Pasture Management on Sheep Farms: A Summary of Eight Case Studies

by Kate Duesterberg, Sarah Flack, and Chet Parsons
The Center for Sustainable Agriculture, The UVM Extension System, and participating farmers

University of Vermont and State Agricultural College
Burlington, Vermont
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August, 2000

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cooperating, offer education and employment to everyone with regard to
race, color, national origin, gender, religion, age, disability,
political beliefs, sexual orientation, and marital or familial status.
All of them for their contributions, expertise, this project would not have been possible. We would like to thank and time in helping design and implement the project. Without their help and contributions, this case study couldn't have been done.

The farmers who participated in the case study contributed extensively effort. UVM/CSA (UVM/CSA) are responsible for the design and layout of the publication.

Sustainable Agriculture (UVM/CSA); and Chief Parsons and Rick Primary Researchers were Sarah Black, University of Vermont Center for Northeast Region of Sustainable Agriculture Research & Education.

This study was conducted over a period of four years, beginning in 1994. The

Acknowledgments
EXPANDING PROFITS FOR SHEEP PRODUCTION THROUGH INTENSIVE PASTURE MANAGEMENT

In 1994, a research team was formed to work with ten sheep producers to assist them in adopting an efficient record-keeping system and to test and demonstrate more effective pasture utilization methods. **Our goal was to increase profitability for producers through lower cost production methods, alternative marketing, and cooperative learning.** Production methods and financial data were collected and analyzed to address the following questions.

- Can producers make a profit by more effectively utilizing the pasture resource?
- What management and/or planning tools are effective for meeting economic and lifestyle goals of sheep producers?
- Does a cooperatively managed research and outreach program produce more readily usable information for agricultural producers?

The participating farms served as demonstrations for a wider audience of producers. Farm walks, discussion groups and workshops were organized to disseminate the information we obtained to sheep producers throughout the state. The marketing component of this project was designed to create opportunities for producers to sell their grass-fed lambs to new outlets developed throughout the course of the project.

### Objectives

I. Investigate the economic feasibility and production capacity of finishing lambs on pasture.

II. Test the applicability of management systems, specifically the Standardized Performance Analysis (SPA) and Holistic Resource Management (HRM).

III. Identify, evaluate, and develop potential alternative lamb markets as an addition to commercial lamb sales.

IV. Implement a model for cooperative research and information dissemination.
Production and Management

- Members of the Vermont Sheep Breeders Association
- Roger Cripp, Vermont Department of Agriculture Marketing Specialist
- Cheryl Persons and Rick Wakefield, UVM Extension and Research Faculty Members
- KEI Digesters and Sarah Hack, UVM Center for Sustainable Agriculture
- 10 Sheep Producers Participating in On-Farm Research and Demonstration Cooperatives

Research Team

METHODOLOGY
Animal Management and Genetics:

a) Weigh lambs throughout the grazing season to calculate average daily gain;

b) Track each producer’s lambs through carcass evaluation to identify sheep with superior finishing qualities on grass diets;

c) Gather and compare data on lambing techniques, such as lambing on pasture vs. in the barn, for the purpose of reducing labor required at lambing time;

d) Identify each producer’s method of predator control, documenting successful alternatives;

Management:

a) Facilitate better record keeping and continue using SPA to measure profitability;

b) Monitor reductions in feed purchases as an indicator of more efficient grass utilization.

Marketing:

Evaluate the requirements and returns for each of the following markets:

- Finished lambs to marketing coops or feedlots;
- Finished natural lamb for the local freezer trade and farmers' markets;
- Easter "hothouse" lamb markets;
- Ethnic markets and other markets as they develop.

Outreach

The research team felt that a vital component of the project would be to analyze and disseminate information as it became available. The project included meetings and pasture walks to give farmers and other research team members an opportunity to exchange ideas and information on marketing, management, and production methods.

The research team also disseminated information through on-going forums such as the Vermont Sheepposium, the Sheep & Wool Festival (educational meetings for sheep producers organized every year by UVM Extension and the Vermont Sheep Breeders' Association), the Sustainable Agriculture Conference, and other similar workshops.
The results of the data collection process are

Whole carcasses to restaurants.

Store products to restaurants and wool

Value added meat and wool

Breeding stock.

Freezer Lamb.

Lamb to auction.

Marketing styles included selling

Mutton.

Rearing starting in the fall

选秀 is more influential on pay.

Winter months with less hay

Extended grazing into fall and

Vacccinations and de-worming.

No vaccinations and no

SpA Program

Information on an annual basis with the

we collected stock production and financial

order to measure average daily gains and

minimum of twice a year on each farm in

at least once per year. We weighed lambs a

composition, soil fertility, and pasture quality.

On each farm we measured pasture species

we have complete data on eight of the farms.

During last included 620 breeding ewes. During last

In Vermont and New Hampshire.

By the third year of the project, the ten

**Management styles included:**

own farms.

considered the best way to run their

discuss with each other as they each

a group deal of subject material to

This variation in styles gave parameters.

marketing styles.

Farms also varied in their management and

sheep (book size varied from 23 to 115).

From 17 to 78 acres), breed and number of

Farm size (land used for the sheep ranged

Farms in many characteristics, including the

There was a lot of variability among the 10

**Project Results**

Rotation through larger areas.

Very intensive grazing.

Refeeding.

Some grain feeding to zero grain.

Lambing.

Lambing dates from late winter.
OVERVIEW OF THE DATA COLLECTED

Introduction

To determine if there is a change in a sheep operation, it is first necessary to find out where the operation is by collecting baseline data. This was done on all of the farms the first year they were involved in the study. In addition to providing baseline data for the study, this also provides real numbers for producers or potential producers to use for budgeting purposes or for comparison purposes.

Daily rates of gains were determined by weighing lambs at least twice during their growth and calculating their average weight gain per day. Soil fertility was determined by selecting two pasture paddocks that were representative of the overall pastures. A soil sample was taken and sent to the Vermont Testing Lab for analysis.

Nutritional value of the pastures was estimated by having forage samples analyzed from the representative pastures selected. Pasture species composition was determined by separating the forage samples into clover, grass and other (referred to as forbs or weeds).

Production and financial data was gathered and recorded on a computer program (called SPA, Standardized Performance Analysis), supplied by the American Sheep Industry. This program was developed to standardize data collection and enable the comparison of one sheep farm to another.

Average Daily Gain of Lambs

Average daily gain is an important tool to compare how lambs are growing. This can be used to compare lambs to each other for such purposes as selecting breeding stock, or it can be used to compare growth from one year to the next. When making these comparisons, it is necessary to keep in mind that many factors determine the growth rate of a lamb. The milking ability of the lamb’s mother and the quality of the pastures and concentrate feeding can make a considerable difference on the daily weight gain of lambs.

During the 4-year period of our study, average daily gain varied from .34 lbs. per day to .76 lbs. per day. As expected, higher gains occurred when lambs were younger, before weaning. The rate of gain was lower after weaning, as lambs grew larger. Several of the farms attained satisfactory rates of gain with no supplemental grain feeding while doing very intensive grazing management. (For example, during the years of the study. Farm 001 went from .50 to .54 lbs./day and Farm 004 from .51 to .54 lbs./day) Farms that practiced less intensive grazing management and also fed no grain tended to have somewhat lower rates of gain. (For example, Farm 003 went from .34 to .40 lbs./day, Farm 005 from .34 to .43 lbs./day, and Farm 006 from .35 to .44 lbs./day). Lambs on farms feeding grain had rates of gain which were sometimes, but not consistently, higher. (Farm 007 went from .48 to .61 lbs./day and Farm 009 from .38 to .39 lbs./day).

Some of the farms showed improvements in rates of gains during the study as they improved management. Farmer 003 had steadily increasing carcass weights and rates of gain as he improved pasture quality and grazing management. Parasite problems decreased rates of gains on some farms, particularly in 1998, which was a wet
Appendix

A productive sheep pasture would be the result of a reasonable amount of forage and pasture improvement. The forage is the green material that is consumed by the sheep. The pasture is the area where the forage is grown. The forage and pasture should be well managed to provide the best possible environment for the sheep. This includes proper grazing management, proper fertilization, and proper rotation of the pasture. The researchers on the project used a combination of forage and pasture improvement techniques to develop a productive sheep pasture.

Forage Analysis

The soil tests did not seem to reflect the same performance on their farms as those on the model farms. In particular, the model farms had higher forage and pastures. This is also reflected in the soil test results from soil test data included in the Appendix. The model farms had a higher proportion of sandy soil. This change is applicable because while the forage and pasture are the primary focus of the study, the soil is equally important. The soil on the model farms had a higher proportion of sandy soil.

The model farms were more likely to use fertilizers, which may be typical of Northern soil fertility. However, in an appendix to determine any improvements in the soil fertility, it was beyond the scope of this project to do so.
intensity of grazing of one field seemed to result in less clover growth (the percentage of clover went from 14.5% to 1.2%).

**SPA Program Data**

The SPA or *Standardized Performance Analysis* is a computer program that was used to analyze the production and financial data from each farm. In the beginning of the study, it was a bit of a challenge to be able to sort out the input to obtain meaningful output. For example, cost of feed to keep a ewe included purchased hay, but it also included the cost of making hay (if produced on the farm), and other costs such as taxes and fences for pastures. As more data was entered, we were more confident that the output was meaningful and accurate.

"An unexpected finding from the SPA data was the level of diversification and its impact on profitability. The farm which included other livestock and crops were often more profitable than less diversified farms."

Information collected and analyzed through the SPA program provided valuable ways for farmers to look at their own farm operation during the study. The examples below show improvements in management that are reflected in the SPA data.

- Several farmers decided to try to decrease the amount of stored hay they fed, and, over time, were able to make significant reductions. Pounds of feed fed per ewe on Farm 003 decreased from 2161 to 1225. Farm 004 went from 654 to 449, while Farm 005 went from 1440 to 800, and Farm 007 went from 1216 to 840.

- Decreased use of stored hay fed and decreased or eliminated grain supplementation reduced feed costs per ewe on some farms. Farm 001 feed costs went from $81 to $28 per ewe, and Farm 003's costs went from $206 to $64. Feed costs were often related to other factors such as repairs to haying equipment or fluctuations in feed costs and weather, so most farms showed variations in feed cost from year to year.

- Income after expense per ewe varied considerably from farm to farm, and sometimes from year to year on the same farm (for example, $91 per ewe to -$252 per ewe). Farms showing mostly positive (profitable) numbers include the farms with both the largest and smallest flock size, farms selling lambs mostly to auction, farms selling value added products, farms feeding no grain and one farm which fed a small amount of grain to lambs. Farms that were able to keep feed costs relatively low with good grazing management and extended grazing seasons were more likely to be profitable.
profitability. Proactive control and overall farm found to be an important criterion for success in their operations. During the study, and participating farmers added cattle to dairy cows. However, several of these study led to look at grazing sheep following cattle grazing. No dairy farms fenced the grazing area, leading to increased risk of sheep and cattle disease. Due to the complexity and cost of
Our goal for the marketing objective was to evaluate the producers' current market and to identify and develop alternative markets for grass fed lamb. Each year, we organized one or two activities to a) enhance the market for grass-fed lamb; or b) help producers understand how to “sell” the qualities of grass-fed lamb to potential customers.

During the first year of the project, we focused on working with chefs at the New England Culinary Institute (NECI) so that both chefs and the producers could learn more about the differences in carcass quality between grass and grain finished lamb.

One significant potential market for grass finished lamb is the restaurant/tourist market. Roger Clapp had stated at the time that, “It will always be difficult for Vermont and New England lamb to compete with western or New Zealand lamb at the retail grocery level because we simply cannot produce it as cheaply as they can." So, we decided to try to get chefs to recognize the culinary advantages of locally raised, grass finished lamb.

NECI helped us by testing grass vs. grain vs. grass & grain finished lamb. The tests were done in the “fine dining” class and the “taste and flavor” class. Students and instructors compared the two lambs for taste, tenderness, and "desirability of the different varieties."

The results for this first test were inconclusive. Unfortunately, the lambs differed considerably in size and were not the same breed. However, the results were reported at the November 1996 Sheeposium for discussion purposes. The instructors for the fine dining class stated, "There were subtle differences in the flavors, depending on the cut of meat. It was very difficult to determine an outright winner, as opinion was mixed throughout the testing. Texture was a more defined issue, with the blend and grain fed lamb being more tender and consistent."

The instructor who coordinated the test stated, "I believe that the weight of the carcass, and the size of the eye in the rack and loin, will be crucial in getting acceptance in the market, and that the differences in flavor and yield will be less important, if the original price per pound to the restaurant is close. Size of eye and carcass weight will be less important to the retail customer."

At one of the research team meetings, producers identified their primary marketing problem in the restaurant market as not being able to sell the entire carcass. Restaurants that serve Vermont-raised lamb tend to be the upper end, white-table cloth establishments. Many prefer to serve only the better cuts; e.g. racks, loin medallions and sometimes leg meat.

In June 1997, the Vermont Department of Agriculture, the Vermont Fresh Network (a collaboration of chefs and farmers), and our research team co-sponsored a whole lamb carcass cutting and utilization demonstration for chefs. The program was arranged with NECI chef instructor Brad Koehler both breaking and preparing finished cuts of lamb.

The Whole Lamb Cutting Demonstration was attended by 20 participants. The demonstration was videotaped and
different pieces were used. The workshop opened with a presentation by Dr. Dwight Barney, a meat scientist from the University of New Hampshire.

A check sheet from NECG, Chef Paul, discussed the differences between the three methods of production. Between the three methods of production, the differences in the carcasses of lamb were evaluated - one that was primarily grass-finished, one that was primarily grain-finished, and the last was intermediate. Dr. Barney pointed out the advantages and disadvantages of each method.

Another important topic covered was the role of feedback in the production process. Close cooperation with the producer is essential in order to establish a system that works for both parties.

The participants were very enthusiastic about the session. More education of chefs is needed, and opportunities to local restaurants sales, more cooperation with local farmers is needed. However, there is no question that the lamb is not only a very healthy food source but also an excellent meat source. We held a lamb carcass on both carcass evaluation and nutrition sessions. The participants learned how to evaluate and prepare lamb carcasses.

On October 1998, we held a lamb carcass evaluation and nutrition session in cooperation with the Vermont Lamb and Veal Council. The participants were provided with information about the production and processing of lamb.

The workshop was attended by over 300 people. The sessions were followed by a Vermont Lamb and Veal Cookbooks published by the Vermont Lamb and Veal Council, supplemented by the Vermont Lamb and Veal Council.
CASE STUDIES

Following are summary descriptions of each participating farm over the three years of the study. The study included four cooperating farms during the first year, ten (including the original four) during the second year, and eight in the third year. One of the first things we asked the participating farms to do was to fill out a “case study form” so we had baseline information on their farm. This included a description and history of the farm and a description of their goals for the farm, especially as they related to improving pasture management as a way to increase profitability. We asked each producer what he or she thought the barriers to profitability were, and these remarks are included in each of the case studies below. We also asked each producer to fill out a more detailed form regarding his or her particular management style, including grazing practices, health management, predator control, etc. An overview of this information is also included. During the course of the project, we held farm walks and meetings on various participants’ farms so that the producers had opportunities to provide suggestions and input to each other.

The data from each farm is included in tables in the appendices. During the last year of the study, we interviewed all participants so that we could get their interpretations of the data and their reflections of the changes they observed in their operations as a result of changes in management practices. We have included the producers’ comments in the case study descriptions.
Market price business.
Expand on herd growth and selling meat.
Continue their retail strategy for warming chemicals.
Continue to work with local de-chemicals.
Observe how their parasite strategy

Production objectives at the beginning of

Management Strategies

Production Objectives

Connected to community.

Goal: Create a healthy, integrated, self-sustaining farm organization, connected to family.

Organic grain. This farm is now certified organic grain. The farm is pasture raised, no hormones used on pasture meat. Lambs are moved to fresh pasture every 12 hours to 3 days. Lambs are being grazed. The sheep are during the summer, as well as the areas are preserved for hay stocking with the sheep. Many of the sheep are sheep's breed. They have been raised with high levels of forage, using high energy and intensive nutrition. Grazing management is very rotational. Intensive nutrition is very intensive. The sheep are mostly

The flock size is now up to about 70 sheep. The farm is somewhat hilly, and about 65 acres of pasture and hay land. Farm consists of about 65 acres of pasture and hay land.

Description of Farm

CASE STUDY 001
Management Style:

The grazing season begins on Farm 001 normally between the 15th and 20th of April and goes until heavy snow. In 1997, this was November 17th; in 1996, it was December 26th. They stockpile pasture and outwinter mature ewes, and sometimes lambs are on pastures until the snow becomes too deep for the sheep to be able to move. Hay and round balage are fed to the sheep during the winter. In 1997 and 1998, a small amount of grain was fed to ewes (1/2 lb./day) for only about four weeks, two weeks before lambing until sheep were put out to pasture. A mineral mix of salt and kelp (with some added selenium pre-mix) is fed, as well as a block of mineral rock salt. In 1999, no grain was used before lambing, and this will be the practice in all future years. They do not plan to feed any grain to ruminant livestock in future years.

Their parasite control strategy is in transition. It currently includes selection for resistant animals and grazing a great diversity of plants including brush. Lambs are kept on clean (that is, free of internal parasite larvae) hayland at weaning, i.e., using harvesting to provide clean pastures. They also use cattle to clean up the sheep pasture. The flock was dewormed in August of 1995 and in August of 1998. No dewormers were used in 1996 or 1997. In the future, they plan to greatly diversify the farm and come to a better balance between sheep, cattle and poultry. Farm 001 does not vaccinate.

They lamb in early and mid April, although would prefer to lamb in late April if other work commitments permitted. The number of hours worked on the farm is minimal. There is off farm income. During the 1998-grazing season, Farm 001 had two interns.

Composted manure is spread on the pastures, as well as lime. Fertilizer is not used. They do not frost seed. Predator control is a five strand fence fit exactly to ground contour.

Farm 001's marketing strategy includes retailing cuts of lamb from the farm shop and auctioning light lambs in the summer. They have the USDA natural lamb label for fancy cuts and do sausage and cured summer sausage. Two restaurants and one food coop feature their lamb. They sell freezer lamb as well.

Changes in management practices to achieve better pasture utilization for increased profits (goal of the project).

By the end of the study, this farm had diversified its livestock by adding cows, calves, heifers, and chickens to the grazing plan. The farm has continued to practice intensive grazing management and winter feeding hay on pasture with diverse livestock in order to improve pasture productivity and quality. In the 1998-1999 winter, ewes and heifers were fed on a barn bedded pack starting in late December. This will greatly increase the amount of compost for next year. Starting in 1996 and 1997, brushy areas on the farm were managed to remain brushy in order to provide feed diversity.

The number of breeding ewes was 32 at the beginning of the study; it dropped to 26 in the second year and then rose to 63 by the final year. The farm began marketing a significant amount of retail lamb in 1997, the same year it was first certified as organic.
The flock was dewormed once in 1997. Dewormers were used in 1996 or 1997. No incident of internal or external parasites. No April, they received no grain and were turned on this farm where they were born in 1998.

Average Daily Gain:

Less productive than the Ridge pasture. It is much less productive than the Ridge pasture. This area is much more suitable for cattle than for sheep. The same amount of grass is available, but the same amount of clover and hay appear to be increased in the Ridge pasture in the last few years. For one or two days per week, the same amount of pasture that is also used as a hay field in the Ridge pasture is not available for grazing. Over the course of the study, both the farmer and his helpers observed that the pasture was growing on the farm where the samplings were taken. To help gain better understanding of what happened, a better understanding of what happened.

Nutrition samples:

Fortnightly, species composition and take forage

In addition to grossing management and the course of the study, there was little noticeable change over the course of the study. There was no hay or pasture production during this period. Liquid manure was applied in less dry matter and less palatable forage on a wetter, shorter soil and produces.
Lamb Average Daily Gains

<table>
<thead>
<tr>
<th>Days of Age</th>
<th>50-55</th>
<th>85-90</th>
<th>105-110</th>
<th>125-130</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>-</td>
<td>.53 lbs./day</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1996</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>.51 lbs./day</td>
</tr>
<tr>
<td>1997</td>
<td>-</td>
<td>.60 lbs./day</td>
<td>.50 lbs./day</td>
<td>-</td>
</tr>
<tr>
<td>1998</td>
<td>.59 lbs./day</td>
<td>-</td>
<td>.54 lbs./day</td>
<td>-</td>
</tr>
</tbody>
</table>

SPA (Standardized Performance Analysis) Data

<table>
<thead>
<tr>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Revenue Per Ewe</td>
<td>$135</td>
<td>199</td>
<td>132</td>
<td>130</td>
<td>113</td>
<td>134</td>
</tr>
<tr>
<td>Feed Cost Per Ewe</td>
<td>$81</td>
<td>52</td>
<td>87</td>
<td>57</td>
<td>62</td>
<td>28</td>
</tr>
<tr>
<td>Total Operating Expenses Per Ewe</td>
<td>$113</td>
<td>107</td>
<td>123</td>
<td>82</td>
<td>153</td>
<td>113</td>
</tr>
<tr>
<td>Income After Expenses Per Ewe</td>
<td>$22</td>
<td>91</td>
<td>9</td>
<td>48</td>
<td>-40</td>
<td>21</td>
</tr>
<tr>
<td>Lambs Weaned Per Ewe Exposed</td>
<td>Lambs</td>
<td>1.84</td>
<td>1.6</td>
<td>1.51</td>
<td>1.38</td>
<td>1.29</td>
</tr>
<tr>
<td>Pounds of Lamb Per Ewe Exposed</td>
<td>lbs.</td>
<td>111</td>
<td>171</td>
<td>92</td>
<td>130</td>
<td>99</td>
</tr>
<tr>
<td>Pounds of Feed Per Breeding Ewe</td>
<td>lbs.</td>
<td>1100</td>
<td>980</td>
<td>1100</td>
<td>850</td>
<td>939</td>
</tr>
</tbody>
</table>

The number of breeding ewes increased from 32 to 63 from 1993 to 1998.

The primary source of income from 1993 through 1996 was market lamb with a small freezer lamb trade. In 1997, the farm sold more than half of the lamb retail. Other sources of income were cull ewes, wool, sheepskins and sheep dog sales in some years.

Expenses related to the retail business included cut, wrap and labels. This raised expenses by almost $4000 in 1997. Many frozen lamb cuts were also carried as inventory into 1998. This explains the negative income after expenses per ewe in 1997.

Most feed was raised on the farm in the first several years of the study, but as the flock size grew, more winter hay was purchased. Some haying equipment and machinery is owned (and fully depreciated); some haying is custom hire. Repair bills varied from $587 to $810 per year. Lime was purchased in 1995, 1996, and 1997. Property taxes are also included in the feed costs. Other non-feed related costs included vet (varied from $0 to $226), supplies, shearing, sheep skin processing, insurance, dues and supplies.
using chemical dewormers. "I won't be profitable unless a person is very dedicated to intensive grazing management, working with smaller numbers of each, it is more realistic to promote diversified farming, and changing the idea of buying and selling livestock. Also, unless a person is very dedicated to intensive grazing management, it will be a long time before we see a lot of different types of livestock."

the biggest limitations on this farm are soil fertility and clean water. Hill farms are

Comments as the project wraps up:

and following.

Constraints to profitable lamb production include soil fertility and clean water. Sheep

Constraints as Key elements to profitable lamb production as project begins:

Farmer Observations
CASE STUDY 002

Description of Farm

Farm 002 consists of 48 acres of hilly pasture, with several very steep areas. Elevation is 1500 feet. There are 115 ewes and 3 rams. Sheep move on a rotating system between four or five large pastures, with access back to the barn at night. Farmer 002 raises some hay and purchases the rest. Fence is a mixture of woven wire, high tensile and electric net. He is has been building a lot more high tensile fence. There have been predator problems with both dogs and coyotes, and Farmer 002 has experimented with different types of guard animals. Lambs are born in late winter and spring in the barn.

Goals: Farm 002's goals are to make enough money on the sheep to pay the property taxes and to improve the land.

Production Objectives/
Management Strategies

Production objectives at the beginning of the study:

- Raise 150 lambs;
- Take better care of the ewes/lambs;
- Have fewer health losses;
- Improve the barn layout;
- Improve the fence for predator control.

Management style:

Farm 002's grazing season tends to go from about May 5th until about November 1st. They keep records by tracking the number of days and number of animals in each pasture. Some pasture is stockpiled for fall feeding and the livestock are wintered in the barn.

Small square bales serve as winter feed. Whole corn and starter pellets are fed to bottle lambs. Whole corn is fed to ewes in the last two weeks of gestation and after lambing until they get on to the pasture. They also feed a commercial mineral mix. Lambs are fed corn after weaning.

For parasites, they deworm ewes before lambing and before going on pasture. In addition, they deworm lambs 2-3 times per year. For predator control, they have used

Strategies to achieve objectives:

- Improve pasture;
- Increase feed available in each paddock;
- Lengthen grazing season;
- Reduce purchased feed costs.
- Increase rate of gain for lambs.
the clipped quadrat method. The composition data which was collected by

the Appendix A for percent species

and age, climate, vegetation and other factors.

by when the sample were taken (plant

animal impact, parasites were also assessed

in addition to grazing management and

weed species by the end of the study.

weed species by the end of the study.

an increase in which cover and decrease in

bo. Researcher and the owner noted

managed so that refuging periods were

mainly was spread, and grazing was

mostly "weeds" and some grass. In 1996

quality and quantity. In 1997, it was

The hillside pasture was low in both

amount of clover during the four years of

 astronomically seems to have increased the

because was around those more

changing the grazing management so that

leagues had been lost due to sheding.

amount of the study. Much of the

beginning of the study, much of the

stocked and therefore overgrazed. As the

The landing pasture needed to be under-

and take foliage nutrition samples.

look at soil fertility, species composition

species gathered in order to plot the

To help gain a better understanding of

Species Composition:

Information Gathered/Results:

the amount of coyote losses.

illegally, which does appear to be reducing

evertheless was replaced by another

worst was added. The first one was not

sheep at night, and two dorkeys stayed with

sheep were generally moved back to the

problem on this farm improving the study.

Predators continued to be a serious

Increased profits (goal of the project):

achieve better pasture utilization to

Changes in management practices to

mostly direct to feed lots and re-sale.

The marketing strategy for farm 002 is

This will help keep 97% of farm income, and has help from

20% of the hays/weeks on the farm. This

them for feed. Farmer 002 was between

ready when hays are able to fill up the

weather is warmer and pastures will be

weather is warmer. Because the

purchased.

sold. Selling in 1997 all winter hay was

but do not use fertilizer, not do they frost

improved the fields over 10 years ago

manure on the fields. They

protection. Farmer 002 spreads

the barn at night for additional

manually effective, and starting in 1998,

donkeys (which appears to have been only
### SPA (Standardized Performance Analysis) Data

<table>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross revenue per ewe</td>
<td>$</td>
<td>91</td>
<td>90.02</td>
<td>139.31</td>
<td>98</td>
<td>117.16</td>
</tr>
<tr>
<td>Feed cost per ewe</td>
<td>$</td>
<td>89</td>
<td>97.46</td>
<td>69.94</td>
<td>82</td>
<td>134.18</td>
</tr>
<tr>
<td>Total operating expenses per ewe</td>
<td>$</td>
<td>163</td>
<td>122.66</td>
<td>128.64</td>
<td>152</td>
<td>204.47</td>
</tr>
<tr>
<td>Income after expenses per ewe</td>
<td>$</td>
<td>-72</td>
<td>-32.64</td>
<td>10.68</td>
<td>-54</td>
<td>-87.31</td>
</tr>
<tr>
<td>Lambs weaned per ewe exposed</td>
<td>lambs</td>
<td>1.29</td>
<td>0.88</td>
<td>1.6</td>
<td>1.35</td>
<td>1.24</td>
</tr>
<tr>
<td>Pounds of lamb per ewe exposed</td>
<td>lbs.</td>
<td>61</td>
<td>93</td>
<td>105</td>
<td>116</td>
<td>134</td>
</tr>
<tr>
<td>Pounds of feed per breeding ewe</td>
<td>lbs.</td>
<td>667</td>
<td>1108</td>
<td>631</td>
<td>1133</td>
<td>929</td>
</tr>
<tr>
<td>Return on assets: cost basis</td>
<td>%</td>
<td>-2</td>
<td>-2.6</td>
<td>0.86</td>
<td></td>
<td>-5.86</td>
</tr>
</tbody>
</table>

The primary source of income was from sale of lambs to feed lots and for re-sale. Other income included wool sales.

Feed costs included purchased hay, grain for ewes and lambs, property taxes and repairs.

Other costs included insurance, labor, supplies, utilities, veterinarian and interest expense. In 1993 through 1996, some hay was made and the remainder purchased. In 1997 and 1998, all the hay was purchased.

### Farmer Observations

**Constraints & key elements to profitable lamb production as project begins:**

"Feed costs through the winter were a major barrier to profit. The number one reason for participating in this project is to reduce these costs. For Farm 002, predator losses have become a huge issue over the past few years. They have lost animals and this has had an impact on the pastures. The costs of the donkey, llama, and fencing are significant, and time spent dealing with the predator losses detracts from other management issues.

Where coyotes are a problem, they can mean the difference between a profitable operation and one that loses money. Would-be sheep producers may want to do a little research in the area they plan to farm in to determine if there is a history of coyote problems."

**Comments as the project wraps up:**

"My pastures have clearly improved every year and are able to provide a lot more feed. The ewes start the winter in excellent condition. My winter feed costs remain a major issue, but I have made progress. Predator losses have become a huge issue. They impact income and management in many direct and subtle ways.

I am glad to have participated in the study, and although the data is discouraging, I have learned a lot."

19
Lamb at the beginning March; shear at the end of February; condition lambs; winter feed on pasture as long as practical; advertise lamb and wool; broaden marketing efforts; add len acres of fenced pasture; intensive rotational grazing; purchase a new ram; increase flock size to 100 ewes; complete agri-business certification; sell hay overstock and two guarded does; make 100 gallons of maple syrup; sell wren stocks plus new yarn to 100#'s; market 15 quality pelts; market 40#'s quality fleeces; produce hay to winter feed 100 ewes; buy 300 wool; lamb with a carcass averaging 4 1/2-5 1/2; produce pasture grass to market 100 lbs. per week; implement family farm.

Production Objectives/Management Strategies: The study: Production activities at the beginning of the year: 3000 ewes.

Goals: To manage combined farm resources for sustainable, productive and profitable farm.

Descriptive of Farm: During the study, there were 60 to 100 non-confined ewes.

Southwest corner: The bottom 10 acres of the farm's southwest corner is well-drained, with the soil profile reaching 6 to 8 feet. The soil is mostly Budishon-Washita, fairly consistent and rolling. There are 6 acres of pastureland near the farm.

30-acre 2-3-5-6 farm, 3-6 feet of elevation, 140 acres of pasture around the farm; 40 acres. 36 acres of cropland (hay), 15 acres of pastureland; and 36 acres; 5 acres of cropland (hay)
♦ Return to pasture April;
♦ Turn in ram in October.

Management Strategies:
Farm 003’s lambs move to a fresh pasture every day during the grazing season. They start the grazing season in April or May and finish usually in December. They stockpile pasture and leave the sheep out at least until February 15th if snow permits. The main forage source fed in winter is hay; no grain is fed. A mineral mix of sweetlix 3 and 1# 698 is fed to lambs and ewes. Manure is spread on the fields, but no lime. They also use an organic fish solution as fertilizer.

They estimate that they work about 6-10 hours per week now, although it used to be more. Farm 003 has off-farm income, and the only other paid or unpaid labor is for shearing and other occasional help. They use a maremma dog for predator control.

They sell natural lamb, so they do few vaccinations (rabies), use no hormones, feed no grain, use no herbicides or pesticides. Sales are to freezer trade, restaurants, and auction. They also sell to customers who are chemically at-risk.

Changes in management practices to achieve better pasture utilization for increased profits (goal of the project).

The farm has not been certified organic, but has continued to be managed organically. This farm increased the flock size and fenced in additional acres for grazing. The farm has continued to improve its practice intensive grazing management.

They increased the flock size during the course of the study but also added additional acres of pastures. There was significant improvement of pasture quality and quantity, so there was often a feed surplus during the grazing season.

Information Gathered/ Results

Species Composition:
To help gain a better understanding of what was growing on the farm over the course of the study, we picked two areas to look at soil fertility, species composition and take forage nutrition samples.

This farm was previously continuously grazed with heifers at a low stocking rate, and sheep began grazing in 1983. The pastures have gradually improved from mostly grass with some woody weed species to better quality grass with more legumes.

Field #1: This is a very productive area near the barn which is primarily grass. Due to heavy manure buildup from livestock in past years there is a lot of rejected forage in this area, and grasses have tended to grow taller and shade out the legumes. During the course of the study, the farmer improved the grazing management, and both farmer and researchers noticed an increase the clover content and a decrease in the problem weed (thistle) in this area.

Field #2: This is a hilly pasture which was not grazed as intensively as Field #1. As a result, the farmer and researchers noticed that the amount of clover decreased and grasses increased. Also, as the total acres and productivity of the pastures increased, the sheep were not able to keep up with the grass, and it
## Table: Pounds of Feed per Breeding ewe

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<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Lbs</td>
<td>0</td>
<td>0</td>
<td>0.2</td>
<td>0.3</td>
</tr>
<tr>
<td>Lbs</td>
<td>1.1</td>
<td>1.1</td>
<td>1.1</td>
<td>1.1</td>
</tr>
<tr>
<td>Lbs</td>
<td>2.2</td>
<td>2.2</td>
<td>2.2</td>
<td>2.2</td>
</tr>
<tr>
<td>Lbs</td>
<td>3.3</td>
<td>3.3</td>
<td>3.3</td>
<td>3.3</td>
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<tr>
<td>Lbs</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
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</table>

## Table: Income after Expenses per ewe

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<tbody>
<tr>
<td>$</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>$</td>
<td>20</td>
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## Table: Feed Revenues per ewe

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<tr>
<td>$</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
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<tr>
<td>$</td>
<td>40</td>
<td>40</td>
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<td>40</td>
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</table>

## LPAR (Lamb Average Daily Gain)

### 1998

<table>
<thead>
<tr>
<th>Days of Age</th>
<th>190-200</th>
<th>170-180</th>
<th>150-170</th>
<th>110-115</th>
</tr>
</thead>
<tbody>
<tr>
<td>37 Ibs/day</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>47 Ibs/day</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>49 Ibs/day</td>
<td></td>
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</tbody>
</table>

### 1997

<table>
<thead>
<tr>
<th>Days of Age</th>
<th>190-200</th>
<th>170-180</th>
<th>150-170</th>
<th>110-115</th>
</tr>
</thead>
<tbody>
<tr>
<td>37 Ibs/day</td>
<td></td>
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<tr>
<td>47 Ibs/day</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>49 Ibs/day</td>
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</tbody>
</table>

### 1996

<table>
<thead>
<tr>
<th>Days of Age</th>
<th>190-200</th>
<th>170-180</th>
<th>150-170</th>
<th>110-115</th>
</tr>
</thead>
<tbody>
<tr>
<td>37 Ibs/day</td>
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<tr>
<td>47 Ibs/day</td>
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</tr>
<tr>
<td>49 Ibs/day</td>
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</table>

## Results and Soil Tests

### Fertilizer

Guatemala method

Data which was collected by the clipped appendices for perennial species composition

Appendix A for perennial species composition

Climatic variations and other factors, see

By whom the samples were taken (date e.g.)

Animal impact, pastures were also affected

In addition to grazing management and

Fertilizing tended to be taken both before and after

### Averaging

Along with an organic nitrogen source

### (Inorganic)

spread on the hay fields in 1997 and 1998 not grazed. Fertilizer was not applied. Communal fertilizer was applied on the hay field which is managed (year-old, partly composed sheep

Some time was spread in 1993 and 1998.

## Conclusion

The lambs on this farm received no grazing.
The primary source of income was lamb sales, but they also had significant income from sheep skins, wool, yarn, knitted products, sheep guard dogs, cull animals and a small amount of hay sales some years. Farm 003 purchased 20 Dorset ewes in 1996, contributing to the higher pounds of lamb/ewe in that year.

The decrease in the pounds of feed fed per ewe was directly due to stockpiling pastures and other benefits of improved grazing management to extend the grazing season.

The fluctuations in lambing rates were partially due to replacement ewes which were kept but were generally not bred in their first year.

There were no machinery repairs in 1998, but repair costs were high in 1993 and 1997. This farm owns all its own haying equipment and machinery, which contributes to overhead expenses in the form of repairs (this was often over $1500/year), fuel, oil and depreciation. Non feed expenses included vet, utilities, insurance, supplies and building depreciation.

**Farmer Observations**

**Constraints and key elements to profitable lamb production as project begins:**

"Some of the key elements to profitable lamb production are developing confidence in practices based on Northeast realities, intensive rotational grazing, not feeding to the national fat layer standard - finish lambs on grass, maintenance feeding for ewes, 80+ ewes (with hay machinery), value added strategy, niche market strategy, fencing; and assess, evaluate and change your plan at least annually.

An important profit from the project is the exchange of information and ideas, insights and experience, philosophy and attitudes among the participants. Increased technical knowledge is less evident at this point. I am confident that will come along in due course as more data is gathered.

Most sheep operations in Vermont are homesteaders; that is, a shepherd who just doesn’t want to or need to reach profitable levels. And for them, western priorities remain the back bone of their operations. At the same time, and I believe largely because of the outreach of this project, for those who do want to reach profitable levels of sheep production, there is now a new standard and it will become increasingly more important as this project grows.

The heavy machinery investment on our farm was a personal choice because I wanted to make my own hay. It probably was not a good business decision, especially when hay was $65/ton. Now hay is almost twice that.

The key elements to profitable production remain the same. Grass, good pasture, short paddock time (periods of occupation), good fencing means producer controls the sheep. I would make some changes in my husbandry regimen. I lost too many lambs during the first two weeks so I would go back to vaccinating ewes to protect lambs during first weeks after
look for better meat characteristics. Sheep and lambs are very much the same, so it seems reasonable to expect similar results. I am now looking into methods for improving the meat quality of sheep. I have been experimenting with different feeding regimes and have noticed some interesting results. One of the things that I have found is that sheep tend to produce more meat when they are fed a high-protein diet. I am currently working on developing a feeding regimen that will maximize meat yield while minimizing the costs associated with feeding.

The first step in this project is to establish a herd of sheep that is well-adapted to the local environment. Once this is accomplished, I plan to begin experimenting with different feeding regimes. I will be using a combination of grass and hay, and I will be monitoring the weight gain of the sheep to determine which regimen is most effective.

I have been very pleased with the results of my experiments so far. The sheep that I have been feeding on a high-protein diet have been producing more meat than those on a lower-protein diet. I am currently working on developing a feeding regimen that will maximize meat yield while minimizing the costs associated with feeding.

I am also interested in exploring the use of genetic selection to improve the meat quality of sheep. I have been working with a number of breeders to develop a selection program that will allow us to identify and breed the best-performing sheep.

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CASE STUDY 004

Description of Farm

Farm 004 is a 135-acre hilltop farm consisting of 87 acres woods, 17.5 acres grass, seasonal watercourses, with sand and gravel based soil. The soil is poorly drained and drought prone. During the project, they had between 26 and 45 breeding ewes each year, but the sheep on this farm are just one part of the whole farm. Grazing management is very intensive, with sheep moving every 2 hours to 3 days. Other livestock on the farm includes heifers, cows, calves, pigs and poultry. Fencing is a mix of high tensile, polywire and electric net. Lambs are born on pasture during May. Most winter hay is purchased, and no grain is fed to lambs or ewes. The farm is now certified organic. Current (sheep related) products are lamb, wool, and cull ewes that are sold through direct market, wholesale, commission sale, and wool pool.

Goals:
Continue to increase the conversion of sunlight into a marketable commodity, using diverse classes of livestock to control succession and improve the nutrient cycle. Leave large islands, corridors and brush borders for wildlife habitat and travel. Set the price for all farm products sold. Have healthy livestock on a profitable farm run by happy people.

Production Objectives/
Management Strategies

Production objectives at the beginning of the study:

♦ Maintain an average growth rate of 34 lb. dry matter/acre/day for 150 days without machine harvest or sacrifice of animal performance;

♦ Have the SPA program show a net profit per acre of at least $1.30/acre;

♦ Healthy livestock and happy people.

Strategies to achieve objectives:

♦ Adding custom grazing of dairy replacements, pasture broiler production, suckler calves on brood cow -- all will increase dry matter demand;

♦ Adding 6 acres new ground with fence and winter water supply;

♦ Lamb and calve at onset of grass growth;

♦ Increase direct market.
Improving pasture productivity and quality

on pastures with diverse legumes in order to
manage weeds and improve pasture
productivity. This farm has continued to practice intensive
rotation of legumes that are variously placed on the farm.

In 1979, the farm added orchards to the
increased profits (goal of the project),
achieve better pasture utilization for
Changes in management practices.

and improving stock by advertising
wool at the wool pool. But even at auction,
previous efforts at selling high-grade sheep, the

Marketing strategies include selling lamb at

holes, where the feed is green and deep for wildlife.
Grazing (cattle and sheep) must permit
movement of livestock, mixed species
produced on a mineral mix of salt
Sheep say out all winter, eating dry hay, no

They stockpile feed for winter feed.

A daily log of grazing, feed demand, and

Management style:

Information Gathered/Results:

The first time in many years, the
sedges, bermudagrass, and foxtail
composition of the pastures was
abandoned. In 1999, the farm was
receiving 15,000 bales of hay,
only one-half of their pastures were
grazed. This pasture was a

of plant species (tops),
material per year and had a greater range
over time. The hillside pasture was
production (total pounds of dry
matter) because it had a higher
percentage of nutrient-rich
composition and low forage
nutrition.

To look at soil fertility, species
of the study, we picked two areas
where there was standing, and
understanding of

Impact
The use of grazing, manure, and animal
has been significantly improved with the
was taken over, but much of the farm
moderately productive when the farm
biologically received more meaning (was
Some of the land (around the barn) so little
with little on manure spread on it
abandoned or not for hay each year
Much of the land was a dairy farm 30 years ago.
This farm was a dairy farm 30 years ago.

In addition to grazing management and animal impact, pastures were also affected by when the samples were taken (plant age), climatic variations and other factors. See Appendix A for percent species composition data which was collected by the clipped quadrat method.

**Average Daily Gains:**

The lambs on this farm were born in May on pasture. They received no grain and were raised on intensively grazed pasture. None of the lambs or ewes were dewormed during any of the years that this farm participated in the study.

### Lamb Average Daily Gains

<table>
<thead>
<tr>
<th>Days of Age</th>
<th>55-60</th>
<th>75-80</th>
<th>85-90</th>
<th>135-40</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>.69 lbs./day</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1997</td>
<td>.62 lbs./day</td>
<td>-</td>
<td>.54 lbs./day</td>
<td>-</td>
</tr>
<tr>
<td>1998</td>
<td>-</td>
<td>.6 lbs./day</td>
<td>-</td>
<td>.51 lbs./day</td>
</tr>
</tbody>
</table>

**SPA (Standardized Performance Analysis) Data**

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Gross revenue per ewe</td>
<td>$135</td>
<td>74</td>
<td>93.17</td>
<td>52</td>
</tr>
<tr>
<td>Feed cost per ewe</td>
<td>$38</td>
<td>35</td>
<td>41.81</td>
<td>38</td>
</tr>
<tr>
<td>Total operating expenses per ewe</td>
<td>$101</td>
<td>53</td>
<td>78.2</td>
<td>69</td>
</tr>
<tr>
<td>Income after expenses per ewe</td>
<td>$34</td>
<td>21</td>
<td>14.97</td>
<td>-17</td>
</tr>
<tr>
<td>Lambs weaned per ewe exposed</td>
<td>1.5</td>
<td>1.12</td>
<td>1.17</td>
<td>0.79</td>
</tr>
<tr>
<td>Pounds of lamb per ewe exposed</td>
<td>115</td>
<td>81</td>
<td>61</td>
<td>44</td>
</tr>
<tr>
<td>Pounds of lamb per acre</td>
<td>lbs.</td>
<td>175</td>
<td>356</td>
<td>270.45</td>
</tr>
<tr>
<td>Pounds of feed per breeding ewe</td>
<td>lbs.</td>
<td>654</td>
<td>415</td>
<td>708</td>
</tr>
<tr>
<td>Return on assets: cost basis</td>
<td>%</td>
<td>6</td>
<td>8.73</td>
<td>4.92</td>
</tr>
<tr>
<td>Return on assets: market basis</td>
<td>%</td>
<td>17.28</td>
<td>5.19</td>
<td>-5</td>
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</table>

This farm is a very diversified grass based operation with sheep only a part of the total income and expenses. The data presented here is only for the sheep enterprise. The primary source of revenue in this analysis was lamb sales (direct and auction), although in some years income from sales of cull ewes was significant. No wool was sold in 1998 due to low wool prices.
Comments as the Project Wraps up:

"How valuable sheep can be to a diverse population of land owners and farmers."

In general, I think of the project as a collaborative effort to produce a solid demonstration of in order to have production be sustained in a cooperative advantage to other enterprises.

However, as livestock, sheep are relatively low value. The individual ewe must be profitable

Owning multiple = improved profitability, and the smaller the operation, the more

And in itself

Focus on having land be the product of resource management with sheep, rather than an

Minimize the level of inflexible capital investment devoted solely to sheep enterprise

Minimize the expense of carrying a ewe through the zero energy income time of year

The key elements of profitable lamb production are:

The big picture consideration to profitable lamb production is the belief in what it’s not profitable.

Constraints and Key Elements to Profitable Lamb Production as Project Begins:

Farmer Observations

The majority of hay fed is purchased. The feed cost per ewe was kept relatively low by

The majority of hay fed is purchased. The feed cost per ewe was kept relatively low by

and fed hay in the winter.

Sheep were grazed in the summer months

Intensive diet strategies during the way the

The sheep, calves, pigs and poultry. This

Includes increase numbers of hens.

Sow, grain, corn, sorghum, which also

Sheep on this farm were just part of the
diversity, fertility, water clarity, longevity, health, aesthetic pleasure and personal satisfaction. Resupplying the capital account is a present-day cultural dilemma brought on by an industrial model for agriculture.

This project... A couple of people have worked hard to draw shepherds together, collect information, and share ideas that can lead to better farming and better decision making. Chet and Sarah deserve much credit for the proposal and the effort required to follow through.

What is better and what have I learned as a result of this project? A better defined community of Vermont shepherds has developed in the time of this project, and in part due to this project. I have learned some nuances about profitably using sheep to help a farm express it's character and vitality. The scales and the SPA program specifically have made some facts out of thoughts and ideas. The project has given me more confidence to continue farm management along the lines that appear in the farm itself.

This project is the first time that I know of that anyone has collected real information on a wide range of production and economic figures from a group of Vermont shepherds over several years."
Management Strategies

Goals: Make maximum use of my pastures as a source of income; to develop a ewe flock and do this on a really forage diet.

pasture (no grain).

The flock size is now up to 005, immediate area.
other farmer in Parnymph, diversification of polytype and flock size, one of which
mixed grasses and
land utilized is

Champion Valley. The
primarily clay soils in the
The farm is 740 acres of

Description of Farm

CASE STUDY 005
Management style:

Farm 005 starts the grazing season generally in early to mid April and finishes in December. Lambs move to a fresh pasture every 2-3 days. They do stockpile pasture. Sheep, horses, and one cow are outwintered as much of the winter as the snow cover will permit. Hay is the main forage source during the winter. Very little grain is occasionally fed to ewes in early lactation. A mineral mix called Blue Seal Sheep is used. Manure is spread on the fields. No lime or fertilizer has been used recently. Frost seeding is done occasionally.

Farm 005 vaccinates for clostridium perfringens type C and D, and clostridium tetani annually. They deworm the ewe flock before the pasture season and the lambs several times during the summer. Spring tight fence is used for predator control.

They sell a few freezer lambs and auction the rest. Farm 005 lambs in March so that lambs will reach market size in summer and early fall. Farmer 005 works approximately 40 hours per week on the farm, although this also includes time spent with the other livestock. There is off-farm income and a bit of other labor.

Information Gathered/ Results

Species Composition:

To help gain a better understanding of what was growing on the farm over the course of the study, we picked two areas to look at soil fertility, species composition and take forage nutrition samples.

Duck Pond Pasture: This is an area which has relatively low productivity compared to the rest of the farm. The soil is a compacted stony clay loam. As rest periods following grazings were increased from 1995 through 1997, the researchers and farmer noticed more grass and more overall production.

The Garden Pasture: This a very productive pasture which grows good quality forage. It is primarily grasses and white clover. However, during the study there was an increase in ground ivy which was spreading in from a nearby hedge.

In addition to grazing management and animal impact, pastures were also affected by when the samples were taken (plant age), climatic variations and other factors. See Appendix A for percent species composition data which was collected by the clipped quadrat method.

Soil & Forage tests:

See Appendices B and C for forage and soil test results, respectively. The combination of clay soils and lower elevations provide an ideal environment for legume pastures, which in turn, are well suited to finish lambs on pasture. Liquid manure was spread on both fields in 1997. No fertilizer or lime was spread during the study.

Average Daily Gains:

No grain was fed to lambs during the study.
depending on the energy and climate of the region. Very
well able to communicate with others on their own level, as with other marketing ideas. Very
brief period of time. Possibly we should give him a share in order to make this as he is
metropolitan area restaurants as unique specialty products available only in certain local
markets. Our tastes are different, we should try marketing Vermont pastured fed lamb in top

interesting to devote a lot of effort for many, many years.

Zedlund lamb seems to me to be an unadulterated dream unless there is someone out there
producing a consistent. Accessible to markers is still probably the major issue. Producing a consistent

Constraints & Key Elements to Profitable Lamb Production as Project Begins:

**Farmer Observations**

- We: 
  - 1997; resulting in a higher feed cost per
  - 1996; purchased hay and property
  
- Pounds of feed per breeding ewe: 122
- Pounds of lamb per ewe exposed: 63
- Lands weaned per ewe exposed: 13
- Income after expenses per ewe: $111
- Total operating expenses per ewe: $44
- Feed cost per ewe: $28
- Cross revenue per ewe: $15

**SPA (Standardized Performance Analysis) Data**

<table>
<thead>
<tr>
<th>Days of Age</th>
<th>70-75</th>
<th>75-125</th>
<th>120-125</th>
<th>110-145</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.34 lbs/day</td>
<td>0.43</td>
<td>0.65</td>
<td>0.65</td>
<td>0.65</td>
</tr>
<tr>
<td>0.48 lbs/day</td>
<td>0.52</td>
<td>0.75</td>
<td>0.75</td>
<td>0.75</td>
</tr>
<tr>
<td>0.60 lbs/day</td>
<td>0.57</td>
<td>0.81</td>
<td>0.81</td>
<td>0.81</td>
</tr>
</tbody>
</table>
CASE STUDY 006

Description of the Farm

Farm 006 has 35 acres total: 22 open, 7 permanently fenced, and the remainder in seasonal fence. The farm elevation is 1500' with clay-type soil, rolling to flat, south facing. The water supply is abundant. They have been grazing sheep and poultry but land is understocked, and it will be several years before maximum stocking rate is achieved. The number of ewes on the farm increased from 23 to 28 during the course of the study. Currently, Farm 006 is producing a small supply of fresh eggs sold locally and lamb which will be sold at feeder weights off grass. They no longer have time for direct marketing and are switching towards more lamb sales at auction.

Goals: The farm’s goal is to preserve open, productive land and produce a variety of products to be sold locally.

Production Objectives/Management Strategies

Production objectives at the beginning of the study:

♦ Increase stocking density;
♦ Encourage growth of legumes;
♦ Winter-feed out on pastures to concentrate manure on poor pastures.

Management Strategies:

Farm 006 moves ewes and lambs to a fresh pasture during the season according to pasture growth; sometimes as often as twice/day to every 48 hours, depending on grass and producer’s schedule. Their grazing season is generally April 30th to November 15th. They do stockpile pasture. They leave the flock outside until March 1st, and then move the sheep inside to shear. Farm 006 plans to leave the sheep out all winter with run-in shelter in winter 1998, and then lamb in May. The main forage source for winter feed is hay. They don’t feed any grain to sheep, but do to horses and chickens. They feed a mineral mix of granular sheep mineral/salt mix from Agway.
The average annual pea harvest has increased in the amount of peas harvested. However, there was also an increase in the amount of peas harvested per acre. The researchers identified two factors: a reduction in the number of peas harvested per acre and an increase in the number of peas harvested per field. A visual observation of the field showed that the peas were better developed in the areas with a higher density of peas. This was confirmed by the researchers.

**Information Gathered**

All lambs were purchased in 1996. In 1997, a small amount of peas was produced (400 lbs), and in subsequent years, the peas were purchased in 1998 and 1999. In 2000, the peas were sold for $1 per pound. In 2001, the peas were sold for $2 per pound. The researchers noted that the peas were better developed in the areas with a higher density of peas. This was confirmed by the researchers.

**Challenges Found**

- **Production Drop:** In some fields, the peas were not harvested due to the lack of labor. The researchers noted that the peas were better developed in the areas with a higher density of peas.
- **Quality Issues:** The researchers noted that the quality of the peas was better in the areas with a higher density of peas.
- **Marketing:** The researchers noted that the marketing of the peas was better in the areas with a higher density of peas.

**Conclusion**

The researchers recommended that the pea harvest should be increased in the areas with a higher density of peas. They also recommended that the marketing of the peas should be improved.
In addition to grazing management and animal impact, pastures were also affected by when the samples were taken (plant age), climatic variations and other factors. See Appendix A for percent species composition data which was collected by the clipped quadrat method.

**Average Daily Gains:**
In 1997 early fast growing lambs were sold to the Easter market (43 days of age). In both years, the lambs were sold as soon as they reached market weight. No grain was in fed to lambs in 1997 or 1998.

<table>
<thead>
<tr>
<th>Days of Age</th>
<th>45-50</th>
<th>55-60</th>
<th>155-160</th>
<th>205-210</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>.6 lbs./day</td>
<td>-</td>
<td>.44 lbs./day</td>
<td>.36 lbs./day</td>
</tr>
<tr>
<td>1998</td>
<td>-</td>
<td>.57 lbs./day</td>
<td>.35 lbs./day</td>
<td>-</td>
</tr>
</tbody>
</table>

**SPA (Standardized Performance Analysis) Data**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross revenue per ewe</td>
<td>$</td>
<td>97</td>
<td>123</td>
</tr>
<tr>
<td>Feed cost per ewe</td>
<td>$</td>
<td>25</td>
<td>53</td>
</tr>
<tr>
<td>Total operating expenses per ewe</td>
<td>$</td>
<td>75</td>
<td>124</td>
</tr>
<tr>
<td>Income after expenses per ewe</td>
<td>$</td>
<td>22</td>
<td>-1</td>
</tr>
<tr>
<td>Lambs weaned per ewe exposed</td>
<td>lambs</td>
<td>1.35</td>
<td>1.39</td>
</tr>
<tr>
<td>Pounds of feed per breeding ewe</td>
<td>lbs.</td>
<td>1216</td>
<td>896</td>
</tr>
</tbody>
</table>

The primary source of income on the farm is the sale of lambs. In 1996 and 1997 the farm did a considerable amount of direct/retail marketing at farmers markets and to the Easter market. This is reflected in higher gross revenue per ewe and in higher processing cost in those years. There was also income from culls, yarn and wool. In 1997 and 1996, some lambs were also sold at the Easter market.

They purchased nine ewe lambs in 1997 to increase the flock size. However, those ewes did poorly and had to be culled by the end of the year.

Feed cost were higher in 1997 because hay costs were higher, and they paid to have manure spread that year. Overall pounds of stored feed fed per ewe decreased over the course of the study because of improved management. They made some hay in 1996, but purchased all hay in future years. Some of the hay purchased in 1997 was not fed until 1998.
Although some lambs reach market weight (100+ lbs) on grass alone, some lambs never

You can make money on poultry and also make money and improve soil fertility with

In theory, without expensive purchases now,

smoother and there was a lot of grass. I feel more solid about ideas on how to improve soil

When is better on the farm? Improved data and records and lamb weights. I don't know if

regardless of climate years.

What have I learned? I need to improve my management, whether on grass or in a feed lot.

What is better on the farm? Improved data and records and lamb weights. I don't know if

Questions I have: What is the most appropriate time and group of animals (ewes or

using a good record keeping system.

Finding ewes that graze and do well on grass. It would be interesting to compare cross-breeds

People may need to figure what they prefer. Bred for meat or milk production (to raise lambs) is which is will as being

Comments as the Project Wraps up:

farm.

Identify good milkers. Handling and weighing systems will have to be incorporated into my

Some management tools are essential, such as lamb and ewe weights. This has helped me

itself to me again. What is the most economical way to do this and to whom - lambs/ewe?

Constraints are: Consistent time and quality. These are always a factor. Identifying a ewe with

produce without grazing and ewes that produce more than one lamb per year.

remaining can be exhausting. Key elements to profit are: ewe, lambs, and ewe - lambs/ewe.

Constraints include cost of ewe maintenance, which feed expenses, and quality, availability

Constraints & Key Elements to profitable lamb production as project begins:

Farmer Observations
CASE STUDY 007

Description of Farm

This 135 acre south facing hill farm is located on a tributary to the third branch of the White River. Much of the pasture and cultivated land is river bottom. Currently, 29 acres are pasture, 7.7 are combination pasture and hay fields, 12.4 are hay fields and 12 are in corn raised by a local dairy farmer for his use. In return, that farmer does their haying.

The primary barn is 20’ x 40’ with hay storage above. A second barn is 10’ x 35’, also with storage above. Two paddocks totaling 2.4 acres are enclosed by five wire high tensile fencing, while all other pastures are enclosed by temporary three strand poly wire. They utilize intensive grazing management on most fields. The exception is a 14 acre field they are reclaiming, where the ewes spend most of the summer.

The flock is Montadale/Suffolk crosses. They have two rams: an older Montadale and a 3-year-old Suffolk. They are maintaining straight Montadale and Suffolk bloodlines for replacement ewes, while most of the market animals are crosses. They experimented with Texel ewes in 1997, but perhaps because of the quality of the animals, they were disappointed with the results. The flock is now closed.

Goals: “Have a mutual (with my wife) farm based life style which successfully meets the challenges of running an agricultural business and contributes to the payment of real estate taxes; enhances our property values; keeps land open; and is fun.”

Production Objectives/
Management Strategies

Production objectives at the beginning of the study:

• In the area of lamb production:
  • Increase market carcass weight from 45.9 to 47 pounds, including organs;
  • Reduce lamb losses;
  • Market 70 lambs.
Lamb Average Daily Gain Data

<table>
<thead>
<tr>
<th>Days of Age</th>
<th>60-75</th>
<th>0-90</th>
<th>1-150</th>
</tr>
</thead>
<tbody>
<tr>
<td>48 lbs/day</td>
<td>76</td>
<td>71</td>
<td>69</td>
</tr>
<tr>
<td>64 lbs/day</td>
<td>83</td>
<td>78</td>
<td>73</td>
</tr>
<tr>
<td>76 lbs/day</td>
<td>85</td>
<td>79</td>
<td>75</td>
</tr>
</tbody>
</table>

Average Daily Gain:

- Lambs are turned through pastures and supplemented with grain.
- Consider culturing early, including soil losses, and continue to develop upper.
- H11l Pasture: New Seeding? This area is a deep pasture.
- Continue to develop upper.
- Any pasture after look has been through once.
- Cut lower pasture and evaluate seating some.
- Possible and evaluate seating some: Deficiencies.
- In fall, evaluate soil conditions in all pastures; correct major deficiencies.
- If leaf, evaluate soil conditions in all pastures; correct major deficiencies.
- Keep at least 4 replacement ewes.

Information Collected/Results:

- Consumption:
  - Stockpile grass for fall/early winter
  - Economics allow:
  - Peene lower pasture (five wire) it

- 2000 Procedure:
  - Breeding: 37 ewes including 6
  - Continue to agressively call:

Management Strategies:

- Increase quality of hay:
- Develop better utilization of early growth:
- In the area of pasture management:
SPA (Standardized Performance Analysis) Data

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross revenue per ewe</td>
<td>$205</td>
<td>267</td>
<td>264</td>
</tr>
<tr>
<td>Feed cost per ewe</td>
<td>$73</td>
<td>113</td>
<td>50</td>
</tr>
<tr>
<td>Total operating expenses per ewe</td>
<td>$237</td>
<td>336</td>
<td>266</td>
</tr>
<tr>
<td>Income after expenses per ewe</td>
<td>-$32</td>
<td>-$68</td>
<td>-$2</td>
</tr>
<tr>
<td>Lambs weaned per ewe exposed</td>
<td>lambs</td>
<td>1.86</td>
<td>1.79</td>
</tr>
<tr>
<td>Pounds of lamb per ewe exposed</td>
<td>lbs.</td>
<td>207</td>
<td>214</td>
</tr>
<tr>
<td>Pounds of feed per breeding ewe</td>
<td>lbs.</td>
<td>1725</td>
<td>1966</td>
</tr>
<tr>
<td>Return on assets: cost basis</td>
<td>%</td>
<td>-2.3</td>
<td>-4.6</td>
</tr>
</tbody>
</table>

Farmer Observations

Constraints & key elements to profitable lamb production as project begins:

“A 40 ewe sheep farm managed by a couple with outside jobs/income, marketing meat and excess hay, can be profitable to the point of covering property taxes and property upkeep. Limited investment should be needed if property has a basic farm infrastructure. Our property can handle 100 ewes with little additional investment, but our time availability would not be sufficient and some hired help would be necessary. Beyond 100 ewes, some major investment would be required with additional paid labor, or a reallocation of our time required.”

Comments as the project wraps up:

“We have learned a great deal during the past three years, particularly about our farm as a business. And we are beginning to reach our near-term financial objectives within the scale of operation we have chosen. We have reduced our real and indirect costs, improved our pastures, and have a higher return per ewe. One of our key objectives was to increase the return from each lamb sold by increasing the market weight. Our goal was to exceed 47 pounds carcass weight on average. During the first third of our 1999 shipping year, our lambs are weighing in at 51.9 pounds on average!

This project has contributed to our understanding of our cost structure. And it has had a major impact on our ability to raise quality grass in quantity, thanks to Sarah Flack’s tutelage. Our constraints to a larger operation remain the same, and relate primarily to the amount of time we have to commit to the farm.

Overall, the project has been a benefit to us. It would have been more helpful if we could have discussed the relative farm performance results as we went along, so each of us could have make adjustments based on others ideas and performance. Hopefully the final report will provide this type of information. Does it make sense to have the participants sit down together to discuss the final report?”

39
**Management Strategies**

- **Goals:** To make an efficient farming operation as possible on a small scale. We raise pigs, chickens, eggs, and milk. We also raise a few heifers, with a cow or two. We have pigs, chickens, and milk. We can be pleased with and enjoy living on.

- **Mission:** Having said all of this, the operation is a labor of love - having a farm that is a labor of love.

- **Objectives:**
  - Improve our profitability and physical condition.
  - Expand our facilities and equipment.
  - Improve our marketing and sales.

- **Objectives:**
  - Reduce expenses, increase our efficiency.
  - Improve our marketing and sales.
  - Improve our profitability.

- **Objectives:**
  - Improve our marketing and sales.
  - Improve our profitability.

**Description of the Farm**

- **Casestudy 008**
they shut the sheep inside at night. They feed hay grown on the farm in the winter. They feed the milk cow and chickens grain and creep feed grain to the lambs. They have started feeding kelp along with salt. They do spread manure on their fields but feel they don’t have enough. They lime when needed but have not used fertilizer in the last 7 years. The only animals that they have purchased during the past 10 years are rams.

They vaccinate for rabies when necessary. They control parasites by deworming the ewes twice a year with commercial dewormers. Lambs, once weaned, are dewormed every 25 or so days. They lamb in February in hopes of selling lambs for the Easter market. For predator control, Farm 008 uses a burro and has good electric fences. This has been a successful strategy as they have had the burro for 10 years and only lost 4 sheep.

Farm 008 has off-farm income. They work, on average, a total of 56 hours a week on the farm and they have some occasional unpaid (family) labor and a very small amount of paid labor at some times of the year. They feel that marketing is not their strong suit. About 50% of their lambs are hot house lambs, about 25% go to auction, and about 25% are sold to the restaurant, freezer trade.

Changes in management practices to achieve better pasture utilization for increased profits (goal of the project)

The flock size was increased in 1996 to 84, after which they culled heavily and went back to 76 ewes. They may increase the flock size again over time using their own replacements.

During the study, they made significant improvements in pasture management and used mob stocking to reclaim some brushy pastures. They fed hay to livestock out on pasture in fall and winter to decrease the amount of manure they needed to spread and to improve the pastures in poorer areas. The improvement in pasture productivity and quality has extended their grazing season and helped decrease the amount of stored feed they need.

Information Gathered/Results

Species Composition:

To help gain a better understanding of what was growing on the farm over the course of the study, we picked two areas to look at soil fertility, species composition and take forage nutrition samples.

Brushy Hill Pasture: This pasture was one that was in the process of being brought back from brush by mob stocking. At the time of the study, the pasture is a very diverse mix of trees, forbs and grasses. The forbs included golden rod, raspberries, buttercup, milkweed and many woody species. The area where the clipped quadrants were taken were primarily grass with about 15% percent clover. Researchers observed during the course of this study that the overall amount of woody forbs and trees decreased and the density of the desirable pasture grasses increased. The farmer said that the field looked "100 percent better" in 1998, and that there was definite decrease in non-edible weed species.

Lower Pasture: This pasture has been in the farm pasture rotation for many years and was producing high quality forage. This area has received no manure, and it is usually cut once for hay and then grazed. It
Lamb Average Daily Gain

<table>
<thead>
<tr>
<th>Days of Age</th>
<th>1998</th>
<th>1997</th>
<th>1996</th>
</tr>
</thead>
<tbody>
<tr>
<td>160-170</td>
<td>39.7</td>
<td>38.9</td>
<td>34.1</td>
</tr>
<tr>
<td>141 lbs/day</td>
<td>62.7</td>
<td>41.1</td>
<td>38.9</td>
</tr>
</tbody>
</table>

Average Daily Gain

Tests showed a higher rate of gain in the following average daily gains. Therefore, the following average daily gains were expected. A pasture in each test section was selected, and larger pastures were expected when there were no observed differences to spread over all fields in a regular basis. The soil itself does not produce enough pasture

Appendix C

Soil & Forage Tests:

Guadalupe method: Data which was collected by the chipped appendix a for percent species composition climatic variations and other factors. See by when the samples were taken (plant age), animal impact, pastures were also affected. In addition to grazing management and changes in how the area was managed, the test results were not applied any more.

Table 1. Lamb Average Daily Gain
The primary source of income on this farm is from sales of lamb, most of which go to the Easter market. The remaining lambs are sold at auction, freezer trade, and as replacement animals. Income from wool is higher than on many farms because it is sold to a local processor. Other income includes the sale of cull animals. A considerable amount of effort is put into direct marketing of products in order to receive the highest price possible. In 1998, there was a larger than usual amount of income from culls, and the lamb prices were higher than usual for both freezer and Easter lambs.

Feed cost per ewe tends to be relatively low because most hay is made on the farm with fully depreciated equipment. The total pounds of stored feed fed decreased during the study due to improved pastures and increased grazing season. In 1997 no hay was purchased. In 1996, about 1-ton of hay was purchased, and in 1998 2-tons of hay was purchased due to lower hay yields and higher stocking rate on the farm. This farm keeps detailed financial records and makes an effort to keep expenses as low as possible. Feed costs include repairs, hay, grain, property taxes and fuel.

**Farmer Observations**

**Constraints & key elements to profitable lamb production as production begins:**

"Profitability is a relative thing. I think that the major problem is cost of production. Taxes, vet bills, feed costs, repairs, etc. To get to a critical mass, I think you need too much land which is very expensive. I do believe that there is a better market (therefore, price) in the Boston/NY area. However, there are too few sheep to provide a consistent supply. How do we get more sheep in Vermont?"

"Allegedly the state wants to keep the land open, keep family farms intact, etc. Why not offer a $25 per ewe annual subsidy to sheep farmers? I think this would create lots of interest in sheep - and kill about 5 birds with one stone!"

---

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross revenue per ewe</td>
<td>$</td>
<td>68</td>
<td>67</td>
</tr>
<tr>
<td>Feed cost per ewe</td>
<td>$</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>Total operating expenses per ewe</td>
<td>$</td>
<td>42</td>
<td>44</td>
</tr>
<tr>
<td>Income after expenses per ewe</td>
<td>$</td>
<td>26</td>
<td>23</td>
</tr>
<tr>
<td>Lambs weaned per ewe exposed</td>
<td>lambs</td>
<td>1.28</td>
<td>1.33</td>
</tr>
<tr>
<td>Pounds of lamb per ewe exposed</td>
<td>lbs.</td>
<td>67</td>
<td>68</td>
</tr>
<tr>
<td>Pounds of feed per breeding ewe</td>
<td>lbs.</td>
<td>1075</td>
<td>1204</td>
</tr>
</tbody>
</table>
We'll make more money in 1999 with many fewer lambs (we are keeping more replacements)

money is the cost more cutting costs right across the brand.

The only way we could make more - we are doing significant of feeding grain and other costs.

allowed us to have a longer grazing season.

The project has also helped us look at costs 100

I think our grazing is the most important thing that we have learned especially since it has

are better because we participated in this project.

interaction with other farmers was very helpful. I wish there was more of that. Our pass times

The most valuable thing was visiting other farms in the project and going on pasture walks.

looking at different aspects of it.

I think the project has been interesting and it has given us more focus to our operation and

It would be interesting to look at this data over 10 years or longer instead of just 2 or 3.

Comments on the project wraps up:

be a constraint, but direct marketing to restaurants may help us with this.

The biggest constraint to profit... are that we have to cut our costs. Marketing might also
Appendix A: Pasture Species & Composition

<table>
<thead>
<tr>
<th></th>
<th>Ridge Pasture</th>
<th></th>
<th></th>
<th></th>
<th>SE Corner</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>% Grass</td>
<td>82.9</td>
<td>91.3</td>
<td>87.1</td>
<td>70.3</td>
<td>89.2</td>
<td>91.1</td>
<td>91.3</td>
<td>91.6</td>
</tr>
<tr>
<td>% Clover</td>
<td>16.0</td>
<td>7.1</td>
<td>12.9</td>
<td>28.8</td>
<td>8.5</td>
<td>6.0</td>
<td>6.0</td>
<td>2.1</td>
</tr>
<tr>
<td>% Forb</td>
<td>1.0</td>
<td>1.6</td>
<td>0.0</td>
<td>0.8</td>
<td>2.3</td>
<td>2.9</td>
<td>2.7</td>
<td>6.2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Landing</th>
<th></th>
<th></th>
<th></th>
<th>Hovencamp</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>% Grass</td>
<td>89.6</td>
<td>86.3</td>
<td>87.0</td>
<td>81.7</td>
<td>45.8</td>
<td>92.1</td>
<td>81.1</td>
<td>68.0</td>
</tr>
<tr>
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**Appendix C: Soil Tests**
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<td>Effective CEC (meq/100g)</td>
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<td>% Soil Organic Matter</td>
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