

# Stocker enterprise budgets for grass-based systems

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Cattle-grazing enterprises have become increasingly popular in the upper Midwest, a region characterized by a favorable grazing season climate and high quality pasture forage production. In the past, most farmers have used a continuous grazing system. This publication examines management-intensive rotational grazing (MIRG) as a strategy increasing the profitability of grazing in general and stocker production in particular.

Interest in Wisconsin has been expanding in grazing stockers as an alternative to a feedlot system. Typically, calves are bought in the spring, grazed through early fall, and then sold to feedlot operations. These calves may be grazed continuously or grazed in a MIRG system where the pasture is split into sub-fields, or paddocks, and the stockers are moved to a new paddock every two to four days. Graziers (producers managing these paddock systems) have found that MIRG leads to more grass production, higher stocking rates, improved seasonal distribution of growth, increased beef production, and increased profits per acre. However, they have also noted that, like any production system, skillful production and marketing management is required for financial success.

This publication examines the economics of the management intensive rotational grazing stocker option. In particular, it looks at both traditional beef and Holstein steers intensively grazed over a 6-month period. The stocker operation is divided into two enterprises, pasture and the stocker animal, to better estimate the costs and returns in the system. Many assumptions are needed to construct the enclosed enterprise budgets. Therefore, significant space is devoted to carefully describing these assumptions. Tables are also included that show the effect of changes in key variables (price spread and weight gain assumptions, in particular) on the expected profitability of using MIRG in stocker operations.

## Assumed characteristics of the stocker grazing enterprise

Tables 1 and 2 outline the assumptions used to develop the budgets and table 3 summarizes the net profits (and losses). You can adjust the budget assumptions and results as your situation differs from those listed.

Both beef and Holstein steers use the same kinds of inputs, such as the same number of total acres, days on pasture, and supplemental feeds. The calves are grazed for 170 days on a 100-acre parcel split into six equal-sized paddocks.

The pastures, made up of quackgrass and red clover (frost seeded at 2 lb/acre), are expected to yield 3.7 tons/acre (3.13 tons of dry matter). Since pasture growth typically exceeds animal consumption in the spring, mechanical harvesting of some pasture growth is assumed.



**Table 1.** Assumed characteristics of the stocker grazing enterprise

| <b>assumptions</b>         | <b>beef calf</b>   | <b>Holstein calf</b>   | <b>notes</b>   |
|----------------------------|--|--|--|
| stocking rate              | 1.4 animals/acre<br>(136 animals/100 acres)                      | 1.5 animals/acre<br>(150 animals/100 acres)                      |  |
| dry matter intake          | 3.3%   | 3.7%   | Daily dry matter intake<br>(percent of body weight)  |
| weight, initial            | 500 lb   | 300 lb   |  |
| daily gain                 | 2.0 lb/day   | 2.0 lb/day   |  |
| total gain                 | 340 lb (2.0 lb/day x 170 days)                                   | 340 lb (2.0 lb/day x 170 days)                                   | Daily weight gain x days grazing   |
| final                      | 840 lb (500 lb + 340 lb)   | 640 lb (300 lb + 340 lb)   | Initial weight + total weight gain   |
| <b>costs</b>               | <b>\$/animal</b>   | <b>\$/animal</b>   |  |
| purchase price             | 525.00 (500 lb x \$1.05/lb)                                      | 315.00 (300 lb x \$1.05/lb)                                      | Initial weight x price/lb  |
| cost of pasture consumed   | 129.83 (1.88 tons x \$68.97/ton DM)                              | 102.08 (1.48 tons x \$68.97/ton DM)                              |  |
| labor                      | 4.69 (\$7.50/hour x 85 hours/season ÷ 136 animals)               | 4.28 (\$7.50/hour x 85 hours/season ÷ 150 animals)               | Includes time for changing paddocks, inserting implants, marketing, veterinary, and other tasks. |
| veterinary fees & medicine | 5.00   | 5.00   | Services include two wormings and a re-vaccination.  |
| death loss                 | 6.37 (\$0.95 average price x 670 lb average wt. x 1% death rate) | 8.93 (\$0.95 average price x 470 lb average wt. x 2% death rate) | Assumes that 1% of the beef calves and 2% of the Holsteins will die.                             |
| implants                   | 3.00   | 3.00   | 2 implants x \$1.50/implant  |
| salts & minerals           | 3.19   | 3.19   | 2 oz/day x \$0.15/lb x 170 days  |
| fly control ear tags       | 3.20   | 3.20   | 2 tags x \$1.60/tag  |
| durables                   |  |  | Durables include loading chute, fencing <sup>a</sup> , shed, and water system.                   |
| interest & insurance       | 12.97  | 13.33  |  |
| repair & maintenance       | 14.69  | 14.99  |  |
| depreciation               | 23.13  | 22.33  |  |
| interest on borrowed money | 37.66  | 25.34  | 12% interest on purchase price for 6 months  |
| marketing costs            | 8.00   | 8.00   |  |
| miscellaneous              | 0.27   | 0.27   | Phone, etc.  |
| management                 | 6.62   | 6.00   |  |
| <b>total costs</b>         | <b>783.59</b>  | <b>534.93</b>  |  |
| selling price              | 714.00 (840 lb x \$0.85/lb)                                      | 544.00 (640 lb x \$0.85/lb)                                      | Final weight x price/lb  |
| <b>profit/loss</b>         | <b>-69.58</b>  | <b>9.07</b>  | Selling price – total costs  |

<sup>a</sup>Assumes a 100-acre parcel surrounded by an exterior fence that is divided into six paddocks using an interior fence. The exterior fence consists of five strands of high-tensile electric wire and 6-inch x 8-foot treated-wood posts spaced 40-feet apart. The annual interest and depreciation was calculated at 15% over 10 years. The interior is fenced with a single strand of 15-gauge polywire and a plastic post every 12 feet. This fence has an initial cost of \$500.00 and was depreciated over 5 years, resulting in an 18% annual charge.

**Table 2.** Assumed characteristics of the pasture enterprise

| <b>assumptions</b>                         | <b>expenses (\$/acre)</b>          | <b>notes</b>  |
|--|------------------------------------|---|
| seeding costs                              | 4.50                               | Assumes using annual frost seeding.   |
| fertilizer                                 | 46.50                              |   |
| equipment<br>gas, repair,<br>& maintenance | 3.08                               | Assumes the operator already owns a 60-horsepower tractor, a 9-foot mower conditioner, a 9-foot hay rake, a 3-point hitch broadcast seeder, and a 10-foot utility trailer.  |
| interest & insurance                       | 8.98                               |   |
| depreciation                               | 2.42                               |   |
| custom round baling                        | 8.54 (beef)<br>13.31 (Holstein)    | Pasture produces more than stockers will consume. Surplus is custom round baled at \$7.00/bale (935 lb bale). Since beef calves consume more pasture than Holsteins, each will have a different surplus—assume 0.57 ton/acre for beef and 0.9 ton/acre for Holsteins.     |
| labor                                      | 6.38 (beef)<br>7.24 (Holstein)     |   |
| land charge                                | 60.00                              | The land charge is equal to the cash rent equivalent. Although \$60 is almost 10% below the 1992 state average of \$66.12*, assumed that less-than-average quality land is being it is used for grazing.<br>*Wisconsin Dept. of Agriculture, Statistical Dept. 1994 p.12. |
| property taxes                             | 22.00                              |   |
| management costs                           | 9.00                               |   |
| <b>total costs</b>                         | 171.42 (beef)<br>176.99 (Holstein) |   |
| value of hay                               | 215.88                             | Assumes yields of 3.13 tons dry matter/acre at a value of \$68.97/ton. The surplus hay is worth \$39.31/acre (beef) and \$62.76/acre (Holstein).  |
| <b>profit/loss</b>                         | 44.46 (beef)<br>38.89 (Holstein)   | Value of hay – total costs  |

**Table 3.** Combined profits/losses from stocker grazing and pasture enterprises

| <b>assumptions</b>                      | <b>beef calf</b>   |                     | <b>Holstein calf</b> |                    | <b>notes</b>  |
|---|--------------------|---------------------|----------------------|--------------------|---|
|   | <b>cost/animal</b> | <b>cost/acre</b>    | <b>cost/animal</b>   | <b>cost/acre</b>   |   |
| <b>profit/loss</b>                      |                    |                     |                      |                    |   |
| stocker enterprise                      | -69.58             | -94.62 <sup>a</sup> | 9.07                 | 13.61 <sup>a</sup> | data from table 1   |
| pasture enterprise                      | 32.69 <sup>a</sup> | 44.46               | 25.93 <sup>a</sup>   | 38.89              | data from table 2   |
| <b>total profit/loss</b>                | <b>-36.89</b>      | <b>-50.18</b>       | <b>35.00</b>         | <b>52.50</b>       |   |
| <b>return to management<sup>b</sup></b> |                    |                     |                      |                    |   |
| stocker enterprise                      | -58.27             | -79.25 <sup>a</sup> | 19.35                | 29.02 <sup>a</sup> | profit/loss – (stocker labor + management charges)        |
| pasture enterprise                      | 88.11 <sup>a</sup> | 119.83              | 76.75 <sup>a</sup>   | 115.13             | profit/loss – (grazing labor + management + land charges) |
| <b>total return to management</b>       | <b>29.84</b>       | <b>40.58</b>        | <b>96.10</b>         | <b>144.15</b>      | stocker return + pasture return                           |

<sup>a</sup>Tables 1 and 2 calculate expenses using different units (\$/animal vs. \$/acre). To convert units, use the following equations:

cost/acre = cost/animal (table 1) x (136 beef calves/100 acres OR 150 Holstein calves/100 acres)

cost/animal = cost/acre (table 2) x (100 acres/136 beef calves OR 100 acres/150 Holstein calves)

<sup>b</sup> Figures in this section exclude management, labor, and land charges from production costs.

## How factors change profits

Many factors may affect the performance, inputs, costs, and profitability of the cattle enterprise including daily rate of gain, price spread, death loss, and grain feeding. This section examines the impacts of some of these factors by calculating the breakeven points (where returns equal costs) and by comparing profits over a range of these variables.



### Purchase weight

Purchase weight has a major impact on profitability, causing the greatest differences between the beef and Holstein budgets in table 1. Farmers had suggested the average beef calf is purchased at 500 lb while Holsteins are normally purchased at about 300 lb. Using a purchase price of \$1.05/lb, a beef calf costs \$525 and a Holstein calf costs \$315. The price difference in turn affects other expenses in the budget: since more money is borrowed, interest is about \$12 more per beef calf than for a Holstein calf (\$37.66 vs. \$25.34); also, larger beef calves consume \$27 more forage than smaller Holstein calves (\$129.83 vs. \$102.08). Thus, the difference in animal weight alone accounts for approximately \$40 worth of the difference in profit between beef and Holstein calves.

### Weight gain

**Beef calves.** In the original budget, the daily rate of gain for beef calves equals 2.0 lb/day with a net loss of \$36.90/animal (see table 4). Keeping all other variables constant, the break-even point for raising beef calves is just over 2.25 lb/day. At a rate of gain of 1 lb/day, graziers could lose \$181.38/animal; but with a rate of gain of 2.75 lb/day graziers have the ability to make \$71.46/animal. Keep in mind that the price will likely decrease as sales weights increase, somewhat reducing the benefits. However, using the numbers in this example, each 0.1 lb/day gain is worth about \$14.40/animal.

**Table 4.** Profit for various rates of gain/day for beef calves

| gain/day (lb) | weight gained (lb) | sale weight (lb) | profit (\$/animal) |
|---------------|--------------------|------------------|--------------------|
| 1.00          | 170                | 670              | -181.38            |
| 1.25          | 213                | 713              | -145.26            |
| 1.50          | 255                | 755              | -109.14            |
| 1.75          | 298                | 798              | -73.02             |
| 2.00          | 340                | 840              | -36.90             |
| 2.25          | 383                | 883              | -0.78              |
| 2.50          | 425                | 925              | 35.34              |
| 2.75          | 468                | 968              | 71.46              |

**Holstein calves.** It is assumed in the original budget that Holsteins will gain 2 lb/day with a net return of \$35.00/animal (see table 5). Keeping all other variables constant, the break-even point for raising Holsteins is just over 1.75 lb/day. At a pound a day rate of gain, graziers could lose \$109.48/animal but with a rate of gain of 2.75 lb/day graziers have the ability to make \$143.36/animal. Each 0.1 lb/day gain is worth about \$14.40/animal in this example.

**Price spread (difference between purchase price and sale price)**

**Beef calves.** Beef calves are assumed to be purchased for \$1.05/lb and sold for \$0.85/lb, a \$0.20 price spread, resulting in a loss of \$36.90/animal. The break-even selling price for beef calves is just under \$0.89/lb, a \$0.16 price spread (see table 6). With a selling price of \$0.45/lb, a \$0.60 price spread, producers could lose \$372.90/animal. Conversely, they could gain \$89.10/animal with a \$1.00/lb selling price, a \$0.05 price spread. Every \$0.01/lb increase in price spread is worth close to \$8.50/animal using the numbers in this example.

**Table 5.** Profit for various rates of gain/day for Holstein calves

| gain/day (lb) | weight gained (lb) | sale weight (lb) | profit (\$/animal) |
|---------------|--------------------|------------------|--------------------|
| 1.00          | 170                | 470              | -109.48            |
| 1.25          | 213                | 513              | -73.36             |
| 1.50          | 255                | 555              | -37.24             |
| 1.75          | 298                | 598              | -1.12              |
| 2.00          | 340                | 640              | 35.00              |
| 2.25          | 383                | 683              | 71.12              |
| 2.50          | 425                | 725              | 107.24             |
| 2.75          | 468                | 768              | 143.36             |

**Table 6.** Profit for various selling prices and price spreads for a beef calf purchased at \$1.05/lb

| selling price (\$/lb) | spread (\$/lb) | profit (\$/animal) |
|-----------------------|----------------|--------------------|
| 0.45                  | 0.60           | -372.90            |
| 0.50                  | 0.55           | -330.90            |
| 0.55                  | 0.50           | -288.90            |
| 0.60                  | 0.45           | -246.90            |
| 0.65                  | 0.40           | -204.90            |
| 0.70                  | 0.35           | -162.90            |
| 0.75                  | 0.30           | -120.90            |
| 0.80                  | 0.25           | -78.90             |
| 0.85                  | 0.20           | -36.90             |
| 0.90                  | 0.15           | 5.10               |
| 0.95                  | 0.10           | 47.10              |
| 1.00                  | 0.05           | 89.10              |

**Holstein calves.** The base assumptions made in the Holstein enterprise include a purchase price of \$1.05/lb and a sales price of \$0.85/lb, a \$0.20 price spread. They make \$35.00/animal at that point. The break-even selling price for Holsteins is just under \$0.80/lb, a \$0.26 price spread (see table 7). With a selling price of \$0.45/lb, a \$0.60 price spread, graziers could lose \$221.00/animal, but a profit of \$131.00/animal could be realized with a price of \$1.00/lb, a \$0.05 price spread. Every \$0.01/lb increase in price spread results in an extra \$6.40/animal in our example.



**Weight gain and price spread combined**

Tables 8 and 9 contain break-even purchase prices calculated at various rates of daily gains and selling prices for beef and Holstein stockers. The numbers in the top row represent expected selling prices. The far left column includes the range of expected rates of gain. To use these tables, find the expected selling price and rate of gain combination. Reading down and across the tables, you will find the break-even purchase price.

For example, assume you are going to buy beef cattle intending to sell them for \$0.70/lb this fall with a rate of gain of 2.25 lb/day. Under this situation you can pay up to \$0.80/lb and still have a profit with these cattle (from table 8). Using a similar example for Holsteins (table 9), suppose you purchase them with the expectation that you will sell them for \$0.80/lb and that they will gain 2 lb/day. You could pay up to \$1.07/lb and still break even. Of course, the profit would equal zero at the break-even point.

Further calculations would be needed to figure how much less would need to be paid to make a targeted profit level, e.g., \$100/animal. A word of caution, these break-evens are calculated for the situation described in this publication; they may or may not fit your situation.

**Table 7.** Profit for various selling prices and price spreads for a Holstein purchased at \$1.05/lb

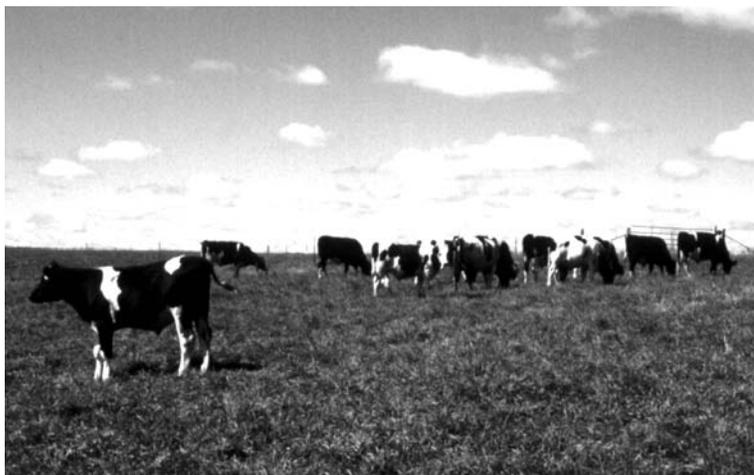
| selling price (\$/lb) | spread (\$/lb) | profit (\$/animal) |
|-----------------------|----------------|--------------------|
| 0.45                  | 0.60           | -221.00            |
| 0.50                  | 0.55           | -189.00            |
| 0.55                  | 0.50           | -157.00            |
| 0.60                  | 0.45           | -125.00            |
| 0.65                  | 0.40           | -93.00             |
| 0.70                  | 0.35           | -61.00             |
| 0.75                  | 0.30           | -29.00             |
| 0.80                  | 0.25           | 3.00               |
| 0.85                  | 0.20           | 35.00              |
| 0.90                  | 0.15           | 67.00              |
| 0.95                  | 0.10           | 99.00              |
| 1.00                  | 0.05           | 131.00             |

**Table 8.** Break-even purchase prices for beef calves at various rates of gain and selling prices

| rate of gain<br>(lb/day) | selling price (\$/lb)             |      |      |      |      |      |      |
|--------------------------|-----------------------------------|------|------|------|------|------|------|
|                          | 0.50                              | 0.60 | 0.70 | 0.80 | 0.90 | 1.00 | 1.10 |
|                          | break-even purchase price (\$/lb) |      |      |      |      |      |      |
| 1.00                     | 0.26                              | 0.39 | 0.51 | 0.64 | 0.77 | 0.90 | 1.03 |
| 1.25                     | 0.30                              | 0.44 | 0.57 | 0.71 | 0.84 | 0.98 | 1.11 |
| 1.50                     | 0.34                              | 0.48 | 0.63 | 0.77 | 0.92 | 1.06 | 1.20 |
| 1.75                     | 0.38                              | 0.53 | 0.68 | 0.84 | 0.99 | 1.14 | 1.29 |
| 2.00                     | 0.42                              | 0.58 | 0.74 | 0.90 | 1.06 | 1.22 | 1.38 |
| 2.25                     | 0.46                              | 0.63 | 0.80 | 0.97 | 1.13 | 1.30 | 1.47 |
| 2.50                     | 0.50                              | 0.68 | 0.85 | 1.03 | 1.21 | 1.38 | 1.56 |
| 2.75                     | 0.54                              | 0.73 | 0.91 | 1.10 | 1.28 | 1.46 | 1.65 |

**Table 9.** Break-even purchase prices for Holstein calves at various rates of gain and selling prices

| rate of gain<br>(lb/day) | selling price (\$/lb)             |      |      |      |      |      |      |
|--------------------------|-----------------------------------|------|------|------|------|------|------|
|                          | 0.50                              | 0.60 | 0.70 | 0.80 | 0.90 | 1.00 | 1.10 |
|                          | break-even purchase price (\$/lb) |      |      |      |      |      |      |
| 1.00                     | 0.19                              | 0.34 | 0.48 | 0.63 | 0.78 | 0.93 | 1.08 |
| 1.25                     | 0.25                              | 0.41 | 0.57 | 0.74 | 0.90 | 1.07 | 1.23 |
| 1.50                     | 0.32                              | 0.50 | 0.67 | 0.85 | 1.03 | 1.20 | 1.38 |
| 1.75                     | 0.39                              | 0.58 | 0.77 | 0.96 | 1.15 | 1.34 | 1.53 |
| 2.00                     | 0.46                              | 0.69 | 0.86 | 1.07 | 1.27 | 1.47 | 1.67 |
| 2.25                     | 0.52                              | 0.74 | 0.96 | 1.17 | 1.39 | 1.61 | 1.82 |
| 2.50                     | 0.59                              | 0.82 | 1.05 | 1.28 | 1.51 | 1.74 | 1.97 |
| 2.75                     | 0.66                              | 0.90 | 1.15 | 1.39 | 1.63 | 1.88 | 2.12 |



## Conclusions— Which factors are most important?

This publication is designed to provide a ballpark estimate of the profitability of running a stocker operation using beef or Holstein steers in a management-intensive rotational grazing (MIRG) system. The assumptions used in this publication are our best estimate of what inputs are needed, what they cost, and how they are tied to the production levels (rate of gain).

Given the assumptions made in the publication, incomes range from a net loss of \$36.89/beef calf to a profit of \$35.00/Holstein. If we add the \$18/acre management charge to the profits, the returns to the operator's management would increase profits to \$29.84 and \$96.10/animal, respectively. Running 100 head of stocker animals would yield about \$3,000–10,000/season.

But if any of the assumptions don't hold, particularly if costs turn out to be higher, rate of gain is lower, or the sell–purchase price spread is less than expected, these profits can rapidly disappear. To get an idea of the variability in profits, table 10 demonstrates the impact of a 10% increase in rate of purchase weight, daily gain, selling price, and price spread on profits. Clearly, protecting the expected selling price by using forward contracting, hedges, or options might be worthwhile considering the potential impact on profits shown in table 10. Rate of daily gain is also very important. Dropping 0.2 lb/day can cut a third or more off your expected profits. Purchase weight has the largest impact on profitability. The price spread is also important, although less so than the other three variables (note that 10% is only 1–2 cents per pound, relatively small in comparison). Of course, one should also note the upside potential in the profits if these 10% changes work in your favor.

**Table 10.** Impacts on profit of 10% increases in variables

| variable           | breed    | change in profit<br>(\$/animal) |
|--------------------|----------|---------------------------------|
| purchase weight    | beef     | 150.04                          |
|                    | Holstein | 99.62                           |
| rate of daily gain | beef     | 29.85                           |
|                    | Holstein | 27.14                           |
| selling price      | beef     | 63.91                           |
|                    | Holstein | 47.60                           |
| price spread       | beef     | 11.28                           |
|                    | Holstein | 15.40                           |

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