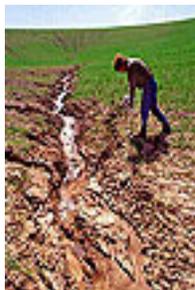


ENVIRONMENTAL ASSESSMENT: GRAZING MANAGEMENT

Environmental Benefits of Pasture

The environmental benefits of well-managed pasture include

- reduced soil erosion,
- improved air and water quality,
- better plant diversity, vigor, and production, and
- improved fish and wildlife habitat.



Inadequate cover and erosion
Photo courtesy of ARS
NRCS



Eroded stream due to unlimited access
Photo courtesy of USDA NRCS



Path to maintain bank
Photo courtesy of USDA

Improving grazing management will result in more grass cover and improved soil structure that will allow a higher percentage of the rainfall to infiltrate the soil, where it can be used for plant growth, rather than running off resulting in soil erosion and sedimentation problems. The ecological processes, including decomposition of manure and increase in a highly managed pasture. Nutrients can then be recycled several times during the growing season. The overall soil quality improves with improved grazing management.

Water Quality Improves with Pasture Quality

Water quality improves as the pasture vegetation becomes denser and the soil conditions improve. A university study showed that pastures are the best "crop" for reducing runoff, erosion, and phosphorus pollution over any other land use. A similar study done by USDA at Coshocton, Ohio, revealed that both surface and ground water in the pastured watershed was as good as, or better than, water leaving the adjacent wooded watershed. Pasture soils are a terrific biological filter to recover nutrients passing through the soil. Grass roots are active nearly year-round and thus can recover nutrients efficiently from pasture soils that can leach from other land uses.

Grazing Management Systems

Management of the leaf area is important to sustain the plant's persistence and future growth. The plant after being grazed must have enough leaf area to intercept sunlight for photosynthesis. The potential yield of a pasture is based on the amount of leaf area available for light interception. These leaves have a life span of about 30 to 60 days. Older leaves do not utilize the sunlight as well as younger leaves. This is one reason why under grazed or unmowed pastures decline. To manage a pasture well it is necessary to graze off half of the leaves to improve light penetration, which will encourage new leaf growth and keep the plant actively growing in a vegetative stage.

Set Stocked Grazing

Set stocked or continuous grazing is a system where the animals are maintained on a single pasture during the grazing season. This system allows the animals to selectively graze, unless the stocking rate is too high. If the animal numbers or the pasture size is not adjusted as pasture conditions change, this system will lead to some plants being overgrazed and others under grazed. Loss of desirable forage species, the invasion of weeds, erosion, and the uniform distribution of manure by the grazing animals are the management concerns.

Rotational Grazing

Rotational grazing systems have multiple pastures. An example would be a four-pasture system in which the animals graze a pasture for 7 to 10 days then are rotated to the next pasture. This system does allow for some rest period during the growing season for the plants. The actual length of the grazing time and rest periods depend on the size of the herd and the pasture and the weather. The pasture plants benefit from the rest with more growth and vigor, and animals gain from a more stable and nutritious forage supply. Manure is spread more uniformly by the grazing animals than in a continuous grazing system.

A well planned and operated grazing system:

- improves the vegetative cover, reducing erosion and improving water quality
- increases harvest efficiency, forage utilization and helps ensure adequate forage throughout the grazing season
- increases forage quality and production, which helps increase feed efficiency and can improve profits
- rotating also evenly distributes manure nutrients.

Management-Intensive Grazing

Management-intensive grazing differs from conventional grazing systems in that livestock are moved frequently among pasture divisions called paddocks or cells. The animals are moved based on forage quality and quantity and livestock nutritional needs. This system provides a rest or recovery period for the growing plant and the soil. This system does not need to be a labor-intensive system, but it is a management-intensive system. The frequency, intensity, timing, and duration of grazing events, as well as the livestock stocking rate and the class of animals, will affect the ecosystem and the land management.

Best Management Practices

Access Roads

Livestock lanes or access roads can aid in livestock movement or the transportation of livestock feed. Access roads that are properly planned will allow for livestock and vehicle movement. Livestock can be moved from paddock to paddock with lanes much easier than by moving through paddocks. Livestock will tend to stop moving when they enter a new paddock and start to graze even though you may want them to move on to a different paddock. Grassed lanes can be grazed with adjacent paddock. The locations of lanes should avoid potential erosion, concentrated water flow, wet areas, and flooding. Avoid placing lanes up and down hills in wetlands or on organic soils. Stabilized lanes can be prepared for heavy traffic areas, areas subject to erosion, or unstable areas with geotextile fabric, a suitable subgrade material, and fine material on top to protect the animals' hooves.

Stream Crossings



Fenced crossing area
Photo courtesy of ARS NRCS

A stream crossing will control animal and vehicles crossing the stream. It can also be used to control access point for livestock watering. Pastures with streams have areas where the animals have chosen spots to cross the stream. These areas are usually the best locations to construct the stream crossing. The animals choose these areas because of stable footing and ease of crossing. Improving the existing crossing with the livestock's needs in mind will encourage the livestock use. Livestock avoid soft, muddy, and rocky streambeds. They prefer a firm gravel bottom to walk on. They need to be able to see the bottom in order to use the area as a water source.

The primary component of a stream crossing is a heavy layer of gravel thick enough to support the animals. The size of the gravel affects how long the cattle spend in the crossing. Aggregate with about 1.50 inch diameter is large enough (that is, uncomfortable enough) to keep the animals from loitering but small enough to allow the animals access. The flow of the stream has to slow enough not to wash the aggregate away. Geotextile material can be used in streams with unstable streambeds. Stream crossings should be at least 10 feet wide. The ramps entering and exiting the channel should not be steeper than 4:1 slope (rise:run).

Livestock Stream Exclusion

One area of concern in grazing management is the impact of pasture management on streams within the pasture. Streams with continuously stocked and overgrazed pastures often have little vegetation on the banks and are wide, shallow, and muddy. These types of pastures have an erosion concern and nutrient run off into the stream. Complete exclusion of the livestock from the stream seems to be the solution, but the winding nature of many of the streams, flood damage to the fence, and the need for livestock water make complete exclusion impractical.

There are other alternatives to fencing livestock out of streams. These include rotational and management-intensive grazing systems that provide alternative water sources. Wisconsin studies have shown that rotational grazing systems can be an alternative to grassy buffer strips in regard to bank stability and in-stream habitat. Virginia Tech research concluded that the presence of an off-stream water source for grazing cattle reduced the time cattle spent near the stream. Cattle given a choice will drink from a spring-fed water trough 92% of the time compared to drinking from a stream. Providing an alternative source of good clean water in a trough and adequate forage will reduce stream bank erosion, sediment and sediment-bound pollutants, including nitrogen, phosphorus, and fecal bacteria.

Coshocton Ohio Research on Stream Exclusion

Ohio has a research station where agriculture practices can be studied for their impact on soil erosion, surface water, and groundwater quality. There is a greater infiltration of rainfall in pastures than in the wooded areas. When a fence is added to exclude livestock from the stream and water is provided from a trough, annual soil loss from the pasture was reduced from 70.4 tons on the 64 acres (1.1 tons per acre) to 38.4 tons (.6 tons per acre). This pasture includes slopes from 2% to 35% on soils that are predominantly silt-loam.

Livestock Use Area Protection

These are protected areas that are paved with asphalt or concrete or constructed with, and surfaced with, aggregate. These areas are designed to protect the pasture, soil, and water quality from being abused. Pastures can be pugged, or trampled, by the grazing animals

during the spring or other extended wet periods. This trampling can lead to plant death or thinning of the stand. The resulting mud can reduce animal performance. Mud 4 to 8 inches deep will reduce gain by 14% and mud 8 to 24 inches deep will reduce gain by 25%. The damaged pastures are susceptible to soil erosion. Run off from damaged pastures can degrade surface waters with sediment and manure. Excessive soil compaction will reduce rain infiltration and plant growth.

Livestock heavy use areas or pads should be located outside the flood plains. If the pad is located close to a watercourse, run off and manure from the pad should be managed to protect the stream from pollution. These areas should be located at least 300 feet away from neighboring residences and away from wells. A manure management system should be designed to handle any accumulated manure on the pad.

Winter Feeding Options

Winter feed costs are the largest single expense in most livestock grazing production systems. Extending the grazing to reduce the cost of feeding stored feed will greatly increase profits. Labor can be reduced 25% or more. Rotational grazing takes about three hours per acre per year as opposed to hay production, which takes seven hours per acre per year. The cost for grazing a cow per day is \$.25 compared to \$1.00 per day to feed hay to a cow.

The first step is to evaluate the potential, available, existing feed. Crop residue is the least expensive and most abundant winter feed. Corn, soybean, and small grain residue and small grain and hay aftermath can all be utilized. Corn stalks can maintain a spring calving cow in good body condition for about 60 days after corn harvest. The feed value will decline quickly after the 60-day period. Cattle will select and eat grain, then husks and leaves, and last cobs and stalks. Strip grazing increases utilization, rations the feed, and reduces the need for supplementation. The crop fields should be grazed so that adequate residue remains soil erosion control. The summer growth after harvest of small grain fields and fall growth of hay fields can be utilized in a winter grazing system.

After crop residues, stockpiled grasses are the least expensive feed option. Stockpiled perennial grasses can be grazed in the late fall/early winter. The general recommendation is to clip or make hay in the field during the end of July, and apply 30 to 50 pounds of nitrogen per acre. High-producing, clean, well-drained fescue and orchard grass meadows would be a good choice. Let the forage grow until you need it. Strip grazing will increase utilization.

Winter annual forage crops can be used to provide grazing. They have a higher cost of production because there is seed, fertilizing, and planting cost associated with growing the crop. Winter cereal rye is the most winter-hardy and will produce the most dry matter production with both fall and spring growth. Oats will generally winter-kill but will provide the highest yield in the fall with excellent quality and palatability even after killed.

Brassicas are easy to establish, fast-growing, high-yielding, and high-quality and can withstand cold temperatures. Turnips can reach maximum quality in as little as 60 days. The tops can tolerate temperatures down to 20 degrees and the bulbs down to 10 degrees. Cows and sheep will eat both the tops and bulbs.

Grazing and presetting round bales prior to feeding can reduce trampling and extend the grazing season. Setting rounds 20 feet on center in the fall when the weather is fit and moving a temporary electric fence to feed them reduces winter feeding time. Hay should be fed away from drainage ways and near livestock watering sources. Feeding hay in low fertility areas will improve the fertility and future pasture quality.

Site Selection for Winter Feeding Areas

Care needs to be taken when deciding which areas of the farm are to be utilized as winter pastures or feeding areas. Soil erosion, damage to plants, soil compaction, excessive buildup of nutrients in the soil, and poor animal performance or health are all potential problems if outdoor winter feeding is poorly planned.

There are several factors that need to be considered when deciding if outdoor wintering will work on your farm. These factors should also be considered when choosing the best location on the farm to winter the livestock. These include:

- your goals as a producer
- basic needs of the livestock
- topography of the farm
- soil characteristics on the farm
- aspect (orientation to the sun)
- environmental sensitivity of the area
- aesthetics
- feeding and handling methods to be used

Your Goals as a Producer

What goals have you set for your winter feeding program? For example, are you trying to maximize daily gain on growing steers or lambs, or are you simply trying to maintain body weight on non-lactating beef cows or ewes? Outdoor wintering is simply not realistic for all producers or for all farms. In general, outdoor wintering is much better suited for animals that are already in relatively good body condition. For example, gestating ewes or beef cows can easily have their physical requirements met through a well-planned outdoor feeding program. Outdoor wintering is generally less successful when the goal is to put body condition on thin livestock or to maximize daily gain on growing stock. These animals see the most benefit from a more sheltered environment.

Basic Needs of the Livestock

Throughout this LEAP program we have focused on environmental stewardship. However, it is also essential that the basic needs of the animals be met. Basic needs such as access to water, adequate feed, shelter from high winds, and relatively dry soil conditions are all critical when selecting the area where the livestock will be placed. If any of these basic needs cannot be met, the outdoor wintering system will not succeed, regardless of how well it protects the environment.

Topography

Topography is important for three major reasons: drainage, risk of erosion, and protection from high winds.

In general, higher ground drains best. However, high ridge tops are prone to experience high winds and should generally be avoided unless a tree line or windbreak is available. Look for natural land features (such as knolls) that can be excellent locations for practices such as heavy-use pads. These slightly elevated areas provide positive drainage and are naturally protected from surface water flow from adjoining areas. Low-lying areas should also be avoided.

Gentle to moderately sloping sites are ideal in most cases. Extremely flat sites often experience problems with ponding of surface water and excessive soil compaction. Extremely steep sites are more likely to experience rapid run off and can be subject to erosion.

Take advantage of the topography of the area surrounding the feeding area as well. Large hills on the north or west side of the wintering area can be a valuable tool that can help shield livestock from high winds and improve animal performance.

Soil Characteristics

Soils vary greatly in their ability to drain water, support weight, and hold nutrients. Before selecting your livestock wintering area, it is essential that you know the characteristics of the soils on your farm. Depending upon the county you live in, the soil survey data will be available either through published soil survey books or through an electronic format. Please check with your local Soil & Water Conservation District (SWCD) to access this information. This information is available free of charge, and staff at the local SWCD office are available to help you. Once you have obtained the soil survey for your county, here is a step-by-step procedure for identifying the soil on your property and determining its strengths and limitations.

Start by locating your farm on the aerial photos in the soil survey. A soil survey report has on its inside front cover a section entitled "How To Use This Soil Survey." This helps you find your property or other tract of interest on the photo-based soil maps and directs you to other places in the report to gain understanding of the occurrence and nature of soils found there. One page that you will refer to repeatedly is the Index to Map

Sheets, a fold-out page that usually follows the General Soil Map but precedes the photo-based maps.

On the photo-based maps, you will notice that there are many sorts of map symbols employed to identify landscape features, including streams, roads, boundaries of soil delineations, soil map unit symbols (one in each delineation), section corners and numbers, and a variety of spot symbols representing small but significant features such as sinkholes, sandy spots, wet spots, rock outcrops, and so forth. In addition, around the borders of the individual maps there are map scales, township and range numbers, and other information. These symbols and other information are described and defined on the fold-out Index to Map Sheets page and/or on its reverse, which contains the Soil Legend and the Conventional and Special Symbols Legend.

Aspect

Ideally, outdoor winter feeding areas should have southern or southeastern exposure to the sun. Sunlight helps to reduce soil moisture, increase soil temperature, and improve animal comfort. Avoid areas with obstructions to the south, such as trees, hills, or buildings that could block sunlight. Shaded area will tend to be colder and slow to dry after rain or snowfall events.

Environmental Sensitivity of the Area

On a given farm, there can be a wide array of environmentally sensitive areas. These may include areas such as stream corridors, springs or seeps, subsurface drainage tiles, ditches, wellheads, etc. Care should be taken to insure that animal waste is not allowed to accumulate in and around these sensitive areas. The following are recommendations for minimum setbacks for an animal feeding operation as set forth by the USDA Natural Resources Conservation Service Field Office Technical Guide (FOTG):

Wells and Springs	100 feet
Waters of the State (streams and water courses)	100 feet
Public wells	1,000 feet

Manure nutrients can accumulate rapidly in winter feeding areas. This is especially true if the same area is used each year. Areas in and around the winter feeding area should be soil-tested annually to monitor the soil fertility level.

Aesthetics

Non-farm neighbors may not understand your goals and why you have chosen outdoor wintering. Keep in mind that their opinion of your environmental ethic will be greatly influenced by what they see. If they see mud in a pasture they may perceive that there is an environmental problem. If they see manure accumulating on an outdoor feeding pad, they may perceive that the environment is being affected, whether it really is or not.

When all other factors are equal, choose winter feeding locations that are well away from adjoining property lines and public roads. When this is not possible, try to take advantage of visual barriers such as trees or existing building that may help to shield the feeding area from public view. Remember, your goal is to achieve environmental stewardship as well as your production goals. Shielding the area from the public can help prevent unwarranted complaints, but it does not mean that the area can be mismanaged.

Feeding Method

There are a wide variety of methods that can be used for supplying winter feed. The method that you choose will certainly influence the location you choose. For example, if you choose to bring round bales of hay to the pasture on a daily basis, you will need to consider the distance to be traveled and the damage that the tractor may do between the hay storage area and the feeding area. Techniques such as stockpiling forage and placing bales in the field before wet weather begins can substantially reduce the risk of damage from equipment travel.

Do you currently feed your livestock outdoors during the winter? If so, stop and think about your current winter feeding program. What is the biggest environmental problem with your current system? Is it erosion and compaction done by your livestock or erosion and compaction created by your tractor or other bale-handling equipment? For many producers, the answer is the heavy equipment travel.

Outdoor wintering can be a tremendous cost-saving tool, but the environmental risks must carefully considered. Time taken to properly locate the outdoor winter feeding area is time well spent. If you need further assistance in identifying or evaluating potential wintering areas, please contact your local SWCD or your local OSU Extension office for additional guidance.

Water Quality Risk Assessment

The following checklist will help you assess the potential for water quality problems in surface and groundwater on or adjacent to the farm. This checklist was adapted from a similar tool developed by the Florida Cattlemen's Association with funding from United States Environmental Protection Agency. By answering the questions in the checklist, you can identify sources of potential problems, and prioritize areas where action is needed.

Rate the following conditions in your pastures from 1 (low) to 5 (high):

I. Soil Erosion		SCORE
A.	Is there soil erosion or bare areas, due to livestock having access to stream banks?	
	1 <20% of banks have erosion or denuded/bare areas	1
	2 <40% of banks have erosion or denuded/bare areas	2
	3 <60% of banks have erosion or denuded/bare areas	3
	4 <80% of banks have erosion or denuded/bare areas	4
	5 almost all banks have erosion or denuded/bare areas	5
	YOUR SCORE:	
B.	Is there soil erosion from roads that runs into nearby wetlands, lakes or streams?	
	1 Never	1
	2 Only following very large storms (> 2 inches of rain)	2
	3 Usually some erosion following minor storms (> 1 inch of rain)	3
	4 Usually some erosion (plume of sediment) every time it rains	4
	5 Observable delta of sediment into nearby water bodies	5
	YOUR SCORE:	
C.	Have you observed muddy water leaving your property following a storm event?	
	1 Never	1
	2 Only following very large storms (> 2 inches of rain)	2
	3 Usually some turbidity following minor storms (> 1 inch of rain)	3
	4 Usually some turbidity every time it rains	4
	5 Water is always a little turbid, even when it doesn't rain	5
	YOUR SCORE:	
D.	Is there soil erosion and/or bare areas present at discharge site?	
	1 No soil erosion or denuded areas present	1
	2 <20% soil erosion or denuded areas present	2
	3 20-40% soil erosion or denuded areas present	3
	4 >40% erosion or denuded areas present	4
	YOUR SCORE:	
E.	Have excess vegetation and sediment been removed from drainage ditches?	
	0 N/A No drainage ditches	0
	1 Both vegetation and sediment mechanically removed within 5 years	1
	3 Herbicide applied to vegetation and no sediment removed	2
	5 No maintenance of vegetation or sediment with in 5 years	5
	YOUR SCORE:	

Soil Erosion (Average of all Erosion Scores) _____

If your score averages 2 or less in any category, keep up the good work in that category. If your score averages greater than 2 in any category, you may have a problem which could lead to a violation of water quality standards and should be investigated further.

<u>II. Nutrients</u>		SCORE
A.	Soil and Forage Analysis	
	0 N/A No fertilization practices used	0
	1 Soil analysis is used for pH	1
	1 Soil and/or forage analysis is used as an indicator of plant nutritional needs	1
	5 University or government recommendations not used to determine plant needs	5
	YOUR SCORE:	
B.	Nitrogen fertilization rates are based on:	
	0 No nitrogen fertilizer used	0
	1 Plant needs or university/government recommendations	1
	3 Plant needs, but sometimes extra is applied to guarantee forage quality and quantity	3
	5 No analysis taken	5
	YOUR SCORE:	
C.	Phosphorus fertilization rates are based on:	
	0 No Phosphorus fertilization used	0
	1 Plant needs or university/government recommendations	1
	3 Plant needs, but sometimes extra is applied to guarantee forage quality and quantity	3
	5 No analysis taken	5
	YOUR SCORE:	
D.	Manure Management	
	1 Livestock waste is spread evenly in the pasture by grazing cattle	1
	2 Livestock waste is spread mostly evenly in the pasture by grazing cattle	2
	4 Livestock waste is spread poorly in the pasture by grazing cattle	4
	5 Livestock waste is concentrated in small areas of the pasture such as around supplemental feeding sites and shade near water bodies and ditches	5
	YOUR SCORE:	
E.	Overall nutrient management	
	0 If No fertilization is added	0
	1 Nutrients contributed from organic matter, legumes, and manure are always considered when determining fertilization rates needed to meet plant needs	1
	3 Nutrients contributed from organic matter, legumes, and manure are sometimes considered when determining fertilization rates needed to meet plant needs	3
	5 Nutrients contributed from organic matter, legumes, and manure are not considered when determining fertilization rates needed to meet plant needs	5
	YOUR SCORE:	

Nutrients (Average of all Nutrient Scores) _____

If your score averages 2 or less in any category, keep up the good work in that category. If your score averages greater than 2 in any category, you may have a problem which could lead to a violation of water quality standards and should be investigated further.

<u>III. Pasture Management</u>		Score
A.	Stocking Rates / Forage utilization	
	0 Stocking rates with abundant and forage excesses and availability	0
	1 Stocking rates forage production meeting grazing needs	1
	3 Stocking rates maybe threatening the sustain ability of forage production during the growing season	3
	5 Stocking rates severely over grazing pastures with no excess forage availability (during growing season / rainy season)	5
	YOUR SCORE:	
B.	Grazing system	
	1 Low density grazing	1
	1 Pastures are subdivided and rotational grazing is practiced	1
	5 Rotational grazing is not practiced	5
	YOUR SCORE:	
C.	Livestock distribution	
	1 Livestock are highly encouraged to move about the pasture by placement of water sources, shade and supplemental feed	1
	2 Livestock are moderately encouraged to move about the pasture by placement of water sources, shade or supplemental feed	2
	4 Livestock are somewhat encouraged to move about the pasture by placement of water sources, shade or supplemental feed	4
	5 Livestock are not encouraged to move about the pasture	5
	YOUR SCORE:	
D.	Livestock Access to Water bodies (water bodies include streams, lakes, and ponds)	
	1 Livestock do not have access to water bodies	1
	2 Livestock only have limited access to water bodies at specific points for crossing and watering, with appropriate soil erosion control measures	2
	2 Livestock have unlimited access to water bodies pasture but at low density grazing	2
	3 Livestock have unlimited access to water bodies but on a rotational grazing scheme	3
	5 Livestock have unlimited access to water bodies at high density grazing	5
	YOUR SCORE:	
E.	Denuded Areas (or bare spots)	
	1 There are no areas of the pasture that are denuded of vegetation	1
	2 The only areas denuded of vegetation are around shade, alternative water sources or supplemental feed areas that are more than 100' away from water bodies	2
	3 There are a few areas denuded of vegetation for less than 30 days that are greater than 50' from water bodies	3
	4 There are a few areas constantly denuded of vegetation that are greater than 50' from water bodies	4
	5 There are constantly denuded areas within 50' of water bodies	5

		YOUR SCORE:	
F.	Buffer Strips		
	1 There's a buffer strip 50' or more wide of good vegetation along all water bodies		1
	2 There's a buffer strip 25' wide along all water bodies		2
	3 There's a buffer strip 10' wide along all water bodies		3
	4 There's a buffer strip 5' wide along all water bodies		4
	5 There's no buffer strip along water bodies		5
		YOUR SCORE:	

Pasture Management (Average of Pasture Management Scores) _____

If your score averages 2 or less in any category, keep up the good work in that category. If your score averages greater than 2 in any category, you may have a problem which could lead to a violation of water quality standards and should be investigated further.

<u>IV. Concentrated Animal Runoff</u>		Score
A.	If you periodically keep cattle in concentrated areas, such as winter feeding, do you	
	1 Prevent all of the runoff from the concentrated area from reaching streams	1
	2 Route all of the runoff through vegetated filter strips before it gets to streams	2
	3 Collect some of the runoff in ponds or vegetated filter strips before it gets to streams	3
	5 Allow uncontrolled runoff from the concentrated area directly to streams	5
	YOUR SCORE	
B.	Are your cattle feeding areas located within 200' of a stream?	
	0 None of them are located within 200' of a stream.	0
	3 All of them are located within 200' of a stream.	3
	YOUR SCORE:	

Concentrated Animal Runoff (Average of all scores) _____

If your score averages 2 or less in any category, keep up the good work in that category. If your score averages greater than 2 in any category, you may have a problem which could lead to a violation of water quality standards and should be investigated further.

Ground Water Risk Assessment

<u>I. Potential Contamination</u>		Score
A.	Is there pesticide and fertilizer handling and mixing areas near water wells?	
	1 > 200' from a well	1
	2 within 200' to 150' from a well	2
	3 within 150' to 100' from a well	3
	5 less than 100' from a well	5
	YOUR SCORE:	
B.	Is there fueling and fuel storage areas near water wells?	
	1 > 200' from a well	1
	3 150' to 200' from a well	3
	5 less than 150' from a well	5
	YOUR SCORE:	
C.	Is there feeding areas near water wells?	
	1 > 200' from a well	1
	2 200' to 50' from a well	2
	3 50' to 25 ' from a well	3
	4 25' to 5 feet from a well	4
	5 within 5' or within the pens	5
	YOUR SCORE:	
D.	Are anti-siphon devices attached to the well system?	
	1 All discharge points have backflow preventers	1
	2 All discharge points to water troughs and potential siphoning points have backflow preventers	2
	5 no backflow preventers are on the system	5
	YOUR SCORE:	
E.	Do wells have the ability to be closed?	
	1 All wells have been properly capped, sealed or have control valves and the values are above ground level	1
	2 Wells have been properly capped, sealed or have control valves but at ground or below ground level	2
	4 Only some of the above ground wells have the ability to be closed	4
	5 No wells above or below ground have been closed.	5
	YOUR SCORE:	

Ground Water Potential Contamination (Average of all scores) _____

If your score averages 2 or less in any category, keep up the good work in that category. If your score averages greater than 2 in any category, you may have a problem which could lead to a violation of water quality standards and should be investigated further.

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