Farmer Rancher Grant Program

Final Report Form

I. PROJECT IDENTIFICATION

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- Website: **NorthAcresFarm.wordpress.com**
- Project Title: **Low input Pasture Renovation through multi species intensive grazing**
- Project Number: FNC**08- 710**
- Project Duration: **3 years**
- Date of Report: **3/1/2012**

PROJECT BACKGROUND

Our property is 40 acres; 32 of these are forested and enrolled in Wisconsin's Managed Forest Law Program. Approximately 17 acres are managed for forest diversity and periodic select harvest; about 12 acres are managed for regeneration harvest and the remaining approximately three acres are managed for wetland habitat. We have an approximately seven-acre former pasture and one acre where the house, barn, garden, lawn and sustainable/native landscaping beds are sited. We have left one acre of the former pasture in brush to allow for current wildlife trails and habitat. We also have several areas within the pasture paddocks that are reserved as wildlife and insect habitat. These include an area planted with native fruiting shrubs and a buffer around the rock pile that was created when the property was originally cleared. We currently raise 200 pastured poultry each year (300 in 2010) and market them directly to local consumers. We also raise vegetables, herbs, garlic and greens to sell locally in both retail and wholesale markets. During the three years of this research project I raised 24-40 small ruminant feeder animals each season, (more lambs and fewer goats). This spring I am purchasing a small breeding flock of sheep. I market their wool, meat, and hides. The poultry are raised in 4 foot x10 foot Andy Lee style pens which are treated as day range pens once the chicks are about five weeks old. The poultry 'graze' about 2/3 acre each season, leaving an intense dose of nutrition behind from their processing of about 2,500 lbs. of chicken feed along with pasture plants, insects and over 1000 gallons of water. The chickens are raised on a different portion of the pasture each season. The feeder lambs and goats, and in the future the breeding flock, rotationally graze the pasture in a management intensive technique where they are often times moved twice daily. We will begin harvesting a portion of the pasture each summer for winter hay supply this summer. The past three years we did not over winter the ruminants and bought in the small amount of hay that we needed for fall feeding.

We have been raising the pastured poultry for nine years and have basically used the same sustainable methods of moving them across varying pastures each season. Our gardens have never been treated with pesticides or chemicals and I generally purchase as many certified organic seeds as I can source. We established the first garden here in 2000.

We have attempted to be sustainable in all of the actions on our farm and home site. Our home has been included in several solar home tours. This outreach was intended to illustrate and educate about methods of revising an existing home to increase its sustainability. Aspects included in the tours were: passive solar design, energy efficiency, sustainable landscaping and native plants, alternative heating fuels, window quilts and super insulation. We began our home renovation in 2002 and still have projects on the docket.

PROJECT DESCRIPTION

GOALS: **Low input renovation of a long fallow pasture by intensively grazing feeder lambs and goat kids as well as pastured poultry. Document improvement in forage quality gained with no other inputs.**

Quite a bit of work has been done to communicate ways that rotational grazing can be a profitable part of a farming operation, however, less research has been done on converting formerly fallow and brushy pasturelands back into productive pasture by intensive grazing. Although good results have been reported anecdotally, little measurement of the changes that occur during such a conversion seems to have been documented.

We used a number of measurement techniques to track the changes in the forage quality of the various paddocks in the pasture. We documented the changes in the pasture using soil tests, forage nutrient analysis, photos and forage/forb surveys. We have paddocks at various stages of renovation because some have not been cleared or cut in nearly 40 years, some have been cut only, some have had lime added and some have had lime, frost seeded legumes, and pastured poultry manure added. We attempted to document the ways in which each paddock responds to the intensive grazing. Though the project period is only 21 months, these paddocks at various stages should be able to provide information about which plants in the seed bank are encouraged by grazing and also indicate limitations due to high acidity, excessive moisture, undesirable forbs, etc.

We would like to document the improvements that we could make by adding intensively grazed sheep and goats to our management system. By starting before much renovation has taken place, we hope to be able to record the transformation of a pasture through intensive multi-species rotational grazing.

We also prefer to limit the fossil fuel input on our farm. We used some power equipment to clear brush along the west and north fence lines while installing the perimeter fencing, but we avoided a need for using mechanical equipment on a regular basis.

I want to keep our farm a productive element of the local food system rather than just another place that used to be a farm.

Improve forage quality and minimize our dependence on non-renewable resources.

Increase the potential earning power of our farm.

Take non-productive land and convert it to a higher income and more sustainable use with relatively low monetary investment.

Illustrate a low-input method for renovating former pastures.

Provide high quality and sustainable food to our local community.

Farm without the stress of owning and operating expensive and dangerous equipment.

PROCESS

Spring of 2009 involved preparing for, design of and installation of the fencing system, watering system and energizer (to keep the livestock in and the predators out). My first small group of lambs actually arrived before the fence was complete and I kept them contained with electro-net and a solar fencer. We even got a bear stuck inside the fence boundaries while the fencing was being installed – but that is another story…

That spring I located and acquired the feeder lambs and goats and conducted the first soil tests so that I would have baseline data for each paddock. I divided the farm into 12 paddocks and marked the perimeter fence with plastic marking ribbon to indicate their locations. The 12 primary paddocks are not permanently divided; they are just boundaries that I use to keep track of data, inputs, etc. I use electro-net to confine the animals to a specific area.

In late May, 2009, the first of four plant surveys was conducted to establish a baseline of the plant varieties that are encountered in each paddock. A tape measure was stretched across the paddock and a metal frame about 14 inches square was placed on the ground. The plants within that square were identified and a percentage was applied to indicate the amount of space each plant type occupied within the square. The square was moved 30 feet and the process was repeated. We generally have four or five sample plots for each paddock. Plant surveys were repeated in late May 2010, early June 2011, and September 2011.


May, 2010 – Paddock 11, Plot 2 (20 percent reed canary grass, 70 percent red fescue, 10 percent dandelion)

Each day, I noted which paddock the livestock were in, which species and how many of each variety. When I moved the animals, I noted the height of the pasture going in and coming out. At times I was moving the ruminants two times each day. The spaces they occupied were much smaller than the numbered paddock sizes, but I used the paddock numbers to help track what part of the pasture they were in. Pastured poultry were added to the mix each summer. I raised only Cornish cross in 2009. They were on the pasture for about six weeks. In 2010 and 2011, I raised some Cornish cross, and other alternative breeds. We had a total of 300 birds of six different breeds in 2010 and we had a total of 200 birds of three different breeds in 2011. In both 2010 and 2011 the birds spent about nine weeks on pasture total.

Throughout the summer of 2009 I was collecting forage samples and I did a follow-up collection of samples again in the summer of 2011. I gathered the samples just before I moved the ruminants into an area to graze, so the timing and degree of maturity were not consistent between the two years. I'm not sure that the data collected was especially useful because of this. It would probably be better to develop a method to make sure that the sampling is comparing apples to apples. It might have also been helpful if I had kept better records of exactly how I collected the samples to make sure they were collected in a consistent manner. Two years was a long time to try to remember (with sketchy notes) what I gathered and when I gathered it. And, as I discovered, the realities of farming, sick lambs, vegetables needing harvesting, marketing, record keeping, etc. make on-farm research quite difficult to accomplish.

A portion of the pasture to the west was very brushy. I left it that way assuming that the ruminants would do more to graze the brush down, but learned that the brush was too large and mature for the ruminants to make much of a dent in. I was able to note a browse line. In June of 2011 we had far too frequent visits from a pair of coyotes, so I decided to

hire a neighbor to cut the brush. We kept a number of small clusters of willow and avoided cutting down the few trees that were in the area. I'm hoping these will be useful in providing shade options without giving predators a place to hide out. The broiler chickens were placed in one of the cutover areas during 2011 and did an amazing job of working over the smaller willow shoots. The sheep were also willing to browse a fair amount of willow as long as it was tender.

In 2009 the pasture was stocked with 18 lambs and six goats. In 2010 we had 34 lambs and five goats. In 2011, I wasn't able to locate a good source for feeder goats so I went ahead with just 35 lambs.

Weather certainly had an impact on workload and data results. 2009 was basically the last of a long series of mildly droughty years. We are on fairly low heavy ground, so mild drought didn't impact us in an especially negative way, but rain certainly can, as we learned in 2010. We received nearly twice as much rain during the growing season in 2010 as we had in 2009.

General Weather Data 2009-2011

	Temperature (F)		Degree Days			Precip.
	Max.	Min.	Heating	Cooling	Growing	inches
May '09	84	31	326	6	159	2.75
May '10	89	26	274	60	292	2.5
May '11	80	26	330	13	200	3.5
June '09	92	33	151	88	391	2.75
June '10	82	36	84	59	431	8
June '11	93	35	83	78	445	3.5
July '09	83	42	82	30	410	1.75
July '10	86	53	0	199	655	7.5
July '11	93	51	5	253	714	4.5
August '09	85	36	84	81	458	5
August '10	89	45	15	205	666	5
August '11	84	46	14	91	539	5
Sept. '09	80	25	119	26	364	0.75
Sept. '10	75	33	267	7	198	9
Sept. '11	84	32	267	33	246	2.25
October '09	61	22	709	0	8	5
October '10	78	23	498	0	86	2.5
October '11	82	24	472	22	157	1.75
Totals '09			1471	231	1790	18
Totals '10			1138	530	2328	34.5
Totals '11			1171	490	2301	20.5

I can't determine exactly what effects this extremely wet season had, but am certain that a pasture that varied between 'squishy' and 'splashy' nearly all summer must have had a negative impact on the pursuit of my goals.

I did conduct Pasture Condition scoring a number of times. I intended to do them much

more frequently, but general farming duties seemed to keep getting in the way. I still think it is a very useful tool. It covers such a broad range of criteria, that the lack of legumes within our pastures, as one example, doesn't overwhelm the overall evaluation of the paddocks. The fact that we have very good and complete sod cover receives its due credit, the availability of some shade cover is a positive, plant vigor, residue and diversity are all considered, etc. Our average pasture condition score on 6/10/09 was 15.3 (poor) and on 8/22/11 was 27.9 (good). This tool can be downloaded at:
http://learningstore.uwex.edu/Assets/pdfs/A3667.pdf

I chose to limit the variables that I changed during the three years of my research project, so I didn't lime and I only did a very small amount of legume seeding. I felt overwhelmed enough by the changes in variables that were beyond my control, such as weather, health issues in the livestock that I bought and brought on the farm, etc.

PEOPLE

- **Chris Wallner – Husband, supported and encouraged my efforts and filled in where needed to stay on top of data collection and farm management**
- **Cindy Banh – Biologist, conducted the plant surveys**
- **Kim Cassano – Farmer, lead farmer for the SARE funded Alternative pastured poultry breed research project that we teamed up to conduct in 2010. Also critical help with small ruminant health issues and small ruminant mentor**
- **Rick Holm – Farmer, helped to source stock, haul stock, shear lambs and also small ruminant mentor**
- **Randy Cutler – Fence contractor, helped with fence and water system design and installation**
- **Martha Vaccarella – Farm intern during two months in 2011, helped with and learned about all aspects of the management intensive grazing system**
- **Bob Brandt – PRI-RU-TA RC and D Grazing specialist, advised on developing a grazing plan, involved in pasture walk**
- **Mark Kopecky – Price County UWEX Agricultural agent, advised on research design, grazing system, soil and forage analysis, pasture walk, etc.**
- **Laura Paine – WiDATCP Grazing and Organic Agriculture Specialist, advised on research design, analyzed data and advised on graphing for report**

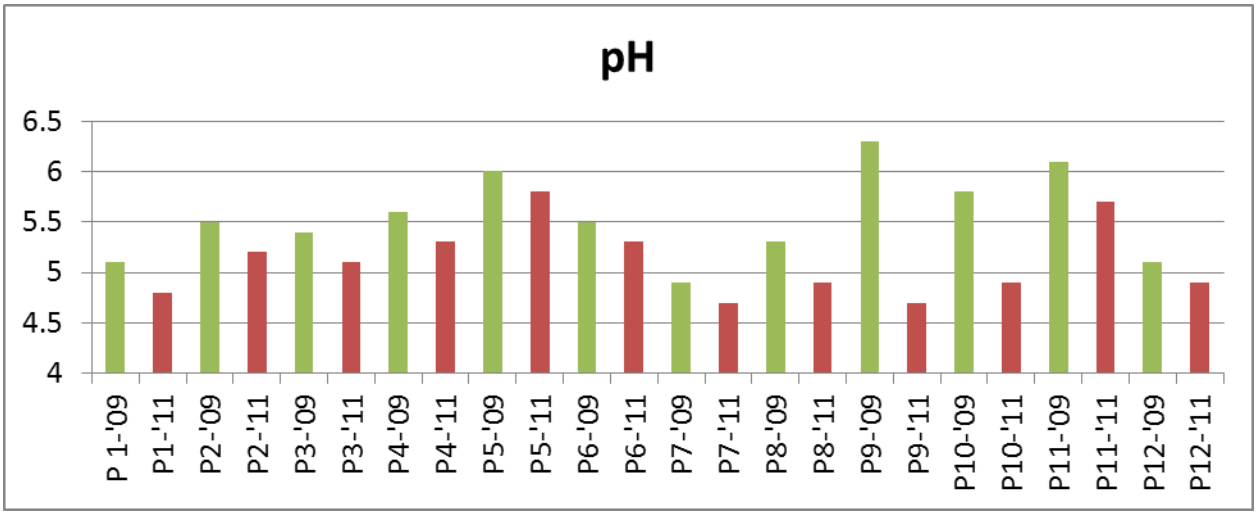
RESULTS

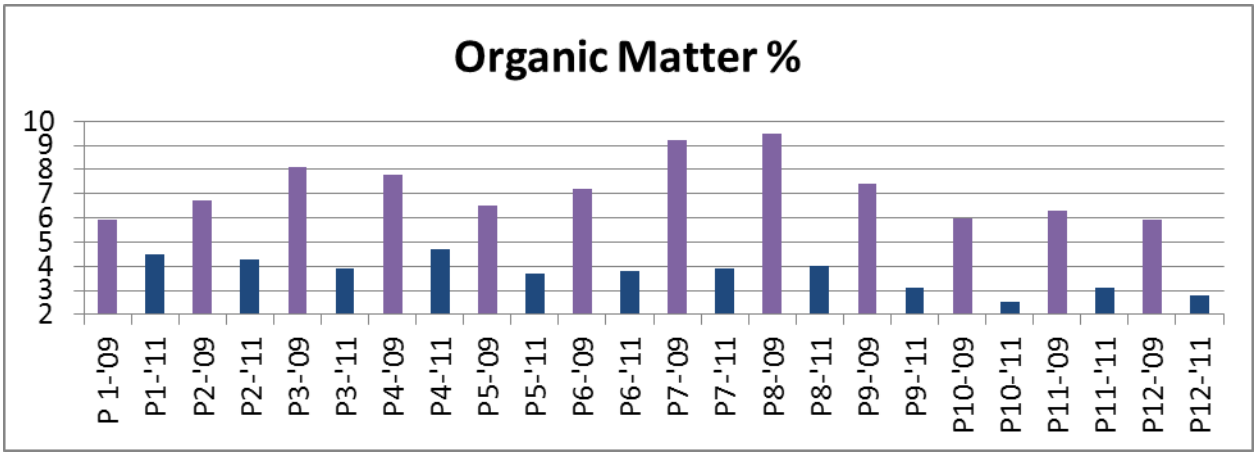
First of all, as it came time to analyze all of the data I had collected, I began to feel my lack of experience in this realm. I am a farmer with a background in architecture. Neither of these has really prepared me as a researcher. Fortunately I have access to government and extension specialists who can help me puzzle through the puzzling things that my data showed.

I discovered that it is true, as many people had told me and as my reading and study had shown, three years are not enough time to see real dramatic changes in pastures through management intensive grazing with limited inputs.

As I mentioned above, I chose not to lime during the research period. I had anecdotal information that the pH might increase through rotational grazing and I wanted to see if I would observe that here, but now I think that the anecdotal changes in pH through grazing might be really minor and I would strongly advise other farmers with extremely acidic soils like mine to make the investment in liming one of the first priorities on their farm.

I collected soil samples twice during the project. The first was a baseline test in spring 2009. The second was in spring 2011. The results were disturbing and puzzling. The pH and organic matter levels went down in all of the paddocks. The average pH for all 12 paddocks was 5.55 in 2009 and dropped to 5.11 in 2011. The average organic matter in 2009 was 7.21 in 2009 and dropped to 3.69 in 2011. I reviewed this with Mark Kopecky, the Price County Ag agent and he was as puzzled as me. Both sets of samples were tested at the UW lab in Marshfield, WI. We reviewed the results with John Peters of that lab and he was also puzzled. We discussed the possibility that the extremely wet season in 2010 may have impacted the tests, but could come up with nothing conclusive. The fact that the tests inside the exclusion fences were also lower added to our puzzlement because these had not received impact from grazing, so this indicated that changes had to come from other influences/variables.

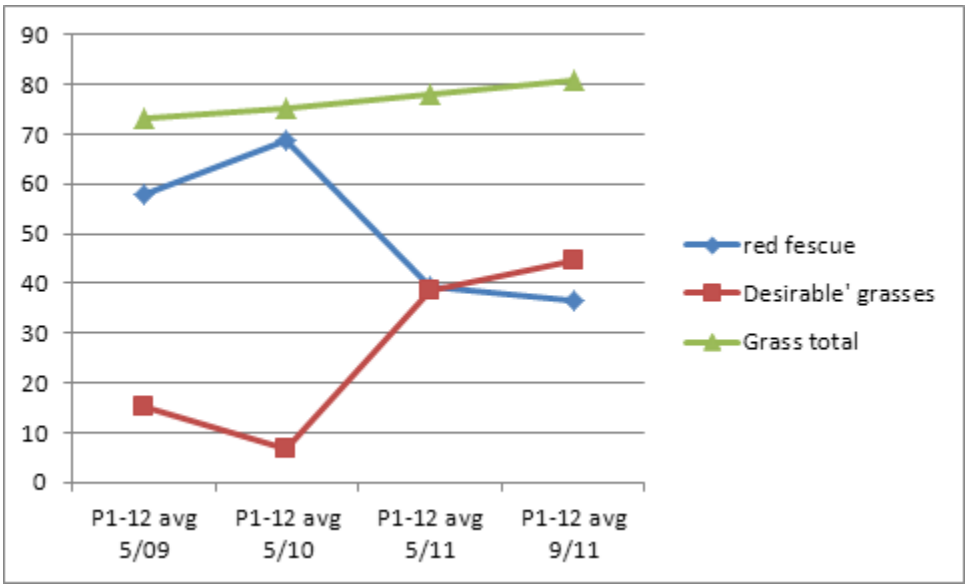




Mark had advised me when I gathered the soil samples that I keep the leftover soil stored away in case it would be needed at the end of the project, so I stored it away in the root cellar. We sent this in for additional samples and learned that soil pH apparently neutralizes while stored long term in plastic bags, so we weren't able to determine if there were any differences in the testing (2009 vs. 2011) when the samples were first tested.

This spring, based on the pH test results, I will be applying about three tons/acre of lime on my pastures and I will also be frost seeding alsike clover throughout. I selected alsike because it has the best chance of thriving in an acidic environment. I'm also planning to broadcast seed at least a portion of the pasture (where the soil is slightly disturbed by logging this winter) with meadow fescue or festulolium to increase the desirable grass species. I will probably be applying lime again in a few years, at least on the paddocks with the lowest pH. I'm committed to continuing to track soil testing results periodically into the future.

Through evaluating the plant survey data, I was able to determine that (as I had also begun to observe in the field) the desirable grasses (reed canary grass, timothy, Kentucky blue grass and quack grass) were beginning to increase and compete effectively with the undesirable red fescue that covers much of our pasture.



Although willow didn't show up in many of the plant survey plots, we still observed a great deal of small willow plants throughout the pastures. As long as the willow is immature and tender it seems that all the animals (sheep, goats, and chickens) enjoy eating it and they have done an effective job of weakening the root systems of these small willow plants and each year fewer of the willow plants emerge in the pastures.

I kept track of ruminant weights to be able to evaluate daily gain rates. These were all quite low in part because rates on pasture do tend to be low, but it may also be an

indication of the quality of the forage, perhaps my learning curve in raising ruminants and managing pasture and probably also because these were feeder animals that were brought in without their mothers, who they would have been able to learn from. In 2009 the average rate of gain was .16 lb/day. In 2010 it was .2 lb/day. And in 2011 it was .26 lb/day. There were other variables involved, though. In 2009, I fed no grain, in 2010 I introduced about 1/4 lb grain per day part way through the season and in 2011 I fed about 1/2 lb grain per day and free choice hay throughout the summer. In 2011, for the first time, I received animals that had not spent the first 45 days with their mothers. They were from a dairy sheep flock and were given colostrum and then moved to milk replacer. I had many difficult health issues to deal with in 2011 and kept hay and grain in front of them to try to insure a proper level of nutrition while they learned on their own to be efficient grazers. I did observe significant changes in how they grazed and what forage they consumed as the season wore on.

I intended to track changes much more through photography than I actually did. The idea of taking a monthly photo at a set point on the farm didn't occur to me until just recently when I read about another farmer doing that. So, today, March 1st at 9am, I started my photo project with photos taken at 6 different points in my pastures. These photos aren't particularly informative because of the 14-21 inches of snow we got yesterday, but over time they will tell a story. I do have a series of informal photos that do help to illustrate the types of pastures that I have, but nothing that really tracks a particular place in the pasture from season to season. Paddock 1 may be the easiest to illustrate that in because it is the smallest.

Paddock 1 July 2009

Paddock 1 Nov. 2009


Paddock 1 July 2010


Paddock 1 Oct. 2010

DISCUSSION

I'm still committed to continuing to renovate our pasture by low input methods, but I've also learned that a great deal of patience is required and that certain priorities in inputs are likely to increase the possibility of success. On the top of this list of priorities is increasing pH and introducing legumes.

Using animals to improve the pasture requires much less money and fossil fuel inputs, but requires a great deal more attention, record keeping, observation, and patience.

As I mentioned earlier, the decision to use this method of pasture renovation would require that the farmer or rancher enjoys animal husbandry more than machines, is willing to spend time moving animals and observing nature, weather conditions and animal behavior.

OUTREACH

I prepared a press release which was published in the local paper when the project started. July 22, 2010 I hosted a pasture walk/field day which was an opportunity for local farmers to see the work underway for this pasture renovation project and for the SARE funded alternative broiler breeds project that I was also involved in that summer. That event was promoted by Pri-Ru-Ta RC and D and by Price County UW-Extension. We toured the pastures looking at the Alternative Poultry breeds project first and then discussing the Low Input Pasture Renovation project. We reviewed the record keeping techniques I am using – pasture plate, plant surveys, soil tests, forage analysis, pasture condition score, etc. We discussed techniques I could try that would encourage the ruminants to utilize the forage in each paddock more completely. I wound up using the suggestions and modifying my rotation by dividing a 40 foot x 160 foot paddock in half with net gates and moving the animals twice each day. Twenty-three people attended this field day.

Presentation at SARE Farmer Forum – Nov. 2010 at the National Small Farm Trade Show and Conference: Presented info on applying for SARE Farmer Rancher grants, project information and research techniques. Approximately 60 people attended this session.

I have developed a website for my farm recently and will be posting information there about my research along with a link to the SARE website.

www.NorthAcresFarm.wordpress.com