



# **Blueprint for Success**

## ***A Guide for Feeding Quality Assured Beef Cattle in Pennsylvania***

**A joint initiative of:**

**Penn State College of Agricultural Sciences  
The Pennsylvania Beef Council**

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## Blueprint for Success

### For Feeding Quality Assured Beef Cattle

#### Forward

Pennsylvania is uniquely positioned to produce high quality, finished beef cattle for the nation's and the world's consumers because of the availability of meat packing facilities, a nearby concentration of population, and from an established agricultural infrastructure. Consumers demand consistent, flavorful, nutritious, and safe muscle foods. Beef can maintain its competitiveness in the food marketplace by meeting these demands. These safety and palatability traits can be enhanced in many ways, including farm-level production practices. The advantages for feeding cattle in this region are twofold:

**1. There is a number and diversity of markets available for beef cattle.** These markets include major beef packers; available markets for restaurant, export, and "labeled" retail beef products; smaller, local butchers and retailers of beef; and active terminal auction markets.

**2. The availability of inputs to a cattle feeding enterprise.** Extensive feeder cattle production is found in the surrounding states of Virginia and West Virginia, cattle are available in the southern Atlantic states, and there are 100,000 feeder cattle produced in Pennsylvania. Feed commodities of many types are readily available. Extensive corn and small grain production currently exists with 1.4 million acres of corn and 500,000 acres of small grains. An extensive food processing industry exists that produces waste products which find an alternative use as cattle feed. Finally, poultry production is one of the largest and emerging animal enterprises in the region, and the byproducts from this industry are also excellent sources of cattle feed.

On March 12, 1999, representatives from the College of Agricultural Sciences at Penn State, Moyer Packing Co. and the Pennsylvania Beef Council met in Souderton, PA to discuss the opportunities for feeding cattle in Pennsylvania and the Northeast, determine an educational process that is necessary to improve fed cattle production in the region, and organize an effort among the participants to institute an educational program to improve fed cattle production.

The first step in this process was to determine the management factors that are necessary to improve the competitiveness and consumer value of a finished animal. An effort was initiated between Penn State University Cooperative Extension and Moyer Packing Co. to jointly determine production and educational needs to address this issue. Named the "Blueprint for Success," a working committee was formed that determined the specific factors necessary to produce a valuable beef carcass. That committee was co-chaired by Steve Bryce, Director of Cattle Procurement at Moyer Packing Co. and by Dr. John Comerford, Beef Extension Specialist at Penn State. The other members were Darwin Nissley, a cattle feeder from Lancaster County; John McFadden, Regional Sales Manager for Hoechst-Roussel Animal Health; John Moose, Fulton Bank; Jim Hogue, Territory Manager for Agric-Basics, Inc.; Bill McCoy, McCoy Cattle Co.; Chester Hughes, Lancaster County Extension Agent; and Micheal Firestine, Agricultural Representative of Fulton Bank. The charge for this group was to list the specific management and animal factors that would improve the value of fed cattle for producers, packers, and consumers in Pennsylvania. This document, "Blueprint for Success for Feeding Cattle in Pennsylvania" is the result of that discussion.

## **Purpose**

The purpose of this manual is to provide a summary of the management and animal factors that can increase the competitiveness, predictability, quality, and value to consumers of fed cattle in Pennsylvania. Recognizing that quality beef cattle may come in many forms and that market forces may not allow even the "best" animal to be profitable, the practices outlined here are intended to help reduce the cost of production, increase the value of the product to consumers, and reduce carcass discounts affecting meat quality.

## **Objectives**

1. To increase the long-term competitiveness and consumer value of cattle fed for slaughter using prescribed management practices.
2. To increase the number of cattle fed in Pennsylvania that meet consumer demands for consistency, quality, and value.

## **Overview**

What does the perfect finished steer look like? Obviously there is no single answer to this question. The integration of variation in animals, feed resources, land resources, management skills, markets, and consumer demands will result in competitive cattle that take many forms. However, there are three factors that are universal to increased value: capturing premium carcass prices through additional consumer value when they are available, eliminating carcass discounts, blemishes, and other factors that affect consumer acceptability for beef, and reducing production costs to insure a consistent supply. The following values represent the "Ten-Point Benchmark" for fed cattle that have the highest potential to reach these goals:

## Ten-Point Benchmark for Quality Cattle in Pennsylvania

1. Carcasses with an USDA quality grade of Choice or better to reach and exceed consumer's "window of acceptability."
2. A carcass weight of 700-900 lbs. to help insure tenderness, quality factors, and portion sizes acceptable to consumers.
3. A yield grade of 1, 2, or 3 to reduce fat, make beef more visually attractive, and influence tenderness and consistency.
4. No distinguishing Dairy or Brahman characteristics. Identify breed and feeding systems for premium programs that address eating quality, value, safety, and nutrition.
5. Fed high energy feed for at least 120 days to meet consumer demands for uniformity and flavor.
6. Healthy cattle that produce safe and desirable beef.
7. Free of carcass blemishes that may detract from consumer value and insure appropriate animal husbandry practices.
8. Less than 20-24 months of age at slaughter to positively influence tenderness and high consumer demand.
9. High growth rate with desirable feed conversion to make more efficient use of feed, water, land resources, and reduce production of animal wastes.
10. Produced in environmentally friendly conditions that target excellent animal welfare and positive community relations.

Cattle, both fed steers and heifers, that match these criteria form the "mainstream" of desirable cattle for both producers and consumers. Likewise, here are some of the factors that may detract from the value in fed cattle (**the Ten-Point Discounts**):

- 1. Lower than USDA Choice Quality Grade.**
- 2. Yield grades greater than 3.5.**
- 3. Carcass weights greater than 950 lbs or less than 600 lbs.**
- 4. Distinguishing dairy- or Brahman - influenced characteristics.**
- 5. Carcass blemishes such as bruising and injection sites.**
- 6. Recurrent and chronic health problems.**
- 7. "B" maturity carcasses.**
- 8. Low or moderate energy diets fed for extended periods.**
- 9. Poor growth and feed conversion.**
- 10. Rejected by consumers for poor product wholesomeness, or when produced in unfriendly environmental conditions.**

### **Achieving Added Value**

#### **Quality grade of USDA Choice or Prime**

Background: Quality grades of beef cattle are intended to categorize beef into segments that will have similar eating quality. The two major factors that are used to determine quality grade in carcasses are a subjective intramuscular fat - marbling - between the 12<sup>th</sup> and 13<sup>th</sup> ribs and maturity of the carcass. The latter is determined by lean color, calcification of the spinous processes, and calcification and flatness of the ribs. Beef cattle less than 24 months of age will generally have "A" maturity.



### Keys to Success: Understanding Marbling



Within an age category, marbling will be the most important factor determining quality grade. The specific factors, which allow marbling to be experienced in a carcass, are not well understood. It is generally believed to be some combination of genetics of the animal, animal age, and animal feed intake relative to the energy density of the daily ration.

**Genetics:** Genetic influences on marbling come in two forms. First, there is an "average breed effect" for marbling. Most scientific reports have shown that breeds such as Angus, Shorthorn, and Jersey will generally have the highest positive average breed effect on marbling, while breeds with a high proportion of muscling in the carcass, such as Limousine, will have a lower average breed effect for marbling. There is very little influence of heterosis (hybrid vigor) on marbling. The second factor is variation in the genetics of marbling within a breed that is measured with Expected Progeny Differences (EPDs). This is a fairly recent technology, but it has been shown:

- (1) There is a wide variation in the genetics of marbling within all breeds.
- (2) Selection of parents with high EPD for marbling will result in a larger percentage of Choice carcasses compared to those from parents with a low EPD for marbling.
- (3) Marbling is genetically independent of most other production and carcass traits. This is particularly true of fat thickness in the carcass. While marbling is in fact

fat, it has a different composition than subcutaneous fat, so it is possible to select for more marbling and for less fat thickness and achieve this result.

**Age:** It is known that yearlings will usually have a higher proportion of Choice carcasses than calf-feds. This is probably due to the influence of age and maturity in converting feed to fat in the carcass. Even within heavy selection pressure for EPD for marbling, older cattle will usually have more marbling in the carcass.

**Feed Intake:** It has been suggested that cattle of the same genetic potential for marbling and of the same age will have a "threshold" of feed energy intake that must be reached to express marbling in the carcass. This factor will, of course, vary from animal to animal, but documentation of this threshold will have important economic benefit.

This is the basis for the ultrasound sorting program written by Dr. Brethour at Kansas State University described later in this manual.

## **Managing for Success: Feeding and Feed Management**

### **Specifications for Feedlot Rations:**

- (1) For cattle 600-850 lbs., feed 12.5% crude protein diet and minimum of .55 mcal/kg net energy of gain.**
- (2) For cattle 850 lbs. And up, feed 13% crude protein diet and minimum of .60 mcal/kg net energy of gain.**
- (3) Diets should be 70% corn (or equivalent) of the dry matter.**
- (4) Diets should be less than 8% fat.**
- (5) Diets should be a minimum of 40% dry matter.**
- (6) Diets should be a minimum of 8% roughage.**
- (7) Protein ratio should be 65-75% undegradable intake protein.**
- (8) No more than 1/3 of the total protein requirement should be met with non-protein nitrogen.**
- (9) At least sixty percent of the total protein requirement of receiving diets should be high quality ruminal escape protein**

**Examples of Feedlot Rations:**

**Ingredients and Prices Used:**

Dry, shelled corn                    \$2.50/bu  
 Corn silage                            \$35/ton  
 36% natural protein                \$200/ton  
 Mineral mix                            \$350/ton

Yardage = \$.40/head/day

Fed at 3 lbs/hd/d

Fed at .5 lbs/hd/d                    cost                    cost

<u>Animal Wt.</u>	<u>Sex</u>	<u>Ration NEq</u>	<u>Corn (as fed) lbs</u>	<u>Corn Silage (as fed) lbs</u>	<u>ADG (lbs/day)</u>	<u>Feed Conversion (feed/gain)</u>	<u>Non-feed \$/cwt gain</u>	<u>Feed \$/cwt gain</u>	<u>Total \$/cwt gain</u>
650 (850)	S	60	12 (14)	11 (16)	3.6	4.9 (5.9)	11.05 (11.02)	34.15 (38.91)	45.20 (49.93)
	S	55	7 (8)	22 (30)	3.3	5.4 (6.3)	12.66 (12.25)	36.62 (42.56)	48.78 (54.81)
	S	50	4 (5)	28 (37)	3.0	6.0 (7.2)	13.48 (12.97)	39.62 (44.70)	53.10 (57.67)
	H	60	12	11	3.5 (3.4)	5.1 (6.3)	11.41 (11.72)	35.24 (41.37)	46.65 (53.08)
	H	55	7	22	3.1 (3.1)	5.8 (7.1)	12.92 (13.01)	38.91 (45.21)	51.83 (58.22)
	H	50	4	28	2.8 (2.9)	6.4 (7.6)	14.31 (13.07)	42.07 (47.46)	56.38 (61.23)



### Key to Success: Determining feed cost

Farmer - feeders in Pennsylvania typically market crops through cattle. An important component of cost - and subsequent determination of profitability - is how home-grown feeds are valued in the feedlot enterprise. There are several methods available:

- (1) Never consider home-grown feeds of any kind as "free." They all have a cost.
- (2) The cost of production is added to the cost of production of cattle. The fallacy of this method is that it is economically important to separate the value of crop production from cattle feeding to determine which enterprise is more profitable.
- (3) Charge the cattle enterprise for the feed at the value the crop could be sold for on an open market or the price you would have to pay to buy the commodities on an open market. This will allow the operator to determine the true profit centers on the farm-crop farming or feeding cattle.

Another perspective is equivalent pricing of nutrients, particularly energy. Consider the following example:

Corn Silage Production Budget (1997 PSU Agronomy Guide)  
(Per acre basis)

<u>Yield</u>	<u>TDN</u>	<u>Variable cost</u>	<u>Fixed cost</u>	<u>Total cost</u>
21 tons	68%	238.77	99.56	338.36

Adjustments: (1995 NRAES Dairy Reference Manual)

Harvest and Storage loss (11.3%) = \$385.81  
Feeding loss (4%) = \$401.89

Corn silage production cost per ton = \$19.31  
TDN cost per lb. of silage = \$.04  
TDN cost per lbs. of corn @\$2.50/bu = \$.04

Under this scenario it is shown that actual feed energy costs for corn silages at the cost of production is equivalent to purchasing corn at \$2.50 per bushel.







































❖ **A thorough knowledge of the USDA beef grading system is necessary to understand the source of premium and discounts.**

**<sup>1</sup>Marketing direct to packers. Direct marketing to packers will usually be based on a carcass price that will employ discounts and premiums found on a pricing grid. Some flexibility in delivery can be negotiated.**

**Marketing at Auctions. Auctions can provide immediate liquidity through competitive bidding. Buyers of "non-traditional" beef - small butchers and ethnic markets - can be included with major packers. The risk of some carcass discounts passes to the buyer. Pricing may be volatile due to local conditions of supply and demand, and pricing will usually be based on some "average" value with few premiums available.**



**Keys to Success:  
Effective Marketing**



1. Plan purchases of cattle and commodities based on a market that is targeted.
2. Fully understand the USDA beef grading system.
3. Know your costs of production.
4. Avoid the "people discounts" of carcass bruises, yellow fat, and heavy or light carcasses.
5. Communicate with several potential markets while the cattle are being fed.
6. Make profitability dictate marketing procedures and not animal weight, grade, or time on feed.
7. Control price risk when costs and animal performance are known with some accuracy.
8. Use feeder cattle selection, rations, and feeding systems to realize available premiums in the market.

Maintain a historical record of cattle source, performance, and carcass values so appropriate markets may be addressed.



