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UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

2009

SAMPLE COSTS TO ESTABLISH AND PRODUCE

# TIMOTHY GRASS HAY



## INTERMOUNTAIN REGION SHASTA – LASSEN COUNTIES

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 INTERMOUNTAIN REGION  
 SHASTA – LASSEN COUNTIES – 2009

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**INTRODUCTION**

The detailed costs for Timothygrass hay establishment and production in the Intermountain Region, Fall River Valley and Big Valley areas of Shasta and Lassen Counties, are presented in this study. The hypothetical farm used in this report consists of 320 acres with 300 acres of Timothygrass hay production and 20 acres dedicated to roads, buildings, and unused land.

The hypothetical farm operations, production practices, overhead, and calculations are described under the assumptions. For additional information or an explanation of the calculations used in the study call the Department of Agricultural and Resource Economics, University of California, Davis, California, 530-752-2414 or the local UC Cooperative Extension office.

Sample Cost of Production Studies for many commodities can be downloaded at <http://coststudies.ucdavis.edu>, requested through the Department of Agricultural and Resource Economics, UC Davis, 530-752-4424 or obtained from the local county UC Cooperative Extension offices. Some archived studies are also available on the website.

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## ASSUMPTIONS

The following assumptions pertain to sample costs to establish and produce Timothygrass hay in Shasta and Lassen Counties in the Intermountain Region. Practices described are not recommendations by the University of California, but represent production practices considered typical of a well-managed farm for this crop and area. The costs are based on the cultural practices used by growers in the region, some of which may not be used during every establishment or production year. The cultural practices and production inputs for growing Timothygrass hay vary considerably amongst growers and fields. Costs are represented on an annual, per acre basis. The use of trade names in this report does not constitute an endorsement or recommendation by the University of California, nor is any criticism implied by omission of other similar products.

**Land Costs and Rent.** The study is based on a 640 acre field and row crop farm, of which 300 acres are dedicated to growing Timothygrass hay and 340 acres are occupied by crops, roads, and farmstead. Other crops that may be grown on the farm are small grains, alfalfa, orchardgrass hay, sudangrass hay, and pasture.

Rental agreements for Timothygrass hay can include combinations of rent and cost. Rent for land is usually a cash payment between \$100 and \$200 depending on the quality of the land. The rented ground is a heavy soil. This study uses a rent of \$100 per acre. The tenant pays all production costs. The long-term interest rate used in this study is 4.25% and the short-term rate is 5.75%. Your interest rates will vary depending on many factors.

**Labor.** Basic hourly wages for workers are \$9.60 per hour for machine and \$8.00 per hour for non-machine (field workers) labor. Adding 36% for the employers' share of federal and state payroll taxes (13.95%), insurance (7.77%), and other unspecified benefits (14.00%) increases the labor rates to \$13.06 per hour for machine and \$10.88 per hour for non-machine labor. The labor for operations involving machinery are 20% higher than the operation time to account for the extra labor involved in equipment set up, moving, maintenance and repair. A farm manager is paid \$3,028.25 per month or \$36,339 per year. Adding the employers' share of payroll taxes and benefits brings the cost to \$49,421 and is included as cash overhead. In addition, the farm manager is furnished a leased pickup for personal and business use. The pickup is valued at \$1,000 per month, which includes license, insurance, and fuel, is included as cash overhead. Any returns above total costs are considered a return to management and investment.

### STAND ESTABLISHMENT, PRODUCTION CULTURAL PRACTICES, AND MATERIAL INPUTS

**Site Preparation.** The seedbed preparation begins in late August when the hard ground is chiseled to a depth of two feet by a custom operator using a chisel. The ground is then disced once and smoothed with a roller harrow. The ground is custom laser leveled. Planting is in September. Small broadleaves are controlled with 2, 4-D sprayed in the fall and again in the spring.

**Fertilization.** In the establishment year, a custom application of elemental sulfur is incorporated into the ground preplant at 200 pounds per acre for the five year stand life. Ammonium sulfate (21-0-0-24) is applied in the operation as planting providing 20 pounds of nitrogen (N) per acre.

Urea is applied four times in the growing season, 75 pounds of N in April by ground, 70 pounds of N in May by air, 100 pounds of N after the first cutting in June, and 75 pounds of N in September for a total of 320 pounds of N per acre. The two final fertilizer applications are spread by ground rig.

**Irrigation.** Irrigation begins in May in both the establishment and average production years. No irrigation is done in April because stored soil moisture from winter rainfall. A total of 32 acre-inches are applied to the field in 8 irrigations to match California Irrigation Management Information System (CIMIS) evapotranspiration (ET<sub>o</sub>) from April to September. CIMIS data can be found on the internet at <http://www.cimis.water.ca.gov/cimis/welcome.jsp>. A border flood irrigation system is used. The water is pumped from the well using a 100 hp electric pump with a 150 foot lift. The pumping cost is \$4.00 per acre inch. After the last harvest operation, the field is irrigated with three acre inches of water. The postharvest irrigation is included in the 33 acre-inch irrigation amount.

**Stand Establishment.** This study uses a rate of seven pounds per acre planted with an airseeder. Timothygrass is ideally planted in September and later plantings are usually unsuccessful. Certified seed should be used to avoid introduction of grassy weeds. Once planted, the stand is kept for 10 years. The seed and fertilizer is placed directly on top of the ground by the custom airseeder followed by the grower rolling the seed firmly into the ground to a depth of 1/8 to 1/4 inches.

**Pest Management.** Pest management consists of herbicide treatments only. For information and specific pesticide use, contact your pest control advisor. Written recommendations are required for many pesticides and are written by licensed pest control advisors. For additional information contact the Shasta-Lassen County field crop Farm Advisor. Pesticide use permits are available at the county Agricultural Commissioner Office. Although control for insect damage is not common and not used in this study, some scouting for insects should be done by the manager in the late winter (grain mites) and in the summer (armyworms).

*Weeds.* Prior to planting the ground is tilled for broadleaf weed control. Most weeds in the seedling stand are controlled with 2,4-D amine sprayed after planting in October at a rate of 1.5 pints per acre without surfactant when broadleaf weeds are smaller than a quarter.

After establishment, 2,4-D amine is sprayed at 0.5 pints per acre plus 1.0 pints of non-ionic surfactant for winter annuals (April) and field bindweed (after each harvest). Borders are also sprayed to manage any weeds that are invasive to the stand. The field edges need to be maintained clean of weeds for quality hay by spraying twice with Roundup at a rate one quart per acre on 10% of the acreage during June and September.

Electric fencing is used to manage livestock and to graze off the stand in September and October. Rotational grazing is used to quickly clean off crop residue in October. Before fall rains, grazing provides income and eliminates trash from the hay in the following season. It can also reduce habitat for meadow mice.

*Insects.* Supracide is used at 2.0 pints per acre plus a non-ionic surfactant, Dynamic, and is applied before the first cutting in May by ground. A mixture of Baythroid, at a rate of 4.0 ounces per acre, with Dynamic is applied by air in June. Baythroid is applied after Supracide to reduce the risk of thrip flair ups.

**Establishment Costs.** The establishment cost is the sum of cash costs for land preparation, planting, production expenses, and cash overhead for growing Timothygrass hay through the first year. The Total Accumulated Net Cash Cost in the first year as shown in Table 2 represents the establishment cost per acre. For this study, the cost is \$509 per acre or \$152,700 for the 300 acre field. The establishment cost is amortized over the remaining 5 years of the stand life.

**Harvest.** Timothygrass hay is usually cut two times during the growing season on an approximate 75 day schedule. A swather with a 14 foot disc-mower type header is used to cut the hay and lay into windrows. In this study, windrows are tedded once with the first windrows bailed directly and late June harvest rain damage is minimally raked. Due to slower speeds two balers and tractors are used. The balers are “chambered” for small bales allowing bottom bales to stand on edge for easier squeeze handling during loading and reduce weights to about 105 pounds each. Bales are picked up and removed from the field by a harrowbed and placed on plastic sheets or tarps in the hay barns.

Costs for loading and storage of higher priced Timothygrass hay is sometimes provided by the grower and at other times is paid directly by the trucker or buyer. Loading and storage of hay is negotiated by either the buyer or seller. A hay squeeze is used to place hay in the barns and load trucks. In this study loading is provided by the hay seller/grower for \$4.00 per ton. Growers pay for weighing the hay load for \$0.50 per ton and the buyer pays for hay testing.

If growers have their hay custom harvested then the equipment for the required operations should be deleted in the investments on Tables 1, 2, 3, 4, 6, and 7. Labor, fuel, repairs, depreciation and interest on investment would need to be removed from the harvest operations and custom charges added.

**Postharvest.** After the last hay cutting the fields are irrigated once.

**Yields & Returns.** The crop yield used in this study is 6.25 tons per acre annually with 4.0 tons the first cutting and 2.0 tons in the second cutting and 1/4 ton for grazing. Hay is normally cut and baled twice each growing season. Timothygrass hay is harvested at the end of June and early September with approximately 75 days between cuttings. The hay is sold mostly for the horse market and export. This is less than the premium price because of grassy weeds, rain damaged, and mechanically damaged hay on headlands. The first cutting may be lower in quality, but demand may be higher because of lack of availability of other hay for horse feed.

Returns will vary according to quality and market. The yields and prices used in this cost study are estimates based on the current market. Current market prices for hay can be found on the internet at [http://www.ams.usda.gov/mnreports/ml\\_gr311.txt](http://www.ams.usda.gov/mnreports/ml_gr311.txt). Many of the Intermountain hay growers advertise at <http://www.intermountainhaygrowers.com/>. A price of \$27.00 per AUM is used to determine the potential income from grazing

**Risk.** The risks associated with the production of Timothygrass hay should not be minimized. While this study makes every effort to model a production system based on typical, real world practices, it cannot fully represent financial, agronomic and market risks which affect the profitability and economic viability of Timothygrass hay production. Because of the risks involved, access to a market is crucial. A grower should identify potential markets and, where possible, have a contract for their hay before a Timothygrass hay stand is established.

## CASH OVERHEAD COSTS

*Property Tax.* Counties charge a base property tax rate of 1% on the assessed value of the property. In some counties special assessment districts exist and charge additional taxes on property including equipment, buildings, and improvements. For this study, county taxes are calculated as 1% of the average value of the property. Average value equals new cost plus salvage value divided by 2 on a per acre basis. Salvage value for investments will vary.

*Interest on Operating Capital.* Interest on operating capital is based on cash operating costs and is calculated monthly until harvest at a nominal rate of 5.75% per year. A nominal interest rate is the going market cost of borrowed funds.

*Insurance.* Insurance for farm investments varies depending on the assets included and the amount of coverage. Property insurance provides coverage for property loss and is charged at 0.740% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs \$1,073 for the entire farm or \$1.68 per acre.

*Office Expense.* Various farm and office expenses are estimated at \$22 per acre or a total of \$14,080 for the ranch. These expenses include office supplies, utilities, telephones, bookkeeping, accounting, legal fees, marketing, and maintenance, etc.

*Safety Equipment.* Farms are required to have a safety program in place to meet legal requirements. This includes such things as training, equipment for employees, signage, etc., and is assumed to cost \$1.00 per acre. Many farms have small separate and lockable storage for pesticides. These costs are included in the cost of buildings.

**Equipment Operating Costs.** Repair costs are based on purchase price, annual hours of use, total hours of life, and repair coefficients formulated by the American Society of Agricultural Engineers (ASAE). Fuel and lubrication costs are also determined by ASAE equations based on maximum PTO horsepower and fuel type.

Prices for on-farm delivery of diesel and gasoline are \$3.70 and \$3.36 per gallon, respectively. Fuel costs are derived from American Automobile Association (AAA) and Energy Information Administration (EIA) 2009 monthly data. The cost includes a 2% local sales tax on diesel fuel and 8% sales tax on gasoline. Gasoline also includes federal and state excise tax, which are refundable for on-farm use when filing your income tax. Diesel is bought in shipments of 7,400 gallons and stored in a 10,000 above ground storage tank with a spill containment pad and uses an electric pump to fill equipment. Gasoline is also stored above ground in a 100 gallon tank on a riser in a spill containment pad, but uses gravity flow to fill equipment.

The fuel, lube, and repair cost per acre for each operation in Table 1, 2, 5, and 6 is determined by multiplying the total hourly operating cost in Table 4 and 9 for each piece of equipment used for the selected operation by the hours per acre. Tractor time is 10% higher than implement time for a given operation to account for setup, travel and down time.

## NON-CASH OVERHEAD COSTS

**Investment.** The investments shown in Table 6 are those that are partially or completely allocated to the Timothygrass hay operation. Costs of investments such as tractors, trucks, buildings, etc. can be spread over the whole farm. Annual investments shown in Tables 1 and 3 represent depreciation and opportunity cost for each investment on an annual per acre basis.

*Capital Recovery.* Capital recovery cost is calculated for equipment and other farm investments. Although farm equipment used on mint farms might be purchased new or used, this study shows the current purchase price for new equipment. The new purchase price is adjusted to 50% to indicate a mix of new and used equipment. Annual ownership costs (Equipment and Investments) are shown in Tables 1-4, and 6. They represent the capital recovery cost for investments on an annual per acre basis.

Capital recovery cost is the annual depreciation and interest costs for a capital investment. It is the amount of money required each year to recover the difference between the purchase prices and salvage value (unrecovered capital). Put another way, it is equivalent to the annual payment on a loan for the investment with the down payment equal to the discounted salvage value. This is a more complex method of calculating ownership costs than straight-line depreciation and opportunity costs, but more accurately represents the annual costs of ownership because it takes the time value of money into account (Boehlje and Eidman). The calculation for the annual capital recovery costs is as follows.

$$\left[ \left( \frac{\text{Purchase Price} - \text{Salvage Value}}{\text{Capital Recovery Factor}} \right) + \left[ \frac{\text{Salvage Value} \times \text{Interest Rate}}{\text{Capital Recovery Factor}} \right] \right]$$

*Salvage Value.* Salvage value is an estimate of the remaining value of an investment at the end of its life. For farm machinery (e.g., tractors and implements) the remaining value is a percentage of the new cost of the investment (Boehlje and Eidman). The life in years is estimated by dividing the wear-out life, as given by ASAE by the annual use in hours. Salvage value is calculated as

$$\text{New Price} \times \% \text{ Remaining Value}$$

Salvage value for other investments including irrigation systems, buildings, and miscellaneous equipment is zero. The salvage value for land is equal to the purchase price because land does not depreciate from use. The purchase price and salvage value for certain equipment and investments are shown in Table 4.

*Capital Recovery Factor.* Capital recovery factor is the amortization factor or annual payment whose present value at compound interest is 1. It is the function of the interest rate and years of life of the equipment.

*Interest Rate.* The interest rate of 4.75% used to calculate capital recovery cost is used to calculate capital recovery cost is the effective long-term interest rate in April 2009. The interest rate is used to reflect the long-term realized rate of return to these specialized resources that can only be used effectively in the agricultural sector. In other words, the next best alternative use for these resources is in another agricultural enterprise.

*Non-Cash Equipment Costs.* Much of the equipment inventory on a typical Timothygrass Hay farm in Shasta and Lassen counties have high hours of use which reduces its value. This study shows current purchase prices for new equipment with an adjustment of 50% of new value to indicate a mix of new and used equipment. Annual ownership costs for equipment and other investments are shown in Tables 3 and 8. Equipment costs are composed of three parts: non-cash overhead, cash overhead, and operating costs. Both of the overhead factors have been discussed in previous sections. The operating costs consist of repairs, fuel, and lubrication and are discussed under operating costs.

The equipment listed in Tables 3, 4, 6, and 7 indicate only that equipment which is used in the Timothygrass hay enterprise and does not necessarily include all of the equipment that would be found on a typical farm growing Timothygrass Hay.

**Table Values.** Due to rounding, the totals may be slightly different from the sum of the components.

**Acknowledgment.** Appreciation is expressed to those growers and other cooperators who provided information for this study.



## REFERENCES

- American Society of Agricultural Engineers. 2003. *American Society of Agricultural Engineers Standards Yearbook*. Russell H. Hahn and Evelyn E. Rosentreter (ed.) St. Joseph, Missouri. 41st edition.
- American Society of Farm Managers and Rural Appraisers. 2009. *Trends in Agricultural Land & Lease Values*. California Chapter of the American Society of Farms Managers and Rural Appraisers. Woodbridge, CA.
- Barker, Doug. January 22, 2009. *California Workers' Compensation Rating Data for Selected Agricultural Classifications as of January 1, 2009*. California Department of Insurance, Rate Regulation Branch.
- Boehlje, Michael D., and Vernon R. Eidman. 1984. *Farm Management*. John Wiley and Sons. New York, New York.
- Blank, Steve, Karen Klonsky, Kim Norris, and Steve Orloff. 1992. *Acquiring alfalfa hay equipment: A financial analysis of alternatives*. University of California. Oakland, California. Giannini Information Series No. 92-1. <http://giannini.ucop.edu/InfoSeries/921-HayEquip.pdf>. Internet accessed July, 2009.
- California State Automobile Association. 2009. *Gas Price Averages 2007 - 2009*. AAA Press Room, San Francisco, CA. <http://www.csaa.com/portal/site/CSAA/menuitem.5313747aa611bd4e320cfad592278a0c/?vgnextoid=8d642ce6cda97010VgnVCM1000002872a8c0RCRD>. Internet accessed April, 2009.
- California State Board of equalization. *Fuel Tax Division Tax Rates*. <http://www.boe.ca.gov/sptaxprog/spftdrates.htm>. Internet accessed April, 2009.
- Energy Information Administration. 2009. *Weekly Retail on Highway Diesel Prices*. <http://tonto.eia.doe.gov/oog/info/gdu/gasdiesel.asp>. Internet accessed April, 2009.
- Marcum, Daniel B., Karen M. Klonsky, Pete Livingston, 2006. *Sample Costs To Establish And Produce Orchardgrass Hay, Intermountain Region, Shasta – Lassen Counties – 2006*. U.C. Cooperative Extension, University of California, Department of Agricultural and Resource Economics, Davis, CA
- USDA-ERS. 2005. *Farm Sector: Farm Financial Ratios*. Agriculture and Rural Economics Division, ERS. USDA. Washington, DC. <http://usda.mannlib.cornell.edu/reports/nassr/price/zap-bb/agpran04.txt>; Internet accessed May, 2005.

For information concerning the above or other University of California publications, contact UC DANR Communications Services at 800-994-8849, online at <http://anrcatalog.ucdavis.edu/InOrder/Shop/Shop.asp>, or your local county UC Cooperative Extension office.

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Table 1.

UC COOPERATIVE EXTENSION  
COST PER ACRE TO ESTABLISH AN TIMOTHYGRASS HAY STAND  
INTERMOUNTAIN REGION  
SHASTA & LASSEN COUNTIES - 2009

Labor Rate: \$13.06/hr. machine labor  
\$10.88/hr. non-machine labor

Short Term Interest Rate: 5.75%

Operation	Cash and Labor Costs per Acre						Your Cost
	Operation Time (Hrs/A)	Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/Rent	Total Cost	
Cultural:							
Chisel Ground	0.14	2	10	0	0	12	
Fertilize - Nitrogen & Sulfur	0.00	0	0	30	8	38	
Disc Crop Stubble Residue	0.11	2	8	0	0	10	
Smooth and Roll Field	0.10	2	3	0	0	4	
Laser Level	0.00	0	0	0	200	200	
Fertilize - Sulfur	0.00	0	0	20	1	21	
Pull Borders	0.03	0	1	0	0	1	
Plant Timothygrass	0.00	0	0	19	8	28	
Roll Field	0.10	2	3	0	0	4	
Irrigate 2X	0.00	0	0	24	0	24	
Weed Control - Winter Weed Spray	0.11	2	0	4	0	6	
Pickup Truck Use	0.24	4	3	0	0	7	
ATV Use	<u>0.24</u>	<u>4</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>4</u>	
TOTAL CULTURAL COSTS	1.05	17	28	98	218	360	
Interest on Operating Capital @ 5.75%						8	
TOTAL OPERATING COSTS/ACRE		17	28	98	218	368	
CASH OVERHEAD:							
Manager's Salary						77	
Office Expense						11	
Liability Insurance						2	
Land Rent						150	
Property Taxes						2	
Property Insurance						2	
Investment Repairs						<u>8</u>	
TOTAL CASH OVERHEAD COSTS						252	
TOTAL CASH COSTS/ACRE						621	
NON-CASH OVERHEAD:							
		Per producing		-- Annual Cost --			
Investment		<u>    Acre</u>		<u>Capital Recovery</u>			
Fuel Wagon		3		0		0	
Fuel Tanks & Pumps		35		3		3	
Hay Barns (2)		169		13		13	
Shop Building		78		6		6	
Shop Tools		21		2		2	
Equipment		<u>86</u>		<u>10</u>		<u>10</u>	
TOTAL NON-CASH OVERHEAD COSTS		393		33		33	
TOTAL COSTS/ACRE						653	

Table 2.

UC COOPERATIVE EXTENSION  
 COST AND RETURNS PER ACRE TO ESTABLISH AN TIMOTHYGRASS HAY STAND  
 INTERMOUNTAIN REGION  
 SHASTA & LASSEN COUNTIES - 2009

Labor Rate: \$13.06/hr. machine labor  
 \$10.88/hr. non-machine labor

Short Term Interest Rate: 5.75%

	Quantity/Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
<b>OPERATING COSTS</b>					
Fertilizer:					
21-0-0-24	20.00	Lb N	1.50	30	
Sulfur - Elemental	0.00	Lb	0.10	20	
Custom:					
Ground Application	1.10	Acre	8.00	9	
Laser Level	1.00	Acre	200.00	200	
Ground Application Seed	1.00	Acre	8.25	8	
Seed:					
Seed - Timothygrass	7.00	Lb	2.76	19	
Irrigation:					
Water	6.00	AcIn	4.00	24	
Herbicide:					
2,4-D Amine	1.50	Pint	2.87	4	
Labor (machine)	1.26	Hrs	13.06	17	
Labor (non-machine)	0.00	Hrs	0.00	0	
Fuel - Gas	0.94	Gal	3.36	3	
Fuel - Diesel	4.76	Gal	3.70	18	
Lube				3	
Machinery repair				5	
Interest on Operating Capital @ 5.75%				8	
<b>TOTAL OPERATING COSTS/ACRE</b>				<b>368</b>	
<b>CASH OVERHEAD COSTS:</b>					
Manager's Salary				77	
Office Expense				11	
Liability Insurance				2	
Land Rent				150	
Property Taxes				2	
Property Insurance				2	
Investment Repairs				8	
<b>TOTAL CASH OVERHEAD COSTS/ACRE</b>				<b>252</b>	
<b>TOTAL CASH COSTS/ACRE</b>				<b>621</b>	
<b>NON-CASH OVERHEAD COSTS (CAPITAL RECOVERY):</b>					
Fuel Wagon				0	
Fuel Tanks & Pumps (2)				3	
Hay Barns - 500 Tons Each (2)				13	
Shop Building				6	
Shop Tools				2	
Equipment				10	
<b>TOTAL NON-CASH OVERHEAD COSTS/ACRE</b>				<b>33</b>	
<b>TOTAL COSTS/ACRE</b>				<b>653</b>	

Table 3.

UC COOPERATIVE EXTENSION  
ANNUAL ESTABLISHMENT EQUIPMENT COSTS  
INTERMOUNTAIN REGION - 2009  
Fall River Valley in Shasta and Lassen Counties

		ANNUAL EQUIPMENT COSTS						
Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	- Cash Overhead -		Total
						Insur- ance	Taxes	
08	100 Gallon Sprayer with Boom for ATV	5,545	10	981	631	27	33	690
08	235 HP Crawler	221,063	10	65,299	23,030	1,174	1,432	25,635
08	90 HP 4WD Tractor	87,109	16	15,602	7,222	421	514	8,157
08	ATV	6,865	7	2,604	853	39	47	940
08	Chisel - 18'	17,447	10	3,085	1,984	84	103	2,171
08	Cultipacker - 16'	20,109	10	3,556	2,287	97	118	2,502
08	Disc - Border	2,253	10	398	256	11	13	280
08	Disc - Tandem 21'	24,782	10	4,382	2,818	120	146	3,083
08	Pickup- 4WD 3/4 Ton	38,260	7	14,513	4,756	216	264	5,236
TOTAL		423,433		110,420	43,837	2,189	2,669	48,695
50% of New Cost *		254,060		66,252	26,302	1,313	1,602	29,217

\* Used to reflect a mix of new and used equipment.

Table 4.

HOURLY ESTABLISHMENT EQUIPMENT COSTS  
INTERMOUNTAIN REGION - 2009  
Fall River Valley in Shasta and Lassen Counties

		----- COSTS PER HOUR -----							
Yr	Description	Actual Hours Used	Capital Recovery	Insur- ance	Taxes	- Cash Overhead -		Operating	Total Costs/Hr.
						Repairs	Fuel & Lube	Total Oper.	
08	100 Gallon Sprayer with Boom for ATV	159.4	2.37	0.10	0.12	1.49	0.00	1.49	4.09
08	235 HP Crawler	1599.5	8.64	0.44	0.54	5.88	58.03	63.91	73.53
08	90 HP 4WD Tractor	999.9	4.33	0.25	0.31	2.20	18.81	21.01	25.91
08	ATV	284.6	1.80	0.08	0.10	0.51	2.58	3.09	5.07
08	Chisel - 18'	199.5	5.97	0.25	0.31	3.72	0.00	3.72	10.25
08	Cultipacker - 16'	199.6	6.87	0.29	0.36	2.30	0.00	2.30	9.83
08	Disc - Border	199.5	0.77	0.03	0.04	0.37	0.00	0.37	1.22
08	Disc - Tandem 21'	199.7	8.47	0.36	0.44	4.09	0.00	4.09	13.35
08	Pickup- 4WD 3/4 Ton	284.2	10.04	0.46	0.56	2.83	11.59	14.42	25.47

Table 5.

UC COOPERATIVE EXTENSION  
 COSTS PER ACRE TO PRODUCE TIMOTHYGRASS HAY  
 INTERMOUNTAIN REGION  
 SHASTA & LASSEN COUNTIES - 2009

Labor Rate: \$13.06/hr. machine labor  
 \$10.88/hr. non-machine labor

Short Term Interest Rate: 5.75%

Operation	Operation Time (Hrs/A)	----- Cash and Labor Costs per Acre -----					Total Cost	Your Cost
		Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/ Rent			
Cultural:								
Weed Control - Dormant Spray	0.01	0	0	13	0	13		
Fertilize 4X - 46-0-0 (Urea)	0.00	0	0	296	39	335		
Weed Control - Spot Spray 2X on 10% of Acreage	0.02	0	0	7	0	7		
Insect Control - Supracide	0.00	0	0	40	8	48		
Irrigate 8X	0.60	7	0	148	0	155		
Insect Control - Baythroid	0.00	0	0	38	8	46		
Make Electric Fence	0.10	1	0	0	0	1		
Remove Electric Fence	0.10	1	0	0	0	1		
Pickup Truck Use	0.48	7	7	0	0	14		
ATV Use	<u>0.48</u>	<u>7</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>9</u>		
<b>TOTAL CULTURAL COSTS</b>	1.78	24	8	541	55	628		
Harvest:								
Harvest Hay 2X	0.00	0	0	0	100	100		
Graze Field - October	<u>0.05</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>		
<b>TOTAL HARVEST COSTS</b>	0.05	1	0	0	100	101		
Interest on Operating Capital @ 5.75%	0.06					1		
<b>TOTAL OPERATING COSTS/ACRE</b>		25	8	541	155	730		
<b>TOTAL OPERATING COSTS/TON</b>						121.66		
CASH OVERHEAD:								
Office Expense						11		
Liability Insurance						2		
Manager's Salary						77		
Safety Equipment						1		
Land Rent						150		
Property Taxes						5		
Property Insurance						4		
Investment Repairs						<u>9</u>		
<b>TOTAL CASH OVERHEAD COSTS</b>						260		
<b>TOTAL CASH COSTS/ACRE</b>						990		
<b>TOTAL CASH COSTS/TON</b>						164.95		
NON-CASH OVERHEAD:								
Investment		Per producing		-- Annual Cost --				
		Acre		Capital Recovery				
Fuel Tanks & Pumps (2)		35		3		3		
Fuel Wagon		3		0		0		
Shop Building		78		6		6		
Shop Tools		21		2		2		
Irrigation System		24		2		2		
Hay Barns - 500 Tons Each (2)		169		13		13		
Electric Fencing		10		1		1		
Timothygrass Hay Establishment Costs		620		142		142		
Equipment		<u>39</u>		<u>5</u>		<u>5</u>		
<b>TOTAL NON-CASH OVERHEAD COSTS</b>		1000		173		173		
<b>TOTAL COSTS/ACRE</b>						1162		
<b>TOTAL COSTS/TON</b>						193.73		

Table 6.

UC COOPERATIVE EXTENSION  
 COSTS AND RETURNS PER ACRE TO PRODUCE TIMOTHYGRASS HAY  
 INTERMOUNTAIN REGION  
 SHASTA & LASSEN COUNTIES - 2009

	Quantity/Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
Labor Rate: \$13.06/hr. machine labor					
\$10.88/hr. non-machine labor					
Short Term Interest Rate: 5.75%					
<hr/>					
GROSS RETURNS					
Timothygrass Hay	6.0	Ton	260.00	1,560	
Graze	0.25	AUM	27.00	<u>7</u>	
TOTAL GROSS RETURNS FOR TIMOTHYGRASS HAY				1,567	
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OPERATING COSTS					
Herbicide:					
2,4-D Amine	2.00	Pint	2.87	6	
Glyphosphate	0.80	Pint	8.58	7	
Adjuvant:					
DyneAmic	7.00	Pint	7.02	49	
Fertilizer:					
Urea 46-0-0	320.00	Lb N	0.926	296	
Custom:					
Ground Application	5.00	Acre	8	41	
Air Application	1.00	Acre	12.75	13	
Hay Harvest	2.00	Acre	50	100	
Insecticide:					
Supracide 2E	2.00	Pint	9.34	19	
Baythroid	4.00	FlOz	4.11	16	
Irrigation:					
Water	32.00	AcIn	4.63	148	
Labor (machine)	1.18	Hrs	13.06	15	
Labor (non-machine)	0.85	Hrs	10.88	9	
Fuel - Gas	1.76	Gal	3.36	6	
Lube				1	
Machinery Repair				1	
Interest on Operating Capital @ 5.75%				<u>1</u>	
TOTAL OPERATING COSTS/ACRE				730	
TOTAL OPERATING COSTS/TON				122	
NET RETURNS ABOVE OPERATING COSTS/ACRE				837	
<hr/>					
CASH OVERHEAD COSTS:					
Office Expense				11	
Liability Insurance				2	
Manager's Salary				77	
Safety Equipment				1	
Land Rent				150	
Property Taxes				5	
Property Insurance				4	
Investment Repairs				<u>9</u>	
TOTAL CASH OVERHEAD COSTS/ACRE				260	
TOTAL CASH COSTS/ACRE				990	
TOTAL CASH COSTS/TON				165	
<hr/>					
NON-CASH OVERHEAD COSTS (CAPITAL RECOVERY):					
Fuel Tanks & Pumps (2)				3	
Fuel Wagon				0	
Shop Building				6	
Shop Tools				2	
Irrigation System				2	
Hay Barns - 500 Tons Each (2)				13	
Electric Fencing				1	
Timothygrass Hay Establishment Costs				142	
Equipment				<u>5</u>	
TOTAL NON-CASH OVERHEAD COSTS/ACRE				173	
TOTAL COSTS/ACRE				1,162	
TOTAL COSTS/TON				194	
NET RETURNS ABOVE TOTAL COSTS/ACRE				404	

Table 7.

UC COOPERATIVE EXTENSION  
MONTHLY CAST COSTS PER ACRE TO PRODUCE TIMOTHYGRASS HAY  
INTERMOUNTAIN REGION  
SHASTA & LASSEN COUNTIES - 2009

Beginning JAN 09	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Ending DEC 09	09	09	09	09	09	09	09	09	09	09	09	09	
Cultural:													
Weed Control - Dormant Spray				13									13
Fertilize - 46-0-0 (Urea)				79	78	101			77				335
Weed Control - Spot Spray				4		4							7
Insect Control - Supracide					48								48
Irrigate 11X					24	24	53	24	29				155
Insect Control - Baythroid						46							46
Make Electric Fence										1			1
Remove Electric Fence										1			1
Pickup Truck Use				2	2	2	2	2	2	2			14
ATV Use				<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>		<u>9</u>
<b>TOTAL CULTURAL COSTS</b>				99	153	177	56	28	110	5			628
Harvest:													
Harvest Hay 2X						50			50				100
Graze Pasture - October										<u>1</u>			<u>1</u>
<b>TOTAL HARVEST COSTS</b>						50			50	1			101
<b>Interest on Operating Capital @ 5.75%</b>				0	1	2	-1	-1	-1	0			1
<b>TOTAL OPERATING COSTS/ACRE</b>				100	154	230	55	27	159	6			730
<b>TOTAL OPERATING COSTS/TON</b>				17	26	38	9	4	26	1			121.66
OVERHEAD:													
Office Expense				2	2	2	2	2	2	2			11
Liability Insurance	2												2
Manager's Salary				11	11	11	11	11	11	11			77
Safety Equipment				0	0	0	0	0	0	0			1
Land Rent							150						150
Property Taxes	3							3					5
Property Insurance	2							2					4
Investment Repairs	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>9</u>
<b>TOTAL CASH OVERHEAD COSTS</b>	7	1	1	14	14	14	168	14	14	14	1	1	260
<b>TOTAL CASH COSTS/ACRE</b>	7	1	1	113	168	243	224	40	172	19	1	1	990
<b>TOTAL CASH COSTS/TON</b>	1	0	0	19	28	41	37	7	29	3	0	0	164.95

Table 8.

UC COOPERATIVE EXTENSION  
WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS  
INTERMOUNTAIN REGION  
SHASTA & LASSEN COUNTIES - 2009

ANNUAL EQUIPMENT COSTS

Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	- Cash Overhead -		Total
						Insur- ance	Taxes	
09	100 Gallon Sprayer with Boom for ATV	5,545	10	981	631	27	33	690
09	ATV	6,865	7	2,604	853	39	47	940
09	Pickup - 4WD 3/4 Ton	38,260	7	14,513	4,756	216	264	5,236
TOTAL		50,670		18,098	6,240	282	344	6,866
50% of New Cost *		25,335		9,049	3,120	141	172	3,433

\* Used to reflect a mix of new and used equipment.

ANNUAL INVESTMENT COSTS

Description	Price	Yrs Life	Salvage Value	Capital Recovery	----- Cash Overhead -----			Total
					Insur- ance	Taxes	Repairs	
INVESTMENT								
Electric Fencing	6,223	20	630	469	28	34	173	705
Fuel Tanks & Pumps (2)	22,720	20	2,300	1,713	103	125	632	2,573
Fuel Wagon	2,163	10	219	259	10	12	60	341
Hay Barns - 500 Tons Each (2)	108,132	20	10,947	8,154	488	595	3,010	12,248
Irrigation System	15,558	25	1,575	1,042	70	86	433	1,631
Shop Building	50,088	20	5,071	3,777	226	276	1,394	5,673
Shop Tools	13,344	20	1,351	1,006	60	73	186	1,326
Timothygrass Hay Establishment Cost	186,000	5		42,665	763	930	0	44,357
TOTAL INVESTMENT	404,228		22,093	59,086	1,748	2,132	5,889	68,854

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm Unit	Price/ Unit	Total Cost
Land Rent	300 Acre	150.00	45,000
Liability Insurance	640 Acre	1.68	1,075
Manager's Salary	640 Acre	77.22	49,421
Office Expense	640 Acre	10.95	7,008
Safety Equipment	640 Acre	1.13	723

Table 9.

UC COOPERATIVE EXTENSION  
HOURLY EQUIPMENT COSTS  
INTERMOUNTAIN REGION  
SHASTA & LASSEN COUNTIES - 2009

----- COSTS PER HOUR -----									
Yr	Description	Actual Hours Used	- Cash Overhead -					Total Oper.	Total Costs/Hr.
			Capital Recovery	Insur- ance	Taxes	Repairs	Fuel & Lube		
05	100 Gallon Sprayer with Boom for ATV	149.7	2.11	0.09	0.11	1.25	0.00	1.25	3.55
05	ATV	284.2	1.50	0.07	0.08	0.43	2.58	3.01	4.66
05	Pickup 0 4WD 3/4 Ton	283.5	8.39	0.38	0.47	2.35	11.59	13.94	23.18



Table 10.

UC COOPERATIVE EXTENSION  
RANGING ANALYSIS  
INTERMOUNTAIN REGION  
SHASTA & LASSEN COUNTIES - 2009

COSTS PER ACRE AT VARYING YIELDS FOR TIMOTHYGRASS HAY							
	YIELD (TONS/ACRE)						
	4.5	5.0	5.5	6.0	6.5	7.0	7.5
OPERATING COSTS/ACRE:							
Cultural Cost	628	628	628	628	628	628	628
Harvest Cost	101	101	101	101	101	101	101
Interest on Operating Capital	1	1	1	1	1	1	1
TOTAL OPERATING COSTS/ACRE	730	730	730	730	730	730	730
TOTAL OPERATING COSTS/TON	162	146	133	122	112	104	97
CASH OVERHEAD COSTS/ACRE							
	260	260	260	260	260	260	260
TOTAL CASH COSTS/ACRE	990	990	990	990	990	990	990
TOTAL CASH COSTS/TON	220	198	180	165	152	141	132
NON-CASH OVERHEAD COSTS/ACRE							
	173	173	173	173	173	173	173
TOTAL COSTS/ACRE	1,162	1,162	1,162	1,162	1,162	1,162	1,162
TOTAL COSTS/TON	258	232	211	194	179	166	155

NET RETURNS PER ACRE ABOVE OPERATING COSTS FOR TIMOTHYGRASS HAY								
PRICE (DOLLARS/Ton)		YIELD UNIT/ACRE and AUM						
Hay (Ton)	(DOLLARS/AUM) Graze (AUM)	4.5	5.0	5.5	6.0	6.5	7.0	7.5
		0.18	0.20	0.23	0.25	0.28	0.30	0.33
200	21.00	172	273	374	475	576	677	778
220	23.00	262	373	485	596	707	818	929
240	25.00	353	474	595	716	838	959	1,080
260	27.00	443	574	705	837	968	1,099	1,231
280	29.00	533	674	816	957	1,099	1,240	1,382
300	31.00	623	775	926	1,078	1,229	1,381	1,532
320	33.00	713	875	1,037	1,198	1,360	1,522	1,683

NET RETURNS PER ACRE ABOVE CASH COSTS FOR TIMOTHYGRASS HAY								
PRICE (DOLLARS/Ton)		YIELD UNIT/ACRE and AUM						
Hay (Ton)	(DOLLARS/AUM) Graze (AUM)	4.5	5.0	5.5	6.0	6.5	7.0	7.5
		0.18	0.20	0.23	0.25	0.28	0.30	0.33
200	21.00	-88	13	115	216	317	418	519
220	23.00	3	114	225	336	447	558	670
240	25.00	93	214	335	457	578	699	820
260	27.00	183	314	446	577	708	840	971
280	29.00	273	415	556	698	839	980	1,122
300	31.00	363	515	667	818	970	1,121	1,273
320	33.00	454	615	777	939	1,100	1,262	1,424

NET RETURNS PER ACRE ABOVE TOTAL COSTS FOR TIMOTHYGRASS HAY								
PRICE (DOLLARS/Ton)		YIELD UNIT/ACRE and AUM						
Hay (Ton)	(DOLLARS/AUM) Graze (AUM)	4.5	5.0	5.5	6.0	6.5	7.0	7.5
		0.18	0.20	0.23	0.25	0.28	0.30	0.33
200	21.00	-260	-159	-58	43	144	245	346
220	23.00	-170	-59	52	163	275	386	497
240	25.00	-80	41	163	284	405	526	648
260	27.00	10	142	273	404	536	667	798
280	29.00	101	242	383	525	666	808	949
300	31.00	191	342	494	645	797	948	1,100
320	33.00	281	443	604	766	928	1,089	1,251

Table 11.

UC COOPERATIVE EXTENSION  
 COSTS AND RETURNS/BREAKEVEN ANALYSIS  
 INTERMOUNTAIN REGION  
 SHASTA & LASSEN COUNTIES - 2009

COSTS AND RETURNS - PER ACRE BASIS

Crop	1. Gross Returns	2. Operating Costs	3. Net Returns Above Oper. Costs (1-2)	4. Cash Costs	5. Net Returns Above Cash Costs (1-4)	6. Total Costs	7. Net Returns Above Total Costs (1-6)
Timothygrass Hay	1,567	730	837	990	577	1,162	404

COSTS AND RETURNS - TOTAL ACREAGE

Crop	1. Gross Returns	2. Operating Costs	3. Net Returns Above Oper. Costs (1-2)	4. Cash Costs	5. Net Returns Above Cash Cost (1-4)	6. Total Costs	7. Net Returns Above Total Costs (1-6)
Timothygrass Hay	470,025	218,990	251,035	296,908	173,117	348,714	121,311

BREAKEVEN PRICES PER YIELD UNIT

CROP	Base Yield (Units/Acre)	Yield Units	----- Breakeven Price To Cover -----		
			Operating Costs	Cash Costs	Total Costs
----- \$ per Yield Unit -----					
Timothygrass Hay	6.0	Ton	121.14	164.24	192.90

BREAKEVEN YIELDS PER ACRE

CROP	Yield Units	Base Price (\$/Unit)	----- Breakeven Yield To Cover -----		
			Operating Costs	Cash Costs	Total Costs
----- Yield Units / Acre -----					
Timothygrass Hay	Ton	260.00	2.80	3.80	4.50

Table 12.

UC COOPERATIVE EXTENSION  
 DETAIL BY OPERATIONS  
 INTERMOUNTAIN REGION  
 SHASTA & LASSEN COUNTIES – 2009

Operation	Operation Month	Tractor/ Power Unit	Implement	Material	Broadcast Rate/acre	Material Unit
Cultural:						
Weed Control - Dormant Spray	April	ATV	100 Gal ATV Sprayer w/Boom	2, 4-D, Amine DyneAmic	0.50 1.00	Pint Pint
Fertilize - 4X	April	Custom	Ground Application - N Fertilizer	Urea 46-0-0	75.00	Lb N
	May	Custom	Air Application - N Fertilizer	Urea 46-0-0	70.00	Lb N
	June	Custom	Ground Application - N Fertilizer	Urea 46-0-0	100.00	Lb N
	September	Custom	Ground Application - N Fertilizer	Urea 46-0-0	75.00	Lb N
Weed Control - - Spot Spray - 2X on 10% of Acreage	April	ATV	100 Gal ATV Sprayer w/Boom	Roundup	0.40	Pint
	June	ATV	100 Gal ATV Sprayer w/Boom	Roundup	0.40	Pint
	August	ATV	100 Gal ATV Sprayer w/Boom	Roundup	0.40	Pint
	August	Custom	Ground Application - N Fertilizer	Urea 46-0-0	50.00	Lb N
Insect Control - Supracide	May	Custom	Air Application - Insecticide	Supracide 2E DyneAmic	2.00 3.00	Pint Pint
Irrigate - 11X	May	Labor		Water	5.00	AcIn
	June	Labor		Water	5.00	AcIn
	July	Labor		Water	11.00	AcIn
	August	Labor		Water	5.00	AcIn
	September	Labor		Water	6.00	AcIn
Harvest Hay 2X	June	Custom				
	September	Custom				
Insect Control - Baythroid	June	Custom	Ground Application - Insecticide	Baythroid DyneAmic	4.00 3.00	FLOz Pint
Make Electric Fence	October	Labor				
Graze Pasture	October	Labor				
Remove Electric Fence	October	Labor				
Pickup Truck Use	All Months					
ATV Use	All Months					