OMAFRA Virtual Beef

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Cutting Cow Feed Costs
Do or die for Ontario's cow herds

Christoph Wand
Beef Cattle and Sheep Nutritionist, OMAFRA

Is your winter feeding program the same today as in the winter of 2002-2003? Despite current high calf prices, feed and energy costs (electricity and fuel) are also up. As a result, we are still not where we were 8 years ago, economically. What have you as a cow/calf operator done to address the 30% swing in international competitiveness of your Ontario operation due to the change in the $CDN vs. the $US exchange rate? With feed being the major portion of the total cow/calf annual operating cost, most of the changes required to re-level the economic playing field must come from feeding strategies. What can you do about it?

Below are five strategies to reduce costs, which are given in order of the time required for implementation, from short to long term.

1. **review mineral formulation**
2. **substituting feeds/restricting hay**
3. **reduce days of conserved feeds**
4. **change calving season**
5. **address cow factors**

Figure 1: Total mixed ration containing 60% grass haylage, 40% chopped wheat straw and 0.5% vitamin/ mineral premix. (photo courtesy of Katherine Wood)

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Review mineral formulation

Although ensuring proper mineral nutrition is critical to cow and calf health and performance, making sure the required minerals are actually being consumed in the correct proportions is also important to monitor. The first thing that must be done is to reconcile the recommended intakes provided by your feed supplier with what is actually happening. Your cows may be eating too much mineral overall, and even if they aren't, they may be over consuming several specific mineral elements. Then, based on your forage tests, expensive mineral constituents such as phosphorus may be excluded or reduced, creating a custom mineral which matches your feed. While it may be more expensive per bag to go this route, it will likely be less expensive per cow per day due to a reduced delivery rate per cow per day.

Another benefit of fine tuning mineral intake and composition for your cows is ensuring that the required amounts of critical trace elements such as selenium are being supplemented. To better understand this opportunity you need to reconcile requirements and intake using all sources on a mineral-by-mineral basis. "Meeting Mineral Requirements at Pasture" a *Virtual Beef* article in July of 2009 (*Volume 8, Issue 23*) explained how this might be done during the pasture season, but keep in mind the conserved feed usage period will likely require supplementation of Vitamins A and E. Also keep in mind all of this is dependant on feed testing for mineral levels; book values or averages are simply not good enough.

Substituting feeds/restricting hay

Feeding hay is expensive! In most cases it is no longer a "cheap feeding strategy", and it may actually be less expensive to pull other feeds like corn silage or commodities into the cow ration, with hay limit fed. Presently, corn silage is less expensive to produce per unit of dry matter than hay in many parts of Ontario, and certainly cheaper per unit of TDN (energy). However, corn silage or any other grain commodity or by-product must be used with limit-fed hay or in a TMR (total mixed ration). The beef cow does not have a tremendously high nutrient requirement, but she does have a great appetite! Unlimited access to high energy feeds will result in over fat cows, wasted feed dollars and calving problems. Since appetite is not necessarily a measure of need, we need to restrict overall feed intake when offering high quality forages, corn silage, or high energy opportunity feeds. What this means is that if feed access is restricted to the herd, sufficient bunk space has to be provided for all cows to get the opportunity to eat their share. Limit feeding of hay in conjunction with other feeds may reduce winter feeding costs in beef cows compared to free-choice hay.

Reduce days of conserved feeds

Going forward, this may be the most important strategy of the five! As mentioned above, feeding hay is expensive business and that is a function of harvest cost. The best way to avoid harvesting cost is to let the cows do the work. The effectiveness of a farm's pasture program and ability to keep that expensive hay out of the mouths of cows is considered by many to be the primary predictor of profit on a cow enterprise. Starting with the crown jewel of perennial pasture, numerous annual forages and crop residues can keep precious hay away from those insatiable cows. The other jewels of the grazing crown are described in detail the recent *Virtual Beef* article "Rotational Grazing Primer" from May of 2010 *(Volume 8, Issue 25)*which also includes links to other excellent material. Reducing days on conserved feeds is the most important strategy in reducing the beef cow's feed bill. Even cash crop land can fit into this part of the plan effectively.

Figure 2: Cows grazing corn stubble.

Change calving season

The killer in winter feeding programs is the cost associated with the act of conserving feeds (harvesting and storage costs). The most expensive period during which to feed the cow is lactation. Whether using all hay, or a commodity plus restricted hay feeding program, the high cost associated with lactation remains because so much total feed, energy and protein is required. The only meaningful way to reduce this high lactation ration cost is to have more of the lactation period occurring on pasture, in other words, spring calving as opposed to winter, and certainly not fall. Separate from days on pasture as suggested in strategy #3, this strategy actually moves peak intake and requirements more in line with peak fresh forage growth and thus lower forage costs. Looking at the sample rations in Table 1 comparing dry lot lactation to pasture lactation, and taken in conjunction with a George Morris Centre report on cow-calf cost projections adapted in Table 2, you can see the potential impact.

Address cow factors

In the longer term, choices around replacements and wintering sites may also help reduce the feed bill. These strategies are of a magnitude that deserves their own article. The *Virtual Beef* articles: "Cow Size: A Piece of the Cow-calf Efficiency Puzzle" (*February 2010: Volume 8, Issue 24*) and "Selecting and Culling for Efficient Cows" (November 2009: *Volume 8, Issue 24*) can serve as starting points on the discussion regarding the importance of the cow herself.

Table 1: Three separate rations calculated to address the needs of a cow in lactation*

Scenario	Pasture	Standard Hay Scenario	Poor Quality Hay Scenario[1]
Lactating Cow: 1200 lbs moderate milking ability	148 lbs pasture 0.07 lbs TM salt	33.0 lbs. good hay 0.34 lbs premix	21.5 lbs. mature hay 9.0 lbs. corn grain 2.0 lbs. DDGS 0.34 lbs premix
Cost / cow / day[2]	**$0.60**	**$1.93**	**$2.24**

*Needs of the calf (creep) are not assumed nor is bedding. For larger cows as more typical in Ontario, the intake could be scaled up over moderate size increases. (eg 1200 to 1500).

1 *This would assume the lactation needs to be supported long-term on a mature hay (July cutting) with moderate condition (weight loss) to the cow, similar in performance to an all-hay ration.*

2 *Feeds are values as follows: Hay = $120/tonne (5.5¢ per lb.), Corn = $220 /tonne, Dried distillers grain w. solubles (DDGS) = $220/tonne, Vitamin/Mineral premix = $850/tonne, High selenium TM salt = $9 per 25 kg bag, and pasture is valued at $8.80 per tonne wet weight.*

Table 2: Feeding costs by calving month*

Calving Month	Feed Costs $ per head	Other Costs $ per head
May	325	446
June	342	449
July	366	454
August	389	459
September	413	464
October	420	466
November	413	465
December	389	460
January	366	455
February	342	449
March	325	446
April	325	446
Average	**368**	**455**

*adapted from “Ontario Cattle Costs and Returns” prepared by Al Mussell, Anatoliy Oginskyy, and Graeme Hedley of the George Morris Centre. Presented at the Dec. 2009 Beef Research Update in Guelph, and also presented at the 2010 Ontario Cattlemen’s Association Annual General Meeting. The complete presentation also contained revenue and returns by months, omitted here for simplicity. In all cases the feeding period (calf age) is constant at 8.2 months at sale, and the original report also factored in seasonal calf premiums at sale.

So what?

Cows feed costs are a make or break part of the cow-calf operation. As a whole, Ontario’s cow operators need to, and can do better. Without the advantages of a low Canadian dollar and cheap commodities, some significant changes need to be made in the feeding of the Ontario beef cows for this to be a profitable venture. The strategies discussed here *(reviewing mineral formulation, substituting feeds/restricting hay, increasing days at pasture, spring calving and cow factors)* need to be the priorities in forming the basis of a genuine action plan to control feed costs. Finding a way to reduce the feed bill is the only way that Ontario cow operators can do to wind back the financial clock to the situation which existed around eight years ago.

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BS Balancing Act … or, of Bull Shopping, Dollars, Data and DNA

Nancy Noecker
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Spring is almost on the horizon and many producer's minds are turning to the BS season —Bull Shopping that is.

When you start looking you'll find bulls across the entire spectrum, ranging from bulls with nothing more than "they look good", to bulls with pages and pages of data, pedigrees and a DNA profile to try and sort through.

So start a list of what you want him for. Now I know this may seem a little elementary, after all we want him to breed cows. But is this his only criteria? If that's the case than any bull with a good set of testicles, viable sperm and a delivery system could fit the bill. However, most producers are looking for a lot more – let's say a lot of proof and a little less bull, perhaps.

So is this bull just to sire the calf crop I'll market in 2012? Will everything go to market from that group? Or is your main aim to market heifers out of this bull? Or perhaps you are looking for a middle of the road bull that will let you do both? On another front, are you marketing everything as finished beef or meat in the box? All of these starts with getting the cows bred but require different sets of traits by the time we get to marketing.

They all start with a live calf, so the first set of numbers to worry about are the calving ease and birth wt. EPD's. No matter how good the performance numbers- a live calf is the beginning of it all. Table 1 shows a breakdown of selection traits related to your end market.

Figure 1: A healthy newborn calf with attentive mother.

If we look at a true Terminal situation where "they all go" it can cut down the traits we need to consider. We need a live vigorous calf, that gains well, and exhibits good muscling, capacity and over all eye appeal for the sale ring in the fall. Then we need that stocker calf to gain quickly and efficiently in the feedlot, and yield and grade well in the packing plant. I'll leave the eye-appeal and breed question to your local situations, but remember a crossbred calf is still the cheapest way to increase vigour.

Considering grow, gain and yield questions we need to turn to some of that data. Typically we have looked to the EPD's, whether BIO or Breed Association generated, to compare marbling grade, gain and yield. If the amount of numbers starts to make your head spin then you may like using the BIO$ index, which attempts to roll the commercial carcass data into one easily compared number. Using this data is all good and certainly proven over time to make big changes in the calf crop and the carcasses.

However, we can now have another set of data available – if we ask for it. That means asking for a genetic profile done on potential bulls. The DNA Test Panels have been expanding over the last number of years and you can find the traits broken down into Carcass Composition, Maternal and Docility categories. From the Carcass section, the DNA profile will give a rating on Tenderness, Quality Grade, Yield Grade, Ribeye Area, Fat Thickness and Marbling. Along with the Docility rating, the Average Daily Gain and Residual Feed Intake ratings can make big changes in Cost of feeding. (The Maternal traits won't matter in this case but come along with the profile.)

Figure 2: Eye-appeal is important in the sales ring.

If you are looking for a bull to sire replacements then that Maternal Profile from the DNA test will become of great interest. Under it you will find ratings for Heifer Pregnancy Rate (fertility), Stayability (longevity) and for Maternal Calving Ease. The Docility rating as well as Residual Feed Intake (feed efficiency) ratings are also important rankings if keeping heifers. From the straight EPD's look to Calving Ease, Birth Wt, Milk, and Scrotal Circumference as important selection criteria. From a physical eye-appeal aspect, important traits include lots of capacity, and good feet and legs and easy movement. If possible a look at the bull's mother's udder can tell you a lot as well.

If your bull selection involves selling the calves as boxed meat then the tenderness and marbling profile in the DNA test probably shoot to the top of your list. Add to that the Residual Feed Intake and Docility. From the bull test angle frame score may become more important as you work to keep carcass size moderate in the resultant progeny. Functional conformation is important but the eye-appeal is less so in this case.

Figure 3: Bull fertility is an essential selection trait.

A main DNA profile is about $40.00 (a good investment on a purchase that is probably in the many $1000's category). Also, in the DNA test a producer can ask for other extra tests on genetic abnormalities, parentage, horn condition, and coat colour as well as if the animal is negative for BVD virus.

These are extra costs but in particular bull buyers should ask for a BVD test as it is only $3.50 extra and can save a lot of economic hardship in a cow herd.

So before you start into the BS or Bull Shopping decide the main sale route of the resultant progeny. This will then help you make the list up for your needs and wants in this year's purchase. You can "never have it all", so pick the main traits you want to concentrate on. However, remember single trait selection is a recipe for disaster. So make sure you balance you bull selection criteria so that 2012's fall sales leave you smiling.

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Table 1: Bull trait selection related to main market

Main Sales	Breed or Feed Test EPD's	DNA Testing - Panel Traits	Conformation/Eye Appeal
Feeder Calves	Marbling Gain Yield	**Carcass** Tenderness Quality Grade Yield Grade Ribeye Area Fat Thickness Marbling. **Docility Rating** **Average Daily Gain** **Residual Feed Intake** **BVD-Negative**	Muscling Capacity Eye-appeal in the Sales Ring Good Feet, Legs and Movement
Replacement Heifers	Calving Ease, Birth Weight Milk Scrotal Circumference	**Maternal** Heifer Pregnancy Rate Stability Rate Maternal Calving Ease **Docility Rating** Residual Feed Intake **BVD-Negative**	Good Feet, Legs and Movement Capacity Bull's Mothers' Udder
Branded or **Direct Meat Sales**	Marbling Gain Yield	**Carcass** Tenderness*** Marbling *** Quality Grade Yield Grade Ribeye Area Fat Thickness **Docility Rating** **Average Daily Gain** **Residual Feed Intake** **BVD-Negative**	Good Feet, Legs and Movement. Frame Score

*** most important traits

Saving Time and Money with Polled Bulls
Take advantage of the mutation situation!

Brian Pogue
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We are now into bull buying season. Dehorning calves at birth or later is a nuisance and it has been proven that horned cattle are an economic disadvantage both in the cowherd and the feedlot. While we know that dehorning earlier is better for man and beast, there is a method that reduces both stress and labour to zero – taking advantage of a favourable genetic mutation, the polled factor. Polled calves are a nice convenience, but were once thought to be inferior for other traits. Fortunately, seedstock producers have made great improvements with polled cattle in the popular breeds, particularly the exotic breeds where horns were the norm. From a genetic perspective, it is possible to find polled bulls that are equal to if not superior to horned bulls for virtually any trait that can be measured, as evidenced by data from BIO and breed associations. Most bull buyers now look to invest in a polled bull. However, all polled bulls are not created equal with respect to their specific genetic makeup for polledness.

In wild cattle (from which all domesticated breeds are descended) the presence of horns is the natural state. However, wild individuals occasionally demonstrate the polled condition due to a genetic mutation. It is this mutation that was selected for in the creation of polled breeds of cattle.

The polled trait is due to the gene for horn condition which has two alleles (alternative forms). Each progeny gets one allele for horn condition from the bull and one allele for horn condition from the cow. The polled form is dominant, and denoted as **P.** The horned form is recessive and denoted as **h**. An animal with a mixed pair of alleles (**Ph**) will show as polled, since the polled allele dominates over the horned allele.

All polled breeding stock carry at least one **P** allele (it only takes one **P** to make the animal exhibit the polled trait), and so will produce progeny that are, on average, at least 50% polled. The percentage of progeny which will show polled depends on whether the polled parent carries the allele pair **PP** or **Ph**, and also whether the other parent is horned (**hh**) or polled (either **hP** or **PP**).

Table 1: Terminology of Horns and Scurs

- Horned – exhibits horns attached to the head; both copies of the horn condition gene carry the allele for horns (**h//h**)
- Polled – no horns attached to the head
- Clean Polled – polled with no scurs
- Polled/Scurred – polled but with small appendices that look like small horns
- Double Polled – both parents of the animal are polled
- Single Polled = heterozygous – only one copy of the horn condition gene has the polled allele, the other carries the horned allele (**P//h**)
- Homozygous Polled – both horn condition genes carry the polled allele for horn condition (**P//P**)

So when you mate a homozygous polled bull (**P//P)** to a horned cow (**h//h**), all of the calves will be heterozygous polled (**P//h**). They are polled but carry also the horned allele. This can be shown in a Punnett square (Table 2.). The 2 chromosomes for the bull will be shown in blue and the chromosomes for the cow in red.

Table 2:

Cow	Bull P	Bull P
h	P//**h**	P//**h**
h	P//**h**	P//**h**

However if the bull is Heterozygous polled (**P//h**) when mated to horned cows (**h//h**) then only half of the calves would be polled (Table 3).

Table 3:

Cow	Bull P	Bull h
h	**P//p**	**h//h**
h	**P//p**	**h//h**

When a heterozygous bull (**P//h**) is mated to heterozygous cows **(P//h),** then in theory 25% of the calves will be horned, while 75% will be polled (Table 4). Of the polled calves, 1/3 will be homozygous polled (P//P). So when you hear a bull is double polled (having both parents showing the polled trait), it is not certain to be homozygous polled.

Table 4:

Cow	Bull	
P	P//P	P//h
h	P//h	h//h

Unfortunately, it is not possible to determine if a bull is homozygous polled (**P//P**) just by looking. If you know for **certain** that both parents are homozygous polled, then the bull must be the same. Things are said like "it is peaked polled so it must be homozygous polled" or "it has a long sheath so it must be homozygous" but neither are necessarily true. Fortunately, there is now a DNA test available to determine if an animal is homozygous polled.

Unfortunately, it is not possible to determine if a bull is homozygous polled (**P//P**) just by looking. If you know for **certain** that both parents are homozygous polled, then the bull must be the same. Things are said like "it is peaked polled so it must be homozygous polled" or "it has a long sheath so it must be homozygous" but neither are necessarily true. Fortunately, there is now a DNA test available to determine if an animal is homozygous polled.

SCURS

The inheritance of scurs is not as simple. Scurs are horn like growths that appear on polled cattle and are generally loose and moveable, at least at young ages. Part of the confusion is the fact that scurs vary in size from being almost as large as horns to being so small that they are hard to detect, more like a scab. It appears there are additional genes affecting the size of scurs and some evidence that there are different genes that cause scurs. Scurs are only expressed on polled cattle and not all horned cattle carry scurs.

The common theory of how scurs are expressed depends on the gender of the animal. For a cow to show scurs, she must have 2 alleles for Scurs (**Sc//Sc**), whereas a bull will have scurs if it has only one allele for scurs (**Sc//ns**). The following table (Table 5) is the result of some Candian research by Dr. Sheila Schmutz. This suggests that all scurred bulls are single polled.
As well, research in the Charolais breed has found a recessive gene for scurs so that even bulls must have 2 scur genes in order for scurs to be present.

Figure 1: Bull showing scurs.

So if you wish to buy a bull whose calves will not have to dehorned, ask some questions about his pedigree with respect to both horns and scurs. Ask if the bull has been DNA tested if it is double polled, but you are not certain if it is homozygous polled.

Be sure to consider all of the other economically important traits when investing in a bull. Buying a bull is the most important decision with respect to the genetic improvement of your herd! But remember to take advantage of the mutation situation and consider buying polled breeding stock when possible. They will save time and money in the long run, with dividends being paid if you retain their female polled progeny in your herd.

Table 5: Inheritance of Horns and Scurs*

Genotype	Cows	Bulls
P//P Sc//Sc	smooth polled	smooth polled
P//P Sc//ns	smooth polled	smooth polled
P//P ns//ns	smooth polled	smooth polled
P//h Sc//Sc	scurs	scurs
P//h Sc//ns	smooth polled	scurs
P//h ns//ns	smooth polled	smooth polled
h//h Sc//Sc	horned	horned
h//h Sc//sc	horned	horned
h//h sc//sc	horned	horned

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Cattle Handling Facilities

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Any producer who is dealing with cattle needs some type of handling facilities (Figure 1) whether he has ten steers or a thousand steers. Handling facilities are, and will continue to be an important part of a successful cattle operation, allowing the producer many advantages and options.

Handling facilities allow producers to make use of current and future technology available in the industry. From simple tagging to more complex health management practices a good handling facility gives the producer the choice of what to use and what not to.

Figure 1: Handling facilities save labour

With many beef operations being a part time enterprise, time and labour are often at a premium. Good facilities reduce the time and labour needed, and therefore reduce the costs. The labour force may also be happier and more willing to work in an efficient facility.

The safety and health of both the animals and the people working them need to be considered any time cattle are handled. Cattle often outweigh the operator by a considerable amount, and with four legs are much more stable and better balanced. Good facilities, with slip resistant flooring, will reduce stress levels, and help to prevent expensive bruising.

Many management procedures give better results if applied with a certain level of skill. This is much more likely to happen if the animal can be properly restrained. Producer satisfaction with a job done right is also a side benefit of a good handling facility.

Locate the facilities:
a) close to the cattle to be worked (feedlot, barnyard, etc.).
b) where there is good road access and turning room for livestock trucks.
c) to blend in with future plans for the operation.

It may be desirable to consider portable handling facilities for some operations.

What is needed for a facility will vary depending on the operation. A number of things should be considered before making this decision, such as:

The layout of present, and future buildings and yards
The size, weight and numbers of cattle normally worked
The extent of processing to be carried out
The amount of labour available to help with processing

Once these have been decided on, the system itself breaks down into two sections; **the basic components,** or heart of the system and **the optional components,** or accessories.

THE BASIC COMPONENTS - consist of three major sections

1. **The Crowding Pen** funnels cattle into the working chute. A circular or angular pen helps to get the cattle facing the right way and entering the chute in single file. Solid sides and crowd gates help to avoid the cattle becoming distracted. It also makes the cattle see the chute as the only way out. Older facilities built with open sides can be easily improved by closing them in.

2. **The Working Chute** holds the cattle in single file ready to enter the headgate or squeeze. Ideally it should be long enough to line up and hold at least three animals. If the chute can be curved it will help to make moving the cattle even easier. Chutes must be narrow enough to prevent cattle from turning. A chute with sloping sides will allow different sizes of cattle to be worked and still prevent turning. Some simple procedures may be done right in the working chute.

3. **The Headgate** is for restraining animals securely and safely during treatment. They range from manual models to self-catching and hydraulic models. They need to be quick, easy to operate and adjustable for different sizes of cattle.

THE OPTIONAL COMPONENTS - vary with each setup and producer's preferences and help to add efficiency and flexibility.

Holding Pens will allow for faster handling of cattle as they can be sorted and held prior to moving into the crowd pen. They also prevent the mixing of treated cattle back into the main herd.

The Squeeze gives greater control of the animal by holding it's sides. This serves to reduce the struggling and thus the stress on the animal. Many have gates and sections which swing out to give greater access to different parts of the animal.

Cutting Gates along the chute allow you to let an animal out of the main group. THey can also be very useful if you every have an animal go down in the chute. They usually form part of the wall of the working chute.

Blocking Gates located along the chute will prevent cattle from moving ahead or back. They usually slide across the chute on a track or drop down guillotine style on a rope and pulley.

Back Stops are similar to blocking gates except they allow the animals to move forward and only prevent them from backing up.

Kick Bars are located behind the animal in the squeeze to prevent the operator from being kicked while working there. Kick bar holes should be 12" to 14" above the floor of the crate or squeeze, and spaced 4'-6", 5'-0" and 5'-6" back from the headgate.

Scales can be located in the main chute or close by where cattle can be easily diverted into them. Some commercial squeezes have weigh bars mounted under them to provide a scale-squeeze combination.

Man Gates and Passes are both a safety factor and a convenience. A man gate behind the squeeze allows you to block off upcoming cattle. It also gives you some room to work, and allows you in behind the animal without having to crawl over the chute every time. Man passes should be 11" to 14" wide and placed in the crowd pen, along the chute, or any place you could become trapped and need a fast escape route.

Loading Ramps can be placed coming off the working chute or out of holding pens. Cattle don't like climbing so a ramp should not be steeper than 30^{o} and it should have 2" cleats spaced at 8". Cattle will move much easier up a stair step ramp with a 12" run and a 4" rise for the steps. Loading is also much easier if the cattle are in single file and there is a flat platform at the top of the ramp for them to step on or off the truck from.

How do I go about building a handling facility? Start by considering what you need and how you want to work your cattle. Visit a neighbour's facility, and find out what works or doesn't work for them. After all there's no sense in making the same mistakes as someone else. Fairs, farm shows and exhibits offer a good chance to see what is commercially available. Reading publications, and the popular press will also give you good ideas. Then you move on to sketching a plan, of the facility you want (preferable to scale). This will let you find out how to fit the different components into the space you have allowed. After all, it is much easier to move fences on paper than it is to move them once the post holes are dug.

When you have a plan you are happy with it is time to move to the actual site where you intend to build. There you again lay out your plan. This time however make it actual size and mark it off with spikes and baler twine. Then walk through it imagining how the gates will swing and the cattle will move. Then and only then, should you start to dig post holes. Build the fences first, and then adjust the gates to fit.

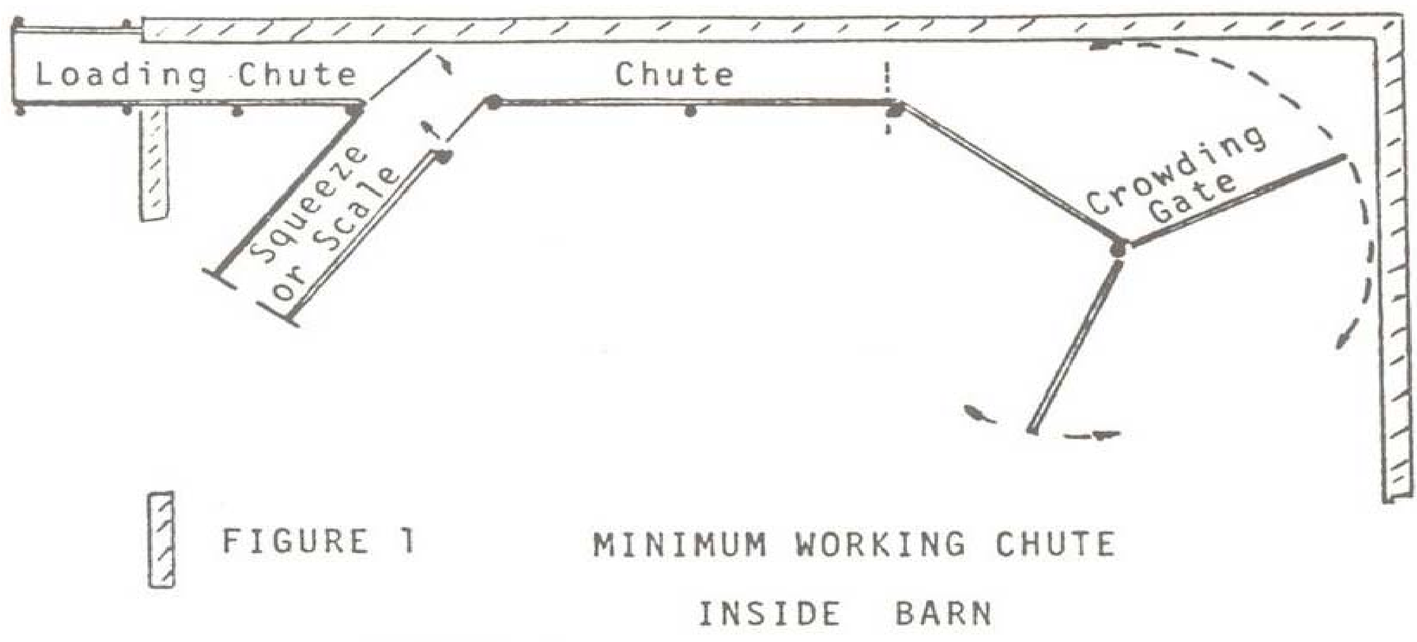

Figure 2: Minimum working chute inside barn.
OMAFRA Engineering Unit

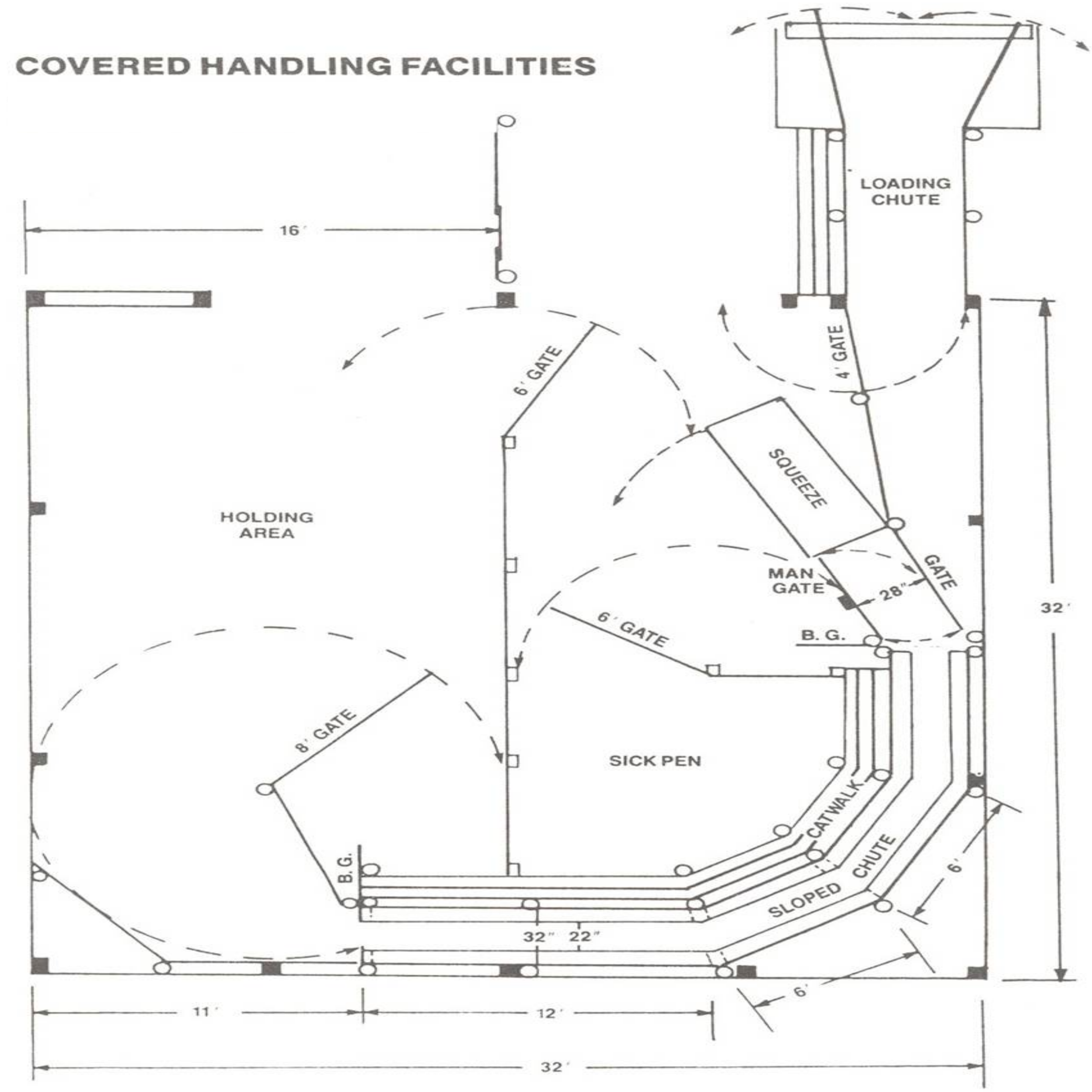

Figure 3: General layout for covered handling facilities. OMAFRA Engineering Unit

CATTLE HANDLING FACILITIES for SLATTED BEEF BARN WITH MECHANICAL FEEDER

1. Holding Pen for 25 head
2. Crowding gate
3. Working Chute for 5 head
4. Raised Catwalk
5. Angled Squeeze for better access
6. 2 Sick Pens
7. Loading Chute at start of working chute

NOTE: For drive-thru barn shorten working chute to allow passage for feed truck. Holding pen partition would become a gate.

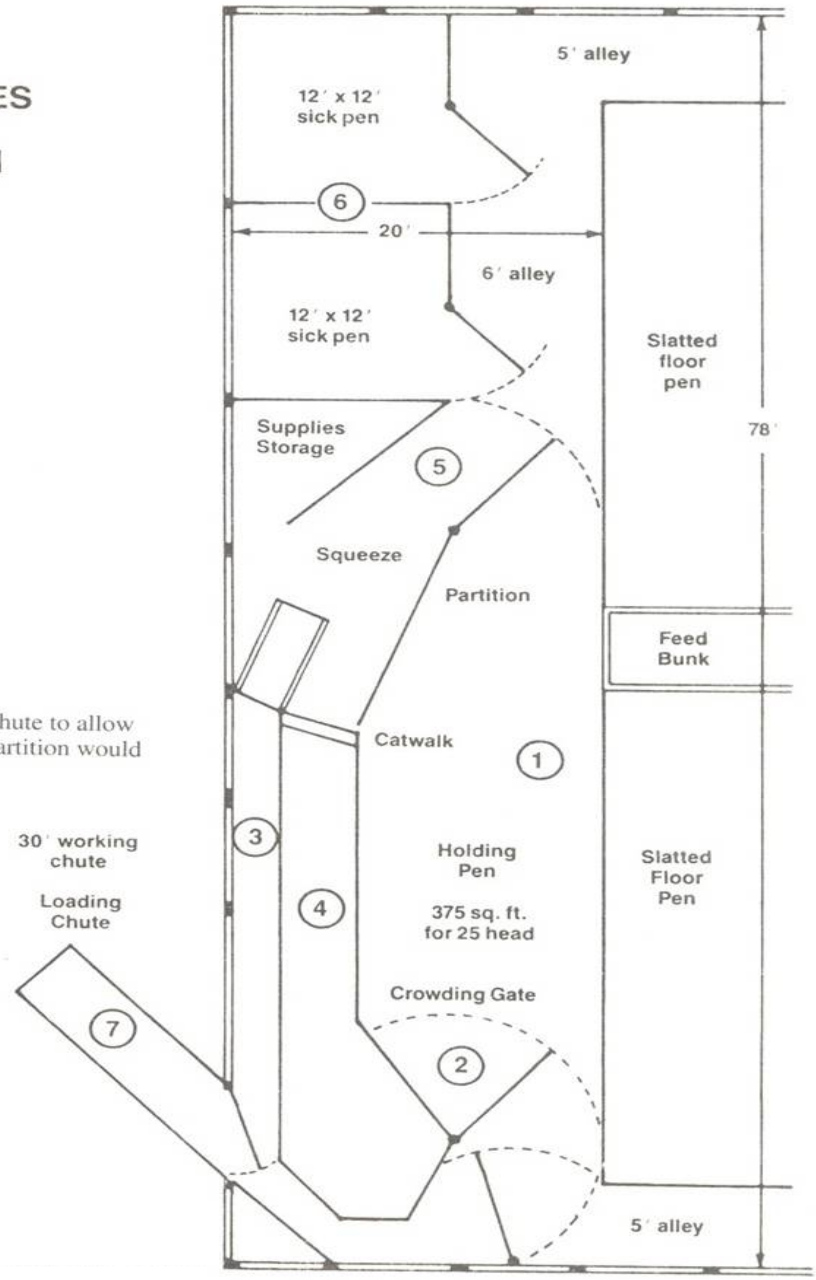

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Figure 4: Cattle handling facilities for slatted beef barn with mechanical feeder. OMAFRA Engineering Unit

Resources

Websites
Dr. Temple Grandin Website
http://www.grandin.com/

Behaviour of Cattle, Pigs, Buffalo and Antelope During Handling and Transport
http://www.grandin.com/behaviour/transport.html

Canada Plan Service
http://www.cps.gov.on.ca/english/frameindex.htm

Beef Cattle Handling Facilities
Government of Saskatchewan
http://www.agriculture.gov.sk.ca/Default.aspx?DN=fd3df715-2548-4067-a0d9-895fb70d03a5

Canadian Cattleman's Association
http://www.cattle.ca/handling-facilities/

Books
Humane Livestock Handling
Temple Grandin
http://www.grandin.com/inc/book.description.html

Corrals for Handling Beef Cattle
Alberta Agriculture and Rural Development
http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/agdex27

Modern Corral Design
Oklahoma Cooperative Extension Service
http://www.mwps.org/index.cfm?fuseaction=c_Products.viewProduct&catID=736&productID=6372&skunumber=OKE%2D938&crow=6

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Will Your Cows Dig Dugouts?

Tom Hamilton
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Water is life: it is the most essential nutrient for livestock, yet something that we may take for granted in Ontario, a region rich in water resources. Beef cattle use a lot of the resource. They aren't very efficient at recycling water (compared with animals like sheep), so they need to drink a lot every day. Lactating beef cows require about 115 litres (25 gallons) per day during summer, while stocker cattle need about 70 litres (15 gallons) each day.[1] It's important to realize that cattle performance on pasture can be limited by lack of easy access to clean, abundant water, just like in a feedlot. In many pasture situations, providing cattle with adequate access to water can be challenging. Dugouts offer an alternative. They are man-made ponds which offer a way of creating a water source on pastures which are a long ways from a well or natural water source.

Do You Need a Dugout?

Beef cattle like to drink 3 to 5 times a day. Many pasture cattle have to trek long distances to get to water, cutting down on grazing time, and requiring extra energy expenditure. Distance to water can also limit the amount of pasture area that the cattle will effectively graze. Recommendations for maximum distances to water on pasture vary, depending on the intensity of the grazing system.

With high intensity systems, cattle grazing distribution may be negatively affected if cattle have to walk more than 250 m (820 ft) to the water source. Along with decreased forage utilization, the cattle will spend more time in the area adjacent to the water source, and manure nutrients will be concentrated there, rather than being evenly distributed across the pasture.[2]

For more extensive situations, the distance to a water source can significantly restrict the amount of area which will be grazed. In arid rangelands, cattle will seldom graze farther than 1100 m (3600 ft) from a water source, and when portable water sources are relocated, they will move their grazing radius to remain within this proximity.[3]

Dugout Design

Dugouts are constructed ponds, and in Ontario they usually trap and contain ground water. (Surface runoff may also help fill dugouts, but this is not a good thing unless the runoff is free of contaminants.) While dugouts can be a good option when other water sources are too far away, they should be treated with the same care as rivers, streams and natural ponds … we have to ensure both the water source and the cattle are managed in a sustainable way.

Locate the dugout as centrally as possible in the grazed area, giving preference to areas which stay greenest throughout the summer. If you're not sure where the dugout should go, dig some test holes to evaluate a few potential sites. The sizing of a dugout is dependant on the amount of water it is expected to supply and the hydraulic characteristics of the soil where it is located. For a given water volume, it is better to construct a deeper dugout with a smaller surface area, rather than a shallow dugout with a larger surface area. A smaller surface area will result in less loss due to evaporation and require less fencing to protect it from the cattle. Depth will be limited by the size and type of machinery used, depth to ground water, and depth to bedrock. In medium to heavy textured soils the end slopes should be 4:1 (4 units horizontal to 1 unit vertical) with side slopes of 1.5:1. In lighter textured soils, make flatter side slopes with a ratio of 2:1. [4]

Managing Your Dugout

It is critical to prevent cattle access to the water. Cattle traffic along the banks will erode soil into the water, causing silting of the water and filling in the dugout. Cattle manure in the water delivers pathogens and nutrients such as nitrogen and phosphorous, contaminating the water source. These pathogens can amplify and spread disease within your herd. Excess nutrients will increase the growth of algae and set up conditions for the appearance of toxic blue-green algae. On top of all of these factors, cattle prefer to drink clean water, so providing an "out of the dugout" watering system will maximize water intake and thus cattle performance.[4]

Fence cattle out of the dugout, with a minimum grassed buffer strip of 30 m (100 ft) between the edge of the water and the fencing. The type of watering system needed will depend on the number of cattle. The key concept is having a pump which draws clean water from the pond and sends it either directly to a water trough or to a storage tank. The pump can be solar electric, gasoline powered, or even cattle powered (nose pumps). Locate the intake about a foot below the surface, attached to a float. The pump can feed an elevated storage tank which in turn feeds a stock trough via gravity and a standard float valve.

If algae growth becomes a problem, you can install an aerator (solar or wind powered) which will keep water circulating and prevent the conditions that cause "blooms" of algae. In extreme circumstances, chemicals may be needed to control algae.

***Regulatory Note*:** In Ontario, no permit is required to take water for livestock production.[5]

References:

[1]National Research Council. Nutrient Requirements of Beef Cattle. 7th Rev. Ed. Update 2000. http://www.nap.edu/catalog.php?record_id=9791 Retrieved Feb 2011.

[2] Gerrish, J.R., P.R Peterson, and F.A Martz. Proximity of Water Affects Grazing Distribution and Soil Nutrient Cycling. International Grasslands Symposium 2007. Retrieved Feb 2011.

[3]Walter D. Willms, Orin R. Kenzie, Tim A. McAllister, Doug Colwell, Doug Veira, John F. Wilmshurst, Toby Entz, and Merle E. Olson Effects of water quality on cattle performance. Journal of Range Management. Sept 2002. Retrieved Feb 2011.

[4]AAFC Prairie Farm Rehabilitation Administration Thinking About Constructing a Dugout? http://www.rural-gc.agr.ca/pfra/water/dugoutc_e.htm Retrieved Feb 2011.

[5] Ontario Ministry of the Environment. Green Facts: Permit to Take Water http://www.ene.gov.on.ca/environment/en/resources/STD01_078770.html Retrieved Feb 2011.

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Upcoming Events

Profitable Pastures Workshops - March 9 and 10, 2011, Elmwood and Stirling Learn More

Dr. Temple Grandin, **Creating the Best Life for Our Animals** - March 17, 2011; Stratford Rotary Complex - Call 519-291-9733 or Email: sue@harmonyorganic.ca to register. (PDF)

Quest for New Farm Value - Value Plus™ workshop.
A Two Day Workshop for Farm and Rural Entrepreneurs.
Locations and Dates.