



FIELD GUIDE

BQA PRODUCER FIELD GUIDE

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The BQA Producer Field Guide is a quick reference version of the National Manual. Its goal is to provide producers with reminders and important references when making management decisions.

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CHAPTER 1. INTRODUCTION TO BQA

WELCOME TO THE BEEF QUALITY ASSURANCE FIELD GUIDE!

Welcome to doing things the right way – the BQA way. Each aspect of the BQA program is economically logical and part of good business management. This responsible management approach can bring positive benefits to the cattle producer,

including improved resource management and positive returns.

Watch how BQA has been setting the standard for proper management techniques in the beef industry:

BQA CERTIFICATION

The BQA program is a voluntary program involving “basic training” in BQA followed by an exam. Training certification continues in communities across the U.S. with the assistance of qualified local individuals, such as veterinarians and extension educators who have completed the BQA Trainer training. Become BQA certified online at the [BQA website](#) or through your state’s BQA

coordinator. Your BQA certification must be renewed once every three years. Following the completion of your BQA training and successful completion of the exam, you will receive a certificate of completion—an opportunity to proudly display your commitment to beef quality and animal well-being.

BQA’S HACCP-LIKE PRINCIPLES

The BQA management approach incorporates Hazard Analysis Critical Control Points (HACCP)-like principles, which address food safety concerns and quality issues by identifying quality control points within beef production. These concepts of control points, critical limits, preventive measures, corrective actions and monitoring have

helped pave the way toward ensuring the safety and quality of beef. The seven HACCP-like principles and examples of how each might be incorporated into your BQA program are included in the table below.

HACCP-like principle	Example in practice
Review all management programs to identify production practices that affect food safety, quality, and the environment.	Review employee trainings to ensure everyone is up to date on protocols.
Identify the control points where potential problems can occur, be prevented and/or controlled.	Storage of feed and/or chemical products is a control point. To help ensure that feed is not accidentally contaminated, batteries, fuel containers or paint should never be stored in the same location as feedstuffs.
Establish critical limits associated with each control point.	Identify the proper withdrawal time associated with a drug treatment to determine the earliest date the treated animal is eligible for market.
Establish control point monitoring requirements to ensure that each control point stays within its limit.	Maintain pesticide use records so that you can check grazing restrictions on a particular field or pasture before turning cattle out.
Establish corrective actions necessary to implement if a problem occurs.	Corrective actions for a drug residue violation might include improving record keeping and employee training.
Establish effective record keeping procedures that document that a system is working properly.	As a way to verify your treatment protocol, use a processing map to record where each injection was given, how much was given, how it was given, who gave the injection, and what the injection was.
Establish procedures for verifying that the system is working properly.	At a minimum, conduct an annual review with the herd veterinarian to review your animal treatment records, production practices, critical limits, treatment protocols, etc. This helps verify that management strategies are occurring according to an operations’ management plan.

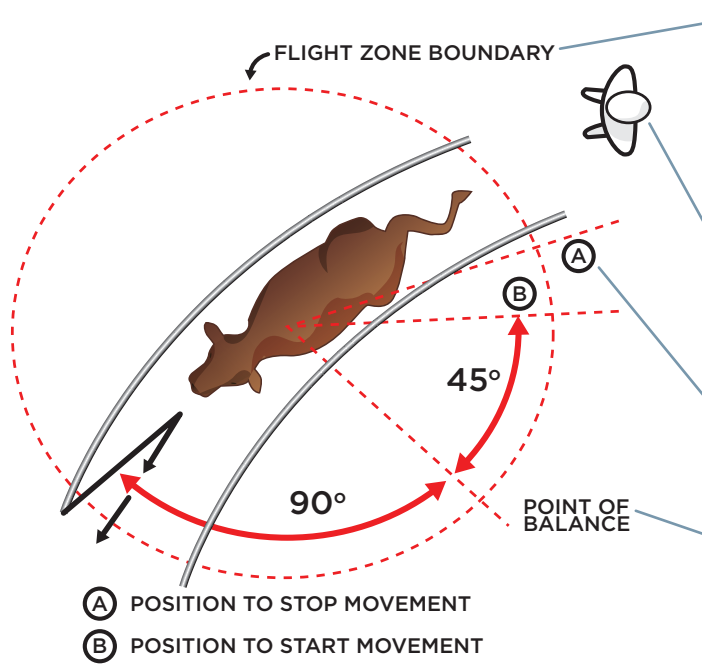
CHAPTER 2. BEHAVIOR AND HANDLING

Proper handling management, based on sound animal behavior knowledge, will reduce stress and behavior-related issues. Improper handling that does not consider cattle behavior may lower conception rates, impair immune system and rumen functions, and predispose animals to shipping fever and excess shrink and/or bruises, requiring excess carcass trimming at the time of processing. The following information serves as an educational resource. All production practices should be adapted to specific needs of individual operations.

CATTLE'S FLIGHT ZONE

An important concept of livestock handling is the animal's flight zone or personal space. The size of the flight zone varies depending on how accustomed the cattle are to their current surroundings, people, equipment etc.

Properly utilizing an animal's natural flight zone can facilitate efficient, low-stress cattle movement—guidelines to do so are described with diagrams on the next page.

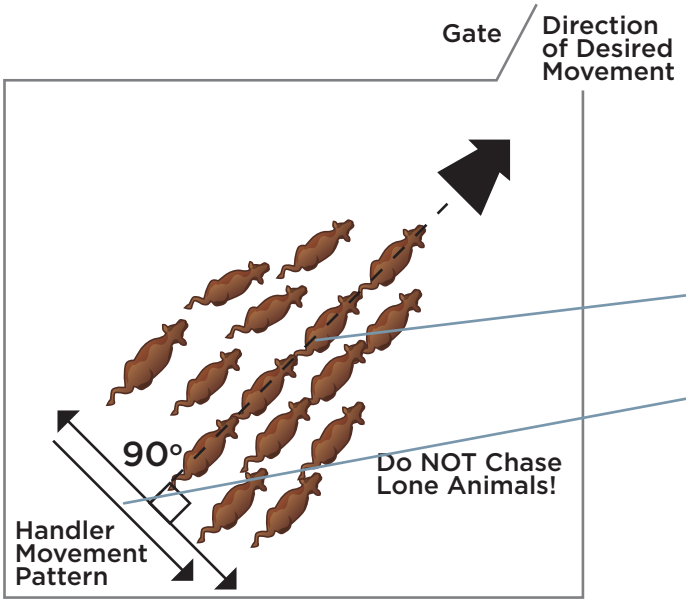


» Determine an animal's or group of animals' flight zone boundary by slowly walking up to them; they will move away when you have entered their flight zone.

» Avoid entering the animal's flight zone boundary too deeply or quickly as this may cause them to bolt away or back past you.

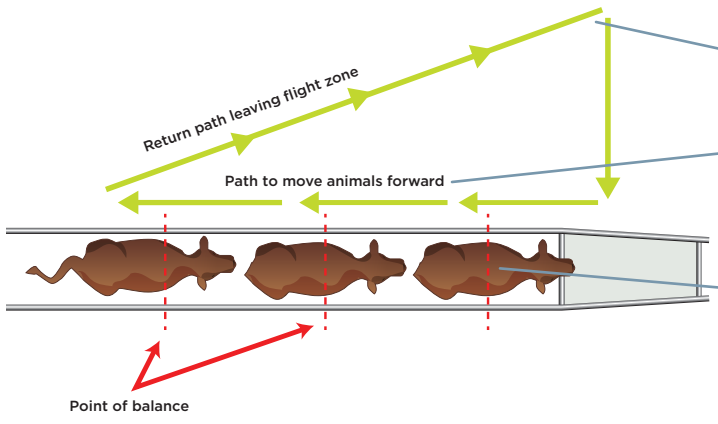
» Retreat from an animal's flight zone boundary if you want it to stop moving.

» Move cattle forward by moving toward their rear past their point of balance (shoulder).



» Allow cattle to follow one another in the direction that they are facing.

» Move behind a group of cattle in a manner which keeps you in their line of sight, to keep them moving forward.



» Leave cattle's flight zone to stop their movement in a chute.

» Move along across cattle's point of balance to keep them moving forward.

» Concentrate on moving the leader(s), rather than the rear animals, if a group of cattle bunch up.

CATTLE HANDLING FACILITIES AND EQUIPMENT

In addition to working with an animal's flight zone to handle cattle, it is especially important to properly design, construct, maintain and utilize cattle handling facilities. When utilized correctly, facilities and equipment can improve

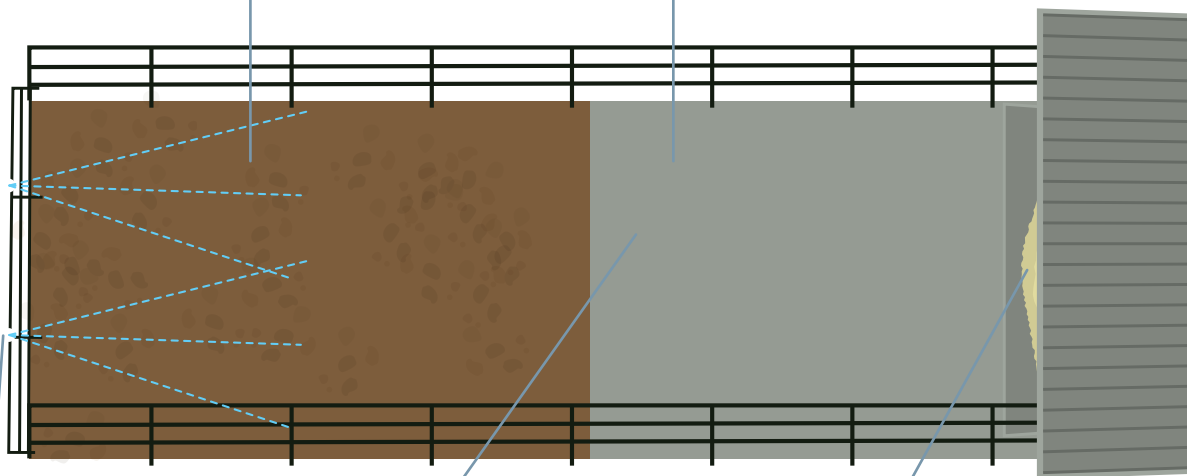
animal well-being and productivity at an operation. The video below further discusses the design and use of cattle-handling facilities.

Cattle housing considerations are indicated in the image below.

Ensure floors in housing facilities properly drain and provide adequate traction.

Ensure that mud depth is not consistently deeper than the ankles of cattle in pens.

Consider the following features when fabricating shelters: protection from weather/elements, adequate ventilation, amount of space per animal, the potential need for bedding, the direction and force of wind, safe use of mechanical/electrical devices, waste removal/drainage, and the animal's continued access to food and water.



Use dust reduction measures, like sprinklers, to improve animal performance.

Construct an elevated area to give cattle a dry place to lie down if the slope of the pen is not sufficient to facilitate proper drainage.

Scrape/clean all bunk aprons as needed so cattle do not have to stand in mud to eat from the bunk. Maintain the pen floor and bunk apron interface so that cattle do not have an excessive step up to the apron.

TEMPERATURE CONSIDERATIONS

The normal core body temperature for cattle is, on average, 101.5 degrees Fahrenheit. The animal must maintain normal body temperature to sustain essential physiological processes. Properly caring for and handling cattle includes

supporting their temperature maintenance and ability to adapt to their regional environment. Prevent or address environmental conditions that approach cattle’s heat and cold thresholds to maintain optimal performance and health.

HEAT

- » Move or process cattle during the cooler part of the day.
- » Work cattle more prone to heat stress first, earlier in the day or later if conditions are moderate.
- » Limit the amount of time cattle spend in handling facilities where heat stress may be more significant.
- » Avoid handling cattle when the risk of heat stress is high. If cattle must be handled, a general rule is to work them before the Temperature Humidity Index (THI) reaches 84. As an example, and as seen in the image below, when the temperature is 98° F and the humidity is 30%, the THI is 83.

Beef Cattle Temperature Humidity Index

		Relative Humidity (%)											
		30	35	40	45	50	55	60	65	70	75	80	85
Temperature (°F)	100	84	85	86	87	88	90	91	92	93	94	95	97
	98	83	84	85	86	87	88	89	90	91	93	94	95
	96	81	82	83	85	86	87	88	89	90	91	92	93
	94	80	81	82	83	84	85	86	87	88	89	90	91
	92	79	80	81	82	83	84	85	85	86	87	88	89
	90	78	79	79	80	81	82	83	84	85	86	86	87
	88	76	77	78	79	80	81	81	82	83	84	85	86
	86	75	76	77	78	78	79	80	81	81	82	83	84
	84	74	75	75	76	77	78	78	79	80	80	81	82
	82	73	73	74	75	75	76	77	77	78	79	79	80
	80	72	72	73	73	74	75	75	76	76	77	78	78
	78	70	71	71	72	73	73	74	74	75	75	76	76
	76	69	70	70	71	71	72	72	73	73	74	74	75

Temperature Humidity Index (THI)

Normal <75	Alert 75-78	Danger 79-83	Emergency >84
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COLD

- » Adjust feed and energy rations to match increased maintenance energy requirements of cold-exposed cattle.
- » Provide windbreaks and shelters to reduce wind, moisture, and mud build-up on the cattle.
- » Construct feedlots and buildings in a manner that reduces winter stress due to temperature and moisture.
- » Provide bedding in severe conditions to put a barrier between cattle and the frozen ground.
- » Provide modest protection by either natural or manmade structures to reduce effects of extreme cold by allowing exposure to be intermittent rather than continuous.

CHAPTER 3. BIOSECURITY

Biosecurity measures help the cattle industry maintain animal and human health. Work with your veterinarian to develop specific biosecurity measures for your operation. Consider the biological hazard, relative significance and risk of each potential biosecurity challenge. Examples of sources that might spread of disease into and/or across an operation include:

Potential sources of disease:



- » Diseased animals
- » Animals recovered from disease but now are carriers
- » Clinically healthy animals but incubating disease
- » Vector-borne disease



- » Non-livestock animals
- » Wildlife and pests
- » Feral livestock



- » People who move between herds and their clothing, shoes, etc.



- » Contact with inanimate objects including vehicles and equipment that move between herds.



- » Feedstuffs, especially high-risk feedstuffs, which could be contaminated with feces.



- » Impure water (surface drainage water, etc.).



- » Aerosol transmission (wind) including aerosolized manure and dust.

The checklists below are meant to provide management guidelines for a variety of biosecurity concerns.

Best Management Practices for Strategic Vaccine Use

- Have a written strategic vaccination plan for each operation.
- Know when and how to use the vaccines listed in the vaccination plan.
- Discuss the vaccination history of all cattle purchased before the cattle arrive.

Biosecurity Practices for Preventing Infectious Disease from Entering All Operations

- Attempt to obtain the health history for the herds from which cattle are purchased.
- Attempt to obtain the health status of animals brought into the operation and demand a valid health certificate.
- When possible, ensure the herd veterinarian talks to the seller's veterinarian prior to buying animals.
- Transport animals in clean vehicles.
- Have a disease control program for outside animals that could spread disease (e.g., rodents, etc.).
- Locate the loading area at the perimeter of the operation.
- Locate the dead animal pickup area so that rendering trucks do not contaminate the operation.
- Limit people's access to cattle pens, feed mixing/storage areas, feed bunks, and cattle treatment areas.
- Keep a record of visitors to the operation.

Biosecurity Practices for Disease Containment

- Provide a clean area for restraint, treatment, and isolation of sick cattle.
- Prevent cross-contamination of water, manure, feed, or equipment between groups with different health status.
- Have a plan to manage group size, age distribution, and animal flow to reduce risk of disease.
- Handle highest health status animals first (i.e., young calves, healthy older cattle), and sick animals last.
- Necropsy selected animals to verify the causes of death.
- Ensure a veterinarian collects blood samples from all cows that abort.

Biosecurity Practices for Sanitation

Clean contaminated vehicles and equipment before use around healthy cattle.

Attempt to prevent manure contamination of feed and equipment.

Immediately remedy any situation in which manure accidentally contaminates feed or water.

Clean treatment, handling, and feeding equipment used on sick animals after each use.

Attempt to prevent cross-contamination between healthy and sick or dead cattle.

Regularly evaluate the activities on your operation to assess the potential for contaminating cattle.

Use disinfectant products according to label instructions and for the correct pathogen.

Biosecurity Practices for Equipment

Use different equipment to feed and clean pens or clean and disinfect equipment between use.

Never step in the feed bunk.

Never leave manure-handling equipment in pens with different animal groups.

Clean and disinfect contaminated vehicles and equipment before use around healthy cattle.

Routinely clean and disinfect feeding equipment and cattle handling equipment

Routinely clean and disinfect equipment used to medicate cattle.

Routinely clean equipment washing areas.

Biosecurity Practices for Preventing Infectious Disease from Entering Cow/Calf Operations

Place cattle that use community pastures in performance evaluation centers.

Control fence-line contact with neighboring cattle.

Always buy cattle that have tested negative for Johne's Disease.

Know the biosecurity, vaccination, and testing program for herd(s) for replacement cattle.

Quarantine new arrivals for 21-30 days before allowing them contact with your cattle.

Design the quarantine area to prevent cross contamination between cattle.

Biosecurity Practices for Calf Management

Have a strategic vaccination and parasite control plan in place for all cattle.

Keep newly introduced cattle off of pastures where manure that could pose a disease risk has been spread until risk can be confidently neutralized.

Keep replacement cattle separate from other cattle for at least 21-30 days.

Provide replacement cattle a separate source of water.

Consult with a veterinarian annually about calf care.

Ensure the calving area is clean and dry.

Ensure all calves are born from cows that have tested negative for infectious diseases.

Ensure all colostrum fed to calves comes from cows that have tested negative for diseases of concern in your herd.

Ensure calves are permanently identified prior to any grouping.

Biosecurity Practices for Controlling Salmonella

Realize that visitors and employees can be infected with salmonella from cattle.

Isolate sick cattle in hospital area and prevent cross contamination.

Discuss proper antibiotic use with a veterinarian.

Clean all instruments and equipment used on sick cattle after each use.

Test purchased feed for salmonella.

Restrict birds, cats, rodents, and stray animals from accessing cattle's feed and water.

Do not allow rendering trucks to access feed or animal areas.

Biosecurity Practices for Controlling Bovine Viral Diarrhea (BVD)

- Understand persistently infected (PI) animals as they relate to BVD.
- Do not keep a PI calf as a replacement heifer.
- Commit to finding BVD PI cattle and removing them from herd.
- Discuss use of killed virus versus modified live virus vaccines for BVD with your veterinarian.
- Control fence-line contact with neighboring cattle.

Biosecurity Practices for Controlling Johne's (M. paratuberculosis) Disease

- Understand how Johne's disease can impact your herd and how it is spread.
- If Johne's is suspected, screen the whole herd using an antibody ELISA test (measures antibody in blood) and/or fecal culture.
- Work with your veterinarian to determine detection threshold for culling.
- Ensure replacement heifers (less than 24 months) are tested prior to introduction to the herd.
- Remove calves from cows testing positive.
- Implement a follow-up testing program for Johne's and have it reviewed with herd veterinarian.

Biosecurity Practices for Controlling Bovine Leukosis

- Use caution when using needles or palpation sleeves on more than one animal.
- Avoid feeding colostrum to calves from cows testing positive to bovine leukemia virus.
- Test purchased cattle during quarantine.

Biosecurity Practices for Controlling Foot & Mouth Disease (FMD)*

- Designate a Biosecurity Manager to write an operation-specific enhanced biosecurity plan

with the assistance of a veterinarian.

Ensure the Biosecurity Manager and essential personnel are trained in biosecurity measures to keep FMD out of the herd.

Establish a line of separation (LOS) with controlled access points to protect cattle from movement of virus onto the operation.

Establish a cleaning and disinfection station for all vehicles/equipment crossing the LOS.

Ensure everyone crossing the LOS has showered, is wearing clean clothing and footwear, and signs the log book.

Record all animal, semen, and embryo movement.

Only accept animals, semen, and embryos from sources with documented biosecurity practices and that have no evidence of current or previous FMD infection.

Develop contingency plans for interrupted animal movement (e.g., several weeks).

Dispose of carcasses (i.e., normal mortalities) in a manner that prevents attraction of scavengers; the use of rendering trucks may be prohibited during an FMD outbreak.

Dispose of manure in a manner that prevents exposure of animals and meets regulations.

Establish control measures to minimize interaction between cattle and other animals (e.g., deer, feral pigs, rodents, dogs, cats, etc.).

Ensure feedstuffs are delivered, stored, mixed, and fed in a manner that minimizes contamination and feed spills are cleaned up promptly to avoid attracting wildlife.

* These practices are part of the Secure Beef Supply Plan for Continuity of Business during an FMD Outbreak. Producers are encouraged to write an enhanced biosecurity plan and be ready to implement it during an FMD outbreak. Controlling the spread of this highly-contagious animal disease involves stopping animal and animal product (i.e., cattle, pigs, sheep, goats, semen, embryos, manure) movement in the areas around infected animals. Once stopped, restarting movement will require a special permit issued by Regulatory Officials after a producer meets certain requirements, including enhanced biosecurity. The Secure Beef Supply (SBS)

Plan provides guidance for producers who have cattle with no evidence of FMD infection prepare to meet movement permit requirements. Visit the [Secure Beef website](#) for more information.

Biosecurity Practices for Controlling Microbial Contamination

Evaluate ways to prevent fecal contamination of cattle's feed or oral cavity (e.g., ingestion).

Avoid high-risk feed sources and protect feed supplies from fecal contamination.

Observe septic leach fields and fix any broken pipes.

Educate workers about the importance of personal hygiene near feedstuffs or feed bunks, water tanks, or pens where cattle could come in contact with tapeworm segments or eggs spread by infected humans.

Biosecurity Practices for Pest Control

Understand that rodents and birds may transmit disease and cause damage to equipment, including sensitive electrical connections.

Consider employing a certified pesticide applicator or service.

Read and follow all label directions for controlled products.

Biosecurity Practices for Water Contamination

Prioritize protecting cattle's water supply from contamination (e.g., manure, chemicals, etc.).

Ensure everyone in the beef operation is on constant alert for practices that could cause contamination of the water supply.

Report to the operation's manager and address any suspected contamination of a water supply.

Pathogen Management

Pathogens, or microorganisms that can cause disease, can survive in environments for significant periods of time. However, when used properly, disinfectants can control the survival and transmission of various pathogens. The physiology of pathogens directs the best disinfectants to use against them. For example, some viruses are covered in an envelope or a membrane made of lipids and proteins.

These envelopes make the viruses more easily compromised by disinfectants. Identifying the existing or potentially existing pathogens on an operation is the first step to determining how to manage them. The tables below display common cattle viruses and disinfectants that effectively manage different pathogens.

Cattle Viruses With and Without Viral Envelopes

Virus	Enveloped	Virus	Enveloped	Virus	Enveloped
Bluetongue	No	BVD	Yes	BRSV	Yes
Coronavirus (enteric and respiratory)	Yes	Cowpox	Yes	FMD	No
Herpes 1 (IBR and IPV)	Yes	Herpes 2 (Mammallitis)	Yes	Leukemia	Yes
Lumpy Skin Disease	Yes	Malignant Catarrhal Fever	Yes	Papilloma	No
Papular Stomatitis	Yes	PI3	Yes	Pseudocowpox	Yes
Rabies	Yes	Rotavirus	No	Vesicular Stomatitis	Yes

Disinfectant Selection Table

Compound	Chlorine 0.01-5%	Iodine iodophor 0.5-5%	Chlorhexidine 0.05-0.5%	Alcohol 70-95%	Oxidizing 0.2-3%	Phenol 0.2-3%	Quaternary ammonium 0.1-2%	Aldehyde 1-2%
Examples	Clorox	Tincture/ Provodine	Novalsan	---	VikronS	Lysol	Roccal-D	Wavicide
Bactericidal	Good	Good	Very Good	Good	Good	Good	Good	Very Good
Virucidal	Very Good	Good	Very Good	Good	Good	Fair	Fair	Very Good
Enveloped viruses	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Non- enveloped viruses	Yes	Yes	No	No	Yes	No	No	Yes
Bacterial spores	Fair	Fair	Poor	Fair	Fair to Good	Poor	Poor	Good
Fungicidal	Good	Good	Fair to Good	Fair	Fair	Good	Fair	Good
Effective in organic matter	Poor	Fair	Fair	Fair	Poor	Good	Fair	Good
Inactivated by soap	No	No & Yes	No	No	No	No	Yes	No
Effective in hard water	Yes	No	Yes	Yes	Yes	Yes	No	Yes
Contact time (minutes)	5-30	10-30	5-10	10-30	10-30	10-30	10-30	10-60
Residual activity	Poor	Poor	Good	Fair	Poor	Poor	Fair	Fair

CHAPTER 4. HERD HEALTH MANAGEMENT

VETERINARIAN/CLIENT/PATIENT RELATIONSHIP

For the health and well-being of cattle, it is critical for a veterinarian-client-patient relationship (VCPR) to exist between veterinarians, their clients, and their patients. A valid VCPR is required for all prescription medications, extra-label use of non-prescription medications and all FDA feed medications that require a “Veterinary Feed Directive” (VFD).

Components of a VCPR include:

Herd Veterinarian

- » Responsible for herd health oversight
- » Personally/regularly acquainted with the herd (patients) and their care
- » Available for follow-up consultations
- » Regularly evaluates herd's (patients') medical records with clients
- » Provides treatment protocols and personnel training when needed



Client

- » Establishes a written agreement identifying the herd veterinarian
- » Informs the herd veterinarian if another veterinarian provides professional services for the farm
- » Follows veterinarians' medical directions
- » Keeps treatment records

HERD HEALTH PLANNING

Base your disease control programs on risk assessment and efficacy of available products. Reduce your economic losses through prevention and/or early intervention as part of health management programs. General herd health guidelines for all cattle sectors include:

- » Offer animals safe, well-managed feedstuffs.
- » Practice “Low Stress” cattle handling techniques.

- » Make records available to the next production sector.
- » Control external and internal parasites.
- » Establish a veterinary/client/patient relationship.

Segment-specific guidelines include:

Cows & bulls



- » Complete breeding soundness exams on all bulls annually, including testing for transmittable diseases such as trichomoniasis.
- » Booster vaccinations as indicated in the herd health plan.
- » Maintain cows at a body condition score (BCS) of at least five (out of a nine-point scale) before the calving season.
- » Examine cows with mild lameness, early eye problems such as ocular neoplasia, mastitis, or loss of body condition to determine well-being and/or prompt marketing.

Calves



- » Perform all surgeries such as dehorning and castration in a humane manner at the earliest possible age.
- » Pain management such as providing local anesthetic and post-operative analgesia should be included in all painful procedures.
- » Wean calves at least 30 days prior to marketing. Practicing a 60-day weaning period will improve cattle health and the opportunity for a return on investments in herd health management.
- » Provide proper pre-weaning nutrition.
- » Vaccinate against respiratory diseases prior to weaning.

Heifers & purchased breeding stock



- » Isolate all stock entering the herd as indicated on the herd health plan.
- » Test all stock entering the herd for diseases that could jeopardize the herd.
- » Maintain herd records for at least two years so that if these diseases arise, the issue can be reported back to the stock seller.

Stocker & feeders



- » Vaccinate all incoming stockers and feeders against pathogens that could lead to BRD.
- » All cattle should be vaccinated with a clostridial vaccine.
- » Use other vaccines and parasite controls based on risk assessment, efficacy of available animal health products and the herd health plan.
- » Check high risk cattle at least daily for illness, lameness, or other problems during the first 30 days following arrival.
- » Remove cattle from a pen if they are aggressively riding or “bulling” one or more pen mates to prevent serious injury.
- » Identify and address pregnancy in immature heifers.

ANTIMICROBIAL USE CHECKLIST

Responsible antibiotic stewardship is important to ensure that animal health technologies remain viable for cattle raisers and care givers. Below are judicious antibiotic use guidelines to responsibly and legally treat and market cattle:

- Consult with the herd veterinarian regarding the selection and use of antibiotics.
- Perform routine health examinations and vaccinations.
- Consider therapeutic alternatives prior to using antimicrobial therapy.
- Avoid using antibiotics that are important in human medicine as first line therapy.
- Use culture and susceptibility test results to aid in the selection of antimicrobials.
- Select and dose an antibiotic to effect a cure.
- Avoid combination antibiotic therapy unless there is clear evidence that the specific practice is beneficial.
- Confine therapeutic antimicrobial use to proven clinical indications, avoiding inappropriate uses such as for viral infections without bacterial complication.
- Optimize regimens for therapeutic antimicrobial use by using current pharmacological information and principles.
- Limit antibiotic use to treatment or control of antibiotic susceptible diseases.

Treat for the recommended time period.

Keep records of antibiotic use.

Follow proper withdrawal times.

Follow label directions.

All extra-label antibiotic use should follow FDA regulations and be under the supervision of a veterinarian. Prescriptions, including extra-label use of medications, must meet the Animal Medicinal Drug Use Clarification Act (AMDUCA) amendments to the Food, Drug, and Cosmetic Act. Note that the BQA program does not support/recommend extra-label drug use (ELDU) for injectable aminoglycosides (such as neomycin, gentamicin or kanamycin) because of the potential violative residues related to extremely long withdrawal times.

Never administer more than 10 cc per IM injection site; exceeding this amount will increase tissue damage, alter withdrawal time, and may require testing before marketing cattle for consumption.

Do not mix products prior to administration as this compounding will result in undetermined withdrawal periods and may inactivate the products.

Minimize antimicrobials reaching the environment through spillage, contaminated ground runoff or aerosols.

VACCINATIONS AND DISEASE PREVENTION

Biological use can aid in the prevention of common viral and bacterial diseases and lessen the possible need for treatments and residue

risk later in the production cycle. Management programs should be science-based and common-sense driven.

Vaccination Guidelines

- Always read directions before starting.
- Determine target pathogens.
- Select the most effective vaccine.
- Restrain animals properly.



Administer proper dose.
 Administer via recommended route.
 Administer in recommended site (neck region for IM or subcutaneous, nose for intranasal).
 Never place vaccine in hip or round.
 Always follow label directions, including either 21- or 60-day withdrawal assigned to all USDA approved vaccines.

Booster all vaccines when label requires it.
 Never leave vaccines un-refrigerated.
 Prevent exposure of vaccine to heat and UV light.
 Keep a receiving record for all cattle health products which includes: date, name, quantity, unit sizes, lot/serial numbers, and the expiration dates.

Vaccination Equipment



Use quality syringes.
 Select sterile disposable or multiple-dose, easily cleaned and heat-sanitized syringes.
 Never use detergents or disinfectants to clean multiple-dose syringe.
 Always inspect syringes prior to processing.
 Label syringes and the cooler box prior to processing.
 Draw from bottle with a sterile needle.
 Use proper needle size: complete the injection without the needle bending or breaking in muscle tissue.
 Change needles often to reduce tissue irritation.

Change needles immediately if contaminated or damaged.
 Never market an animal containing an injection needle shaft.
 Follow local, state, and federal EPA guidelines for disposal of used needles and other sharps.
 Seal sharps container and dispose of in an approved landfill.
 When using vaccines that must be mixed prior to use, such as Modified Live Virus (MLV) products, mix only as much as can be used in one hour or less.
 Use a sterile transfer needle when reconstituting MLV and chemically-altered (CA) vaccines.
 Always place the transfer needle in the stopper of the diluent bottle first.

Injectable viscosity		Route of Administration								
		SQ (1/2 to 3/4 inch needle)			IM (3/4 to 1 inch needle)			IV (1 to 1 1/2 inch needle)		
		Cattle weight			Cattle weight			Cattle weight		
	< 300	300-700	> 700	< 300	300-700	> 700	< 300	300-700	> 700	
Thin Example: most vaccines	18 gauge	18-16 gauge	16 gauge	20-18 gauge	18-16 gauge	18-16 gauge	18-16 gauge	18-16 gauge	16-14 gauge	
Thick Example: thick antibiotics	18-16 gauge	18-16 gauge	16-14 gauge	18-16 gauge	18-16 gauge	16 gauge	18-16 gauge	18-16 gauge	16-14 gauge	

SELECT THE NEEDLE TO FIT THE CATTLE SIZE (USE THE SMALLEST PRACTICAL SIZE WITHOUT FEAR OF BENDING)

Additional Vaccination Resources

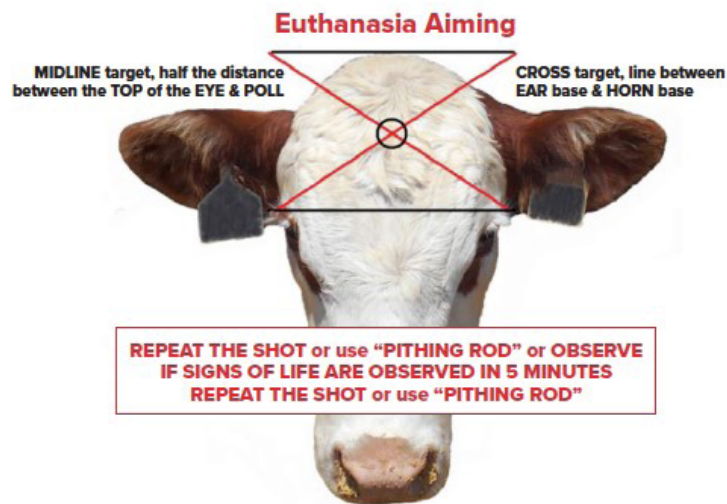
- » [Click here](#) to learn about types, use, and storage of vaccines.
- » [Click here](#) to learn how to use a transfer needle.
- » [Click here](#) for syringe transfer instructions.
- » [Click here](#) to learn about vaccine labeling and administration.

4 KEY ELEMENTS OF EUTHANASIA

1. Acceptable methods of euthanasia in cattle:
 - Gunshot
 - Penetrating captive bolt with a secondary step to insure death
 - Never select a hollow point or other fragmenting bullet for euthanasia
2. Landmarks for euthanasia
 - Current information for adult cattle and calves indicates that the point of entry of the projectile should be at (or slightly above) the intersection of two imaginary lines, each drawn from the outside corner of the eye to the center of the base of the opposite horn.
 - If a firearm is used it should be used within three feet of the target when possible and positioned so that the muzzle is perpendicular to the skull to avoid ricochet.
 - When using penetrating captive bolt, operators are advised to restrain the head so that the captive bolt may be held flush with the skull.
3. Indications of unconsciousness
 - Animal collapses immediately when shot and makes no attempt to right itself.
 - Body and muscles become rigid immediately upon collapse followed by relaxation of the body, brief tetanic spasms and eventually uncoordinated hind limb movements.
 - An absence of vocalization.
 - An absence of eye reflexes and eyelids remain open facing straight forward.
 - Immediate and sustained cessation of rhythmic breathing.
4. Confirmation of death
 - Criteria to be used for confirmation of death include lack of pulse, lack of breathing, lack of corneal reflex, lack of response to firm toe pinch (as with a hoof tester), failure to detect/hear respiratory sounds or heart beat by use of a stethoscope, graying of the mucous membranes, and rigor mortis.
 - None of these signs alone, with exception

Animal/firearm	Handgun	Rifle	Shotgun
Calves	.32 to .45 caliber Solid-point bullet	.22 LR caliber or larger Solid-point bullet	.410 to 12 gauge #4-6 birdshot or slug
Adult	.38 to .45 caliber Solid-point bullet	.22 magnum or higher caliber ¹ Solid-point bullet	20 to 12 gauge #4-6 birdshot or slug (within 3 feet)

¹ .22 LR is discouraged for use in euthanasia of adult cattle because it lacks sufficient ballistic energy to yield consistent results. Higher caliber rifles should be avoided as bullets may exit the body and place bystanders in danger.



CHAPTER 5. TRANSPORTATION

LOADING AND UNLOADING

Apart from severe weather, transportation provides the single largest source of stress for cattle in their lifetime. Quiet and low stress animal handling techniques used for loading and unloading significantly reduces animal stress, thereby allowing cattle to remain healthier and more quickly acclimate to their new address.

LOADING

UNLOADING

FITNESS FOR TRANSPORT

Things to consider when determining if an animal is fit for transport include the health of the animal, the body condition of the animal,

and the mobility of the animal. The table below identifies scenarios in which cattle are fit vs. unfit for transport.

Fit for transport	Unfit for transport
<ul style="list-style-type: none"> » Cattle that have passed all treatment withdrawal times. » Cattle with a body condition score greater than 2 (for both beef and dairy scales). » Mobility scores should be used to determine if an animal can be shipped; cattle with a mobility score of 1-2 are fit for transport. » Cattle with a mobility score of 3 should be shipped with special provisions, including location on truck and awareness of their condition. » Ambulatory cattle with a recent fracture, unrelated to mobility, should be transported directly to a packing or processing facility. » Cattle that are not exhausted or dehydrated. 	<ul style="list-style-type: none"> » Heifers or cows where calving is imminent and likely to occur during the transportation or marketing process. » Cattle that require mechanical assistance (hip lifts) to rise and walk. » Cattle with bone fractures of the limbs or injuries to the spine. » Cattle with conditions that will not pass pre-slaughter inspection at a packing or processing plant. » Non-ambulatory cattle or cattle with a mobility score of 4 are not fit for transport. » Cattle that pose a public health threat.

NON-AMBULATORY CATTLE

A non-ambulatory animal is unable to stand up or walk, even if assisted. Design procedures to prevent cattle from becoming non-ambulatory; however, in the event an animal becomes non-ambulatory manage and care for it in a humane manner. Guidelines for non-ambulatory animals include:

- » Provide adequate feed and water to non-ambulatory cattle at least once daily.
- » Move non-ambulatory animals very carefully to avoid compromising animal welfare.
- » Acceptable methods of transporting downers include a sled, low-boy trailer or in the bucket

of a loader. Animals should not be “scooped” into a front-loader bucket, but rather should be humanely rolled into the bucket by caretakers.

- » Humanely euthanize animals, within 24-36 hours of initial onset, which refuse to eat or drink and/or are unable to sit up unaided (i.e., lie flat on their side) when treatment is attempted.
- » Do not send non-ambulatory cattle to a livestock market or processing facility even though signs of a more favorable prognosis may exist.

TRAVEL CONSIDERATIONS

Mitigating common cattle hauling related risks can prevent many accidents. Common risks include adverse weather, equipment failure, distracted and impaired driving, as well as driver fatigue. Below are guidelines pertaining to travel considerations. Additional Beef Quality Assurance Transportation (BQAT) information and certification opportunities are available at the [BQA website](#).



» Weather

- Check weather forecast prior to loading/leaving and while en route.
- Have alternate routes available.
- Determine appropriate routes, based on truck and trailer weight. Consider:
 - Amount of anticipated traffic
 - Number of stops
 - Number of sharp turns and road width
- Constantly monitor animals for comfort and condition during any delay.



» Breakdowns

- Have another truck take the trailer if the repairs will take long or cannot be done at the site of the breakdown.
- Transfer animals to another unit if the problem is with the trailer.



» Safety

- Avoid distractions such as:
 - Eating or drinking
 - Talking or texting on a phone
 - Checking email
 - Reading
 - Searching for items in the truck
- Follow posted speed signs.
- Drive defensively.
- Do not tailgate, pass illegally, or attempt to beat traffic lights or railroad crossings.
- Stay alert.
- Never drive impaired.



» Fatigue

- Get adequate sleep where fatigue will not be an issue for the duration of the trip.
- If you drive at night, ensure you get quiet, restful sleep during the day.
- Take 15-20 minute power naps to recharge as needed.
- Bring fresh air into the cab and play music to stay wakeful.



» Accidents

- Document any incidents with photographs for the insurance company and your employer.
- Do your best to ensure animals do not enter the roadway.
- Call 9-1-1 if the situation is life threatening for you, bystanders, or the livestock.

CHAPTER 6.

RECORD KEEPING

Record keeping is a key element of Beef Quality Assurance and a good business practice in general. A quality record keeping system is one that cattle raisers are comfortable using and that maintains accurate, thorough, and timely production records. The video to the right discusses record keeping methods and benefits.

CATTLE IDENTIFICATION

Cattle identification and its associated contributions to quality record keeping can facilitate many management and production benefits. Individual animal identification supports the tracking of animal's performance characteristics such as reproductive status, growth, health, age, offspring performance etc.

These performance indicators may be important as cattle raisers make culling, retention, purchasing, or breeding decisions. Additionally, an emphasis on animal identification, record keeping, and proper handling has supported the beef industry's excellent control of violative drug residues. Methods of cattle identification include:

Branding



- On the hip or shoulder
- Easily identified
- Legal and permanent proof of ownership
- Check brand temperature
- Do not re-brand unless required by law

Ear Tagging



- In the middle rib of the ear
- Include a number that identifies each animal to its group and an individual number unique to that animal

RFID Devices



- Place within the first quarter (from the head) of the animal's ear between the rises in auricular cartilage
- Securely close the tag
- Use compatible front and back components

Ear Notching



- Leave at least ¼ inch between notches
- Avoid notching too close to the tip of the ear
- Avoid making notches too shallow

TYPES OF RECORDS



» Herd Health Records

- Keep all records for at least two years from the date of transfer or sale of cattle.
- Make a copy of the appropriate records available to the buyer of your cattle or to the unit they are transferred to on your ranch.
- Include all individual and group treatment processing history records.



» Feed Records

- Keep all feed records for at least two years from the date of transfer or sale of the cattle.
- Require an invoice that includes the date, amount, lot/batch number and signatures of both the person who delivered the product and the person receiving the product to accompany all feed products.
- Obtain a valid/current Veterinary Feed Directive (VFD) for each product before offering cattle feed or water additives that require a VFD.



» Health Product Records

- Ensure health product records show origin and expiration dates of products utilized.
- Consider using:
 - A receiving record of all animal health products to trace product origination and expiration dates
 - A record system which allows processing medications and implants to be recorded under a running or beginning and ending inventory
 - A computer program or handwritten system to record health product inventory and also record chute-side administration



» Chemical Records

- Acquire the mandatory pesticide applicator license to purchase restricted-use chemicals.
- Keep records of any applications of restricted-use chemicals.
- Record non-restricted chemical applications as well.
- Track the date and time used, product name, name of applicator and EPA product number.

RESIDUE AVOIDANCE

A residue refers to the presence of veterinary drugs or pesticides in meat. The prevention of illegal antibiotic residues is a continuous, coordinated effort between government agencies, veterinarians, and livestock producers that begins before the antibiotic is used in animals.

Farmers, ranchers, and veterinarians are required by law to follow the FDA-approved label to administer the drug appropriately and correctly. Producers who market animals that test positive for chemical residues more than a single time are placed on the publicly available USDA FSIS Residue Repeat Violator List.

Steps to Prevent a Violative Residue

- Identify and segregate all animals treated.
- Record all treatments: date, animal ID, serial/lot number, dose given, route of administration, the person who administered the treatment, and the withdrawal time.
- Strictly follow label directions for product use.
- Use newer technology antibiotics when possible.
- Reduce unwanted depot effect — select a low-volume product when available.
- Select generic medications and vaccines with an animal health professional.
- Avoid inferior products as they may cause performance loss or damage quality.
- Select the product with a shorter withdrawal when antibiotic choice is equivalent.
- Never give more than 10cc per IM injection site.
- Avoid Extra-Label Drug Use (ELDU) of antibiotics.
- Use label dose and route of administration under a valid VCPR.

Avoid using multiple antibiotics at the same time.

Do not mix antibiotics in the same syringe.

Check all medication/treatment records before marketing.

Do not market cattle with less than 60 withdrawal days without examining their treatment history.

Extend the withdrawal time if the route or location of administration is altered.

Extend the withdrawal time to the longest withdrawal period of all products given.

Extend the withdrawal for all penicillin given at doses which exceed the label dose.

Note that testing urine may not detect injection site residues that will test positive by the USDA FSIS.

Never inject gentamicin or neomycin since the estimated withdrawal is more than 24 months.

Testing urine may not detect a kidney that will test positive by the USDA FSIS.

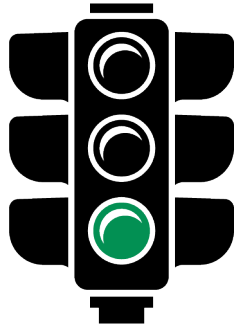
Do not market cattle that have relapsed without examining the treatment history.

Do not market cattle with suspected liver or kidney damage without examining the treatment history.

Do not market cattle with antibiotic injection site knots without examining the treatment history.

Cattle that appear to have a compromised health status and/or metabolic disease may require additional time beyond the labeled withdrawal time to metabolize animal health products. Consult a veterinarian to assess violative residue risk in these situations.

The information below contains risk assessment information for avoiding violative residues in animal tissues.



Low Risk

- Animal history is documented, recorded, and available.
- Animal was never treated with drugs.

OR

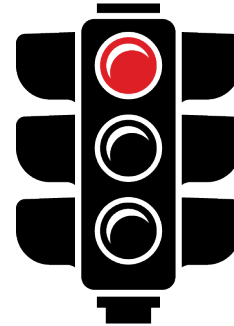
- Single-drug administration of lactating/non-lactating animal approved drug.

AND

- Drug label information for dose, route of administration, duration of therapy, and withholding time were followed.

OR

- A veterinarian oversaw the use of drugs in an extra-label manner.



High Risk

- Animal is displaying lameness, injection sites, surgical evidence, or has signs of illness.

AND if any of the situations below apply:

- History of animal treatment is not documented or not communicated to the person sending cattle to market.
- Route of administration used was not as prescribed.
- Multiple drugs were administered without veterinary oversight.
- Drug was not approved for animal's status (e.g., lactating).
- Doses or withholding times were not followed or are unknown.
- Duration of therapy was not followed.
- If any of the above high-risk attributes exist, consult pharmaceutical, veterinary, or screening test experts to determine status of animal before it is offered for sale.

CHAPTER 7. NUTRITION

BODY CONDITION SCORES

Proper cow nutritional management includes utilizing a scientifically approved method to assess nutritional status called Body Condition Scores (BCS). Body condition scores range from one (emaciated) to nine (obese). Target a BCS between five and seven for cows at calving for optimum production and for cow and calf health.

When determining an animal's body condition score, look to see how many ribs (from the last half of the rib cage) are evident to visual appraisal. If more than two ribs are easily discernible, then expect the cow to score

lower than five. Also look closely at the spinous processes (vertebrae along the edge of the loin in front of the hook bones). If the outline of the vertebrae is visually apparent, expect the cow to receive a body condition score of four or lower.

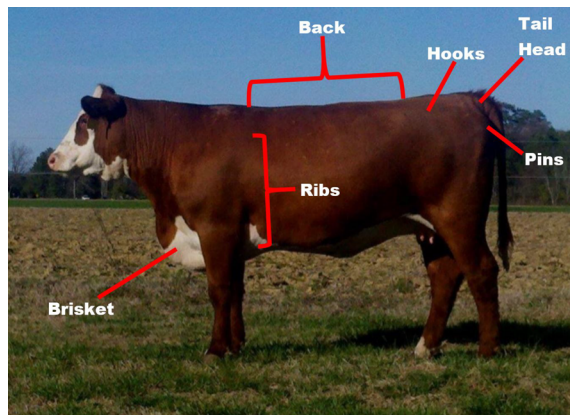


Figure 1.

The following images and their BCS descriptions are available for reference/body condition scoring practice:

- » **BCS 2:** The cow appears emaciated. Muscle tissue is severely depleted through the hindquarters and shoulder. (Figure 2)

A note about cows with BCS of 1; these cows are severely emaciated and physically weak with all ribs and bone structure easily visible. Cattle in this score are extremely rare and are usually inflicted with a disease and/or parasitism.



FIGURE 2.

PHOTO COURTESY OF ARKANSAS EXTENSION SERVICE.

- » **BCS 3:** The cow is very thin with no fat cover on ribs or in the brisket and the backbone is easily visible. Some muscle depletion appears evident through the shoulder and hindquarters. (Figure 3)



FIGURE 3.

- » **BCS 4:** The cow appears thin, with ribs easily visible and the backbone showing. The spinous processes (along the edge of the loin) are still very sharp and barely visible individually. Muscle tissue is not depleted through the shoulders and hindquarters. (Figure 4)



FIGURE 4.

- » **BCS 5:** The cow may be described as moderate to thin. The last two ribs can be seen and little evidence of fat is present in the brisket, over the ribs, or around the tail head. The spinous processes are now smooth and no longer individually identifiable. (Figure 5)



FIGURE 5.

- » **BCS 6:** The cow exhibits a good, smooth appearance throughout. Some fat deposition is present in the brisket and over the tail head. The back appears rounded and fat can be palpated over the ribs and pin bones. (Figure 6)

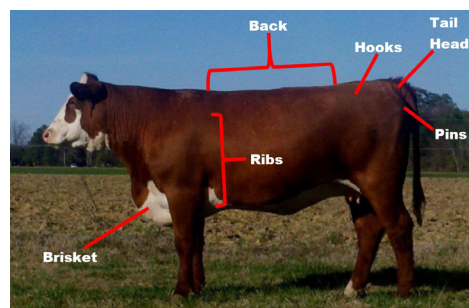


FIGURE 6.

» **BCS 7:** The cow appears in very good flesh. The brisket is full, the tail head shows pockets of fat and the back appears square due to fat. The ribs are very smooth and soft handling due to fat cover. (Figure 7)



FIGURE 7

» A note about cows with BCS of 8: these cows are obese. Their neck is thick and short, and their back appears very square due to excessive fat. Their brisket is distended, and they have heavy fat pockets around the tail head.

» A note about cows with BCS of 9: These cows are very obese and are rarely seen. They can be described as similar to eight but taken to greater extremes. They also have a heavy deposition of udder fat.

VITAMINS AND MINERALS

Vitamins that appear to be the most critical in immune system function are vitamin A (betacarotene) and vitamin E.

Imbalances in mineral intake interfere with the development and function of the immune

system, even when adequate levels of protein and energy are supplied.

The table below includes mineral requirements and maximum tolerable concentrations (in Percentage or PPM of Diet Dry Matter).

Mineral	Unit	Requirements			Maximum tolerable concentration
		Cows			
		Growing and finishing cattle	Gestating	Early lactation	
Chlorine	%	-	-	-	-
Chromium	ppm	-	-	-	1,000
Cobalt	ppm	0.10	0.10	0.10	10
Copper	ppm	10.00	10.00	10.00	40
Iodine	ppm	0.50	0.50	0.50	50
Iron	ppm	50.00	50.00	50.00	1,000
Magnesium	%	0.10	0.12	0.20	0.40
Manganese	ppm	20.00	40.00	40.00	1,000
Molybdenum	ppm	-	-	-	5
Nickel	ppm	-	-	-	50
Potassium	%	0.60	0.60	0.70	3
Selenium	ppm	0.10	0.10	0.10	2
Sodium	%	0.06-0.08	0.06-0.08	0.10	-
Sulfur	%	0.15	0.15	0.15	0.40
Zinc	ppm	30.00	30.00	30.00	500

Adapted from Table 5-1 in Nutrient Requirements of Beef Cattle, National Research Council, 1996.

FEEDING GUIDELINES FOR COWS, CALVES, STOCKERS, AND FEEDERS



Cows

- » Maintain cows at a BCS of 4-6. for their health and production. A BCS of 5-7 is ideal for cows at calving.
- » Ensure feeding plans reflect increased energy needs during periods of decreased temperature.
- » Meet cow's protein and energy requirements.
- » Ensure trace mineral intake.



Calves

- » Introduce calves to rations they'll be offered post-weaning, prior to their weaning (i.e., creep feeder). Limit high starch energy sources to 50 percent or less of the dietary dry matter of calf rations.
- » Provide trace minerals for calves, as these play an important role in the calves' immune function.
- » Freshly weaned calves will consume about 1.5 percent of their body weight to begin with and this should increase to >2.5 percent of their body weight by 28 days post weaning.



Stockers

- » Establish stocking rates on growing forages that meet production goals for growth and performance.
- » Supplement cattle as needed on dormant pastures to meet maintenance or growth requirements for the animals' weight, breed, age, and targeted production goals of the operation.
- » Develop your heifers, stockers, and/or feeders by maintaining a positive plane of nutrition throughout the weaning and growing phases.



Feeders

- » Consult a nutritionist (private consultant, university or feed company employee) for advice on ration formulation and feeding programs.
- » Monitor changes in weight gain, feces, incidence of digestive upsets (acidosis or bloat), and foot health to help evaluate the feeding program.
- » Avoid sudden changes in ration composition or amount of ration offered.

ESTIMATING COWS' MAXIMUM DRY MATTER INTAKE (MDMI)

Cow's Maximum Dry Matter Intake is determined by the quality of the forage. High quality forages (such as good quality alfalfa hay, irrigated pasture, or corn silage) allow cattle to consume

2.5 percent of their body weight on a dry matter basis (DMB). Examples are outlined in the tables below:

Estimated Maximum Intake Based on Forage Quality

Forage quality	Example	MDMI as % Body Weight	Pounds of dry matter for a 1,000 lb. Cow
High	Alfalfa hay Corn silage Pasture	2.5%	25 Pounds
Medium	Meadow hay	2.0%	20 Pounds
Low	Corn stover Straw	0.8–1.4%	8-14 Pounds

Intake as Fed Basis Versus Dry Matter Intake

Feed	% Dry matter	As fed basis 25 pounds dry matter
Alfalfa Hay	90%	27.8 pounds
Corn silage	35%	71 pounds
Irrigated Pasture	18%	139 pounds

Tables from University of Missouri Extension

It is also possible to estimate a cow's intake if you know the following:

- » The percentage of neutral detergent fiber (NDF) in the forage sources
- » The cow's body weight

For more information on this intake estimation approach consult the full fact sheet available [here](#) and/or observe the table included on the next page illustrating maximum intakes for cows consuming diets of 50 percent or more of forage.

Body weight, pounds	Forage NDF, %	NDF intake, pounds	Forage dry matter intake, pounds
1,000	40	9.9	24.8
	50	9.9	19.8
	60	9.9	16.5
1,200	40	11.9	29.7
	50	11.9	23.8
	60	11.9	19.8
1,400	40	13.9	34.7
	50	13.9	27.7
	60	13.9	23.1

WEANED CALF RATIONS

Example dry lot diets, based on 500-pound calves eating 13 pounds of dry matter per day and gaining 1.5 pounds per day, by day 14 of

adaptation to the diets are included in the table below:

Weaning adaptation diets	Day 1-3 (of adaptation to the diet)		Day 4-8		Day 9-14	
	% Dry matter	% Actual feed	% Dry matter	% Actual feed	% Dry matter	% Actual feed
Grass hay	100	100	90	83.5	80	65.0
Corn	0	0	5	4.5	5	4.0
Wet distillers grain	0	0	5	12.0	15	31.0
Crude protein	10	-	11	-	13	-
NEg Mcal/lb	0.26	-	0.32	-	0.38	-
TDN	55	-	61	-	68	-
Actual lb Feed/hd/d	-	14.6	-	15.9	-	18.1

Table from University of Nebraska Extension

Example starter rations for early-weaned calves are included in the table below:

Ingredient	Ration 1	Ration 2
Rolled corn, barley, milo	64%	56%
Soybean meal	20%	22%
Soybean hulls	10%	-
Molasses	5%	5%
Ground hay	-	-
Ground alfalfa	-	15%

Table from South Dakota State University Extension

Example starting rations for three different calf types are included in the table below:

Average	400 lb. highly-stressed long-hauled calves			400 lb. pre-conditioned or low stress calves			800 lb. backgrounded yearlings		
	Concen- trate, lb average	Feed intake, lb	% Concen- trate	Concen- trate, lb	Feed intake, lb	% Concen- trate	Concen- trate, lb	Feed intake, lb	% Concen- trate
Week 1	3	4	75	4	8	60	6	15	40
Week 2	5.5	8	75	6.6	11	60	10	17	60
Week 3	7	10	75	7.5	12.5	60	14	20	70
Week 4	8.5	12	75	8.4	14	60	17	23	74
Final ration	8.5	14	60	8.5	14	60	20	25	80

Table from Iowa Beef Center

FEED SAFETY

It is essential to monitor feed sources.

Operations purchasing external feeds should set up a sampling program to test for quality specifications in feedstuffs. This could include moisture, protein, foreign material, etc.

Guidelines for monitoring feed sources include:

- » Inform suppliers that sampling of delivered product will occur.
- » Require all products to be accompanied by an invoice.
- » Visually inspect feeds.
 - Create a checklist, which includes items such as color, odor, moisture, temperature, evidence of foreign material and no evidence of bird, rodent or insect contamination.
- » Obtain and store a representative sample of each batch of newly purchased feed.
- » Randomly sample each batch of feed in five to 10 locations and pool the individual samples into a larger sample.
- » Collect and store forage samples.
- » Store feed in a manner that prevents development of molds and mycotoxins and exposure to contaminants.
- » Ensure products are FDA/ USDA/EPA approved.
- » Store all equipment, fluids, solvents, etc. in an area separate from the feed storage and feed production areas.
 - Follow manufacturer's directions for use and disposal and keep a Material Safety Data Sheet (MSDS) file available.
 - Provide proper training for pesticide handling to all who work with these products.
- » Regularly check all feed-handling equipment for fluid leaks.
- » Clean up spills to prevent potential contaminants from causing residues, illness, or death in cattle.
- » Submit any feed ingredients suspected of contamination for analysis by a qualified laboratory, prior to usage.
- » The training should include personal safety, handling accidental spills, and preventing contamination of the feed and water supply.

CHAPTER 8. ENVIRONMENTAL QUALITY CONTROL POINTS

Beef raisers aim to be ecologically and socially responsible by caring for the natural resources beef production depends upon. Monitoring natural resources allows producers to know if and/or when current management needs adjusting. The most important resources

for ranchers to manage are vegetation, streambanks/riparian areas, and water quality. Additional processes, control points, and potential environmental concerns are listed in the table below:

Process	Control Point	Potential Environmental Concern
Forage management	Stocking rate	Deteriorating range/pasture Riparian areas Air and/or water quality Soil erosion
Soil fertility	Fertilizer application Animal waste application	Water quality Transfer of disease
Pasture chemical use	Herbicide and pesticide use Container disposal	Water quality Soil contamination
Disposal of dead stock	Composting Burial Burning	Air and/or water quality Transfer of disease
Confined cattle	Water runoff control	Air and/or water contamination Transfer of disease

STOCKING RATE

Stocking rate is the number of acres required per animal unit for the grazing season, which can be sustained on a long-term basis without forage resource degradation. An animal unit

is a 1,000-pound cow with an average dry matter forage requirement of 26 pounds per day through the production cycle.

Properly stocked

On properly stocked pastures, healthy stands of forage significantly reduce runoff, allowing water to infiltrate into the soil for use by plants or for recharge of groundwater aquifers.

Adequate, permanent ground cover, maintained by appropriate stocking rates and fertility programs on introduced forage species, is essential. The results are higher soil organic matter content, better soil structure, and a barrier that prevents detachment of the soil which thereby serves to maintain water quality and reservoir capacity.

Overstocked

Sediment production from overstocked pastures decreases water quality and reduces the capacity of surface water reservoirs.

A reduction in plant vigor reduces desirable plant frequency and abundance.

Earlier seral stage plant species (weeds) that increase in abundance generally do not provide adequate ground cover.

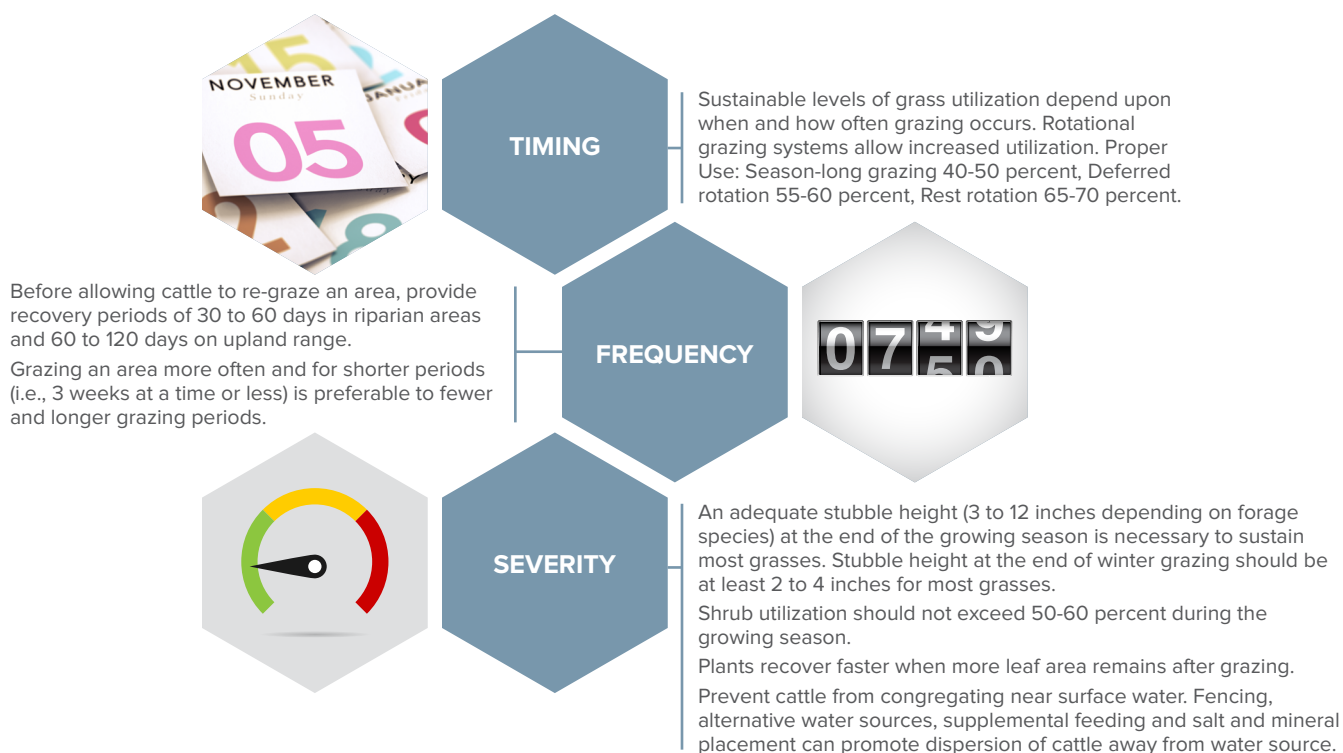
Overstocked pastures can also experience soil compaction of more clay-type soils. This can lead to further reduction in infiltration rates and increased runoff.

Heavy grazing pressure of desirable plants reduces animal performance.

GRAZING MANAGEMENT

Whether environmental impacts from cattle grazing are beneficial, harmful or benign depends entirely upon how the grazing is

managed – its timing (when grazing occurs), frequency (how often grazing occurs), and severity (how much vegetation is removed).



TRIPLE-RINSING PESTICIDE CONTAINERS

Pesticides may interfere with the operation of wastewater treatment systems or pollute waterways. Many municipal systems are not equipped to remove all pesticide residues. If pesticides reach waterways, they can harm fish, plants, and other living things. Follow the eight steps below to properly triple-rinse pesticide containers:

1. Remove the cap or lid from the pesticide container, measure the pesticide as you empty the container into the sprayer tank and let the container drain into the sprayer tank for 30 seconds.
2. Fill the container 10-20 percent full of water.
3. Secure the cap or lid on the container and shake to rinse the inside.
4. Remove the cap or lid and add the rinse water from the container to the sprayer tank.
5. Let the container drain into the sprayer tank for 30 seconds or more.
6. Repeat steps two-four more times.
7. Put the cap or lid back on the pesticide container and dispose of the container according to label directions.
8. Do not use empty containers to store any other liquids.

SOIL AND WATER MANAGEMENT

Improper fertilizer and animal waste application can affect soil and water resources. Monitor and manage both soil and water to prevent contamination, reduce run-off, and prevent the transfer of disease.



» Soil

- Use soil testing to determine the level of nutrients required for the optimum production of the target forage species.
- Apply fertilizer materials based only on soil test recommendations.
- Record all applications (rate and nutrient composition) of fertilizer, regardless of source, and the area to which it was applied.



» Water

- Use elemental scans to determine which salts are potential problems if high levels of total dissolved solids are detected.
- Develop water sources using gravity, solar, wind or electric power to prevent cattle from watering in streams.
- Limit cattle access to streams and sensitive riparian areas; fence critical management areas with temporary or permanent fence.
- Provide vegetative filter/buffer strips between corrals and streams—width of the strip is dependent on soil type and slope.
- Install runoff diversions above livestock holding areas or corrals to keep up-slope runoff from mixing with runoff from corrals.
- Install dikes and/or sediment ponds below livestock holding areas or corrals and streams.
- Seal all old and abandoned wells and protect active wells.

MORTALITY DISPOSAL



- » Incineration, burial, or composting:
 - On-site burial of carcasses may be the best disposal option for cow-calf producers. However, regardless of the size of your operation, no dead animal is to be buried on-site unless you have checked with applicable local and state authorities and have received approval to do so.
 - Some municipal solid waste landfills will accept dead animals if they can be covered immediately with three feet of other solid waste or at least two feet of soil.
 - Composting is routinely done in the poultry and swine industries and is being adopted by feedyard/backgrounding operations to economically dispose of mortalities.
 - Under no circumstances should mortalities be disposed of by dumping in a creek, on a county road, abandoned hand-dug wells, or other areas where water and air quality might be jeopardized.

CHAPTER 9. WORKER SAFETY

The Occupational Safety and Health Administration (OSHA) requires that all employees be made aware of any hazardous chemicals to which they may be exposed. Managers must be sure that a Material Safety Data Sheet (MSDS), which contains information such as the proper use of each chemical, must be on file and readily accessible to all interested employees. Maintain a safe work environment through the use of personal protective equipment (PPE) and through the implementation of safety practices when using equipment, handling cattle, handling animal health products, and around potentially hazardous areas.

Respirator

- » Inform all employees that poorly ventilated areas such as pits, grain bins, silos, etc. may contain toxic fumes.
 - » Inform all employees that exposure to toxic fumes can also occur when working with chemicals, such as pesticides.
 - » Inform all employees that handling dusty and moldy feed can expose workers to inhalation of particles that can be detrimental to the respiratory system causing short-term sickness or long-term disease.
- » Train all employees on how to safely work in poorly ventilated areas.
 - » Ventilate working areas where grains, manure, etc. are stored before employees enter these areas.
 - » Provide proper respiratory protection gear (such as respirators) to all employees if their entry into poorly ventilated areas is necessary prior to adequate ventilation.
 - » Ensure individuals wear dust masks or respirators when continuous or frequent exposure to molds and feed dusts, or chemical fumes, are incurred.



Gloves

- » Wear plastic gloves at all times when handling medications, insecticides, or when in contact with animal fluids.
- » Thoroughly wash hands with soap and water after handling animal health products. Lather then scrub hands for 20 seconds. Rinse under clean, warm water.
- » During an injection:
 - Beware of fingers and hands locations.
 - Stay focused and attentive.
 - Report accidental injections immediately.
 - Seek medical help immediately if accidental injection occurs.

Clothing

- » Remove contaminated clothing and wash affected skin as soon as possible if exposed to animal health products that can cause health problems in humans, such as anthelmintics, pesticides, or reproductive hormones.

Clipboard

- » Ensure documented safety training of all individuals. For example, how to handle excited or aggressive cattle, how to use and store animal health products, and/or how to perform animal health procedures.
- » Post emergency contact information in or near areas where animals and animal health products are handled.

CHAPTER 10. EMERGENCY ACTION PLANNING

Emergency action plans are critical for an operation's ability to address a variety of infrequent but often dangerous situations. Emergency action plans should be available at critical access points where you, your crew, or others can find and use it to contact help. For example, a copy should be in the office and where employees are frequently working. A copy should also be available in remote locations and in the glove compartment of vehicles. Review your action plan with your crew on a regular basis and update it when changes are required. Emergency action plans should contain:

- » Premise Name
 - » Premise ID Number (PIN)
 - » Owner Name and/or Operator Name
 - » Farm Services (FSA) Number
 - » GPS coordinates
 - » Site physical address (911 address)
 - » Directions to the site from nearest town(s)
- » Important telephone numbers
 - 9-1-1
 - Operation owner
 - Herd Manager
 - Cattle Handlers
 - Veterinarian
 - Local Doctor's Office
 - Local Emergency Room
 - Local Poison Control
 - Fire Department(s)
 - Local Police Department(s)
 - State Police
 - Sheriff
 - Highway Patrol
 - Electric Company
 - Water Company
 - Natural Gas Company
 - Telecommunications/Internet
- Operations may choose to add information such as a site map/layout of the operation

and a diagram that shows where equipment, controls, and potentially hazardous items such as medicines, chemicals, and fuel are located.

These details will be valuable to emergency response teams.

TRANSPORTATION EMERGENCIES

- » Engage all employees that transport livestock in the BQAT Program; they can participate online at the **BQA website** or through an in-person program.
- » Encourage local first responders to participate in the Bovine Emergency Response Plan (BERP).
- » Consider conducting a mock emergency to practice the chain of phone calls or practice responding to a stranded trailer loaded with cattle.
- » Consider who will administer euthanasia and how if it becomes necessary due to a transportation emergency.





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