THE KENTUCKY AGRICULTURE WATER QUALITY PLAN

August 2020

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Chapter 1 Introduction

The Kentucky Agriculture Water Quality Plan is a comprehensive listing of every Best Management Practice currently approved by the Kentucky Agriculture Water Quality Authority. It is a living document, as the Authority meets regularly to discuss and approve additional BMPs to assist Kentucky's agricultural and silvicultural industry in its efforts to address environmental issues.

History

The Kentucky Agriculture Water Quality Act (KRS 224.71-100 through 224.71-145) was enacted by the 1994 General Assembly. The Act established a 15-member Agriculture Water Quality Authority (Authority) to represent Kentucky's agricultural and environmental community as they develop and support a statewide agriculture water quality plan. This plan is part of a practical, flexible, coordinated natural resources management system that protects the waters of the Commonwealth and complies with applicable government rules and regulations. It is based on pollution prevention through the use of Best Management Practices (BMPs) as the most effective, practical, and economical means of reducing and preventing water pollution. BMPs establish minimum acceptable quality levels for planning, siting, designing, installing, operating, and maintaining agriculture and silviculture facilities and operations.

Current

The Authority meets quarterly to consider Kentucky's environmental needs as they review possible BMPs. Seven committees comprised of Authority members and interested parties from other farmer and commodity groups meet throughout the year to review current and suggested practices. They discuss current agriculture and silviculture operations and their impact on the environment as they consider possible practices to include.

The following were assumed during the development of BMPs:

· Agriculture and silviculture producers are responsible citizens and good environmentalists with strong ties to the land and water in their operations.

· Agriculture and silviculture producers are primary consumers of well water for drinking and surface water for recreational activities. It is therefore in their own interest to protect the water resources in their operations.

· Kentucky supports educational programs that promote the voluntary adoption of BMPs to protect water quality.

· Agriculture and silviculture producers will consider BMPs that fit their individual circumstances each time those circumstances change.

The Authority has developed these guidelines upon which a producer can build a water quality plan. The Authority believes the success of the Statewide Agriculture Water Quality Plan will ultimately rest with the decisions each producer makes on their own land. The Authority is confident that most producers have the ability and desire to protect and enhance the water quality of Kentucky given the flexibility of a site-specific planning approach based on sound information and technology.

Agriculture Water Quality Authority Membership

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Agriculture Water Quality Authority (15 members)

Original Agriculture Water Quality Plan Committee Structure

Livestock Committee	**Crops Committee**	**Pesticide & Fertilizer Committee**	**Farmstead Committee**	**Silviculture Committee**
Keith Rogers, Chair	Adam Andrews, Chair	John Pitcock, Chair	Dr. Steve Higgins, Chair	Dr. Jeff Stringer, Chair
Example Issues:	Example Issues:	Example Issues:	Example Issues:	Example Issues:
Livestock waste	Soil erosion	Chemical storage	Solid Waste	Timber harvesting
Waste application	Pesticide application	Chemical mixing	Well protection	Logging roads
Dead animal removal	Fertilizer application	Fertilizer storage	Petroleum storage	Riparian areas
Feedlot management	Groundwater impact	Transporting	Household wastewater	Stream management zones
Woodland management	Container disposal	Stream protection	Sinkholes	

COMMITTEE MISSION

Each committee was charged with:

1. Identifying potential water pollution problems;

2. Evaluating current best management practices (BMPs) and other potential solutions to problems, based on the investigation of the best available research data; and

3. Developing a list of solutions to be presented to the Agriculture Water Quality Authority as guidance in the development of the State-wide Water Quality Plan.

Commonly Asked Questions

How was the statewide plan developed?

The Governor appointed the 15 members of the Authority in accordance with the Kentucky Agriculture Water Quality Act. The current members of the Authority are listed elsewhere in this document. To develop BMPs to meet the needs of Kentucky's agriculture and silviculture producers, the Authority formed 5 committees: Crops, Farmstead, Livestock, Pesticides and Fertilizer, and Silviculture. Two additional committees currently advise the Authority on Forestry and Monitoring. Each committee held public meetings across the state to learn the concerns, interests, and suggestions of producers and other concerned citizens. The Authority's priority was the early and continued involvement of all stakeholders (locally based agriculture and silviculture operations, landowners, farm and agriculture businesses, government representatives, environmental interest groups, agriculture commodity groups, technical resources support personnel, university research and extension personnel, etc.). Each committee also studied the laws, regulations, and technical recommendations in its field. Each committee then developed the BMPs and supporting text for its section in this statewide plan. Each BMPs was scientifically reviewed and approved by the Authority for inclusion. Additionally, the Kentucky Division of Water approved the final draft of each BMP.

Why was the statewide plan developed?

The statewide plan was developed to insure long term natural resource protection. The statewide and individual plans can be updated to take advantage of new knowledge regarding resources needs, water quality, environmental conditions, effectiveness of BMPs, and the availability of new and beneficial technology.

The statewide plan also streamlines or simplifies the process that agriculture and silviculture producers face in determining the multiple and often conflicting regulatory requirements and environmental program provisions already in existence. These include, but are not limited to:

· State groundwater regulations

· State water quality standards

· Clean Water Act

· Conservation compliance plan requirements

· U.S. Army Corps of Engineers nationwide permits

Finally, the statewide plan serves as a planning tool for agriculture and silviculture producers and will provide regulatory guidance for those who are actively implementing an approved water quality plan.

How does the statewide plan meet the needs of Kentucky's agriculture and silviculture producers and landowners?

The statewide plan will ensure adequate environmental protection for both surface and groundwater, while leaving authority for designing and implementing the individual plans vested in each agriculture operator. This approach provides maximum flexibility to agriculture operators to meet the goals of the Agriculture Water Quality Act at the lowest cost given their unique operations, resources, and site specific knowledge. Each farmer selects BMPs that apply to the specific activities and characteristics of their operation. Support for this voluntary decision making approach exists in various incentives such as technical assistance, cost share coverage for approved practices, farmers' ownership of the process, and compliance protection through the "bad actor" procedure.

Each BMP lists all pertinent regulatory requirements, the minimum requirements of the Authority, and available technical and financial assistance, as well as some design information, practice maintenance guidelines, recommendations, and other references. These resources should help agriculture and silviculture operators to protect Kentucky's water quality as easily and cost effectively as possible.

The statewide plan serves as the detailed reference book for agencies, agriculture and silviculture operators, and others when addressing agriculture and silviculture pollution issues.

Do I need an individual water quality plan?

All agriculture and silviculture operations must establish individual water quality plans complying with the statewide plan. "Agriculture operations" is defined as any farm or forestry operation on a tract of land, including all income producing improvements and farm dwellings, together with other farm buildings and structures incident to the operation and maintenance of the farm or forestry operation, situated on ten (10) contiguous areas or more of land and used for the production of livestock or livestock products, silviculture products, or crops.

How often should I update my individual water quality plan?

The Authority reviews and approves new BMPs regularly. Each time the circumstances of your agriculture or silviculture operation change, you should update your water quality plan. These changed circumstances could include, but not be limited to, adding or taking away acreage, changing crops or type of livestock, implementation of BMPs nearby, etc.

What are the benefits of a water quality plan?

Properly implemented agriculture water quality plans can protect ground and surface water, as well as producing other resources benefits, such as:

· Soil health

· Nutrient retention

· Improvements of drinking water quality

· Reduced risk to production

· Flood control

· Restoration/enhancement of wildlife habitat

· Achieving environmental responsibilities to others

· Overall improvement to the quality of life.

What if I don't have an individual water quality plan?

Failure to comply with the requirements of the Statewide Agriculture Water Quality Plan could mean the loss of financial assistance under the Kentucky Soil Erosion and Water Quality Cost Share Program. Anyone deemed a "bad actor" shall be subject to enforcement action for violations of KRS 224.71-100 to 224.71-145. Violations of KRS Chapter 224 or the Cabinet's promulgated regulations or final orders are punishable by civil penalty, injunction, or criminal conviction. The Division of Water currently carries out these duties.

This document is so long. Do I need all this for my operation?

This document includes all the approved BMPs. Each individual agriculture or silviculture operation will only need to review the BMPs that apply to them. For instance, a farmer that does not have livestock can disregard the livestock BMPs. For assistance with figuring out which BMPs are right for your operation, please refer to the online workbook.

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Chapter 2 Silviculture

Best Management Practices (BMPs) for Silviculture

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Guide for Determining Need for Silviculture Best Management Practices (BMPs)

Activity	Pollutant	Applicable BMPs (apply one or more of the following as needed to protect water quality)
Timber Harvesting	sediment	1, 2, 3, 4
	debris	3, 4, 5
Road, Skid Trail and Log Landing Construction and Management	sediment	1, 2, 3, 4
Activity in Streamside Corridors and Around Ponds and Lakes	sediment	3, *
	water temperature	3
	debris	3, 5
	pesticides**	3, 8
	fertilizers	3, 7
	animal waste	*
Activity Near Sinkholes	sediment	4
	debris	4, 5
	pesticides**	4, 8
	fertilizers	4, 7
	animal waste	*
Revegetation of Disturbed Areas	sediment	2
	fertilizers	7
Site Preparation and Forest Regeneration	sediment	6, 9
	pesticides**	8
	fertilizers	7
Forest Wetland Activity	sediment	1, 2, 3, 10
	pesticides**	9, 10
	fertilizers	7, 10
Application of Fertilizers and/or Pesticides**	fertilizers	3, 7
	pesticides**	3, 8
Woodland Grazing	sediment	*
	animal waste	*

*Refer to appropriate Livestock BMP.
**Pesticides include insecticides, herbicides, fungicides, rodenticides, nematocides, etc.

Silviculture BMP #1 Access Roads, Trails, and Landings

Revised September 3, 2015

I. Description and Definition(s):

An access road is constructed to connect timber harvesting or some other forest activity with the farm or public road system. Trails are secondary vehicle travel routes, for log skidders and forwarders through the forest used to remove harvested timber from a point near where it was harvested to an access road or concentration area. Landings or log yards are concentration areas where harvested forest products are temporarily concentrated and stored before being permanently removed from the woods. It is important to construct and maintain these areas in a way that minimizes soil erosion and protects nearby water bodies from sedimentation.

II. Regulatory Requirements:

Construction in Floodplains [KRS 151.250]:
Any structures (bridges, berms, or other construction that could obstruct flood flows), to be constructed in the floodplain of a perennial stream which drains more than one square mile, require a floodplain permit from the Kentucky Division of Water. (Division of Water regional office telephone numbers and addresses are listed in Chapter 8)

Filling or draining of wetlands [U.S. Clean Water Act, Section 404]:
The U.S. Army Corps of Engineers regulates all filling or draining of wetlands, streams, lakes, or other bodies of water. Normal ongoing silvicultural activities, including building and maintaining forest roads, do not require individual permits providing certain conditions are met, including adherence to the federal baseline BMPs for forest roads. For detailed information on the silvicultural exemption, contact the Kentucky Division of Forestry.

All Silviculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near High Quality Waters and Outstanding National Resource Waters [401 KAR 10:029, 10:030, and 10:031]:
Kentucky Water Quality Standards (401 KAR 10:029) require the use of Best Management Practices to protect High Quality Waters and Outstanding National Resource Waters listed in 401 KAR 10:030. In addition, outstanding resource waters that support federally listed, threatened and endangered species require special protection (see 401 KAR 10:031).

Activities near Wild Rivers [KRS 146.200 et seq. and 401 KAR 4:100-140]:
The Kentucky Wild Rivers Act and associated regulations give special protection to streams designated as “wild rivers”, including regulation of silvicultural activity. Before undertaking any

silvicultural activity in a corridor of a designated wild river, the landowner or logger should contact the Wild Rivers Program of the Office of Kentucky Nature Preserves for applicable regulations and instructions.

III. AWQA Minimum Requirements:

1. Access roads and trails shall be constructed to minimize grade.
2. Skidders or other logging equipment shall not be operated under conditions that may cause the development of ruts that contribute to water quality degradation and cannot be resurfaced with available equipment.
3. To avoid runoff from entering streams or channels access roads and trails shall be located, constructed, maintained and water control structures installed at appropriate intervals to drain surfaces, reduce erosion of road and trail surfaces and the undisturbed forest floor.
4. Practices shall be implemented to control erosion that can deliver sediment to streams or channels from disturbed ground other than roads, trails, and landings.
5. Landings shall be constructed to drain and avoid runoff from entering streams or channels.
6. Where economically and/or topographically feasible, elevated crossings (ex. bridges, culverts, pole crossings, etc.) shall be used when crossing streams (perennial and intermittent) and ephemeral channels.
7. If it is not feasible to install an elevated crossing, fords with firm and/or protected stream or channel beds shall be used to cross streams and channels at right angles. Avoid depositing soil into the stream or channel.
8. Immediately stabilize disturbed ground associated with crossings (excluding the active trail or road surface) to reduce runoff into streams.
9. On roads, trails, and landings that are temporarily inactive practices shall be promptly implemented to minimize erosion and runoff entering streams or channels.
10. Upon completion of harvesting activities permanent retirement practices shall be implemented on roads, trails, and landings and other areas of disturbed ground to minimize erosion and runoff from entering streams or channels.
11. Permanent retirement practices include the use of appropriate practices including: resurfacing, removing berms and other impediments to allow drainage and correct installation of permanent water control structures to drain surfaces and minimize erosion; removal of temporary stream and channel crossings; correct installation of permanent water control structures to drain surfaces and minimize erosion; and seeding and measures to promote the development of vegetative cover (see Silviculture BMP #2) that may include one or more of the following; loosening compacted soil, fertilization, mulching, or liming.
12. After silvicultural and harvest activities are completed landowners should restrict vehicle access on retired roads, trails and landings until the site is stabilized.

IV. Design Information:

The intended purpose of a road will dictate the construction standards: high standards for permanent use or lower standards for temporary use. Where possible, access roads should not exceed a grade of 15% except for short stretches of 200 feet or less, where grades should not exceed 18%. The recommended distances between water control structures are shown in the following tables:

Recommended Distances Between Culverts and Drainage Structures for Access Roads

Road Grade (percent)	Spacing (feet)
2-5	300-500
6-10	200-300
11-15	100-200
16-18	100

Note: Actual distance between culverts will depend upon the nature of the road surface material and its tendency to erode.

Recommended Distances Between Deep Water Breaks (Water Bars) for Retirement of Trails

Grade (percent)	Spacing (feet)
1	400
2	245
5	125
10	78
15	58
20	47
25	40
30	35
35	32
40	29

Where road construction requires low water stream crossings, the Division of Water has developed a standard design that is typically acceptable for issuance of a floodplain permit. This design is available upon request. (See Division of Water office listings in Chapter 8)

V. Practice Maintenance:

Access roads, trails, and landings should be maintained sufficiently to adequately control or significantly abate future soil erosion. Maintenance of access roads to control erosion is basically a problem of water control. This requires a properly functioning drainage system, and maintenance to keep the road reasonably free of ruts, curbs, and debris that prevent water from flowing freely off road surfaces.

If an access road is to remain open, it is advisable to keep travel to a minimum unless the surface material permits all weather use. If a road is not to be kept open, it should be retired after completion of forest activity by smoothing and shaping road surfaces, road banks, and landings, and removing any stream crossing structures. Areas with a potential for soil erosion should also be revegetated as soon as is practicable, and have their access restricted. Periodic inspections should be performed and maintenance work done as needed.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- Kentucky Division of Forestry (primary contact)
- Natural Resources Conservation Service (NRCS)
- University of Kentucky Cooperative Extension Service
- Kentucky Department of Fish and Wildlife Resources
- Kentucky Division of Water

VII. Cost Share Assistance:

Cost Share assistance to landusers considering this BMP may be available in some circumstances through the USDA Conservation Provisions of the current Farm Bill or the Kentucky Soil Erosion and Water Quality Cost Share Program. For more information contact the local offices of the USDA Natural Resources Conservation Service (NRCS) or the local conservation district office.

To receive cost share funding, approved BMPs must meet the specific requirements of the particular cost share program.

VIII. Recommendations:

IX. References: (see address and telephone listings in Chapter 8)

See "Access Roads" in the current version of Kentucky Forest Practice Guidelines for Water Quality Management for detailed specifications concerning construction of access roads, skid trails and landings.

Guidelines for Low Water Crossings is available from the Division of Water, Floodplain Management Section.

Silviculture BMP #2 Revegetation of Silviculturally Disturbed Areas

Revised September 3, 2015

I. Description and Definition(s):

"Revegetation" means establishing a vegetative cover to stabilize the soil and reduce damage to downstream areas from sediment and runoff resulting from silvicultural activity. This BMP is applicable on sediment producing, erodible, or severely eroded areas resulting from silvicultural activities other than timber harvesting.

II. Regulatory Requirements:

All Silviculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near High Quality Waters and Outstanding National Resource Waters [401 KAR 10:029, 10:030, and 10:031]:
Kentucky Water Quality Standards (401 KAR 10:029) require the use of Best Management Practices to protect High Quality Waters and Outstanding National Resource Waters listed in 401 KAR 10:030. In addition, outstanding resource waters that support federally listed, threatened and endangered species require special protection (see 401 KAR 10:031).

Activities near Wild Rivers [KRS 146.200 et seq. and 401 KAR 4:100-140]:
The Kentucky Wild Rivers Act and associated regulations give special protection to streams designated as "wild rivers", including regulation of silvicultural activity. Before undertaking any silvicultural activity in a corridor of a designated wild river, the landowner or logger should contact the Wild Rivers Program of the Office of Kentucky Nature Preserves for applicable regulations and instructions.

III. AWQA Minimum Requirements

Areas of disturbed soil associated with silviculture and forest management operations (other than timber harvesting addressed in Silviculture BMP #1) shall be promptly seeded and measures taken to promote vegetative cover to minimize erosion and/or runoff entering streams or channels. Vegetative cover should be sufficient to significantly reduce or eliminate erosion and sediment production.

IV. Design Information:

Revegetation should be sufficient to adequately control or significantly abate potential soil erosion from the site, and should be established according to generally accepted agricultural principles.

V. Practice Maintenance:

Practice should be maintained at a level sufficient to adequately control or significantly abate future soil erosion from the affected areas.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- Kentucky Division of Forestry (primary contact)
- Natural Resources Conservation Service (NRCS)
- University of Kentucky Cooperative Extension Service
- Kentucky Department of Fish and Wildlife Resources
- Kentucky Division of Water

VII. Cost Share Assistance:

Cost Share assistance to landusers considering this BMP may be available in some circumstances through the USDA Conservation Provisions of the current Farm Bill or the Kentucky Soil Erosion and Water Quality Cost Share Program. For more information contact the local offices of the USDA Natural Resources Conservation Service (NRCS) or the local conservation district office.

To receive cost share funding, approved BMPs must meet the specific requirements of the particular cost share program.

VIII. Recommendations:

IX. References: (see address and telephone listings in Chapter 8)

See "Vegetative Establishment of Silviculturally Disturbed Areas" in the current version of Kentucky Forest Practice Guidelines for Water Quality Management for detailed specifications concerning revegetation.

Silviculture BMP #3 Streamside Management Zones (SMZ)

Revised September 3, 2015

I. Description and Definition(s):

A streamside management zone (SMZ) is a strip of woodland located adjacent to a stream (or other water bodies including but not limited to lakes, ponds, and sloughs) where only limited disturbance is desirable. SMZs maintain natural temperatures in perennial water bodies through shading, maintain the integrity of the bank, and reduce the amount of sediment entering the water by minimizing soil disturbance and filtering overland flow. Intermittent streams are generally dry in the summer months and do not require shading. Both "perennial SMZs" and "intermittent SMZs" require protection of the banks, channel, and of the adjacent strip of forestland.

II. Regulatory Requirements:

Debris in Floodplains [KRS 151.250]:
Kentucky Division of Water has authority over the placement of debris (including logging slash) in floodplains of perennial streams that have a drainage area larger than one square mile. The Division of Water advises that as long as the BMPs for Streamside Management Zones and Logging Debris are followed, landowners and loggers will be considered in compliance with floodplain regulations that address debris. If these BMPs are not followed, the Kentucky Division of Water may institute enforcement proceedings.

All Silviculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near High Quality Waters and Outstanding National Resource Waters [401 KAR 10:029, 10:030, and 10:031]:
Kentucky Water Quality Standards (401 KAR 10:029) require the use of Best Management Practices to protect High Quality Waters and Outstanding National Resource Waters listed in 401 KAR 10:030. In addition, outstanding resource waters that support federally listed, threatened and endangered species require special protection (see 401 KAR 10:031).

Activities near Wild Rivers [KRS 146.200 et seq. and 401 KAR 4:100-140]:
The Kentucky Wild Rivers Act and associated regulations give special protection to streams designated as "wild rivers", including regulation of silvicultural activity. Before undertaking any silvicultural activity in a corridor of a designated wild river, the landowner or logger should contact the Wild Rivers Program of the Office of Kentucky Nature Preserves for applicable regulations and instructions.

III. AWQA Minimum Requirements:

1. In areas adjacent to perennial and intermittent streams, lakes, or other water bodies, the use of streamside management zones (SMZs) is required. Management activities are acceptable within SMZs however SMZ requirements for perennial, intermittent, and coldwater aquatic habitats must be followed. SMZ requirements include maintaining original overstory trees and minimum surface distances from the bank, with the exception of designated crossings, where the construction and/or use of roads, trails, and landings is avoided where feasible.
2. Adjacent to perennial streams and perennial water bodies SMZs require retention of 50 percent of the original overstory trees for minimum surface distances of 25 feet on ground with less than 15% slope and 50 feet for ground with more than 15% slope. Minimum surface distances for roads, trails, and landings are 50 feet on ground with less than 15 percent slope and 100 feet for ground with greater than 15 percent slope.
3. Adjacent to intermittent streams or other intermittent water bodies SMZs require minimum surface distances for roads, trails, and landings of 50 feet on ground with less than 15 percent slope and 100 feet for ground with greater than 15 percent slope.
4. In areas adjacent to designated coldwater aquatic habitats SMZs require the retention of 75 percent of the original overstory trees and a minimum surface distance for roads, trails, and landings of 100 feet regardless of slope. Disturbance of understory vegetation in coldwater aquatic habitat SMZs should be minimized.

	Overstory Width		Overstory Retained	Minimum Distance to Roads, Trails, and Landings	
Stream Type	Slope			Slope	
	<15%	>16%		<15%	>16%
Regular Perennial	25’	50’	50%	50’	100’
Intermittent	0’		0%	50’	100’
CWAH	100’		75%	100’	

5. Except at designated crossings, roads, trails and landings shall be located, where feasible, outside SMZ minimum surface distances. Where it is not feasible to maintain minimum required distances, extra measures are required during and after use to reduce and restrict down slope runoff to streams. These include the appropriate use of the following practices: minimizing road and trail grade; preventing runoff from accumulating at low points along roads, trails and landings; increasing water control structure frequency; and adequate use of logging debris and or other natural or manmade sediment barriers to stop or reduce down slope movement of runoff to streams.
6. Disturbed soil or logging slash including tops shall not be left in or have the potential to be washed into perennial or intermittent streams.
7. Logging slash that blocks the flow of water shall not be left in ephemeral channels.

8. Streams and ephemeral channels must not be used as roads, trails, or the loading of logs unless topography or other circumstance leaves no other alternative for access or when use of streams and channels would create less water quality degradation than constructing new or using existing roads and trails. In these circumstances the stream or channel bed should be used only for the minimum distance necessary.

IV. Design Information:

The minimum SMZ distances in the requirements are established to work to dramatically reduce overland sediment movement from roads, trails and landings into water bodies (perennial or intermittent). The following two tables provides more detailed design information, specifically of interest when water bodies are next to extremely steep ground.

Minimum Distances from Perennial Water Bodies to Roads, Trails, or Landings*

Slope of Land (on each side of stream, percent)	Distance (on each side of stream, feet)
0	25
5	35
10	45
15	55
20	65
25	75
30	85
35	95
40	105
50	125
60	145
70	165

*Where minimum distances are not possible, roads, trails, and landings can be located at less than the recommended distances, but should be constructed to protect water quality. In no case should stream beds be used as roads or for the skidding of logs except where the geology or other physical conditions of the site (rock walls, notches, or other limiting factors) leave no other alternatives for access, or where road or skid trail placement in normally recommended locations is either impossible or will cause a higher degree of water quality degradation. If an exception due to physical site conditions is necessary, stream channels may be used as roads or for skidding only for the minimum distance required.

Minimum Distances from Intermittent Streams to Roads, Trails, or Landings*

Slope of Land (on each side of stream, percent)	Distance (on each side of stream, feet)
0	25
5	30
10	35
15	40
20	45
25	50
30	55
40 or higher	65

*Where minimum distances are not possible, roads, trails, and landings can be located at less than the recommended distances but should be constructed to protect water quality. In no case should stream beds be used as roads or for the skidding of logs except where the geology or other physical conditions of the site (rock walls, notches, or other limiting factors) leave no other alternatives for access or where road or skid trail placement in normally recommended locations is either impossible or will cause a higher degree of water quality degradation. If an exception due to physical site conditions is necessary, stream channels may be used as roads or for skidding only for the minimum distance required.

V. Practice Maintenance:

Overstory trees maintained in perennial and coldwater aquatic habitat streamside management zone areas should be protected from damage that would significantly reduce their ability to shade water bodies. Equipment trafficking in streamside management zones both around perennial and intermittent water bodies should be maintained at a level that does not create large areas of disturbed soil (outside of constructed roads, trails, or landings) subject to erosion and delivery of runoff to waters.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- Kentucky Division of Forestry (primary contact)
- Natural Resources Conservation Service (NRCS)
- University of Kentucky Cooperative Extension Service
- Kentucky Department of Fish and Wildlife Resources
- Kentucky Division of Water

VII. Cost Share Assistance:

Cost Share assistance to landusers considering this BMP may be available in some circumstances through the USDA Conservation Provisions of the current Farm Bill or the Kentucky Soil Erosion and Water Quality Cost Share Program. For more information contact the local offices of the USDA Natural Resources Conservation Service (NRCS) or the local conservation district office.

To receive cost share funding, approved BMPs must meet the specific requirements of the particular cost share program.

VIII. Recommendations:

IX. References: (address and telephone listings in Chapter 8)

See "Streamside Management Zones" in the current version of Kentucky Forest Practice Guidelines for Water Quality Management for detailed specifications concerning silvicultural activities in SMZs.

Silviculture BMP #4 Sinkholes, Sinking Streams, and Caves

Revised September 3, 2015

I. Description and Definition(s):

This BMP concerns forested areas in karst topography which contain "sinkhole" depressions. Sinkholes (or karst windows) are open or closed circular depressions in karst (limestone) areas where surface waters flow to join an underground drainage system. Sinkholes are caused by dissolution of the underlying limestone bedrock. A "swallet" is a point where surface water leaves the surface and flows underground. For the purposes of this BMP, sinkholes include: depressional areas with or without swallet, sinking streams, caves, karst windows, and naturally occurring pits or vertical shafts.

II. Regulatory Requirements:

Activities around Sinkholes, Cave Entrances, etc.: [KRS 433.871, 433.873, 433.875]:
The Kentucky Cave Protection Act offers protection to any sinkhole, pit, karst window, and/or sinking stream that has an opening large enough for a person to enter a black zone. The Federal Cave Protection Act is used to manage non-renewable cave resources on federal lands. Management techniques include buffer zones around sinkhole and cave entrances to provide food sources for cave life, regulate thermal variations, and prevent sedimentation. Extremely sensitive karst systems may include the entire recharge area as a buffer zone.

Endangered Species in Caves [Federal Register 55:6184 6229 and 56:58804 58836]:
The Kentucky State Nature Preserves Commission maintains the Kentucky Endangered, Threatened, and Special Concern Plants and Animals List. The U.S. Fish and Wildlife Service administers the federal Endangered Species Act of 1973, as amended in 1990, and the 1991 Candidate Review. Many species protected by these acts live in caves and may be threatened by pollutants entering sinkholes.

Modified Sinkholes:
Any sinkhole that has been modified to receive additional stormwater runoff may be classified as a Class V Underground Injection Control (UIC) Well, which must be registered and/or permitted by the U.S. EPA Underground Injection Control Program.

Cave Streams and other Underground Surface Waters:
Kentucky surface water statutes and regulations have defined subterranean streams that flow underground and have discrete banks and channels (such as cave streams) as surface waters. Several karst groundwater basins in the Mammoth Cave National Park which extend well outside of the Park's boundary have been designated as Outstanding Resource Waters and receive the same special protection of species as the blind shrimp in Mammoth Cave.

All Silviculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near High Quality Waters and Outstanding National Resource Waters [401 KAR 10:029, 10:030, and 10:031]:
Kentucky Water Quality Standards (401 KAR 10:029) require the use of Best Management Practices to protect High Quality Waters and Outstanding National Resource Waters listed in 401 KAR 10:030. In addition, outstanding resource waters that support federally listed, threatened and endangered species require special protection (see 401 KAR 10:031).

Activities near Wild Rivers [KRS 146.200 et seq. and 401 KAR 4:100-140]:
The Kentucky Wild Rivers Act and associated regulations give special protection to streams designated as "wild rivers", including regulation of silvicultural activity. Before undertaking any silvicultural activity in a corridor of a designated wild river, the landowner or logger should contact the Wild Rivers Program of the Office of Kentucky Nature Preserves for applicable regulations and instructions.

Karst Groundwater Basin Protection:
The federal and state Wellhead Protection Programs are developing karst groundwater basin protection plans for public water supplies that utilize karst springs or groundwater as their water source.

III. AWQA Minimum Requirements:

1. Runoff from roads, trails and landings shall not drain into sinkholes, sinking streams, or caves. (Note that if runoff does enter a sinkhole, a UIC (Underground Injection Control) permit may be required.)
2. Soil and logging debris shall not be concentrated or actively accumulated in a sinkhole.

IV. Design Information:

Sinkholes with no open swallet should pose no significant concern. Sinkholes with open swallets require concern; runoff should be diverted from the opening.

The distance between any disturbed area (disturbed areas include access/haul roads, trails, log landings, or those disturbances produced from mechanical site preparation treatments) and the open swallet of a sinkhole will be at least 30 feet for areas of 5 percent slope. An additional 10 feet in width will be added to this zone for each 10 percent increase in slope up to a maximum width of 65 feet.

V. Practice Maintenance:

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- Kentucky Division of Forestry (primary contact)
- Natural Resources Conservation Service (NRCS)

- University of Kentucky Cooperative Extension Service
- Kentucky Department of Fish and Wildlife Resources
- Kentucky Division of Water

VII. Cost Share Assistance:

Cost Share assistance to landusers considering this BMP may be available in some circumstances through the Kentucky Soil Erosion and Water Quality Cost Share Program. For more information contact the local conservation district office.

To receive cost share funding, approved BMPs must meet the specific requirements of the particular cost share program.

VIII. Recommendations:

Disturbing soil in sinkholes with open swallets should be avoided. However, each case can be evaluated individually. Reestablish vegetation on disturbed areas as quickly as possible. Divert runoff away from openings in sinkholes.

IX. References: (see address and telephone listings in Chapter 8)

See "Sinkholes" in the current version of Kentucky Forest Practice Guidelines for Water Quality Management for detailed specifications regarding silvicultural activity near sinkholes.

Silviculture BMP #5 Fluids and Trash

Revised September 3, 2015

I. Description and Definition(s):

This BMP is designed to protect water bodies from pollution by trash and fluids associated with logging and other forestry equipment. It is applicable in forested areas where silvicultural practices such as timber harvesting, site preparation, or woodland improvement are to be applied.

II. Regulatory Requirements:

All Silviculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near High Quality Waters and Outstanding National Resource Waters [401 KAR 10:029, 10:030, and 10:031]:
Kentucky Water Quality Standards (401 KAR 10:029) require the use of Best Management Practices to protect High Quality Waters and Outstanding National Resource Waters listed in 401 KAR 10:030. In addition, outstanding resource waters that support federally listed, threatened and endangered species require special protection (see 401 KAR 10:031).

Debris in Floodplains [KRS 151.250]:
KRS 151.250 deals with floodplains and gives the Kentucky Division of Water authority over the placement of debris (including logging slash) in floodplains of perennial streams which have a drainage area larger than one square mile. The Division of Water advises that as long as the BMPs for Streamside Management Zones and Debris are followed, landowners and loggers will be considered in compliance with floodplain regulations which address debris. If they are not followed, the Kentucky Division of Water may institute enforcement proceedings.

Activities near Wild Rivers [KRS 146.200 et seq. and 401 KAR 4:100-140]:
The Kentucky Wild Rivers Act and associated regulations give special protection to streams designated as "wild rivers", including regulation of silvicultural activity. Before undertaking any silvicultural activity in a corridor of a designated wild river, the landowner or logger should contact the Wild Rivers Program of the Office of Kentucky Nature Preserves for applicable regulations and instructions.

III. AWQA Minimum Requirements:

1. Equipment fluids shall not be drained onto the ground and should be collected, transported off site and disposed of properly.
2. Equipment shall not be left on or adjacent to stream banks.
3. All trash shall be properly disposed of off-site.

Equipment should not be left on stream banks, nor oil or equipment fluids changed in a manner by which pollutants may drain onto the ground or wash into a stream. Properly dispose of cans, bottles, lunch bags, oil filters or air filters, etc. Properly dispose of used oil, hydraulic fluids, and other fluids.

IV. Design Information:

The requirements are to be used throughout the area subjected to timber harvesting silvicultural operation.

V. Practice Maintenance:

Trash should be continuously and appropriately removed from the site. Equipment should be monitored for leakage and equipment moved to appropriate areas away from water bodies or ephemeral channels in a manner to reduce the possibility directly or indirect water contamination. Leaking equipment should be repaired or removed from site.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- Kentucky Division of Forestry (primary contact)
- Natural Resources Conservation Service (NRCS)
- University of Kentucky Cooperative Extension Service
- Kentucky Department of Fish and Wildlife Resources
- Kentucky Division of Water

VII. Cost Share Assistance:

VIII. Recommendations:

IX. References: (see address and telephone listings in Chapter 8)

See the current version of Kentucky Forest Practice Guidelines for Water Quality Management for detailed specifications concerning trash and fluids associated with silvicultural activities.

Silviculture BMP #6 Proper Planting of Tree Seedlings by Machine

Revised September 3, 2015

I. Description and Definition(s):

This BMP concerns planting of tree seedling stock with mechanical tree planting machines in a manner to minimize potential degradation of water quality.

II. Regulatory Requirements:

All Silviculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near High Quality Waters and Outstanding National Resource Waters [401 KAR 10:029, 10:030, and 10:031]:
Kentucky Water Quality Standards (401 KAR 10:029) require the use of Best Management Practices to protect High Quality Waters and Outstanding National Resource Waters listed in 401 KAR 10:030. In addition, outstanding resource waters that support federally listed, threatened and endangered species require special protection (see 401 KAR 10:031).

Activities near Wild Rivers [KRS 146.200 et seq. and 401 KAR 4:100-140]:
The Kentucky Wild Rivers Act and associated regulations give special protection to streams designated as "wild rivers", including regulation of silvicultural activity. Before undertaking any silvicultural activity in a corridor of a designated wild river, the landowner or logger should contact the Wild Rivers Program of the Office of Kentucky Nature Preserves for applicable regulations and instructions.

III. AWQA Minimum Requirements:

During tree planting operations, mechanical tree planters should be used only on the contour.

IV. Design Information:

V. Practice Maintenance:

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- Kentucky Division of Forestry (primary contact)
- Natural Resources Conservation Service (NRCS)
- University of Kentucky Cooperative Extension Service
- Kentucky Department of Fish and Wildlife Resources
- Kentucky Division of Water

VII. Cost Share Assistance:

VIII. Recommendations:

IX. References: (see address and telephone listings in Chapter 8)

See "Machine Planting of Tree Seedlings" in the current version of Kentucky Forest Practice Guidelines for Water Quality Management for detailed specifications concerning planting tree seedlings with mechanical tree planters.

Silviculture BMP #7 Fertilization

Revised September 3, 2015

I. Description and Definition(s):

This BMP concerns minimizing water quality degradation while artificially applying specific chemicals to the soil to favor increased growth of vegetation. This practice induces desirable, target vegetation to achieve maximum growth practical for site conditions, while managing the fertilizer in such a way as to protect the quality of nearby water bodies.

II. Regulatory Requirements:

Application of Sludge:
The application of some organic materials, such as sludge, may require a permit and compliance with federal and/or state regulations. For more information regarding permits required for the application of sludge, contact the Kentucky Division of Waste Management.

All Silviculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near High Quality Waters and Outstanding National Resource Waters [401 KAR 10:029, 10:030, and 10:031]:
Kentucky Water Quality Standards (401 KAR 10:029) require the use of Best Management Practices to protect High Quality Waters and Outstanding National Resource Waters listed in 401 KAR 10:030. In addition, outstanding resource waters that support federally listed, threatened and endangered species require special protection (see 401 KAR 10:031).

Activities near Wild Rivers [KRS 146.200 et seq. and 401 KAR 4:100-140]:
The Kentucky Wild Rivers Act and associated regulations give special protection to streams designated as “wild rivers”, including regulation of silvicultural activity. Before undertaking any silvicultural activity in a corridor of a designated wild river, the landowner or logger should contact the Wild Rivers Program of the Office of Kentucky Nature Preserves for applicable regulations and instructions.

III. AWQA Minimum Requirements:

In silvicultural operations fertilizer should be applied in compliance with label directions and avoid application within 30 feet from any sinkholes or noticeable openings.

IV. Design Information:

Use recommended rates of fertilizer determined from soil sampling and professional recommendations or rates found in Silviculture BMP #2.

V. Practice Maintenance:

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- Kentucky Division of Forestry (primary contact)
- Natural Resources Conservation Service (NRCS)
- University of Kentucky Cooperative Extension Service
- Kentucky Department of Fish and Wildlife Resources
- Kentucky Division of Water

VII. Cost Share Assistance:

VIII. Recommendations:

IX. References: (see address and telephone listings in Chapter 8)

See "Fertilization" in the current version of Kentucky Forest Practice Guidelines for Water Quality Management for detailed specifications concerning use of fertilizer in silvicultural activities.

Silviculture BMP #8 Application of Pesticides

Revised September 3, 2015

I. Description and Definition(s):

Pesticides include insecticides, herbicides, fungicides, rodenticides and nematocides. Applications of these chemicals are used to destroy, prevent, or control woody or herbaceous vegetation and other forest pests on forested lands or areas being reforested. The BMP is to apply pesticides in such a manner that water quality degradation is minimized.

II. Regulatory Requirements:

Application of Pesticides:
Use only pesticides approved by the U.S. Environmental Protection Agency (USEPA) for use in Kentucky. Follow all pesticide label directions. Application of some chemicals may require applicator certification and/or licensing.

All Silviculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near High Quality Waters and Outstanding National Resource Waters [401 KAR 10:029, 10:030, and 10:031]:
Kentucky Water Quality Standards (401 KAR 10:029) require the use of Best Management Practices to protect High Quality Waters and Outstanding National Resource Waters listed in 401 KAR 10:030. In addition, outstanding resource waters that support federally listed, threatened and endangered species require special protection (see 401 KAR 10:031).

Activities near Wild Rivers [KRS 146.200 et seq. and 401 KAR 4:100-140]:
The Kentucky Wild Rivers Act and associated regulations give special protection to streams designated as "wild rivers", including regulation of silvicultural activity. Before undertaking any silvicultural activity in a corridor of a designated wild river, the landowner or logger should contact the Wild Rivers Program of the Office of Kentucky Nature Preserves for applicable regulations and instructions.

III. AWQA Minimum Requirements:

1. Follow label directions.
2. Do not clean equipment or dump excess materials near bodies of water.
3. Remove empty containers from the woods and dispose of them properly.
4. Pesticides should not be applied within 30 feet or allowed to wash into sinkholes, sinking streams, or caves.

IV. Design Information:

Follow label directions.

V. Practice Maintenance:

Maintain current pesticide certification and/or licensing if required for the pesticide being used.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- Kentucky Division of Forestry (primary contact)
- Natural Resources Conservation Service (NRCS)
- University of Kentucky Cooperative Extension Service
- Kentucky Department of Fish and Wildlife Resources
- Kentucky Division of Water

VII. Cost Share Assistance:

VIII. Recommendations:

IX. References: (see address and telephone listings in Chapter 8)

See "Application of Pesticides" in the current version of Kentucky Forest Practice Guidelines for Water Quality Management for detailed specifications concerning the use of pesticides in silvicultural activity.

Silviculture BMP #9 Site Preparation for Reforestation

Revised September 3, 2015

I. Description and Definition(s):

This BMP concerns treatment of lands prior to the planting of tree seedlings or direct seeding of tree seed to eliminate or suppress undesirable vegetation and/or to facilitate hand or machine planting operations. This is done to aid in the successful establishment and growth of tree seedlings once planted. This BMP is to apply such treatment in a manner by which potential water quality degradation is minimized.

II. Regulatory Requirements:

All Silviculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near High Quality Waters and Outstanding National Resource Waters [401 KAR 10:029, 10:030, and 10:031]:
Kentucky Water Quality Standards (401 KAR 10:029) require the use of Best Management Practices to protect High Quality Waters and Outstanding National Resource Waters listed in 401 KAR 10:030. In addition, outstanding resource waters that support federally listed, threatened and endangered species require special protection (see 401 KAR 10:031).

Activities near Wild Rivers [KRS 146.200 et seq. and 401 KAR 4:100-140]:
The Kentucky Wild Rivers Act and associated regulations give special protection to streams designated as "wild rivers", including regulation of silvicultural activity. Before undertaking any silvicultural activity in a corridor of a designated wild river, the landowner or logger should contact the Wild Rivers Program of the Office of Kentucky Nature Preserves for applicable regulations and instructions.

III. AWQA Minimum Requirements:

When possible during tree planting activities, use methods of site preparation to minimize potential for non-point source pollution.

IV. Design Information:

V. Practice Maintenance:

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- Kentucky Division of Forestry (primary contact)
- Natural Resources Conservation Service (NRCS)
- University of Kentucky Cooperative Extension Service

- Kentucky Department of Fish and Wildlife Resources
- Kentucky Division of Water

VII. Cost Share Assistance:

VIII. Recommendations:

IX. References: (see address and telephone listings in Chapter 8)

See "Site Preparation for Reforestation" in the current version of Kentucky Forest Practice Guidelines for Water Quality Management for detailed specifications concerning site preparation for reforestation.

Silviculture BMP #10 Silviculture in Wetland Areas

Revised September 3, 2015

I. Description and Definition(s):

Wetlands are defined as areas characterized by soils saturated with moisture during all or a significant proportion of the year and which support a dominance of hydrophytes (plants adapted to primarily wet conditions). Such areas are transition zones between predominately dry upland sites and permanent water in streams and lakes. Official determinations of whether a forested area is a wetland are the responsibility of the U.S. Army Corps of Engineers unless there is adjacent cropland, in which case the determination may be made by the Natural Resources Conservation Service of USDA. Forested wetlands, because of their uniqueness, require additional considerations above those listed in other BMPs dealing with silvicultural activities. The requirements listed here are supplemental to other silvicultural BMPs.

II. Regulatory Requirements:

Filling or Draining of Wetland [33 USC §1251 et seq., Section 404]:
Filling or draining of wetland or other water is regulated by the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act, which is summarized in Chapter 7. Normal ongoing silvicultural activities, including forest roads, are exempt from having to obtain individual permits providing certain conditions are met, including adherence to the federal baseline BMPs for forest roads. For detailed information on the silvicultural exemption, landowners should contact the Kentucky Division of Forestry.

All Silviculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near High Quality Waters and Outstanding National Resource Waters [401 KAR 10:029, 10:030, and 10:031]:
Kentucky Water Quality Standards (401 KAR 10:029) require the use of Best Management Practices to protect High Quality Waters and Outstanding National Resource Waters listed in 401 KAR 10:030. In addition, outstanding resource waters that support federally listed, threatened and endangered species require special protection (see 401 KAR 10:031).

Activities near Wild Rivers [KRS 146.200 et seq. and 401 KAR 4:100-140]:
The Kentucky Wild Rivers Act and associated regulations give special protection to streams designated as “wild rivers”, including regulation of silvicultural activity. Before undertaking any silvicultural activity in a corridor of a designated wild river, the landowner or logger should contact the Wild Rivers Program of the Office of Kentucky Nature Preserves for applicable regulations and instructions.

III. AWQA Minimum Requirements:

1. When silvicultural activities including harvesting are implemented in wetlands, additional BMPs shall be used including: minimizing construction of roads, locating landings on higher ground, and minimizing vehicle traffic.
2. Crossing of streams and sloughs should be avoided. If not possible follow appropriate stream crossing requirements of Silviculture BMP #1.

IV. Design Information:

V. Practice Maintenance:

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- Kentucky Division of Forestry (primary contact)
- Natural Resources Conservation Service (NRCS)
- University of Kentucky Cooperative Extension Service
- Kentucky Department of Fish and Wildlife Resources
- Kentucky Division of Water

VII. Cost Share Assistance:

VIII. Recommendations:

IX. References: (see address and telephone listings in Chapter 8)

See "Silviculture in Wetland Areas" in the current version of Kentucky Forest Practice Guidelines for Water Quality Management for detailed specifications concerning silvicultural activity in those areas classified as "wetland."

Additional Recommendations/Considerations for Silvicultural Activity

Fire Lanes and Fire Lines:

Fire lanes constructed for fire protection and fire lines constructed to control an actual fire should cause minimum soil disturbance and be no larger than actually needed to control a fire. Water bars should be used and areas revegetated where necessary. Sensitive areas should have a Class A Foam wetline used in lieu of surface disturbance if possible. As a matter of information, foam wetlines are a technological breakthrough which involve the addition of a sudsing agent to water applied through truck mounted pumpers, back pack sprayers, or even aircraft. The water based foam fully penetrates the fuel and greatly enhances the characteristics of water in suppressing fires and/or creating an effective fire line. See "Fire Lines" in the current version of Kentucky Forest Practice Guidelines for Water Quality Management for detailed specifications concerning fire lanes and fire lines with respect to water quality.

Prescribed Burning:

When prescribed burning in the woods (purposeful burning done to accomplish a specific forestry objective), use proper line construction techniques to protect water quality. Be careful! See "Prescribed Burning" in the current version of Kentucky Forest Practice Guidelines for Water Quality Management for detailed specifications concerning prescribed burning.

Wildfires:

Wildfire (uncontrolled fire) in the forest is a major cause of nonpoint source pollution. All precautions should be taken to prevent wildfire and to control those wildfires that do occur as soon as possible.

Woodland Grazing:

It is recommended that livestock in forested areas be carefully managed where their presence may seriously damage desired forest reproduction, soil hydrologic values, and/or existing vegetation, and by doing so, contribute to nonpoint source pollution. Livestock should also be excluded from SMZs except for watering sites and at designated crossings if it is determined that they are causing a water quality problem.

Chapter 3 Pesticides and Fertilizer

Best Management Practices for Pesticides and Fertilizer

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Guide for Determining Need for Pesticide & Fertilizer Best Management Practices (BMPs)

Activity	Pollutant	Applicable BMPs (apply one or more of the following as needed to protect water quality)
Storage of Dry Bulk Fertilizer	Fertilizer Contamination	1
Storage of Liquid Bulk Fertilizer	Fertilizer Contamination	2
Storage of Liquid & Dry Fertilizer, small quantities	Fertilizer Contamination	3
Storage of Dry Bulk Pesticides	Pesticide Contamination	4
Storage of Liquid Bulk Pesticides	Pesticide Contamination	5
Storage of Liquid & Dry Pesticides, small quantities	Pesticide Contamination	6
Transportation of all Pesticides and Fertilizers	Pesticide/Fertilizer Contamination	7
Mixing, Loading, and Handling of all Pesticides and Fertilizers	Pesticide/Fertilizer Contamination	8
Excess Pesticide Disposal	Pesticide Contamination	4, 5, 7, 9, 10
Pesticide and Fertilizer Container Disposal	Pesticide/Fertilizer Contamination	10
Applying Pesticides	Pesticide Contamination	11

Pesticide & Fertilizer BMP #1 Storage of Dry Bulk Fertilizer

Revised October 16, 2017

I. Description and Definition(s):

Dry Bulk Fertilizer is any dry fertilizer that is:

- Stored in a non-mobile structure or container, in accumulated quantities exceeding 25 tons; and
- Stored longer than six months.

II. Regulatory Requirements:

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near Special Designated Use Waters:
Surface Water Intakes for Domestic Water Supply Use, Outstanding State Resource Waters, and Cold Water Aquatic Habitats as defined by 401 KAR 10:026 as well as Exceptional Waters and Outstanding National Resource Waters as defined by 401 KAR 10:030 require the use of Best Management Practices to protect Kentucky Water Quality Standards (401 KAR 10:029). Additionally, Outstanding State and National Resource Waters require additional protection to maintain water quality standards (see 401 KAR 10:031).

Spills, Leaks, or other Releases [KRS 224.1 400]:
Any spill, leak, discharge, dumping, or other "release" of any of the following classifications of substances in excess of a Reportable Quantity, as defined in 40 CFR 355, must be reported immediately to the Energy and Environment Cabinet's 24 hour environmental response line at 800-928-2380. If you are unsure what the Reportable Quantities are for your products, you may also call the same number to obtain them.

- Hazardous substances.
- Pollutants or contaminants. A release or threatened release of any element, substance, compound, or mixture (including fertilizer) into the environment in a quantity that may present an imminent or substantial danger to the public health is reportable.

Clean up requirements state that once a release has occurred, even if it is less than a reportable quantity, the responsible person must determine its effect on the environment and correct that effect. For questions concerning the Environmental Release Reporting and cleanup law call the Division of Waste Management 502-564-6716.

Labeling, Sale, and Distribution of Fertilizers [KRS 250.360 250.488]:
This statute, administered by the University of Kentucky, Department of Regulatory Services, includes provisions concerning the labeling, sale, and distribution of fertilizers.

Storage of Materials in Floodplains [KRS 151.250 and 401 KAR 4:060]:
The Kentucky Division of Water, Floodplain Management Program requires that a permit be issued prior to the construction of structures, dams, embankments, levees, dikes, and bridges across or along a stream in the Commonwealth. Construction in a floodplain without such a permit is a violation of KRS 151.250 and 401 KAR 4:060.

II. AWQA Minimum Requirements:

Locate new storage facilities 100 feet minimum away from on-site wells and sinkholes 200 feet from private domestic wells, 200 feet from springs, cisterns, and 400 feet from open-throated sinkholes and perennial streams.

You can find the definition of a sinkhole in 401 KAR 5:002 where it states that a “sinkhole" means a naturally occurring topographic depression in a karst area. Its drainage is subterranean and serves as a recharge source for groundwater. It is formed by the collapse of a conduit or the solution of bedrock.

An open-throated sinkhole is a sinkhole with an internal opening or drain, including a cave, proto-cave, conduit, sub-conduit, or fissure, leading into the subsurface through which water and other materials can pass from the sinkhole into underlying solutional voids and conduits. Open throats may be air-filled or water-filled.

Store fertilizers and pesticides separately from one another and away from foodstuffs and feed.

IV. Design Information:

V. Practice Maintenance:

Check storage areas frequently for leaks and spills.

Clean up spills immediately.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- University of Kentucky Cooperative Extension Service.
- Kentucky Department of Agriculture, Division of Environmental Services.
- Kentucky Fertilizer & Agriculture Chemicals Association
  512 Capitol Avenue, Frankfort, KY 40601, 502-226-1122.

VII. Cost Share Assistance:

At this time, no cost share assistance is available for this practice.

VIII. Recommendations:

IX. References: (see address and telephone listings in Chapter 8)

Crop Protection Reference
Chemical & Pharmaceutical Press, Inc.
888 Seventh Avenue, 28th Floor, New York, NY 10106, 212-621-4600.

Design Manual: Designing Facilities for Pesticide and Fertilizer Containment
Midwest Plan Service, Ag and Biosystems Engineering Department
122 Davidson Hall, Iowa State University, Ames, IA 50011-3080

Kentucky Certified Crop Advisor Training Manual
University of Kentucky College of Agriculture in association with the Kentucky Certified Crop Administration Board.

Kentucky Department of Agriculture, Division of Environmental Services

Report a Release Immediately to 502-564-2380 or 800-928-2380. Kentucky Energy Environment Cabinet.

Pesticide & Fertilizer BMP #2 Storage of Liquid Bulk Fertilizer

Revised October 16, 2017

I. Description and Definition(s):

Liquid Bulk Fertilizer is any liquid fertilizer stored in a non-mobile structure or container and:

- Held in accumulated quantities in excess of 5,000 gallons in one location; and
- Stored longer than six months.

II. Regulatory Requirements:

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near Special Designated Use Waters:
Surface Water Intakes for Domestic Water Supply Use, Outstanding State Resource Waters, and Cold Water Aquatic Habitats as defined by 401 KAR 10:026 as well as Exceptional Waters and Outstanding National Resource Waters as defined by 401 KAR 10:030 require the use of Best Management Practices to protect Kentucky Water Quality Standards (401 KAR 10:029). Additionally, Outstanding State and National Resource Waters require additional protection to maintain water quality standards (see 401 KAR 10:031).

Spills, Leaks, or other Releases [KRS 224.1-400]:
Any spill, leak, discharge, dumping, or other "release" of any of the following classifications of substances in excess of a Reportable Quantity, as defined in 40 CFR 355, must be reported immediately to the Energy and Environment Cabinet's 24 hour environmental response line at 800-928-2380. If you are unsure what the Reportable Quantities are for your products, you may also call the same number to obtain them.

- Hazardous substances.
- Pollutants or contaminants. A release or threatened release of any element, substance, compound, or mixture (including fertilizer) into the environment in a quantity that may present an imminent or substantial danger to the public health is reportable.

Clean up requirements state that once a release has occurred, even if it is less than a reportable quantity, the responsible person must determine its effect on the environment and correct that effect. For questions concerning the Environmental Release Reporting and cleanup law call the Division of Waste Management 502-564-6716.

Labeling, Sale, and Distribution of Fertilizers [KRS 250.360 250.488]:
This statute, administered by the University of Kentucky, Department of Regulatory Services, includes provisions concerning the labeling, sale, and distribution of fertilizers.

Storage of Materials in Floodplains [KRS 151.250 and 401 KAR 4:060]:
The Kentucky Division of Water, Floodplain Management Program requires that a permit be issued prior to the construction of structures, dams, embankments, levees, dikes, and bridges

across or along a stream in the Commonwealth. Construction in a floodplain without such a permit is a violation of KRS 151.250 and 401 KAR 4:060.

Discharge of contaminated materials collected in a secondary containment area may require a Kentucky Pollution Discharge Elimination System (KPDES) Permit, issued by the Division of Water. If materials collected in a secondary containment area are used for appropriate beneficial re-use (e.g. field application) no KPDES permit is required.

III. AWQA Minimum Requirements:

At a minimum, tanks should be confined within an earthen berm and bottom.

Locate new storage facilities 100 feet minimum away from on-site wells and sinkholes, 200 feet from private domestic wells, 200 feet from springs and cisterns, and 400 feet from open-throated sinkholes and perennial streams.

You can find the definition of a sinkhole in 401 KAR 5:002 where it states that a “sinkhole" means a naturally occurring topographic depression in a karst area. Its drainage is subterranean and serves as a recharge source for groundwater. It is formed by the collapse of a conduit or the solution of bedrock.

An open-throated sinkhole is a sinkhole with an internal opening or drain, including a cave, proto-cave, conduit, sub-conduit, or fissure, leading into the subsurface through which water and other materials can pass from the sinkhole into underlying solutional voids and conduits. Open throats may be air-filled or water-filled.

Secondary containment structures should include a sump and/or collection point for temporary collection of spillage, leakage, rinsate, or other residues. The sump or collection point shall not be greater than (2) feet deep and shall not contain more than 109 gallons.

Secondary Containment Structure shall be cleaned and rinsed within (72) hours after any release into the secondary containment.

IV. Design Information:

At a minimum, tanks should be confined within an earthen berm and bottom, constructed of clayey soil that will contain 100% of the largest tanks capacity, the displacement of other tanks inside the secondary containment, plus a 6” rainfall in a 24 hour period if unroofed.

Earthen walls used for secondary containment of fertilizer should be protected against erosion (e.g., sodded and seeded). Side slopes should not exceed a 3 to 1 ratio of horizontal to vertical. The top width of earthen walls should not be less than 2.5 feet.

Secondary containment structures should include a sump and/or collection point for temporary collection of spillage, leakage, rinsate, or other residues.

V. Practice Maintenance:

Make sure that all valves are secure when tanks are unattended.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- University of Kentucky Cooperative Extension Service
- Kentucky Department of Agriculture, Division of Environmental Services
- Natural Resources Conservation Service

VII. Cost Share Assistance:

Cost share assistance to landusers considering this BMP may be available in some circumstances through the Kentucky Soil Erosion and Water Quality Cost Share Program. For more information, contact the local conservation district office.

To receive cost share funding, approved BMPs must meet the specific requirements of the particular cost share program.

VIII. Recommendations:

Uncontaminated precipitation collected should be discharged from containment areas. Contaminated precipitation collected should be applied to labeled target areas or disposed of by other approved methods.

IX. References: (see address and telephone listings in Chapter 8)

Technical Document, Natural Resources Conservation Service

Design Manual: Designing Facilities for Pesticide and Fertilizer Containment
Midwest Plan Service, Ag and Biosystems Engineering Department
122 Davidson Hall, Iowa State University, Ames, IA 50011-3080

Report a Release Immediately to 502-564-2380 or 800-928-2380. Kentucky Energy and Environment Cabinet

Pesticide & Fertilizer BMP #3 Storage of Liquid & Dry Fertilizer (small quantities)

Revised October 16, 2017

I. Description and Definition(s):

"Fertilizer" refers to any fertilizer in liquid or dry forms.

This BMP applies to dry fertilizer in accumulated quantities of less than 25 tons of net dry weight, stored for any period of time. It also applies to liquid fertilizer in accumulated quantities of less than 5,000 gallons liquid measure, stored for any period of time.

II. Regulatory Requirements:

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near Special Designated Use Waters:
Surface Water Intakes for Domestic Water Supply Use, Outstanding State Resource Waters, and Cold Water Aquatic Habitats as defined by 401 KAR 10:026 as well as Exceptional Waters and Outstanding National Resource Waters as defined by 401 KAR 10:030 require the use of Best Management Practices to protect Kentucky Water Quality Standards (401 KAR 10:029). Additionally, Outstanding State and National Resource Waters require additional protection to maintain water quality standards (see 401 KAR 10:031).

Spills, Leaks, or other Releases [KRS 224.1-400]:
Any spill, leak, discharge, dumping, or other "release" of any of the following classifications of substances in excess of a Reportable Quantity, as defined in 40 CFR 355, must be reported immediately to the Energy and Environment Cabinet's 24 hour environmental response line at 800-928-2380. If you are unsure what the Reportable Quantities are for your products, you may also call the same number to obtain them.

- Hazardous substances.
- Pollutants or contaminants. A release or threatened release of any element, substance, compound, or mixture (including fertilizer) into the environment in a quantity that may present an imminent or substantial danger to the public health is reportable.

Clean up requirements state that once a release has occurred, even if it is less than a reportable quantity, the responsible person must determine its effect on the environment and correct that effect. For questions concerning the Environmental Release Reporting and cleanup law call the Division of Waste Management 502-564-6716.

Labeling, Sale, and Distribution of Fertilizers [KRS 250.360-250.488]:
This statute, administered by the University of Kentucky, Department of Regulatory Services, includes provisions concerning the labeling, sale, and distribution of fertilizers.

Storage of Materials in Floodplains [KRS 151.250 and 401 KAR 4:060]:
The Kentucky Division of Water, Floodplain Management Program requires that a permit be issued prior to the construction of structures, dams, embankments, levees, dikes, and bridges across or along a stream in the Commonwealth. Construction in a floodplain without such a permit is a violation of KRS 151.250 and 401 KAR 4:060.

III. AWQA Minimum Requirements:

Store in properly labeled containers that are chemically compatible with the fertilizer.

Storage containers and appurtenances shall be constructed, installed, and maintained to prevent the discharge of liquid fertilizer.

Clean up spills immediately.

Store fertilizers and pesticides separately from one another and away from foodstuffs and feed.

Read and follow label directions for storage.

IV. Design Information:

Locate new storage facilities 100 feet minimum away from on-site wells and sinkholes, 200 feet from private domestic wells, 200 feet from springs and cisterns, and 400 feet from open-throated sinkholes and perennial streams.

You can find the definition of a sinkhole in 401 KAR 5:002 where it states that a “sinkhole" means a naturally occurring topographic depression in a karst area. Its drainage is subterranean and serves as a recharge source for groundwater. It is formed by the collapse of a conduit or the solution of bedrock.

An open-throated sinkhole is a sinkhole with an internal opening or drain, including a cave, proto-cave, conduit, sub-conduit, or fissure, leading into the subsurface through which water and other materials can pass from the sinkhole into underlying solutional voids and conduits. Open throats may be air-filled or water-filled.

V. Practice Maintenance:

Regularly inspect stored fertilizers for leaks and spills, and assure maintenance of proper storage conditions.

Make sure all valves are secured when tanks are unattended.

VI. Technical Assistance: (see address and telephone listings in Chapter 8):

- University of Kentucky Cooperative Extension Service
- Kentucky Department of Agriculture, Division of Environmental Services

- Natural Resources Conservation Service

VII. Cost Share Assistance:

Cost share assistance to landusers considering this BMP may be available in some circumstances through the Kentucky Soil Erosion and Water Quality Cost Share Program. For more information contact the local conservation district office.

To receive cost share funding, approved BMPs must meet the specific requirements of the particular cost share program.

VIII. Recommendations:

Use proper storage practices even if fertilizers are on site for only a short time (e.g., in springtime before plantings). Even seasonal storage can result in spills or leaks that can pollute groundwater.

Develop a plan to deal with fertilizer spills, including spill site management and storage site clean-up.

IX. References: (see address and telephone listings in Chapter 8)

Fertilizer Spills:
Kentucky Department for Environmental Protection, Emergency Response Team
For information: 502-564-2150
In case of emergency: 502-564-2380 or 800-928-2380

Technical Document, Natural Resources Conservation Service.

Design Manual: Designing Facilities for Pesticide and Fertilizer Containment
Midwest Plan Service, Ag and Biosystems Engineering Department
122 Davidson Hall, Iowa State University, Ames, IA 50011 3080

AgriBusiness Association of Kentucky
340 Democrat Dr., Frankfort, KY 40601, 502-226-1122

Kentucky Department of Agriculture

Pesticide & Fertilizer BMP #4 Storage of Dry Bulk Pesticides

Revised October 16, 2017

I. Description and Definition(s):

A pesticide is any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any insect, rodent, nematode, fungus, weed, or any other forms of life declared to be pests, and any substance or mixture of substances intended for use as a plant regulator, defoliant, or desiccant.

Dry Bulk Pesticide is any dry pesticide stored in a non-mobile structure or container or held in an individual container:

- In undivided quantities of greater than 300 pounds of net dry weight; and
- Stored longer than six months.

II. Regulatory Requirements:

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near Special Designated Use Waters:
Surface Water Intakes for Domestic Water Supply Use, Outstanding State Resource Waters, and Cold Water Aquatic Habitats as defined by 401 KAR 10:026 as well as Exceptional Waters and Outstanding National Resource Waters as defined by 401 KAR 10:030 require the use of Best Management Practices to protect Kentucky Water Quality Standards (401 KAR 10:029). Additionally, Outstanding State and National Resource Waters require additional protection to maintain water quality standards (see 401 KAR 10:031).

Spills, Leaks, or other Releases [KRS 224.1-400]:
Any spill, leak, discharge, dumping, or other "release" of any of the following classifications of substances in excess of a Reportable Quantity, as defined in 40 CFR 355, must be reported immediately to the Energy and Environment Cabinet's 24 hour environmental response line at 800-928-2380. If you are unsure what the Reportable Quantities are for your products, you may also call the same number to obtain them.

- Hazardous substances.
- Pollutants or contaminants. A release or threatened release of any element, substance, compound, or mixture (including fertilizer) into the environment in a quantity that may present an imminent or substantial danger to the public health is reportable.

Clean up requirements state that once a release has occurred, even if it is less than a reportable quantity, the responsible person must determine its effect on the environment and correct that effect. For questions concerning the Environmental Release Reporting and cleanup law call the Division of Waste Management 502-564-6716.

Registration, Sale, and Distribution of Pesticides [7 USC 136 136y and KRS 217.570]:
The Federal Insecticide, Fungicide, & Rodenticide Act (FIFRA) regulates registration, sale, and distribution of certain pesticides. KRS 217.570, administered by the Kentucky Department of Agriculture, regulates the registration of pesticide products and adjuvants for sale in the state of Kentucky.

Licensure and Operator Training [KRS 217B]:
KRS 217B, administered by the Kentucky Department of Agriculture, regulates licensure of pesticide applicators and commercial operator training.

Release, Storage, Treatment, and Disposal [42 USC 9601, 42 USC 6901, KRS 224.46]:
The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the Resource Conservation and Recovery Act (RCRA), administered by the U.S. Environmental Protection Agency, regulates the release, storage, treatment, and disposal of certain hazardous pollutants or contaminants.

Worker Protection Standards [40 CFR 156, 40 CFR 170]:
These regulations, administered by the U.S. Environmental Protection Agency, contain standards designed to reduce the risks of illness or injury resulting from occupational exposures to pesticides.

Storage of Materials in Floodplains [KRS 151.250 and 401 KAR 4:060]:
The Kentucky Division of Water, Floodplain Management Program requires that a permit be issued prior to the construction of structures, dams, embankments, levees, dikes, and bridges across or along a stream in the Commonwealth. Construction in a floodplain without such a permit is a violation of KRS 151.250 and 401 KAR 4:060.

III. AWQA Minimum Requirements:

- Dry bulk pesticide storage shall be separated from other containment areas by a six (6) inch curb that extends at least two (2) feet beyond the perimeter of the walls of the storage container.
- Store in a dry, secure, ventilated area. Locate new storage facilities 100 feet minimum away from on-site wells and sinkholes, 200 feet from private domestic wells, 200 feet from springs and cisterns, and 400 feet from open-throated sinkholes and perennial streams.
- You can find the definition of a sinkhole in 401 KAR 5:002 where it states that a “sinkhole" means a naturally occurring topographic depression in a karst area. Its drainage is subterranean and serves as a recharge source for groundwater. It is formed by the collapse of a conduit or the solution of bedrock.
- An open-throated sinkhole is a sinkhole with an internal opening or drain, including a cave, proto-cave, conduit, sub-conduit, or fissure, leading into the subsurface through which water and other materials can pass from the sinkhole into underlying solutional voids and conduits. Open throats may be air-filled or water-filled.

IV. Design Information:

New permanent containment areas and operational areas located in a floodplain shall be protected from inundation by floods.

V. Practice Maintenance:

Check storage areas frequently for leaks and spills.

Clean up of spills immediately.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- Kentucky Department of Agriculture, Division of Environmental Services
- University of Kentucky Cooperative Extension Service

VII. Cost Share Assistance:

Cost Share assistance to landusers considering this BMP may be available in some circumstances through the Kentucky Soil Erosion and Water Quality Cost Share Program. For more information contact the local conservation district office.

To receive cost share funding, approved BMPs must meet the specific requirements of the particular cost share program.

VIII. Recommendations:

IX. References: (see address and telephone listings in Chapter 8)

Kentucky Department of Agriculture, Division of Environmental Services

Report a Release Immediately to 502-564-2380 or 800-928-2380. Kentucky Energy and Environment Cabinet

University of Kentucky Cooperative Extension Service

Pesticides & Fertilizer BMP #5 Storage of Liquid Bulk Pesticides

Revised October 16, 2017

I. Description and Definition(s):

A pesticide is any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any insect, rodent, nematode, fungus, weed, or any other forms of life declared to be pests, and any substance or mixture of substances intended for use as a plant regulator, defoliant, or desiccant.

Liquid Bulk Pesticide is any liquid pesticide that is stored in a non-mobile structure or container or held in an individual container:

- In undivided quantities of greater than 300 gallons of liquid measure; and
- Stored longer than six months.

II. Regulatory Requirements:

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near Special Designated Use Waters:
Surface Water Intakes for Domestic Water Supply Use, Outstanding State Resource Waters, and Cold Water Aquatic Habitats as defined by 401 KAR 10:026 as well as Exceptional Waters and Outstanding National Resource Waters as defined by 401 KAR 10:030 require the use of Best Management Practices to protect Kentucky Water Quality Standards (401 KAR 10:029). Additionally, Outstanding State and National Resource Waters require additional protection to maintain water quality standards (see 401 KAR 10:031).

Spills, Leaks, or other Releases [KRS 224.1-400]:
Any spill, leak, discharge, dumping, or other "release" of any of the following classifications of substances in excess of a Reportable Quantity, as defined in 40 CFR 355, must be reported immediately to the Energy and Environment Cabinet's 24 hour environmental response line at 800-928-2380. If you are unsure what the Reportable Quantities are for your products, you may also call the same number to obtain them.

- Hazardous substances.
- Pollutants or contaminants. A release or threatened release of any element, substance, compound, or mixture (including fertilizer) into the environment in a quantity that may present an imminent or substantial danger to the public health is reportable.

Clean up requirements state that once a release has occurred, even if it is less than a reportable quantity, the responsible person must determine its effect on the environment and correct that effect. For questions concerning the Environmental Release Reporting and cleanup law call the Division of Waste Management 502-564-6716.

Registration, Sale, and Distribution of Pesticides [7 USC 136 136y and KRS 217.570]:
The Federal Insecticide, Fungicide, & Rodenticide Act (FIFRA) regulates registration, sale, and distribution of certain pesticides. KRS 217.570, administered by the Kentucky Department of Agriculture, regulates the registration of pesticide products and adjuvants for sale in the state of Kentucky.

Licensure and Operator Training [KRS 217B]:
KRS 217B, administered by the Kentucky Department of Agriculture, regulates licensure of pesticide applicators and commercial operator training.

Worker Protection Standards [40 CFR 156, 40 CFR 170]:
These regulations, administered by the U.S. Environmental Protection Agency, contain standards designed to reduce the risks of illness or injury resulting from occupational exposures to pesticides.

Release, Storage, Treatment, and Disposal [42 USC 9601, 42 USC 6901, KRS 224.46]:
The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the Resource Conservation and Recovery Act (RCRA), administered by the U.S. Environmental Protection Agency, regulates the release, storage, treatment, and disposal of certain hazardous pollutants or contaminants.

Storage of Materials in Floodplains [KRS 151.250 and 401 KAR 4:060]:
The Kentucky Division of Water, Floodplain Management Program requires that a permit be issued prior to the construction of structures, dams, embankments, levees, dikes, and bridges across or along a stream in the Commonwealth. Construction in a floodplain without such a permit is a violation of KRS 151.250 and 401 KAR 4:060.

Discharge of contaminated materials collected in a secondary containment area may require a Kentucky Pollution Discharge Eliminated System (KPDES) Permit issued by the Division of Water. If materials collected in a secondary containment area are used for appropriate beneficial re-use (e.g. field application) no KPDES permit is required.

III. AWQA Minimum Requirements:

- Locate storage facilities 100 feet minimum away from on-site wells and sinkholes, 200 feet from private domestic wells, 200 feet from springs and cisterns, and 400 feet from open-throated sinkholes and perennial streams.
- You can find the definition of a sinkhole in 401 KAR 5:002 where it states that a “sinkhole" means a naturally occurring topographic depression in a karst area. Its drainage is subterranean and serves as a recharge source for groundwater. It is formed by the collapse of a conduit or the solution of bedrock.
- An open-throated sinkhole is a sinkhole with an internal opening or drain, including a cave, proto-cave, conduit, sub-conduit, or fissure, leading into the subsurface through which water and other materials can pass from the sinkhole into underlying solutional voids and conduits. Open throats may be air-filled or water-filled.

For new Secondary Containment facilities of liquid bulk pesticides in undivided quantities of 300 gallons or more:

- Construct facilities of concrete or other impervious materials.
- The use of underground storage containers or plumbing as (or used in conjunction to) secondary containment is prohibited.

IV. Design Information:

Floors and walls of secondary containment structures should be constructed of concrete, concrete block (capped and filled with concrete and sealed), steel, or other impervious materials compatible with product being stored. Clay, natural soil clay mixtures, or clay/bentonite mixtures cannot be used to contain any liquid bulk pesticide.

Temporary operational containment or elephant rings should not be used as a secondary containment.

Floors and walls of secondary containment structures which contain pesticides should be constructed of materials that will maintain their structural integrity under fire conditions.

Secondary containment structures should not have relief outlets and/or release valves.

Protect containers, pipes, hoses, and valves against reasonably foreseeable risks of damage by vandalism or trucks and other moving vehicles.

Secondary containment structures should include a sump and/or collection point for temporary collection of spillage, leakage, rinsate, and other residues.

A sump or collection point should not be greater than two (2) feet deep and should not contain more than 109 gallons.

V. Practice Maintenance:

Clean and rinse secondary containment structures within 72 hours after any agrichemical spill or leakage.

Rinsate of equipment and secondary containment structures should be applied at a label approved site or disposed of by other approved methods.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- Kentucky Department of Agriculture, Division of Environmental Services
- University of Kentucky Cooperative Extension Service

VII. Cost Share Assistance:

Cost Share assistance to landusers considering this BMP may be available in some circumstances through the Kentucky Soil Erosion and Water Quality Cost Share Program. For more information contact the local conservation district office.

To receive cost share funding, approved BMPs must meet the specific requirements of the particular cost share program.

VIII. Recommendations:

Develop a plan to deal with fertilizer spills, including spill site management and storage site clean-up.

Store all liquid bulk pesticides in a dry, secure, ventilated area.

IX. References: (see address and telephone listings in Chapter 8)

Kentucky Department of Agriculture, Division of Environmental Services

Design Manual: *Designing Facilities for Pesticide and Fertilizer Containment*
Midwest Plan Service, Ag. and Biosystems Engineering Department
122 Davidson Hall, Iowa State University, Ames, IA 50011-3080
Pesticide and Fertilizer BMP #1

AgriBusiness Association of Kentucky
340 Democrat Dr., Frankfort, KY, 40601, 502-226-1122

Crop Protection Reference
Chemical & Pharmaceutical Press, Inc.
888 Seventh Avenue, 28th Floor, New York, NY, 10106, 212-621-4600

University of Kentucky Cooperative Extension Service

Report a Release Immediately to 502-564-2380 or 800-928-2380. Kentucky Energy and Environment Cabinet

Pesticide & Fertilizer BMP #6 Storage of Liquid & Dry Pesticides (small quantities)

Revised October 16, 2017

I. Description and Definition(s):

A pesticide is any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any insect, rodent, nematode, fungus, weed, or any other forms of life declared to be pests, and any substance or mixture of substances intended for use as a plant regulator, defoliant, or desiccant.

This BMP applies to storage, over any period of time, of dry pesticides in quantities less than 300 pounds avoirdupois net dry weight. It also applies to storage, over any period of time, of liquid pesticides in quantities less than 300 gallons liquid measure.

II. Regulatory Requirements:

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near Special Designated Use Waters:
Surface Water Intakes for Domestic Water Supply Use, Outstanding State Resource Waters, and Cold Water Aquatic Habitats as defined by 401 KAR 10:026 as well as Exceptional Waters and Outstanding National Resource Waters as defined by 401 KAR 10:030 require the use of Best Management Practices to protect Kentucky Water Quality Standards (401 KAR 10:029). Additionally, Outstanding State and National Resource Waters require additional protection to maintain water quality standards (see 401 KAR 10:031).

Spills, Leaks, or other Releases [KRS 224.1-400]:
Any spill, leak, discharge, dumping, or other "release" of any of the following classifications of substances in excess of a Reportable Quantity, as defined in 40 CFR 355, must be reported immediately to the Energy and Environment Cabinet's 24 hour environmental response line at 800-928-2380. If you are unsure what the Reportable Quantities are for your products, you may also call the same number to obtain them.

- Hazardous substances.
- Pollutants or contaminants. A release or threatened release of any element, substance, compound, or mixture (including fertilizer) into the environment in a quantity that may present an imminent or substantial danger to the public health is reportable.

Clean up requirements state that once a release has occurred, even if it is less than a reportable quantity, the responsible person must determine its effect on the environment and correct that effect. For questions concerning the Environmental Release Reporting and cleanup law call the Division of Waste Management 502-564-6716.

Registration, Sale, and Distribution of Pesticides [7 USC 136 136y]:
The Federal Insecticide, Fungicide, & Rodenticide Act (FIFRA) regulates registration, sale, and distribution of certain pesticides.

Licensure and Operator Training [KRS 217B]:
KRS 217B, administered by the Kentucky Department of Agriculture, regulates licensure of pesticide applicators and commercial operator training.

Worker Protection Standards [40 CFR 156, 40 CFR 170]:
These regulations, administered by the U.S. Environmental Protection Agency, contain standards designed to reduce the risks of illness or injury resulting from occupational exposures to pesticides.

Release, Storage, Treatment, and Disposal [42 USC 9601, 42 USC 6901, KRS 224.46]:
The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the Resource Conservation and Recovery Act (RCRA), administered by the U.S. Environmental Protection Agency, regulates the release, storage, treatment, and disposal of certain hazardous pollutants or contaminants.

Storage of Materials in Floodplains [KRS 151.250 and 401 KAR 4:060]:
The Kentucky Division of Water, Floodplain Management Program requires that a permit be issued prior to the construction of structures, dams, embankments, levees, dikes, and bridges across or along a stream in the Commonwealth. Construction in a floodplain without such a permit is a violation of KRS 151.250 and 401 KAR 4:060.

III. AWQA Minimum Requirements:

Pesticides shall be stored in original containers.

Restricted Use Products shall be stored separate from General Use Products.

Do not put pesticide concentrate or diluted pesticide into food or drink containers.

Do not allow pesticides to contaminate feed or foodstuffs. Do not store or transport pesticides near feed or foodstuffs.

Read and follow label directions for storage.

Clean up spills immediately.

IV. Design Information:

All Restricted Use Pesticide storage areas should be well marked with warning signs, and locked to prevent unauthorized entry.

Locate storage facilities 100 feet minimum away from on-site wells and sinkholes, 200 feet from private domestic wells, 200 feet from springs and cisterns, and 400 feet from open-throated sinkholes and perennial streams.

You can find the definition of a sinkhole in 401 KAR 5:002 where it states that a “sinkhole" means a naturally occurring topographic depression in a karst area. Its drainage is subterranean and serves as a recharge source for groundwater. It is formed by the collapse of a conduit or the solution of bedrock.

An open-throated sinkhole is a sinkhole with an internal opening or drain, including a cave, proto-cave, conduit, sub-conduit, or fissure, leading into the subsurface through which water and other materials can pass from the sinkhole into underlying solutional voids and conduits. Open throats may be air-filled or water-filled.

V. Practice Maintenance:

Temporary Restricted Use Pesticide storage areas should be well marked with warning signs, and locked to prevent unauthorized entry.

Regularly inspect stored pesticides for leaks and spills, and assure maintenance of proper storage conditions.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- Kentucky Department of Agriculture, Division of Environmental Services
- University of Kentucky Cooperative Extension Service

VII. Cost Share Assistance:

Cost Share assistance to landusers considering this BMP may be available in some circumstances through the Kentucky Soil Erosion and Water Quality Cost Share Program. For more information contact the local conservation district office.

To receive cost share funding, approved BMPs must meet the specific requirements of the particular cost share program.

VIII. Recommendations:

Develop a plan to deal with pesticide spills, including spill site management and storage site clean-up.

Use proper storage practices even if pesticides are on site for only a short time (e.g., in springtime before plantings). Even seasonal storage can result in spills or leaks that can pollute groundwater.

IX. References: (see address and telephone listings in Chapter 8)

Kentucky Department of Agriculture, Division of Environmental Services

University of Kentucky Cooperative Extension Service

CHEMTREC Pesticide Emergency Hotline: 800-424-9300 (Emergency calls only)

Disaster Emergency Service (24 hour), State coordinating agency for disasters and emergencies: 502-564 7815

Report a Release Immediately to 502-564-2380 or 800-928-2380. Kentucky Energy and Environment Cabinet

Pesticide & Fertilizer BMP #7 Transport of Pesticides & Fertilizer

Revised October 16, 2017

I. Description and Definition(s):

This BMP concerns transportation of all pesticides and fertilizers on public highways.

II. Regulatory Requirements:

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near Special Designated Use Waters:
Surface Water Intakes for Domestic Water Supply Use, Outstanding State Resource Waters, and Cold Water Aquatic Habitats as defined by 401 KAR 10:026 as well as Exceptional Waters and Outstanding National Resource Waters as defined by 401 KAR 10:030 require the use of Best Management Practices to protect Kentucky Water Quality Standards (401 KAR 10:029). Additionally, Outstanding State and National Resource Waters require additional protection to maintain water quality standards (see 401 KAR 10:031).

Spills, Leaks, or other Releases [KRS 224.1-400]:
Any spill, leak, discharge, dumping, or other "release" of any of the following classifications of substances in excess of a Reportable Quantity, as defined in 40 CFR 355, must be reported immediately to the Energy and Environment Cabinet's 24 hour environmental response line at 800-928-2380. If you are unsure what the Reportable Quantities are for your products, you may also call the same number to obtain them.

- Hazardous substances.
- Pollutants or contaminants. A release or threatened release of any element, substance, compound, or mixture (including fertilizer) into the environment in a quantity that may present an imminent or substantial danger to the public health is reportable.

Clean up requirements state that once a release has occurred, even if it is less than a reportable quantity, the responsible person must determine its effect on the environment and correct that effect. For questions concerning the Environmental Release Reporting and cleanup law call the Division of Waste Management 502-564-6716.

Travel on Public Roads [40 CFR - 49 CFR]:
This regulation pertains to the protection of the environment during transport of cargo on public roads. Farmers transporting cargo are subject to motor vehicle inspections and safety requirements, but are exempt from requirements for commercial driver's licenses, drug testing, and lighting during daylight.

Packaging and Transportation of Hazardous Materials [49 CFR Parts 171, 172, 177, 178, 180, and 397]:
This regulation pertains to the transportation of hazardous materials by air or highway. It provides guidance in developing measures to prevent spills and in preparing emergency response plans for handling spills.

Transport of Hazardous Material [KRS 174.400-435]:
This statute requires the adoption of the Federal Hazardous Materials Transportation Regulations by Kentucky state agencies. See Administrative Regulation 601 KAR 1:025, "Transporting Hazardous Materials by Air or Highway".

III. AWQA Minimum Requirements:

Follow all U.S. Department of Transportation requirements for travel on public roads, pursuant to 40 CFR, 49 CFR, and all other applicable regulations.

All packages and containers should be transported in a safe and stable manner.

IV. Design Information:

V. Practice Maintenance:

Maintain transport vehicles and any safety equipment, i.e., fire extinguisher.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- U.S. Department of Transportation

VII. Cost Share Assistance:

At this time, no cost share assistance is available for this practice.

VIII. Recommendations:

IX. References: (see address and telephone listings in Chapter 8)

Crop Protection Reference
Chemical & Pharmaceutical Press, Inc.
888 Seventh Avenue, 28th Floor, New York, NY, 10106, 212-621-4600

Report a Release Immediately to 502-564-2380 or 800-928-2380. Kentucky Energy and Environment Cabinet

U.S. Department of Transportation

Pesticide & Fertilizer BMP #8 Mixing, Loading, and Handling of Pesticides & Fertilizer and their Containers

Revised October 16, 2017

I. Description and Definition(s):

This BMP concerns mixing, loading, and handling of all pesticides and fertilizers and their containers.

II. Regulatory Requirements:

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near Special Designated Use Waters:
Surface Water Intakes for Domestic Water Supply Use, Outstanding State Resource Waters, and Cold Water Aquatic Habitats as defined by 401 KAR 10:026 as well as Exceptional Waters and Outstanding National Resource Waters as defined by 401 KAR 10:030 require the use of Best Management Practices to protect Kentucky Water Quality Standards (401 KAR 10:029). Additionally, Outstanding State and National Resource Waters require additional protection to maintain water quality standards (see 401 KAR 10:031).

Spills, Leaks, or other Releases [KRS 224.1-400]:
Any spill, leak, discharge, dumping, or other "release" of any of the following classifications of substances in excess of a Reportable Quantity, as defined in 40 CFR 355, must be reported immediately to the Energy and Environment Cabinet's 24 hour environmental response line at 800-928-2380. If you are unsure what the Reportable Quantities are for your products, you may also call the same number to obtain them.

- Hazardous substances.
- Pollutants or contaminants. A release or threatened release of any element, substance, compound, or mixture (including fertilizer) into the environment in a quantity that may present an imminent or substantial danger to the public health is reportable.

Clean up requirements state that once a release has occurred, even if it is less than a reportable quantity, the responsible person must determine its effect on the environment and correct that effect. For questions concerning the Environmental Release Reporting and cleanup law call the Division of Waste Management 502-564-6716.

Registration, Sale, and Distribution of Pesticides [7 USC 136 136y and KRS 217.570]:
The Federal Insecticide, Fungicide, & Rodenticide Act (FIFRA) regulates registration, sale, and distribution of certain pesticides. KRS 217.570, administered by the Kentucky Department of Agriculture, regulates the registration of pesticide products and adjuvants for sale in the state of Kentucky.

Worker Protection Standards [40 CFR 156, 40 CFR 170]:
These regulations, administered by the U.S. Environmental Protection Agency, contain standards designed to reduce the risks of illness or injury resulting from occupational exposures to pesticides.

Licensure and Operator Training [KRS 217B]:
KRS 217B, administered by the Kentucky Department of Agriculture, regulates licensure of pesticide applicators and commercial operator training.

Storage of Materials in Floodplains [KRS 151.250 and 401 KAR 4:060]:
The Kentucky Division of Water, Floodplain Management Program requires that a permit be issued prior to the construction of structures, dams, embankments, levees, dikes, and bridges across or along a stream in the Commonwealth. Construction in a floodplain without such a permit is a violation of KRS 151.250 and 401 KAR 4:060.

III. AWQA Minimum Requirements:

Follow all pesticide and fertilizer label requirements. The label directions are federal law and enforceable by the Kentucky Department of Agriculture.

Follow KRS 217B, administered by the Kentucky Department of Agriculture, concerning licensure of pesticide applicators and commercial operator training. KRS 217B requirements for restricted use pesticides include:

- Having a Private Applicator Card certifying the holder has participated in a progressive, inclusive educational program for the application of pesticides, which includes training by the Cooperative Extension Office, using updated video and live presentations on the proper use of the pesticides with special attention to calibration for application, record keeping requirements, and personal safety.

Use backflow prevention techniques for all measuring, mixing, and loading. See Farmstead BMP #6.

IV. Design Information:

Use backflow prevention techniques such as keeping the end of the fill hose above the water level in the spray tank to prevent back siphoning, or using an anti-backflow device.

V. Practice Maintenance:

Rinse spray equipment in the field and apply the rinsate created on the field just treated or at a label approved site.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- Kentucky Department of Agriculture, Division of Environmental Services.

- University of Kentucky Cooperative Extension Service.

VII. Cost Share Assistance:

At this time, no cost share assistance is available for this practice.

VIII. Recommendations:

If possible, measure, mix, and load at the field site.

If possible, use a nurse tank as the water source.

Avoid mixing or loading within label required distances of wells, open-throated sinkholes, perennial streams, and lakes.

You can find the definition of a sinkhole in 401 KAR 5:002 where it states that a “sinkhole" means a naturally occurring topographic depression in a karst area. Its drainage is subterranean and serves as a recharge source for groundwater. It is formed by the collapse of a conduit or the solution of bedrock.

An open-throated sinkhole is a sinkhole with an internal opening or drain, including a cave, proto-cave, conduit, sub-conduit, or fissure, leading into the subsurface through which water and other materials can pass from the sinkhole into underlying solutional voids and conduits. Open throats may be air-filled or water-filled.

All containers should be rinsed until clean, and the rinsate added to the spray tank.

IX. References: (see address and telephone listings in Chapter 8)

Crop Protection Reference
Chemical & Pharmaceutical Press, Inc.
888 Seventh Avenue, 28th Floor, New York, NY, 10106, 212-621-4600

Design Manual: Designing Facilities for Pesticide and Fertilizer Containment
Midwest Plan Service, Ag and Biosystems Engineering Department
122 Davidson Hall, Iowa State University, Ames, IA 50011-3080

University of Kentucky Cooperative Extension Service

Kentucky Department of Agriculture, Division of Environmental Services

Report a Release Immediately to 502-564-2380 or 800-928-2380

Pesticide & Fertilizer BMP #9 Excess Pesticide Disposal

Revised October 16, 2017

I. Description and Definition(s):

Excess pesticide disposal includes disposal of any pesticide meeting the definition of "pesticide" at KRS 217B.040, including any substance or mixture of substances intended to prevent, destroy, control, repel, attract, or mitigate any pest; any substance or mixture of substances intended to be used as a plant regulator, defoliant, or desiccant; and any substance or mixture of substances intended to be used as a spray adjuvant.

II. Regulatory Requirements:

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near Special Designated Use Waters:
Surface Water Intakes for Domestic Water Supply Use, Outstanding State Resource Waters, and Cold Water Aquatic Habitats as defined by 401 KAR 10:026 as well as Exceptional Waters and Outstanding National Resource Waters as defined by 401 KAR 10:030 require the use of Best Management Practices to protect Kentucky Water Quality Standards (401 KAR 10:029). Additionally, Outstanding State and National Resource Waters require additional protection to maintain water quality standards (see 401 KAR 10:031).

Spills, Leaks, or other Releases [KRS 224.1-400]:
Any spill, leak, discharge, dumping, or other "release" of any of the following classifications of substances in excess of a Reportable Quantity, as defined in 40 CFR 355, must be reported immediately to the Energy and Environment Cabinet's 24 hour environmental response line at 800-928-2380. If you are unsure what the Reportable Quantities are for your products, you may also call the same number to obtain them.

- Hazardous substances.
- Pollutants or contaminants. A release or threatened release of any element, substance, compound, or mixture (including fertilizer) into the environment in a quantity that may present an imminent or substantial danger to the public health is reportable.

Clean up requirements state that once a release has occurred, even if it is less than a reportable quantity, the responsible person must determine its effect on the environment and correct that effect. For questions concerning the Environmental Release Reporting and cleanup law call the Division of Waste Management 502-564-6716.

Registration, Sale, and Distribution of Pesticides [7 USC 136 136y and KRS 217.570]:
The Federal Insecticide, Fungicide, & Rodenticide Act (FIFRA) regulates registration, sale, and distribution of certain pesticides. KRS 217.570, administered by the Kentucky Department of

Agriculture, regulates the registration of pesticide products and adjuvants for sale in the state of Kentucky.

Worker Protection Standards [40 CFR 156, 40 CFR 170]:
These regulations, administered by the U.S. Environmental Protection Agency, contain standards designed to reduce the risks of illness or injury resulting from occupational exposures to pesticides.

Release, Storage, Treatment, and Disposal [42 USC 9601, 42 USC 6901, KRS 224.46]:
The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the Resource Conservation and Recovery Act (RCRA), administered by the U.S. Environmental Protection Agency, regulates the release, storage, treatment, and disposal of certain hazardous pollutants or contaminants.

Licensure and Operator Training [KRS 217B]:
KRS 217B, administered by the Kentucky Department of Agriculture, regulates licensure of pesticide applicators and commercial operator training.

III. AWQA Minimum Requirements:

KRS 217B.190, No Person shall discard or store any pesticide or pesticide containers in a manner as to cause injury to humans, vegetation, crops, livestock, wildlife, or pollinating insects, or to pollute any waterway in a way harmful to any wildlife.

IV. Design Information:

V. Practice Maintenance:

To prevent having excess materials, mix only the quantities to be used immediately.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- Kentucky Department of Agriculture, Division of Environmental Services

VII. Cost Share Assistance:

At this time, no cost share assistance is available for this practice.

VIII. Recommendations:

Periodically inspect pesticide containers for deterioration.

Dispose of unusable excess agricultural pesticides according to a state Agricultural Chemical Collection Program 502-573-0282

Consider existing inventory when planning for use of spray material.

IX. References: (see address and telephone listings in Chapter 8)

Kentucky Department of Agriculture, Division of Environmental Services

Crop Protection Reference
Chemical & Pharmaceutical Press, Inc.
888 Seventh Avenue, 28th Floor, New York, NY, 10106, 212-621-4600

Report a Release Immediately to 502-564-2380 or 800-928-2380. Kentucky Energy and Environment Cabinet

Pesticide & Fertilizer BMP #10 Pesticide & Fertilizer Container Disposal

Revised October 16, 2017

I. Description and Definition(s):

This BMP concerns disposal of containers for all pesticides and fertilizers.

II. Regulatory Requirements:

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near Special Designated Use Waters:
Surface Water Intakes for Domestic Water Supply Use, Outstanding State Resource Waters, and Cold Water Aquatic Habitats as defined by 401 KAR 10:026 as well as Exceptional Waters and Outstanding National Resource Waters as defined by 401 KAR 10:030 require the use of Best Management Practices to protect Kentucky Water Quality Standards (401 KAR 10:029). Additionally, Outstanding State and National Resource Waters require additional protection to maintain water quality standards (see 401 KAR 10:031).

Spills, Leaks, or other Releases [KRS 224.1-400]:
Any spill, leak, discharge, dumping, or other "release" of any of the following classifications of substances in excess of a Reportable Quantity, as defined in 40 CFR 355, must be reported immediately to the Energy and Environment Cabinet's 24 hour environmental response line at 800-928-2380. If you are unsure what the Reportable Quantities are for your products, you may also call the same number to obtain them.

- Hazardous substances.
- Pollutants or contaminants. A release or threatened release of any element, substance, compound, or mixture (including fertilizer) into the environment in a quantity that may present an imminent or substantial danger to the public health is reportable.

Clean up requirements state that once a release has occurred, even if it is less than a reportable quantity, the responsible person must determine its effect on the environment and correct that effect. For questions concerning the Environmental Release Reporting and cleanup law call the Division of Waste Management 502-564-6716.

Registration, Sale, and Distribution of Pesticides [7 USC 136 136y and KRS 217.570]:
The Federal Insecticide, Fungicide, & Rodenticide Act (FIFRA) regulates registration, sale, and distribution of certain pesticides. KRS 217.570, administered by the Kentucky Department of Agriculture, regulates the registration of pesticide products and adjuvants for sale in the state of Kentucky.

Management and Disposal of Contaminants [KRS 224]:
These regulations, administered by the Kentucky Energy and Environment Cabinet, concern management and disposal of pollutants and contaminants affecting air, land, and water. In particular, KRS 224.20-110, concerning air quality, prohibits the burning of pesticide containers.

III. AWQA Minimum Requirements:

Dispose of nonreturnable containers according to label directions.
Store containers that have been triple-rinsed or pressure rinsed in a dry ventilated area until properly disposed or recycled.

IV. Design Information:

V. Practice Maintenance:

Triple-rinse or pressure rinse empty containers until clean, and add the rinsate to the spray tank.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- Kentucky Department of Agriculture, Division of Environmental Services

VII. Cost Share Assistance:

At this time, no cost share assistance is available for this practice.

VIII. Recommendations:

Participate in a Rinse and Return Recycling program administered by the Kentucky Department of Agriculture, Division of Environmental Services.

Use biodegradable or returnable containers whenever possible.

Puncture recyclable containers to prevent reuse, remove label booklets, and discard lids.

IX. References: (see address and telephone listings in Chapter 8)

Kentucky Department of Agriculture, Division of Environmental Services

Crop Protection Reference
Chemical & Pharmaceutical Press, Inc.
888 Seventh Avenue, 28th Floor, New York, NY, 10106, 212-621-4600

Report a Release Immediately to 502-564-2380 or 800-928-2380. Kentucky Energy and Environment Cabinet

Pesticide & Fertilizer BMP #11 Applying Pesticides

Revised October 16, 2017

I. Description and Definition(s):

A pesticide is any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any insect, rodent, nematode, fungus, weed, or any other forms of life declared to be pests, and any substance or mixture of substances intended for use as a plant regulator, defoliant, or desiccant.

This BMP concerns the application of pesticides.

II. Regulatory Requirements:

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near Special Designated Use Waters:
Surface Water Intakes for Domestic Water Supply Use, Outstanding State Resource Waters, and Cold Water Aquatic Habitats as defined by 401 KAR 10:026 as well as Exceptional Waters and Outstanding National Resource Waters as defined by 401 KAR 10:030 require the use of Best Management Practices to protect Kentucky Water Quality Standards (401 KAR 10:029). Additionally, Outstanding State and National Resource Waters require additional protection to maintain water quality standards (see 401 KAR 10:031).

Spills, Leaks, or other Releases [KRS 224.1-400]:
Any spill, leak, discharge, dumping, or other "release" of any of the following classifications of substances in excess of a Reportable Quantity, as defined in 40 CFR 355, must be reported immediately to the Energy and Environment Cabinet's 24 hour environmental response line at 800-928-2380. If you are unsure what the Reportable Quantities are for your products, you may also call the same number to obtain them.

- Hazardous substances.
- Pollutants or contaminants. A release or threatened release of any element, substance, compound, or mixture (including fertilizer) into the environment in a quantity that may present an imminent or substantial danger to the public health is reportable.

Clean up requirements state that once a release has occurred, even if it is less than a reportable quantity, the responsible person must determine its effect on the environment and correct that effect. For questions concerning the Environmental Release Reporting and cleanup law call the Division of Waste Management 502-564-6716.

Registration, Sale, and Distribution of Pesticides [7 USC 136 136y and KRS 217.570]:
The Federal Insecticide, Fungicide, & Rodenticide Act (FIFRA) regulates registration, sale, and distribution of certain pesticides.

KRS 217.570, administered by the Kentucky Department of Agriculture, regulates the registration of pesticide products and adjuvants for sale in the state of Kentucky.

Worker Protection Standards [40 CFR 156, 40 CFR 170]:
These regulations, administered by the U.S. Environmental Protection Agency, contain standards designed to reduce the risks of illness or injury resulting from occupational exposures to pesticides.

Licensure and Operator Training [KRS 217B]:
KRS 217B, administered by the Kentucky Department of Agriculture, regulates licensure of pesticide applicators and commercial operator training.

III. AWQA Minimum Requirements:

Follow all pesticide label requirements. The label directions are federal law and enforceable by the Kentucky Department of Agriculture.

Follow KRS 217B, administered by the Kentucky Department of Agriculture, concerning licensure of pesticide applicators and commercial operator training. KRS 217B requirements for restricted use pesticides include:

- Having a Private Applicator Card certifying the holder has participated in a progressive, inclusive educational program for the application of pesticides, which includes training by the Cooperative Extension Office, using updated video and live presentations on the proper use of the pesticides with special attention to calibration for application, record keeping requirements, and personal safety.

Use backflow prevention techniques for all measuring, mixing, and loading. See Farmstead BMP #6.

IV. Design Information:

Follow all application directions and requirements on the label.

V. Practice Maintenance:

Maintain application equipment to insure application rate accuracy. Pesticide application shall be performed during suitable weather conditions to prevent drift and pesticide losses from runoff.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- Kentucky Department of Agriculture, Division of Environmental Services
- University of Kentucky Cooperative Extension Service

VII. Cost Share Assistance:

At this time, no cost share assistance is available for this practice.

VIII. Recommendations:

Pesticide application equipment should be calibrated regularly to insure application rate accuracy.

Avoid performing application prior to rainfall events to avoid pesticide losses from runoff.

IX. References: (see address and telephone listings in Chapter 8)

Crop Protection Reference
Chemical & Pharmaceutical Press, Inc.
888 Seventh Avenue, 28th Floor, New York, NY, 10106, 212-621-4600

Design Manual: Designing Facilities for Pesticide and Fertilizer Containment
Midwest Plan Service, Ag and Biosystems Engineering Department
122 Davidson Hall, Iowa State University, Ames, IA 50011-3080

University of Kentucky Cooperative Extension Service

Kentucky Department of Agriculture, Division of Environmental Services

Report a Release Immediately to 502-564-2380 or 800-928-2380. Kentucky Energy and Environment Cabinet

Chapter 4 Farmstead

Best Management Practices for Farmstead

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Guide for Determining Need for Farmstead Best Management Practices (BMPs)

Activity	Pollutant	Applicable BMPs (apply one or more of the following as needed to protect water quality)
Solid Waste	Biological, Chemical	1
Household Wastewater	Biological, Chemical	2
Petroleum Storage	Petroleum Products	3
Well Water Contamination	Biological, Chemical	1, 2, 3, 4
Water Harvesting		5
Backflow Prevention	Biological, Chemical	6

Farmstead BMP #1 Solid Waste Procedures

Revised November 9, 2018

I. Description and Definition(s):

Some water pollution is due to solid waste dumped into sinkholes, wells, and streams.

Solid Waste includes any garbage, refuse, sludge, and other discarded material, including solid, liquid, semi solid, or contained gaseous material resulting from industrial, commercial, mining (excluding coal mining wastes, coal mining by products, refuse and overburden), or agricultural operations, and from community activities.

Solid waste does not include:

- Those materials including, but not limited to, sand, soil, rock, gravel, or bridge debris, extracted as part of a public road construction project funded wholly or in part with state funds;
- Recovered material;
- Special wastes as designated by KRS 224.50 760;
- Solid or dissolved material in domestic sewage;
- Manure, crops, crop residue, or a combination thereof which are placed on the soil for return to the soil as fertilizers or soil conditioners; or
- Solid or dissolved material in irrigation return flows or industrial discharges which are point sources subject to permits under Section 402 of the Federal Water Pollution Control Act.

II. Regulatory Requirements:

Restrictions to Open Burning [401 KAR 63:005 Section 5]:
This regulation prohibits open burning, except for specific materials and circumstances.

Environmental Performance Standards for Solid Waste [401 KAR 30:031]:
This regulation sets forth the environmental standards with which all solid waste facilities must comply. It includes the federal Maximum Contaminant Levels (MCL).

Operation of Dumps [KRS 149:395]
This regulation requires dumps to prevent fires from spreading to nearby timberland.

Open Dumps Prohibited [KRS 224.40-100]
No person shall transport to or dispose of solid waste at any site or facility other than a site or facility for which a permit for waste disposal has been issued by the cabinet.

Public Health Nuisances [KRS 212.210]:
This statute authorizes the Cabinet for Human Resources and local Health Boards to penalize the operator of any facility that creates a health problem or potential health problem.

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near Special Designated Use Waters:
Surface Water Intakes for Domestic Water Supply Use, Outstanding State Resource Waters, and Cold Water Aquatic Habitats as defined by 401 KAR 10:026 as well as Exceptional Waters and Outstanding National Resource Waters as defined by 401 KAR 10:030 require the use of Best Management Practices to protect Kentucky Water Quality Standards (401 KAR 10:029). Additionally, Outstanding State and National Resource Waters require additional protection to maintain water quality standards (see 401 KAR 10:031).

III. AWQA Minimum Requirements:

Prevent surface and groundwater pollution from occurring when water drains through solid waste dumps (including garbage).

Do not dump solid waste in sinkholes, gulleys, streams, or other water bodies. Do not allow solid waste (including construction materials, dead animals, agricultural plastics, etc.) to enter lagoons, farm ponds, or other water bodies.

Follow label directions on solid waste with special disposal requirements.

Open burning of trash is prohibited. Only burn trees and brush when allowed by law.

IV. Design Information:

Not Applicable (Use solid waste receptacles through waste removal service).

V. Practice Maintenance:

Monitor receptacles for leaks.

Do not store wastes near or outside receptacle.

Ensure lid is closed after depositing waste.

Contact waste removal service well in advance of need for removal.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- University of Kentucky Cooperative Extension Service
- Local Conservation District Office
- Kentucky Department for Public Health
- Kentucky Division of Waste Management
- Kentucky Division of Forestry
- Kentucky Division of Public Health Protection and Safety

- Kentucky Cabinet for Health and Family Services
- Kentucky Division of Compliance Assistance

VII. Cost Share Assistance:

No cost share assistance is currently available for this best management practice, however, producers can utilize tire, chemical, hazardous, and general waste amnesty programs when offered.

VIII. Recommendations:

Close and remediate existing dumps on farms.

Look for new and creative ways to reduce waste quantity and toxicity.

Reduce unnecessary packaging use and disposal.

Reuse, recycle, and/or compost.

Repurposing spent tires is acceptable for agricultural purposes (i.e. silage cover weight, waterers, etc.).

Tires not being repurposed should be disposed of through an appropriate contractor or through a waste tire amnesty program.

IX. References: (see address and telephone listings in Chapter 8)

County Solid Waste Management Plans

University of Kentucky College of Agriculture Extension Publications

KY A Syst publication, Household Waste Management

Farmstead BMP #2 Septic Systems and On Site Sewage Disposal

Revised November 9, 2018

I. Description and Definition(s):

A septic system/onsite sewage disposal uses natural processes to treat and dispose of the wastewater from a home. It typically consists of a septic tank and a drainfield (also called a leachfield, lateral field, or subsurface soil absorption beds/trenches). The system accepts both "blackwater" (toilet wastes and kitchen sink waste) and "greywater" (wastes from the bathtub, shower, and laundry). Water that should not be discharged to the system includes water from foundation or footing drains, roof gutters, and other "clear" water.

II. Regulatory Requirements:

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near Special Designated Use Waters:
Surface Water Intakes for Domestic Water Supply Use, Outstanding State Resource Waters, and Cold Water Aquatic Habitats as defined by 401 KAR 10:026 as well as Exceptional Waters and Outstanding National Resource Waters as defined by 401 KAR 10:030 require the use of Best Management Practices to protect Kentucky Water Quality Standards (401 KAR 10:029). Additionally, Outstanding State and National Resource Waters require additional protection to maintain water quality standards (see 401 KAR 10:031).

Standards for Household Sewage Treatment [KRS 211.350 through KRS 211.380]:
These regulations, administered by the Cabinet for Health and Family Services, set minimum standards for household sewage treatment systems.

On Site Sewage System Construction Requirements [902 KAR 10:081 and 10:085]
These regulations, administered by the Cabinet for Health and Family Services, cover the approval of sewage disposal systems and site approval procedures.

On Site Sewage System Permit Issuance Requirements [902 KAR 10:110]
This regulation sets standards for issuance of permits to install or alter on-site sewage disposal systems to certified installers and homeowners under specific provisions.

On Site Sewage System Installer Certification Requirements [902 KAR 10:140]:
This regulation is administered by the Cabinet for Health and Family Services. It contains the requirements for certification as an on-site sewage system installer.

On Site Sewage System Plumbing Permit Issuance Requirements [KRS 211.370]:
This regulation allows the local boards of health to issue permits for on-site sewage treatment.

Groundwater Protection Plans [401 KAR 5:037]:
This regulation requires a groundwater protection plan for any facility engaged in any activity that has the potential to pollute groundwater.

III. AWQA Minimum Requirements:

Follow state and local Health Department codes that specify how wastewater systems must be designed, installed and maintained.

Develop and implement a Groundwater Protection Plan for septic tank system

Operate and maintain existing septic tanks in a manner that will not pollute surface water or groundwater.

IV. Design Information:

See the Generic Groundwater Protection Plan for Residential Septic Systems entitled "Homeowner's Septic System Guide and Record Keeping Folder".

The septic tank provides the first step in treatment by separating the solids from the liquids.

The soil surrounding the lateral lines provides the final treatment of the wastewater and disposes of it through groundwater recharge.

The groundwater protection plan prevents groundwater pollution, describes how the household septic system works, and describes good operation and maintenance practices that will prevent groundwater pollution.

V. Practice Maintenance:

Evaluate the septic system to determine if it is working properly and if the system needs maintenance.

Follow the check list, found in the Generic Groundwater Protection Plan, for evaluating your septic system.

Find and designate the location of the septic system and drainfield.

DO:

- Repair any leaking faucets and toilets.

- Discharge only biodegradable wastes into system.
- Divert down spouts and other surface water away from your drainfield.
- Keep your septic tank cover accessible for tank inspections and pumping.
- Have your septic tank pumped regularly every 3 to 5 years and checked for leaks and cracks.
- Call a certified septic system installer or plumber when you have problems.
- Limit use of sink garbage disposals.

DON'T:

- Flush non-biodegradable products (e.g., cigarette butts, disposable diapers, feminine napkins, tampons, pharmaceuticals, etc.) into your system.
- Dump solvents, oil, paints, thinners, disinfectants, pesticides or poisons down the drain. These materials can disrupt the treatment process and contaminate the groundwater and possibly the surface water.
- Dig in your septic drainfield or build anything over your septic drainfield.
- Plant anything over your drainfield except grass.
- Drive over your drainfield or compact the soil in this area in any way.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- Local Health Department
- Kentucky Division of Water, Groundwater Section
- Kentucky Department for Environmental Protection
- Kentucky Division of Public Health Protection and Safety, Environmental Management Branch
- University of Kentucky Cooperative Extension Service

VII. Cost Share Assistance:

No cost share assistance is currently available for this best management practice.

VIII. Recommendations:

Conserve home water and properly manage the wastewater treatment system to extend the effectiveness and life of the system.

Prevent water that does not need treatment (rainwater, etc.) from entering the treatment system.

If any of the following conditions exist, call a state licensed master plumber or certified septic system installer:

- Toilets flush slowly and water drains slowly from sinks and tubs.
- You notice any standing water, soggy ground, or smelly liquid in or near the drainfield.

- The ground slopes toward the septic system.
- Your septic tank and drainfield is less than 100 feet from a lake, stream, or pond.
- Water loving trees such as willows, sycamores, birches, or water maples are growing within 10 feet of the septic tank or lateral field.
- People have driven their cars or trucks frequently in any areas over the septic tank or drainfield.
- Any additions have been made to the house since the present septic system was installed.
- Faucets drip or a toilet runs continuously.

Keep a Maintenance Log. Date what was done and reason for the maintenance (Example: measure sludge, pump the tank).

Keep an Inspection Log. Date what you observed upon walking over the septic system (Example: any unpleasant odors, soggy soil, surfacing wastewater).

Prepare a Site Drawing. Show accurately the layout of the system on your lot. Include exact distances of each portion of the system from at least two (2) fixed reference points (e.g., corner of house or garage, large trees, property line markers).

Maintain any permits or receipts and record current residential address.

IX. References: (see address and telephone listings in Chapter 8)

Generic Groundwater Protection Plan: Residential Septic Systems, Kentucky Division of Water

Homeowner Tips for Septic Systems, Kentucky Department for Public Health

University of Kentucky Cooperative Extension Service Publications

Household Wastewater Treatment: a KY A SYST publication that provides an assessment opportunity and suggestions for improving household wastewater treatment, all in the framework of reducing the risk of groundwater contamination.

National Environmental Services Center Septic System information

Pipeline, Fall 2004, Maintaining Your Septic System, A Guide for Homeowners

Environmental Protection Agency, A Homeowner's Guide to Septic Systems

Environmental Protection Agency, Septic Systems (Onsite/Decentralized Systems)

Farmstead BMP #3 On Farm Petroleum Storage and Handling

Revised November 9, 2018

I. Description and Definition(s):

An "underground storage tank (UST) system" is any tank, including underground piping connected to the tank, which has at least 10% of its volume underground. This BMP applies only to UST systems that have stored or are storing petroleum products.

"Release" means any spilling, leaking, emitting, discharging, escaping, leaching, or disposing of a petroleum product into groundwater, surface water, or surface or subsurface soils. The term shall not include releases that are permitted or authorized by state or federal law.

USTs are divided by law into "regulated" and "unregulated" tanks. Unregulated tanks include:

- Farm and residential fuel tanks of less than 1100 gallon capacity storing motor fuel used for non-commercial purposes;
- Tanks used for storing heating oil for consumptive use on the premises where they are stored;
- Tanks on or above the floor of underground areas, such as vaults, basements, or tunnels that can be visually inspected;
- Tanks empty prior to January 1, 1974;
- Home fuel oil tanks with capacity less than 110 gallons.

Note: Lexington/Fayette County has no exclusions or exemptions, i.e., all USTs are regulated.

Operators of regulated tanks have specific requirements such as: performing environmental site assessments before some installations, obtaining approval for installation plans from State Fire Marshall, installing or upgrading with spill and overfill and corrosion protection, performing some method of release detection for the UST system, meeting requirements for financial responsibility, etc. There are also provisions that require certified contractors for cleanup of releases, tank or piping upgrades or removals, etc. These items and more must be carried out in a specific manner in order to be in compliance with state and federal regulations.

Although unregulated tanks are not regulated to the above extent, cleanup requirements are similar in the event of a release. Also, most of the requirements and recommendations in this document offer a choice of procedures which may apply to non-regulated tanks but not to regulated tanks.

II. Regulatory Requirements:

Spills, Leaks, or other Releases [KRS 224.1-405 and 401 KAR Chapter 42]:
Any spill, leak, discharge, dumping, or other "release" of petroleum or petroleum products, including a fuel, oil, or lubricant, in excess of 25 gallons within a 24 hour period, or any release that causes a visible sheen on surface waters, must be reported. The reportable quantity of diesel fuel is 75 gallons or more in a 24 hour period. This holds for both regulated and non-regulated

tanks. Any release from a regulated tank is reportable. Report releases immediately to the Energy and Environment Cabinet's 24 hour environmental response line at 800-928-2380 or 502-564-2380.

Cleanup requirements state that once a release has occurred, even if it is less than a reportable quantity, the responsible person must determine its effect on the environment and correct that effect. For questions concerning the Environmental Release Reporting and Cleanup Law call 502-564-6716.

Disposal of Used Oil [40 CFR 279.82]:
Used automotive or industrial oil shall be recycled or properly disposed of.
Used oil may not be applied as a dust suppressant.

Groundwater Protection Plans [401 KAR 5:037]:
A person responsible for storage of petroleum products in containers greater than or equal to 55 gallons must develop and implement BMPs in order to prevent groundwater contamination.

Underground Storage Tanks [KRS 224.60 and 401 KAR 42]:
USTs are regulated by the Division of Waste Management (DWM) Underground Storage Tank (UST) Branch, under 401 KAR Chapter 42. If USTs are identified that should be registered, notify the DWM.

Above Ground Storage Tanks for Flammable Products [NFPA 30A and NFPA 31]:
Above ground storage tanks (ASTs) are regulated by the State Fire Marshall under NFPA 395 and NFPA 31. NFPA 395 concerns ASTs used to store flammable products on farms and isolated construction sites. NFPA 31 deals primarily with the storage of heating oil.

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near Special Designated Use Waters:
Surface Water Intakes for Domestic Water Supply Use, Outstanding State Resource Waters, and Cold Water Aquatic Habitats as defined by 401 KAR 10:026 as well as Exceptional Waters and Outstanding National Resource Waters as defined by 401 KAR 10:030 require the use of Best Management Practices to protect Kentucky Water Quality Standards (401 KAR 10:029). Additionally, Outstanding State and National Resource Waters require additional protection to maintain water quality standards (see 401 KAR 10:031).

III. AWQA Minimum Requirements:

Operate and maintain fuel storage tanks in a manner that will not pollute surface water or groundwater.

Develop and implement a Groundwater Protection Plan.

Use tanks designed for petroleum product storage and label all tanks. Post contact information for the Environmental Response Team 800-928-2380 or 502-564-2380 on all storage tanks.

Store absorbent materials nearby, in case of spill.

Install tanks according to manufacturer's recommendations.

To minimize the impact of leaks, locate tanks as far as practicable from water sources (e.g., plastic piping, wells, streams, ponds, septic systems, or open channel sinkholes).

If a spill occurs:

- Clean up immediately with absorbent material.
- Correct leaks immediately.
- If greater than 50 gallons of gasoline or 75 gallons of diesel are spilled, it must be reported to Environmental Response Team 800-928-2380.
- Empty remaining contents from tank.

When closing a tank in place:

- Remove all product and residue from the tank. Product may be used in equipment. Any residues or remaining product may be recycled. Contact Division of Waste Management or Solid Waste Coordinator for assistance locating waste oil recyclers.
- Disconnect and cap lines and fill pipe and leave vent lines open.

When removing underground storage tanks:

- Remove all product and residue from tank.
- Place any contaminated soil on plastic and cover with plastic. Prevent runoff of contaminated soil from storage area.
- If evidence of contamination (free product, staining, strong odors) is observed in the final excavation, it is recommended to request professional assistance from Division of Waste Management.
- If there is a minimal amount of stained or odorous soil, the soil can be backfilled into in the tank pit, placed on plastic and covered, or placed on plastic in a bermed area and allowed to aerate.
- Tanks must be disposed of properly (e.g. scrapped or used as culvert only after removing all product and residue from tank). Contact Division of Waste Management or Solid Waste Coordinator for information.
- If groundwater is contaminated, contact Division of Waste Management and/or Division of Water.

The tank owner should contact the local conservation district and/or the Division of Waste Management for assistance if there is a significant amount (more than 20 cubic yards) of contaminated soil, or if there is any groundwater contamination.

IV. Design Information:

Use tanks and equipment designed for petroleum product storage.

Install tank systems according to manufacturer's specifications.

Generic Groundwater Protection Plan for Home Heating Oil Tanks

V. Practice Maintenance:

- Above Ground Tanks
- Clean up Spills immediately
- Replace leaking hoses and equipment
- Routinely do a Visual check for leaks and damage to tanks.
- Underground Tanks
- Clean up Spills immediately
- Replace leaking hoses and equipment
- Routinely inspect for releases from tank
- Unexpected loss of fuel from the tank
- Dead vegetation around where tank is located
- Strong odor after rain events/ sheen.
- Product coming out of the ground.
- Periodically measure product in the tank and inspect fuel filters in equipment to ensure no water is entering the tanks

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- Kentucky Division of Waste Management
- Kentucky Division of Water, Groundwater Section

VII. Cost Share Assistance:

No cost share assistance is currently available for this best management practice.

VIII. Recommendations:

Buyers beware that the current owner of a property is responsible for petroleum storage tanks and spills unless an exclusion is written into the purchase agreement indicating the prior owner is liable. Check with a lending institution for an environmental audit checklist. This checklist will assist the purchaser of a farm in identifying problems that could lead to costly pollution cleanups.

When Installing Tanks:

- For above-ground tanks, use concrete pads with retention structures or soil berms for secondary containment to prevent spills from moving into waterways.

- Direct traffic around tank pits, tanks, and pumps to protect them from vehicle collision and damage. Driving over a buried UST can collapse the tank or cause leaky connections.
- Install bollards to prevent damage to tank from vehicles or trailers.
- Use some type of leak detection (i.e., record reconciliation, secondary containment).

When Closing a Tank in Place:

- Fill the tank with solid inert material (e.g., sand, concrete grout) to prevent tank collapse or floating to surface.
- Non regulated tanks may be removed by the owner. However, it is recommended that a certified tank remover conduct the removal for optimum safety, reduced potential for contamination, and reduced liability.

Please note that it is not recommended to thin spread soil contaminated with waste oil because of possible lead contamination. In this case, it is recommended to first test soil for lead.

IX. References: (see address and telephone listings in Chapter 8):

Division of Waste Management Underground Storage Tank Branch

Environmental Release Reporting and Cleanup Requirements

NFPA 395 for Standard for the Storage of Flammable and Combustible Liquids at Farms and Isolated Sites

NFPA 31, primarily regarding heating oil storage

Groundwater Protection Plans

Generic Groundwater Protection Plan for Home Heating Oil Tanks

State Fire Marshal Hazardous Materials

Emergency and Information Contacts (see address and telephone listings in Chapter 8)

Energy and Environment Cabinet 24 Hour Environmental Response line (to report releases or spills) 800-928-2380 or 502-564-2380

Farmstead BMP #4 Well Protection

Revised November 9, 2018

I. Description and Definition(s):

A water supply well is any excavation or opening in the surface of the earth that is drilled, cored, bored, washed, driven, jetted, or otherwise constructed when the actual or intended use in whole or part of an excavation is the removal of water for any purpose, including but not limited to culinary and household purposes, animal consumption, food manufacture, use of geothermal resources for domestic heating purposes and industrial, irrigation, and dewatering purposes, but not including wells to be used for watering stock or for general farmstead use if the wells do not provide water for human consumption; KRS 223.400

A well for human consumption is a well that produces potable water that meets the provisions of 401 KAR Chapter 8, the quality of which is approved by the cabinet, or is used as a primary drinking water source.

II. Regulatory Requirements:

Water Well Construction Practices and Standards [401 KAR 6:310]:
This regulation provides standards for the drilling, modification, and abandonment of wells, to protect well water quality and groundwater resources.

Protection of Water Quality in Human Consumption Wells [902 KAR 10:085]
This regulation refers to the protection of wells with nearby on-site sewage disposal systems.

Practices and Standards for Dairy Farm Wells [902 KAR 50:110]:
This regulation provides standards for the protection of private well water supplies from dairy and other animal waste and groundwater runoff.

Use of Kentucky Certified Well Drillers [KRS 223.400-460]:
This statute gives the Cabinet the authority to require that all water wells drilled in Kentucky are to be constructed by certified drillers, and the authority to certify drillers. All water wells drilled and abandoned in Kentucky, including on Kentucky farms, must be drilled, constructed, and abandoned by a Kentucky Certified Well Driller.

Requirements for Kentucky Certified Well Drillers [401 KAR 6:320]:
This regulation provides for the certification of water well drillers, including the requirements for applications and examinations, and a fee schedule.

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near Special Designated Use Waters:
Surface Water Intakes for Domestic Water Supply Use, Outstanding State Resource Waters, and Cold Water Aquatic Habitats as defined by 401 KAR 10:026 as well as Exceptional Waters and Outstanding National Resource Waters as defined by 401 KAR 10:030 require the use of Best Management Practices to protect Kentucky Water Quality Standards (401 KAR 10:029). Additionally, Outstanding State and National Resource Waters require additional protection to maintain water quality standards (see 401 KAR 10:031).

Groundwater Protection Plans [401 KAR 5:037]:
This regulation requires a groundwater protection plans for any facility engaged in any activity that has the potential to pollute groundwater.

III. AWQA Minimum Requirements:

Develop and implement a Groundwater Protection Plan to protect your water source.

At a minimum, a well should be located at the required distance from potential sources of contamination.

Human Consumption Wells:

- When installing drinking water wells, use certified well drillers. Contact Division of Water, Groundwater Section for a list. All drillers are required to be certified and to follow state regulations 401 KAR 6:310.
- Producers or their agents or contractors shall not alter the design of wells. (e.g., cutting off casing below ground level).
- Location of new wells relative to septic drainage fields, septic tanks, etc. is subject to the requirements of 902 KAR 10:085.

General Use Wells: wells constructed or improved to provide water for livestock, irrigation or recreation.

- Protect wells from contamination.
- Locate new wells at least 50 feet from septic tank (70 feet from lateral field) in accordance with 902 KAR 10:085.
- Locate wells up gradient from animal waste area, pesticide, fuel or waste storage.
- See NRCS standards and specifications for water wells.

IV. Design Information:

Well Water Quality Protection:
Surface completions for water wells shall be constructed with a minimum of four inches of well casing above the ground surface, so as to exclude the entrance of surface or near surface water and contaminants into the well and subsurface.

Recommended setback requirements, and other design criteria from 401 KAR 6:310.

(1) Wells shall be installed in accordance with the minimum lateral distances between the well and potential pollution sources in Table C of this administrative regulation.

Table C: Setback Requirements	
Lateral Sources of Contamination	Minimum Distances
Leaching Pit	100 Feet
Petroleum Storage Tank	100 Feet
Grave or Cemetery	75 Feet
Manure Pile, Animal Waste Storage or Confined Animal Feeding Operation	75 Feet
Wastewater Treatment Disposal System	75 Feet
Side Wall of Lateral Trench, Bed or Lagoon	70 Feet
Geothermal – Closed Loop, Un-grouted	70 Feet
Water Supply Well	50 Feet
Septic Tank or Sewer Line	50 Feet
Livestock Pen, Corral or Stable	50 Feet
Surface Water Body	25 Feet
Geothermal – Closed Loop, Grouted; Abandoned Water Well, Grouted	20 Feet
Property Lines, Utility Lines or Roadway Right of Way	10 Feet

(2) The certified well driller shall evaluate land-use activities, both on the property on which the well is to be located and on adjacent properties, and identify other potential pollution sources not listed subsection (1) of this section.
(3) If the unconsolidated material is less than twenty (20) feet thick and composed of predominantly sand or gravel, the minimum lateral distances in subsection (1) of this section shall be doubled.
(4) Wells may be constructed in flood zones if an alternate site does not exist.
(5) The certified well driller shall terminate the casing a minimum of two (2) feet above the maximum known flood elevation, or any known conditions of flooding by drainage or run-off from the surrounding land.
(6) Buildings. The well extended vertically shall clear a projection from a building by a minimum of five (5) feet.
(7) Pits and basements. Wells shall not be constructed in pits or basements.

General Use Wells:
These wells are not for human consumption. Animal use only.

- Install adequate pumping facilities to meet the anticipated needs.
- For further information see the NRCS standards/specifications for water wells.
- Generic Groundwater Protection Plans for Domestic Water Well

V. Practice Maintenance:

Inspect exposed parts of well periodically for problems such as:

- Cracked or corroded well casing.

- Broken or missing well cap.
- Damage to protective casing.
- Settling and cracking of surface seals.

Provide a well cap or sanitary seal to prevent unauthorized use of or entry into the well.

If an existing well is located closer than the specified distance from a potential contamination source (see "IV. Design Information", above), disinfection and appropriate well testing should be conducted more than once per year.

Avoid mixing or using pesticides, fertilizers, herbicides, degreasers, fuels, or other pollutants near a well.

Do not use dry wells, or wells that are not properly abandoned, for disposal. (This activity requires an underground injection control permit from EPA.)

Do not locate any type of polluting activity up slope from your well.

Disinfect drinking water wells at least once per year using bleach or hypochlorite granules.

Provide for sediment removal or well cleaning as necessary.

Have the well tested once per year for fecal coliform or other constituents that may be of concern.

Keep accurate records of any well maintenance, such as disinfection or sediment removal, that might require use of chemicals in the well.

Use a Kentucky Certified Water Well Driller for any new well construction or modification, and proper well abandonment.

Implement the BMPs in your Groundwater Protection Plan

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- Kentucky Division of Water, Groundwater Section
- Local Health Department
- Kentucky Division of Public Health Protection and Safety

VII. Cost Share Assistance:

No cost share assistance is available for this practice at this time.

VIII. Recommendations:

Follow the Division of Water Generic Groundwater Protection Plan.

Conduct basic water testing annually.

Properly maintain each well over the life of its use, including repairing damage, removing sediment accumulations, and addressing other concerns dealing with the integrity of the well.

- Keep a log for well maintenance.
- Keep a log for well testing and well disinfection.

IX. References: (see agency address and telephone listings in Chapter 8)

Kentucky Division of Water, Groundwater Section

The Generic Groundwater Protection Plan for Domestic Wells, Kentucky Division of Water

Water Well Owners Guide, Kentucky Division of Water

Water Supply Well Construction Practices and Standards. 401 KAR 6:310

Kentucky Division of Public Health Protection and Safety

USDA NRCS Water Well Practice Standards

- Practice Code 642 Water Well
- Practice Code 351 Water Well Decommissioning

University of Kentucky College of Agriculture Extension publications

U.S. EPA's Safe Drinking Water Hotline: 800-426-4791

Farmstead BMP #5 Water Harvesting

Revised November 9, 2018

I. Description and Definition(s):

Water harvesting is the collection of water from farmland or farm buildings for utilization by livestock or crops. Sources of water include, but are not limited to, runoff, springs, groundwater aquifers, rivers, streams, ponds, reservoirs, floodplains, rainfall, condensation inside green and hoop houses, and dew. In some cases, residential greywater may be harvested and utilized for subsurface irrigation on crops.

Benefit(s): Rainwater comes without charge, its sodium free, soft, has almost a neutral pH and superior for livestock, crops, and landscape irrigation. Harvested water is close to the source eliminating the need for costly distribution systems.

Harvesting rainwater and other water found on the landscape provides a water source when groundwater is unacceptable due to sulfur or iron content or unavailable. It can also be used to supplement city water supplies. Harvested water can thereby reduce energy and utility bills.

Zero hardness prevents scale on equipment. Rainwater harvesting reduces storm water runoff reducing the potential for soil erosion. Diverting clean water from roofs may also reduce water that may become contaminated by animal confinement areas.

The process of developing a water budget for livestock and or crops reveals the value of water, promotes conservation, and stimulates additional conservation management practices such as rotational grazing, proper stocking density, and riparian areas and filter strips.

II. Regulatory Requirements:

Operating Permits [401 KAR 5:005, 401 KAR 5:065]:
Building and/or operating a wastewater storage pond requires a Kentucky No Discharge Operations Permit (KNDOP) in accordance with 401 KAR 5:005, or a Kentucky Pollution Discharge Elimination System (KPDES) permit, in accordance with 401 KAR 5:065.

Construction in Floodplains [KRS 151.250]:
Construction activities (e.g., fillings, channel relocations, streambank restoration, buildings, culverts, and bridges) in floodplains require a stream construction permit pursuant to KRS 151.250. An exemption exists for watersheds of less than one square mile (640 acres), except for impoundments and dams which again fall under KRS 151.250 for a permit.

Spills, Leaks, or other Releases [KRS 224.01-400]:
Any spill, leak, discharge, dumping, or other "release" of any of the following classifications of substances in excess of a reportable quantity must be reported immediately to the Energy and Environment Cabinet's 24-hour environmental response line at 800-928-2380:

- Hazardous substances
- Pollutants or contaminants. A release or threatened release of any element, substance, compound, or mixture (including manure) into the environment in a quantity that may present an imminent or substantial danger to the public health is reportable.
- Petroleum or petroleum products. Any release including a fuel, oil, or lubricant, in excess of 25 gallons within a 24-hour period, must be reported. The reportable quantity of diesel fuel is 75 gallons or more in a 24-hour period.

Cleanup requirements state that once a release has occurred, even if it is less than a reportable quantity, the responsible person must determine its effect on the environment and correct that effect. For questions concerning the Environmental Release Reporting and Cleanup Law call 502-564-6716.

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near Special Designated Use Waters:
Surface Water Intakes for Domestic Water Supply Use, Outstanding State Resource Waters, and Cold Water Aquatic Habitats as defined by 401 KAR 10:026 as well as Exceptional Waters and Outstanding National Resource Waters as defined by 401 KAR 10:030 require the use of Best Management Practices to protect Kentucky Water Quality Standards (401 KAR 10:029). Additionally, Outstanding State and National Resource Waters require additional protection to maintain water quality standards (see 401 KAR 10:031).

III. AWQA Minimum Requirements:

- Construct water harvesting structure and manage harvested water using practices that do not cause erosion.
- Ensure that practices continue to divert stormwater away from animals, feedlots, and animal waste storage facilities in order to minimize the volume of wastewater and maximize harvested water.
- Maintain grassed waterways and filter strips that may receive concentrated flows. Direct concentrated flows away from areas where erosion may occur.
- In some cases, diversions, berms, and sheet flow systems may be needed to prevent erosion and reduce the speed of overflows.
- Install backflow prevention or air gap system to prevent contaminated water from entering municipal water supply lines.

IV. Design Information:

Utilize USDA Natural Resources Conservation Service practices to harvest water.

Utilize roof area and catchments, grassed waterways, filter strips, or existing ponds to collect water.

Adhere closely to the design and construction plan developed by government or private engineers. Contact the county conservation district for local information.

V. Practice Maintenance:

- Periodically checking the water harvesting system, including downspouts, culverts, surface drains, and ponds to make sure that the structures are working properly.
- Preventing erosion at outlets.
- Inspecting for and removing debris, minerals, algae, and other materials that may restrict system flow.
- Draining or providing cold weather operation of the system during the winter.
- Controlling vegetation, wildlife, rodents, or burrowing animals from damaging structures.
- Maintaining all fences to prevent unauthorized human or livestock access.
- Inspecting the catchment area for signs of ultraviolet degradation of flexible materials.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- USDA Natural Resources Conservation Service Kentucky Office
- Kentucky Division of Water

VII. Cost Share Assistance:

Cost Share assistance to landusers considering this BMP may be available in some circumstances through the USDA Conservation Provisions of the current Farm Bill or the Kentucky Soil Erosion and Water Quality Cost Share Program. For more information contact the local offices of the USDA Farm Service Agency (FSA) or the local conservation district office.

To receive cost share funding, approved BMPs must meet the specific requirements of the particular cost share program.

VIII. Recommendations:

- Water harvesting structures should be sized appropriately for rainfall amount and usage needs.
- Screens and other guards should be installed to minimize the leaf debris that can reach the storage structure.
- Guards should also prevent mosquito breeding.
- Water harvesting for above ground tanks should begin in March and continue through the middle of October, unless there is an unexpected risk of freezing prior.
- Water harvested from asphalt shingles should not be used to water livestock.
- Backflow preventers should be installed to prevent contamination of the municipal water supply.
- Use dark or shaded tanks to prevent algal growth and cooler water temperatures for the plants and animals.
- Solar panels and wind energy can be used to pump water to tanks, however gravity flow is the most efficient.

IX. References: (see address and telephone listings in Chapter 8)

USDA/NRCS Field Office Technical Guide

- Practice Code 636 Water Harvesting Catchment
- Practice Code 362 Diversion
- Practice Code 558 Roof Runoff Structure
- Practice Code 350 Sediment Basin
- Practice Code 356 Dike
- Practice Code 410 Grade Stabilization Structure
- Practice Code 468 Lined Waterway or Outlet
- Practice Code 620 Underground Outlet
- Practice Code 638 Water and Sediment Control Basin
- Practice Code 554 Drainage Water Management
- Practice Code 516 Livestock Pipeline
- Practice Code 614 Watering Facility

University of Kentucky College of Agriculture Extension publications:

- AEN-103 Stormwater BMPs for Confined Livestock Facilities
- AEN-135 Rainwater Harvesting for Livestock Production Systems
- HO-120 Off the Grid: Ultra-low Pressure Drip Irrigation and Rainwater Catchment

Farmstead BMP #6 Backflow Prevention

Approved June 8, 2019

I. Description:

This BMP concerns backflow prevention from both livestock and crop production facilities.

Definition(s):
"Backflow" means the flow of water, chemicals, pathogens, nutrients, and/or other undesirable substance into the distribution pipes of a potable water supply from any source or sources other than the water treatment plant.

"Backpressure Backflow" occurs when the pressure from system user exceeds the positive pressure in the distribution lines

"Backsiphonage" occurs when there is a partial vacuum (negative pressure) in the distribution lines due to pressure loss from the source.

"Backflow preventer" is a method or mechanical device to prevent backflow.

"Farmstead" means a farm dwelling together with other farm buildings and structures incident to the operation and maintenance of the farm situated on 10 acres or more of land which is located outside the corporate limits of a municipality. "Farm" as associated with farmstead which is defined in KRS 318.010(8) means property that shall have a bona fide agricultural or horticultural use as defined by KRS 132.010(9) and (10) and qualified by and registered with the PVA in that county.

Benefit(s): Agricultural activities including but not limited to fertigation, pesticide mixing and loading, and livestock water requirements have the potential to contaminate municipal water sources. Backflow, which is the flow of water in the reverse direction, can cause contaminated water to enter drinking water lines, creating a health hazard. Implementing practices and installing devices to prevent backflow and backsiphonage can reduce this risk.

II. Regulatory Requirements:

Farmstead Exemption [KRS 318.015]:
Farmsteads are exempt in accordance with KRS 318.015, unless the water purveyor does not accept farmsteads.

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

III. AWQA Minimum Requirements:

Implementing backflow prevention practices reduces the risk of contaminated water entering drinking water lines and creating a health hazard.

- Use backflow prevention techniques for all pesticide related activities including measuring, mixing, and loading.
- Implement backflow prevention techniques at all livestock watering facilities.
- Install vacuum breakers and utilize air gaps with all spigots and hoses.
- Protect all plumbing fixtures from livestock to reduce the risk of livestock damage. Damaged fixtures may be more susceptible to backflow events.
- Install double check valves in the lines of all fertigation and irrigation equipment.

IV. Design Information:

Use backflow prevention techniques such as air gap when filling spray tanks or livestock troughs. Install anti-backflow device/s (double check valve would be the standard option) on the farm side of the water meter to reduce risk of contaminant flow to potable water system. Protect all plumbing fixtures from livestock to reduce the risk of livestock damage. Install exclusion fencing to around waterers in a manner that limits livestock access to plumbing fixtures, while still allowing access to water. Damaged fixtures may be more susceptible to backflow events. Mount holders for hoses that are used to fill tanks and troughs at a level and location that ensures an airgap is maintained while prohibiting direct access of livestock to interact with hose. Install double check valves in the lines of all fertigation and irrigation equipment.

V. Practice Maintenance:

Regularly inspect and ensure the proper function of backflow prevention practices. When necessary, repair and maintain any malfunctioning devices or practices. Identify new areas of need for backflow prevention on the farm during routine inspections. Develop and implement new backflow prevention practices on the farmstead, as necessity dictates.

VI. Technical Assistance:

- Kentucky Division of Plumbing
- Kentucky Division of Water

VII. Cost Share Assistance:

No state cost share is currently available for this practice.

VIII. Recommendations:

Contact a licensed plumber to evaluate water infrastructure

If possible, use a nurse tank as the water source when filling application equipment for pesticide dilution and application.

Install an Anti-Backflow device such as those listed below:

- Air Gap
- Reduced Pressure Principle Back Pressure Backflow Preventer
- Double Check Valve Assembly
- Pressure Type Vacuum Breaker
- Atmospheric Type Vacuum Breaker
- Barometric Loop

IX. References:

USDA/NRCS Field Office Technical Guide
- Practice Code 614 Watering Facility
- Practice Code 533 Pumping Plant

University of Kentucky College of Agriculture Extension publications:
- IP-41 Agricultural Storage and Handling

Chapter 5 Crops

Best Management Practices for Crops

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Guide for Determining Need for Crops Best Management Practices (BMPs)

Activity	Pollutant	Applicable BMPs (apply one or more of the following as needed to protect water quality)
Farming Row Crops 1616,	Sediment	1, 2, 3, 4, 6, 7, 10, 13, 14, 15, 16,*
Farming in Critical Areas	Sediment	8, 11, 15
Pesticide Use	Pesticides	6, 12
Plant Food Usage	Plant Nutrients	5, 6, 13, 15, *
Animal Waste Application	Animal Waste	5, 6, 7, 13, 15, 16,*
Industrial Waste Application	Industrial Waste	6, 7, 13, 15, *
Forage	Animal Waste	7, 9, 15, *
Growing and Maintaining Turf	Nutrient/Pesticide	2, 6, 12, 15, *
Raising Fruit or Christmas Trees	Nutrient/Pesticide	2, 6, 9, 12, 15, *

Streambank and Shoreline Protection should be implemented to minimize negative impacts for streambank areas adjacent to crops. To determine needs in this area refer to Streams & Other Waters BMP #3.

* Also refer to Livestock BMP #11 - Nutrient Management

Crops BMP #1 Conservation Cropping Sequence

Revised 4/23/20

I. Description and Definition(s):

Conservation cropping sequence is designed to provide adequate organic residue for maintenance or improvement of soil tilth.

Crops to be planted on a given field may be changed year by year in a planned sequence. Higher yields generally produce more crop residue, which results in more soil organic matter accumulation. Rotation of crop species generally results in higher yields of each crop species and promotes better soil quality. Where possible, the corn-wheat-double crop soybean rotation generally results in the best benefits to soils.

II. Regulatory Requirements:

Activities in Jurisdictional Wetlands:
Farming activities that may affect surface drainage in areas designated as jurisdictional wetlands may be subject to regulation by the US Army Corps of Engineers, Kentucky Division of Water, and US Department of Agriculture depending on the nature of the activity. Contact local representatives of the Natural Resources Conservation Service to determine specific requirements.

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near Special Designated Use Waters:
Surface Water Intakes for Domestic Water Supply Use, Outstanding State Resource Waters, and Cold Water Aquatic Habitats as defined by 401 KAR 10:026 as well as Exceptional Waters and Outstanding National Resource Waters as defined by 401 KAR 10:030 require the use of Best Management Practices to protect Kentucky Water Quality Standards (401 KAR 10:029). Additionally, Outstanding State and National Resource Waters require additional protection to maintain water quality standards (see 401 KAR 10:031).

III. AWQA Minimum Requirements:

Maintain an adopted sequence of crops designed to provide adequate organic residue for maintenance or improvement of the physical, chemical, and biological condition of the soil. These methods will reduce soil erosion, improve water use efficiency and water quality, and break the reproduction cycle of plant pests.

IV. Design Information:

Choose crops suited to the soil type(s) of each field.

Design crop rotations to meet the residue needs of your crop residue management plans.

Rotations that include winter small grains, winter cover crops and/or pasture/hay fields all provide good erosion control. High-yielding crops produce more crop residue than low-yielding crops.

Winter small grains and pasture/hay can be used in rotations with low residue crops, such as tobacco, soybean and vegetables, to gain better erosion control.

High residue crops such as corn can be used to replace soybeans or any other low residue crop in the rotation to gain better erosion control.

Crop rotations that include pasture/hay can be lengthened by maintaining the existing stand for additional years.

V. Practice Maintenance:

Take soil tests and refer to University of Kentucky AGR 1 Lime and Nutrient Recommendations to determine the annual nutrient and lime application rates for obtaining desired yield levels.

Scout fields for pests and take appropriate management decisions.

Plant each crop species at the proper time, the proper soil depth and the proper plant population into weed-free conditions.

Manage other plant pests as necessary to help protect grain yield potential and soil-carbon building potential.

Consider herbicide carry over to avoid crop failures.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- University of Kentucky Cooperative Extension Service
- USDA Natural Resources Conservation Service

VII. Cost Share Assistance:

Cost share assistance to landusers considering this BMP may be available in some circumstances. For more information contact the local office of the USDA Natural Resources Conservation Service (NRCS) or the local conservation district office.

To receive cost share funding, approved BMPs must meet the specific requirements of the particular cost share program.

VIII. Recommendations:

See Design Information and Practice Maintenance sections.

IX. References: (see address and telephone listings in Chapter 8)

USDA/NRCS *Field Office Technical Guide*

- Practice Code 328 Conservation Crop Rotation

University of Kentucky College of Agriculture Extension publications

Crops BMP #2 Conservation Cover

Revised 4/23/20

I. Description and Definition(s):

Conservation cover: establishing and maintaining perennial vegetative cover (grass, legume, trees, and/or shrubs) to protect soil and water resources on land retired from agricultural production.

II. Regulatory Requirements:

Activities in Jurisdictional Wetlands:
Farming activities that may affect surface drainage in areas designated as jurisdictional wetlands may be subject to regulation by the US Army Corps of Engineers, Kentucky Division of Water, and US Department of Agriculture depending on the nature of the activity. Contact local representatives of the Natural Resources Conservation Service to determine specific requirements.

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near Special Designated Use Waters:
Surface Water Intakes for Domestic Water Supply Use, Outstanding State Resource Waters, and Cold Water Aquatic Habitats as defined by 401 KAR 10:026 as well as Exceptional Waters and Outstanding National Resource Waters as defined by 401 KAR 10:030 require the use of Best Management Practices to protect Kentucky Water Quality Standards (401 KAR 10:029). Additionally, Outstanding State and National Resource Waters require additional protection to maintain water quality standards (see 401 KAR 10:031).

III. AWQA Minimum Requirements:

Establish and maintain perennial vegetative cover to adequately protect soil and water resources.

IV. Design Information:

Grass and Legume Plantings:
Follow Cooperative Extension Service or NRCS Guidelines.

V. Practice Maintenance:

Take soil tests and/or refer to University of Kentucky publication AGR-1 Lime and Nutrient Recommendations to determine the annual nutrient and lime application rates.

Grass and Legume Plantings:
Maintain in perennial vegetation.

Mow to control weeds.

During the seedling period, keep mowing height above the height of the grass or legume seedlings. If possible, mow after bird nesting seasons.

Noxious weeds such as multi-flora rose, Johnson grass, and thistles may be controlled using herbicides.

Tree and Shrub Plantings:
Mow the herbaceous plants (grasses and broadleaves) whenever necessary to reduce competition with the trees and shrubs.

Noxious weeds may be controlled by herbicide spot treatments at any time.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- University of Kentucky Cooperative Extension Service
- USDA Natural Resources Conservation Service
- Kentucky Division of Forestry

VII. Cost Share Assistance:

Cost share assistance to landusers considering this BMP may be available in some circumstances. For more information contact the local office of the USDA Natural Resources Conservation Service (NRCS) or the local conservation district office.

To receive cost share funding, approved BMPs must meet the specific requirements of the particular cost share program.

VIII. Recommendations:

Use University of Kentucky Cooperative Extension Services and/or NRCS Guidelines.

IX. References: (see address and telephone listings in Chapter 8)

USDA/NRCS *Field Office Technical Guide*

- Practice Code 327 Conservation Cover

University of Kentucky College of Agriculture Extension publications

Kentucky Division of Forestry

Crops BMP #3 Conservation Tillage/Crop Residue Use

Revised 4/23/20

I. Description and Definition(s):

Conservation Tillage: any tillage and planting system in which enough of the soil surface is covered by plant residue after planting to minimize soil erosion by water.

II. Regulatory Requirements:

Activities in Jurisdictional Wetlands:
Farming activities that may affect surface drainage in areas designated as jurisdictional wetlands may be subject to regulation by the U.S. Army Corps of Engineers, Kentucky Division of Water, and U.S. Department of Agriculture depending on the nature of the activity. Contact local representatives of the Natural Resources Conservation Service to determine specific requirements.

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near Special Designated Use Waters:
Surface Water Intakes for Domestic Water Supply Use, Outstanding State Resource Waters, and Cold Water Aquatic Habitats as defined by 401 KAR 10:026 as well as Exceptional Waters and Outstanding National Resource Waters as defined by 401 KAR 10:030 require the use of Best Management Practices to protect Kentucky Water Quality Standards (401 KAR 10:029). Additionally, Outstanding State and National Resource Waters require additional protection to maintain water quality standards (see 401 KAR 10:031).

III. AWQA Minimum Requirements:

Adopt any tillage or planting system to maintain an adequate cover (at least 30% of the soil surface covered by residue after planting) to reduce soil erosion to acceptable levels.

IV. Design Information:

Adopt a cropping management system that will provide adequate crop residue to minimize soil and water losses.

Crop residue use is a necessary and integral part of conservation tillage systems, especially no tillage.

Site specific information is available from the University of Kentucky Cooperative Extension Service and the USDA/Natural Resources Conservation Service.

V. Practice Maintenance:

Maintain crop residues on the soil surface by reduced or no cultivation.

Use harvesting and other farm machinery that distributes residue evenly over the field.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- University of Kentucky Cooperative Extension Service
- USDA Natural Resources Conservation Service

VII. Cost Share Assistance:

Cost share assistance to landusers considering this BMP may be available in some circumstances. For more information contact the local office of the USDA Natural Resources Conservation Service (NRCS) or the local conservation district office.

To receive cost share funding, approved BMPs must meet the specific requirements of the particular cost share program.

VIII. Recommendations:

Reduced tillage and no till should be selected in soils and cropping systems where practical.

For corn, soybean and wheat in Kentucky, no-tillage generally results in yields better than or equal to yields in tilled systems.

IX. References: (see address and telephone listings in Chapter 8)

USDA/NRCS *Field Office Technical Guide*

- Practice Code 329 Residue and Tillage Management
- Practice Code 345 Residue and Tillage Management, Reduced Till

University of Kentucky College of Agriculture Extension publications

Crops BMP #4 Contour Farming

Revised 4/23/20

I. Description and Definition(s):

Contour farming: farming in such a way that all operations, such as tillage, planting, cultivating, and harvesting are across the slope, rather than up and down the slope.

II. Regulatory Requirements:

Activities in Jurisdictional Wetlands:
Farming activities that may affect surface drainage in areas designated as jurisdictional wetlands may be subject to regulation by the U.S. Army Corps of Engineers, Kentucky Division of Water, and U.S. Department of Agriculture depending on the nature of the activity. Contact local representatives of the Natural Resources Conservation Service to determine specific requirements.

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near Special Designated Use Waters:
Surface Water Intakes for Domestic Water Supply Use, Outstanding State Resource Waters, and Cold Water Aquatic Habitats as defined by 401 KAR 10:026 as well as Exceptional Waters and Outstanding National Resource Waters as defined by 401 KAR 10:030 require the use of Best Management Practices to protect Kentucky Water Quality Standards (401 KAR 10:029). Additionally, Outstanding State and National Resource Waters require additional protection to maintain water quality standards (see 401 KAR 10:031).

III. AWQA Minimum Requirements:

Perform all cropping operations across the most critical slope.

IV. Design Information:

Sinkhole depressions are generally not practical to contour, therefore, all operations should be done across the most critical slope.

Existing natural waterways should be left undisturbed in grass sod.

Site specific information is available from the USDA/Natural Resources Conservation Service.

V. Practice Maintenance:

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- University of Kentucky Cooperative Extension Service
- USDA Natural Resources Conservation Service

VII. Cost Share Assistance:

Cost share assistance to landusers considering this BMP may be available in some circumstances. For more information contact the local office of the USDA Natural Resources Conservation Service (NRCS) or the local conservation district office.

To receive cost share funding, approved BMPs must meet the specific requirements of the particular cost share program.

VIII. Recommendations:

Consider the size and operation of farm implements when planning the contour layout.

Consider the installation of a diversion or terrace system to intercept excess surface runoff and deliver the excess runoff to a stable outlet.

Consider terracing in extreme cropping situations.

IX. References: (see address and telephone listings in Chapter 8)

USDA/NRCS *Field Office Technical Guide*

- Practice Code 330 Contour Farming

University of Kentucky College of Agriculture Extension publications

Crops BMP #5 Nutrient Management

Revised 4/23/20

I. Description and Definition(s):

Nutrient management requires careful monitoring of all aspects of soil fertility and making necessary adjustments so that crop needs are met while minimizing the loss of nutrients to surface or groundwater. Nutrient management includes management of all plant nutrients associated with animal manure, commercial fertilizer, legume crops, crop residues and other organic wastes. Nutrient management provides the crop with the correct amount of nutrients at the optimum time and location possible so they are utilized efficiently. Proper nutrient management limits the amount of plant nutrients lost to leaching, runoff and volatilization. Nutrient management is one of the more important conservation practices that protect our natural resources. Tremendous benefits to water quality can be achieved and it is relatively easy to implement and can increase profits.

II. Regulatory Requirements:

Operating Permits [401 KAR 5:005, KAR 5:065]:
Building and/or operating any facility with components for management of liquid waste requires a Kentucky No Discharge Operations Permit (KNDOP) in accordance with 401 KAR 5:005, or a Kentucky Pollution Discharge Elimination System Permit (KPDES), in accordance with 401 KAR 5:065. There are no requirements from the Division of Water for dry or solid manure waste management systems.

No permit is required from the Division of Water if the stack pad is covered and the manure, from generation to final disposal, is handled in a dry (no water added intentionally or otherwise) fashion.

Groundwater Protection Plans [401 KAR 5:037]:
This regulation requires a groundwater protection plan for any facility engaged in any activity that has the potential to pollute groundwater.

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near Special Designated Use Waters:
Surface Water Intakes for Domestic Water Supply Use, Outstanding State Resource Waters, and Cold Water Aquatic Habitats as defined by 401 KAR 10:026 as well as Exceptional Waters and Outstanding National Resource Waters as defined by 401 KAR 10:030 require the use of Best Management Practices to protect Kentucky Water Quality Standards (401 KAR 10:029). Additionally, Outstanding State and National Resource Waters require additional protection to maintain water quality standards (see 401 KAR 10:031).

Use of Manure from Off-Site [KRS 224.1-010 (30)(a)]:
Manure, crops and crop residues are exempt from regulation as a solid waste when "placed on the soil for return to the soil as fertilizers or soil conditioners" (KRS 224.1-010 (30)(a)). Manure, crops and crop residues shall be used in accordance with a nutrient management plan for the facility on which the manure, crops and crop residues are being utilized.

Activities in Jurisdictional Wetlands:
Farming activities that may affect surface drainage in areas designated as Jurisdictional Wetlands may be subject to regulation by the U.S. Army Corps of Engineers, Kentucky Division of Water, U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency, and the U.S. Department of Agriculture depending on the nature of the activity. Contact local representatives of the USDA Natural Resources Conservation Service to determine specific requirements.

III. AWQA Minimum Requirements:

- Follow the guidelines in the University of Kentucky's Extension Publication ID-211, Kentucky Nutrient Management Planning Guidelines (KyNMP), to develop nutrient management plans unless the Producer is required to follow current NRCS Practice Code 590 (version 2013) based on federal program participation.
- Maintain an adopted sequence of crop rotations to utilize nutrients.
- Protect yield potential of the crops planted to help ensure nutrient use. A crop that performs poorly does not take up the expected amount of nutrients, does not provide adequate ground cover, and does not provide healthy root systems. Practices that help ensure high yields are met will better ensure proper nutrient use.
- Take soil tests to determine the pH (buffer), pH (water), phosphorous, potassium, and zinc to optimize plant production.
- Analyze animal manure for total nitrogen, phosphate, potash, and zinc prior to land application to establish nutrient credits and to formulate application rates. Phosphorous-based nutrient management plans shall require annual soil testing.
- Manage animal manure in a manner that prevents degradation of water, soil, air, and that protects public health and safety.
- Sufficient land must be available for a disposal area without overloading soils or exceeding crop requirements for nutrients.
- Minimize edge-of-field delivery of nutrients where no setbacks are required.
- Temporary storage of poultry manure up to 90 days, shall be stored in a manner that prevents water from coming in contact with litter storage area to prevent the migration of nutrients to surface and ground waters.

IV. Design Information:

Planning Considerations

Water Quality Protection. The nutrient form (animal manure, commercial fertilizer), timing, method of application and placement should be adjusted to conform to seasonal variations in the uptake of nutrients by specific crops. An example is splitting applications of nitrogen that is a recommended practice to reduce leaching and atmospheric deposition along with timing the application according to plant growth patterns. A single application may result in a portion of the nitrogen leaching into the groundwater or being transported in surface runoff to receiving water bodies.

Cover crops such as small grains can utilize excess nutrients, prevent their movement out of the root zone during the season when major crops are not produced. Nutrients returned to the soil from crop residues need to be considered when determining application rates of commercial fertilizers or animal manure for subsequent crops.

Residual Soil Nutrients. Soil tests are required to determine the amount of phosphorus, potassium, secondary nutrients, and micro-nutrients available in the soil and the liming requirements based on the soil pH. Nutrient application rates should be based on the results of independent soil tests or the University of Kentucky soil test recommendations.

Nutrient Needs of the Crops and Forages. Base manure applications off of the P2O5 and/or K2O content of the manure and the guidelines from AGR-1 Lime and Nutrient Recommendations. Account for the Nitrogen being contributed by the manure. Specific crops will utilize nutrients at different rates depending on factors such as soil type, climatic factors, and water budgets.

Available Nutrients. Nutrients in the soil available to the crop are identified with a soil test. Manure, litter, compost or wastewater that will be used should be analyzed for available nutrients prior to application. Nitrogen not available to plants in the manure is slowly converted to nitrate which is available to the plant. A pre-sidedress soil nitrate test can provide an estimate of the nitrate available in season from the manure. This test can work for nitrate becoming available from legumes and green manures.

V. Practice Maintenance:

Nutrient management is an ongoing practice and includes, but is not limited to the following:

- Take soil test and/or refer to University of Kentucky publication AGR-1 Lime and Nutrient Recommendations to determine annual nutrient and liming recommendations.
- Target realistic yield goals for each crop and forage grown.
- Utilize cover crops to maximize nutrient uptake, prevent groundwater contamination and/or leaching and prevent soil erosion. Cover crops can prevent un-utilized nitrogen from entering groundwater.
- Application Timing:
    - Manures have a significant portion of nitrogen in the organic form which delays release to the crop (spring applied) until closer to peak demand, resulting in

greater nutrient efficiency. However, manure applications may take place in the spring, summer, and fall months providing the appropriate conservation practices are followed (maintaining adequate reside, using cover crops, filter strips, etc.). Manure should not applied within 48 hours following a rain or within 12 hours of a forecasted rain.

- Monitor manure levels in storage facilities to assure proper storage capacity, and allow adequate time for emptying and spreading during favorable weather conditions and at times for optimum crop uptake. Avoid spreading animal manure on frozen or snow-covered land unless conditions allow no other reasonable alternatives and special provisions are made to control runoff and pollution. Permitted manure application operations cannot apply manures to frozen or snow covered soil. Limit the rate of liquid application through irrigation to 1/2 inch per hour with the total application stopped when soil moisture in the surface six inches is brought to field capacity. Liquid applications to pasture and hay land should result in no more than 24% coverage of the plant leaf surface. Livestock should be withheld from animal manure application areas until either the plant has added three inches of growth or a rainfall of at least 1/2 inch has occurred since application to wash some of the material for the leaf surface.
- Site specific information such as soil types and production capabilities are available from NRCS and the University of Kentucky Cooperative Extension Service.

VI. Technical Assistance: (See address and telephone listings in Chapter 8)

- USDA Natural Resources Conservation Service
- University of Kentucky Cooperative Extension Service
- Approved third party vendors (i.e. Certified Crop Advisors through the American Society of Agronomy, etc.)

VII. Cost Share Assistance:

Cost share assistance to landusers considering this BMP may be available in some circumstances. For more information contact the local office of the USDA Natural Resources Conservation Service (NRCS) or the local conservation district office.

To receive cost share funding, approved BMPs must meet the specific requirements of the particular cost share program.

VIII. Recommendations:

Fertilizer and/or Manure Rates and Balancing -
Nutrient application rates should be based on soil tests, manure analysis, and AGR-1 Lime and Nutrient Recommendations for the crops being grown. Manures should be considered and managed as fertilizers not as “waste”. Higher applications than recommended are not profitable and excess nutrients may be transported to groundwater aquifers or to surface streams.

IX. References: (See address and telephone listings in Chapter 8)

USDA/NRCS *Field Office Technical Guide*

- Practice Code 590 Nutrient Management

University of Kentucky College of Agriculture Extension publications

- IP-71: Nutrient Management in Kentucky
- ID-211: Kentucky Nutrient Management Planning Guidelines
- AGR-165: The Agronomics of Manure Use for Crop Production
- AEN-91: Managing Liquid Dairy Manure
- ID-148: Sampling Animal Manure
- IP-57: Potential for Livestock and Poultry Manure to Provide the Nutrients Removed by Crops and Forages in Kentucky
- AGR-146: Using Animal Manures as Nutrient Sources
- ID-189 Vegetative Filter Strips for Livestock Facilities

Crops BMP #6 Filter Strip

Revised 4/23/20

I. Description and Definition(s):

Filter strip: a strip or area of vegetation for removing sediment, organic matter, and other pollutants from runoff.

II. Regulatory Requirements:

Use of Heavy Equipment in Stream Channels [US Clean Water Act, 33 USC §1251 et seq., Section 404]:
The use of heavy equipment, within or along stream channels, that has the potential to degrade or alter the stream channel or the streambank, may require a 404 permit from the U.S. Army Corps of Engineers. See page Chapter 7 of this document for further information.

Activities in Jurisdictional Wetlands:
Farming activities that may affect surface drainage in areas designated as jurisdictional wetlands may be subject to regulation by the U.S. Army Corps of Engineers, Kentucky Division of Water, and U.S. Department of Agriculture depending on the nature of the activity. Contact local representatives of the Natural Resources Conservation Service to determine specific requirements.

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near Special Designated Use Waters:
Surface Water Intakes for Domestic Water Supply Use, Outstanding State Resource Waters, and Cold Water Aquatic Habitats as defined by 401 KAR 10:026 as well as Exceptional Waters and Outstanding National Resource Waters as defined by 401 KAR 10:030 require the use of Best Management Practices to protect Kentucky Water Quality Standards (401 KAR 10:029). Additionally, Outstanding State and National Resource Waters require additional protection to maintain water quality standards (see 401 KAR 10:031).

III. AWQA Minimum Requirements:

Maintain an adequate strip width or area of vegetation to remove sediment, organic matter, and other pollutants from runoff and wastewater.

Consider Practice Code 393 Filter Strips for minimum distances applicable to your farm.

IV. Design Information:

Locate filter strip on the lower edge of row crop fields especially if adjacent to intermittent or perennial streams, wells, or lakes or completely around sinkhole depressions.

Filter strips are most effective on slopes of 5% or less.

Current site specific information is available from the University of Kentucky Cooperative Extension Service.

V. Practice Maintenance:

Take soil tests and/or refer to University of Kentucky AGR-1Lime and Nutrient Applications to determine the annual nutrient and lime application rates for obtaining desired yield levels.

Apply plant nutrients and lime to maintain adequate growth.

Mow to eliminate woody plants.

Avoid using a filter strip as a roadway.

Avoid drift when applying herbicides on surrounding cropland.

Controlled grazing may be allowed if filter strips are dry and firm.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- USDA Natural Resources Conservation Service
- University of Kentucky Cooperative Extension Service

VII. Cost Share Assistance:

Cost share assistance to landusers considering this BMP may be available in some circumstances. For more information contact the local office of the USDA Natural Resources Conservation Service (NRCS) or the local conservation district office.

To receive cost share funding, approved BMPs must meet the specific requirements of the particular cost share program.

VIII. Recommendations:

Follow the Cooperative Extension Service recommendations for establishing vegetation.

Filter strip width should consider slope, nutrients used, and crop being grown.

IX. References: (see address and telephone listings in Chapter 8)

USDA/NRCS *Field Office Technical Guide*
- Practice Code 393 Filter Strip

University of Kentucky College of Agriculture Extension publications

Crops BMP #7 Grasses and Legumes in Rotation

Revised 4/23/20

I. Description and Definition(s):

This BMP concerns the use of grasses and/or legumes for one or more years as part of a crop rotation.

II. Regulatory Requirements:

Activities in Jurisdictional Wetlands:
Farming activities that may affect surface drainage in areas designated as jurisdictional wetlands may be subject to regulation by the U.S. Army Corps of Engineers, Kentucky Division of Water, and U.S. Department of Agriculture depending on the nature of the activity. Contact local representatives of the Natural Resources Conservation Service to determine specific requirements.

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near Special Designated Use Waters:
Surface Water Intakes for Domestic Water Supply Use, Outstanding State Resource Waters, and Cold Water Aquatic Habitats as defined by 401 KAR 10:026 as well as Exceptional Waters and Outstanding National Resource Waters as defined by 401 KAR 10:030 require the use of Best Management Practices to protect Kentucky Water Quality Standards (401 KAR 10:029). Additionally, Outstanding State and National Resource Waters require additional protection to maintain water quality standards (see 401 KAR 10:031).

III. AWQA Minimum Requirements:

Grasses and legumes should be used in the rotation with other crops to prevent erosion.

IV. Design Information:

Fields with long slopes require longer rotations than do fields with short slopes.

Rotate grasses and legumes with other crops in a planned sequence on sloping soils. Crop rotation should be implemented and managed so that it will reduce erosion and prevent excess nutrients from entering water supplies by providing adequate vegetative cover, reducing fertilizer needs by replacing some nitrogen, and reducing pesticide use by naturally breaking the cycle of weeds, insects, and diseases.

Site specific information is available from the Cooperative Extension Service and the USDA/Natural Resources Conservation Service.

V. Practice Maintenance:

Take soil tests and/or refer to University of Kentucky publication AGR-1 Lime and Nutrient Recommendations to determine the annual nutrient and lime application rates.

Animal manure can be used in place of commercial fertilizer. Nutrient testing will determine the amount of nutrients available in animal waste. Use caution in grazing immediately after heavy manure applications.

Avoid applying manure on frozen soil or before rains.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- University of Kentucky Cooperative Extension Service
- USDA Natural Resources Conservation Service

VII. Cost Share Assistance:

Cost share assistance to landusers considering this BMP may be available in some circumstances. For more information contact the local office of the USDA Natural Resources Conservation Service (NRCS) or the local conservation district office.

To receive cost share funding, approved BMPs must meet the specific requirements of the particular cost share program.

VIII. Recommendations:

The number of years of grasses and/or legumes needed in the crop rotation depends on the other crops grown, soil and landscape conditions, and the other best management practices.

The number of years in a rotation will be a determining factor in the selection of grasses and legumes.

Always consider the farm operation, livestock numbers, and future needs of hay or pasture crops.

Consider herbicide carryover to avoid crop failures.

IX. References: (see address and telephone listings in Chapter 8)

USDA /NRCS *Field Office Technical Guide*
- Practice Code 328 Conservation Crop Rotation

University of Kentucky College of Agriculture Extension publications

Crops BMP #8 Mulching

Revised 4/23/20

I. Description and Definition(s):

Mulching: applying plant residues or other suitable materials produced off site, to the land surface.

II. Regulatory Requirements:

Activities in Jurisdictional Wetlands:
Farming activities that may affect surface drainage in areas designated as jurisdictional wetlands may be subject to regulation by the U.S. Army Corps of Engineers, Kentucky Division of Water, and U.S. Department of Agriculture depending on the nature of the activity. Contact local representatives of the Natural Resources Conservation Service to determine specific requirements.

Use of Wood By-products or Off Site Plant Residue [KRS 224, 401 KAR Chapters 47-48]:
Mulching with plant residue not produced on site, or with wood by products, constitutes beneficial reuse of solid waste, and is subject to Division of Waste Management solid waste regulations.

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near Special Designated Use Waters:
Surface Water Intakes for Domestic Water Supply Use, Outstanding State Resource Waters, and Cold Water Aquatic Habitats as defined by 401 KAR 10:026 as well as Exceptional Waters and Outstanding National Resource Waters as defined by 401 KAR 10:030 require the use of Best Management Practices to protect Kentucky Water Quality Standards (401 KAR 10:029). Additionally, Outstanding State and National Resource Waters require additional protection to maintain water quality standards (see 401 KAR 10:031).

III. AWQA Minimum Requirements:

Apply plant residue (other than that produced on the site), wood fiber or by products, or other suitable material to the soil surface to conserve moisture, prevent surface compaction or crusting, reduce runoff and erosion, control weeds, and help establish plant cover.

IV. Design Information:

On severely eroded and graded sites use mulch with complementary water management practices, such as the protection of the area by diversions.

Anchor mulch to prevent removal by wind or surface water runoff.

On steep sites, where conventional equipment is impractical, use a hydro-seed or a blower to apply mulch.

V. Practice Maintenance:

Inspect mulched areas, especially after windstorms or rainstorms. Replace or repair all damaged areas as soon as practical. Severely damaged areas may need replacement with a different, more suitable mulch material and/or mulch anchoring.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- USDA Natural Resources Conservation Service

VII. Cost Share Assistance:

At this time, no cost share assistance is available for this as a stand-alone practice.

VIII. Recommendations:

Most mulches provide temporary protection from 2 or 3 months up to one year. Therefore, establish permanent vegetation or other erosion control practices as rapidly as practical.

Consider hydroseeding mulch with seed and fertilizer on steep and difficult sites.

IX. References: (see address and telephone listings in Chapter 8)

USDA/NRCS *Field Office Technical Guide*
- Practice Code 484 Mulching

Crops BMP #9 Pasture and Hayland Planting and Management

Revised 4/23/20

I. Description and Definition(s):

This BMP concerns the establishment, reestablishment, and maintenance of adapted grasses and/or legumes for long term pasture or hayland uses. It also concerns keeping pasture and hay plants growing and vigorous as long as possible to reduce water loss and protect the soil.

II. Regulatory Requirements:

Activities in Jurisdictional Wetlands:
Farming activities that may affect surface drainage in areas designated as jurisdictional wetlands may be subject to regulation by the U.S. Army Corps of Engineers, Kentucky Division of Water, and U.S. Department of Agriculture depending on the nature of the activity. Contact local representatives of the Natural Resources Conservation Service to determine specific requirements.

Use of Manure from Off Site [KRS 224 and 401 KAR Chapters 47-48]:
Manure brought from one farm to another is subject to Division of Waste Management solid waste regulations. Animal waste becomes solid waste when it is generated on one farm and disposed on another farm, or when its use doesn't constitute agronomic utilization of nutrients or benefit to the soil. If disposed on another farm, it is a permit by rule activity with no written authorization from the Division of Waste Management needed, but must meet the minimum environmental standards of KRS Chapter 224.

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near Special Designated Use Waters:
Surface Water Intakes for Domestic Water Supply Use, Outstanding State Resource Waters, and Cold Water Aquatic Habitats as defined by 401 KAR 10:026 as well as Exceptional Waters and Outstanding National Resource Waters as defined by 401 KAR 10:030 require the use of Best Management Practices to protect Kentucky Water Quality Standards (401 KAR 10:029). Additionally, Outstanding State and National Resource Waters require additional protection to maintain water quality standards (see 401 KAR 10:031).

III. AWQA Minimum Requirements:

Establish and maintain vigorous plant growth over as long a period as possible to reduce water loss and to protect the soil.

IV. Design Information:

Identify the soil types and the adapted plant species. Estimate the forage yield or the pasture carrying capacity.

Pasture Management:
Make a realistic estimation of the kinds and numbers of livestock on the farm and their estimated pastureland and hayland needs to avoid overgrazing.

Check the availability and location of an adequate and economical livestock water supply for successful grazing management.

To maintain hardy stands, control grazing and mow pastures to control weeds; cut hay at proper stage and timing for the plant species being grown.

V. Practice Maintenance:

A healthy, vigorous pasture and hayfield is essential to providing maximum soil protection, timely nutrient use and optimum livestock capacity.

Take soil tests and/or refer to University of Kentucky publication AGR-1 Lime and Nutrient Recommendations to determine the annual nutrient and lime application rates for obtaining desired yield levels. Properly apply lime and fertilizers.

Animal manure can be used in place of or addition to commercial fertilizer. Nutrient testing will determine the amount of nutrients available in animal manure. Use caution in grazing immediately after heavy manure applications.

Avoid making manure applications to frozen soil or before heavy rains.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- University of Kentucky Cooperative Extension Service
- USDA Natural Resources Conservation Service

VII. Cost Share Assistance:

Cost share assistance to landusers considering this BMP may be available in some circumstances. For more information contact the local office of the USDA Natural Resources Conservation Service (NRCS) or the local conservation district office.

To receive cost share funding, approved BMPs must meet the specific requirements of the particular cost share program.

VIII. Recommendations:

Consider the use of temporary control of surface runoff until grasses and legumes are established.

IX. References: (see address and telephone listings in Chapter 8)

USDA/NRCS *Field Office Technical Guide*

- Practice Code 512 Forage and Biomass Planting

University of Kentucky College of Agriculture Extension publications

- AGR-1 Lime and Nutrient Recommendations
- AGR-191 Using a Grazing Stick for Pasture Management

Crops BMP #10 Stripcropping

Revised 4/23/20

I. Description and Definition(s):

Stripcropping: a cropping system of growing two different crops in alternate strips on the contour or across the slope.

II. Regulatory Requirements:

Activities in Jurisdictional Wetlands:
Farming activities that may affect surface drainage in areas designated as jurisdictional wetlands may be subject to regulation by the U.S. Army Corps of Engineers, Kentucky Division of Water, and U.S. Department of Agriculture depending on the nature of the activity. Contact local representatives of the Natural Resources Conservation Service to determine specific requirements.

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near Special Designated Use Waters:
Surface Water Intakes for Domestic Water Supply Use, Outstanding State Resource Waters, and Cold Water Aquatic Habitats as defined by 401 KAR 10:026 as well as Exceptional Waters and Outstanding National Resource Waters as defined by 401 KAR 10:030 require the use of Best Management Practices to protect Kentucky Water Quality Standards (401 KAR 10:029). Additionally, Outstanding State and National Resource Waters require additional protection to maintain water quality standards (see 401 KAR 10:031).

II. AWQA Minimum Requirements:

Arrange crops so that a strip of grass, small grain, or other close growing crop is alternated with a strip of row crop. An entire field may be planted to crop if one is a close grown crop. Crop residue should be left on the ground over the winter, or a winter cover crop seeded. Necessary protective tillage operations should be carried out on each strip when it is used for row crops. Natural depressions and draws subject to erosion should be established and maintained in grassed or sod waterways.

IV. Design Information:

Buffer strips of perennial vegetation can be used in karst topography or fields with short slopes that break in different directions and do not lend to contour or field stripping.

Grass waterways should be established in concentrated water flow areas, according to Crops BMP #14 Grassed Waterways.

Alter strip width to fit equipment. (4 row, 6 row, 8 row, etc.)

Site specific information is available from the University of Kentucky Cooperative Extension Service and the USDA/Natural Resources Conservation Service.

V. Practice Maintenance:

Select alternate crops that fit well into the overall farm operation and that are adapted to the soil.

Maintain strip width, grassed waterways, diversions and other BMPs annually and repair or re-seed as needed.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- University Kentucky Cooperative Extension Service
- USDA Natural Resources Conservation Service

VII. Cost Share Assistance:

Cost share assistance to landusers considering this BMP may be available in some circumstances. For more information contact the local office of the USDA Natural Resources Conservation Service (NRCS) or the local conservation district office.

To receive cost share funding, approved BMPs must meet the specific requirements of the particular cost share program.

VIII. Recommendations:

Relocation of a fence or other obstruction may improve the strip cropping layout.

Oddly shaped areas and row ends may be used for wildlife habitat or hay.

Take soil tests and/or refer to University of Kentucky publication AGR-1 Lime and Nutrient Recommendations to determine the nutrient and lime application needs.

IX. References: (see address and telephone listings in Chapter 8)

USDA/NRCS *Field Office Technical Guide*
- Practice Code 585 Stripcropping

University of Kentucky College of Agriculture Extension publications

Crops BMP #11 Critical Area Planting and Treatment

Revised 4/23/20

I. Description and Definition(s):

Critical area planting: the establishment of vegetation on severely eroded, sediment producing areas that often require special planting and management techniques to overcome unfavorable soil site conditions.

II. Regulatory Requirements:

Activities in Jurisdictional Wetlands:
Farming activities that may affect surface drainage in areas designated as jurisdictional wetlands may be subject to regulation by the U.S. Army Corps of Engineers, Kentucky Division of Water, and U.S. Department of Agriculture depending on the nature of the activity. Contact local representatives of the Natural Resources Conservation Service to determine specific requirements.

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near Special Designated Use Waters:
Surface Water Intakes for Domestic Water Supply Use, Outstanding State Resource Waters, and Cold Water Aquatic Habitats as defined by 401 KAR 10:026 as well as Exceptional Waters and Outstanding National Resource Waters as defined by 401 KAR 10:030 require the use of Best Management Practices to protect Kentucky Water Quality Standards (401 KAR 10:029). Additionally, Outstanding State and National Resource Waters require additional protection to maintain water quality standards (see 401 KAR 10:031).

III. AWQA Minimum Requirements:

Establish vegetation on severely eroded, sediment producing areas.

Vegetative cover should be adequate to reduce the amount of sediment running off farmland.

IV. Design Information:

Install a temporary diversion or other structures to reduce surface runoff water across the area.

If vegetation is an insufficient control measure, then plan complementary structural BMPs such as riprap or grade stabilization structures.

Select the most effective erosion control plants for the site.

Conduct a soil test and adjust soil pH, potassium and phosphorous, if necessary. If possible, plant into soils with adequate moisture: not excessively wet or dry. Spread 4" to 6" of topsoil if extremely unfavorable soil conditions exist.

Always use best management seeding techniques, and increased seed rates and mulch.

Site specific information is available from the Cooperative Extension Service and the USDA/Natural Resources Cooperative Services.

V. Practice Maintenance:

Take soil tests and/or refer to University of Kentucky publication AGR-1 Lime and Nutrient Recommendations to determine annual nutrient and lime application rates for obtaining desired yield levels.

Mow fescue as needed to control undesirable growth, and minimize weed competition, but not to less than 4 inches in plant height.

Mowing normally occurs once a year on native warm season grasses to minimize weed competition and control undesirable growth. Mowing should not be less than 8 inches and should occur after bird nesting is complete.

Re-seed and mulch areas that have inadequate cover.

Protect area from grazing and traffic.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- USDA Natural Resources Conservation Service

VII. Cost Share Assistance:

Cost share assistance to landusers considering this BMP may be available in some circumstances. For more information contact the local office of the USDA Natural Resources Conservation Service (NRCS) or the local conservation district office.

To receive cost share funding, approved BMPs must meet the specific requirements of the particular cost share program.

VIII. Recommendations:

Select plants (grasses, legumes, shrubs, vines or trees) that are adapted to the site condition and that can tolerate the limitations of slope, subsoil, soil acidity, or other adverse site conditions.

Use special care in seedbed and site preparation and in the control of surface runoff. Use higher rates of fertilizer and seed. Use mulch and also consider irrigation, if feasible.

If pasture or hay grasses and legumes are unsuitable, select erosion control plants with wildlife or aesthetic value.

A dense stand of tall fescue is excellent at holding soil in place, especially on steeper slopes and is highly effective at filtering nutrients and agrochemicals from fields before the runoff enters surface waters. Since fescue grows quickly in the spring and many field activities are done in the spring, fescue will help filter potential runoff very well. A dense stand of tall fescue is not a good habitat for most nesting birds or other wildlife. Follow guidelines for establishing and maintaining tall fescue. Mow as needed to control undesirable growth and minimize weed competition, but not less than 4 inches in plant height.

An established stand of native warm season grass can produce root biomass that will help hold soils together and can tolerate intermittent submersion in water. Native warm season grasses typically require about two to three years of herbicide use to control weeds and allow the native warm season grasses to become fully established. Once established, a native warm season grass will help filter runoff waters. Native warm season grasses make excellent habitat for some bird species. Mowing normally occurs once a year on native warm season grasses to minimize weed competition and control undesirable growth. Mowing should not be less than 8 inches and should occur after bird nesting is complete.

IX. References: (see address and telephone listings in Chapter 8)

USDA/NRCS *Field Office Technical Guide*

- Practice Code 342 Critical Area Planting

University of Kentucky College of Agriculture Extension publications

- AGR 1 Lime and Nutrient Recommendations
- AGR-18 Grain and Forage Crop Guide for Kentucky

University of Tennessee, December 2012. Native Warm Season Grass Roles in Soil and Water Conservation: A Literature Synthesis.

Crops BMP #12 Pest Management, Including Cultural Control

Revised 4/23/20

I. Description and Definition(s):

This BMP concerns the wise use and application of insecticides, herbicides, and other agriculture chemicals in the production of farm crops and livestock. It includes safe storage of unused chemicals and proper disposal of empty containers and wash materials. Cultural control is also included.

II. Regulatory Requirements:

Release, Storage, Treatment, and Disposal of Pesticides [42 USC 9601, 42 USC 9601, KRS 224.46]:
The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the Resource Conservation and Recovery Act (RCRA), administered by the U.S. Environmental Protection Agency, regulates the release, storage, treatment, and disposal of certain hazardous pollutants or contaminants.

Licensure and Operator Training of Pesticide Applicators [KRS 217B]:
KRS 217B, administered by the Kentucky Department of Agriculture, regulates licensure of pesticide applicators and commercial operator training.

Worker Protection Standards [40 CFR 156, 40 CFR 170]:
These regulations, administered by the US Environmental Protection Agency, contain standards designed to reduce the risks of illness or injury resulting from occupational exposures to pesticides.

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near Special Designated Use Waters:
Surface Water Intakes for Domestic Water Supply Use, Outstanding State Resource Waters, and Cold Water Aquatic Habitats as defined by 401 KAR 10:026 as well as Exceptional Waters and Outstanding National Resource Waters as defined by 401 KAR 10:030 require the use of Best Management Practices to protect Kentucky Water Quality Standards (401 KAR 10:029). Additionally, Outstanding State and National Resource Waters require additional protection to maintain water quality standards (see 401 KAR 10:031).

III. AWQA Minimum Requirements:

Read and follow label directions when using pesticides.

Evaluate and use a tailored pest management system to reduce crop and environmental damages.

IV. Design Information:

Scout crops to determine types of pests (such as insects, weeds, and diseases) and their stages of development.

Determine the economic effect of pesticide use by comparing the potential crop damage versus the cost of spraying.

V. Practice Maintenance:

Key elements of integrated pest management (IPM) are the early detection and correct identification of the pests and the monitoring of pest population levels. The use of insect traps, together with visually "scouting" the crop fields, is the most commonly used method to check for the presence and concentrations of potential pests. This monitoring program can also identify the most vulnerable stage of the pest and help determine the most critical control period. From this information, the most effective control practices and the optimum timing of control measures can be determined.

Application of Pesticides:
Select the pesticide which is the most effective at terminating the pest.

Do not apply highly toxic pesticides where excess spray drift or contaminated surface runoff water will be washed directly into sensitive environmental areas such as food crops, urban areas, water supply reservoirs, streams or groundwater .

When using a field sprayer, avoid double application or overlaps.

Rotation of different pesticide chemical modes of action can help avoid development of resistance by pests.

Insect Traps:
Insect scouting allows for accurate assessment of the risk of crop injury and crop loss from the insect pests. Insect traps have been used to identify and monitor insect populations. Black lights, sex attractants, and other methods are used to lure insects into the traps.

Pesticide Containers:
Insure that empty containers are properly handled, cleaned, and properly disposed.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- University of Kentucky Cooperative Extension Service.

VII. Cost Share Assistance:

At this time, no cost share assistance is available for this practice.

VIII. Recommendations:

Rarely will all pesticides purchased in a season be used in that season.

Build and maintain an effective pesticide storage facility.

Triple rinse used pesticide containers and puncture to prevent use for other purposes.

An integrated pest management (IPM) program can reduce agri-chemical water pollution and unnecessary pesticide applications. Implementation of IPM by farmers can contribute significantly in improving water quality.

Reduce spraying to spot treatment of major problems, rather than spraying the entire field, if possible.

Use extreme care to minimize contamination of waterways, streams, ponds and lakes. Never drive equipment into these water areas for filling or cleaning. Use either a pump or suction line to fill equipment tanks to reduce water pollution. Prevent back siphoning by using an airbreak or anti back siphoning device between the sprayer tank and source of water.

IX. References: (see address and telephone listings in Chapter 8)

USDA/NRCS *Field Office Technical Guide*

- Practice Code 595 Integrated Pest Management

University of Kentucky College of Agriculture Extension publications

Farmstead BMP #16 Backflow Prevention

Crops BMP #13 Cover Crop

Revised 4/23/20

I. Description and Definition(s):

Cover crop: a close growing crop (grass, legume, or small grain) grown primarily for the purpose of temporarily protecting from erosion and improving the soil.

II. Regulatory Requirements:

Activities in Jurisdictional Wetlands:
Farming activities that may affect surface drainage in areas designated as jurisdictional wetlands may be subject to regulation by the U.S. Army Corps of Engineers, Kentucky Division of Water, and U.S. Department of Agriculture depending on the nature of the activity. Contact local representatives of the Natural Resources Conservation Service to determine specific requirements.

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near Special Designated Use Waters:
Surface Water Intakes for Domestic Water Supply Use, Outstanding State Resource Waters, and Cold Water Aquatic Habitats as defined by 401 KAR 10:026 as well as Exceptional Waters and Outstanding National Resource Waters as defined by 401 KAR 10:030 require the use of Best Management Practices to protect Kentucky Water Quality Standards (401 KAR 10:029). Additionally, Outstanding State and National Resource Waters require additional protection to maintain water quality standards (see 401 KAR 10:031).

III. AWQA Minimum Requirements:

Plant crops such as cereal rye, oats, and winter wheat to temporarily protect the soil when crop residues are not adequate following crop production. The population of cover crop and resulting crop canopy must be adequate to protect the cropland against soil erosion.

IV. Design Information:

Choose plant species that are well suited to the soil site conditions and that fit well in the crop management system.

Choose plant species that are less likely to escape and produce weedy offspring.

Provide adequate plant nutrition to allow the cover crop to gain enough fall growth to survive over the winter and provide protection of the soil throughout the winter.

While providing enough nutrients to allow for proper establishment, minimize nutrient applications compared with cash crops, especially on soils with high water infiltration rates.

V. Practice Maintenance:

Take soil tests and/or refer to University of Kentucky publication AGR-1 Lime and Nutrient Recommendations to ensure soils have adequate nutrient supply for the growth of a cover crop.

This practice is adapted to any cultivated land that is unvegetated and exposed to soil erosion.

Cover crops are generally grown for one year or less during the period between regular row crop production. A perennial cover crop is used sometimes between trees and vines in orchards, nurseries and vineyards.

Cover crops increase risks of soil-borne fungi, seedling insects and could potentially compete with the cash crop. Termination of the cover crop prior to planting the cash crop provides the least risk to problems occurring with the cash crop.

If soils are adequately dry, some cover crops could be grazed or harvested and ensiled for livestock, providing the benefit of winter cover crop and supplying valuable feed to livestock.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- University of Kentucky Cooperative Extension Service
- USDA Natural Resources Conservation Service

VII. Cost Share Assistance:

Cost share assistance to landusers considering this BMP may be available in some circumstances. For more information contact the local office of the USDA Natural Resources Conservation Service (NRCS) or the local conservation district office.

To receive cost share funding, approved BMPs must meet the specific requirements of the particular cost share program.

VIII. Recommendations:

A grain drill, band seeder, no till seeder, or broadcast seeder may be used. Aerial seeding is common in parts of western Kentucky, especially to establish a cover crop in standing corn or soybeans just before harvest.
Inoculate legume seed just before sowing.

Adhere to recommended seeding rates and dates.

Consider previous crop and herbicides when selecting species of cover crop.

Terminate a cover crop 14 days before planting to cash crop to reduce risks of seedling diseases and insects.

IX. References: (see address and telephone listings in Chapter 8)

USDA/NRCS *Field Office Technical Guide*

- Practice Code 340 Cover Crop

University of Kentucky College of Agriculture Extension publications

- AGR-1 Lime and Nutrient Recommendations
- AGR-240 Cover Crop Benefits and Challenges in Kentucky

Crops BMP #14 Grassed Waterway

Revised 4/23/20

I. Description and Definition(s):

Grassed waterway: a natural or constructed channel, usually broad and shallow, covered with erosion reducing grasses, used to safely carry surface runoff water from a field, terrace, diversion, or other area to a suitable outlet.

II. Regulatory Requirements:

Activities in Jurisdictional Wetlands:
Farming activities that may affect surface drainage in areas designated as jurisdictional wetlands may be subject to regulation by the U.S. Army Corps of Engineers, Kentucky Division of Water, and U.S. Department of Agriculture depending on the nature of the activity. Contact local representatives of the Natural Resources Conservation Service to determine specific requirements.

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near Special Designated Use Waters:
Surface Water Intakes for Domestic Water Supply Use, Outstanding State Resource Waters, and Cold Water Aquatic Habitats as defined by 401 KAR 10:026 as well as Exceptional Waters and Outstanding National Resource Waters as defined by 401 KAR 10:030 require the use of Best Management Practices to protect Kentucky Water Quality Standards (401 KAR 10:029). Additionally, Outstanding State and National Resource Waters require additional protection to maintain water quality standards (see 401 KAR 10:031).

III. AWQA Minimum Requirements:

Maintain a drainage way by grading and shaping a smooth, bowl shaped channel and seeding it with sod forming grasses. This grass cover protects the drainage way from gully erosion and acts as a filter to absorb some of the chemicals and nutrients in runoff water. Adequate vegetation and proper width of grass areas must be maintained to meet this objective.

IV. Design Information:

Check soils for unfavorable subsoil, depth to rock, and other limitations to revegetation.

Determine if an adequate outlet is available at the end of waterways.

A stable outlet should be in place before construction of the waterway.

V. Practice Maintenance:

Take soil tests and/or refer to University of Kentucky publication AGR-1 Lime and Nutrient Recommendations to determine the annual nutrient and lime application rates for obtaining desired yield levels.

Always maintain the original designed width. Lift plows, straighten disks and other equipment when crossing the waterway. Also turn off herbicide or other chemical spraying equipment when crossing waterways.

Repair and re-vegetate all breaks and bare spots soon after discovery.

Maintain an adequate sod cover.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- University of Kentucky Cooperative Extension Service
- USDA Natural Resources Conservation Service

VII. Cost Share Assistance:

Cost share assistance to landusers considering this BMP may be available in some circumstances. For more information contact the local office of the USDA Natural Resources Conservation Service (NRCS) or the local conservation district office.

To receive cost share funding, approved BMPs must meet the specific requirements of the particular cost share program.

VIII. Recommendations:

Check for high water table soils and seepage areas to determine the need for tile drainage along waterways.

IX. References: (see address and telephone listings in Chapter 8)

USDA/NRCS *Field Office Technical Guide*

- Practice Code 412 Grassed Waterway

University of Kentucky College of Agriculture Extension publications

Crops BMP #15 Water Control Structure

Revised 4/23/20

I. Description and Definition(s):

A water control structure is a device that is added to a new or existing tile drainage system that allows for regulation of the water table in tiled fields. It is a manufactured fiberglass/metal rectangular box or vertical, semi-circular corrugated metal riser, which are added prior to the outlet of the tile drainage system. The structure has a slotted track for adding and removing flash boards. Flash boards can be added or removed from the water control structure to raise or lower the water table in the tiled field. The water table can be raised or lowered seasonally in response to water demand and management goals. This device can be used to retain water in the soil, which lowers flow rates from the tiled system. Lowering the flow rate of the tiled system can reduce nutrient, pathogen, and pesticide delivery to receiving waters.

Benefit(s): Water control structures can be used to regulate flow from tile drainage systems. Reducing flow can lower nutrient, pathogen, and pesticide loading from tile drainage systems to receiving waters.

Water control structures allow for seasonal regulation of the water table, which can improve the productivity, health, and vigor of plants by reducing water stress. Water control structures have the ability to reduce the oxidation of soil organic matter. Raising the water table in fields when not in production can create an anoxic environment. Organic matter tends to accumulate in an anoxic environment as opposed to being lost to volatilization through oxidation.

Raising the water table can create saturated soils. Water control structures can allow for inundation of fields when not in production. Inundation of fields can improve wildlife habitat for select species. Inundating fields can reduce the habitat for undesirable, burrowing pests.

II. Regulatory Requirements:

Operating Permits [401 KAR 5:005, 401 KAR 5:065]:
Building and/or operating a wastewater storage pond requires a Kentucky No Discharge Operations Permit (KNDOP) in accordance with 401 KAR 5:005, or a Kentucky Pollution Discharge Elimination System (KPDES) permit, in accordance with 401 KAR 5:065.

Construction in Floodplains [KRS 151.250]:
Construction activities (e.g., fillings, channel relocations, streambank restoration, buildings, culverts, and bridges) in floodplains require a stream construction permit pursuant to KRS 151.250. An exemption exists for watersheds of less than one square mile (640 acres), except for impoundments and dams which again fall under KRS 151.250 for a permit.

Spills, Leaks, or other Releases [KRS 224.1-400]:]:
Any spill, leak, discharge, dumping, or other "release" of any of the following classifications of substances in excess of a Reportable Quantity, as defined in 40 CFR 355, must be reported

immediately to the Energy and Environment Cabinet's 24 hour environmental response line at 800-928-2380. If you are unsure what the Reportable Quantities are for your products, you may also call the same number to obtain them.

- Hazardous substances.
- Pollutants or contaminants. A release or threatened release of any element, substance, compound, or mixture (including fertilizer) into the environment in a quantity that may present an imminent or substantial danger to the public health is reportable.

Clean up requirements state that once a release has occurred, even if it is less than a reportable quantity, the responsible person must determine its effect on the environment and correct that effect. For questions concerning the Environmental Release Reporting and cleanup law call the Division of Waste Management 502-564-6716.

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near Special Designated Use Waters:
Surface Water Intakes for Domestic Water Supply Use, Outstanding State Resource Waters, and Cold Water Aquatic Habitats as defined by 401 KAR 10:026 as well as Exceptional Waters and Outstanding National Resource Waters as defined by 401 KAR 10:030 require the use of Best Management Practices to protect Kentucky Water Quality Standards (401 KAR 10:029). Additionally, Outstanding State and National Resource Waters require additional protection to maintain water quality standards (see 401 KAR 10:031).

III. AWQA Minimum Requirements:

- Install water control structure and regulate flow in a manner that reduces nutrient, pathogen, and pesticide delivery to receiving water.
- Manipulate the water table to reduce oxidation of organic matter when fields are not in production.

IV. Design Information:

Utilize USDA Natural Resources Conservation Service practices to install and maintain a water control structure.

Adhere closely to the design and construction plan developed by government or private engineers. Contact the county conservation district for local information.

Special Considerations: Careful site evaluation is very important before proceeding with design and construction of water control structures. Information needed for proper design and installation include the site topography, soil properties, and drainage characteristics, including the depth and spacing of existing tile drains. Water control structures are best suited for flat or gently sloping fields (less than 1% slope) because a uniform depth to the water table is in theory easier to create and maintain. Flatter fields require fewer water control structures and allow each installed structure to manage drainage over a larger area. A relatively homogenous soil

composition throughout the field is preferable as a uniform water table level may be difficult to achieve where soil composition is highly variable, particularly if hardpans and discontinuous layers or lenses of low-permeability clays are present at depth. In such conditions, water-level monitoring wells or piezometers and frequent monitoring of water table levels over and between tiles may be required to determine if any corrective measures (e.g. installation of additional tiles or water drainage structures) are needed for more effective operation. Increased monitoring and management of water levels should also be anticipated during periods of wet weather or after prolonged heavy rainfall in order to avoid excess soil saturation and water stress to crops during the growing season. The potential for excessive surface runoff and flooding may be increased during prolonged wet-weather conditions unless soil water storage and changing water table levels are carefully managed. Water control structures must be installed and operated in a manner that does not affect adjacent landowners. Excess saturation of soils and flooding of upstream neighbors are to be avoided, as are adverse impacts to nearby septic fields. Where questions may arise, producers are encouraged to consult with the agricultural extension agent prior to installation of water control structures about the suitability of local site conditions, and how these may affect performance and use.

V. Practice Maintenance:

- Periodically checking the water control structure to make sure that the structure is working properly.
- Preventing erosion at outlets.
- Inspecting for and removing debris, minerals, algae, and other materials that may restrict system flow.
- Adding or removing flash board risers as necessary to meet management goals and reduce pollutant delivery.
- Controlling vegetation, wildlife, rodents, or burrowing animals from damaging structures.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- USDA Natural Resources Conservation Service
- Kentucky Division of Water
- Kentucky Geological Survey

VII. Cost Share Assistance:

Cost share assistance to landusers considering this BMP may be available in some circumstances. For more information contact the local office of the USDA Natural Resources Conservation Service (NRCS) or the local conservation district office.

To receive cost share funding, approved BMPs must meet the specific requirements of the particular cost share program.

VIII. Recommendations:

Install water control structures in new or existing tile drainage systems to reduce nutrient, pathogen, and pesticide pollution from agricultural fields. Install at the edge of fields to minimize impact to production. Regulate water table in a manner that achieves desired management goals for soil organic matter conservation and wildlife habitat. Reduce crop water stress during the growing season by raising the water table to the lower extent of the rooting zone. Consult with an extension agent regarding the suitability of your soils for achieving benefits from a water control structure.

IX. References: (see address and telephone listings in Chapter 8)

USDA/NRCS *Field Office Technical Guide*

- Practice Code 554 Drainage Water Management
- Practice Code 587 Structure for Water Control

USDA, NRCS. 2001. National Engineering Handbook, Part 624, Sec. 16, Drainage of agricultural land.

USDA, NRCS. 2001. National Engineering Handbook, Part 650, Engineering Field Handbook, Chapter 14, Water management (Drainage).

University of Kentucky College of Agriculture Extension publications

Drainage Water Management for the Midwest, Fact Sheet WQ-44, Purdue University Agriculture Extension.

Agricultural Water Table Management Systems, Fact Sheet AEX 321-97, Ohio State University Food, Agricultural and Biological Engineering Fact Sheet.

Crops BMP #16 Precision Agriculture

Revised 4/23/20

I. Description and Definition(s):

Precision agriculture is a management system that is information and technology based, is site specific and uses one or more of the following sources of data: soils, crops, nutrients, pests, moisture, or yield, for optimum profitability, sustainability, and protection of the environment. The goal of precision agriculture is to optimize inputs for agricultural production according to the capability of the land. Careful consideration of productivity versus environmental impacts guides decisions in precision agriculture systems.

Benefit(s): Some of the primary benefits are cost reduction and more efficient use of production inputs. The use of precision agriculture can increase the size and scope of farming operations without increasing labor requirements. It can lead to improved site selection and control of production processes that help in the production of higher value or specialty products. It improves recordkeeping and production tracking for food safety, and environmental benefits.

Soil and water quality benefits can result from reduced or targeted application of inputs such as nutrients, pesticides, and irrigation water. When used to precisely control where equipment travels in a field, precision agriculture can also reduce soil compaction and erosion. Avoidance of environmentally sensitive areas can greatly improve off-site delivery of nutrient and pesticide related water pollution. Improvements in water use efficiency can also be gained through variable rate irrigation, providing both economic and environmental benefit.

II. Regulatory Requirements:

Operating Permits [401 KAR 5:005, 401 KAR 5:065]:
Building and/or operating a wastewater storage pond requires a Kentucky No Discharge Operations Permit (KNDOP) in accordance with 401 KAR 5:005, or a Kentucky Pollution Discharge Elimination System (KPDES) permit, in accordance with 401 KAR 5:065.

Construction in Floodplains [KRS 151.250]:
Construction activities (e.g., fillings, channel relocations, streambank restoration, buildings, culverts, and bridges) in floodplains require a stream construction permit pursuant to KRS 151.250. An exemption exists for watersheds of less than one square mile (640 acres), except for impoundments and dams which again fall under KRS 151.250 for a permit.

Spills, Leaks, or other Releases [KRS 224.1-400]:
Any spill, leak, discharge, dumping, or other "release" of any of the following classifications of substances in excess of a Reportable Quantity, as defined in 40 CFR 355, must be reported immediately to the Energy and Environment Cabinet's 24 hour environmental response line at 800-928-2380. If you are unsure what the Reportable Quantities are for your products, you may also call the same number to obtain them.

- Hazardous substances.

- Pollutants or contaminants. A release or threatened release of any element, substance, compound, or mixture (including fertilizer) into the environment in a quantity that may present an imminent or substantial danger to the public health is reportable.

Clean up requirements state that once a release has occurred, even if it is less than a reportable quantity, the responsible person must determine its effect on the environment and correct that effect. For questions concerning the Environmental Release Reporting and cleanup law call the Division of Waste Management 502-564-6716.

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near Special Designated Use Waters:
Surface Water Intakes for Domestic Water Supply Use, Outstanding State Resource Waters, and Cold Water Aquatic Habitats as defined by 401 KAR 10:026 as well as Exceptional Waters and Outstanding National Resource Waters as defined by 401 KAR 10:030 require the use of Best Management Practices to protect Kentucky Water Quality Standards (401 KAR 10:029). Additionally, Outstanding State and National Resource Waters require additional protection to maintain water quality standards (see 401 KAR 10:031).

III. AWQA Minimum Requirements:

Use equipment, methods, and technology that support precision agriculture in a manner that addresses an environmental resource concern. This could include but is not limited to utilizing Global Positioning Systems (GPS), auto-steering, light bars, grid sampling, remote sensing, and variable rate application to reduce impacts to soil and water resources.

IV. Design Information:

Utilize USDA Natural Resources Conservation Service practices to install, maintain and utilize precision agriculture technology.

Adhere closely to the design and construction plan developed by government or private engineers. Contact the county conservation district for local information.

V. Practice Maintenance:

- Maintenance and updating of hardware and software associated with electronic devices utilized in precision agriculture system.
- Installation and maintenance of various remote sensing and data collection devices to ensure high quality data is available to shape management decisions.
- Charging and replacement of any batteries utilized in precision agriculture system
- Collection of site specific, georeferenced soil or water samples to periodically evaluate nutrient needs in the context of precision agriculture plan.
- Organizing and evaluating records in a manner that will allow for ease of analysis and translation into management practices.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- USDA Natural Resources Conservation Service
- University of Kentucky Cooperative Extension Service

VII. Cost Share Assistance:

Cost share assistance to landusers considering this BMP may be available in some circumstances. For more information contact the local office of the USDA Natural Resources Conservation Service (NRCS) or the local conservation district office.

To receive cost share funding, approved BMPs must meet the specific requirements of the particular cost share program.

VIII. Recommendations:

- Develop a precision agriculture plan to define goals, identify environmentally sensitive areas, monitor inputs, evaluate yields, and optimize practices after review and analysis of collected data.
- Develop a record keeping system that contains georeferenced records relating to inputs, yield, and critical environmental factors.
- Utilize spatially referenced soil, water, yield, and other datasets to inform decisions and develop management zones on farm.
- Optimize nutrient, pesticide, and irrigation applications through variable rate application/irrigation and guidance system technology.
- Limit soil compaction by utilizing defined wheel tracks to travel within fields year after year.
- Utilize guidance system technology to plant buffer strips along contours to protect sensitive crops and reduce soil loss.
- Evaluate and revise precision agriculture plan after every growing season and address deficiencies and surpluses in the system as they are identified.

IX. References: (see address and telephone listings in Chapter 8)

Precision Agriculture: NRCS Support for Emerging Technologies. USDA NRCS. June 2007. Agronomy Technical Note No. 1

USDA/NRCS *Field Office Technical Guide*
- Practice Code 590 Nutrient Management

University of Kentucky College of Agriculture Extension publications
Precision Agriculture (PA) extension publication

Chapter 6 Livestock

Best Management Practices for Livestock

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Guide for Determining Need for Livestock Best Management Practices (BMPs)

Activity	Pollutant	Applicable BMPs (apply one or more of the following as needed to protect water quality)
Streamside Grazing	Animal Manure Sediment	1, 2, 3, 4, 11, 13
Paved Feeding Areas	Animal Manure	5, 6, 7, 9, 10, 11, 13, 18
Confined/Unpaved Feeding Areas (beef)	Animal Manure Sediment	2, 5, 13, 14, 18, 19
Pasture Feeding Areas Sediment	Animal Manure	2, 13, 11, 14, 18
Manure Application	Animal Manure	11, 5, 17
Dead Animal Disposal	Bacteria	15, 18
Confined Dirt Lot Feeding Areas (Swine)	Animal Manure Sediment	2, 5, 13, 11, 14, 18
Poultry Waste Disposal	Animal Manure	5, 7, 10, 12, 17, 18
Milk Parlor Wash Water Disposal	Animal Manure	5, 6, 8, 9, 11, 16
Horse Muck Disposal Organics	Animal Manure	5, 11, 12, 18

Livestock BMP #1 Planned Grazing Systems

Revised November 14, 2019

I. Description and Definition(s):

Planned grazing system: a practice in which two or more pastures are alternately rested and grazed in a planned sequence for a period of years in order to maintain minimum recommended grazing coverage as typically measured by height. Rest periods may be scheduled throughout the year or during the growing season of key plants.

II. Regulatory Requirements:

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near High Quality Waters and Outstanding National Resource Waters [401 KAR 10:029, 10:030, and 10:031]:
Kentucky Water Quality Standards (401 KAR 10:029) require the use of Best Management Practices to protect High Quality Waters and Outstanding National Resource Waters listed in 401 KAR 10:030. In addition, outstanding resource waters that support federally listed threatened and endangered species require special protection (see 401 KAR 10:031).

III. AWQA Minimum Requirements:

Divide larger pasture fields into smaller pasture units with (temporary or permanent) fences. Rotate animals from one pasture unit to another schedule based on forage availability and livestock nutrition needs.

Allow rest periods so each pasture unit will have adequate time to recover during the growing season to promote plant growth and prevent erosion.

IV. Design Information:

Pasture Management: Rotational grazing requires the division of larger pasture fields into smaller pasture units, often by temporary electric fences. Animals are rotated from one pasture unit to another on a pre-arranged schedule based on forage availability and livestock nutrition needed. Allow rest periods so each pasture unit will have adequate time to recover during the growing season to promote plant growth and prevent erosion. Strip grazing utilizes even smaller grazing units for a shorter period.

A water supply will be necessary, which may include (but is not limited to) a spring development, pond, pipeline and tank, temporary water system, etc.

Consider using Livestock BMP #14 Feeding and Heavy Use Area Management and Livestock BMP #19 Totally Covered Open Confinement, in conjunction with rotational grazing, to hold animals in order to preserve pastures and reduce the creation of mud during drought, unseasonably wet periods or winter months.

V. Practice Maintenance:

Take soil tests to determine the annual fertilizer and lime application rates for obtaining desired yield levels.

If animal and (or) poultry manure is used in place of commercial fertilizer, apply in accordance to a nutrient management plan. Testing of manure will indicate the amount of nutrients available in animal or poultry manure.

Keep fencing secure.

Some paddocks may need to be mowed or hayed during heavy growth periods or sprayed to control weeds.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- USDA Natural Resources Conservation Service
- University of Kentucky Cooperative Extension Service

VII. Cost Share Assistance:

Cost share assistance to land users considering this BMP may be available in some circumstances through the USDA Conservation Provisions of the current Farm Bill or the Kentucky Soil Erosion and Water Quality Cost Share Program. For more information contact the local offices of the USDA or the local conservation district office.

To receive cost share funding, approved BMPs must meet the specific requirements of the particular cost share program.

VIII. Recommendations:

Implement a planned grazing system to improve pasture use efficiency and reduce risk of impacts to forage stands, soil and water resources.

Utilize NRCS KY Graze Worksheet, available at your local NRCS/Conservation District office.

IX. References: (see address and telephone listings in Chapter 8)

USDA/NRCS Field Office Technical Guide

- Practice Code 528 Prescribed Grazing

- NRCS Grazing Calculator

University of Kentucky College of Agriculture Extension publications

- ID-143 Rotational Grazing
- ID-74 Planning Fencing Systems for Intensive Grazing Management
- AGR-191 Using a Grazing Stick for Pasture Management
- AGR-18 Grain and Forage Crop Guide for Kentucky
- AGR-215 Evaluating Land Resource Potential in Kentucky
- AGR-26 Renovating Hay and Pasture Fields
- AGR-162 Stockpiling for Fall and Winter Pasture
- AEN-130 Drought Risk Management for Beef Cattle Farms

Livestock BMP #2 Proper Stocking Density

Revised November 14, 2019

I. Description and Definition(s):

This BMP concerns grazing at an intensity that will maintain enough cover to protect the soil and maintain or improve the quantity and quality of desirable vegetation and crop residues. This option may include matching stocking rates to maintain cover when Livestock BMP #1 is not implemented.

II. Regulatory Requirements:

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near High Quality Waters and Outstanding National Resource Waters [401 KAR 10:029, 10:030, and 10:031]:
Kentucky Water Quality Standards (401 KAR 10:029) require the use of Best Management Practices to protect High Quality Waters and Outstanding National Resource Waters listed in 401 KAR 10:030. In addition, outstanding resource waters that support federally listed threatened and endangered species require special protection (see 401 KAR 10:031).

III. AWQA Minimum Requirements:

Apply practices that will keep pastures growing and vigorous over as long a period as possible. This includes grazing and pasture management practices that improve the quantity and quality of the forages and to maintain adequate vegetative cover. The amount of animal waste and nutrients reaching streams will be reduced by the filtering effects of the vegetation slowing runoff and by the increased uptake of nutrients.

Identify the kinds of soils and the adapted plant species. Estimate the forage yield or the pasture carrying capacity.

Make a realistic estimation of the kinds and numbers of livestock on the farm and their estimated pastureland and hayland needs.

IV. Design Information:

Check the availability and location of an adequate and economical livestock water supply for successful grazing management.

V. Practice Maintenance:

Take soil tests and/or refer to University of Kentucky publication AGR-1 to determine the annual fertilizer and lime application rates for obtaining desired yield levels.

If animal and poultry manure is used in place of commercial fertilizer, apply in accordance to a nutrient management plan (Livestock BMP #11). Testing of manure will indicate the amount of nutrients available in animal and poultry manure. Use caution in grazing immediately after heavy manure applications.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- USDA Natural Resources Conservation Service
- University of Kentucky Cooperative Extension Service

VII. Cost Share Assistance:

Cost share assistance to land users considering this BMP may be available in some circumstances through the USDA Conservation Provisions of the current Farm Bill or the Kentucky Soil Erosion and Water Quality Cost Share Program. For more information contact the local offices of the USDA or the local conservation district office.

To receive cost share funding, approved BMPs must meet the specific requirements of the particular cost share program.

VIII. Recommendations:

Utilize NRCS KY Graze Worksheet, available at your local NRCS/Conservation District office.

When vegetation cannot be maintained, consider implementing conservation buffers, such as filter strips, grass waterways, riparian area buffers, etc. to filter contaminants.

IX. References: (see address and telephone listings in Chapter 8)

USDA/NRCS Field Office Technical Guide

- Grazing management calculator
- Practice Code 528 Prescribed Grazing

University of Kentucky College of Agriculture Extension publications

- ID-74 Planning Fencing Systems for Intensive Grazing Management
- AGR-191 Using a Grazing Stick for Pasture Management
- AGR-222 Estimating Carrying Capacity of Cool-Season Pastures in Kentucky Using Web Soil Survey
- AEN-99 Shade Options for Grazing Cattle

- AEN-105 Pasture Feeding, Streamside Grazing, and the Kentucky Agriculture Water Quality Plan

Livestock BMP #3 Riparian Area Protection

Revised November 14, 2019

I. Description and Definition(s):

Protected Riparian Area: an area of trees, woody shrubs, grasses, and other vegetation located adjacent to or up gradient from water courses, wetlands, and impounded water bodies. Area is protected from livestock or they are managed in a manner to protect the area. The area reduces sediment, organic material, nutrients, and pesticides in surface runoff and shallow groundwater flow. Benefits of this practice include enhanced wildlife habitat, reduced stream water temperature, streambank protection and erosion control.

II. Regulatory Requirements:

Use of Heavy Equipment in Stream Channels [US Clean Water Act, 33 USC §1251 et seq., Section 404]:
The use of heavy equipment, within or along stream channels, that has the potential to degrade or alter the stream channel or the streambank, may require a 404 permit from the U.S. Army Corps of Engineers. See Chapter 7 of this document for further information.

Construction in Floodplains [KRS 151.250]:
Construction activities (e.g., fillings, channel relocations, streambank restoration, buildings, culverts, and bridges) in floodplains require a stream construction permit pursuant to KRS 151.250. An exemption exists for watersheds of less than one square mile (640 acres), except for impoundments and dams which require a permit pursuant to KRS 151.250.

Cold Water Aquatic Habitat [401 KAR 10:026]:
Streams classified as cold water aquatic habitat have natural temperature maintenance requirements that could restrict removal of riparian trees and shrubs.

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near High Quality Waters and Outstanding National Resource Waters [401 KAR 10:029, 10:030, and 10:031]:
Kentucky Water Quality Standards (401 KAR 10:029) require the use of Best Management Practices to protect High Quality Waters and Outstanding National Resource Waters listed in 401 KAR 10:030. In addition, outstanding resource waters that support federally listed threatened and endangered species require special protection (see 401 KAR 10:031).

III. AWQA Minimum Requirements:

Apply this BMP in areas where a portion of the runoff occurs as shallow groundwater flow and where water quality is impaired or there is a high potential for water quality impairment. The

riparian buffer area should be adjacent to permanent or intermittent streams, lakes or ponds, and wetlands.

Livestock activities are acceptable in these areas. Fencing of riparian buffer zones will not be required; however, the selection and management of vegetation must be sufficient to adequately control or significantly abate potential soil erosion and provide adequate filtering and uptake benefits from the affected areas.

If vegetation is not capable of withstanding grazing pressure, then livestock should be excluded except at designated crossing areas and watering sites (Livestock BMP#4). Temporary fence may be used to exclude livestock from zones that may be grazed temporarily while maintaining the effectiveness of the practice.

IV. Design Information:

Vegetation: The selection and management of vegetation is essential to the achievement of the purpose of the riparian buffer practice.

Selected plantings of hardwood trees, shrubs, and grass/legume species (ground covers) shall be adapted to the soils and other site factors. Technical information relating to the establishment of these plantings is available in the NRCS Field Office Technical Guide (FOTG). Selection and management of vegetative species must be specific to the function of the riparian area. A groundcover should be established and/or maintained to provide erosion protection and additional filtering and uptake benefits. Groundcover establishment within new riparian zones should include a perennial grass and legume species and at least one quick cover (annual) species. Only noncompetitive species of ground cover should be established within zones to be forested.

Riparian buffer areas extend in a linear manner along both sides of the stream at a distance away from the top of the stream channel. Although the riparian buffer area extends along both sides of the stream channel, similar vegetation does not have to be maintained on both sides unless dictated by site specific recommendations.

V. Practice Maintenance:

Perform, as needed, corrective actions to curtail soil erosion and to restore sheet flow.

The riparian buffer zones shall be monitored for possible damages following significant storm events. Routine inspections of the riparian area should be scheduled on a regular basis to monitor the overall effectiveness of the buffer zones and to implement needed corrective actions.

Keep fences repaired, where applicable.

Avoid damaging buffer zones with herbicides from surrounding cropland.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- USDA Natural Resources Conservation Service
- Kentucky Division of Forestry
- Kentucky Division of Water

VII. Cost Share Assistance:

Cost share assistance to land users considering this BMP may be available in some circumstances through the USDA Conservation Provisions of the current Farm Bill or the Kentucky Soil Erosion and Water Quality Cost Share Program. For more information contact the local offices of the USDA or the local conservation district office.

To receive cost share funding, approved BMPs must meet the specific requirements of the particular cost share program.

VIII. Recommendations:

Consider the type and quantity of potential pollutants that will be derived from the drainage area.

Consider the adverse impacts which could result from uncontrolled and concentrated flows through the buffer zones if sheet flow is not maintained.

Consider the sequence of conservation practice application to assure that excessive erosion and pollution rates do not prohibit the successful establishment of the buffer zones.

The width of the riparian area may be adjusted to accommodate exceptional situations such as unique landforms, sensitive areas, public structures, etc.

Consider establishing "zones" in the riparian area that may include trees (Zone 1), small trees/shrubs (Zone 2), and or native warm season grasses and forbs (Zone 3).

Consider removing invasive species (i.e. bush honeysuckle) using methods/equipment that does not contribute to erosion.

IX. References: (see address and telephone listings in Chapter 8)

Kentucky Forest Practice Guidelines for Water Quality Management

USDA/NRCS Field Office Technical Guide

- Practice Code 391 Riparian Forest Buffer

University of Kentucky College of Agriculture Extension publications

- ID-175 Riparian Buffers: A Livestock Best Management Practice for Protecting Water Quality
- ID-185 Planting a Riparian Buffer
- AEN-99 Shade Options for Grazing Cattle
- FOR-112 Riparian Buffer Strips
- ENRI-109 Riparian Buffer

Livestock BMP #4 Limiting Access to Surface Water Sources

Revised November 14, 2019

I. Description and Definition(s):

Fencing: enclosing or dividing an area of land with a suitable structure that acts as a barrier to livestock or people.

Alternative Water Systems: water supply other than present system (generally a stream) which may include a spring development, pipeline and tank, temporary water system, etc.

Limited Access Points: means of restricting or limiting the access of livestock to a given area. This most often occurs along streams or ponds by fencing and creating an access ramp to the water supply.

Stream Crossings: installing a designated ford-type crossing for livestock using a design that utilizes rock and geotextile fabric.

II. Regulatory Requirements:

Use of Heavy Equipment in Stream Channels [U.S. Clean Water Act, 33 USC §1251 et seq., Section 404]:
The use of heavy equipment, within or along stream channels, that has the potential to degrade or alter the stream channel or the streambank, may require a 401 Water Quality Certification/404 permit from the U.S. Army Corps of Engineers. See Chapter 7 of this document for further information.

Construction in Floodplains [KRS 151.250]:
Construction activities (e.g., fillings, channel relocations, streambank restoration, buildings, culverts, and bridges) in floodplains require a stream construction permit pursuant to KRS 151.250. An exemption exists for watersheds of less than one square mile (640 acres), except for impoundments and dams which require a permit pursuant to KRS 151.250.

Cold Water Aquatic Habitat [401 KAR 10:026]:
Streams classified as cold water aquatic habitat have natural temperature maintenance requirements that could restrict removal of riparian trees and shrubs.

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near High Quality Waters and Outstanding National Resource Waters [401 KAR 10:029, 10:030, and 10:031]:
Kentucky Water Quality Standards (401 KAR 10:029) require the use of Best Management Practices to protect High Quality Waters and Outstanding National Resource Waters listed in

401 KAR 10:030. In addition, outstanding resource waters that support federally listed threatened and endangered species require special protection (see 401 KAR 10:031).

III. AWQA Minimum Requirements:

Carefully manage livestock around bodies of water or streams where their presence may seriously contribute to nonpoint source pollution. Adequate vegetative cover should be maintained on the land area affected by livestock along the stream edge. Livestock activities are acceptable in these areas. Fencing of these areas will not be required; however, the selection and management of vegetation must be sufficient to adequately control or significantly abate potential soil erosion and provide adequate filtering and uptake benefits from the affected areas. If vegetation is not capable of withstanding grazing pressure, then livestock should be excluded except at designated crossing areas and watering sites. Temporary fence may be used to exclude livestock from zones that may be grazed temporarily while maintaining the effectiveness of the practice.

IV. Design Information:

Select the most practical type of fence to achieve adequate protection. Barbed wire or electric fences may be the most economical.

Consider electric fences or other easily moved fences for temporary use.

Consider presence of Threatened and Endangered (T&E) Species that may be present and mitigation techniques that may be required.

Request Natural Resources Conservation Service or other technical assistance to design alternative water systems such as spring development, pipeline and tanks, or other watering systems, and also to develop access ramps to water sources and/or stream crossings.

V. Practice Maintenance:

Walk fence line routinely and after major storms and inspect posts and wire for damage and needed repair, as well as removal of debris. Paint wood fence, as needed, to prevent deterioration.

Inspect alternative water systems and access ramps to assure proper operation.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- USDA Natural Resources Conservation Service
- University of Kentucky Cooperative Extension Service
- Kentucky Division of Forestry

VII. Cost Share Assistance:

Cost share assistance to land users considering this BMP may be available in some circumstances through the USDA Conservation Provisions of the current Farm Bill or the Kentucky Soil Erosion and Water Quality Cost Share Program. For more information contact the local offices of the USDA or the local conservation district office.

To receive cost share funding, approved BMPs must meet the specific requirements of the particular cost share program.

VIII. Recommendations:

Select and manage vegetation to control soil erosion. Use vegetation to provide stormwater filtering and uptake benefits from the affected areas.

Exclude livestock except at designated crossing areas and watering sites if vegetation is not capable of withstanding grazing pressure.

Use temporary fence to exclude livestock for pasture recovery in riparian areas.

Consider slopes and stream characteristics when choosing locations for stream crossings and access points.

IX. References: (see address and telephone listings in Chapter 8)

Kentucky Forest Practice Guidelines for Water Quality Management

USDA/NRCS Field Office Technical Guide

- Practice Code 382 Fence
- Practice Code 472 Access Control
- Practice Code 578 Stream Crossing
- Practice Code 614 Watering Facility

University of Kentucky College of Agriculture Extension publications

- ID-170 Drinking Water Quality Guidelines for Cattle
- AEN-98 Alternative Water Source: Developing Springs for Livestock
- AEN-101 Stream Crossings for Cattle
- ID-236 Providing Water for Beef Cattle in Rotational Grazing Systems
- AEN-133 Tire Tanks for Watering Livestock

Livestock BMP #5 Manure Management Systems

Revised November 14, 2019

I. Description and Definition(s):

Manure Management System: a planned system for managing liquid and solid manure, in which all necessary components, including runoff from concentrated manure areas, are installed in a manner that does not degrade soil or water resources.

II. Regulatory Requirements:

Operating Permits [401 KAR 5:005, 401 KAR 5:065]:
Building and/or operating any facility with components for management of liquid waste requires a Kentucky No Discharge Operations Permit (KNDOP) in accordance with 401 KAR 5:005, or a Kentucky Pollution Discharge Elimination System (KPDES) permit, in accordance with 401 KAR 5:065. Both the KNDOP and KPDES permits for animal feeding operations have an effluent limit of "no discharge." Facilities that manage manure via dry or solid systems do not require a permit from the KY Division of Water.

Construction in Floodplains [KRS 151.250]:
Construction activities (e.g., fillings, channel relocations, streambank restoration, buildings, culverts, and bridges) in floodplains require a stream construction permit pursuant to KRS 151.250. An exemption exists for watersheds of less than one square mile (640 acres), except for impoundments and dams which require a permit pursuant to KRS 151.250.

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near High Quality Waters and Outstanding National Resource Waters [401 KAR 10:029, 10:030, and 10:031]:
Kentucky Water Quality Standards (401 KAR 10:029) require the use of Best Management Practices to protect High Quality Waters and Outstanding National Resource Waters listed in 401 KAR 10:030. In addition, outstanding resource waters that support federally listed threatened and endangered species require special protection (see 401 KAR 10:031).

Use of Manure from Off-Site [KRS 224.1-010 (31)(a)]:
Manure, crops and crop residues are exempt from regulation as a solid waste when "placed on the soil for return to the soil as fertilizers or soil conditioners" (KRS 224.1-010 (31)(a)). Manure, crops and crop residues shall be used in accordance with a nutrient management plan for the facility on which the manure, crops and crop residues are being utilized.

Spills, Leaks, or other Releases [KRS 224.1-400]:
Any spill, leak, discharge, dumping, or other "release" of any of the following classifications of substances in excess of a reportable quantity must be reported immediately to the Energy and Environment Cabinet's 24 hour environmental response line at 800-928-2380:

- Hazardous substances.
- Pollutants or contaminants. A release or threatened release of any element, substance, compound, or mixture (including manure) into the environment in a quantity that may present an imminent or substantial danger to the public health is reportable.
- Petroleum or petroleum products. Any release including a fuel, oil, or lubricant, in excess of 25 gallons within a 24 hour period, must be reported. The reportable quantity of diesel fuel is 75 gallons or more in a 24 hour period.

Cleanup requirements state that once a release has occurred, even if it is less than a reportable quantity, the responsible person must determine its effect on the environment and correct that effect. For questions concerning the Environmental Release Reporting and Cleanup Law call 502-564-6716.

III. AWQA Minimum Requirements:

Manage manure in rural areas in a manner that prevents or minimizes degradation of soil, and water resources and protects public health and safety. Such systems are planned to preclude discharge of pollutants to surface or ground water and to recycle manure through soil and plants to the fullest extent practicable. They must meet all applicable permit requirements.

IV. Design Information:

Planning considerations:
A manure management system for a given enterprise shall include the components necessary to properly manage manure and prevent degradation of water, soil, and plant resources. A system may consist of a single component, such as a diversion, or may consist of several components. Components shall not be installed until an overall manure management system has been planned.

Components of complete waste management systems may include, but are not limited to, the following:

Debris basins	Pond sealings or linings
Dikes	Subsurface drains
Diversions	Surface drains
Fencing	Manure storage facility
Grassed waterways or outlets	Manure treatment lagoons
Irrigation systems	Nutrient Management
Irrigation water conveyance	Constructed Wetlands

Design criteria for individual components shall be according to standards in the USDA/NRCS Field Office Technical Guide. The criteria for the design of components not included in this handbook shall be consistent with sound engineering principles.

V. Practice Maintenance:

System operation: The owner or operator shall be responsible for operating and maintaining the system. An operation plan shall be prepared for this use. It should provide specific details concerning the operation of each component and should include:

- Timing, rates, volumes, and locations for application of manure and, if appropriate, approximate number of trips for hauling equipment and an estimate of the time required.
- Minimum and maximum operation levels for storage and treatment practices and other operations specific to the practice, such as estimated frequency of solids removal.
- Safety warnings, particularly where there is danger of drowning or exposure to poisonous or explosive gases.
- Maintenance requirements for each of the practices.

Plans and Specifications: Plans and specifications for waste management systems shall be in keeping with this standard and standards for individual system components.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- USDA Natural Resources Conservation Service
- Kentucky Division of Water

VII. Cost Share Assistance:

Cost Share assistance to land users considering this BMP may be available in some circumstances through the USDA Conservation Provisions of the current Farm Bill or the Kentucky Soil Erosion and Water Quality Cost Share Program. For more information contact the local offices of the USDA or the local conservation district office.

To receive cost share funding, approved BMPs must meet the specific requirements of the particular cost share program.

VIII. Recommendations:

Manure should be used to the fullest extent possible by recycling it through soil and plants.

Clean water should be excluded from concentrated manure areas to the fullest extent practical.

Manure shall be collected and safely spread on land, treated, or stored until it can be safely spread in accordance with Livestock BMP #11. Adequate storage must be provided to allow spreading during favorable weather and at times compatible with crop management and available labor.

Polluted runoff and seepage from concentrated manure areas shall be intercepted and directed to storage or treatment facilities for future disposal or be applied, in an acceptable manner, directly to land.

Adequate drainage, erosion control, and other soil and water management practices shall be incorporated to prevent system related problems.

The overall system shall include sufficient land for proper use or disposal of manure at locations, times, rates, and volumes that maintain desirable water, soil, plant, and other environmental conditions. Appropriate manure handling equipment shall be available for effective operation of the system.

Sequence of installation: System components shall be planned and installed in a sequence that insures that each will function as intended without being hazardous to others or to the overall system.

Safety: Safety features and devices shall be included in manure management systems, as appropriate, to protect animals and humans from drowning, dangerous gases, and other hazards. Fencing shall be provided, as necessary, to prevent livestock and others from using the facilities for other purposes.

IX. References: (see address and telephone listings in Chapter 8)

USDA/NRCS Field Office Technical Guide

- Practice Code 313 Waste Storage Facility

University of Kentucky College of Agriculture Extension publications

- AGR-165 The Agronomics of Manure Use for Crop Production
- AEN-91 Managing Liquid Dairy Manure
- ID-148 Sampling Animal Manure
- IP-57 Potential for Livestock and Poultry Manure to Provide the Nutrients Removed by Crops and Forages in Kentucky
- AGR-146 Using Animal Manures as Nutrient Sources
- ID-168 Composting Horse Muck

Livestock BMP #6 Manure Storage Ponds

Revised November 14, 2019

I. Description and Definition(s):

Manure Storage Pond: a reservoir, pit, or pond made by excavation or earth fill for the temporary storage of liquid and/or solid livestock manures, waste water, and/or other polluted runoff prior to land application.

Construction of a storage pond for animal manure allows it to be used more effectively for fertilizer. Livestock manures are temporarily held in the manure storage pond until spreading.

Benefits:

- Manure and waste retention reduces the direct delivery of polluted water to streams.
- Increased flexibility in selecting timing of application and a slight decrease in runoff reduces nutrients reaching surface waters.
- Entrapment of organics and other chemicals increases stream water quality for the suitability of aquatic habitat in the streams.
- Temporary storage allows for a more optimal disposal time on the soil for maximum crop utilization.
- Use of storage ponds concentrates labor requirements and spreading during more favorable weather and crop application conditions.

II. Regulatory Requirements:

Operating Permits [401 KAR 5:005, 401 KAR 5:065]:
Building and/or to operating a wastewater storage pond requires a Kentucky No Discharge Operations Permit (KNDOP) in accordance with 401 KAR 5:005, or a Kentucky Pollution Discharge Elimination System (KPDES) permit, in accordance with 401 KAR 5:065.

Construction in Floodplains [KRS 151.250]:
Construction activities (e.g., fillings, channel relocations, streambank restoration, buildings, culverts, and bridges) in floodplains require a stream construction permit pursuant to KRS 151.250. An exemption exists for watersheds of less than one square mile (640 acres), except for impoundments and dams which require a permit pursuant to KRS 151.250.

Use of Manure from Off-Site [KRS 224.1-010 (31)(a)]:
Manure, crops and crop residues are exempt from regulation as a solid waste when "placed on the soil for return to the soil as fertilizers or soil conditioners" (KRS 224.1-010 (31)(a)). Manure, crops and crop residues shall be used in accordance with a nutrient management plan for the facility on which the manure, crops and crop residues are being utilized.

Spills, Leaks, or other Releases [KRS 224.1-400]:
Any spill, leak, discharge, dumping, or other "release" of any of the following classifications of substances in excess of a reportable quantity must be reported immediately to the Energy and Environment Cabinet's 24 hour environmental response line at 800-928-2380:

- Hazardous substances.
- Pollutants or contaminants. A release or threatened release of any element, substance, compound, or mixture (including manure) into the environment in a quantity that may present an imminent or substantial danger to the public health is reportable.
- Petroleum or petroleum products. Any release including a fuel, oil, or lubricant, in excess of 25 gallons within a 24 hour period, must be reported. The reportable quantity of diesel fuel is 75 gallons or more in a 24 hour period.

Cleanup requirements state that once a release has occurred, even if it is less than a reportable quantity, the responsible person must determine its effect on the environment and correct that effect. For questions concerning the Environmental Release Reporting and Cleanup Law call 502-564-6716.

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near High Quality Waters and Outstanding National Resource Waters [401 KAR 10:029, 10:030, and 10:031]:
Kentucky Water Quality Standards (401 KAR 10:029) require the use of Best Management Practices to protect High Quality Waters and Outstanding National Resource Waters listed in 401 KAR 10:030. In addition, outstanding resource waters that support federally listed threatened and endangered species require special protection (see 401 KAR 10:031).

III. AWQA Minimum Requirements:

Construct a storage pond for the temporary storage of liquid and/or solid animal manure until it can be spread or used more effectively and without causing degradation to the water, and manage the pond properly.

IV. Design Information:

Vegetate the embankment and surrounding areas to control erosion.

Estimate pond size from the projected liquid and solid manure, surface runoff water, and frequency of pumping the pond.

Depth and shape are not critical so long as the design capacity is achieved.

Consider concrete ramps down into holding pond for pumping and hauling equipment to prevent energy dissipation that may erode clay liners.

Storage pond embankment standards should exceed farm pond standards.

Consider future livestock expansion as well as present number in determining pond size.

Plan inlet so that manure is emptied near the middle of the pond. Use corrosion resistant materials and protect them from freezing, and prevent energy dissipation that may erode clay liner.

Engineer should design the structure to hold the precipitation from a 25 year, 24 hour storm, plus six months of manure generation, while maintaining one foot of freeboard.

Manage pond to avoid overflow by scheduled pumping.

Adhere closely to the design and construction plan developed by government or private engineers. Permit is required. Contact the Division of Water for permit information.

V. Practice Maintenance:

Prepare a manure removal and disposal management plan specifying times, rates, and volumes usable without polluting surface or ground water or exceeding crop requirements. Always empty the pond before it is completely full.

If excessive solids are present after emptying the pond, remove and dispose of them in order to maintain design capacity. Periodically check and clean inlets and outlets to prevent clogging.

Inspect earthen structure for erosion or other damages; repair and revegetate as necessary.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- USDA Natural Resources Conservation Service
- Kentucky Division of Water

VII. Cost Share Assistance:

Cost share assistance to land users considering this BMP may be available in some circumstances through the USDA Conservation Provisions of the current Farm Bill or the Kentucky Soil Erosion and Water Quality Cost Share Program. For more information contact the local offices of the USDA or the local conservation district office.

To receive cost share funding, approved BMPs must meet the specific requirements of the particular cost share program.

VIII. Recommendations:

Clean water should be excluded from concentrated manure areas to the fullest extent practical. See Livestock BMP #18 Stormwater Management.

Potential Sites:

- Locate out of the floodplain area unless other protective measures are taken.
- Check soils, rock depth, topography, and underlying geology for site suitability.
- Place close to the manure source to reduce excessive surface runoff water in the holding pond.
- Select a site with the greatest practical distance from residences, roads, streams, and lakes.
- Consider wind direction and offensive odor problems.
- Sufficient land must be available for a disposal area without overloading soils or exceeding crop requirements.

Planning Concerns:

- Leakage through the sidewalls and bottom may allow pollutants to move into groundwater.

IX. References: (see address and telephone listings in Chapter 8)

USDA/NRCS Field Office Technical Guide

- Practice Code 313 Waste Storage Facility

University of Kentucky College of Agriculture Extension publications

- AGR-165 Agronomics of Manure Use for Crop Production
- AEN-91 Managing Liquid Dairy Manure
- ID-148 Sampling Animal Manure
- IP-57 Potential for Livestock and Poultry Manure to Provide the Nutrients Removed by Crops and Forages in Kentucky
- AGR-146 Using Animal Manures as Nutrient Sources
- AEN-125 Closing a Liquid Manure Storage Structure

Livestock BMP #7 Manure Storage Facility: Holding Tanks

Revised November 14, 2019

I. Description and Definition(s):

Holding Tank: an essentially water tight structure of concrete, concrete block, steel, fiberglass, or similar materials to temporarily store livestock liquid and slurry manure.

Holding tanks are an effective means of storing animal manure on site, reducing its access to streams. The manure can be hauled and applied in a slurry form when soil conditions permit and it is needed most for crop production.

Benefits:

- Permits manure management for optimum utilization on soils, especially for croplands.
- Reduces water pollution by retaining manure on site and decreasing nutrient loading to streams.
- Decreases organics reaching surface water, improving quality of aquatic habitat in streams.
- Can minimize insect problems and manure odors.

II. Regulatory Requirements:

Operating Permits [401 KAR 5:005, 401 KAR 5:065]:
Building and/or operating a wastewater holding tank requires a Kentucky No Discharge Operations Permit (KNDOP) in accordance with 401 KAR 5:005, or a Kentucky Pollution Discharge Elimination System (KPDES) permit, in accordance with 401 KAR 5:065.

Construction in Floodplains [KRS 151.250]:
Construction activities (e.g., fillings, channel relocations, streambank restoration, buildings, culverts, and bridges) in floodplains require a stream construction permit pursuant to KRS 151.250. An exemption exists for watersheds of less than one square mile (640 acres), except for impoundments and dams which require a permit pursuant to KRS 151.250.

Use of Manure from Off-Site [KRS 224.1-010 (31)(a)]:
Manure, crops and crop residues are exempt from regulation as a solid waste when "placed on the soil for return to the soil as fertilizers or soil conditioners" (KRS 224.1-010 (31)(a)). Manure, crops and crop residues shall be used in accordance with a nutrient management plan for the facility on which the manure, crops and crop residues are being utilized.

Spills, Leaks, or other Releases [KRS 224.1-400]:
Any spill, leak, discharge, dumping, or other "release" of any of the following classifications of substances in excess of a reportable quantity must be reported immediately to the Energy and Environment Cabinet's 24 hour environmental response line at 800-928-2380:

- Hazardous substances.

- Pollutants or contaminants. A release or threatened release of any element, substance, compound, or mixture (including manure) into the environment in a quantity that may present an imminent or substantial danger to the public health is reportable.
- Petroleum or petroleum products. Any release including a fuel, oil, or lubricant, in excess of 25 gallons within a 24 hour period, must be reported. The reportable quantity of diesel fuel is 75 gallons or more in a 24 hour period.

Cleanup requirements state that once a release has occurred, even if it is less than a reportable quantity, the responsible person must determine its effect on the environment and correct that effect. For questions concerning the Environmental Release Reporting and Cleanup Law call 502-564-6716.

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near High Quality Waters and Outstanding National Resource Waters [401 KAR 10:029, 10:030, and 10:031]:
Kentucky Water Quality Standards (401 KAR 10:029) require the use of Best Management Practices to protect High Quality Waters and Outstanding National Resource Waters listed in 401 KAR 10:030. In addition, outstanding resource waters that support federally listed threatened and endangered species require special protection (see 401 KAR 10:031).

III. AWQA Minimum Requirements:

Construct a holding tank to store animal manure on site until it can be applied in a slurry form when soil conditions permit and it is needed most for production.

IV. Design Information:

Push-offs will be structurally sound with safety bars, and other devices to prevent humans, animals or equipment from falling into the tank.

Estimate tank size according to the kind and number of livestock, the amount of flushing water for dilution, and the planned retention time.

Allow a minimum six inch freeboard at the top of tank and six inches at the bottom for accumulated wastes.

Use water tight tank construction to prevent seepage from the tank and groundwater seepage into the tank.

Design a reinforced tank to withstand internal and external pressures.

Protect metals with concrete or paint to reduce corrosion.

In larger tanks, plan several unloading openings to allow adequate agitation. These openings should have tight covers.

Construct according to engineering design by government or private engineer. Permit is required. Contact the Division of Water for permit information.

V. Practice Maintenance:

Since manure solids accumulate on tank bottom, always agitate liquid before removal. Be aware of noxious gases produced during agitation and removal of wastes.

Check covered tank vents (especially tanks under buildings) to avoid gas accumulation and to prevent explosions.

Maintain proper warning signs for safety and check fencing regularly around uncovered or open holding tanks.

Remove and dispose of manure according to a manure management plan.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- USDA Natural Resources Conservation Service

VII. Cost Share Assistance:

Cost share assistance to land users considering this BMP may be available in some circumstances through the USDA Conservation Provisions of the current Farm Bill or the Kentucky Soil Erosion and Water Quality Cost Share Program. For more information contact the local offices of the USDA or the local conservation district office.

To receive cost share funding, approved BMPs must meet the specific requirements of the particular cost share program.

VIII. Recommendations:

Clean water should be excluded from concentrated manure areas to the fullest extent practical.

Potential Sites

- Locate as close to livestock manure source as possible.
- Tanks are usually constructed underground (e.g., under a building), although some are above ground.
- Locate where surface water is excluded, unless it is needed for manure dilution.
- Site should be easily accessible for emptying and spreading equipment.

Soil Planning Concerns

- Check soils, depth of rock, drainage, and topography for planning, design, and easy access for emptying equipment.

Ground Water Planning Concerns

- Adequate land must be available for a disposal area without overloading soils or exceeding crop requirements causing an increase in nutrients reaching ground water.
- If a high water table is present, either drainage or special tank design is needed to reduce seepage problems.

Other Planning Concerns

- Consider future livestock expansion, as well as present numbers, in determining tank size.
- More than one tank may be needed in large operations.
- Adhere to local and state health regulations concerning design, location, and ventilation (especially if tank is located under a building).

IX. References: (see address and telephone listings in Chapter 8)

USDA/NRCS Field Office Technical Guide

- Practice Code 313 Waste Storage Facility

University of Kentucky College of Agriculture Extension publications

- AGR-165 Agronomics of Manure Use for Crop Production
- AEN-91 Managing Liquid Dairy Manure
- ID-148 Sampling Animal Manure
- IP-57 Potential for Livestock and Poultry Manure to Provide the Nutrients Removed by Crops and Forages in Kentucky
- AGR-146 Using Animal Manure as Nutrient Sources
- AEN-125 Closing a Liquid Manure Storage Structure

Livestock BMP #8 Manure Treatment Lagoons

Revised November 14, 2019

I. Description and Definition(s):

Manure Treatment Lagoon: an impoundment made by excavation or earthfill to biologically treat livestock manure or other agricultural wastes, reduce pollution, and protect the environment.

Lagoons biologically treat agricultural manure to reduce nutrient content when manure is not used for fertilizer value. Excess effluent may be removed from the lagoons by irrigation or hauling if needed.

Anaerobic Lagoons:
Less surface area is required for anaerobic lagoons, however they may produce odor. These lagoons work best at depths of 8 to 15 feet. They are sized based on production and loading rates of volatile solids. In Kentucky, rainfall exceeds evaporation by about 12 inches per year. Excess effluent may be removed by irrigation or hauling.

Aerobic Lagoons:
These shallow lagoons have a recommended depth of 3 to 5 feet, where bacteria work in the presence of oxygen. Naturally aerobic lagoons are designed on the basis of daily biochemical oxygen demand (BOD) loading per acre of lagoon surface. These are sometimes used when the landowner does not want the manure as a fertilizer.

Anaerobic/Aerobic Lagoon Combination:
A combination of anaerobic and aerobic lagoons may be used if desired and site conditions permit. The anaerobic lagoon is sized and located to discharge into the aerobic lagoon. The aerobic lagoon should equal one half of the surface area of the anaerobic lagoon. If further treatment is desired a second aerobic lagoon may be added to receive discharge from the first aerobic lagoon. Both aerobic lagoons should be of equal surface area.

Benefits:

- Increases utilization of animal manure by using trapped solids, when available, on cropland.
- Reduces water pollution by retaining manure on site, decreasing nutrients reaching streams.
- Decreases organics reaching surface water, improving quality of aquatic habitat in streams.
- Runoff is retained to allow solids and insoluble phosphorus to settle and form a sludge in the bottom of the lagoon.

II. Regulatory Requirements:

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near High Quality Waters and Outstanding National Resource Waters [401 KAR 10:029, 10:030, and 10:031]:
Kentucky Water Quality Standards (401 KAR 10:029) require the use of Best Management Practices to protect High Quality Waters and Outstanding National Resource Waters listed in 401 KAR 10:030. In addition, outstanding resource waters that support federally listed threatened and endangered species require special protection (see 401 KAR 10:031).

Operating Permits [401 KAR 5:005, 401 KAR 5:065]:
The facility owner or operator must obtain a Kentucky No Discharge Operations Permit (KNDOP) in accordance with 401 KAR 5:005, or a Kentucky Pollution Discharge Elimination System (KPDES) permit, in accordance with 401 KAR 5:065.

Construction in Floodplains [KRS 151.250]:
Construction activities (e.g., fillings, channel relocations, streambank restoration, buildings, culverts, and bridges) in floodplains require a stream construction permit pursuant to KRS 151.250. An exemption exists for watersheds of less than one square mile (640 acres), except for impoundments and dams, which require a permit pursuant to KRS 151.250.

Spills, Leaks, or other Releases [KRS 224.1-400]:
Any spill, leak, discharge, dumping, or other "release" of any of the following classifications of substances in excess of a reportable quantity must be reported immediately to the Energy and Environment Cabinet's 24 hour environmental response line at 800-928-2380:

- Hazardous substances.
- Pollutants or contaminants. A release or threatened release of any element, substance, compound, or mixture (including manure) into the environment in a quantity that may present an imminent or substantial danger to the public health is reportable.
- Petroleum or petroleum products. Any release including a fuel, oil, or lubricant, in excess of 25 gallons within a 24 hour period, must be reported. The reportable quantity of diesel fuel is 75 gallons or more in a 24 hour period.

Cleanup requirements state that once a release has occurred, even if it is less than a reportable quantity, the responsible person must determine its effect on the environment and correct that effect. For questions concerning the Environmental Release Reporting and Cleanup Law call 502-564-6716.

Use of Manure from Off-Site [KRS 224.1-010 (31)(a)]:
Manure, crops and crop residues are exempt from regulation as a solid waste when "placed on the soil for return to the soil as fertilizers or soil conditioners" (KRS 224.1-010 (31)(a)). Manure, crops and crop residues shall be used in accordance with a nutrient management plan for the facility on which the manure, crops and crop residues are being utilized.

III. AWQA Minimum Requirements:

Construct lagoons to biologically treat manure to reduce nutrients in it when manure is not used for fertilizer value, and remove excess effluent by irrigation or hauling if needed.

The types of lagoons most common in Kentucky are anaerobic lagoons, aerobic lagoons, and anaerobic/aerobic lagoon combinations.

IV. Design Information:

Estimate lagoon size by the projected maximum weight of animals using the lagoon as well as other agricultural waste that might be directed into the facility.

Locate the lagoon on soils that can seal through mechanical compaction and biological action to prevent leakage.

Use mechanical treatment or liners in limited cases where self-sealing is not probable.

The minimum depth is 8 feet for anaerobic lagoons and 2 feet for aerobic lagoons.

The edges of all lagoons below the planned waterline should be constructed as steep as possible to reduce weed growth in shallow water areas.

Vegetate the embankment and surrounding areas to control erosion.

Build according to engineering design by a government or private engineer.

A permit is required. Contact the Division of Water for permit information.

Fence and post warning signs if necessary to protect and to assure use for intended purpose.

V. Practice Maintenance:

Inspect the dam for erosion or leakage; repair and improve vegetation as necessary.

Prepare a nutrient management plan for manure utilization to prevent pollution of surface or ground water. Lagoons should be designed to hold the precipitation from a 25 year, 24 hour storm, plus six months of manure generation, while maintaining one foot of freeboard.

Lagoons shall not discharge directly to surface waters.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- USDA Natural Resources Conservation Service
- Kentucky Division of Water

VII. Cost Share Assistance:

Cost Share assistance to land users considering this BMP may be available in some circumstances through the USDA Conservation Provisions of the current Farm Bill or the Kentucky Soil Erosion and Water Quality Cost Share Program. For more information contact the local offices of the USDA or the local conservation district office.

To receive cost share funding, approved BMPs must meet the specific requirements of the particular cost share program.

VIII. Recommendations:

Potential Sites

- Locate near the source of manure.
- Locate downhill from manure, concentrated livestock areas, feedlots, or other waste generated by agricultural production.
- Locate out of the floodplain area unless other protective measures are taken.
- Locate where prevailing winds will minimize odors.
- Select a site the greatest practical distances from water supplies, streams, and residences.

Soil Planning Concerns

- Check soils, rock depth, drainage, and topography for site suitability.

Ground Water Planning Concerns

- Seepage through the lagoon may allow pollutants to move into groundwater.

Other Planning Concerns

- Check and comply with local and state regulation.
- Consider future livestock expansion, as well as present number, in determining size of lagoons.

IX. References: (see address and telephone listings in Chapter 8)

USDA/NRCS Field Office Technical Guide

- Practice Code 359 Waste Storage Facility

University of Kentucky College of Agriculture Extension publications

- AGR-165 Agronomics of Manure Use for Crop Production
- AEN-91 Managing Liquid Dairy Manure
- ID-148 Sampling Animal Manure
- IP-57 Potential for Livestock and Poultry Manure to Provide the Nutrients Removed by Crops and Forages in Kentucky
- AGR-146 Using Animal Manure as Nutrient Sources
- AEN-91 Managing Liquid Dairy Manure

- AEN-125 Closing a Liquid Manure Storage Structure

Livestock BMP #9 Sediment or Solids Separation Basins

Revised November 14, 2019

I. Description and Definition(s):

Separation Basin: a structure that temporarily restrains runoff and permits liquids to drain gradually to a holding pond, lagoon, or infiltration area. Solids remain in the basin for drying and later removal for field application.

II. Regulatory Requirements:

Operating Permits [401 KAR 5:005, 401 KAR 5:065]:
The facility owner or operator must obtain a Kentucky No Discharge Operations Permit (KNDOP) in accordance with 401 KAR 5:005, or a Kentucky Pollution Discharge Elimination System (KPDES) permit, in accordance with 401 KAR 5:065, unless only a filter strip is used. No wastewater shall leave the filter strip in a point source manner at any time.

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near High Quality Waters and Outstanding National Resource Waters [401 KAR 10:029, 10:030, and 10:031]:
Kentucky Water Quality Standards (401 KAR 10:029) require the use of Best Management Practices to protect High Quality Waters and Outstanding National Resource Waters listed in 401 KAR 10:030. In addition, outstanding resource waters that support federally listed threatened and endangered species require special protection (see 401 KAR 10:031).

Construction in Floodplains [KRS 151.250]:
Construction activities (e.g., fillings, channel relocations, streambank restoration, buildings, culverts, and bridges) in floodplains require a stream construction permit pursuant to KRS 151.250. An exemption exists for watersheds of less than one square mile (640 acres), except for impoundments and dams which require a permit pursuant to KRS 151.250.

Spills, Leaks, or other Releases [KRS 224.1-400]:
Any spill, leak, discharge, dumping, or other "release" of any of the following classifications of substances in excess of a reportable quantity must be reported immediately to the Energy and Environment Cabinet's 24 hour environmental response line at 800-928-2380:

- Hazardous substances.
- Pollutants or contaminants. A release or threatened release of any element, substance, compound, or mixture (including manure) into the environment in a quantity that may present an imminent or substantial danger to the public health is reportable.
- Petroleum or petroleum products. Any release including a fuel, oil, or lubricant, in excess of 25 gallons within a 24 hour period, must be reported. The reportable quantity of diesel fuel is 75 gallons or more in a 24 hour period.

Cleanup requirements state that once a release has occurred, even if it is less than a reportable quantity, the responsible person must determine its effect on the environment and correct that effect. For questions concerning the Environmental Release Reporting and Cleanup Law call 502-564-6716.

III. AWQA Minimum Requirements:

Construct a sediment or solids separation basin, generally a shallow basin designed for low velocities and the accumulation of settled materials between the manure source and manure storage or treatment facilities. An infiltration area may be utilized to further treat effluent.

IV. Design Information:

The separation basin should have adequate capacity to store settled solids for a reasonable period based on climate, equipment, and method of disposal.

Locate basin on soils of slow to moderate permeability or on soils that can seal through mechanical compaction, sedimentation, and biological action. Avoid gravelly soils and shallow soils over fractured or cavernous rock. If self-sealing is not probable, the basin shall be sealed by mechanical treatment or by the use of an impermeable membrane. Do not construct to an elevation below the seasonal high water table unless considered as a special design.

V. Practice Maintenance:

A program should be prepared for maintaining the embankment, the design capacity, the vegetative cover, and the outlet.

After each large storm, check basins and perform needed maintenance.

Maintain sod and control trees and brush by chemical or mechanical means.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- USDA Natural Resources Conservation Service

VII. Cost Share Assistance:

Cost share assistance to land users considering this BMP may be available in some circumstances through the USDA Conservation Provisions of the current Farm Bill or the Kentucky Soil Erosion and Water Quality Cost Share Program. For more information contact the local offices of the USDA or the local conservation district office.

To receive cost share funding, approved BMPs must meet the specific requirements of the particular cost share program.

VIII. Recommendations:

- Maintain fence around the pipe
- Design and size basin appropriately for expected sediment/solids load
- Plan for routine maintenance and removal of settled sediment/solids

IX. References: (see address and telephone listings in Chapter 8)

USDA/NRCS Field Office Technical Guide

University of Kentucky College of Agriculture Extension publications

- AGR-165 Agronomics of Manure Use for Crop Production
- AEN-91 Managing Liquid Dairy Manure
- ID-148 Sampling Animal Manure
- IP-57 Potential for Livestock and Poultry Manure to Provide the Nutrients Removed by Crops and Forages in Kentucky
- AGR-146 Using Animal Manure as Nutrient Sources

Livestock BMP #10 Manure Storage Facility: Stack Pads

Revised November 14, 2019

I. Description and Definition(s):

Stack Pad: a stacking facility constructed of durable materials to temporarily store solid livestock manure or other agricultural waste until it can be removed and properly disposed of on the land.

II. Regulatory Requirements:

No permit is required from the Division of Water if the stack pad is covered and the manure, from generation to final disposal, is handled in a dry (no water added intentionally or otherwise) fashion.

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near High Quality Waters and Outstanding National Resource Waters [401 KAR 10:029, 10:030, and 10:031]:
Kentucky Water Quality Standards (401 KAR 10:029) require the use of Best Management Practices to protect High Quality Waters and Outstanding National Resource Waters listed in 401 KAR 10:030. In addition, outstanding resource waters that support federally listed threatened and endangered species require special protection (see 401 KAR 10:031).

Construction in Floodplains [KRS 151.250]:
Construction activities (e.g., fillings, channel relocations, stream bank restoration, buildings, culverts, and bridges) in floodplains require a stream construction permit pursuant to KRS 151.250. An exemption exists for watersheds of less than one square mile (640 acres), except for impoundments and dams which require a permit pursuant to KRS 151.250.

Use of Manure from Off-Site [KRS 224.1-010 (31)(a)]:
Manure, crops and crop residues are exempt from regulation as a solid waste when "placed on the soil for return to the soil as fertilizers or soil conditioners" (KRS 224.1-010 (31)(a)). Manure, crops and crop residues shall be used in accordance with a nutrient management plan for the facility on which the manure, crops and crop residues are being utilized.

III. AWQA Minimum Requirements:

Construct stack pads to provide storage of solid animal manures until it can be properly utilized for fertilizer. Other management components such as manure storage ponds and filter strips may be used effectively with stack pads to reduce nutrient rich runoff from reaching surface water.

IV. Design Information:

Fence as necessary to prevent livestock and humans from using facility for other purposes.

Use vegetative screens or other methods as needed to shield structure from public view and/or improve visual conditions.

The storage structure's size depends on the type and number of animals, amount of bedding used, and the proposed retention time.

Pushoffs must be reinforced for safety.

Slope floors slightly away from equipment entrance.

Construct nearly level access ramps, if possible, for easy equipment entrance.

For storage of semi solid manure, design and use removable reinforced concrete or heavy timer entrance gates to minimize liquid outflow.

Follow a design construction plan prepared by a government or private engineer.

A permit may be required. Contact the Division of Water for permit information.

V. Practice Maintenance:

Check for leakage from manure stack pad and correct problem to minimize soil and water pollution.

Remove and dispose of manure according to a waste management plan.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- USDA Natural Resources Conservation Service
- Kentucky Division of Water

VII. Cost Share Assistance:

Cost share assistance to land users considering this BMP may be available in some circumstances through the USDA Conservation Provisions of the current Farm Bill or the Kentucky Soil Erosion and Water Quality Cost Share Program. For more information contact the local offices of the USDA or the local conservation district office.

To receive cost share funding, approved BMPs must meet the specific requirements of the particular cost share program.

VIII. Recommendations:

Clean water should be excluded from concentrated manure areas to the fullest extent practical. See Livestock BMP #18 Stormwater Management.

Potential Sites

- Locate where prevailing winds will minimize odors.
- Locate close to manure source to reduce scraping time.
- Topography will affect location, design, and amount of excavation.
- Locate the greatest possible distance from residences, water supplies, and streams.
- Adhere to local and state regulations that relate to site location and design.

Soil Planning Concerns

- Check soils, depth to rock, water table, and topography before locating site and designing structure.

Other Planning Concerns

- As an alternate to storage, you may include in the design an access under the pushoff for daily manure spreading equipment.

IX. References: (see address and telephone listings in Chapter 8)

USDA/NRCS Field Office Technical Guide

- Practice Code 313 Storage Facility

University of Kentucky College of Agriculture Extension publications

- AGR-165 Agronomics of Manure Use for Crop Production
- AEN-91 Managing Liquid Dairy Manure
- ID-148 Sampling Animal Manure
- IP-57 Potential for Livestock and Poultry Manure to Provide the Nutrients Removed by Crops and Forages in Kentucky
- AGR-146 Using Animal Manure as Nutrient Sources

Livestock BMP #11 Nutrient Management

Revised November 14, 2019

I. Description and Definition(s):

Nutrient management requires careful monitoring of all aspects of soil fertility and making necessary adjustments so that crop needs are met while minimizing the loss of nutrients to surface or groundwater. Nutrient management includes management of all plant nutrients associated with animal manure, commercial fertilizer, legume crops, crop residues and other organic wastes. Nutrient management provides the crop with the correct amount of nutrients at the optimum time and location possible so they are utilized efficiently. Proper nutrient management limits the amount of plant nutrients lost to leaching, runoff and volatilization. Nutrient management is one of the more important conservation practices that protect our natural resources. Tremendous benefits to water quality can be achieved and it is relatively easy to implement and can increase profits.

II. Regulatory Requirements:

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near High Quality Waters and Outstanding National Resource Waters [401 KAR 10:029, 10:030, and 10:031]:
Kentucky Water Quality Standards (401 KAR 10:029) require the use of Best Management Practices to protect High Quality Waters and Outstanding National Resource Waters listed in 401 KAR 10:030. In addition, outstanding resource waters that support federally listed threatened and endangered species require special protection (see 401 KAR 10:031).

Operating Permits [401 KAR 5:005, 401 KAR 5:065]:
Building and/or operating any facility with components for management of liquid waste requires a Kentucky No Discharge Operations Permit (KNDOP) in accordance with 401 KAR 5:005, or a Kentucky Pollution Discharge Elimination System Permit (KPDES), in accordance with 401 KAR 5:065. There are no requirements from the Division of Water for dry or solid manure waste management systems.

No permit is required from the Division of Water if the stack pad is covered and the manure, from generation to final disposal, is handled in a dry (no water added intentionally or otherwise) fashion.

Use of Manure from Off-Site [KRS 224.1-010(31)(a)]:
Manure, crops and crop residues are exempt from regulation as a solid waste when "placed on the soil for return to the soil as fertilizers or soil conditioners" (KRS 224.1-010 (31)(a)). Manure, crops and crop residues shall be used in accordance with a nutrient management plan for the facility on which the manure, crops and crop residues are being utilized.

Activities in Jurisdictional Wetlands:
Farming activities that may affect surface drainage in areas designated as Jurisdictional Wetlands may be subject to regulation by the U.S. Army Corps of Engineers, Kentucky Division of Water, U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency, and the U.S. Department of Agriculture depending on the nature of the activity. Contact local representatives of the USDA Natural Resources Conservation Service to determine specific requirements.

III. AWQA Minimum Requirements:

- Follow the guidelines in the University of Kentucky's Extension Publication ID-211, Kentucky Nutrient Management Planning Guidelines (KyNMP), to develop nutrient management plans unless the Producer is required to follow current NRCS Practice Code 590 (version 2013) based on federal program participation.
- Maintain an adopted sequence of crop rotations to utilize nutrients.
- Take soil tests to determine the pH (buffer), pH (water), phosphorous, potassium, zinc, magnesium, and calcium to optimize plant production. Analyze animal manure for total nitrogen, phosphate, potash, calcium, and magnesium prior to land application to establish nutrient credits and to formulate application rates. Phosphorous-based nutrient management plans shall require annual soil testing.
- Manage animal manure in a manner that prevents degradation of water, soil, and that protects public health and safety.
- Sufficient land must be available for a disposal area without overloading soils or exceeding crop requirements for nutrients.
- Minimize edge-of-field delivery of nutrients where no setbacks are required.
- Temporary storage of poultry manure up to 90 days, shall be stored in a manner that prevents water from coming in contact with litter storage area to prevent the migration of nutrients to surface and ground waters.

IV. Design Information:

Planning Considerations

Water Quality Protection. The nutrient form (animal manure, commercial fertilizer), timing, method of application and placement should be adjusted to conform to seasonal variations in the uptake of nutrients by specific crops. An example is splitting applications of nitrogen that is a recommended practice to reduce leaching and atmospheric deposition along with timing the application according to plant growth patterns. A single application may result in a portion of the nitrogen leaching into the groundwater or being transported in surface runoff to receiving water bodies.

Cover crops such as small grains can utilize excess nutrients, prevent their movement out of the root zone during the season when major crops are not produced. Nutrients returned to the soil from crop residues need to be considered when determining application rates of commercial fertilizers or animal manure for subsequent crops.

Residual Soil Nutrients. Soil tests are required to determine the amount of phosphorus, potassium, secondary nutrients, and micro-nutrients available in the soil and the liming requirements based on the soil pH. Nutrient application rates should be based on the results of independent soil tests or the University of Kentucky soil test recommendations.

Nutrient Needs of the Crops and Forages. Specific crops will utilize nutrients at different rates depending on factors such as soil type, climatic factors, and water budgets. Determination of a realistic yield goal should be determined for the crop based on these factors and nutrients applied to satisfy but not exceed that specific yield goal. Yield goals should be realistic for the soil type and based on producer records and/or research documentation.

Available Nutrients. Nutrients available to crops include those identified by the soil test along with any residual nitrogen provided by animal manure applied in prior years and any nitrogen provided by legumes and green manure crops. (Nitrogen is not evaluated in the soil test, an estimate of nitrogen in the soil must me made based on history of manure application and previous crops grown.) Manure, litter, compost or wastewater that will be used should be analyzed for available nutrients prior to application.

V. Practice Maintenance:

Nutrient management is an ongoing practice and includes, but is not limited to the following:

- Take soil test and/or refer to University of Kentucky publication AGR-1 to determine annual nutrient and liming recommendations.
- Target realistic yield goals for each crop and forage grown.
- Utilize cover crops to maximize nutrient uptake, prevent groundwater contamination and/or leaching and prevent soil erosion. Cover crops can prevent un-utilized nitrogen from entering groundwater.

Application Timing:

- Manures have a significant portion of nitrogen in the organic form which delays release to the crop (spring applied) until closer to peak demand, resulting in greater nutrient efficiency. However, manure applications may take place in the spring, summer, and fall months providing the appropriate conservation practices are followed (maintaining adequate reside, using cover crops, filter strips, etc.). Manure should not applied within 48 hours following a rain or within 12 hours of a forecasted rain.
- Monitor manure levels in storage facilities to assure proper storage capacity, and allow adequate time for emptying and spreading during favorable weather conditions and at times for optimum crop uptake. Avoid spreading animal manure on frozen or snow-covered land unless conditions allow no other reasonable alternatives and special provisions are made to control runoff and pollution. Permitted manure application operations cannot apply manures to frozen or snow covered soil. Limit the rate of liquid application through irrigation to 1/2 inch per hour with the total application stopped when soil moisture in the surface six inches is brought to field capacity. Liquid applications to pasture and hay land should result in no more than 24% coverage of the plant leaf surface. Livestock should be withheld from animal manure application areas until either

the plant has added three inches of growth or a rainfall of at least 1/2 inch has occurred since application to wash some of the material for the leaf surface.
- Site specific information such as soil types and production capabilities are available from NRCS and the Cooperative Extension Service.

VI. Technical Assistance: (See address and telephone listings in Chapter 8)

- USDA Natural Resources Conservation Service
- University of Kentucky Cooperative Extension Service
- Approved third party vendors (i.e. Certified Crop Advisors through the American Society of Agronomy, etc.)

VII. Cost Share Assistance:

Cost share may be available for this BMP in some programs through the Kentucky Soil Erosion and Water Quality Cost Share Program, the USDA Conservation Provisions of the current Farm Bill, or the local Conservation District.

VIII. Recommendations:

Fertilizer and/or Manure Rates and Balancing
Nutrient application rates should be based on soil tests, manure analysis, previous applications, soil characteristics, crops to be grown and projected realistic yield goals. Higher applications than recommended are not profitable and excess nutrients may be transported to groundwater aquifers or to surface streams.

IX. References: (See address and telephone listings in Chapter 8)

USDA/NRCS Field Office Technical Guide

- Practice Code 313 Waste Storage Facility
- Practice Code 590 Nutrient Management

University of Kentucky College of Agriculture Extension publications

- IP-71 Nutrient Management in Kentucky
- AGR-165 Agronomics of Manure Use for Crop Production
- AEN-91 Managing Liquid Dairy Manure
- ID-148 Sampling Animal Manure
- IP-57 Potential for Livestock and Poultry Manure to Provide the Nutrients Removed by Crops and Forages in Kentucky
- AGR-146 Using Animal Manures as Nutrient Sources
- ID-189 Vegetative Filter Strips for Livestock Facilities

- ID-123 Livestock Waste Sampling and Testing
- AGR-16 Taking Soil Test Samples
- AGR-200 Soil Sampling and Nutrient Management in Horse Pastures
- ID-211 Kentucky Nutrient Management Planning Guidelines
- AGR-1 Lime and Fertilizer Recommendations

Livestock BMP #12 Equine or Poultry Waste Feed

Revised November 14, 2019

I. Description and Definition(s):

Certain animal manure can be utilized as feed for other livestock. Feeding broiler litter to cattle is an example of effective use of a by-product from one livestock industry by another. This type of activity usually requires some type of processing prior to feeding.

II. Regulatory Requirements:

Feed regulatory laws may apply, if product is sold specifically as a feed ingredient, processed feed, or an animal feed.

Use of Manure from Off-Site [KRS 224.1-010(31)(a)]:
Manure, crops and crop residues are exempt from regulation as a solid waste when "placed on the soil for return to the soil as fertilizers or soil conditioners" (KRS 224.1-010 (31)(a)). Manure, crops and crop residues shall be used in accordance with a nutrient management plan for the facility on which the manure, crops and crop residues are being utilized.

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near High Quality Waters and Outstanding National Resource Waters [401 KAR 10:029, 10:030, and 10:031]:
Kentucky Water Quality Standards (401 KAR 10:029) require the use of Best Management Practices to protect High Quality Waters and Outstanding National Resource Waters listed in 401 KAR 10:030. In addition, outstanding resource waters that support federally listed threatened and endangered species require special protection (see 401 KAR 10:031).

III. AWQA Minimum Requirements:

Animal manure to be used as feed should be stored and processed in such a way as to prevent contamination of streams, sink holes, springs, wells, and ground water. Accumulated manure should not be stored or processed in floodplains or sensitive environmental areas. Measures should be taken to prevent runoff water from stockpiled manure from entering the above mentioned areas.

IV. Design Information:

A concrete pad or stack pad will aid in material handling and pollution prevention.

Use of an open roofed structure or polyethylene cover will aid in runoff prevention.

V. Practice Maintenance:

Check storage areas for runoff or leakage after storms.

Maintain area surrounding stored processed manure by cleaning up loose or spilled materials.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- USDA Natural Resources Conservation Service
- University of Kentucky Cooperative Extension Service

VII. Cost Share Assistance:

No cost share assistance is currently available for this practice.

VIII. Recommendations:

Analyze manure products for nutrient content prior to use as feed. Feeding manure materials to livestock should be incorporated into a total feeding program.

Manure materials should undergo the necessary processing such as deep stacking prior to feeding to eliminate pathogenic organisms.

To minimize risks from drug residues in tissues of livestock that are fed manure materials, all feeding of waste should be discontinued at least 15 days before animals are marketed for slaughter.

Manure should not be fed to lactating dairy cattle.

XI. References: (see address and telephone listings in Chapter 8)

University of Kentucky College of Agriculture Extension publications

Livestock BMP #13 Filter Strips

Revised November 14, 2019

I. Description and Definition(s):

Filter Strip: a strip of close growing dense vegetation for filtering sediment, nutrients, and pathogens. Ideally, they are established down slope of animal production areas to capture and treat runoff before it reaches environmentally sensitive areas.

Benefits:

- Slows runoff water and allows greater infiltration.
- Provide breakdown of pollutants by beneficial bacteria within the filter strip area.
- Reduces soil erosion by capturing sediment before it reaches a waterway.
- Traps pollutants and filters runoff water coming from production areas.
- Utilize nutrients and runoff water for vegetative growth that can be used to increase forage production.
- Provides a practical best management practice that can easily be implemented into existing management strategies that will both protect the environment and provide additional production for the operation.

II. Regulatory Requirements:

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near High Quality Waters and Outstanding National Resource Waters [401 KAR 10:029, 10:030, and 10:031]:
Kentucky Water Quality Standards (401 KAR 10:029) require the use of Best Management Practices to protect High Quality Waters and Outstanding National Resource Waters listed in 401 KAR 10:030. In addition, outstanding resource waters that support federally listed threatened and endangered species require special protection (see 401 KAR 10:031).

Construction in Floodplains [KRS 151.250]:
Construction activities (e.g., fillings, channel relocations, streambank restoration, buildings, culverts, and bridges) in floodplains require a stream construction permit pursuant to KRS 151.250. An exemption exists for watersheds of less than one square mile (640 acres), except for impoundments and dams which require a permit pursuant to KRS 151.250.

III. AWQA Minimum Requirements:

Plant or maintain a dense grass sod in strips to filter soil and water to help protect water quality by reducing soil movement.

IV. Design Information:

Establishment:
When there is little or no existing vegetation, follow pasture and hayland planting or forage and biomass best management practices.

V. Practice Maintenance:

Take soil tests and/or refer to University of Kentucky publication AGR-1 to determine the annual fertilizer and lime application rates for obtaining desired yield levels.

Apply fertilizer and lime to maintain vigorous growth, except in waste management areas.

Mow to eliminate woody plants or for hay production.

Remove sediment deposits as needed, and grade to a uniform slope and re-seed.

Provide rest periods for grass recovery if there are large concentrated water flows.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- USDA Natural Resources Conservation Service
- University of Kentucky Cooperative Extension Service

VII. Cost Share Assistance:

Cost share assistance to land users considering this BMP may be available in some circumstances through the USDA Conservation Provisions of the current Farm Bill or the Kentucky Soil Erosion and Water Quality Cost Share Program. For more information contact the local offices of the USDA or the local conservation district office.

To receive cost share funding, approved BMPs must meet the specific requirements of the particular cost share program.

VIII. Recommendations:

Filter strips not only are good management practices, but also can provide additional forage for hay production when needed and properly managed.

Potential Sites:
- On the lower edge of row crop fields, especially those fields adjacent to intermittent or perennial streams, farm ponds, or lakes.
- Areas directly below an animal manure management system.
- A strip located between a timber harvesting operation and a stream, pond, or lake.
- Within a crop field as parallel strips between row crop strips.

Soil Planning Concerns

- Leave existing natural vegetation along streams or lake if it is effective in removing sediment or animal manures.

Surface and Ground Water Planning Concerns

- During large storms, runoff in excess of the design may flood the filter and release large loads of pollutants into the surface water.

Other Planning Concerns

- Nearly level uniform slopes are most effective. Slopes over 8% need wider filter strips.
- The filter strip width should be in multiples of the width of mowing, fertilization, and other farm equipment. For example, use 6, 12, 18 or 24 foot wide strips if equipment is 6 feet wide.

XI. References: (see address and telephone listing in Chapter 8)

USDA/NRCS Field Office Technical Guide

- Practice Code 393 Waste Storage Facility

University of Kentucky College of Agriculture Extension publications

- ID-189 Enhanced Vegetative Filter Strips for Livestock Facilities
- AGR-1 Lime and Fertilizer Recommendations

Livestock BMP #14 Feeding and Heavy Use Area Management

Revised November 14, 2019

I. Description and Definition(s):

This BMP concerns managing heavily used livestock areas in a manner that protects areas prone to water quality or soil erosion problems by establishing vegetative cover, by surfacing with suitable load bearing materials, or by installing needed structures.

II. Regulatory Requirements:

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near High Quality Waters and Outstanding National Resource Waters [401 KAR 10:029, 10:030, and 10:031]:
Kentucky Water Quality Standards (401 KAR 10:029) require the use of Best Management Practices to protect High Quality Waters and Outstanding National Resource Waters listed in 401 KAR 10:030. In addition, outstanding resource waters that support federally listed threatened and endangered species require special protection (see 401 KAR 10:031).

III. AWQA Minimum Requirements:

Protect or stabilize heavily used livestock areas by establishing vegetative cover, by surfacing with suitable load bearing materials, or by installing needed structures.

Site livestock feeding and heavy use areas in a manner that recognizes areas prone to water quality or soil erosion problems and avoids such problems.

IV. Design Information:

Provision shall be made for surface and subsurface drainage as needed and for disposal of runoff without erosion.

Sprays and Artificial Mulches:
Sprays of asphalt, oil, plastic, manufactured mulches and similar materials will be installed in accordance with the manufacturers' recommendations.

Vegetative Treatment:
Vegetation shall be established by seeding and/or sprigging or sodding to stabilize heavy use areas. Select plant species that will tolerate a wide range of environmental conditions including sun, shade, drought, and excessive traffic by livestock. Some adapted plant species suitable for this use are listed in the NRCS Technical Guide.

All surfacing materials shall be placed and finished to the lines and grades shown on the plans.

V. Practice Maintenance:

Take soil tests and/or refer to University of Kentucky publication AGR-1 to determine the annual fertilizer and lime application rates for obtaining desired yield levels.

Re-seed and mulch areas that have inadequate cover. Always use best management techniques for seeding and increase seed rates and mulch with straw or hay (2 tons/acre).

Protect area from traffic.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- USDA Natural Resources Conservation Service
- University of Kentucky Cooperative Extension Service

VII. Cost Share Assistance:

Cost share assistance to land users considering this BMP may be available in some circumstances through the USDA Conservation Provisions of the current Farm Bill or the Kentucky Soil Erosion and Water Quality Cost Share Program. For more information contact the local offices of the USDA or the local conservation district office.

To receive cost share funding, approved BMPs must meet the specific requirements of the particular cost share program.

VIII. Recommendations:

Fertilize and lime according to soil test results.

Potential Sites:
Increased animal traffic around feeding and watering facilities makes these areas particularly susceptible to erosion, so they should be located upgradient from streams, drainageways, and other water bodies. Portable shades, hay feeding racks, and similar facilities should be periodically moved about the pasture area to prevent overgrazing and denuding of any area.

Areas with high stocking densities should use BMPs to collect and store or filter out waste and sediment produced on these sites prior to this runoff reaching a drainageway, stream, open sinkhole, spring, well, or impounded body of water.

Dirt lots located on sites with topography sloping towards a drainageway, stream, well, spring, impounded water body, or open sinkhole should maintain a 100 foot vegetative filter strip to separate the animal feeding area from these water systems.

IX. References: (see address and telephone listings in Chapter 8)

USDA/NRCS Field Office Technical Guide

- Practice Code 342 Critical Area Planting

University of Kentucky College of Agriculture Extension publications

- ID-171 Using Dry Lots to Conserve Pastures and Reduce Pollution Potential
- ID-164 High Traffic Area Pads for Horses
- ID-176 Using Soil Cement on Horse and Livestock Farms
- ID-187 Woodland Winter Feeding Cattle
- ID-161 Pervious Concrete as a Flooring Material for Horse Handling Areas
- AEN-107 Paved Feeding Areas and the Kentucky Agriculture Water Quality Plan
- ID-202 Feedlot Design and Environmental Management for Backgrounding and Stocker Operations
- ID-229 All-Weather Surfaces for Cattle Watering Facilities
- AEN-115 Appropriate All Weather Surfaces for Livestock
- AEN-134 Fenceline Feeder Systems for Beef Cattle Production and Resource Conservation
- ID-188 Strategic Winter Feeding of Cattle Using a Rotational Grazing Structure
- AGR-1 Lime and Fertilizer Recommendations

Livestock BMP #15 Dead Animal Disposal

Revised November 14, 2019

I. Description and Definition(s):

This BMP concerns a method of disposing of dead livestock that is legally and environmentally acceptable.

II. Regulatory Requirements:

Disposal of Animal Carcasses [KRS 257:160]:
If the producer is unable to dispose of the carcass in an approved manner described above, it will be permissible to haul a dead carcass (rendering service) under these conditions:

- The bodies of dead animals transported over the highways must be covered with a tarpaulin or other heavy material and no portion of the dead animal can be exposed, and
- The sides of the trucks used must be of solid material.

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near High Quality Waters and Outstanding National Resource Waters [401 KAR 10:029, 10:030, and 10:031]:
Kentucky Water Quality Standards (401 KAR 10:029) require the use of Best Management Practices to protect High Quality Waters and Outstanding National Resource Waters listed in 401 KAR 10:030. In addition, outstanding resource waters that support federally listed threatened and endangered species require special protection (see 401 KAR 10:031).

III. AWQA Minimum Requirements:

Follow requirements of state law KRS 257:160.

When burying carcasses, avoid areas subject to flooding or closer than 100 feet to a stream, well, spring, lake, or sinkhole.

When composting carcasses, composting shall be conducted in accordance with ID-166 On-farm Composting of Animal Mortalities.

IV. Design Information:

Producers need to be aware of the need to develop specific handling procedures that avoid aesthetic and odor problems.

V. Practice Maintenance:

Diligent and conscientious management of dead animals is a safeguard to prevent groundwater or surface water pollution and odor nuisances.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- University of Kentucky Cooperative Extension Service
- Kentucky Division of Livestock Sanitation (State Veterinarian)
- Commercial Rendering Services

VII. Cost Share Assistance:

Some Conservation Districts offer cost share assistance for dead animal disposal.

To receive cost share funding, approved BMPs must meet the specific requirements of the particular cost share program.

VIII. Recommendations:

Plan ahead for livestock mortality events. Be prepared to manage mortalities by means of incineration, burial, rendering or composting.

Manage mortalities within 48 hours, unless the animal is stored in a cooler.

If the death of an animal is suspicious or of an unknown cause that may pose a risk to other livestock, quarantine exposed livestock and contact State Veterinarian and the Veterinary Diagnostic Laboratory.

Contact tree trimmers or county solid waste programs for wood chips.

IX. References: (see address and telephone listings in Chapter 8)

Kentucky Office of the State Veterinarian

University of Kentucky Veterinary Diagnostic Laboratory

USDA – NRCS Field Office Technical Guide

- Practice Code 316 Animal Mortality Facility
- Practice Code 317 Composting Facility

University of Kentucky College of Agriculture Extension publications

- ID-167 On-Farm Disposal of Animal Mortalities
- ID-166 On-Farm Composting of Animal Mortalities

Livestock BMP #16 Milking Center Wastewater Treatment

Revised November 14, 2019

I. Description and Definition(s):

Milking center wastewater includes waste from the milking parlor and milkhouse. It comprises milk solids, fat, casein, detergents, manure, and other solid and liquid particles.

II. Regulatory Requirements:

Grade A Dairy Sanitary Standards [902 KAR 50:110]:
This regulation provides standards for the protection of private well water supplies from dairy and other animal waste and groundwater runoff.

Manufacturing Dairy Grade Standards [902 KAR 50:032]

Pasteurized Milk Ordinance (from **U.S. Department of Health and Human Services**)

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near High Quality Waters and Outstanding National Resource Waters [401 KAR 10:029, 10:030, and 10:031]:
Kentucky Water Quality Standards (401 KAR 10:029) require the use of Best Management Practices to protect High Quality Waters and Outstanding National Resource Waters listed in 401 KAR 10:030. In addition, outstanding resource waters that support federally listed threatened and endangered species require special protection (see 401 KAR 10:031).

III. AWQA Minimum Requirements:

Develop and manage a milking center wastewater treatment system that is environmentally acceptable and prevents wastewater from contaminating ground or surface water.

IV. Design Information:

Direct wastewater to a manure storage facility and then spread on cropland or pasture.

Direct disposal to a specially designed grass covered area. Direct disposal to a municipal sewage system.

Direct disposal to a soil absorption/lateral field.

V. Practice Maintenance:

Proper clean up practice will minimize the amount of wastewater.

Proper utilization of waste milk, manure, and excess feed is economically sound and avoids turning them into pollutants.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- USDA Natural Resource Conservation Service
- University of Kentucky Cooperative Extension Service
- Kentucky Milk Safety Branch, Department of Health Services

VII. Cost Share Assistance:

Cost Share assistance to land users considering this BMP may be available in some circumstances through the USDA Conservation Provisions of the current Farm Bill or the Kentucky Soil Erosion and Water Quality Cost Share Program. For more information contact the local offices of the USDA or the local conservation district office.

To receive cost share funding, approved BMPs must meet the specific requirements of the particular cost share program.

VIII. Recommendations:

Combine milking center wastes with manure to allow for a common collection system for both types of waste.

The milking center wastewater can be directed to a holding pond or pit which contains both manure and wastewater.

The wastewater should bypass the stack pad and run directly to the holding pond or settling basin if one is used.

A permit may be required. Contact the Division of Water for information.

IX. References: (see address and telephone listings in Chapter 8)

Grade A Pasteurized Milk Ordinance (FDA Milk Specialists 215-597-4390 ext. 4005)

Pasteurized Milk Ordinance (PMO), U.S. Department of Health and Human Services.

University of Kentucky College of Agriculture Extension publications

- ID-200 Environmental Compliance for Dairy Operations

KY Cabinet for Health Services, Department of Public Health, Division of Public Health Protection and Safety, Milk Safety Branch

Livestock BMP #17 Poultry Siting and Land Application of On-Farm Generated Waste By-Products

Revised November 14, 2019

I. Description and Definition(s):

This practice is used to eliminate or control the potentially harmful effects of agriculture on surface and groundwater and relates to siting of poultry facilities and the land applications of poultry waste and by-products. It applies to the construction of poultry facilities and the use of nutrient management planning in conjunction with land applications to control or eliminate the contribution of excess nutrients (especially nitrogen and phosphorus) to our water resources.

II. Regulatory Requirements:

Operating Permits [401 KAR 5:005, 401 KAR 5:065]:
Building and/or operating any facility with components for management of liquid waste requires a Kentucky No Discharge Operations Permit (KNDOP) in accordance with 401 KAR 5:005, or a Kentucky Pollution Discharge Elimination System Permit (KPDES), in accordance with 401 KAR 5:065. There are no requirements from the Division of Water for dry or solid manure waste management systems.

Activities in Jurisdictional Wetlands:
Farming activities that may affect surface drainage in areas designated as Jurisdictional Wetlands may be subject to regulation by the U.S. Army Corps of Engineers, Kentucky Division of Water, U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency, and the U.S. Department of Agriculture depending on the nature of the activity. Contact local representatives of the USDA Natural Resources Conservation Service to determine specific requirements.

No permit is required from the Division of Water if the stack pad is covered and the manure, from generation to final disposal, is handled in a dry (no water added intentionally or otherwise) fashion.

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near High Quality Waters and Outstanding National Resource Waters [401 KAR 10:029, 10:030, and 10:031]:
Kentucky Water Quality Standards (401 KAR 10:029) require the use of Best Management Practices to protect High Quality Waters and Outstanding National Resource Waters listed in 401 KAR 10:030. In addition, outstanding resource waters that support federally listed threatened and endangered species require special protection (see 401 KAR 10:031).

Use of Manure from Off-Site [KRS 224.1-010 (31)(a)]:
Manure, crops and crop residues are exempt from regulation as a solid waste when "placed on the soil for return to the soil as fertilizers or soil conditioners" (KRS 224.1-010 (31)(a)). Manure, crops and crop residues shall be used in accordance with a nutrient management plan for the facility on which the manure, crops and crop residues are being utilized.

Spills, Leaks, or other Releases [KRS 224.1-400]:
Any spill, leak, discharge, dumping, or other "release" of any of the following classifications of substances in excess of a reportable quantity must be reported immediately to the Energy and Environment Cabinet's 24 hour environmental response line at 800-928-2380:

- Hazardous substances.
- Pollutants or contaminants. A release or threatened release of any element, substance, compound, or mixture (including manure) into the environment in a quantity that may present an imminent or substantial danger to the public health is reportable.
- Petroleum or petroleum products. Any release including a fuel, oil, or lubricant, in excess of 25 gallons within a 24 hour period, must be reported. The reportable quantity of diesel fuel is 75 gallons or more in a 24 hour period.

Cleanup requirements state that once a release has occurred, even if it is less than reportable quantity, the responsible person must determine its effect on the environment and correct that effect. For questions concerning the Environmental Release Reporting and Cleanup Law call 502-564-6716.

Disposal of Animal Carcasses [KRS 257.160]:
If the producer is unable to dispose of the carcass in an approved manner description above it will be permissible to haul a dead carcass (rendering service) under these conditions:

- The bodies of dead animals transported over the highways must be covered with a tarpaulin or other heavy material and no portion of the dead animal can be exposed.
- The sides of the trucks used must be of solid material.

Construction in Floodplains [KRS 151.250]:
Construction activities (e.g. fillings, channel relocations, streambank restoration, buildings, culverts and bridges) in floodplains require a stream construction permit pursuant to KRS 151.250. An exemption exists for watersheds of less than one square mile (640 acres), except for impoundments and dams which require a permit pursuant to KRS 151.250.

III. AWQA Minimum Requirements:

Siting Acreage
The minimum acreage on which a one or two poultry house farm may be sited is 15 acres. Each additional poultry house requires five acres.

Siting Setbacks
These distances apply to all nutrient management facilities as well as poultry houses themselves. Setbacks relating to dwellings, churches, and property lines may be waived by the owner of these features by obtaining a sworn affidavit from the owner that he or she is agreeable to the waiver:

- Schools, churches and adjacent cemeteries, incorporated city limits, and public parks as of July 1, 1998 - minimum of 1500 feet.
- Dwellings other than growers/or not associated with the operation - 500 feet.
- Except at tunnel ventilation fan outlets - 750 feet.
- Property lines - minimum of 75 feet.
- Roadways, primary (state and federal) - minimum of 150 feet.
- Roadways, secondary (county) - minimum of 100 feet.
- Lakes, rivers, blue line streams, sinkholes with openings - minimum 150 feet.
- Water well not owned by producer - minimum of 300 feet.

Land Application Setbacks - Poultry Waste
These distances apply to all poultry waste or by-products that are land applied. Setbacks relating to dwellings, churches, and property lines may be waived by the owner of these features by obtaining a sworn affidavit from the owner that he or she is agreeable to the waiver:

- Dwellings or occupied buildings - minimum of 300 feet.
- Water well - minimum of 200 feet.
- Lakes, rivers, blue line streams, sinkholes with openings - minimum of 75 feet.

Nutrient Management Plans
Each poultry operation must prepare a nutrient management plan. As a minimum this plan must meet the Kentucky Agriculture Water Quality Plan requirements in Livestock BMP #11 Nutrient Management.

The nutrient management plan will specify on-farm application of litter.

Litter Storage
Storage area must be covered temporarily or permanently as required in Livestock BMP #11 Nutrient Management, and not located within 150 feet of a stream or tributary.

Take necessary measures to reasonably prevent an increase in moisture content by diverting water.

Accepted mortality methods will be limited to those approved by the Kentucky State Veterinarian (see Regulatory Requirements-Disposal of Animal Carcasses KRS 257:160).

IV. Design Information:

Planning Considerations
Storm water runoff patterns should be reflected in farm siting and construction.

The topography, prevailing wind and discharge area of the tunnel ventilation fan should be considered when siting a house.

Consider future expansion as well as present number in determining siting of facilities. Sufficient land must be available for a disposal area without overloading soils or exceeding crop requirements.

Use vegetative screens or other methods as needed to shield structure from public view and/or improve visual conditions. They will also reduce dust and odors that might create a nuisance or the perception of a nuisance among neighbors. If the house is sited within an adequate wind shed and on high ground with adequate drainage, many potential air and water quality problems can be avoided with little or no adverse effect on the community.

V. Practice Maintenance:

Apply poultry manure in accordance with a nutrient management plan. Use soil test(s) recommendations, waste analysis and plant availability calculations to match rates of waste application with crop nutrient needs.

Remove and dispose of poultry waste according to a waste or nutrient management plan to prevent pollution of surface or groundwater.

Diligent and conscientious management of dead animals is a safeguard to prevent groundwater or surface water pollution and odor nuisances.

VI. Technical Assistance: (See address and telephone listings in Chapter 8)

- USDA Natural Resources Conservation Service
- Kentucky Division of Water
- University of Kentucky Cooperative Extension Service
- Kentucky Division of Livestock Sanitation (State Veterinarian)

VII. Cost Share Assistance:

Cost share assistance to land users considering this BMP may be available in some circumstances through the USDA Conservation Provisions of the current Farm Bill or the Kentucky Soil Erosion and Water Quality Cost Share Program. For more information, contact the local offices of the USDA or the local conservation district office.

To receive cost share funding, approved BMPs must meet the specific requirements of the particular cost share program.

VIII. Recommendations:

Waste should be used to the fullest extent possible by recycling it through soil and plants.

Manure shall be collected and safely spread on land, treated or stored until it can be safely spread. Adequate storage must be provided to allow spreading during favorable weather and at times compatible with crop management and available labor.

Adequate drainage, erosion control and other soil and water management practice shall be incorporated to prevent system-related problems.

The overall system shall include sufficient land for proper use or disposal of waste at locations, time, rates and volumes that maintain desirable water, soil, plant and other environmental conditions. Appropriate waste handling equipment shall be available for effective operation of the system.

Analyze waste products for nutrient content prior to use as feed. Feeding waste materials to livestock should be incorporated into a total feeding program and should meet the applicable requirements in Livestock BMP #12 Equine or Poultry Waste Feed.

IX. References: (See address and telephone listings in Chapter 8)

USDA/NRCS Field Office Technical Guide

- Practice Code 590 Nutrient Management

University of Kentucky College of Agriculture Extension publications

Poultry Water Quality Handbook, Poultry Water Quality Consortium.

Livestock BMP #18 Stormwater Management

Revised November 14, 2019

I. Description and Definition(s):

Stormwater management is the practice of diverting rain water to keep it clean and reduce the volume of wastewater that must be managed. In accordance with the Clean Water Act, agriculture operations must manage wastewater in a manner that creates no discharge to surface water resources.

Appropriate practices for managing stormwater include but are not limited to: guttering buildings; underground outlets; vegetative filter strips (Livestock BMP #13); lined channels; detention /retention structures; and hardened structures such as rock-lined ditches, grade stabilization structures, and check dams, that divert stormwater away from the animal production and waste storage facilities and also prevent soil erosion associated with high storm runoff flows.

Benefit(s): Diverting clean water reduces the amount of wastewater that requires containment, and management, conserves wastewater storage space, creates a drier environment for animals, and reduces odors.

II. Regulatory Requirements:

Operating Permits [401 KAR 5:005, 401 KAR 5:065]:
Building and/or operating a wastewater storage pond requires a Kentucky No Discharge Operations Permit (KNDOP) in accordance with 401 KAR 5:005, or a Kentucky Pollution Discharge Elimination System (KPDES) permit, in accordance with 401 KAR 5:065.

Construction in Floodplains [KRS 151.250]:
Construction activities (e.g., fillings, channel relocations, streambank restoration, buildings, culverts, and bridges) in floodplains require a stream construction permit pursuant to KRS 151.250. An exemption exists for watersheds of less than one square mile (640 acres), except for impoundments and dams which requires a permit pursuant to KRS 151.250.

Spills, Leaks, or other Releases [KRS 224.1-400]:
Any spill, leak, discharge, dumping, or other "release" of any of the following classifications of substances in excess of a reportable quantity must be reported immediately to the Energy and Environment Cabinet's 24 hour environmental response line at 800-928-2380:

- Hazardous substances.
- Pollutants or contaminants. A release or threatened release of any element, substance, compound, or mixture (including manure) into the environment in a quantity that may present an imminent or substantial danger to the public health is reportable.
- Petroleum or petroleum products. Any release including a fuel, oil, or lubricant, in excess of 25 gallons within a 24 hour period, must be reported. The reportable quantity of diesel fuel is 75 gallons or more in a 24 hour period.

Cleanup requirements state that once a release has occurred, even if it is less than a reportable quantity, the responsible person must determine its effect on the environment and correct that effect. For questions concerning the Environmental Release Reporting and Cleanup Law call 502-564-6716.

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near High Quality Waters and Outstanding National Resource Waters [401 KAR 10:029, 10:030, and 10:031]:
Kentucky Water Quality Standards (401 KAR 10:029) require the use of Best Management Practices to protect High Quality Waters and Outstanding National Resource Waters listed in 401 KAR 10:030. In addition, outstanding resource waters that support federally listed threatened and endangered species require special protection (see 401 KAR 10:031).

III. AWQA Minimum Requirements:

- Divert clean water using gutters, downspouts, and/or other practices to minimize the volume of wastewater that must be managed.
- Construct and manage stormwater practices in a manner that does not cause further erosion.

IV. Design Information:

Utilize USDA Natural Resources Conservation Service practices to divert clean water and minimize the volume of wastewater.

Utilize grassed waterways, filter strips, or grade stabilization structures to minimize erosion from concentrated flows of stormwater runoff.

Adhere closely to the design and construction plan developed by government or private engineers. Contact the county conservation district for local information.

V. Practice Maintenance:

Periodically check downspouts, culverts, surface drains, and underground outlets, etc. to make sure that the structures are working properly.

Ensure that practices continue to divert stormwater away from animals, feedlots, and animal waste storage facilities in order to minimize the volume of wastewater.

Maintain grassed waterways and filter strips that may receive concentrated flows. Direct concentrated flows away from areas where erosion may occur.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- USDA Natural Resources Conservation Service
- Kentucky Division of Water

VII. Cost Share Assistance:

Cost share assistance to landusers considering this BMP may be available in some circumstances through the USDA Conservation Provisions of the current Farm Bill or the Kentucky Soil Erosion and Water Quality Cost Share Program. For more information contact the local offices of the USDA or the local conservation district office.

To receive cost share funding, approved BMPs must meet the specific requirements of the particular cost share program.

VIII. Recommendations:

Stormwater runoff should be excluded from animals and animal waste (manure) areas to the fullest extent practical. See Farmstead BMP # 5 Water Harvesting for additional information about capturing stormwater for use on the farm.

IX. References: (see address and telephone listings in Chapter 8)

USDA/NRCS Field Office Technical Guide

- Practice Code 362 Diversion
- Practice Code 558 Roof Runoff Structure
- Practice Code 350 Sediment Basin
- Practice Code 356 Dike
- Practice Code 412 Grassed Waterway
- Practice Code 393 Filter Strip
- Practice Code 410 Grade Stabilization Structure
- Practice Code 468 Lined Waterway or Outlet
- Practice Code 587 Structure for Water Control
- Practice Code 620 Underground Outlet
- Practice Code 638 Water and Sediment Control Basin

University of Kentucky College of Agriculture Extension publications

- AEN-103 Stormwater BMPs for Confined Livestock Facilities
- AEN-135 Rainwater Harvesting for Livestock Production Systems

Livestock BMP #19 Totally Covered Open Confinement

Revised November 14, 2019

I. Description and Definition(s):

Totally covered open confinement is defined as using a roofed facility to house animals, where they will be fed and maintained continuously or during winter and spring feeding and or drought periods. Totally covered is used to distinguish that the structure for housing the animals is all under roof. Open means that the sides of the structure can be open to the outside or the sidewall area can be reduced or closed by sidewall curtains. The goal of totally covered confinement is to provide an option to livestock producers for increasing animal production efficiency, while controlling potential environmental damages and impacts. This type of confinement reduces or eliminates the necessity to consider liquid waste management options. In some cases, manure storage and housing can be combined into one facility. Compost bedded and bedded pack barns are an example of this practice.

Totally covered open confinement requires specific management techniques and specialized facility design. Careful consideration of productivity versus environmental impacts should guide decisions.

Benefit(s): Some of the primary benefits are the potential to provide nutrient and pollutant runoff reduction and more efficient use of production inputs. The use of livestock confinement can increase the feed efficiency and finishing time of animals without increasing labor requirements. It can also lower mortality rates during calving by providing shelter. It can lead to improved facilities management and control of production processes that help in the production of a higher value product. It improves recordkeeping and production tracking for total system management and provides a great potential for environmental benefits. It eliminates the need for pasture and a large outside lot requiring additional land. Lower cost structures could include hoop barns, which provide cover and housing at less cost than traditional structures.

Soil and water quality benefits can result from having totally covered open confinement. The ability to manage solid manure and divert clean water from the facility are added benefits. By reducing the need for equipment to travel in a field as frequently, livestock confinement can also reduce soil compaction and erosion. Avoidance of environmentally sensitive areas can greatly reduce off-site delivery of nutrient and pesticide related water pollution. Improvements in water and feed use efficiency can also be gained, providing both economic and environmental benefit. Developing a livestock confinement facility that is appropriately sized and managed at an appropriate stocking density can essentially allow for better control of an agricultural operation's inputs and outputs, which can improve overall system profitability and efficiency.

II. Regulatory Requirements:

Operating Permits [401 KAR 5:005, 401 KAR 5:065]:
Building and/or operating a wastewater storage pond requires a Kentucky No Discharge Operations Permit (KNDOP) in accordance with 401 KAR 5:005, or a Kentucky Pollution Discharge Elimination System (KPDES) permit, in accordance with 401 KAR 5:065.

Construction in Floodplains [KRS 151.250]:
Construction activities (e.g., fillings, channel relocations, streambank restoration, buildings, culverts, and bridges) in floodplains require a stream construction permit pursuant to KRS 151.250. An exemption exists for watersheds of less than one square mile (640 acres), except for impoundments and dams which require a permit pursuant to KRS 151.250.

Spills, Leaks, or other Releases [KRS 224.1-400]:
Any spill, leak, discharge, dumping, or other "release" of any of the following classifications of substances in excess of a reportable quantity must be reported immediately to the Energy and Environment Cabinet's 24 hour environmental response line at 800-928-2380:

- Hazardous substances.
- Pollutants or contaminants. A release or threatened release of any element, substance, compound, or mixture (including manure) into the environment in a quantity that may present an imminent or substantial danger to the public health is reportable.
- Petroleum or petroleum products. Any release including a fuel, oil, or lubricant, in excess of 25 gallons within a 24 hour period, must be reported. The reportable quantity of diesel fuel is 75 gallons or more in a 24 hour period.

Cleanup requirements state that once a release has occurred, even if it is less than a reportable quantity, the responsible person must determine its effect on the environment and correct that effect. For questions concerning the Environmental Release Reporting and Cleanup Law call 502-564-6716.

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near High Quality Waters and Outstanding National Resource Waters [401 KAR 10:029, 10:030, and 10:031]:
Kentucky Water Quality Standards (401 KAR 10:029) require the use of Best Management Practices to protect High Quality Waters and Outstanding National Resource Waters listed in 401 KAR 10:030. In addition, outstanding resource waters that support federally listed threatened and endangered species require special protection (see 401 KAR 10:031).

III. AWQA Minimum Requirements:

Use equipment, methods, and technology that support livestock confinement in a manner that reduces impacts to soil and water resources. This could include but is not limited to the use of roof runoff structures, heavy use area production lots, covered manure stack pads, compost

bedded pack barns, and waste storage lagoons to improve runoff management from production areas and reduce impacts to soil and water resources.

IV. Design Information:

Utilize USDA Natural Resources Conservation Service practices to install, maintain and utilize livestock Confinement technology. The following practices directly support livestock confinement operations:

- Waste Storage Facility (Conservation Practice Standard 313)
- Nutrient Management (Conservation Practice Standard 590)
- Animal Mortality Facility (Conservation Practice Standard 316)
- Waste Transfer (Conservation Practice Standard 634)
- Waste Separation Facility (Conservation Practice Standard 632)
- Roof Runoff Structure (Conservation Practice Standard 558)
- Access Road (Conservation Practice Standard 650)
- Windbreak/Shelterbelt Establishment (Conservation Practice Standard 380)

Adhere closely to the design and construction plan developed by government or private engineers. Contact the county conservation district for local information.

V. Practice Maintenance:

- Development and adherence to appropriate nutrient management planning strategies. See Livestock BMP #11 Nutrient Management Planning
- Regular inspection of drainage structures to ensure functionality
- Management of freeboard at waste lagoon sites
- Periodic manure disposal from collection sites by off-site disposal, composting, or land application
- Regular inspection of facility bedding, manure levels in confinement areas, and animal conditions.
- Sawdust and or other bedding materials may be difficult and expensive to acquire.

Additional planning, labor, and structures may be needed to store and manage bedding, which needs to be considered prior to implementation.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- USDA Natural Resources Conservation Service
- University of Kentucky

VII. Cost Share Assistance:

Cost share assistance to landusers considering this BMP may be available in some circumstances through the USDA Conservation Provisions of the current Farm Bill or the Kentucky Soil

Erosion and Water Quality Cost Share Program. For more information contact the local offices of the USDA or the local conservation district office.

To receive cost share funding, approved BMPs must meet the specific requirements of the particular cost share program.

VIII. Recommendations:

- Develop a livestock confinement plan to define goals, identify environmentally sensitive areas that could be avoided by confining livestock
- Develop a record keeping system to track system inputs, outputs, and evaluate the influence of critical environmental factors.

IX. References: (see address and telephone listings in Chapter 8)

USDA/NRCS Field Office Technical Guide

- Practice Code 313 Waste Storage Facility
- Practice Code 590 Nutrient Management
- Practice Code 316 Animal Mortality Facility
- Practice Code 634 Waste Transfer
- Practice Code 632 Waste Separation Facility
- Practice Code 558 Roof Runoff Structure
- Practice Code 560 Access Road
- Practice Code 380 Windbreak/Shelterbelt Establishment

University of Kentucky College of Agriculture Extension Publications

- ID-206 Compost-Bedded Pack Barn Design
- ID-178 Compost-Bedded Pack Barns in Kentucky
- ID-213 Kentucky Compost-Bedded Pack Barn Project

General Recommendations for Applicable Best Management Practices for Livestock

Conservation practice standards are reviewed periodically and updated if needed. To obtain the current version of these standards, contact the USDA Natural Resources Conservation Service or the appropriate technical agencies.

Chapter 7 Streams and Other Waters

Best Management Practices for Streams and Other Waters

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Guide for Determining Needs for Streams Best Management Practices (BMPs)

Activity	Pollutant	Applicable BMPs (Apply one or more of the following as needed to protect water quality)
Stream Crossing Construction	Sediment/Nutrients	1
Debris and/or Gravel Excavation	Sediment	2, 4
Streambank Stabilization Projects	Sediment/Nutrients	2, 3, 4

Streams and Other Waters BMP #1 Stream Crossing for Farm Equipment

Revised November 9, 2018

I. Description and Definition(s):

A stream crossing is a bridge or low water crossing built across a stream, river, or wetland for farm equipment or vehicular traffic. These guidelines are provided to minimize impacts to streams and wetlands from sedimentation, bank erosion, and obstruction of flow. This BMP covers activities described by the Nationwide Permit (NWP) #14 for Linear Transportation Projects issued by the U.S. Army Corps of Engineers. Note that the Nationwide Permit #14 conditions issued by the U.S. Army Corps of Engineers are subject to change every five years. Refer to the U.S. Army Corps of Engineers website for the most current conditions.

For livestock or silviculture stream crossing projects, refer to the requirements and recommendations specified under Livestock BMP #4 for livestock stream crossing and Silviculture BMP #1 for timber harvest operation access roads, skid trails, and landings.

II. Regulatory Requirements:

Stream and Wetland Crossings [U.S. Clean Water Act, 33 USC §1251 et seq., §404 and §401]:
Stream crossing projects that are authorized under the Nationwide Permit (NWP) #14 for Linear Transportation Projects, that meet the regulatory requirements listed in Section II, and that meet the AWQA Minimum Requirements listed in Section III are granted Water Quality Certification through the AWQA and do not require an Individual Water Quality Certification from the Kentucky Division of Water.

The Clean Water Act Sections 401 and 404 provide the Division of Water and the U.S. Army Corps of Engineers regulatory authority over this practice. See Clean Water Act Summary at the end of this chapter for further information.

Construction Across or Along a Stream [KRS 151.250]:
Construction activities in a floodplain or across or along a stream (e.g., fill, channel relocations, streambank restoration, buildings, culverts, and bridges) require a floodplain or stream construction permit pursuant to KRS 151.250. An exemption exists for watersheds of less than one square mile (640 acres), except for water impounding structures (e.g. dams or levees) or for any construction that does or may endanger life or cause severe damage to residential or commercial property. Contact the Division of Water, Floodplain Management Section for regulatory guidance (see Section VIII, Recommendations).

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near Special Use Waters and Wild Rivers [401 KAR 10:026, 10:029, 10:030, 10:031 and 400 KAR Chapter 4]:
Activities located near a Special Use Water may require an Individual Water Quality Certification from the Division of Water. Refer to the Kentucky Water Health Portal or Special Waters website to determine if your project may impact a Special Use Water. Contact the Division of Water, Water Quality Certification Section for regulatory guidance if your project is located near a Special Use Water.

Best management practices are required to meet Kentucky Water Quality Standards (401 KAR 10:029) within Special Use Waters. Special Use Waters include Surface Water Intakes for Domestic Water Supply Use, Outstanding State Resource Waters, and Cold Water Aquatic Habitats as defined by 401 KAR 10:026, as well as Exceptional Waters and Outstanding National Resource Waters as defined by 401 KAR 10:030. Outstanding State Resource Waters require additional protection to maintain Water Quality Standards (see 401 KAR 10:031). Kentucky Wild Rivers receive extra water quality protections, such as required buffer zones, through 400 KAR Chapter 4:140. Certain activities and changes in land use within or near a Kentucky Wild River may require a permit from the Kentucky Energy and Environmental Cabinet. Contact the Office of Kentucky Nature Preserves for regulatory guidance if your project is located near a Wild River.

III. AWQA Minimum Requirements:

1. The crossing must impact less than 300 linear feet of surface waters of the Commonwealth (streams) and less than ½ acre of wetland/marsh. An Individual Water Quality Certification is required if the crossing impacts 300 or more linear feet of surface waters of the Commonwealth or more than ½ acre of wetland/marsh.
2. Construct the crossing in a manner that does not impede or obstruct natural water flow.
3. Construct the crossing as perpendicular to the stream channel as possible. Avoid construction within the bend of a stream.
4. To the maximum extent practicable, construction activities shall take place during low-flow or no flow conditions (during late summer or fall).
5. Materials are to be placed in a manner that will not be eroded by normal or expected high flows.
6. Materials cannot be creek bed material (e.g., creek rock or gravel) due to its lack of stability.
7. Minimize the removal of streamside vegetation during construction. Vegetation prevents soil erosion and aids in bank stability.
8. Any fill materials shall be of such composition that it will not adversely affect the biological, chemical, or physical properties of the receiving waters and/or cause violations of water quality standards. If rip-rap is utilized, it should be of such weight and size that bank stress or slump conditions will not be created because of its placement.
9. Erosion and sedimentation pollution control plans and Best Management Practices must be designed, installed, and maintained in effective operating condition at all times during construction activities so that violations of state water quality standards do not occur (401 KAR 10:031 Section 2 and KRS 224.70-100).

10. Sediment and erosion control measures, such as check-dams constructed of any material, silt fencing, hay bales, etc., shall not be placed within surface waters of the Commonwealth, either temporarily or permanently, without prior approval by the Kentucky Division of Water's Water Quality Certification Section. If placement of sediment and erosion control measures in surface waters is unavoidable, design and placement of temporary erosion control measures shall not be conducted in such a manner that may result in instability of streams that are adjacent to, upstream, or downstream of the structures. All sediment and erosion control devices shall be removed and the natural grade restored within the completion timeline of the construction.
11. Seed/re-vegetate the banks and bare soil areas immediately after completion of the project to a minimum fifteen (15) foot wide buffer parallel to the stream on each bank. See the Division of Water website for a suggested riparian species planting list.
12. Heavy equipment, e.g. bulldozers, backhoes, draglines, etc., if required for this project, should not be used or operated within the stream channel. In those instances in which such in-stream work is unavoidable, then it shall be performed in such a manner and duration as to minimize turbidity and disturbance to substrates and bank or riparian vegetation. If entry into the stream channel is unavoidable, use rubber track/tire equipment if possible.
13. Measures shall be taken to prevent or control spills of fuels, lubricants, or other toxic materials used in construction from entering the watercourse.
14. Do not place excavated material in the stream or floodplain.
15. Projects receiving Farm Bill funding through the Natural Resources Conservation Service (NRCS) or Kentucky Soil Erosion and Water Quality Cost Share Program funding through the Kentucky Division of Conservation must additionally follow NRCS Practice Standard Code 578 Stream Crossing requirements.

A Division of Water floodplain or stream construction permit is required for projects in streams where the watershed is greater than one square mile (640 acres). Identify stream segment and coordinates and contact the Division of Water to determine drainage size. Project design will require technical assistance (list provided in Section VI below) to design the stream crossing specific to the site conditions. The site design is to be submitted to the Division of Water for determination.

If the Nationwide Permit #14 conditions, Section II Regulatory Requirements, or AWQA Minimum Requirements cannot be met, an Individual Water Quality Certification may be required from the Division of Water. Contact the Division of Water, Water Quality Certification Section for additional information (see Section II Recommendations).

IV. Design Information:

For help with stream crossing design and construction, your local Natural Resources Conservation Service (NRCS) or local Conservation District can assist you with appropriate stream crossing plans. Private consultants and technical service providers may be hired for design and construction technical assistance.

V. Practice Maintenance:

- Check the crossings regularly and especially after flooding.
- Repair structural damage immediately.
- Revegetate any bare and/or eroded areas.
- Remove debris to maintain flow at all times (see Streams BMP #4 Stream Drainage Maintenance).

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- U.S. Army Corps of Engineers
- Kentucky Division of Water, Water Quality Certification Section
- Kentucky Division of Water, Floodplain Management Section
- Kentucky Division of Water, Regional Field Offices
- USDA Natural Resources Conservation Service
- Technical Service Providers
- Local Conservation Districts
- Private Engineering Consultants

VII. Cost Share Assistance:

Cost Share assistance to landowners considering this BMP may be available in some circumstances through the USDA Conservation Provisions of the current Farm Bill or the Kentucky Soil Erosion and Water Quality Cost Share Program. For more information contact the local offices of the USDA Natural Resources Conservation Service (NRCS) or the local conservation district office.

VIII. Recommendations:

1. Anyone who plans to construct a stream crossing for farm equipment must first determine where they intend to work. Use the Division of Water Stream Maintenance Application to identify the stream name and the latitude and longitude coordinates of the proposed project (see Section II, Activities near Special Use Waters and Wild Rivers).
2. The landowner will then develop plans for the stream crossing construction.
3. When the location and construction information is available, contact the Division of Water Floodplain Management and Water Quality Certification Sections for regulatory guidance.

IX. References and Resources: (see address and telephone listings in Chapter 8

Kentucky Department for Environmental Protection and University of Kentucky, Kentucky Transportation Center, Technology Transfer Program. Kentucky Erosion Prevention and Sediment Control Field Guide. Division of Water. Revised October 2009.

Kentucky Division of Water, Stream Maintenance FAQ. 2017

USDA/NRCS Field Office Technical Guide

- Practice Code 578 Stream Crossing

University of Kentucky Extension Publications

Streams and Other Waters BMP #2 Sand and Gravel Removal

Revised November 9, 2018

I. Description and Definition(s):

The commercial excavation, removal, and sale of sand or gravel requires a permit from the Department of Natural Resources, Division of Mine Reclamation and Enforcement, Non-Coal Review Branch. When conducting gravel removal to control stream flow, follow the guidelines outlined in the Guidelines for the One-step Removal of Stream Flow Obstructions. If these guidelines cannot be followed, a Water Quality Certification issued by the Kentucky Division of Water may be required. Be aware that depending on the type of work being done, other federal, state and/or local regulations may apply.

II. Regulatory Requirements:

Surface Effects of Non-coal Mining [405 KAR Chapter 5]:
The commercial excavation, removal, and sale of gravel requires a permit from the Department of Natural Resources, Division of Mine Reclamation and Enforcement, Non-Coal Review Branch. Mineral operations subject to 405 KAR Chapter 5 include mining of sand and gravel, and surface disturbance or dredging of river or creek sand and gravel (405 KAR 5:015). Permit requirements are found in 405 KAR 5:032. Measures for protecting surface water quality and quantity are addressed in 405 KAR 5:050.

Sand and Gravel Removal [U.S. Clean Water Act, 33 USC §1251 and §1341 et seq., §404 and §401]:
Sand and gravel can be removed in accordance with the Guidelines for One-step Removal of Stream Flow Obstructions without a Water Quality Certification issued by the Division of Water. If these guidelines cannot be followed, a Water Quality Certification from the Division of Water may be required. Be aware that depending on the type of work being done, other federal, state and/or local regulations may apply. Failure to follow these guidelines or to receive a Water Quality Certification may result in violations of laws and may result in potential penalties and remedial actions required (401 KAR 10:031, KRS 224.70-100, 33 USC §1341).

The Clean Water Act Sections 401 and 404 provide the Division of Water and the U.S. Army Corps of Engineers regulatory authority over this practice. See Clean Water Act Summary at the end of this chapter for further information.

Construction Across or Along a Stream [KRS 151.250]:
Construction activities in a floodplain or across or along a stream (e.g., fill, channel relocations, streambank restoration, buildings, culverts, and bridges) require a floodplain or stream construction permit pursuant to KRS 151.250. An exemption exists for watersheds of less than one square mile (640 acres), except for water impounding structures (e.g. dams or levees) or for any construction that does or may endanger life or cause severe damage to residential or commercial property. Contact the Division of Water, Floodplain Management Section for regulatory guidance (see Section VIII, Recommendations).

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near Special Use Waters and Wild Rivers [401 KAR 10:026, 10:029, 10:030, 10:031 and 400 KAR Chapter 4]:
Activities located near a Special Use Water may require an Individual Water Quality Certification from the Division of Water. Refer to the Kentucky Water Health Portal or Special Waters website to determine if your project may impact a Special Use Water. Contact the Division of Water, Water Quality Certification Section for regulatory guidance if your project is located near a Special Use Water.

Best management practices are required to meet Kentucky Water Quality Standards (401 KAR 10:029) within Special Use Waters. Special Use Waters include Surface Water Intakes for Domestic Water Supply Use, Outstanding State Resource Waters, and Cold Water Aquatic Habitats as defined by 401 KAR 10:026, as well as Exceptional Waters and Outstanding National Resource Waters as defined by 401 KAR 10:030. Outstanding State Resource Waters require additional protection to maintain Water Quality Standards (see 401 KAR 10:031).

Kentucky Wild Rivers receive extra water quality protections, such as required buffer zones, through 400 KAR Chapter 4:140. Certain activities and changes in land use within or near a Kentucky Wild River may require a permit from the Kentucky Energy and Environmental Cabinet. Contact the Office of Kentucky Nature Preserves for regulatory guidance if your project is located near a Wild River.

III. AWQA Minimum Requirements:

When removing obstructions to control stream flow, follow the guidelines outlined in the Guidelines for the One-step Removal of Stream Flow Obstructions and the minimum requirements listed below.

1. The material removed from the channel or floodway should be placed sufficiently upland/landward outside of the floodplain enough to prevent the runoff from entering streams and/or wetlands.
2. The temporary or permanent disposal and/or side-casting of removed material into wetlands, stream tributaries, side ditches, or other surface water is not allowed under one-step removal and would require appropriate state and federal authorizations before the work is done.
3. The removal of vegetation should be limited to the removal of snags, loose debris and vegetation which obstructs stream flow. The stumps and roots of trees and/or shrubs should be left undisturbed to protect against erosion.
4. Where obstruction removal is needed, access routes for efficient operation of equipment should be selected to minimize disturbance to the floodplain and riparian areas. All work should be performed outside of the flowing section(s) of the stream, preferably from the bank or other temporary access point. Do not use the stream as a road. If entry into the stream channel is unavoidable, use rubber track/tire equipment if possible.

5. All disturbed areas outside of the stream channel should be restored to original conditions, reseeded or replanted with native riparian species, and mulched in order to prevent erosion and sedimentation. See the Division of Water website for a suggested riparian species planting list.
6. If necessary, equipment which can scoop or lift material out of the channel from the stream bank is recommended for this type of work. Material should not be pushed against the banks or piled in the channel.
7. Activities should take place during low-flow or no flow conditions (during late summer or fall).
8. Removal of materials should not be conducted during the fish-spawning season (April 15 to June 15).
9. Precautions should be taken to prevent petroleum products such as lubricating, engine, or transmission oils and greases, etc. from entering surface waters. Washing, fueling, or servicing of equipment is prohibited where spillage or wash water can impact surface waters.
10. For sediment (sand or gravel) bar excavation, only the material more than 12 inches above the normal water elevation should be removed.
11. Maintain the cross-sectional area of stream. Do not widen the stream. Do not straighten the stream.

If the Guidelines for One-step Removal of Stream Flow Obstructions, Section II Regulatory Requirements, or AWQA Minimum Requirements cannot be met, a Water Quality Certification may be required from the Division of Water. Contact the Division of Water, Water Quality Certification Section for additional information (see Section VIII, Recommendations).

IV. Design Information:

For help with stream maintenance designs, your local Natural Resources Conservation Service (NRCS) or local Conservation District can assist you with appropriate plans. Private consultants and technical service providers may be hired for design and construction technical assistance.

V. Practice Maintenance:

Perform the one-step removal process as infrequently as possible (no more than once per year or less frequently) due to its potentially harmful effects on water quality and stream channel stability.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- U.S. Army Corps of Engineers
- Kentucky Division of Water, Water Quality Certification Section
- Kentucky Division of Water, Floodplain Management Section
- Kentucky Division of Water, Regional Field Offices
- USDA Natural Resources Conservation Service

VII. Cost Share Assistance:

No cost share assistance is currently available for this practice.

VIII. Recommendations:

1. Anyone who plans to remove sand and gravel from a stream must first determine where they intend to work. Use the Division of Water Stream Maintenance Application to identify the stream name and the latitude and longitude coordinates of the proposed sand and gravel removal project (see Section II, Activities near Special Use Waters and Wild Rivers).
2. The landowner will then develop plans for the removal method of the sand and gravel.
3. When the location and removal method information is available, contact the Division of Water Floodplain Management and Water Quality Certification Sections for regulatory guidance.

IX. References and Resources: (see address and telephone listings in Chapter 8)

Kentucky Department for Environmental Protection. Guidelines for the One-step Removal of Stream Flow Obstructions. Division of Water. Revised May 2016.

Kentucky Department for Environmental Protection and University of Kentucky, Kentucky Transportation Center, Technology Transfer Program, Kentucky Erosion Prevention and Sediment Control Field Guide. Division of Water. Revised October 2009.

Kentucky Department for Environmental Protection. Stream Maintenance FAQ. 2017. Division of Water.

Streams and Other Waters BMP #3 Streambank and Shoreline Protection

Revised November 9, 2018

I. Description and Definition(s):

Streambank protection is structural and/or vegetative practices designed to control or prevent streambanks from scouring, caving, or sloughing. These guidelines are provided to minimize impacts to streams and wetlands from sedimentation, bank erosion, and obstruction of flow. This BMP covers activities described by the Nationwide Permit (NWP) #13 for Bank Stabilization issued by the U.S. Army Corps of Engineers. Note that the Nationwide Permit #13 conditions issued by the U.S. Army Corps of Engineers are subject to change every five years. Refer to the U.S. Army Corps of Engineers website for the most current conditions.

Potential sites are:

- Any bare or unprotected bank of a stream, ditch, channel, or lake that is eroding at an accelerated rate.
- Stream crossings that may be damaged by flooding, vehicular traffic, or livestock use.

II. Regulatory Requirements:

Streambank and Shoreline Protection [U.S. Clean Water Act, 33 USC §1251 et seq., §404 and §401]:
Bank Stabilization projects that are authorized under the Nationwide Permit (NWP) #13 for Bank Stabilization, that meet the regulatory requirements listed in Section II, and that meet the AWQA Minimum Requirements listed in Section III are granted Water Quality Certification (WQC) through the AWQA and do not require an Individual Water Quality Certification from the Kentucky Division of Water.

The Clean Water Act Sections 401 and 404 provide the Division of Water and the U.S. Army Corps of Engineers regulatory authority over this practice. See Clean Water Act Summary at the end of this chapter for further information.

Construction Across or Along a Stream [KRS 151.250]:
Construction activities in a floodplain or across or along a stream (e.g., fill, channel relocations, streambank restoration, buildings, culverts, and bridges) require a floodplain or stream construction permit pursuant to KRS 151.250. An exemption exists for watersheds of less than one square mile (640 acres), except for water impounding structures (e.g. dams or levees) or for any construction that does or may endanger life or cause severe damage to residential or commercial property. Contact the Division of Water, Floodplain Management Section for regulatory guidance (see Section VIII, Recommendations).

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near Special Use Waters and Wild Rivers [401 KAR 10:026, 10:029, 10:030, 10:031 and 400 KAR Chapter 4]:
Activities located near a Special Use Water may require an Individual Water Quality Certification from the Division of Water. Refer to the Kentucky Water Health Portal or Special Waters website to determine if your project may impact a Special Use Water. Contact the Division of Water, Water Quality Certification Section for regulatory guidance if your project is located near a Special Use Water.

Best management practices are required to meet Kentucky Water Quality Standards (401 KAR 10:029) within Special Use Waters. Special Use Waters include Surface Water Intakes for Domestic Water Supply Use, Outstanding State Resource Waters, and Cold Water Aquatic Habitats as defined by 401 KAR 10:026, as well as Exceptional Waters and Outstanding National Resource Waters as defined by 401 KAR 10:030. Outstanding State Resource Waters require additional protection to maintain Water Quality Standards (see 401 KAR 10:031).

Kentucky Wild Rivers receive extra water quality protections, such as required buffer zones, through 400 KAR Chapter 4:140. Certain activities and changes in land use within or near a Kentucky Wild River may require a permit from the Kentucky Energy and Environmental Cabinet. Contact the Office of Kentucky Nature Preserves for regulatory guidance if your project is located near a Wild River.

III. AWQA Minimum Requirements:

1. The bank stabilization/ protection must impact less than 500 linear feet of surface waters of the Commonwealth (streams) and less than ½ acre of wetland/marsh. If opposite banks are stabilized, impacts to both banks are summed together to calculate the cumulative impact. An Individual Water Quality Certification is required if the project impacts 500 or more linear feet of surface waters of the Commonwealth or more than ½ acre of wetland/marsh.
2. Material shall not be creek bed material (e.g., creek rock or gravel), grouted rip-rap, poured/unformed concrete, poured asphalt or asphalt pieces.
3. Maintain the cross-sectional area of stream. Do not widen the stream. Do not straighten the stream.
4. Materials must be of the type or placed in a manner that does not impede or obstruct natural water flow. Use the minimum amount of material needed for erosion protection.
5. Materials are to be placed in a manner that will not be eroded by normal or expected high flows.
6. Do not pile materials along the streambank in order to raise the streambank elevation above pre-construction conditions.
7. Minimize the removal of streamside vegetation during construction. Vegetation prevents soil erosion and aids in bank stability.
8. To the maximum extent practicable, construction activities shall take place during low-flow or no flow conditions (during late summer or fall).

9. Any fill materials shall be of such composition that it will not adversely affect the biological, chemical, or physical properties of the receiving waters and/or cause violations of water quality standards. If rip-rap is utilized, it should be of such weight and size that bank stress or slump conditions will not be created because of its placement.
10. Erosion and sedimentation pollution control plans and Best Management Practices must be designed, installed, and maintained in effective operating condition at all times during construction activities so that violations of state water quality standards do not occur (401 KAR 10:031 Section 2 and KRS 224.70-100).
11. Sediment and erosion control measures, such as check-dams constructed of any material, silt fencing, hay bales, etc., shall not be placed within surface waters of the Commonwealth, either temporarily or permanently, without prior approval by the Kentucky Division of Water's Water Quality Certification Section. If placement of sediment and erosion control measures in surface waters is unavoidable, design and placement of temporary erosion control measures shall not be conducted in such a manner that may result in instability of streams that are adjacent to, upstream, or downstream of the structures. All sediment and erosion control devices shall be removed and the natural grade restored within the completion timeline of the construction.
12. Seed/re-vegetate the banks and bare soil areas immediately after completion of the project to a minimum fifteen (15) foot wide buffer parallel to the stream on each bank. See the Division of Water website for a suggested riparian species planting list.
13. Heavy equipment, e.g. bulldozers, backhoes, draglines, etc., if required for this project, should not be used or operated within the stream channel. In those instances in which such in-stream work is unavoidable, then it shall be performed in such a manner and duration as to minimize turbidity and disturbance to substrates and bank or riparian vegetation. If entry into the stream channel is unavoidable, use rubber track/tire equipment if possible.
14. Measures shall be taken to prevent or control spills of fuels, lubricants, or other toxic materials used in construction from entering the watercourse.
15. Do not place excavated material in the stream or floodplain.

Projects receiving Farm Bill funding through the Natural Resources Conservation Service or Kentucky Soil Erosion and Water Quality Cost Share Program funding through the KY Division of Conservation must additionally follow NRCS Practice Standard Code 580 Streambank and Shoreline Protection for stream stabilization design and construction requirements.

A Division of Water floodplain or stream construction permit is required for projects in streams where the watershed is greater than one square mile (640 acres). Identify stream segment and coordinates and contact Division of Water to determine drainage size. Project design will require technical assistance (list provided in Section VI below) to design the streambank stabilization specific to the site conditions. The site design is to be submitted to the Division of Water for determination.

If the Nationwide Permit #13 conditions, Section II Regulatory Requirements, or AWQA Minimum Requirements cannot be met, an Individual Water Quality Certification may be required from the Division of Water. Contact the Division of Water, Water Quality Certification Section for additional information (see Section VIII, Recommendations).

IV. Design Information:

For help with streambank stabilization design and construction, your local Natural Resources Conservation Service (NRCS) or local Conservation District can assist you with appropriate plans. Private consultants and technical service providers may be hired for design and construction technical assistance.

V. Practice Maintenance:

- Check the stabilized areas regularly and especially after flooding.
- Repair structural damage immediately.
- Revegetate any bare and/or eroded areas.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- U.S. Army Corps of Engineers
- Kentucky Division of Water, Water Quality Certification Section
- Kentucky Division of Water, Floodplain Management Section
- Kentucky Division of Water, Regional Field Offices
- USDA Natural Resources Conservation Service
- Technical Service Providers
- Local Conservation Districts
- Private Engineering Consultants

VII. Cost Share Assistance:

Cost Share assistance to landowners considering this BMP may be available in some circumstances through the USDA Conservation Provisions of the current Farm Bill or the Kentucky Soil Erosion and Water Quality Cost Share Program. For more information contact the local offices of the USDA Natural Resources Conservation Service (NRCS) or the local conservation district office.

VIII. Recommendations:

1. Anyone who plans to construct a streambank stabilization/ protection project must first determine where they intend to work. Use the Division of Water Stream Maintenance Application to identify the stream name and the latitude and longitude

coordinates of the proposed stream crossing locations (see Section II, Activities near Special Use Waters and Wild Rivers).

2. The landowner will then develop plans for the general design and construction method of the bank stabilization project.
3. When the location and construction information is available, contact the Division of Water Floodplain Management and Water Quality Certification Sections for regulatory guidance.
4. Stream banks often need sloping for more favorable vegetative establishment and growth. Select adapted plant species that withstand design flow velocities for the streambank areas that are occasionally under water. See the Division of Water website for a suggested riparian species planting list and for bioengineering bank stabilization examples. The stumps and roots of trees and/or shrubs should be left undisturbed to protect banks against erosion.

Streambank stabilization projects should strive to minimize negative effects on adjacent streambank areas.

IX. References and Resources: (see address and telephone listings in Chapter 8)

Kentucky Department for Environmental Protection and University of Kentucky, Kentucky Transportation Center, Technology Transfer Program, Kentucky Erosion Prevention and Sediment Control Field Guide. Division of Water. Revised October 2009

Kentucky Department for Environmental Protection. Stream Maintenance FAQ. 2017. Division of Water

USDA/NRCS Engineers Field Handbook, Chapter 18, "Soil Bio-engineering for Upland Slope Protection and Erosion Reduction"

USDA/NRCS Field Office Technical Guide

- Practice Code 580 Streambank and Shoreline Protection

Streams and Other Waters BMP #4 Stream Drainage Maintenance

Revised November 9, 2018

I. Description and Definition(s):

Stream drainage maintenance consists of activities to remove obstructions to flow, such as log jams and sediment blockages. The goals of stream drainage maintenance are to keep the channel clear enough to allow water to flow through to reduce flooding occurrence, sustain aquatic life, and provide water for farming needs during a normal rainfall year. Stream drainage maintenance activities can affect water quality. In order to minimize negative effects, proper maintenance techniques need to be employed.

When removing obstructions to control stream flow, follow the best practices outlined in the Guidelines for the One-step Removal of Stream Flow Obstructions. If these guidelines cannot be followed, a Water Quality Certification issued by the Kentucky Division of Water may be required. Be aware that depending on the type of work being done, other federal, state and/or local regulations may apply.

For sand and gravel removal, refer to the requirements and recommendations specified under Streams and Other Waters BMP #2 for Sand and Gravel Removal.

II. Regulatory Requirements:

Stream Drainage Maintenance [U.S. Clean Water Act, 33 USC §1251 et seq., §404 and §401]:
Stream flow obstructions (debris, log jams, silt, sand, gravel, etc.) can be removed in accordance with the Guidelines for One-step Removal of Stream Flow Obstructions without a Water Quality Certification issued by the Division of Water. If these guidelines cannot be followed, a Water Quality Certification issued by the Division of Water may be required. Be aware that depending on the type of work being done, other federal, state and/or local regulations may apply. Failure to follow these guidelines may result in violations of laws and may result in potential penalties and remedial actions required (401 KAR 10:031, KRS 224.70-100, 33 USC § 1341).

The Clean Water Act Sections 401 and 404 provide the Division of Water and the U.S. Army Corps of Engineers regulatory authority over this practice. See Clean Water Act Summary at the end of this chapter for further information.

Construction Across or Along a Stream [KRS 151.250]:
Construction activities in a floodplain or across or along a stream (e.g., fill, channel relocations, streambank restoration, buildings, culverts, and bridges) require a floodplain or stream construction permit pursuant to KRS 151.250. An exemption exists for watersheds of less than one square mile (640 acres), except for water impounding structures (e.g. dams or levees) or for any construction that does or may endanger life or cause severe damage to residential or commercial property. Contact the Division of Water, Floodplain Management Section for regulatory guidance (see Section VIII, Recommendations).

All Agriculture Operations [401 KAR 10:026, 10:029, 10:030, and 10:031]:
All operations must meet Kentucky Water Quality Standards.

Activities near Special Use Waters and Wild Rivers [401 KAR 10:026, 10:029, 10:030, 10:031 and 400 KAR Chapter 4]:
Activities located near a Special Use Water may require an Individual Water Quality Certification from the Division of Water. Refer to the Kentucky Water Health Portal or Special Waters website to determine if your project may impact a Special Use Water. Contact the Division of Water, Water Quality Certification Section for regulatory guidance if your project is located near a Special Use Water.

Best management practices are required to meet Kentucky Water Quality Standards (401 KAR 10:029) within Special Use Waters. Special Use Waters include Surface Water Intakes for Domestic Water Supply Use, Outstanding State Resource Waters, and Cold Water Aquatic Habitats as defined by 401 KAR 10:026, as well as Exceptional Waters and Outstanding National Resource Waters as defined by 401 KAR 10:030. Outstanding State Resource Waters require additional protection to maintain Water Quality Standards (see 401 KAR 10:031).

Kentucky Wild Rivers receive extra water quality protections, such as required buffer zones, through 400 KAR Chapter 4:140. Certain activities and changes in land use within or near a Kentucky Wild River may require a permit from the Kentucky Energy and Environmental Cabinet. Contact the Office of Kentucky Nature Preserves for regulatory guidance if your project is located near a Wild River.

III. AWQA Minimum Requirements:

When removing obstructions to control stream flow, follow the best management practices outlined in the Guidelines for the One-step Removal of Stream Flow Obstructions and the minimum requirements listed below.

1. The material removed from the channel or floodway should be placed sufficiently upland/landward outside of the floodplain enough to prevent the runoff from entering streams and/or wetlands.
2. The temporary or permanent disposal and/or side-casting of removed material into wetlands, stream tributaries, side ditches, or other surface water is not allowed under one-step removal and would require appropriate state and federal authorizations before the work is done.
3. The removal of vegetation should be limited to the removal of snags, loose debris and vegetation which obstructs stream flow. The stumps and roots of trees and/or shrubs should be left undisturbed to protect against erosion.
4. Where obstruction removal is needed, access routes for efficient operation of equipment should be selected to minimize disturbance to the floodplain and riparian areas. All work should be performed outside of the flowing section(s) of the stream, preferably from the bank or other temporary access point. Do not use the stream as a road. If entry into the stream channel is unavoidable, use rubber track/tire equipment if possible.

5. All disturbed areas outside of the stream channel should be restored to original conditions, reseeded or replanted with native riparian species, and mulched in order to prevent erosion and sedimentation. See the Division of Water website for a suggested riparian species planting list.
6. If necessary, equipment which can scoop or lift material out of the channel from the stream bank is recommended for this type of work. Material should not be pushed against the banks or piled in the channel.
7. Activities should take place during low-flow or no flow conditions (during late summer or fall).
8. Removal of materials should not be conducted during the fish-spawning season (April 15 to June 15).
9. Precautions should be taken to prevent petroleum products such as lubricating, engine, or transmission oils and greases, etc. from entering surface waters. Washing, fueling, or servicing of equipment is prohibited where spillage or wash water can impact surface waters.
10. For sediment (sand or gravel) bar excavation, only the material more than 12 inches above the normal water elevation should be removed.
11. Maintain the cross-sectional area of stream. Do not widen the stream. Do not straighten the stream.

If the Guidelines for One-step Removal of Stream Flow Obstructions, Section II Regulatory Requirements, or AWQA Minimum Requirements cannot be met, a Water Quality Certification may be required from the Division of Water. Contact the Division of Water, Water Quality Certification Section for additional information, (see Section VIII, Recommendations).

IV. Design Information:

For help with stream maintenance designs, your local Natural Resources Conservation Service (NRCS) or local Conservation District can assist you with appropriate plans. Private consultants and technical service providers may be hired for design and construction technical assistance.

V. Practice Maintenance:

- Check streams regularly and especially after flooding.
- Perform the one-step removal process as needed to remove stream obstructions without altering the stream channel.
- Revegetate any bare and/or eroded areas.

VI. Technical Assistance: (see address and telephone listings in Chapter 8)

- U.S. Army Corps of Engineers
- Kentucky Division of Water, Water Quality Certification Section
- Kentucky Division of Water, Floodplain Management Section
- Kentucky Division of Water, Regional Field Offices
- USDA Natural Resources Conservation Service

VII. Cost Share Assistance:

No cost share assistance is currently available for this practice.

VIII. Recommendations:

1. Anyone who plans to remove debris from a stream must first determine where they intend to work. Use the Division of Water Stream Maintenance Application to identify the stream name and the latitude and longitude coordinates of the proposed project (see Section II, Activities near Special Use Waters and Wild Rivers).
2. The landowner will then develop plans for the debris removal.
3. When the location and construction information is available, contact the Division of Water Floodplain Management and Water Quality Certification Sections for regulatory guidance.

IX. References and Resources: (see address and telephone listings in Chapter 8)

Clean Water Act of 1972, 33 USC §1251 and §1341 et seq.

Kentucky Department for Environmental Protection. Guidelines for the One-step Removal of Stream Flow Obstructions. Division of Water. Revised May 2016.

Kentucky Department for Environmental Protection and University of Kentucky, Kentucky Transportation Center, Technology Transfer Program, Kentucky Erosion Prevention and Sediment Control Field Guide. Division of Water. Revised October 2009.

Kentucky Department for Environmental Protection. Stream Maintenance FAQ. 2017. Division of Water.

Clean Water Act [33 USC §1251 et seq.] Sections 404 & 401

Introduction

The Clean Water Act (CWA) of 1972 is the legal underpinning of many federally mandated water quality programs. The objective of the CWA is to "…restore and maintain the chemical, physical, and biological integrity of the Nation's waters." Section 404 of the CWA specifically regulates the deposition of fill material (soil, rock, gravel, concrete, etc.) into jurisdictional waters of the United States. The Army Corps of Engineers (COE) is the federal agency responsible for implementing a permit program designed to meet the intent of Section 404 of the CWA. Section 401 of the CWA requires that all federally permitted projects receive a certification from the state to ensure that the project meets state water quality standards. In Kentucky, the certification is referred to as the §401 Water Quality Certification (WQC) and is administered by the Division of Water (DOW).

Specific activities that will have minimal environmental impacts may be authorized by the COE under Nationwide Permits (NWPs). Kentucky has its own corresponding General WQCs for many of these NWPs. NWPs and the corresponding General WQCs are issued every five years. Projects that do not qualify for a NWP may require an Individual §404 permit from the COE. For projects that require an Individual §404 permit, landowners are also required to obtain an Individual WQC from the Kentucky DOW.

Project approval process

In 1996 the Kentucky General Assembly passed an amendment to the Agricultural Water Quality Act of 1994 (KRS 224.71) which requires the Agriculture Water Quality Authority (AWQA) to provide guidance to landowners for stream related activities covered under certain NWPs. The Agriculture Water Quality Act grants §401 WQC for certain projects, provided that the project has received the appropriate NWP from the COE and all regulatory requirements and Agriculture Water Quality Plan Minimum Requirements are met.

In order for the AWQA to provide guidance to landowners involved in stream related activities, the AWQA has determined that:

1. Projects in streams where the watershed above the work is less than one square mile (640 acres) may be completed by following the BMPs contained in the Streams and Other Waters Section of the State Agriculture Water Quality Plan.
2. Projects in watersheds greater than one square mile (640 acres) will require site specific technical assistance from sources such as U.S. Army Corps of Engineers, USDA Natural Resources Conservation Service, private consultants, and the Division of Water.

COE Nationwide Permits contained in the Agriculture Water Quality Act
The NWPs addressed within the Agriculture Water Quality Plan are listed below. The NWP Conditions can be found online at: https://www.usace.army.mil/Missions/Civil-Works/Regulatory-Program-and-Permits/Nationwide-Permits/

NWPs 13 and 14 cover routine agricultural practices:

- NWP #13 Bank Stabilization. Covers bank stabilization, see Streams BMP #3.
- NWP #14 Linear Transportation Projects. Covers minor road stream crossings, see Streams BMP #1.

NWPs 12, 27, 33 and 37, while covered by the AWQA, do not normally cover individual agricultural practices. NRCS and DOW should be consulted for applicability.

Chapter 8 Agency/Agriculture Program Directory

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Section I Explanation of Abbreviations and Listings

ACEP: Agriculture Conservation Easement Program

AST: Above Ground Storage Tank

AWQA: Agriculture Water Quality Authority

BMPs: Best Management Practices

BOD: Biological Oxygen Demand

CERCLA: Comprehensive Environmental Response, Compensation and Liability Act

CFR: Code of Federal Regulations

COE: U. S. Army Corps of Engineers

CRP: Conservation Reserve Program

CSP: Conservation Stewardship Program

CTA: Conservation Technical Assistance

CWA: Clean Water Act

CWAHs: Cold Water Aquatic Habitats

DOC: Kentucky Division of Conservation

DOF: Kentucky Division of Forestry

DOW: Kentucky Division of Water

DWM: Kentucky Division of Waste Management

EQIP: Environmental Quality Incentive Program

FAQ: Frequently Asked Questions

FDA: Federal Drug Administration

FFSA: Federal Food Security Act

FIFRA: Federal Insecticide, Fungicide, and Rodenticide Act

FOTG: Field Office Technical Guide

FSA: Farm Services Agency

GGPP: Generic Groundwater Protection Plan

GPS: Global Positioning System

ICM: Integrated Crop Management

IPM: Integrated Pest Management

KAR: Kentucky Administrative Regulations

KNDOP: Kentucky No Discharge Operational Permit

KPDES: Kentucky Pollution Discharge Elimination System

KRS: Kentucky Revised Statutes

KWQS: Kentucky Water Quality Standards

KyNMP: Kentucky Nutrient Management Plan

MCL: Maximum Contaminant Level

NFPA: National Fire Protection Association

NPS: Nonpoint Source Pollution

NRCS: Natural Resources Conservation Service

NWP: Nationwide Permit

PMO: Pasteurized Milk Ordinance

RCRA: Resource Conservation and Recovery Act

SIP: Stewardship Incentive Program

SMZs: Streamside Management Zones

T&E: Threatened and Endangered

UIC: Underground Injection Control

UK: University of Kentucky

USC: United State Code

USDA: United States Department of Agriculture

USEPA: United States Environmental Protection Agency

UST: Underground Storage Tank

WQC: Water Quality Certification

Section II Agency Addresses and Telephone Listings

Energy and Environment Cabinet

Department for Environmental Protection		
24-hour Environmental Response Line	300 Sower Blvd	800-928-2380
(to report releases or spills)	Frankfort, KY 40601	502-564-2380
Division of Forestry	300 Sower Blvd	
	Frankfort, KY 40601	502-564-4496
Division of Water	300 Sower Blvd	
• Watershed Management Branch	Frankfort, KY 40601	502-564-3410
• Groundwater Section		
• Water Quality Branch		
• Water Quality Certification Section		
Division of Waste Management	300 Sower Blvd	
	Frankfort, KY 40601	502-564-6716
Division of Conservation	300 Sower Blvd	
	Frankfort, KY 40601	502-782-6703

Department of Fish and Wildlife Resources

Office of the Commissioner	#1 Game Farm Road	
	Frankfort, KY 40601	502-564-3400
Director of Information and Education	#1 Game Farm Road	
	Frankfort, KY 40601	502-564-4336

Department of Agriculture

Commissioner's Office	105 Corporate Dr	
	Frankfort, KY 40601	502-573-0282
Division of Environmental Services	105 Corporate Dr	
	Frankfort, KY 40601	502-782-9240
State Veterinarian	109 Corporate Dr	
	Frankfort, KY 40601	502-573-0282

Cabinet for Health and Family Services		
Department for Public Health	275 East Main Street Frankfort, KY 40601	502-564-3970
Milk Safety Branch	275 East Main Street Frankfort, KY 40601	502-564-3340
Division of Public Protection and Safety	275 East Main Street Frankfort, KY 40601	502-564-7398
Public Protection Cabinet		
State Fire Marshal	101 Sea Hero Rd, Suite 100 Frankfort, KY 40601	502-573-0382
United States Department of Agriculture		
Natural Resources Conservation Service	771 Corporate Drive, Suite 110 Lexington, KY 40503	859-224-7350
Farm Service Agency	771 Corporate Drive, Suite 100 Lexington, KY 40503	859-224-7601
University of Kentucky		
Cooperative Extension Service	Room S-123 Ag. Science Bldg. Lexington, KY 40546-0091	859-257-4772
United States Army Corps of Engineers		
Nashville District	110 9th Avenue South Nashville, TN 37203-3863	615-736-7161
Memphis District	B-202 Clifford Davis Federal Bldg. 167 N Main Street Memphis, TN 38103-1894	901-544-3222
Huntington District	502 8th Street Huntington, WV 25701-2070	304-399-5211
Louisville District	P.O. Box 59 Louisville, KY 40201-0059	502-315-6107

Division of Water
Regional Office Listings

Bowling Green Regional Office
2642 Russellville Road
Bowling Green, KY 42104
(270) 746-7475
Attn: Bill Baker

Allen	Grayson	Simpson
Barren	Hart	Warren
Butler	Logan	Edmonson
Ohio		

London Regional Office
875 South Main Street
London, KY 40741
(606) 330-2080
Attn: Rob Miller

Bell	Knox	Owsley
Clay	Laurel	Rockcastle
Harlan	Leslie	Whitley
Jackson		McCreary

Columbia Regional Field Office
2751 Campbellsville Road
Columbia, KY 42728
(270) 384-4734
Attn: Brian Crump

Adair	LaRue	Pulaski
Boyle	Lincoln	Russell
Casey	Marion	Taylor
Clinton	Metcalfe	Washington
Cumberland	Monroe	Wayne
Green	Nelson	

Louisville Regional Field Office
9116 Leesgate Road
Louisville, KY 40222-5084
(502) 429-7122
Attn: Charlie Roth

Breckinridge	Meade
Bullitt	Oldham
Hardin	Shelby
Jefferson	Spencer

Florence Regional Office
8020 Veterans Memorial Drive, Suite 110
Florence, KY 41042
(859) 525-4923
Attn: Matt Gross

Boone	Gallatin	Owen
Bracken	Grant	Pendleton
Campbell	Henry	Trimble
Carroll	Kenton	

Madisonville Regional Office
625 Hospital Drive
Madisonville, KY 42431-1683
(270) 824-7529
Attn: Randy Thomas

Caldwell	Hancock	Muhlenberg
Christian	Henderson	Todd
Crittenden	Hopkins	Union
Daviess	McLean	Webster

Frankfort Regional Office
300 Sower Blvd
Frankfort, KY 40601
(502) 564-3358
Attn: Robert Daniell

Anderson	Franklin	Mercer
Bourbon	Garrard	Nicholas
Clark	Harrison	Powell
Estill	Jessamine	Scott
Fayette	Madison	Woodford

Morehead Regional Office
525 Hecks Plaza Drive
Morehead, KY 40351
(606) 783-8655
Attn: Danny Fraley

Bath	Greenup	Montgomery
Boyd	Lawrence	Robertson
Carter	Lewis	Rowan
Elliott		Mason
Fleming		Menifee

Hazard Regional Office
1332 South KY Hwy 15
Hazard, KY 41701
Attn: Aston Johnson
(606) 435-6022

Breathitt	Knott	Magoffin	Pike
Floyd	Lee	Martin	Wolfe
Johnson	Letcher	Perry	

Paducah Regional Office
130 Eagle Nest Drive
Paducah, KY 42003
Attn: Shannon McLeary
(207) 898-8468

Ballard	Fulton	Livingston
Calloway	Graves	Lyon
Carlisle	Hickman	Marshall
Trigg	McCracken	

Office	Phone	Fax
Bowling Green	(270)746-7475	(270)746-7865
Columbia	(270)384-4734	(270)384-5199
Florence	(859)525-4923	(859)525-4157
Frankfort	(502)564-3358	(502)564-5043
Hazard	(606)435-6022	(606)435-6025
London	(606)330-2080	(606)330-2097
Louisville	(502)429-7122	(502)429-7125
Madisonville	(270)824-7529	(270)824-7070
Morehead	(606)783-8655	(606)783-8659
Paducah	(270)898-8468	(270)898-8640

Division of Water
Field Offices

Section III Cost Share Programs

Stewardship Incentive Program (SIP)
Provides cost sharing to landowners in implementation of conservation practices as designed in a forest stewardship plan. Cost sharing up to 75 percent on practices such as reforestation, riparian zone protection, revegetation of logging roads, and wildlife plantings. Landowners apply for SIP through their county FSA and receive assistance from the Kentucky Division of Forestry (DOF).

Kentucky Division of Water's 319(h) Nonpoint Source Grant Program
Section 319(h) of the Clean Water Act amendments of 1987 establishes a grant program for watershed protection and restoration. The focus of the 319(h) Grant program is to develop and implement comprehensive watershed plans to protect and restore water quality. Watershed plans provide an integrative approach for identifying and describing how, when, who and what actions should be taken in order to meet water quality standards, including the voluntary adoption of BMPs by landowners in the watershed. Contact the Kentucky Division of Water (DOW).

Kentucky Soil Erosion and Water Quality Cost Share Program
The program was created to provide cost sharing to landowners for installing best management practices according to their water quality plans. Priority for the program which can provide up to 75 percent cost share is animal waste systems and watersheds within agriculture districts. Landowners can apply for the funds at their local conservation district. Contact the Kentucky Division of Conservation (DOC).

USDA NRCS Programs
Assistance to producers is available through cost share payments, incentive payments, education and technical assistance. The provisions are included in the current Farm Bill.

Conservation Technical Assistance (CTA): NRCS delivers conservation technical assistance through its voluntary Conservation Technical Assistance Program (CTA). CTA is available to any group or individual interested in conserving natural resources and sustaining agricultural production. It helps land users to address opportunities, concerns, and problems related to the use of natural resources and to help them make sound natural resource management decisions. Contact the Natural Resources Conservation Service (NRCS).

Environmental Quality Incentives Program (EQIP): Provides financial and technical assistance to agricultural producers to address natural resource concerns and deliver environmental benefits, such as improved water and air quality, conserved ground and surface water, reduced soil erosion and sedimentation, and improved or created wildlife habitat. Contact NRCS.

Conservation Stewardship Program (CSP): Helps agricultural producers maintain and improve their existing conservation systems and adopt additional conservation activities to

address priority natural resource concerns. Participants earn CSP payments for conservation performance—the higher the performance, the higher the payment. Contact NRCS.

Conservation Reserve Program (CRP): Protects soil, water quality, and habitat by removing highly erodible or environmentally sensitive land from agricultural production through long-term rental agreements. Contact Farm Service Agency (FSA) or NRCS.

Agricultural Conservation Easement Program (ACEP): Helps landowners, land trusts, and other entities protect, restore, and enhance wetlands, grasslands, and working farms and ranches through conservation easements. Contact NRCS.

To learn more, visit your local USDA Service Center or farmers.gov.

Section IV: Glossary

Agriculture Operation: Any farm operation on a tract of land, including all income producing improvements and farm dwellings, together with other farm buildings and structures incident to the operation and maintenance of the farm, situated on ten (10) contiguous acres or more of land used for the production of livestock, livestock products, poultry, poultry products, milk, milk products, or silviculture products, or for the growing of crops such as, but not limited to, tobacco, corn, soybeans, small grains, fruits and vegetables; or devoted to and meeting the requirements and qualifications for payments to agriculture programs under an agreement with the state or federal government.

Agriculture Water Quality Authority: Created and administratively attached to the Energy and Environment Cabinet. The authority is a multi-discipline peer group that shall evaluate, develop, and improve best management practices in conservation plans, compliance plans, and forest stewardship management plans; establish statewide and regional agriculture water quality plans; and otherwise promote soil and water conservation activities that protect waters of the Commonwealth.

Agriculture Water Quality Plan: A document incorporating the conservation plan, compliance plan, or forest stewardship management plan as necessary to prevent groundwater and surface water pollution from an agriculture operation.

Animal Wastes: Fecal and urinary waste from livestock and poultry; process water and feed, bedding, litter, and soil with which they become intermixed.

Bad Actor: Any person engaged in agriculture operations, who receives written notification of documented water pollution and of the agriculture water quality plan needed to prevent water pollution, and is provided technical assistance, and financial assistance when possible, to implement the agriculture water quality plan, but still refuses or fails to comply with the requirements of the agriculture water quality plan.

Best Management Practices: For agriculture operations, the most effective, practical, and economical means of reducing and preventing water pollution provided by the United States Department of Agriculture/Natural Resources Conservation Service (USDA/NRCS), the Kentucky Soil and Water Conservation Commission and the Agriculture Water Quality Authority. Best management practices shall establish a minimum level of acceptable quality for planning, siting, designing, installing, operating, and maintaining these practices. BMP terms for purposes of this plan are:

I. Description and Definition(s): A general description of the intent and function of this practice.

II. Regulatory Requirements: The title and explanation of statutes and regulations that are currently in effect relating to this practice.
III. AWQA Minimum Requirements: The specific foundation requirements for enacting this practice.
IV. Design Information: General description of the practice. This is not intended to duplicate other descriptive documents and published specifications.
V. Practice Maintenance: How to effectively maintain this practice over an extended time to help insure its effectiveness.
VI. Technical Assistance: May include multiple listings. The intent is to determine who, specifically, a producer can go to for assistance. Who is the primary contact to support this practice? Agencies may need to use this as a cross reference in referring client to other help. An appendix listing each agency and their expertise is attached to this document.
VII. Cost Share Assistance: List of existing, identified cost share programs. These entries will have to be kept up to date as programs change.
VIII. Recommendations: General recommendations to assist the producer. A general recommendation section may be found at the end of the document.
IX. References: Should be those pertinent materials that will support this practice and offer additional related information.

Blue Line Streams: A perennial stream denoted by a continuous blue line appearing on a U.S. Geological Survey 7.5 minute topographic map.

Compliance Plan: A conservation plan containing best management practices developed for persons engaged in agriculture operations by the USDA/NRCS in conjunction with local conservation districts as required for eligibility under the Federal Food Security Act (FFSA).

Conservation District: A subdivision of state government organized pursuant to KRS Chapter 262 for the specific purpose of assisting persons engaged in agriculture operations and land users in solving soil and water resource problems, setting priorities for conservation work to be accomplished and coordinating the federal, state, and local resources to carry out these programs.

Conservation Plan: A plan, provided by the USDA/NRCS and the Kentucky Soil and Water Conservation Commission, describing best land management practices, including an installation schedule and maintenance program, which when completely implemented, will improve and maintain soil, water, and related plant and animal resources of the land.

Ephemeral Channel: A channel formed by water during or immediately after precipitation events as indicated by an absence of forest litter and exposure of mineral soil, and which conveys surface water directly or indirectly to surface or subsurface streams.

Ephemeral Watercourses: Flow only during a rainfall or shortly thereafter, or which lack definite channels and banks, are not considered “streams” for purposes of this plan.

Forest Stewardship Management Plan: A plan developed by the Energy and Environment Cabinet's Division of Forestry, the Cabinet's Division of Conservation, the Department of Fish and Wildlife Resources, and the USDA/NRCS which establishes practices for a person engaged in agriculture operations to manage forest lands in accordance with sound silvicultural principles.

Groundwater: Subsurface water occurring in the zone of saturation beneath the water table and any perched water zones below the B soil horizon.

Integrated Crop Management (ICM): This is a farm management approach that treats the farm operation as a total system, including best management practices on the timing and application of fertilizers and pesticides, handling and storage of agricultural chemicals, and management of animal wastes.

Integrated Pest Management (IPM): This is a farm management approach primarily geared towards the safe and effective use of pesticides in farm production. IPM emphasizes limited use of pesticides at strategic times to increase effectiveness, lower costs, and reduce adverse impacts on the environment.

Intermittent Stream: Has a well-defined channel but flowing only during the wet portions of the year. Denoted by a broken blue line on a U.S. Geological Survey topographic map.

Kentucky Soil and Water Conservation Commission: The commission was created in KRS 146:090 for the purpose of administering the organization of conservation districts.

Nonpoint Source Pollution: Pollution that comes from a number of sources spread over a wide geographic area. Generally, each source only contributes a small amount of contamination, but the sum impact may be substantial. Agriculture, mining, forestry, urban runoff, and construction all contribute to nonpoint source pollution. A single source for the pollution is not readily identifiable.

Open-throated Sinkhole: An open-throated sinkhole is a sinkhole with an internal opening or drain, including a cave, proto-cave, conduit, sub-conduit, or fissure, leading into the subsurface through which water and other materials can pass from the sinkhole into underlying solutional voids and conduits. Open throats may be air-filled or water-filled).

Perennial Stream: Has a well-defined channel and flows all year or nearly all year under typical climatic conditions. Denoted by a continuous blue line appearing on a US Geological Survey 7.5-minute topographic map.

Point Source Pollution: Pollution that can be directly attributed to a single contributor at a specific area. For example, a discharge pipe from a factory is a point source of pollution.

Skid Trail: A skid trail is a temporary pathway used to drag felled trees or logs to a landing or concentration point, resulting in duff (the partially decomposed organic material of the forest floor) and ground disturbance sufficient to cause erosion.

Sediment: The result of erosion. It is the solid material, both mineral and organic, that is in suspension that is being transported, and creates pollution problems.

Senate Bill 241: This Kentucky Bill is known as the Agriculture Water Quality Act. This act establishes the Agriculture Water Quality Authority to improve best management practices, establish a statewide water quality plan, and promote soil and water conservation activities. It requires all landusers with 10 or more acres to establish a water quality protection plan.

Silviculture: Generally, the science and art of cultivating (i.e., growing and tending) forest crops based on a knowledge of silvics. More particularly, the theory and practice of controlling the establishment, composition, constitution, and growth of forests. The term "silvics" is defined as "the study of the life history and general characteristics of forest trees and stands, with particular reference to locality factors, as a basis for the practice of silviculture."

Sinkhole: You can find the definition of a sinkhole in 401 KAR 5:002 where it states that a "Sinkhole" means a naturally occurring topographic depression in a karst area. Its drainage is subterranean and serves as a recharge source for groundwater. It is formed by the collapse of a conduit or the solution of bedrock.

Streamside Management Zone (SMZ): A strip of land adjacent to either side of a stream or surrounding a lake, pond, or sinkhole. These areas are carefully maintained and managed to protect water quality by filtering sediment, to provide shade to maintain water temperatures, and to trap logging debris. They also provide wildlife travel lanes. Also referred to as a riparian area.

Surface Water: Those waters having well defined banks and beds, either constantly or intermittently flowing; lakes and impounded waters, marshes and wetlands; and any subterranean waters flowing in well-defined channels and having a demonstrable hydrologic connection with the surface. Effluent ditches and lagoons used for waste treatment which are situated on property owned, leased, or under valid easement by a permitted discharger shall not be considered to be surface waters of the Commonwealth.

Sustainable Agriculture: This approach generally recommends using lower chemical inputs and practices that are regenerative.

Swallow Holes (Swallet): Used in a loose sense to indicate the place where a sinking stream goes underground. Swallow holes come in many sizes and shapes. Some are places where major streams abruptly go underground, either vertically through their beds or laterally into their banks. Some swallow holes are pits, some are open cave entrances, and some are choked; others are simply reaches of stream bed where water is lost. Upstream from the swallow hole the stream

flows at its full volume; downstream the stream is reduced or the bed is dry. In between is an intermediate reach, where the water is lost gradually in the stream bed alluvium. Often there is no “hole” associated with the swallow.

Water Priority Protection Region: An area specifically delineated where water pollution from agriculture operations has been scientifically documented.

Wetland: Geographic areas which characteristically support vegetation suited to life in saturated soil conditions, and have hydric (wet) soils and some saturation or flooding during the growing season.

Section V: Procedure to Modify the Kentucky Agriculture Water Quality Plan or Any Regional Water Quality Plan

Approved 2/20/97

1. Persons engaged in agriculture and silviculture operations may request modifications to the state or any regional agriculture water quality plans. The person must submit the proposed modifications in writing for review to the appropriate conservation district. The conservation district shall review the proposed modification and forward with recommendations to the Agriculture Water Quality Authority for consideration of the modification.
2. Any member of the Agriculture Water Quality Authority may introduce a proposed modification in writing to the Authority for consideration.
3. Proposed modifications to the water quality plan will be received by the Authority at its next regularly scheduled meeting and no final shall be taken at that meeting on the proposed modification.
4. Upon receipt of the written proposal for plan modification, the Authority may refer the proposed modification to the appropriate committee(s) and/or establish a specific study committee to evaluate and make recommendations to the Authority concerning the proposed modification. The appropriate committee(s) shall make a recommendation on the modification to the Authority at its next or later meeting.
5. Upon receipt of the recommendations from the committee(s), the Authority shall take action upon the modification either in the way of approval, disapproval, amendments to the modification, or an additional study period agreed to by the Authority. Authority action on proposed modifications shall take action by the majority vote. Modifications adopted by the Authority shall be submitted to the Kentucky Division of Water for approval, disapproval, or approval with conditions. Following the actions by the Kentucky Division of Water, the Authority shall take appropriate actions to modify the appropriate water quality plan and notify the appropriate agriculture operations.

Section VI: Procedures for Alternative and Experimental Practices

Approved 5/15/97

WHEREAS, the Kentucky Agriculture Water Quality Authority supports evaluating experimental and alternative practices to improve water quality in the state.

WHEREAS, KRS Chapter 224.71-120 sets forth the requirement for the development of the Kentucky Agriculture Water Quality Plan which has been completed by the Authority and is to be utilized by producers for the protection of water quality in the state.

NOW THEREFORE, in recognition of the fact that experimental and alternative practices, which may deviate from the Kentucky Agriculture Water Quality Plan, may promote and improve water quality in the Commonwealth, the following procedures for utilizing alternative and experimental practices are hereby implemented.

An agriculture operation may utilize an experimental or alternative practice that deviates from the Kentucky Agriculture Water Quality Plan by following these procedures:

1. The agriculture operation shall submit the alternative or experimental practice and documentation as to how the practice will be implemented to the local conservation district. The conservation district shall contact the most appropriate technical agency for review and recommendation for use of the practice. Appropriate technical agencies are those named in KRS Chapter 224.71-110(2) and in the Kentucky Agriculture Water Quality Plan (ex: Local Health Department). The agriculture operation shall demonstrate to the satisfaction of the conservation district and the technical agency that the practice is, or should be, as protective of water quality as the BMPs found in the Kentucky Agriculture Water Quality Plan. If the conservation district and the technical agency recommend the practice, the conservation district shall send a letter to the Authority stating so.
2. If recommended, the practice shall be sent to the Authority with an appropriate letter for final registration.
3. Once the alternative or experimental practice is registered by the Authority, the agriculture operation shall not be deemed in bad actor status if it is following the alternative or experimental practice and is not causing water pollution.
4. If it appears the alternative or experimental practice is not working, the Division of Water and the Authority may take steps to withdraw the registration in consultation with the appropriate technical agency and with notice to the producer.
5. Successful practices may be incorporated into the Kentucky Agriculture Water Quality Plan at any time by using the modification procedures.