

ADOPTION OF BEEF CATTLE PRECONDITIONING PRACTICES IN
RELATIONSHIP TO INFORMATION SOURCES AND METHODS

By

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Abstract of Thesis Presented to the Graduate School
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As with most industries, the cattle industry is rapidly changing and cattlemen must stay abreast of the changes to be competitive. This study examined how well beef cattle producers are staying abreast of recommendations related to preconditioning practices. Preconditioning practices are given to calves prior to sale to improve health and performance which, in turn, can result in higher returns when the calves are sold.

The focus of the study is the rural counties of the eastern Panhandle, also known as Florida's Big Bend. One objective of this study was to determine the adoption rates of preconditioning practices of producers. It was found that de-worming was the most frequently adopted preconditioning practice. Castrating and vaccinating for blackleg were also adopted by at least half of the producers. The preconditioning intensity index

showed a mean of three, which indicated that the average producer has adopted three of eight preconditioning practices.

A second objective was to describe the composition of producers. It was found that the majority of the ranchers in the survey have small scale commercial operations, which are less than 49 cows, depend on off-farm employment to earn a living, earn less than 50% of their agricultural income from raising beef cattle, and were raising cattle for reasons other than to earn a living.

The third objective was to determine where producers go to gain information on these preconditioning practices. By looking at the frequency of use of information sources and methods, this study found that other producers, veterinarians, and county agents are used with the same frequency. However, farm and ranching magazines are the most frequently used methods followed by extension newsletters.

A fourth objective examined the relationships between adoption of preconditioning practices, rancher characteristics and where producers go to gain information on preconditioning practices. The most significant findings were if a producer reads a newsletter he or she is more likely to use a fact sheet followed by the other methods. Then if a producer reads a fact sheet he/she is more likely to consult a county agent followed by other methods. If a producer consults a county agent he/she is more likely to go to meetings and use web sites. Finally if a producer consults with an agent and visits the agents' web sites he/she is more likely to adopt recommended preconditioning practices. Lastly the study gives recommendations as to how educators can increase producers' adoption rates, thus improving the quality of the calves on Florida's cattle ranches.

CHAPTER 1 INTRODUCTION

The diversity of the state of Florida can be seen in many ways ranging from its climate and landscape to its economy and the people who live there. Florida's terrain stretches from the North Florida rolling pine forests to Disney World in the central region and the subtropical Florida keys in the south. As a consequence, there are many different industries and job opportunities in Florida that are contributing to its growth and development.

Florida quick facts lists one of the economic strengths of the state as being international trade because 40% of all the United States exports to Latin and South America pass through Florida. Tourism brings about 58.9 million visitors to the state with an economic impact of \$46.7 billion; the industry also employs 839,541 Floridians (State of Florida.com, 2004).

One influence on Florida's growth and development is its climate. As shown in Figure 1, there are seven climate divisions in the state of Florida (Fraisie, Zierden, Breuer, Jackson, & Brown, 2004). These climate divisions range from an average temperature of 76 degrees Fahrenheit in South Florida (regions 5, 6, and 7) to 73 degrees Fahrenheit in Central Florida (regions 3 and 4) and 67 degree Fahrenheit in North Florida (regions 1 and 2) (Florida Travel, 2004). These climate zones have

a big impact on both population density and the industries that locate there. The population density is much greater in South Florida where residents enjoy the year around warm climate. In addition, much of Florida's tourist and agriculture industries are dependent on Florida's warm winters. Florida supplies winter vegetables, as well as citrus, to the rest of the nation.



Figure 1. Climate Divisions of Florida (Fraisie et al., 2004)

Agriculture is another economically important industry in Florida. A recent study by Hodges, Mulkey, and Philippakos (2004) reported that in the past two years, agriculture accounted for about \$62 billion of the state's \$484 billion economy. Florida agriculture also is among the most diverse in the United States. Commodities produced include citrus and winter vegetables in South Florida and logging, field crops and livestock in North Florida. The diversity of agriculture also is reflected by the fact that nearly one-half of all agricultural producers in Florida report their principal occupation as "other than farming" (USDA Census of Agriculture, 2002). This is very common in the beef cattle sector. Where, the majority of beef producers do not have a large herd. This

is particularly true for North Florida where average herd size is about 28 cows (Table 1). This is in contrast to South Florida where average herd size is more than three times larger.

Table 1. North, Central, and South Florida Cattle and Farm Population

	Farms	Cows	Average Herd Size
North	5,431	154,688	28
Central	5,238	178,780	34
South	5,046	494,812	98

Source: (USDA Census of Agriculture, 2002)

Note: Some counties have no data

Although a large number of producers have small operations, Florida is one of the major cow/calf states in the Nation with 1,750,000 head of cattle and calves (USDA Census of Agriculture, 2002). Beef cattle produced cash receipts of 293 million dollars in 1998 (Hodges et al., 2004).

As with most industries, the cattle industry is rapidly changing and cattlemen must stay abreast of the changes to be competitive. Whether it is producing forages, vaccinating, or marketing, there are always new demands on the cattle producers. Regardless of size, ranching operations still have to operate at or above break-even cost if they are going to stay in the beef cattle industry (Mayo et al., 2002). According to Martin (2002), Florida Cooperative Extension leaders believe that retaining a viable cattle industry is important for both economic and environmental reasons. That is one reason that the strategic plan of Cooperative Extension is placing an educational program emphasis on beef cattle operators (IFAS Extension Strategic Plan, 2004).

The purpose of this study is to examine how well beef cattle producers are staying abreast of recommendations. A key component of the recommendations is a set of preconditioning practices. Preconditioning practices are given to calves prior to sale to

improve health and performance which, in turn, can result in higher returns when the calves are sold. The focus of the study is the rural counties of the Florida Panhandle including the Big Bend area. The 12 counties in the study area have 12.4% of the farms in Florida and 6.2% of the beef cows in Florida (Table 2).

Table 2. Distribution of Farms and Cattle in Northwest Florida by Counties

	# of Farms	% of Farms	# of Cows	% of Cows
Florida	15,717	100	982,404	100
Escambia	201	1.2	4,009	.4
Gadsen	122	.7	2,710	.3
Holmes	306	1.9	9,347	1.0
Jackson	362	2.3	17,878	1.8
Jefferson	107	.7	4,702	.5
Leon	66	.4	2,000	.2
Okaloosa	131	.8	1,978	.2
Santa Rosa	170	1.1	3231	.3
Taylor	60	.4	3,500	.4
Wakulla	47	.3	641	.1
Walton	223	1.4	6435	.6
Washington	153	1.0	4202	.4
Total for Counties	1,948	12.4	60,633	6.2

Source: (USDA Census of Agriculture, 2002)

The specific objectives of this study are as follows:

1. To determine adoption rates of preconditioning practices of producers.
2. To describe the composition of producers in the Big Bend.
3. To determine where producers go to gain information on these preconditioning practices (four different information categories will be examined).
4. To determine the relationships between adoption of preconditioning practices, rancher characteristics and where producers go to gain information on preconditioning practices.

Definition of Terms

The following terms used in the thesis are defined below.

Commercial cattle operation is a ranch that raises steers and heifers primarily for feedlot or to replace breeding females.

Part-time rancher is a producer that receives income from off-farm sources.

Preconditioning intensity score will be used to measure the number of preconditioning practices that a rancher adopts. The score ranges from 0 -- no adoption to 8-- adopted all 8 practices.

Preconditioning practices are practices cattle ranchers administer to calves prior to sale or entering them into the herd.

Purebred operation is a ranch that raises calves to sell as registered breeding stock, primarily bulls 12 to 24 months of age.

Small scale producer is a producer that has less than 49 cows as defined by the United States Department of Agriculture.

Limitations of the Study

The results of the study will not be applicable to all cattle producers in Florida. The study is based on a random sample of producers in Northwest Florida and may not represent the entire population of Florida because the conditions for forages and other ranching management practices vary throughout the state.

This is a study of relationships and should not be construed as cause and effect associations. Many of the variables may be related, such as number of cattle and amount of land but one does not cause the other. In analyzing the data it will be important not to make causation assumptions.

Summary

Florida is a very diverse state with many industries. The cattle industry with 15,715 ranches plays a small, but significant role in the economy and the environment. Although cattle operations are generally small-scale in size in Northwest Florida, they have the third largest agricultural impact on the Northwest region.

This introductory chapter has explained the size of the cattle industry in Florida compared to that of Northwest Florida. Results of an earlier study of Northwest Florida (Mayo et al., 2002) found that many producers in this region are small scale and are diversified in characteristics. Therefore, it is critical that educators reach out to all producers and explain the importance of adopting beneficial preconditioning practices. For Florida's cattle producers to produce healthy feedlot ready feeder calves, producers must take advantage of the sources of information offered to them and adopt technologies that can increase to the prices received for feeder cattle.

CHAPTER 2 THEORETICAL FRAMEWORK

Introduction

The mission of the University of Florida\IFAS is to develop knowledge in human and natural resource, agriculture, and the life sciences and to make that knowledge accessible to sustain and enhance the quality of human life (Pasco, 2003). If ranchers are better informed about animal health care, nutrition, and marketing, they can increase profitability. Other factors also influence production such as record keeping, forage production, and culling practices.

The study will look at the dependent variable, adoption rates of preconditioning practices critical to the production efficiency of an operation. The study will then correlate the adoption rate with three independent variables: selected rancher characteristics, information sources, and information methods. The study will also look at the relationships between rancher characteristics, information sources and methods. Rancher characteristics will also help define the composition of the producers in the Big Bend. Many of the practices being examined have been taught in extension livestock programs for the past 50 years. However, there are many producers that are new to the Florida cattle industry and, therefore, they are not aware of the practices that are necessary for producing marketable feeder calves (Mayo et al., 2002).

Adoption of Technology

The purpose of this study is to determine how well producers are staying abreast of and adopting recommended preconditioning practices. A new technology or innovation will change the marginal rate of substitution between inputs in a production process. Some changes may be perceived as large by a potential adopter. Early studies of adoption were based on the assumption that people were resistant to change and that resistance had to be overcome (Nowak, 1992). There is a distinct difference, however, between a producer who is unable to adopt versus one who is unwilling to adopt. Nowak (1992) (cited from Caswell, Fuglie, Ingram, Jans, & Kascak, 2001) summarized these two types of barriers to adoption:

Inability to adopt: (1) Information lacking or scarce; (2) costs of obtaining information too high; (3) complexity of the system too great; (4) too expensive; (5) labor requirements excessive; (6) planning horizon too short (benefits too far in the future); (7) limited availability and accessibility of supporting resources; (8) inadequate managerial skill; and (9) little or no control over the adoption decision.

Unwillingness to adopt: (1) Information conflicts or is inconsistent; (2) poor applicability and relevance of information; (3) conflicts between current production goals and the new technology; (4) ignorance on the part of the farmer or promoter of the technology; (5) inappropriate for the physical setting; (6) increased risk of negative outcomes; and (7) belief in traditional practices. Many of the distinctions made between inability and unwillingness to adopt are based on relative judgments (i.e., too high, too short, inadequate) and would be difficult to test empirically.

Another way to differentiate non-adopters is to characterize them as (1) those for whom adoption would not be more profitable than continuing with current practices, and

(2) those for whom adoption would be more profitable but who choose not to switch technologies due to other barriers.

If there were a continuation of this study to design policies to encourage adoption, producers would need to be first classified into one of the two groups and then targeted differently. The total benefits of switching to these technologies may outweigh the costs by a large margin, but if those gains are not realized by the rancher who bears the costs, the voluntary adoption of preferred technologies may not occur. Since neither ranches nor ranchers are identical, there will be differences in whether a particular technology is adopted and when. Ranchers will differ in their ability to understand and adapt to innovative methods, and in the quality of the cattle and land they manage. The farmer is aware of these factors and uses that knowledge to determine the degree of adoption. The distribution of the underlying heterogeneous factors will determine the pattern of practice adoption (Caswell et al., 2001).

So what makes a rancher adopt these practices and use them to improve their ranching operation? The classic study by Ryan and Gross (1943) recommended starting the adoption process of farm practices by encouraging innovative farmers to adopt innovations. Then other farmers will soon follow, speeding up the adoption of new agricultural practices; this is called the innovation diffusion theory (as cited from Stephenson, 2003).

It was found in Stephenson's study that early adopters are very different from other ranchers. They are younger, have higher incomes and have the larger operation (Stephenson, 2003). For practices to be adopted they have to have a relative advantage

over the old practice and it has to be consistent with existing cultural patterns (Stephenson, 2003).

A key part of the adoption process is identifying the criteria used in decision-making. Bohlen (1961) (as cited from Stephenson, 2003) says that innovations that are less complex, are divisible, readily observable, low cost, and profitable are adopted quickly.

Rogers (1995) (as cited from Stephenson, 2003) acknowledges that there are criticisms to the innovation diffusion theory; they are mainly that those who can afford to innovate, get richer and those who do not adopt the innovation are blamed for their lack of response.

While decisions on the amount of conventional inputs to apply are made on a seasonal or annual basis, the adoption of new technology represents a significant shift in a production strategy. The decision to adopt new technology is equivalent to an investment decision. The decision may involve substantial initial fixed costs, while the benefits accumulate over time. The initial costs may include the purchase of new equipment and learning the best techniques for managing the technology on the farm. A producer may perceive the non-monetary costs of change to be very high. An individual's assessment of the new technology is subjective and may change over time as a rancher learns more about the technology from neighbors who have already adopted it, the extension service, or the media. When a technology first becomes available, uncertainty about its performance under local conditions is often high. Significant adaptation of the technology may be necessary before it performs well in the local production environment. Over time, as some ranchers in one location adopt and gain

experience with the new technology, the uncertainty and cost of adoption fall. Some ranchers may fail to adopt the technology altogether if they determine that it simply does not perform well under their resource conditions, or if the size or type of their ranch operation is not suited to the technology in question (Griliches, 1957 as cited in Caswell et al., 2001).

Another adoption theory by Klonglan and Coward (1970) defines symbolic adoption as the culmination of the evaluation of the innovation, wherein evaluation entails learning about the innovation and the positions taken by opinion leaders. Symbolic adoption represents an important juncture in the innovation-decision process because it is at this point that the principles of the innovation are considered acceptable. Subsequent implementation and confirmation decisions entail consideration of availability, trialability, financial resources, and technical support, where as symbolic adoption represents the affective response to cognitive messages about the innovation and social persuasion from opinion leaders. It reflects the individual's emotional and affective responses to information messages, social persuasion, and perceived normative expectations (Sapp & Korsching, 2004).

Reasons for Adopting Preconditioning Practices

This section describes the reasoning behind adopting the dependent variable, preconditioning practices. Cow/Calf producers must produce calves that are healthy and will stay healthy if they want to obtain the highest price for their calves. One reason being that feeder calf buyers will discount the price they pay for calves if they cannot confidently predict the calf will stay healthy. Richey (2000) says to insure that calves are healthy and will remain healthy all calves must be properly prepared before marketing and shipment. Preparation includes dehorned, castrated, de-wormed, exposed to

commercial feed, and properly vaccinated. When calves are uniform, healthy, and remain healthy, they exhibit predictable performance. Calves like this will develop a good reputation (Richey, 2000).

Implanting is a management practices available to cow/calf producers that offers one of the highest benefit-to-cost ratios. Implanting suckling calves once with zeranol or estradiol-progesterone type implant will increase daily gains an average of .10 pounds per day for steer calves and .12 pounds per day for heifer calves (McCollum, 1998).

Implanting cattle has long been recognized as one of the most profitable investments a cattle producer can make. Whether a producer has a few or several thousand head, properly administered implants will yield an economic return of \$15 to \$35 per head. So it makes good sense to correctly implant cattle for maximum returns (Prichard, Hartzog, Gamble, & Jennings, 2002).

Vaccinating twice for shipping fever protects calves from getting any type of respiratory disease. Respiratory diseases can be fatal to cattle. If a calf ever gets a respiratory disease it will decrease their value (Richey, 2000).

Horned cattle will receive a discount per head because buyers of feeder calves prefer animals without horns. Dehorning reduce the possibility of injury and reduces bruising. Cattle without horns require less space at the feed bunk and in transit. Also, horned animals are more difficult to catch in a head gate, and more likely to injure the handler during processing (Prichard et al., 2002).

Blackleg is a vaccine that protects cattle for the disease blackleg. The disease is not seen often but if it does get into the herd a producer could loose several grown calves

and there are no signs of the disease until the producer finds the dead calves (Richey, 2000).

Teaching cattle to eat from a bunk is a practice used mostly by producers that intend to retain ownership on their cattle, therefore it is to their benefit to have calves eating grain out of a bunk before they leave the farm and are stressed by other factors. The cattle will loose less weight and start gaining faster than calves that have not been taught to eat from a bunk. It may take several days for the calves without prior bunk feeding experience to learn where and how to eat. This will lower the calves weight and immunity to disease. Preconditioning calves with feed prior to shipment will improve rate of gain, reduce sickness, and reduce death loss in the feedlot. It is doubtful that the resulting cost savings in the feedlot will offset the premium price required for preconditioned calves to recover preconditioning cost (Pate & Crockett, 2002).

De-worming is also a practice that is of great benefit to the producer it removes internal and external parasites. By removing these parasites calves will grow faster and heavier (Prichard, et al., 2002).

Castration is the removal or destruction of the testicles, by either surgical or non-surgical methods. Once castrated, the male calf is referred to as a steer. Beef from steers is preferred over beef from bulls because castration improves the color, texture, tenderness, and juiciness of the meat. And cow-calf producers and stocker operators benefit from castrating bulls because the market pays a premium for steers (usually \$2 to \$6/cwt), partly because of consumer preference and partly because of their quieter disposition and ease of handling in the feed yard. The negative side of castration is that

bulls naturally have faster growth rates, better feed efficiencies, and higher carcass cutabilities than steers (Prichard et al., 2002).

Lastly, sorting calves into uniform groups is a practice one should use when selling calves. Markets are topped by calves that are uniform and grouped into truckload lots (48,000 to 50,000 pounds) of steers or heifers. These large, uniform lots can and do attract competitive bids from all the buyers in the market and, hence, sell well. However, most owners of small herds cannot assemble truckload lots and so must look for other ways of selling their calves. Some collaborate with other owners of small herds with similar breeding, attempting to make it easier for buyers to assemble loads of similar calves, thereby improving price per pound (Holt, Lord, & Simpson, 2002).

If producers in Florida want a good reputation for their calves they need to follow established research practices that are recommended by the Cooperative Extension Services, ranching magazines, veterinarians and many other information sources and keep up to date on new management practices. Also they may need a variety of sources to learn and implement a practice such as implanting and vaccinating. However it is critical for ranchers to use research based information from credited sources.

The next section of the study will look at past research on rancher characteristics. Some sources indicate that there are relationships between adoption of preconditioning and rancher characteristics

Rancher Characteristics

As reported earlier, the majority of ranchers in the Big Bend have small-scale operations (less than 49 cows) and most of the operations involve raising commercial cattle. Other characteristics looked at will be years of experience, percent of income from beef cattle operation, and the main reason for raising beef cattle. The study will

look at the composition of these characteristics to see if there is an association with adoption of preconditioning practices.

Years of Experience

Human capital variables, such as years of experience, may enable ranchers to acquire and effectively use information about new agricultural production technologies. The growing complexities of some resource management technologies may increase the need for specialized skills (Gladwin, 1979 as cited in Caswell et al., 2001). Securing the appropriate technical skills may increase the costs of applying a new technology since it could require educational investments or the hiring of managers or contractors (Welch, 1978 as cited in Caswell et al., 2001). Farmers with higher levels of human capital are expected to be more likely to adopt complex technologies (Caswell et al., 2001).

The number of years of farming experience could positively or negatively affect the likelihood that a rancher would adopt production practices. Farmers who have been agricultural producers for many years are expected to be more efficient at incorporating new technology into production. However, long-time ranchers may actually be more reluctant to switch from technologies they have used efficiently for many years.

Huffman and Mercier's (1991) study of adoption of computer technologies in agriculture found that experience with new technologies was highly correlated with more education, but not necessarily with age or years of operation. Also, long-term farmers are generally older and have shorter time horizons for collecting the benefits from adopting new technology (Caswell et al., 2001).

Ladewig and Chickering's (1984) study showed that even though experience and economic situations may be related to years in the cattle business, it is not significant

with adoption of practices. Therefore we have seen various results on whether, years of experience is associated to the adoption of practices.

Operation Type

Another characteristic the study will be looking at is type of cattle raised-- purebred or commercial. Purebred herds require more attention to record keeping and herd health therefore they may adopt technologies that may not be required by commercial cattlemen. Ladewig and Chickering's (1984) study showed that adoption of blackleg vaccination was significant with the type of cattle raised.

Income/Reason

The higher one's gross farm income the more likely one is to utilize recommended preconditioning production (Ladewig & Garibay, 1982). Another study showed that the amount of income received from farming yielded no significant difference among adoption rates of farmers (Hall, Dunkelberger, Ferreira, Prevatt, Martin, 2003). A third study also showed that higher family income decreased the likelihood of participation in an educational program therefore farmer could not have an opportunity to even learn about new technology. The study suggested that a high income would decrease the need to improve farm productivity and profits (Israel & Ingram, 1991). Therefore, research shows different options on whether adoption is influenced by rancher income or reason for producing cattle.

Also, knowing the reason why one is in the cattle business may give insight into the intensity of adoption of preconditioning practices and the response to technology. One of the reasons for producing cattle is to use crop residue, for instance cattle can forage through harvested crops and receive nutrients that would have been wasted. Producers also put non-crop land to use with cattle because row crop producers should

not plant, back to back crops. It is best to let the land sit dormant for five to six years between crops. Another reason for producing cattle is to receive green belt tax exemption, which, is a tax break for agricultural land. A producer has to have a certain number of cattle per acre to receive the tax break. Lastly, hobby farmers might raise cattle just for enjoyment so that some may need to break even while others may not. Therefore cattle producers have many reasons besides earning a living as reasons for raising cattle. These reasons may explain the level of adoption.

Employment Status

Ranchers that work off-farm are more likely to adopt time-saving technologies and less likely to adopt time-intensive technologies (Caswell et al., 2001). Also, studies show that off-farm employment is negatively related to farming commitment, which has been shown to be positively related to innovativeness (Nielson, 1984 & Willems, 1980 as cited from Ladewig & Chickering, 1984). Ladewig & Chickering's (1984) study showed that off-farm employment was not significant with regards to blackleg vaccination but it was significant with having a controlled calving season. Therefore off-farm employment may be only related to adoption of certain practices such as practices that only require the producer to work cows once such as dehorn and castrating. While it may not show an association with bunk feeding since this would be a continuous chore.

Research has shown part-time farmers have less contact with research and Extension. Such contact may be needed if they are to benefit from the advances made in today's agriculture. Rather than letting these less experienced farmers learn by their mistakes, research and Extension efforts should be directed to improve cooperation between those ranchers adopting technology and those needing to learn these practices (Drost, Long, & Hales, 1998).

Operation Size

The effect of farm size, or number of cattle raised on the adoption of ranching practices has long been debated. Many argue that new agricultural technologies often have a scale bias that favors larger farms and that adoption of these technologies will accelerate the decline in the number of small farms. Although theory provides little guidance on the relationship between ranch size and investments in new technology, empirical studies often find that larger farms are more likely to adopt new technology than smaller farms.

One reason could be that larger farms may have lower information or management costs per unit of output (Caswell et al., 2001). These factors of size and cattle number will be correlated with adoption of preconditioning practices

Information Attainment

A third objective of this study is to learn where ranchers go to gain knowledge about preconditioning practices. This study will identify which sources and methods make a significant difference in the adoption of preconditioning practices.

Dollisso and Martin (1999) recommended that the main focus of an educational program should always be on “increasing profitability.” They also recommended that change agents interact with the farmers and identify real world challenges, and design programs that would provide practical solutions to their problems. Ranchers want to know the latest technologies that can help them in their day-to-day work on the farm.

To reach an audience one must know it, and in particular, realize the obstacles preventing the use of a specific information source (Cobourn & Danoldson, 1997 as cited from Varlanoff, Florkowski, Latimer, Braman, & Jordan, 2002). Convenience, accessibility, and cost drive consumers in their choice of goods and services including

information. For educators to provide stakeholders with information, it must be convenient and low in cost if educators expect for the information to be used.

Saltiel, Bauder, and Palakovich (1994) found that access to information plays a stronger role in the adoption of management-intensive practices than it does for low input methods. Therefore some of the low input methods such as castrating and dehorning that are critical to a better outcome of herd health and increase profit may be overlooked. Advice that is designed to increase profits may or may not affect adoption of practices (Caswell et al., 2001).

Pounds (1985) as cited from (Varlanoff et al., 2002) found that when consumers were asked to name the source of information regarding five specific areas, they most often named professionals or businesses. However, friends, a free and convenient source, were often listed as the second source of information. Extension and magazines were also often named, followed by libraries. Two of these sources are free, but require dedicated time to obtain information, while magazines may require a payment for a single purchase or subscription (Varlanoff et al., 2002).

Varlanoff et al. (2002) say there are four levels information attainment that information and methods can be grouped into. 1) Totally free and convenient because you can access at home. Other producer's information would fall into this category. 2) Free but requires search and/or wait. Fact sheets, newsletters/ bulletins, agent consultation, field days, and research and farm demonstrations would all fall into this category. 3) Paid and Convenient, being that it is delivered to your home at a very low cost is cattle or farm magazines. 4) Paid and requires searching which would include consultation with a veterinarian. County or state internet sites would also fall into this

category since they have initial costs of hardware, software, and paid access to an internet line. Varlanoff et al. (2002) research showed that most producers preferred free information that requires search and or wait. However with all these sources stakeholders must have knowledge of the persons or organization's existence.

Information Sources and Methods

Farmers can learn about new agricultural technologies and receive assistance from both the public and private sectors. Feder, Just, and Zilberman (1985) found that the extent of effort to gain information is a function of the expected gain from that knowledge. For example, the United States Department of Agriculture Extension Service and the National Resource Conservation Services provide information and technical assistance to farmers about agricultural and resource management practices, but farmers will not seek that information unless the potential gain is perceived as significant. Agricultural firms typically supply information about new products, and private contractors can be hired to provide technical assistance.

Petrzelka, Padgitt, and Wintersteen (1999) found that half of the Extension clientele in their study that have received information on livestock made changes in their operation based on Extension recommendations. The other half used information to confirm their own plans. The study also showed that livestock producers who sought out information reported substantial savings with nearly half of respondents reporting that the information saved them \$11 a head or better. When looking at Extension ranking, past studies have shown that the majority of clientele indicated they were very satisfied or satisfied with information they received (Petrzelka et al., 1999).

In Calderwood's (1997) study, she found that farmers showed equal preference for magazines, farm visits, and meetings as a form of education. However farmers do not

always have the time or luxury of leaving the farm to attend meetings. It has been found that farmers prefer farm visits over other educational methods (Jordan, 1993 as cited from Calderwood, 1997). Even though farm visits are costly and time consuming for extension agents, they hold an important place in extension education programs no matter what the farm size is. Calderwood's study found that 75 % of the farmers felt that farm visits had positively impacted their profitability. Therefore the need for traditional extension programs and new programs will continue to be relevant in regions of the country dominated by cow-calf producers (Bailey, Bastian, Menkhaus, & Glover, 1995).

CHAPTER 3 METHODOLOGY

General Purpose

The purpose of this study is to examine how well beef cattle producers are staying abreast of recommended preconditioning practices. The focus of the study is the rural counties of the Panhandle, also known as Florida's Big Bend. This study uses the data collected in the 2002 Northwest Florida Beef and Forage Survey (Mayo et al., 2002). Most of the ranchers in the study are small-scale producers; small farms serve as an important component of rural community life and cultural continuity; therefore they need to be informed of recommended preconditioning practices (Singh et al., 1999 as cited from Ekanem, Singh, Muhammad, Tegegne, & Akuley-Amenyenu, 2001).

The majority of the ranchers in this study have small-scale commercial operations (which is less than 49 cows), they depend on off-farm employment to earn a living, and earn less than 50 % of their agricultural income from raising beef cattle, and were raising cattle for reasons other than to earn a living (Mayo et al., 2002).

In the Northwest Beef and Forage Survey, producers responded as having 17,243 head of cattle which is 3% of the cattle in the 12 counties surveyed shown in Figure 2 below. Northwest Florida may not have very many cattle; however there are more beef

cattle operations in this region compared to other geographical area in the state. Most of the cattle in the state come from south Florida on a few, very large beef cattle operations. The 12 counties in this survey have 12.4 % of the farms in Florida and 6.2 % of the beef cows in Florida (USDA Census of Agriculture, 2002).



Figure 2 Counties Surveyed in 2002 Northwest Beef and Forage Survey

The 2002 Northwest Florida Beef & Forage Survey (Mayo et al., 2002) surveyed 25 % of the Extension clientele currently being served by Florida Cooperative Extension to assess the current level of management performance being utilized. They found that knowing this information will help extension agents better understand which areas of management need to be stressed to improve profitability and efficiency in the Northwest region.

The population for the study has coverage error in that the respondents were selected from a Cooperative Extension mailing list; therefore respondents had to be

somewhat knowledgeable of the extension program for their name to be on the mailing list which may cause some bias. To avoid coverage error every member of the population that the research is trying to describe would have an equal (or known) chance of being selected for the sample (Salant & Dillman, 1994).

As shown in figure 3 below, the major purpose of this study is to examine how well beef cattle producers are staying abreast of recommended preconditioning practices and the role of selected factors in their staying abreast of recommended practices.

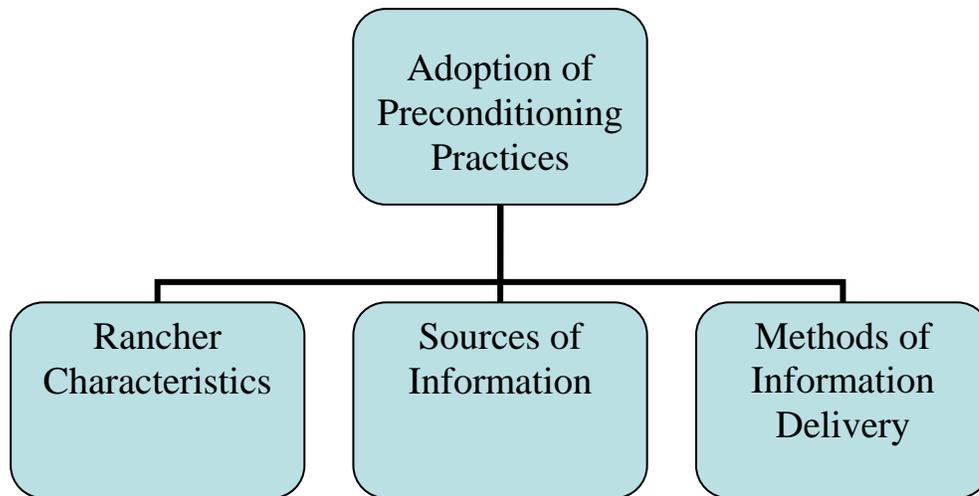


Figure 3. Variables Used to Explain Purpose of the Study

Adoption of Preconditioning Practices

One purpose of this study is to determine the practices currently followed by producers. In the study there are several practices that will be used to measure adoption rates of preconditioning practices. Producers were asked, “Which of the following practices are used on your calves before they are sold?” The producers could respond yes or no to each individual practice. The practices the producers could select included the following:

- ❑ Castrating
- ❑ Growth Implants
- ❑ De-worming
- ❑ Feeding from Bunk
- ❑ Dehorning Physically
- ❑ 7 or 8 way Clostridium (Blackleg)
- ❑ Vaccinate Twice for Shipping Fever (IBR, PI3, BVD, BRSV)
- ❑ Sorting Calves

An intensity of adoption of preconditioning practices variable also was computed.

It is a summated scale score ranging from 0 (did not adopt any preconditioning practices) to 8 (adopted all 8 practices). It was computed by adding the number of practices adopted by each rancher and assumes that each practice is equally important.

Characteristics of Producers

The characteristics of a producer may have a big impact on the adoption of these recommended preconditioning practices. The study will look at six different questions to determine characteristics of a cattle producer. They include:

- ❑ Years spent in the cattle business in categories of
 - Less than 5
 - 5-10
 - 11-29
 - 30-75
- ❑ Type of Cattle Operation:
 - Commercial Only
 - Purebred Only
 - Purebred & Commercial producers
 - (The last two types of operations are combined in the data analysis)
- ❑ Percent of total agricultural income from the beef cattle operation with categories of:
 - 0-25 %
 - 26-50 %
 - 51-75 %
 - 76-100 %
- ❑ Main reason for raising beef cattle:
 - Earn a living
 - Use crop residue

Put non-crop land to use
 Greenbelt tax exemption
 Hobby
 Other

- ❑ Employment Status:
 Full-time rancher
 Other Employment (Part-time) (Full-time)
- ❑ Herd Size:
 Small (0-49)
 Medium (50-99)
 Large (100-900)

Information Sources

A third objective was to determine the sources ranchers use to gain information about practices used in their cattle ranching operation. The information sources examined in this study were as follows:

- ❑ Other cattle producers in the area
- ❑ Veterinarian
- ❑ County Extension Agent

These three are only a small number of sources that could be used as information sources; however the frequency distribution showed these three sources were used by producers most often for gaining information. For these three sources, producers were asked to respond using a five point scale of possible answers including, “Never Use,” “Seldom Use,” “Sometimes use,” “Usually Use,” or “Always Use.” In the results, data frequencies were summarized into three categories--seldom, sometimes, and usually/always--to make more concise results.

Another information source being looked at is information delivery methods used by Extension. Giving that Florida Cooperative Extension leaders believe that retaining a

viable cattle industry is important for both economic and environmental reasons, then it is important to see how extension can work with producers.

Producers were asked whether they had attended an educational event or received information about beef cattle or forages from University of Florida Cooperative Extension Service during the last 12 months. The producer could only answer yes or no and if the producer said “yes,” they were asked to rank the information provided as very good, good, fair, poor, and very poor which were coded on a 0 to 4 scale.

Information Methods

Producers also were asked how often they used the following methods “when looking for information on beef production practices or management problems that you have?” In this question the study will focus on the following information methods:

- Extension Bulletins/Fact Sheets
- County Extension Newsletters
- One-on-one consultation with county agent by phone, office visit or on farm
- County Extension Internet web site
- University Internet web sites
- Beef Cattle or Forage Field Days (Research Center)
- Farm Demonstrations
- Cattle or Farm Magazines

For these information methods, producers were asked to respond using a five point scale of possible answers including, “Never Use,” “Seldom Use,” “Sometimes use,” “Usually Use,” or “Always Use.” In the results section, data were summarized into three categories--seldom, sometimes, and usually/always--to make more concise results.

Data Collection

The study used data collected from the 2002 Northwest Florida Beef and Forage Survey (Mayo et al., 2002). The goal of that study was to examine 25 percent of the clientele currently being served by the Cooperative Extension Services livestock

programs. The survey included seven major topics: attributes of the operation, reproduction, general management, herd health, nutrition, pasture management, and production information.

The survey was sent to a random sample of beef cattle producers in Jefferson, Taylor, Leon, Gadsen, Wakulla, Jackson, Washington, Holmes, Walton, Okaloosa, Santa Rosa, and Escambia counties using the County Extension Offices' mailing lists (Mayo et al., 2002). There were 765 producers selected for the study. There were 411 surveys returned (a response rate of 54%). A screening question asked whether the respondent was presently involved in a beef cattle operation as the owner, manager, overseer or operator. Of the 411 who responded, 264 (35%) reported being involved as the owner or manager of a beef cattle operation in 2002. The respondents that answered "no" to this question did not answer any other questions and were excluded from the analysis. Thus, the analysis will be based on 264 cattle producers that responded to the survey. The amount of sampling error is $\pm 6\%$ with 95% confidence and a $P=.05$ (Israel, 1992).

The mailing procedures for data collected were as followed

- Pre-survey postcard making producers aware of the process and alerting them to be on the lookout for the survey.
- Cover letter from corresponding agents along with the actual survey instrument.
- Reminder post card sent to non-responders.
- Second survey and cover letter sent to non-respondents.

To encourage a higher response rate, agents from each individual county provided cover letters on their own letterhead to the producers in their counties. This was done because loyalty to the local agent was expected to generate a higher response rate than a request by an unknown researcher in a nearby county. Pre-paid postage return envelopes were provided to encourage response.

In this study there is also non-response error because a significant number of people (46%) of the survey sample did not respond to the questionnaire and they may be different from those who did respond in a way that is important to the study (Salant & Dillman, 1994).

In order to improve the content validity of the data, a panel of experts including Extension agents and specialists in the region evaluated the survey instrument. Jackson County producers that serve as advisory committee members were utilized to pilot test the questionnaire (Mayo et al., 2002).

Data Analysis

The data was put into a Statistical Package for the Social Sciences (SPSS, 2002). First, a frequency distribution was computed on the dependent variables related to preconditioning practices to find the adoption rates for each practice. Then frequency distributions were run on the independent variables to provide descriptions of the producers and information sources and methods. The second SPSS analysis was correlation. Each independent variable was correlated with each of the preconditioning practices and the summated scale. The independent variables also were correlated with each other. The level of significance selected for the Pearson Correlation was .05. The purpose of these correlations was to determine whether significant relationships existed between characteristics of producers, information sources, information methods, and the adoption of preconditioning practices. The adding of the adoption of preconditioning practices into summated scale will be used as an indicator of intensity of adoption of preconditioning practices.

CHAPTER 4 RESULTS

The overall purpose of this study is to examine how well beef cattle producers are staying abreast of recommendations. If ranchers are better informed about animal health care, nutrition, and marketing, they can increase profitability.

The specific objectives of this study are as follows:

1. To determine adoption rates of preconditioning practices of producers.
2. To describe the composition of producers in the Big Bend.
3. To determine where producers go to gain information on these preconditioning practices (four different information categories will be examined.)
4. To determine the relationships between adoption of preconditioning practices, rancher characteristics and where producers go to gain information on preconditioning practices.

Preconditioning Practices

The first objective and dependent variable is to determine adoption rates related to preconditioning practices for calves before shipping. The results are presented in Table

3. The most frequently used practice was de-worming. Nearly 70 % of the producers used this practice. The least widely used practice at 14 % was vaccinating twice for shipping fever. Although all of these practices are recommended, the top three seem to be more important to producers than the bottom four.

Table 3. Distribution of Adoption of Preconditioning Practices

Preconditioning Practices	Number Adopting	Percent Adopting
De-worming	182	69
Castrating	150	57
Blackleg	122	46
Feeding From A Bunk	65	25
Dehorning	64	24
Sorting	60	23
Growth Implanting	44	17
Shipping Vaccine Twice	37	14
Total	264	100

The percentage distribution of producers by intensity of adoption of preconditioning practices is reported in Table 4. Half of the producers adopted 1-3 of the practices. None of the producers adopted all 8 of the practices. Also, the mean intensity score is 3 and the standard deviation is 2. A mean of 3 indicates that the average producer has adopted 3 of the preconditioning practices.

Table 4. Distribution of Operation Intensity

Intensity Score	Percentage Distribution
0	16
1-3	52
4-7	32
8	0
Total N=264	100

Characteristics of Ranchers

The second objective of the study was to describe the composition of producers in the Big Bend. The literature review showed that some rancher characteristics are more closely linked to adoption of preconditioning practices, uses of information sources, methods, and extension attendance than are other characteristics. Understanding these characteristics of producers may help educators to better meet the needs of the producers.

As reported in Table 5, years in the cattle business is fairly evenly divided. About 1/3rd of the producers having been in the cattle business over 30 years, 1/3rd between 11 and 29 years and the remainder 10 years or less. Only about 9 % have been in the business for less than five years.

Table 5. Percentage Distribution for Number of Years in Cattle Industry

Years in Industry	Percent Distribution
Less than 5	9
5 to 10	20
11 to 29	32
30 to 75	34
No Response	5
Total N=264	100

With regards to type of cattle operations 74 % of producers have only commercial cow/calf operations, 11 % raise purebred only, and 15 % raise both commercial and purebred cattle.

As shown in Table 6, about half of the producers reported that less than a half of their income comes from the beef cattle operation. Conversely, 30 % reported that the majority of their income (75-100 %) comes from the beef cattle operation.

Table 6. Percent Distribution of Agricultural Income from Raising Beef Cattle

Percent Income	Percent Distribution
0-25%	40
26-50%	14
51-75%	13
76-100%	30
No Response	3
Total N=264	100

As reported in Table 7, the primary reason that 38 % of the producers are in the cattle business is to earn a living, while 19 % say they raise cattle as a hobby or for the

greenbelt tax exemption. Over one-third report they raise cattle to make better use of the land.

Table 7. Ranchers Reasons for Producing Cattle

Reasons	Percentage Distribution
Earn a Living	38
Use Crop Residue	4
Put non-crop land to use	30
Green belt tax exemption	3
Hobby	16
Other	4
No Response	5
Total N=264	100

Table 8 shows that 42 % of producers earn less than 25 % of their agricultural income from cattle and 17 % of those producers are raising cattle to put non-crop land to use. Therefore we can summarize that a majority of the ranchers produce cattle for reasons other than to earn a living. The reason that earning a living is widely dispersed is because producers may also have row crops that represent their other agriculture income.

Table 8. Percent Distribution of Reasons for Producing Cattle and Percent Ag. Income from Cattle

Reasons for Producing Cattle	Percent Income				Total %
	76-100%	51-75%	26-50%	0-25%	
Earn a Living	15	9	7	11	42
Use Crop Residue	0	0	0	3	3
Put non-crop land to use	8	2	4	17	31
Green belt tax exemption	2	0	0	2	4
Hobby	5	2	2	7	16
Other	0	1	1	2	4
Total % N=246	30	14	14	42	100

Note: Non Respondents Are Not Included

Results on employment status showed that 47 % of producers were full time ranchers while 53 % have off-farm employment. Therefore the ranchers in the study are

evenly distributed between full time ranch work and off-farm employment. Of the ranchers that have off-farm employment 91 % have full-time jobs and 9 % have part-time jobs. Therefore most ranchers that have off-farm work have full time jobs. These two variables may affect the type of practices ranchers adopt or the information sources and methods they chose to use due to time restrains from being employed off the farm.

As reported in Table 9, nearly 60 % of the producers have less than 50 cows (considered a small herd) and 14 % have between 50- 95 cows which is a medium size herd. This study uses the same categories as the United States Department of Agriculture to classifying producer groups. Here it is summarized that the majority of producers have small herds while the majority of the cattle belong to ranchers with large herds.

Table 9. Percent Distribution of Ranchers and Cattle by Herd Size

Herd Size	Percent Ranchers	Percent Cattle
Small 0-49	59	19
Medium 50-99	14	14
Large 100-900	19	67
No Response	8	8
Total N=264	100	100

In summary, the majority of the ranchers in the survey have small scale commercial operations (less than 49 cows), depend on off-farm employment for the majority of their income, earn less than 50 % of their agricultural income from raising beef cattle, and were raising cattle for reasons other than to earn a living.

Information Sources

A third objective of this study was to determine the frequency of use of information sources for beef and forage production practices and/or management problems. Three sources of information examined in this study were other cattle producers, veterinarian,

and county extension agent. Table 10 shows that of these three, 38 % of the producers reported they usually or always use the county extension agent, as compared to 36 % for other cattle producers and 24 % for the veterinarian. Conversely, veterinarians had the highest percent of seldom being used.

Table 10. Frequency of Use of Information Sources

Frequency	Information Sources					
	Other Producers		Veterinarian		Extension Agent	
	N	%	N	%	N	%
Seldom	41	15	94	36	76	29
Sometimes	104	39	83	31	62	24
Usually/Always	95	36	63	24	102	38
No Response	24	9	24	9	24	9
Total	264	100	264	100	264	100

Table 11 below shows that the group who usually or always use extension agents are most likely to use other producers as information sources 17 %. Producers who use other producers as a source of information also use veterinarians 16 % of the time. Overall there is no significant use of one source of information over another.

Table 11. Frequency of Use of Multiple Information Sources

Sources	Frequency	Sources Frequency			
Extension Agent					
		Seldom	Sometimes	Usually/Always	Total
Other Producers		%	%	%	%
Seldom	%	6	13	13	32
Sometimes	%	3	15	9	27
Usually/Always	%	8	16	17	41
Total	%	17	44	39	100
Extension Agent					
		Seldom	Sometimes	Usually/Always	Total
Veterinarian		%	%	%	%
Seldom	%	16	10	6	32
Sometimes	%	9	12	5	26
Usually/Always	%	14	13	15	42
Total	%	39	35	26	100
Other Producers					
		Seldom	Sometimes	Usually/Always	Total
Veterinarian		%	%	%	%
Seldom	%	10	18	12	40
Sometimes	%	5	18	12	35
Usually/Always	%	2	7	16	25
Total	%	17	43	40	100

Note: Non Respondents not Include N=240

Extension Attendance & Ranking

Looking at uses of information sources, 57 % of producers attended an Extension event in the previous year. Of those 150 producers who attended an Extension event in the previous year, 50 % ranked extension as very good, 46 % as good, 3 % as fair, and 1 % did not respond. None of the producers ranked Extension below fair.

Information Methods

In follow-up of methods, this study examined the frequency of use of information methods. As reported in Table 12, the most popular method of obtaining information was farm magazines (46 %), followed by extension newsletters (43 %) and extension fact

sheets (39 %). Conversely, only 4 % reported using the county extension internet web sites. It is interesting to note that the most popular methods reflect written information received by the producer.

Table 12. Frequency of Use of Methods Used for Receiving Information

Information Methods	Frequency				Total %
	Seldom %	Sometimes %	Usually/Always %	No Response %	
Magazine	15	29	46	10	100
Newsletter	16	29	43	11	100
Fact Sheets	18	32	39	10	100
County Agent	45	19	25	11	100
Field Day	50	23	16	11	100
Research Demonstration	56	19	14	11	100
Farm Demonstration	55	22	13	10	100
UF Web Sites	73	11	5	11	100
County Web Sites	75	11	4	10	100

N=264

The fourth objective of this study was to determine the relationships between preconditioning practices, rancher characteristics and sources of information.

Preconditioning Practices Correlations

As reported in Table 13, the variables most highly correlated were castrating and de-worming with a correlation value of .44. This would suggest that when producers castrate, they also are more likely to de-worm the animals. There were also patterns of adoption of blackleg vaccination and castrating with the other preconditioning variables. This would suggest that producers who castrate or use blackleg vaccinations are more likely to utilize the other preconditioning practices than those who do not castrate or blackleg. Preconditioning intensity was also correlated with all the preconditioning practices and, as expected, all variables were significantly related to the intensity score and to each other. The internal consistency and reliability of the preconditioning index

was found to be good. Cronbach's alpha is .74. If any of the eight practices were removed from the index, the alpha would decrease.

Table 13. Correlation of Preconditioning Practices

Preconditioning Practices	Preconditioning Practices								
	Blackleg	Bunk	Castrating	Dehorning	De-worming	Implanting	Shipping Vaccine Twice	Sorting	Intensity
Blackleg Vaccine	1								
Feeding From A Bunk	.25*	1							
Castrating	.36*	.13*	1						
Dehorning	.36*	.07	.33*	1					
De-worming	.39*	.23*	.44*	.30*	1				
Growth Implanting	.34*	-.02	.36*	.27*	.26*	1			
Shipping Vaccine Twice	.37*	.33*	.20*	.31*	.25*	.17*	1		
Sorting	.28*	.19*	.14*	.35*	.15*	.12*	.33*	1	
Preconditioning Intensity ¹	.65*	.51*	.65*	.45*	.63*	.72*	.59*	.53*	1

*Significant at the .05 level¹ Chronbach Alpha .74 for intensity index N=264

Rancher Characteristics Correlations

Table 14 shows the relationships between rancher characteristics, preconditioning practices, information sources, and information methods. Type of operation was the only rancher characteristic to be significantly related to a preconditioning practice (shipping vaccine twice). Its correlation of .15 indicates that producers that raise both pure bred and commercial cattle are more likely to practice vaccinating twice for shipping fever than those having only commercial cattle. Based on these findings, it can be concluded there is no substantively significant relationship between these rancher characteristics and adoption of recommended preconditioning practices.

Table 14 also shows the relationships between rancher characteristics and information sources. It shows a relationship between type of operation and attending an Extension program. Producers who have pure bred and commercial cattle are more likely to attend an Extension program than those who only have commercial cattle. Thus, knowledge of rancher characteristics does not contribute to our knowledge of the information sources that a producer chooses to use.

Table 14 also shows the relationships between producer characteristics and information methods used. Here we see a pattern between number of cows and attending field days, research center demonstrations, and farm demonstrations. Therefore the producers with larger herds are more likely to attend field presentations. Therefore we can see there is a definite relationship between number of cows and attending field presentations.

Table 14. Correlations between Rancher Characteristics and Practices, Information Sources, and Information Methods

Practices	Rancher Characteristics					
	Years	Type	%Income	Reason	Employment	#Cows
De-worming	-.05	.05	-.02	-.04	.10	-.02
Castrating	-.05	-.02	-.04	-.05	-.01	-.07
Blackleg	-.01	.09	-.04	-.02	-.01	-.04
Feeding From A Bunk	-.04	-.03	.01	-.01	.06	-.06
Dehorning	.04	.12	.04	-.06	.04	-.05
Sorting	.04	-.03	.06	-.01	-.01	-.04
Growth Implanting	-.04	.08	.04	.03	.01	.04
Shipping Vaccine Twice	-.04	.15*	.08	.03	.10	.01
Intensity Index	-.03	.08	.02	-.03	.06	-.05
Information Sources						
Producers	.01	.03	.03	-.02	.09	-.01
Veterinarian	.124	.07	-.07	-.01	.10	-.10
County Agent	-.05	.02	.02	-.01	.02	.12
Extension Attendance	.07	.16*	.09	-.05	.02	.11
Information Methods						
Magazine	-.01	.02	-.03	-.03	.11	.08
Newsletter	-.10	.04	-.09	.05	-.03	.04
Fact Sheets	-.06	.09	-.02	-.03	.01	.01
Agent Consultation	-.12	.01	-.10	-.08	-.03	-.04
Field Day	.10	.05	.01	-.09	-.04	.16*
Research Demonstration	.02	-.02	.03	-.08	-.07	.18*
Farm Demonstration	.01	.06	.01	-.01	-.02	.14*
UF Web Sites	.03	.07	-.04	-.01	.06	-.05
County Web Sites	-.01	.02	.03	-.04	.02	-.03

Note: Significant at .05 level N=264

Information Sources Correlations

Table 15 shows that producers who rely on other producers or who utilize county agents also are more likely to seek out veterinarians. Conversely, those who utilize other producers as an information source are not as likely to use county agents as often for a source of information. The two practical significant relationships are between other

producers and veterinarians who serve both the pure bred and commercial producers and producers who use their county agent and attend Extension programs. Thus, if a producer who raises purebred and commercial cattle uses other producers as information sources, they are more likely to also use a veterinarian as an information source. Producers who use a county agent as an information source are more likely to attend Extension programs. The highest correlation value was between preconditioning practices and use of information sources was blackleg and commercial veterinarian at .17.

Although several significant relationships had low correlation values, there was a distinct pattern to those relationships worth noting between veterinarian who serves commercial cattlemen and the adoption of 4 of the 8 practices. With the preconditioning index there were significant relationships of adoption with commercial producers who use a veterinarian, county agent, or attend an extension program.

Table 15. Correlations between Information Sources and Preconditioning Practices

Information Sources	Information Sources				
	Other Producers	Veterinarian Commercial	Veterinarian Pure/Comm.	County Agent	Extension Attendance
Other Producers	1				
Veterinarian Commercial	.29*	1	N/A		
Veterinarian Pure/Comm.	.47*	N/A	1		
County Agent	-.01	.22*	.13	1	
Extension Attendance	-.03	.10	.06	.46*	1
Preconditioning Practices					
Blackleg	.06	.17*	.09	.04	.13*
Feeding From A Bunk	.03	.12	-.07	.1	.04
Castrating	.01	.12	.17	.06	.09
Dehorning	.03	.16*	.28	.08	.12*
De-worming	.07	.16*	.05	.13*	.12
Growth Implanting	.01	-.07	.04	.08	.09
Shipping Vaccine Twice	.04	.15*	.14	.05	.06
Sorting	.03	.14	.17	.12	.04
Preconditioning Intensity	.06	.21*	.17	.14*	.15*

Note: Significant at .05 level N=264

Information Methods Correlations

To determine if frequency of use of one method of information was related to another method, a correlation was computed for the methods used and reported in Table 16. The strongest relationship was between beef cattle and forage field days and research center demonstrations at .82. Therefore if a producer attends a field day they are more likely to attend a research center demonstration.

Between the information methods, there seemed to be a recurrent pattern to some of the relationships. Two sets of relationships seem to stand out. First, those who use newsletters and/or fact sheets are more likely to use more methods offered by Extension than are those who do not use fact sheets as a method for obtaining information on beef cattle. Second, those producers who attend beef cattle and forage field days are more likely to also view research center demonstrations than are producers who do not attend. There was also practical significance between using the county web site and consulting a county agent. Therefore producers who consult their county agent must be using the county web site.

To determine if frequency of preconditioning practices was related to information methods, a correlation matrix was computed and there were several statistically significant relationships found. The most significant relationship was between agent consultation and dehorning at .25. There is an obvious pattern of adoption when the producer has a one on one consultation with the producer. If a county agent consults with a rancher he or she is more likely to adopt a preconditioning practice than those producers using any other information method. There were also pattern, seen between the web sites and adoption of preconditioning practices. The strongest relationships

between the preconditioning index and methods were agent consultation and using state extension web sites.

Table 16. Correlations between Information Methods and Preconditioning Practices

Information Methods	Information Methods								
	Fact Sheet	Newsletter	Agent Consultation	County Web	UF Web	Field Days	Research Demonstrations	Farm Demonstrations	Magazines
Fact Sheet	1								
Newsletter	.72*	1							
Agent Consultation	.46*	.47*	1						
County Web	.25*	.21*	.31*	1					
UF Web	.28*	.18*	.28*	.77*	1				
Field Days	.38*	.38*	.42*	.22*	.21*	1			
Research Demos	.34*	.36*	.40*	.22*	.25*	.82*	1		
Farm Demos	.39*	.37*	.43*	.24*	.22*	.73*	.76*	1	
Magazines	.36*	.32*	.33*	.07	.12	.26*	.30*	.22*	1
Preconditioning Practices									
Blackleg	.14*	.11	.15*	.14*	.17*	.16*	.17*	.11	.07
Bunk	.11	-.01	.09	.12	.21*	.12	.18*	.11	.05
Castrate	.02	.04	.09	.17*	.20*	.01	.09	.05	.09
Dehorn	.09	.14*	.25*	.10	.08	.20*	.20*	.14*	.15*
De-worm	.12	.04	.15*	.03	.12	.01	.04	.01	.07
Implant	.11	.05	.14*	.01	.07	.06	.06	.10	.12
Shipping 2	.13	.03	.04	.13*	.16*	.11	.12	.10	.07
Sort	.12	.15*	.22*	.12	.11	.21*	.20*	.17*	.10
Preconditioning Intensity	.17*	.12	.24*	.17*	.24*	.18*	.22*	.17*	.15*

Note: Significant at the .05 level also N=264

In summary, chapter 4 shows the results for all four objectives for the study. First the chapter began by examining preconditioning practices adopted by producers. Results showed de-worming, castrating, and blacklegging to be the highest adopted practices. Also the preconditioning intensity found the average producer only adopts three of the practices.

The results for the second objective describing the composition of the ranchers showed that a majority of the ranchers in the survey have been in the cattle business for 11 to 75 years, and have small scale commercial operations (less than 49 cows), and depend on off-farm employment to earn a living. Most rancher earn less than 50 % of their agricultural income from raising beef cattle and were raising cattle for reasons other than to earn a living.

A third objective was to examine information sources most often used to stay abreast of current technology. The study found that three sources were used with the same frequency. Also, over ½ of the respondents had attended an event and half of them ranked the services as very good. Farm and ranch magazines were used most frequently as a means for getting information.

The fourth and final objective found castration and de-worming to be practically significant. There was a pattern between number of cows and attendance at field presentations. When we looked at sources of information producers who have both purebred and commercial cattle and use other producers are more likely to use a veterinarian. Also producers who use a county agent for consultation are more likely to attend Extension programs.

Finally significant results showed that attendance at a beef and forage field day and attendance at a research demonstration are highly correlated. Also use of an Extension Fact Sheet is highly correlated with using other Extension information such as news letters and agent consultation. The last table also showed significant pattern between adoption of practices with agent consultation and web sites. In all there were eight conclusions made from the analysis of this data. The central one being that adoption of practices is related to the type of sources and methods that are being use.

CHAPTER 5 SUMMARY, CONCLUSIONS, AND IMPLICATIONS

The overall purpose of this study was to examine how well beef cattle producers were staying abreast of recommended preconditioning practices so that they can increase profitability. This chapter will discuss the summary, conclusions, and implications from the results that were found from answering the four objectives of this study, which were:

1. To determine adoption rates of preconditioning practices of producers.
2. To describe the composition of producers in the Big Bend.
3. To determine where producers go to gain information on these preconditioning practices.
4. To determine the relationships between adoption of preconditioning practices, rancher characteristics and where producers go to gain information on preconditioning practices.

Summary of Findings

The first objective, adoption of preconditioning practices looked at the frequency distribution between the eight preconditioning practices a producer could respond to in the Northwest Beef and Forage Survey. De-worming was the most frequently adopted preconditioning practice at seventy percent. Castrating and Blackleg vaccination were also adopted by at least half of the producers. There was also a preconditioning intensity index and it showed that the average producer has adopted three of the preconditioning practices.

The second objective was to describe the composition of ranchers in Northwest Florida. The majority of the ranchers in the survey have small scale commercial operations which is less than 49 cows, they depend on off-farm employment to earn a

living, and earn less than 50% of their agricultural income from raising beef cattle, and were raising cattle for reasons other than to earn a living.

The third objective of the study was to find where producers go for knowledge about recommendations such as preconditioning practices. Results for the information sources showed that the three sources (other producers, veterinarians, and extension agents) were used with about the same frequency. However, producers who use extension agents are more likely to use other producers as their second information source. The results for information methods showed that farm and ranch magazines were used most often by producers followed by county extension newsletters, and extension bulletins/fact sheets. Frequency of use of these methods were followed by county extension agents, field days at research centers, research demonstrations, farm demonstrations, university web sites and lastly county extension web sites. The frequency for extension attendance showed that over half of the respondents attended an extension program or received information in the last year. About half of those attending an Extension activity ranked extension as very good. These results were consistent with Petrzelka et al. (1999) past research on extension information.

The fourth objective was to determine if there were relationships between adoption of preconditioning practices, rancher characteristics and where producers go to gain information on preconditioning practices. Among the preconditioning practices, three practices were significantly correlated: castration and de-worming, followed by blackleg and de-worming, and shipping twice and blackleg.

Characteristics of ranchers in Northwest Florida were not significantly correlated with adoption of preconditioning practices. However there was a pattern between

number of cattle and attendance of field presentations which are usually organized by county agents and state extension specialists.

There was a relationship between the four different information sources. The two practically significant relationships were between other producers and a veterinarian who serves the pure bred and commercial producer and also an association between Extension attendance and agent consultation.

Use of information sources also showed an obvious pattern of adoption when commercial cattlemen used a veterinarian as a source of information. Therefore veterinarians are having some success at educating and encouraging the commercial producers to adopt recommended preconditioning practices.

When looking at relationship between the information methods, the most significant relationship was between beef and forage field days and research demonstrations followed by county web sites and university web sites and research demonstrations and farm demonstrations, and then fact sheets and newsletters. There was also practical significance between agent consultation and using the counties agricultural extension web site.

Next is the relationship between information methods and preconditioning practices. Here there are several statistically significant relationships the highest being dehorning and agent consultation. There is a strong pattern shown between adoption of practices and agent consultation which was also shown in Calderwood's (1997) study. There are also patterns seen between the web sites and adoption of preconditioning practices. The strongest relationships between the preconditioning index and methods were agent consultation and using state extension web sites.

Conclusions

There were very low adoption rates among the producers which is something that all educators and producers should be concerned about since preconditioning practices are crucial to raising healthy and productive calves. Therefore it is critical to increase adoption of practices if there is going to be improvement in the cattle industry.

Most ranches today are small-scale because the cattle industry is very difficult to enter into because of the high initial costs of property and livestock. Today cattlemen have to possess many resources to make ranching profitable. For instance they may raise cattle to earn a living but also receive green belt tax exemption, use crop residue, and put non-crop land to use. The more resources a rancher has, the more profitable raising cattle can be.

The most frequently used methods are easily accessible and the rancher can study them at their own leisure unlike the agent visits, demonstrations, and field days. As for the low frequency for internet usage, many ranchers may not know about or have access to the internet websites.

This study found that producers that have both purebred and commercial cattle and use other producers for information are more likely to use a veterinarian. Results also show that Extension agents can depend on ranchers who attend Extension events to consult with them when they need information on ranching practices.

Almost every information method is significantly correlated with other methods therefore ranchers are studying and comparing many different sources. The strongest relationships were between extension fact sheets and other extension methods this shows that Extension fact sheets are a very valuable tool in educating producers to use other extension methods in learning about the importance of preconditioning practices as well

as other beef and forage information. As for the relationships between practices and methods there are two patterns one between county agents and one between web sites.

Implications

With such poor adoption rates, it is critical that educators continue to inform producers about all eight preconditioning practices. Each practice adopted makes the calves become more valuable. If the survey was repeated it should ask producers if the costs of medications and labor had an impact on their lack of adopting a practice. Some producers may not be able to afford the costs of the labor and medications. As Richey (2002) says, producers must produce calves that are healthy and will stay healthy if they want to obtain the highest price for their calves. To insure that calves are healthy and will remain healthy all calves must be properly prepared before marketing and shipment.

Since the majority of producers have small herds and full time jobs, educators need to make sure that they are getting the proper information into areas that these producers frequently visit (such as farm supply stores). Also, agents must offer meetings or consultations at convenient times for those producers that have full time jobs.

Knowing that producers use farm and ranch magazines most frequently, educators may find it useful to present their research or promote the adoption of practices in these magazines to increase the adoption of preconditioning practices. Also since extension web sites showed such low frequencies Extension may need to advertise the presence of their web sites and the usefulness of them to increase frequency of use.

Results also showed a relationship between county web use when a rancher consulted with an agent, therefore if agents have a website they need to let their producers know it is a fast and affordable way for them to receive information.

There is a relationship between adoption and confirming the adoption with a veterinarian or a county agent. Therefore producers are not going to adopt a practice just because they read about it-they are going to ask a trusted professional. Websites can provide a helpful link for producers to learn about issues, which lead to adoption.

When the relationships were looked at between, adoption of preconditioning practices, implanting was a practice that would have been expected to have a higher frequency and correlation since it increases daily growth. Additional research is needed to find out why it is not being adopted by a majority of producers.

Since there was a pattern between producers that have larger herds and attendance at field days, educators may need to find other ways to get information to the producers with small herds. These producers may have full time jobs and are unable to attend field days. Therefore educators that schedule these field days should send this information to their clients that were not in attendance. Or, they could video tape the field presentations and put them on their web sites for producers to watch at their own leisure.

There are very strong relationships between using fact sheets and other sources of extension information. Therefore sending fact sheets to all clientele may be an excellent way to educate producers and get them more involved in extension programs.

Although a small number of producers reported using the county websites, the pattern between adoption and web sites suggests that those who visit the website are more likely to adopt than those who did not visit the website. Therefore, agents and state specialists should build on this finding that their web sites are useful and they are being used by producers that are adopting preconditioning practices. However these web sites

need to be advertised to increase the frequency of use. Frequency of use should increase over time as producers becoming more fluent with internet.

With the strong relationship seen between adoption of practices and agent consultation, agents must take the time to visit with clientele if they want to see their clients increase production. Agents will also receive a great benefit in that they get the opportunity to work with real world problems and stay current on what is going on in the field. Then they can apply their real world experiences in consulting other producers. This also ensures that researchers are studying relevant problems in the field because agents can share their observations with specialists. Also, agent consultation provides professional development for county agents as well as the opportunity to market Extension as they demonstrate extensions credibility and competency (Petrzelka et al., 1999). Therefore, consistent with past and present research, one-on-one consultation may be the key to increasing adoption of preconditioning practices and increasing the performance of feeder cattle from Florida.

In conclusion, cattlemen today are adopting some preconditioning practices but are a long ways from where they need to be. Extension can increase adoption through providing private consultations and providing accurate and up to date web sites. In today's age, beef consumers are very concerned about animal welfare and health. Therefore, feeder cattle buyers in the future may not buy calves unless they have received these basic and necessary preconditioning practices.

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BIOGRAPHICAL SKETCH

Martha Thomas was born in Inverness, Florida, and is the daughter of John and Ella Thomas. Martha was raised on a cattle ranch along with her sister Sarah. Being raised on a cattle ranch Martha has a great love for the cattle industry and therefore pursued a degree in animal sciences and then continued with a master's degree in extension. With her education and personal experience Martha dreams of working in the cattle industry and improving the quality of cattle produced on Florida ranches.