YEAR ROUND GRAZING
365 DAYS

"Year Round Grazing 365 Days" was published by the Livestock and Forage Group of Agricultural Research and Extension Council of Alberta (ARECA) November 2006.

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Introduction

The demonstration of Year Round Grazing Systems "**Using Best Management Practices"** was carried out by the Agricultural Research and Extension Council of Alberta (ARECA) with support from the Western Forage/Beef Group (WFBG). This project was made possible through the generous funding of the Greencover Canada - Alberta Technical Assistance Program (GCTAP) and also by the Alberta Environmentally Sustainable Agriculture (AESA) Program. For their support and vision we are greatly appreciative.

The five associations that actively coordinated this project and their cooperators were: Peace Country Beef and Forage Association based out of Fairview with cooperator Neil and Ruby Boyd; Gateway Research Organization based out of Westlock with cooperators Steve and Stacey Kenyon; Battle River Research Group based out of Forestburg with cooperators Elgar and Annie Grinde; Chinook Applied Research Association based out of Oyen with cooperator, John Gattey; and the Foothills Forage Association based out of Calgary with cooperators, Doug and Linda Wray. Field demonstrations and workshops were held at each location.

At a time when production costs in agriculture keep rising and prices for agriculture products stay similar to years past the future for livestock producers becomes less clear. As profit margins continue to get tighter, crisis like BSE, drought or a falling cattle cycle, are being covered by losses of equity in farms and ranches. Most cow/calf operations are wondering if there is a future in the business.

As coordinators of this project we do see a way to find profit in the cow/calf business. As Gregg Simmonds said at the 1998 Western Canadian Grazing Conference, "We cannot afford to be tied to an increasingly inflationary beef cow". Changes to how the cow/calf business is carried out must occur to create a sustainable and profitable future in the beef industry. As the zero-till movement came to reduce costs in the grain industry during the early 1990's there is an opportunity in the beef business for changes to reduce costs and capture a profit. For cow/calf and yearling operators, this can from a system based on grazing alternatives, instead of adopting a new technology. Several studies of producers across the prairies over the past few years have found time and time again that operations with the lowest cost per unit produced are the highest profit operations.

The 300+ Day or Year Round Grazing Systems can greatly reduce cost and capture a profit in both a financially and environmentally sustainable way.

The five cooperators in this project are wisely using various grazing systems in combination as they create their own unique grazing system recipe. They were chosen to demonstrate their system as they are experienced "Year Round Graziers".

They have been actively applying, flexibly adjusting and fine tuning these 300+ day grazing systems on their cow/calf operations for many years. This project was carried out to demonstrate how some producers are applying the art and science of low cost/unit production to their personal, grazing structured, beef business. Their planning and management is focused around ways to keep cattle grazing. They are doing this with a higher degree of flexible management, but with less labor and machinery than traditional cow/calf operations.

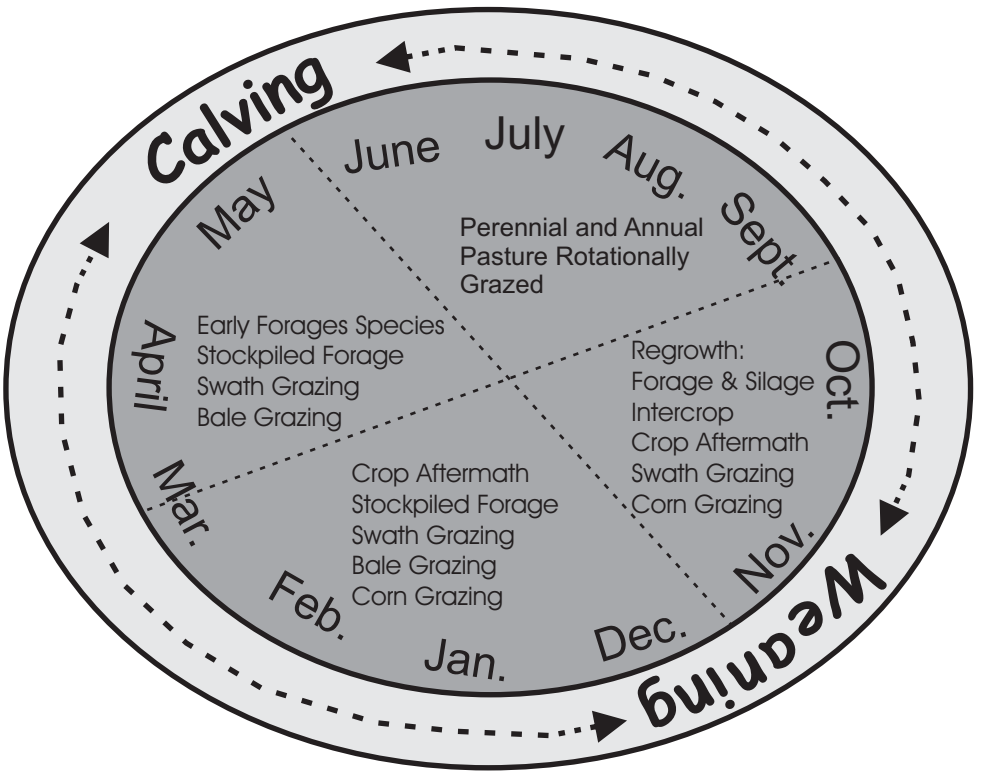
The cooperators in Year Round Grazing programs are managing and controlling their cow/calf or yearling businesses, by structuring their systems around the animal's strengths and grazing opportunities:

- Calving later in spring or summer,
- Use body condition when animals have excess fat,
- Build body condition when plenty of feed is available,
- Cows can travel to the feed source,
- Can utilize various feeds, ie. chaff, straw, corn stover, etc. and,
- Harvest their own feed by grazing.

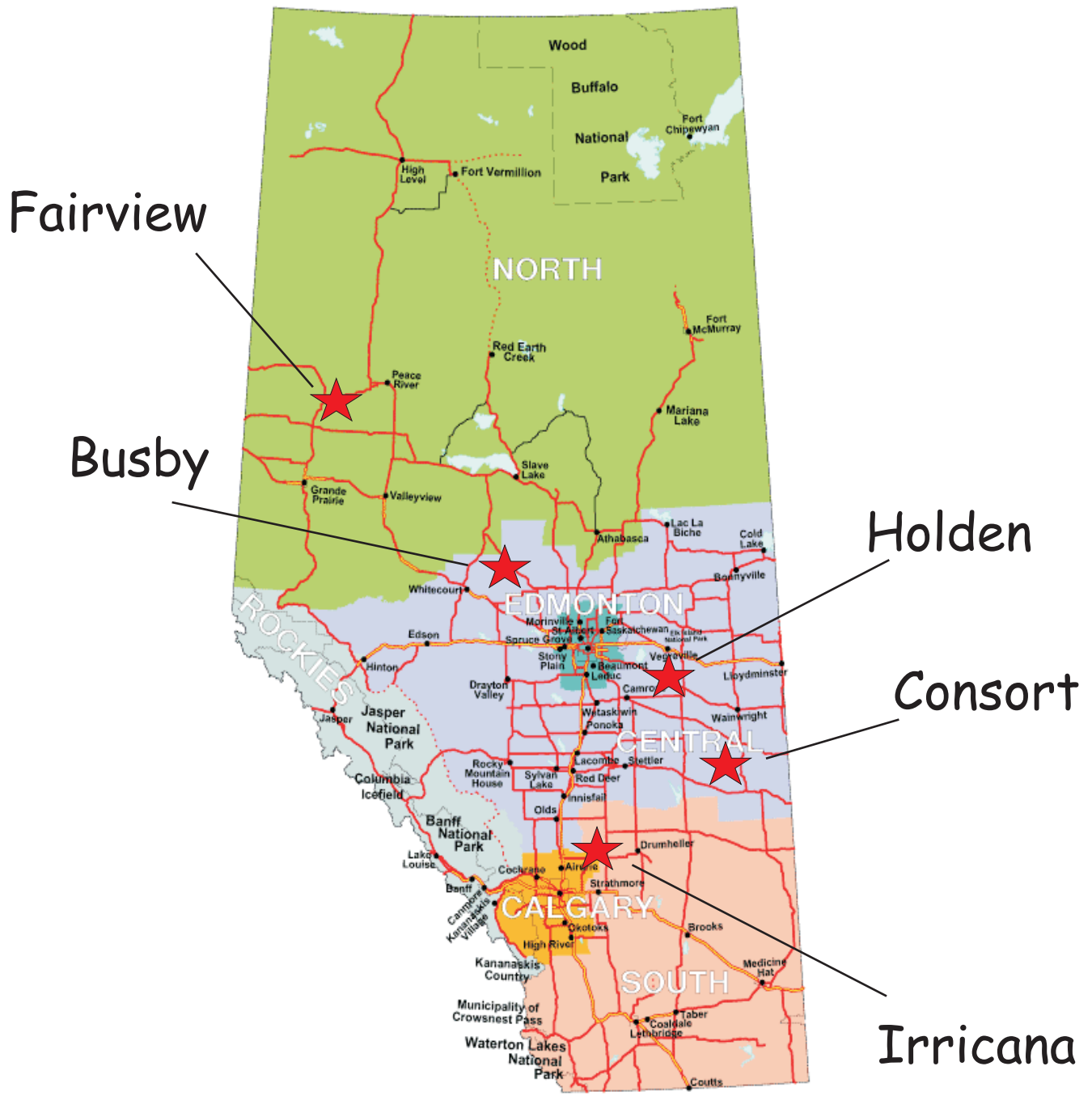
The cooperator's business management, economics and financial decisions are based around using these animal strengths as much as possible. Machinery use is kept to a minimum.

Grazing/feeding has evolved from 1906/1907 to today: putting up some stored winter feed for the critical times when cows could not access it in the field, very labor intensive limiting amount of stored feeds, to a high machinery use replacing labor with a 200 day feeding period.
Cattle/calving has evolved from the 1960's: spring calving of an easy doing cow weaning a smaller calf, to cross-breeding with higher performance, higher requirement exotic breeds, calving at earlier dates and using better calving facilities.

300 + Day Grazing Model



Alberta, Canada



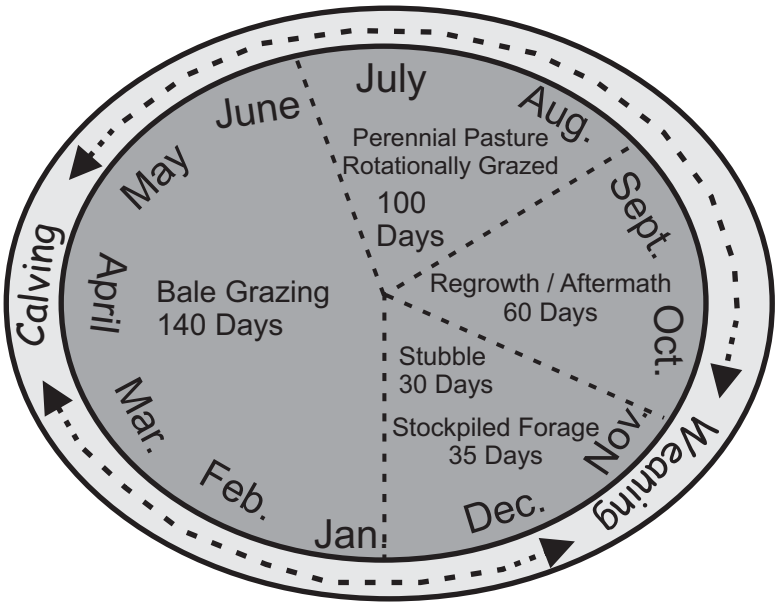
Neil Boyd
Fairview, Alberta
Greywooded Luvisol Soil

The Boyd family farm is located southwest of Fairview, where the annual precipitation is 12-14 inches. It is owned by Neil and Ruby Boyd and is maintained by them and their children. The Boyd's main enterprise is grain but is complimented by the 100 head cow/calf herd. Neil says his farming operation is mixed, like scotch and water. By using crop rotations, the farm is able to utilize feed and pasture that wouldn't normally be used. The grazing land base consists of 80 acres of pasture at home, 100 acres of tame pasture (meadow brome), and 1100 acres of native pasture. The Boyd's began to extend their grazing season in order to better utilize the synergies of their operation and to have more spare time.

System

Through various techniques Neil is able to achieve 300 + days of grazing in one form or another. He uses a variety of methods including bale grazing, perennial and native pasture, regrowth and aftermath, stubble, screening and stockpiled forage. The cattle are an average of 1400 lbs and had a body condition score all year of 3 - 3.5 on a 5 point scale. The Boyd's keep their own replacements and bulls. The calves are not tagged, castrated, dehorned or vaccinated. Neil believes that these practices are not necessary because he has a closed herd. The calves are weaned in December when the kids come home for Christmas holidays and are then backgrounded all winter.

Bale grazing is a major component of the Boyd's program, usually lasting for around 140 days per year. His yardage costs are $0.30 -.035/hd/day. His cattle are started on bale grazing around the beginning of January and Neil tries to keep them out there until June 10. He sets out the bales in the fall, lining them up in rows of 4 bales rotating meadow brome and slender wheat grass. The feed test for the brome grass came back at CP 7.3% DM and TDN was 62.63%. The slender wheat grass was CP 4.3% DM, and TDN was 43.44%. Neil places step in posts and wire in each bale in the two rows ahead of the bales that are being grazed. He spaces the bales far enough apart that the cattle won't touch each other when eating, and the rows are spaced so cattle won't back into the wire. The bales



are 800 lbs and he uses sisal twine to prevent having to cut twine in the winter. It is easier for fencing purposes to set the bales as straight as possible. The wire is moved every two days which provides fresh/cheap bedding, parasite control and a snow and manure mat to prevent water run off in the spring. During bale grazing the cattle lick snow if sufficient and if not they walk back to the yard to the watering bowl. Prior to the past 2-3 years the average snow fall was 2-3 feet. When the snow is deep Neil runs his skidoo up and down in front of the bales to pack down the snow and make a track.

The cattle are fed salt all year round, and in March they are given mineral prior to calving. Calving begins in late April out on the bale grazing field and runs until early June. The bulls are put out on July 20. After bale grazing the herd is divided into two groups and are sent out to pasture when he is done spraying. One group heads out to native pasture in the coulee hills, and the other stays close to home and rotates through the paddocks. If bales are left and grass is low he will run the herd at home through the bales to compensate. The cattle on native pasture, water from a creek. The cattle are brought in from native pasture after combining, which is usually around October 10. The herds are combined and then go out onto regrowth and are fed crop aftermath. Feeding forage seed screenings is not a problem because animals do not wander far, so they do not spread weed seeds. They also utilize crop and grass seed stubble. Neil utilizes stockpiled forage as needed during November and December.

The secret to the Boyd's success with Year Round Grazing is patience and flexibility. The system is ultimately the same each year but the number of days on each treatment varies slightly. The grazing system that the Boyd's have implemented provides them with many opportunities they never before realized. Their chore load is reduced which leaves them with more family and social time. The cattle seem more content and are quieter and easier to handle. According to Neil, “working against nature costs you money”. He believes that his system encompasses the natural grazing resources right in his own back yard. The Boyd family truly enjoys watching their cattle graze, and when the work is fun it is not only more enjoyable but will be profitable.

Neilisms

- Fighting mother nature costs you money.
- Bale grazing is SEXY!!!
- Use the synergies within your own operation.
- Every operation is different, feeding should fit into what you are doing.
- Patience is the key.
- Don't quit bale grazing one year if grass dies, soil will improve.
- Don't be afraid of quack grass.
- Don't be afraid of foxtail barley.
- Judge what nutrition they need at each stage of winter, start off on half hay and half straw, work up to $\frac{3}{4}$ hay and straw.
- Read your cattle, they will tell you what they need.
- Check cattle behavior to see if they are getting enough feed.

Steve & Stacey Kenyon
Busby, Alberta
Black Soil

Steve & Stacey Kenyon ranch in the Barrhead area under the name of Greener Pastures Grazing Management Ltd. They purchased their home quarter in 1999. At that time the main source of income was off - farm work. It's now 2006 and they still own one quarter of land, but manage over 2000 acres of leased land, manage 500 head of custom cattle and their income is derived from the farm business. By using extended grazing techniques such as swath grazing and bale grazing they are able to pasture cattle year round.

The Kenyon's believe that sustainable agricultural practices lead to long term profitability. They have found that there needs to be a balance between managing for the land, animals and the people within the system. In their operation, it is important to work with Mother Nature. Preservation of wildlife habitats, riparian areas and the millions of soil organisms that benefit soil health will also benefit their operation for years to come. Working with Mother Nature also reflects positively on the amount of time and cost associated with running the cattle herd.

The health of their business is managed with two main strategies. Their economics are managed with a gross margin analysis and their finances using a rolling cash flow. Steve and Stacey believe the most important tool on their farm is a pencil. That being said, there are not very many farms that can run over 500 head without owning a tractor. The Kenyon's run their operation while trying to maintain very low overheads. The only motorized equipment they own is a 4x4 bale truck and an ATV.

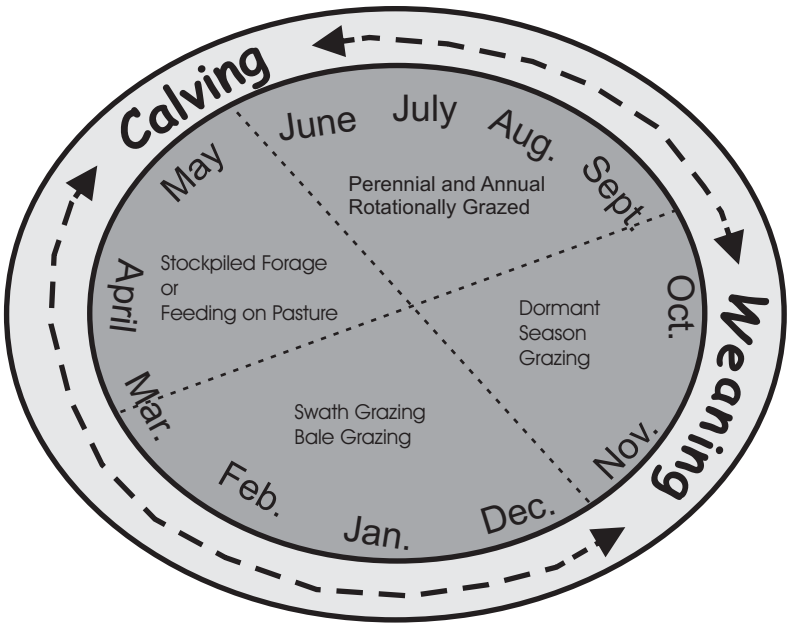
The Kenyon's believe the most important resource on their farm is their children. Their goal is to build a profitable business that will provide quality time for family, and the opportunity to maintain the family farm for generations.

System
The overall strategy at Greener Pastures is to maintain flexibility in their grazing system. Any system that they develop, or follow, must be able to change and adapt. Their most important decision making tool is an economic analysis. Steve states, “Without understanding the numbers, we would just be guessing.”

The summer pasture management is structured around four main concepts: graze period, rest period, stock density and animal impact. Herds are rotated according to these concepts and not according to a set time period on a calendar. Steve says, “It is important to understand why you are moving cattle, instead of just moving them. If these concepts are not understood, you may just be practicing controlled overgrazing.” The key is to be managing for the roots of the plants and ensuring that the plants remain strong. The Kenyon's currently run five grazing cells ranging from 8 paddocks per cell to 28 paddocks per cell, with the farthest being less than 10 miles from home. Most cell designs incorporate a combination of alleys and cell centers, and cross fencing is done with one electric wire. Water needs are supplied by solar powered water systems fed from creeks, slough or dugouts. They would love to put in more pipelines, but it doesn't 'pencil' for them to put capital dollars into short-term leased land.

The Kenyons are believers in summer calving, as that is what Mother Nature intended. However, they have found that with their intensive cell grazing system, June and July born calves are difficult to manage in treed areas. Their calving begins at the end of April with the goal of a three cycle calving period. After that they focus on managing the pastures. By calving in this period, they also try to time weaning with the end of their dormant season grazing in November. Calving at Greener Pastures requires relatively low labor, and very few facilities or equipment. Cows are checked once or twice a day, and calves are tagged, castrated (banded) and weighed via a hoof tape.

Leading up to, and during the calving period, cows are grazed on stockpiled grass and fed hay on what Steve calls 'rotationally abused' pastures. By 'rotationally abusing', he means grazing these paddocks in April as the new grass is just starting to grow, which, by definition, is overgrazing. They unroll and/or place a two-day supply of hay at any given time. Cows are moved to new paddocks as the ground becomes soiled. This maintains a clean calving area, and reduces the number of paddocks that are 'abused'. This system allows the Kenyon's to keep the calving herd close to the house and facilities for a longer period of time. The grass is set back by this treatment, but by mid summer, with adequate rest, has recovered. These pastures have also had the benefit of imported nutrients, organic matter and water holding capacity that the hay, and 'Abuse' provides. The cattle are gradually moved into pastures by mid May, and later born pairs are moved out as the grass growth increases through June.



Their summer pasture management usually leaves them with the ability to graze dormant pastures late into the fall, and leave some stockpiled grass for calving. The dormant season grass usually gets them to early November at which point they like to wean, pregnancy check and vaccinate. With the cows now dry, it is much easier to move down the road to the swath grazing.

When it comes to swath grazing, Steve tends to be a bit of a scavenger. Because they don't own any equipment, crops are purchased from local grain producers. The Kenyon's have proven themselves to be a positive market for farmers to sell their crops. Steve says; “With this system we don't take the risk of planting the crop, or have the costs associated with owning the equipment. The negative side is that all the nutrients that are returning to the land through the cow, are on someone else's land. Therefore, we need to make sure that we are making up for that loss of nutrients in cash flow, or we would be better off to bale graze at home. The big benefit of swath grazing is the reduced labor and equipment costs. We let the cows do the work. With a large group of animals, our labor costs are greatly reduced compared to traditional winter-feeding. I have had swath grazing results of anywhere from $1.15/hd/day down to $0.56/hd/day, labor included. I believe swath grazing is a viable option in the right situation. The swath grazing in our situation can be a bit more risk. Water is a big concern if we do not get snow. In 2005/2006, we did not get any snow until March, which

added $3600 worth of labor because of water pumping and hauling. This can sure increase your costs per day. If you have a reliable winter watering site, this difficulty is overcome. The distance needed to travel to the swath grazing is also a concern for us due to the rising cost of fuel. Currently we are 4 miles away, which with a 2-3 day move is still feasible. Another concern that we ran into is swath grazing into the spring thaw. It can really punch out a field. We prefer to be on a good solid pasture during this period."

Depending on the year, availability of swath grazing, location and the cost of hay, they need to decide on the amount of winter grazing that is done with swath grazing and/or bale grazing. If the cost of hay is cheap, the Kenyon's prefer to bale graze at home. Bale grazing allows them to greatly reduce labour and equipment requirements during the feeding period. Last season with a four/five day graze, their feeding labor worked out to under $0.10/hd/day. Total feed and labor costs were under $1.15/hd/day. In addition to the reduced labor, bale grazing also allows them to import nutrients and organic matter to their land. Steve says, "It is a tremendous way to rejuvenate or simply improve our current pastures". He values each cow that is fed on their pastures at $0.30/hd/day due to the fertilizer value added to the land. This would make our true feed cost $0.85/hd/day. We also receive added water holding capacity and ground cover due to this strategy. Bale grazed land can out-produce the land not-bale grazed by up to $75/acre more in the 1st year. That benefit remains in the land for years to come. This is a tool that will remain in their system for as long as the price of hay remains reasonable. Nutrients are also imported onto their land through mineral fed to the cattle on a year round basis.

In the Kenyon system it is important to be finished or pull out of the bale grazing during the spring thaw. The land is heavily covered with residue and manure and the cows start to drink from the dirty puddles that form. At this point the cows are moved to cleaner, higher ground closer to water, and are fed until calving. Even when they feed, the Kenyon's try to keep costs low, and maintain their grazing mentality. They have the hay delivered to different parts of the pasture to reduce the distance to travel when feeding. They try to set out enough feed for at least 2-3 days. In some cases they can set out one or two week's worth of feed in multiple paddocks at one time. This then allows the cattle to graze through the paddocks without Steve needing to start a vehicle every day. When the 1st calf hits the ground the herd is moved to the calving grounds and the busy season begins.

Steveisms

- Learn how to operate a pencil and calculator effectively.
- Manage for your soil.
- Manage pastures for the 4 grazing concepts; graze period, rest period, stock density and animal impact.
- Plan to improve nutrient recycling, 80% of what goes into a cow ends up behind the cow.
- Soil life is extremely important, care for your underground army of workers.
- Feed waste in the right place is not a waste!!
- Cows have 24 hours/day to get your work done.

John Gattey, Cross Bar Ranch
Consort, Alberta
Dark Brown Soil

The year 2010 will mark the 100th Anniversary of the Cross Bar Ranch, situated on the south side of the Neutral Hills in east central Alberta. John is the 3rd generation of Gatteys to ranch under the Cross Bar brand, and his sons Justin and Brandon will potentially make it a 4th generation operation.

The backbone of the Cross Bar operation includes approximately 10 sections of native pasture, 3 ½ sections of re-seeded grass and a few quarters of cultivated land used for silage and swath-grazing. While the majority of this land base nestles the Neutral Hills, 3 ½ sections are located about 35 miles south near Cereal, and another section and a half near Castor.

John currently calves out about 300 head and runs approximately 1100 yearlings. Most of the cows are of red and black Angus bloodlines, chosen for their moderate size and feed efficiency. He winters his own calves, buys some in the fall to background in the ranch feedlot and purchases more in the spring.

The diversity of Cross Bar's land base provides for a flexible annual grazing program. Cows begin calving the third week in April on tame pasture or stockpiled native range. Cows are restricted to areas of approximately 80 acres by electric cross-fences. This is a good pasture management tool as well as one that saves time checking for new calves. Late spring storms can happen while calving out on grass. John has made sure there are gates in the south-east corners of the calving pastures, so when the northwest wind is blowing snow around he can quickly turn the cows into a more sheltered field just by opening the gate. No supplementation with grain or silage is given during the calving season to encourage the cows to stay spread out among the rolling hills, thus cutting down on potential scour problems.

The cows will generally be rotated through tame pastures as much as possible during the summer grazing period, saving native range until early fall. They are moved every week to 10 days throughout the summer and into the fall, a procedure which John feels helps utilize brome grass invading the native pastures. If clipped off early in the season, the brome may re-grow, providing green growth later in the year. This controls brome from spreading. The cattle typically utilize a number of natural water holes throughout the grazing season. John has also developed a portable solar powered watering system which helps preserve water sources during drought years.

The pairs are moved back closer to home onto Russian wildrye pastures before weaning in November. John prefers to wait until there is some snow cover before turning the cows into the swaths. They were moved to the swaths the first week of January in 2006, carrying an average body condition score of 2.34. Portable windbreaks ensure the cattle have adequate shelter, and are moved periodically to help distribute manure. After determining the appropriate area of swaths, the portable electric fence is moved every three days. John estimates the volume of

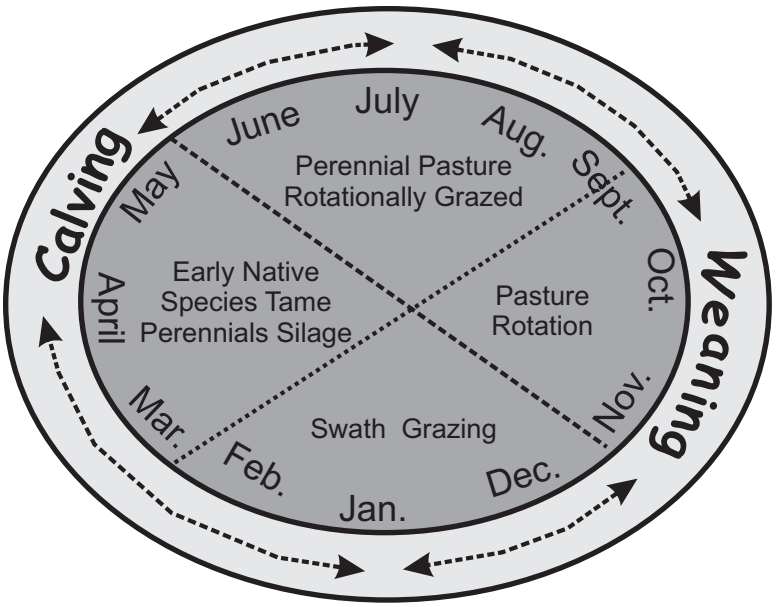
feed in the swaths by rolling up a few bales, giving him an idea of how many grazing days the swaths can provide for his number of cows. The cows remain on the swaths until the forage is gone or the ground starts to thaw, which ever comes first. The feed, fencing and labour of the swath grazing portion of John's feeding system costs less than $0.65/cow/day. Cost varies depending on the yield of the annual crop to be grazed.

The cows were moved from the swaths in early March in 2006 to avoid rutting and compaction in the muddy field. They were fed silage until early April, when they were turned into tame pasture for calving. Some cows were returned to ungrazed barley swaths, when the ground had dried up, for a couple weeks of grazing at the end of April. The pairs then entered reseeded pastures and the program began all over again.

Nothing is written in stone in John's system. Located in a typically dry area of Alberta, Mother Nature often plays a strong role in determining grazing patterns. The length of time John's cattle spend grazing swaths depends on the productivity of the annual crop. Stocking rates and length of grazing periods on the perennial pastures are determined by the health and volume of grass available. John tries to preserve some stockpiled grasses and likes to have a respectable amount of silage on hand for insurance in years of low productivity.

Steps are taken throughout the year in preparation for the swath grazing portion of John's annual grazing program. The cereal crop is seeded in late May or early June, and swathed at soft to mid dough stage. Westford barley was chosen for the 2005/06 swath grazing crop because of its yield potential (actual yield in 2006 was 5400 lb/acre). Once the crop is swathed, posts are pounded across the field, breaking it into quarters, providing a semi-permanent fence. High tensile wire is run on the cross fences connected to an electrical outlet back at the yard, so the system does not rely on batteries. Re-bar posts are strung with plastic turbo wire to create a moveable fence which limits access to the swaths once the cows are turned in. These rectangular fields will always have a semi-permanent fence on one side and the permanent perimeter fence on 2 sides. The portable fence re-connects to the semi-permanent lines with every move, without having to make changes to the power source.

Straw bales in self feeders are used as a monitor of when to move the cows. When they become interested in the straw, it's time to move the fence. This is a low cost way of making sure cows are not losing body condition while being forced to clean up the swaths. John tries to give the cows enough swaths so the fence can be moved every three days. Grazing begins in the corner containing the water source, a dug-out. He doesn't cut ice for water if there is adequate snow, this saves time as well as preserves the water in the dug-out.



John has developed time-saving tools which help speed up moving the fence. He has mounted a holding bracket for the reel on the deck of his truck, so he can drive along, rolling out wire while he moves along putting in the 3/8” rebar posts. A small slide hammer, made from pipe with sucker-rod plug, is slid up and down on the end of the

rebar to pound them in the ground. Giving the re-bar a twist with a small pipe wrench makes quick work of pulling them out of frozen ground. He will often place two lines of fence at a time, so when it is time to move the cows he can lift the restraining wire with an eight foot board and the cows are trained to walk under it into the next paddock. John's portable solar powered watering system, complete with a small catch pen and holding chute, is really handy for calving on pastures without corrals.

Gatteyisms

- A key to the annual grazing system is a good supply of grass for calving (reseeded or stockpiled native grass).
- Calving onto grass has eliminated scours and mothering problems.
- Knowledge of the nutritional quality of various feed sources is important to maintain body condition. Although quality declines somewhat while cereals lay in a swath, protein levels remain adequate for a cow in mid-pregnancy.
- No real difference in conception or calving has been observed since swath grazing was incorporated into the Cross Bar grazing system.
- When cow requirements are met, adequate, healthy bull power is probably the most important tool to achieving good conception.
- Swath grazing has cut winter labour and equipment costs.
- The minimum swath grazing period John has had since beginning swath grazing was 60 cattle days per acre, while the highest he has achieved was 120 days per acre (2006).
- His fencing tools have reduced the hassle of making and moving fence.
- Maintaining flexibility is essential having a back-up plan is important to be able to deal with conditions such as drought, spring storms, etc.
- Quality of life has improved with more time for doing what he really enjoys.

Feed Quality Analysis - Westford Barley

Date	9/23/05	11/23/05	12/15/05	1/04/06	2/12/06	4/18/06
CP%	15.3	11.9	10.7	10.7	11.4	9.6
ADF%	27.2	31.4	33.8	34.8	44.4	37.8
TDN%	73.9	67.6	64.6	62.4	54.1	58.0
DE Mcal/Kg	3.25	2.97	2.81	2.75	2.38	2.55

Elgar Grinde
Holden, Alberta
Black Soil

The Elgar and Annie Grinde Farm is located northeast of Holden, Alberta where the average precipitation for May September is 250 - 300 mm and annual precipitation is 400 - 500 mm. The Grindes currently operate a 350 head cow/calf herd, where the farm is their only source of income. This is a third generation farm; the first half section of the Grinde farm was purchased by Elgar's grandfather in 1917. The Grindes have expanded to the point where they now own 1840 acres, which includes a 160 acre crown grazing lease. Of these 1800+ acres, 1120 acres is sandy black loam that is used extensively for cereal cropping and legume pasture which is then utilized under an intensive swath grazing and extended grazing season system. Forty acres has been set aside as a permanent Aspen Parkland Reserve. The remaining acres are heavy clay solonetzic soil, some of which is still native prairie, while the remaining balance has been seeded to perennial pasture.

System
The Grinde's cattle are intensively managed under a rotational grazing system through the summer grazing season. Stockpiled forages are utilized in the fall and swath grazing and bale grazing are depended upon extensively throughout the winter and spring, thus completing the 365 days of grazing that can be achieved through proper management.

The cattle on the Grinde farm are somewhat “different” from your typical Alberta cattle. Last January the cows weighed on average 926 pounds with a body condition score of 2 on the 5 point scale. Cows gained condition while they were out on swaths. The Grindes use the same bulls on their heifers as are used on their cows. The exception being cows which are “on their way out” of the herd. On those cows the Grindes use terminal bulls. Elgar uses his own bulls that have been net feed efficiency tested. Cows and heifers begin calving simultaneously in mid April. They are all out at the same time, in the same place (which as Elgar pointed out is “the middle of nowhere!”). Cow's and heifers alike are out on swath grazing as the calves hit the ground. Last year the Grindes pregnancy tested 390 cows, in which they had 30 opens leaving 360 to calve out. From those 360 cows the Grindes assisted 1 calf and lost only 8. They calved out 235 cows in the first 3 weeks of calving, averaging about 12 calves/day.

The Grinde's have approximately 600 acres set aside as tame pasture which usually enters Elgar's system around June 1st . Tame pastures tend to be utilized after spring grazing of winter triticale and swath grazing has been completed. On their alfalfa pasture the Grindes are able to stock 100 cows/acre/day. On improved pasture utilized during the summer the stocking rate is 40 cows/acre/day.

Cattle are turned out onto native pasture after August 1st depending on where the Grindes are in their rotation. Pairs will graze the 350 acres of native prairie. On native pasture the stocking rate is about 28 cows/acre/day. The Grindes have partitioned both their native and tame pastures into 40 acre paddocks which are used in rotation. Some may be grazed more than once, while others may be grazed only once during the year, depending on the rotation. Once the pastures have stopped actively producing forage, the Grinde's look to stockpiled

forage tame hay or whatever forage is available for the fall. Some paddocks will not have been used since spring, or perhaps not since the preceding year. The Grinde's consider this forage stockpiled and will use it as long as there is something available. His stocking rate is 20 cows/acre/day. Last year, cattle were moved from the stockpiled forage on December 1st.

On December 1st, the Grindes turned their cattle out onto spring seeded AC Ranger barley for swath grazing. The Grindes swath grazing fields are seeded between May 10 and June 20 each year. The crop is cut with a 21 foot swather when the barley is very green and in the milk stage. The swath is tight and crowned, laid opposite the way in which the field was seeded. The Grindes tried Westford barley in the past, but stopped using it due to crop disease. This year, Elgar also planted some Baler oats, but has a hunch that the Ranger barley will out yield and be of better quality than the oats.

Their unique winter/spring swath grazing system has the Grindes moving cattle from once a day to 3 or 4 times a day, as conditions require. During the wet spring, the cattle were moved upwards of 4 times a day. Moving of the cattle takes less than a half hour per move on the Grinde farm! While the average cost of winter feeding for other producers is between $1.50 and $3.00/head/day, the Grindes have reduced their winter feeding cost to less than $0.40/head/day. They are able to feed 30% more cattle on the same land base and are burning very little fuel in the process. The cattle are moved to the feed and the feed is then consumed where it has grown. The manure is dropped where the plants are eaten and the nutrient cycle is now complete. By using legumes, such as yellow sweet clover and red clover in the rotation, the Grinde farm has been able to reduce its purchased nitrogen substantially. Using this system, the Grindes have been able to swath graze 300 cows/acre/day during the winter and spring. As

Grinde-ism's

- We did not use 1000 gallons of fuel in the past year.
- We are growing all of the seed and all of the feed and forage we need to market 500 lbs of beef animal for every gallon of diesel fuel used on the farm.
- Move the cattle, don't move the feed.
- Move the feed bunk to the feed not the feed to the feed bunk.
- We're selling by the pound so the more $ /pound you get the more profit you have.
- Daily chores consist of one move per day, half hour total time.
- I've tried most other systems available and when you look at the costs all are expensive compared to swath grazing – swath grazing is cheap.
- Everything is an evolution, what I am doing now has evolved over many years of trial and error.
- Relatively cheap in every way.
- It's a system that's not for the faint of heart. You need to have a strong disposition so that you are not tempted to do as your neighbours do. It is difficult to watch your neighbours out swathing, baling and making feed while you're not.
- This is definitely environmentally friendly.

noted earlier, this past year the cattle went out onto swath grazing at the beginning of December and finished the end of June. Of special note, a feed sample was collected at the beginning of June from a field the Grindes were currently swath grazing. After 10 months and 6.5 inches of rain the swaths feed tested at 12% CP and 58% TDN.

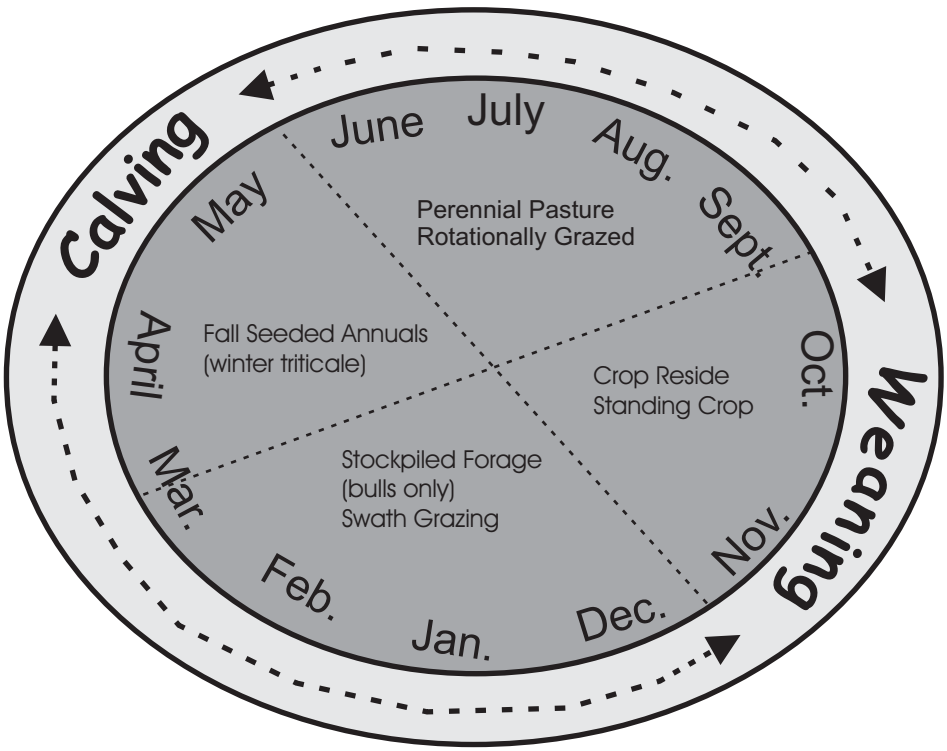
In terms of watering, cattle are encouraged to eat snow when snow is available; otherwise they are watered using well water in most locations.

For daily fencing moves the Grindes use a geared reel and turbo wire with pig tail step in posts. They pack along a 24 volt power pack drill with a long masonry drill bit to drill holes into the ground to accommodate the step in posts. The Grindes use two solar powered and two 2-12 volt electric fencers, to “power” their fence layout.

The Grindes have found that their cattle will comfortably graze swaths under 2 feet of snow and clean it up nicely. What happens if there's more snow is that it's harder to walk through to put the pegs in the ground so Elgar will drive where he wants to put the posts in. If snow is drifted and hard, cows can't break through it, so those swaths will wait until spring when the cows can find them again.

While the cows are out on swath grazing in the winter months, the Grindes bulls are out on forty year old tame pasture bale grazing. Manure and urine are dropped in the pasture where they can be utilized more efficiently, and a tractor does not need to be started to do the feeding.

As the cattle come off of swath grazing and bale grazing in May and June they are turned out onto winter triticale that was seeded between mid August and mid September of the previous year. At turn out time the triticale has reached a height of 6 - 8inches. The Grindes do not use a particular type of winter triticale and they prefer it over fall rye.



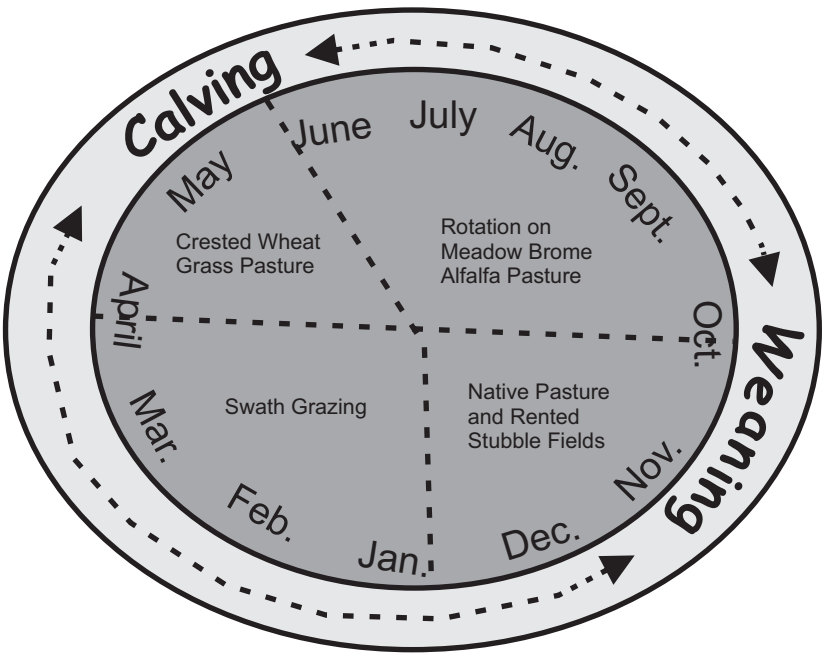
Doug and Linda Wray
Irricana, Alberta
Thin Black Soil

Doug & Linda Wray operate the family ranch at Irricana. They run 225+ cows, background their calves and raise their own replacements. This summer the ranch carried 250 yearlings as well. They have developed strategies that allow them to graze in some form year round. Feeding (round bales) is supplemental to dietary needs or to stretch carrying capacity. Rotational grazing, early grass varieties, stockpiled grass, bale grazing, swath grazing, the right mix of livestock and shared machinery are among the key tools used to create an efficient business model.

The Wray Ranch consists of 390 acres of native grass, 1060 acres seeded pasture (mostly meadow brome and alfalfa) and 300 acres of cultivated land, which is seeded each spring to a cereal for winter swath grazing.

Program

Heifers are calved out beginning April 1st. with cows following during the last half of April and into May. Usually 75% of the cows calve within the first three weeks. Cows are turned out to a crested wheatgrass pasture from swath grazing as they calve. Since the crested wheatgrass was only used in April and May the previous year the cows have a mix of stock-piled forage and depending on the year some early green growth. This is a good time to transition the cows onto green grass. They also are fed half their ration as hay for the first 10 to 14 days after turnout, as well as salt and mineral free choice. Doug relies on feed test to ensure that rations are always balanced.



From June through October cow /calf pairs are rotationally grazed on the meadow brome / alfalfa paddocks. These paddocks are about 20 acres each and are subdivided using a single strand electric fence. The cattle are on new forage every 2 - 4 days. A shallow pipeline system provides water to the paddocks.

Each paddock is managed so that no more than 40% of the forage is grazed. Doug's objective is to maintain or improve stand health, which includes having an adequate layer of thatch. This high level of pasture health allows him to start grazing earlier as well as graze later into the year.

During the late summer / early fall, Doug searches out local opportunities that may help him conserve his grass, or carry him through a grass shortage in a dry year. He has grazed hailed cereal crops, near-by stubble fields and canola regrowth.

The cows weigh approximately 1340 pounds and have a body condition score of 3.5 at weaning in early November and gain 50-75 pounds going into winter. His average conception rate is 93% in a 55 day breeding season.

The native pasture is grazed during the November - December time period. This grass provides good nutrition for second trimester dry cows. Water is an issue at one of these sites. If there is no water in the creek he has to wait until there is enough snow to provide adequate moisture for the cows to consume. Late fall grazing has allowed these native sites to reseed themselves. Since starting this late fall grazing program Doug has noticed a shift towards a greater population of more favorable species as well as an increase in carrying capacity of 30-40 percent.

Dougisms

- Moisture or lack of it has such a big effect on the grazing system.
  My cows don't loose weight in the winter. I am trying to figure how to make use of the body condition the cows gain over the summer.
- Bale grazing is an opportunity to impact the nutrient condition of the soil.
- Year round grazing is a systems approach complete with contingency plans in the event that some part of the system fails.
- Oats ability to react to moisture at any stage is an insurance against drought.
- With swath-grazing we need an escape plan when fields get muddy in the spring.
- Sometimes we put the electric fence down the middle of the swath to prevent the cows from bedding on it.
- If in doubt seed early to make use of the spring moisture.
- Perimeter fences have an inside, offset single strand hot wire.
- There comes a point when we stop thinking about the condition of the forage and concern ourselves with the health of the soil.

Swath grazing a cereal crop has always played a role in keeping the cattle grazing during the winter months. His swath grazing averages 150 cow days/acre, but can range from 75-225. Doug started swath grazing with Pitic wheat. The cows loved it, they ate all the straw, the bearded heads and even ate the stubble to the extent that the field had no cover left after grazing. This eventually became a problem. When a hot dry spring came along there was no crop aftermath to cover the soil to help conserve moisture for the new crop and keep the soil cool.

If the swath grazing field gets too soft and muddy, due to wet snow, rain or a fast thaw, a native pasture adjacent to the swath-grazing site is his alternate choice. The cows can graze or be given hay until the field dries up, this can be for 2 or 3 days or a few weeks. The cows have to walk about half a mile to water when on swaths. The cows do not lose condition while swath-grazing.

Doug now likes to leave 10 to 20 % crop residue each year. This practice helps build soil organic matter and leaves a protective layer that helps conserve moisture. As part of a Foothills Forage Association nutrient monitoring program, this swath-grazing field has had a complete soil analysis each spring for the past five years. The soil is a loam with a pH of 5.5. The soil being acidic makes it more difficult to build organic matter but has remained constant at about 5%. Phosphorous and sulfur levels have remained constant and although there has been an increase in sodium level there has been no increase in soluble salt (mmhos/cm). Nitrate nitrogen has increased to a certain extent and has shown a high degree of variability from year to year depending on moisture availability to assist the crop in using the available N. Over the years, Doug has been able to reduce his fertilizer inputs to the point of just applying a small amount of starter fertilizer at seeding. This speaks well to the improved mineralization of the organic nutrients in the soil.

Swath-grazing completes the cycle. The cows come off the swaths to calve. Any excess swaths are baled as the cows quickly lose interest in the swaths once there is green grass available.

Feed Quality Analysis

Feed	Native Pasture	Oat Barley Swath	Oat Swath	Meadow Brome	Oat Barley Swath	Oat Wheat Swath
Use	Dry Cows	Dry Cows	Calving Cows	Weaned Calves	Calves Bred Heifers	Calves
Time	Dec - Jan 4	Jan 4 - Feb 23	April - Mid May	Nov 15 - Dec 12	Dec 12 - Feb 14	Feb 22 - April
Date Tested	Nov-09	Jan-24	Nov-09	Nov-09	Nov-09	Jan-24
Protein %	8.53	12.6	12.7	13.1	14.1	11.3
ADF %	38.9	30.3	29.8	29.4	32.2	26.2
TDN%	58.2	69.2	68.6	69	65.8	75.3
DE Mcal/kg	-	3.04	-	-	-	2.75
Ca	0.51	0.31	0.37	0.77	0.35	0.29
PL	0.17	0.32	0.41	0.23	0.31	0.34
Potassium	0.95	1.75	2.36	1.71	1.91	1.86

Associated Swath Grazing Costs

	Swath Graze	Conventional
Application	Cost Per Acre	
Rent	$40.00	$40.00
Seed	$7.00	$7.00
Fertililzers	$19.88	$19.88
Chemical	$7.06	$7.06
Repair	$10.00	$10.00
Custom	$8.83	$8.83
Swather	$8.00	
Haybine		$15.00
Baling @ $8.00		$32.00
Hauling @ $3.50		$14.00
Total	$100.77	$153.77

	Per Cow Day Cost	
200 cow days feed per acre	$.50/hd	$.77/hd
Yardage	$0.10	$0.70
Total Feed Cost	$0.60	$1.47

	Nutrient Cycling	
	$20.00/ac	$0.10

Watering Systems

Keeping cattle out of creeks, lakes and sloughs involves a remote watering system. Cattle will be happier and cleaner, and nursing calves will grow and survive better due to cleaner udders and cleaner feet.

Remote watering systems can involve gas, electric, solar or wind pumps as well as stock tanks, buried or surfaced plastic pipelines. The size and type of pump and tank depends on the size of the herd, the lift to the tank, and how often the pump runs.

Cattle can survive by accessing water directly from creeks and sloughs. This direct access has several detrimental effects on both the water body and the cattle. Creek banks and slough edges can become muddy and de-stablizied as well as become contaminated by manure and urine. Cattle suffer from increased foot rot and muddy udders. Research has conclusively shown that cattle prefer and perform better with clean water. If remote watering can be easily moved and used, then it will more likely be used all the time rather than only in certain fields. In addition, a portable system will provide much more flexibility for rotational grazing systems and extending the grazing season.

If you plan to purchase a remote watering system you may want to pay special attention to how easy it is to move either with a truck or quad. Putting a remote solar watering system on a trailer is very useful for moving from field to field. It is also possible to put a windmill system and stock tank, or nose pumps on a trailer for easy portability.

When moving watering systems is too cumbersome and time consuming, some farmers have installed remote pipeline systems rather than dig another dugout or build another watering system. Remote plastic pipelines buried six inches underground are surprisingly comparative in cost, and a special pipeline plow requiring little horsepower can be used to quickly bury the lines.

We live in an age of convenience and efficiency. It is important to be aware of how convenient it is to use these remote watering systems, so that they do not sit in the farm yard most of the summer. They should used to their maximum benefit and fit in well with your livestock management style.

Grazing 300 + Days in Alberta


14/12/2005

Winterizing pasture water systems
In the last few years, some producers have installed winterized pasture water systems. The reasons for these systems include:

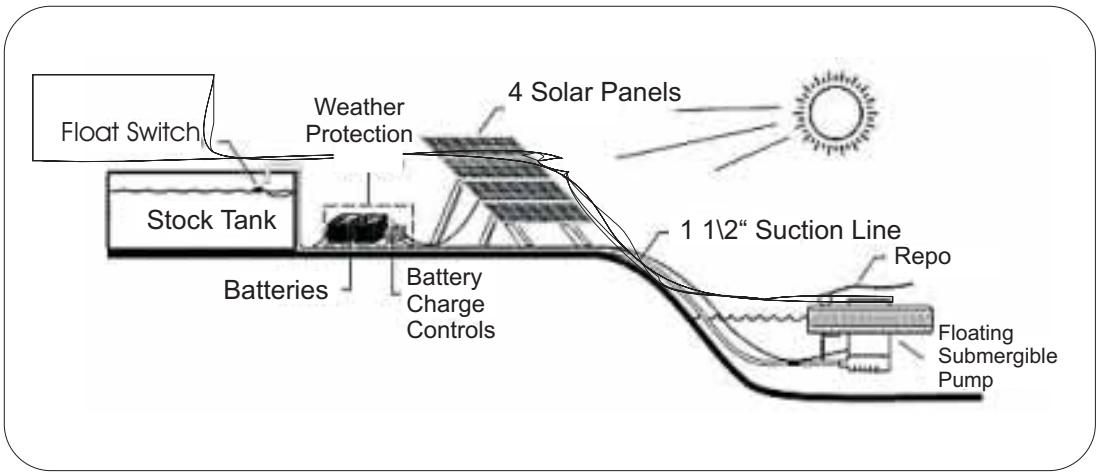
- Extending the pasture grazing season.
- Lack of water at the farmyard site or cropland.
- Winter feeding of cattle on pasture to reduce manure hauling costs.
- Provide increased flexibility for separating cattle at weaning and calving times.
- To prevent manure build-up in the calving areas.
- Animal health problems associated with all of these.

With the proper planning and design, almost all the pasture water systems can be modified and used through the winter.

In addition, many cow-calf producers utilize snow for watering their cattle in the winter, particularly when swath grazing or bale grazing. Clean fresh snow is preferred, especially for younger inexperienced stock. A backup contingency system is recommended in case the snow melts, or disappears due to the cattle utilizing it, or in case of lack of snowfall.

More information on livestock watering systems can be found on both Federal and Provincial websites. In other provinces contact an agricultural government office to find a water specialist near you. For further information on all types of livestock watering systems, contact the Agricultural Water Specialists with Alberta Agriculture, Food and Rural Development at the following locations:

Lethbridge (403) 381-5846
Red Deer (403) 340-5324
Grande Prairie (780) 538-5606
Edmonton (780) 422-5000



Snow as a Water Source

It is best to have access to a water source when winter grazing. Lack of/or poor quality types of snow may not meet cow dietary water requirements. However, if there is enough of the correct type of snow, cows can consume snow as a replacement for water.

Depending on the winter grazing system additional water needs vary. Swaths have usually 30% moisture. When grazing snow covered banked or stockpiled forages, moisture content is 30% or greater, and normal animal grazing actions consume snow with each forage bite taken in.

The University of Alberta has carried out studies on cows, calves and sheep using snow as a water source. Pregnant cows, when given snow as the only water source had no significant difference in body mass, subcutaneous fat, or birth weight, or weaning weight in their resultant calves versus a control group that was given water.

Calves can also consume snow. Average daily gain of calves can be suppressed at times when snow is the sole water source. It was concluded that if high performance is required, access to water for calves is advised.

Lactating cows will be able to use snow as a water source but since they lose body weight while doing it this is not recommended.

Cows (sheep, etc.) that have used snow as a primary water source in the past will adjust quickly when water is not available. Animals that are not experienced will show some distress for one to three days as they adjust and learn how to consume snow.

Animals prefer clean snow that is easily picked up. They do not prefer to consume snow from areas where it has been tramped, wind blown or crusted. In many parts of the prairies the lack of snow, or periodic melting conditions, make use of snow as a water source often undependable. Snow trapping may help to meet animal needs.

Animals need to be monitored to see if their needs for water are being met through available snow. A manager needs to watch for those animals that do poorly. These animals need to be removed from the system.

Snow Depth and Structure
Cows can graze through snow up to depths of about two feet depending on softness, experience and finding enough feed to be rewarded for their efforts. Sheep paw and can graze through snow. Supplementation will be needed to make up for intake shortfalls if snow depth or

structure is limiting animals feed intakes. The keys to grazing through snow are: high forage volume, adequate forage quality, softer snow type and high stock density to break snow crusts. Animals need to learn how to use snow as a water source. Wind swept areas or severely crusted snow make grazing difficult. The noses of animals can get tender. Lower leg hair can be rubbed off if the snow is too hard or crystallized. If this happens the animals need to be removed from this feeding system. Physically getting to the feed can become impossible if the snow becomes too hard or the feed cannot be found.

Electric Fencing for Winter Grazing

Winter and electric fences are not usually a good combination. There are several factors against you before you start and these factors can cause problems controlling animals in the winter.

- The soil is generally quite dry on top even with the snow on it so your ground does not conduct as well as it does in summer when soil is moist. The reason for this is that dry soil acts almost as an insulator rather than a conductor because of its resistance to the flow of electricity.
- Animal winter coats are much thicker and longer so are not good at conducting electricity and delivering a shock to animals.
- The atmosphere is also generally quite dry in winter so the air itself is also much more resistant to electrical flow.

Electric fence performance in winter can be improved by:

- Ground becomes very critical, therefore you must pay special attention to detail in this area.
- Use galvanized large surface area ground rods (e.g. galvanized pipe + 1 ¼" tubing used to frame link fence gates).

Use more than one ground rod at the energizer end especially if you are using a half mile or more of main electric wire to supply your cross fence. Consider running a second wire below this wire and ground it to the energizer and to several ground rods along the fence every 1/8 mile. This reduces the distance from animals to ground connection of energizer.

- Use all galvanized connections, wire, rods, etc.
- Pour water on ground rods in fall and in winter occasionally to improve ground connection.
- The wire conductor used for cross fencing seems to make a difference as well.

First choice would be to use high tensile wire for all fences and install all fences in the fall for winter use. This means you need some method of winding up cross fences as they need to be taken out (e.g. ATV with reel on wheel or an electric or hydrostatic reel).

- If you like plastic wire, use the wire rather than the tape for movable fence. It seems to conduct electricity better in these conditions.

Training of animals is very important as it seems people who have cattle on electric fence year round have much better success in winter.

- Training means 24-48 hours in a regular fenced area using either barbed wire or board fence with offset wire at about 1 metre height energized with a high performance energizer (high voltage).
- If you have trouble, install both a hot and ground wire about 6 inches apart for a move or two, this may help train them again.

Voltage
Use your voltage meter to be sure voltage is, and remains high. Be sure to insulate fence well to reduce voltage loss.

- Be sure your energizer produces 4000+ volts and it matches your load (length of fence).
- Unless your main system is in good condition, you may want to disconnect much of the main system that is not in use for winter months.
- If you use a battery operated energizer, pay special attention to keeping the voltage up. Batteries do not like cold weather, so charge them often and keep them stored in an insulated box. A plug-in energizer is much more dependable.
- Some energizers are low in Joules (watts per second) rating but quite high voltage output so consider this. The higher voltage may help.

Mechanical construction ideas

- Pound posts in fall to facilitate use of high tensile wire for cross fences.
- If you need to install cross fence posts, use a cordless drill with a masonry bit to drill holes in the frozen ground and install 3/8" diameter fiberglass posts or step-ins.
- Another option is to pour concrete in car tires with a steel post in the centre. Make it so the concrete does not contact the ground in the center and a small bump with a loader will break and loosen it for moving.

Species for Extending the Grazing Season

General Thoughts

- Forages used for winter feeding should be tested using a wet chemistry test for feed value whether they are in a bale, pit, standing or lying in the field.
- Pay close attention to the mineral requirements of animals, especially cows close to calving. Different species have different mineral profiles. For example, cereals tend to be low in calcium and magnesium, and higher in phosphorus and potassium. This combination can cause winter tetany.
- ALL species have losses in yield, crude protein and energy over the course of time; especially those left to the elements. Do not assume that what you tested in September is what the cattle are eating in February.

Annual Cereals

- Traditionally grown cereal crops are low risk compared to some of the newer species entering the market place. They are low cost to grow, and will produce good yields in almost any kind of weather.
- Barley and oats are most commonly used.
- Producers and researchers have found that high yielding grain varieties generally produce higher forage yields. That is because the head makes up a significant portion of the dry matter yield in a plant.
- Barley has higher feed value than oats. Forage quality of Barley is 11-12% crude protein (CP) and the total digestible nutrients (TDN) are 62-64% while oats is 10-11% CP and 60-61% TDN.
- Oats can tend to have higher feed wastage due to the coarseness of its stem.
- If using barley for swath grazing, smooth-awned varieties are preferred as rough barley awns may lodge in a cow's mouth causing lump jaw.
- Triticale or wheat can also be used for swath grazing, however they are less commonly used and have limitations. Triticale will have similar yields and quality as oats and barley; however it does have a very coarse stem possibly limiting palatability. It also has rough awns similar to barley; although there are new varieties arriving that are awnless or have reduced awns. Wheat will tend to have lower yields than the other cereals.
- Seeding of crops for swath grazing have traditionally been delayed to avoid spoilage. Research at Lacombe (Figure 1) shows that delayed seeding of barley and oats until mid-June reduces yields by about 40% when compared with mid-May seeding.
- Forage quality at the time of swathing can be enhanced by selecting late maturing forage type varieties.
- Crops that are in the soft dough stage, green and leafy at the time of cutting, will provide the best forage quality for swath grazing. Cereals should be swathed in the soft to mid-dough stage.

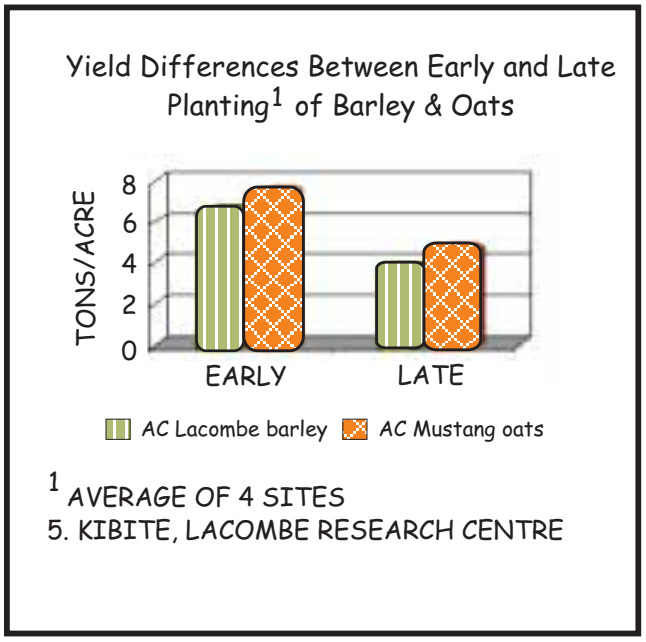


Figure 1

- Normal fertilizer rates used for grain crops are adequate for a swath grazing program, however increasing the fertilizer rates by 25% has been advocated by some. The rationale behind this thought is to extend the growing season, and increase potential for growth.

- Nitrate accumulation can be a concern with swath grazing. If normal fertility rates are used, the incidence of nitrate problems is very low. Nitrate accumulation might be a concern in fields with a history of high soil test nitrogen.

Winter Cereals

- Fall rye, winter wheat, winter triticale and annual rye grass are the fall/winter crops commonly grown in Alberta.

- These crops provide late fall and early spring grazing when perennial pastures may not be able to be grazed.

- Fall rye is the most winter hardy followed by winter triticale and winter wheat, which more often show signs of winterkill.

- Winter triticale, fall rye and annual ryegrass are more productive during the fall than winter wheat. These crops are capable of withstanding frosts and still maintain their green color and quality.

- Optimal seeding dates for winter crops vary slightly across the province, however if the crop is intended for fall grazing, it should be seeded by the middle of August.

- If the crop is intended for spring grazing as well, the goal is for the crop to reach the three-to five-leaf stage before freeze-up. The plant mustn't be grazed too heavily in the fall to ensure good winter survival.

- Winter crops generally perform best when shallow seeded to about ½ to ¾ inch depth, with minimal soil disturbance into standing stubble. Shallow seeding allows for rapid seedling emergence, and the standing stubble preserves moisture for the fall and provides the best environment for over wintering.

- Winter cereals and annual ryegrass can also be seeded in the spring and used for summer grazing. Because they require a vernilization period to produce seed, these crops remain vegetative and produce only leaves in the year of seeding.

- The quality of the winter cereals and annual ryegrass is high and can easily be 20% protein and 75% digestibility.

Perennial Grasses & Legumes

- The best use of stock piled grazing is in the fall before the grass is covered over by snow. In early spring, yield and feed quality have declined significantly in most species.
- Supplementation can be used to “top-up” feed value while still having the stock piled forage provide a significant percentage of the diet in the spring.
- Work done by the Western Forage/Beef Group at Lacombe found that using vegetative regrowth is the first step in a successful stockpiled grazing program.
- Meadow brome grass, creeping red fescue and western wheatgrass had the ability to resist the weathering process. In spite of frost, snow, snow-melt and rain, they retained nutritive value longer than all other forage species. Their nutritional value maintained beef cows well into the winter months and served as a maintenance ration in the spring.
- Grass species commonly found in permanent pastures, such as creeping red fescue and Kentucky bluegrass, had the disadvantages of relatively low yields to begin winter.
- Alfalfa and clover are not a good choice for stockpiled grazing. They lose their leaves after the first frost and have a more rapid yield and nutritive value loss than all of the grass species.

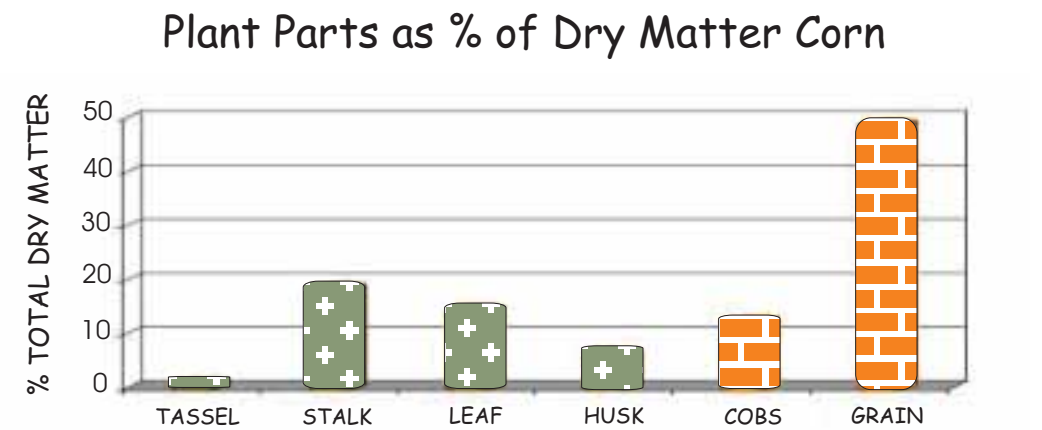
Cereal & Grass Residues

- Using combine residues can benefit both the livestock and cereal producers. It is a cost effective way to remove excess material from a field, and feed a cow for the winter.
- Residues can be left in a swath or in piles.
- In order of preference, cattle will eat grass straw before oat straw and barley straw, followed by legume straws and wheat straw.
- The quality of grass and legume straw can be extremely variable. The more leaves that are on the stems the better, but it can be very coarse and of poor quality. Coarse stems are also harder to dry down so mold growth may be present.
- Straws with more chaff will generally have more feed value.
- Chaff is made up of glumes, hulls, unthreshed heads and pods, short straw, leaf material and whole or cracked kernels or seeds from cereal, oilseed and pulse crops. Weed seeds are also a major component of chaff.
- Chaff can be handled and collected in either of two ways. It can be collected and dropped on top of the straw swath in straw/chaff bunches or it can be collected and blown into a chaff wagon using a chaff collector. The wagon then dumps piles of chaff in the field for feeding.
- Some producers have trouble feeding certain types of chaff. For instance, cattle have developed mouth ulcers from eating chaff from rough-awned barley.
- In areas where grass seed is grown, residues such as grass straw and fall re-growth can be used.
- A recent survey of grass seed straw found that all grass seed straws had higher average nutritional values than cereal straws. Tall fescue straw is one of the higher-quality grass seed straws that can be fed.
- The survey also showed a wide range in quality among the samples within each species, as well as variation from year-to-year within the same field. This emphasizes the importance of both feed testing and ration balancing.
- Health problems may occur if livestock are fed straw, seed screening or the re-growth of certain turf grass species like tall fescue that contain endophytes. Endophytes are fungi that can be toxic to livestock and that live within the plants (beneficial to the plant).

Corn

- Corn is much more expensive to grow than cereals due to higher seed costs and fertilizer requirements.
- Corn yields are similar to other cereal yields when seeded in early to mid-May and are harvested as greenfeed or silage.
- Most cereals grown for swath grazing are late seeded (late May to late June), and research conducted by the late Dr. S. Kibite at the Lacombe Research Centre showed that yield losses in late seeded cereals can be up to 40% due to the shortened growing season. Corn seeded in early May utilizes the entire growing season, and in this case may prove more economical for winter grazing than late seeded cereals.
- In Canada, corn varieties are rated according to their cumulative heat requirements to reach grain maturity using a system of Corn Heat Units (CHU). To reach an appropriate harvest stage for grazing generally requires 200 fewer CHUs.
- Many new varieties of forage corn have CHUs in the 2100-2400 range.
- When ear (cob and kernel) development is limited, or does not occur, silage yield is reduced by up to 50%, which will effectively double the unit cost of the forage (see Figure 1). Optimal development occurs when the milk line reaches half way up the kernel.
- Seed corn as early as possible to make maximum use of available heat units. Corn germinates when the soil temperature is about 10°C, and temperatures are usually adequate by early May. Choose a field with a south facing slope.
- Excellent weed control is a must! Corn competes very poorly with weeds in the early stages of growth. Using a glyphosate tolerant (Round-Up ready) variety often simplifies weed control issues.
- To determine corn heat units in your area refer to your provincial agriculture website.
- High nitrogen fertility is needed, especially in areas where corn silage yields can be very high. Low nitrogen levels can limit growth and lower protein levels in the plant.
- Corn is capable of utilizing high levels of soil nutrients caused by many years of manure application which creates lodging and other problems in cereal crops.
- Feed value of whole plant corn is approximately 8-10% crude protein (CP) and 66-70% total digestible nutrients (TDN).

Figure 1



M.S.Allen: Trouble Shooting Silage Based Ration Problems.
Proc. National Silage Production Conference. 1993

Millet

- Millet is an annual warm season grass.

- There are several different types of millet, but the three most commonly grown in Western Canada are Crown (proso; panicle type seed head), German (foxtail) and Siberian (foxtail). The foxtail millets are taller, later maturing, and well suited to forage production.

German Millet at Hairy Hill, AB
September 2003. Photo by Ted Greku

Proso Millet at Hairy Hill, AB
September 2003. Photo by Ted Greku

- Both types of millet have been successfully grown in Alberta. However, they require a fairly warm climate to produce well, and cool conditions can limit their growth potential.

- Millets, and proso's in particular, rapid maturity make it an excellent emergency forage crop if an earlier seeded crop has failed.

- Millet's warm season metabolism and early maturity allow it to tolerate drought. Proso millet seems to be the most drought tolerant, and under severe drought conditions, foxtail millet has been reported to go into dormancy.

- Millet is slow to establish and should be seeded on clean ground. Chemical weed control options are limited for millet. Producers can take of advantage of the later seeding date to make an extra pre-seed glyphosate application.

- For best results, select fields that are well drained with a southern exposure.

- Sow millet into warm soils (about 10°C) when the risk of frost has passed.

- Millet does not have especially high fertility requirements and will produce well with only 30 to 50 lbs of available nitrogen. Higher nitrogen levels will produce considerably higher yields, but severe lodging and the risk of nitrate accumulation in the forage offset any gains.

- Millet is best suited for swath grazing. Yields and quality tend to be comparable to spring cereals used for the same purpose. However, later seeding dates, warmer temperatures, and drier conditions can favor millet. Millet will resist some weathering in the swath due to a thick waxy coating over its leaves and stems.

Millet should be cut at the boot or early heading stage. Forage quality of German millet harvested at this stage is 10-14% crude protein and the total digestible nutrients are 57-60%. After heading, foxtail millet will begin to develop sharp bristles in the seed head, which may cause lump jaw and eye irritation.

Economics of Year Round Grazing Systems

Introduction
Over the last few years, surveys of cow/calf operations in Alberta and Saskatchewan have shown that the total cost to produce a calf has been between $550-760, or $1.05-1.47/lb of calf raised. Feeding systems make up about 60-70% of these costs of which 2/3 is winter feed and bedding. Pasture makes up the other 1/3 of the equation. Yardage costs, the variable costs other than feed that are used during that feeding or grazing time, have ranged between $0.38-1.25/hd/day.

Economics can be overwhelming and confusing for farm managers. However, production numbers, revenues and costs are all needed in order to make good business decisions. Costs and returns for cow/calf producers are typically spread over different enterprises within a mixed farm operation. For example, they may be spread over a hay or silage operation, calf back grounding operation and a cow/calf operation. Calculating them can be a bit complicated, but is worth the effort. A good understanding of revenue and costs makes decision making quicker, easier and more sound, so good opportunities aren't missed and losses do not continue to mount up. Taking control helps reduce stress levels.

Cost Comparisons of Grazing Systems
Comparing the costs of alternative practices to traditional stored winter feeding systems will evaluate what impact the alternative system has on the operation as a whole. The cooperators in the Year Round Grazing Project have shared production and rough cost numbers in each of their articles. The numbers and assumptions will be different for each farm or ranch operation. Circumstances in your operation will make it unique as well. Keep in mind, however, the benchmarks gathered by surveys of cow/calf producers in western Canada and the United States show:

- The low cost per unit produced cow/calf operations are the high profit ones.
- The lowest cost operations tend to have longer grazing seasons and use less winter feed.
- The most profitable operations have less overhead in machinery and other capital items.

It is not the winter feed costs that hurt most cattle operations; it is the system they use to deliver the feed. Most cattle operations are structured around high cost winter feeding systems. Essentially what they do in the summer will dictate what is done in the winter.

Putting Pencil to Paper
The numbers we share are primarily from producer surveys or research results gathered by the Economic Divisions of Alberta and Saskatchewan Agriculture, the Western Forage/Beef Group (WFBG), Western Beef Development Center (WBDC) and other economists. This data was then formatted to give honest, yet understandable systems comparisons. We recommend that the results of these comparisons be used carefully. Every farm or ranch operation is unique. Calculating a “bottom line” using your own production and financial records is necessary to be accurate for your own situation.

Feed and Yardage Costs
There are two parts to grazing or feeding costs. One is the cost of feed, and the second is the cost of everything involved in allowing that feed to be used, commonly referred to as yardage. For our purposes **feed cost** is the common purchase price and transport cost to get feed to the winter feeding yard. **Yardage** is all the costs of delivering the feed to the animals plus the expense for items used in that feeding period. These include: fuel, machinery operation and maintenance, building and fence repairs, utilities (natural gas and power), custom work,

operating interest, paid and unpaid labor, licenses, insurance, office costs, depreciation, lease payments and capital interest paid. In grazing perennial forages a startup cost (establishment, fencing and water systems) may be added on. We did not add it in because we have priced grazing at custom rates.

Generalizations:

- The majority of savings from year round grazing systems come from having lower overhead costs. Less machinery is required, therefore yardage costs of depreciation, capital interest paid, fuel, repairs and labor are lower than traditional systems.
- Rotational grazing pastures, when well done, will increase forage production, increase utilization from each acre, prevent the loss of higher production forage species and as a result will still be a highly productive pasture for years.
- Feed and yardage costs will vary depending on the cost to produce a unit of forage. For example, if yields are poor due to drought, overgrazing, low heat units, etc., the costs for these grazing systems will increase greatly.
- Comparing the costs of annual cereal pasture is difficult. Yield and economics of annuals depends on time of seeding, heat units, input requirements, weather conditions, etc.
- Well managed perennial pastures are typically more economical than using annuals for pasture. It is often difficult to get enough grazing days from annual pasture to cover establishment and production costs, competitively to well managed perennials pastures.
- Use of annual crops for grazing is still more economical than traditional winter feeding systems.

1. Comparison of Summer and Stockpiled Pastures

Comparing costs of perennial pastures is also a challenge. Continuous grazing has proven utilization rates of 30-50%, while skillful and flexible management using rotational grazing (Management-intensive Grazing) will have up to 60-85% utilization rates. With managed grazing, more of the annual production is utilized; and when wisely done, is sustainable over years of grazing.

Pasture cost data comparisons in Alberta come from the WFBG 1998 - 2005 Grazing System Comparison project. Pastures that were compared in summer, and also as banked for fall, were:

- Old species continuous grazed pasture.
- Old species fertilized and rotational grazed pasture.
- New seeded species grass/legume fertilized and rotationally grazed pasture.
- Alfalfa fertilized and rotationally grazed pasture.
- Annual species fertilized and rotationally grazed pasture.

Comparison was a challenge over the years as the grass/legume pasture lost the legume, the annual pasture establishment was poor in dry years and the alfalfa pasture winterkilled. Therefore, the annuals and alfalfa are not included in Table 1.

Table 1:

Gross Margin* for Summer and Stockpiled Pastures (Average of 5 Years)

	Summer	Stockpiled	Summer	Stockpiled
	$/Head		$/acre	
Continuous Grazed Old Grass	80	---	49	---
Rotationally Grazed Fertilized Old Grass	90	21	169	68
Rotationally Grazed Fertilized Meadow Brome Grass	94	65	214	249

* Gross product minus Direct costs = Gross margin

Assumptions:

- Costs are based on a 500 yearling farm unit with land rented.
- Yearling animals were purchased and sold from one system to the next using a 4% price slide and adjustments for seasonality.
- Prices were the average of 10 years
- Pasture costs per item were held constant at 1998 values.
- There was no forage left for stockpiling in the continuous grazed old grass pasture.

Table 2: **Summer Pasture Enterprise Yardage Costs**

	$/AUM *	
	Range	Average
2003 Economics & Competitiveness Division of Alberta Agriculture Survey	7 - 15 **	11 **
2002 - 2004 Western Beef Development Centre Pasture Yardage Survey	11 - 13	
2000 Alberta Agriculture Economic and Competitiveness Pasture Yardage Survey		$0.25 ***

* one 1000 lb animal unit with or without calf at side

** based on typical pastures with lower productivity (production ranging from 0.05 - 1.31 AUM/A

*** does not include fertilizer, start-up and land cost (assumed to be part of feed costs)

Yardage for well managed or rotationally grazing pastures in Western Canada varies with the level and experience of management. Low productivity is costly in any production system and most tame and/or native pastures are in need of rejuvenation. Yardage costs tended to be less on higher yielding tame or tame/native mixed pastures. Costs may go up for pastures that are more highly managed, but these pastures are also typically higher yielding for more years. WFBG research has shown over 2 times more grazing days on well managed rotationally grazed old grass pastures compared to continuously grazed old pastures. Production and profit were even higher on well managed improved species pastures. Yardage

costs of these various grazing systems are not published yet. For our calculations, we'll conservatively assume that the benefits of higher production rotational pastures are offset by higher costs for fencing, water development and labor.

2. Costs of fall/winter/spring year round grazing system alternatives

The following is a rough estimation of cost savings which would be realized by using any one of these systems for the entire 200 day winter feeding period. In reality, most operations will combine one or more of the practices, based on their individual operation. We recommend you calculate your own costs for your most accurate cost comparison.

Table 3:

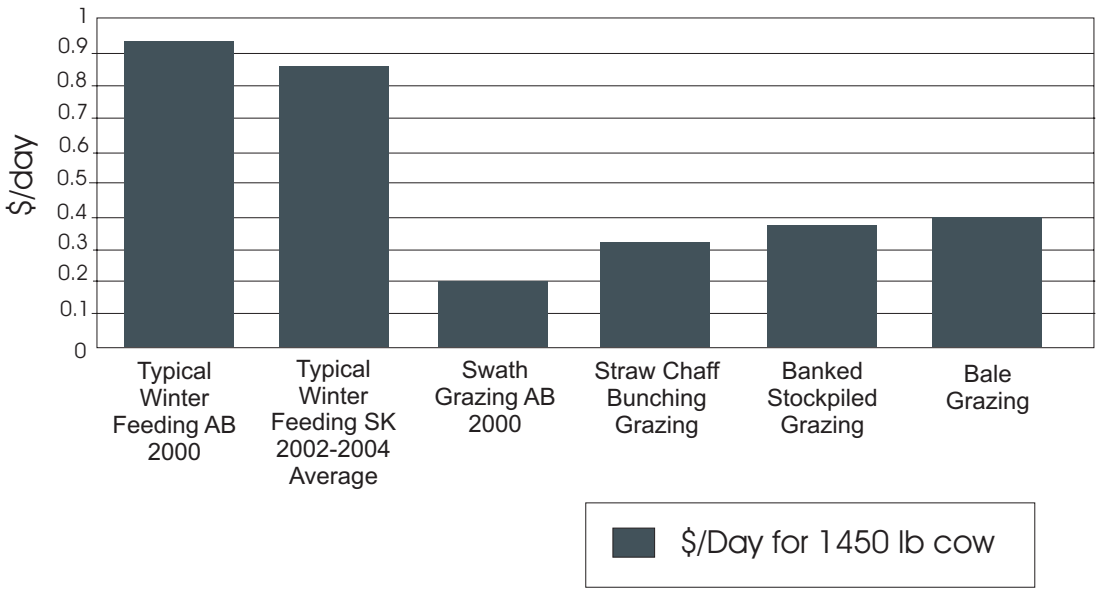
Grazing Alternatives Compared to 200 Day Winter Feeding Period of Hay/Straw

	Cost/Cow/Day	% Savings	Savings/Day	Savings/Cow	Savings /lb calf*
Traditional Hay/Straw	$1.75	0	0	0	0
Straw/Chaff Buncher	$0.72 or Less	59	$1.03	$206	$0.41
Swath Grazing	$0.91 More or Less	48	$.84	$168	$0.34
Banked/Stockpiled Grazing	$1.02 or Less	42	$0.73	$146	$0.29
Bale Grazed	$1.35	23	$0.40	$80	$0.16
1 Body Condition Score		15	$0.26	$52	$0.10

*of resulting 500 lb calf raised (refer to appendix on page 40 for cost savings details)

Table 4:

Yardage (non-feed) Cost of Wintering Systems



Open Forum

Forages left in the field can have losses in yield and quality due to weathering. Losses in quality are less than anticipated. To reduce weather risk swath grazing crops are seeded later but yields are usually lower because of this. Also, producers are trying to lay a more weather resistant swath. Using a tighter throated swather, or speeding up the swather canvases gives a more crowned swath with less surface area exposed. Swathing in an opposite direction of the seeding operation will help the swath sit up better on the stubble. Spraying glyphosate on the crop 1 week before normal swathing would occur and leaving it standing for an extended period of time is also being tried. This seems to work well from preliminary trial data. However, swaths made thereafter are fluffy. In windy areas they may have to be rolled with a canola roller so that the winds do not move them.

Second cut alfalfa hay can be grazed a few days after a greater than -5°C frost for over 5 hours with less bloat concerns. Swath grazing alfalfa has had mixed results. Success in Manitoba with alfalfa swath grazing has occurred. Alfalfa was cut only after a -7 to -8°C frost had occurred. Swaths were then not grazed until after the ground was frozen in November and December.

Wildlife can be a problem to winter grazing. Since systems like swath grazing are about ½ the cost of traditional systems yield losses of up to 50% can occur before the swath grazing cost advantage is lost. Deer damage may be acceptable but elk or bird damage may be too severe. Prevent damage by picking fields closer to building sites, encouraging hunting, and using sound cannons or scarecrows. Deer prefer alfalfa regrowth often over cereal swaths. Millet swaths which may not have grain in the heads could be another solution in areas with good heat units. Oats is not as preferred by waterfowl but ungulates still like them. Bird damage often is to the top of the swaths only, but fouling could be an issue. If on a bird flight path, allowing hunters in or using scare cannons can be effective solutions.

Temporary electric fences can be pulled down by herds of deer, elk or moose. Watching for direction of trails may help so fence placement is less disruptive to wildlife habits. Using survey tape on posts or wire will help wildlife to see fences. Building fences to be flexible and at a 30 inch height or lower can limit problems. Rebar is not as flexible as other posts unless it is free standing with a flat base welded on them.

When using extended grazing, management is more important than in traditional feeding systems. Contingency plans should be in place in advance for when sudden bad weather places hardships on animals. Use wet chemistry analysis to test feeds to find out forage limitations. Use mineral supplements (often calcium and magnesium is needed) and monitor intakes thereafter so animal needs are matched for forage limitations. In winter with short daylight hours it is hard to see what is really happening out in the grazing field. Cold weather, winds and snow can quickly impact feed accessibility, animal requirements and feed disappearance. Are the cows running out of feed under the snow? Is feed sealed off? Is the snow deep enough that all feed intake needs are not being met? Watch the cows for signs of unrest. To operate as a warning sign that something may be wrong, place poor quality forage like straw in a field being grazed. When cattle start accessing this feed it is a sign that they need to be moved or supplemented. Supplementing with a grain product or a protein source will

extend the grazing season, still keep costs lower and encourage the cows to keep grazing. A large enough amount of protein to meet each day's animal needs can be supplemented in larger amounts once every 3-5 days. No adverse effects from this feeding system were seen on older cows. Energy supplements must be given more often and every second day can be okay. An energy source high in digestible fiber, like alfalfa hay, is preferred over grain which is a high starch source. Starch will lower digestibility and forage intake depending on amount and time of day grain given, type of grain and quality of forage.

Cow condition needs to be monitored any time feed supplies can be deficient. Inexperienced animals, younger animals, or any animal losing condition are animals that may need to be removed from the extended grazing system. Running two herds is recommended so that animals can be sorted into more even groups.

For cows that have extra body condition and are calving later, another cost cutting option is limiting their feed intake. Limit feeding in winter should be done carefully and with more uniform groups of animals. Wait until February when days are notably longer and the sun's heat is greater. Energy intake is only what should be limiting. Protein and other nutrients should not be limited at any time.

Appendix 1

- Typical daily winter ration costs @ $1.75/cow/day ($0.95 feed +$0.80 yardage).
- Hay @ $65/ton in yard, 12% waste so 23 lbs fed.
- Straw @ $35/ton in yard, 20% waste so 12 lbs fed.
- Yardage @ $0.80/head/day (the average of Alberta and Saskatchewan cow/calf producer surveys of winter yardage, less the labor cost of calving, and adjusted upward to represent a 1450 lb cow. The range in yardage was $0.38 - 1.25/animal unit (AU) in Alberta and $0.78 - 1.04/head/day in Saskatchewan).
- Straw/chaff, grazed in the field in mixed piles + 4 lbs of barley supplement + 1 lb canola meal @ $0.72/cow/day ($0.40 feed + $0.32 yardage). Note: Feed cost includes interest, depreciation, repairs, labor of straw/chaff buncher and in spring heavy harrowing as well as barley @ $2.75/bu. and canola @ $240/tonne. Yardage is for grain delivery on alternate days and other overhead items. If the combine is set to throw over light grain, yardage can be dropped to $0.02/head/day. However supplementing just barley makes a ration borderline in crude protein and deficient in calcium and magnesium. Although this barley supplemented straw/chaff system is used by producers, use extreme caution as this approach can create a dangerous nutritional situation with winter tetany resulting. Supplementing with a very high quality alfalfa hay (to balance protein, possibly energy, and some mineral needs) every three days is an excellent alternative to a grain based supplement.
- Swath grazing @ $0.91/animal day ($0.73/day feed + $0.18/day yardage; yardage is based on 2000 AAFRD Swath Grazing producer survey results). Both surveyed and WFBG data showed about 46% savings in cost. The WFBG showed 44% less labor for swath grazing versus traditional feeding. Feed wastage averaged 14%.
- Seeding and swathing for swath grazing costs about $110/acre. Yields can average about 150 animal days of grazing per acre. (2.25 tons limit fed by allocated 30 lbs/cow/day is $0.73/day for feed). A 3 ton yield would reduce costs to $0.54/day for feed. That is why seeding earlier to take advantage of a potential for higher yields, is important.
- Banked/stockpiled grazing @ $1.02/animal/day ($0.66 pasture rent + $0.36 yardage). Feed costs reflect custom rates for grazing a 1450# dry cow. Yardage is taken from producer survey data in table 2 (page36). This is broken down into actual cost categories in the Appendix section, table 5(page 41). The yardage cost used reflects producer cost studies done by Alberta Agriculture in 2000. Pasture cost work done later by Alberta Agriculture and the Western Beef Development Centre in Saskatchewan actually give higher costs. Costs for pasture yardage are higher than most would expect. This is true even with rented pasture. The "typical" pasture is old and is not managed to provide high production. Low yield/low stocking rate, or short time spent grazing on that pasture does not have enough units of production to spread over costs (trucking, checking, labour, etc.) that do occur. Therefore, cost per unit produced is high. Work done by the Western Forage Beef Group has shown that well managed, higher yielding pastures should have a lower yardage cost per unit of production than low yielding pastures.
- Thin cows require 26.5 lbs dry matter and fat cows 21 lbs, therefore 5.5 lbs/day less feed.
- 1 BCS lost is a feed savings of $36/1000 lb cow or $52/1450 lb cow (1997-2000 AAFRD results Ellerslie study). $52 over 200 days = $0.26/cow/day.
- Bale grazing @ $1.35/animal day ($0.95 feed + $0.40 yardage). Yardage includes the cost to place bales, set up some semi-permanent fencing, labor to cut and remove twines, move electric fence plus bale feeders and other normal yardage items.

Yardage (non-feed) Cost of Wintering Systems

Table 5:

	Alberta Survey *	Sask. Survey **	Swath Grazing AB 2000	Straw Chaff Bunching Grazing	Banked Stockpiled Grazing	Bale Grazing
	$/AU/day	$/hd/day	$/AU/day	$/hd/day	$/AU/day	$/hd/day
Variable Costs						
Fuel	0.06	0.07	0.02	0.04	0.02	0.01
Repairs - Machinery	0.07	0.07	0.00	0.04	0.01	0.01
Repairs - Buildings	0.06	0.03	0.00	0.02	0.03	0.01
Utilities - Natural Gas & Electricity	0.03	0.12	0.00	0.03	0	0.03
Custom Work	0.04	0.06	0.00	0	0.01	0.23
Operating Interest	0.04	0.00	0.00	0.02	0.01	0.04
Paid Labour & Benefits	0.01	0.09	0.08	0	0.01	0
Unpaid Labour	0.13	0.32	0.02	0.12	0.04	0.05
Capital Costs						
License & Insurance, Equipment & Bldg Depreciation	0.15	0.11	0.01	0.05	0.07	0.02
Equipment & Bldg Lease Payments	0.01	0.02	0.00	0.00	0.00	0.00
Capital Interest Paid	0.05	0.00	0.00	0.00	0.05	0.00
Total Yardage Cost/head (1000 lb cow)	0.65		0.13		0.25	
Total Yardage for 1450 lb cow ($/head)	0.94	0.87	0.19	0.32	0.36	0.40

* Economic Division of Alberta Agriculture Survey of Cow/Calf Producers in 2000 Typical Winter Feeding System

** Economic Division of Saskatchewan Agriculture Survey of Cow/Calf Producers in 2002-2004 Typical Winter Feeding System

Dry matter losses (from harvesting and storage) in each of these systems need to be considered to fairly compare economic cost

Table 6: **Dry Matter Losses From Various Feeding Systems**

	% Range	% Average
Hay/Silage Systems	Hay 25-40/Silage 20	
Stockpiled/Banked Grasses	3 - 35	21
Stockpiled/Banked Legumes	40 - 50	45
Late Seeding of Swath Grazing Crop	0 - 50	10 - 30

NOTES

NOTES

The Year Round Grazing Program Committee gratefully acknowledges the support provided by the following groups for this publication.

Agriculture and Agri-Food Canada

Agriculture et Agroalimentaire Canada

These Producers generously shared their forage/beef systems with us and others through farm tours, workshops and contributing their experiences and knowledge to this handbook.

Neil and Ruby Boyd
Doug and Linda Wray
Elgar and Annie Grinde
John Gattey
Steve and Stacey Kenyon

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Lorne Erickson, Owen Nelsen, Duane McCartney, Lorne Klein, Dale Kaliel, Mark Johns, Vern Baron, Jim Bauer, Jack Kyle, Bart Lardner, Greg Griffin, Leanne Stucklschwaiger, Albert Kuipers, Arvid Aasen, Jane Thornton, Jim Gerrish and Fraser Stewart.

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We would like to thank all of the other supporters of this project whom we may have missed from the list.