

**SUSTAINABLE AGRICULTURE RESEARCH
AND
EDUCATION PROGRAM**

2003 INTERIM REPORT

March 26, 2003

1. Optimizing Forage Quality and Production on Depleted Farmland to Extend the Grazing Season FNE02-432.

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2. Project Goals

Test three pasture improvement methods to determine which method(s) generate superior forage quality, composition and production.

Reclaim run out potato acreage and return soil fertility.

Test use of brassicas for extending the grazing season/reducing stored forage demand.

3. Farm Update

In 2003 the farm operation will comprise 270 acres of pasture and hay land most of which is leased. We plan to graze roughly 200 acres. The commercial cowherd is comprised of 31 Red Angus/Simmental cow/calf pairs, eleven replacement heifers and two Red Angus bulls. We are continuing to study the economics of a cowherd in extreme northern Maine and are exploring options and opportunities related to a straight grazing operation of stocker cattle, a grass finished beef operation and other possibilities.

4. Cooperators

Our major cooperator is the Beech Hill Homestead owned by Jim & Gerry Robinson, Fort Kent Maine. They own the land on which the project is being carried out. Last year Jim helped by bush hogging about 3 acres in the project area to set back the most advanced brush growth. Jim works other areas of the farm in advance of my work applying needed inputs to prepare the land for grazing and hay production.

Saint John Valley Soil and Water Conservation District: The District will help with educational outreach by supporting pasture walks and publicity.

Fort Kent Community High School: I am presently discussing a field trip for students studying native plant communities with John Kaleta, Science Teacher for the late summer 2003.

5a. Project Progress in Year 2002

The project is designed to compare three practices to improve pasture composition, quality and production over 2-3 growing seasons. The study site is divided into three, 12-acre sections each receiving a separate practice. (See Aerial Photo) The practices vary in terms of the timing and types of inputs as summarized below:

Practice # 1: Animal deposition of nutrients, broadcast seeding, extended grazing using brassicas

Practice #2: Spring no-till seeding, July seedling release & manure application, Fall grazing

Practice #3: Early winter broadcast seeding, spring manure application, grazing using brassicas

Liming

All three practices required lime application according to soil test recommendations. Lime was applied topdress on June 7 and August 30, 2002. The first application was limited to 4000 lb per acre. A total of 76.3 U.S. tons were applied to about 33 acres at a cost of \$3,273.04. Access to 3 acres was a problem in the Spring and we ran short of lime during the Fall application. This section requires 1500 lb/acre. It takes 2-3 growing seasons for lime to react with soil when applied by topdress method. Hence the soil pH management level of 6 will not be achieved until 2004-05.

Clipping

Practices 1 and 3 required that the existing stand be clipped close to the ground to knock back competition for the brassica seeding. About 25 acres was mowed on July 10 with a rotary deck mower, which took 8 hours to complete. Most of the acres had sparse vegetative cover but approximately 5-6 acres was relatively heavy. Clipping in late June would have allowed greater breakdown of the mulch generated by mowing. These acres were no-till seeded in July/August.

No-till Seeding of Brassicas

A total of 24 acres were no-till seeded with two varieties of forage rape (brassica) on July 29 and August 2, respectively. The varieties included Rangiora and Barnapoli with a seed test date of April 2002, origin New Zealand. A Tye Pasture Pleaser, no-till seeder was used and seed depth varied from ¼ to 1 inch. The seed cost totaled \$435 (non-grant funds) and the seeder rental totaled \$288. The seeding took 6 hours to complete. While it had been dry in the weeks prior to seeding, a few days of rain in late July was the impetus to go forward with the seeding. The site was monitored in August and September for seed germination/seedling establishment.

Grazing and Manure Application and Hauling

Practice 1 requires cow manure application by the animals during grazing. A total of 32 dry beef cows equaling 48 animal units were grazed on the site from October 10 through November 2, 2002. Practices 2 and 3 require the use of chicken manure applied at different times, May and July, respectively. About 150 tons of chicken manure was trucked to the site in August 2002 and stockpiled for application in 2003. The trucking cost on the manure totaled \$825 or \$5.50/ton.

Plant Species Inventory

The study site was randomly traversed during late summer 2002 and the presence of herbaceous plant species was noted. Fifteen (mostly undesirable) species were identified. The list identifies the most dominant plants but is incomplete. (See attached list)

5b. What Remains

For each practice area the following activities will be completed:

Seeding and manure applications

Establishment of sampling transects and quadrats to examine pasture composition/production

Nutrient analysis of harvested forage

Comparison of the three practices based on pasture composition/production and input costs

Follow-up soil sampling/analyses

Educational out-reach via pasture walks, press releases, field trip ...

6. & 7. Preliminary Results to Date

Brassicas Seeding to Extend Grazing

Unfortunately, the seeding failed to establish a sufficient stand for late fall grazing. Observations in September and October may best be summarized as germination, stagnation and death. Seedlings were present but failed to grow. (See Photo Sheet) Why did the seeding fail? Probably because of poor fertility and lack of moisture. Soil test results from 2001 show the site variably low in ph, organic matter and all major nutrients. Some sections had optimum phosphorus and potassium and organic matter. All sections lacked calcium and magnesium and were below optimum for pH. It was believed that the spring lime application would “boost” fertility enough to allow the forage rape to establish and grow. It did not. Moisture may well have been the major factor limiting growth. The site is fairly well drained. Growing seasons in 2001 and 02 were dryer than normal. While there was good moisture at the time of seeding, August became hot, dry and breezy. The seedlings just did not respond to the cooler, wetter conditions when they arrived. By mid-October the region was experiencing “hard” freeze conditions.

Extended Grazing

Some October/November grazing was done on the regrowth that occurred after the July mowing. (See Photo Sheet) The best grazing was obviously on those acres that were more productive and had heavier cover. The sparsely vegetated acres without the forage rape having been established were simply not worth grazing. Approximately 11 acres received deposition of cow manure during the 23 day grazing period. Cow manure was deposited at an average rate of 1.75 tons/acre. The total grazing season was 160 days in 2002. Grazing ceased on November 2nd. A small amount of dry hay was fed during the last 4-5 days of grazing.

8. Economic Findings

Not yet evaluated

9. Results Generated New Ideas

Without adequate soil nitrogen and moisture the forage rape seeding was doomed. The lack of a forage rape stand sufficient for grazing made it necessary to modify Practices 1 & 3. Since a significant area that was seeded with forage rape was not grazed, the November broadcast seeding of rye and clover was abandoned. There simply was nothing to graze on most of the acreage that had been seeded with forage rape. (See Photo Sheet) Hence, there would not have been enough grazing pressure to embed seed and deposit any meaningful amount of manure.

The key question now is what to do in practice areas 1 & 3? A final decision must be made soon. Here are some ideas.

The Brassicas seeding could be duplicated in 2003 in hopes of improved results. The lime would have had more time to react further improving soil fertility and the soil moisture may be more favorable. There, of course, would be added seed cost. Perhaps a smaller area (5 acres) could be tried. Results would be delayed until after the 2004 growing season to determine the outcome of the rye/clover seeding that is part of Practices 1 & 3.

Practices 1 & 3 could be modified to substitute the November 2002 rye/clover seeding with an April/May 2003 frost seeding. This would get the seed to the ground and serve to compare seeding methods. The cow manure deposition via grazing would not apply uniformly since half of the area was not grazed and what was grazed was not done systematically. To simulate manure application via grazing, a mechanical application of cow manure could be done in spring 2003. However, because of equipment and terrain limitations, the rate of application in tons/acre would significantly exceed that of grazing. I estimate the grazing of 32 cows to deposit a minimum of 1.25 tons/acre while a manure spreader would put down a minimum of 5 tons/acre. There would also be an additional cost for the spreading.

Another possibility is to compare the pasture's response to cow manure vs. chicken manure in practice areas 1 and 3, respectively. Applying near equivalent amounts of nitrogen and/or phosphorus by adjusting the application rates of each manure type could do this. New manure

samples would have to be analyzed for 2003. Past sampling indicates that 1-ton of chicken manure equals about 7-tons of cow manure for total nitrogen. It would be best to compare the results over two growing seasons, i.e. 2003-04. The rye/clover stand would be better established and the manure nutrients would be more completely released during the second growing season.

Some important observations were made with regard to extended grazing and it's value to a cow/calf operation. In the study area, the more productive sections provided enough regrowth after the July mowing for some late grazing. In addition, on another farm that I've been working for 10+ years, there was 25 acres of excellent regrowth after the hay crop was removed in early-mid July. This forage went unutilized because of the logistics of moving the herd for two additional weeks of grazing. If all of this acreage and forage production were in closer proximity, grazing could have extended past mid-November. This is something that is rare in Northern Maine. The brassicas crop, had it succeeded, would have been a short term "stepping stone" to more productive pastures, the ultimate goal. With ample acreage, strong production and careful management, grazing beef cattle in this region may well be possible into December. If the cost savings of 1 month of extended grazing is applied to the pounds of calves weaned, its value based on a rough estimate would be about .03 cents per pound. Who wouldn't want that?

10. David M. Potter

March 26, 2003

LIST OF PLANT SPECIES

	<u>Common Name</u>	<u>Scientific Name</u>
1.	Timothy	<i>Phleum pratense</i>
2.	Birdsfoot Trefoil	<i>Lotus corniculatus</i>
3.	Red Clover	<i>Trifolium pratense</i>
4.	Hop Clover	<i>T. agrarium</i>
5.	Cow Vetch	<i>Vicia cracca</i>
6.	Common Dandelion	<i>Taraxacum officinale</i>
7.	Wild Strawberry	<i>Fragaria virginiana</i>
8.	Wild Red Raspberry	<i>Rubus idaeus</i>
9.	Orange Hawkweed	<i>Hieracium aurantiacum</i>
10.	Mouse Ear	<i>H. pilosella</i>
11.	New England Aster	<i>Aster novae-angliae</i>
12.	Pearly Everlasting	<i>Anaphalis margaritacea</i>
13.	Goldenrod	<i>Solidago sp.</i>
14.	Fireweed	<i>Epilobium augustifolium</i>
15.	Dogbane	<i>Apocynum sp.</i>