GUIDELINES FOR
CARE AND HANDLING OF BEEF CATTLE

Prepared by the NCBA Cattle Care Working Group

Introduction
Cattlemen have long recognized the need to properly care for livestock. Sound animal husbandry practices, based on decades of practical experience and research, are known to impact the well-being of cattle, individual animal health and herd productivity. Cattle are produced in very diverse environments and geographic locations in the United States. There is not one specific set of production practices that can be recommended for all cattle producers. These guidelines are just that — suggested guidelines. Personal experience, training and professional judgment can serve as a valuable resource for providing proper animal care.

Producer Code of Cattle Care
Beef cattle producers take pride in their responsibility to provide proper care to cattle. The Code of Cattle Care below lists general recommendations for care and handling of cattle:

- Provide necessary food, water and care to protect the health and well-being of animals.
- Provide disease prevention practices to protect herd health, including access to veterinary care.
- Provide facilities that allow safe, humane, and efficient movement and/or restraint of cattle.
- Use appropriate methods to euthanize terminally sick or injured livestock and dispose of them properly.
- Provide personnel with training / experience to properly handle and care for cattle.
- Make timely observations of cattle to ensure basic needs are being met.
- Minimize stress when transporting cattle.
- Keep updated on advancements and changes in the industry to make decisions based on sound production practices and consideration to animal well-being.
- Persons who willfully mistreat animals will not be tolerated.
Cattle Care – Training and Education
Many skills are necessary to operate a successful farm, ranch or feedlot. On many farms and ranches, animal care principles have been passed from generation to generation. Most skills come naturally and/or are learned on the job. On farm training and ‘how to’ training is effective. The amount of training varies depending on experience of caretakers, turnover among employees and type of cattle operation. Producers and employees are encouraged to take advantage of educational programs, meetings and interaction with production management specialists. Training for those who have supervisory roles should be prioritized because they become trainers of new employees. All employees who work with livestock should have a basic understanding of livestock handling techniques.

Training of those who handle cattle should include:
• An understanding of the animal’s point of balance and flight-zone
• Avoiding sudden movement, loud noises or other actions that may frighten cattle
• Proper handling of aggressive/easily excited cattle to ensure the welfare of the cattle and people
• Proper use of handling and restraining devices
• Recognizing early signs of distress and disease
• How to properly diagnose common illnesses and provide proper care
• Administration of animal health products and how to perform routine animal health procedures
• Recognizing signs associated with extreme weather stress and how to respond with appropriate actions
• Basic feeding/nutritional management of beef cattle

Feed and Water
Beef cattle can utilize a wide variety of feedstuffs and thrive in a broad range of environments. These environments vary from the arid Southwest ranges, to the lush pastures of the North Central states and large commercial feedyards on the High Plains. Beef cows and bulls typically graze rangelands or pastures throughout their lifetime, and are supplemented as necessary. Beef calves are usually weaned at 7 - 8 months of age, and a significant portion of weaned calves, called stockers, are grazed on summer pasture, cool season grasses, or small grain forages until they reach feeder cattle weight. Because cattle effectively utilize forages, many beef calves do not enter confinement feedlots until one year of age or more.

General Feeding Guidelines
Nutrition requirements vary according to age, sex, weight, breed or biological type, weather, body condition and stage of production. Diets for all classes of beef cattle, grazing or feeding, should meet the recommendation of the National Research Council (NRC) and/or recommendations of a feed consultant.

Ruminants readily adapt to varying weather conditions. For this reason, they function well in outdoor environments. During periods of decreasing temperature, feeding plans should reflect increased energy needs.
• If the cowherd is wintered in drylot, it is desirable, but not always possible, to separate cows according to age, size and body condition to more precisely meet nutritional needs.
• Provide adequate feed. Avoid feed and water interruption longer than 24 hours. When changing rations, avoid abrupt changes in the diet to minimize digestive upsets.
• Feedstuffs and feed ingredients should be of satisfactory quality to meet nutritional needs.
• Under certain circumstances (e.g., droughts, frosts, and floods), test feedstuffs or other dietary components to determine the presence of substances that can be detrimental to cattle well-being, such as nitrate, prussic acid, mycotoxins, etc.
• Producers should become familiar with potential micronutrient deficiencies or excesses in their respective areas and use appropriately formulated supplements.
• The USDA, FDA and EPA approve products for use in cattle. These products must be used in accordance with the approved product use guidelines.

Water
Cattle must have access to an adequate water supply. Estimated water requirements for all classes of beef cattle in various production settings are described in the NRC Nutrient Requirements of Beef Cattle.

Feeding Guidelines for Beef Cows
Beef cows must be fed to sustain health and reproduction. This can be accomplished by grazing beef cows on rangelands or pastures, and supplementing them as necessary. The nutrient requirements are found in the NRC Nutrient Requirements of Beef Cattle.

Body condition scoring of beef cows is a scientifically approved method to assess nutritional status. Body condition scores (BCS) range from 1 (emaciated, skeletal) to 9 (obese).
• A BCS of 4-6 is most desirable for health and production. A BCS of 2 or under is not acceptable and immediate corrective action should be taken.
• During periods of prolonged drought and widespread shortages of hay and other feedstuffs, the average BCS of cows within a herd may temporarily decline. This is not desirable, but may be outside the cattle owner’s control until drought relief is achieved.

Feeding Guidelines for Stocker Cattle
The term stocker is used for cattle from weaning until placement in a feedlot or other type of finishing program. This is a growth phase of the animal’s development. Stockers are raised on a wide variety of forages (native pasture, annuals, improved pasture) with minimal additional nutrient supplementation.
• On growing forages, stocking rates should be established that meet production goals for growth and performance.
• On dormant pastures, supplement cattle as needed to meet maintenance or growth requirements for the animal’s weight, breed, and age as established by NRC Guidelines and targeted production goals of the operation.

Feeding Guidelines for Feeder Cattle
Feedyard cattle eat diverse diets. Regardless of the commodities used, the ration typically contains a high proportion of grain(s) (corn, milo, barley, grain by-products) and a smaller
proportion of roughages (hay, straw, silage, hulls, etc.). The NRC *Nutrient Requirements of Beef Cattle* lists the dietary requirements of beef cattle (based on weight, weather, frame score, etc.) and the feeding value of various commodities included in the diet.

Because of the variation in feeder cattle such as age, feeding background, ration ingredients, processing methods, etc, it is not appropriate to outline a standard protocol for starting cattle on a feedlot receiving diet and transitioning them to a finishing diet.

General guidelines include:

- Use the NRC *Nutrient Requirements of Beef Cattle* as the basis of ration formulation.
- Consult a nutritionist (private consultant, university or feed company employee) for advice on ration formulation and feeding programs.
- Avoid sudden changes in ration composition or amount of ration offered.
- Monitor changes in feces, incidence of digestive upsets (acidosis or bloat) and foot health to evaluate the feeding program.
- A small percentage of cattle in feedyards develop laminitis or founder. Mild cases do not affect animal welfare or performance; however, hooves that are double their normal length compromise movement. Extreme cases should be provided appropriate care and marketed as soon as possible.

**Disease Prevention Practices and Health Care**

Like other species, cattle are susceptible to infectious diseases, metabolic disorders, toxins, parasites, neoplasia and injury. Economic losses are reduced by early intervention through health management programs. Healthy herds are more productive.

Many diseases can be prevented or minimized by proper nutrition based on NRC guidelines. Others are controlled by vaccination, parasite control, use of feed additives, biosecurity and other forms of management. Not all diseases can be controlled by vaccination. In some cases, such as cryptosporidiosis, no vaccine exists.

- The producer should work with a veterinarian and/or nutritionist to determine the risk of infectious, metabolic and toxic diseases and to develop effective management programs when designing a herd health plan.
- Producers and their employees should have the ability to recognize common health problems and know how to properly utilize animal health products and other control measures.
- When prevention or control measures are ineffective, the producer should promptly contact a veterinarian for a diagnosis and treatment program to reduce animal suffering and animal losses.
- The use of a diagnostic laboratory to provide a definitive diagnosis is highly recommended for unusual or questionable cases.
- In areas where handling facilities are not readily available, alternative traditional restraining techniques are sometimes necessary. There must be a balance between the stress of handling cattle and the benefits derived from health care procedures.
**Beef Cows and Bulls**

- Cows and bulls should be vaccinated against respiratory, reproduction or other diseases based on risk assessment and efficacy of available vaccines.
- Parasite control should be based on risk assessment, utilizing such tools as fecal examination and BCS to make the final decision.
- It is desirable for cows to have a BCS of at least 4 before the calving season.
- During calving season, cows should be checked regularly for calving difficulties. First-calf heifers may require more frequent observation and care.
- Cows and heifers should be allowed to calve on open pasture unless weather or possibility of calving difficulty dictates otherwise. If a calving barn is used, ample room for the cow/heifer to deliver her calf naturally must be provided. Fresh bedding should be provided and changed frequently to avoid soiling and disease transmission.
- Producers should consider contacting a veterinarian for advice or assistance if cows or heifers have calving difficulties that cannot be corrected by the producer within a reasonable amount of time.
- Cows with mild lameness, early eye problems such as ocular neoplasia, mastitis or loss of body condition should be examined to determine well-being and in some cases be promptly marketed.
- Bull rings, while rare, are applied for safe handling and are required by some local regulations if bulls are exhibited in a public facility.

**Calves**

- Procedures such as castration and dehorning are done for the protection of the animal, other cattle in the herd and people who handle the cattle. Early castration improves animal performance gain and reduces health complications. Castration prior to 120 days of age or when calves weigh less than 500 pounds is strongly recommended. Acceptable reasons to delay castration are if bull calves are being considered as seedstock or to be finished as intact bulls. Producers should vaccinate against tetanus when bands are used for castration.
- When horns are present, it is strongly recommended that calves be dehorned prior to 120 days of age. Tipping of horns (removing the tip only) can be done with little impact on the well-being of individual animals.
- Weaning can be less stressful by castrating and dehorning calves early in life, vaccinating against respiratory diseases prior to weaning, and providing proper pre-weaning nutrition.
- Calves should be vaccinated and treated for parasites based upon risk assessment and the efficacy of available animal health products.
- Stress is decreased if calves are weaned for approximately 45 days before shipment to a stocker operation or feedyard.

**Stocker and Feeder Cattle**

- Weaning, commingling, marketing and transportation predispose calves to disease, primarily Bovine Respiratory Disease (BRD).
- All incoming stocker and feeder cattle should be vaccinated against BRD. Stocker cattle that will be grazing rangeland or pasture should be vaccinated against clostridial diseases. The use of other vaccines and parasite control should be based on risk assessment and efficacy of available animal health products.
• Tipping of horns (removing the tip only) can be done with little impact on the well-being of individual animals.
• A local anesthetic should be used when heifers are spayed using the flank approach.
• High risk cattle should be checked at least daily for illness, lameness or other problems during the first 30 days following arrival.
• Pregnancy in immature heifers can result in calving difficulties and subsequent trauma to the birth canal, paralysis or death of the heifer. For these reasons it is often more humane to abort pregnant heifers. This should be done under the direction of a veterinarian.
• If heifers in the feedyard or a stocker operation deliver a full-term, healthy calf, it should be allowed to nurse to obtain colostrum. At all times, these calves must be handled humanely and provided proper nutrition. Compromised calves or fetuses should be promptly euthanized and disposed of according to local regulations.
• “Bulling” is a term to describe aggressive riding of a steer by one or more penmates. This occurs both on pasture and in the feedlot, but is more commonly noticed in feedlot cattle. Bullers should be promptly removed from the pen to prevent serious injury.

Identification
Permanent, identification can be an important management tool. The industry encourages continued development and application of identification methods that can be retained throughout the animals’ life cycle, are readily legible and economically feasible.
• When cattle are housed or pastured where they can be readily checked, identification systems such as ear tags are encouraged.
• Hot or freeze branding is necessary under many management conditions. Hot branding in some states is the only legal proof of ownership. In remote locations, when communal grazing is practiced and in many other situations branding remains the most practical means of permanent identification.
• If cattle are branded, it should be accomplished quickly, expertly and with the proper equipment.
• Feeder cattle should not be re-branded when entering a feedlot unless required by law.
• Brands should be of appropriate size to achieve clear identification.
• Jaw brands should not be used.
• Ear notching may be used to identify cattle.
• Wattling, ear splitting and other surgical alterations for identification are strongly discouraged.
• Use of emerging cattle identification technology, such as electronic ear tags and retinal scans is encouraged when practical.

Shelter and Housing
Cattle reside on pastures and ranges and in various types of feedlots. Genetic variation among cattle species, breeds and individuals makes it possible for them to thrive in a wide range of natural conditions and artificial environments. When behavioral and physiological characteristics of cattle are matched to local conditions, beef cattle thrive in virtually any environment in the United States without artificial shelter. Protection may be beneficial (especially for newborns) during adverse weather conditions. Housing facilities should be designed and constructed to promote the animals’ comfort and to enhance their health.
• Cattle on rangelands and pastures are stocked at various rates, depending mostly on forage production.
• Cows, calves, and bulls are held in close confinement for routine processing, veterinary care, weighing or transportation.
• Cattle in backgrounding facilities or feedyards must be offered adequate space for comfort, socialization and environmental management. The allotted space is dependent upon body weight, rainfall, evaporation rate, geographic region, and type of pen surface, pen slope and presence of mounds. Cattle spacing has an influence on manure moisture content and therefore on dust, runoff and mud conditions. Because of this, it is impossible to construct a precise set of recommendations.
• Pen maintenance, including manure harvesting, will help improve pen conditions.
• Mud is more of a problem in the winter with low evaporation rate or improper drainage conditions. Accumulation of mud on cattle should be monitored as a measure of pen condition and cattle care in relation to recent weather conditions.
• Feedyards should use dust reduction measures to improve animal performance. Control measures may include: wetting unpaved roadways; scraping feedlot surfaces; wetting feedlot surfaces if adequate water is available; increasing the stocking rate, therefore increasing the effective “precipitation”.
• Floors in housing facilities should be properly drained.
• Floors of barns and handling alleys should provide traction to prevent injuries to animals and handlers.
• Handling alleys and housing pens must be free of sharp edges and protrusions to prevent injury to animals and handlers.
• Mechanical and electrical devices used in housing facilities must be safe.

Cattle Handling
Cattle are gathered to perform routine husbandry procedures, such as veterinary care, weighing, sorting, weaning and transportation to and from pastures, feedlots and livestock markets.

Handling procedures must be safe for the cattle and caretakers, and cause as little stress as possible. Facilities should be designed and constructed to take advantage of cattle’s natural instincts.

Facilities
Cattle handling facilities do not have to be elaborate or expensive. Proper design and quick recognition of problems that impede cattle flow are essential for safe, efficient cattle handling.
• Design and operate alleys and gates to avoid impeding cattle movement. When operating gates and catches, reduce excessive noise, which may cause distress to the animals.
• Adjust hydraulic or manual restraining chutes to the appropriate size of cattle to be handled. Regular cleaning and maintenance of working parts is imperative to ensure the system functions properly and is safe for the cattle and handlers.
• Avoid slippery surfaces, especially where cattle enter a single file alley leading to a chute or where they exit the chute. Grooved concrete, metal grating (not sharp), rubber mats or deep sand can be used to minimize slipping and falling. Quiet handling is essential to minimize slipping. Under most conditions, no more than 2% of the animals should fall
outside the chute. A level of more than 2% should indicate a review of the process may be of value, including asking questions such as: is this a cattle temperament issue, has something in the handling area changed that is effecting cattle behavior, etc.

**Cattle Handling**

- Abuse of cattle is not acceptable under any circumstances.
- Take advantage of cattle’s flight zone and point of balance to move them. For safety and welfare reasons, minimize the use of electric prods. Non-electric driving aids, such as plastic paddles, sorting sticks, flags or streamers (affixed to long handles) should be used to quietly guide and turn animals. When cattle continuously balk, cattle handlers should investigate and correct the reason rather than resort to overuse of electric prods.
- Under desirable conditions, ninety percent or more of cattle should flow through cattle handling systems without the use of electric prods.
- When cattle prods must be used, avoid contact with the eyes, rectum, genitalia and udder.
- Driving aids powered by AC current should never be used unless manufactured and labeled specifically for that purpose. Voltage must be regulated to less than 50 volts.
- Some cattle are naturally more prone to vocalize, but if more than 5% of cattle vocalize (after being squeezed but prior to procedures being performed) it may be an indication that chute operation should be evaluated. Key questions to ask include: is this a cattle temperament issue or effect of prior handling, are chute pressures and catching methods appropriate, or should they be re-evaluated?
- If more than 25% of cattle jump or run out of the chute there should be a review of the situation and questions asked such as: is this a result from cattle temperament or prior handling issue, was the chute operating properly etc. Evaluate handling procedures to determine if practices need to be improved or whether the problem is cattle temperament.
- Properly trained dogs can be effective and humane tools for cattle handling. During chute-side cattle processing procedures, dogs that continually bark, impede cattle flow or are unnecessarily rough with cattle should not be used.

**Marketing Cattle**

The overwhelming majority of cattle are marketed in good health and physical condition. Some compromised cattle should not enter intermediate marketing channels because of animal welfare concerns. Instead, these cattle should be sold directly to a processing plant or euthanized (see Euthanasia section), depending upon the severity of the condition, processing plant policy, and state or USDA regulations.

**Sorting Loading and Transporting**

- Cattle sorting and holding pens should allow handling without undue stress, be located near the loading/unloading facility and be suitable for herd size.
- Provide properly designed and maintained loading facilities for easy and safe animal movement. Proper design of loading chutes as well as personnel that are knowledgeable of their proper use can assure the safety of both cattle and cattlemen. Ramps and chutes should be strong and solid, provide safe footing, and have sides high enough to keep cattle from falling or jumping off. Studies indicate limiting the ramp angle to 25 degrees or less will improve cattle movement.
• All vehicles used to transport cattle should provide for the safety of personnel and cattle during loading, transporting and unloading.
• All vehicles used to transport cattle should have properly maintained flooring, gates, and latches and adequate ventilation.
• Strictly adhere to safe load levels with regard to animal weight and space allocation.
• Producers hauling cattle in farm and ranch trailers must ensure that adequate space is provided so that cattle have sufficient room to stand with little risk of being forced down because of overcrowding.
• Transport crews should have a proper understanding on the basics of transportation and handling cattle. Crews should be aware of basic animal-handling techniques.
• Cattle that are unable to withstand the rigors of transportation should not be shipped.
• When the vehicle is not full, safely partition cattle into smaller areas to provide stability for the cattle and the vehicle.
• Cattle haulers should start, drive and stop their vehicles as smoothly as possible. They should practice defensive driving by ensuring that adequate space is available to stop should an emergency require an unexpected stop. In addition, they should negotiate turns in a smooth manner. Abrupt sharp turns should be avoided.
• Knowingly inflicting physical injury or unnecessary pain on cattle when loading, unloading or transporting animals is not acceptable.
• Use internal or external ramps to unload trucks.
• No gap which would allow injury to an animal should exist between the ramp, its sides, and the vehicle.
• Vehicle doors and internal gates should be sufficiently wide to permit cattle to pass through easily without bruising or injury.
• Cattle should be loaded, unloaded, and moved through facilities with patience and as quietly as possible to reduce stress and injury.

Non-Ambulatory (Downer) Cattle
Cattle can become downers for several reasons, including injury, severe disease and chronic emaciation. With proper care, many of these will recover and become productive animals. It is the responsibility of livestock owners and caretakers to make every effort to provide proper care for non-ambulatory livestock. Physical management of downer cattle presents challenges as they may weigh over 1000 pounds.
• A prompt diagnosis should be made to determine whether the animal should be humanely euthanized or receive additional care.
• Provide feed and water to non-ambulatory cattle at least once daily.
• Move downer animals very carefully to avoid compromising animal welfare. Dragging downer animals is unacceptable. Likewise, animals should not be lifted with chains onto transportation conveyances. Acceptable methods of transporting downers include a sled, low-boy trailer or in the bucket of a loader. Animals should not be “scooped” into the bucket, but rather should be humanely rolled into the bucket by caretakers.
• When treatment is attempted, cattle unable to sit up unaided (i.e. lie flat on their side) and refuse to eat or drink should be humanely euthanized within 24-36 hours of initial onset.
• Signs of a more favorable prognosis include the ability to sit up unaided, eating and drinking. It is acceptable to allow more time for recovery for these animals, provided
they are offered water, feed and the weather is moderate to good. If weather creates inhumane conditions or the animal’s condition deteriorates, it should be humanely euthanized.

- Cattle that are non-ambulatory must not be sent to a livestock market or to a processing facility. If the prognosis is unfavorable or the animal has not responded to veterinary care, it should be humanely euthanized.

**Euthanasia**

Euthanasia is humane death occurring without pain and suffering. The decision to euthanize an animal should consider the animal’s welfare. The producer will most likely perform on-farm euthanasia because a veterinarian may not be immediately available to perform the service. The person performing the procedure should be knowledgeable of the available methods and have the necessary skill to safely perform humane euthanasia; if not, a veterinarian must be contacted. When euthanasia is necessary an excellent reference is the *Practical Euthanasia of Cattle* guidelines developed and published by the American Association of Bovine Practitioners.

Reasons for euthanasia include:

- Severe emaciation, weak cattle that are non-ambulatory or at risk of becoming downers
- Downer cattle that will not sit up, refuse to eat or drink, have not responded to therapy and have been down for 36 hours or more
- Rapid deterioration of a medical condition for which therapies have been unsuccessful.
- Severe, debilitating pain
- Compound (open) fracture
- Spinal injury
- Central nervous system disease
- Multiple joint infections with chronic weight loss

**Emergency Procedures**

Develop a plan to ensure the welfare of the animals when unforeseen emergencies occur. Post names and telephone numbers of the producer or management, veterinarian, equipment suppliers, and the fire and police departments near telephones, along with directions to the cattle operation, including road names and numbers. The person in charge should review possible emergencies that might arise and review these plans with other employees so everyone is familiar with the appropriate emergency response.

- Make advanced plans for dealing with emergencies, such as flooding, blizzards, heat, ice storms or a reportable disease outbreak. If a disease outbreak should occur, notify a veterinarian.
- Arrange animal care to cover weekends, holidays, unexpected absences and other leaves and emergencies. All workers should be qualified to perform assigned duties. Establish a procedure for emergency animal health care after hours, weekends and holidays.
- Almost all operations have some supply of feedstuffs on hand. Make sure adequate feed is available for emergencies, such as winter storms.
- Fire extinguishers should be readily accessible in confinement buildings.
Emergency Transportation Procedures for Haulers under the Control of the Producer

- Provide emergency procedures for cattle haulers in the event of a breakdown, an accident, or other delay during transit.
- Be sure cattle hauler(s):
  1. Know the telephone number of the home or office of the shipper and receiver to immediately report an emergency situation (appropriate numbers should be furnished by shippers).
  2. If necessary, arrange for another vehicle to move the load to a holding facility or final destination.

Feedlot Heat Stress Procedures

- During periods of high heat and humidity and little wind, actions should be taken to minimize the effects of heat stress as cattle are processed.
- Provide adequate water.
- If possible, avoid handling cattle when the risk of heat stress is high. The final decision must consider temperature, humidity, wind speed, phenotype and cattle acclimation. If cattle must be handled, a general rule is to work them before the Temperature Humidity Index (THI) reaches 84 if possible. As an example, when the temperature is 98°F and the humidity is 30%, the THI is 83. At a constant temperature, the THI increases as the relative humidity increases. Each one mile per hour increase in wind speed decreases the THI by approximately one. More information can be found in NebGuide G00-1409-A (www.gpvec.unl.edu).
- Work cattle more prone to heat stress first, earlier in the day or later if conditions moderate. For example, larger cattle should be processed at lower stress times of the day.
- Limit the time cattle spend in handling facilities where heat stress may be more significant.

Maintaining and Improving Cattle Care and Handling Implementation and Review Programs

Throughout these guidelines, general “rules of thumb” are provided that can be used as indicators of the performance of cattle handling systems and the employees managing them. Since cattle behavior varies as a result of genetics and previous experiences, there is no one set of performance targets. However, the indicators listed in this document can be helpful in conducting periodic evaluation of cattle care and handling practices. Management practices should be informally assessed every day to ensure that animal welfare is not compromised. Regardless, producers are encouraged to implement a system to verify efforts directed towards animal care and handling.

This can be accomplished by:

- Establishing a network of resources on cattle care
- Following the Cattle Care and Handling Guidelines
- Keeping track of training and education activities
- Conducting self-audits or external audits of animal care and handling procedures
Informal self-reviews should be periodically conducted by those involved with cattle feeding and care. In other words, managers and employees should continually ask themselves if they are following proper cattle care and handling procedures. Results should be reviewed by those responsible for animal care welfare to assess the effectiveness of the program and to determine training needs.

Summary
Cattlemen have long recognized the need to properly care for their livestock. They have, in many cases passed on animal care principles from generation to generation. More recently, research has provided additional information that can supplement experience. Research provides the basis for many day-to-day decisions about animal husbandry. Management programs should be science-based and common-sense driven. As such, the cattle industry continues their commitment to proper care and handling of their livestock.
For Additional Information:

Training Materials
- National Institute for Animal Agriculture (NIAA):
  - Cattle Handling and Transportation (video)
  - Livestock Handling Guide (pamphlet)
  - Livestock Trucking Guide (pamphlet)
  - Proper Handling Techniques for Non-Ambulatory Animals (pamphlet)
- Flight Zone and Point of Balance
  - www.grandin.com/behavior/principles/flight.zone.html

Transporting Cattle
- Cattle and Swine Trucking Guide for Exporters, USDA Agricultural Marketing Service publication, published May 1997

Euthanasia
- Practical Euthanasia of Cattle, American Association of Bovine Practitioners

Heat Stress
- NebGuide G00-1409-A, www.gpvec.unl.edu

Additional References
- FASS 1999
- Midwest Planning Service (MWPS) Handbooks