Recent prolonged drought in the western United States has led to more culled cows and fewer replacement heifers. The inventory of US beef cows was 3.6% lower in January 2023 than the previous year and the lowest since 2014. Similarly, beef replacement heifer numbers were down 5.6% in January 2023 and the lowest in over a decade (LMIC 2023). As a result, the 2023 calf crop is going to be reduced from previous years and calf prices will reflect the reduced supply.

When rain comes and pasture and forage conditions improve, cow-calf producers will rebuild herds. Recovery will be expensive, either due to reducing sales to retain heifers or purchasing replacement heifers. A lower supply of heifers (and calves in general) will mean calf prices will be much higher than long-term average prices. In the Fall 2014, the last time the industry was rebuilding from drought, heifer calf prices ranged from $230 per cwt to almost $250 per cwt for six weight heifers. There were numerous lots of light weight heifers selling for over $300 per cwt (LMIC 2023).

Cow-calf producers looking to rebuild cow inventories need to be aware of the potential hit to their financial positions from leveraged replacement heifer purchases. Six hundred pound heifers purchased in Fall 2023 will not generate calf revenue until Fall 2025. So, debt service, feed expense and other cash expenses will require other sources of cash flow. This adds strain to the ranch business which likely is already stressed from reduced calf production and higher per head feed costs.

Financed purchases can lead to poor financial health as measured by standard liquidity and equity measures. For example, borrowed funds to purchase replacement heifers increases nearby principal and interest payments, so the business’ current ratio and working capital are reduced. Debt-to-asset, debt-to-equity and other measures of equity position are increased due to an increase amount of debt relative to the business’ asset base.

To help evaluate the financial stress associated with replacement heifer purchases financed with debt, we developed a spreadsheet tool. The “Heifer Purchase Financial Stress Analysis Tool” allows producers and lenders to enter information related to anticipated replacement heifer purchases, future production expenses and future calf and cull cow revenues to forecast impact on cash flow, liquidity and equity position.

In Figure 1, a screen capture of the tool is shown. The tool is programmed in MS Excel using macros for calculations and formatting. There are four blocks of information in the tool. In the first block (top of entry form), the user enters anticipated purchase, financing information, mature cow weight and percent of heifer crop retained annually. A “button” control (cell F3) allows the user to select from bred or open heifers. This information is used to calculate annual principal and interest obligations and future calf revenues.

The second block requires the user to enter information about anticipated production cost ($/head), culling percentages, cull cow prices ($/head) and, calf weaning weights (lbs. per head) and sale prices ($/cwt). A weaning weight model taken from Bir et al. (2018) is automatically computed based on mature cow weight, cow age and calf sex. To use the calculated weaning weights, click on any cell in the light green column under “Steer weaning weight lbs” and/or “Heifer weaning weight lbs” to transfer the calculated weights for steers and heifers, respectively. Enter feed cost and other costs in dollars per head. Steer and heifer sale prices are entered in dollars per cwt. In the column “% calf crop,” enter the calf weaning percentage of cows exposed. Next, enter the percent of cows of each age culled. Finally, enter cull cow price in dollars per head.

The last three columns in the second block report anticipated operating cash flow, principal interest payments and cash surplus (or deficit) in dollars per head. The spreadsheet calculates the number of heifers/cows remaining at the end of the year. Total operating cash flow less down payment assumes

1 Macros must be enabled if a security warning is visible when running the tool.
Heifer Purchase Financial Stress Analysis Tool
Eric A. DeVuyst
Hannah Shear
Derrel Peel
Department of Agricultural Economics
Oklahoma State University
eric.devuyst@okstate.edu
August 2023, Release version 1.0

Figure 1. Screen capture of Heifer Purchase Financial Stress Analysis Tool

![Screen capture of Heifer Purchase Financial Stress Analysis Tool](https://example.com)

that feed and other costs are charged for the full year based on the number of heifers/cows at the start of the year. Total principal and interest are computed using the amount of the purchase financed, interest rate and term (years) assuming an amortized loan.

In the third block, users enter balance sheet information before heifers are purchased and financing obtained. Assets are on the left side and liabilities on the right side. The program computes the implied Owners' Equity.

The last block reports three financial ratios, current ratio (=current assets ÷ current liabilities), debt-to-asset ratio (=liabilities ÷ assets) and debt-to-equity ratio (liabilities + owners' equity) both pre- and post-purchase. The macros then format these ratios using green, yellow and red backgrounds. A green background indicates the ratio is in a healthy range; a yellow background indicates the ratio is in a warning range; and a red background indicates the ratio is a financially unhealthy range. Producers with ratios in yellow and red backgrounds should discuss the implications of a leverage heifer purchase with their banker before proceeding.

References


### Balance Sheet and Ratio Analysis

<table>
<thead>
<tr>
<th>Age</th>
<th>Steer weaning weight Bir et al. lbs</th>
<th>Steer weaning weight lbs</th>
<th>Heather weaning weight Bir et al. lbs</th>
<th>Heather weaning weight lbs</th>
<th>Annual feed cost $/head</th>
<th>Annual other costs $/head</th>
<th>Steer sale price $/cwt</th>
<th>Heifer sale price $/cwt</th>
<th>% Calf crop</th>
<th>% Cull by cow age</th>
<th>Cull cow price $/head</th>
<th>End of Year Head Remaining (Culled)</th>
<th>Operating cash flow less down payment</th>
<th>TOTAL Principal and interest</th>
<th>TOTAL Cash surplus or deficit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>2</td>
<td>449</td>
<td>449</td>
<td>434</td>
<td>434</td>
<td>600</td>
<td>50</td>
<td>235</td>
<td>82%</td>
<td>25%</td>
<td>810</td>
<td>75 (25)</td>
<td>3,088</td>
<td>(35,993)</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>3</td>
<td>466</td>
<td>466</td>
<td>451</td>
<td>451</td>
<td>625</td>
<td>50</td>
<td>243</td>
<td>86%</td>
<td>19%</td>
<td>1,080</td>
<td>67 (8)</td>
<td>11,115</td>
<td>(35,993)</td>
<td>(24,878)</td>
<td>--</td>
</tr>
<tr>
<td>4</td>
<td>480</td>
<td>480</td>
<td>465</td>
<td>465</td>
<td>650</td>
<td>50</td>
<td>238</td>
<td>87%</td>
<td>10%</td>
<td>810</td>
<td>60 (7)</td>
<td>9,381</td>
<td>(35,993)</td>
<td>(26,612)</td>
<td>--</td>
</tr>
<tr>
<td>5</td>
<td>491</td>
<td>491</td>
<td>475</td>
<td>475</td>
<td>675</td>
<td>50</td>
<td>235</td>
<td>87%</td>
<td>12%</td>
<td>1,170</td>
<td>53 (7)</td>
<td>8,442</td>
<td>(35,993)</td>
<td>(27,551)</td>
<td>--</td>
</tr>
<tr>
<td>6</td>
<td>497</td>
<td>497</td>
<td>482</td>
<td>482</td>
<td>700</td>
<td>50</td>
<td>230</td>
<td>87%</td>
<td>20%</td>
<td>1,238</td>
<td>42 (11)</td>
<td>10,163</td>
<td>(35,993)</td>
<td>(23,833)</td>
<td>--</td>
</tr>
<tr>
<td>7</td>
<td>499</td>
<td>499</td>
<td>484</td>
<td>484</td>
<td>700</td>
<td>50</td>
<td>225</td>
<td>87%</td>
<td>30%</td>
<td>1,238</td>
<td>29 (3)</td>
<td>11,938</td>
<td>(35,993)</td>
<td>(14,386)</td>
<td>--</td>
</tr>
<tr>
<td>8</td>
<td>497</td>
<td>497</td>
<td>482</td>
<td>482</td>
<td>700</td>
<td>50</td>
<td>226</td>
<td>87%</td>
<td>40%</td>
<td>1,238</td>
<td>17 (12)</td>
<td>13,684</td>
<td>(35,993)</td>
<td>(13,684)</td>
<td>--</td>
</tr>
<tr>
<td>9</td>
<td>492</td>
<td>492</td>
<td>477</td>
<td>477</td>
<td>725</td>
<td>50</td>
<td>228</td>
<td>87%</td>
<td>75%</td>
<td>1,238</td>
<td>4 (13)</td>
<td>14,965</td>
<td>(35,993)</td>
<td>(14,965)</td>
<td>--</td>
</tr>
<tr>
<td>10</td>
<td>483</td>
<td>483</td>
<td>468</td>
<td>468</td>
<td>750</td>
<td>50</td>
<td>236</td>
<td>86%</td>
<td>100%</td>
<td>1,238</td>
<td>0 (4)</td>
<td>4,600</td>
<td>(35,993)</td>
<td>--</td>
<td>4,600</td>
</tr>
</tbody>
</table>

Enter Information as of BEFORE Heifer Purchase

<table>
<thead>
<tr>
<th>Assets</th>
<th>$</th>
<th>Liabilities and Equity</th>
<th>$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Assets</td>
<td>$1,375,000</td>
<td>Current Liabilities</td>
<td>$1,375,000</td>
</tr>
<tr>
<td>Intermediate Assets</td>
<td>$1,800,000</td>
<td>Intermediate Liabilities</td>
<td>$2,400,000</td>
</tr>
<tr>
<td>Long-term Assets</td>
<td>$15,125,000</td>
<td>Long-term Liabilities</td>
<td>$10,587,500</td>
</tr>
<tr>
<td>Total Assets</td>
<td>$4,080,000</td>
<td>Total Liabilities</td>
<td>$772,000</td>
</tr>
<tr>
<td>Owner's Equity</td>
<td>$3,308,000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**D/E >1.5** 0.43-1.5 **<0.43**  
**D/A >0.6** 0.3-0.6 **<0.3**  
**Current Ratio <1.3** 1.3-2.0 **>2**  
**Ratio benchmarks** Green Yellow Red

https://extension.umn.edu/farm-finance/ratios-and-measurements
The Oklahoma Cooperative Extension Service

Education Everywhere for Everyone

The Cooperative Extension Service is the largest, most successful informal educational organization in the world. It is a nationwide system funded and guided by a partnership of federal, state, and local governments that delivers information to help people help themselves through the land-grant university system.

Extension carries out programs in the broad categories of agriculture, natural resources and environment; family and consumer sciences; 4-H and other youth; and community resource development. Extension staff members live and work among the people they serve to help stimulate and educate Americans to plan ahead and cope with their problems.

Some characteristics of the Cooperative Extension system are:

- The federal, state, and local governments cooperatively share in its financial support and program direction.
- It is administered by the land-grant university as designated by the state legislature through an Extension director.
- Extension programs are nonpolitical, objective, and research-based information.
- It provides practical, problem-oriented education for people of all ages. It is designated to take the knowledge of the university to those persons who do not or cannot participate in the formal classroom instruction of the university.
- It utilizes research from university, government, and other sources to help people make their own decisions.
- More than a million volunteers help multiply the impact of the Extension professional staff.
- It dispenses no funds to the public.
- It is not a regulatory agency, but it does inform people of regulations and of their options in meeting them.
- Local programs are developed and carried out in full recognition of national problems and goals.
- The Extension staff educates people through personal contacts, meetings, demonstrations, and the mass media.
- Extension has the built-in flexibility to adjust its programs and subject matter to meet new needs. Activities shift from year to year as citizen groups and Extension workers close to the problems advise changes.

The Cooperative Extension Service is the largest, most successful informal educational organization in the world. It is a nationwide system funded and guided by a partnership of federal, state, and local governments that delivers information to help people help themselves through the land-grant university system.