

Planning a Grazing System: Assessing Resources and Setting Goals

Lesson 1

Introduction

This lesson will offer tools to assess your farm's resources, determine a farm plan by setting, prioritizing and scheduling goals, and establish a monitoring system under a whole farm approach.

There are basically two ways of managing the grazing area on a farm: continuous and managed grazing. Both strategies have advantages and disadvantages. In a continuous grazing system, set-up cost and time required for planning, managing and monitoring are lower. Nevertheless, if stocking rate is low, animals use the pasture resource inefficiently by spot grazing only 30 to 35% of the forage available. If the stocking rate is too high, overgrazing will occur. Both situations lead to weed problems and depletion of legumes and preferred grasses, resulting in high re-seeding and herbicide costs, and reduced meat and/or milk production per acre.

In contrast, managed grazing promotes pasture productivity and biodiversity (with fewer weeds), and allows for making hay or stockpiling to lengthen the grazing season. These advantages are a result of time spent in planning, managing and monitoring, and higher initial investment in setting up the system.

Whole Farm Planning

Before you start improving a particular area of your farm, it is important to evaluate that area in the concept of the WHOLE FARM. You have a certain amount of resources (time, money, enthusiasm, etc.), that you will split among several objectives, not only for your farm, but for your family life as well. Developing a whole farm plan consists of assessing resources, writing a plan with specific goals, developing monitoring tools to measure progress made towards goals, and finally, evaluating and re-planning as needed.

If you have written farm goals, and devised alternative strategies to reach them, you can make proactive and informed decisions of how to allocate your resources. Without a plan, you will only react to situations, and might regret your decisions later on. For example, you allocate money to farm improvements and also family expenses. What is the appropriate amount for each item? When resources are limited, you use them for what seems most important at that time.

**Don't let yourself be a victim of
circumstance.**

**If you plan, you can dodge
market, price, and weather
changes and also take
advantages of opportunities!**

First of all, bring together the farm team, that is, people that participate in, and/or are affected by the farm: spouse, children, partner, workers, landlord, etc. Picture the farm not only as a resource to generate income, but also a place to raise your family and a site of natural resources. During the assessment and planning process, be creative but don't overestimate or underestimate your potential and goals!

1. Assessment of Resources

Inventory. Start by making a list of your resources and their condition.

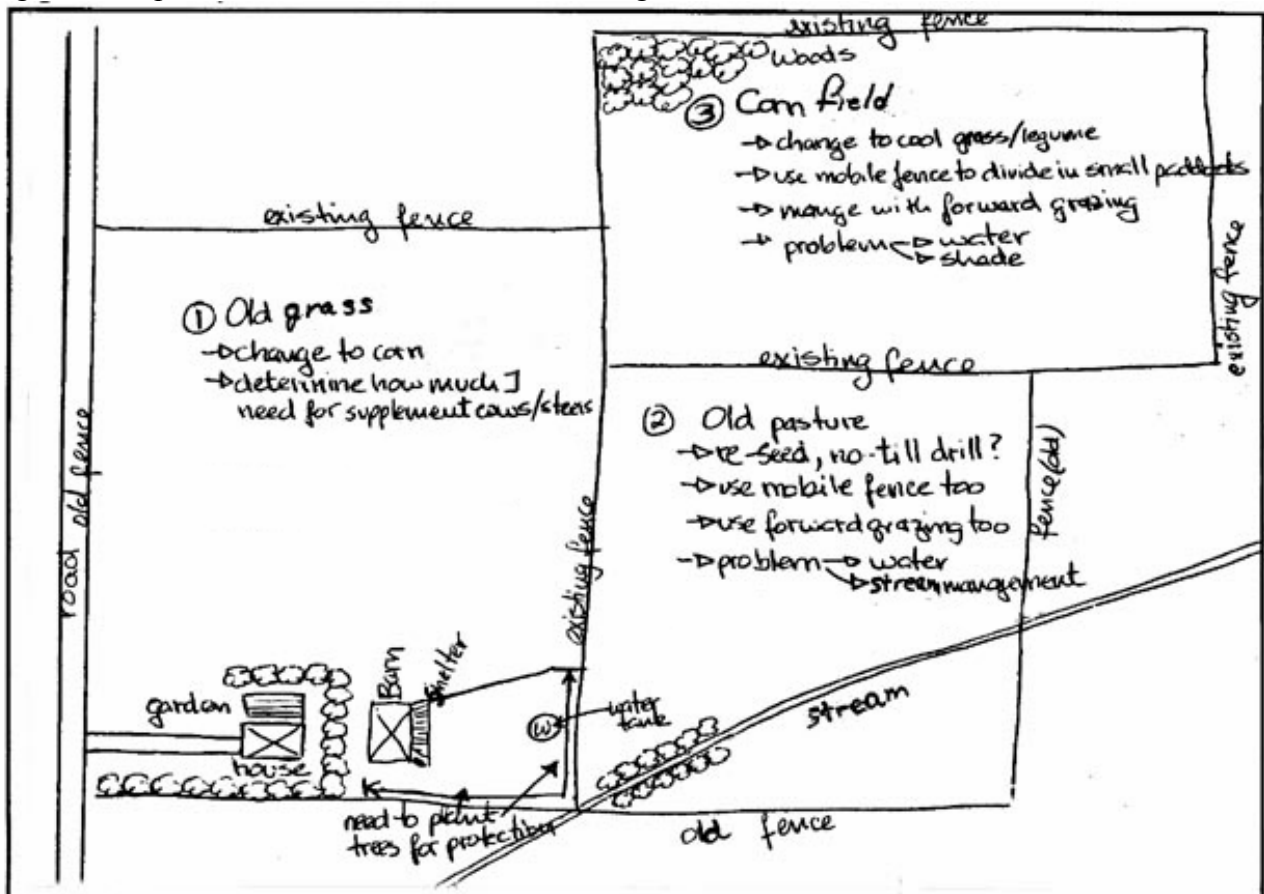
- ☑ Personnel: time available, interests
- ☑ Animals by species, condition and biological stage
- ☑ Facilities: size & condition
- ☑ Feed and forage
- ☑ Land resources: owned and rented
- ☑ Wildlife

Something to think about:

- How much capital do you have available for investment?
- What are the feed requirements of your animals?
- Do you have shortage/abundance of forage from your pastures?
- What is the fencing condition?

Map. Get an aerial picture of your farm, or a map of your land from the Natural Resources Conservation Service (NRCS), and draw the items such as buildings, shelters, fences, lanes, water points, wooded areas etc. You can get soil maps at the same time, as they will also provide useful information to make informed decisions on pasture management. Number each field and write notes of changes needed (See Figure 1).

Figure 1. Map of farm with notes of fields, buildings, facilities and natural resources.



The local Farm Service Agency Office can provide actual field measurements using aerial photographs and their planimeter (electronic measurement device).

Condition of Pastures and Fields. Once you have drawn the farm map, research the present condition of the farm by getting information and making notes about each pasture or field. You can use some of the monitoring tools explained later in this lesson.

Measurements to be taken	Decision to be made	Cost information
Land area	How much into pasture or other crops?	Renting vs. buying
Length and condition of existing fences	Type of fence to use	Fence and fencing supplies
Condition of existing watering system	Type of tanks and lines or ponds	Well, water line, and tank
Pasture composition, condition and productivity	Kind of pasture mix to use: cool and warm season grasses, legumes	Tillage, seed, and seeding. Herbicides and application
Soil characteristics	Kind of nutrients to use: fertilizer purchase, manure, compost	Fertilizer and application
Condition of existing machinery	What equipment is really needed? Till, no-till, animal impact	Repairs, new equipment, rental

2. Writing a Plan with Goals

Set Goals. Together with the farm team, determine your goals, how to accomplish them, how important they are and how to measure progress.

<p>Here are some questions to start off the goal setting task:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> What is your whole farm goal? <input checked="" type="checkbox"/> Do you want to maintain a herd, maximize production per acre or per animal, clear the land, other? <input checked="" type="checkbox"/> How intensive do you want the management to be? <input checked="" type="checkbox"/> Are you willing to fertilize and/ or apply chemicals? <input checked="" type="checkbox"/> How will you supplement hay and/or grain to be fed? <input checked="" type="checkbox"/> How much time should be allowed to reach the goals? <input checked="" type="checkbox"/> Is there a severe weed problem in the pastures? <input checked="" type="checkbox"/> What type and how much winter shelter is available for animals?
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It may take more than one farm team meeting for an effective planning process. During the first session, everyone will gain an understanding of the process, and some of the team members may be hesitant about providing their input toward the future of the farm. Give them some time so that each member can think about his/her goals for the farm. Then, get the group back together to brainstorm ideas, determine goals for the farm, realistic measures for those goals, and the necessary steps to get there. Having realistic financial information (costs and prices) is necessary for accurate evaluation. Each team member should have a list of information available for the next meeting.

Allow enough time between meetings so that all members can get reliable information to share in the next session.

Prioritize. Incorporate the goals from each member into one whole farm chart (See Figure 2). This will help to prioritize actions and direct allocation of available resources. There are some actions that need to be taken care of right away for the proper functioning of the farm. There are also actions that are essential for the healthy development of the family. Finally, there are some actions that can wait until next year. Display this chart in a very visible place and use it as a reminder of the farm’s goals, and refer back to it to determine the best use of available resources. Get the team together to re-evaluate the chart every year, change or add goals and celebrate those that have been achieved.

Figure 2. The Whole Farm Goal Chart (See Appendix A for blank chart)

<i>Lifestyle</i>				<i>Financial</i>			
Goal	Measure	To Do	Rank	Goal	Measure	To Do	Rank
<i>Play piano</i>	<i>3 times a week</i>	<i>Subscribe class</i>	<i>1</i>	<i>Increase income</i>	<i>60,000</i>	<i>Increase sales off-farm job</i> <i>→ Go to fair</i>	
<i>Vacation</i>	<i>1 week cruise</i>	<i>Travel agency</i>	<i>2</i>	<i>Buy bull</i>			
<i>Production</i>				<i>Natural Resource/ Environmental</i>			
Goal	Measure	To Do	Rank	Goal	Measure	To Do	Rank
<i>Improve conception rate</i>	<i>97%</i>	<i>Improve nutrition</i>	<i>2</i>	<i>Better Soil</i>	<i>Organic matter</i>	<i>Rotational grazing</i>	
<i>Condition Score</i>	<i>6-7 into winter</i>			<i>More birds</i>		<i>Leave nesting area</i>	
<i>Improve pastures</i>	<i>10% CP 350lb. DM/ac/in</i>	<i>Re-seed clover soil sample</i>	<i>1</i>				

Schedule an Action Plan. Decide when to do what. Make a calendar for the coming year. Review the example below which illustrates an option for each field and see how it matches the map shown in Figure 1.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Field 1				soil analysis	corn					Harvest		
Field 2				soil analysis	reseed cool season grass, mobile fence	graze, rest	rest	rest	rest, cut	rest		
Field 3				soil analysis	plant cool season grass	rest	cut	rest	rest, mobile fence, graze	graze, rest		

Keep Records. Keep a notebook to write goals and notes. For examples of worksheets to keep records on your natural resources, see Appendix B.

3. Monitoring

One aspect often overlooked is monitoring the system. How is the farm plan working? Develop a specific set of monitoring tools to measure progress. The indicators listed below give a good framework for a monitoring system that can determine how well the system is working and when adjustments need to be made. It is important to keep records of observations and measurements. The following lists and the forms in Appendix C may be used as examples to record monitoring information, or you can make your own. Do not select more tools than you will use, or tools that are not pertinent to your goals, but DO IT!

Visual Forage Indicators

- ✎ Pasture condition - vigor, health (poor to excellent)
- ✎ Forage density - how thick is desirable vegetation
- ✎ Color - degree of greenness
- ✎ Pasture productivity - rate of regrowth
- ✎ Uniformity of grazing

Environmental Indicators

- ✎ Erosion problems and soil characteristics
- ✎ Trails or paths developing
- ✎ Streambank erosion and cover
- ✎ Plant diversity
- ✎ Manure distribution
- ✎ Earthworm populations
- ✎ Wildlife presence or use

Monitoring tools

Soil. Take soil samples to determine soil pH and fertility. Identify soil type. Soil analysis results will offer lime and fertilizer recommendations for the crop that you are planning. Fertilizing without previous analysis can lead to under- or over-application, which is a waste of money and a potential pollution source. Contact your local UMCE or NRCS office for soil testing information and materials.

Plant diversity. Walk in a zigzag pattern across each pasture. At several points toss a one-foot square grid, count how many legumes, grasses, shrubs and weeds are in each square. Record the information on chart (See Figure 3) and note general area on your field map. Take notes as you walk the pasture. Add up all legumes, grasses, shrubs and weeds in the pasture and total them. Finally, divide the number of each type of plant by the total number of plants and multiply by 100 to determine the percentage of each type of plant in the pasture. Grids should be representative of the whole pasture. Repeat this process each year to determine improvement.

Figure 3. Notes on pasture composition, condition, production, and soil characteristics.

5/10/99	Composition					Condition	Production (visual)	Soil Test				
	Legumes	Grass	Shrubs	Weeds	Total	% ground covered	Avg. height	Organic Matter	pH	N	P	K
Pasture 2												
Point A	6	23	2	1		80%	7 in.					
Point B	5	17	5	3		85%	8 in.					
Total	11	40	7	4	62							
	$\frac{11 \times 100}{62}$	$\frac{40 \times 100}{62}$	$\frac{7 \times 100}{62}$	$\frac{4 \times 100}{62}$								
Percentage (%)	17.7	64.5	11.3	6.5		82.5	7.5	2.8	7.3			

Notes/comments: Control weeds with application of herbicide directly to each plant + clipping
Seed legumes - frost seeding next winter
- - no-till drill - find out cost
Productivity = 7.5 - 3 = 4.5 in available for grazing

Pasture Condition. How much bare soil can you see? Based on a visual estimate of green plant ground cover after the paddock has been grazed leaving a 2-4 inch residual stubble height, determine if it is fair, good or excellent based on the following criteria:

Fair – Less than 75% ground cover or greater than 25% bare ground.

Good – 75 – 90% ground cover or 10-25% bare ground.

Excellent – At least 90% ground cover or less than 10% bare ground.

Pasture productivity. As you walk your pastures to determine composition, you can follow the visual or the clipping method to determine productivity and forage available for grazing or cutting for hay.

- A. Visual Method. Measuring pasture height is a tool for making quick estimates of the pounds of forage dry matter in the field at the time measurements are taken. Determine the average vertical height of the undisturbed stand of forage species in inches, and use the table and instructions shown in Appendix D to estimate the amount of forage available for harvest.
- B. Clipping Method. To estimate pasture productivity more accurately, use the clipping method explained in Appendix E.
- C. Grazing Stick (Manual and Electronic): The manual version is a three foot long stick marked with different species of forage that you can estimate the forage density. The electronic version uses radio frequencies to make electrical measurements of forage density and will store measurements.
- D. Rising Plate Method. (Manual and Electronic): This is a variation on the Grazing Stick. It has a Plexiglas plate with a stick through its center. The height of the forage is compressed and this is taken into account when you calibrate the readings. You need to use the clipping method to calibrate to your area. This is also available in an electronic version that will quickly tally measurements.

After determining productivity, condition and composition, go back to the map drawn on the aerial picture. Make notes on each field about present condition and plans for improvement.

4. Evaluate and Change

Use your records! Compare these numbers to the written goals in your plan. Is your farm moving in the right direction? Do you need to make changes in management? Maybe you have new or different goals that you want to incorporate into the plan and need to adjust your management accordingly. Once again, take notes as you do your evaluation, and seek advice. You can find professional information locally at your County Extension office, Natural Resources Conservation Service, or Soil and Water Conservation District. You can also find valuable advice from your neighbors or other people in the industry.

Resources and Reading

- Whole Farm Planning; Combining Family, Profit and Environment, BU-6985-GO 1998, David Mulla, Les Everett, and Gigi DiGicomio, Minnesota Institute for Sustainable Agriculture.
Source: The Minnesota Distribution Center, 405 Coffey Hall, 1420 Eckles Avenue University of Minnesota, St. Paul, MN 55108-6068, (651) 645-6159
<http://www.extension.umn.edu/>
- Pasture Management Guide for the Northeast
Source: USDA Natural Resources Conservation Service
- Pastures for Profit, A Guide to Rotational Grazing, publication A3529, University of Wisconsin, Cooperative Extension Publications, 45 North Charter Street Madison, WI 53715; Phone (608) 262-3346
<http://www1.uwex.edu/ces/pubs/>
- Greener Pastures on Your Side of the Fence
Author: Bill Murphy Source: Arriba Publishing, 212 Middle Rd. , Colchester, VT 05446 1-800-639-4178
- Holistic Management: A New Framework for Decision-Making, By Allan Savory with Jody Butterfield, Island Press, 1999, 612 pages. Holistic Management, it considers humans, their economies, and the environment as inseparable. At the heart of the approach lies a simple testing process that enables people to make decisions that simultaneously consider economic, social, and environmental realities, both short-and long-term. 1998, 616 pages, Island Press.
- The Monitoring Tool Box: 1998; 161 pages; Land Stewardship Project, 180 E. Main St., P.O. Box 130, Lewiston, MN 55952 (507) 523-3366 This guide is for farmers and other land owners interested in learning easy-to-use techniques for monitoring the impact of management decisions on their land, finances and family.
- Managed Grazing Videos: Introduction, Animal Management, Fencing and Watering, Year Around Resource Management, & Managing Pasture Plants.
Source: University of Maine Cooperative Extension Livestock Office, 207-581-2787 or in Maine 1-800-287-7170 or
Iowa State University, Attn: Donna Watson, 337 Kildee Hall, Ames, IA 50011.
- IRM Desk Record
Source: National Cattlemen's Beef Association, PO Box 3469, Englewood, CO 80155 (303) 694-0305
- Beef Farm Sustainability Checklist
Source: Appropriate Technology Transfer for Rural Areas (ATTRA), P.O. Box 3657, Fayetteville, AR 72702, Phone: 1-800-346-9140 www.attra.org
- Sustainable Sheep Production: Livestock Production Guide
Source: Appropriate Technology Transfer for Rural Areas (ATTRA), P.O. Box 3657, Fayetteville, AR 72702, Phone: 1-800-346-9140 www.attra.org
- Sustainable Goat Production: Overview
Source: Appropriate Technology Transfer for Rural Areas (ATTRA), P.O. Box 3657, Fayetteville, AR 72702, Phone: 1-800-346-9140 www.attra.org
- Multispecies Grazing
Source: Appropriate Technology Transfer for Rural Areas (ATTRA), P.O. Box 3657, Fayetteville, AR 72702, Phone: 1-800-346-9140 www.attra.org

- Pasture and Hay for Horses , equine fact sheet explaining nutrient balances, pasturing, types of hay, and forage concerns, #1006, University of Maine Cooperative Extension Livestock Office, Hitchner Hall Orono, ME 04469, 207-581-2791 or in Maine 1-800-287-7170 www.umaine.edu/livestock
- Planning Fencing Systems for Intensive Grazing Management, L. W. Turner, et. Al. University of Kentucky Cooperative Extension, Lexington, KY ID-74, 1997
- Managed Grazing Video Tapes from Iowa State University Extension, Ames, Iowa. Can be borrowed from the UM Cooperative Extension Livestock Office, Hitchner Hall, Orono, 207-581-2787 or in Maine 1-800-287-7170.
 1. Introduction
 2. Animal Management
 3. Fencing and Watering
 4. Year Around Resource Management
 5. Managing Pasture Plants

Adapted by Donna Lamb and Ken Andries from Planning a Grazing System: Assessing Resources and Setting Goals - Lesson 1, University of Minnesota, Beef Education Series, Pasture Management Home Study Course -

Maribel Fernandez, Minnesota, Extension Educator, Livestock Systems
 Dennis Johnson, West Central Experiment Station, University of Minnesota

Visit the UMCE Web Site at www.umext.maine.edu and
 Maine Natural Resources Conservation Service Web Site at www.me.nrcs.usda.gov

Appendix A: The whole Farm Goal Chart

Lifestyle				Financial			
Goal	Measure	To Do	Rank	Goal	Measure	To Do	Rank
Production				Natural Resources/ Environmental			
Goal	Measure	To Do	Rank	Goal	Measure	To Do	Rank

APPENDIX B

CLIMATIC CONDITIONS

Month	PRECIPITATION			TEMPERATURE		
	Rainfall	Snow	Total Precip.	Ave. Temp	Ave. Low	Ave. High
January						
February						
March						
April						
May						
June						
July						
August						
September						
October						
November						
December						
Total						

Use a rain gauge to measure rain. Snow inches need to be converted to rain equivalent. Use local weather data from newspapers for snow conversion.

Link to local weather service:

PASTURE INVENTORY RECORD

Pasture #	Name and Description	
Acres	Suggested Stocking Rate	
Type (Native, Tame)		Ownership
GRAZING		WATER
Grazing System		Number of Watering Sites
Key Management Plant		Type and Volume
Primary Growth Period		Condition of Source & Facility
Past Use (Severe, Heavy, Moderate, Slight)		Condition of Water
Overall Condition		Last Water Test
Problems? (i.e. weeds, bare spots, drainage, predators, etc.)		Problems?
Condition of Riparian ¹ Areas/Wooded Valleys		
Special Consideration		

¹Riparian is the area of land located immediately adjacent to streams, lakes, or other surface waters.

APPENDIX C

This Job Sheet was designed for use by persons with different levels of technical ability. It can be used quickly and without tools, to visually estimate the condition and trend on grasslands. For example, when it asks for a %, the user should make their best visual estimate. It reminds the user to evaluate 10 items important to grassland condition/trend. With experience, condition/trend surveys will be quite consistent between users.

Use this form to inventory up to 5 different fields or sites, or to record change on the same field or site for 5 years. Enter the Pasture Type for the site being evaluated. Acres can be the total acres in the field or the acres represented by the evaluation. The month and year should be recorded at M___ and Y___.

CATEGORY:

- 1) Plant Population - Visually estimate the % composition by weight of each plant grouping and assign a weighted value. Desirable, intermediate and undesirable will vary with site, kind of grazing animal and intended use.
- 2) Plant Diversity - The number of different kinds of plants that are well represented on the site. If only one kind of plant occurs, diversity is narrow; if six or more kinds are present, diversity is broad.
- 3) Plant Density - Ignore undesirables and visually estimate density of living desirable and intermediate species that would be present at a two-inch stubble. Is there room for more desirable and intermediate plants?
- 4) Plant Vigor - Are the desirable and intermediate species healthy and growing at their potential? Some things to look for are; color, leaf area index, reproduction, presence of weeds, rate of growth and regrowth, etc.
- 5) Legumes in Stand - Visually estimate the % composition by weight of the legumes present in the stand for the area being evaluated.
- 6) Severity of Use - Close and frequent use causes loss of vigor, reduces desirable species, and promotes erosion and runoff. Light use allows excessive residue buildup, blocks sunlight, and reduces palatability.
- 7) Uniformity of Use - Uniform grazing has all plants grazed to a moderate, uniform height throughout the field. Spotty grazing appears uneven, with some plants or parts of the field grazed heavily and others lightly.
- 8) Soil Erosion - Visually observe and collectively evaluate all types of erosion and determine the severity for the area being surveyed.
- 9) Woody Canopy - Estimate the percent canopy (shaded area at noon) of woody cover over six feet tall.
- 10) Plant Residue - Appropriate residue provides adequate ground cover to retard runoff, returns nutrients to the soil, and provides a favorable microclimate for biological activity.

VALUE:

Where needed, use weighted values and interpolate. For example; if you can't decide between a value of 2 or 3 use a value of 2.5.

DETERMINING GRASSLAND CONDITION / TREND

Owner/Operator:			Date:				
Field Office:			Technician:				
Field #:							
Pasture Type:							
Acres:							
Month and Year:			M__Y__	M__Y__	M__Y__	M__Y__	M__Y__
CATEGORY	PARAMETER	VALUE	VALUE	VALUE	VALUE	VALUE	VALUE
1) Plant Population The estimated % by weight is mostly	Desirable	3 4					
	Intermediate	1 2					
	Undesirable	0					
2) Plant Diversity The diversity of plant species is;	Broad > 5	3 4					
	Medium 4-5	1 2					
	Narrow < 4	0					
3) Plant Density Desirables and intermediates are;	Dense > 85%	3 4					
	Medium 75-85%	1 2					
	Sparse < 75%	0					
4) Plant Vigor Desirables and intermediates are;	Strong	3 4					
	Medium	1 2					
	Weak	0					
5) Legumes in Stand Percent of legumes by weight make up;	>40%	3 4					
	20-29% 30-39%	1 2					
	<10% 10-19%	0					
6) Severity of use The degree and frequency is;	Light	2 0					
	Moderate	2 4					
	Heavy	0					
7) Uniformity of Use The uniformity of grazing use is;	Uniform	3 4					
	Intermediate	1 2					
	Spotty	0					
8) Soil Erosion Sheet, rill, gully and stream bank is;	Slight	3 4					
	Moderate	1 2					
	Severe	0					
9) Woody Canopy The canopy over 6 ft makes up;	<11%	3 4					
	21-30% 11-20%	1 2					
	>40% 31-40%	0					
10) Plant Residue Dead and decaying plant material is;	Excessive	2 0					
	Appropriate	2 4					
	Deficient	0					
<u>TOTALS</u>							
<u>PASTURE CONDITION / TREND</u>							
0-10 = VERY POOR		11-20 = POOR	21 – 30 = GOOD		31 – 40 = VERY GOOD		

APPENDIX D

VISUAL METHOD TO ESTIMATE STAND PRODUCTIVITY

Determine the average vertical height of the undisturbed stand of forage species in inches and use the table below to estimate the forage available for consumption.

Estimated dry matter yield in pounds per acre per inch of height for pasture types and stand conditions

Pasture Species	Stand Condition, (lb./acre/inch)*		
	Fair	Good	Excellent
Bluegrass/Clover	150-200	250-300	350-400
Perennial Ryegrass/Clover	150-200	250-300	350-400
Orchardgrass/Legume	150-200	250-300	300-350
Timothy/Legume	150-200	250-300	300-350
Tall Fescue + Nitrogen	100-150	200-250	350-400
Mixed Pasture	150-200	250-300	300-350

*Values from Pasture Stick developed by Cornell University and NRCS

For rapid regrowth and to maintain a healthy stand, forage crops should not be grazed below 2-4 inches for most cool season grasses and legumes.

For example, an Orchardgrass/legume pasture in excellent condition with an average undisturbed height of 7 inches will have 4 inches of usable forage (3-inch stubble height left after grazing). The available forage dry matter would be **estimated** to be 300-350 pounds/acre-inch or 1,200-1,400 pounds/acre.

Use the following formulas to calculate the number of animals that can be grazed or the approximate number of days the pasture can support a specific group of animals:

$$\text{Days} = \frac{\text{Total lbs. Forage/Ac.} \times \text{Ac.} \times \% \text{ Grazing Efficiency}}{\text{Avg. Animal Wt.} \times \text{Intake Rate in \% Body Wt.} \times \text{Animal \#}}$$

$$\text{Animal Number} = \frac{\text{Total lbs. Forage/Ac.} \times \text{Ac.} \times \% \text{ Grazing Efficiency}}{\text{Avg. Animal Wt.} \times \text{Intake Rate in \% Body Wt.} \times \text{Days}}$$

Pasture system	Grazing Efficiency (total season)
Continuous	30 %
4 pastures	35%
8 pastures	50%
12 pastures	65%
24 + pastures	75%

For example,

$$19.5 \text{ Animals} = \frac{1,300 \text{ lbs. Forage/Ac.} \times 1 \text{ Ac.} \times .75 \text{ Grazing Efficiency}}{1,250 \text{ lbs. Animal wt.} \times 4\% (.04) \text{ of Body Wt. Intake} \times 1 \text{ Day}} = 19 \text{ animals fed}$$

APPENDIX E

CLIPPING METHOD TO ESTIMATE STAND PRODUCTIVITY

Clipping method.

1. Clip the forage in 1 square yard of pasture. Clip at the height to which you would like to graze. (This varies with species.)
2. Weigh all of the forage collected. Record the total weight of the sample (for example, 2.07 lbs./sq. yd).
3. Determine the % forage dry matter (DM):
 - a) Weigh an empty paper plate. Record weight of plate (for example, 1 oz).
 - b) Take a 1/2 lb (approximately) subsample of the forage. Place it on the plate and weigh it accurately. Record original weight of subsample (for example, 9 oz).
 - c) Place the plate and forage in a microwave oven with a cup of water and turn the microwave on high for three minutes. Note: It is extremely important to leave water in the microwave throughout the drying process. Water reduces the chance of ruining the microwave or possibly starting a fire.
 - d) Weigh.
 - e) Place back in microwave for 1 minute.
 - f) Repeat steps 3d and 3e until no additional weight loss occurs. Record final weight of subsample (for example, 3 oz).
 - g) Calculate % forage DM as:

$$\% \text{ Forage DM} = \frac{(\text{final weight of subsample}) - (\text{weight of plate})}{(\text{initial weight of subsample}) - (\text{weight of plate})} \times 100$$

For example,

$$25\% \text{ Forage DM} = \frac{(3 \text{ oz}) - (1 \text{ oz})}{(9 \text{ oz}) - (1 \text{ oz})}$$

Note: Be sure to account for weight of plate before and after drying.

4. Determine pasture yield (lb/acre) as:

$$\text{Pasture yield} = \frac{(\text{total sample wt}) \times (\% \text{ forage DM}) \times (43,560 \text{ sq. ft/acre})}{(9 \text{ sq. ft/sq. yd})}$$

For example,

$$2,505 \text{ lbs./acre} = \frac{(2.07 \text{ lbs./sq. yd}) \times (.25) \times (43,560 \text{ sq. ft/acre})}{(9 \text{ sq. ft/sq. yd})}$$

Appendix F: Planning Fencing Systems for Intensive Grazing Management, L. W. Turner, et. Al.
University of Kentucky Cooperative Extension, Lexington, KY ID-74, 1997

Appendix G: Guide to Pasture Condition Scoring, Grazing Lands Technology Institute, Natural
Resources Conservation Service, United States Department of Agriculture, May 2001.

Pasture Record

Pasture _____ **acres** _____

Comments _____

Note: Indicate other pastures in rotation if appropriate

Kind of animal	In			Out			Days	Animal Days	Est. Ton/Ac
	Date (m/d/y)	Number of head	Size (weight)	Date (m/d/y)	Number of head	Size (weight)			

Notes

1. Name the four steps involved in developing a whole farm plan.

2. (T or F) A benefit of preparing a whole farm plan is that if you have written goals for your farm, and alternative strategies devised, then proactive and informed decisions can be made on how to allocate resources.

3. Using the table in Appendix D, how many pounds of available forage dry matter per acre would a bluegrass/clover pasture have if there was 6 inches of usable forage (9 inches of total height and leaving a 3 inch stubble) and the stand is in good condition?

4. List two forage indicators and two environmental indicators that can be monitored to determine if a whole farm plan is working effectively.

5. (T or F) A pasture with 75% to 90% ground cover with 10% to 25% bare ground is considered a good stand condition.

6. Name three of the observations you should make and record information for when assessing the present condition of a pasture.

7. (T or F) A continuous grazing system will result in a higher grazing efficiency than rotating pastures.

8. (T or F) The whole farm planning process should include everyone that is affected by the farm and decisions made regarding its management.

LESSON 1 QUIZ

9. What is the percentage dry matter in a sample of forage that had an initial weight of 10 ounces, and weighed 2 ounces after microwaving the sample until there was no longer any weight loss? (Assume the paper plate weighs 1 ounce)

10. Name the four pasture monitoring tools discussed in this lesson.

Name _____ Phone _____

Address _____

(Optional) Fax _____ E-mail _____