Forage Country

SUMMER 2014

SPECIAL POINTS OF INTEREST:

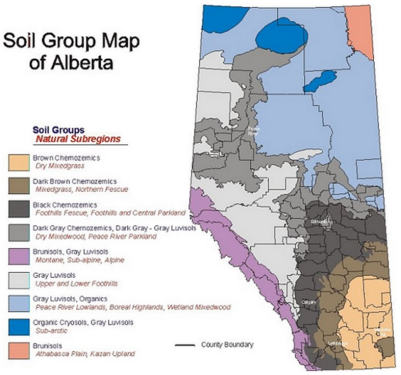
- Update on PCBFA Projects & Extension for the Year
- Research Articles
- Tour Ads

THIS ISSUE:

Fertilizing Perennial Hay and Pasture

by Kristy Oatway

Decreasing yield is the most common reason that forage stands are terminated through tillage and re-seeding. In many cases low yield may simply be due to nutrient deficiencies and not due to forage crop failure. Soil rejuvenation by fertilizer application is often the most practical and economical method to improve forage production and quality. While fertilizer is not commonly applied to forage crops it is a cost effective option that producers should consider when facing lower than expected or decreasing yields on both pasture and hay land (*Source: Beef Research Council).*



Forages require a number of soil nutrients to achieve optimum production. The type of soil found on your farm largely determines its nutrient content. The Peace Region is dominated by grey and dark grey soils which can pose a unique set of challenges for producers. Grey soils are commonly deficient in nitrogen and phosphorus and occasionally deficient in potassium and sulfur. Micronutrient deficiencies, such as copper and boron deficiencies, have also been reported in Alberta's grey soil regions. The nutrient composition of your soil can also vary greatly based on your management practices. Given the wide degree of variation in soil nutrient profiles it is often necessary to take soil samples to assess your soils fertility. Soil samples are a relatively quick way to assess your soil's fertility, giving you the ability to make informed decisions about your fields. Fertilizer retailers and forage associations can help you to collect soil samples and send them for appropriate laboratory analysis. Once the fertility of the soil in your hay and pasture lands has been assessed, any deficiencies can be corrected with application of fertilizers specific to your needs (*Alberta Agriculture).*

Grass in particular has high nutrient demands when compared to other crops, these needs should be considered when developing a fertilization program. For example, a 2 ton per acre brome grass crop will remove approximately 64lbs/acre of nitrogen per year where as a 59 bushel per acre barley crop will only remove 58.4 lbs/acre of nitrogen *(International Plant Nutrition Institute Nutrient Removal Calculator)*. Both crop yields are based on ten year averages published by Alberta Agriculture and Rural Development in 2011. These high demands can be, in part, reduced by adding legumes to your pasture mix.

Peace Country Beef & Forage Association

" Forages & Beef; Partners in Profits"

Locations

Fairview Campus, Animal Sciences Building

780-835-6799

High Prairie Provincial Building

ARD/AFSC Office

780-523-4033

" Whole-Farm Systems Analysis for Beef Cattle Production" and "Management of Environmental Responsibilities on Beef Cattle Operations"

The Peace Country Beef & Forage Association believes that the sustainability of rural communities in the Peace River region will be dependent upon a strong agricultural economy with livestock production as its foundation. Our goal is to improve the profitability and sustainability of the forage / beef industry in the Peace region through the transfer of leading edge forage and beef technology to producers, students, and industry representatives through innovative extension activities and initiatives. This will be accomplished by providing forage / beef producers with the management tools needed to manage their beef and forage operation as a unit, rather than individual components. To contribute towards sustaining this foundation, the Peace region beef industry will need to embody the following objectives:

- Create awareness of nutrients, nutrient distribution, collection and management on farm from wintering sites to pastures to crop land and to increase distribution and utilization of farm resources.
- Increase animal performance by enhancing utilization of feed stuffs through improved feeding strategies and better forage/feed selection.
- Improve management strategies of annual and perennial forage species.
- Improve livestock facilities and manure management operations that pose a significant risk to water quality.
- Enhance riparian function and condition through improved grazing management.
- Reduce environmental impact of livestock production/wintering systems and create an environmentally and economically sustainable beef cattle production system.

If you have any questions, comments or feedback about our current extension events or any of our projects, please do not hesitate to give us a call at either PCBFA office.

Your input matters to us!

Table 1. Nutrient removal per ton of grass	
Nutrient	Nutrient removed (lb/ton – dry matter basis) [Z]
Nitrogen (N)	30 to 35
Phosphorus (P)	4
Phosphate (P_2O_5) [Y]	10
Potassium (K)	40
Potash (K_2O) [X]	50
Calcium (Ca)	7
Magnesium (Mg)	5
Sulphur (S)	5
Boron (B)	0.08
Copper (Cu)	0.01
Iron (Fe)	0.3
Manganese (Mn)	0.1
Molybdenum (Mo)	0.002
Zinc (Zn)	0.05

One of the most important nutrients for plant growth is nitrogen. Nitrogen is stored in soil organic matter as "organic nitrogen". In order to be utilized by plants organic nitrogen must be converted to "inorganic nitrogen" by soil microbes through a process known as mineralization. Mineralization is a slow process that can only supply 5-20% of the total nitrogen required for grass production. The process of mineralization can be affected by soil temperature, soil moisture, soil compaction and organic matter content. Legumes, such as alfalfa, are capable of generating their own nitrogen through nitrogen fixation and can therefore reduce the need for supplemental nitrogen application. If the total legume content exceeds the grass content on a percent basis there is little need to apply nitrogen fertilizer. Nitrogen can be applied to hay and pasture as urea or liquid nitrogen. Urea (46-0-0) is available in a granular form that can be used for broadcast application. However when broadcasting urea it is important to consider the environmental conditions. Urea is susceptible to volatilization when soil temperatures exceed 5° Celsius or when air temperatures exceed 10°. Liquid nitrogen fertilizers (28-0-0) contain 50% urea and 50% ammonium nitrate and can be successfully dribble banded onto pasture in early spring.

Phosphorus is another nutrient important for plant health and productivity. Without adequate phosphorus, many types of forage will not respond to nitrogen fertilization leading to lower than expected yields. Most soils in Alberta are low in plant available phosphorus, however residual phosphorus levels can vary greatly depending on past phosphate fertilizer use and manure management practices. Phosphorus can be applied to forage annually at a rate of 20-40lbs/acre of phosphate (P_2O_5) for soil maintenance or in a bulk application before a new stand is established at a rate of 100-200lbs/acre. A bulk application is often considered more convenient as it provides enough phosphorus to sustain forage growth for six or more years, however annual application tends to be more economical. Broadcast and band fertilization have both been found to be effective application methods.

Other nutrients can also affect the productivity of your forages. Sulfur, like nitrogen, is stored in organic matter and then released in its useable form SO_4-S. Fertilizers with sulphate-sulfur, like ammonium sulphate (21-0-0-(24)) are most effective for meeting your short term goals with elemental sulfur fertilizers better suited to long term goals. Potassium is another important nutrient for forage growth, however, potassium fertilizers do not reliably increase yield even in potassium deficient soils.

If commercially produced fertilizers are not a good fit for your farm other options are available to help increase forage yield. One of the most well-known alternatives to commercial fertilizers is manure. Manure should be used with some caution as manure, and liquid manure in particular, can burn leaves in addition to potentially introducing weed seeds into your pastures. Soil compaction due to the use of heavy manure spreading equipment is another potential issue that can arise after manure application. Producers should consult the Tri-Provincial Manure Application and Use Guidelines available on Alberta Agriculture's website for more information before applying manure. Fall and winter bale grazing is another alternative producers can explore to improve their soil's fertility and in turn increase the yield of their forage crops (*Alberta Agriculture*).

Producers have a number of options to improve the production of their pasture and hay crops. Soil testing and appropriate fertilization is an option that producers should consider before terminating their fields. Fertilization can improve yields and increase the longevity of forage stands while saving producers time and money. For more information on forage fertilization producers can consult Alberta Agriculture and Rural Development's website or your local forage specialist.

Forage Fact # 77

Date:
January 2014

Emerging Re-vegetation Superstars

" It has been a great working partnership with Encana and Shell. We are all on a steep learning curve."
~Bill Wilson
Project Lead

Introduction

The Re-vegetation project has been garnering a lot of positive attention over the last two years as it works cooperatively with both Shell and Encana to re-vegetate disturbed land. Between research and demonstration plots, significant information has been collected in regards to forage species and seeding practices that work well in these situations.

Julie Robinson and Bill Wilson - a couple of the people superstars in the project.

Year One Overview

In the spring of 2011 two lease sites and one roadside were seeded. When research and demonstration plots are seeded onto the berms and roadsides there is a target number of 80 seeds/ ft^2 broadcast. The first piece of data collected after seeding is emergence (Forage Fact 75: Re-vegetation Project Overview). Plant count data one month following seeding combined with germination and purity information from the Seed Certificate of Analysis provides data on which species had successful emergence (see Forage Fact 60: Seeding Your Knowledge).

Germination data from these sites is important as the growing conditions on berms and some roadsides can be less than ideal. Berm construction is not regulated therefore it depends on the equipment operators as to how they are built. Berms are normally separated into top soil and sub soil (mineral soils). This affects the nutrients distribution and presence, pH and organic matter present. Slope of the berm also plays a key role as this adds erosion risks, challenges for seed distribution and mimics droughty growing conditions. Therefore plants have to overcome a number of extreme conditions just to germinate and exist on a lease site berm.

From the first year of data both meadow bromegrass and Anik alfalfa emerged very well. Creeping red fescue and slender wheatgrass had moderate emergence while sheep's fescue, timothy, and fowl bluegrass displayed poorer performance.

Forage Species Seeded in Research Plots

Creeping Red Fescue

Fowl Bluegrass

Meadow Bromegrass

Smooth Bromegrass

Sheeps Fescue

Slender Wheatgrass

Timothy

Anik Alfalfa

See Forage Facts 70-74 for species descriptions on our website.

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For more Forage Facts visit:

www.peaceforage.bc.ca

Peace River Forage Association of British Columbia

Encana Lease 13-18-79-17

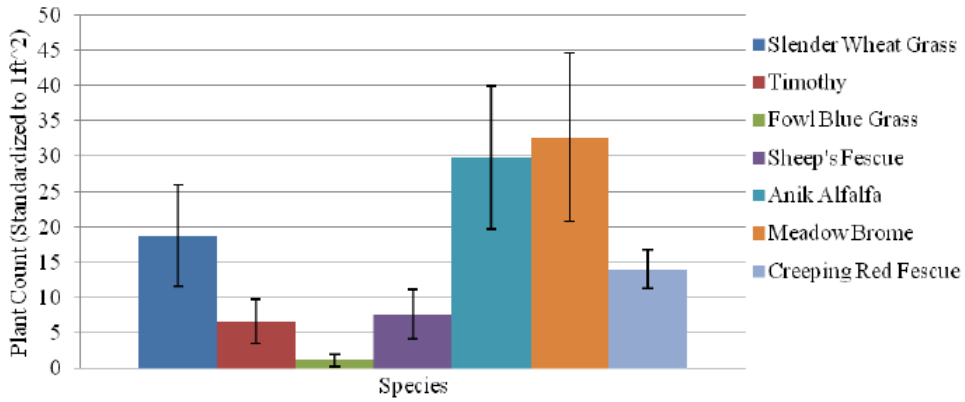
Last year we obtained our first statistical results for emergence of plants in our research plots. The site 13-18-79-17 is located on the 214 Rd near Farmington . It was seeded in May of 2012 and emergence counts were done in July of the same year. At this site we had seven species in the research plots, each one repeated four times to provide reliability in the results. The research plots were only on a topsoil berm.

Anik Alfalfa at 13-18, 2013

Emergence

The diagram below indicates the average emergence count of each species on Site 13-18. Meadow brome, had the highest emergence, where as fowl bluegrass had the lowest. The vertical black lines indicate the standard deviation. For statistical significance (Table 1 below), if two species share a letter they are not significantly different. If they don't share a letter, they are statistically different and not due to chance. This shows that Anik alfalfa and meadow brome were the strongest species in emergence data, by a significant difference. Slender wheat and creeping red fescue follow with a significant difference to alfalfa and brome. Timothy and sheep's fescue are lower, although not being significantly different from creeping red, with fowl blue being the lowest.

Timothy at 13-18, 2013



Average number of plants emerged of seven species, repeated four times on EnCana Lease13-18-79-17-W6. Seeded May 2012, counted July 2012

Meadow Brome at 13-18, 2013

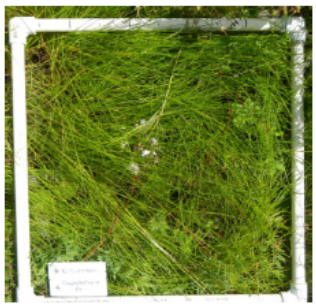
Standard deviation (SD) is the variation of data points around the Mean (average) calculated value. A low SD value indicates that the data points (replicas) are relatively close together, indicating that the results were less variable than if the SD is high

Statistical significance means two species have a difference that is not due to chance. No significant difference means the difference between two species may be due to chance.

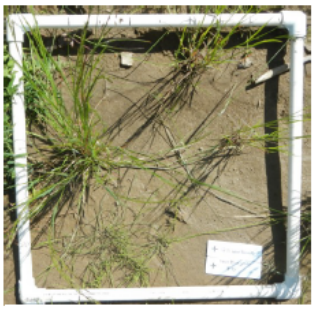
Table 1. Statistical Significance

Species	
Anik alfalfa	a
Creeping red fescue	bc
Fowl bluegrass	d
Meadow bromegrass	a
Sheep's fescue	cd
Slender wheatgrass	b
Timothy	cd

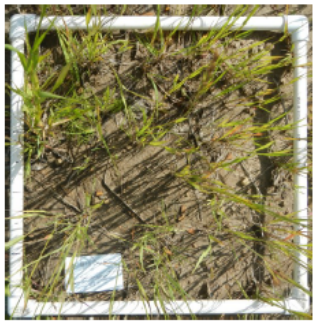
Sheep's Fescue at 13-18, 2013



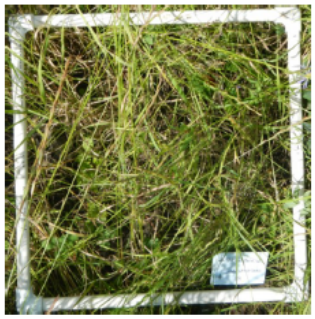
Creeping red fescue at 12-15 on topsoil berm, 2013



Fowl bluegrass at 12-15 on mineral soil berm, 2013



Slender wheatgrass at 12-15 on mineral soil berm, 2013



Slender wheatgrass at 12-15 on topsoil berm, 2013

Encana Lease 12-15-77-15

The site 12-15-77-15 is located on Bear Mountain behind Pouce Coupe. It was seeded in May of 2012 and emergence counts were done in July of the same year. At this site we had six species in the research plots, each one repeated four times to provide reliability in the results.

This site is unique in that the topsoil and mineral soil berms were constructed side by side therefore the research plots run perpendicular across both berms. This provides an excellent comparison between the different soil layers.

Emergence

The first figure (Berm 1) below shows the plant count results on the subsoil berm in the summer of 2012. Anik alfalfa, slender wheatgrass, meadow bromegrass and creeping red fescue all displayed similar ability to establish on this berm. Sheep's fescue established with moderate success and fowl bluegrass displayed poor establishment. Plant count on the topsoil berm (Berm 2) were higher overall than Berm 1. The worst emerging species to best emerging species followed a similar pattern as those on the mineral soil berm. The only exception is creeping red fescue which performed better in topsoil than subsoil.

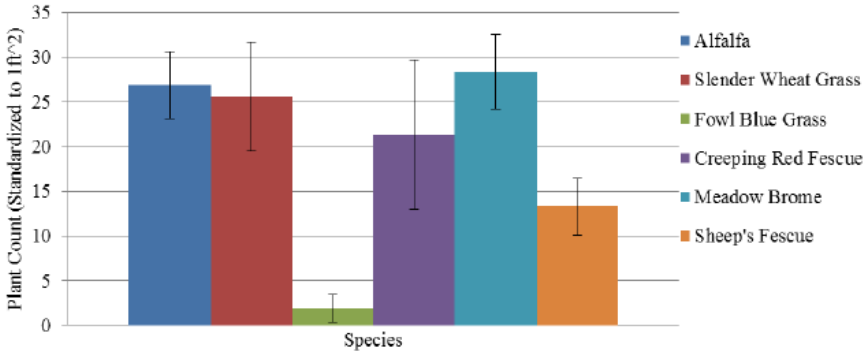


Figure 2.0 - 2012 average emergence of select species on Encana Lease Site 12-15-77-15-W6 Berm 1.

Note: The color coding between the figures is not consistent. E.g. Alfalfa is blue above and green below.

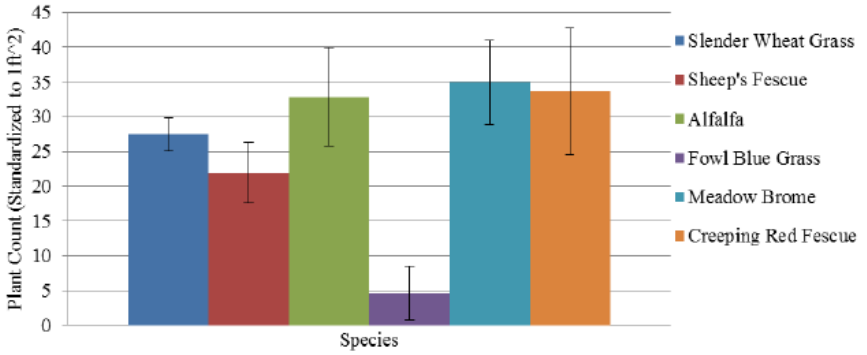
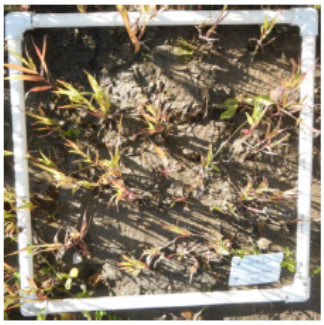


Figure 2.2 - 2012 average emergence of select species on Encana Lease Site 12-15-77-15-W6 Berm 2.

Encana Road 12-15-77-15

Only one road was seeded in the first year and it was the one that lead into the 12-15 lease site on Berry rd behind Bear Mountain. A unique attribute of this site is when the road was constructed the topsoil from one side of the road was dug up and used to build up the other side. This resulted in the forage species seeded on the south side of the road establishing in mineral soils and those on the north side in topsoil. At this site we had seven species in the research plots, each one repeated four times.



Smooth bromegrass on 12-15 road, 2013

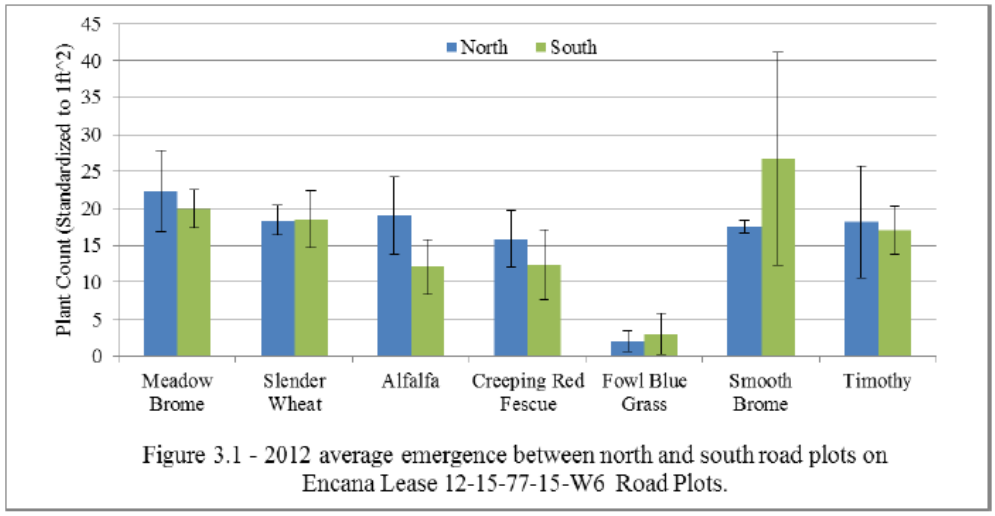


Figure 3.1 - 2012 average emergence between north and south road plots on Encana Lease 12-15-77-15-W6 Road Plots.

Emergence

In the figure above plant counts are presented for both the north and south sides of the road. Although the standard deviation is high, smooth bromegrass is the only species that had higher counts in the mineral soil (south side) than in topsoil. Ultimately, there should always be better establishment in topsoil. However what is not shown in this data, is the natural re-vegetation that occurs in the topsoil plots. There is a large seed bank in this soil which once disturbed also provides opportunity for seeds to germinate and emerge. These plants provide competition to the forage species that were broadcast seeded. This could explain why smooth bromegrass has established better at this point in the research plots. As predicted from the statistical results seen previously, meadow bromegrass, slender wheatgrass, Anik alfalfa, creeping red fescue, timothy along with smooth bromegrass had no statistical significance between the counts on the north side of the road. On the south side there was more of a spread between the species. Fowl bluegrass however consistently performed poorly on both sides of the road.

Summary

Overall meadow bromegrass and Anik alfalfa showed the best emergence in year one of the project. Although fowl bluegrass performed poorly it will be tested again in the fall seeded plots.

Agriculture and Agri-Food Canada / Agriculture et Agroalimentaire Canada

Investment Agriculture Foundation of British Columbia

Funding for this project has been provided by: Agriculture and Agri-Food Canada through the Canadian Agricultural Adaptation Program (CAAP). In British Columbia, this program is delivered by the Investment Agriculture Foundation of BC.

Compiled by: Carmen Schneider, Erwin Rehl and Talon Johnson in January 2014.
With Contributions from: Julie Robinson, Sandra Burton & Bill Wilson.
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Evaluation of Forage Type Soybeans and Peas for Forage Yield and Quality

Annual forage legume crops can complement annual cereals or perennial forages or they can be utilized as emergency feed. Using annual legumes can provide additional rotational benefits with about 25% of the overall nitrogen fixed by the legume plant remaining in the soil. Utilizing annual forage legumes in a portion of the forage based cropping systems will also allow the producer to diversify without taking land out of annual crop production. The objective of this trial was to assess the performance of forage type soybean and pea varieties for forage yield and quality for beef cattle production.

Methods

Trial Site: Fairview Research Farm (NW5-82-3W6) on RR #35, MD of Fairview. The site had no crop planted in 2012, but had a canola variety trial in 2011. The site had a pH of 5.4 and 8.8% organic matter. Prior to seeding, a pre-seed weed control was carried out with Credit® after the site had been harrowed.

Crop Variety, Seeding and Crop Management: Three forage/silage type roundup ready soybean varieties (P001T34R (from Pioneer), Mcleod R2 (from Secan) and Mammoth R2 (from BrettYoung) and two forage type pea varieties (40-10 and CDC Horizon) were used for the trial. The crop varieties were arranged in a randomized complete block design with two replications in plots measuring 1.4 m in width and 8.5 m in length. Seeding and fertilizer application were done on May 23, 2013 with a Fabro plot drill equipped with double shoot Atom jet openers. Inoculated soybean and peas seeds were used. Fertility was 40 lbs/acre of 11-52-0. Seeding rate was 104 lbs/acre for 40-10 pea, 115 lbs/acre for CDC Horizon pea, 48 lbs/acre for P001T34R soybean, 75 lbs/acre for Mcleod R soybean and 62 lbs for Mammoth R2 soybean. Seeding rate was based on 4 seeds/sq ft for soybeans and 10 seeds/sq ft for peas. In crop weed control in soybeans involved the use of roundup and for peas, Basagran Forte was used. Hand weeding of volunteer canola took place twice in the soybean plots.

Field Notes and Measurements: Notes were taken on seedling emergence, flowering, lodging and plant height. Crop harvest for forage yield estimation and feed quality test was done on August 18 and August 31 respectively for peas and soybeans.

Results and Discussion

Seedling Emergence and Crop Growth

Both pea varieties germinated at the same time and 7-10 days earlier than soybeans. Soybeans are warm season crops that require warmer soil temperature (about 10^{o}C) to germinate. Peas generally grew taller than soybean varieties. 40-10 pea variety lodged heavily, while no lodging was observed for CDC Horizon and any of the soybeans. All crop varieties (except for P001T34R) flowered and had their pods filled to some extent at harvest .


Soybeans


Soybeans with pods

Forage Yield

The DM yield was highest for 40-10 pea and lowest for P001T34R soybean. The lowest DM yield recorded for P001T34R probably resulted from its inability to flower during the growing season and absence of pods at harvest. This is probably an indication that DM would generally decrease for later maturing soybean varieties in this environment. But generally, pea varieties appeared to have higher forage DM yields (3.9 - 4.1 ton/acre) than soybean varieties (2.9-3.3 tons/acre). 40-10 pea out yielded CDC Horizon pea by 428 lbs DM/acre.

Legume Variety	Moisture (%)	DM yield (lb/acre)	CP (%)	Ca (%)	P (%)	Mg (%)	K (%)	Na (%)	ADF (%)	TDN (%)	ME ——	DE (Mcal/kg)	NEM ——	NEG —-
Mcleod R2	61.2	6654	17.9	1.78	0.18	0.60	1.74	0.02	28.8	63.8	2.30	2.81	1.43	0.85
Mammoth R2	65.1	6133	17.3	1.59	0.17	0.61	1.29	0.01	31.0	62.7	2.26	2.76	1.40	0.81
P001T34R	65.2	5868	18.2	1.56	0.15	0.73	1.73	0.01	31.8	62.3	2.25	2.74	1.39	0.81
40-10	65.2	8288	11.4	1.54	0.13	0.50	0.82	0.06	32.5	62.0	2.24	2.73	1.37	0.79
CDC Horizon	62.5	7860	11.9	1.30	0.15	0.37	0.96	0.05	33.3	61.6	2.22	2.71	1.36	0.78
Variety signifi-cance?	No	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No
LSD0.05	-	1639	3.92	-	-	-	-	-	-	-	-	-	-	-
CV, %	3.01	15.1	9.22	11.0	8.10	16.0	21.7	25.3	5.44	1.37	1.39	1.33	2.08	3.00

Forage Quality

Protein content was between 11.4 and 11.9% for pea varieties and > 17.0% for soybean varieties. Soybean varieties had 5.9 - 6.8% more protein than pea varieties. Protein was highest for P001T34R (18.2% CP). The protein values obtained for both peas and soybeans were sufficient for a dry gestating (7-9% CP) and lactating (11% CP) cow. All soybeans far exceeded the protein requirements by these categories of cows. For growing and finishing calves, which require 12-13% CP, all soybeans even far exceeded the required values.

The forage Ca content was lowest for CDC Horizon (1.30%) and highest for Mcleod R2 (1.78%). All the crop varieties exceeded the suggested Ca requirements for various categories of beef cattle (0.31% for growing & finishing calves, 0.18% for dry gestating cows and 0.42% for lactating cows).

For a dry gestating cow which requires 0.16% P, only two of the crop varieties (Mcleod R2 and Mammoth R2) met P requirement. Other varieties fell short (0.13-0.15%) of meeting what is needed by a dry gestating cow.

The requirements of both 0.12 % Mg and 0.6% K by a dry gestating cow were both met by all crop varieties. Of the five crop varieties, only 40-10 pea variety met the suggested Na content for a dry gestating cow.

Forage energy content (TDN) was >61% for all crop varieties and sufficient for cows in the mid and late pregnancy stages, but all crops had insufficient TDNs needed by a lactating cow (65% TDN).

Generally, though no significant differences were observed for all feed quality parameters analyzed for in the present study (except protein), soybean varieties appeared to be favoured by all feed quality parameters than pea varieties (Table 1).

Two cows are standing next to each other in a field.
Daisy: I was artificially inseminated this morning.
Dolly: I don't believe you.
Daisy: It's true, straight up, no bull!

Don Campbell
Peace Country Field Day Series

by Kristy Oatway

Local cattle producers and members of the Peace Country Beef and Forage Association were lucky enough to have the opportunity to learn from well-known holistic rancher Don Campbell when he visited the Peace Region from June 17-19th, 2014. Three, one day sessions were held in Valleyview, Fairview and La Glace on various topics including holistic ranch management, improving soil health and maximizing pasture potential. Producers in attendance came away with a number of ideas that are sure to be useful when implemented on their farms.

Don Campbell is a well-known author and veterinarian turned rancher from Meadow Lake, Saskatchewan. He and his wife Bev, along with his two sons, operate B-C Ranch, a commercial cow-calf operation with approximately 650 Angus-Galloway cross cows. Don was first introduced to holistic management in the 1980's and has been passionate about it ever since. He and his wife Bev both say holistic management has allowed them to live their dream and enabled their 4200 acre ranch to support not only themselves, but their two son's families as well. During his visit he stated that without holistic management he would not have been able to double his grass production and thus substantially increase his herd. Over the three days he regularly stated "Holistic management allows you to create the future you want". Don, one of only a handful of certified holistic educators in Canada, regularly offers six day Holistic Management courses to producers looking to learn more about holistic management.

Holistic management is a unique way to manage your farm to help you reach your farm goals. Campbell defines holistic management in two ways. It can first be defined as managing in a way that takes care of our people and improves our land while making a profit. Holistic Management can also be defined as making decisions that are simultaneously sound from a social, environmental and financial perspective. Throughout his three day visit Campbell emphasized that holistic management isn't about finding a way to solve everyone's problems, instead it focuses on working towards solutions to address each individual farms issues.

One of the most important pillars of holistic management, as was discussed during our three field visits, is the holistic goal. Campbell emphasized during the field visits that a farm's holistic goal needs to balance the needs of the land with the need to make a profit and maintain a good quality of life. He described the goal as a guiding principle that you should always be working towards achieving on your farm and that all decisions should bring you closer to achieving your end goal.

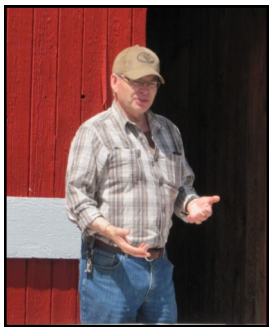
Over the three days we were lucky enough to visit three very different farms across the Peace Country, all of which brought a unique set of learning opportunities. During the field visits Don discussed the basics of holistic management and different ideas pertaining to pasture management were discussed while looking at various pasture sites on each farm.

Bill Hanson's ranch was the first of three visits throughout the week. Bill and his family have raised cattle in the Valleyview area for over a decade. One of the most important concepts touched upon during the day was the concept of planned grazing. Planned grazing is a grazing strategy that enables producers to make the best use of the grass they currently have and improve their future grass production while

improving their soil. The first step in making your grazing plan each spring is determining how long you want to keep your cattle in each pasture. By effectively planning the amount of time your cattle will spend in each pasture overgrazing can be prevented. Campbell defines overgrazing as something that happens when a cow grazes a piece of grass and remains in that pasture long enough to come back and re-graze the same piece of grass. In most cases it takes 3-5 days for grass to grow back enough for an animal re-graze the same plant. Based on this principle, we need to move our cattle every 3-5 days depending on our stock density, or the number of animals per acre.

The second step is determining the recovery period each pasture will be given. The recovery period is the time required for the plant to regrow its roots and leaves to a point where the plant is ready to bloom again. The recovery period required by each plant species varies, but is typically between 60-90 days. This means that once your animals have grazed an area they will not return to the same area until the recovery period has passed. Longer recovery periods will lead to lusher pastures but requires more paddocks. It is important to note that recovery is different from rest. Resting your pasture means leaving the land idle for a longer period of time than is necessary for the plant to recover. This leads to increased plant growth in the short term but fewer nutrients will be returned to the soil in a usable form leading to decreased productivity in subsequent years. Reduced production is partly due to the "mirror effect. The mirror effect refers to the fact that the amount of leaf material above ground is mirrored by the amount of root material below ground. When the plant grows, its roots grow with it. When the plant is grazed it no longer needs the same root system it did before, so part of the roots will die off and then be broken down by microbes returning nutrients to the soil. Rested pastures are unable to benefit from the recycling of root material throughout the summer resulting in poorer production than pastures that were only given a recovery period before being re-grazed.

After your grazing and recovery periods have been determined, you can calculate the number of pastures you will require. This is calculated by dividing your recovery period by your graze period and adding 1. For example, 16 pastures are required when each pasture is grazed for 5 days and the given a 75 day recovery period. Planned grazing with higher stock densities will result in a more even manure distribution and in turn better overall pastures.



Our second day of Don's visit brought us to Neil and Ruby Boyd's Fairview area farm. Neil and his wife have been farming in the area for a number of years and have overseen a number of changes to their farm during those years. The Boyd's originally focused on raising cattle and overtime have seen their focus shift towards a greater focus on grain production which brings its own set of unique challenges.

As Don discussed in depth over the week, cattle are an excellent tool improve the soil and productivity of your land. Cattle exert their beneficial effects in three ways: their manure, their urine and the action of their hoofs. Manure and urine recycle nutrients taken up from plants back the soil in a usable form, where as the "hoof action" provided by the cattle can help to improve the soils texture, as long as the cattle are not overgrazing the land. However, in order to

exert a beneficial effect on the land the cattle have to be on the land. While at the Boyd's farm we were able to visit his bale grazing site to see these principles in action. Areas where he had bale grazed showed a marked improvement in soil health as evidenced by the soft springy feel to the soil and the increased overall forage productivity. However, as Neil stated, it can often be difficult to use cattle as a tool on your grain land. As part of his holistic management plan for his grain land Neil uses zero till practices to help retain more moisture in his soil. The Boyd's also use different kinds of crops to help improve the overall health of their land, by incorporating legumes, like peas, they have been able to reduce their use of commercial fertilizer. Don suggested that a ten year rotation with the land being used for grain or oilseeds for six years and as a forage based pasture for the remaining four years would be another option to improve crop land.

During the day we were also able to visit the Boyd's pasture land along the banks of the Hines Creek. The native pasture illustrated a concept Campbell discussed throughout the week known as natural succession.

We have all heard the line "nature abhors a vacuum", this concept also applies to pasture land. In areas where the ground is bare, hardy plants like forbs and "weeds" will begin to grow in that space. In other areas of his pasture, the group was able to see a vast diversity of native grasses and legumes. Don described that this diversity was key to the pasture's success as regardless of the growing conditions, at least one of the dozens of plant species would thrive, ensuring that there would always be something for the cows to graze. Producers can replicate the diversity found on native pastures in their own fields by planting as many grass and legume species as possible. In doing so, producers can have a built- in insurance policy that will ensure that something will always grow regardless of how poor the weather may be. A final highlight of the day was seeing the "tippy tap" and water filtration system the Boyd's were introduced to on a humanitarian project in Africa.

Our last visit of the week was to Peter Egger's La Glace area organic farm. Peter and his family, along with trainees from all over the world, raise cattle on their former grain land. Peter and his family are firm believers in Holistic Management, frequently applying its principles on their farm. Peter even credits it with improving his marriage as the process of defining their goals allowed him and his wife to gain a better understanding of each other's wants and needs and empowered them to make better decisions.

Producers in attendance were able to view a number of his pastures and see how the principles of organic forage production can be easily tied into holistic ranch management. One key principle that was emphasized during our visit was the importance of profit over production. As Don explained, there is no benefit to doubling your grass production if your overall profit decreases. He suggested starting at the beginning of the year by deciding how much profit you want to make and then determining the level of production you need in order to be profitable. Don also emphasized the importance of farmers thinking like business people and farming to make a profit. During the session he stated "There is no conflict between business and a way of life, if you aren't a business person you may lose your way of life".

During our visit Don also discussed four factors to that must be considered when improving your land. The first factor is the flow of energy through your pastures. In order to increase your energy flow, you must increase the diversity of plants and include plants with wide leaves that will absorb more solar energy. This solar energy is converted to carbohydrates that your cattle can then use. A second important factor to look at is the water cycle in your pasture. Water is often the limiting factor to forage production in the Peace Country, and Alberta as a whole. While there is nothing we can do as producers to increase the total rainfall, we can, as Campbell says, increase our effective rainfall. Don defines effective rainfall as the rain that is left for the plant to use after water is lost to runoff and evaporation. Evaporation can be reduced by increasing the amount of thatch (or plant material leftover from previous years) on top of the topsoil through effective summer grazing or the use of effective winter feeding strategies such as bale grazing. Runoff can be reduced by increasing ground cover with plants whose roots can quickly take up water and reduce the speed with which water travels. The third factor is the mineral cycle. Manure contains a wide variety of minerals that can be used by plants. By quickly breaking down cow patties, or 'Diamond Pies" as Campbell refers to them, more nutrients are returned to the soil and less are lost to evaporation. Rapid breakdown of "diamond pies" indicates a healthy microbe population in your soil. The fourth factor is a diversity of plants. An ideal pasture mix includes plants that grow quickly in the spring to capture solar energy and plants that grow longer into the fall.

Over the three days Don Campbell and his wife introduced field day participants to a number of useful concepts they can apply to their own farms to improve their soil and increase their grass production while improving their quality of life. The three farms, Hanson's, Boyd's and Eggers' all offered participants a chance to see pasture management in action and gave producers a real feel for the benefits of holistic management. PCBFA would like to thank our three host farms, Don, and all those in attendance for making these three workshops a huge success!

The Peace Country Beef and Forage Association is planning to bring Don Campbell to the Peace Country again this winter to teach a full six day course in holistic management. The six day course is split into two, three day blocks separated by one to two weeks and will cover a variety of topics related to holistic management and will help producers to build a holistic plan for their own operations. Those who are interested in learning more about the course or other opportunities offered through the association should contact Monika Benoit in our High Prairie office for more information.

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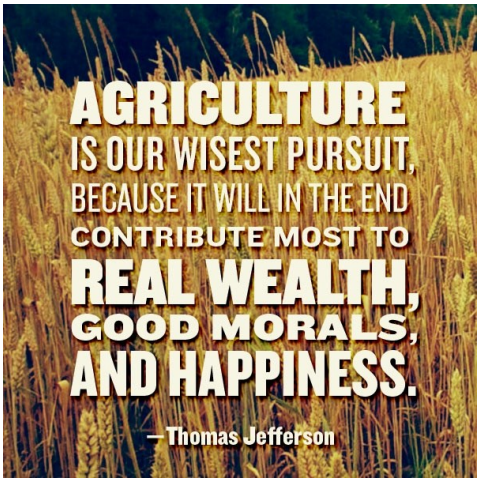


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A New Project on the Horizon: The Heart River Restoration Project

by Monika Benoit (PCBFA) and Adam Norris (MPWA)

This past winter, Peace Country Beef and Forage Association was invited to be a part of a restoration project on the North Heart River. PCBFA has been involved with many riparian projects over the years, and our involvement is a good fit to a new project taking place in the Mighty Peace Watershed, an area that we work in extensively. PCBFA has been involved so far in the set-up of the project, and once the on-the-ground work begins, our role will be to work with the livestock producers of the area to implement best management practices in riparian areas and across the landscape that will help to restore the Heart River to a healthy state.

The Heart River Watershed encompasses all of the land that flows into the Heart River. This watershed is home to the Village of Nampa, many farms, industrial activity and recreational spots among other things. A watershed is a unit defined by the land itself - all water drains to the same water body - and so it makes a lot of sense to think about water and how we deal with it in terms of watersheds. Many organizations have been active in this watershed trying to improve or maintain its ability to function. A watershed's ability to function is important because a functioning watershed supplies us with things that we want and need such as clean water, steady supplies of water, habitat for wildlife and fish, erosion control, soil moisture and flood control.

When funds became available to restore fish habitat in the Peace River area, several organizations got together and applied for that money. So we started working our way back from that endpoint. What drives fish habitat? Water quality and quantity. What drives water quality and quantity? The landscape (this is the same area as the watershed). What drives landscape? Human activity. In short, to really improve fish habitat we needed to start with human activity on the landscape. With this line of reasoning several organization found common ground in this project because developing a watershed restoration plan touches on human activity, landscape, water quantity and quality and fish habitat offering something to a range of organizations.

The underlying idea behind this project and its approach is that we need to take care of the watershed so that it can take care of us by providing us with those services that we want. Everyone needs water whether they drink, shower with it, grow crops with it, extract resources with it or just enjoy it. Since there are a lot of different groups using water, there are also a lot of groups interested in ensuring that we have adequate water resources. A restoration plan is simply the means of us trying to work at the big picture level.

The Heart River Watershed Restoration Project team consists of Cows and Fish, Government of Alberta staff - Peace River Fisheries Branch, the Mighty Peace Watershed Alliance, Northern Sunrise County, Peace Country Beef and Forage Association, Smoky Applied Research and Demonstration Association and the Village of Nampa. Each partner has its own area of focus but they all fall into the scope of the restoration plan and how it is attempting to restore fish habitat by starting with the big picture and working from human activity down through the chain.

With so many different organizations involved in the watershed and different people with different uses of water, coordination is a big concern. The restoration plan being developed by this project team will help ensure that there is no overlap or redundancy between the organizations. Also, once everyone has agreed upon the most effective steps that we can take to maintain and/or restore the function of the watershed, our resources can be employed with their biggest bang for the buck. If you have thoughts about the Heart River Watershed and what we can all do to share our water resources, please contact the project lead:

Adam Norris
Adam.mpwa@serbernet.com
780-324-3355

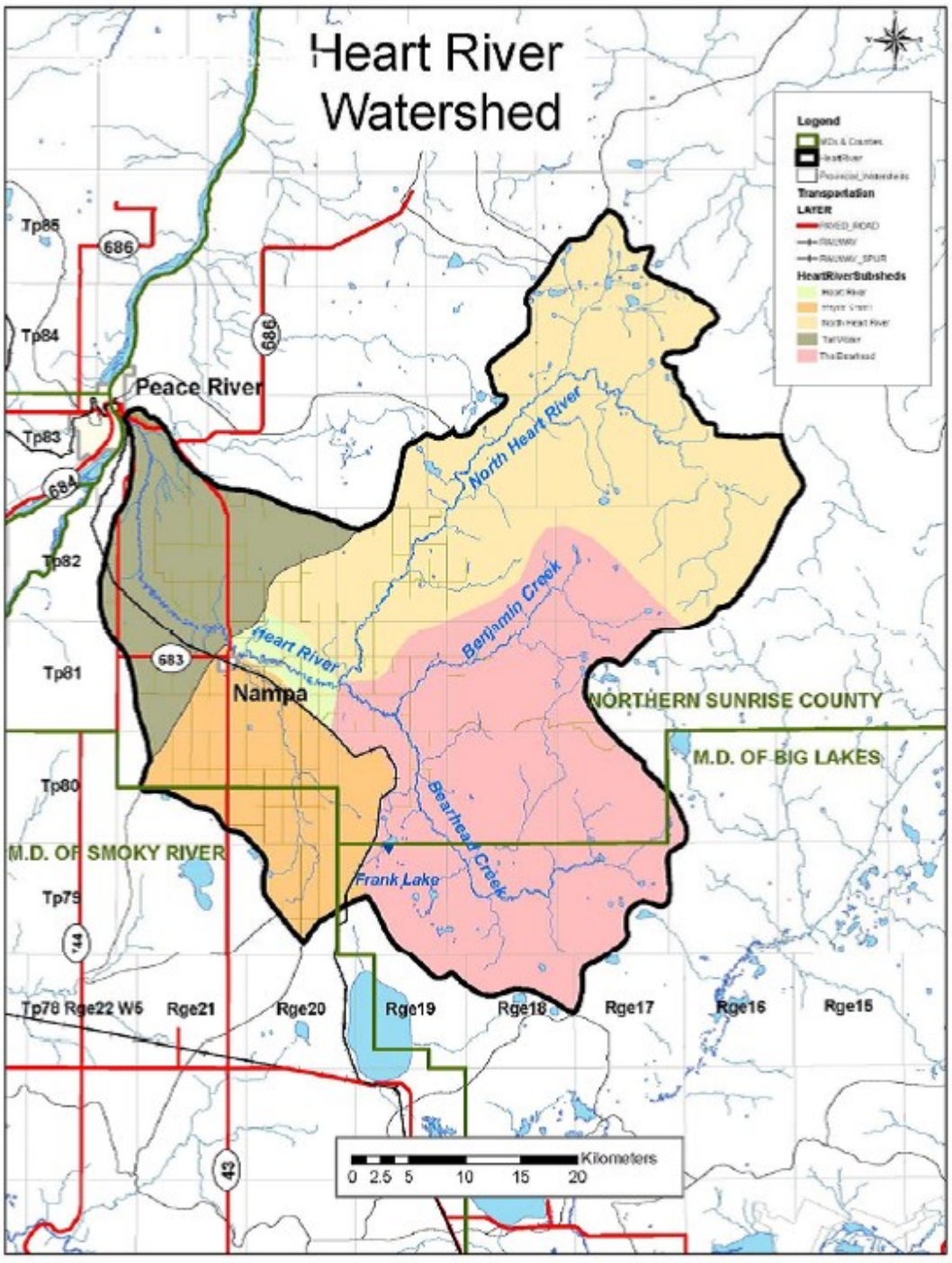

Figure 1: Heart River Watershed and Planning Area (figure provided by PFRA, 2007).

Agricultural Research and Extension Council of Alberta Hires New Executive Director

"ARECA is pleased to welcome Janette McDonald as our new Executive Director," says Bill Gaugler, chair of the board of ARECA.

McDonald grew up on a grain farm in western Manitoba and worked for 10 years as a District Agriculturist and 13 years as Executive Director of the Alberta Pulse Growers. "I respect farmers and the whole business of producing food," says McDonald. "I am excited about the opportunity to help farmers get the information they need to maintain soil and water health while paying the bills. The balance has always been tricky, and it will continue to be a challenge in the future."

"Our member organizations are looking forward to working with McDonald to advance the interests of Alberta farmers and the agriculture industry," says Gaugler.

ARECA

AGRICULTURAL RESEARCH AND EXTENSION COUNCIL OF ALBERTA

211-2 Athabascan Ave
Sherwood Park, AB
T8A 4E3
Ph: 780-416-6046
Fax: 780-416-8915
www.areca.ab.ca

The Agricultural Research and Extension Council of Alberta (ARECA) is a not-for-profit, producer-driven organization working to enhance and improve agricultural operations through increased access to field research and new technology.

Made up of 9 member Associations, ARECA acts as a strong, united voice for producers by speaking on their behalf to industry leaders and government representatives.

Each member Association delivers programs and develops projects that address the concerns and priorities of producers in their specific regions. ARECA's member Associations include:

- Battle River Research Group (BRRG)
- Chinook Applied Research Association (CARA)
- Foothills Forage and Grazing Association (FFGA)
- Gateway Research Organization (GRO)
- Grey Wooded Forage Association (GWFA)
- Mackenzie Applied Research Association (MARA)
- North Peace Applied Research Association (NPARA)
- Peace Agriculture Research and Demonstration Association (PARDA)
- Peace Country Beef and Forage Association (PCBFA)

In addition to the work done in each of the regions, ARECA oversees province-wide initiatives including the Regional Variety Trials, Precision Tools for On-Farm Research and the Energy Conservation and Energy Efficiency Project.

ARECA and its member Associations participate in and organize a wide variety of conferences and information sessions for producers.

Some of these include:

- Western Canadian Grazing Conference
- The Alberta Forage Industry Network (AFIN) and the Forage Agronomy Update
- Precision AG 2.0 Conference
- Various farm and field tours at locations throughout Alberta
- Diagnostic fields schools and workshops on age verification, riparian health assessment, ranching and marketing for women, crop strategy, energy efficiency, VRT and more…

ARECA also manages the Environmental Farm Plan www.albertaefp.com

For more information on ARECA, the specific projects taking place in each of the regions or upcoming special events, please go to www.areca.ab.ca or call us at (780) 416-6046

Introducing our 2014 Summer Student: Kristy Oatway!

I am very excited for the opportunity to work with the Peace Country Beef and Forage Association as the summer technician this year.

I grew up on a small purebred and commercial cattle farm just north of Rycroft. I spent much of my childhood showing bulls, heifers and steers at local purebred association shows and at local 4-H sales. I was a member of the East-West Woking and Eaglesham 4-H beef clubs for 9 years. As a 4-H member, I was able to travel to the Northern International Livestock Exhibition in Billings Montana as a member of the Alberta 4-H Livestock Judging Team and I also served as a Provincial Ambassador for two years.

After high school I studied Biological Sciences at the University of Calgary for two years before applying to veterinary school. I am currently in my 3rd year of veterinary school at the University of Calgary's Faculty of Veterinary Medicine and will graduate as a member of the Class of 2016. I have a strong interest in large animal medicine and I currently serve as the President of the school's Production Animal Health Club.

After graduating I hope to return to the Peace Country to work as a large animal veterinarian. My primary interests lie with beef industry and I hope to work closely with primarily cow-calf and feedlot clients to improve the health and productivity of their herds. At some point in the future I would like to be able to own my own large animal veterinary clinic somewhere in the Peace Country.

Throughout the summer I hope to broaden my experience and learn more about the production side of the beef industry and more about some of the unique challenges producers in the Peace Country face in order to better serve my future clients. I hope to meet many of you out at the research sites and at the field days this summer.

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Progress on Whole Farm Nutrient Management Projects (2012 - 2015)

The survey carried out by PCBFA in 2012 with beef cattle producers in parts of the Peace identified farm nutrient management as one of the main areas of research and demonstrations needing more attention. PCBFA members recognized the fact that in order for the Peace Region beef industry to remain sustainable, the industry needed to decrease their economic and environmental risk. The systems approach, which is one of PCBFA programs across the Peace from 2012 to 2014 and beyond will enable an in-depth examination of farm nutrient loading and utilization, cost/benefit analysis, and the potential environmental impacts of beef cattle production systems and their components. In 2012, base data on 6 systems (bale grazing, bale processing, hay field, pasture, wintering site and stockpile forage) to be used for the project were collected. In 2013, another set of data was collected for the purpose of examining the pattern of nutrient availability, distribution and utilization in both soil and plant components of each system. As a reminder, the overall objectives of the project are:

- Create awareness of nutrients, nutrient distribution, collection and management on farm, and to increase distribution and utilization of farm resources
- Development of a site-specific nutrient management plan
- Understand and gain working knowledge of manure and general fertility management in forage and crop production for greenfeed or swath grazing systems

Methods

PCBFA is working with the following cow-calf producers (see table below) on 6 beef cattle production systems for this project:

MD/County	Collaborating Producer	Production System	Data Collection Date in 2013
Fairview	Gary Kuriga	Stockpile forage	9-Jul
Clear Hills County	Nelson Ferris	Bale grazing	15-Jul
Saddle Hills County	Ken Titford	Hay	19-Jun
Peace	Ken Herlinveaux & Judy Bowcott	Bale processing/rolling	8-Jul
Big Lakes	Erik Verstappen	Wintering site	24-Jun
Greenview	Dale Smith	Pasture	25-Jul

For each system, 2-5 acres were marked out in 2012 and these will be used for yearly data collection. Also, in 2012, notes were taken on history and managements of selected systems.

Baseline (July—August, 2012) and 2013 (June-July) data collection include the following for each project site (or selected production systems):
- soil nutrients in 0 to 24 inches soil depths
- soil moisture content (gravimetric method)
- soil compaction (digital penetrometer)
- water infiltration (ring method)
- forage yield & quality, and brix (sugar) level
- field nutrient mapping with GreenSeeker
- water quality issues

GreenSeeker in use | Digital penetrometer

In this report, only soil measurements taken in the 0 to 6 inches soil depth are presented. The results presented in this report are summaries of two years (2012 & 2013). Two different hay fields were used between 2012 and 2013, but the 2013 site will continue to be used for future hay field evaluation.

Results and Discussion

Soil Water Infiltration and Compaction

Infiltration is the downward entry of water into the soil. The velocity at which water enters the soil is the infiltration rate. Infiltration rate is typically expressed in inches per hour and is an indicator of the soil's ability to allow water movement into and through the soil profile. Soil temporarily stores water, making it available for root uptake, plant growth and a habitat for soil organisms. A high infiltration rate is generally desirable for plant growth and the environment. The results of soil water infiltration rate (inches per hour) in the present study, over 2 years (2012 & 2013) showed that both bale grazing and bale processing increased infiltration rate (very rapid) better than the other systems (Table 1). Hay field had rapid infiltration, while both pasture and wintering site had moderately rapid infiltration. Stockpile forage had the least infiltration rate (moderate).

Soil compaction can be a serious and unnecessary form of soil degradation that can result in increased soil erosion and decreased crop production. Compaction of soil is the compression of soil particles into a smaller volume, which reduces the size of pore space available for air and water. Soil compaction can impair water infiltration into soil, root penetration and crop nutrient and water uptake, all of which result in depressed crop yield. Readings of 400 to 500 psi would indicate potential soil compaction. The preliminary soil compaction recorded for the 6 systems evaluated here showed that only pasture paddock appeared to have some potential for soil compaction (Table 1).

Soil Organic Matter and Nutrients

The mean soil organic matter was lower for both the hay field and wintering site. It is important to note that a sheep farm was used for the wintering site.

Averaged over 2 years, both bale grazing and processing had higher mean soil N than the other systems (Table 1). Bale grazing had higher mean soil P, followed by pasture and then bale processing site (Table 1). Mean soil K was higher for both bale grazing and processing, following by pasture (Table 1). Other systems had <600 lb K/acre. Mean soil S varied from 82 lb/acre for wintering site to 2559 lb/acre for stockpile forage (Table 1).

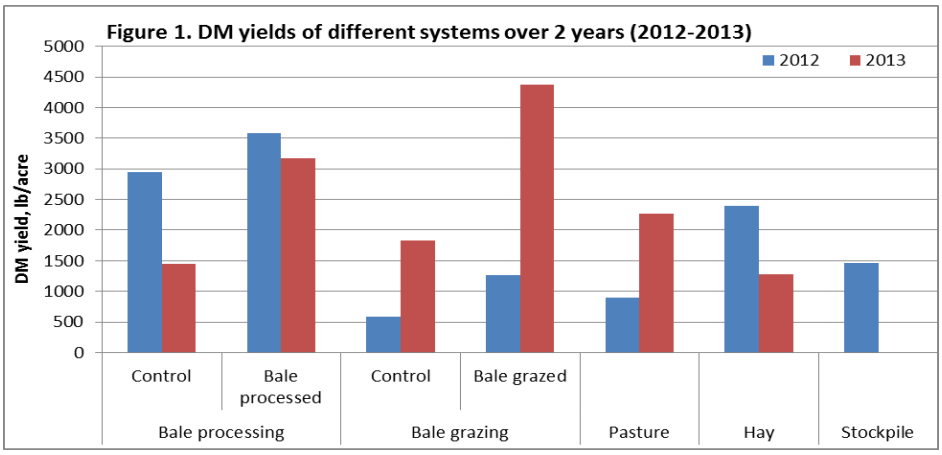
Table 1. Soil water infiltration, temperature, compaction, organic matter & nutrients (average of 2 years)

System	Water infiltration	Soil temperature (^{O}C)	Soil compaction (PSI)	Organic matter (%)	N (lb/acre)	P (lb/acre)	K (lb/acre)	S (lb/acre)
Bale grazing	Very rapid	9.8	295	9.55	153	71	1200	1065
Bale processing	Very rapid	16.0	341	8.85	157	36	1200	2313
Hay field	Rapid	18.6	286	5.00	15	20	395	183
Pasture	Moderately rapid	12.7	466	9.35	37	61	1041	1816
Stockpile	Moderate	15.3	338	9.00	17	17	251	2559
Wintering site	Moderately rapid	16.1	264	3.78	39	16	582	82

Forage DM Yield (Figure 1)

No DM yield was available from the wintering site for both years (2012 & 2013) and from the stockpile site in 2013 due to prior grazing before data collection. But the results for other sites/systems showed that for both bale grazing and processing systems, areas that were bale grazed or where bale was processed had significant increase in DM over control checks in 2012 and 2013. Bale processing increased DM by 1717 lb/acre in 2013 over 2012 compared to an increase of only 635 lb/acre for the control check over the same period. Similarly, bale grazing increased DM yield substantially in 2013 over 2012 compared to non bale grazed areas (2536 vs 673 lb/acre). For the pasture paddock being evaluated, DM was higher in 2013 than

2012 by 1381 lb DM/acre. The increase in forage production is probably the result of manure application to the paddock in 2012, in addition to the site being grazed yearly. For bale grazing, bale processing and pasture, mean DM (over 2 years) was in order of bale processing (3379 lb DM/acre) > bale grazing (2815 lb DM/acre) > pasture (1839 lb DM/acre).



Forage Quality (Table 2)

Protein - The forage protein content was highest for both bale grazing and wintering sites (15% CP) and lowest for stockpile forage (10% CP). The Beef Cow Rule of Thumb with protein is 7-9-11, which means an average mature beef cow requires a ration with crude protein of 7 per cent in mid pregnancy, 9 per cent in late pregnancy and 11 per cent after calving. With the exception of stockpile forage, which slightly fell short of 11% protein needed by a nursing cow, all systems had adequate levels of protein suggested for a dry gestating and a nursing cow.

Macro-minerals - With the exception of Na, all other measured macro-mineral contents in the present study (Ca, P, K, Mg) had sufficient amounts or levels recommended for a dry gestating cow.

For a nursing cow, only the hay field and wintering site had adequate Ca needed by this category of a beef cow. The higher Ca content for the hay field could be as a result of forage composition (substantial amount of alfalfa stands in both sites used in 2012 and 2013), date of data collection, location and nature of soil. Of the systems examined here, the P requirement of a nursing cow (0.26% Ca) was only met by the pasture site, which had 0.28% P. All systems examined had adequate amount of K suggested for a nursing cow. For Mg, both pasture and stockpile forage fell short of the 0.20% Mg needed by a lactating cow. The inconsistencies in mineral contents noted for all systems in the present study either for a dry gestating or a lactating cow, further suggests the need for a prior forage testing to determine if minerals in forages are adequate for beef cows or not before utilization. The inconsistencies further confirms the need for mineral supplementation as currently practised by producers.

Table 2. Mean (2012-2013) of forage DM & quality

Production System	CP (%)	Ca (%)	P (%)	K (%)	Mg (%)	Na (%)	ADF (%)	NDF (%)	TDN (%)	ME ——	NEG ——	NEL (Mcal/kg)	NEM ——	DE ——	RFV
Bale grazing	14.7	0.38	0.24	3.11	0.15	0.01	43.4	68.4	56.5	2.04	0.62	1.27	1.19	2.49	75
Bale processing	12.4	0.25	0.21	2.50	0.21	0.01	41.6	67.1	57.4	2.07	0.65	1.29	1.22	2.53	78
Hay field	12.7	0.45	0.18	1.66	0.56	0.01	33.7	51.4	61.3	2.21	0.77	1.38	1.35	2.70	113
Pasture	10.8	0.34	0.28	2.21	0.12	0.01	38.7	62.5	58.8	2.12	0.70	1.32	1.27	2.59	87
Stockpile	9.70	0.22	0.20	1.53	0.13	0.01	43.5	68.1	56.4	2.04	0.62	1.26	1.19	2.48	75
Wintering site	14.8	0.47	0.25	2.56	0.18	0.02	38.0	61.0	59.2	2.14	0.71	1.33	1.28	2.61	91

Forage Brix Level

The mean grass brix for the 2 years (2012 & 2013) appeared to be higher for bale grazed areas than its control check as well as other production systems (with the exception of stockpile forage, which only had data for 2012). For the legumes, hay field had the highest brix and this is probably a reflection of the good alfalfa growth observed in both hay fields used. Both hay fields were harvested earlier than other systems and they both had better alfalfa growth than other systems. We observed that both bale grazing and bale processed sites had a higher concentration of grasses than legumes (including alfalfa) and other plant types (including dandelions). Overall, only control check for bale grazing and wintering site had a mean brix level that is less 6.00%.

Table 3. Mean (2012 & 2013) of brix (% sugar) level of identified forages at harvest

Production System		Grass	Legume	Others	mean
Bale grazing	Control check	7.31	7.29	2.94	5.85
	Bale grazed	10.4		3.13	6.77
Bale processing	Control check	7.75	6.81	3.69	6.08
	Bale processed	8.13	6.94	3.44	6.17
Hay field		7.36	11.5	5.33	8.06
Pasture		7.38	7.42	4.5	6.43
Stockpile (data from 2012 only)		10.9	10.3		10.6
Wintering site		4.88	3.31	3.19	3.79

Some notes on testing brix in our forage

Brix measurements of forage are a useful technology that not many cow/calf producers currently use.

A brix measurement – which measures the amount of plant solids to water in a plant – will give the true nutrient density in a particular forage. Solids in the plant include sugars, minerals, lipids, pectins, amino acids and proteins.

Moderate to high plant sugars are necessary to adequately finish livestock on forages. High brix levels means the plants are being grown on healthy soils with good organic matter, which results in higher carbohydrate levels and higher energy levels in that forage.

Taking brix measurements requires a garlic press or other type of press and a portable refractometer (see above picture). Measurements are best taken on a sunny day in the mid-afternoon.

To take a brix measurement, producers should pick a plant sample of their forage; place the sample in a garlic press or other type of press; squeeze out the plant sap onto the stage of a portable refractometer and take a reading.

What do brix measurements of common forages mean?

In alfalfa for example, a brix measurement of 4 equals poor forage, while a brix measurement of 8 means average. A brix measurement of 16 is good and a brix of 22 on an alfalfa plant indicates excellent forage for cattle. In US, higher animal performance when brix levels in forages are higher have been found. In addition, high brix forages are more resistant to disease, pests and drought.

Upcoming 2014 Events

EVENT	DATE	LOCATION	CONTACT
Whole Farm Water Planning *Jesse Lemieux*	August 21 August 22 August 23	TBD	780.835.6799 780.523.4033
On Farm Energy	September	TBD	780.835.6799 780.523.4033
Cover Cropping *Gabe Brown*	Late October	TBD	780.835.6799 780.523.4033
Soils *Christine Jones*	November 3	Grande Prairie	780.835.6799 780.523.4033
Agriculture Tour to AUSTRALIA	November 8-22	Victoria & South Australia	
AARD - Cow Calfenomics	January 20	Grande Prairie	780.523.4033

Check Out Our Website For More Details

www.peacecountrybeef.ca

For more information about any of our field tours, workshops or project sites please call either Peace Country Beef and Forage Association Office.
Fairview 780-835-6799 or High Prairie 780-523-4033

Thank you to all our Funding Agencies.

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