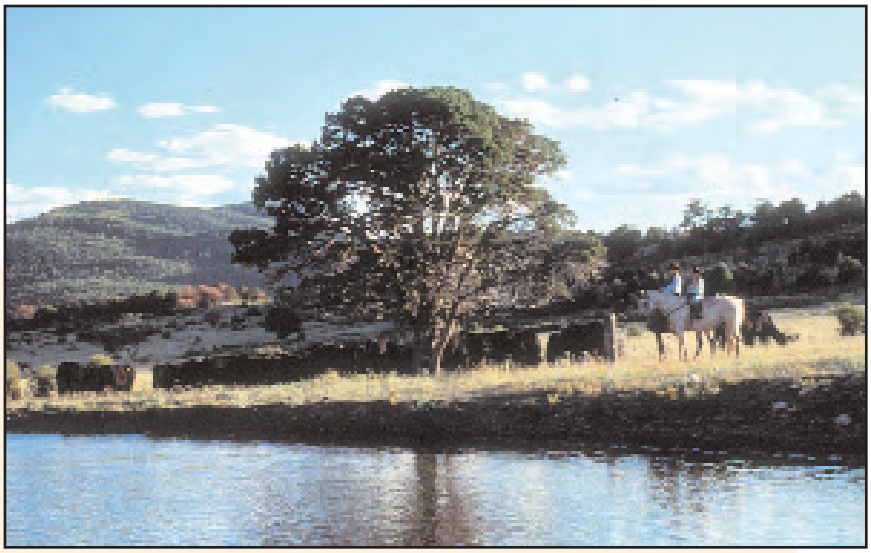
ENVIRONMENTAL QUALITY CONTROL POINTS



Beef cattle production in Texas depends upon our state's bountiful natural resources. Caring for these resources ensures that cattle production is ecologically and socially sustainable. Natural resources must be monitored to learn whether or not current management needs to be adjusted.

Information collected from natural resource monitoring will usually identify problems before damage occurs and put in place preventative measures. Monitoring information may also confirm that current management practices are appropriate. That information can then be used to defend current management when questioned by critics.

The most important resources for ranchers to manage are vegetation, streambanks/riparian areas and water quality. Each of these areas has specific environmental control points that can be managed and monitored.

Process	Control Point	Potential Environmental Concerns
Forage management	**Stocking rate**	**Deteriorating range/pasture** **Riparian areas** **Water quality** **Air quality** **Soil erosion**
Soil fertility	**Fertilizer application** **Animal waste application**	**Water quality** **Transfer of disease**
Pasture chemical use	**Herbicide application** **Pesticide application** **Container disposal**	**Water quality** **Soil contamination**
Disposal of dead animals	**Composting** **Burial** **Burning**	**Water quality** **Air quality** **Transfer of disease**

Management Approaches for Environmental Control Points

Environmental concerns fall under these five areas:

1. *Forage management*
   a. Stocking rate
      i. Forage conservation
      ii. Water quality and conservation
      iii. Soil conservation/erosion
   b. Grazing management
2. *Soil fertility*
3. *Pesticide use*
   a) Safe application of pesticides
   b) Safe storage of pesticides
   c) Safe disposal of pesticides and containers
4. *Water Quality*
5. *Dead animal disposal*

Forage Management

Photo by Russell Graves

Livestock have been produced for centuries around the world. This fact alone demonstrates that livestock *can* be produced in an environmentally sound – and sustainable – manner. Both rangeland and introduced pastures are utilized in livestock production systems.

Management strategies are generally different between the two systems due to environment, soil type, relief and the fact that fertilizer is a common input associated with introduced forage production systems. Rangelands are natural systems managed by ecological principles, while pastures (which can be made up of native or introduced forages), are usually managed according to agronomic principles with cultural inputs.

While abuses have occurred in the past that degraded both forage and soil resources, current *Best Management Practices* seek to optimize livestock production in a manner that protects and/or enhances the environment.

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.

Roots also act as binding agents that reduce the potential for soil detachment. Properly stocked rangeland and properly stocked and/or fertilized introduced forage pastures contain higher root number, which help maintain or enhance site integrity. Thus, a vigorous stand of permanent ground cover stabilizes and maintains site integrity and improves air quality.

The following brief discussion illustrates those aspects of forage management and production that *can* have the greatest negative impact on the environment, as well as *Best Management Practices* for minimizing those impacts.

Animal Unit Equivalency Table

Kind and class of livestock	Approximate animal unit equivalent*
Cow (1,000-lb) with calf	1.0
Dry cow (1,000-lb)	0.77
Heifer (600- to 900-lb)	0.6 - 0.8
Bull (1,500-lb)	0.7 - 0.9
	1.1
Horse (800-lb. yearling)	0.75
Horse (1,000-lb 2-yr.-old)	1.0
Horse (1,100-lb 3-yr.-old and older)	1.25
Ewe (130-lb)	0.20
Weaned lamb (75-lb)	0.12
Ram (175-lb)	0.25
Nanny (70-lb)	0.17
Weaned kid (35-lb)	0.10
Billy (125-lb)	0.25
Whitetail deer	0.17
Mule deer	0.25

***Animal unit equivalents will vary significantly depending on the weight and physiological stage of the animal.**

From the Rancher's Reference Guide at www.texnat.tamu.edu.

Stocking rate

Stocking rate is defined as the relationship between the number of animals and the grazing management unit utilized over a specified time period. Stated more simply, it is the number of acres required per animal unit for the grazing season that can be sustained on a long-term basis without forage resource degradation.

A useful term in helping define stocking rates based on forage demand is the *animal unit*. 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.

Of all the aspects associated with livestock production (under the control of the manager), stocking rate is the most important. Using appropriate stocking rates for the system being managed is related to the following aspects of environmental quality.

Forage conservation

Too heavy a stocking rate places excessive grazing pressure on forage resources. On either rangeland or introduced forage pastures, heavy grazing pressure of desirable plants reduces animal performance; but more importantly, it decreases forage plant vigor.

A reduction in plant vigor reduces desirable plant frequency and abundance. Plant species composition shifts as an invasion of less desirable or undesirable species occurs. This species composition change results in an overgrazed condition and a degradation of range condition with reduced potential for introduced forage pastures.

Under these conditions, carrying capacity is diminished, animal performance is reduced and the potential for profit is eliminated. Input costs (such as increased herbicide use and increased winter feeding costs) associated with the livestock production enterprise are increased, thus making a bad situation worse.

Generally, the level of forage harvest efficiency is higher for introduced forage pastures compared with rangeland. Therefore, stocking rates *can* be higher for introduced forage pastures – if adequate moisture is received during the growing season and appropriate levels of fertilizer are used.

***Stocking Rate*: the number of acres required per animal unit for the grazing season that can be sustained on a long-term basis without forage resource degradation.**

Water quality and conservation

As a result of overstocking, earlier seral stage plant species (weeds) that increase in abundance generally do not provide adequate ground cover. 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.

On overstocked sites, there is little forage to impede runoff of precipitation. Subsequently, much of the precipitation is lost from the site, thus reducing forage production potential. Overstocked pastures can also experience soil compaction of more clay-type soils. This can lead to further reduction in infiltration rates and increased runoff.

Sediment production from overstocked pastures decreases water quality and reduces the capacity of surface water storage reservoirs. The use of proper stocking rates on rangeland and the use of appropriate stocking and fertility programs in introduced forage pastures helps to maintain adequate, permanent ground cover and reduces erosion potential, which thereby serves to maintain water quality and reservoir capacity.

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Soil conservation

Loss of topsoil, either as a result of rain or wind, is known as erosion. Bare soil exposed to raindrop impact (splash) dislodges topsoil particles, which are lost from the site as sediment trapped in the runoff. In other words, the more bare soil you have, the larger the impact of the "splash" and the more erosion your land will experience.

Likewise, bare soil exposed to wind reduces air quality as soil particles are detached and transported away by wind currents. Topsoil forms at extremely slow rates, often requiring hundreds of years. Thus, the loss of topsoil due to erosion can affect site productivity for several generations. Besides loss of topsoil itself, important soil nutrients, such as nitrogen, phosphorus and potassium, are also removed.

Grazing management

Profitable beef cattle ranches in Texas depend upon healthy, productive, grazing lands. Well-managed grazing is compatible with a healthy environment; but improper grazing can increase soil erosion, encourage weeds, degrade water quality and decrease plant yield and diversity.

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).

Every grazing land situation is unique, so every grazing management plan should be site-specific. The following guidelines are starting points for developing grazing plans that will sustain the plant and water resources of Texas.

Best Management Practices – Grazing

1. More pastures and smaller pastures increase management flexibility and provide greater opportunity to control the timing, frequency and severity of grazing.
2. Sustainable levels of grass utilization depend upon when and how often grazing occurs. Rotational grazing systems allow increased utilization.

	Proper Use
Season-long grazing	40-50%
Deferred rotation	55-60%
Rest rotation	65-70%

3. An adequate stubble height (3 to 12 inches depending on forage species) at the end of the growing season is necessary to sustain most grasses.
4. Shrub utilization should not exceed 50-60% during the growing season.
5. Stubble height at the end of winter grazing should be at least 2 to 4 inches for most grasses.
6. Before allowing cattle to regraze an area, provide recovery periods of 30 to 60 days in riparian areas and 60 to 120 days on upland range.
7. Plants recover faster when more leaf area remains after grazing.
8. Grazing an area more often and for shorter periods (i.e. 3 weeks at a time or less) is preferable to fewer and longer grazing periods.
9. When environmental damage from cattle grazing occurs, it is often a result of poor cattle distribution or too many animals.
10. Prevent cattle from congregating near surface water. Fencing, alternative water sources, supplemental feeding and salt and mineral placement can promote dispersion of cattle away from water sources.
11. Use cattle accustomed to the grazing land environment. For example, cattle raised on flat, open grasslands often do not disperse well when relocated to steep or timbered grazing land.

Every grazing land situation is unique, so every grazing management plan should be site-specific.

Soil Fertility

Many forage species used in livestock production systems are introduced from other parts of the world and have been selected for improvements in dry matter production, tolerance to grazing, cold tolerance, drought tolerance, insect and/or disease tolerance, etc.

Generally, these introduced forage species offer these improved characteristics only when fertilized appropriately. Fertilizers can be expensive production system inputs and can prove to be water pollutants if not applied appropriately.

Best Management Practices – Soil fertility

1. Use soil testing to determine the level of nutrients required for the optimum production of the target forage species.

2. Apply fertilizer materials based **only** on soil test recommendations. The use of soil testing to determine fertilizer requirements reduces the potential for both soil and surface water contamination due to over-application of fertilizer nutrients. Animal wastes, such as poultry litter or manure, have been shown to be effective fertilizers. Many of the same concerns relating to nutrient overload and potential effects on water quality apply when using manure, as well as commercial fertilizers. Soil testing and fertilizing according to recommendations is critical when using animal waste as fertilizer. (Also, spreading raw manure on pastures can create potential sources of cattle disease problems.)

3. Routinely record all applications (rate and nutrient composition) of fertilizer, regardless of source, and the area to which it was applied.

Pesticide Use

An Integrated Pest Management (IPM) approach seeks to use routine management practices to minimize the use of pesticides on a regular basis. These routine strategies include:

- The use of an appropriate stocking rate for the grazing management unit. This minimizes the number of unwanted weed species in the pasture environment and, thus, the routine application of herbicides.
- The use of relevant grazing systems that allow for biological control of unwanted, but palatable and nutritious, weed species. This again minimizes the routine application of herbicides.
- The use of appropriate fertility programs on introduced forage pastures. This encourages the growth and vigor of desirable forage species that can challenge less desirable weed species.

- The use of prescribed burning programs. Prescribed fire can safely and efficiently reduce competition from many weed species, especially those that are woody in nature.
- Close adherence to label directions. When pesticides are required, *Best Management Practices* include following label directions carefully to optimize target species control and eliminate negative effects to the environment.

To use pesticides in a manner not consistent with label directions is a violation of state and federal laws.

Best Management Practices – Pesticide Storage and Disposal

1. Don't stockpile.

2. Always store pesticides in their original containers.

3. Store pesticides out of reach of children and pets.

4. When disposing of pesticides, check with your local landfill, solid waste management authority, local health department or the Texas Department of Agriculture to find out whether your community has a hazardous waste collection program for getting rid of unwanted pesticides.

5. If you have any doubt about proper pesticide use and disposal, contact the Texas Department of Agriculture at 800-835-5832.

6. Water that is used to rinse pesticide containers should never be dumped on the ground or down a drain. It must be added to the sprayer tank and used on the site for which the pesticide is labeled.

7. Do not pour leftover pesticides down the sink, into the toilet, or down a sewer or street drain. 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.

Steps for triple rinsing 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% 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. Let the container drain into the sprayer tank for 30 seconds or more.
5. Repeat steps 2-4 two more times.
6. Put the cap or lid back on the pesticide container and dispose of the container according to label directions.
7. Do not use empty containers to store any other liquids.

Water Quality

Water quality can be thought of in three categories: biological, physical and chemical.

- *Biological* – bacteria, viruses, protozoa and eggs of worms.
- *Physical* – color, turbidity, sediment, temperature, odor, algae (blue-green can produce toxic effects).
- *Chemical* – pH, total dissolved solids (TDS), nitrates/nitrites, phosphates, sodium, sulphates.

If high levels of total dissolved solids are detected, use elemental scans to determine which salts are the potential problems.

Best Management Practices – Water Quality

1. Develop water sources using gravity, solar, wind or electric power to prevent cattle from watering in streams.
2. Limit cattle access to streams and sensitive riparian areas. Fence critical management areas, either with temporary or permanent fence. Electric fence works well.
3. Provide vegetative filter/buffer strips between corrals and streams. Width of the strip is dependent on soil type and slope.
4. Install runoff diversions above livestock holding areas or corrals to keep up-slope runoff from mixing with runoff from corrals.
5. Install dikes and/or sediment ponds below livestock holding areas or corrals and streams.
6. Seal all old and abandoned wells and protect active wells from being a source of contamination to groundwater.
7. Portable windbreaks will draw animals out of riparian areas and are especially good in winter.

Dead Animal Disposal

The disappearance of rendering plants in rural areas is a concern and has become a national trend in recent years. It is estimated that fees for dead livestock removal range from $20 to $150 dollars per animal. High disposal prices, combined with the disappearance of rendering plants, have resulted in some producers improperly burying or simply dumping the carcass into wooded areas, creeks or other inconspicuous areas.

These practices have created concerns about:

- Solid waste management
- Water quality
- Air quality
- Public sensitivity
- Sources of animal disease

For livestock, several options for carcass disposal are available, including burial, incineration, and composting. Incineration of large animals requires special facilities, which may be impractical for cow-calf and stocker producers.

Researchers are studying the feasibility of on-site composting of carcasses as a means of environmentally sound disposal. Composting is routinely done in the poultry and swine industries and is being adopted by feedlot/backgrounding operations to economically dispose of deads.

Guidelines are available to aid producers in developing composting facilities. Other options, such as cooking carcasses for animal feed (done in swine and poultry industry), are not an option with cattle because of the ban on feeding ruminant-derived proteins back to ruminants (See Ruminant Ban Fact Sheet in the Appendix, page 121).

Disposal of dead animals is not a major concern for cow-calf producers, who usually deal with minimal numbers of dead livestock. However, for larger backgrounding and stocker operations, timely disposal of deads becomes an environmental concern.

On-site burial of carcasses may be the best disposal option for cow-calf producers currently available. However, regardless of the size of your operation, no dead animal is to be buried on-site unless there is a disposal facility permitted by TNRCC. (For more information on relevant state laws and regulations, contact TNRCC at 512-239-6774.)

Some municipal solid waste landfills will accept dead animals provided that they can be covered immediately with 3 feet of other solid waste or at least 2 feet of soil. Producers should contact the local waste disposal facility to determine if carcasses are accepted.

Best Management Practice — Dead Animal Disposal

1. Under no circumstances should dead animals 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.

Beef Quality Assurance is Everyone's Job