BCRC
Beef Cattle Research Council
Fact Sheet
Research & technology development for the Canadian Beef Industry

Economic and Reproductive Considerations for Developing Replacement Heifers

Beef cattle producers may choose to raise or purchase replacement heifers for their herds for several different reasons, including:

1. Replacing older or cull breeding cows typically removed from a herd due to age, infertility, or other production issues (i.e. temperament, poor feet, inferior udders);
2. Increasing their herd size *or* rebuilding their herd following a reduction; and
3. Improving the genetic and production potential of their cow herd.

Replacement heifers come at a cost however, whether producers retain females from their own breeding stock or whether they purchase them from another source.

Economics of Developing Replacement Heifers

The majority of producers retain their own heifers for several reasons including: maintaining their herd genetics, reducing the introduction of external diseases, and avoiding the cash outlay required to purchase outside heifers. However, there is still a substantial cost to retaining heifers. When a producer retains replacement heifers from their own calf crop there is an **opportunity** or **non-cash cost.** Opportunity cost represents the revenue a producer foregoes when they choose to retain heifers rather than sell them at weaning.

When a producer calculates their cost to develop replacement heifers, they need to include:

OPPORTUNITY COSTS + CASH COSTS

Producers also incur **cash costs** when they retain replacement heifers. Cash costs will include the expenses incurred from the point the heifer is weaned to the point she is confirmed pregnant the following year. Post-wean winter feeding costs (i.e. feed, mineral, bedding, yardage), spring and summer grazing, health expenses (i.e. vaccination, parasite control, pregnancy diagnosis), as well as the costs associated with breeding the heifers (i.e. herd sire costs of artificial insemination).

The cost of raising a replacement heifer will vary year-to-year, depending on what weaned heifer calves are worth as well as the individual producers' cost of production.
The market value of the heifer at weaning may comprise 50-60% of the total cost of raising replacement heifers.

The **target body weight at breeding** can also impact the cost of production for replacement heifers. Recent research suggests the decades-old "Rule of Thumb" of a developing a heifer to 65% of her mature body weight by time of first breeding may be outdated and depend on the breed of the heifer. Many Canadian beef producers have gradually been shifting away from traditional drylot pen feeding in favour of extensive wintering (or field feeding) practices for beef cattle, including replacement heifers. Extensively wintering (bale grazing) heifers and lowering their post-wean gains from 1.5 to 1.1 lb per head per day so that they reach 50-55% of their mature body weight at time of first breeding, has been shown to save money on winter feeding costs without compromising the health and welfare of the animal or reducing reproductive performance (Lardner et al, 2014).

The Western Beef Development Centre has created a Replacement Heifer Calculator, available for free [download at www.wbdc.sk.ca](http://www.wbdc.sk.ca).

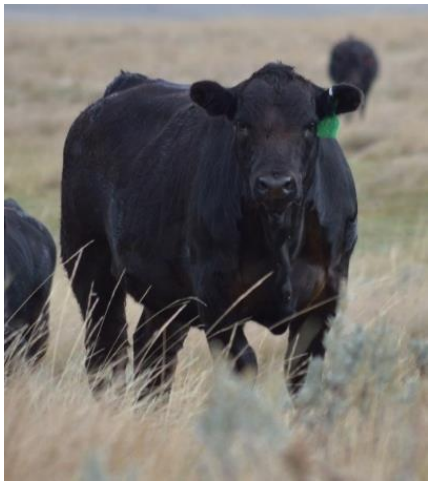
Here is an example

6	# of Heifers being Developed	50						
7	Weaning weight of hfrs	550						
8	Weaning date	01-Nov-16	*Assumes heifers go immediately onto backgrounding diet of hay/grain*					
9	Spring pasture turn-out date	01-Jun-17						
10	**TOTAL WINTER FEEDING DAYS**	**212**	days					
11	Est. Market Value $/lb	$1.75						
12	Opportunity Cost	**$964**	$/hd		Mkt Value			
13	**WINTERING COSTS**	**$369**	$/hd		or Price Paid		$/hd	
14	Hay, Silage, etc	12	lb/hd/d	X	$ 0.036	$/lb	$ 91.58	
15	Grain, Pellet	3	lb/hd/d	X	$ 0.080	$/lb	$ 50.88	
16	Bedding Straw	700	lbs total	X	$ 0.020	$/lb	$ 14.00	
17	Salt & Mineral	$18	$/hd					
18	Vet & Medicine	$15	$/hd					
19	Yardage/Lot Costs	$0.80	$/hd/d					
20	Interest (%)	0%						
21	Death Loss (%)	1%					$/hd	
22	**GRAZING**	$0.80	$/hd/d	X	150	days	$120.00	
23	**BREEDING COSTS**	**$65**						
24	Price of heifer bull	$5,000						
25	# heifers serviced per year	20	hd/yr					
26	# years used	4	yrs					
27	Cull weight	1900	lbs					
28	Cull price	$1.20	$/lb					
29	Annual bull feed costs	$500	$/hd					
30	Semen Test & Vaccinations	$125	$/hd					
31	**SUBTOTAL HEIFER DEV COSTS**	**$1,518**	$/hd					
32	# of Opens	5	hd					
33	**Heifer conception rate (%)**	**90%**						
34	**ADJUST FOR CONCEPTION**	**$1,687**	$/bred heifer					
35	Market price of open heifer	$1.55	$/lb					
36	Estimated Weight of Opens	950	lbs					
37	**Adjust for opens**	**$164**	$/bred heifer CREDIT					
38	**Cost PER BRED HEIFER**	**$1,523**	BREAK-EVEN PRICE PER HEAD					
39	**Heifer Development Costs**	**$559**	$/bred heifer					

Replacement_Calculator

Producers can input their own information, including the number of heifers they are retaining, their grazing and wintering days and costs, the conception rate achieved, as well as the price they receive for the sale of open heifers to estimate their overall cost of developing heifers.

Reproductive and Health Management Considerations for Developing Replacement Heifers



Given that a heifer must typically wean 5 to 6 calves in order to recoup her development costs, it is critical for producers to focus on the reproduction and health management of replacement heifers in order to give the heifer a fair chance at paying back her development costs.

Heifer management strategies will vary greatly between operations and depend largely on the goals of the producers. There are a few approaches that have been demonstrated to improve conception rates, weaning weights and subsequent profitability that producers may want to incorporate in their replacement heifer program.

Calves born early in the calving season will have an age and often weaning weight advantage over their later-born counterparts. "Front-loading" the calving season, that is, when a producer ensures 65% of their breeding

herd is bred and calves in the first 21-30 days (i.e. first cycle), results in heavier calves and a shorter re-breeding interval, which should translate to higher profitability.

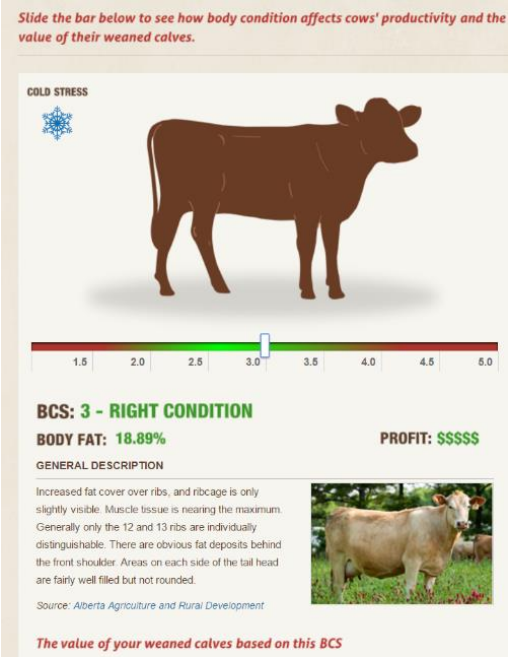
Nutrition, Puberty, and Body Condition

Nutrition affects almost every aspect of a replacement heifer's success, from her reproductive momentum to her health status. Proper nutrition is achieved by providing an appropriate ration that suits the situation in which the heifers are being developed, whether it is a traditional drylot or extensive wintering system.

Feeding replacement heifers separately from the rest of a herd is a valuable management practise that will allow producers to meet the particular nutritional requirements of pre-breeding replacement heifers.

Many producers want to **calve bred heifers by two years of age**, which means heifers need to be cycling by 11-14 months of age. **Age and weight** (according to breed) can influence puberty, with some heifers cycling at 55% of their mature body weight while others need to be at 65% to cycle. **Pre-breeding palpations** may be done on heifers to identify and cull any non-cycling animals.

BODY CONDITION SCORE SYSTEM	
Canada	American (U.S.A)
UNDERCONDITIONED/THIN	
1	1
1.5	2
2	3
RIGHT CONDITION / OPTIMUM	
2.5	4
3	5
3.5	6
OVERCONDITIONED/FAT	
4	7
4.5	8
5	9



One method of monitoring nutritional well-being is to assess their **body condition score (BSC)**. Maintaining the optimum BCS of 2.5-3.5 is a valuable way to maximize the reproductive momentum of a beef producer's entire herd, including replacement heifers. Research demonstrates that cattle with an optimum BCS tend to cycle faster and re-breed more quickly.

To learn more about Body Condition Scoring, visit www.BodyConditionScoring.ca. Watch videos, view photos, or use the Body Condition Score Interactive Tool.

Time of Breeding

While it only takes mature cows 50-60 days to re-breed post-calving, it naturally takes heifers a longer time, approximately 80-100 days. **Breeding heifers to calve early in the calving season** will ensure the heifers have enough time to heal and resume cycling before the next breeding season starts. Recent research also suggested that heifers that breed and calve early in their first calving have **greater longevity** and wean more pounds of calf in their lifetime than heifers that calve in the second or third cycle (Cushman et al, 2013).

Producers may wish to achieve early breeding by having a concise, **defined breeding season of 42-45 days**. Early **pregnancy detection in heifers** may also be a useful practice to adopt, providing producers with an opportunity to sell open heifers, and reduce additional feeding, grazing, or veterinary expenses.

Take Measures to Prevent Wrecks

Properly developing heifers and establishing their reproductive momentum will have lasting effects on beef cattle profitability. Other factors are required for successful replacement heifer management, including:

- **Disease prevention**: implement vaccination protocols and disease prevention strategies in consultation with a veterinarian;
- **Parasite management**: provide appropriate parasite control for replacement heifers from weaning through breeding;
- **Bull power:** use fertile bulls that are free from injury in an appropriate bull to heifer ratio to achieve maximum reproductive potential in replacement heifers;
- **Biosecurity measures**: employ proper biosecurity protocols to prevent introduction of diseases before, during and after breeding heifers.

What are some things producers can do if they are interested in retaining replacement heifers?

- Evaluate your **goals** for heifer development. What is motivating you? How will retaining or purchasing replacement heifers fit in with your current herd management?
- Consider your **financial risk**. How will this impact your cash flow? Are you financially prepared to weather the potential opportunity cost as well as cash costs of developing replacement heifers? How many calves would heifers need to wean before they are profitable?
- Study your **replacement heifer options**. Perhaps you need to challenge your own paradigms and consider purchasing rather than retaining heifers, or retaining as opposed to purchasing.
- Understand the **realities** of developing replacement heifers. Do you have experience managing heifers post-weaning? Are you prepared to deal with potential disease outbreaks or nutritional challenges?

The Beef Cattle Research Council, a division of the Canadian Cattlemen's Association, sponsors research and technology development and adoption, in support of the Canadian beef industry's vision to be recognized as the preferred supplier of healthy, high quality beef, cattle and genetics.

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