd due to older age and unsuccessful breeding. Steer calves, non-replacement heifer calves, cull cows, and cull bulls are marketed before mid-Novem-

ber. Livestock production and inventory is outlined in Table 4.

Gross Receipt

Gross receipts are a five-year average of prices received for livestock sold and indexed to 2017 dollars for the state of Idaho (CattleFax, 2018; BLS, 2018). Livestock weights and prices received are shown in the enterprise budget (Table 3). These are assumed "typical" by the focus group and confirmed by market data in the state of Idaho and the Lost River Valley and Mountains region.

Animal Health (Veterinary and Medicine)

This includes vaccines, medicines, and all other veterinary services including pregnancy testing. Pre-calving for mature cows and bred replacement heifers include scour prevention (ScourGard). Calves are given post-calving season vaccinations, are branded, dehorned, and bulls castrated between mid-March and mid-April. These vaccinations include 7-Way, IBR/PI3/BVD/BRSV, and Pour-On/wormer (Ivomec or Dectomax). Previous year's selected replacement heifers are given pre-breeding vaccinations including Vibriosis-Leptospirosis, 7-Way, IBR/PI3/BVD/BRSV, and Pour-On/wormer (Ivomec or Dectomax) before the April 22 bull turnout. Bulls will be tested for fertility and trichomoniasis. Cows and replacement heifers are pregnancy tested in the fall as the cattle are gathered, and heifer calves are given bangs vaccinations. Table 2 below gives typical vaccinating and animal health practices and cost estimations by livestock class as provided by Forero et al. (2017).

Table 2. Animal Health activities and cost comparison

Activities	Cost per Unit	Number of Head	Total Cost
Cows – Vaccine, wormer, etc.	\$9.00	150	\$1,350.00
Cows – Vet service (preg check, etc.)	\$2.25	150	\$337.50
Bulls – Vaccine, wormer, etc.	\$15.50	7	\$108.50
Bulls – Vet service (trich, semen, etc)	\$40.00	7	\$280.00
Heifers – Vaccine, wormer, etc.	\$12.50	26	\$325.00
Heifers – Vet service (Bangs, preg check)	\$7.25	26	\$188.50
Horses – Wormer	\$15.00	8	\$120.00
Calves – Dehorned, vaccine, boosters, dewormer, castrate (bulls calves only)	\$15.82	138	\$2,183.16
Total			\$4,892.66
Cost per cow			\$32.62

Marketing and Transportation

Calves and cull animals are marketed through local auctions. Most operators of this size and scale will utilize transportation companies for delivery of cattle as the focus group indicated no ownership of a semi-truck and cattle pot. Trucking expenses are included in the budget as “Freight & Trucking” with a per mile cost of \$4.35 for an average of 300 miles for cull animals with a minimum of three trips required. “Marketing” is \$5.00 per head and incorporates auction sale commission, checkoff fees, and brand inspections for all livestock sold. These three operating costs are listed under “Other Variable Costs” in the budget.

Labor

Day work and/or contract workers are considered in this budget as hired labor and are paid at a rate of \$100 per day for a maximum of 20 days in the year. The focus group indicated no other employees or labor for a herd of this size and scale. Day work or contract workers assist with cattle drives, branding, cattle work days, and additional calving season activities. The cost of owner labor and management are not included in the budget. The net returns in this budget are compensation to labor and management.

Taxes

Annual property tax costs are estimated following the tax rate of 1 percent on the assessed value of agriculture/farm land and personal property, as recommended by American Agriculture Economics Association (AAEA, 2000). Land values are averaged across an

MLRA using rates provided by the U.S. Department of Agriculture in a 2017 Land Value Summary (USDA-NASS, 2017) by land type, and pasture was valued in Idaho at a rate of \$1,350 per acre. The 2012 Census of Agriculture (USDA-NASS, 2012) indicated the average farm size was 548 acres private land with only the counties included in this MLRA (Custer, Lemhi, Butte).

Inventory and Capital Investments

Buildings and improvements include a set of corrals that incorporate portable panels and a loading chute, a storage shop, and water developments. The focus group indicated water development can be portable and/or solar powered. A squeeze chute, feed/hay bunks, tractor implements, veterinary equipment, storage tanks (fuel and water storage), and a livestock trailer were also included in the equipment inventory. Vehicles and machinery used for the cow-calf operation include one ½-ton truck, one ¾-ton truck, a 1-ton truck, one ATV, one 80 to 120 horsepower 4WD tractor, and one 75 horsepower tractor with front-end loader. Other equipment mentioned by focus group participants included tools and branding irons, and these are utilized in the cow-calf operation. The depreciation costs are calculated using straight-line method and applying a 5 percent interest rate on useful life of the asset, determined by the Modified Accelerated Cost Recovery System (MACRS) standards. The machinery salvage value calculations come from Iowa State University of Science and Technology’s Cooperative Extension Service (File A3-29, Edwards, 2015). General maintenance

and repairs on machinery and vehicles was provided by the focus group in a lump sum under “Ownership Costs and Capital.”

Interest on Operating Capital and Retained Livestock

Interest on operating capital expenses is derived from the assumption 50 percent of all annual operating costs are borrowed for a period of six months at 5 percent interest.

Interest on retained livestock is the value of the herd and is assumed at a 2 percent interest rate (Yi and Zhang, 2016). This cost is the opportunity cost of keeping the herd and can be thought of as the amount a rancher could have made if the value of the herd had otherwise been invested at a 2 percent interest rate. The value of the herd is calculated using the January 1 herd size and market prices received for bulls, mature cows, and replacement heifers. Bull cost is valued at four times the budget’s market price for a feeder steer (Meteer, 2014).

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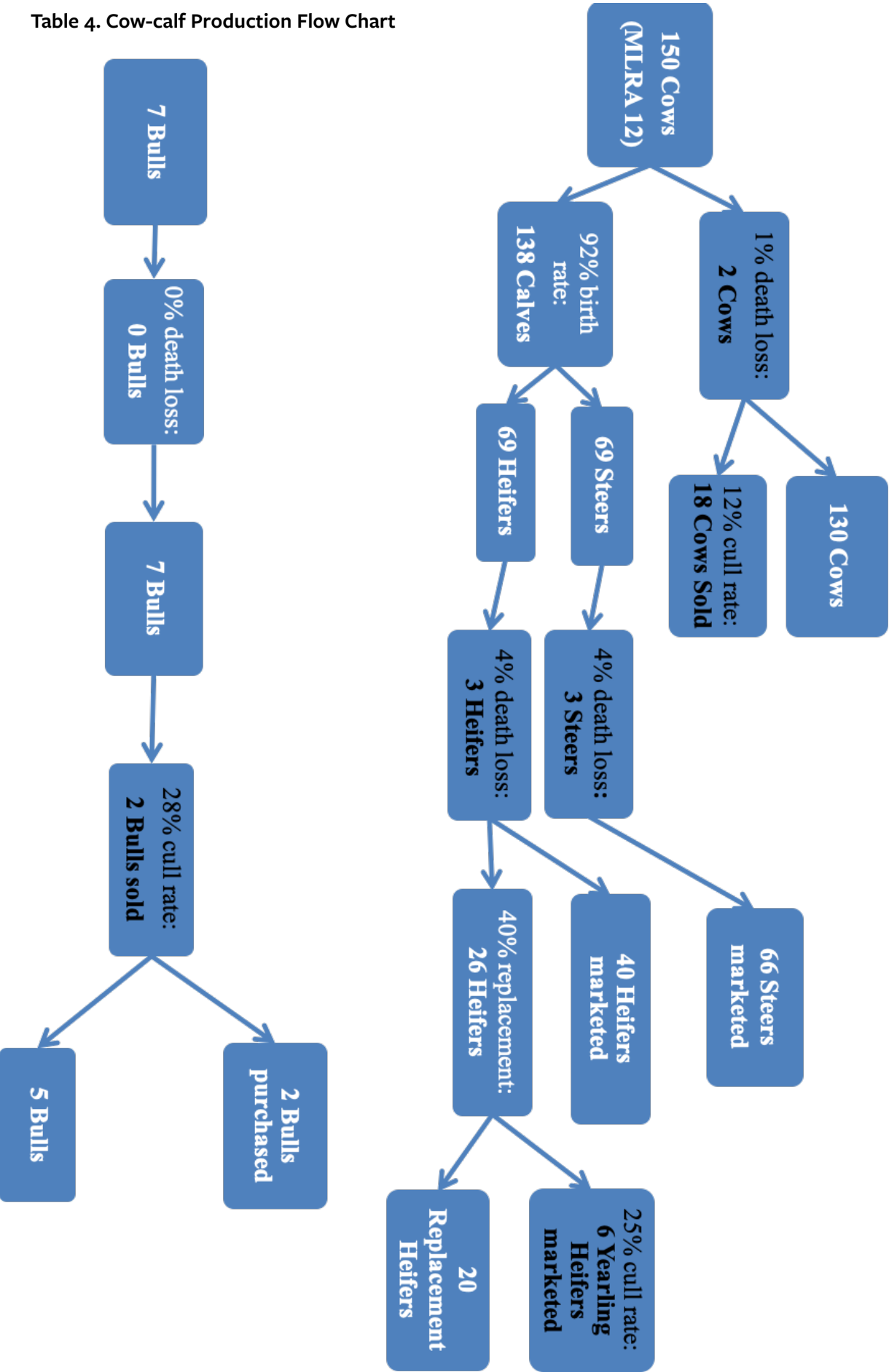
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Table 3. Enterprise Budget for 150-head, Cow-calf, Public Land Ranch in MLRA 12.

MLRA 12: Lost River Valleys & Mountains							
Public Land							
Herd Size: 150-head, Cow-calf, 7 Bulls							
	Weight	Unit	Total Head or Unit	Price or Cost Per Unit	Total Value	Price or Cost Per Cow	Your Value
Gross Receipts							
Steer Calves	6.70	cwt	66	\$198.15	\$87,940.56	\$586.27	_____
Heifer Calves	6.25	cwt	40	\$178.99	\$45,105.48	\$300.70	_____
Cull Cows	12.50	cwt	18	\$76.89	\$17,300.25	\$115.34	_____
Cull Bulls	18.00	cwt	2	\$92.14	\$3,317.04	\$22.11	_____
Cull Yearling Heifers	9.00	cwt	6	\$162.61	\$9,483.42	\$63.22	_____
Total Receipts					\$163,146.74	\$1,087.64	_____
Operating Costs							
USFS		AUM	761	\$1.87	\$1,422.76	\$9.49	_____
BLM		AUM	99	\$1.87	\$185.44	\$1.24	_____
Deeded Land							
Irrigated Pasture		AUM	207	\$23.40	\$4,844.64	\$32.30	_____
Aftermath (Hay)		AUM	455	\$23.40	\$10,651.17	\$71.01	_____
Winter Feed							
Meadow Hay		ton	153	\$165.92	\$25,385.76	\$169.24	_____
Alfalfa		ton	356	\$171.86	\$61,182.16	\$407.88	_____
Supplement							
Salt & Mineral		ton	5	\$554.40	\$2,772.00	\$18.48	_____
Fuel & Lube					\$6,000.00	\$40.00	_____
Supplies & Fencing					\$3,000.00	\$20.00	_____
Utilities					\$2,500.00	\$16.67	_____
Veterinary					\$4,892.66	\$32.62	_____
Repairs					\$6,000.00	\$40.00	_____
Hired Labor		day	25	\$100.00	\$2,500.00	\$16.67	_____
Other Operating Costs*					\$2,970.00	\$19.80	_____
Interest on Operating Capital		%	0.025	\$67,153.30	\$1,678.83	\$11.19	_____
Total Operating Costs					\$134,306.60	\$895.38	_____
<i>Income Above Operating Costs</i>					\$28,840.15	\$192.27	_____
Ownership Costs and Capital							
Purchased Livestock		bull	2	\$5,310.42	\$10,620.84	\$70.81	_____
Interest on Retained Livestock		%	0.02	\$332,320.16	\$6,646.40	\$44.31	_____
Asset Depreciation		\$			\$9,455.74	\$63.04	_____
Taxes		\$			\$7,398.00	\$49.32	_____
Total Ownership Costs					\$34,120.98	\$227.47	_____
Total Costs					\$168,427.58	\$1,122.85	_____
Returns to Labor and Management					<u>\$(5,280.84)</u>	<u>\$(35.21)</u>	_____

* Freight & Trucking \$1,305; Marketing \$665; Professional fees \$1,000.

Table 4. Cow-calf Production Flow Chart



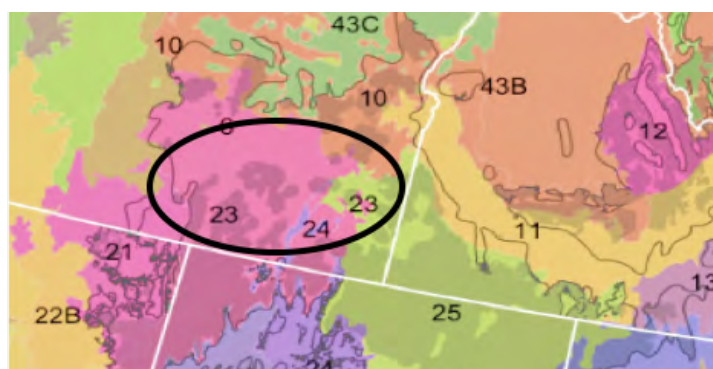


Enterprise budget for 700-head, cow-calf public land ranch

Malheur High Plateau **MLRA 23**

Tom Hilken¹, Kendall Roberts¹, Holly Dyer¹, Holly Kirkpatrick¹, Anna Maher¹, Nicolas Quintana Ashwell¹, Dustin Johnson and Pete Shrader², Fara Brummer³, John Tanaka⁴, John Ritten⁵, and Kristie Maczko⁴

Oregon counties: Harney, Lake and southern half of Malheur County



This budget represents typical cost and returns for a 700-head, cow-calf operation in Major Land Resource Area (MLRA) 23, the Malheur High Plateau region of Oregon. A panel of producers from Harney and Lake counties assisted with the information contained in this enterprise budget.

Feed Sources

Feed is supplied as deeded pasture, Bureau of Land Management (BLM) and U.S. Forest Service (FS) public rangelands, and hay (alfalfa and grass hay) aftermath during the spring, summer, and fall periods. Livestock are grazed on BLM and FS rangelands April 15-October 1, and hay aftermath grazing occurs October 1-December 15. Replacement heifers are kept on

deeded pasture April 15-November 1, and graze hay aftermath November 1-December 15. Cattle are fed a mixture of alfalfa and native meadow hay at ratio of 60 percent alfalfa and 40 percent meadow hay December 15-April 15. Salt and minerals are fed year-round, and protein tubs are available for a 90-day period during winter. A schedule of activities within a calendar year is in Table 1.

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Table 1. Annual Calendar Activities for Cow-Calf Operation in MLRA 23.

Management Activities	Calendar Date
Management Activities	Calendar Date
Winter feeding – 60% alfalfa, 40% native meadow hay	December 15-April 15
Calving season	February -April 15
Public land grazing (BLM & FS) – Cows and calves are vaccinated, calves are branded, and bull calves are castrated prior to turnout.	April 15-October 1
Replacement heifers on deeded irrigated pasture; pre-breeding vaccine prior to turnout.	April 15-November 1
Bulls turned out with cows May 1-July 15	May 1-July 15
Mature cow herd on hay aftermath	October 1 - December 15
Replacement heifers on hay aftermath	November 1-December 15
Cows vaccinated, pregnancy tested, and calves weaned in fall. Replacement heifers worked spring and fall.	Spring-Fall
Cull cows, bulls, horses, and open heifers are sold in early fall through local auction markets or private treaty	October-November
All calves sold in late fall through video marketing sales.	November-December

Land Cost

The cost of land is included in the budget on an AUM cost by land type and ownership. Public land rates are published by the land management agencies. Deeded land rates for Oregon were obtained from USDA-NASS, Agricultural Prices (2018). Irrigated pasture and aftermath rates were assumed to be 30 percent higher than non-irrigated land rates.

Herd Characteristics

Livestock inventory consists of 700 cows, 42 bulls (35 for the mature cow herd and 7 for the replacement heifer herd), and 15 horses. Eight replacement bulls are bought most years, but only 7 are needed in other years. Bulls have a useful life of 5 years with a 1 percent death loss. Bulls are turned into the herd from May 1-July 15. The cow death loss is 2 percent, and an additional 13 percent are culled annually resulting in an annual replacement rate of 15 percent. The calving rate for all cows exposed is 95 percent with a 4 percent calf loss resulting in 91 percent of the mature cows weaning a calf in the fall. In the fall, all steer calves are sold, and 58 percent of the heifer calves are sold. The remaining 42% of heifer calves are selected at weaning as potential replacement heifers and after death loss consist of 134 head. Twenty-nine yearling heifers are sold in the fall, and 105 replacement yearling heifers are brought into the herd. Ninety-one mature cows are culled from the herd due to unsuccessful breeding or old age. Table 4 shows a cow-calf production flow chart.

Animal Health (Veterinary and Medicine)

Veterinary and medicine includes the value of vaccines, medicines, and veterinary services. Veterinary care for calves includes viral treatments, 8-way vaccinations (given twice during the year) and dehorning and castration of bull calves. Heifer calves are also vaccinated for brucellosis. Cows, bulls, and replacement heifers receive vaccinations for viral infections, vibriosis and leptospirosis. The herd is treated annually for parasites. Cows are pregnancy checked in the fall. Bulls also receive a semen and trichomoniasis test. Table 2 is a summary of veterinary and medical costs by class of livestock (estimates from Forero et al. 2017).

Marketing and Transportation

“Marketing Fees” are \$5.00 per head that includes marketing costs, brand inspection and checkoff. Calves are marketed through video marketing sales through the summer with a late fall delivery.

Cull animals are marketed through local auction markets and private treaty in the fall. Trucking and shipping fees are \$4.50 per mile for an average of 300 miles for cull animals with 3 trips required.

Labor

Labor is provided by the owner and his family with an additional 200 days of hired seasonal labor at \$120 per day. The ranch owner provides the seasonal employee

Table 2. Animal Health Activities and Medicine

Activities	Cost per Unit	Number of Head	Total Cost
Cows - Vaccine (Lepto Vibrio, 8-Way, IBR, P13, BVD) Wormer, and Pour-On	\$9.00	700	\$6,300.00
Cows - Vet service (preg check, misc. treatments)	\$5.00	700	\$3,500.00
Heifers - Vaccine (IBR, P13, BVD and 8-Way), Wormer, and Pour-On	\$12.50	136	\$1,700.00
Heifers - Vet service (Bangs, preg check)	\$7.25	136	\$986.00
Bulls - Vaccine (8-Way), wormer, and Pour-On	\$15.50	42	\$651.00
Bulls - Vet service (trich and semen tested)	\$40.00	42	\$1,680.00
Calves - Vaccine (8-Way, IBR, P13, BVD), dewormer, dehorned, castrate bull calves, and fly tags	\$15.82	666	\$10,536.12
Grand Total			\$25,353.12

free on-site housing and utilities. The cost of owner labor and management are not included in this budget. The net returns in this budget are compensation to labor and management.

Taxes

Annual property tax costs are estimated following the tax rate of 1 percent on the assessed value of agricultural/farm land as recommended by the American Agricultural Economics Association (AAEA, 2000). Land values are averaged across the MLRA using county values from USDA-NASS (2017) by deeded pasture land type at a rate of \$700 per acre. The USDA-NASS (2012) reported average farm size was 1,919 acres private land for the counties included in this MLRA.

Inventory and Capital Investments

Buildings and equipment include a bunkhouse, shop and equipment (welder, air compressor, tools), calving barn, 1 set of permanent, and 1 set of portable corrals, livestock water developments (including 2 solar pumps), 2 squeeze chutes (1 portable and 1 hydraulic), vet equipment, hydraulic post pounder, hay feed bunks (2.5 feet per head), 4 branding iron heaters, and propane tanks, fuel and water storage tanks, electric fence materials, and 2 gooseneck trailers. Buildings and equipment are valued at 80 percent of new replacement cost.

Machinery and vehicles include two 120 horsepower tractors, one 150 horsepower 4X4 tractor with front-end loader, two flatbed 1-ton 4X4 pickups, one ½-ton 4X4 pickup, two ATVs, one mini farm truck or skid-steer, and a 2-ton feed truck. Values on these invest-

ments are calculated at 50 percent of new replacement cost to reflect typically aged but functional ranch vehicles and machinery.

Depreciation costs are calculated using straight-line method and assuming a 5 percent interest rate on useful life of the asset, as determined by the Modified Accelerated Cost Recovery System standards (IRS, 2017). The machinery salvage value calculations come from Iowa State University of Science and Technology's Cooperative Extension Service (Edwards, 2015).

Interest on Operating Capital and Retained Livestock

The interest amount on operating capital expenses was derived from the assumption that half of all operating costs are borrowed for a period of 6 months assuming a 5 percent annual percentage rate.

Interest on retained livestock is the value of the herd multiplied by the 2 percent interest rate (Yi and Zang, 2016). This cost is the opportunity cost of keeping the herd. The value of the herd is calculated using the January 1 herd size, the budget's current average weights, and the average market value for bred cows, bred heifers, and horses before death loss. The market value of replacement bulls are estimated at 4 times the value of a steer (Meteer, 2014).

Gross Receipts and Operating Expenditures

Livestock prices are five-year (2013-2017) averages from the CattleFax database (2018), while livestock weights are typical for this herd size and location. Hay and alfalfa prices are also five-year (2013-2017) averages from USDA-NASS (2018). All prices were in-

dexed to 2017 using the consumer price index prior to averages being calculated. Livestock average prices and weights, and average hay and alfalfa prices are shown under Total Receipts and Operating Costs in Table 3.

References

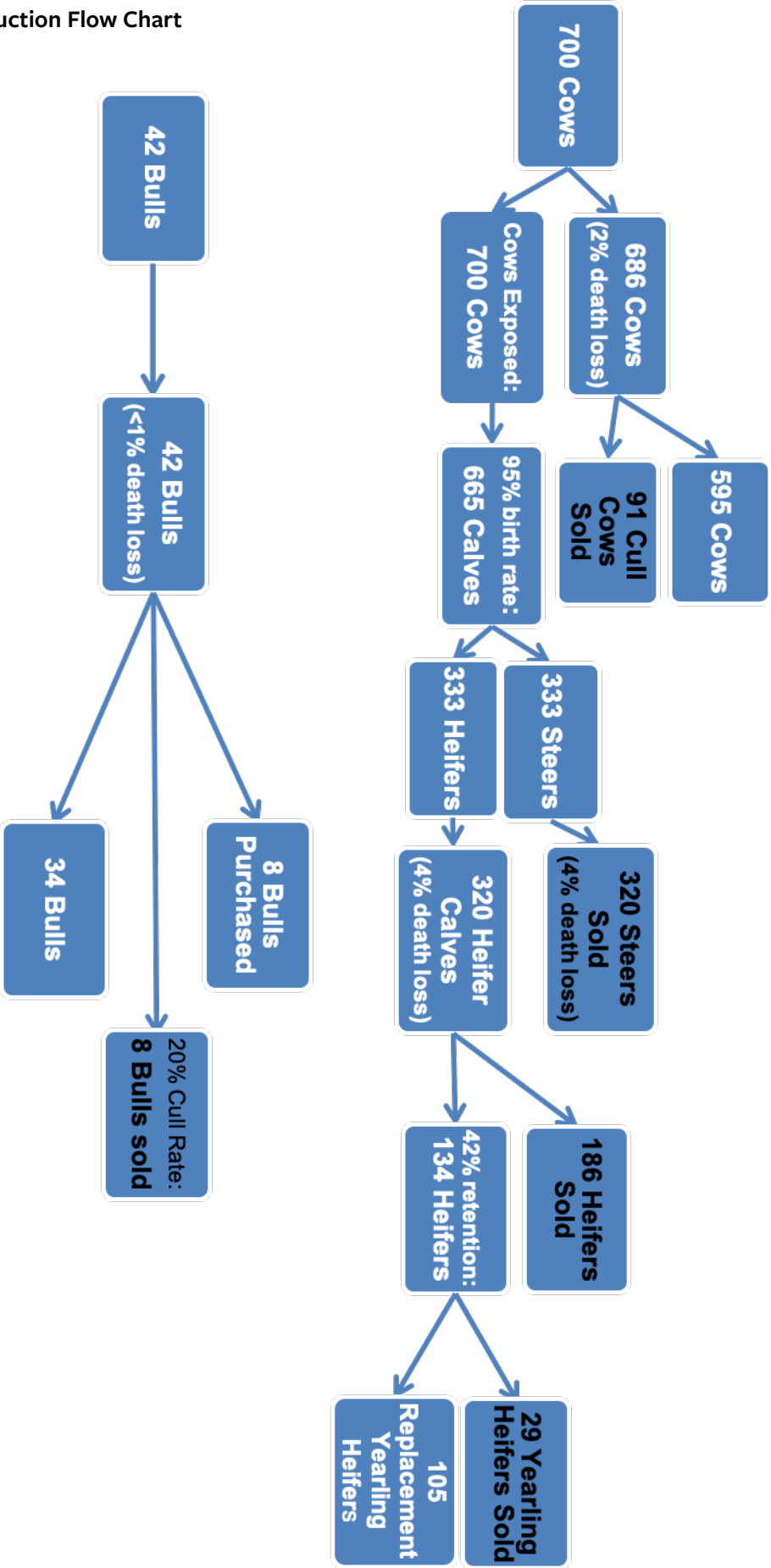
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Table 3. Enterprise Budget for a 700-head, Cow-calf Public Land Operation in MLRA 23.

MLRA 23: Malheur High Plateau Public Land Herd Size: 700-head, Cow-calf, 42 Bulls, 15 Horses							
	Weight	Unit	Total Head or Units	Price or Cost/Unit	Total Value	Value or Cost/Cow	Your Value
Gross Receipts							
Steer Calves	5.50	cwt	320	\$198.15	\$348,744.00	\$498.21	_____
Heifer Calves	5.30	cwt	186	\$178.99	\$176,448.34	\$252.07	_____
Cull Cows	11.50	cwt	91	\$76.89	\$80,465.39	\$114.95	_____
Cull Bulls	18.00	cwt	8	\$92.14	\$13,268.16	\$18.95	_____
Cull Yearling Heifers	9.50	cwt	29	\$162.61	\$44,799.06	\$64.00	_____
Cull Horses	10.00	cwt	2	\$100.00	\$2,000.00	\$2.86	_____
Total Receipts					\$665,724.94	\$951.04	_____
Operating Costs							
Public Land Grazing (BLM & FS)		AUM	4,774	\$1.87	\$8,927.38	\$12.75	_____
Deeded:							
Crop Aftermath		AUM	2,345	\$21.45	\$50,300.25	\$71.86	_____
Irrigated Pasture		AUM	1,073	\$21.45	\$23,015.85	\$32.88	_____
Winter Feed:							
Meadow Hay		ton	636	\$187.00	\$118,932.00	\$169.90	_____
Alfalfa Hay		ton	954	\$200.00	\$190,800.00	\$272.57	_____
Supplements:							
Salt and Mineral		ton	18	\$260.00	\$4,680.00	\$6.69	_____
Protein Tubs		ton	95	\$500.00	\$47,500.00	\$67.86	_____
Fuel and Lube				\$22,500.00	\$22,500.00	\$32.14	_____
Machinery and Equipment Repair				\$22,500.00	\$22,500.00	\$32.14	_____
Supplies				\$8,000.00	\$8,000.00	\$11.43	_____
Fence Repair				\$3,000.00	\$3,000.00	\$4.29	_____
Utilities				\$8,000.00	\$8,000.00	\$11.43	_____
Veterinary Medicine:							
Cattle				\$25,353.12	\$25,353.12	\$36.22	_____
Horses		hd	12	\$300.00	\$3,600.00	\$5.14	_____
Hired Labor		day	200	\$120.00	\$24,000.00	\$34.29	_____
Other operating costs:*				\$15,095.00	\$15,095.00	\$21.56	_____
Interest on Operating Capital		\$	288,101.80	2.50%	\$7,202.55	\$10.29	_____
Total Operating Costs					\$583,406.15	\$833.44	_____
<i>Income Above Operating Costs</i>					\$82,318.80	\$117.60	_____
Ownership Costs and Capital Recovery:							
Purchased livestock-8 bulls, 1 horse					\$37,848.00	\$54.07	_____
Interest on Retained Livestock		\$	1,693,290.00	2.00%	\$33,865.80	\$48.38	_____
Asset Depreciation					\$18,640.06	\$26.63	_____
Taxes-real property					\$13,433.00	\$19.19	_____
Total Ownership Costs					\$103,786.86	\$148.27	_____
Total Costs					\$687,193.00	\$981.70	_____
Net Returns Above Costs					<u>\$(21,468.06)</u>	<u>\$(30.67)</u>	_____

*Other operating costs include: Trucking (\$4,050), Marketing (\$3,045) and Accounting (\$8,000)

Table 4. Cow-calf Production Flow Chart



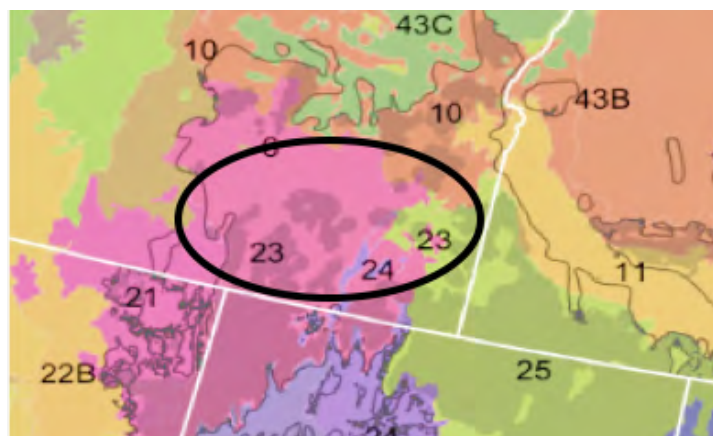


Enterprise budget for 200-head, cow-calf public land ranch

Malheur High Plateau **MLRA 23**

Holly Dyer¹, Holly Kirkpatrick¹, Tom Hilken¹, Kendall Roberts¹, Anna Maher¹, Nicolas Quintana Ashwell¹, Dustin Johnson and Pete Shrader², Fara Brummer³, John Tanaka⁴, John Ritten⁵, and Kristie Maczko⁴

Oregon counties: Harney, Lake, Malheur



This budget represents typical cost and returns for a 200-head, cow-calf operation in Major Land Resource Area (MLRA) 23, the Malheur High Plateau region of Oregon. A panel of producers from Harney and Lake counties assisted with the information contained in this enterprise budget.

Feed Sources

Bureau of Land Management (BLM) and United States Forest Service (FS) lands are available for ranchers to use from April 1-September 30 for six months total (first three months on BLM and last three months on FS). The main cow herd and bulls graze on these public lands. The replacement heifers, two bulls, and horses remain on private irrigated pasture and meadows (deeded/leased) April 1-September 30. All livestock

then graze private non-irrigated pasture and meadow (deeded/leased) October 1-November 30. Cattle are fed grass/alfalfa mix hay December 1-March 31. All hay is valued at market price of five-year averages in region (USDA-NASS, 2018). Salt and minerals are fed at the rate of 4 pounds per-head per-month and provided year-round. An annual outlook of activities calendar with feed sources is described below in Table 1.

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Table 1. Annual Calendar Activities for 200-head Cow-Calf Operation in MLRA 23.

Management Activities	Calendar Date
Winter feeding – 20% alfalfa, 80% meadow hay	December 1-March 31
Calving season	January 30-April 10
Post-calving (branding, vaccinating, castrating); Pre-breeding vaccinate heifers	March 15-April 15
Breeding season (~60 Days)	April 20-June 30
Graze Public Lands (BLM) – Brood cows and bulls (8 head until June 30)	April 1-June 30
Graze Public Lands (FS) – Brood cows	July 1-September 30
Graze Deeded/Leased Irrigated Pasture – Heifers, bulls (2 head), and horses; all bulls after June 30	April 1-September 30
Pregnancy check/vaccinate cows & pre-condition calves	September 30-October 1
Wean calves; Market steer calves, culls & non-replacement heifer calves	October 15-November 15
Graze Deeded/Leased Non-irrigated Pasture - All livestock	October 1-December 1

*Note: overlap of dates may occur in this MLRA.

Land Cost

The cost of land is included in the budget on an AUM cost by land type. Deeded land rate is calculated using area rates by type and availability and published in the USDA-NASS Agricultural Prices reports (2018). Irrigated pasture and aftermath rates were assumed to be 30 percent higher than non-irrigated land rates.

Herd Characteristics

The livestock inventory consists of 200 brood cows, 10 bulls, and 6 horses. Eight bulls are provided for the brood cows, and two bulls are provided for the replacement heifers at a rate of 25 cows per bull. Two bulls are bought annually in the spring prior to breeding season, and all bulls have a useful life of five years (cull rate of 20 percent for this herd size). Bulls begin the breeding season April 20 and are removed June 30. Cow death loss is 2 percent and 10 percent are culled annually resulting in replacement rate of 12 percent. The calving rate for all cows exposed is 95 percent, and calf death loss is 5 percent. Calving season takes place from January 30-April 10.

All steer calves are sold, and 50 percent of the heifer calves are sold after weaning. The remaining 50 percent are selected at weaning as the next year's replacement heifers. This consists of 45 head of replacements with minimal death loss. Twenty-one heifers are then culled following fall breeding evaluation. Twenty cows are culled from the herd due to older age and unsuccessful breeding. Steer calves, non-replacement heifer calves,

cull cows, and cull bulls are marketed before mid-November. Livestock production and inventory is outlined in Table 4: Flow Chart of Livestock Production.

Gross Receipt

Gross receipts are five-year average of prices received for livestock sold and indexed to 2017 dollars for the state of Oregon (CattleFax, 2018; BLS, 2018). Livestock weights and prices received are shown in the enterprise budget (Table 3). These are assumed "typical" by the focus group and confirmed by market data in the state of Oregon and in the Malheur High Plateau.

Animal Health (Veterinary and Medicine)

This includes vaccines, medicines, and all other veterinary services including pregnancy testing. Pre-calving for mature cows and bred replacement heifers include scour prevention (ScourGard). Calves are given post-calving season vaccinations, are branded, dehorned, and bulls castrated between mid-March and mid-April. These vaccinations include 7-Way, IBR/PI3/BVD/BRSV, and Pour-On/wormer (Ivomec or Dectomax). Previous year's selected replacement heifers are given pre-breeding vaccinations including Vibriosis-Leptospirosis, 7-Way, IBR/PI3/BVD/BRSV, and Pour-On/wormer (Ivomec or Dectomax) before the April 20 bull turnout. Bulls will be tested for fertility and trichomoniasis. Cows and replacement heifers are pregnancy tested in the fall as the cattle are gathered and heifer calves are given Bangs vaccinations. Table 2 below gives typical vaccinating and animal health practices and cost estimations by livestock class as provided by Forero et al. (2017).

Table 2. Animal Health Activities and Cost Comparison

Activities	Cost per Unit	Number of Head	Total Cost
Cows - Vaccine, wormer, etc.	\$9.00	200	\$1,800.00
Cows - Vet service (preg check, etc.)	\$2.25	200	\$450.00
Bulls - Vaccine, wormer, etc.	\$15.50	10	\$155.00
Bulls - Vet service (trich, semen, etc)	\$40.00	10	\$400.00
Heifers - Vaccine, wormer, etc.	\$12.50	45	\$562.50
Heifers - Vet service (bangs, preg check)	\$7.25	45	\$326.25
Horses - Wormer	\$15.00	6	\$90.00
Calves - Dehorned, vaccine, boosters, dewormer, castrate (bulls calves only)	\$15.82	190	\$3,005.80
Total			\$6,789.55
Cost per cow			\$33.95

Marketing and Transportation

Calves and cull animals are marketed through local auctions. Most operators of this size and scale will utilize transportation companies for delivery of cattle as the focus group indicated no ownership of a semi-truck and cattle pot. Trucking expenses are included in the budget as “Freight & Trucking” with a per-mile cost of \$4.50 for an average of 300 miles for cull animals and with a minimum of three trips required. “Marketing” is \$5.00 per head and incorporates auction sale commission, checkoff fees, and brand inspections for all livestock sold. These three operating costs are listed under “Other Operating Costs” in the budget.

Labor

Day work and/or contract workers are considered in this budget as hired labor and are paid at a rate of \$125 per day for a maximum of 25 days in the year. The focus group indicated no other employees or labor for a herd of this size and scale. Day work or contract workers assist with cattle drives, branding, cattle work days, and additional calving season activities. The cost of owner labor and management are not included in the budget. The net returns in the budget are compensation to labor and management.

Taxes

Annual property tax costs are estimated following the tax rate of 1 percent on the assessed value of agriculture/farm land and personal property, as recommended by American Agriculture Economics Association (AAEA, 2000). Land values are averaged across an

MLRA using rates provided by the U.S. Department of Agriculture in a 2017 Land Value Summary (USDA-NASS, 2017) by type of land, and pasture was valued in Oregon at a rate of \$700 per acre. The 2012 Census of Agriculture (USDA-NASS, 2012) indicated average farm size was 1,919 acres private land with only the counties included in this MLRA (Harney, Lake, Malheur).

Inventory and Capital Investments

Buildings and improvements include a set of corrals that incorporate portable panels and a loading chute, a storage shop, calving barn/facility, and water developments. The focus group indicated water development can be portable and/or solar powered. A squeeze chute, feed/hay bunks, tractor implements, veterinary equipment, storage tanks (fuel and water storage), and a livestock trailer were also included in the equipment inventory. Vehicles and machinery used for the cow-calf operation include one ½-ton truck, one ¾-ton truck, a 1-ton truck, one ATV, one 80- to 120-horsepower 4WD tractor, and one 75 horsepower tractor with a front-end loader. Other equipment was mentioned by focus group participants including tools and branding irons, and these are utilized in the cow-calf operation¹. The depreciation costs are calculated using straight-line method and applying a 5 percent interest rate on useful life of the asset, determined by the Modified Accelerated Cost Recovery System (MACRS) standards. The machinery salvage value calculations come from Iowa State University of Science and Technology's Cooperative Extension Service (File A3-29, Edwards,

2015). General maintenance and repairs on machinery and vehicles was provided by the focus group in a lump sum under “Ownership Costs and Capital”.

Interest on Operating Capital and Retained Livestock

Interest on operating capital expenses is derived from the assumption that 50 percent of all annual operating costs are borrowed for a period of six months at 5 percent interest.

Interest on retained livestock is the value of the herd multiplied by the 2 percent interest rate (Yi and Zhang, 2016). This cost is the opportunity cost of keeping the herd and can be thought of as the amount a rancher could have made if the value of the herd had otherwise been invested at a 2 percent interest rate. The value of the herd is calculated using the January 1 herd size and market prices received for bulls, mature cows, and replacement heifers. Bull cost is valued at four times the budget's market price for a feeder steer (Meteer, 2014).

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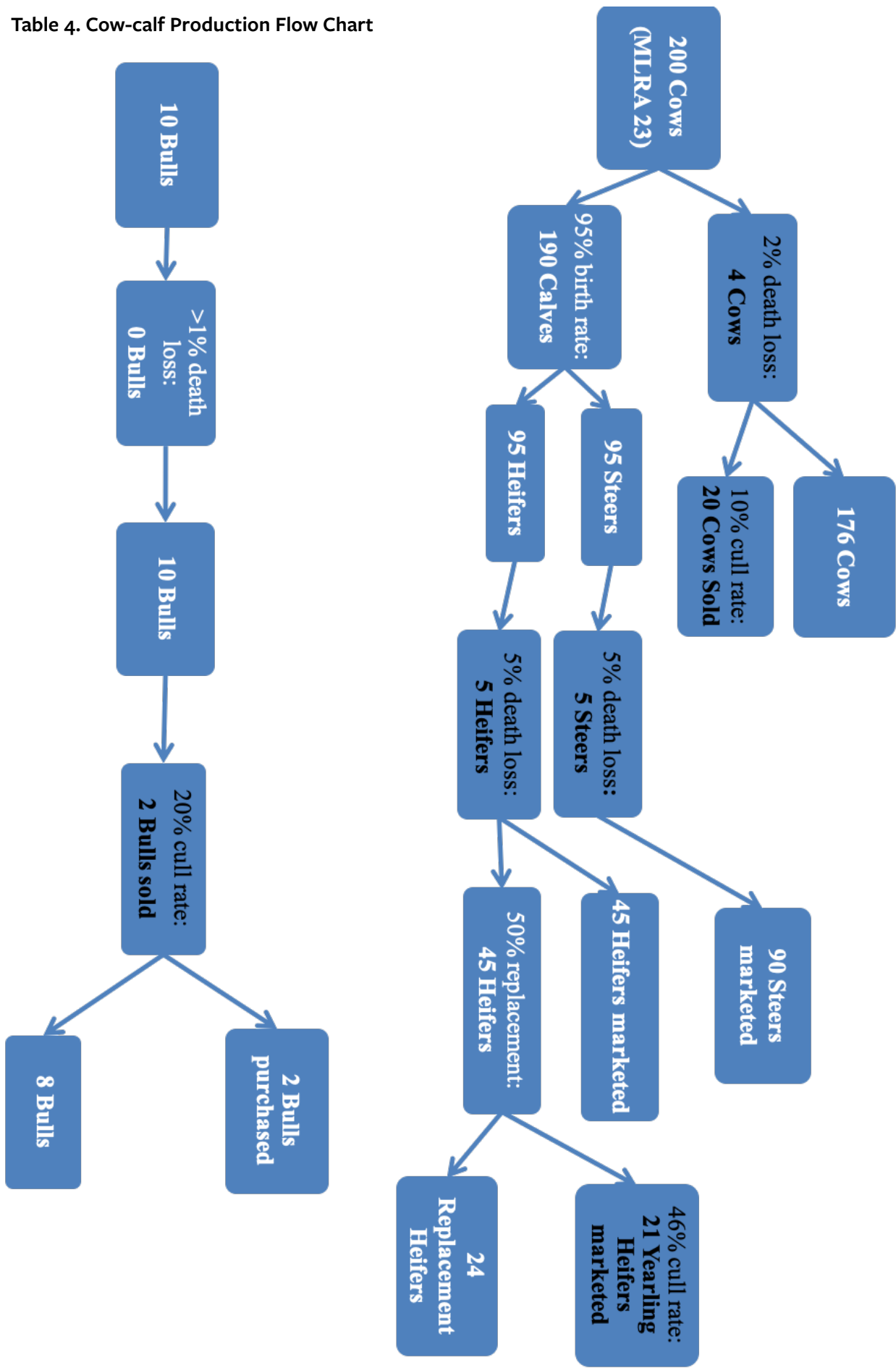
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Table 3: Enterprise Budget for 200-head, Cow-Calf, Public Lands Ranch in MLRA 23.

MLRA 23: Malheur High Plateau							
Public Land							
Herd Size: 200-head, Cow-calf, 10 Bulls							
	Weight	Unit	Total Head or Unit	Price or Cost Per Unit	Total Value	Price or Cost Per Cow	Your Value
Gross Receipts							
Steer Calves	5.28	cwt	90	\$ 198.15	\$ 94,422.44	\$ 472.11	_____
Heifer Calves	4.93	cwt	45	\$ 178.99	\$ 39,819.23	\$ 199.10	_____
Cull Cows	10.50	cwt	20	\$ 76.89	\$ 16,146.90	\$ 80.73	_____
Cull Bulls	18.00	cwt	2	\$ 92.14	\$ 3,317.04	\$ 16.59	_____
Cull Yearling Heifers	8.50	cwt	21	\$ 162.61	\$ 28,690.71	\$ 143.45	_____
Total Receipts					\$ 182,396.32	\$ 911.98	_____
Operating Costs							
USFS		AUM	660	\$ 1.87	\$ 1,234.20	\$ 6.17	_____
BLM		AUM	704	\$ 1.87	\$ 1,316.48	\$ 6.58	_____
Deeded Land							
Irrigated Pasture		AUM	378	\$ 21.45	\$ 8,108.10	\$ 40.54	_____
Unirrigated Pasture		AUM	550	\$ 16.50	\$ 9,075.00	\$ 45.38	_____
Winter Feed							
Meadow Hay		ton	380	\$ 187.00	\$ 71,060.00	\$ 355.30	_____
Alfalfa		ton	73	\$ 200.00	\$ 14,600.00	\$ 73.00	_____
Supplement							
Salt & Mineral		ton	7	\$ 554.40	\$ 3,880.80	\$ 19.40	_____
Fuel & Lube					\$ 6,000.00	\$ 30.00	_____
Supplies & Fencing					\$ 3,000.00	\$ 15.00	_____
Utilities					\$ 2,500.00	\$ 12.50	_____
Veterinary					\$ 6,789.55	\$ 33.95	_____
Repairs					\$ 5,000.00	\$ 25.00	_____
Hired Labor		day	25	\$ 125.00	\$ 3,125.00	\$ 15.63	_____
Other Operating Costs*					\$ 3,240.00	\$ 16.20	_____
Interest on Operating Capital		%	0.025	\$ 69,464.57	\$ 1,736.61	\$ 8.68	_____
Total Operating Costs					\$ 138,929.13	\$ 694.65	_____
<i>Income Above Operating Costs</i>					\$ 43,467.19	\$ 217.34	_____
Ownership Costs and Capital							
Purchased Livestock		bull	2	\$ 4,184.93	\$ 8,369.86	\$ 41.85	_____
Interest on Retained Livestock		%	0.02	\$429,440.76	\$ 8,588.82	\$ 42.94	_____
Asset Depreciation		\$			\$ 9,738.85	\$ 48.69	_____
Taxes		\$			\$ 13,433.00	\$ 67.17	_____
Total Ownership Costs					\$ 40,130.52	\$ 200.65	_____
Total Costs					\$ 179,059.65	\$ 895.30	_____
Returns to Labor and Management					<u>\$ 3,336.66</u>	<u>\$ 16.68</u>	_____

* Freight & Trucking \$1,350; Marketing \$890; Professional fees \$1,000.

Table 4. Cow-calf Production Flow Chart

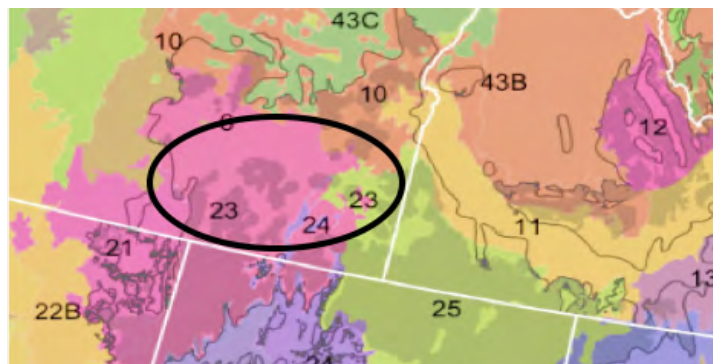




Malheur High Plateau **MLRA 23**

Holly Dyer¹, Holly Kirkpatrick¹, Tom Hilken¹, Kendall Roberts¹, Anna Maher¹, Nicolas Quintana Ashwell¹, Dustin Johnson and Pete Shrader², Fara Brummer³, John Tanaka⁴, John Ritten⁵, and Kristie Maczko⁴

Oregon counties: Harney, Lake, Malheur



This budget represents typical cost and returns for a 100-head, cow-calf operation in Major Land Resource Area (MLRA) 23, the Malheur High Plateau region of Oregon. A panel of producers from Harney and Lake counties assisted with the information contained in this enterprise budget.

Feed Sources

All livestock (cows, replacement heifers, bulls, and horses) remain on irrigated pasture and meadows (deeded/leased) May 1-September 30. All livestock then graze private non-irrigated pasture and meadow (deeded/leased) October 1-November 30. Cattle are fed grass/alfalfa mix hay December 1-April 30). All hay is valued at market price of five-year averages in region (USDA-NASS, 2018). Salt and minerals are fed at the

rate of 4 pounds per-head per-month and provided year-round. An annual outlook of activities calendar with feed sources is described below in Table 1.

Land Cost

The cost of land is included in the budget on an AUM cost by land type. Deeded land rate is calculated using area rates by type and availability and published in the USDA-NASS Agricultural Prices reports (2018). Irri-

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⁴ Wyoming Agricultural Experiment Station, University of Wyoming; Sustainable Rangelands Roundtable

⁵ Department of Agricultural and Applied Economics, University of Wyoming.

Table 1. Annual Calendar Activities for 100-head Cow-Calf Operation in MLRA 23.

Management Activities	Calendar Date
Winter feeding – 20% alfalfa, 80% meadow hay	December 1-April 30
Calving season	February 10-April 30
Post-calving (branding, vaccinating, castrating); Pre-breeding vaccinate cows & heifers	April 1-May 15
Breeding season (~75 Days)	May 1-July 15
Graze Deeded/Leased Irrigated Pasture – All livestock; bulls removed from cows/heifers July 15	May 1-September 30
Graze Deeded/Leased Non-irrigated Pasture - All livestock	October 1-November 30
Pregnancy check/vaccinate cows & pre-condition calves	October 15-October 31
Wean calves; Market steer calves and non-replacement heifer calves	November 1-November 30
Market all cull cows, yearling heifers and cull bulls	November 15-December 1

*Note: overlap of dates may occur in this MLRA

gated pasture and aftermath rates were assumed to be 30 percent higher than non-irrigated land rates.

Herd Characteristics

The livestock inventory consists of 100 brood cows, 5 bulls, and 3 horses. Four bulls are provided for the brood cows, and one bull is provided for the replacement heifers at a rate of 25 cows per bull. One bull may be bought in the spring prior to breeding season, and bulls have a useful life of five years (cull rate of 20 percent for this herd size). Bulls begin the breeding season from May 1 and are removed on July 15. Cow death loss is 1 percent and 10 percent are culled annually resulting in replacement rate of 11 percent. The calving rate for all cows exposed is 95 percent, and calf death loss is 4 percent. Calving season takes place from February 10-April 30.

All steer calves are sold and 50 percent of the heifer calves are sold after weaning. The remaining 50 percent are selected at weaning as the next year's replacement heifers. This consists of 23 head of replacements with minimal death loss. Twelve heifers are then culled following fall breeding evaluation. Ten cows are culled from the herd due to older age and unsuccessful breeding. Steer calves, non-replacement heifer calves, cull cows, and cull bulls are marketed before mid-November. Livestock production and inventory is outlined in Table 4: Flow Chart of Livestock Production.

Gross Receipt

Gross receipts are five-year average of prices received for livestock sold and indexed to 2017 dollars for the

state of Oregon (CattleFax, 2018; BLS, 2018). Livestock weights and prices received are shown in the enterprise budget (Table 3). These are assumed "typical" by the focus group and confirmed by market data in the state of Oregon and in the Malheur High Plateau.

Animal Health (Veterinary and Medicine)

This includes vaccines, medicines, and all other veterinary services, including pregnancy testing. Pre-calving for mature cows and bred replacement heifers include scour prevention (ScourGard). Calves are given post-calving season vaccinations, are branded, dehorned, and bulls castrated between April and mid-May. These vaccinations include 7-Way, IBR/PI3/BVD/BRSV, and Pour-On/wormer (Ivomec or Dectomax). Previous year's selected replacement heifers and mature cows are given pre-breeding vaccinations including Vibriosis-Leptospirosis, 7-Way, IBR/PI3/BVD/BRSV, and Pour-On/wormer (Ivomec or Dectomax) before the May 1 bull turnout. Bulls will be tested for fertility and trichomoniasis. Cows and replacement heifers are pregnancy tested in the fall as the cattle are gathered and heifer calves are given Bangs vaccinations. Table 2 below gives typical vaccinating and animal health practices and cost estimations by livestock class as provided by Forero et al. (2017).

Marketing and Transportation

Calves and cull animals are marketed through local auctions. Most operators of this size and scale will utilize transportation companies for delivery of cattle as the focus group indicated no ownership of a semi-truck and cattle pot. Trucking expenses are included in

Table 2. Veterinary and Medical Costs.

Activities	Cost per Unit	Number of Head	Total Cost
Cows - Vaccine, wormer, etc.	\$9.00	100	\$900.00
Cows - Vet service (preg check, etc.)	\$2.25	100	\$225.00
Bulls - Vaccine, wormer, etc.	\$15.50	5	\$77.50
Bulls - Vet service (trich, semen, etc)	\$40.00	5	\$200.00
Heifers - Vaccine, wormer, etc.	\$12.50	23	\$287.50
Heifers - Vet service (Bangs, preg check)	\$7.25	23	\$166.75
Horses - Wormer	\$15.00	3	\$45.00
Calves - Dehorned, vaccine, boosters, dewormer, castrate (bulls calves only)	\$15.82	95	\$1,502.90
Total			\$3,404.65
Cost per cow			\$34.05

the budget as “Freight & Trucking” with a per mile cost of \$4.50 for an average of 300 miles for cull animals with a minimum of two trips required. “Marketing” is \$5.00 per head and incorporates auction sale commission, checkoff fees, and brand inspections for all live-stock sold. These three operating costs are listed under “Other Operating Costs” in the budget.

Labor

Day work and/or contract workers are considered in this budget as hired labor and are paid at a rate of \$125 per day for maximum of 20 days in the year. The focus group indicated no other employees or labor for a herd this size and scale. Day work or contract workers assist with cattle drives, branding, cattle work days and additional calving season activities. The cost of owner labor and management are not included in the budget. The net returns in the budget are compensation to labor and management.

Taxes

Annual property tax costs are estimated following the tax rate of 1 percent on the assessed value of agriculture/farm land and personal property, as recommended by American Agriculture Economics Association (AAEA, 2000). Land values are averaged across an MLRA using rates provided by the U.S. Department of Agriculture in a 2017 Land Value Summary (USDA-NASS, 2017) by land type, and pasture was valued in Oregon at a rate of \$700 per acre. The 2012 Census of Agriculture (USDA-NASS, 2012) indicated average farm size was 1,919 acres private land with only the

counties included in this MLRA (Harney, Lake, Malheur).

Inventory and Capital Investments

Buildings and improvements include a set of corrals that incorporate portable panels and a loading chute, a storage shop, calving barn/facility, and water developments. The focus group indicated water development can be portable and/or solar powered. A squeeze chute, feed/hay bunks, tractor implements, veterinary equipment, storage tanks (fuel and water storage), and a livestock trailer were also included in the equipment inventory. Vehicles and machinery used for the cow-calf operation include one $\frac{3}{4}$ -ton truck, a 1-ton truck, one ATV, one 80- to 120 horsepower 4WD tractor, and one 75 horsepower tractor with a front-end loader. Other equipment was mentioned by focus group participants including tools and branding irons, and these are utilized in the cow-calf operation¹. The depreciation costs are calculated using straight-line method and applying a 5 percent interest rate on useful life of the asset, determined by the Modified Accelerated Cost Recovery System (MACRS) standards. The machinery salvage value calculations come from Iowa State University of Science and Technology’s Cooperative Extension Service (File A3-29, Edwards, 2015). General maintenance and repairs on machinery and vehicles was provided by the focus group in a lump sum under “Ownership Costs and Capital”.

Interest on Operating Capital and Retained Livestock

Interest on operating capital expenses is derived from the assumption that 50 percent of all annual operating costs are borrowed for a period of six months at 5 percent interest.

Interest on retained livestock is the value of the herd multiplied by the 2 percent interest rate (Yi and Zhang, 2016). This cost is the opportunity cost of keeping the herd and can be thought of as the amount a rancher could have made if the value of the herd had otherwise been invested at a 2 percent interest rate. The value of the herd is calculated using the January 1 herd size and market prices received for bulls, mature cows and replacement heifers. Bull cost is valued at four times the budget's market price for a feeder steer (Meteer, 2014).

References

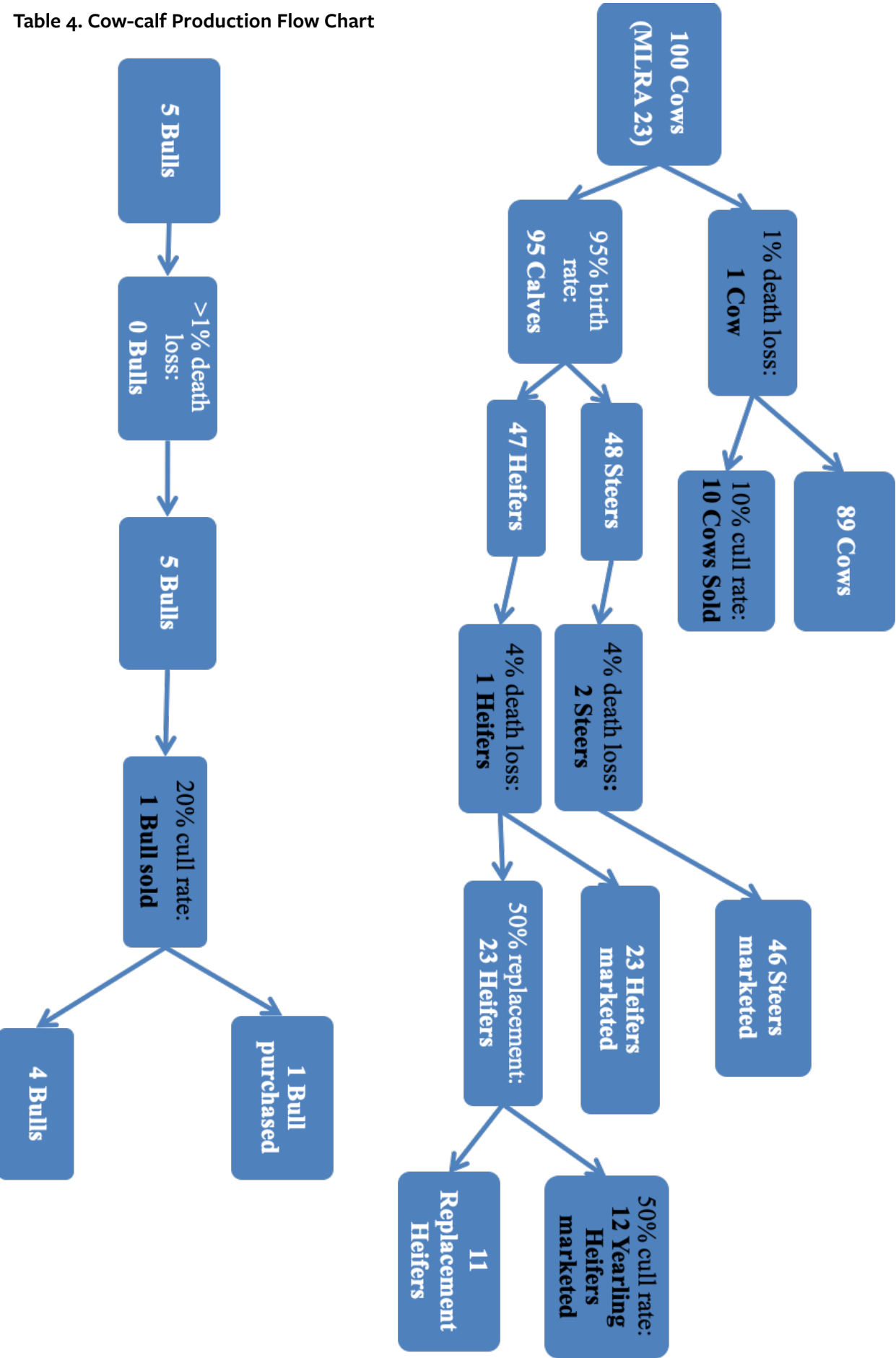
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- Yi, K. M., & Zhang, J. 2016. "Real interest rates over the long run". *Economic Policy Papers*, Federal Reserve Bank of Minneapolis, (16-10).

Table 3. Enterprise Budget for 100-head, Cow-calf, Private Lands Ranch in MLRA 23.

MLRA 23: Malheur High Plateau							
Private Land							
Herd Size: 100-head, Cow-calf, 4 Bulls							
	Weight	Unit	Total Head or Unit	Price or Cost Per Unit	Total Value	Price or Cost Per Cow	Your Value
Gross Receipts							
Steer Calves	5.28	cwt	46	\$ 198.15	\$ 47,708.18	\$ 477.08	_____
Heifer Calves	4.93	cwt	23	\$ 178.99	\$ 20,119.19	\$ 201.19	_____
Cull Cows	10.50	cwt	10	\$ 76.89	\$ 8,073.45	\$ 80.73	_____
Cull Bulls	18.00	cwt	1	\$ 92.14	\$ 1,658.52	\$ 16.59	_____
Cull Yearling Heifers	8.50	cwt	12	\$ 162.61	\$ 16,586.22	\$ 165.86	_____
Total Receipts					\$ 94,145.56	\$ 941.46	_____
Operating Costs							
Deeded Land							
Irrigated Pasture		AUM	717	\$ 21.45	\$ 15,379.65	\$ 153.80	_____
Unirrigated Pasture		AUM	272	\$ 16.50	\$ 4,488.00	\$ 44.88	_____
Winter Feed							
Meadow Hay		ton	235	\$ 187.00	\$ 43,945.00	\$ 439.45	_____
Alfalfa		ton	45	\$ 200.00	\$ 9,000.00	\$ 90.00	_____
Supplement							
Salt & Mineral		ton	4	\$ 554.40	\$ 2,217.60	\$ 22.18	_____
Fuel & Lube					\$ 5,000.00	\$ 50.00	_____
Supplies & Fencing					\$ 3,000.00	\$ 30.00	_____
Utilities					\$ 2,500.00	\$ 25.00	_____
Veterinary					\$ 3,404.65	\$ 34.05	_____
Repairs					\$ 3,000.00	\$ 30.00	_____
Hired Labor		day	20	\$ 125.00	\$ 2,500.00	\$ 25.00	_____
Other Variable Costs*					\$ 2,805.00	\$ 28.05	_____
Interest on Operating Capital		%	0.025	\$ 48,619.95	\$ 1,215.50	\$ 12.15	_____
Total Operating Costs					\$ 97,239.90	\$ 972.40	_____
<i>Income Above Operating Costs</i>					\$ (3,094.34)	\$ (30.94)	_____
Ownership Costs and Capital							
Purchased Livestock		bull	1	\$ 4,184.93	\$ 4,184.93	\$ 41.85	_____
Interest on Retained Livestock		%	0.02	\$215,764.20	\$ 4,315.28	\$ 43.15	_____
Asset Depreciation		\$			\$ 8,690.27	\$ 86.90	_____
Taxes		\$			\$ 13,433.00	\$ 134.33	_____
Total Ownership Costs					\$ 30,623.48	\$ 306.23	_____
Total Costs					\$ 127,863.38	\$ 1,278.63	_____
Returns to Labor and Management					<u>\$ (33,717.82)</u>	<u>\$ (337.18)</u>	_____

* Freight & Trucking \$1,350; Marketing \$455; Professional fees \$1,000.

Table 4. Cow-calf Production Flow Chart





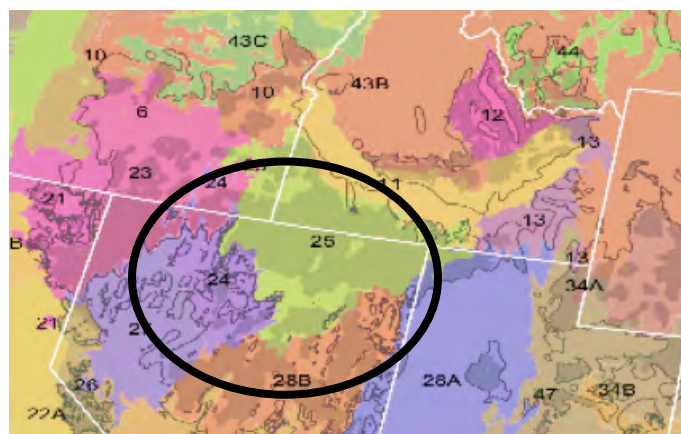
Enterprise budget for 500-head, cow-calf public land ranch

Owyhee High Plateau **MLRA 25**

Tom Hilken¹, Kendall Roberts¹, Holly Dyer¹, Holly Kirkpatrick¹, Anna Maher¹, Nicolas Quintana Ashwell¹, John Tanaka², John Ritten³, and Kristie Maczko²

Idaho counties: Cassia, Owyhee, Twin Falls

Oregon counties: Malheur



This budget represents typical cost and returns for a 500-head, cow-calf operation in Major Land Resource Area (MLRA) 25, the Owyhee High Plateau. The information in this budget was derived from 3 previous developed enterprise budgets for the following states and counties: Oregon (Malheur County) (Turner et al., 1997), Idaho (Cassia, Owyhee and Twin Falls) (Painter and Rimbey, 2014), and Nevada (Elko) (Darden et al., 2000). Operating costs for this budget were indexed to 2017 using the consumer price index and then averaged across the 3 budgets. Alfalfa, hay, and livestock prices for this budget were also indexed and averaged for the 3 states (Nevada, Oregon, Idaho) within the MLRA. Grazing rates for irrigated pasture and aftermath were averaged across the three states.

Feed Sources

Feed is supplied as deeded irrigated pasture, Bureau of Land Management (BLM) and Forest Service (FS) rangelands, and hay (alfalfa, grass) aftermath. Live-stock are grazed on public rangelands (BLM and FS) April 15-October 1 and on hay aftermath from Octo-

ber 1-November 15. Replacement heifers are grazed on deeded irrigated pasture from April 15-October 1. Cattle are fed a mixture of alfalfa and native meadow hay at a ratio of 10 percent alfalfa and 90 percent meadow hay for 5 months. Salt and minerals are fed year-round and protein tubs are available for a 90-day

¹ Department of Ecosystem Science and Management, University of Wyoming.

² Wyoming Agricultural Experiment Station, University of Wyoming; Sustainable Rangelands Roundtable.

³ Department of Agricultural and Applied Economics, University of Wyoming.

Table 1. Annual Calendar Activities for 500-head Cow-Calf Operation in MLRA 25.

Management Activities	Calendar Date
Winter feeding – 10% alfalfa, 90% native meadow hay	November 15-April 15
Calving season	February 15-April 15
BLM rangeland is grazed in the spring. FS rangeland is grazed in the summer. Cows and calves are vaccinated, and calves are branded, earmarked, dehorned, and bull calves are castrated prior to turnout in the spring.	April 15-July 1 July 1-October 1
Replacement heifers graze deeded irrigated pasture season long. Vaccinated and pregnancy checked prior to turnout.	April 15-October 1
Bulls turned out May 15 for a 60-day breeding season. Bulls trich and semen tested prior to turnout.	May 15-July 15
All livestock graze hay aftermath during the fall.	October 1-November 15
Cows vaccinated, pregnancy tested, and calves weaned in the fall.	October
Cull cows, bulls, horses and open heifers are sold in early fall through local auction markets or private treaty	October-November
All calves marketed through summer video marketing sale with a November delivery date.	November

period during winter. A schedule of activities within a calendar year is listed in Table 1.

Land Cost

The cost of land is included in the budget on an AUM cost by land type and ownership. Public land rates are published by the land management agencies. Deeded land rates for Nevada, Idaho and Oregon were obtained from USDA-NASS, Agricultural Prices (2018). The rates for the 3 states were averaged and irrigated and aftermath rates were assumed to be 30 percent higher than non-irrigated land rates.

Herd Characteristics

Livestock inventory consists of 500 cows, 31 bulls, and 10 horses. Eight replacement bulls are bought most years, but only 7 are needed in other years. Bulls have a useful life of 4 years with a 1 percent death loss. Bulls are turned into the herd for a 2-month breeding season from May 15-July 15. Cow death loss is 2 percent, and 15 percent are culled annually resulting in an annual replacement rate of 17 percent. The calving rate for all cows exposed is 92 percent with a 4 percent calf death loss resulting in 88 percent of the mature cows weaning a calf in the fall. In the fall, all steer calves are sold, and 42 percent of the heifer calves are sold. The remaining 58 percent of heifer calves are selected at weaning as potential replacement heifers and after death loss consist of 128 head. Forty-three yearling heifers are

sold in the fall ,and 85 replacement yearling heifers are brought into the herd. Seventy-five mature cows are culled from the herd due to unsuccessful breeding or old age. Table 4 shows a cow-calf production flow chart.

Animal Health (Veterinary and Medicine)

Veterinary and medicine includes the value of vaccines, medicines, and veterinary services. Veterinary care for calves includes viral treatments, 8-Way vaccinations (given twice during the year), and dehorning and castration of bull calves. Heifer calves are also vaccinated for brucellosis. Cows, bulls, and replacement heifers receive vaccinations for viral infections, vibriosis, and leptospirosis. The herd is treated annually for parasites. Cows are pregnancy checked in the fall. Bulls also receive a semen and trichomoniasis test. Table 2 is a summary of veterinary and medical costs by class of livestock (estimates from Forero et al., 2017).

Marketing and Transportation

“Marketing Fees” are \$5.00 per head that include marketing costs, brand inspection, and checkoff fees. Calves are marketed through video marketing sales through the summer with a late fall or early winter delivery. Cull animals are marketed through local auction markets and private treaty in the fall. Trucking and shipping fees are \$4.50 per mile for an average of 250 miles for cull animals with 3 trips required.

Table 2. Veterinary and Medicine Costs.

Activities	Cost per Unit	Number of Head	Total Cost
Cows - Vaccine (Lepto Vibrio, 8-Way, IBR, P13, BVD) Wormer, and Pour-On	\$9.00	500	\$4,500.00
Cows - Vet service (preg check, misc. treatments)	\$5.00	500	\$2,500.00
Heifers - Vaccine (IBR, P13, BVD and 8-Way), wormer, and Pour-On	\$12.50	128	\$1,600.00
Heifers - Vet service (Bangs, preg check)	\$7.25	128	\$928.00
Bulls - Vaccine (8-way), wormer, and Pour-On	\$15.50	31	\$480.50
Bulls - Vet service (trich and semen tested)	\$40.00	31	\$1,240.00
Calves - Vaccine (8-way, IBR, P13, BVD), dewormer, dehorned, castrate bull calves, and fly tags	\$15.82	460	\$7,277.20
Grand Total			\$18,525.70

Labor

Labor is provided by the owner and his family with an additional 9 months of hired seasonal labor at \$2,500 per month. The ranch owner provides the seasonal employee with free on-site housing and utilities. The cost of owner labor and management are not included in this budget. The net returns in this budget are compensation to labor and management.

Taxes

Annual property tax costs are estimated following the tax rate of 1 percent on the assessed value of agricultural/farm land as recommended by the American Agricultural Economics Association (AAEA, 2000). Land values are averaged across the MLRA using county values from USDA-NASS (2017) by deeded pasture land type at a rate of \$892 per acre. The USDA-NASS (2012) reported that average farm size was 1,894 acres private land for the counties included in this MLRA.

Inventory and Capital Investments:

Buildings and equipment: A shop and equipment (welder, air compressor, and tools), 2 sets of permanent corrals and loading chutes, livestock water developments, 2 squeeze chutes (1 portable and 1 hydraulic), vet equipment, hydraulic post pounder, tub grinder, 1 set of scales and calf table, 2 branding iron heaters and propane tanks, fuel and water storage tanks, electric fence materials, and 2 gooseneck trailers. Buildings and equipment are valued at 80 percent of new replacement cost.

Machinery and vehicles for this ranch type include: one 125 horsepower tractor, two 90 horsepower tractors, one crawler type tractor, one $\frac{3}{4}$ -ton 4X4 pickup, one $\frac{1}{2}$ -ton pickup, one 1-ton 4X4 pickup, one 2-ton

feed-truck, and 2 ATVs. Values on these investments are calculated at 50 percent of new replacement cost to reflect typically aged but functional ranch vehicles and machinery.

The depreciation costs are calculated using straight-line method and assuming a 5 percent interest rate on useful life of the asset, as determined by the Modified Accelerated Cost Recovery System standards (IRS, 2017). The machinery salvage value calculations come from Iowa State University of Science and Technology's Cooperative Extension Service (Edwards, 2015).

Interest on Operating Capital and Retained Livestock

The interest amount on operating capital expenses was derived from the assumption that half of all operating costs are borrowed for a period of 6 months assuming a 5 percent annual rate.

Interest on retained livestock is the value of the herd multiplied by the 2 percent interest rate (Yi and Zang, 2016). This cost is the opportunity cost of keeping the herd. The value of the herd is calculated using a January 1 herd size, the budget's current average weight, and the market value for bred cows, bred heifers, and horses before death loss. The market value of replacement bulls are estimated at 4 times the value of a steer (Meteer, 2014).

Gross Receipts and Operating Expenditures

Livestock prices are five-year (2013-2017) averages from the CattleFax data base (2018) for Idaho, Oregon and Nevada. Hay and alfalfa prices are also five-year (2013-2017) averages from USDA-NASS (2018) for

the 3 states. Livestock weights are typical for this herd size and location and were averaged for Oregon, Idaho, and Nevada. All averaged prices and operating costs were indexed to 2017 using the consumer price index prior to averages being calculated. Livestock averaged prices and weights, and averaged hay and alfalfa prices along with other operating costs are shown under Total Receipts and Operating Costs in Table 3.

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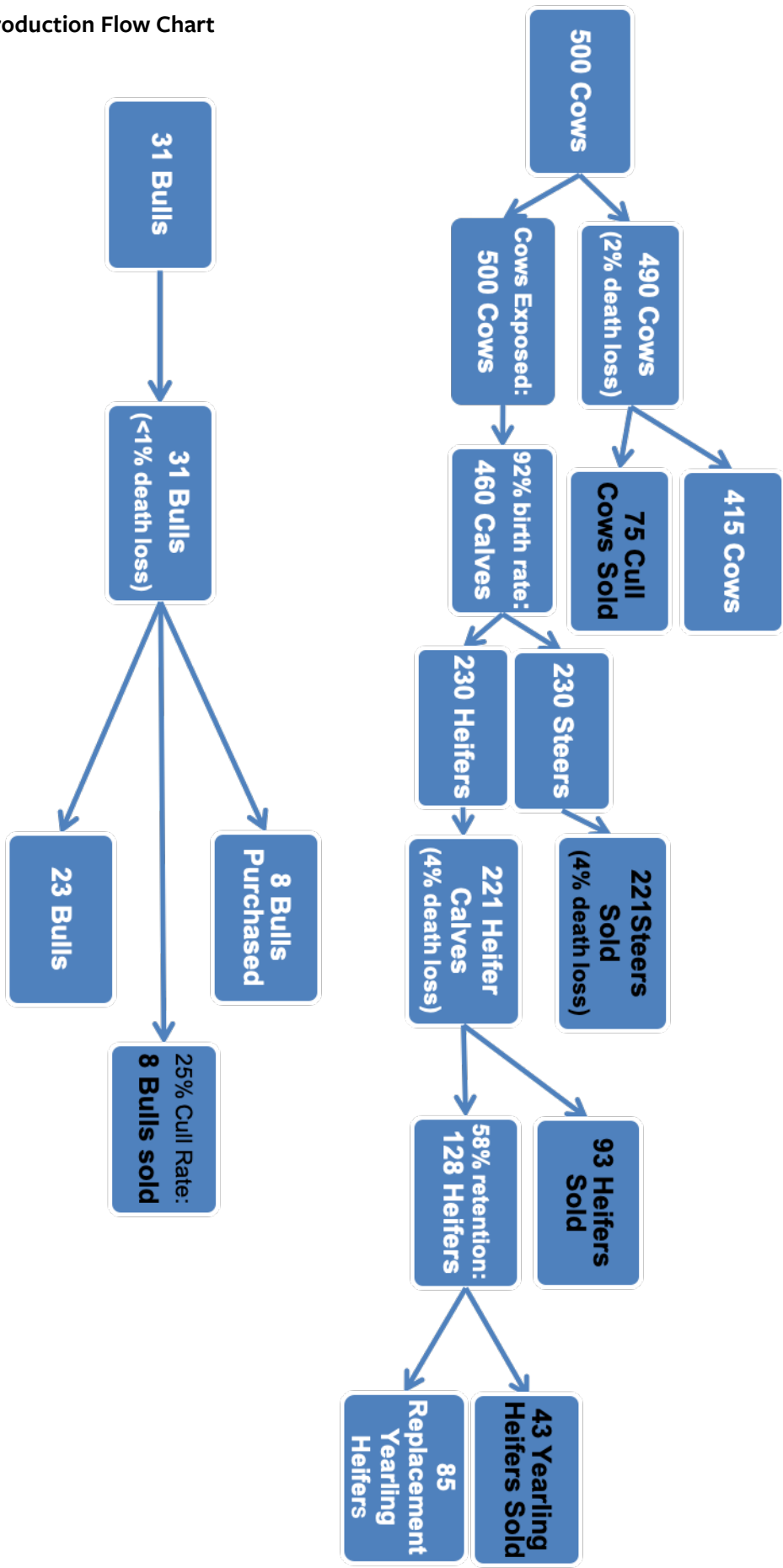
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Table 3. Enterprise Budget for 500-head, Cow-calf Public Land Ranch in MLRA 25.

MLRA 25: Owyhee High Plateau Public Land Herd Size: 500-head, Cow-calf, 31 Bulls, 10 Horses							
	Weight	Unit	Total Head or Units	Price or Cost per Unit	Total Value	Value or Cost/Cow	Your Value
Gross Receipts							
Steer Calves	4.72	cwt	221	\$192.17	\$200,456.37	\$400.91	_____
Heifer Calves	4.28	cwt	93	\$181.94	\$72,419.40	\$144.84	_____
Cull Cows	10.00	cwt	75	\$77.98	\$58,485.00	\$116.97	_____
Cull Bulls	15.17	cwt	8	\$91.73	\$11,132.35	\$22.26	_____
Cull Yearling Heifers	7.75	cwt	43	\$161.85	\$53,936.51	\$107.87	_____
Cull Horses	10.00	cwt	1	\$100.00	\$1,000.00	\$2.00	_____
Total Receipts					\$397,429.63	\$794.86	_____
Operating Costs							
BLM		AUM	1345	\$1.87	\$2,515.15	\$5.03	_____
USFS		AUM	1614	\$1.87	\$3,018.18	\$6.04	_____
Deeded:							
Hay Aftermath		AUM	1041	\$19.24	\$20,028.84	\$40.06	_____
Irrigated Pasture		AUM	720	\$19.24	\$13,852.80	\$27.71	_____
Winter Feed							
Meadow Hay		ton	1148	\$180.85	\$207,615.80	\$415.23	_____
Alfalfa Hay		ton	128	\$188.52	\$24,130.56	\$48.26	_____
Supplement							
Salt/Mineral		ton	14	\$260.00	\$3,640.00	\$7.28	_____
Protein Tubs		ton	74	\$500.00	\$37,000.00	\$74.00	_____
Fuel and Lube				\$10,000.00	\$10,000.00	\$20.00	_____
Machinery and Equipment Repair				\$9,000.00	\$9,000.00	\$18.00	_____
Supplies				\$4,500.00	\$4,500.00	\$9.00	_____
Fence Repair				\$2,500.00	\$2,500.00	\$5.00	_____
Utilities				\$5,000.00	\$5,000.00	\$10.00	_____
Veterinary Medicine							
Cattle				\$18,525.70	\$18,525.70	\$37.05	_____
Horses		hd	10	\$400.00	\$4,000.00	\$8.00	_____
Hired Labor		months	9	\$2,500.00	\$22,500.00	\$45.00	_____
Other operating costs:*				\$7,525.00	\$7,525.00	\$15.05	_____
Interest on Operating Capital			\$193,913.52	2.50 percent	\$4,847.84	\$9.70	_____
Total Operating Costs					\$400,199.87	\$800.40	_____
<i>Income Above Operating Costs</i>					\$(2,770.23)	\$(5.54)	_____
Ownership Costs and Capital Recovery:							
Purchased livestock-8 bulls, 1 horse					\$30,264.00	\$60.53	_____
Interest on Retained Livestock			\$1,242,756.00	2.00 percent	\$24,855.12	\$49.71	_____
Asset Depreciation					\$19,302.00	\$38.60	_____
Taxes-real property					\$16,894.00	\$33.79	_____
Total Ownership Costs					\$91,315.12	\$182.63	_____
Total Costs					\$491,514.99	\$983.03	_____
Net Returns Above Costs					<u>\$94,085.35</u>	<u>\$188.17</u>	_____

*Other operating costs include: trucking (\$3,375), marketing (\$2,250) and accounting (\$1,900)

Table 4. Cow-calf Production Flow Chart





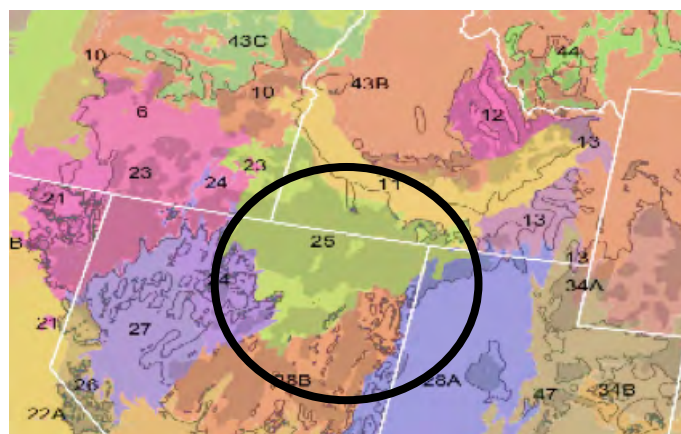
Enterprise budget for 200-head, cow-calf public land ranch

Owyhee High Plateau **MLRA 25**

Holly Dyer¹, Holly Kirkpatrick¹, Tom Hilken¹, Kendall Roberts¹,
Anna Maher¹, Nicolas Quintana Ashwell¹, John Tanaka², John
Ritten³, and Kristie Maczko²

Nevada counties: Elko

Oregon counties: Malheur



This budget represents typical cost and returns for a 200-head, cow-calf operation in Major Land Resource Area (MLRA) 25, the Owyhee High Plateau region. The information contained in this enterprise budget is derived from the assumptions of previous budget development in Idaho (Painter & Rimbey, 2014) and Nevada (Curtis et al., 2006) as well as utilization of focus group discussion in representative MLRA 23 (Oregon), MLRA 12 (Idaho), and MLRA 28b (Nevada).

Feed Sources

Bureau of Land Management (BLM) and United States Forest Service (FS) lands are available for ranchers to use April 15-September 30 for five and a half months total (2.5 months on BLM and three months on FS). The main cow herd and eight bulls graze on these public lands. Replacement heifers, two bulls, and horses remain on private irrigated pasture and meadows (deeded/leased) April 15-September 30. All livestock

then graze crop/hay aftermath October 1-November 15. Cattle are fed grass/alfalfa mix hay November 15-April 15. All hay is valued at market price of five-year averages in region (USDA -NASS, 2018). Salt and minerals are fed at the rate of 4 pounds per-head per-month and provided year-round. An annual outlook of activities calendar with feed sources is described below in Table 1.

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Table 1. Annual Calendar Activities for 200-head Cow-Calf Operation in MLRA 25.

Management Activities	Calendar Date
Winter feeding – 20% alfalfa, 80% meadow hay	November 15-April 15
Calving season	February 15-April 15
Post-calving (branding, vaccinating, castrating); Pre-breeding vaccinate heifers	March 15-April 15
Breeding Season (~60 Days)	May 6-July 4
Graze Public Lands (BLM) – Brood cows and bulls (8 head)	April 15-June 30
Graze Public Lands (USFS) – Brood cows and bulls (8 head until July 4)	July 1-September 30
Graze Deeded/Leased Irrigated Pasture – Heifers, bulls (2 head until July 4) and horses; all bulls after July 4	April 15-September 30
Pregnancy check/vaccinate cows & Pre-condition calves	September 30-October 1
Wean calves; Market steer calves, culls & non-replacement heifer calves	October 15-November 15
Graze Deeded/Leased Non-irrigated Pasture - All livestock	October 1-December 1

*Note: overlap of dates may occur in this MLRA.

Land Cost

The cost of land is included in the budget on an AUM cost by land type. Deeded land grazing rate is calculated using area rates by type and availability and published in the USDA-NASS Agricultural Prices report for private, non-irrigated land by state (USDA-NASS, 2018). The rates were then averaged across the three states in this MLRA (Oregon, Nevada, and Idaho). Irrigated pasture and aftermath rates were assumed to be 30 percent higher than non-irrigated land rates.

Herd Characteristics

The livestock inventory consists of 200 brood cows, 10 bulls, and 6 horses. Eight bulls are provided for the brood cows and two bulls are provided for the replacement heifers at a rate of 25 cows per bull. Two bulls are bought annually in the spring prior to breeding season, and all bulls have a useful life of 5 years (cull rate of 20 percent for this herd size). Bulls begin the breeding season from May 6 and are removed July 4. Cow death loss is 2 percent, and 12 percent are culled annually resulting in replacement rate of 14 percent. The calving rate for all cows exposed is 88 percent, and calf death loss is 4 percent. Calving season is February 15-April 15.

All steer calves are sold, and 60 percent of the heifer calves are sold after weaning. The remaining 40 percent are selected at weaning as the next year's replacement heifers. This consists of 34 head of replacements with minimal death loss. Six heifers are then culled following fall breeding evaluation. Twenty-four cows are

culled from the herd due to older age and unsuccessful breeding. Steer calves, non-replacement heifer calves, cull cows, and cull bulls are marketed before mid-November. Livestock production and inventory is outlined in Table 4: Flow Chart of Livestock Production.

Gross Receipt

Gross receipts are five-year averages of prices received for livestock sold and indexed to 2017 dollars for the MLRA area (CattleFax, 2018; BLS, 2018). Livestock weights and prices received are shown in the enterprise budget (Table 3).

Animal Health (Veterinary and Medicine)

This includes vaccines, medicines, and all other veterinary services including pregnancy testing. Calves are given post-calving season vaccinations, are branded, dehorned, and bulls castrated between mid-March and mid-April. These vaccinations include 7-Way, IBR/PI3/BVD/BRSV, and Pour-On/wormer (Ivomec or Dectomax). Previous year's selected replacement heifers are given pre-breeding vaccinations including Vibriosis-Leptospirosis, 7-Way, IBR/PI3/BVD/BRSV, and Pour-On/wormer (Ivomec or Dectomax) before the May 6 bull turnout. Bulls will be tested for fertility and trichomoniasis. Cows and replacement heifers are pregnancy tested in the fall as the cattle are gathered and heifer calves are given Bangs vaccinations. Table 2 below gives typical vaccinating and animal health practices and cost estimations by livestock class as provided by Forero et al. (2017).

Table 2. Veterinary and Medicine Costs.

Activities	Cost per Unit	Number of Head	Total Cost
Cows - Vaccine, wormer, etc.	\$9.00	200	\$1,800.00
Cows - Vet service (preg check, etc.)	\$2.25	200	\$450.00
Bulls - Vaccine, wormer, etc.	\$15.50	10	\$155.00
Bulls - Vet service (trich, semen, etc)	\$40.00	10	\$400.00
Heifers - Vaccine, wormer, etc.	\$12.50	34	\$425.00
Heifers - Vet service (bangs, preg check)	\$7.25	34	\$246.50
Horses - Wormer	\$15.00	6	\$90.00
Calves - Dehorned, vaccine, boosters, dewormer, castrate (bulls calves only)	\$15.82	176	\$2,784.32
Total			\$6,350.82
Cost per cow			\$31.75

Marketing and Transportation

Calves and cull animals are marketed through local auctions. Most operators of this size and scale will utilize transportation companies for delivery of cattle and no ownership of a semi-truck and cattle pot. Trucking expenses are included in the budget as “Freight & Trucking” with a per mile cost of \$4.50 with an average of 250 miles and a minimum of at least three trips. “Marketing” is \$5.00 per head and incorporates auction sale commission, checkoff fees, and brand inspections for all livestock sold. These three operating costs are listed under “Other Operating Costs” in the budget.

Labor

Day work and/or contract workers are considered in this budget as hired labor and are paid at a rate of \$125 per day for maximum of 25 days in the year. The focus group indicated no other employees or labor for a herd of this size and scale. Day work or contract workers assist with cattle drives, branding, cattle work days, and additional calving season activities. The cost of owner labor and management are not included in the budget. The net returns in the budget are compensation to labor and management.

Taxes

Annual property tax costs are estimated following the tax rate of 1 percent on the assessed value of agriculture/farm land and personal property, as recommended by American Agriculture Economics Association (AAEA, 2000). Land values are averaged across an MLRA using rates provided by the U.S. Department of Agriculture in a 2017 Land Value Summary (US-

DA-NASS, 2017) by type of land, and pasture was valued in Oregon, Nevada, and Idaho at a rate of \$892 per acre. The 2012 Census of Agriculture (USDA-NASS, 2012) indicated the average farm size was 1,894 acres private land with only the counties included in this MLRA (Idaho counties: Cassia, Owyhee, Twin Falls; Nevada counties: Elko; Oregon counties: Malheur).

Inventory and Capital Investments

Buildings and improvements include a set of corrals that incorporate portable panels and a loading chute, a storage shop, calving barn/facility, and water developments. A squeeze chute, feed/hay bunks, tractor implements, veterinary equipment, storage tanks (fuel and water storage), and a livestock trailer have been included in the equipment inventory. Vehicles and machinery used for the cow-calf operation include two $\frac{3}{4}$ -ton trucks, a one-ton truck, one ATV, one 80 to 120 horsepower 4WD tractor, and one 75 horsepower tractor with front-end loader. Other equipment essential to the cow-calf operation are tools and branding irons. The depreciation costs are calculated using straight-line method and applying a 5 percent interest rate on useful life of the asset, determined by the Modified Accelerated Cost Recovery System (MACRS) standards. The machinery salvage value calculations come from Iowa State University of Science and Technology’s Cooperative Extension Service (File A3-29, Edwards, 2015). General maintenance and repairs on machinery and vehicles was provided by the focus group in a lump sum under “Ownership Costs and Capital”.

Interest on Operating Capital and Retained Livestock

Interest on operating capital expenses is derived from the assumption that 50 percent of all annual operating costs are borrowed for a period of six months at 5 percent interest.

Interest on retained livestock is the value of the herd multiplied by the 2 percent interest rate (Yi and Zhang, 2016). This cost is the opportunity cost of keeping the herd and can be thought of as the amount a rancher could have made if the value of the herd had otherwise been invested at a 2 percent interest rate. The value of the herd is calculated using the January 1 herd size and market prices received for bulls, mature cows and replacement heifers. Bull cost is valued at four times the budget's market price for a feeder steer (Meteer, 2014).

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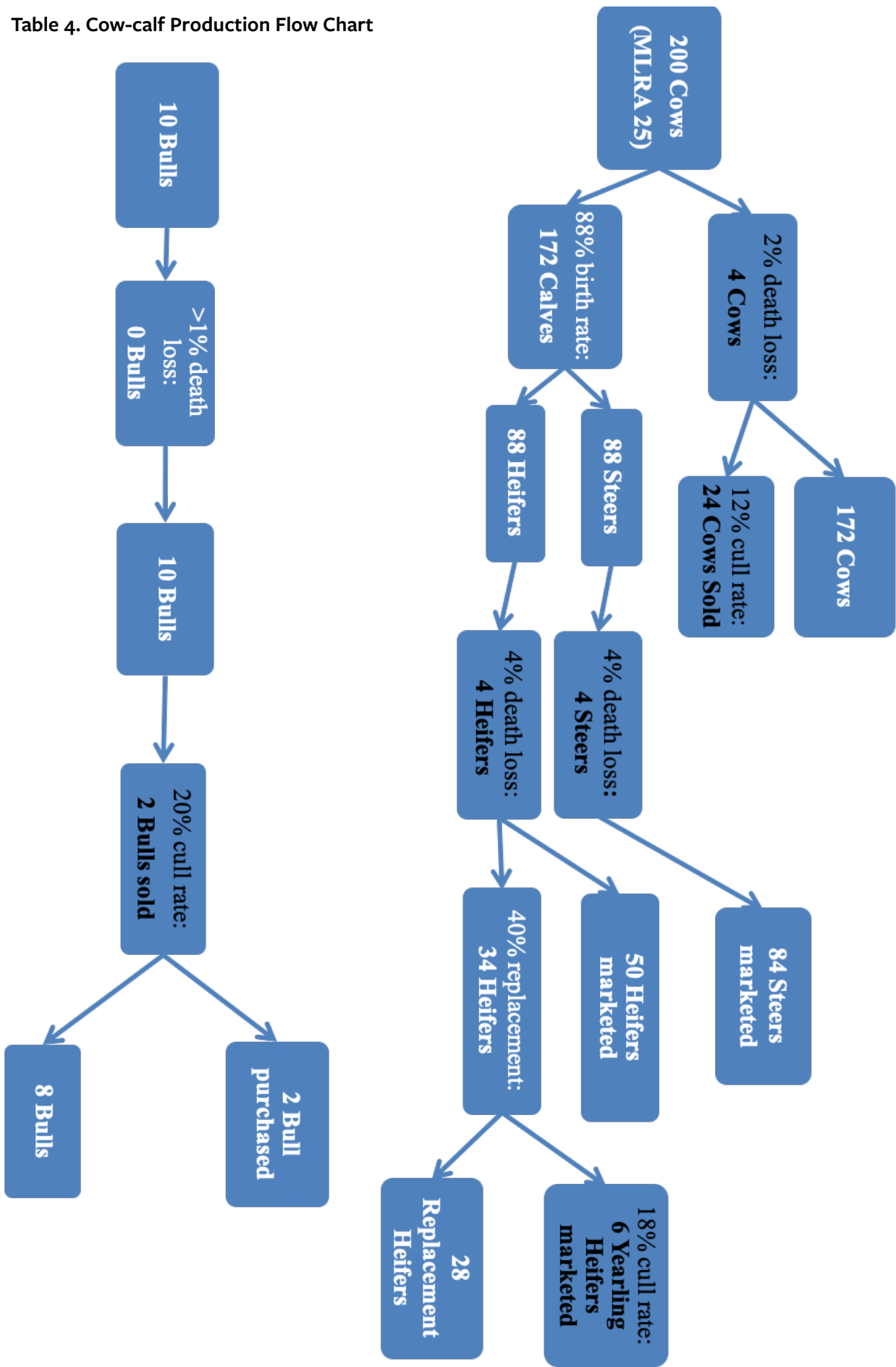
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Table 3. Enterprise Budget for 200-head, Cow-calf, Public Lands Ranch in MLRA 25.

MLRA 25: Owyhee High Plateau							
Public Land							
Herd Size: 200-head, Cow-calf, 10 Bulls							
	Weight	Unit	Total Head or Unit	Price or Cost Per Unit	Total Value	Price or Cost Per Cow	Your Value
Gross Receipts							
Steer Calves	5.40	cwt	84	\$ 192.17	\$ 87,168.31	\$ 435.84	_____
Heifer Calves	4.97	cwt	50	\$ 181.94	\$ 45,212.09	\$ 226.06	_____
Cull Cows	11.40	cwt	24	\$ 77.98	\$ 21,335.33	\$ 106.68	_____
Cull Bulls	18.00	cwt	2	\$ 91.73	\$ 3,302.28	\$ 16.51	_____
Cull Yearling Heifers	8.30	cwt	6	\$ 161.85	\$ 8,060.13	\$ 40.30	_____
Total Receipts					\$ 165,078.14	\$ 825.39	_____
Operating Costs							
USFS		AUM	684	\$ 1.87	\$ 1,279.08	\$ 6.40	_____
BLM		AUM	723	\$ 1.87	\$ 1,352.01	\$ 6.76	_____
Deeded Land							
Irrigated Pasture		AUM	307	\$ 19.24	\$ 5,906.68	\$ 29.53	_____
Aftermath (crop/hay)		AUM	549	\$ 19.24	\$ 10,562.76	\$ 52.81	_____
Winter Feed							
Meadow Hay		ton	357	\$ 180.85	\$ 64,563.45	\$ 322.82	_____
Alfalfa		ton	90	\$ 188.52	\$ 16,966.80	\$ 84.83	_____
Supplement							
Salt & Mineral		ton	7	\$ 554.40	\$ 3,880.80	\$ 19.40	_____
Fuel & Lube					\$ 5,000.00	\$ 25.00	_____
Supplies & Fencing					\$ 3,000.00	\$ 15.00	_____
Utilities					\$ 2,500.00	\$ 12.50	_____
Veterinary					\$ 6,350.82	\$ 31.75	_____
Repairs					\$ 5,000.00	\$ 25.00	_____
Hired Labor		day	25	\$ 125.00	\$ 3,125.00	\$ 15.63	_____
Other Operating Costs*					\$ 2,955.00	\$ 14.78	_____
Interest on Operating Capital		%	0.025	\$ 66,221.20	\$ 1,655.53	\$ 8.28	_____
Total Operating Costs					\$ 132,442.40	\$ 662.21	_____
<i>Income Above Operating Costs</i>					\$ 32,635.74	\$ 163.18	_____
Ownership Costs and Capital							
Purchased Livestock		bull	2	\$ 4,150.87	\$ 8,301.74	\$ 41.51	_____
Interest on Retained Livestock		%	0.02	\$437,026.04	\$ 8,740.52	\$ 43.70	_____
Asset Depreciation		\$			\$ 10,368.00	\$ 51.84	_____
Taxes		\$			\$ 16,894.48	\$ 84.47	_____
Total Ownership Costs					\$ 44,304.74	\$ 221.52	_____
Total Costs					\$ 176,747.14	\$ 883.74	_____
Returns to Labor and Management					<u>\$ (11,669.00)</u>	<u>\$ (58.35)</u>	_____

* Freight & Trucking \$1,125; Marketing \$830; Professional Fees \$1,000

Table 4. Cow-calf Production Flow Chart





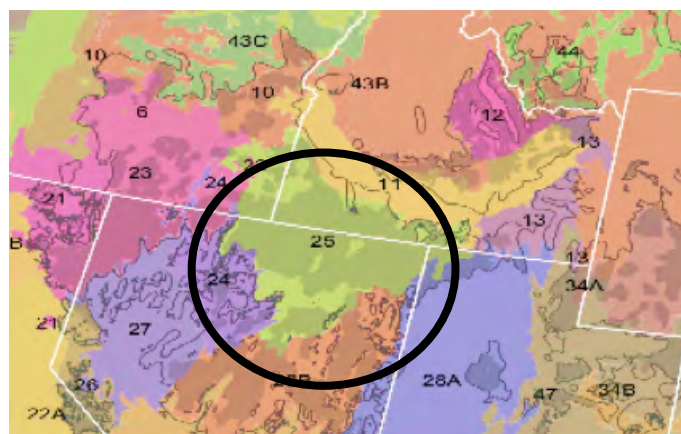
Enterprise budget for 150-head, cow-calf private land ranch

Owyhee High Plateau **MLRA 25**

Holly Dyer¹, Holly Kirkpatrick¹, Tom Hilken¹, Kendall Roberts¹,
Anna Maher¹, Nicolas Quintana Ashwell¹, John Tanaka², John
Ritten³, and Kristie Maczko²

Nevada counties: Elko

Oregon counties: Malheur



This budget represents typical cost and returns for a 150-head, cow-calf operation in Major Land Resource Area (MLRA) 25, the Owyhee High Plateau region. The information contained in this enterprise budget is derived from the assumptions of previous budget development in Idaho (Painter & Rimbey, 2014) and Nevada (Curtis et al., 2006) as well as utilization of focus group discussion in representative MLRA 23 (Oregon), MLRA 12 (Idaho), and MLRA 28b (Nevada).

Feed Sources

The main cow herd and six bulls graze private summer rangelands (deeded/leased) April 15-September 30. Replacement heifers, one bull, and horses remain on private irrigated pasture and meadows (deeded/leased) April 15-September 30. All livestock then graze crop/hay aftermath October 1-November 15. Cattle are

fed grass/alfalfa mix hay for five months November 15-April 15. All hay is valued at market price of five-year averages in region (USDA-NASS, 2018). Salt and minerals are fed at the rate of 4 pounds per-head per-month and provided year-round. An annual outlook of activities calendar with feed sources is described below in Table 1.

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Table 1. Annual Calendar Activities for 150-head Cow-Calf Operation in MLRA 25.

Management Activities	Calendar Date
Winter feeding – 20% alfalfa, 80% meadow hay	November 15-April 15
Calving season	February 15-April 15
Post-calving (branding, vaccinating, castrating); Pre-breeding vaccinate heifers	March 15-April 15
Breeding Season (~60 Days)	May 6-July 4
Graze Deeded/Lease Summer Range – Brood cows and 7 bulls (bulls removed from cows July 4)	April 15-September 30
Graze Deeded/Leased Irrigated Pasture – Heifers, bull (1 head until July 4) and horses; all bulls after July 4	April 15-September 30
Pregnancy check/vaccinate cows & pre-condition calves	September 30-October 1
Wean calves; Market steer calves, culls & non-replacement heifer calves	October 15-November 15
Graze Deeded/Leased Aftermath (crop/hay) – All livestock	October 1-December 1

*Note: overlap of dates may occur in this MLRA

Land Cost

The cost of land is included in the budget on an AUM cost by land type. Deeded land grazing rate is calculated using area rates by type and availability and published in the USDA-NASS Agricultural Prices report for private, non-irrigated land by state (USDA-NASS, 2018). The rates were then averaged across the three states in this MLRA (Oregon, Nevada and Idaho). Irrigated pasture and aftermath rates were assumed to be 30 percent higher than non-irrigated land rates.

Herd Characteristics

The livestock inventory consists of 150 brood cows, 7 bulls, and 6 horses. Six bulls are provided for the brood cows, and one bull is provided for the replacement heifers at a rate of 25 cows per bull. Two bulls are bought annually in the spring prior to breeding season, and all bulls have a useful life of 4 years (cull rate of 28 percent for this herd size). Bulls begin the breeding season from May 6 and are removed on July 4. Cow death loss is 2 percent, and 12 percent are culled annually resulting in replacement rate of 14 percent. The calving rate for all cows exposed is 88 percent, and calf death loss is 4 percent. Calving season takes place February 15-April 15.

All steer calves are sold, and 60 percent of the heifer calves are sold after weaning. The remaining 40 percent are selected at weaning as the next year's replacement heifers. This consists of 25 head of replacements with minimal death loss. Four heifers are then culled follow-

ing fall breeding evaluation. Eighteen cows are culled from the herd due to older age and unsuccessful breeding. Steer calves, non-replacement heifer calves, cull cows, and cull bulls are marketed before mid-November. Livestock production and inventory is outlined in Table 4: Flow Chart of Livestock Production.

Gross Receipts

Gross receipts are five-year average of prices received for livestock sold and indexed to 2017 dollars for the MLRA area (CattleFax, 2018; BLS, 2018). Livestock weights and prices received are shown in the enterprise budget (Table 3).

Animal Health (Veterinary and Medicine)

This includes vaccines, medicines, and all other veterinary services including pregnancy testing. Calves are given post-calving season vaccinations, are branded, dehorned, and bulls castrated between mid-March and mid-April. These vaccinations include 7-Way, IBR/PI3/BVD/BRSV, and Pour-On/wormer (Ivomec or Dectomax). Previous year's selected replacement heifers are given pre-breeding vaccinations including Vibriosis-Leptospirosis, 7-Way, IBR/PI3/BVD/BRSV, and Pour-On/wormer (Ivomec or Dectomax) before the May 6 bull turnout. Bulls will be tested for fertility and trichomoniasis. Cows and replacement heifers are pregnancy tested in the fall as the cattle are gathered, and heifer calves are given Bangs vaccinations. Table 2 below gives typical vaccinating and animal health practices and cost estimations by livestock class as provided by Forero et al. (2017).

Table 2. Veterinary and Medicine Costs.

Activities	Cost per Unit	Number of Head	Total Cost
Cows - Vaccine, wormer, etc.	\$9.00	150	\$1,350.00
Cows - Vet service (preg check, etc.)	\$2.25	150	\$337.50
Bulls - Vaccine, wormer, etc.	\$15.50	7	\$108.50
Bulls - Vet service (trich, semen, etc)	\$40.00	7	\$280.00
Heifers - Vaccine, wormer, etc.	\$12.50	25	\$312.50
Heifers - Vet service (bangs, preg check)	\$7.25	25	\$181.25
Horses - Wormer	\$15.00	6	\$90.00
Calves - Dehorned, vaccine, boosters, dewormer, castrate (bulls calves only)	\$15.82	132	\$2,088.24
Total			\$4,747.99
Cost per cow			\$31.65

Marketing and Transportation

Calves and cull animals are marketed through local auctions. Most operators of this size and scale will utilize transportation companies for delivery of cattle and no ownership of a semi-truck and cattle pot. Trucking expenses are included in the budget as “Freight & Trucking” with a per mile cost of \$4.50 with an average of 250 miles and a minimum of at least two trips. “Marketing” is \$5.00 per head and incorporates auction sale commission, checkoff fees, and brand inspections for all livestock sold. These three operating costs are listed under “Other Operating Costs” in the budget.

Labor

Day work and/or contract workers are considered in this budget as hired labor and are paid at a rate of \$125 per day for a maximum of 25 days in the year. The focus group indicated no other employees or labor for a herd of this size and scale. Day work or contract workers assist with cattle drives, branding, cattle work days, and additional calving season activities. The cost of owner labor and management are not included in the budget. The net returns in the budget are compensation to labor and management.

Taxes

Annual property tax costs are estimated following the tax rate of 1 percent on the assessed value of agriculture/farm land and personal property, as recommended by American Agriculture Economics Association (AAEA, 2000). Land values are averaged across an MLRA using rates provided by the U.S. Department of Agriculture in a 2017 Land Value Summary (US-

DA-NASS, 2017) by type of land, and pasture was valued in Oregon, Nevada, and Idaho at a rate of \$892 per acre. The 2012 Census of Agriculture (USDA-NASS, 2012) indicated the average farm size was 1,894 acres private land with only the counties included in this MLRA (Idaho counties: Cassia, Owyhee, Twin Falls; Nevada counties: Elko; Oregon counties: Malheur).

Inventory and Capital Investments

Buildings and improvements include a set of corrals that incorporate portable panels and a loading chute, a storage shop, calving barn/facility, and water developments. A squeeze chute, feed/hay bunks, tractor implements, veterinary equipment, storage tanks (fuel and water storage) and a livestock trailer have been included in the equipment inventory. Vehicles and machinery used for the cow-calf operation include two ¾-ton trucks, a one-ton truck, one ATV, one 80- to 120 horsepower 4WD tractor, and one 75 horsepower tractor with a front-end loader. Other equipment essential to the cow-calf operation are tools and branding irons. The depreciation costs are calculated using straight-line method and applying a 5 percent interest rate on useful life of the asset, determined by the Modified Accelerated Cost Recovery System (MACRS) standards. The machinery salvage value calculations come from Iowa State University of Science and Technology’s Cooperative Extension Service (File A3-29, Edwards, 2015). General maintenance and repairs on machinery and vehicles was provided by the focus group in a lump sum under “Ownership Costs and Capital”.

Interest on Operating Capital and Retained Livestock

Interest on operating capital expenses is derived from the assumption that 50 percent of all annual operating costs are borrowed for a period of six months at 5 percent interest.

Interest on retained livestock is the value of the herd multiplied by the 2 percent interest rate (Yi and Zhang, 2016). This cost is the opportunity cost of keeping the herd and can be thought of as the amount a rancher could have made if the value of the herd had otherwise been invested at a 2 percent interest rate. The value of the herd is calculated using the January 1 herd size and market prices received for bulls, mature cows and replacement heifers. Bull cost is valued at four times the budget's market price for a feeder steer (Meteer, 2014).

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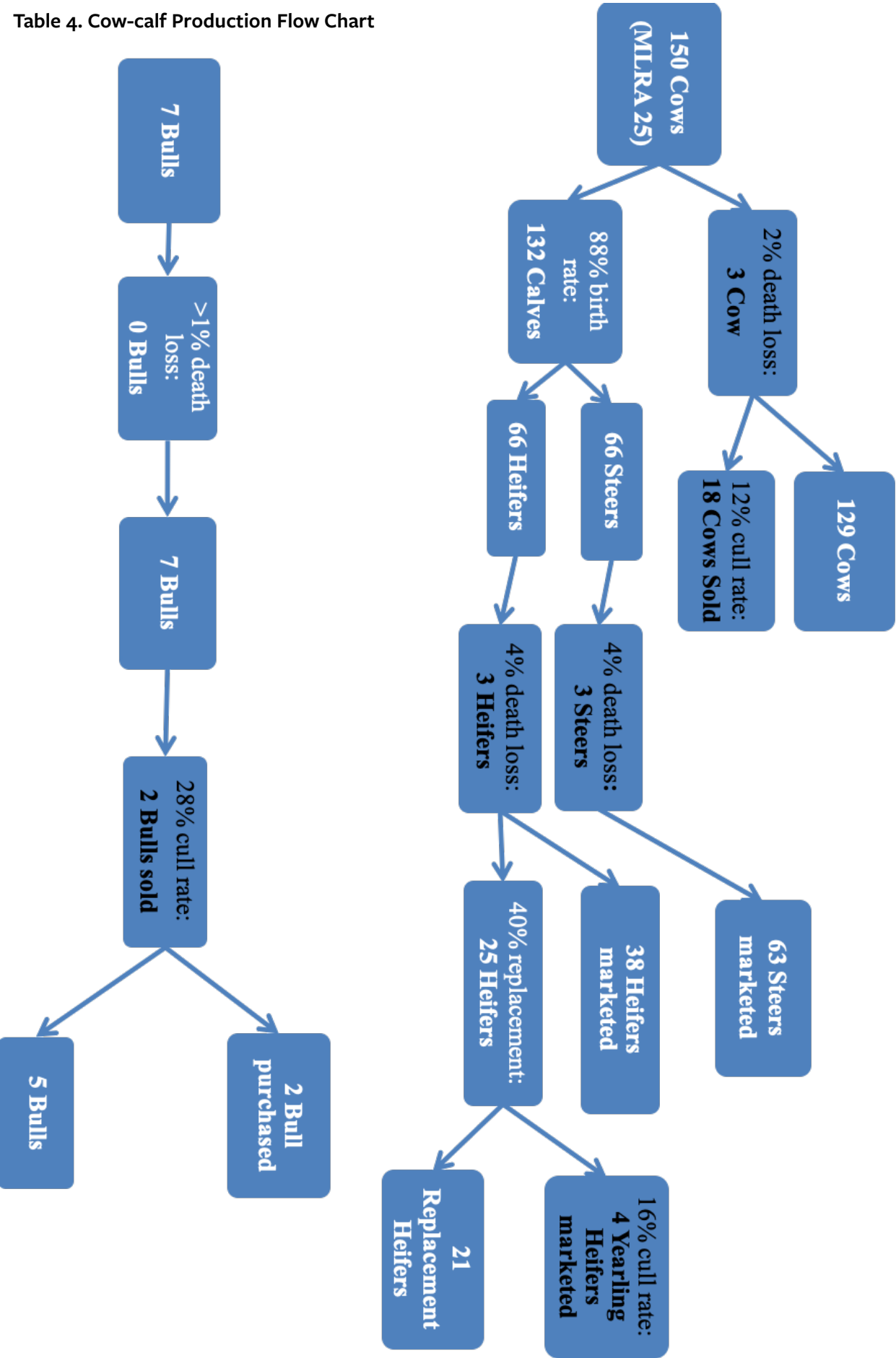
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Table 3. Enterprise Budget for 150 Cow-Calf, Private Lands Ranch in MLRA 25.

MLRA 25: Owyhee High Plateau							
Private Land							
Herd Size: 150-head, Cow-calf, 8 Bulls							
	Weight	Unit	Total Head or Unit	Price or Cost Per Unit	Total Value	Price or Cost Per Cow	Your Value
Gross Receipts							
Steer Calves	5.40	cwt	63	\$192.17	\$65,376.23	\$435.84	_____
Heifer Calves	4.97	cwt	38	\$181.94	\$34,361.19	\$229.07	_____
Cull Cows	11.40	cwt	18	\$77.98	\$16,001.50	\$106.68	_____
Cull Bulls	18.00	cwt	2	\$91.73	\$3,302.28	\$22.02	_____
Cull Yearling Heifers	8.30	cwt	4	\$161.85	\$5,373.42	\$35.82	_____
Total Receipts					\$124,414.62	\$829.43	_____
Operating Costs							
Deeded Land							
Summer Rangeland		AUM	1,064	\$14.80	\$15,747.20	\$104.98	_____
Irrigated Pasture		AUM	247	\$19.24	\$4,752.28	\$31.68	_____
Aftermath (crop/hay)		AUM	421	\$19.24	\$8,100.04	\$54.00	_____
Winter Feed							
Meadow Hay		ton	273	\$180.85	\$49,372.05	\$329.15	_____
Alfalfa		ton	69	\$188.52	\$13,007.88	\$86.72	_____
Supplement							
Salt & Mineral		ton	5	\$554.40	\$2,772.00	\$18.48	_____
Fuel & Lube					\$5,000.00	\$33.33	_____
Supplies & Fencing					\$3,000.00	\$20.00	_____
Utilities					\$2,500.00	\$16.67	_____
Veterinary					\$4,747.99	\$31.65	_____
Repairs					\$5,000.00	\$33.33	_____
Hired Labor		day	25	\$125.00	\$3,125.00	\$20.83	_____
Other Operating Costs*					\$2,750.00	\$18.33	_____
Interest on Operating Capital		percent	0.025	\$59,937.22	\$1,498.43	\$9.99	_____
Total Operating Costs					\$119,874.44	\$799.16	_____
<i>Income Above Operating Costs</i>					\$4,540.18	\$30.27	_____
Ownership Costs and Capital							
Purchased Livestock		bull	2	\$4,150.87	\$8,301.74	\$55.34	_____
Interest on Retained Livestock		percent	0.02	\$325,855.40	\$6,517.11	\$43.45	_____
Asset Depreciation		\$			\$10,368.00	\$69.12	_____
Taxes		\$			\$16,894.48	\$112.63	_____
Total Ownership Costs					\$42,081.33	\$280.54	_____
Total Costs					\$161,955.77	\$1,079.71	_____
Returns to Labor and Management					<u>\$(37,541.15)</u>	<u>\$(250.27)</u>	_____

* Freight & Trucking \$1,125; Marketing \$625; Professional Fees \$1,000

Table 4. Cow-calf Production Flow Chart





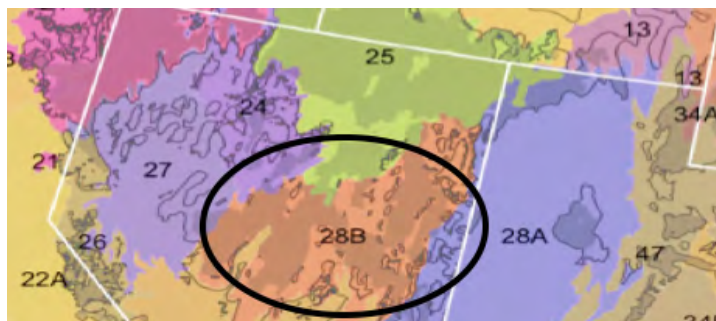
Enterprise budget for 500-head, cow-calf public land ranch

Central Nevada Basin and Range

MLRA 28B

Tom Hilken¹, Kendall Roberts¹, Holly Dyer¹, Holly Kirkpatrick¹,
Anna Maher¹, Nicolas Quintana Ashwell¹, Gary McCuin²,
John Tanaka³, John Ritten⁴, and Kristie Maczko³

Nevada counties: Eureka, White Pine, and Lander



This budget represents typical cost and returns for a 500-head, cow-calf operation in Major Land Resource Area (MLRA) 28B, the Central Nevada Basin and Range. This design and information was established by a producer panel from MLRA 28B.

Feed Sources

Feed is supplied as deeded pasture, Bureau of Land Management (BLM) public rangelands, and hay aftermath (alfalfa and meadow hay). Livestock are turned onto BLM rangeland April 15 and grazed until October 15, while crop aftermath fall grazing occurs from October 15-December 15. Replacement heifers are kept on deeded pasture April 15-December 15. Purchased

or raised alfalfa and native meadow grass hay is fed December 15-April 15 at a ratio of 20 percent alfalfa and 80 percent meadow hay. Salt and minerals are fed year-round and protein tubs are available for a 90-day period during the winter. A schedule of activities within a calendar year is listed in Table 1.

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⁴ Department of Agricultural and Applied Economics, University of Wyoming.

Table 1. Annual Calendar Activities for 500-head Cow-Calf Operation in MLRA 28b.

Management Activities	Calendar Date
Winter feeding – 20% alfalfa, 80% native meadow hay	December 15-April 15
Calving season	February 15-April 15
Mature cows and calves graze public rangeland April 15-October 15. Calves are earmarked, vaccinated, branded, and dehorned (bull calves castrated) prior to turnout. Cows are treated with insecticide prior to turnout.	April 15-October 15
Yearling heifers on deeded pasture April 15-December 15.	April 15-December 15
Bulls turned out May 15 with mature cow and heifer herds until August 1. Bulls trich and semen tested prior to turnout.	May 15-August 1
Mature cow herd fall grazing on private/leased crop aftermath (alfalfa and meadow hay pastures) from October 15–December 15	Oct.15-December 15
Cows and replacement heifers are vaccinated and pregnancy checked in October-November	October-November
Steer calves, non-selected replacement heifers are marketed for delivery in November. Cull bulls and cull cows are sold at auction in the fall.	October-November

Land Cost

The cost of land is included in the budget on an AUM cost by land type and ownership. Public land rates are published by the land management agencies. Deeded land rates for Nevada were obtained from USDA-NASS, Agricultural Prices (2018). Irrigated pasture and aftermath rates were assumed to be 30 percent higher than non-irrigated land rates.

Herd Characteristics

Livestock inventory consists of 500 cows, 24 bulls, and 8 horses. Six replacement bulls are bought most years, but only 5 are needed in other years. Bulls have a useful life of 4 years with a 1 percent death loss. Bulls are turned into the herd for the breeding season May 15-August 1. Cow death loss is 2 percent, and 10 percent are culled annually resulting in an annual replacement rate of 12 percent. The calving rate for all cows exposed is 90 percent with a 4 percent calf loss resulting in 86 percent of the mature cows weaning a calf in the fall. In the fall, all steer calves are sold, and 60 percent of the heifer calves are sold. The remaining 40 percent of heifer calves are selected at weaning as potential replacements and after death loss consist of 86 head. Twenty-six yearling open heifers are sold in the fall, and 60 replacement heifers are brought into the herd. Fifty mature cows are culled from the herd due to unsuccessful breeding or old age. Table 4 shows a cow-calf production flow chart.

Animal Health (Veterinary and Medicine)

Veterinary and medicine includes the value of vaccines, medicines, and veterinary services. Veterinary care for calves includes viral treatments, 8-Way vaccinations (given twice during the year) and dehorning and castration of bull calves. Heifer calves are also vaccinated for brucellosis. Cows, bulls, and replacement heifers receive vaccinations for viral infections, vibriosis, and leptospirosis. The herd is treated annually for parasites. Cows are pregnancy checked in the fall. Bulls also receive a semen and trichomoniasis test. Table 2 is a summary of veterinary and medical costs by class of livestock (estimates from Forero et al. 2017).

Marketing and Transportation

“Marketing Fees” are \$7.00 per head that includes sale commission, beef checkoff, and brand inspection fees for all livestock sold. Calves are marketed through video marketing sales through the summer with a late fall delivery. Cull animals are marketed through local auction markets and private treaty in the fall. Trucking and shipping fees are \$5.50 per mile for an average of 400 miles for cull animals with 2 trips required.

Labor

Labor is provided by the owner and his family with an additional 30 days of hired seasonal labor at \$125 per day for this ranch size. The ranch owner provides the seasonal employee free on-site housing and utilities. The cost of owner labor and management are not included in this budget. The net returns in this budget are compensation to labor and management.

Table 2. Veterinary and Medicine Costs.

Activities	Cost per Unit	Number of Head	Total Cost
Cows - Vaccine (Lepto Vibrio, 7-Way, IBR P13 BVD) wormer, and Pour-On	\$9.00	500	\$4,500.00
Cows - Vet service (preg check, misc. treatments)	\$5.00	500	\$2,500.00
Heifers - Vaccine (IBR P13 BVD), wormer, and Pour-On	\$12.50	86	\$1,075.00
Heifers - Vet Service (Bangs, preg check)	\$7.25	86	\$623.50
Bulls - Vaccine (7-Way), wormer, and Pour-On	\$15.50	24	\$372.00
Bulls - Vet service (trich and semen tested)	\$40.00	24	\$960.00
Calves - Vaccine (7-Way, IBR P13 BVD), dewormer, dehorned, castrate bull calves, and fly tags	\$15.82	450	\$7,119.00
Grand Total			\$17,149.50

Taxes

Annual property tax costs are estimated following the tax rate of 1 percent on the assessed value of agricultural/farm land as recommended by the American Agricultural Economics Association (AAEA, 2000). Land values are averaged across the MLRA using county values from USDA-NASS (2017) by deeded pasture land type at a rate of \$625 per acre. The USDA-NASS (2012) reported the average farm size was 3,355 acres private land for the counties included in this MLRA.

Inventory and Capital Investments

Buildings and equipment include a bunkhouse, shop and equipment (welder, air compressor, tools), calving barn, 1 set of permanent and 1 set of portable corrals, livestock water developments (including 1 solar powered pump and 1 gas powered pump), 1 portable squeeze chute, vet equipment, hydraulic post pounder, hay feed bunks (2.5 feet per head), 1 to 2 branding iron heaters and propane tanks, fuel and water storage tanks, electric fence materials, hay tarps and 2 goose-neck trailers. Buildings and equipment are valued at 80 percent of new replacement cost.

Machinery and vehicles include two 120 horsepower tractors, one 150 horsepower 4X4 equipped tractor with front-end loader, 1 backhoe, 2 flatbed 1-ton 4X4 pickups, one 1/2 ton 4X4 pickup, two ATVs, one mini farm truck or skidsteer, 2-ton feed truck, and water hauling truck. Values on these investments are calculated at 50 percent of new replacement cost to reflect typically aged but functional ranch vehicles and machinery.

The depreciation costs are calculated using straight-line method and assuming a 5 percent interest rate on useful life of the asset, as determined by the Modified Accelerated Cost Recovery System standards (IRS, 2017). The machinery salvage value calculations come from Iowa State University of Science and Technology's Cooperative Extension Service (Edwards, 2015).

Interest on Operating Capital and Retained Livestock

The interest amount on operating capital expenses was derived from the assumption half of all operating costs are borrowed for a period of 6 months assuming a 5 percent annual percentage rate.

Interest on retained livestock is the value of the herd multiplied by the 2 percent interest rate (Yi and Zang, 2016). This cost is the opportunity cost of keeping the herd. The value of the herd is calculated using a January 1 herd size, the budget's current average weight, and the market value for bred cows, bred heifers, and horses before death loss. The market value of replacement bulls are estimated at 4 times the value of a steer (Meteer, 2014).

Gross Receipts and Operating Expenditures

Livestock prices are five-year (2013-2017) averages from the CattleFax database (2018), while livestock weights are typical for this herd size and location. Hay and alfalfa prices are also five-year (2013-2017) averages from USDA-NASS (2018). All prices were in-

dexed to 2017 using the consumer price index prior to averages being calculated. Livestock average prices and weights, and average hay and alfalfa prices are shown under Total Receipts and Operating Costs in Table 3.

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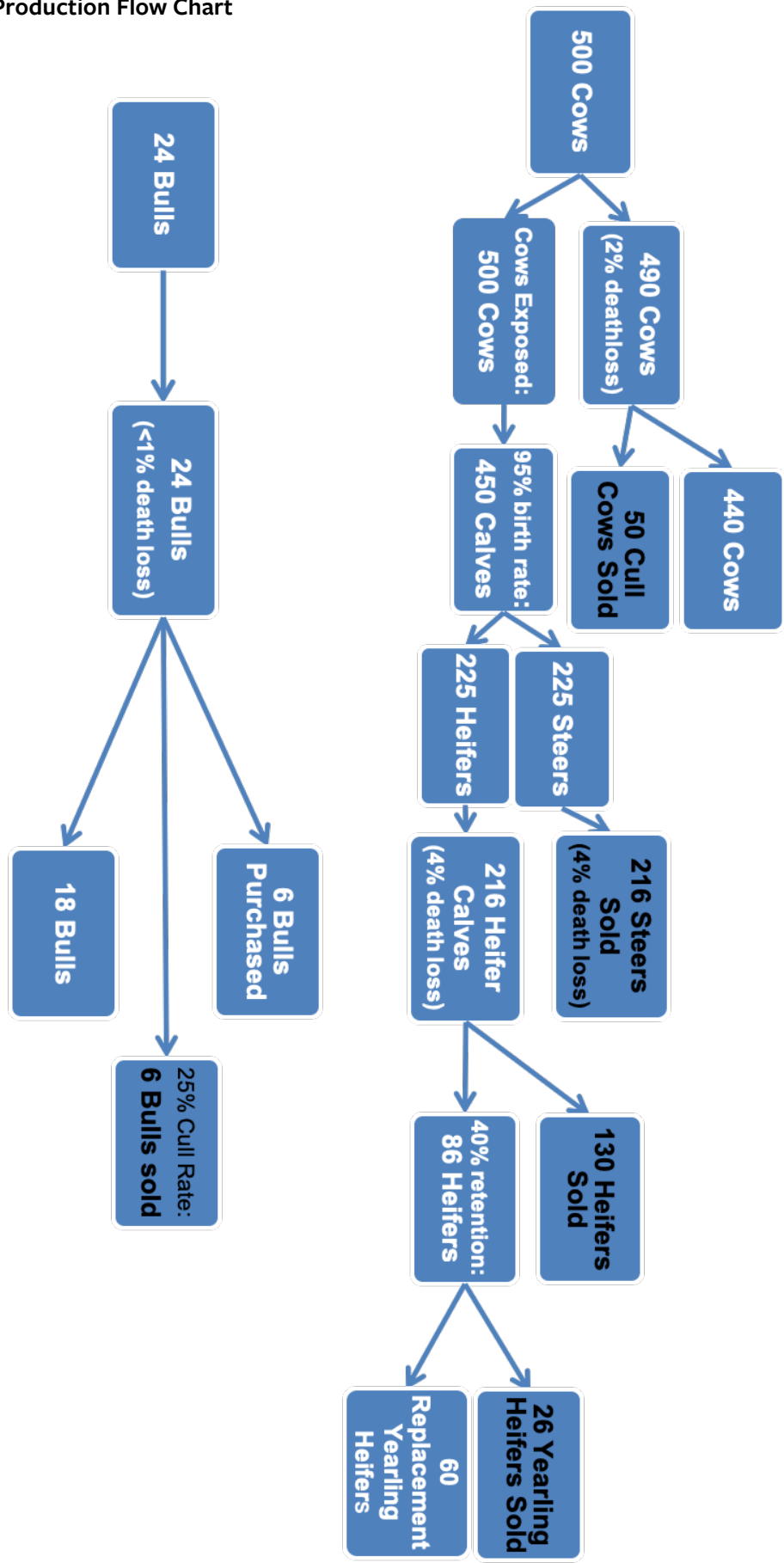
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Table 3. Enterprise Budget for 500-head, Cow-calf Public Land Ranch in MLR 28b.

MLRA 28b: Central Nevada Basin & Range Public Land Herd Size: 500-head, Cow-calf, 24 Bulls, 8 Horses							
	Weight	Unit	Total Head or Units	Price or Cost per Unit	Total Value	Value or Cost/ Cow	Your Value
Gross Receipts							
Steer Calves	5.00	cwt	216	\$197.79	\$213,613.20	\$427.23	
Heifer Calves	4.70	cwt	130	\$199.99	\$122,193.89	\$244.39	
Cull Cows	10.00	cwt	50	\$78.30	\$39,150.00	\$78.30	
Cull Bulls	18.00	cwt	6	\$91.88	\$9,923.04	\$19.85	
Cull Yearling Heifers	8.50	cwt	26	\$163.15	\$36,056.15	\$72.11	
Cull Horses	10.00	cwt	1	\$100.00	\$1,000.00	\$2.00	
Total Receipts					\$421,936.28	\$843.87	
Operating Costs							
BLM		AUM	2948	\$1.87	\$5,512.76	\$11.03	
Deeded:							
Crop aftermath		AUM	1340	\$12.87	\$17,245.80	\$34.49	
Irrigated Pasture		AUM	863	\$12.87	\$11,106.81	\$22.21	
Winter Feed:							
Meadow Hay		ton	794	\$189.17	\$150,200.98	\$300.40	
Alfalfa Hay		ton	198	\$193.53	\$38,318.94	\$76.64	
Supplement:							
Salt/Mineral		ton	13	\$260.00	\$3,380.00	\$6.76	
Protein Tubs		ton	69	\$500.00	\$34,500.00	\$69.00	
Fuel and Lube				\$18,000.00	\$18,000.00	\$36.00	
Machinery and Equipment Repair				\$5,000.00	\$5,000.00	\$10.00	
Supplies				\$5,000.00	\$5,000.00	\$10.00	
Fence Repair				\$5,000.00	\$5,000.00	\$10.00	
Utilities				\$10,000.00	\$10,000.00	\$20.00	
Veterinary Medicine:							
Cattle				\$17,149.50	\$17,149.50	\$34.30	
Horses		hd	8	\$400.00	\$3,200.00	\$6.40	
Hired Labor		day	30	\$125.00	\$3,750.00	\$7.50	
Other operating costs:*				\$9,980.00	\$9,980.00	\$19.96	
Interest on Operating Capital			\$168,672.40	2.50%	\$4,216.81	\$8.43	
Total Operating Costs					\$337,344.79	\$674.69	
<i>Income Above Operating Costs</i>					\$84,591.49	\$169.18	
Ownership Costs and Capital Recovery:							
Purchased livestock-6 bulls, 1 horse					\$26,757.00	\$53.51	
Interest on Retained Livestock			\$1,161,246.00	2.00%	\$23,224.92	\$46.45	
Asset Depreciation					\$20,440.00	\$40.88	
Property Taxes					\$20,969.00	\$41.94	
Total Ownership Costs					\$91,390.92	\$182.78	
Total Costs					\$428,735.71	\$857.47	
Net Returns Above Costs					<u>\$(6,799.43)</u>	<u>\$(13.60)</u>	

*Other operating costs include: trucking (\$4,400), marketing (\$3,080) and accounting (\$2,500)

Table 4. Cow-calf Production Flow Chart





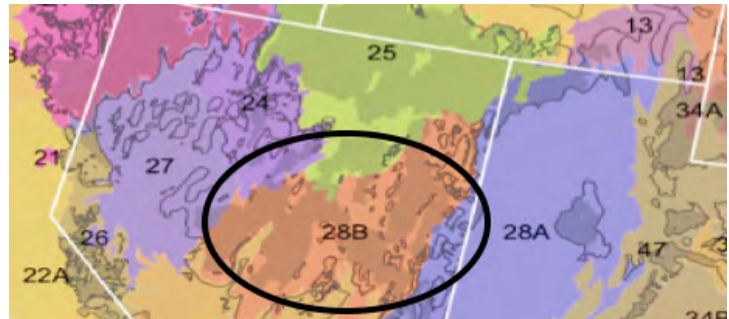
Enterprise budget for 500-head, cow-calf public land ranch

Central Nevada Basin and Range

MLRA 28B

Holly Dyer¹, Holly Kirkpatrick¹, Tom Hilken¹, Kendall Roberts¹,
Anna Maher¹, Nicolas Quintana Ashwell¹, Gary McCuin²,
John Tanaka³, John Ritten⁴, and Kristie Maczko³

Nevada counties: Eureka, White Pine, and Lander



This budget represents typical cost and returns for a 150-head, cow-calf operation in Major Land Resource Area (MLRA) 28b, the Central Nevada Basin and Range. A panel of producers from Eureka County assisted with the information contained in this enterprise budget.

Feed Sources

Bureau of Land Management (BLM) lands are available for ranchers to use from June 1-October 31 for a total of five months (USFS/BLM, 2017). All livestock graze these public lands. Brood cows, bulls, and heifers graze deeded (owned/leased) irrigated pasture for one month (May). Horses remain on deeded (owned/leased) pasture May 1-October 31, and bulls return after August

3. All livestock graze on hay aftermath November 1-December 31 and then fed grass/alfalfa mix hay January 1-April 30. All hay is valued at market price of five-year averages in region (USDA-NASS, 2018). Salt and minerals are fed at the rate of 4 pounds per-head per-month year-round. An annual outlook of activities calendar with feed sources is described in Table 1.

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Table 1. Annual Calendar Activities for 150-head Cow-Calf Operation in MLRA 28b.

Management Activities	Calendar Date
Winter feeding – 50% alfalfa, 50% meadow hay	January 1-April 30
Calving season	March 1-May 15
Post-calving (branding, vaccinating, castrating); Pre-breeding vaccinate cows & heifers	April 15-May 20
Breeding season (~75 Days)	May 20-August 3
Graze Deeded/Leased Irrigated Pasture - All (horses May-October; bulls after August 3)	May 1-May 31
Graze Public Lands (BLM) - All cattle (bulls removed from cows August 3)	June 1-October 31
Pregnancy check/vaccinate cows & pre-condition calves; wean calves; market steer calves	October 1-October 31
Market culls & non-replacement heifer calves	November 1-November 30
Graze Deeded/Leased Aftermath - All livestock	November 1-December 31
Note: overlap of dates may occur in this MLRA.	

Land Cost

The cost of land is included in the budget on an AUM cost by land type. Deeded land rate is calculated using area rates by type and availability and published in the USDA-NASS Agricultural Prices reports (2018). Irrigated pasture and aftermath rates were assumed to be 30 percent higher than non-irrigated land rates.

Herd Characteristics

The livestock inventory consists of 150 brood cows, 9 bulls, and 6 horses. Seven bulls are provided for the brood cows, and two bulls are provided for the replacement heifers at a rate of 20 cows per bull. Two bulls are bought annually in the spring prior to breeding season and all bulls have a useful life of four years (cull rate of 25 percent for this herd size). Bulls begin the breeding season from May 20 and are removed August 3 to coincide with calving season dates. Cow death loss is 2 percent, and 10 percent are culled annually resulting in replacement rate of 12 percent. The calving rate for all cows exposed is 90 percent, and calf death loss is 4 percent. Calving season is March 1-May 15.

All steer calves and 50 percent of the heifer calves are sold after weaning. The remaining 50 percent of heifer calves are selected at weaning as the next year's replacement heifers. This consists of 32 head of replacements with minimal death loss. Fourteen replacement heifers are then culled following fall breeding evaluation. Fifteen cows are culled from the herd due to older age and unsuccessful breeding. Steer calves are marketed in

October, and non-replacement heifer calves, cull cows, and cull bulls are marketed before the end of November. Livestock production and inventory is outlined in Table 4: Flow Chart of Livestock Production.

Gross Receipt

Gross receipts are a five-year average of prices received for livestock sold and indexed to 2017 dollars for the state of Nevada (CattleFax, 2018; BLS, 2018). Livestock weights and prices received are shown in the enterprise budget (Table 3). These are assumed "typical" by the focus group and confirmed by market data in the state of Nevada and the Central Nevada Basin and Range region.

Animal Health (Veterinary and Medicine)

This includes vaccines, medicines, and all other veterinary services including pregnancy testing. Pre-calving for mature cows and bred replacement heifers include scour prevention (ScourGard). Calves are given post-calving season vaccinations, are branded, dehorned, and bulls castrated between mid-April and mid-May. These vaccinations include 7-Way, IBR/PI3/BVD/BRSV, and Pour-On/wormer (Ivomec or Dectomax). Previous year's selected replacement heifers and mature cows are given pre-breeding vaccinations including Vibriosis-Leptospirosis, 7-Way, IBR/PI3/BVD/BRSV, and Pour-On/wormer (Ivomec or Dectomax) before the May 20 bull turnout. Bulls will be tested for fertility and trichomoniasis and receive Pour-On/wormer. Cows and replacement heifers are pregnancy tested in the fall as the cattle are gathered, and heifer

Table 2. Veterinary and Medicine Costs.

Activities	Cost per Unit	Number of Head	Total Cost
Cows - Vaccine, wormer, etc.	\$9.00	150	\$1,350.00
Cows - Vet service (preg check, etc.)	\$2.25	150	\$337.50
Bulls - Vaccine, wormer, etc.	\$15.50	9	\$139.50
Bulls - Vet service (trich, semen, etc.)	\$40.00	9	\$360.00
Heifers - Vaccine, wormer, etc.	\$12.50	32	\$400.00
Heifers - Vet service (Bangs, preg check)	\$7.25	32	\$232.00
Horses - Wormer	\$15.00	6	\$90.00
Calves - Dehorned, vaccine, boosters, dewormer, castrate (bulls calves only)	\$15.82	136	\$2,151.52
Total			\$5,060.52
Cost per cow			\$33.74

calves are given Bangs vaccinations. Table 2 below gives typical vaccinating and animal health practices and cost estimations by livestock class as provided by Forero et al. (2017).

Marketing and Transportation

Calves and cull animals are marketed through local auctions. Most operators of this size and scale will utilize transportation companies for delivery of cattle as the focus group indicated no ownership of a semi-truck and cattle pot. Trucking expenses are included in the budget as “Freight & Trucking” with per head costs of \$7.00. Mileage, included in per-head cost, will be an average of 400 miles for cull animals with a minimum of two trips required. “Marketing” is \$5.00 per head and incorporates auction sale commission, checkoff fees, and brand inspections for all livestock sold. These three operating costs are listed under “Other Operating Costs” in the budget.

Labor

Day work and/or contract workers are considered in this budget as hired labor and are paid at a rate of \$100 per day for a maximum of 15 days in the year. The focus group indicated no other employees or labor for a herd of this size and scale. Day work or contract workers assist with cattle drives, branding, cattle work days, and additional calving season activities. The cost of owner labor and management are not included in the budget. The net returns in the budget are compensation to labor and management.

Taxes

Annual property tax costs are estimated following the tax rate of 1 percent on the assessed value of agriculture/farm land and personal property, as recommended by American Agriculture Economics Association (AAEA, 2000). Land values are averaged across an MLRA using rates provided by the U.S. Department of Agriculture in a 2017 Land Value Summary (USDA-NASS, 2017) by type of land, and pasture was valued at a rate of \$625 in the Mountain Region (includes Nevada). The 2012 Census of Agriculture (USDA-NASS, 2012) indicated that average farm size was 3,355 acres private land with only the counties included in this MLRA (Eureka, White Pine, Lander).

Inventory and Capital Investments

Buildings, equipment, and improvements include a set of corrals that incorporate portable panels and a loading chute, a storage shop, a calving barn/facility, and water developments (portable and/or solar powered). A squeeze chute, calf table, feed/hay bunks, tractor implements, veterinary equipment, storage tanks (fuel and water storage), tools, and branding irons, and a livestock trailer were also included in the equipment inventory. Vehicles and machinery used for the cow-calf operation include one ½-ton truck, one ¾-ton truck, a 1-ton truck, one ATV, one 80 to 120 horsepower 4WD tractor, and one 75 horsepower tractor with front-end loader. The depreciation costs are calculated using straight-line method and applying a 5 percent interest rate on useful life of the asset, determined by the Modified Accelerated Cost Recovery System (MACRS)

standards (IRS, 2017). Calculations of machinery salvage value come from Iowa State University of Science and Technology's Cooperative Extension Service (Edwards, 2015).

Interest on Operating Capital and Retained Livestock

Interest on operating capital expenses is derived from the assumption that 50 percent of all annual operating costs are borrowed for a period of six months at 5 percent interest.

Interest on retained livestock is the value of the herd multiplied by the 2 percent interest rate (Yi and Zhang, 2016). This cost is the opportunity cost of keeping the herd and can be thought of as the amount a rancher could have made if the value of the herd had otherwise been invested at a 2 percent interest rate. The value of the herd is calculated using the January 1 herd size and market prices received for bulls, mature cows and replacement heifers. Bull purchase is valued at four times the budget's market price for a feeder steer (Meter, 2014).

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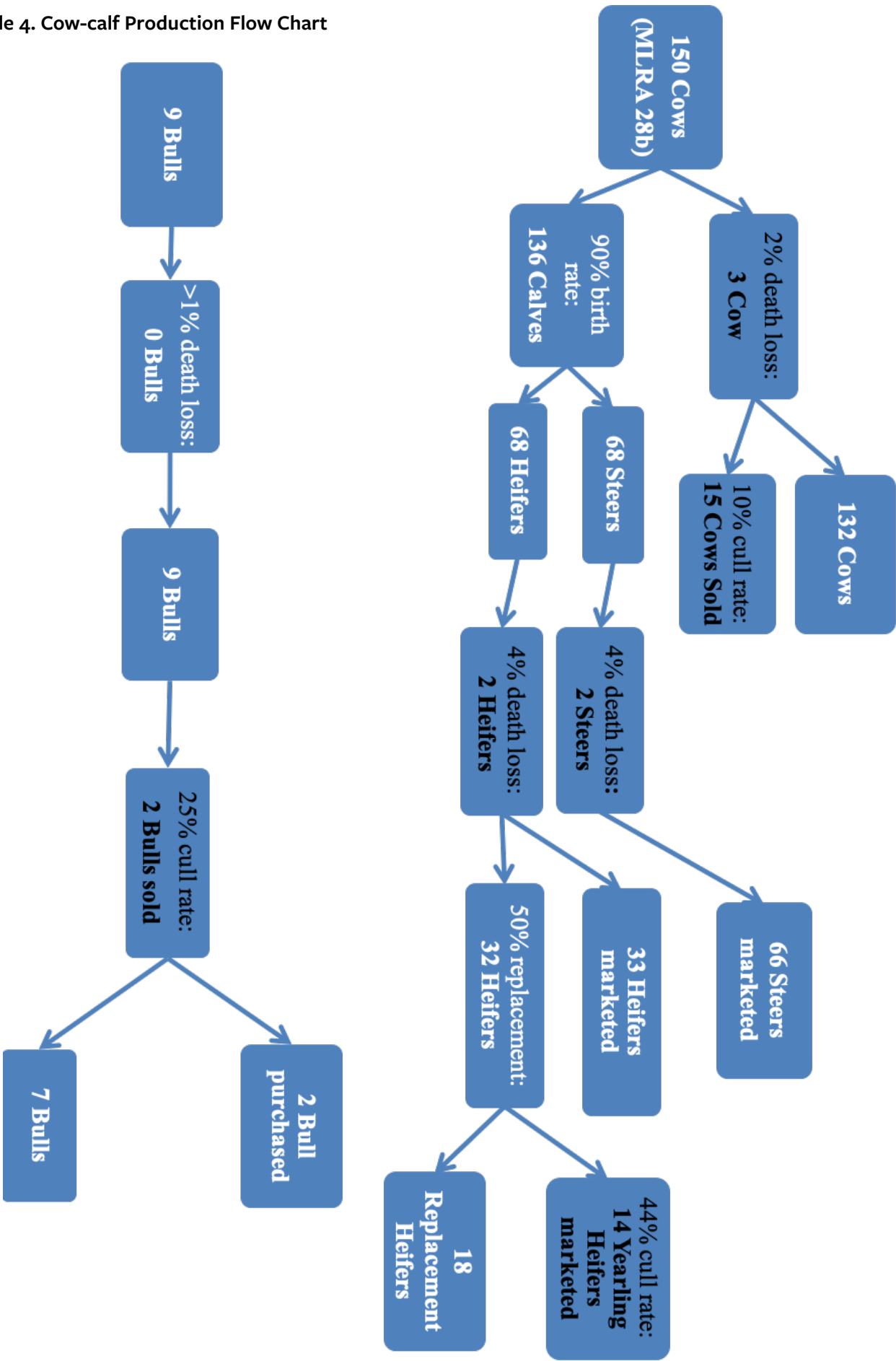
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Table 3. Enterprise Budget for a 150-head, Cow-calf, Public Land Ranch in MLRA 28b.

MLRA 28b: Central Nevada Basin and Range							
Public Land							
Herd Size: 150-head, Cow-calf, 9 Bulls							
	Weight	Unit	Total Head or Unit	Price or Cost Per Unit	Total Value	Price or Cost Per Cow	Your Value
Gross Receipts							
Steer Calves	5.50	cwt	66	\$197.79	\$71,797.77	\$478.65	_____
Heifer Calves	4.95	cwt	33	\$199.99	\$32,668.37	\$217.79	_____
Cull Cows	11.50	cwt	15	\$78.30	\$13,506.75	\$90.05	_____
Cull Bulls	20.00	cwt	2	\$91.88	\$3,675.20	\$24.50	_____
Cull Yearling Heifers	8.50	cwt	14	\$163.15	\$19,414.85	\$129.43	_____
Total Receipts					\$141,062.94	\$940.42	_____
Operating Costs							
BLM		AUM	1,047	\$1.87	\$1,957.89	\$13.05	_____
Deeded Land							
Irrigated Pasture		AUM	327	\$12.87	\$4,208.49	\$28.06	_____
Aftermath		AUM	440	\$12.87	\$5,662.80	\$37.75	_____
Winter Feed							
Meadow Hay		ton	179	\$189.17	\$33,861.43	\$225.74	_____
Alfalfa		ton	179	\$193.53	\$34,641.87	\$230.95	_____
Supplement							
Salt & Mineral		ton	6	\$554.40	\$3,326.40	\$22.18	_____
Fuel & Lube					\$5,000.00	\$33.33	_____
Supplies & Fencing					\$3,000.00	\$20.00	_____
Utilities					\$3,600.00	\$24.00	_____
Veterinary					\$5,060.52	\$33.74	_____
Repairs					\$5,000.00	\$33.33	_____
Hired Labor		day	15	\$100.00	\$1,500.00	\$10.00	_____
Other Operating Costs*					\$2,560.00	\$17.07	_____
Interest on Operating Capital		percent	0.025	\$54,689.70	\$1,367.24	\$9.11	_____
Total Operating Costs					\$109,379.40	\$729.20	_____
<i>Income Above Operating Costs</i>					\$31,683.54	\$211.22	_____
Ownership Costs and Capital							
Purchased Livestock		bull	2	\$4,351.38	\$8,702.76	\$58.02	_____
Interest on Retained Livestock		percent	0.02	\$333,111.53	\$6,662.23	\$44.41	_____
Asset Depreciation		\$			\$8,086.70	\$53.91	_____
Taxes		\$			\$20,968.75	\$139.79	_____
Total Ownership Costs					\$44,420.44	\$296.14	_____
Total Costs					\$153,799.84	\$1,025.33	_____
Returns to Labor and Management					<u>\$(12,736.91)</u>	<u>\$(84.91)</u>	_____

* Freight & Trucking \$910; Marketing \$650; Professional Fees \$1,000

Table 4. Cow-calf Production Flow Chart



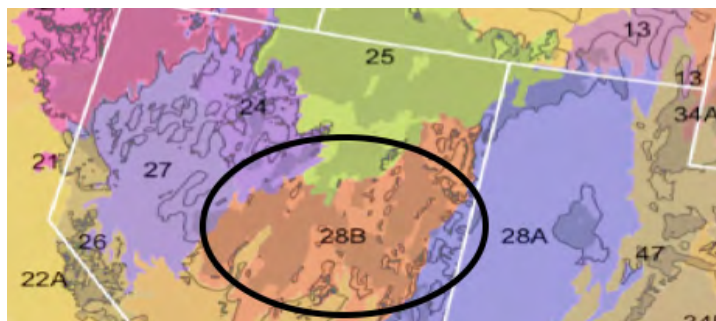


Enterprise budget for 100-head, cow-calf private land ranch

Central Nevada Basin and Range

MLRA 28B

Holly Dyer¹, Holly Kirkpatrick¹, Tom Hilken¹, Kendall Roberts¹,
Anna Maher¹, Nicolas Quintana Ashwell¹, Gary McCuin²,
John Tanaka³, John Ritten⁴, and Kristie Maczko³



Nevada counties: Eureka, White Pine, and Lander

This budget represents typical cost and returns for a 100-head, cow-calf operation in Major Land Resource Area (MLRA) 28b, the Central Nevada Basin and Range. A panel of producers from Eureka County assisted with the information contained in this enterprise budget.

Feed Sources

All livestock graze deeded (owned/leased) irrigated pasture May 1-October 31. All livestock graze on hay aftermath November 1-December 31, and then fed grass/alfalfa mix hay January 1-April 30. All hay is valued at market price of five-year averages in region (USDA -NASS, 2018). Salt and minerals are fed at the rate of 4 pounds per-head per-month and provided year-round. An annual outlook of activities calendar with feed sources is described in Table 1.

Land Cost

The cost of land is included in the budget on an AUM cost by land type. Deeded land rate is calculated using area rates by type and availability and published in the USDA-NASS Agricultural Prices reports (2018). Irrigated pasture and aftermath rates were assumed to be 30 percent higher than non-irrigated land rates.

¹ Department of Ecosystem Science and Management, University of Wyoming.

² Extension Educator, Eureka County Extension, University of Nevada, Reno

³ Wyoming Agricultural Experiment Station, University of Wyoming; Sustainable Rangelands Roundtable

⁴ Department of Agricultural and Applied Economics, University of Wyoming.

Table 1. Annual Calendar Activities for 100-head Cow-Calf Operation in MLRA 28b.

Management Activities	Calendar Date
Winter feeding – 50% alfalfa, 50% meadow hay	January 1-April 30
Calving season	March 1-May 15
Post-calving (branding, vaccinating, castrating); Pre-breeding vaccinate cows & heifers	April 15-May 20
Breeding season (~75 Days)	May 20-August 3
Graze Deeded/Leased Irrigated Pasture - All livestock (bulls removed August 3)	May 1-October 31
Pregnancy check/vaccinate cows & pre-condition calves; wean calves; market steer calves	October 1-October 31
Market culls & non-replacement heifer calves	November 1-November 30
Graze Deeded/Leased Aftermath - All livestock	November 1-December 31
Note: overlap of dates may occur in this MLRA	

Herd Characteristics

The livestock inventory consists of 100 brood cows, 6 bulls, and 4 horses. Five bulls are provided for the brood cows, and one bull is provided for the replacement heifers at a rate of 20 cows per bull. Two bulls are bought annually in the spring prior to breeding season three out of four years, and all bulls have a useful life of four years (cull rate of 2 percent for this herd size). Bulls begin the breeding season May 20 and are removed August 3 to coincide with calving season dates. Cow death loss is 2 percent and 10 percent are culled annually resulting in replacement rate of 12 percent. The calving rate for all cows exposed is 90 percent, and calf death loss is 4 percent. Calving season takes is March 1-May 15.

All steer calves and 50 percent of the heifer calves are sold after weaning. The remaining 50 percent of heifer calves are selected at weaning as the next year's replacement heifers. This consists of 21 head of replacements with minimal death loss. Nine replacement heifers are then culled following fall breeding evaluation. Ten cows are culled from the herd due to older age and unsuccessful breeding. Steer calves are marketed in October, and non-replacement heifer calves, cull cows, and cull bulls are marketed before the end of November. Livestock production and inventory is outlined in Table 4: Flow Chart of Livestock Production.

Gross Receipt

Gross receipts are a five-year average of prices received for livestock sold and indexed to 2017 dollars for the state of Nevada (CattleFax, 2018; BLS, 2018). Livestock weights and prices received are shown in the enterprise

budget (Table 3). These are assumed “typical” by the focus group and confirmed by market data in the state of Nevada and the Central Nevada Basin and Range region.

Animal Health (Veterinary and Medicine)

This includes vaccines, medicines, and all other veterinary services including pregnancy testing. Pre-calving for mature cows and bred replacement heifers include scour prevention (ScourGard). Calves are given post-calving season vaccinations, are branded, dehorned, and bulls castrated between mid-April and mid-May. These vaccinations include 7-Way, IBR/PI3/BVD/BRSV, and Pour-On/wormer (Ivomec or Dectomax). Previous year's selected replacement heifers and mature cows are given pre-breeding vaccinations including Vibriosis-Leptospirosis, 7-Way, IBR/PI3/BVD/BRSV, and Pour-On/wormer (Ivomec or Dectomax) before the May 20 bull turnout. Bulls will be tested for fertility and Trichomoniasis and receive Pour-On/wormer. Cows and replacement heifers are pregnancy tested in the fall as the cattle are gathered and heifer calves are given Bangs vaccinations. Table 2 below gives typical vaccinating and animal health practices and cost estimations by livestock class as provided by Forero et al. (2017).

Marketing and Transportation

Calves and cull animals are marketed through local auctions. Most operators of this size and scale will utilize transportation companies for delivery of cattle as the focus group indicated no ownership of a semi-truck and cattle pot. Trucking expenses are included in the budget as “Freight & Trucking” with per head costs

Table 2. Veterinary and Medicine Costs.

Activities	Cost per Unit	Number of Head	Total Cost
Cows - Vaccine, wormer, etc.	\$9.00	100	\$900.00
Cows - Vet service (preg check, etc.)	\$2.25	100	\$225.00
Bulls - Vaccine, wormer, etc.	\$15.50	6	\$93.00
Bulls - Vet service (trich, semen, etc.)	\$40.00	6	\$240.00
Heifers - Vaccine, wormer, etc.	\$12.50	21	\$262.50
Heifers - Vet service (Bangs, preg check)	\$7.25	21	\$152.25
Horses - Wormer	\$15.00	4	\$60.00
Calves - Dehorned, vaccine, boosters, dewormer, castrate (bulls calves only)	\$15.82	90	\$1,423.80
Total			\$3,356.55
Cost per cow			\$33.57

of \$7.00. Mileage, included in per head cost, will be an average of 400 miles for cull animals with a minimum of two trips required. “Marketing” is \$5.00 per head and incorporates auction sale commission, check-off fees, and brand inspections for all livestock sold. These three operating costs are listed under “Other Variable Costs” in the budget.

Labor

Day work and/or contract workers are considered in this budget as hired labor and are paid at a rate of \$100 per day for maximum of 10 days in the year. The focus group indicated no other employees or labor for a herd of this size and scale. Day work or contract workers assist with cattle drives, branding, cattle work days and additional calving season activities. The cost of owner labor and management are not included in the budget. The net returns in the budget are compensation to labor and management.

Taxes

Annual property tax costs are estimated following the tax rate of 1 percent on the assessed value of agriculture/farm land and personal property, as recommended by American Agriculture Economics Association (AAEA, 2000). Land values are averaged across an MLRA using rates provided by the U.S. Department of Agriculture in a 2017 Land Value Summary (USDA-NASS, 2017) by type of land, and pasture was valued at a rate of \$625 in the Mountain Region (includes Nevada). The 2012 Census of Agriculture (USDA-NASS, 2012) indicated the average farm size

was 3,355 acres private land with only the counties included in this MLRA (Eureka, White Pine, Lander).

Inventory and Capital Investments

Buildings, equipment, and improvements include a set of corrals that incorporate portable panels and a loading chute, a storage shop, a calving barn/facility, and water developments (portable and/or solar powered). A squeeze chute, calf table, feed/hay bunks, tractor implements, veterinary equipment, storage tanks (fuel and water storage), tools, and branding irons, and a livestock trailer were also included in the equipment inventory. Vehicles and machinery used for the cow-calf operation include one ½-ton truck, one ¾-ton truck, a one-ton truck, one ATV, one 80 to 120 horsepower 4WD tractor, and one 75 horsepower tractor with a front-end loader. The depreciation costs are calculated using straight-line method and applying a 5 percent interest rate on useful life of the asset, determined by the Modified Accelerated Cost Recovery System (MACRS) standards (IRS, 2017). Calculations of machinery salvage value come from Iowa State University of Science and Technology’s Cooperative Extension Service (Edwards, 2015).

Interest on Operating Capital and Retained Livestock

Interest on operating capital expenses is derived from the assumption that 50 percent of all annual operating costs are borrowed for a period of six months at 5 percent interest.

Interest on retained livestock is the value of the herd multiplied by the 2 percent interest rate (Yi and Zhang, 2016). This cost is the opportunity cost of keeping the herd and can be thought of as the amount a rancher could have made if the value of the herd had otherwise been invested at a 2 percent interest rate. The value of the herd is calculated using the January 1 herd size and market prices received for bulls, mature cows and replacement heifers. Bull purchase is valued at four times the budget's market price for a feeder steer (Meter, 2014).

References

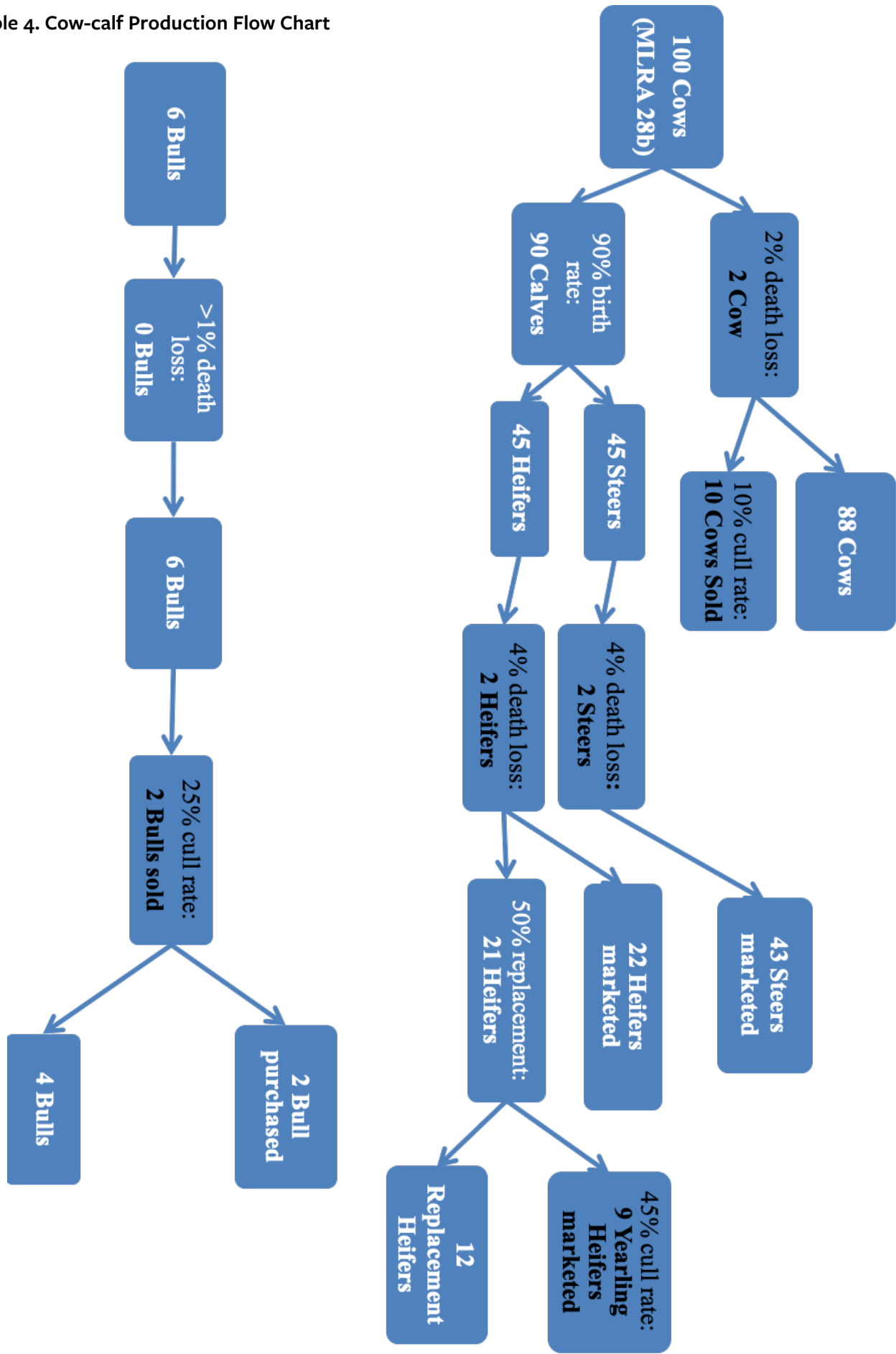
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Table 3. Enterprise Budget for a 100-head, Cow-calf, Private Land Ranch in MLRA 28b.

MLRA 28b: Central Nevada Basin and Range							
Private Land							
Herd Size: 100-head, Cow-calf, 6 Bulls							
	Weight	Unit	Total Head or Unit	Price or Cost Per Unit	Total Value	Price or Cost Per Cow	Your Value
Gross Receipts							
Steer Calves	5.50	cwt	43	\$197.79	\$46,777.34	\$467.77	_____
Heifer Calves	4.95	cwt	22	\$199.99	\$21,778.91	\$217.79	_____
Cull Cows	11.50	cwt	10	\$78.30	\$9,004.50	\$90.05	_____
Cull Bulls	20.00	cwt	2	\$91.88	\$3,675.20	\$36.75	_____
Cull Yearling Heifers	8.50	cwt	9	\$163.15	\$12,480.98	\$124.81	_____
Total Receipts					\$93,716.92	\$937.17	_____
Operating Costs							
Deeded Land							
Irrigated Pasture		AUM	914	\$12.87	\$11,763.18	\$117.63	_____
Aftermath		AUM	292	\$12.87	\$3,758.04	\$37.58	_____
Winter Feed							
Meadow Hay		ton	119	\$189.17	\$22,511.23	\$225.11	_____
Alfalfa		ton	119	\$193.53	\$23,030.07	\$230.30	_____
Supplement							
Salt & Mineral		ton	4	\$554.40	\$2,217.60	\$22.18	_____
Fuel & Lube					\$5,000.00	\$50.00	_____
Supplies & Fencing					\$3,000.00	\$30.00	_____
Utilities					\$3,600.00	\$36.00	_____
Veterinary					\$3,356.55	\$33.57	_____
Repairs					\$5,000.00	\$50.00	_____
Hired Labor		day	10	\$100.00	\$1,000.00	\$10.00	_____
Other Operating Costs*					\$2,032.00	\$20.32	_____
Interest on Operating Capital		%	0.025	\$43,134.34	\$1,078.36	\$10.78	_____
Total Operating Costs					\$86,268.67	\$862.69	_____
<i>Income Above Operating Costs</i>					\$7,448.25	\$74.48	_____
Ownership Costs and Capital							
Purchased Livestock		bull	2	\$4,351.38	\$8,702.76	\$87.03	_____
Interest on Retained Livestock		%	0.02	\$221,332.35	\$4,426.65	\$44.27	_____
Asset Depreciation		\$			\$8,086.70	\$80.87	_____
Taxes		\$			\$20,968.75	\$209.69	_____
Total Ownership Costs					\$42,184.86	\$421.85	_____
Total Costs					\$128,453.53	\$1,284.54	_____
Returns to Labor and Management					<u>\$(34,736.61)</u>	<u>\$(347.37)</u>	_____

* Freight & Trucking \$602; Marketing \$430; Professional Fees \$1,000

Table 4. Cow-calf Production Flow Chart





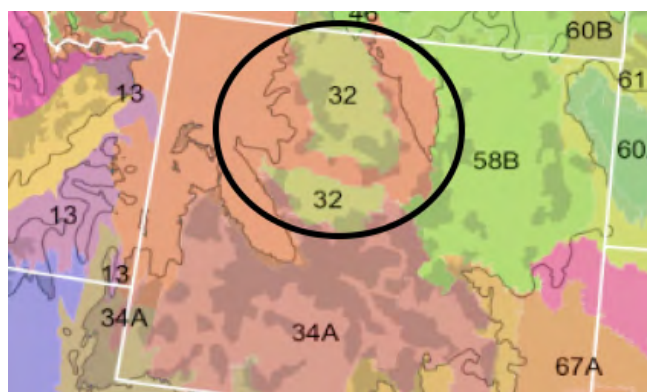
Enterprise budget for 300-head, cow-calf public land ranch

North Intermountain Desertic Basins

MLRA 32

Holly Kirkpatrick¹, Holly Dyer¹, Tom Hilken¹, Kendall Roberts¹, Anna Maher¹, Nicolas Quintana Ashwell¹, Caitlin Youngquist², John Tanaka³, John Ritten⁴, and Kristie Maczko³

Wyoming counties: Big Horn, Washakie, Hot Springs, Fremont



This budget represents typical cost and returns for a 300-head, cow-calf operation in Major Land Resource Area (MLRA) 32, the Northern Intermountain Desertic Basins. A panel of producers from Big Horn, Washakie, Hot Springs, and Fremont counties assisted with the information contained in this enterprise budget.

Feed Sources

Feed is supplied from: Bureau of Land Management (BLM), United States Forest Service (USFS) Lands, deeded rangelands, and meadow hay aftermath. Livestock are grazed on BLM and USFS rangelands from July 1-Oct. 9. Deeded hay meadow aftermath is grazed from Oct. 10 until winter feeding begins, typically Jan 1. Deeded rangeland is grazed from May 15-June 30. Cattle are fed equal amounts of alfalfa and

meadow hay for 4½ months from Jan. 1-May 15. Salt and minerals are fed during the summer months, and protein tubs and protein cake are fed during the winter months. A schedule of activities within a calendar year are listed in Table 1.

Land Cost

The cost of land is included in the budget on a per Animal Unit Month (AUM) cost by land type. In the

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Table 1. Annual Calendar Activities for 300-head Cow-Calf Operation in MLRA 32.

Management Activities	Calendar Date
Begin winter feed and provide protein supplements	Jan 1 - May 15
Calving	March 10 - May 10
Market open-animals; work replacement heifers	May 15
Graze deeded rangeland	May 15 - June 30
Breeding	June 10 - Aug 10
Branding	May 1 - May 31
Graze USFS or BLM Land	July 1 - Oct 9
Trail to base or home operation; vaccine and preg check cows; wean and sell calves and cull animals	Oct 10
Graze deeded aftermath	Oct 11 - Jan 1

case of public lands, per AUM rates are published by the land management agency. Deeded land cost is calculated based on prevailing lease rates for rangelands in the area. Aftermath grazing is assumed to have the same cost per AUM – not necessarily the same rate per acre.

Herd Characteristics

Livestock inventory consists of 300 cows, 14 bulls, and 9 horses. Three replacement bulls are bought four of five years and two in the fifth year, and all bulls have a useful life of five years. Bulls are turned into the herd for a two-month breeding season from June 10 to Aug. 10. Cow death loss is 1%, and 12% are culled annually resulting in an annual replacement rate of 13%. The weaning rate for all cows exposed to bulls is 87%. In the fall, all steer calves are sold, and 63% of heifer calves are sold. The remaining 37% of heifer calves are selected at weaning as potential replacement heifers and after death loss consist of 48 head. Seven replacement heifers are culled and sold in the spring, and 39 replacement-heifer yearlings are brought into the herd. Due to unsuccessful breeding or old age, 36 cows are culled from the herd. Steer calves, non-replacement heifer calves, cull bulls, and cull cows are marketed for delivery in October. Also in October, all cattle are vaccinated while cows and replacement heifers are pregnancy-checked. All steer and heifer calves are earmarked, branded, dehorned, and vaccinated by May 31. Steer calves are also commonly castrated and implanted during branding (May). Table 4 shows a cow-calf production flow chart.

Animal Health (Veterinary and Medicine)

This includes vaccines, medicines, and all other veterinary services including pregnancy testing. Pre-calving for mature cows and bred replacement heifers include scour prevention (ScourGard). Calves are given post-calving season vaccinations, are branded, dehorned, and bulls castrated in June. These vaccinations include 7-way, IBR/PI3/BVD/BRSV, and pour-on/wormer (Ivomec or Dectomax). Previous year's selected replacement heifers and mature cows are given pre-breeding vaccinations including Vibriosis-Leptospirosis, 7-way, IBR/PI3/BVD/BRSV, and pour-on/wormer (Ivomec or Dectomax) before the May 15 bull turnout. Bulls will be tested for fertility and trichomoniasis and receive pour-on/wormer. Cows and replacement heifers are pregnancy tested in the fall as the cattle are gathered and heifer calves are given Bangs vaccinations. Table 2 gives typical vaccinating and animal health practices and cost estimations by livestock class as provided by Forero et al. (2017). Approximately 50% of ranchers in this MLRA artificially inseminate their replacement heifers in June. The \$36 per head cost of artificial insemination is not included in Table 2 but can be found as a line item on the enterprise budget (Table 3).

Marketing and Transportation

In the summer months, calves are marketed through video auction. All calves sold are delivered in October. Both fall and spring, culled livestock are transported to sale barns and sold through local auction markets. Freight and trucking expenses are included in the marketing fees, which total 4% of gross receipts in Table 3.

Table 2. Veterinary and Medicine Costs.

Activities	Cost per Unit	Number of Head	Total Cost
Cows - Vaccine, wormer, etc.	\$9.00	300	\$2,700.00
Cows - Vet service (preg check, etc.)	\$2.25	300	\$675.00
Bulls - Vaccine, wormer, etc.	\$15.50	14	\$216.35
Bulls - Vet service (trich, semen, etc.)	\$40.00	14	\$558.32
Heifers - Vaccine, wormer, etc.	\$12.50	49	\$611.89
Heifers - Vet service (bangs, preg check)	\$7.75	49	\$354.59
Horses - Wormer	\$15.00	9	\$135.00
Calves - Dehorned, vaccine, boosters, dewormers, castrate (bull calves only)	\$15.82	261	\$4,121.90
Total			\$9,373.35
Cost per cow	\$31.24		

Labor

Labor is provided by the owner or manager and their family. Additional part-time labor is required to trail cattle to and from BLM and USFS land. Approximately five day laborers are hired at a rate of \$150 per day for an average of five days each year. The cost of owner labor and management are not included in the budget. The net returns in this budget are compensation to labor and management.

Taxes

Taxes on real property is estimated using the average farm size by county within MLRA 32 (USDA-NASS, 2012). The average land value per farm is calculated by multiplying the farm size by the average pasture value per acre for Wyoming (USDA-NASS, 2017). Total taxes on real property is then calculated by multiplying the average land value per farm by the tax rate of 1% (AAEA, 2000).

Inventory and Capital Investments

There are five buildings and structures for a large cow-calf operation including one shop, two homes, and two calving barns. Vehicles used for the ranch enterprise include a 130 horsepower tractor, a goose-neck 32-foot stock trailer, a 48-foot flatbed trailer, and a 1-ton 4x4 pickup truck. The ranch also uses two ATVs. Other machinery and equipment include one set of corrals, a portable loading chute, and one squeeze chute. This budget's depreciation costs are calculated using straight-line depreciation and applying a 5% interest rate, useful life by asset as determined by the Modified Accelerated Cost Recovery System (MACRS)

standards, and machinery salvage value calculations from Iowa State University of Science and Technology's Cooperative Extension Service (File A3-29, Edwards, 2015).

Interest on Operating Capital and Retained Livestock

Interest on operating capital expenses is derived from the assumption that 50% of all annual operating costs are borrowed for a period of six months assuming a 5% annual percentage rate.

Interest on retained livestock is the value of the herd multiplied by the 2% interest rate (Yi and Zhang, 2016). This cost is the opportunity cost of keeping the herd. The value of the herd is calculated using the January 1 herd size, the budget's sale weights, and market value for bred cows, bred heifers, and horses before death loss. The market value of replacement bulls are estimated at four times the value of a steer (Meteer, 2014).

Gross Receipts and Operating Expenditures

Livestock prices are five-year (2013-2017) averages from the CattleFax data base (2018) for Wyoming. Hay and alfalfa prices are also five-year (2013-2017) averages from USDA-NASS (2018) for Wyoming. Livestock weights are typical for this herd size and location. All averaged prices were indexed to 2017 using the consumer price index prior to averages being calculated. Livestock averaged prices and averaged hay and alfalfa prices are shown under Total Receipts and Operating Costs in Table 3.

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Table 3. Enterprise Budget for a 300-head, Cow-calf, Public Land Ranch in MLRA 32.

MLRA 32: Northern Intermountain Desertic Basins

Public Land

Herd Size: 300 head

	Weight	Unit	Total Head or Unit	Price or Cost Per Unit	Total Value	Price or Cost Per Cow	Your Value
Gross Receipts							
Steer Calves	5.25	cwt	130	\$207.94	\$141,919.05	\$473.06	
Heifer Calves	4.90	cwt	82	\$204.78	\$82,280.60	\$274.27	
Yearling Heifers	10	cwt	7	\$139.12	\$9,738.40	\$32.46	
Cull Cows	11.50	cwt	36	\$82.07	\$33,976.98	\$113.26	
Cull Bulls	19	cwt	3	\$101.87	\$5,806.59	\$19.36	
Total Receipts					\$273,721.62	\$912.41	
Operating Costs							
BLM		AUM	718	\$1.87	\$1,342.66	\$4.48	
USFS		AUM	718	\$1.87	\$1,342.66	\$4.48	
Deeded Land							
Rangeland		AUM	647	\$21.50	\$13,919.52	\$46.40	
Hay Meadow Aftermath		AUM	1,142	\$21.50	\$24,547.70	\$81.83	
Winter Feed							
Meadow Hay		ton	403	\$131.58	\$53,026.74	\$176.76	
Alfalfa		ton	403	\$147.91	\$59,607.73	\$198.69	
Supplement							
Protein Tubs		ton	2.1	\$1,101.60	\$2,331.08	\$7.77	
Salt & Mineral		ton	4.0	\$1,398.86	\$5,595.43	\$18.65	
Cake -- 15% Protein		ton	0.9	\$280.00	\$253.93	\$0.85	
Fuel					\$5,000.00	\$16.67	
Supplies & Fencing					\$1,000.00	\$3.33	
Utilities					\$2,500.00	\$8.33	
Veterinary Medicine					\$9,537.40	\$31.79	
Artificial Insemination		hd	40	\$36.00	\$1,445.58	\$4.82	
Hired Labor		day	25	\$150.00	\$3,750.00	\$12.50	
Marketing Fees ¹					\$10,948.86	\$36.50	
Other Variable Costs ²		hd	300	\$1.90	\$570.00	\$1.90	
Repair ³							
Machinery & Equipment					\$3,000.00	\$10.00	
Housing & Improvements					\$2,000.00	\$6.67	
Interest on Operating Capital		%	0.025	\$100,859.64	\$2,521.49	\$8.40	
Total Operating Costs					\$204,240.78	\$680.80	
Income Above Operating Costs					\$69,480.85	\$231.60	
Ownership Costs and Capital							
Purchased Livestock		bull	3	\$4,792.00	\$14,376.00	\$47.92	
Interest on Retained Livestock		\$	2%	\$362,068.64	\$7,241.37	\$24.14	
Asset Depreciation ⁴		\$			\$24,795.79	\$82.65	
Taxes		\$			\$8,001.90	\$26.67	
Total Ownership Costs					\$54,415.07	\$181.38	
Total Costs					\$258,655.84	\$862.19	
Returns to Labor and Management					\$15,065.78	\$50.22	

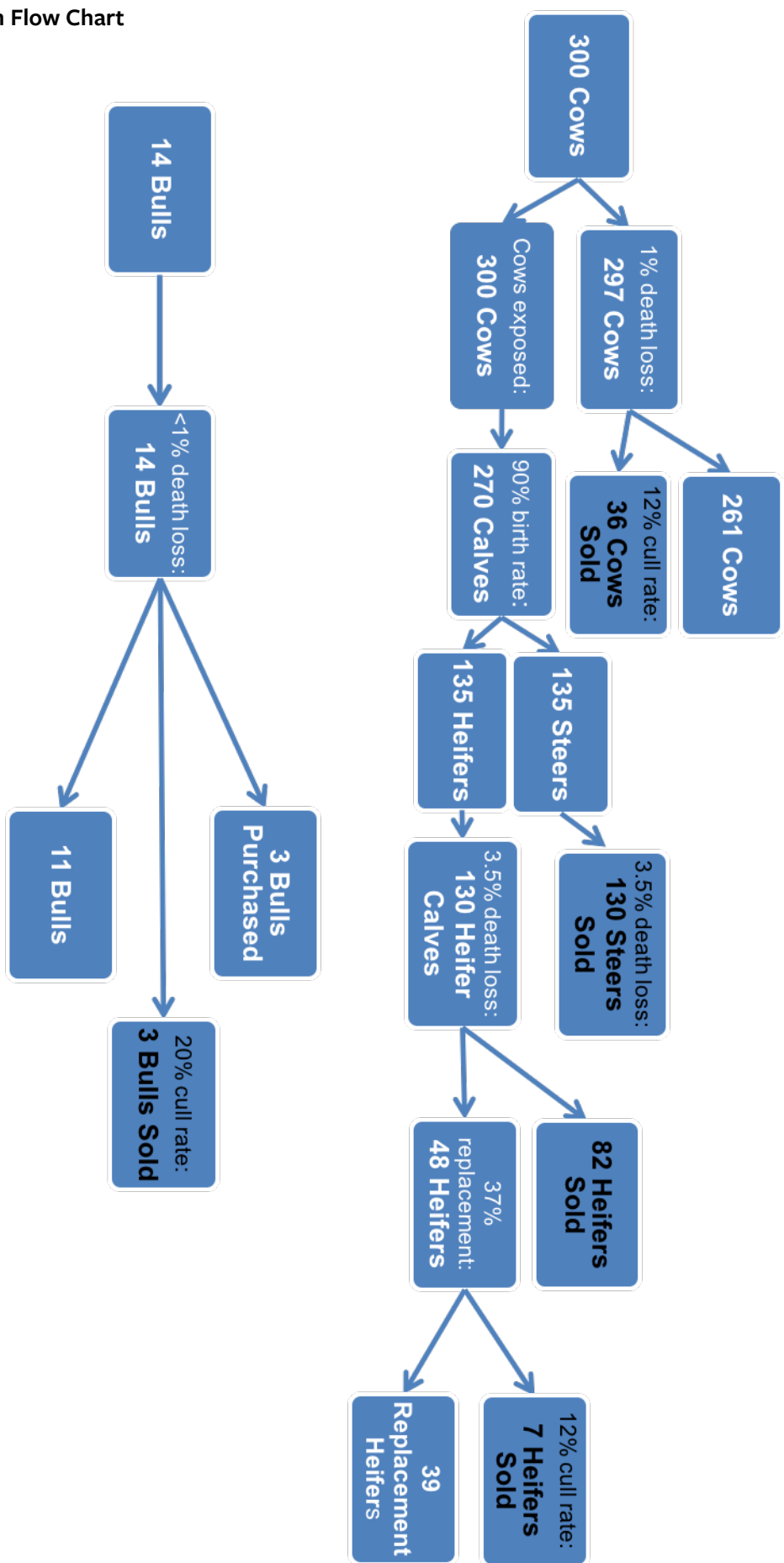
¹ Marketing fees include freight, trucking, video marketing and sale barn auction fees totaling 4% of total receipts

² Other variable costs include Brand Inspection and Beef Check-off fees.

³ Lump-sum annual repair cost estimates provided by focus group.

⁴ Depreciation costs of haying equipment are not included in this budget as hay production is treated as a separate enterprise.

Table 4. Cow-calf Production Flow Chart





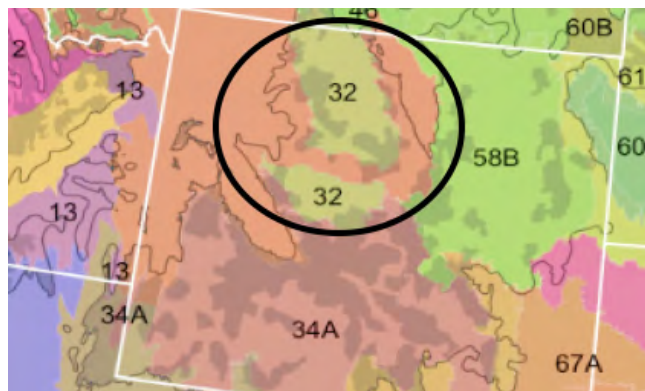
Enterprise budget for small, private-land ranch

North Intermountain Desertic Basins

MLRA 32

Holly Kirkpatrick¹, Holly Dyer¹, Tom Hilken¹, Kendall Roberts¹, Anna Maher¹, Nicolas Quintana Ashwell¹, Caitlin Youngquist², John Tanaka³, John Ritten⁴, and Kristie Maczko³

Wyoming counties: Big Horn, Washakie, Hot Springs, Fremont



This budget represents typical cost and returns for a 100-head, cow-calf operation in Major Land Resource Area (MLRA) 32, the Northern Intermountain Desertic Basins. A panel of producers from Big Horn, Washakie, Hot Springs, and Fremont counties assisted with the information contained in this enterprise budget.

Feed Sources

Feed sources for private land ranches include deeded rangeland, non-irrigated pasture, and hay meadow aftermath grazing. Aftermath grazing occurs from October to mid-November. Deeded land is grazed from mid-November to Jan. 1 when winter feed begins. Ranchers typically put up their own meadow hay and alfalfa to supply 70% of the required winter feed. They purchase the remaining feed required to meet the

herd's demand. Purchased feed is comprised of equal amounts meadow hay and alfalfa hay. After winter, the herd is moved to deeded non-irrigated pasture close to the home operation for about one month of grazing before summer grazing on deeded or privately leased rangeland begins. A schedule of the grazing and other ranch activities within a calendar year is listed in Table 1.

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³Wyoming Agricultural Experiment Station, University of Wyoming; Sustainable Rangelands Roundtable.

⁴Department of Agricultural and Applied Economics, University of Wyoming.

Table 1. Annual Calendar Activities for 100-head Cow-Calf Operation in MLRA 32.

Management Activities	Calendar Date
Begin winter feed and provide protein supplements	Jan 1 - Apr 30
Calving	March 1 - Apr 30
Market open-animals; work replacement heifers	May 15
Graze deeded non-irrigated rangeland	May 1 - May 31
Breeding	June 1 - Aug 1
Branding	May 15 - May 31
Graze deeded or private lease rangeland	June 1 - Sept 30
Trail to base or home operation	Oct 1
Vaccine and preg check cows; wean and sell calves and cull animals	Oct 15
Graze deeded hay meadow aftermath	Oct 1 - Nov 15
Grazed deeded non-irrigated pasture	Nov 15 - Jan 1

Land Cost

The cost of land is included in the budget on a per AUM cost by land type. Deeded land cost is calculated based on prevailing lease rates for rangelands in the area. Aftermath grazing is assumed to have the same cost per AUM – not necessarily the same rate per acre.

Herd Characteristics

Livestock inventory consists of 100 cows, 6 bulls, and 3 horses. One replacement bull is bought annually, and all bulls have a useful life of six years. Bulls are turned into the herd for a two-month breeding season from June 1 to Aug. 1. Cow death loss is 1%, and 10% are culled annually resulting in an annual replacement rate of 11%. The weaning rate for all cows exposed to bulls is 96%. In the fall, all steer calves are sold and 73% of heifer calves are sold. The remaining 27% of heifer calves are selected at weaning as potential replacement heifers and after death loss consist of 13 head. Two replacement heifers are culled and sold in the spring, and 11 replacement-heifer yearlings are brought into the herd. Due to unsuccessful breeding or old age, 10 cows are culled from the herd. Steer calves, non-replacement heifer calves, cull bulls, and cull cows are marketed for delivery in October. Also in October, all cattle are vaccinated while cows and replacement heifers are pregnancy-checked. All steer and heifer calves are earmarked, branded, dehorned, and vaccinated by May 31. Steer calves are also commonly castrated and implanted during branding (May). Table 4 shows a cow-calf production flow chart.

Animal Health (Veterinary and Medicine)

This includes vaccines, medicines, and all other veterinary services including pregnancy testing. Pre-calving for mature cows and bred replacement heifers include scour prevention (ScourGard). Calves are given post-calving season vaccinations, are branded, dehorned, and bulls castrated in June. These vaccinations include 7-way, IBR/PI3/BVD/BRSV, and pour-on/wormer (Ivomec or Dectomax). Previous year's selected replacement heifers and mature cows are given pre-breeding vaccinations including Vibriosis-Leptospirosis, 7-way, IBR/PI3/BVD/BRSV, and pour-on/wormer (Ivomec or Dectomax) before the June 1 bull turnout. Bulls will be tested for fertility and trichomoniasis and receive pour-on/wormer. Cows and replacement heifers are pregnancy tested in the fall as the cattle are gathered and heifer calves are given Bangs vaccinations. Table 2 below gives typical vaccinating and animal health practices and cost estimations by livestock class as provided by Forero et al. (2017).

Marketing and Transportation

In the summer months, calves are marketed through video auction. All calves sold are delivered in October. In the fall and spring, culled livestock are transported to sale barns to be sold through local auction markets. Freight and trucking expenses are included in the marketing fees, which total 4% of gross receipts in Table 3.

Labor

Labor is provided by the owner or manager and their family. The cost of owner labor and management are

Table 2. Veterinary and Medicine Costs.

Activities	Cost per Unit	Number of Head	Total Cost
Cows - Vaccine, wormer, etc.	\$9.00	100	\$900.00
Cows - Vet service (preg check, etc.)	\$2.25	100	\$225.00
Bulls - Vaccine, wormer, etc.	\$15.50	6	\$87.44
Bulls - Vet service (trich, semen, etc.)	\$40.00	6	\$225.66
Heifers - Vaccine, wormer, etc.	\$12.50	13	\$160.38
Heifers - Vet service (bangs, preg check)	\$7.75	13	\$93.02
Horses - Wormer	\$15.00	3	\$45.00
Calves - Dehorned, vaccine, boosters, dewormers, castrate (bull calves only)	\$15.82	95	\$1,503.53
Total			\$3,240.04
Cost per cow			\$32.40

not included in the budget. The net returns in this budget are compensation to labor and management.

Taxes

Taxes on real property is estimated using the average farm size by county within MLRA 32 (USDA-NASS, 2012). The average land value per farm is calculated by multiplying the farm size by the average pasture value per acre for Wyoming (USDA-NASS, 2017). Total taxes on real property is then calculated by multiplying the average land value per farm by the tax rate of 1% (AAEA, 2000).

Inventory and Capital Investments

There are four buildings and structures for a large cow-calf operation including one shop, one home, and two calving barns. Vehicles used for the ranch enterprise include a 130 horsepower tractor, a goose-neck, 32-foot stock trailer, and a 1 ton 4x4 pickup truck. The ranch also uses one ATV. Other machinery and equipment include one set of corrals, a portable loading chute, and one squeeze chute. This budget's depreciation costs are calculated using straight-line depreciation and applying a 5% interest rate, useful life by asset as determined by the Modified Accelerated Cost Recovery System (MACRS) standards, and machinery salvage value calculations from Iowa State University of Science and Technology's Cooperative Extension Service (File A3-29, Edwards, 2015).

Interest on Operating Capital and Retained Livestock

Interest on operating capital expenses is derived from the assumption that 50% of all annual operating costs are borrowed for a period of six months assuming a 5% annual percentage rate.

Interest on retained livestock is the value of the herd multiplied by the 2% interest rate (Yi and Zhang, 2016). This cost is the opportunity cost of keeping the herd. The value of the herd is calculated using the Jan. 1 herd size, the budget's sale weights, and market value for bred cows, bred heifers, and horses before death loss. The market value of replacement bulls are estimated at four times the value of a steer (Meteer, 2014).

Gross Receipts and Operating Expenditures

Livestock prices are five-year (2013-2017) averages from the CattleFax data base (2018) for Wyoming. Hay and alfalfa prices are also five-year (2013-2017) averages from USDA-NASS (2018) for Wyoming. Livestock weights are typical for this herd size and location. All averaged prices were indexed to 2017 using the consumer price index prior to averages being calculated. Livestock averaged prices and averaged hay and alfalfa prices are shown under Total Receipts and Operating Costs in Table 3.

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Table 3. Enterprise Budget for a 100-head, Cow-calf, Private Land Ranch in MLRA 32.

MLRA 32: Northern Intermountain Desertic Basins

Private Land

Herd Size: 100 head

	Weight	Unit	Total Head or Unit	Price or Cost Per Unit	Total Value	Price or Cost Per Cow	Your Value
Gross Receipts							
Steer Calves	5.5	cwt	48	\$207.94	\$54,896.16	\$548.96	
Heifer Calves	5	cwt	35	\$186.34	\$32,609.50	\$326.10	
Yearling Heifers	9	cwt	2	\$146.12	\$2,630.16	\$26.30	
Cull Cows	12.5	cwt	10	\$82.07	\$10,258.75	\$102.59	
Cull Bulls	20	cwt	1	\$101.87	\$2,037.40	\$20.37	
Total Receipts					\$102,431.97	\$1,024.32	
Operating Costs							
Deeded Land							
Non-Irrigated Pasture		AUM	301	\$21.50	\$6,468.48		
Rangeland		AUM	609	\$21.50	\$13,084.05	\$130.84	
Hay Meadow Aftermath		AUM	227	\$21.50	\$4,871.01	\$48.71	
Winter Feed							
Meadow Hay		ton	123	\$131.58	\$16,184.34	\$161.84	
Alfalfa		ton	123	\$147.91	\$18,192.93	\$181.93	
Supplement							
Protein Tubs		ton	0.259	\$1,101.60	\$284.81	\$2.85	
Salt & Mineral		ton	1.163	\$1,398.86	\$1,627.46	\$16.27	
Fuel					\$3,000.00	\$30.00	
Supplies & Fencing					\$2,000.00	\$20.00	
Utilities					\$1,800.00	\$18.00	
Veterinary Medicine					\$3,240.04	\$32.40	
Marketing Fees ¹					\$4,097.28	\$40.97	
Other Variable Costs ²		hd	100	\$1.90	\$190.00	\$1.90	
Repair ³							
Machinery & Equipment					\$1,500.00	\$15.00	
Housing & Improvements					\$1,000.00	\$10.00	
Interest on Operating Capital		%	0.025	\$38,770.20	\$969.25	\$9.69	
Total Operating Costs					\$78,509.65	\$785.10	
Income Above Operating Costs					\$23,922.32	\$239.22	
Ownership Costs and Capital							
Purchased Livestock		bull	1	\$4,792.00	\$4,792.00	\$47.92	
Interest on Retained Livestock		\$	2%	\$127,112.30	\$2,542.25	\$25.42	
Asset Depreciation ⁴		\$			\$15,778.56	\$157.79	
Taxes		\$			\$8,001.90	\$80.02	
Total Ownership Costs					\$31,114.71	\$311.15	
Total Costs					\$109,624.36	\$1,096.24	
Returns to Labor and Management					\$(7,192.39)	\$(71.92)	

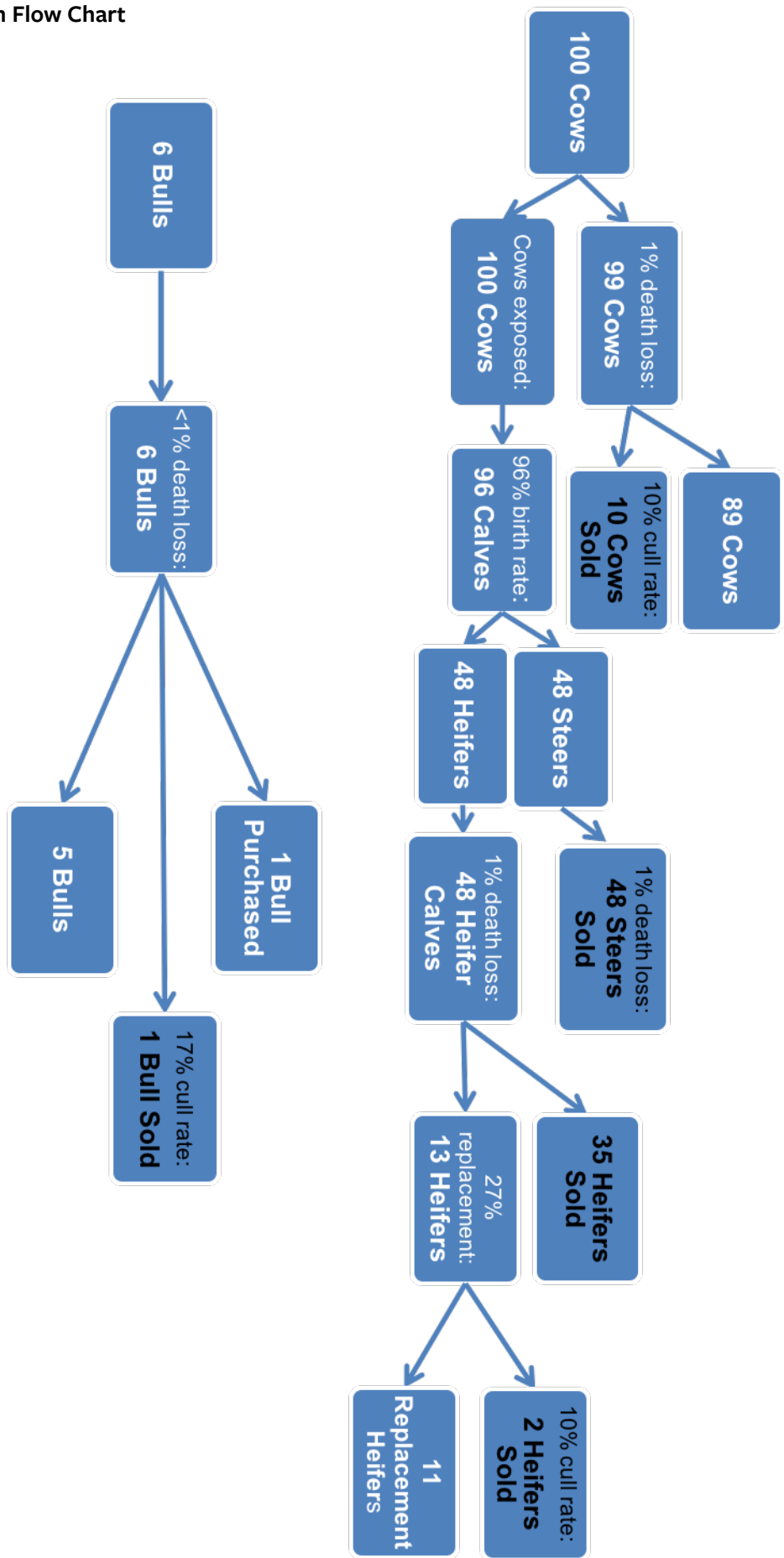
¹ Marketing fees include freight, trucking, video marketing and sale barn auction fees totaling 4% of total receipts

² Other variable costs include Brand Inspection and Beef Check-off fees.

³ Lump-sum annual repair cost estimates provided by focus group.

⁴ Depreciation costs of haying equipment are not included in this budget as hay production is treated as a separate enterprise.

Table 4. Cow-calf Production Flow Chart





Enterprise budget for large, public-land ranch

Cool Central Desertic Basins and Plateaus

MLRA 34a

Holly Dyer¹, Holly Kirkpatrick¹, Tom Hilken¹, Kendall Roberts¹, Anna Maher¹, Nicolas Quintana Ashwell¹, Bridger Feuz², John Tanaka³, John Ritten⁴, and Kristie Maczko³

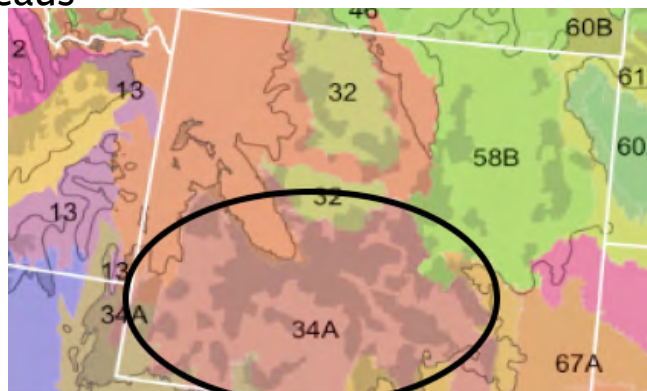
Wyoming counties: Albany, Carbon, Sweetwater, Sublette, Lincoln, Uinta

Colorado counties: Moffat, Rio Blanco, Routt

This enterprise budget estimates the typical costs and returns for a 400 head cow-calf operation in Major Land Resource Area (MLRA) 34A, the Cool Central Desertic Basins and Plateaus. A panel of producers from the counties of Albany, Carbon, Sweetwater, Sublette, Lincoln, Uinta in Wyoming assisted with the design of and the information contained in this enterprise budget.

Feed Sources

Feed is supplied as Bureau of Land Management (BLM) Lands, United States Forest Service (USFS) Lands, deeded rangelands, deeded non-irrigated pasture, and meadow hay aftermath. Livestock is grazed on deeded non-irrigated pasture from May 15-May 31. Replacement heifers remain on deeded non-irrigated pasture through October. All livestock except



replacement heifers are grazed on deeded rangeland from June 1-June 15, BLM lands from June 15-Oct. 31 and USFS lands from July 1-Oct. 31. Deeded hay meadow aftermath is grazed from Nov. 1-Dec. 31 until winter feeding begins, typically Jan 1. Cattle are fed equal amounts of alfalfa and meadow hay for four months from Jan. 1-April 30. Salt and minerals are fed year-round, and protein tubs and protein cake are

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³Wyoming Agricultural Experiment Station, University of Wyoming; Sustainable Rangelands Roundtable.

⁴Department of Agricultural and Applied Economics, University of Wyoming.

Table 1. Annual Calendar Activities for 100-head Cow-Calf Operation in MLRA 32.

Management Activities	Calendar Date
Begin winter feed and provide protein supplements	Jan 1 - Apr 30
Calving	March 15 - May 15
Market open-animals; work replacement heifers	May 31
Graze deeded non-irrigated pasture	May 15 - May 31
Breeding	June 15 - Aug 15
Branding	June 1 - June 15
Graze deeded rangeland	June 1 - June 15
Graze BLM land	June 15 - Oct 31
Graze USFS land	July 1 - Oct 31
Trail to base or home operation; vaccine and preg check cows; wean and sell calves and cull animals	Oct 31
Grazed deeded non-irrigated pasture	Nov 1 - Dec 31

fed during the winter months. A schedule of activities within a calendar year are listed in Table 1.

Land Cost

The cost of land is included in the budget on a per AUM cost by land type. In the case of public lands, per AUM rates are published by the land management agency. Deeded land cost is calculated based on prevailing lease rates for rangelands in the area. Aftermath grazing is assumed to have the same cost per AUM – not necessarily the same rate per acre.

Herd Characteristics

Livestock inventory consists of 400 cows, 18 bulls, and 10 horses. Four replacement bulls are bought in three of five years and three in the other two years, and all bulls have a useful life of five years. Bulls are turned into the herd for a two-month breeding season from June 15- Aug. 15. Cow death loss is 2%, and 10% are culled annually resulting in an annual replacement rate of 12%. The weaning rate for all cows exposed to bulls is 90%. In the fall, all steer calves are sold and 68% of heifer calves are sold. The remaining 32% of heifer calves are selected at weaning as potential replacement heifers and after death loss consist of 57 head. After a 2% death loss, nine replacement heifers are culled and sold in the spring and 47 replacement-heifer yearlings are brought into the herd. Due to unsuccessful breeding or old age, 39 cows are culled from the herd. Steer calves, non-replacement heifer calves, cull bulls, and cull cows are marketed for delivery in October. Also in October, all cattle are vaccinated while cows and replacement heifers are pregnancy-checked.

All steer and heifer calves are earmarked, branded, dehorned, and vaccinated by June 15. Steer calves are also commonly castrated and implanted during branding (May). Table 4 shows a cow-calf production flow chart.

Animal Health (Veterinary and Medicine)

This includes vaccines, medicines, and all other veterinary services including pregnancy testing. Pre-calving for mature cows and bred replacement heifers include scour prevention (ScourGard). Calves are given post-calving season vaccinations, are branded, dehorned, and bulls castrated in June. These vaccinations include 7-way, IBR/PI3/BVD/BRSV, and pour-on/wormer (Ivomec or Dectomax). Previous year's selected replacement heifers and mature cows are given pre-breeding vaccinations including Vibriosis-Leptospirosis, 7-way, IBR/PI3/BVD/BRSV, and pour-on/wormer (Ivomec or Dectomax) before the June 15 bull turnout. Bulls will be tested for fertility and trichomoniasis and receive pour-on/wormer. Cows and replacement heifers are pregnancy tested in the fall as the cattle are gathered and heifer calves are given Bangs vaccinations. Table 2 gives typical vaccinating and animal health practices and cost estimations by livestock class as provided by Forero et al. (2017).

In the summer months, calves are marketed through video auction. All calves sold are delivered in October. In fall and spring, culled livestock are transported to sale barns to be sold through local auction markets. Freight and trucking expenses are included in the

Table 2. Veterinary and Medicine Costs.

Activities	Cost per Unit	Number of Head	Total Cost
Cows - Vaccine, wormer, etc.	\$9.00	400	\$3,600.00
Cows - Vet service (preg check, etc.)	\$2.25	400	\$900.00
Bulls - Vaccine, wormer, etc.	\$15.50	18	\$283.78
Bulls - Vet service (trich, semen, etc.)	\$40.00	18	\$732.32
Heifers - Vaccine, wormer, etc.	\$12.50	58	\$721.28
Heifers - Vet service (bangs, preg check)	\$7.75	58	\$418.34
Horses - Wormer	\$15.00	10	\$150.00
Calves - Dehorned, vaccine, boosters, dewormers, castrate (bull calves only)	\$15.82	361	\$5,705.32
Total			\$12,511.05
Cost per cow			\$31.28

marketing fees, which total 4% of gross receipts in Table 3.

Labor

Employees include one full-time hand for five months at a rate of \$3,000 per month. The ranch owner also provides the full-time employee free on-site housing and pays their utilities. The operation's management includes one owner or manager and additional part-time help (usually the owner's children or grandchildren). The cost of owner labor and management are not included in the budget. The net returns in the budget are the compensation to owner labor and management.

Taxes

Taxes on real property is estimated using the average farm size by county within MLRA 34A (USDA-NASS, 2012). The average land value per farm is calculated by multiplying the farm size by the average pasture value per acre for Wyoming (USDA-NASS, 2017). Total taxes on real property is then calculated by multiplying the average land value per farm by the tax rate of 1% (AAEA, 2000).

Inventory and Capital Investments

There are seven buildings and structures for a large cow-calf operation including two shops, two homes, and three calving barns. Vehicles used for the ranch enterprise include three tractors (130, 75, and 40 horsepower), two goose-neck 32-foot stock trailers, a 48-foot flatbed trailer, and three pickups. The pickups include two $\frac{3}{4}$ -ton 4x4 trucks and one 1-ton pickup.

The ranch also uses three ATVs. Other machinery and equipment include two sets of corrals, a portable loading chute, and two squeeze chutes. This budget's depreciation costs are calculated using straight-line depreciation and applying a 5% interest rate, useful life by asset as determined by the Modified Accelerated Cost Recovery System (MACRS) standards, and machinery salvage value calculations from Iowa State University of Science and Technology's Cooperative Extension Service (File A3-29, Edwards, 2015).

Interest on Operating Capital and Retained Livestock

Interest on operating capital expenses is derived from the assumption that 50% of all annual operating costs are borrowed for a period of six months assuming a 5% annual percentage rate.

Interest on retained livestock is the value of the herd multiplied by the 2% interest rate (Yi and Zhang, 2016). This cost is the opportunity cost of keeping the herd. The value of the herd is calculated using the Jan. 1 herd size, the budget's sale weights, and market value for bred cows, bred heifers, and horses before death loss. The market value of replacement bulls are estimated at four times the value of a steer (Meteer, 2014).

Gross Receipts and Operating Expenditures

Livestock prices are five-year (2013-2017) averages from the CattleFax data base (2018) for Wyoming. Hay and alfalfa prices are also five-year (2013-2017) averages from USDA-NASS (2018) for Wyoming.

Livestock weights are typical for this herd size and location. All averaged prices were indexed to 2017 using the consumer price index prior to averages being calculated. Livestock averaged prices and averaged hay and alfalfa prices are shown under Total Receipts and Operating Costs in Table 3.

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- Yi, K. M., & Zhang, J. 2016." Real interest rates over the long run". *Economic Policy Papers, Federal Reserve Bank of Minneapolis*, (16-10).

Table 3. Enterprise Budget for a 400-head, Cow-calf, Public Land Ranch in MLRA 34a.

MLRA 34a: Cool Central Desertic Basins and Plateaus

Public Land

Herd Size: 100 head

	Weight	Unit	Total Head or Unit	Price or Cost Per Unit	Total Value	Price or Cost Per Cow	Your Value
Gross Receipts							
Steer Calves	5.3	cwt	180	\$207.94	\$198,374.76	\$495.94	
Heifer Calves	4.65	cwt	123	\$204.78	\$117,123.92	\$292.81	
Yearling Heifers	6.55	cwt	9	\$173.07	\$10,202.48	\$25.51	
Cull Cows	12.25	cwt	39	\$82.07	\$39,208.94	\$98.02	
Cull Bulls	16.65	cwt	4	\$101.87	\$6,784.54	\$16.96	
Total Receipts					\$371,694.64	\$929.24	
Operating Costs							
BLM		AUM	1,327	\$1.87	\$2,481.49	\$6.20	
USFS		AUM	1,061	\$1.87	\$1,984.07	\$4.96	
Deeded Land							
Non-irrigated Pasture		AUM	815	\$21.50	\$17,518.45	\$43.80	
Rangeland		AUM	265	\$21.50	\$5,702.69	\$14.26	
Hay Meadow Aftermath		AUM	1,131	\$21.50	\$24,312.25	\$60.78	
Winter Feed							
Meadow Hay		ton	481	\$131.58	\$63,289.98	\$158.22	
Alfalfa		ton	481	\$147.91	\$71,144.71	\$177.86	
Supplement							
Protein Tubs		ton	2.4	\$1,101.60	\$2,597.97	\$6.49	
Salt & Mineral		ton	13.0	\$1,398.86	\$18,185.14	\$45.46	
Cake -- 15% Protein		ton	1.0	\$280.00	\$293.48	\$0.73	
Fuel					\$6,000.00	\$15.00	
Supplies & Fencing					\$3,500.00	\$8.75	
Utilities					\$4,200.00	\$10.50	
Veterinary Medicine					\$12,511.05	\$31.28	
Hired Labor		mo	5	\$3,000.00	\$15,000.00	\$37.50	
Marketing Fees ¹					\$14,867.79	\$37.17	
Other Variable Costs ²		hd	400	\$1.90	\$760.00	\$1.90	
Repair ³							
Machinery & Equipment					\$7,500.00	\$18.75	
Housing & Improvements					\$2,500.00	\$6.25	
Interest on Operating Capital		%	2.5%	\$135,933.79	\$3,398.34	\$8.50	
Total Operating Costs					\$275,265.92	\$688.16	
Income Above Operating Costs					\$96,428.72	\$241.07	
Ownership Costs and Capital							
Purchased Livestock		bull	4	\$4,792.00	\$19,168.00	\$47.92	
Interest on Retained Livestock		%	2%	\$478,551.53	\$9,571.03	\$23.93	
Asset Depreciation ⁴		\$			\$30,604.45	\$76.51	
Taxes		\$			\$12,704.10	\$31.76	
Total Ownership Costs					\$72,047.58	\$180.12	
Total Costs					\$347,313.50	\$868.28	
Returns to Labor and Management					\$24,381.14	\$60.95	

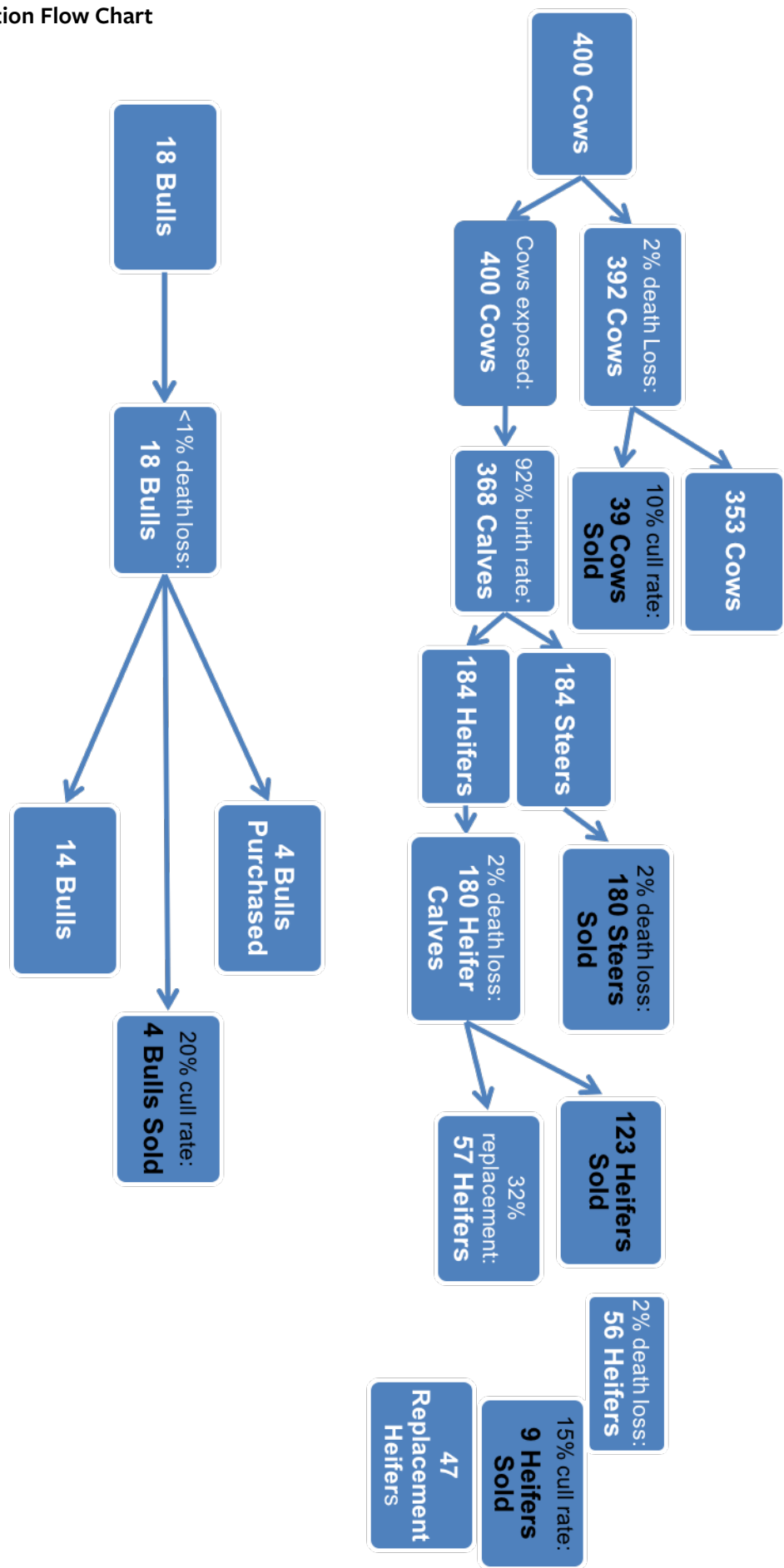
¹ Marketing fees include freight, trucking, video marketing and sale barn auction fees totaling 4% of total receipts

² Other variable costs include Brand Inspection and Beef Check-off fees.

³ Lump-sum annual repair cost estimates provided by focus group.

⁴ Depreciation costs of haying equipment are not included in this budget as hay production is treated as a separate enterprise.

Table 4. Cow-calf Production Flow Chart





Enterprise budget for small, public-land ranch

Cool Central Desertic Basins and Plateaus

MLRA 34a

Holly Dyer¹, Holly Kirkpatrick¹, Tom Hilken¹, Kendall Roberts¹, Anna Maher¹, Nicolas Quintana Ashwell¹, Bridger Feuz², John Tanaka³, John Ritten⁴, and Kristie Maczko³

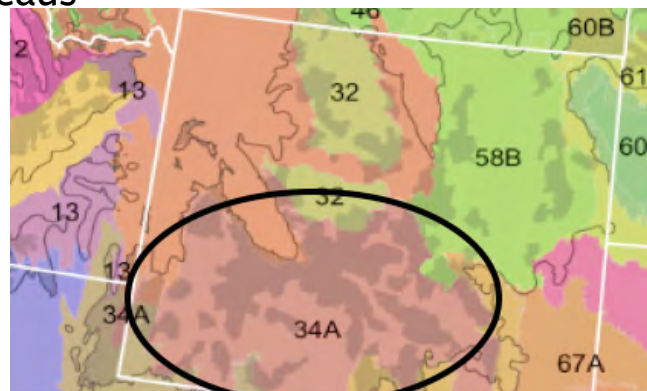
Wyoming counties: Albany, Carbon, Sweetwater, Sublette, Lincoln, Uinta

Colorado counties: Moffat, Rio Blanco, Routt

This enterprise budget estimates the typical costs and returns for a 100-head, cow-calf operation in Major Land Resource Area (MLRA) 34A, the Cool Central Desertic Basins and Plateaus. A panel of producers from the counties of Albany, Carbon, Sweetwater, Sublette, Lincoln, Uinta in Wyoming assisted with the design of and the information contained in this enterprise budget.

Feed Sources

Feed is supplied as Bureau of Land Management (BLM) Lands, United States Forest Service (USFS) Lands, deeded rangelands, deeded non-irrigated pasture, and meadow hay aftermath. Livestock is grazed on deeded non-irrigated pasture from May 15-May 31. Replacement heifers remain on deeded non-irrigated pasture through October. All livestock except



replacement heifers are grazed on deeded rangeland from June 1-June 15, BLM lands from June 15-Oct. 31 and USFS lands from July 1-Oct. 31. Deeded hay meadow aftermath is grazed from Nov. 1-Dec. 31 until winter feeding begins, typically on Jan. 1. Cattle are fed equal amounts of alfalfa and meadow hay for four months from Jan. 1-April 30. Salt and minerals are fed year-round, and protein tubs and protein cake are

¹Department of Ecosystem Science and Management, University of Wyoming.

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³Wyoming Agricultural Experiment Station, University of Wyoming; Sustainable Rangelands Roundtable.

⁴Department of Agricultural and Applied Economics, University of Wyoming.

Table 1. Annual Calendar Activities for 100-head Cow-Calf Operation in MLRA 32.

Activities	Calendar Date
Begin winter feed and provide protein supplements	Jan 1 - Apr 30
Calving	Mar 15 - May 15
Market open-animals; work replacement heifers	31-May
Graze deeded non-irrigated pasture	May 15 - May 31
Breeding	Jun 15 - Aug 15
Branding	June 1 - June 15
Graze deeded rangeland	June 1 - June 15
Graze BLM land	June 15 - Oct 31
Graze USFS land	July 1 - Oct 31
Trail to base or home operation; vaccine and preg-check cows; wean and sell calves and cull animals	31-Oct
Graze deeded hay aftermath	Nov 1 - Dec 31

fed during the winter months. A schedule of activities within a calendar year are listed in Table 1.

Land Cost

The cost of land is included in the budget on a per AUM cost by land type. In the case of public lands, per AUM rates are published by the land management agency. Deeded land cost is calculated based on prevailing lease rates for rangelands in the area. Aftermath grazing is assumed to have the same cost per AUM – not necessarily the same rate per acre.

Herd Characteristics

Livestock inventory consists of 100 cows, five bulls, and 10 horses. One replacement bull is bought annually, and all bulls have a useful life of five years. Bulls are turned into the herd for a two-month breeding season from June 15-Aug. 15. Cow death loss is 2%, and 10% are culled annually resulting in an annual replacement rate of 12%. The weaning rate for all cows exposed to bulls is 90%. In the fall, all steer calves are sold, and 68% of heifer calves are sold. The remaining 32% of heifer calves are selected at weaning as potential replacement heifers and after death loss consist of 14 head. Two replacement heifers are culled and sold in the spring, and 12 replacement-heifer yearlings are brought into the herd. Due to unsuccessful breeding or old age, 10 cows are culled from the herd. Steer calves, non-replacement heifer calves, cull bulls, and cull cows are marketed for delivery in October. Also in October, all cattle are vaccinated while cows and replacement heifers are pregnancy-checked. All steer and heifer calves are earmarked, branded, dehorned, and

vaccinated by June 15. Steer calves are also commonly castrated and implanted during branding (May). Table 4 shows a cow-calf production flow chart.

Animal Health (Veterinary and Medicine)

This includes vaccines, medicines, and all other veterinary services including pregnancy testing. Pre-calving for mature cows and bred replacement heifers include scour prevention (ScourGard). Calves are given post-calving season vaccinations, are branded, dehorned, and bulls castrated in June. These vaccinations include 7-way, IBR/PI3/BVD/BRSV, and pour-on/wormer (Ivomec or Dectomax). Previous year's selected replacement heifers and mature cows are given pre-breeding vaccinations including Vibriosis-Leptospirosis, 7-way, IBR/PI3/BVD/BRSV, and pour-on/wormer (Ivomec or Dectomax) before the June 15 bull turnout. Bulls will be tested for fertility and trichomoniasis and receive pour-on/wormer. Cows and replacement heifers are pregnancy tested in the fall as the cattle are gathered and heifer calves are given Bangs vaccinations. Table 2 below gives typical vaccinating and animal health practices and cost estimations by livestock class as provided by Forero et al. (2017).

Marketing and Transportation

In the summer months, calves are marketed through video auction. All calves sold are delivered in October. In the fall and spring, culled livestock are transported to sale barns to be sold through local auction markets. Freight and trucking expenses are included in the marketing fees, which total 4% of gross receipts in Table 3.

Table 2. Veterinary and Medicine Costs.

Activity	Cost Per Unit	No. of Head	total cost
Cows - vaccine, wormer, etc.	\$ 9.00	100	\$900.00
Cows - Vet service (preg check, etc.)	\$ 2.25	100	\$225.00
Bulls - vaccine, wormer, etc.	\$ 15.50	5	\$70.94
Bulls - Vet service (trich, semen, etc.)	\$ 40.00	5	\$183.08
Heifers - Vaccine, wormer, etc.	\$ 12.50	14	\$180.32
Heifers - Vet service (bangs, preg check)	\$ 7.25	14	\$104.59
Horses - wormer	\$ 15.00	10	\$150.00
Calves - dehorned, vaccine, boosters, dewormer, castrate (bulls calves only)	\$ 15.82	90	\$1,426.33
Total			\$3,240.26
Cost per cow			\$32.40

Labor

Labor for the ranch is provided by the operation's management, which includes one owner or manager and additional part-time help (usually the owner's children or grandchildren). The cost of owner labor and management are not included in the budget. The net returns in the budget are the compensation to owner labor and management.

Taxes

Taxes on real property is estimated using the average farm size by county within MLRA 34A (USDA-NASS, 2012). The average land value per farm is calculated by multiplying the farm size by the average pasture value per acre for Wyoming (USDA-NASS, 2017). Total taxes on real property is then calculated by multiplying the average land value per farm by the tax rate of 1% (AAEA, 2000).

Inventory and Capital Investments

There are four buildings and structures for a small cow-calf operation including one shop, one home, and two calving barns. Vehicles used for the ranch enterprise include one 130 horsepower tractor, one goose-neck 32-foot stock trailer, and two pickups. The pickups include one $\frac{3}{4}$ -ton pickup and one 1-ton pickup. The ranch also uses two ATVs. Other machinery and equipment include one set of corrals, a portable loading chute, and one squeeze chute. This budget's depreciation costs are calculated using straight-line depreciation and applying a 5% interest rate, useful life by asset as determined by the Modified Accelerated

Cost Recovery System (MACRS) standards, and machinery salvage value calculations from Iowa State University of Science and Technology's Cooperative Extension Service (File A3-29, Edwards, 2015).

Interest on Operating Capital and Retained Livestock

Interest on operating capital expenses is derived from the assumption that 50% of all annual operating costs are borrowed for a period of six months assuming a 5% annual percentage rate.

Interest on retained livestock is the value of the herd multiplied by the 2% interest rate (Yi and Zhang, 2016). This cost is the opportunity cost of keeping the herd. The value of the herd is calculated using the Jan. 1 herd size, the budget's sale weights, and market value for bred cows, bred heifers, and horses before death loss. The market value of replacement bulls are estimated at 4 times the value of a steer (Meteer, 2014).

Gross Receipts and Operating Expenditures

Livestock prices are five-year (2013-2017) averages from the CattleFax data base (2018) for Wyoming. Hay and alfalfa prices are also five-year (2013-2017) averages from USDA-NASS (2018) for Wyoming. Livestock weights are typical for this herd size and location. All averaged prices were indexed to 2017 using the consumer price index prior to averages being calculated. Livestock averaged prices and averaged hay and alfalfa prices are shown under Total Receipts and Operating Costs in Table 3.

References

- American Agriculture Economics Association.
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Table 3. Enterprise Budget for a 100-head, Cow-calf, Public Land Ranch in MLRA 34a.

MLRA 34a: Cool Central Desertic Basins and Plateaus

Public Land

Herd Size: 100 head

	Weight	Unit	Total Head or Unit	Price or Cost Per Unit	Total Value	Price or Cost Per Cow	Your Value
Gross Receipts							
Steer Calves	5.6	cwt	45	\$207.94	\$52,400.88	\$524.01	
Heifer Calves	5.25	cwt	31	\$186.34	\$30,326.84	\$303.27	
Yearling Heifers	9.25	cwt	3	\$146.12	\$4,054.83	\$40.55	
Cull Cows	10.5	cwt	10	\$82.07	\$8,617.35	\$86.17	
Cull Bulls	15.5	cwt	1	\$101.87	\$1,578.99	\$15.79	
Total Receipts					\$96,978.88	\$969.79	
Operating Costs							
BLM		AUM	306	\$1.87	\$572.22	\$5.72	
USFS		AUM	245	\$1.87	\$458.15	\$4.58	
Deeded Land							
Non-irrigated Pasture		AUM	205	\$21.50	\$4,414.21	\$44.14	
Rangeland		AUM	61	\$21.50	\$1,312.51	\$13.13	
Hay Meadow Aftermath		AUM	271	\$21.50	\$5,828.50	\$58.28	
Winter Feed							
Meadow Hay		ton	110	\$131.58	\$14,473.80	\$144.74	
Alfalfa		ton	110	\$147.91	\$16,270.10	\$162.70	
Supplement							
Protein Tubs		ton	0.6	\$1,101.60	\$649.49	\$6.49	
Salt & Mineral		ton	4.0	\$1,398.86	\$5,595.43	\$55.95	
Cake -- 15% Protein		ton	0.3	\$280.00	\$73.37	\$0.73	
Fuel					\$4,000.00	\$40.00	
Supplies & Fencing					\$1,500.00	\$15.00	
Utilities					\$2,500.00	\$25.00	
Veterinary Medicine					\$3,240.26	\$32.40	
Marketing Fees ¹					\$3,879.16	\$38.79	
Other Variable Costs ²		hd	100	\$1.90	\$190.00	\$1.90	
Repair ³							
Machinery & Equipment					\$2,500.00	\$25.00	
Housing & Improvements					\$1,000.00	\$10.00	
Interest on Operating Capital		%	2.5%	\$33,942.49	\$848.56	\$8.49	
Total Operating Costs					\$68,733.54	\$687.34	
Income Above Operating Costs					\$28,245.34	\$282.45	
Ownership Costs and Capital							
Purchased Livestock		bull	1	\$4,792.00	\$4,792.00	\$47.92	
Interest on Retained Livestock		%	2%	\$107,593.90	\$2,151.88	\$21.52	
Asset Depreciation ⁴		\$			\$21,059.97	\$210.60	
Taxes		\$			\$12,704.10	\$127.04	
Total Ownership Costs					\$40,707.95	\$407.08	
Total Costs					\$109,441.49	\$1,094.41	
Returns to Labor and Management					\$(12,462.61)	\$(124.63)	

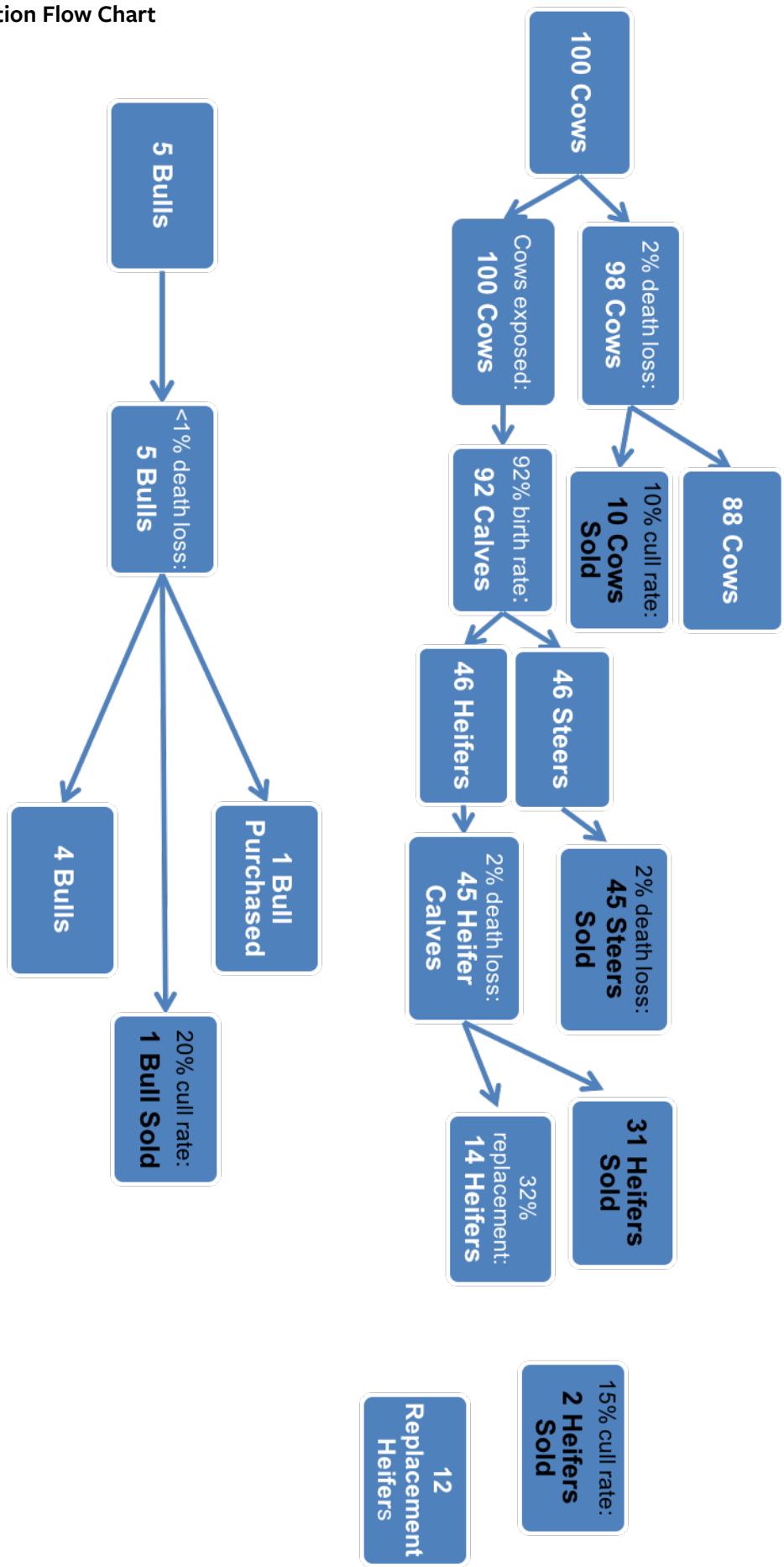
¹Marketing fees include frieght, trucking, video marketing and sale barn auction fees totaling 4% of total receipts

²Other variable costs include Brand Inspection and Beef Check-off fees.

³Lump-sum annual repair cost estimates provided by focus group.

⁴Depreciation costs of haying equipment are not included in this budget as hay production is treated as a separate enterprise.

Table 4. Cow-calf Production Flow Chart





Enterprise budget for large, private-land ranch

Cool Central Desertic Basins and Plateaus

MLRA 34a

Holly Dyer¹, Holly Kirkpatrick¹, Tom Hilken¹, Kendall Roberts¹, Anna Maher¹, Nicolas Quintana Ashwell¹, Bridger Feuz², John Tanaka³, John Ritten⁴, and Kristie Maczko³

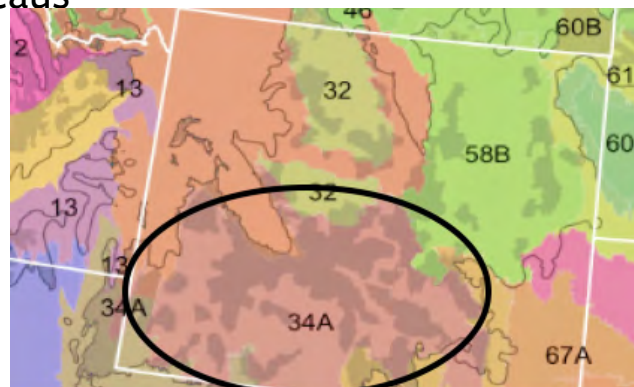
Wyoming counties: Albany, Carbon, Sweetwater, Sublette, Lincoln, Uinta

Colorado counties: Moffat, Rio Blanco, Routt

This enterprise budget estimates the typical costs and returns for a 300-head, cow-calf operation in Major Land Resource Area (MLRA) 34A, the Cool Central Desertic Basins and Plateaus. A panel of producers from the counties of Albany, Carbon, Sweetwater, Sublette, Lincoln, Uinta in Wyoming assisted with the design of and the information contained in this enterprise budget.

Feed Sources

Feed is supplied as deeded rangelands, deeded irrigated pasture, crop aftermath, and meadow hay aftermath. Livestock is grazed on deeded irrigated pasture from May 1-May 31. Replacement heifers remain on deeded irrigated pasture through September. All livestock except replacement heifers are grazed on deeded rangeland from June 1-Aug. 31. All livestock are



grazed on irrigated pasture from Sept. 1-Sept. 30. Crop aftermath is grazed from Oct. 1-Nov. 30. Deeded hay meadow aftermath is grazed from Dec. 1-Dec. 31 until winter feeding begins, typically on Jan 1. Cattle are fed equal amounts of alfalfa and meadow hay for four months from Jan. 1-April 30. Salt and minerals are fed year-round, and protein tubs and protein cake are

¹Department of Ecosystem Science and Management, University of Wyoming.

²Extension Educator, Washakie County Extension, University of Wyoming.

³Wyoming Agricultural Experiment Station, University of Wyoming; Sustainable Rangelands Roundtable.

⁴Department of Agricultural and Applied Economics, University of Wyoming.

Table 1. Annual Calendar Activities for 100-head Cow-Calf Operation in MLRA 34a.

Activities	Calendar Date
Begin winter feed and provide protein supplements	Jan 1 - Apr 30
Calving	Mar 15 - May 15
Market open-animals; work replacement heifers	May 15
Graze deeded irrigated pasture	May 1 - May 31
Breeding	June 15 - Aug 15
Branding	May 1 - May 31
Graze deeded or privately-leased rangeland	June 1 - Aug 31
Graze irrigated pasture	Sept 1 - Sept 30
Graze deeded crop aftermath	Oct 1 - Nov 30
Vaccine and preg-check cows; market and sell calves and cull animals	1-Nov
Graze deeded hay aftermath	Dec 1 - Dec 31

fed during the winter months. A schedule of activities within a calendar year are listed in Table 1.

Land Cost

The cost of land is included in the budget on a per AUM cost by land type. Deeded land cost is calculated based on prevailing lease rates for rangelands in the area. Aftermath grazing is assumed to have the same cost per AUM – not necessarily the same rate per acre. Irrigated pasture is assumed to cost 30% more than non-irrigated pasture.

Herd Characteristics

Livestock inventory consists of 300 cows, 12 bulls, and 10 horses. Three replacement bulls are bought annually, and all bulls have a useful life of four years. Bulls are turned into the herd for a two-month breeding season from June 15 to August 15. Cow death loss is 2%, and 10% are culled annually resulting in an annual replacement rate of 12%. The weaning rate for all cows exposed to bulls is 94%. In the fall, all steer calves are sold, and 58% of heifer calves are sold. The remaining 42% of heifer calves are selected at weaning as potential replacement heifers and after death loss consist of 59 head. After 2% death loss, nine replacement heifers are culled and sold in the spring, and 49 replacement-heifer yearlings are brought into the herd. Due to unsuccessful breeding or old age, 45 cows are culled from the herd. Steer calves, non-replacement heifer calves, cull bulls, and cull cows are marketed for delivery in November. Also in November, all cattle are vaccinated while cows and replacement heifers

are pregnancy-checked. All steer and heifer calves are earmarked, branded, dehorned, and vaccinated by May 31. Steer calves are also commonly castrated and implanted during branding (May). Table 4 shows a cow-calf production flow chart.

Animal Health (Veterinary and Medicine)

This includes vaccines, medicines, and all other veterinary services including pregnancy testing. Pre-calving for mature cows and bred replacement heifers include scour prevention (ScourGard). Calves are given post-calving season vaccinations, are branded, dehorned, and bulls castrated in June. These vaccinations include 7-way, IBR/PI3/BVD/BRSV, and pour-on/wormer (Ivomec or Dectomax). Previous year's selected replacement heifers and mature cows are given pre-breeding vaccinations including Vibriosis-Leptospirosis, 7-way, IBR/PI3/BVD/BRSV, and pour-on/wormer (Ivomec or Dectomax) before the June 15 bull turnout. Bulls will be tested for fertility and trichomoniasis and receive pour-on/wormer. Cows and replacement heifers are pregnancy tested in the fall as the cattle are gathered and heifer calves are given Bangs vaccinations. Table 2 below gives typical vaccinating and animal health practices and cost estimations by livestock class as provided by Forero et al. (2017).

Marketing and Transportation

In the summer months, calves are marketed through video auction. All calves sold are delivered in November. In fall and spring, culled livestock are transported to sale barns to be sold through local auction markets. Freight and trucking expenses are

Table 2. Veterinary and Medicine Costs.

Activity	Cost Per Unit	No. of Head	total cost
Cows - vaccine, wormer, etc.	\$ 9.00	300	\$2,700.00
Cows - Vet service (preg check, etc.)	\$ 2.25	300	\$675.00
Bulls - vaccine, wormer, etc.	\$ 15.50	12	\$185.62
Bulls - Vet service (trich, semen, etc.)	\$ 40.00	12	\$479.03
Heifers - Vaccine, wormer, etc.	\$ 12.50	59	\$740.88
Heifers - Vet service (bangs, preg check)	\$ 7.25	59	\$429.71
Horses - wormer	\$ 15.00	10	\$150.00
Calves - dehorned, vaccine, boosters, dewormer, castrate (bulls calves only)	\$ 15.82	282	\$4,465.04
Total			\$9,825.28
Cost per cow			\$32.75

included in the marketing fees, which total 4% of gross receipts in Table 3.

Labor

Employees include one full-time hand for five months at a rate of \$3,000 per month. The ranch owner also provides the full-time employee free on-site housing and pays their utilities. The operation's management includes one owner or manager and additional part-time help (usually the owner's children or grandchildren). The cost of owner labor and management are not included in the budget. The net returns in the budget are the compensation to owner labor and management.

Taxes

Taxes on real property is estimated using the average farm size by county within MLRA 34A (USDA-NASS, 2012). The average land value per farm is calculated by multiplying the farm size by the average pasture value per acre for Wyoming (USDA-NASS, 2017). Total taxes on real property is then calculated by multiplying the average land value per farm by the tax rate of 1% (AAEA, 2000).

Inventory and Capital Investments

There are seven buildings and structures for a large cow-calf operation including two shops, two homes, and three calving barns. Vehicles used for the ranch enterprise include three tractors (130, 75, and 40 horsepower), two goose-neck 32-foot stock trailers, a 48-foot flatbed trailer, and three pickups. The pickups include two $\frac{3}{4}$ ton 4x4 trucks, and one 1-ton pickup.

The ranch also uses three ATVs. Other machinery and equipment include two sets of corrals, a portable loading chute, and two squeeze chutes. This budget's depreciation costs are calculated using straight-line depreciation and applying a 5% interest rate, useful life by asset as determined by the Modified Accelerated Cost Recovery System (MACRS) standards, and machinery salvage value calculations from Iowa State University of Science and Technology's Cooperative Extension Service (File A3-29, Edwards, 2015).

Interest on Operating Capital and Retained Livestock

Interest on operating capital expenses is derived from the assumption that 50% of all annual operating costs are borrowed for a period of six months assuming a 5% annual percentage rate.

Interest on retained livestock is the value of the herd multiplied by the 2% interest rate (Yi and Zhang, 2016). This cost is the opportunity cost of keeping the herd. The value of the herd is calculated using the January 1 herd size, the budget's sale weights, and market value for bred cows, bred heifers, and horses before death loss. The market value of replacement bulls are estimated at four times the value of a steer (Meteer, 2014).

Gross Receipts and Operating Expenditures

Livestock prices are five-year (2013-2017) averages from the CattleFax data base (2018) for Wyoming. Hay and alfalfa prices are also five-year (2013-2017)

averages from USDA-NASS (2018) for Wyoming. Livestock weights are typical for this herd size and location. All averaged prices were indexed to 2017 using the Consumer Price Index prior to averages being calculated. Livestock averaged prices and averaged hay and alfalfa prices are shown under Total Receipts and Operating Costs in Table 3.

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Table 3. Enterprise Budget for a 300-head, Cow-calf, Private Land Ranch in MLRA 34a.

MLRA 34a: Cool Central Desertic Basins and Plateaus

Private Land

Herd Size: 300 head

	Weight	Unit	Total Head or Unit	Price or Cost Per Unit	Total Value	Price or Cost Per Cow	Your Value
Gross Receipts							
Steer Calves	5.4	cwt	141	\$207.94	\$158,325.52	\$527.75	
Heifer Calves	4.75	cwt	82	\$204.78	\$79,761.81	\$265.87	
Yearling Heifers	8.5	cwt	9	\$154.12	\$11,790.18	\$39.30	
Cull Cows	14.5	cwt	44	\$82.07	\$52,360.66	\$174.54	
Cull Bulls	17.5	cwt	3	\$101.87	\$5,348.18	\$17.83	
Total Receipts					\$307,586.34	\$1,025.29	
Operating Costs							
Deeded Land							
Irrigated Pasture		AUM	1,238	\$27.95	\$34,604.08	\$115.35	
Rangeland		AUM	1,401	\$21.50	\$30,131.50	\$100.44	
Hay Meadow Aftermath		AUM	508	\$21.50	\$10,917.57	\$36.39	
Winter Feed							
Meadow Hay		ton	446	\$131.58	\$58,684.68	\$195.62	
Alfalfa		ton	446	\$147.91	\$65,967.86	\$219.89	
Supplement							
Protein Tubs		ton	1.262	\$1,101.60	\$1,390.06	\$4.63	
Cake -- 15% Protein		ton	2.524	\$280.00	\$706.64	\$2.36	
Salt & Mineral		ton	3.786	\$1,398.86	\$5,295.48	\$17.65	
Fuel					\$10,000.00	\$33.33	
Supplies & Fencing					\$8,500.00	\$28.33	
Utilities					\$6,500.00	\$21.67	
Veterinary Medicine					\$9,825.28	\$32.75	
Hired Labor		mo	5	\$3,000.00	\$15,000.00	\$50.00	
Marketing Fees ¹					\$12,303.45	\$41.01	
Other Variable Costs ²		hd	300	\$1.90	\$570.00	\$1.90	
Repair ³							
Machinery & Equipment					\$5,000.00	\$16.67	
Housing & Improvements					\$4,000.00	\$13.33	
Interest on Operating Capital		%	2.5%	\$139,698.30	\$3,492.46	\$11.64	
Total Operating Costs					\$282,889.06	\$942.96	
Income Above Operating Costs					\$24,697.28	\$82.32	
Ownership Costs and Capital							
Purchased Livestock		bull	3	\$4,792.00	\$14,376.00	\$47.92	
Interest on Retained Livestock		%	2.0%	\$436,435.61	\$8,728.71	\$29.10	
Asset Depreciation ⁴		\$			\$35,480.02	\$118.27	
Taxes		\$			\$23,556.90	\$78.52	
Total Ownership Costs					\$82,141.63	\$273.81	
Total Costs					\$365,030.69	\$1,216.77	
Returns to Labor and Management					\$(57,444.35)	\$(191.48)	

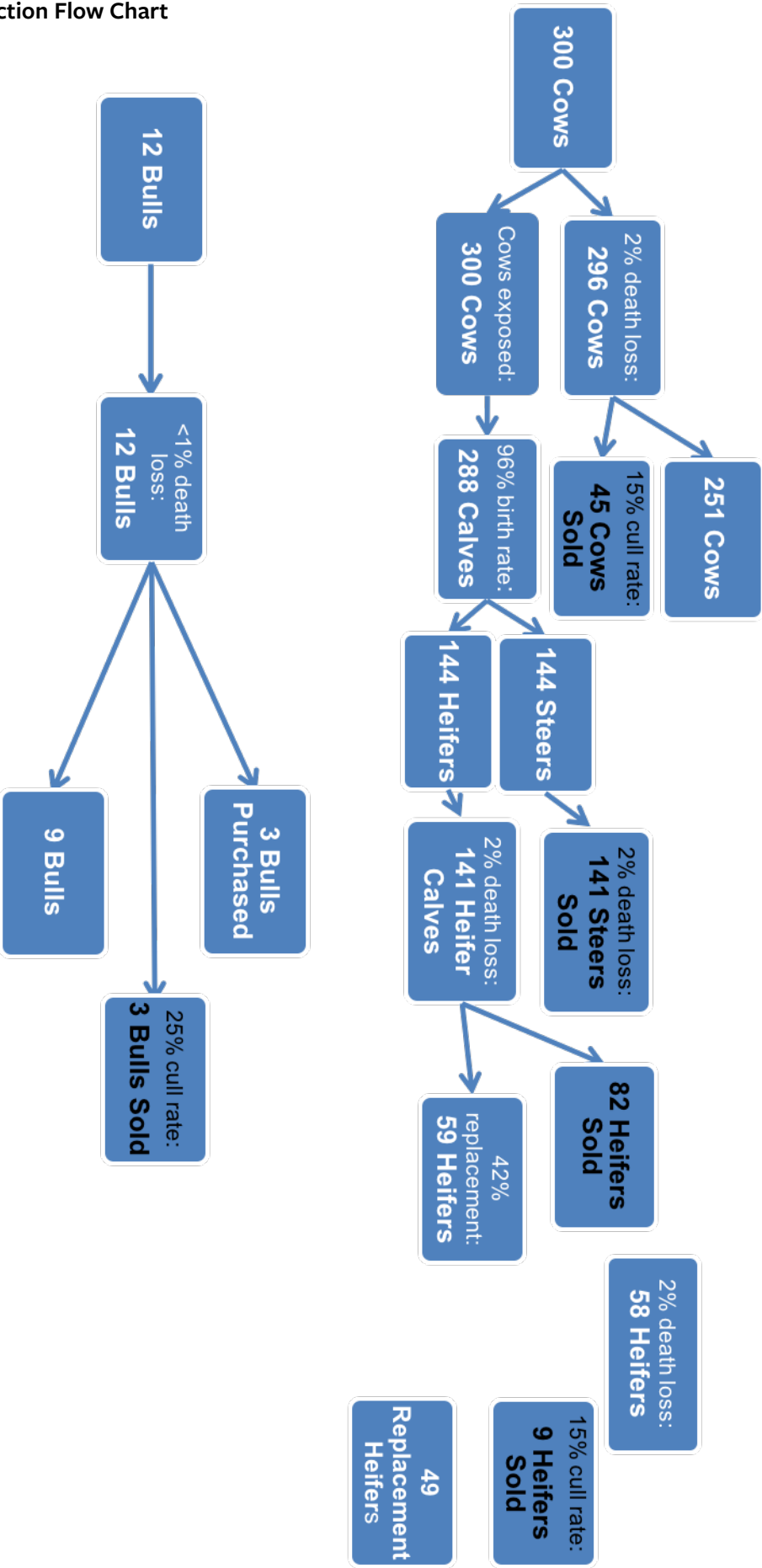
¹ Marketing fees include freight, trucking, video marketing and sale barn auction fees totaling 4% of total receipts

² Other variable costs include Brand Inspection and Beef Check-off fees.

³ Lump-sum annual repair cost estimates provided by focus group.

⁴ Depreciation costs of haying equipment are not included in this budget as hay production is treated as a separate enterprise.

Table 4. Cow-calf Production Flow Chart





Enterprise budget for small, private-land ranch

Cool Central Desertic Basins and Plateaus

MLRA 34a

Holly Dyer¹, Holly Kirkpatrick¹, Tom Hilken¹, Kendall Roberts¹, Anna Maher¹, Nicolas Quintana Ashwell¹, Bridger Feuz², John Tanaka³, John Ritten⁴, and Kristie Maczko³

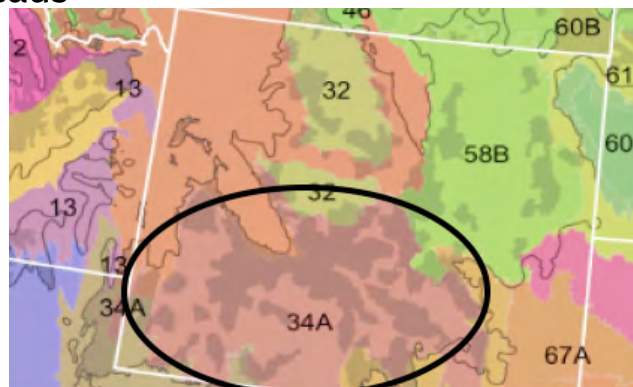
Wyoming counties: Albany, Carbon, Sweetwater, Sublette, Lincoln, Uinta

Colorado counties: Moffat, Rio Blanco, Routt

This enterprise budget estimates the typical costs and returns for a 100-head, cow-calf operation in Major Land Resource Area (MLRA) 34A, the Cool Central Desertic Basins and Plateaus. A panel of producers from the counties of Albany, Carbon, Sweetwater, Sublette, Lincoln, Uinta in Wyoming assisted with the design of and the information contained in this enterprise budget.

Feed Sources

Feed is supplied as deeded rangelands, deeded irrigated pasture, crop aftermath, and meadow hay aftermath. Livestock is grazed on deeded irrigated pasture from May 1-May 31. Replacement heifers remain on deeded irrigated pasture through September. All livestock except replacement heifers are grazed on deeded rangeland from June 1-Aug. 31. All livestock



are grazed on irrigated pasture from Sept. 1- Sept. 30. Crop aftermath is grazed from Oct. 1-Nov. 30. Deeded hay meadow aftermath is grazed from Dec. 1-Dec. 31 until winter feeding begins, typically Jan 1. Cattle are fed equal amounts of alfalfa and meadow hay for four months from Jan. 1-April 30. Salt and minerals are fed year-round, and protein tubs and protein cake are

¹Department of Ecosystem Science and Management, University of Wyoming.

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³Wyoming Agricultural Experiment Station, University of Wyoming; Sustainable Rangelands Roundtable.

⁴Department of Agricultural and Applied Economics, University of Wyoming.

Table 1. Annual Calendar Activities for 100-head Cow-Calf Operation in MLRA 34a.

Activities	Calendar Date
Begin winter feed and provide protein supplements	Jan 1 - Apr 30
Calving	Mar 15 - May 15
Market open-animals; work replacement heifers	May 15
Graze deeded irrigated pasture	May 1 - May 31
Breeding	June 15 - Aug 15
Branding	May 1 - May 31
Graze deeded or privately-leased rangeland	June 1 - Aug 31
Graze irrigated pasture	Sept 1 - Sept 30
Graze deeded crop aftermath	Oct 1 - Nov 30
Vaccine and preg-check cows; market and sell calves and cull animals	1-Nov
Graze deeded hay aftermath	Dec 1 - Dec 31

fed during the winter months. A schedule of activities within a calendar year are listed in Table 1.

Land Cost

The cost of land is included in the budget on a per AUM cost by land type. Deeded land cost is calculated based on prevailing lease rates for rangelands in the area. Aftermath grazing is assumed to have the same cost per AUM – not necessarily the same rate per acre. Irrigated pasture is assumed to cost 30% more than non-irrigated pasture.

Herd Characteristics

Livestock inventory consists of 100 cows, four bulls, and two horses. One replacement bull is bought annually, and all bulls have a useful life of four years. Bulls are turned into the herd for a two-month breeding season from June 15 to Aug. 15. Cow death loss is 2% and 10% are culled annually resulting in an annual replacement rate of 12%. The weaning rate for all cows exposed to bulls is 94%. In the fall, all steer calves and 55% of heifer calves are sold. The remaining 45% of heifer calves are selected at weaning as potential replacement heifers and after death loss consist of 21 head. After 2% death loss, three replacement heifers are culled and sold in the spring, and 17 replacement-heifer yearlings are brought into the herd. Due to unsuccessful breeding or old age, 15 cows are culled from the herd. Steer calves, non-replacement heifer calves, cull bulls, and cull cows are marketed for delivery in November. Also in November, all cattle are vaccinated while cows and replacement heifers

are pregnancy-checked. All steer and heifer calves are earmarked, branded, dehorned, and vaccinated by May 31. Steer calves are also commonly castrated and implanted during branding (May). Table 4 shows a cow-calf production flow chart.

Animal Health (Veterinary and Medicine)

This includes vaccines, medicines, and all other veterinary services including pregnancy testing. Pre-calving for mature cows and bred replacement heifers include scour prevention (ScourGard). Calves are given post-calving season vaccinations, are branded, dehorned, and bulls castrated in June. These vaccinations include 7-way, IBR/PI3/BVD/BRSV, and pour-on/wormer (Ivomec or Dectomax). Previous year's selected replacement heifers and mature cows are given pre-breeding vaccinations including Vibriosis-Leptospirosis, 7-way, IBR/PI3/BVD/BRSV, and pour-on/wormer (Ivomec or Dectomax) before the June 15 bull turnout. Bulls will be tested for fertility and trichomoniasis and receive pour-on/wormer. Cows and replacement heifers are pregnancy tested in the fall as the cattle are gathered and heifer calves are given Bangs vaccinations. Table 2 below gives typical vaccinating and animal health practices and cost estimations by livestock class as provided by Forero et al. (2017).

Marketing and Transportation

In the summer months, calves are marketed through video auction. All calves sold are delivered in November. In fall and spring, culled livestock are transported to sale barns to be sold through local auction markets. Freight and trucking expenses are

Table 2. Veterinary and Medicine Costs.

Activity	Cost Per Unit	No. of Head	total cost
Cows - vaccine, wormer, etc.	\$ 9.00	100	\$900.00
Cows - Vet service (preg check, etc.)	\$ 2.25	100	\$225.00
Bulls - vaccine, wormer, etc.	\$ 15.50	4	\$62.60
Bulls - Vet service (trich, semen, etc.)	\$ 40.00	4	\$161.56
Heifers - Vaccine, wormer, etc.	\$ 12.50	21	\$264.60
Heifers - Vet service (bangs, preg check)	\$ 7.25	21	\$153.47
Horses - wormer	\$ 15.00	2	\$30.00
Calves - dehorned, vaccine, boosters, dewormer, castrate (bulls calves only)	\$ 15.82	94	\$1,488.35
Total			\$3,285.57
Cost per cow			\$32.86

included in the marketing fees, which total 4% of gross receipts in Table 3.

Labor

Labor is provided by the operation's management. The operation's management includes one owner or manager and additional part-time help (usually the owner's children or grandchildren). The cost of owner labor and management are not included in the budget. The net returns in the budget are the compensation to owner labor and management.

Taxes

Taxes on real property is estimated using the average farm size by county within MLRA 34A (USDA-NASS, 2012). The average land value per farm is calculated by multiplying the farm size by the average pasture value per acre for Wyoming (USDA-NASS, 2017). Total taxes on real property is then calculated by multiplying the average land value per farm by the tax rate of 1% (AAEA, 2000).

Inventory and Capital Investments

There are three buildings and structures for a small cow-calf operation including one shop, one home, and one calving barn. Vehicles used for the ranch enterprise include a 130 horse power tractor, a goose-neck, 32-foot stock trailer, and two pickups. The pickups include a $\frac{3}{4}$ -ton 4x4 truck and a 1-ton pickup, which provides 50% use to the cow-calf operation. The ranch also uses two ATVs. Other machinery and equipment include a set of corrals, a portable loading chute, and a squeeze chutes. This budget's depreciation costs are calculated

using straight-line depreciation and applying a 5% interest rate, useful life by asset as determined by the Modified Accelerated Cost Recovery System (MACRS) standards, and machinery salvage value calculations from Iowa State University of Science and Technology's Cooperative Extension Service (File A3-29, Edwards, 2015).

Interest on Operating Capital and Retained Livestock

Interest on operating capital expenses is derived from the assumption that 50% of all annual operating costs are borrowed for a period of six months assuming a 5% annual percentage rate.

Interest on retained livestock is the value of the herd multiplied by the 2% interest rate (Yi and Zhang, 2016). This cost is the opportunity cost of keeping the herd. The value of the herd is calculated using the Jan. 1 herd size, the budget's sale weights, and market value for bred cows, bred heifers, and horses before death loss. The market value of replacement bulls are estimated at four times the value of a steer (Meteer, 2014).

Gross Receipts and Operating Expenditures

Livestock prices are five-year (2013-2017) averages from the CattleFax data base (2018) for Wyoming. Hay and alfalfa prices are also five-year (2013-2017) averages from USDA-NASS (2018) for Wyoming. Livestock weights are typical for this herd size and location. All averaged prices were indexed to 2017 using the consumer price index prior to averages being

calculated. Livestock averaged prices and averaged hay and alfalfa prices are shown under Total Receipts and Operating Costs in Table 3.

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Table 3. Enterprise Budget for a 100-head, Cow-calf, Private Land Ranch in MLRA 34a.

MLRA 34a: Cool Central Desertic Basins and Plateaus

Private Land

Herd Size: 100 head

	Weight	Unit	Total Head or Unit	Price or Cost Per Unit	Total Value	Price or Cost Per Cow	Your Value
Gross Receipts							
Steer Calves	5.6	cwt	47	\$207.94	\$54,729.81	\$547.30	
Heifer Calves	5.25	cwt	26	\$186.34	\$25,435.41	\$254.35	
Yearling Heifers	9.25	cwt	3	\$146.12	\$4,054.83	\$40.55	
Cull Cows	10.5	cwt	15	\$82.07	\$12,926.03	\$129.26	
Cull Bulls	15.5	cwt	1	\$101.87	\$1,578.99	\$15.79	
Total Receipts					\$98,725.06	\$987.25	
Operating Costs							
Deeded Land							
Irrigated Pasture		AUM	411	\$27.95	\$11,479.20	\$114.79	
Rangeland		AUM	463	\$21.50	\$9,963.45	\$99.63	
Hay Meadow Aftermath		AUM	167	\$21.50	\$3,586.67	\$35.87	
Winter Feed							
Meadow Hay		ton	144	\$131.58	\$18,947.52	\$189.48	
Alfalfa		ton	144	\$147.91	\$21,299.04	\$212.99	
Supplement							
Protein Tubs		ton	0.429	\$1,101.60	\$472.06	\$4.72	
Cake -- 15% Protein		ton	0.857	\$280.00	\$239.97	\$2.40	
Salt & Mineral		ton	1.286	\$1,398.86	\$1,798.32	\$17.98	
Fuel					\$6,000.00	\$60.00	
Supplies & Fencing					\$2,500.00	\$25.00	
Utilities					\$3,000.00	\$30.00	
Veterinary Medicine					\$3,285.57	\$32.86	
Marketing Fees ¹					\$3,949.00	\$39.49	
Other Variable Costs ²		hd	100	\$1.90	\$190.00	\$1.90	
Repair ³							
Machinery & Equipment					\$3,000.00	\$30.00	
Housing & Improvements					\$2,000.00	\$20.00	
Interest on Operating Capital		%	2.5%	\$45,855.40	\$1,146.38	\$11.46	
Total Operating Costs					\$92,857.18	\$928.57	
Income Above Operating Costs					\$5,867.88	\$58.68	
Ownership Costs and Capital							
Purchased Livestock		bull	1	\$4,792.00	\$4,792.00	\$47.92	
Interest on Retained Livestock		%	2%	\$114,421.98	\$2,288.44	\$22.88	
Asset Depreciation ⁴		\$			\$19,959.72	\$199.60	
Taxes		\$			\$23,556.90	\$235.57	
Total Ownership Costs					\$50,597.06	\$505.97	
Total Costs					\$143,454.24	\$1,434.54	
Returns to Labor and Management					\$(44,729.18)	\$(447.29)	

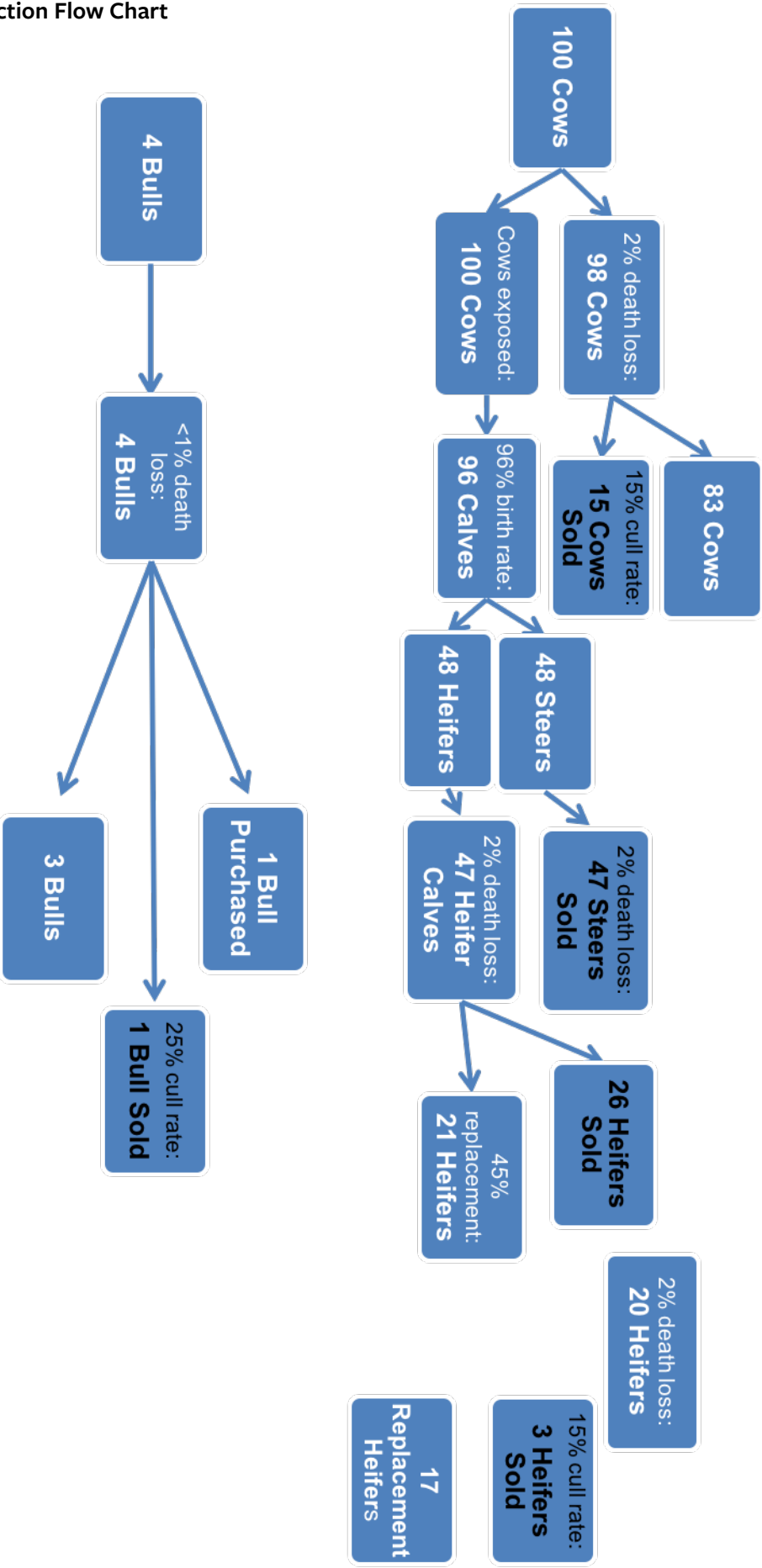
¹ Marketing fees include freight, trucking, video marketing and sale barn auction fees totaling 4% of total receipts

² Other variable costs include Brand Inspection and Beef Check-off fees.

³ Lump-sum annual repair cost estimates provided by focus group.

⁴ Depreciation costs of haying equipment are not included in this budget as hay production is treated as a separate enterprise.

Table 4. Cow-calf Production Flow Chart



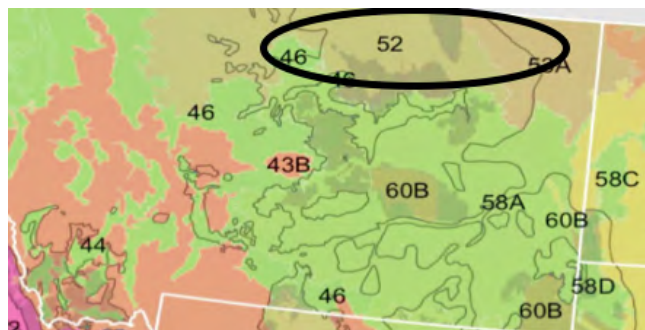


Enterprise budget for large, public-land ranch

Brown Glaciated Plain

MLRA 52

Holly Dyer¹, Holly Kirkpatrick¹, Tom Hilken¹, Kendall Roberts¹, Anna Maher¹, Nicolas Quintana Ashwell¹, Jesse Fulbright², John Tanaka³, John Ritten⁴, and Kristie Maczko³



Montana counties: Toole, Liberty, Hill, Blaine, Phillips, Chouteau, Valley

This enterprise budget estimates the typical costs and returns for a 300-head, cow-calf operation in Major Land Resource Area (MLRA) 52, the Brown Glaciated Plain. A panel of producers from Toole, Liberty, Hill, Blaine, Phillips, Chouteau, and Valley counties in Montana assisted with the design of and provided the information contained in this enterprise budget.

Feed Sources

State and Bureau of Land Management (BLM) lands are the sources of public land available for ranchers to use from May 15-Sept. 15; however, most ranchers do not use both state and BLM land in this MLRA and choose one land type based on its availability and proximity to the operation. Ranchers in Blaine, Phillips, and Valley counties have more BLM land

available than state land whereas Toole, Liberty, Hill, and Chouteau counties in the western region of the MLRA have more state land available. Ranchers do have other privately owned land – including reservation land – available to lease during the same summer months beginning June 1. About seven weeks of grazing crop aftermath occurs starting mid-September due to the abundant farming industry in

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Table 1. Annual Calendar Activities for 300-head Cow-Calf Operation in MLRA 52.

Activities	Calendar Date
Begin winter feed and provide 15%-protein cake	Jan 1 - May 15
Calving	March 15 - May 15
Market open-animals; work replacement heifers	May 15
Start Breeding on Deeded Land	May 15 - June 1
Branding	June 1 - Jun 30
Graze State or BLM Land	May 15 - Sept 15
Privately-owned land is available for grazing	June 1 - Sept 15
Trail to deeded aftermath	Sept 16 - Oct 31
Trail to base or home operation; vaccine and preg-check cows; wean and sell calves and cull animals	Nov 5
Graze Deeded	Nov 6 - Dec 31

the area. Deeded land is grazed from November to December before winter feed begins, typically on Jan. 1. Ranchers typically put up their own meadow hay and alfalfa to supply half of the required winter feed. They purchase the remaining feed required to meet the herd's demand. Purchased feed is comprised of equal amounts meadow hay and alfalfa hay. After winter, the herd is moved to deeded land for about one month of grazing before summer grazing on leased land begins. A schedule of the grazing and other ranch activities within a calendar year is listed in Table 1.

Land Cost

The cost of land is included in the budget on a per AUM cost by land type. In the case of public lands, per AUM rates are published by the land management agency. Deeded land cost is calculated based on prevailing lease rates for rangelands in the area. Aftermath grazing is assumed to have the same cost per AUM – not necessarily the same rate per acre.

Herd Characteristics

On Jan. 1, livestock inventory consists of 300 cows, 15 bulls (including bulls for the replacement-heifer herd), and 10 horses. Three replacement bulls are bought annually, and all bulls have a useful life of five years. Each year 1% of brood cows die, and 12% of brood cows are culled. Bulls are turned into the herd for breeding season from mid-May to June 1. The weaning rate for all cows exposed to bulls is 89%. In the fall, all steer calves and 64% of heifer calves are sold. After a 2% death loss, the remaining 34% or 46 head of heifer calves are selected at weaning as replacement heifers.

Seven replacement heifers are culled in the spring; 39 replacement heifer yearlings are brought into the herd during fall breeding evaluation. Due to unsuccessful breeding and old age, 36 cows are culled from the herd. Steer calves, non-replacement heifer calves, cull bulls, and cull cows are marketed for delivery in November. Also in November, all cattle are vaccinated while cows and replacement heifers are pregnancy-checked. All steer and heifer calves are earmarked, branded, dehorned, and vaccinated by June 30. Steer calves are also commonly castrated and implanted during branding (June).

Animal Health (Veterinary and Medicine)

This includes vaccines, medicines, and all other veterinary services including pregnancy testing. Pre-calving for mature cows and bred replacement heifers include scour prevention (ScourGard). Calves are given post-calving season vaccinations, are branded, dehorned, and bulls castrated in June. These vaccinations include 7-way, IBR/PI3/BVD/BRSV, and pour-on/wormer (Ivomec or Dectomax). Previous year's selected replacement heifers and mature cows are given pre-breeding vaccinations including Vibriosis-Leptospirosis, 7-way, IBR/PI3/BVD/BRSV, and pour-on/wormer (Ivomec or Dectomax) before the May 15 bull turnout. Bulls will be tested for fertility and trichomoniasis and receive pour-on/wormer. Cows and replacement heifers are pregnancy tested in the fall as the cattle are gathered and heifer calves are given Bangs vaccinations. Table 2 gives typical vaccinating and animal health practices and cost estimations by livestock class as provided by Forero et al. (2017).

Table 2. Veterinary and Medicine Costs.

Activity	Cost Per Unit	No. of Head	total cost
Cows - Vaccine, wormer, etc.	\$ 9.00	300	\$2,700.00
Cows - Vet service (preg check, etc.)	\$ 2.25	300	\$675.00
Bulls - Vaccine, wormer, etc.	\$ 15.50	15	\$233.16
Bulls - Vet service (trich, semen, etc.)	\$ 40.00	15	\$601.71
Heifers - Vaccine, wormer, etc.	\$ 12.50	46	\$574.77
Heifers - Vet service (bangs, preg check)	\$ 7.25	46	\$333.37
Horses - Wormer	\$ 15.00	10	\$150.00
Calves - Dehorned, vaccine, boosters, dewormer, castrate (bulls calves only)	\$ 15.82	268	\$4,235.33
Total			\$9,503.34
Cost per cow			\$31.68

Approximately 50% of ranchers in this MLRA artificially inseminate their replacement heifers in June. The \$36 per head cost of artificial insemination is not included in Table 2 but can be found as a line item on the enterprise budget (Table 3).

Marketing and Transportation

In the summer months, calves are marketed through video auction. All calves sold are delivered in November. In the fall and spring, culled livestock are transported to sale barns within a 150-mile radius to be sold through local auction markets. Most ranchers have a semi-truck and cattle pot to transport their cattle to the sale barn. Trucking expenses are included in the annual fuel and asset depreciation expenses on the budget.

Labor

Employees include one full-time hand paid \$11.56 per hour, or about \$24,045 each year. The ranch owner also provides the full-time employee free on-site housing and pays their utilities. The operation's management includes one owner or manager and additional part-time help (usually the owner's children or grandchildren). The cost of owner labor and management are not included in the budget. The net returns in the budget are the compensation to owner labor and management.

Taxes

Annual tax costs for MLRA 52 are estimated following Montana's Department of Revenue 2016 Biennial Report. In this report, agricultural land is property

considered as "Class 3" which follows a productivity valuation standard. The 2016 tax rate for Class 3 agricultural property within Montana is 2.16 percent. According to Montana Code Annotated 2017 (MCA 15-7-201), the per-acre productivity value of agricultural land is equal to the per-acre net income of agricultural land divided by the 6.4% capitalization rate. Net income of agricultural land is based on commodity price and cost of production data obtained from the Montana Agricultural Statistics Service 2017 publication. For the purpose of this budget, the representative ranch's value of agricultural property is calculated by dividing the Income Above Operating Costs by Montana's capitalization rate of 6.4%; equal to \$1,213,143.79. By applying the 2.16% 2016 tax rate, the annual tax expense is estimated at \$26,203.91, or about \$87 per cow. Please note, these numbers are not intended for accounting purposes but rather to provide an example of annual tax expenses' role in a ranching operation. For IRS accounting scenarios and accurate tax filing, ranchers will need to follow the Generally Accepted Accounting Principles (GAAP rules).

Inventory and Capital Investments

There are five buildings and structures for a large cow-calf operation including one shop, two homes, and two calving barns. Vehicles used for the ranch enterprise include three tractors (130, 75, and 40 horsepower), a goose-neck 32-foot stock trailer, one semi-truck (50% of its use is for the ranch enterprise), a cattle pot, and two pickups. The pickups include one ¾-ton 4x4 truck and one 1-ton pickup. The ranch also uses two ATVs.

Other machinery and equipment include one set of corrals, a portable loading chute, and two squeeze chutes. This budget's depreciation costs are calculated using straight-line depreciation and applying a 5% interest rate, useful life by asset as determined by the Modified Accelerated Cost Recovery System (MACRS) standards, and machinery salvage value calculations from Iowa State University of Science and Technology's Cooperative Extension Service (File A3-29, Edwards, 2015).

Interest on Operating Capital and Retained Livestock

Interest on operating capital expenses is derived from the assumption that 50% of all annual operating costs are borrowed for a period of six months at 5% interest.

Interest on retained livestock is the value of the herd multiplied by the 2% interest rate (Yi and Zhang, 2016). This cost is the opportunity cost of keeping the herd and can be thought of as the amount a rancher could have made if the value of the herd had otherwise been invested at a 2% interest rate. The \$409,287.94 value of the herd is calculated using the January 1 herd size (post annual death loss), the budget's sale weights, and market value for various livestock classes. The annual interest on retained livestock expense for this herd is about \$8,186.

Gross Receipts and Operating Expenditures

Livestock prices are five-year (2013-2017) averages from the CattleFax data base (2018) for Montana. Hay and alfalfa prices are also five-year (2013-2017) averages from USDA-NASS (2018) for Montana. Livestock weights are typical for this herd size and location. All averaged prices were indexed to 2017 using the consumer price index prior to averages being calculated. Livestock averaged prices and averaged hay and alfalfa prices are shown under Total Receipts and Operating Costs in Table 3.

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Table 3. Enterprise Budget for a 300-head, Cow-calf, Public Land Ranch in MLRA 52.

MLRA 52: Brown Glaciated Plains

Public Land

Herd Size: 100 head

	Weight	Unit	Total Head or Unit	Price or Cost Per Unit	Total Value	Price or Cost Per Cow	Your Value
Gross Receipts							
Steer Calves	6.50	cwt	134	\$187.08	\$162,946.68	\$543.16	
Heifer Calves	5.75	cwt	88	\$183.32	\$92,759.92	\$309.20	
Yearling Heifers	10.00	cwt	7	\$136.42	\$9,549.40	\$31.83	
Cull Cows	13.50	cwt	36	\$81.71	\$39,711.06	\$132.37	
Cull Bulls	20.00	cwt	3	\$101.30	\$6,078.00	\$20.26	
Total Receipts					\$311,045.06	\$1,036.82	
Operating Costs							
BLM		AUM	992	\$1.87	\$1,855.04	\$6.18	
State		AUM	992	\$14.01	\$13,897.92	\$46.33	
Deeded Land							
Rangeland		AUM	1215	\$16.11	\$19,565.76	\$65.22	
Hay Meadow Aftermath		AUM	109	\$16.11	\$1,761.77	\$5.87	
Crop Aftermath		AUM	634	\$16.11	\$4,665.68	\$15.55	
Winter Feed							
Meadow Hay		ton	413	\$128.58	\$53,103.54	\$177.01	
Alfalfa		ton	413	\$140.09	\$57,857.17	\$192.86	
Supplement							
Protein Tubs		ton	3.375	\$1,101.60	\$3,717.90	\$12.39	
Salt & Mineral		ton	7.200	\$1,398.86	\$10,071.77	\$33.57	
Cake -- 15% Protein		ton	13.500	\$280.00	\$3,780.00	\$12.60	
Fuel					\$5,800.00	\$19.33	
Supplies & Fencing					\$3,300.00	\$11.00	
Utilities					\$2,874.00	\$9.58	
Veterinary Medicine					\$9,537.40	\$31.79	
Artificial Insemination		hd	30	\$36.00	\$1,080.00	\$3.60	
Hired Labor		hr	2080	\$11.56	\$24,044.80	\$80.15	
Marketing Fees ¹					\$6,220.90	\$20.74	
Other Variable Costs ²		hd	300	\$5.00	\$1,500.00	\$5.00	
Repair ³							
Machinery & Equipment					\$5,000.00	\$16.67	
Housing & Improvements					\$2,000.00	\$6.67	
Interest on Operating Capital		%	0.025	\$115,816.83	\$2,895.42	\$9.65	
Total Operating Costs					\$234,529.08	\$781.76	
Income Above Operating Costs					\$76,515.98	\$255.05	
Ownership Costs and Capital							
Purchased Livestock		bull	3	\$4,997.00	\$14,991.00	\$49.97	
Interest on Retained Livestock		%	2%	\$408,777.64	\$8,175.55	\$27.25	
Asset Depreciation ⁴		\$			\$32,264.92	\$107.55	
Taxes		\$	2.16%	\$1,195,562.22	\$25,824.14	\$86.08	
Total Ownership Costs					\$81,255.62	\$270.85	
Total Costs					\$315,784.70	\$1,052.62	
Returns to Labor and Management					\$(4,739.64)	\$(15.80)	

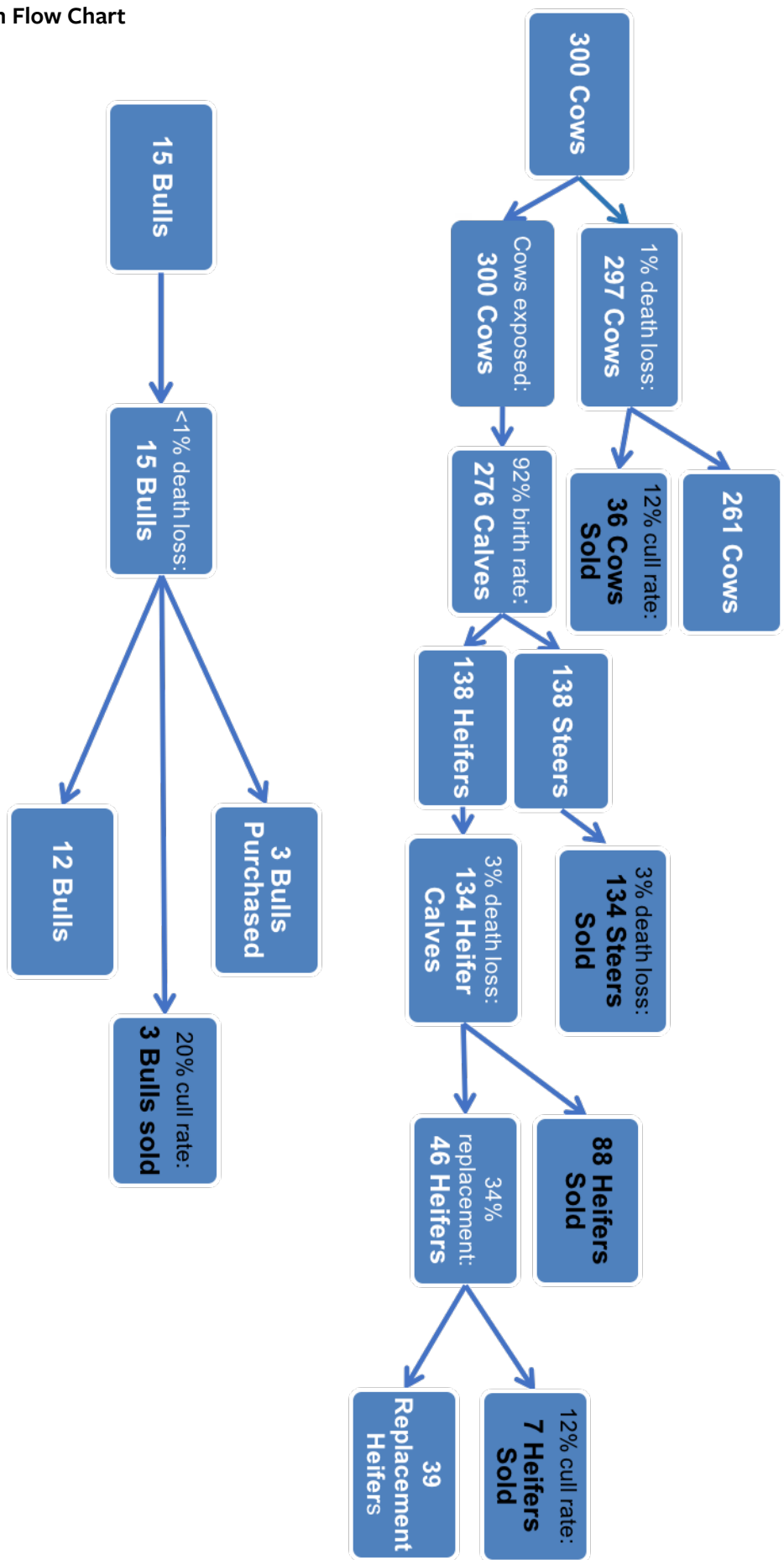
¹ Marketing fees include video and sale barn auction fees totaling 2% of total receipts

² Other variable costs include Montana's Per Capita, Brand Inspection, Predator Control, Beef Check-off fees, and Marketing fees.

³ Lump-sum annual repair cost estimates provided by focus group.

⁴ Depreciation costs of haying equipment are not included in this budget as hay production is treated as a separate enterprise.

Table 4. Cow-calf Production Flow Chart



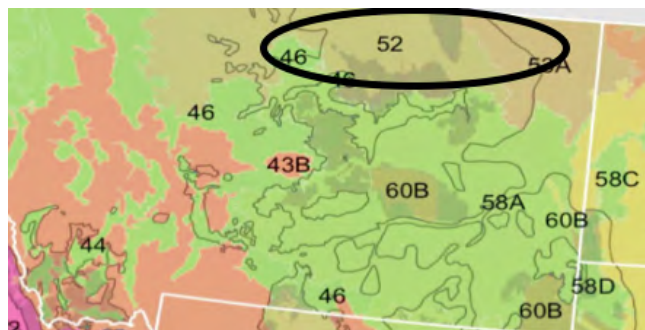


Enterprise budget for small, public-land ranch

Brown Glaciated Plain

MLRA 52

Holly Kirkpatrick¹, Holly Dyer¹, Tom Hilken¹, Kendall Roberts¹, Anna Maher¹, Nicolas Quintana Ashwell¹, Danny Pratt², John Tanaka³, John Ritten³, and Kristie Maczko³



Montana counties: Toole, Liberty, Hill, Blaine, Phillips, Chouteau, Valley

This enterprise budget estimates the typical costs and returns for a 100-head, cow-calf operation in Major Land Resource Area (MLRA) 52, the Brown Glaciated Plain. A panel of producers from Toole, Liberty, Hill, Blaine, Phillips, Chouteau, and Valley counties in Montana assisted with the design of and provided the information contained in this enterprise budget.

Feed Sources

State and Bureau of Land Management (BLM) lands are the sources of public land available for ranchers to use from May 15-Sept. 15; however, most ranchers do not use both state and BLM land in this MLRA and choose one land type based on its availability and proximity to the operation. Ranchers in Blaine, Phillips, and Valley counties have more BLM land

available than state land whereas Toole, Liberty, Hill, and Chouteau counties in the western region of the MLRA have more state land available. Ranchers do have other privately owned land – including reservation land – available for them to lease during the same summer months beginning June 1. About seven weeks of grazing crop aftermath occurs starting mid-September due to the abundant farming industry

¹ Department of Ecosystem Science and Management, University of Wyoming.

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Table 1. Annual Calendar Activities for 100-head Cow-Calf Operation in MLRA 52.

Activities	Calendar Date
Begin winter feed and provide 15%-protein cake	Jan 1 - May 15
Calving	March 15 - May 15
Market open-animals; work replacement heifers	May 15
Start Breeding on Deeded Land	May 15 - June 1
Branding	June 1 - Jun 30
Graze State or BLM Land	May 15 - Sept 15
Privately-owned land is available for grazing	June 1 - Sept 15
Trail to deeded aftermath	Sept 16 - Oct 31
Trail to base or home operation; vaccine and preg-check cows; wean and sell calves and cull animals	Nov 5
Graze Deeded	Nov 6 - Dec 31

in the area. Deeded land is grazed from November to December before winter feed begins, typically Jan. 1. Ranchers typically put up their own meadow hay and alfalfa to supply half of the required winter feed. They purchase the remaining feed required to meet the herd's demand. Purchased feed is comprised of equal amounts meadow hay and alfalfa hay. After winter, the herd is moved to deeded land for about one month of grazing before summer grazing on leased land begins. A schedule of the grazing and other ranch activities within a calendar year is listed in Table 1.

Land Cost

The cost of land is included in the budget on a per AUM cost by land type. In the case of public lands, per AUM rates are published by the land management agency. Deeded land cost is calculated based on prevailing lease rates for rangelands in the area. Aftermath grazing is assumed to have the same cost per AUM – not necessarily the same rate per acre.

Herd Characteristics

On Jan. 1, livestock inventory consists of 100 cows, five bulls (including bulls for the replacement-heifer herd), and three horses. One replacement bull is bought annually and all bulls have a useful life of five years. Each year 2% of brood cows die, and 13% of brood cows are culled. Bulls are turned into the herd for breeding season from mid-May to June 1. The weaning rate for all cows exposed to bulls is 88%. In the fall, all steer calves and 59% of heifer calves are sold. After a 1% death loss, the remaining 41% or 18 head of heifer calves are selected at weaning as replacement heifers.

Three replacement heifers are culled in the spring; 15 replacement heifer yearlings are brought into the herd during fall breeding evaluation. Due to unsuccessful breeding and old age, 13 cows are culled from the herd. Steer calves, non-replacement heifer calves, cull bulls, and cull cows are marketed for delivery in November. Also in November, all cattle are vaccinated while cows and replacement heifers are pregnancy-checked. All steer and heifer calves are earmarked, branded, dehorned, and vaccinated by June 30. Steer calves are also commonly castrated and implanted during branding (June).

Animal Health (Veterinary and Medicine)

This includes vaccines, medicines, and all other veterinary services including pregnancy testing. Pre-calving for mature cows and bred replacement heifers include scour prevention (ScourGard). Calves are given post-calving season vaccinations, are branded, dehorned, and bulls castrated in June. These vaccinations include 7-way, IBR/PI3/BVD/BRSV, and pour-on/wormer (Ivomec or Dectomax). Previous year's selected replacement heifers and mature cows are given pre-breeding vaccinations including Vibriosis-Leptospirosis, 7-way, IBR/PI3/BVD/BRSV, and pour-on/wormer (Ivomec or Dectomax) before the May 15 bull turnout. Bulls will be tested for fertility and trichomoniasis and receive pour-on/wormer. Cows and replacement heifers are pregnancy tested in the fall as the cattle are gathered and heifer calves are given Bangs vaccinations. Table 2 below gives typical vaccinating and animal health practices and cost estimations by livestock class as provided by Forero et al. (2017).

Table 2. Veterinary and Medicine Costs.

Activity	Cost Per Unit	No. of Head	total cost
Cows - Vaccine, wormer, etc.	\$ 9.00	100	\$900.00
Cows - Vet service (preg check, etc.)	\$ 2.25	100	\$225.00
Bulls - Vaccine, wormer, etc.	\$ 15.50	4	\$67.67
Bulls - Vet service (trich, semen, etc.)	\$ 40.00	4	\$174.64
Heifers - Vaccine, wormer, etc.	\$ 12.50	18	\$223.50
Heifers - Vet service (bangs, preg check)	\$ 7.25	18	\$129.63
Horses - Wormer	\$ 15.00	3	\$45.00
Calves - Dehorned, vaccine, boosters, dewormer, castrate (bulls calves only)	\$ 15.82	88	\$1,393.90
Total			\$3,159.34
Cost per cow			\$31.59

Approximately 50% of ranchers in this MLRA artificially inseminate their replacement heifers in June. The \$36 per head cost of artificial insemination is not included in Table 2 but can be found as a line item on the enterprise budget (Table 3).

Marketing and Transportation

In the summer months, calves are marketed through video auction. All calves sold are delivered in November. In the fall and spring, culled livestock are transported to sale barns within a 150-mile radius to be sold through local auction markets. Most ranchers hire trucking companies to transport their cattle to the sale barn at an average cost of \$6 per mile.

Labor

Labor for the ranch is provided by the operation's management, which includes one owner or manager and additional part-time help (usually the owner's children or grandchildren). The cost of owner labor and management are not included in the budget. The net returns in the budget are the compensation to owner labor and management.

Taxes

Annual tax costs for MLRA 52 are estimated following Montana's Department of Revenue 2016 Biennial Report. In this report, agricultural land is property considered as "Class 3" which follows a productivity valuation standard. The 2016 tax rate for Class 3 agricultural property within Montana is 2.16 percent. According to Montana Code Annotated 2017 (MCA 15-7-201), the per-acre productivity value of

agricultural land is equal to the per-acre net income of agricultural land divided by the 6.4% capitalization rate. Net income of agricultural land is based on commodity price and cost of production data obtained from the Montana Agricultural Statistics Service 2017 publication. For the purpose of this budget, the representative ranch's value of agricultural property is calculated by dividing the Income Above Operating Costs by Montana's capitalization rate of 6.4%; equal to \$516,077.22. By applying the 2.16% 2016 tax rate, the annual tax expense is estimated at \$11,147.27, or about \$111 per cow. Please note, these numbers are not intended for accounting purposes but rather to provide an example of annual tax expenses' role in a ranching operation. For IRS accounting scenarios and accurate tax filing, ranchers will need to follow the Generally Accepted Accounting Principles (GAAP rules).

Inventory and Capital Investments

There are three buildings and structures for a small cow-calf operation including one shop, one home, and one calving barn. Vehicles used for the ranch enterprise include one tractor (130 horsepower), a goose-neck 32-foot stock trailer, a 48-foot flatbed trailer, and two ¾-ton 4x4 pickups. The ranch also uses two ATVs. Other machinery and equipment include one set of corrals, one portable loading chute, and one squeeze chute. This budget's depreciation costs are calculated using straight-line depreciation and applying a 5% interest rate, useful life by asset as determined by the Modified Accelerated Cost Recovery System (MACRS) standards, and machinery salvage value calculations

from Iowa State University of Science and Technology's Cooperative Extension Service (File A3-29, Edwards, 2015).

Interest on Operating Capital and Retained Livestock

Interest on operating capital expenses is derived from the assumption that 50% of all annual operating costs are borrowed for a period of six months at 5% interest.

Interest on retained livestock is the value of the herd multiplied by the 2% interest rate (Yi and Zhang, 2016). This cost is the opportunity cost of keeping the herd and can be thought of as the amount a rancher could have made if the value of the herd had otherwise been invested at a 2% interest rate. The \$123,978.12 value of the herd is calculated using the Jan. 1 herd size (post annual death loss), the budget's sale weights, and market value for various livestock classes. The annual interest on retained livestock expense for this herd is about \$2,479.56.

Gross Receipts and Operating Expenditures

Livestock prices are five-year (2013-2017) averages from the CattleFax data base (2018) for Montana. Hay and alfalfa prices are also five-year (2013-2017) averages from USDA-NASS (2018) for Montana. Livestock weights are typical for this herd size and location. All averaged prices were indexed to 2017 using the consumer price index prior to averages being calculated. Livestock averaged prices and averaged hay and alfalfa prices are shown under Total Receipts and Operating Costs in Table 3.

References

- American Agriculture Economics Association.
2000. "Commodity costs and returns estimation handbook." Report from AAEA Commodity Costs and Returns Measurement Methods Task Force: Ames, Iowa.
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Table 3. Enterprise Budget for a 100-head, Cow-calf, Public Land Ranch in MLRA 52.

MLRA 52: Cool Central Desertic Basins and Plateaus

Public Land

Herd Size: 100 head

	Weight	Unit	Total Head or Unit	Price or Cost Per Unit	Total Value	Price or Cost Per Cow	Your Value
Gross Receipts							
Steer Calves	6.50	cwt	44	\$187.08	\$53,504.88	\$535.05	
Heifer Calves	5.50	cwt	26	\$183.32	\$26,214.76	\$262.15	
Yearling Heifers	9	cwt	3	\$143.42	\$3,872.34	\$38.72	
Cull Cows	12	cwt	13	\$81.71	\$12,746.76	\$127.47	
Cull Bulls	20.00	cwt	1	\$101.30	\$2,026.00	\$20.26	
Total Receipts					\$98,364.74	\$983.65	
Operating Costs							
BLM		AUM	299	\$1.87	\$559.13	\$5.59	
State		AUM	299	\$14.01	\$4,188.99	\$41.89	
Deeded Land							
Rangeland		AUM	369	\$16.11	\$5,939.84	\$59.40	
Hay Meadow Aftermath		AUM	33	\$16.11	\$530.88	\$5.31	
Crop Aftermath		AUM	191	\$16.11	\$1,475.47	\$14.75	
Winter Feed							
Meadow Hay		ton	123	\$128.58	\$15,815.34	\$158.15	
Alfalfa		ton	123	\$140.09	\$17,231.07	\$172.31	
Supplement							
Salt & Mineral		ton	2.850	\$1,398.86	\$3,986.74	\$39.87	
Fuel					\$2,500.00	\$25.00	
Supplies & Fencing					\$1,000.00	\$10.00	
Utilities					\$1,200.00	\$12.00	
Veterinary Medicine					\$3,159.34	\$31.59	
Artificial Insemination		hd	10	\$36.00	\$360.00	\$3.60	
Freight & Trucking		mile	150	\$6.00	\$900.00		
Marketing Fees ¹					\$1,967.29	\$19.67	
Other Variable Costs ²		hd	100	\$5.00	\$500.00	\$5.00	
Repair ³							
Machinery & Equipment					\$2,500.00	\$25.00	
Housing & Improvements					\$1,000.00	\$10.00	
Interest on Operating Capital		%	0.025	\$32,407.05	\$810.18	\$8.10	
Total Operating Costs					\$65,624.28	\$656.24	
Income Above Operating Costs					\$32,740.46	\$327.40	
Ownership Costs and Capital							
Purchased Livestock		bull	1	\$4,997.00	\$4,997.00	\$49.97	
Interest on Retained Livestock		\$	2%	\$123,969.12	\$2,479.38	\$24.79	
Asset Depreciation ⁴		\$			\$17,224.54	\$172.25	
Taxes		\$	2.16%	\$511,569.70	\$11,049.91	\$110.50	
Total Ownership Costs					\$35,750.83	\$357.51	
Total Costs					\$101,375.11	\$1,013.75	
Returns to Labor and Management					\$(3,010.37)	\$(30.10)	

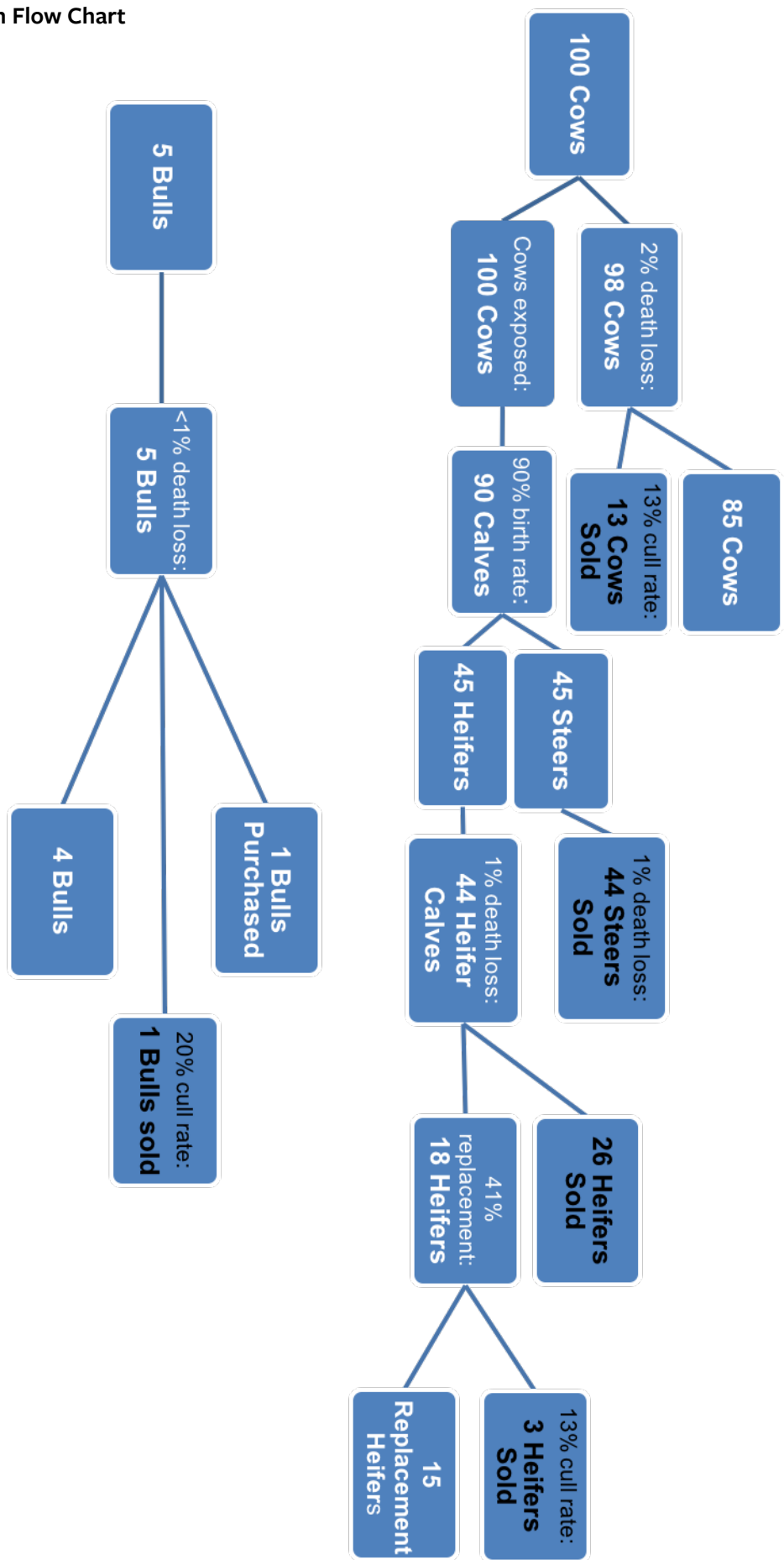
¹ Marketing fees include video and sale barn auction fees totaling 2% of total receipts

² Other variable costs include Montana's Per Capita, Brand Inspection, Predator Control, Beef Check-off fees, and Marketing fees.

³ Lump-sum annual repair cost estimates provided by focus group.

⁴ Depreciation costs of haying equipment are not included in this budget as hay production is treated as a separate enterprise.

Table 4. Cow-calf Production Flow Chart



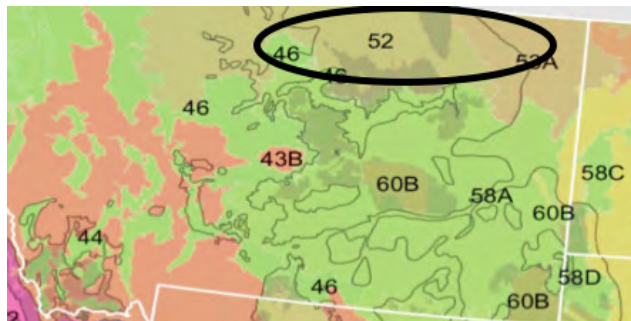


Enterprise budget for large, private-land ranch

Brown Glaciated Plain

MLRA 52

Holly Dyer¹, Holly Kirkpatrick¹, Tom Hilken¹, Kendall Roberts¹, Anna Maher¹, Nicolas Quintana Ashwell¹, Jesse Fulbright², John Tanaka³, John Ritten⁴, and Kristie Maczko³



Montana counties: Toole, Liberty, Hill, Blaine, Phillips, Chouteau, Valley

This enterprise budget estimates the typical costs and returns for a 250-head, cow-calf operation in Major Land Resource Area (MLRA) 52, the Brown Glaciated Plain. A panel of producers from Toole, Liberty, Hill, Blaine, Phillips, Chouteau, and Valley counties in Montana assisted with the design of and provided the information contained in this enterprise budget.

Feed Sources

Feed sources for private land ranches include deeded rangeland, non-irrigated pasture, and both crop and hay meadow aftermath grazing. About seven weeks of grazing crop aftermath occurs starting mid-September due to the abundant farming industry in the area. Deeded land is grazed from November to December before winter feed begins, typically Jan. 1. Ranchers

typically put up their own meadow hay and alfalfa to supply half of the required winter feed. They purchase the remaining feed required to meet the herd's demand. Purchased feed is comprised of equal amounts meadow hay and alfalfa hay. After winter, the herd is moved to deeded rangeland or non-irrigated pasture close to the home operation for about one month of grazing before summer grazing on privately leased rangeland begins.

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² Extension Educator, Liberty County Extension, Montana State University.

³ Wyoming Agricultural Experiment Station, University of Wyoming; Sustainable Rangelands Roundtable.

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Table 1. Annual Calendar Activities for 250-head Cow-Calf Operation in MLRA 52.

Activities	Calendar Date
Begin winter feed (50/50 raised and purchased hay/alfalfa); provide protein	Jan 1 - Apr 30
Calving	Jan 1 - Apr 1
Graze deeded rangeland and non-irrigated pasture	May 1 - May 31
Market open-animals; work replacement heifers	May 15
Breeding	Apr 1 - July 1
Branding	May 1 - May 31
Graze privately-leased rangeland	June 1 - Sept 15
Graze deeded crop aftermath	Sept 16 - Oct 31
Trail to base or home operation; vaccine and preg-check cows; market and sell calves and cull animals	Nov 1
Graze deeded hay aftermath and rangeland	Nov 1 - Dec 31

A schedule of the grazing and other ranch activities within a calendar year is listed in Table 1 below.

Land Cost

The cost of land is included in the budget on a per AUM cost by land type. Deeded land cost is calculated based on prevailing lease rates for rangelands in the area. Aftermath grazing is assumed to have the same cost per AUM – not necessarily the same rate per acre.

Herd Characteristics

On Jan. 1, livestock inventory consists of 250 cows, 13 bulls, and 2 horses. Three replacement bulls are bought three of five years and two bulls in the other two years, and all bulls have a useful life of five years. Each year, 1% of brood cows die and 12% of brood cows are culled. Bulls are turned into the herd for breeding season from mid-May to June 1. The weaning rate for all cows exposed to bulls is 90%. In the fall, all steer calves and 64% of heifer calves are sold. After a 2% death loss, the remaining 36% or 41 head of heifer calves are selected at weaning as replacement heifers. Approximately 4% of replacement heifers die, and six replacement heifers are culled in the spring; 33 replacement heifer yearlings are brought into the herd during fall breeding evaluation. Due to unsuccessful breeding and old age, 36 cows are culled from the herd. Steer calves, non-replacement heifer calves, cull bulls, and cull cows are marketed for delivery in November. Also in November, all cattle are vaccinated, while cows and replacement heifers are pregnancy-checked. All steer and heifer calves are earmarked, branded,

dehorned, and vaccinated by May 3. Steer calves are also commonly castrated and implanted during branding (May).

Animal Health (Veterinary and Medicine)

This includes vaccines, medicines, and all other veterinary services including pregnancy testing. Pre-calving for mature cows and bred replacement heifers include scour prevention (ScourGard). Calves are given post-calving season vaccinations, are branded, dehorned, and bulls castrated in June. These vaccinations include 7-way, IBR/PI3/BVD/BRSV, and pour-on/wormer (Ivomec or Dectomax). Previous year's selected replacement heifers and mature cows are given pre-breeding vaccinations including Vibriosis-Leptospirosis, 7-way, IBR/PI3/BVD/BRSV, and pour-on/wormer (Ivomec or Dectomax) before the April 1 bull turnout. Bulls will be tested for fertility and trichomoniasis and receive pour-on/wormer. Cows and replacement heifers are pregnancy tested in the fall as the cattle are gathered and heifer calves are given Bangs vaccinations. Table 2 below gives typical vaccinating and animal health practices and cost estimations by livestock class as provided by Forero et al. (2017).

Marketing and Transportation

Calves are marketed through video auction in the summer months. All calves sold are delivered in November. In fall and spring, culled livestock are transported to sale barns within a 150-mile radius to be sold through local auction markets. Most ranchers have a semi-truck and cattle pot to transport their cattle to the sale barn. Trucking expenses are included

Table 2. Veterinary and Medicine Costs.

Activity	Cost Per Unit	No. of Head	total cost
Cows - Vaccine, wormer, etc.	\$ 9.00	250	\$2,250.00
Cows - Vet service (preg check, etc.)	\$ 2.25	250	\$562.50
Bulls - Vaccine, wormer, etc.	\$ 15.50	13	\$195.82
Bulls - Vet service (trich, semen, etc.)	\$ 40.00	13	\$505.34
Heifers - Vaccine, wormer, etc.	\$ 12.50	41	\$507.15
Heifers - Vet service (bangs, preg check)	\$ 7.25	41	\$294.15
Horses - Wormer	\$ 15.00	2	\$30.00
Calves - Dehorned, vaccine, boosters, dewormer, castrate (bulls calves only)	\$ 15.82	223	\$3,529.44
Total			\$7,874.40
Cost per cow			\$31.50

in the annual fuel and asset depreciation expenses on the budget.

Labor

Employees include one full-time hand paid \$11.56 per hour, or about \$24,045 each year. The ranch owner also provides the full-time employee free on-site housing and pays their utilities. The operation's management includes one owner or manager and additional part-time help (usually the owner's children or grandchildren). The cost of owner labor and management are not included in the budget. The net returns in the budget are the compensation to owner labor and management.

Taxes

Annual tax costs for MLRA 52 are estimated following Montana's Department of Revenue 2016 Biennial Report. In this report, agricultural land is property considered as "Class 3," which follows a productivity valuation standard. The 2016 tax rate for Class 3 agricultural property within Montana is 2.16 percent. According to Montana Code Annotated 2017 (MCA 15-7-201), the per-acre productivity value of agricultural land is equal to the per-acre net income of agricultural land divided by the 6.4% capitalization rate. Net income of agricultural land is based on commodity price and cost of production data obtained from the Montana Agricultural Statistics Service 2017 publication. For the purpose of this budget, the representative ranch's value of agricultural property is calculated by dividing the Income Above Operating

Costs by Montana's capitalization rate of 6.4%; equal to \$1,058,221.31. By applying the 2.16% 2016 tax rate, the annual tax expense is estimated at \$22,857.58, or about \$91 per cow. Please note, these numbers are not intended for accounting purposes but rather to provide an example of annual tax expenses' role in a ranching operation. For IRS accounting scenarios and accurate tax filing, ranchers will need to follow the Generally Accepted Accounting Principles (GAAP rules).

Inventory and Capital Investments

There are five buildings and structures for a large cow-calf operation including one shop, two homes, and two calving barns. Vehicles used for the ranch enterprise include three tractors (130, 75, and 40 horsepower), a goose-neck 32-foot stock trailer, one semi-truck (50% of its use is for the ranch enterprise), a cattle pot, and two pickups. The pickups include one ¾-ton 4x4 truck and one 1-ton pickup. The ranch also uses two ATVs. Other machinery and equipment include one set of corrals, a portable loading chute, and two squeeze chutes. This budget's depreciation costs are calculated using straight-line depreciation and applying a 5% interest rate, useful life by asset as determined by the Modified Accelerated Cost Recovery System (MACRS) standards, and machinery salvage value calculations from Iowa State University of Science and Technology's Cooperative Extension Service (File A3-29, Edwards, 2015).

Interest on Operating Capital and Retained Livestock

Interest on operating capital expenses is derived from the assumption that 50% of all annual operating costs are borrowed for a period of six months at 5% interest.

Interest on retained livestock is the value of the herd multiplied by the 2% interest rate (Yi and Zhang, 2016). This cost is the opportunity cost of keeping the herd and can be thought of as the amount a rancher could have made if the value of the herd had otherwise been invested at a 2% interest rate. The \$343,815.39 value of the herd is calculated using the Jan. 1 herd size (post annual death loss), the budget's sale weights, and market value for various livestock classes. The annual interest on retained livestock expense for this herd is about \$6,876.

Gross Receipts and Operating Expenditures

Livestock prices are five-year (2013-2017) averages from the CattleFax data base (2018) for Montana. Hay and alfalfa prices are also five-year (2013-2017) averages from USDA-NASS (2018) for Montana. Livestock weights are typical for this herd size and location. All averaged prices were indexed to 2017 using the consumer price index prior to averages being calculated. Livestock averaged prices and averaged hay and alfalfa prices are shown under Total Receipts and Operating Costs in Table 3.

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Table 3. Enterprise Budget for a 250-head, Cow-calf, Private Land Ranch in MLRA 52.

MLRA 52: Brown Glaciated Plains
Private Land
Herd Size: 250 head

	Weight	Unit	Total Head or Unit	Price or Cost Per Unit	Total Value	Price or Cost Per Cow	Your Value
Gross Receipts							
Steer Calves	7	cwt	112	\$173.36	\$135,914.24	\$543.66	
Heifer Calves	6	cwt	71	\$170.42	\$72,598.92	\$290.40	
Yearling Heifers	10	cwt	6	\$136.42	\$8,185.20	\$32.74	
Cull Cows	13.50	cwt	30	\$81.71	\$33,092.55	\$132.37	
Cull Bulls	20	cwt	3	\$101.30	\$6,078.00	\$24.31	
Total Receipts					\$255,868.91	\$1,023.48	
Operating Costs							
Deeded Land							
Non-Irrigated Pasture		AUM	205	\$16.11	\$3,298.37	\$13.19	
Rangeland		AUM	2039	\$16.11	\$32,854.41	\$131.42	
Hay Meadow Aftermath		AUM	401	\$16.11	\$6,467.46	\$25.87	
Crop Aftermath		AUM	614	\$16.11	\$3,838.03	\$15.35	
Winter Feed							
Meadow Hay		ton	342	\$128.58	\$43,974.36	\$175.90	
Alfalfa		ton	342	\$140.09	\$47,910.78	\$191.64	
Supplement							
Protein Tubs		ton	1.010	\$1,101.60	\$1,112.59	\$4.45	
Salt & Mineral		ton	4.040	\$1,398.86	\$5,651.26	\$22.61	
Cake -- 15% Protein		ton	1.515	\$280.00	\$424.19	\$1.70	
Fuel					\$5,000.00	\$20.00	
Supplies & Fencing					\$4,000.00	\$16.00	
Utilities					\$2,400.00	\$9.60	
Veterinary Medicine					\$7,874.40	\$31.50	
Hired Labor		hr	2080	\$11.56	\$24,044.80	\$96.18	
Marketing Fees ¹					\$5,117.38	\$20.47	
Other Variable Costs ²		hd	250	\$5.00	\$1,250.00	\$5.00	
Repair ³							
Machinery & Equipment					\$5,000.00	\$20.00	
Housing & Improvements					\$2,000.00	\$8.00	
Interest on Operating Capital		%	0.025	\$101,109.02	\$2,527.73	\$10.11	
Total Operating Costs					\$204,745.76	\$818.98	
Income Above Operating Costs					\$51,123.15	\$204.49	
Ownership Costs and Capital							
Purchased Livestock		bull	3	\$4,997.00	\$14,991.00	\$59.96	
Interest on Retained Livestock		\$	2%	\$342,779.60	\$6,855.59	\$27.42	
Asset Depreciation ⁴		\$			\$32,264.92	\$129.06	
Taxes		\$	2.16%	\$798,799.22	\$17,254.06	\$69.02	
Total Ownership Costs					\$71,365.58	\$285.46	
Total Costs					\$276,111.34	\$1,104.45	
Returns to Labor and Management					\$(20,242.43)	\$(80.97)	

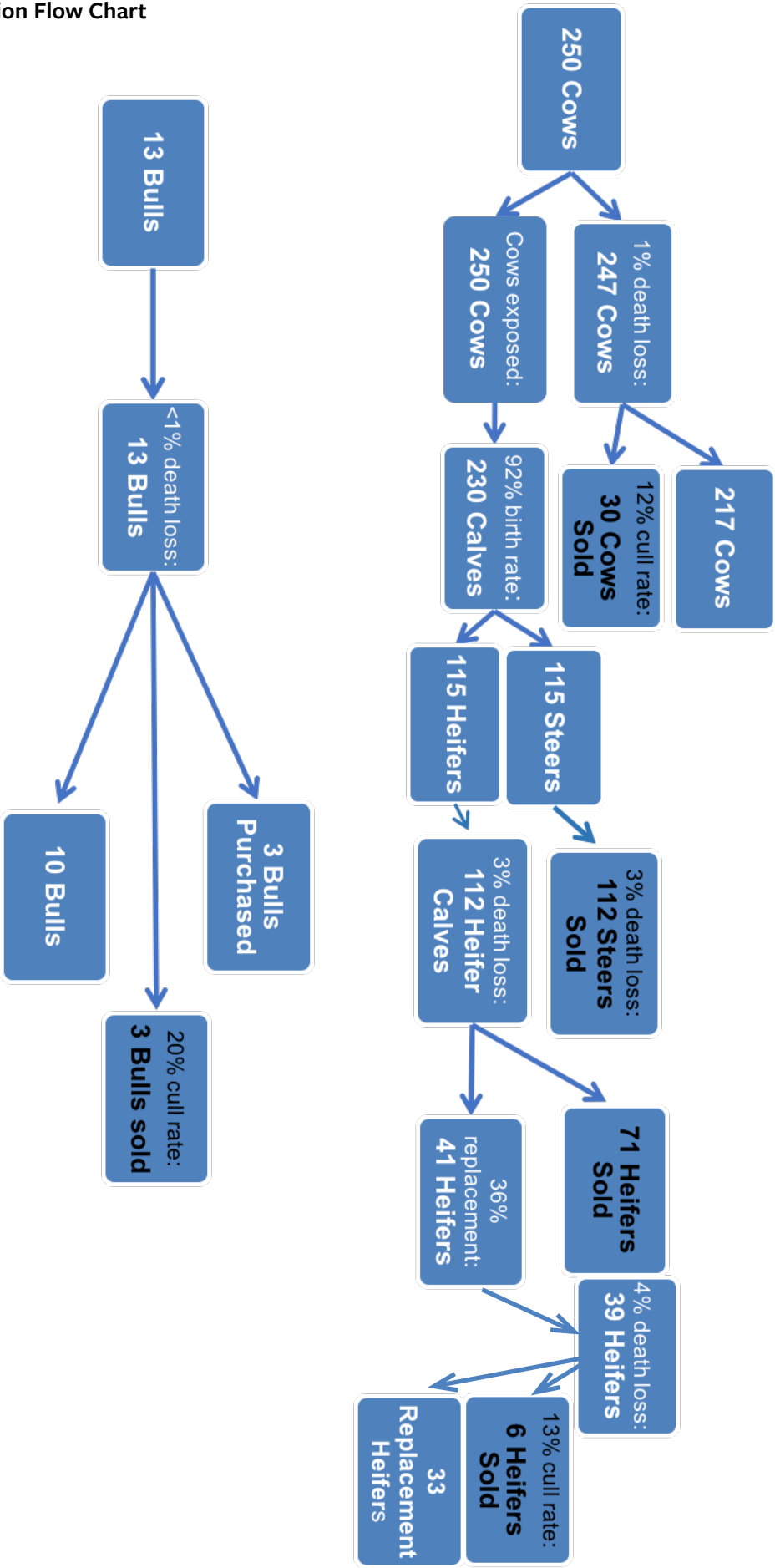
¹ Marketing fees include video and sale barn auction fees totaling 2% of total receipts

² Other variable costs include Montana's Per Capita, Brand Inspection, Predator Control, Beef Check-off fees, and Marketing fees.

³ Lump-sum annual repair cost estimates provided by focus group.

⁴ Depreciation costs of haying equipment are not included in this budget as hay production is treated as a separate enterprise.

Table 4. Cow-calf Production Flow Chart



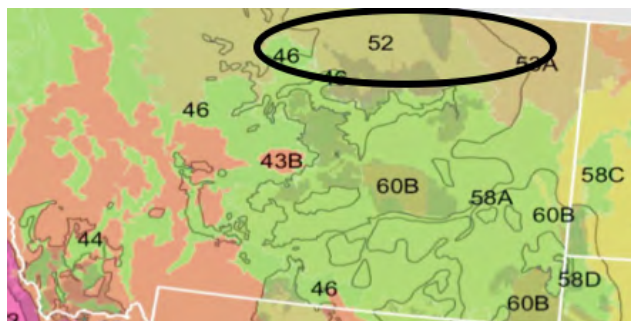


Enterprise budget for small, private-land ranch

Brown Glaciated Plain

MLRA 52

Holly Dyer¹, Holly Kirkpatrick¹, Tom Hilken¹, Kendall Roberts¹, Anna Maher¹, Nicolas Quintana Ashwell¹, Danny Pratt², John Tanaka³, John Ritten⁴, and Kristie Maczko³



Montana counties: Toole, Liberty, Hill, Blaine, Phillips, Chouteau, Valley

This enterprise budget estimates the typical costs and returns for a 75-head, cow-calf operation in Major Land Resource Area (MLRA) 52, the Brown Glaciated Plain. A panel of producers from Toole, Liberty, Hill, Blaine, Phillips, Chouteau, and Valley counties in Montana assisted with the design of and provided the information contained in this enterprise budget.

Feed Sources

Feed sources for private land ranches include deeded rangeland, non-irrigated pasture, and both crop and hay meadow aftermath grazing. About seven weeks of grazing crop aftermath occurs starting mid-September due to the abundant farming industry in the area. Deeded land is grazed from November to December before winter feed begins, typically on Jan. 1. Ranchers

typically put up their own meadow hay and alfalfa to supply half of the required winter feed. They purchase the remaining feed required to meet the herd's demand. Purchased feed is comprised of equal amounts meadow hay and alfalfa hay. After winter, the herd is moved to deeded rangeland or non-irrigated pasture close to the home operation for about one month of grazing before summer grazing on privately leased rangeland begins.

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Table 1. Annual Calendar Activities for 75-head Cow-Calf Operation in MLRA 52.

Activities	Calendar Date
Begin winter feed (50/50 raised and purchased hay/alfalfa); provide protein	Jan 1 - Apr 30
Calving	Mar 1 - Jun 1
Graze deeded rangeland and non-irrigated pasture	May 1 - May 31
Market open-animals; work replacement heifers	May 15
Breeding	Jun 15 - Aug 15
Branding	Jun 1 - Jun 15
Graze privately-leased rangeland	June 15 - Sept 15
Graze deeded crop aftermath	Sept 16 - Oct 31
Trail to base or home operation; vaccine and preg-check cows; market and sell calves and cull animals	Nov 1
Graze deeded hay aftermath and rangeland	Nov 1 - Dec 31

A schedule of the grazing and other ranch activities within a calendar year is listed in Table 1.

Land Cost

The cost of land is included in the budget on a per AUM cost by land type. In the case of public lands, per AUM rates are published by the land management agency. Deeded land cost is calculated based on prevailing lease rates for rangelands in the area. Aftermath grazing is assumed to have the same cost per AUM – not necessarily the same rate per acre.

Herd Characteristics

On Jan. 1, livestock inventory consists of 75 cows, three bulls (including bulls for the replacement-heifer herd), and three horses. One replacement bull is bought three of five years, and all bulls have a useful life of five years. Each year 1% of brood cows die, and 13% of brood cows are culled. Bulls are turned into the herd for breeding season from mid-June to mid-August. The weaning rate for all cows exposed to bulls is 88%. In the fall, all steer calves and 61% of heifer calves are sold. The remaining 39% or 13 head of heifer calves are selected at weaning as replacement heifers. Two replacement heifers are culled in the spring; 11 replacement heifer yearlings are brought into the herd during fall breeding evaluation. Due to unsuccessful breeding and old age, 10 cows are culled from the herd. Steer calves, non-replacement heifer calves, cull bulls, and cull cows are marketed for delivery in November. Also in November, all cattle are vaccinated, while cows and replacement heifers are pregnancy checked.

All steer and heifer calves are earmarked, branded, dehorned, and vaccinated by June 15. Steer calves are also commonly castrated and implanted during branding (June).

Animal Health (Veterinary and Medicine)

This includes vaccines, medicines, and all other veterinary services including pregnancy testing. Pre-calving for mature cows and bred replacement heifers include scour prevention (ScourGard). Calves are given post-calving season vaccinations, are branded, dehorned, and bulls castrated in June. These vaccinations include 7-way, IBR/PI3/BVD/BRSV, and pour-on/wormer (Ivomec or Dectomax). Previous year's selected replacement heifers and mature cows are given pre-breeding vaccinations including Vibriosis-Leptospirosis, 7-way, IBR/PI3/BVD/BRSV, and pour-on/wormer (Ivomec or Dectomax) before the May 15 bull turnout. Bulls will be tested for fertility and trichomoniasis and receive pour-on/wormer. Cows and replacement heifers are pregnancy tested in the fall as the cattle are gathered and heifer calves are given Bangs vaccinations. Table 2 below gives typical vaccinating and animal health practices and cost estimations by livestock class as provided by Forero et al. (2017).

Marketing and Transportation

In the summer months, calves are marketed through video auction. All calves sold are delivered in November. In the fall and spring, culled livestock are transported to sale barns within a 150-mile radius to be sold through local auction markets. Most ranchers hire

Table 2. Veterinary and Medicine Costs.

Activity	Cost Per Unit	No. of Head	total cost
Cows - vaccine, wormer, etc.	\$ 9.00	75	\$675.00
Cows - Vet service (preg check, etc.)	\$ 2.25	75	\$168.75
Bulls - vaccine, wormer, etc.	\$ 15.50	3	\$50.38
Bulls - Vet service (trich, semen, etc.)	\$ 40.00	3	\$130.01
Heifers - Vaccine, wormer, etc.	\$ 12.50	13	\$159.45
Heifers - Vet service (bangs, preg check)	\$ 7.25	13	\$92.48
Horses - wormer	\$ 15.00	3	\$45.00
Calves - dehorned, vaccine, boosters, dewormer, castrate (bulls calves only)	\$ 15.82	66	\$1,045.43
Total			\$2,366.49
cost per cow			\$31.55

trucking companies to transport their cattle to the sale barn at an average cost of \$6 per mile.

Labor

Labor for the ranch is provided by the operation's management, which includes one owner or manager and additional part-time help (usually the owner's children or grandchildren). The cost of owner labor and management are not included in the budget. The net returns in the budget are the compensation to owner labor and management.

Taxes

Annual tax costs for MLRA 52 are estimated following Montana's Department of Revenue 2016 Biennial Report. In this report, agricultural land is property considered as "Class 3" which follows a productivity valuation standard. The 2016 tax rate for Class 3 agricultural property within Montana is 2.16 percent. According to Montana Code Annotated 2017 (MCA 15-7-201), the per-acre productivity value of agricultural land is equal to the per-acre net income of agricultural land divided by the 6.4% capitalization rate. Net income of agricultural land is based on commodity price and cost of production data obtained from the Montana Agricultural Statistics Service 2017 publication. For the purpose of this budget, the representative ranch's value of agricultural property is calculated by dividing the Income Above Operating Costs by Montana's capitalization rate of 6.4%; equal to \$382,968.18. By applying the 2.16% 2016 tax rate, the annual tax expense is estimated at \$8,272.11, or

about \$110 per cow. Please note, these numbers are not intended for accounting purposes but rather to provide an example of annual tax expenses' role in a ranching operation. For IRS accounting scenarios and accurate tax filing, ranchers will need to follow the Generally Accepted Accounting Principles (GAAP rules).

Inventory and Capital Investments

There are three buildings and structures for a small cow-calf operation including one shop, one home, and one calving barn. Vehicles used for the ranch enterprise include one tractor (130 horsepower), a goose-neck 32-foot stock trailer, a 48-foot flatbed trailer, and two ¾-ton 4x4 pickups. The ranch also uses two ATVs. Other machinery and equipment include one set of corrals, one portable loading chute, and one squeeze chute. This budget's depreciation costs are calculated using straight-line depreciation and applying a 5% interest rate, useful life by asset as determined by the Modified Accelerated Cost Recovery System (MACRS) standards, and machinery salvage value calculations from Iowa State University of Science and Technology's Cooperative Extension Service (File A3-29, Edwards, 2015).

Interest on Operating Capital and Retained Livestock

Interest on operating capital expenses is derived from the assumption that 50% of all annual operating costs are borrowed for a period of six months at 5% interest.

Interest on retained livestock is the value of the herd multiplied by the 2% interest rate (Yi and Zhang,

2016). This cost is the opportunity cost of keeping the herd and can be thought of as the amount a rancher could have made if the value of the herd had otherwise been invested at a 2% interest rate. The \$92,588.87 value of the herd is calculated using the Jan. 1 herd size (post annual death loss), the budget's sale weights, and market value for various livestock classes. The annual interest on retained livestock expense for this herd is about \$1,851.29.

Gross Receipts and Operating Expenditures

Livestock prices are five-year (2013-2017) averages from the CattleFax data base (2018) for Montana. Hay and alfalfa prices are also five-year (2013-2017) averages from USDA-NASS (2018) for Montana. Livestock weights are typical for this herd size and location. All averaged prices were indexed to 2017 using the consumer price index prior to averages being calculated. Livestock averaged prices and averaged hay and alfalfa prices are shown under Total Receipts and Operating Costs in Table 3.

References

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2000. "Commodity costs and returns estimation handbook." Report from AAEA Commodity Costs and Returns Measurement Methods Task Force: Ames, Iowa.
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- Yi, K. M., & Zhang, J. 2016." Real interest rates over the long run". *Economic Policy Papers, Federal Reserve Bank of Minneapolis*, (16-10).

Table 3. Enterprise Budget for a 75-head, Cow-calf, Private Land Ranch in MLRA 52.

MLRA 52: Cool Central Desertic Basins and Plateaus
Private Land
Herd Size: 75 head

	Weight	Unit	Total Head or Unit	Price or Cost Per Unit	Total Value	Price or Cost Per Cow	Your Value
Gross Receipts							
Steer Calves	6.50	cwt	33	\$187.08	\$40,128.66	\$535.05	
Heifer Calves	5.75	cwt	19	\$183.32	\$20,027.71	\$267.04	
Yearling Heifers	9	cwt	2	\$146.42	\$2,635.56	\$35.14	
Cull Cows	12	cwt	9	\$81.71	\$8,824.68	\$117.66	
Cull Bulls	20.00	cwt	1	\$101.30	\$2,026.00	\$27.01	
Total Receipts					\$73,642.61	\$981.90	
Operating Costs							
BLM		AUM	226	\$1.87	\$422.62	\$5.63	
State		AUM	226	\$14.01	\$3,166.26	\$42.22	
Deeded Land							
Rangeland		AUM	279	\$16.11	\$4,493.11	\$59.91	
Hay Meadow Aftermath		AUM	25	\$16.11	\$400.82	\$5.34	
Crop Aftermath		AUM	144	\$16.11	\$1,104.64	\$14.73	
Winter Feed							
Meadow Hay		ton	92	\$128.58	\$11,829.36	\$157.72	
Alfalfa		ton	92	\$140.09	\$12,888.28	\$171.84	
Supplement							
Salt & Mineral		ton	2.850	\$1,398.86	\$3,986.74	\$53.16	
Fuel					\$2,500.00	\$33.33	
Supplies & Fencing					\$1,000.00	\$13.33	
Utilities					\$1,200.00	\$16.00	
Veterinary Medicine					\$2,380.76	\$31.74	
Artificial Insemination		hd	10	\$36.00	\$360.00	\$4.80	
Freight & Trucking		mile	150	\$6.00	\$900.00	\$12.00	
Marketing Fees ¹					\$1,472.85	\$19.64	
Other Variable Costs ²		hd	75	\$5.00	\$375.00	\$5.00	
Repair ³							
Machinery & Equipment					\$2,500.00	\$33.33	
Housing & Improvements					\$1,000.00	\$13.33	
Interest on Operating Capital		%	0.025	\$25,990.22	\$649.76	\$8.66	
Total Operating Costs					\$52,630.20	\$701.74	
Income Above Operating Costs					\$21,012.41	\$280.17	
Ownership Costs and Capital							
Purchased Livestock		bull	1	\$4,997.00	\$4,997.00	\$66.63	
Interest on Retained Livestock		\$	2%	\$92,785.17	\$1,855.70	\$24.74	
Asset Depreciation ⁴		\$			\$17,224.54	\$229.66	
Taxes		\$	2.16%	\$328,318.85	\$7,091.69	\$94.56	
Total Ownership Costs					\$31,168.93	\$415.59	
Total Costs					\$83,799.13	\$1,117.32	
Returns to Labor and Management					\$(10,156.52)	\$(135.42)	

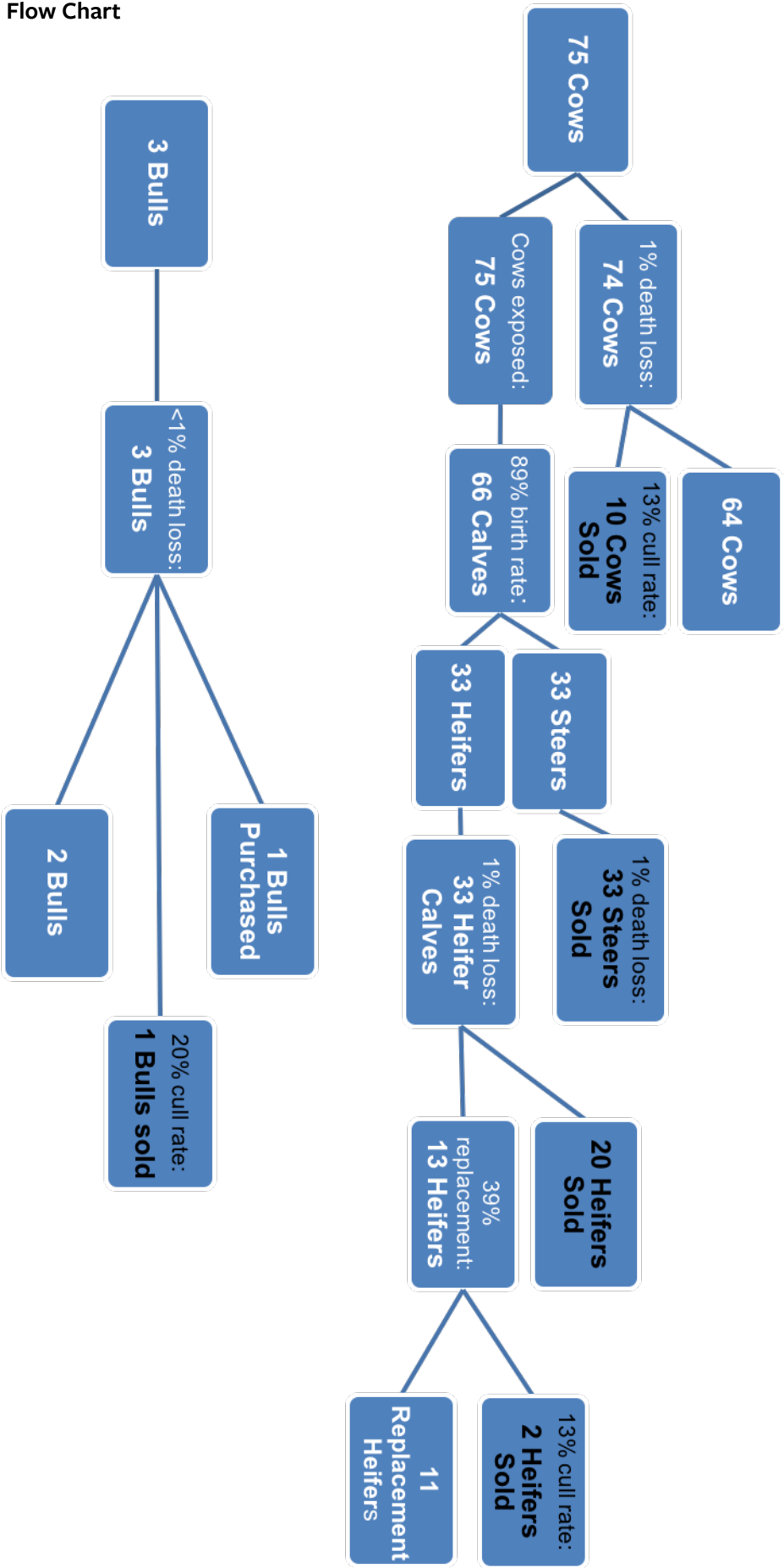
¹ Marketing fees include video and sale barn auction fees totaling 2% of total receipts

² Other variable costs include Montana's Per Capita, Brand Inspection, Predator Control, Beef Check-off fees, and Marketing fees.

³ Lump-sum annual repair cost estimates provided by focus group.

⁴ Depreciation costs of haying equipment are not included in this budget as hay production is treated as a separate enterprise.

Table 4. Cow-calf Production Flow Chart





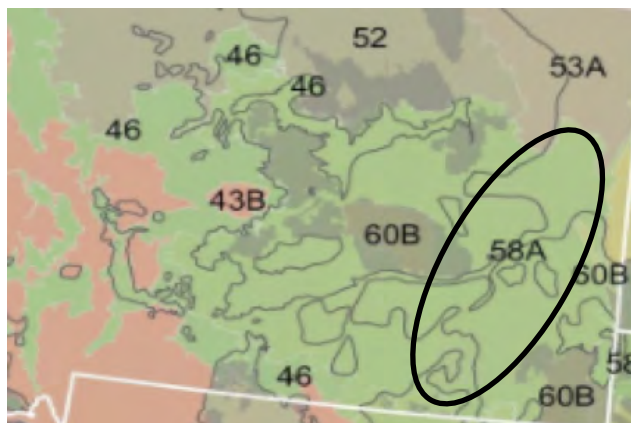
Enterprise budget for large, private-land ranch

Northern Rolling Plains

MLRA 58a

Holly Dyer¹, Holly Kirkpatrick¹, Tom Hilken¹,
Kendall Roberts¹, Anna Maher¹, Nicolas Quintana
Ashwell¹, Mat Walter², John Tanaka³, John Ritten⁴,
and Kristie Maczko³

**Montana counties: Fergus, Petroleum, Wheatland,
Golden Valley, Musselshell, Treasure, Rosebud,
Big Horn, Prairie, Custer, Powder River, Wibaux,
Carter, Yellowstone**



This enterprise budget estimates the typical costs and returns for a 300-head, cow-calf operation in Major Land Resource Area (MLRA) 58A, the Northern Rolling Plains. A panel of producers from the counties of Fergus, Petroleum, Wheatland, Golden Valley, Musselshell, Treasure, Rosebud, Big Horn, Horn, Prairie, Custer, Powder River, Wibaux, Carter, and Yellowstone in Montana assisted with the design of and the information contained in this enterprise budget.

Feed Sources

Feed sources for private land ranches include deeded rangeland, non-irrigated pasture, and hay meadow aftermath grazing. Aftermath grazing occurs during the month of October. Deeded land is grazed from November to mid-December before winter feed

begins around Dec. 15. Ranchers typically put up their own meadow hay and alfalfa to supply 60% of the required winter feed. They purchase the remaining feed required to meet the herd's demand. Purchased feed is comprised of equal amounts meadow hay and alfalfa hay. After winter, the herd is moved to deeded

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³ Wyoming Agricultural Experiment Station, University of Wyoming; Sustainable Rangelands Roundtable.

⁴ Department of Agricultural and Applied Economics, University of Wyoming.

Table 1. Annual Calendar Activities for 300-head Cow-Calf Operation in MLRA 58a.

Activities	Calendar Date
Begin winter feed (50/50 raised and purchased hay/alfalfa); provide protein	Dec 15 - Apr 30
Calving	Feb 15 - Apr 15
Graze deeded non-irrigated pasture	May 1 - May 31
Market open-animals; work replacement heifers	1-May
Breeding	May 15 - July 15
Branding	May 1 - May 31
Graze privately-leased rangeland	June 1 - Sept 30
Graze deeded hay aftermath	Oct 1 - Oct 31
Trail to base or home operation; vaccine and preg-check cows; market and sell calves and cull animals	Nov 1
Graze deeded rangeland and non-irrigated pasture	Nov 1 - Dec 15

non-irrigated pasture close to the home operation for about one month of grazing before summer grazing on privately leased rangeland begins. A schedule of the grazing and other ranch activities within a calendar year is listed in Table 1.

Land Cost

The cost of land is included in the budget on a per AUM cost by land type. Deeded land cost is calculated based on prevailing lease rates for rangelands in the area. Aftermath grazing is assumed to have the same cost per AUM – not necessarily the same rate per acre.

Herd Characteristics

On Jan. 1, livestock inventory consists of 300 cows, 14 bulls, and five horses. Three replacement bulls are bought four of five years and two in the fifth year, and all bulls have a useful life of five years. Each year 1% of brood cows die, and 15% of brood cows are culled. Bulls are turned into the herd for breeding season from mid-May to mid-July. The weaning rate for all cows exposed to bulls is 89%. In the fall, all steer calves and 57% of heifer calves are sold. The remaining 43% or 58 head of heifer calves are selected at weaning as replacement heifers. Approximately 2% of replacement heifers die, and eight replacement heifers are culled in the spring; 48 replacement heifer yearlings are brought into the herd during fall breeding evaluation. Due to unsuccessful breeding and old age, 45 cows are culled from the herd. Steer calves, non-replacement heifer calves, cull bulls, and cull cows are marketed for delivery in November. Also in November, all cattle

are vaccinated while cows and replacement heifers are pregnancy-checked. All steer and heifer calves are earmarked, branded, dehorned, and vaccinated by May 31. Steer calves are also commonly castrated and implanted during branding (May).

Animal Health (Veterinary and Medicine)

This includes vaccines, medicines, and all other veterinary services including pregnancy testing. Pre-calving for mature cows and bred replacement heifers include scour prevention (ScourGard). Calves are given post-calving season vaccinations, are branded, dehorned, and bulls castrated in June. These vaccinations include 7-way, IBR/PI3/BVD/BRSV, and pour-on/wormer (Ivomec or Dectomax). Previous year's selected replacement heifers and mature cows are given pre-breeding vaccinations including Vibriosis-Leptospirosis, 7-way, IBR/PI3/BVD/BRSV, and pour-on/wormer (Ivomec or Dectomax) before the May 15 bull turnout. Bulls will be tested for fertility and trichomoniasis and receive pour-on/wormer. Cows and replacement heifers are pregnancy tested in the fall as the cattle are gathered and heifer calves are given Bangs vaccinations. Table 2 gives typical vaccinating and animal health practices and cost estimations by livestock class as provided by Forero et al. (2017).

Marketing and Transportation

In the summer months, calves are marketed through video auction. All calves sold are delivered in November. In the fall and spring, culled livestock are transported to local livestock auctions in Billings, MT, which is an average 60-mile radius for the region. Most

Table 2. Veterinary and Medicine Costs.

Activity	Cost Per Unit	No. of Head	total cost
Cows - vaccine, wormer, etc.	\$ 9.00	300	\$2,700.00
Cows - Vet service (preg check, etc.)	\$ 2.25	300	\$675.00
Bulls - vaccine, wormer, etc.	\$ 15.50	14	\$223.21
Bulls - Vet service (trich, semen, etc.)	\$ 40.00	14	\$576.04
Heifers - Vaccine, wormer, etc.	\$ 12.50	60	\$750.30
Heifers - Vet service (bangs, preg check)	\$ 7.25	60	\$435.17
Horses - wormer	\$ 15.00	5	\$75.00
Calves - dehorned, vaccine, boosters, dewormer, castrate (bulls calves only)	\$ 15.82	268	\$4,238.18
Total			\$9,672.90
cost per cow			\$32.24

ranchers hire trucking companies to transport their cattle to the sale barn at an average cost of \$6 per mile.

Labor

Labor for the ranch is provided by the operation's management, which includes one owner or manager and additional part-time help (usually the owner's children or grandchildren). The cost of owner labor and management are not included in the budget. The net returns in the budget are the compensation to owner labor and management.

Taxes

Annual tax costs for MLRA 58A are estimated following Montana's Department of Revenue 2016 Biennial Report. In this report, agricultural land is property considered as "Class 3" which follows a productivity valuation standard. The 2016 tax rate for Class 3 agricultural property within Montana is 2.16 percent. According to Montana Code Annotated 2017 (MCA 15-7-201), the per-acre productivity value of agricultural land is equal to the per-acre net income of agricultural land divided by the 6.4% capitalization rate. Net income of agricultural land is based on commodity price and cost of production data obtained from the Montana Agricultural Statistics Service 2017 publication. For the purpose of this budget, the representative ranch's value of agricultural property is calculated by dividing the Income Above Operating Costs by Montana's capitalization rate of 6.4%; equal to \$838,047.19. By applying the 2.16% 2016 tax rate, the annual tax expense is estimated at \$18,101.82, or

about \$60 per cow. Please note, these numbers are not intended for accounting purposes but rather to provide an example of annual tax expenses' role in a ranching operation. For IRS accounting scenarios and accurate tax filing, ranchers will need to follow the Generally Accepted Accounting Principles (GAAP rules).

Inventory and Capital Investments

There are five buildings and structures for a large cow-calf operation including one shop, two homes, and two calving barns. Vehicles used for the ranch enterprise include three tractors (130, 75, and 40 horsepower), a goose-neck 32-foot stock trailer, one semi-truck (50% of its use is for the ranch enterprise), a cattle pot, and two pickups. The pickups include one ¾-ton 4x4 truck and one 1-ton pickup. The ranch also uses two ATVs. Other machinery and equipment include one set of corrals, a portable loading chute, and two squeeze chutes. This budget's depreciation costs are calculated using straight-line depreciation and applying a 5% interest rate, useful life by asset as determined by the Modified Accelerated Cost Recovery System (MACRS) standards, and machinery salvage value calculations from Iowa State University of Science and Technology's Cooperative Extension Service (File A3-29, Edwards, 2015).

Interest on Operating Capital and Retained Livestock

Interest on operating capital expenses is derived from the assumption that 50% of all annual operating costs are borrowed for a period of six months at 5% interest.

Interest on retained livestock is the value of the herd multiplied by the 2% interest rate (Yi and Zhang, 2016). This cost is the opportunity cost of keeping the herd and can be thought of as the amount a rancher could have made if the value of the herd had otherwise been invested at a 2% interest rate. The \$377,484.39 value of the herd is calculated using the Jan. 1 herd size (post annual death loss), the budget's sale weights, and market value for various livestock classes. The annual interest on retained livestock expense for this herd is about \$7,550.

Gross Receipts and Operating Expenditures

Livestock prices are five-year (2013-2017) averages from the CattleFax data base (2018) for Montana. Hay and alfalfa prices are also five-year (2013-2017) averages from USDA-NASS (2018) for Montana. Livestock weights are typical for this herd size and location. All averaged prices were indexed to 2017 using the consumer price index prior to averages being calculated. Livestock averaged prices and averaged hay and alfalfa prices are shown under Total Receipts and Operating Costs in Table 3.

References

- American Agriculture Economics Association.
2000. "Commodity costs and returns estimation handbook." Report from AAEA Commodity Costs and Returns Measurement Methods Task Force: Ames, Iowa.
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Table 3. Enterprise Budget for a 300-head, Cow-calf, Private Land Ranch in MLRA 58a.

MLRA 58a: Northern Rolling Plains
Private Land
Herd Size: 300 head

	Weight	Unit	Total Head or Unit	Price or Cost Per Unit	Total Value	Price or Cost Per Cow	Your Value
Gross Receipts							
Steer Calves	6	cwt	134	\$187.08	\$150,412.32	\$501.37	
Heifer Calves	5.5	cwt	76	\$183.32	\$76,627.76	\$255.43	
Yearling Heifers	8.75	cwt	8	\$151.42	\$10,599.40	\$35.33	
Cull Cows	12	cwt	45	\$81.71	\$44,123.40	\$147.08	
Cull Bulls	18	cwt	3	\$101.30	\$5,470.20	\$18.23	
Total Receipts					\$287,233.08	\$957.44	
Operating Costs							
Deeded Land							
Non-Irrigated Pasture		AUM	449	\$16.11	\$7,235.52		
Rangeland		AUM	2453	\$16.11	\$39,517.67	\$131.73	
Hay Meadow Aftermath		AUM	449	\$16.11	\$7,235.52	\$24.12	
Winter Feed							
Meadow Hay		ton	423	\$128.58	\$54,389.34	\$181.30	
Alfalfa		ton	423	\$140.09	\$59,258.07	\$197.53	
Supplement							
Protein Tubs		ton	1.427	\$1,101.60	\$1,572.29	\$5.24	
Salt & Mineral		ton	5.075	\$1,398.86	\$7,098.87	\$23.66	
Cake -- 15% Protein		ton	1.903	\$280.00	\$532.85	\$1.78	
Fuel					\$10,000.00	\$33.33	
Supplies & Fencing					\$11,500.00	\$38.33	
Utilities					\$8,000.00	\$26.67	
Veterinary Medicine					\$9,672.90	\$32.24	
Freight & Trucking		mile	60	\$6.00	\$360.00		
Marketing Fees ¹					\$5,744.66	\$19.15	
Other Variable Costs ²		hd	300	\$5.00	\$1,500.00	\$5.00	
Repair ³							
Machinery & Equipment					\$5,000.00	\$16.67	
Housing & Improvements					\$2,000.00	\$6.67	
Interest on Operating Capital		%	0.025	\$115,308.85	\$2,882.72	\$9.61	
Total Operating Costs					\$233,500.42	\$778.33	
Income Above Operating Costs					\$53,732.66	\$179.11	
Ownership Costs and Capital							
Purchased Livestock		bull	3	\$4,997.00	\$14,991.00	\$49.97	
Interest on Retained Livestock		%	2%	\$380,406.74	\$7,608.13	\$25.36	
Asset Depreciation ⁴		\$			\$27,778.72	\$92.60	
Taxes		\$	2.16%	\$839,572.84	\$18,134.77	\$60.45	
Total Ownership Costs					\$68,512.62	\$228.38	
Total Costs					\$302,013.04	\$1,006.71	
Returns to Labor and Management					\$(14,779.96)	\$(49.27)	

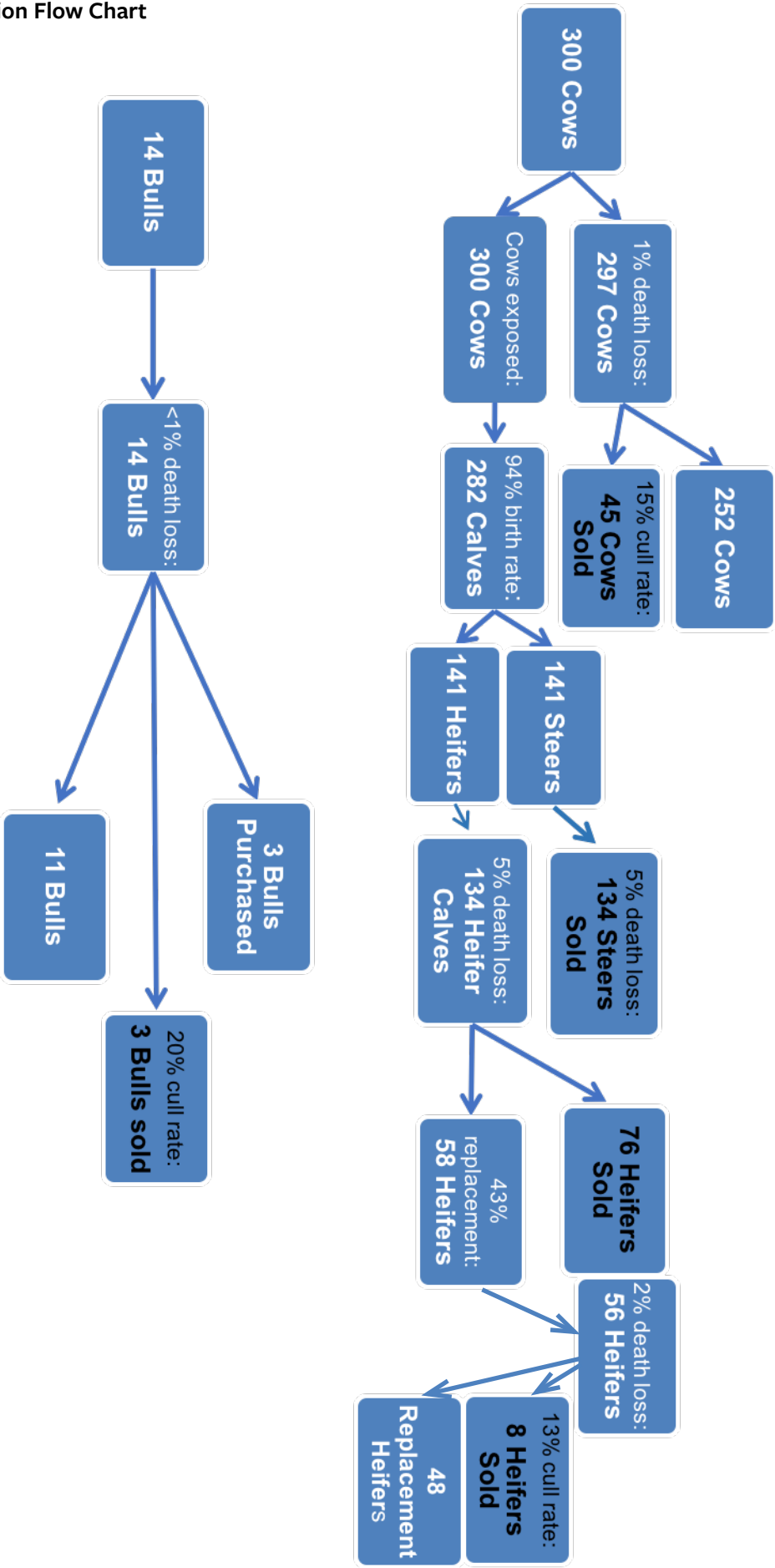
¹ Marketing fees include video and sale barn auction fees totaling 2% of total receipts

² Other variable costs include Montana's Per Capita, Brand Inspection, Predator Control, Beef Check-off fees, and Marketing fees.

³ Lump-sum annual repair cost estimates provided by focus group.

⁴ Depreciation costs of haying equipment are not included in this budget as hay production is treated as a separate enterprise.

Table 4. Cow-calf Production Flow Chart





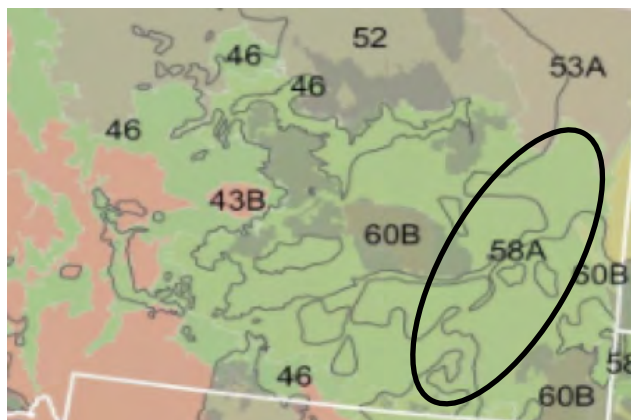
Enterprise budget for small, private-land ranch

Northern Rolling Plains

MLRA 58a

Holly Kirkpatrick¹, Holly Dyer¹, Tom Hilken¹, Kendall Roberts¹, Anna Maher¹, Nicolas Quintana Ashwell¹, Mat Walter², John Tanaka³, John Ritten⁴, and Kristie Maczko³

Montana counties: Fergus, Petroleum, Wheatland, Golden Valley, Musselshell, Treasure, Rosebud, Big Horn, Prairie, Custer, Powder River, Wibaux, Carter, Yellowstone



This enterprise budget estimates the typical costs and returns for a 100-head, cow-calf operation in Major Land Resource Area (MLRA) 58A, the Northern Rolling Plains. A panel of producers from the counties of Fergus, Petroleum, Wheatland, Golden Valley, Musselshell, Treasure, Rosebud, Big Horn, Prairie, Custer, Powder River, Wibaux, Carter, and Yellowstone in Montana assisted with the design of and the information contained in this enterprise budget.

Feed Sources

Feed sources for private land ranches include deeded rangeland, non-irrigated pasture, and hay meadow aftermath grazing. Aftermath grazing occurs during the month of October. Deeded land is grazed from

November to mid-December before winter feed begins around December 15. Ranchers typically put up their own meadow hay and alfalfa to supply 60% of the required winter feed. They purchase the remaining feed required to meet the herd's demand. Purchased

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³ Wyoming Agricultural Experiment Station, University of Wyoming; Sustainable Rangelands Roundtable.

⁴ Department of Agricultural and Applied Economics, University of Wyoming.

Table 1. Annual Calendar Activities for 100-head Cow-Calf Operation in MLRA 58a.

Activities	Calendar Date
Begin winter feed (50/50 raised and purchased hay/alfalfa); provide protein	Dec 15 - Apr 30
Calving	Feb 15 - Apr 15
Graze deeded non-irrigated pasture	May 1 - May 31
Market open-animals; work replacement heifers	1-May
Breeding	May 15 - July 15
Branding	May 1 - May 31
Graze privately-leased rangeland	June 1 - Sept 30
Graze deeded hay aftermath	Oct 1 - Oct 31
Trail to base or home operation; vaccine and preg-check cows; market and sell calves and cull animals	Nov 1
Graze deeded rangeland and non-irrigated pasture	Nov 1 - Dec 15

feed is comprised of equal amounts meadow hay and alfalfa hay. After winter, the herd is moved to deeded non-irrigated pasture close to the home operation for about one month of grazing before summer grazing on privately-leased rangeland begins. A schedule of the grazing and other ranch activities within a calendar year is listed in Table 1.

Land Cost

The cost of land is included in the budget on a per AUM cost by land type. Deeded land cost is calculated based on prevailing lease rates for rangelands in the area. Aftermath grazing is assumed to have the same cost per AUM – not necessarily the same rate per acre.

Herd Characteristics

On Jan. 1, livestock inventory consists of 100 cows, five bulls, and five horses. One replacement bull is bought annually, and all bulls have a useful life of five years. Each year 1% of brood cows die, and 15% of brood cows are culled. Bulls are turned into the herd for breeding season from mid-May to mid-July. The weaning rate for all cows exposed to bulls is 90%. In the fall, all steer calves and 58% of heifer calves are sold. The remaining 42% or 19 head of heifer calves are selected at weaning as replacement heifers. Three replacement heifers are culled in the spring; 16 replacement heifer yearlings are brought into the herd during fall breeding evaluation. Due to unsuccessful breeding and old age, 15 cows are culled from the herd. Steer calves, non-replacement heifer calves, cull bulls, and cull cows are marketed for delivery in November.

Also in November, all cattle are vaccinated while cows and replacement heifers are pregnancy-checked. All steer and heifer calves are earmarked, branded, dehorned, and vaccinated by May 31. Steer calves are also commonly castrated and implanted during branding (May).

Animal Health (Veterinary and Medicine)

This includes vaccines, medicines, and all other veterinary services including pregnancy testing. Pre-calving for mature cows and bred replacement heifers include scour prevention (ScourGard). Calves are given post-calving season vaccinations, are branded, dehorned, and bulls castrated in June. These vaccinations include 7-way, IBR/PI3/BVD/BRSV, and pour-on/wormer (Ivomec or Dectomax). Previous year's selected replacement heifers and mature cows are given pre-breeding vaccinations including Vibriosis-Leptospirosis, 7-way, IBR/PI3/BVD/BRSV, and pour-on/wormer (Ivomec or Dectomax) before the May 15 bull turnout. Bulls will be tested for fertility and trichomoniasis and receive pour-on/wormer. Cows and replacement heifers are pregnancy tested in the fall as the cattle are gathered and heifer calves are given Bangs vaccinations. Table 2 gives typical vaccinating and animal health practices and cost estimations by livestock class as provided by Forero et al. (2017).

Marketing and Transportation

In the summer months, calves are marketed through video auction. All calves sold are delivered in November. In the fall and spring, culled livestock are transported to local livestock auctions in Billings, MT,

Table 2. Veterinary and Medicine Costs.

Activity	Cost Per Unit	No. of Head	total cost
Cows - Vaccine, wormer, etc.	\$ 9.00	100	\$900.00
Cows - Vet service (preg check, etc.)	\$ 2.25	100	\$225.00
Bulls - Vaccine, wormer, etc.	\$ 15.50	5	\$74.25
Bulls - Vet service (trich, semen, etc.)	\$ 40.00	5	\$191.60
Heifers - Vaccine, wormer, etc.	\$ 12.50	20	\$246.88
Heifers - Vet service (bangs, preg check)	\$ 7.25	20	\$143.19
Horses - Wormer	\$ 15.00	5	\$75.00
Calves - Dehorned, vaccine, boosters, dewormer, castrate (bulls calves only)	\$ 15.82	90	\$1,427.76
Total			\$3,283.67
Cost per cow			\$32.84

which is an average 60-mile radius for the region. Most ranchers hire trucking companies to transport their cattle to the sale barn at an average cost of \$6 per mile.

Labor

Labor for the ranch is provided by the operation's management, which includes one owner or manager and additional part-time help (usually the owner's children or grandchildren). The cost of owner labor and management are not included in the budget. The net returns in the budget are the compensation to owner labor and management.

Taxes

Annual tax costs for MLRA 58A are estimated following Montana's Department of Revenue 2016 Biennial Report. In this report, agricultural land is property considered as "Class 3" which follows a productivity valuation standard. The 2016 tax rate for Class 3 agricultural property within Montana is 2.16 percent. According to Montana Code Annotated 2017 (MCA 15-7-201), the per-acre productivity value of agricultural land is equal to the per-acre net income of agricultural land divided by the 6.4% capitalization rate. Net income of agricultural land is based on commodity price and cost of production data obtained from the Montana Agricultural Statistics Service 2017 publication. For the purpose of this budget, the representative ranch's value of agricultural property is calculated by dividing the Income Above Operating Costs by Montana's capitalization rate of 6.4%; equal to \$211,068.49. By applying the 2.16% 2016 tax rate,

the annual tax expense is estimated at \$4,559.08, or about \$46 per cow. Please note, these numbers are not intended for accounting purposes but rather, to provide an example of annual tax expenses' role in a ranching operation. For IRS accounting scenarios and accurate tax filing, ranchers will need to follow the Generally Accepted Accounting Principles (GAAP rules).

Inventory and Capital Investments

There are five buildings and structures for a large cow-calf operation including one shop, two homes, and two calving barns. Vehicles used for the ranch enterprise include three tractors (130, 75, and 40 horsepower), two 32-foot stock trailers, and three pickups. The pickups include one-¾ ton 4x4 truck and two 1-ton pickups (one of which provides 50% use to the cow-calf enterprise). The ranch also uses two ATVs. Other machinery and equipment include one set of corrals, a portable loading chute, and one squeeze chute. This budget's depreciation costs are calculated using straight-line depreciation and applying a 5% interest rate, useful life by asset as determined by the Modified Accelerated Cost Recovery System (MACRS) standards, and machinery salvage value calculations from Iowa State University of Science and Technology's Cooperative Extension Service (File A3-29, Edwards, 2015).

Interest on Operating Capital and Retained Livestock

Interest on operating capital expenses is derived from the assumption that 50% of all annual operating costs are borrowed for a period of six months at 5% interest.

Interest on retained livestock is the value of the herd multiplied by the 2% interest rate (Yi and Zhang, 2016). This cost is the opportunity cost of keeping the herd and can be thought of as the amount a rancher could have made if the value of the herd had otherwise been invested at a 2% interest rate. The \$125,744.68 value of the herd is calculated using the January 1 herd size (post annual death loss), the budget's sale weights, and market value for various livestock classes. The annual interest on retained livestock expense for this herd is about \$2,515.

Gross Receipts and Operating Expenditures

Livestock prices are five-year (2013-2017) averages from the CattleFax data base (2018) for Montana. Hay and alfalfa prices are also five-year (2013-2017) averages from USDA-NASS (2018) for Montana. Livestock weights are typical for this herd size and location. All averaged prices were indexed to 2017 using the consumer price index prior to averages being calculated. Livestock averaged prices and averaged hay and alfalfa prices are shown under Total Receipts and Operating Costs in Table 3.

References

- American Agriculture Economics Association.
2000. "Commodity costs and returns estimation handbook." Report from AAEA Commodity Costs and Returns Measurement Methods Task Force: Ames, Iowa.
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- Forero, L.C., Ingram, R., Nader, G.A., Stewart, D., Sumner, D.A. 2017. "Cow-Calf Production (300 head) Northern Sacramento Valley 2017". University of California Agriculture and Natural Resources Cooperative Extension. Agricultural Issues Center. UC Davis Department of Agricultural and Resource Economics. Davis, California.
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Table 3. Enterprise Budget for a 100-head, Cow-calf, Private Land Ranch in MLRA 58a.

MLRA 58a: Northern Rolling Plains
Private Land
Herd Size: 100 head

	Weight	Unit	Total Head or Unit	Price or Cost Per Unit	Total Value	Price or Cost Per Cow	Your Value
Gross Receipts							
Steer Calves	6	cwt	45	\$187.08	\$50,511.60	\$505.12	
Heifer Calves	5.5	cwt	26	\$183.32	\$26,214.76	\$262.15	
Yearling Heifers	8.75	cwt	3	\$151.42	\$3,974.78	\$39.75	
Cull Cows	12	cwt	15	\$81.71	\$14,707.80	\$147.08	
Cull Bulls	18	cwt	1	\$101.30	\$1,823.40	\$18.23	
Total Receipts					\$97,232.34	\$972.32	
Operating Costs							
Deeded Land							
Non-Irrigated Pasture		AUM	153	\$16.11	\$2,461.22		
Rangeland		AUM	834	\$16.11	\$13,439.79	\$134.40	
Hay Meadow Aftermath		AUM	153	\$16.11	\$2,461.22	\$24.61	
Winter Feed							
Meadow Hay		ton	141	\$128.58	\$18,129.78	\$181.30	
Alfalfa		ton	141	\$140.09	\$19,752.69	\$197.53	
Supplement							
Protein Tubs		ton	0.474	\$1,101.60	\$522.33	\$5.22	
Salt & Mineral		ton	1.686	\$1,398.86	\$2,358.29	\$23.58	
Fuel					\$5,000.00	\$50.00	
Supplies & Fencing					\$5,000.00	\$50.00	
Utilities					\$3,500.00	\$35.00	
Veterinary Medicine					\$3,283.67	\$32.84	
Freight & Trucking		mile	60	\$6.00	\$360.00		
Marketing Fees ¹					\$1,944.65	\$19.45	
Other Variable Costs ²		hd	100	\$5.00	\$500.00	\$5.00	
Repair ³							
Machinery & Equipment					\$3,000.00	\$30.00	
Housing & Improvements					\$1,000.00	\$10.00	
Interest on Operating Capital		%	0.025	\$41,356.82	\$1,033.92	\$10.34	
Total Operating Costs					\$83,747.56	\$837.48	
Income Above Operating Costs					\$13,484.77	\$134.85	
Ownership Costs and Capital							
Purchased Livestock		bull	1	\$4,997.00	\$4,997.00	\$49.97	
Interest on Retained Livestock		%	2%	\$126,724.90	\$2,534.50	\$25.34	
Asset Depreciation ⁴		\$			\$19,433.38	\$194.33	
Taxes		\$	2.16%	\$210,699.59	\$4,551.11	\$45.51	
Total Ownership Costs					\$31,515.99	\$315.16	
Total Costs					\$115,263.55	\$1,152.64	
Returns to Labor and Management					\$(18,031.22)	\$(180.31)	

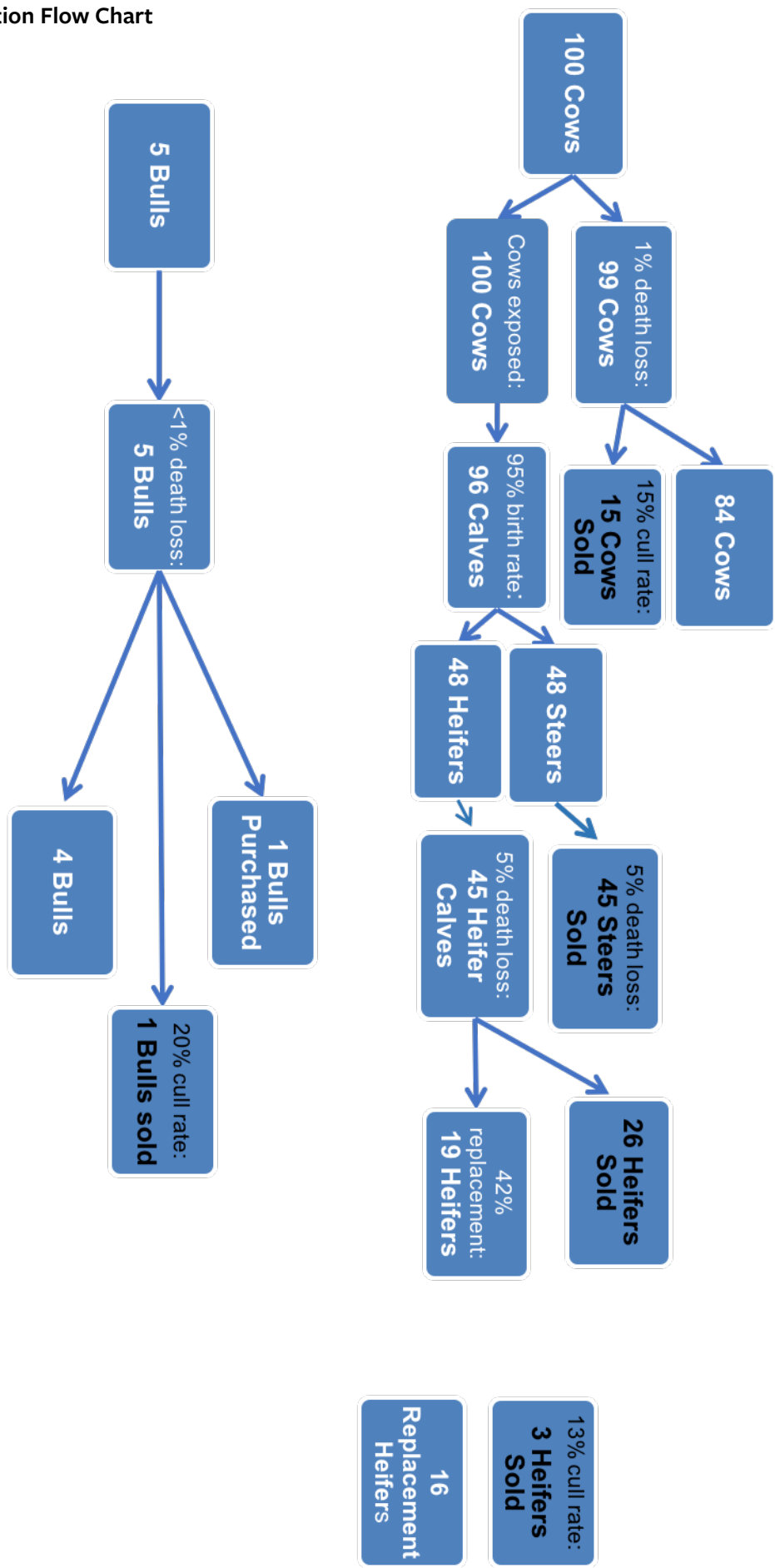
¹ Marketing fees include video and sale barn auction fees totaling 2% of total receipts

² Other variable costs include Montana's Per Capita, Brand Inspection, Predator Control, Beef Check-off fees, and Marketing fees.

³ Lump-sum annual repair cost estimates provided by focus group.

⁴ Depreciation costs of haying equipment are not included in this budget as hay production is treated as a separate enterprise.

Table 4. Cow-calf Production Flow Chart





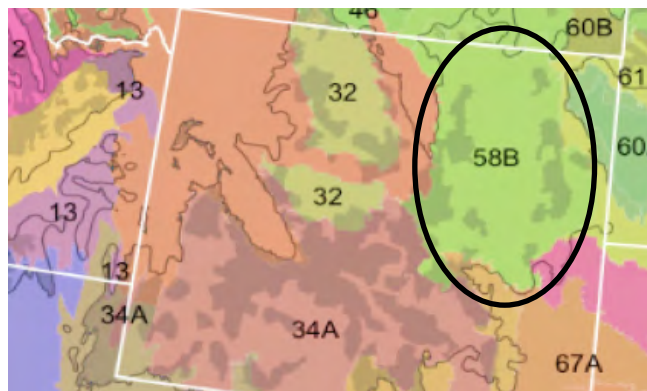
Enterprise budget for large, public-land ranch

Northern Rolling High Plains

MLRA 58b

Holly Dyer¹, Holly Kirkpatrick¹, Tom Hilken¹, Kendall Roberts¹, Anna Maher¹, Nicolas Quintana Ashwell¹, Bridger Feuz², John Tanaka³, John Ritten⁴, and Kristie Maczko³

Wyoming counties: Campbell, Converse, Johnson, Natrona, Niobrara, Sheridan, Weston
Montana counties: Big Horn



This budget represents typical cost and returns for a 600-head, cow-calf operation in Major Land Resource Area (MLRA) 58B, the Northern Intermountain Desertic Basins. A panel of producers from Campbell, Converse, Johnson, Natrona, Niobrara, Sheridan, and Weston counties in Wyoming assisted with the information contained in this enterprise budget.

Feed Sources

Feed is supplied as United States Forest Service (USFS) lands, deeded rangelands, deeded non-irrigated pasture, and meadow hay aftermath. Livestock is grazed on deeded non-irrigated pasture from May 15-May 31. Replacement heifers remain on deeded non-irrigated pasture through October. All livestock except

replacement heifers are grazed on deeded rangeland from June 1-June 30 and USFS lands from July 1-Oct. 15. Deeded hay meadow aftermath is grazed from Oct. 15-Nov. 30. Deeded rangeland is grazed from Dec. 1 until winter feeding begins, typically Jan 1. Cattle are fed equal amounts of alfalfa and meadow hay for 4 ½ months from Jan. 1-May 15. Salt and minerals are

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Table 1. Annual Calendar Activities for 600-head Cow-Calf Operation in MLRA 58b.

Activities	Calendar Date
Begin winter feed and provide protein supplements	Dec 15 - Apr 30
Calving	Feb 15 - May 15
Market open-animals; work replacement heifers	May 15
Graze deeded non-irrigated pasture	May 1 - May 31
Breeding	May 15 - Aug 15
Branding	May 1 - May 31
Graze deeded or privately-leased rangeland	June 1 - Sept 30
Graze deeded hay aftermath	Oct 1 - Nov 30
Vaccine and preg-check cows; market and sell calves and cull animals	1-Nov
Graze deeded non-irrigated pasture	Dec 1 - Dec 15

fed year-round, and protein tubs and protein cake are fed during the winter months. A schedule of activities within a calendar year are listed in Table 1.

Land Cost

The cost of land is included in the budget on a per AUM cost by land type. Deeded land cost is calculated based on prevailing lease rates for rangelands in the area. Aftermath grazing is assumed to have the same cost per AUM – not necessarily the same rate per acre.

Herd Characteristics

Livestock inventory consists of 600 cows, 25 bulls, and 10 horses. Five replacement bulls are bought annually, and all bulls have a useful life of five years. Bulls are turned into the herd for a three-month breeding season from May 15-Aug. 15. Cow death loss is 1%, and 10% are culled annually resulting in an annual replacement rate of 11%. The weaning rate for all cows exposed to bulls is 88%. In the fall, all steer calves and 69% of heifer calves are sold. The remaining 31% of heifer calves are selected at weaning as potential replacement heifers and after death loss consist of 79 head. Twelve replacement heifers are culled and sold in the spring, and 65 replacement-heifer yearlings are brought into the herd. Due to unsuccessful breeding or old age, 59 cows are culled from the herd. Steer calves, non-replacement heifer calves, cull bulls, and cull cows are marketed for delivery in November. Also in November, all cattle are vaccinated while cows and replacement heifers are pregnancy-checked. All steer and heifer calves are earmarked, branded, dehorned, and vaccinated by May 3. Steer calves are also commonly

castrated and implanted during branding (May). Table 4 shows a cow-calf production flow chart.

Animal Health (Veterinary and Medicine)

This includes vaccines, medicines, and all other veterinary services including pregnancy testing. Pre-calving for mature cows and bred replacement heifers include scour prevention (ScourGard). Calves are given post-calving season vaccinations, are branded, dehorned, and bulls castrated in May. These vaccinations include 7-way, IBR/PI3/BVD/BRSV, and pour-on/wormer (Ivomec or Dectomax). Previous year's selected replacement heifers and mature cows are given pre-breeding vaccinations including Vibriosis-Leptospirosis, 7-way, IBR/PI3/BVD/BRSV, and pour-on/wormer (Ivomec or Dectomax) before the May 15 bull turnout. Bulls will be tested for fertility and trichomoniasis and receive pour-on/wormer. Cows and replacement heifers are pregnancy tested in the fall as the cattle are gathered and heifer calves are given Bangs vaccinations. Table 2 below gives typical vaccinating and animal health practices and cost estimations by livestock class as provided by Forero et al. (2017). Approximately 50% of ranchers in this MLRA artificially inseminate their replacement heifers in June. The \$36 per head cost of artificial insemination is not included in Table 2 but can be found as a line item on the enterprise budget (Table 3).

Marketing and Transportation

In the summer months, calves are marketed through video auction. All calves sold are delivered in October. In the fall and spring, culled livestock are transported

Table 2. Veterinary and Medicine Costs.

Activity	Cost Per Unit	No. of Head	total cost
Cows - vaccine, wormer, etc.	\$ 9.00	600	\$5,400.00
Cows - Vet service (preg check, etc.)	\$ 2.25	600	\$1,350.00
Bulls - vaccine, wormer, etc.	\$ 15.50	25	\$390.08
Bulls - Vet service (trich, semen, etc.)	\$ 40.00	25	\$1,006.66
Heifers - Vaccine, wormer, etc.	\$ 12.50	79	\$993.69
Heifers - Vet service (bangs, preg check)	\$ 7.25	79	\$576.34
Horses - wormer	\$ 15.00	10	\$150.00
Calves - dehorned, vaccine, boosters, dewormer, castrate (bulls calves only)	\$ 15.82	529	\$8,375.50
Total			\$18,242.27
Cost per cow			\$30.40

to sale barns to be sold through local auction markets. Freight and trucking expenses are included in the marketing fees, which total 4% of gross receipts in Table 3.

Labor

Employees include one full-time hand paid \$25,000 each year. The ranch owner also provides the full-time employee free on-site housing and pays their utilities. Additional part-time day laborers are hired at a rate of \$150 per day. The operation's management includes one owner or manager and additional part-time help (usually the owner's children or grandchildren). The cost of owner labor and management are not included in the budget. The net returns in the budget are the compensation to owner labor and management.

Taxes

Taxes on real property is estimated using the average farm size by county within MLRA 58B (USDA-NASS, 2012). The average land value per farm is calculated by multiplying the farm size by the average pasture value per acre for Wyoming (USDA-NASS, 2017). Total taxes on real property is then calculated by multiplying the average land value per farm by the tax rate of 1% (AAEA, 2000).

Inventory and Capital Investments

There are seven buildings and structures for a large cow-calf operation including two shops, two homes, and three calving barns. Vehicles used for the ranch enterprise include three tractors (130, 75, and 40 horsepower), a goose-neck 32-foot stock trailer, a

48-foot flatbed trailer, and three pickups. The pickups include two $\frac{3}{4}$ -ton 4x4 trucks and one 1-ton pickup. The ranch also uses three ATVs. Other machinery and equipment include two sets of corrals, a portable loading chute, and two squeeze chutes. This budget's depreciation costs are calculated using straight-line depreciation and applying a 5% interest rate, useful life by asset as determined by the Modified Accelerated Cost Recovery System (MACRS) standards, and machinery salvage value calculations from Iowa State University of Science and Technology's Cooperative Extension Service (File A3-29, Edwards, 2015).

Interest on Operating Capital and Retained Livestock

Interest on operating capital expenses is derived from the assumption that 50% of all annual operating costs are borrowed for a period of six months assuming a 5% annual percentage rate.

Interest on retained livestock is the value of the herd multiplied by the 2% interest rate (Yi and Zhang, 2016). This cost is the opportunity cost of keeping the herd. The value of the herd is calculated using the Jan. 1 herd size, the budget's sale weights, and market value for bred cows, bred heifers, and horses before death loss. The market value of replacement bulls are estimated at four times the value of a steer (Meteer, 2014).

Gross Receipts and Operating Expenditures

Livestock prices are five-year (2013-2017) averages from the CattleFax data base (2018) for Wyoming.

Hay and alfalfa prices are also five-year (2013-2017) averages from USDA-NASS (2018) for Wyoming. Livestock weights are typical for this herd size and location. All averaged prices were indexed to 2017 using the consumer price index prior to averages being calculated. Livestock averaged prices and averaged hay and alfalfa prices are shown under Total Receipts and Operating Costs in Table 3.

References

- American Agriculture Economics Association.
2000. "Commodity costs and returns estimation handbook." Report from AAEE Commodity Costs and Returns Measurement Methods Task Force: Ames, Iowa.
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Table 3. Enterprise Budget for a 600-head, Cow-calf, Public Land Ranch in MLRA 58b.

MLRA 58b: Northern Rolling High Plains

Public Land

Herd Size: 600 head

	Weight	Unit	Total Head or Unit	Price or Cost Per Unit	Total Value	Price or Cost Per Cow	Your Value
Gross Receipts							
Steer Calves	5.7	cwt	265	\$207.94	\$314,093.37	\$523.49	
Heifer Calves	5.3	cwt	184	\$186.34	\$181,718.77	\$302.86	
Yearling Heifers	9	cwt	12	\$146.12	\$15,780.96	\$26.30	
Cull Cows	12.5	cwt	59	\$82.07	\$60,526.63	\$100.88	
Cull Bulls	18.75	cwt	5	\$101.87	\$9,550.31	\$15.92	
Total Receipts					\$581,670.04	\$969.45	
Operating Costs							
USFS		AUM	2,826	\$1.87	\$5,284.62	\$8.81	
Deeded Land							
Rangeland		AUM	1,676	\$21.50	\$36,041.56	\$60.07	
Hay Meadow Aftermath		AUM	1,275	\$21.50	\$27,421.08	\$45.70	
Winter Feed							
Meadow Hay		ton	825	\$131.58	\$108,553.50	\$180.92	
Alfalfa		ton	825	\$147.91	\$122,025.75	\$203.38	
Supplement							
Protein Tubs		ton	4.0	\$1,101.60	\$4,456.39	\$7.43	
Salt & Mineral		ton	19.0	\$1,398.86	\$26,578.29	\$44.30	
Cake -- 15% Protein		ton	1.7	\$280.00	\$485.45	\$0.81	
Fuel					\$12,500.00	\$20.83	
Supplies & Fencing					\$10,000.00	\$16.67	
Utilities					\$8,000.00	\$13.33	
Veterinary Medicine					\$18,242.27	\$30.40	
Artificial Insemination		hd	65	\$36.00	\$2,324.47	\$3.87	
Hired Labor		yr			\$30,000.00	\$50.00	
Marketing Fees ¹					\$23,266.80	\$38.78	
Other Variable Costs ²		hd	600	\$1.90	\$1,140.00	\$1.90	
Repair ³							
Machinery & Equipment					\$10,000.00	\$16.67	
Housing & Improvements					\$5,000.00	\$8.33	
Total Operating Costs					\$451,320.17	\$752.20	
Income Above Operating Costs					\$130,349.87	\$217.25	
Ownership Costs and Capital							
Purchased Livestock		bull	5	\$4,792.00	\$23,960.00	\$39.93	
Interest on Retained Livestock		\$	2%	\$742,346.16	\$14,846.92	\$24.74	
Interest on Operating Capital		%	0.025	\$225,660.08	\$5,641.50	\$9.40	
Asset Depreciation ⁴		\$			\$40,089.84	\$66.82	
Taxes		\$			\$23,556.90	\$39.26	
Total Ownership Costs					\$108,095.17	\$180.16	
Total Costs					\$559,415.33	\$932.36	
Returns to Labor and Management					\$22,254.70	\$37.09	

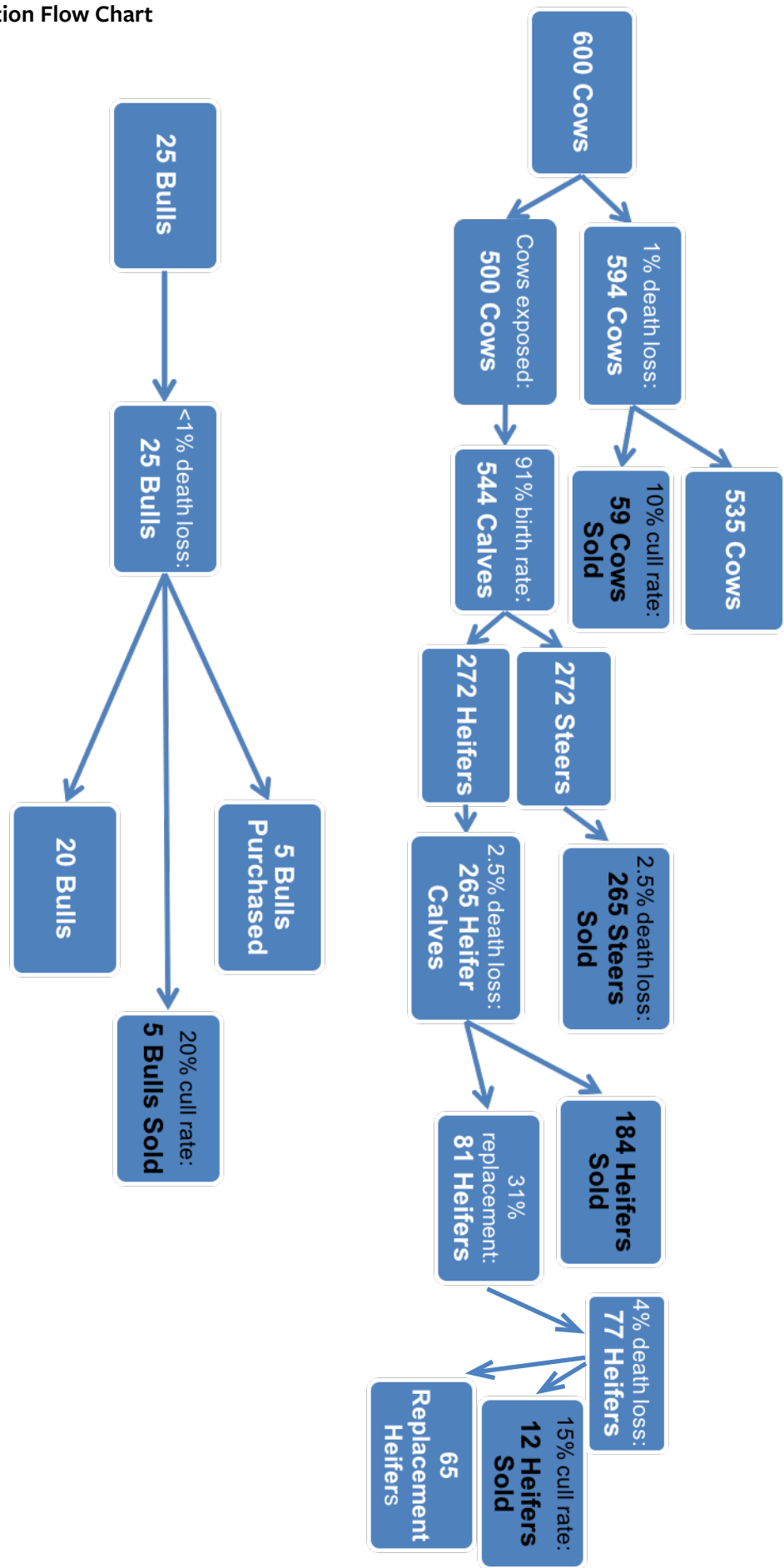
¹Marketing fees include frieght, trucking, video marketing and sale barn auction fees totaling 4% of total receipts

²Other variable costs include Brand Inspection and Beef Check-off fees.

³Lump-sum annual repair cost estimates provided by focus group.

⁴Depreciation costs of haying equipment are not included in this budget as hay production is treated as a separate enterprise.

Table 4. Cow-calf Production Flow Chart





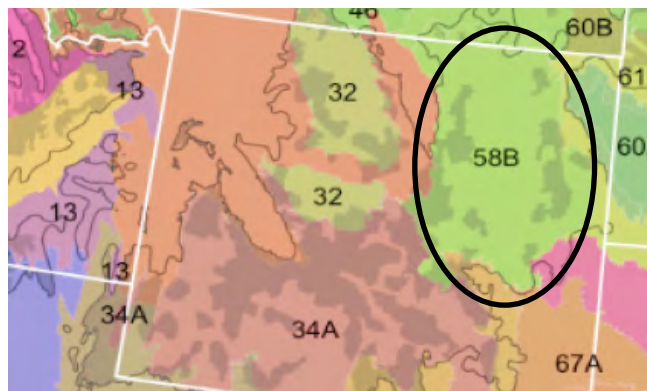
Enterprise budget for large, private-land ranch

Northern Rolling High Plains

MLRA 58b

Holly Dyer¹, Holly Kirkpatrick¹, Tom Hilken¹, Kendall Roberts¹, Anna Maher¹, Nicolas Quintana Ashwell¹, Bridger Feuz², John Tanaka³, John Ritten⁴, and Kristie Maczko³

Wyoming counties: Campbell, Converse, Johnson, Natrona, Niobrara, Sheridan, Weston
Montana counties: Big Horn



This budget represents typical cost and returns for a 500-head, cow-calf operation in Major Land Resource Area (MLRA) 58B, the Northern Intermountain Desertic Basins. A panel of producers from Campbell, Converse, Johnson, Natrona, Niobrara, Sheridan, and Weston counties in Wyoming assisted with the information contained in this enterprise budget.

Feed Sources

Feed sources for private land ranches include deeded rangeland, non-irrigated pasture, and hay meadow aftermath grazing. Aftermath grazing occurs during October and November. Deeded non-irrigated pasture is grazed from early to mid-December when winter feed begins. Ranchers typically put up their

own meadow hay and alfalfa to supply 70% of the required winter feed. They purchase the remaining feed required to meet the herd's demand. Purchased feed is comprised of equal amounts meadow hay and alfalfa hay. After winter, the herd is moved to deeded non-irrigated pasture close to the home operation for about one month of grazing before summer grazing

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Table 1. Annual Calendar Activities for 100-head Cow-Calf Operation in MLRA 52.

Activities	Calendar Date
Begin winter feed and provide protein supplements	Dec 15 - Apr 30
Calving	Feb 15 - May 15
Market open-animals; work replacement heifers	May 15
Graze deeded non-irrigated pasture	May 1 - May 31
Breeding	May 15 - Aug 15
Branding	May 1 - May 31
Graze deeded or privately-leased rangeland	June 1 - Sept 30
Graze deeded hay aftermath	Oct 1 - Nov 30
Vaccine and preg-check cows; market and sell calves and cull animals	1-Nov
Graze deeded non-irrigated pasture	Dec 1 - Dec 15

on deeded or privately-leased rangeland begins. A schedule of the grazing and other ranch activities within a calendar year is listed in Table 1.

Land Cost

The cost of land is included in the budget on a per AUM cost by land type. Deeded land cost is calculated based on prevailing lease rates for rangelands in the area. Aftermath grazing is assumed to have the same cost per AUM – not necessarily the same rate per acre.

Herd Characteristics

Livestock inventory consists of 500 cows, 19 bulls, and 10 horses. Five replacement bulls are bought annually, and all bulls have a useful life of approximately four years. Bulls are turned into the herd for a three-month breeding season from May 15-Aug. 15. Cow death loss is 1.5%, and 12.5% are culled annually resulting in an annual replacement rate of 14%. The weaning rate for all cows exposed to bulls is 94%. In the fall, all steer calves and 65% of heifer calves are sold. The remaining 35% of heifer calves are selected at weaning as potential replacement heifers and after death loss consist of 79 head. Twelve replacement heifers are culled and sold in the spring, and 67 replacement-heifer yearlings are brought into the herd. Due to unsuccessful breeding or old age, 59 cows are culled from the herd. Steer calves, non-replacement heifer calves, cull bulls, and cull cows are marketed for delivery in November. Also in November, all cattle are vaccinated while cows and replacement heifers are pregnancy-checked. All steer and heifer calves are earmarked, branded, dehorned,

and vaccinated by May 31. Steer calves are also commonly castrated and implanted during branding (May). Table 4 shows a cow-calf production flow chart.

Animal Health (Veterinary and Medicine)

This includes vaccines, medicines, and all other veterinary services including pregnancy testing. Pre-calving for mature cows and bred replacement heifers include scour prevention (ScourGard). Calves are given post-calving season vaccinations, are branded, dehorned, and bulls castrated in May. These vaccinations include 7-way, IBR/PI3/BVD/BRSV, and pour-on/wormer (Ivomec or Dectomax). Previous year's selected replacement heifers and mature cows are given pre-breeding vaccinations including Vibriosis-Leptospirosis, 7-way, IBR/PI3/BVD/BRSV, and pour-on/wormer (Ivomec or Dectomax) before the June 1 bull turnout. Bulls will be tested for fertility and trichomoniasis and receive pour-on/wormer. Cows and replacement heifers are pregnancy tested in the fall as the cattle are gathered and heifer calves are given Bangs vaccinations. Table 2 gives typical vaccinating and animal health practices and cost estimations by livestock class as provided by Forero et al. (2017). Approximately 50% of ranchers in this MLRA artificially inseminate their replacement heifers in June. The \$36 per head cost of artificial insemination is not included in Table 2 but can be found as a line item on the enterprise budget (Table 3).

Marketing and Transportation

In the summer months, calves are marketed through video auction. All calves sold are delivered in October.

Table 2. Veterinary and Medicine Costs.

Activity	Cost Per Unit	No. of Head	total cost
Cows - Vaccine, wormer, etc.	\$ 9.00	500	\$4,500.00
Cows - Vet service (preg check, etc.)	\$ 2.25	500	\$1,125.00
Bulls - Vaccine, wormer, etc.	\$ 15.50	19	\$300.00
Bulls - Vet service (trich, semen, etc.)	\$ 40.00	19	\$774.19
Heifers - Vaccine, wormer, etc.	\$ 12.50	81	\$1,008.00
Heifers - Vet service (bangs, preg check)	\$ 7.25	81	\$584.64
Horses - Wormer	\$ 15.00	10	\$150.00
Calves - Dehorned, vaccine, boosters, dewormer, castrate (bulls calves only)	\$ 15.82	473	\$7,479.70
Total			\$15,921.52
Cost per cow			\$31.84

In the fall and spring, culled livestock are transported to sale barns to be sold through local auction markets. Freight and trucking expenses are included in the marketing fees, which total 4% of gross receipts in Table 3.

Labor

Employees include one full-time hand paid \$25,000 each year. The ranch owner also provides the full-time employee free on-site housing and pays their utilities. The operation's management includes one owner or manager and additional part-time help (usually the owner's children or grandchildren). The cost of owner labor and management are not included in the budget. The net returns in the budget are the compensation to owner labor and management.

Taxes

Taxes on real property is estimated using the average farm size by county within MLRA 58B (USDA-NASS, 2012). The average land value per farm is calculated by multiplying the farm size by the average pasture value per acre for Wyoming (USDA-NASS, 2017). Total taxes on real property is then calculated by multiplying the average land value per farm by the tax rate of 1% (AAEA, 2000).

Inventory and Capital Investments

There are seven buildings and structures for a large cow-calf operation including two shops, two homes, and three calving barns. Vehicles used for the ranch enterprise include three tractors (130, 75, and 40 horsepower), a goose-neck 32-foot stock trailer, a

48-foot flatbed trailer, and two pickups. The pickups include one $\frac{3}{4}$ -ton 4x4 truck and one 1-ton pickup. The ranch also uses four ATVs. Other machinery and equipment include two sets of corrals, a portable loading chute, and one squeeze chute. This budget's depreciation costs are calculated using straight-line depreciation and applying a 5% interest rate, useful life by asset as determined by the Modified Accelerated Cost Recovery System (MACRS) standards, and machinery salvage value calculations from Iowa State University of Science and Technology's Cooperative Extension Service (File A3-29, Edwards, 2015).

Interest on Operating Capital and Retained Livestock

Interest on operating capital expenses is derived from the assumption that 50% of all annual operating costs are borrowed for a period of six months assuming a 5% annual percentage rate.

Interest on retained livestock is the value of the herd multiplied by the 2% interest rate (Yi and Zhang, 2016). This cost is the opportunity cost of keeping the herd. The value of the herd is calculated using the Jan. 1 herd size, the budget's sale weights, and market value for bred cows, bred heifers, and horses before death loss. The market value of replacement bulls are estimated at four times the value of a steer (Meteer, 2014).

Gross Receipts and Operating Expenditures

Livestock prices are five-year (2013-2017) averages from the CattleFax data base (2018) for Wyoming.

Hay and alfalfa prices are also five-year (2013-2017) averages from USDA-NASS (2018) for Wyoming. Livestock weights are typical for this herd size and location. All averaged prices were indexed to 2017 using the consumer price index prior to averages being calculated. Livestock averaged prices and averaged hay and alfalfa prices are shown under Total Receipts and Operating Costs in Table 3.

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Table 3. Enterprise Budget for a 500-head, Cow-calf, Private Land Ranch in MLRA 58b.

MLRA 58b: Northern Rolling High Plains
Private Land
Herd Size: 500 head

	Weight	Unit	Total Head or Unit	Price or Cost Per Unit	Total Value	Price or Cost Per Cow	Your Value
Gross Receipts							
Steer Calves	5.5	cwt	236	\$207.94	\$269,906.12	\$539.81	
Heifer Calves	5	cwt	154	\$186.34	\$143,481.80	\$286.96	
Yearling Heifers	8.75	cwt	12	\$163.12	\$17,127.60	\$34.26	
Cull Cows	12	cwt	59	\$82.07	\$58,105.56	\$116.21	
Cull Bulls	17.75	cwt	5	\$101.87	\$9,040.96	\$18.08	
Total Receipts					\$497,662.04	\$995.32	
Operating Costs							
Deeded Land							
Non-Irrigated Pasture		AUM	1,076	\$21.50	\$23,137.38	\$46.27	
Rangeland		AUM	2890	\$21.50	\$62,140.03	\$124.28	
Hay Meadow Aftermath		AUM	1,432	\$21.50	\$30,788.41	\$61.58	
Winter Feed							
Meadow Hay		ton	678	\$131.58	\$89,211.24	\$178.42	
Alfalfa		ton	678	\$147.91	\$100,282.98	\$200.57	
Supplement							
Protein Tubs		ton	2.003	\$1,101.60	\$2,205.99	\$4.41	
Salt & Mineral		ton	6.008	\$1,398.86	\$8,403.78	\$16.81	
Fuel					\$12,000.00	\$24.00	
Supplies & Fencing					\$12,000.00	\$24.00	
Utilities					\$10,000.00	\$20.00	
Veterinary Medicine					\$15,921.52	\$31.84	
Artificial Insemination		hd	67	\$36.00	\$2,406.31	\$4.81	
Hired Labor		yr			\$25,000.00	\$50.00	
Marketing Fees ¹					\$19,906.48	\$39.81	
Other Variable Costs ²		hd	500	\$1.90	\$950.00	\$1.90	
Repair ³							
Machinery & Equipment					\$6,000.00	\$12.00	
Housing & Improvements					\$5,000.00	\$10.00	
Interest on Operating Capital		%	0.025	\$212,677.06	\$5,316.93	\$10.63	
Total Operating Costs					\$430,671.06	\$861.34	
Income Above Operating Costs					\$66,990.99	\$133.98	
Ownership Costs and Capital							
Purchased Livestock		bull	5	\$4,792.00	\$23,960.00	\$47.92	
Interest on Retained Livestock		%	2%	\$614,939.95	\$12,298.80	\$24.60	
Asset Depreciation ⁴		\$			\$36,365.56	\$72.73	
Taxes		\$			\$23,556.90	\$47.11	
Total Ownership Costs					\$96,181.26	\$192.36	
Total Costs					\$526,852.32	\$1,053.70	
Returns to Labor and Management					\$(29,190.28)	\$(58.38)	

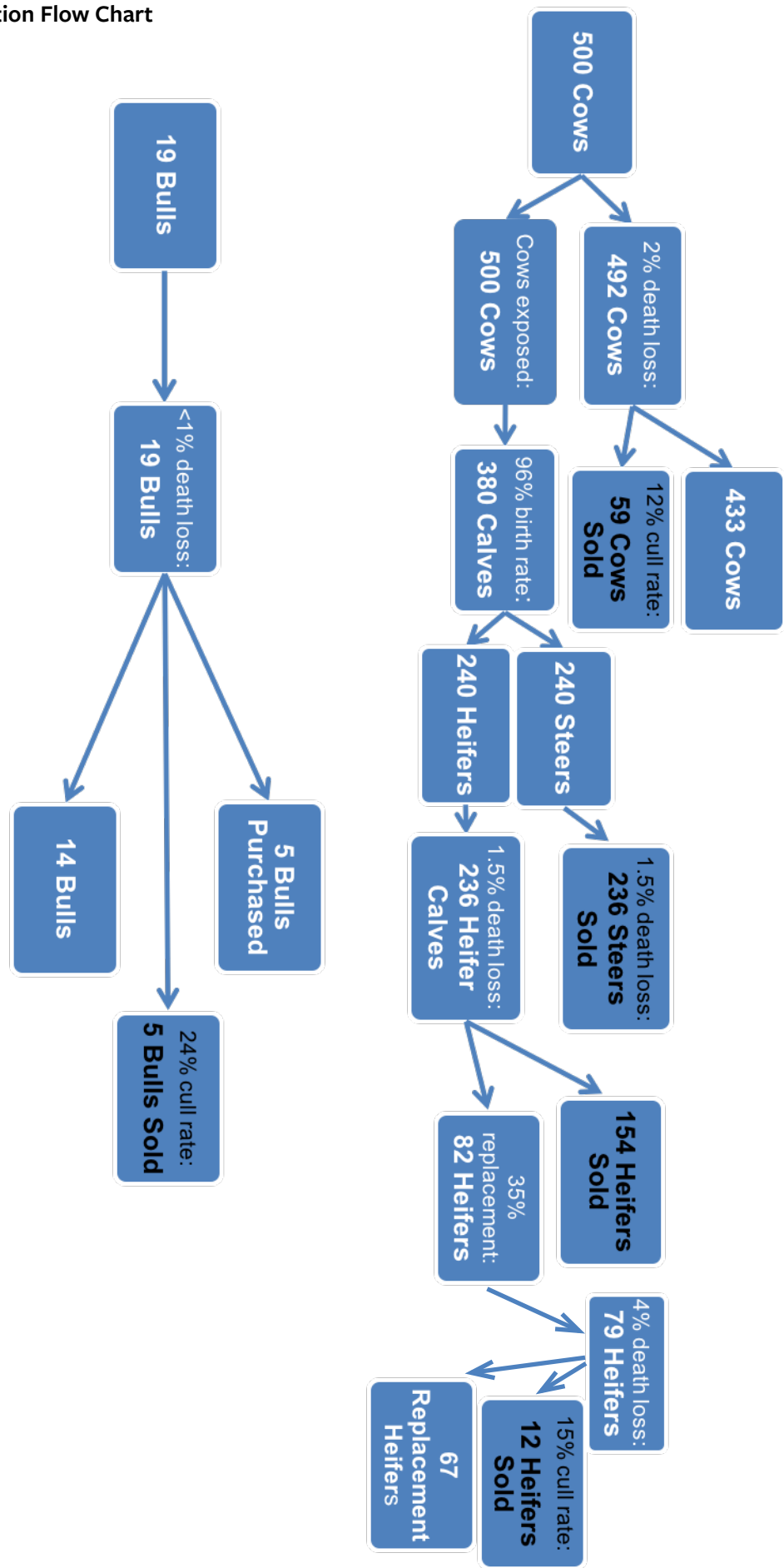
¹ Marketing fees include video and sale barn auction fees totaling 2% of total receipts

² Other variable costs include Montana's Per Capita, Brand Inspection, Predator Control, Beef Check-off fees, and Marketing fees.

³ Lump-sum annual repair cost estimates provided by focus group.

⁴ Depreciation costs of haying equipment are not included in this budget as hay production is treated as a separate enterprise.

Table 4. Cow-calf Production Flow Chart





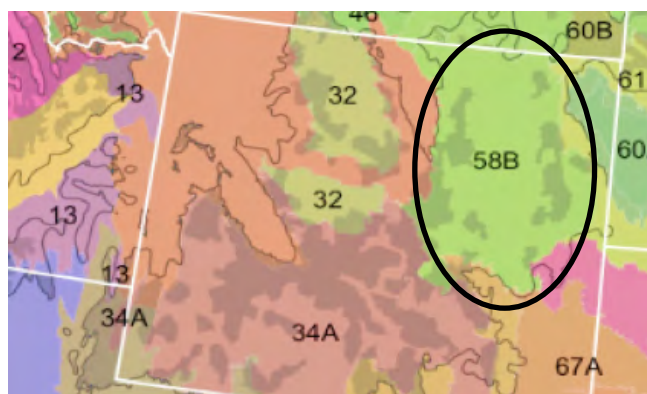
Enterprise budget for small, private-land ranch

Northern Rolling High Plains

MLRA 58b

Holly Dyer¹, Holly Kirkpatrick¹, Tom Hilken¹, Kendall Roberts¹, Anna Maher¹, Nicolas Quintana Ashwell¹, John Tanaka², John Ritten³, and Kristie Maczko²

Wyoming counties: Campbell, Converse, Johnson, Natrona, Niobrara, Sheridan, Weston
Montana counties: Big Horn



This budget represents typical cost and returns for a 75-head, cow-calf operation in Major Land Resource Area (MLRA) 58B, the Northern Intermountain Desertic Basins. A panel of producers from Campbell, Converse, Johnson, Natrona, Niobrara, Sheridan, and Weston counties in Wyoming assisted with the information contained in this enterprise budget.

Feed Sources

Feed sources for private land ranches include deeded rangeland, non-irrigated pasture, and hay meadow aftermath grazing. Aftermath grazing occurs during October and November. Deeded non-irrigated pasture is grazed from early to mid-December when winter feed begins. Ranchers typically put up their

own meadow hay and alfalfa to supply 70% of the required winter feed. They purchase the remaining feed required to meet the herd's demand. Purchased feed is comprised of equal amounts meadow hay and alfalfa hay. After winter, the herd is moved to deeded non-irrigated pasture close to the home operation for about one month of grazing before summer grazing

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² Wyoming Agricultural Experiment Station, University of Wyoming; Sustainable Rangelands Roundtable.

³ Department of Agricultural and Applied Economics, University of Wyoming.

Table 1. Annual Calendar Activities for 75-head Cow-Calf Operation in MLRA 58b.

Activities	Calendar Date
Begin winter feed and provide protein supplements	Dec 15 - Apr 30
Calving	March 1 - Apr 30
Market open-animals; work replacement heifers	May 15
Graze deeded non-irrigated pasture	May 1 - May 31
Breeding	June 1 - Aug 1
Branding	May 15 - May 31
Graze deeded or privately-leased rangeland	June 1 - Sept 30
Graze deeded hay aftermath	Oct 1 - Nov 30
Trail to base or home operation; vaccine and preg-check cows; market and sell calves and cull animals	20-Oct
Graze deeded non-irrigated pasture	Dec 1 - Dec 15

on deeded or privately-leased rangeland begins. A schedule of the grazing and other ranch activities within a calendar year is listed in Table 1.

Land Cost

The cost of land is included in the budget on a per AUM cost by land type. Deeded land cost is calculated based on prevailing lease rates for rangelands in the area. Aftermath grazing is assumed to have the same cost per AUM – not necessarily the same rate per acre.

Herd Characteristics

Livestock inventory consists of 75 cows, three bulls, and three horses. One replacement bull is bought three of four years, and all bulls have a useful life of four years. Bulls are turned into the herd for a two-month breeding season from June 1-Aug. 1. Cow death loss is 1%, and 10% are culled annually resulting in an annual replacement rate of 11%. The weaning rate for all cows exposed to bulls is 83%. In the fall, all steer calves and 70% of heifer calves are sold. The remaining 30% of heifer calves are selected at weaning as potential replacement heifers and after death loss consist of nine head. One replacement heifer is culled and sold in the spring, and eight replacement-heifer yearlings are brought into the herd. Due to unsuccessful breeding or old age, seven cows are culled from the herd. Steer calves, non-replacement heifer calves, cull bulls, and cull cows are marketed for delivery in October. Also in October, all cattle are vaccinated, while cows and replacement heifers are pregnancy-checked. All steer and heifer calves are earmarked, branded, dehorned,

and vaccinated by May 31. Steer calves are also commonly castrated and implanted during branding (May). Table 4 shows a cow-calf production flow chart.

Animal Health (Veterinary and Medicine)

This includes vaccines, medicines, and all other veterinary services including pregnancy testing. Pre-calving for mature cows and bred replacement heifers include scour prevention (ScourGard). Calves are given post-calving season vaccinations, are branded, dehorned, and bulls castrated in May. These vaccinations include 7-way, IBR/PI3/BVD/BRSV, and pour-on/wormer (Ivomec or Dectomax). Previous year's selected replacement heifers and mature cows are given pre-breeding vaccinations including Vibriosis-Leptospirosis, 7-way, IBR/PI3/BVD/BRSV, and pour-on/wormer (Ivomec or Dectomax) before the June 1 bull turnout. Bulls will be tested for fertility and trichomoniasis and receive pour-on/wormer. Cows and replacement heifers are pregnancy tested in the fall as the cattle are gathered and heifer calves are given Bangs vaccinations. Table 2 below gives typical vaccinating and animal health practices and cost estimations by livestock class as provided by Forero et al. (2017).

Marketing and Transportation

In the summer months, calves are marketed through video auction. All calves sold are delivered in October. In the fall and spring, culled livestock are transported to sale barns to be sold through local auction markets. Freight and trucking expenses are included in the marketing fees, which total 4% of gross receipts in Table 3.

Table 2. Veterinary and Medicine Costs.

Activity	Cost Per Unit	No. of Head	total cost
Cows - Vaccine, wormer, etc.	\$ 9.00	75	\$675.00
Cows - Vet service (preg check, etc.)	\$ 2.25	75	\$168.75
Bulls - Vaccine, wormer, etc.	\$ 15.50	3	\$52.31
Bulls - Vet service (trich, semen, etc.)	\$ 40.00	3	\$134.99
Heifers - Vaccine, wormer, etc.	\$ 12.50	9	\$117.14
Heifers - Vet service (bangs, preg check)	\$ 7.25	9	\$67.94
Horses - Wormer	\$ 15.00	3	\$45.00
Calves - Dehorned, vaccine, boosters, dewormer, castrate (bulls calves only)	\$ 15.82	62	\$988.35
Total			\$2,249.49
Cost per cow			\$29.99

Labor

Labor is provided by the owner or manager and their family. The cost of owner labor and management are not included in the budget. The net returns in this budget are compensation to labor and management.

Taxes

Taxes on real property is estimated using the average farm size by county within MLRA 58B (USDA-NASS, 2012). The average land value per farm is calculated by multiplying the farm size by the average pasture value per acre for Wyoming (USDA-NASS, 2017). Total taxes on real property is then calculated by multiplying the average land value per farm by the tax rate of 1% (AAEA, 2000).

Inventory and Capital Investments

There are four buildings and structures for a large cow-calf operation including one shop, one home, and two calving barns. Vehicles used for the ranch enterprise include a 130 horsepower tractor, a goose-neck 32-foot stock trailer, and a ¾-ton 4x4 pickup truck. The ranch also uses one ATV. Other machinery and equipment include one set of corrals, a portable loading chute, and one squeeze chute. This budget's depreciation costs are calculated using straight-line depreciation and applying a 5% interest rate, useful life by asset as determined by the Modified Accelerated Cost Recovery System (MACRS) standards, and machinery salvage value calculations from Iowa State University of Science and Technology's Cooperative Extension Service (File A3-29, Edwards, 2015).

Interest on Operating Capital and Retained Livestock

Interest on operating capital expenses is derived from the assumption that 50% of all annual operating costs are borrowed for a period of six months assuming a 5% annual percentage rate.

Interest on retained livestock is the value of the herd multiplied by the 2% interest rate (Yi and Zhang, 2016). This cost is the opportunity cost of keeping the herd. The value of the herd is calculated using the Jan. 1 herd size, the budget's sale weights, and market value for bred cows, bred heifers, and horses before death loss. The market value of replacement bulls are estimated at four times the value of a steer (Meteer, 2014).

Gross Receipts and Operating Expenditures

Livestock prices are five-year (2013-2017) averages from the CattleFax data base (2018) for Wyoming. Hay and alfalfa prices are also five-year (2013-2017) averages from USDA-NASS (2018) for Wyoming. Livestock weights are typical for this herd size and location. All averaged prices were indexed to 2017 using the consumer price index prior to averages being calculated. Livestock averaged prices and averaged hay and alfalfa prices are shown under Total Receipts and Operating Costs in Table 3.

References

- American Agriculture Economics Association.
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Table 3. Enterprise Budget for a 75-head, Cow-calf, Private Land Ranch in MLRA 58b.

MLRA 58b: Northern Rolling High Plains
Private Land
Herd Size: 75 head

	Weight	Unit	Total Head or Unit	Price or Cost Per Unit	Total Value	Price or Cost Per Cow	Your Value
Gross Receipts							
Steer Calves	4.5	cwt	31	\$230.09	\$32,097.56	\$427.97	
Heifer Calves	4.2	cwt	22	\$204.78	\$18,921.67	\$252.29	
Yearling Heifers	9	cwt	1	\$146.12	\$1,315.08	\$17.53	
Cull Cows	12	cwt	7	\$82.07	\$6,893.88	\$91.92	
Cull Bulls	16	cwt	1	\$101.87	\$1,629.92	\$21.73	
Total Receipts					\$60,858.11	\$811.44	
Operating Costs							
Deeded Land							
Non-Irrigated Pasture		AUM	160	\$21.50	\$3,439.62	\$45.86	
Rangeland		AUM	431	\$21.50	\$9,258.23	\$123.44	
Hay Meadow Aftermath		AUM	213	\$21.50	\$4,573.89	\$60.99	
Winter Feed							
Meadow Hay		ton	97	\$131.58	\$12,763.26	\$170.18	
Alfalfa		ton	97	\$147.91	\$14,347.27	\$191.30	
Supplement							
Protein Tubs		ton	0.191	\$1,101.60	\$210.52	\$2.81	
Salt & Mineral		ton	0.860	\$1,398.86	\$1,202.98	\$16.04	
Fuel					\$3,000.00	\$40.00	
Supplies & Fencing					\$2,000.00	\$26.67	
Utilities					\$1,600.00	\$21.33	
Veterinary Medicine					\$2,249.49	\$29.99	
Marketing Fees ¹					\$2,434.32	\$32.46	
Other Variable Costs ²		hd	75	\$1.90	\$142.50	\$1.90	
Repair ³							
Machinery & Equipment					\$2,000.00	\$26.67	
Housing & Improvements					\$1,000.00	\$13.33	
Interest on Operating Capital		%	0.025	\$30,111.04	\$752.78	\$10.04	
Total Operating Costs					\$60,974.86	\$813.00	
Income Above Operating Costs					\$(116.75)	\$(1.56)	
Ownership Costs and Capital							
Purchased Livestock		bull	1	\$4,792.00	\$4,792.00	\$63.89	
Interest on Retained Livestock		\$	2%	\$88,542.08	\$1,770.84	\$23.61	
Asset Depreciation ⁴		\$			\$15,695.27	\$209.27	
Taxes		\$			\$8,001.90	\$106.69	
Total Ownership Costs					\$30,260.01	\$403.47	
Total Costs					\$91,234.87	\$1,216.46	
Returns to Labor and Management					\$(30,376.76)	\$(405.02)	

¹ Marketing fees include freight, trucking, video marketing and sale barn auction fees totaling 4% of total receipts

² Other variable costs include Brand Inspection and Beef Check-off fees.

³ Lump-sum annual repair cost estimates provided by focus group.

⁴ Depreciation costs of haying equipment are not included in this budget as hay production is treated as a separate enterprise.

Table 4. Cow-calf Production Flow Chart

