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THE KENTUCKY AGRICULTURE WATER QUALITY PLAN

MARCH 2014
ELECTRONIC REVISION

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INTRODUCTION

The Kentucky Agriculture Water Quality Act (KRS 224.71-100 through 224.71-145) was enacted by the 1994 General Assembly. This historic and comprehensive law guides the state's agriculture/silviculture industry in its continuing efforts to address environmental issues associated with its activities.

The Act established a 15-member Agriculture Water Quality Authority representing the state's agriculture and environmental community. The Authority was appointed by the Governor and charged with development and support of a statewide agricultural water quality plan. The Authority instituted a committee process through which agriculture and silviculture producers, educators, and technical and regulatory advisors, from across the state, have developed the Kentucky Agricultural Water Quality Plan that you now read.

This plan is an effort to produce 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). KRS 224.71 defines 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.

The Agriculture Water Quality Authority intends that the BMPs presented in this plan be used by agriculture and silviculture producers to develop individual plans that fit their individual circumstances. The following premises were used to develop appropriate 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 water resources in their operations.

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

Therefore, the Agriculture Water Quality Authority has developed these guidelines upon which a producer can build a water quality plan. We believe the success of the State's Agriculture Water Quality Plan will ultimately rest with the decisions each producer makes on his or her land. We are 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**
Lee Robey, Chair Amanda Gumbert, Staff		Allen Kyle, Chair		Leah MacSwords, Chair Cary Perkins, Staff
Example Issues: Livestock waste Waste application Dead animal removal Feedlot management Woodland management	Example Issues: Soil erosion Pesticide application Fertilizer application Groundwater impact Container disposal	Example Issues: Chemical storage Chemical mixing Fertilizer storage Transporting Stream protection	Example Issues: Solid Waste Well protection Petroleum storage Household wastewater Sinkholes	Example Issues: Timber harvesting Logging roads Riparian areas Stream management zones

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.

SCOPE

The main goal of the Kentucky Agriculture Water Quality Act (KRS 224.71) is to protect surface and groundwater resources from pollution as a result of agriculture and silviculture activities and to develop this Kentucky Agriculture Water Quality Plan (the "Statewide Plan"). This Scope answers common questions about the Statewide Plan, to help guide your use of this document.

Who must establish an individual agriculture water quality plan, and when?
All agriculture and silviculture operations must establish individual agriculture water quality plans complying with the Statewide Plan. The Statewide Plan was approved by the Kentucky Division of Water in October, 1996, and had to be implemented by October, 2001. However, recent amendments to the Agriculture Water Quality Act added a procedure by which a project can be certified under Clean Water Act Section 401. The procedure of application to the Division of Water for its review and certification is still available. In addition, for activities covered by several nationwide permits, a process through the Agriculture Water Quality Plan has been added by which certification can be obtained by following applicable Agriculture Water Quality Authority Minimum Requirements under the "Streams and Other Waters" section of this Statewide Plan. This process of certification is immediate and does not have a 5-year implementation period. (See page 224 for project approval process.)

"Agriculture operation" means 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 acres or more of land, and:

- used for the production of livestock, livestock products, poultry, poultry products, milk, or milk products; or
- used for the production of silviculture products; or
- used for the growing of crops such as, but not limited to, tobacco, corn, soybeans, small grains, fruit, 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.

Any agriculture operation that already has in place a conservation plan, compliance plan, or forest stewardship management plan shall continue following that plan until incorporating that plan into an individual agricultural water quality plan consistent with the Statewide Plan. Individual plans in compliance with the Statewide Plan will often address sites and water quality issues not included in existing plans. All persons engaged in agriculture operations are encouraged to follow the Best Management Practices (BMPs) provided by the Soil and Water Conservation Commission in the Agriculture Best Management Practices Manual until implementing individual agricultural water quality plans consistent with the Statewide Plan.

Nonpoint-source pollution (pollution coming from numerous small sources over a wide geographic area), or causes of water degradation that cannot be attributed to particular farms but are identified in a region, will necessitate the development of regional agriculture water quality plans. Upon documenting water pollution from agriculture operations around Kentucky, the Division of Water and the Agriculture Water Quality Authority will designate water protection priority regions. The Authority will then work with the Soil and Water Conservation Commission and the conservation districts to develop regional agriculture water quality plans where needed. Each regional plan will identify modifications to existing Statewide Plan requirements, assist the region's producers to take appropriate steps to modify their individual water quality plans, and provide notice of any available technical and financial assistance. The Division of Water and the conservation districts, in consultation with the Authority, will set timetables for implementing any regional water quality plans.

Why was the Statewide Plan developed? What are the benefits of implementing a water quality plan?

The Statewide Plan's main goal is the protection of ground and surface water, however, it encourages agriculture and silviculture practices that produce other resource benefits, such as: soil health, which can enhance profits and longevity for the agriculture operation;

- nutrient retention;
- improvements in the quality of drinking water;
- reduced risk to production;
- flood control;
- restoration and enhancement of wildlife habitat;
- achieving environmental responsibilities to others (off-site); and
- an overall improvement to the quality of life.

The Statewide Plan was also developed to insure long-term natural resource protection. The Statewide Plan and individual agricultural water quality plans can be updated to take advantage of new knowledge regarding resource needs, water quality, environmental conditions, effectiveness of BMPs, and the availability of new and beneficial technology. This flexibility will allow the Plan to remain relevant and useful for many years.

The Statewide Agriculture Water Quality Plan will also serve to streamline or simplify 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:

- state groundwater regulations;
- state water quality standards;
- the Clean Water Act and its effort to satisfy nonpoint water pollution control by agriculture;
- conservation compliance plan requirements;
- U.S. Corps of Engineers (COE) nationwide permits, etc.

This Statewide Plan will serve 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. It also serves to notify producers of the consequences of noncompliance. Failure to comply with 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.

In summary, the Agriculture Water Quality Plan seeks to protect the waters of the Commonwealth while allowing agriculture and silviculture producers to attain personal and business goals.

How was the Statewide Plan developed?

In accordance with the Kentucky Agriculture Water Quality Act, the Governor appointed the Agriculture Water Quality Authority, whose members are listed on pages five and six. To develop BMPs to meet the needs of Kentucky's agriculture and silviculture producers, the Authority formed five committees: Crops, Farmstead, Livestock, Pesticide & Fertilizer, and Silviculture. 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 operators, landowners, farm and agricultural businesses, government representatives, environmental interest groups, agriculture commodity groups, technical resource support personnel, university research and extension personnel, etc.) Each committee also studied the laws, regulations, and technical recommendations (including from the USDA Natural Resources Conservation Service and Kentucky Soil and Water Conservation Commission) in its field. Each committee then developed the BMPs and supporting text for its section in this Statewide Plan. Each BMP was scientifically reviewed and approved by the Authority for inclusion in the Statewide Plan. The Statewide Plan was then reviewed by the Kentucky Division of Water, which approved the final draft after the incorporation of necessary revisions and corrections.

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 her or his 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 Agriculture Water Quality 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 operators to protect Kentucky's water quality as easily and cost-effectively as possible.

In conclusion:
The Kentucky Agriculture Water Quality Plan was developed to serve agriculture and silviculture operations of Kentucky by informing and educating producers about the state's water quality needs and requirements. The Statewide Plan provides some minimum requirements and guidelines that can be used by producers. It gives them the maximum flexibility to address nonpoint-source water pollution problems on their own by innovating solutions or, where needed, through identified technical and financial assistance.

The Statewide Plan serves as the detailed reference book for agencies, agriculture and silviculture operators, and others when addressing agriculture and silviculture pollution issues. The Statewide Plan is available for public reference at several locations within each county, such as the local offices of the Conservation Districts, Cooperative Extension, Farm Service Agency, Natural Resources Conservation Service, and Divisions of Forestry and Conservation.

The State Plan includes an extensive list of scientifically evaluated and approved Best Management Practices (BMPs), technical references, and existing regulatory requirements that will enable producers to understand current water regulations governing agriculture operations and provide guidance in developing an individual water quality plan.

BMPs are the foundation upon which agriculture and silviculture operators can build individual water quality plans that fit their unique agriculture and silviculture operations. The Statewide Plan encourages individual management strategies and innovations in applying these BMPs to achieve economically feasible and measurable environmental protection. The Statewide Plan identifies specific agriculture and silviculture activities, the pollution problems that may result from these activities, and BMPs to prevent or minimize such problems. Each BMP includes information and references to help operators understand the BMP and use it, as appropriate, in their individual water quality plans.

The success of the Statewide Water Quality Plan in protecting the waters of the Commonwealth will ultimately rest with the decisions each producer makes in his or her individual operation. Individual producers are responsible for assessing the specific characteristics of their operations and selecting, implementing, and maintaining BMPs necessary to protect water quality. To assure the development of a technically sound and practical individual water quality plan, each producer will be provided with a **producer workbook**. This interactive self-assessment of agriculture or silviculture operations will help the producer identify potential threats to water quality to determine if he or she needs to make improvements to meet the requirements of the Kentucky Agriculture Water Quality Plan. The assessment contains specific questions concerning activities and potential water quality problems and provides basic recommendations to address these identified problems.

For complex issues like animal waste storage facilities or regulated activities, the producer workbook will refer the producer to the appropriate technical agency for assistance. The producer workbook will be a “farmer-friendly how-to” that will provide the producer with practical information and serve as the foundation of an educational process and provide the flexibility to develop site-specific water quality plans that are farmer-driven, technically sound, and economically feasible.

Best Management Practices (BMPs) for Silviculture

Page

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, & Log Landing Construction & 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, Skid Trails, and Landings

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. Skid trails are secondary vehicle travel routes 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 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 on p. 248.)

Filling or draining of wetlands [U.S. Clean Water Act, Section 404, described further on p. 223-240 of this document]:
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. (Division of Forestry telephone numbers and addresses are listed on p. 246.)

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 Kentucky Division of Water for applicable regulations and instructions. A list of Kentucky's designated wild rivers, including a map showing the general location of each wild river corridor, is attached on pages 241-242.

III. AWQA Minimum Requirements:

Roads and skid trails should be constructed to minimize grades. Water bars, culverts, or other drainage structures should be installed at intervals appropriate to remove water from the road or skid trail to prevent damage and erosion to the surface of the road or trail or the forest floor from channelized flow. Where feasible, install and use bridges or culverts to cross streams (perennial and intermittent) or ephemeral channels. Where bridges or culverts are not used, roads and skid trails should cross streams or ephemeral channels at right angles. Disturbed soil or concentrated logging slash should not be left in ephemeral channels. Yards and landings should be located outside of streamside management zones (SMZs) and should have adequate drainage (see minimum requirements in Silvicultural BMP No. 3). Skidders or other logging equipment should not be operated off hard-surfaced roads under conditions that may cause the development of excessive rutting. Excessive rutting is defined as a point where ruts cannot be resurfaced with available equipment. After silvicultural activities are completed, roads, skid trails, and log landings should be promptly reshaped and revegetated (see minimum requirements for Silvicultural BMP No. 2.) Measures to restrict vehicle access on retired roads, skid trails, and landings should be implemented 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 Skid 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 on p. 246.)

V. Practice Maintenance:

Access roads, skid 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 on pages 246-247)

- 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 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:

IX. References:(see address and telephone listings on pages 246-247)

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

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 such as logging roads, skid trails, or log landings.

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 Kentucky Division of Water for applicable regulations and instructions. A list of Kentucky's designated wild rivers, including a map showing the general location of each wild river corridor, is attached on pages 241-242.

III. AWQA Minimum Requirements

Sediment producing, erodible, or severely eroded areas, such as logging roads, skid trails, and log landings, should be revegetated as soon as possible. For the purpose of this minimum requirement erodible areas include those with a slope equal to or greater than 10 percent.

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 on pages 246-247)

- The 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 Billcurrent 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:

IX. References: (see address and telephone listings on pages 246-247)

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

I. Description and Definition(s):

A streamside management zone (SMZ) is a strip of woodland located adjacent to a stream where only limited disturbance is desirable. SMZs are also commonly used where lakes and ponds exist near logging areas. SMZs maintain natural stream temperature in perennial streams through shading, maintain the integrity of the streambank, 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 stream banks and 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 Kentucky Division of Water for applicable regulations and instructions. A list of Kentucky's designated wild rivers, including a map showing the general location of each wild river corridor, is attached on pages 241-242.

III. AWQA Minimum Requirements:

In areas adjacent to **perennial** streams, lakes, and ponds, forest buffers should be maintained for a minimum surface distance of 25 to 55 feet on ground with less than 15% slope, and a minimum surface distance of 55 to 90 feet on ground with slope of 15% or greater. Management activities are acceptable in these areas, however, equipment operation should be avoided except at designated crossings, and at least 50% of the original tree over story (canopy cover) should be retained to shade the water and to maintain water temperature. 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. Take precautions to prevent tree debris, such as tops from harvested trees, from remaining in or being washed into perennial streams.

In areas adjacent to **intermittent** streams, complete removal of over story trees is acceptable. Equipment operation should be avoided in a zone of at least 25 feet on each side of an intermittent stream except for designed crossings. 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. Mechanical site preparation should be excluded from areas adjacent to intermittent streams to maintain the duff layer and filtering capacity. Take precautions to prevent tree debris, such as tops from harvested trees, from remaining in or being washed into intermittent streams.

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.

Coldwater Aquatic Habitats (CAHs) (high quality trout streams), as designated by the Kentucky Division of Water, need additional protection. CAHs should have only individual trees or small groups of trees removed within the 60-foot-wide strip on either side of the stream. A minimum of 75% of the original tree cover story (canopy cover) should also be left intact. Understory vegetation immediately adjacent to CAH streams should be left undisturbed.

Fertilizers and pesticides should be applied in SMZ's only in compliance with Silviculture BMPs 7 and 8 respectively. Fluids should not be drained from equipment near streams, and logging equipment should not be parked near stream banks where direct runoff of pollutants from equipment into the stream is likely to occur.

IV. Design Information:

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:

VI. Technical Assistance: (see address and telephone listings on pages 246-247)

- The 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 Billcurrent 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:

IX. References: (address and telephone listings on pages 246-247)

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

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 pits or vertical shafts.

II. Regulatory Requirements:

Activities around Sinkholes, Cave Entrances, etc.: [KRS 433.870–433.875]:
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 Kentucky Division of Water for applicable regulations and instructions. A list of Kentucky's designated wild rivers, including a map showing the general location of each wild river corridor, is attached on pages 241-242.

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:

Runoff from haul/access roads, skid trails, and log landings shall be diverted so as not to drain directly into sinkholes, sinking streams, or caves. (Note that if runoff does enter a sinkhole, a UIC permit may be required.) Soil, logging debris, or other waste material shall not be pushed into the bottom of a sinkhole or into any noticeable sinkhole opening.

Fluids drained from equipment shall not be drained onto the ground. They should be collected in a container, transported off site, and recycled or disposed properly.

Fertilizer and pesticide usage in the vicinity of a sinkhole with no swallet should pose no problem. However, a buffer zone should be employed in the vicinity of a sinking stream or sinkhole with an open swallet.

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, skid 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 on pages 246-247)

- The 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 on pages 246-247)

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

KY-A-Syst publication, *Agricultural Chemical Handling and Storage*.
KY-A-Syst publications may be obtained from local county Extension offices.

Silviculture BMP #5 -- Logging Debris

I. Description and Definition(s):

Logging debris is noncommercial portions of trees and brush or other logging operation waste products associated with silvicultural operations which may clog, or in some other way, degrade water courses and water quality. This BMP is designed to protect water bodies from pollution by organic and inorganic debris, to protect stream channels, and reduce erosion of streambanks and adjacent areas. 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.

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 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 Kentucky Division of Water for applicable regulations and instructions. A list of Kentucky’s designated wild rivers, including a map showing the general location of each wild river corridor, is attached on pages 241-242.

III. AWQA Minimum Requirements:

Take precautions to prevent tree debris, such as tops from harvested trees, from remaining in or being washed into perennial streams. 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:

V. Practice Maintenance:

VI. Technical Assistance: (see address and telephone listings on pages 246-247)

- The 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 on pages 246-247)

See “Logging Debris” in the current version of *Kentucky Forest Practice Guidelines for Water Quality Management* for detailed specifications concerning debris associated with silvicultural activities.

Silviculture BMP #6 -- Proper Planting of Tree Seedlings by Machine

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 Kentucky Division of Water for applicable regulations and instructions. A list of Kentucky’s designated wild rivers, including a map showing the general location of each wild river corridor, is attached on pages 241-242.

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 on pages 246-247)

- The 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 on pages 246-247)

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

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 Kentucky Division of Water for applicable regulations and instructions. A list of Kentucky’s designated wild rivers, including a map showing the general location of of each wild river corridor, is attached on pages 241-242.

III. AWQA Minimum Requirements:

In silviculture, use only the amount of fertilizer necessary and stay away from bodies of water or those areas immediately adjacent to them. The use of fertilizers in SMZs is generally undesirable, and fertilizer should be applied only in strict compliance with label directions. Use of fertilizer within 30 feet of the bottom of any sinkhole or noticeable opening is undesirable.

IV. Design Information:

V. Practice Maintenance:

VI. Technical Assistance: (see address and telephone listings on pages 246-247)

- The 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 on pages 246-247)

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.

KY-A-Syst publication, *Agricultural Chemical Handling and Storage*.
KY- A-Syst publications may be obtained from local county Extension offices.

Silviculture BMP #8 -- Application of Pesticides

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 Environmental Protection Agency (EPA) 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 Kentucky Division of Water for applicable regulations and instructions. A list of Kentucky’s designated wild rivers, including a map showing the general location of each wild river corridor, is attached on pages 241-242.

III. AWQA Minimum Requirements:

Follow label directions. Do not clean equipment or dump excess materials near bodies of water. Remove empty containers from the woods and dispose of them properly. Use of pesticides in SMZs or within 30 feet of the bottom of a sinkhole or any noticeable opening is generally undesirable. Label directions for applications near bodies of water should be followed closely.

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 on pages 246-247)

- The 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 on pages 246-247)

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.

KY-A-Syst publication, *Agricultural Chemical Handling and Storage.*
KY- A-Syst publications may be obtained from local county Extension offices.

Silviculture BMP #9 -- Site Preparation for Reforestation

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 Kentucky Division of Water for applicable regulations and instructions. A list of Kentucky’s designated wild rivers, including a map showing the general location of each wild river corridor, is attached on pages 241-242.

III. AWQA Minimum Requirements:

When possible during tree planting activities, use only low impact methods of site preparation to minimize potential for nonpoint-source pollution. Low impact methods are defined as those practices which cause a minimum of site disturbance.

IV. Design Information:

V. Practice Maintenance:

VI. Technical Assistance: (see address and telephone listings on pages 246-247)

- The 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 on pages 246-247)

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

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 US 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 on pages 223-240. 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 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 Kentucky Division of Water for applicable regulations and instructions. A list of Kentucky’s designated wild rivers, including a map showing the general location of each wild river corridor, is attached on pages 241-242.

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:

When silvicultural activities are undertaken in wetland areas, in addition to following the other Forestry BMPs, construction of permanent roads should be minimized and landings should be located on higher ground. Vehicle traffic should be restricted to a minimum. Crossing of streams and sloughs should be avoided if possible, and 50-70% of the overstory should be left to shade perennial streams and sloughs.

IV. Design Information:

V. Practice Maintenance:

VI. Technical Assistance: (see address and telephone listings on pages 246-247)

- The 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 on pages 246-247)

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.

Best Management Practices (BMPs) for Pesticides and Fertilizer

Page

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

Pesticide & Fertilizer BMP #1 -- Storage of Dry Bulk Fertilizer

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 one year.

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).

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 Environmental and Public Protection 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 fertilizer) 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.

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 affect on the environment and correct that effect. For questions concerning the Environmental Release Reporting and cleanup law call (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]:
This statute, administered by the Environmental & Public Protection Cabinet, regulates activities in floodplains, including construction of permanent structures.

III. AWQA Minimum Requirements:

Provide a dry, ventilated storage area.

Locate new storage facilities away from wells, springs, cisterns, open channel sinkholes and perennial streams.

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

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 spills immediately.

VI. Technical Assistance: (see address and telephone listings on pages 246-247)

- University of Kentucky Cooperative Extension Service.
- Kentucky Department of Agriculture, Division of Pesticides.

VII. Cost Share Assistance:

VIII. Recommendations:

Locate new storage facilities a minimum of 100 feet from wells, springs, cisterns, open channel sinkholes and perennial streams.

IX. References: (see address and telephone listings on pages 246-247)

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 Fertilizer & Agriculture Chemicals Association
512 Capitol Avenue, Frankfort, KY 40601, (502)226-1122.

Kentucky Department of Agriculture, Division of Pesticides.

KY-A-Syst publication, *Agricultural Chemical Handling and Storage*.
KY-A-Syst publications may be obtained from local county Extension offices.

Facts About Kentucky's Environmental Release Reporting and Cleanup Law: Report a Release Immediately to (502)564-2380 or (800)928-2380. Kentucky Environmental and Public Protection Cabinet.

Pesticide & Fertilizer BMP #2 -- Storage of Liquid Bulk Fertilizer

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; and
- stored longer than one year.

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).

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 Environmental and Public Protection 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 fertilizer) 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 affect on the environment and correct that effect. For questions concerning the Environmental Release Reporting and Cleanup Law call (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]:
This statute, administered by the Environmental & Public Protection Cabinet, regulates activities in floodplains, including construction of permanent structures.

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.

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

IV. Design Information:

At a minimum, tanks should be confined within an earthen berm and bottom, constructed of clayey soil that will contain 110% of the largest tank capacity plus a 6" rainfall.

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 on pages 246-247)

- University of Kentucky Cooperative Extension Service
- Kentucky Department of Agriculture, Division of Pesticides
- 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 on pages 246-247)

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.

Facts About Kentucky's Environmental Release Reporting and Cleanup Law: Report a Release Immediately to (502)564-2380 or (800)928-2380. Kentucky Environmental and Public Protection Cabinet.

KY-A-Syst publication, *Agricultural Chemical Handling and Storage.*
KY-A-Syst publications may be obtained from local county Extension offices.

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

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 5000 U.S. 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 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).

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 Environmental and Public Protection 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 fertilizer) 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 affect on the environment and correct that effect. For questions concerning the Environmental Release Reporting and Cleanup Law call (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]:
This statute, administered by the Environmental & Public Protection Cabinet, regulates activities in floodplains, including construction of permanent structures.

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 at least 100 feet away from wells, springs, cisterns, open channel sinkholes, and perennial streams.

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

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 on pages 246-247):

- University of Kentucky Cooperative Extension Service
- Kentucky Department of Agriculture, Division of Pesticides
- 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 on pages 246-247)

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.

KY-A-Syst publication, *Agricultural Chemical Handling and Storage*.
KY-A-Syst publications may be obtained from local county Extension offices.

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 Fertilizer and Agriculture Chemicals Association
512 Capital Plaza Tower, Frankfort, KY 40601 (502)226-1122.

Kentucky Department of Agriculture.

Pesticide & Fertilizer BMP #4 -- Storage of Dry Bulk Pesticides

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 U.S. Pounds of net dry weight; and
- stored longer than one year.

II. Regulatory Requirements:

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 Environmental and Public Protection 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 pesticides) 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 affect on the environment and correct that effect. For questions concerning the Environmental Release Reporting and Cleanup Law call (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.

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]:
This statute, administered by the Environmental & Public Protection Cabinet, regulates activities in floodplains, including construction of permanent structures.

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:

- Fertilizers and pesticides should be stored separately.
- Store in a dry, secure, ventilated area.
- Locate new storage facilities away from wells, springs, cisterns, open channel sinkholes and perennial streams.

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 on pages 246-247)

- Kentucky Department of Agriculture, Division of Pesticides
- 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:

Locate new storage facilities a minimum of 100' from wells, springs, cisterns, open channel sinkholes and perennial streams.

IX. References: (see address and telephone listings on pages 246-247)

Kentucky Department of Agriculture, Division of Pesticides.

Facts About Kentucky's Environmental Release Reporting and Cleanup Law: Report a Release Immediately to (502)564-2380 or (800)928-2380. Kentucky Environmental and Public Protection Cabinet.

University of Kentucky Cooperative Extension Service.

KY-A-Syst publication, *Agricultural Chemical Handling and Storage.*
KY-A-Syst publications may be obtained from local county Extension offices.

Pesticides & Fertilizer BMP #5 -- Storage of Liquid Bulk Pesticides

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 U.S. Gallons of liquid measure; and
- stored longer than one year.

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).

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 Environmental and Public Protection 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 pesticides) 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 affect on the environment and correct that effect. For questions concerning the Environmental Release Reporting and Cleanup Law call (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]:
This statute, administered by the Environmental & Public Protection Cabinet, regulates activities in floodplains, including construction of permanent structures.

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:

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 or elephant rings cannot be used to contain any liquid bulk pesticide.

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.

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 on pages 246-247)

- Kentucky Department of Agriculture, Division of Pesticides
- 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:

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

IX. References: (see address and telephone listings on pages 246-247):

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 Fertilizer & Agriculture Chemical Association
512 Capitol Avenue, 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.

Facts About Kentucky's Environmental Release Reporting and Cleanup Law: Report a Release Immediately to (502)564-2380 or (800)928-2380. Kentucky Environmental and Public Protection Cabinet.

KY-A-Syst publication, *Agricultural Chemical Handling and Storage*.
KY-A-Syst publications may be obtained from local county Extension offices.

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

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 U.S. 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 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).

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 Environmental and Public Protection 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 pesticides) 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 affect on the environment and correct that effect. For questions concerning the Environmental Release Reporting and Cleanup Law call (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]:
This statute, administered by the Environmental & Public Protection Cabinet, regulates activities in floodplains, including construction of permanent structures.

III. AWQA Minimum Requirements:

Keep pesticides in original containers.

Store each type of pesticide separate from all other types (e.g., store herbicides separate from insecticides).

Construct, install, and maintain pesticide containers and appurtenances to prevent the discharge of liquid pesticides.

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:

New pesticide storage areas should be well marked with warning signs, and locked to prevent unauthorized entry.

Locate new storage facilities at least 100 feet from wells, springs, cisterns, open channel sinkholes, and perennial streams.

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

V. Practice Maintenance:

Temporary 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 on pages 246-247)

- Kentucky Department of Agriculture, Division of Pesticides
- 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:

Locate pesticide storage facilities at least 100 feet from wells, springs, cisterns, open channel sinkholes, and perennial streams.

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 on pages 246-247)

Kentucky Department of Agriculture, Division of Pesticides.

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.

Facts About Kentucky's Environmental Release Reporting and Cleanup Law: Report a Release Immediately to (502)564-2380 or (800)928-2380. Kentucky Environmental and Public Protection Cabinet.

KY-A-Syst publication, *Agricultural Chemical Handling and Storage*.
KY-A-Syst publications may be obtained from local county Extension offices.

Pesticide & Fertilizer BMP #7 -- Transport of Pesticides & Fertilizer

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 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).

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 licences, 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."

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 Environmental and Public Protection 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 pesticides and fertilizers) 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 affect 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:

Follow all U.S. DOT 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 on pages 246-247)

- U.S. Department of Transportation

VII. Cost Share Assistance:

VIII. Recommendations:

IX. References: (see address and telephone listings on pages 246-247)

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

Facts About Kentucky's Environmental Release Reporting and Cleanup Law: Report a Release Immediately to (502)564-2380 or (800)928-2380. Kentucky Environmental and Public Protection Cabinet.

U.S. Department of Transportation.

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

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 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).

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 Environmental and Public Protection 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 pesticides and fertilizers) 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 affect on the environment and correct that effect. For questions concerning the Environmental Release Reporting and Cleanup Law call (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.

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

Follow 302 KAR 31, administered by the Kentucky Department of Agriculture, concerning licensure of pesticide applicators and commercial operator training. 302 KAR 31 requirements for restricted use pesticides include:

- being at least 16 years old to receive certified applicator training and certification.
- having a Certified 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.

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 on pages 246-247)

- Kentucky Department of Agriculture, Division of Pesticides.
- University of Kentucky Cooperative Extension Service.

VII. Cost Share Assistance:

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 channel sinkholes, perennial steams, and lakes.

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

IX. References: (see address and telephone listings on pages 246-247)

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 Pesticides.

Facts About Kentucky's Environmental Release Reporting and Cleanup Law: Report a Release Immediately to (502)564-2380 or (800)928-2380. Kentucky Environmental and Public Protection Cabinet.

KY-A-Syst publication, *Agricultural Chemical Handling and Storage*.
KY-A-Syst publications may be obtained from local county Extension offices.

Pesticide & Fertilizer BMP #9 -- Excess Pesticide Disposal

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 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).

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 Environmental and Public Protection 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 pesticides) 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 affect on the environment and correct that effect. For questions concerning the Environmental Release Reporting and Cleanup Law call (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.

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:

Use only on a label-approved site.

Store in a secure, dry location until used, recycled, or disposed of properly.

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 on pages 246-247)

- Kentucky Department of Agriculture, Division of Pesticides.

VII. Cost Share Assistance:

VIII. Recommendations:

Periodically inspect pesticide containers for deterioration.

Dispose of unusable excess agricultural pesticides according to a state Pesticide Collection Program.

Consider existing inventory when planning for use of spray material.

IX. References: (see address and telephone listings on pages 246-247)

Kentucky Department of Agriculture, Division of Pesticides.

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

Facts About Kentucky's Environmental Release Reporting and Cleanup Law: Report a Release Immediately to (502)564-2380 or (800)928-2380. Kentucky Environmental and Public Protection Cabinet.

KY-A-Syst publication, *Agricultural Chemical Handling and Storage*.
KY-A-Syst publications may be obtained from local county Extension offices.

Pesticide & Fertilizer BMP #10 -- Pesticide & Fertilizer Container Disposal

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 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).

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 Environmental and Public Protection 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 pesticides and fertilizers) 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 affect on the environment and correct that effect. For questions concerning the Environmental Release Reporting and Cleanup Law call (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.

Management and Disposal of Contaminants [KRS 224, 401 KAR]:
These regulations, administered by the Kentucky Environmental & Public Protection 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 rinsed until clean in a ventilated area until properly disposed or recycled.

IV. Design Information:

V. Practice Maintenance:

Rinse all containers until clean, and add the rinsate to the spray tank.

VI. Technical Assistance: (see address and telephone listings on pages 246-247)

- Kentucky Department of Agriculture, Division of Pesticides.

VII. Cost Share Assistance:

VIII. Recommendations:

Participate in a rinse and return program.

Use biodegradable or returnable containers whenever possible.

Puncture recyclable containers to prevent reuse.

IX. References: (see address and telephone listings on pages 246-247)

Kentucky Department of Agriculture, Division of Pesticides.

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

Facts About Kentucky's Environmental Release Reporting and Cleanup Law: Report a Release Immediately to (502)564-2380 or (800)928-2380. Kentucky Environmental and Public Protection Cabinet.

KY-A-Syst publication, *Agricultural Chemical Handling and Storage*.
KY-A-Syst publications may be obtained from local county Extension offices.

Best Management Practices for Farmstead

Page

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

Farmstead BMP #1 -- Solid Waste Procedures

I. Description and Definition(s):

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.

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

II. Regulatory Requirements:

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]

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 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:

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

Do not dump solid waste in sinkholes, gulleys, and streams.

Follow label directions on solid waste with special disposal requirements.

Burn solid waste only when allowed by law.

IV. Design Information:

V. Practice Maintenance:

VI. Technical Assistance: (see address and telephone listings on pages 246-247)

- University of Kentucky Cooperative Extension Service
- Local Conservation District Office
- Kentucky Department for Public Health
- Kentucky Division of Waste Management
- County Solid Waste Coordinators
- Kentucky Division of Forestry
- Kentucky Division of Environmental Health and Community Safety
- Kentucky Cabinet for Health Services

VII. Cost Share Assistance:

VIII. Recommendations:

Clean up existing dumps on farms when possible.

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

Reduce unnecessary packaging use and disposal.

Reuse, recycle, and/or compost.

IX. References: (see address and telephone listings on pages 246-247)

County Solid Waste Management Plans.

County Solid Waste Coordinator.

University of Kentucky College of Agriculture Extension Publications.

KY-A-Syst publication, *Household Waste Management*.
KY-A-Syst publications may be obtained from local county Extension offices.

Farmstead BMP #2 -- Septic Systems and On-Site Sewage Disposal

I. Description and Definition(s):

A septic system/on-site 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 "greywater" (wastes from the kitchen sink, 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 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).

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

On-Site Sewage System Construction Requirements [902 KAR 10:081 and 902 KAR 10:085]

On-Site Sewage System Permit Issuance Requirements [902 KAR 10:110]

On-Site Sewage System Installer Certification Requirements [902 KAR 10:145]:
The regulations in 902 KAR are administered by the Cabinet for Human Resources.

On-Site Sewage System Plumbing Permit Issuance Requirements [KRS 211.370]:
These regulations are administered by local Boards of Health.

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.

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 Guidelines.

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.

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, 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 on pages 246-247)

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

VII. Cost Share Assistance:

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.
- 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 or gradually loses water from its tank.

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 on pages 246-247)

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

Septic System Informational Pamphlets, Kentucky Division of Environmental Health and Community Safety, Environmental Management Branch (Human Resources Cabinet), or contact your local health department.

University of Kentucky Cooperative Extension Service Publications.

Informational Pamphlets, Local Health Department.

Homeowner's Septic System Guide and Record Keeping Folder, provided free upon request by the Groundwater Branch, Kentucky Division of Water. The county agricultural extension office may have a limited number of copies available.

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. Available at the county extension offices.

National Small Flows Clearinghouse, West Virginia University, P.O. Box 6064, Morgantown, WV 26506-6064; telephone (800)624-8301. The following excellent information is available on request at little or no charge:

1. Septic System Information Packet for Homeowners. Includes information no septic system owner should be without, including brochures, articles, and other materials on septic system design and proper care of a septic system. The packet costs $5.20 plus shipping and handling ($2). Ask for Item #WWPCPE28.

2. Pipeline, Fall 1995, *Maintaining Your Septic System--A Guide for Homeowners*. Free except for small shipping and handling fee. (Also available from the Groundwater Branch, Kentucky Division of Water).

Farmstead BMP #3 -- On-Farm Petroleum Storage and Handling

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 224.01-405 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 Environmental and Public Protection 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 affect on the environment and correct that effect. For questions concerning the Environmental Release Reporting and Cleanup Law call (502) 564-6716.

Underground Storage Tanks [KRS 224.60-160 and 401 KAR 42:011-42:200]:
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 395 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 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 tanks designed for petroleum product storage.

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.
- Correct leaks immediately.
- 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 DWM 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 DWM.
- 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 DWM or Solid Waste Coordinator for information.
- If groundwater is contaminated, contact DWM.

The tank owner should contact the local conservation district and/or the DWM 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.

V. Practice Maintenance:

Clean up spills immediately.

Correct leaks immediately.

On a routine basis, visually inspect tank, piping, valves, hoses, and pumps for leakage.

For ASTs, routinely visually inspect the soil beneath the tank and piping.

Periodically "stick" tanks or check fuel filter on tractor for any indication of water leaking into the tank.

VI. Technical Assistance: (see address and telephone listings on pages 246-247)

- Kentucky Division of Waste Management

VII. Cost Share Assistance:

For regulated underground storage tanks, the Petroleum Storage Tank Environmental Assurance Fund Commission (PSTEAFC) may provide financial responsibility and may fund corrective action in case of a release.

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

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 and/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.
- 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 on pages 246-247):

Underground Storage Tank Systems: Kentucky Requirements.

Kentucky 401 KAR 42 and Guidance Documents from the UST Branch.

KY-A-Syst publication, *Petroleum Product Storage.*
KY-A-Syst publications may be obtained from local county Extension offices.

Environmental Release Reporting and Cleanup Requirements for Petroleum Products.

NFPA 395 for Above Ground Tanks, available from the State Fire Marshall.

NFPA 31, primarily regarding heating oil storage.

Generic Groundwater Protection Plan.

Emergency and Information Contacts (see address and telephone listings on pages 246-247).

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

Kentucky Division of Waste Management (to obtain UST regulations or cleanup guidelines).

State Fire Marshall (for certified tank remover list and above ground tank information).

Kentucky Petroleum Storage Tank Environmental Assurance Fund Commission (PSTEAFC) (for list of certified contractors and application forms).

Division of Water, Groundwater Branch (for technical assistance).

Solid Waste Coordinator - County Office: Request a list of disposal and recycling facilities.

Farmstead BMP #4 -- Well Protection

I. Description and Definition(s):

General Farmstead Use Well (non-human consumption): A well constructed or improved to provide water for irrigation, livestock, wildlife or recreation.

Human Consumption Well: A well constructed or improved to provide water for human consumption.

II. Regulatory Requirements:

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

Protection of Water Quality in Human Consumption Wells [902 KAR 10:085]

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 run-off.

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 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).

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.

State Division of Environmental Health and Community Safety Regulations

III. AWQA Minimum Requirements:

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 Branch for 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

Non-Human Consumption 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 upgradient from animal waste area, pesticide, fuel or waste storage.
- See NRCS standards and specifications for water wells.

IV. Design Information:

Well Water Quality Protection:
All surface wells shall be constructed with the casing a minimum of four inches above the ground surface so as to exclude the entrance of surface and near surface water and contaminants.

A sanitary well seal or cap shall be installed at the top of the well casing to prevent the entrance of contaminated water or other objectionable material into the well.

Slope the area around the well so that surface runoff drains away from the well.

A well should be located safe distances from the following potential sources of contamination:

Potential Contamination Source	Suggested Minimum Distance from Well
Animal pens or feedlots	50 ft.
Manure areas	75 ft.
Cesspools	150 ft.
Pit privy	75 ft.
Chemical storage areas	75 ft.
Machinery maintenance areas	75 ft.
Waste piles	75 ft.
Lagoons	150 ft.
Sewers (depending on type)	15-50 ft.
Underground storage tanks for chemical fertilizers or petroleum	75 ft.
Above ground storage tanks for chemical fertilizers or petroleum	75 ft.
Septic systems/on-site sewage systems:	See Section III of this BMP

Facilities for Water Withdrawal:

Non-Drinking Wells:
Not for human consumption.

Install adequate pumping facilities to meet the anticipated needs.

For further information see the NRCS standards/specifications for water wells.

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.

VI. Technical Assistance: (see address and telephone listings on pages 246-247)

- Kentucky Division of Water, Ground Water Branch
- Local Health Department
- Kentucky Division of Environmental Health and Community Service

VII. Cost Share Assistance:

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 on pages 246-247)

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

A Handbook for the Kentucky Water Well User, Kentucky Division of Water.

Kentucky Water Well Construction Practices and Standards, Kentucky Division of Water.

Kentucky Division of Environmental Health and Community Safety.

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

KY-A-Syst publication, *Drinking Water Well Conditions*.

KY-A-Syst publications may be obtained from local county Extension offices.

University of Kentucky College of Agriculture Extension publications.

Best Management Practices For Crops

Page

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	Sediment	1, 2, 3, 4, 6, 7, 10, 13, 15, *
Farming in Critical Areas	Sediment	8, 11
Pesticide Use	Pesticides	6, 12
Plant Food Usage	Plant Nutrients	6, 13, *
Animal Waste Application	Animal Waste	6, 7, 13, 15, *
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

I. Description and Definition(s):

Conservation cropping sequence: an adopted sequence of crops designed to provide adequate organic residue for maintenance or improvement of soil tilth, usually year by year.

Crops to be planted on a given parcel are changed year by year in a planned sequence. Crop rotation is a common practice on sloping soils because of its potential for soil saving.

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 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:

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. This will also reduce soil erosion, improve water use efficiency and water quality, enhance wildlife habitat, and break the reproduction cycle of plant pests.

IV. Design Information:

Choose crops suited to your soil type.

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

Rotations that include small grains or pasture/hay fields provide good erosion control.

Small grains and pasture/hay can be used in rotations with low-residue crops 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/or refer to University of Kentucky AGR-1 to determine the annual fertilizer and lime application rates for obtaining desired yield levels.

Switch crops to maintain perennials in the rotation, if necessary.

Consider herbicide carry-over to avoid crop failures.

VI. Technical Assistance: (see address and telephone listings on pages 246-247)

- USDA Natural Resources Conservation Service

VII. Cost Share Assistance:

VIII. Recommendations:

IX. References: (see address and telephone listings on pages 246-247)

USDA/NRCS *Field Office Technical Guide.*

Crops BMP #2--Conservation Cover

I. Description and Definition(s):

Conservation cover: establishing and maintaining perennial vegetative cover (grass, legume, trees, 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 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 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:

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 to determine the annual fertilizer and lime application rates for obtaining desired yield levels.

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 nesting seasons.

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

Tree and Shrub Plantings:
Grass planted in tree and shrub plantings may be mowed whenever necessary to reduce competition with the trees and shrubs.

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

VI. Technical Assistance: (see address and telephone listings on pages 246-247)

- 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 through the USDA Conservation Provisions of the current Farm Billcurrent Farm Bill. For more information contact the local office 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:

Use Cooperative Extension Services and/or NRCS Guidelines.

IX. References: (see address and telephone listings on pages 246-247)

Kentucky Best Management Practices for Agriculture. Kentucky Division of Conservation, Kentucky Division of Water, and the NRCS.

USDA/NRCS *Field Office Technical Guide*.

University of Kentucky College of Agriculture Extension publications.

Kentucky Division of Forestry.

Crops BMP #3--Conservation Tillage/Crop Residue Use

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 control 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 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:

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 control soil and water losses.

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

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

V. Practice Maintenance:

Maintain crop residues by reduced cultivation.

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

VI. Technical Assistance: (see address and telephone listings on pages 246-247)

- 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 through the USDA Conservation Provisions of the current Farm Billcurrent Farm Bill. For more information, contact the local office 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:

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

IX. References: (see address and telephone listings on pages 246-247)

Kentucky Best Management Practices for Agriculture. Kentucky Division of Conservation, Kentucky Division of Water, and the NRCS.

USDA/NRCS *Field Office Technical Guide*.

University of Kentucky College of Agriculture Extension publications.

Crops BMP #4--Contour Farming

I. Description and Definition(s):

Contour Farming: farming in such a way that all operations, such as plowing, land preparation, 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 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:

Perform all cropping operations across the most critical slope.

IV. Design Information:

Undulating or karst areas 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 on pages 246-247)

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

VII. Cost Share Assistance:

VIII. Recommendations:

Consider terracing in extreme cropping situations.

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.

IX. References: (see address and telephone listings on pages 246-247)

Kentucky Best Management Practices for Agriculture. Kentucky Division of Conservation, Kentucky Division of Water, and the NRCS.

USDA/NRCS *Field Office Technical Guide*.

University of Kentucky College of Agriculture Extension publications.

Crops BMP #5 - Nutrient Management

(Same as Livestock BMP #11)

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.

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.

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 224.01-010 (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 224.01-010 (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, 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. 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 on pages 246-247.)

- 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 on pages 246-247.)

Kentucky Best Management Practices for Agriculture. Kentucky Division of Conservation, Kentucky Division of Water, and USDA/NRCS.

USDA/NRCS *Field Office Technical Guide*. Practice Code 590

University of Kentucky College of Agriculture Extension publications

IP-71: Nutrient Management in Kentucky
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

Crops BMP #6 -- Filter Strip

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 pages 223-240 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 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:

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

IV. Design Information:

Locate filter strip on the lower edge of row crop fields especially if adjacent to intermittent or perennial streams, sink holes, wells, or lakes.

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

Current site-specific information is available from the Cooperative Extension Service.

V. Practice Maintenance:

Take soil tests and/or refer to University of Kentucky AGR-1 to determine the annual fertilizer 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 on pages 246-247)

- USDA 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.

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 on pages 246-247)

Kentucky Best Management Practices for Agriculture. Kentucky Division of Conservation, Kentucky Division of Water, and the NRCS.

USDA/NRCS *Field Office Technical Guide*.

University of Kentucky College of Agriculture Extension publications.

Crops BMP #7--Grasses and Legumes in Rotation

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 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:

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 to determine the annual fertilizer 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 on pages 246-247)

- 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 through the USDA Conservation Provisions of the current Farm Billcurrent Farm Bill. For more information contact the local office 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:

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 on pages 246-247)

Kentucky Best Management Practices for Agriculture. Kentucky Division of Conservation, Kentucky Division of Water, and the NRCS.

USDA /NRCS *Field Office Technical Guide*.

University of Kentucky College of Agriculture Extension publications.

Crops BMP #8--Mulching

I. Description and Definition(s):

Mulching: the application of plant residue (which is not produced on the site), wood fiber or by-products, asphalt or synthetic sprays, or other suitable material to the soil 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 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 plant residue (other than that produced on the site), wood fiber or by-products, asphalt or synthetic sprays, 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 on pages 246-247)

- USDA Natural Resources Conservation Service

VII. Cost Share Assistance:

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 on pages 246-247)

USDA/NRCS *Field Office Technical Guide*.

Crops BMP #9--Pasture and Hayland Planting and Management

I. Description and Definition(s):

This BMP concerns the establishment, re-establishment, 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 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:

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 kinds of soils and the adapted plant species. Estimate the forage yield or the pasture carrying capacity.

Livestock 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.

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

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.

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 making manure applications to frozen soil or before heavy rains.

VI. Technical Assistance: (see address and telephone listings on pages 246-247)

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

VII. Cost Share Assistance:

VIII. Recommendations:

Consider the use of temporary control of surface runoff until grasses and legumes are established.

IX. References: (see address and telephone listings on pages 246-247)

USDA Natural Resources Conservation Service.

University of Kentucky College of Agriculture Publication AGR-1.

Crops BMP #10--Stripcropping

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 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).

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 #15.

Alter strip width to fit equipment. (4-row, 6-row, 8-row, etc.)

Site-specific information is available from the 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 on pages 246-247)

- 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 through the USDA Conservation Provisions of the current Farm Billcurrent 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:

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 to determine the fertilizer and lime application needs.

IX. References: (see address and telephone listings on pages 246-247)

Kentucky Best Management Practices for Agriculture. Kentucky Division of Conservation, Kentucky Division of Water, and the NRCS.

USDA/NRCS *Field Office Technical Guide*.

University of Kentucky College of Agriculture Extension publications.

Crops BMP #11 -- Critical Area Planting and Treatment

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 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:

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.

Reduce unfavorable site conditions; such as low acidity, low fertility, compaction, dryness, or wetness with corrective measures before seedbed preparation. 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 to determine annual fertilizer and lime application rates for obtaining desired yield levels.

Mow as needed to control undesirable growth, and maintain wildlife habitat, but not to less than 4" in height. If possible, mow after nesting seasons.

Re-seed and mulch areas that have inadequate cover.

Protect area from grazing and traffic.

VI. Technical Assistance: (see address and telephone listings on pages 246-247)

- USDA Natural Resources Conservation Service

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 Billcurrent 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:

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.

IX. References: (see address and telephone listings on pages 246-247)

Kentucky Best Management Practices for Agriculture. Kentucky Division of Conservation, Kentucky Division of Water, and the NRCS.

USDA/NRCS *Field Office Technical Guide*.

University of Kentucky College of Agriculture publication AGR-1.

Crops BMP #12--Pest Management, Including Cultural Control

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 U.S. 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 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:

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 - 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 selective and effective for the specific pest, but also the least persistent in the soil and water resources.

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 field spraying, avoid double coverage.

Rotation of different pesticide chemical classes can help avoid development of resistance by pests.

Insect Traps:
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. Insect scouting allows accurate assessment of the need to treat for a pest.

Pesticide Containers:
Insure that empty containers are properly handled, cleaned, and properly disposed.

VI. Technical Assistance: (see address and telephone listings on pages 246-247)

- 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 USDA Conservation Provisions of the current Farm Billcurrent Farm Bill. For more information contact the local office 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:

Use the newly developed products that offer more alternatives to help prevent accumulation of pesticide in the soil.

Purchase pesticides in the smallest quantity that meets your needs to prevent need for storage of unused pesticides. 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 on pages 246-247)

Kentucky Best Management Practices for Agriculture. Kentucky Division of Conservation, Kentucky Division of Water, and the NRCS.

USDA/NRCS *Field Office Technical Guide*.

University of Kentucky College of Agriculture Extension publications.

KY-A-Syst publication, *Agricultural Chemical Handling and Storage*
KY-A-Syst publications may be obtained from local County Extension Offices.

Crops BMP #13--Cover Crop

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 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:

Plant close-growing crops such as cereal rye, oats, and winter wheat to temporarily protect the ground when crop residues are not adequate following crop production. Ground cover 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.

Minimize applications of nutrients in the fall, especially on soils with high infiltration rates.

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.

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 sometimes used between trees and vines in orchards, nurseries and vineyards.

VI. Technical Assistance: (see address and telephone listings on pages 246-247)

- 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 through the USDA Conservation Provisions of the current Farm Bill. For more information, contact the local office 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:

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.

IX. References: (see address and telephone listings on pages 246-247)

Kentucky Best Management Practices for Agriculture. Kentucky Division of Conservation, Kentucky Division of Water, and the NRCS.

USDA/NRCS *Field Office Technical Guide*.

University of Kentucky College of Agriculture Extension publications.

Crops BMP #14 – Nutrient Management

(Same as Livestock BMP#11)

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.

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.

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 224.01-010 (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 224.01-010 (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, 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. 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 on pages 246-247.)

- 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 on pages 246-247.)

Kentucky Best Management Practices for Agriculture. Kentucky Division of Conservation, Kentucky Division of Water, and USDA/NRCS.

USDA/NRCS *Field Office Technical Guide*. Practice Code 590

University of Kentucky College of Agriculture Extension publications

IP-71: Nutrient Management in Kentucky
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

Crops BMP #15 -- Grassed Waterway

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 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:

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 to determine the annual fertilizer 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 on pages 246-247)

- USDA Natural Resources Conservation Service

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. For more information contact the local office 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:

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 on pages 246-247)

Kentucky Best Management Practices for Agriculture. Kentucky Division of Conservation, Kentucky Division of Water, and the NRCS.

USDA/NRCS *Field Office Technical Guide*.

University of Kentucky College of Agriculture Extension publications.

Best Management Practices for Livestock

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
Pasture Feeding Areas	Animal Manure Sediment	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	Animal Manure Organics	5, 11, 12, 18

Livestock BMP #1--Planned Grazing Systems

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 on a pre-arranged 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 dry lots, in conjunction with rotational grazing, to hold animals in order to preserve pastures and reduce the creation of mud during drought, unseasonable 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 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 to control weeds.

VI. Technical Assistance: (see address and telephone listings on pages 246-247)

- 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.

IX. References: (see address and telephone listings on pages 246-247)

Kentucky Best Management Practices for Agriculture. Kentucky Division of Conservation, Kentucky Division of Water, and the NRCS.

USDA/NRCS *Field Office Technical Guide*. (Prescribed Grazing Practice Code 528, 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

Livestock BMP #2--Proper Grazing Use

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. Testing 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 on pages 246-247)

- 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 on pages 246-247)

Kentucky Best Management Practices for Agriculture. Kentucky Division of Conservation, Kentucky Division of Water, and the NRCS.

USDA/NRCS *Field Office Technical Guide*. (Grazing management calculator)

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

Livestock BMP #3--Riparian Area Protection

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 pages 223-240 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 again fall under KRS 151.250 for a permit.

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 on pages 246-247)

- 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 on pages 246-247)

Kentucky Forest Practice Guidelines for Water Quality Management.

USDA/NRCS *Field Office Technical Guide*. (Practice Code 391)

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

Livestock BMP #4--Limiting Access to Streams by Fencing with Alternative Water Systems or Limited Access Points or Stream Crossings

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 [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 401 Water Quality Certification/404 permit from the U.S. Army Corps of Engineers. See pages 223-240 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 again fall under KRS 151.250 for a permit.

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 annually 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 on pages 246-247)

- 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 on pages 246-247)

Kentucky Best Management Practices for Agriculture. Kentucky Division of Conservation, Kentucky Division of Water, and the NRCS.

Kentucky Forest Practice Guidelines for Water Quality Management.

USDA/NRCS *Field Office Technical Guide*. (Practice Codes: 382,472,578,614)

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

Livestock BMP #5--Manure Management Systems

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 again fall under KRS 151.250 for a permit.

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 224.01-010 (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 224.01-010 (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 224.01-400]:
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 Environmental and Public Protection 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 affect 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 air, 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 air, 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 on pages 246-247)

- 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. 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 on pages 246-247)

Kentucky Best Management Practices for Agriculture. Kentucky Division of Conservation, Kentucky Division of Water, and the NRCS.

USDA/NRCS *Field Office Technical Guide* (Practice Code 313).

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

Livestock BMP #6-- Manure Storage Ponds

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 again fall under KRS 151.250 for a permit.

Use of Manure from Off-Site [KRS 224.01-010 (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 224.01-010 (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 224.01-400]:
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 Environmental and Public Protection 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 affect on the environment and correct that effect. For questions concerning the Environmental Release Reporting and Cleanup Law call (502) 564-6716.

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).

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:

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 county conservation district for local 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 on pages 246-247)

- 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.

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 on pages 246-247)

Kentucky Best Management Practices for Agriculture. Kentucky Division of Conservation, Kentucky Division of Water, and the NRCS.

USDA/NRCS *Field Office Technical Guide* (Practice Code 313).

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

Livestock BMP #7—Manure Storage Facility: Holding Tanks

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 again fall under KRS 151.250 for a permit.

Use of Manure from Off-Site [KRS 224.01-010 (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 224.01-010 (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 224.01-400]:
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 Environmental and Public Protection 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 affect on the environment and correct that effect. For questions concerning the Environmental Release Reporting and Cleanup Law call (502) 564-6716.

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).

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:

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 county conservation district for local 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 on pages 246-247)

- 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 on pages 246-247)

Kentucky Best Management Practices for Agriculture. Kentucky Division of Conservation, Kentucky Division of Water, and the NRCS.

USDA/NRCS *Field Office Technical Guide* (Practice Code 313).

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

Livestock BMP #8--Manure Treatment Lagoons

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 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 Environmental and Public Protection 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 affect 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 224.01-010 (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 224.01-010 (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 county conservation district for local 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 on pages 246-247)

- 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 on pages 246-247)

Kentucky Best Management Practices for Agriculture. Kentucky Division of Conservation, Kentucky Division of Water, and the NRCS.

USDA/NRCS *Field Office Technical Guide* (Practice Code 359).

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

Livestock BMP #9--Sediment or Solids Separation Basins

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 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 Environmental and Public Protection 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 affect 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 on pages 246-247)

- 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:

IX. References: (see address and telephone listings on pages 246-247)

USDA/NRCS *Field Office Technical Guide*.

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

Livestock BMP #10--Manure Storage Facility: Stack Pads

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 again fall under KRS 151.250 for a permit.

Use of Manure from Off-Site [KRS 224.01-010 (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 224.01-010 (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 county conservation District for local 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 on pages 246-247)

- 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.

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 on pages 246-247)

Kentucky Best Management Practices for Agriculture. Kentucky Division of Conservation, Kentucky Division of Water, and the NRCS.

USDA/NRCS *Field Office Technical Guide* (Practice Code 313).

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

Livestock BMP #11 - Nutrient Management

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.

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.

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 224.01-010 (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 224.01-010 (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, 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. 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 on pages 246-247.)

- 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 on pages 246-247.)

Kentucky Best Management Practices for Agriculture. Kentucky Division of Conservation, Kentucky Division of Water, and USDA/NRCS.

USDA/NRCS *Field Office Technical Guide*. Practice Code 590

University of Kentucky College of Agriculture Extension publications

IP-71: Nutrient Management in Kentucky
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

Livestock BMP #12--Equine or Poultry Waste Feed

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 224.01-010 (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 224.01-010 (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 on pages 246-247)

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

VII. Cost Share Assistance:

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 on pages 246-247)

University of Kentucky College of Agriculture Extension publications.

Livestock BMP #13--Filter Strips

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 again fall under KRS 151.250 for a permit.

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 on pages 246-247):

- 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 on pages 246-247)

Kentucky Best Management Practices for Agriculture. Kentucky Division of Conservation, Kentucky Division of Water, and the NRCS.

USDA/NRCS *Field Office Technical Guide* (Practice Code 393).

University of Kentucky College of Agriculture Extension publications.

Livestock BMP #14--Feeding and Heavy Use Area Management

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 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 materials, or by installing needed structures.

Feed livestock 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 on pages 246-247)

- 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.

Swine Operations - Dirt Lot Feeding:
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 on pages 246-247)

"Critical Area Planting," in *Kentucky Best Management Practices for Agriculture*. Kentucky Division of Conservation, Kentucky Division of Water, and the NRCS.

USDA/NRCS *Field Office Technical Guide* (Practice Code 562).

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 Winter Woodland Feeding

Livestock BMP #15--Dead Animal Disposal

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]:

257.160 Disposition of carcasses -- How and when made.

(1) All carcasses of domestic livestock, poultry, and fish which have died or which have been destroyed on account of any disease, except as determined and permitted by the state veterinarian or other representative of the board, shall be disposed of by:

(a) Complete incineration of the entire carcass and all of its parts and products;

(b) Boiling the carcass and all of its parts and products in water or heating it with steam at a temperature above boiling, continuously for two (2) hours or more;

(c) Burying the carcass and all of its parts and products in the earth at a point which is never covered with the overflow of ponds or streams and which is not less than one hundred (100) feet distant from any watercourse, sinkhole, well, spring, public highway, residence, or stable. The carcass shall be placed in an opening in the earth at least four (4) feet deep, the abdominal and thoracic cavities opened wide their entire length with a sharp instrument, and the entire carcass covered with two (2) inches of quicklime and at least three (3) feet of earth.

(d) Removal of the carcass by a duly-licensed rendering establishment;

(e) Deposition of the carcass in a contained landfill approved pursuant to KRS Chapter 224;

(f) Composting of the carcass in a facility according to the board's administrative regulations and approved in accordance with KRS Chapter 224;

(g) Any combination of the methods set forth in paragraphs (a) to (f) of this subsection; or

(h) Any other scientifically-proven method of disposal approved by the board.

(2) The owner shall dispose of the carcass of domestic livestock, poultry, and fish as provided in subsection (1) of this section, within forty-eight (48) hours after the carcass is found unless the carcass is otherwise preserved in cold storage.

(3) The board is authorized to promulgate administrative regulations to implement this section.

Effective: June 25, 2009

History: Amended 2009 Ky. Acts ch. 22, sec. 14, effective June 25, 2009. -- Amended 1996 Ky. Acts ch. 58, sec. 2, effective July 15, 1996. -- Amended 1980 Ky. Acts ch. 188, sec. 233, effective July 15, 1980. -- Recodified 1942 Ky. Acts ch. 208, sec. 1, effective October 1, 1942, from Ky. Stat. sec. 63c-8.

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:

1) 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
2) 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 on pages 246-247)

- 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:

IX. References: (see address and telephone listings on pages 246-247)

Kentucky Office of the State Veterinarian.

USDA – NRCS *Field Office Technical Guide* (Practice Codes 316, 317).

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

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 run-off.

Manufacturing Dairy Grade Standards [902 KAR 50:032]

Pretreatment Requirements [402 KAR 0:057]:
This regulation specifies Division of Water pretreatment requirements for waste to be added directly to a municipal waste treatment system.

Pasteurized Milk Ordinance (from US 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 on pages 246-247)

- 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.

IX. References: (see address and telephone listings on pages 246-247)

Grade A Pasteurized Milk Ordinance (FDA Milk Specialists 215-597-4390 ext. 4005).

Pasteurized Milk Ordinance (PMO), US Department of Health and Human Services.

University of Kentucky College of Agriculture Extension publications.

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

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, 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 224.01-010 (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 224.01-010 (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 224.01-400**]**:**
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 Environmental and Public Protection 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 affect 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 Disposition of carcasses -- How and when made.]
(1) All carcasses of domestic livestock, poultry, and fish which have died or which have been destroyed on account of any disease, except as determined and permitted by the state veterinarian or other representative of the board, shall be disposed of by:

(a) Complete incineration of the entire carcass and all of its parts and products;
(b) Boiling the carcass and all of its parts and products in water or heating it with steam at a temperature above boiling, continuously for two (2) hours or more;
(c) Burying the carcass and all of its parts and products in the earth at a point which is never covered with the overflow of ponds or streams and which is not less than one hundred (100) feet distant from any watercourse, sinkhole, well, spring, public highway, residence, or stable. The carcass shall be placed in an opening in the earth at least four (4) feet deep, the abdominal and thoracic cavities opened wide their entire length with a sharp instrument, and the entire carcass covered with two (2) inches of quicklime and at least three (3) feet of earth.
(d) Removal of the carcass by a duly-licensed rendering establishment;
(e) Deposition of the carcass in a contained landfill approved pursuant to KRS Chapter 224;
(f) Composting of the carcass in a facility according to the board's administrative regulations and approved in accordance with KRS Chapter 224;
(g) Any combination of the methods set forth in paragraphs (a) to (f) of this subsection; or
(h) Any other scientifically-proven method of disposal approved by the board.

(2) The owner shall dispose of the carcass of domestic livestock, poultry, and fish as provided in subsection (1) of this section, within forty-eight (48) hours after the carcass is found unless the carcass is otherwise preserved in cold storage.
(3) The board is authorized to promulgate administrative regulations to implement this section.
Effective: June 25, 2009 **History:** Amended 2009 Ky. Acts ch. 22, sec. 14, effective June 25, 2009. -- Amended 1996 Ky. Acts ch. 58, sec. 2, effective July 15, 1996. -- Amended 1980 Ky. Acts ch. 188, sec. 233, effective July 15, 1980. -- Recodified 1942 Ky. Acts ch. 208, sec. 1, effective October 1, 1942, from Ky. Stat. sec. 63c-8.

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:
1. 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.
2. The sides of the trucks used must be of solid material.

Construction in Flood Plains [**KRS 151.250**]**:**
Construction activities (e.g. fillings, channel relocations, streambank restoration, buildings, culverts and bridges) in flood plains 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 that again fall under KRS 151.250 for a permit.

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 on pages 246-247.)

- 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 on pages 246-247.)

Kentucky Best Management Practices for Agriculture. Kentucky Division of Conservation, Kentucky Division of Water, and USDA/NRCS.

USDA/NRCS *Field Office Technical Guide*. The standard and specification for nutrient management, Practice Code 590.

University of Kentucky College of Agriculture Extension publications.

Poultry Water Quality Handbook, Poultry Water Quality Consortium.

Livestock BMP #18—Stormwater Management

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 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 Environmental and Public Protection 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 affect on the environment and correct that effect. For questions concerning the Environmental Release Reporting and Cleanup Law call (502) 564-6716.

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).

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:

- 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 on pages 246-247)

- 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 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:

Stormwater runoff should be excluded from animals and animal waste (manure) areas to the fullest extent practical.

IX. References: (see address and telephone listings on pages 246-247)

Kentucky Best Management Practices for Agriculture. Kentucky Division of Conservation, Kentucky Division of Water, and the NRCS.

USDA/NRCS *Field Office Technical Guide.*

- Diversion (Code 362)
- Roof Runoff Structure (Code 558)
- Sediment Basin (Code 350)
- Dike (Code 356)
- Grassed Waterway (Code 412)
- Filter Strip (code 393)
- Grade Stabilization Structure (Code 410)
- Lined Waterway or Outlet (Code 468)
- Structure for Water Control (Code 587)
- Underground Outlet (Code 620)
- Water and Sediment Control Basin (Code 638).

University of Kentucky College of Agriculture Extension publications:
AEN-103 Stormwater BMPs for Confined Livestock Facilities

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 Natural Resources Conservation Service or the appropriate technical agencies.

Best Management Practices for Streams and Other Waters

Page

Guide for Determining Need for Streams and Other Waters Best Management Practices BMPs

Activity	**Pollutant**	**Applicable BMPs** (apply one or more of the following as needed to protect water quality)
Stream Corridor and Wetland Alteration	Sediment, Nutrients, Temperature	1, 2, 3, 4

Streams and Other Waters
BMP #1 -- Stream Crossing Protection

I. Description and Definition(s):

A stream crossing is a bridge or low water crossing built for farm or vehicular traffic. These guidelines are provided to minimize impacts to surface streams. This BMP covers activities described by Corps of Engineers (COE) Nationwide Permit #14.

II. Regulatory Requirements:

Stream Crossings [US Clean Water Act, 33 USC §1251 *et seq.*, Section 404]:
The Clean Water Act gives the U.S. Army Corps of Engineers regulatory authority. Since this activity normally occurs in small streams, the COE has issued nationwide permit #14 to cover stream crossings. See pages 223-240 of this document for further information.

Low Water Crossings [US Clean Water Act, 33 USC §1251 *et seq.*, Section 401]:
Low water crossings installed as part of a larger streambank protection project may require a 401 Water Quality Certification from KY Division of Water. See pages 223-240 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 again fall under KRS 151.250 for a permit.

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).

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.

III. AWQA Minimum Requirements:

Construct low water crossing in a manner that does not obstruct the normal flow of the stream.

Minimize soil erosion and removal of streamside vegetation.

IV. Design Information:

V. Practice Maintenance:

Check the crossings regularly and especially after flooding. Repair structural damage immediately. Revegetate the damaged spots as soon as possible.

VI. Technical Assistance: (see address and telephone listings on pages 246-247)

- U.S. Army Corps of Engineers
- Kentucky Division of Water, Water Quality Certification Section
- USDA Natural Resources Conservation Service

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.

VIII. Recommendations:

IX. References: (see address and telephone listings on pages 246-247)

Sections 404 and 401 of the Clean Water Act, 33 USC §1251 *et seq.*

USDA/NRCS *Field Office Technical Guide*.

Streams and Other Waters
BMP #2 -- Sand and Gravel Removal

I. Description and Definition(s):

The removal of sand and gravel deposits in streams by mechanical means for commercial or other purposes can affect aquatic ecosystems. These guidelines are provided to minimize the disturbances and adverse effects on water quality.

II. Regulatory Requirements:

Sand and Gravel Removal [US Clean Water Act, 33 USC §1251 *et seq.*, Section 404]:
The Clean Water Act gives the U.S. Army Corps of Engineers (COE) regulatory authority over this practice. The Louisville District of the COE covers this activity under General Permit #40. If the conditions of GP 40 are complied with, no 401 Water Quality Certification is required from the Kentucky Division of Water. For additional information on General Permits see pages 223-240 of this document.

Gravel removal done in conjunction with a streambank stabilization project would not be covered under GP #40, but would be covered by NWP #13 described in BMP #3 of this section.

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.

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:

Minimize disturbance to stream by excavation equipment. Access gravel from shore as much as possible.

IV. Design Information:

Leave a 10 foot buffer between excavations and stream flow.

Gravel removal in high quality streams designated as Outstanding Resource Waters by the KY DOW will require additional stream protection measures.

V. Practice Maintenance:

VI. Technical Assistance: (see address and telephone listings on pages 246-247)

- U.S. Army Corps of Engineers.
- Kentucky Division of Water, Water Quality Certification Section.
- USDA Natural Resources Conservation Service

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.

VIII. Recommendations:

Minimize gravel removal as a flood prevention technique.

Minimize disturbance to stream side vegetation during removal process. This should be done in relation to other practices by addressing upstream and stream flow problems.

IX. References: (see address and telephone listings on pages 246-247)

GP40 from Louisville District Corps of Engineers, on sand and gravel removal.

Corps of Engineers District Map.

Streams and Other Waters
BMP #3 -- Streambank and Shoreline Protection

I. Description and Definition(s):

Streambank protection is structural and/or vegetative practices designed to control or prevent stream banks from scouring, caving, or sloughing. This BMP covers activities described by Corps of Engineers NWP #13.

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 vehicular traffic or livestock use.

II. Regulatory Requirements:

Streambank and Shoreline Protection [US Clean Water Act, 33 USC §1251 *et seq.*, Sections 401 and 404]:
The Clean Water Act, Section 404, gives the U.S. Army Corps of Engineers regulatory authority over this practice. Depending on the size of the project and the stream, the Corps of Engineers may cover this practice under a Nationwide or an individual type of permit. See pages 223-240 of this document for further information.

Recent amendments to the Agriculture Water Quality Act added a procedure by which a project can be certified under CWA section 401. The procedure of application to the Division of Water for its review and certification is still available. In addition, for activities covered by several nationwide permits, a process through the Agriculture Water Quality Plan has been added. (See “III. AWQA Minimum Requirements” on the following page.)

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.

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:

A) For projects in streams where the watershed above the work being conducted is less than one square mile (640 acres) the following BMP conditions should be followed:
   1. No material is placed in excess of the minimum needed for erosion protection;
   2. The bank stabilization activity is less than 500 feet in length;
   3. The activity will not exceed an average of one cubic yard per running foot placed along the bank below the plane of the ordinary high water mark or the high tide line;
   4. No material is placed in any special aquatic site, including wetlands;
   5. No material is of the type or is placed in any location or in any manner so as to impair surface water flow into or out of any wetland area;
   6. No material is placed in a manner that will be eroded by normal or expected high flows (properly anchored trees and treetops may be used in low energy areas); and,
   7. The activity is part of a single and complete project.

Bank stabilization activities in excess of 500 feet in length or greater than an average of one cubic yard per running foot may be authorized by the U.S. Army Corps of Engineers. In such cases the applicant must receive authorization from the Corps prior to project initiation.

B) The Agriculture Water Quality Authority has determined that projects in watersheds greater than one square mile (640 acres) will require site-specific technical assistance from sources such as US Army Corps of Engineers, USDA Natural Resources Conservation Service, private consultants, etc., and the Division of Water. This assistance will ensure that the project is technically sound and that Kentucky water quality standards are not violated. The Division of Water will provide the landowner with documentation after review of the specific project details.

IV. Design Information:

In accordance with the published procedures outlined in *Stream Obstruction Removal Guidelines*, streambanks often need sloping for more favorable vegetative establishment and growth.

Use riprap, gabions, or similar structures on the lower slopes that are often inundated.

Select adapted plant species that withstand design flow velocities for the upper streambank areas that are only occasionally under water.

V. Practice Maintenance:

Check the protected areas regularly, and especially after flooding. Repair structural practices immediately. Revegetated damaged spots as soon as possible.

VI. Technical Assistance: (see address and telephone listings on pages 246-247)

- U.S. Army Corps of Engineers
- USDA Natural Resources Conservation Service
- Kentucky Division of Water, Water Quality Certification Section

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.

VIII. Recommendations:

Streambank stabilization projects should strive to minimize negative effects on adjacent streambank areas.

To ensure long term beneficial streambank protection, the upstream cause of continuous streambank erosion problems should be identified.

Fence livestock out of the stream where practical.

The vegetation area along streambanks should be between 15 and 25 feet wide.

Streambank protection projects should be designed with long term stability as the goal.

Remove felled trees, stumps, and debris that might cause turbulence in the stream.

IX. References: (see address and telephone listings on pages 246-247)

NRCS *Engineers Field Handbook*, Chapter 18, "Soil Bio-engineering for Upland Slope Protection and Erosion Reduction".

USDA/NRCS *Field Office Technical Guide*.

US Forest Service - *Stream Habitat Improvement Handbook.*

Stream Obstruction Removal Guidelines (available from Kentucky Division of Water and Natural Resources Conservation Service).

Recommended Tree Species for Revegetation, Kentucky Division of Water

Streams and Other Waters
BMP #4 -- Proper Stream Drainage Maintenance

I. Description and Definition(s):

Stream drainage maintenance is that group of practices used to assure that streams are able to carry the optimum water flow to prevent flooding. Examples include removal of log jams and sediment blockage.

These stream drainage activities can affect water quality. In order to minimize negative effects, proper stream drainage maintenance techniques need to be employed.

This activity may be covered by Corps of Engineers Nationwide Permit #26.

II. Regulatory Requirements:

Stream Drainage Maintenance [US Clean Water Act, 33 USC §1251 *et seq.*, Sections 401 and 404]:
The Clean Water Act, Section 404, gives the U.S. Army Corps of Engineers regulatory authority over this practice. Depending on the size of the project and the stream, the COE may cover this practice under a nationwide or an individual type of permit. See pages 223-240 of this document for further information.

Recent amendments to the Agriculture Water Quality Act added a procedure, effective July 15, 1996, by which a project can be certified under CWA section 401. The procedure of application to the Division of Water for its review and certification is still available. In addition, for activities covered by several nationwide permits, a process through the Agriculture Water Quality Plan has been added. (See "III. AWQA Minimum Requirements" on the following page.)

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.

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).

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.

III. AWQA Minimum Requirements:

A) For projects in streams where the watershed above the work being conducted is less than one square mile (640 acres) the following BMP conditions should be followed:
   1. Identify specific problem areas (log jams, fallen trees, sediment accumulation, etc.) and focus activities in these areas to avoid unnecessary disturbance to adjacent stream habitat.
   2. Minimize the removal of streamside vegetation:
      a) Remove only the necessary vegetation required in order to clear the stream blockage.
      b) Where practical, operate heavy equipment from only one side of stream to avoid unnecessary loss of vegetation to both sides of stream.
   3. Minimize straightening of stream meanders.
   4. For streams that have already been channelized into ditches, the above items may not be practical. Maintenance associated with such ditches should incorporate erosion control practices such as proper sloping and reseeding of banks. Technical assistance from NRCS and KY Division of Water is recommended.
   5. Care should be taken to avoid impacts to wetlands adjacent to streams. NWP #26 requires that the COE be notified in writing before any filling of 1 acre or more of wetland may occur (see NWP Condition #13 on page 205).

B) The Agriculture Water Quality Authority has determined that projects in watersheds greater than one square mile (640 acres) will require site specific technical assistance from sources such as US Army Corps of Engineers, USDA Natural Resources Conservation Service, private consultants, etc. and the Division of Water. This assistance will ensure that the project is technically sound and that Kentucky water quality standards are not violated. The Division of Water will provide the landowner with documentation after review of the specific project details.

IV. Design Information:

Log and debris jams should be removed in accordance with the published procedures outlined in the publication *Stream Obstruction Removal Guidelines* .

Channel enlargement should be designed by technical assistance personnel to avoid unnecessary erosion.

Minimize disturbance or removal of streamside vegetation.

Where practical, replant trees along stream banks (especially in watersheds >2,000 acres).

V. Practice Maintenance:

VI. Technical Assistance: (see address and telephone listings on pages 246-247)

- U.S. Army Corps of Engineers
- Kentucky Division of Water, Water Quality Certification Section
- USDA Natural Resources Conservation Service

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.

VIII. Recommendations:

IX. References: (see address and telephone listings on pages 246-247)

Sections 404 and 401 of the Federal Clean Water Act (33 USC §1251 *et seq.)*.

USDA/NRCS *Field Office Technical Guide*.

Stream Obstruction Removal Guidelines (available from Kentucky Division of Water and Natural Resources Conservation Service).

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 this act is to "...restore and maintain the chemical, physical, and biological integrity of the nations waters". Section 404 of the CWA specifically regulates the deposition of fill material (sediments, gravel etc.) into US Waters. 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. Under this program a permit must be issued for activities that involve the deposition of fill material into waters of the United States which are broadly defined to include lakes, streams, and wetlands. Activities such as dredging, stream channelization, and filling of wetlands are regulated under the Corps 404 permit.

The Corps has identified two broad categories of 404 permits that reflect the complexity of a proposed project. Projects impacting large streams (watersheds approximately greater than 3.5 sq. mile) and their adjacent wetlands (no minimum size) or projects impacting greater than 10 acres of wetlands that are not adjacent to large streams **require an individual 404 permit**. Individual permits are somewhat involved in detail and require public review. Projects impacting streams in watersheds approximately less than 3.5 square mile or isolated wetlands less than 10 acres in size require a "nationwide" permit (NWP). The COE has published a list of the various NWPs and the associated conditions that must be met in order for the permit to be valid. The Corps may impose additional conditions on a case by case basis.

The CWA also requires that all federally permitted projects receive a certification from the state to ensure that the project meets state water quality standards. Water quality standards are state regulations designed to protect water quality. In Kentucky, the certification is referred to as the 401 certification and is administered by the Division of Water (DOW).

The goal of the 401certification program is to address landowner concerns in a manner that affords protection to the physical integrity of the state's waters. In stream environments, this integrity is defined as the natural meandering stream path and the adjacent vegetation. Past agricultural practices have resulted in the conversion of many Kentucky streams into drainage ditches. These ditches are characterized by straight paths and side slopes sown in fescue. The loss of the meandering stream pattern and the adjacent tree cover has resulted in the degradation of aquatic habitat and the subsequent loss of biological and physical integrity. It is the commitment of the 401 program that waterways can be managed in ways that solve drainage problems without the automatic conversion of streams into ditches. It is this maintenance of stream integrity that is the intent of the CWA.

Project approval process

In 1996 the Kentucky General Assembly passed an amendment to the Agricultural Water Quality Act of 1994 (KRS 224.71). This amendment requires the Agriculture Water Quality Authority (AWQA) to provide guidance to landowners for stream related activities covered under NWPs #12, 13, 14, 26, 27, 33, and 37. The Agriculture Water Quality Act also grants 401 water quality certification for those projects covered under these NWPs. For those projects not covered under NWPs #12, 13, 14, 26, 27, 33, and 37, or for projects not associated with "Agriculture Operations" (defined in KRS 224.71-100 Section 1), a 401 certification may still be required. Under these circumstances the landowner should contact the DOW for guidance.

In order for the AWQA to provide guidance to landowners involved in stream related activities, the AWQA has determined that:

1) Those 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) The Agriculture Water Quality Authority has determined that 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, etc. and the Division of Water. This assistance will ensure that the project is technically sound and that Kentucky water quality standards are not violated. The DOW will provide the landowner with documentation after review of the specific project details.

For projects that require an **individual** COE 404 permit, landowners are required to obtain a 401 Water Quality Certification from the Kentucky Division of Water for those projects and the Agriculture Water Quality Authority provisions in this document (above) do not apply.

COE Nationwide Permits contained in the Agriculture Water Quality Act

Several nationwide COE permits are covered by the Agriculture Water Quality Act. They are listed here along with their standard conditions as developed by the COE.

Nationwide permits 12, 27, 33 and 37, while covered by the Agriculture Water Quality Act, do not normally cover individual agricultural practices. NRCS and DOW should be consulted for permit applicability.

Three of the nationwide permits do cover routine agricultural practices:

NWP #13: covers bank stabilization and is covered by Streams BMP #3.
NWP #14: covers minor road crossings and is covered by Streams BMP #1.
NWP #26: covers stream and wetland filling and excavation, and is covered in Streams BMP #4.
GP #40: covers removal of sand and gravel from streams in the Louisville COE District and is covered by BMP #2 of this section.

All 7 of the NWPs contained in the Agriculture Water Quality Act are herein described along with their standard conditions.

NWP #12 - Utility Line Backfill and Bedding. Discharges of material for backfill or bedding for utility lines, including outfall and intake structures, provided there is no change in preconstruction contours. A “utility line” is defined as any pipe or pipeline for the transportation of any gaseous, liquid, liquefiable, or slurry substance, for any purpose, and any cable, line, or wire for the transmission for any purpose of electrical energy, telephone and telegraph messages, and radio and television communication. The term “utility line” does not include activities which drain a water of the United States, such as drainage tile, however it does apply to pipes conveying drainage from another area. Material resulting from trench excavation may be temporarily sidecast (up to three months) into waters of the United States provided that the material is not placed in such a manner that it is dispersed by currents or other forces. The District Engineer may extend the period of temporary side-casting up to 180 days, where appropriate. The area of waters of the United States that is disturbed must be limited to the minimum necessary to construct the utility line. In wetlands, the top 6” to 12” of the trench should generally be backfilled with topsoil from the trench. Excess material must be removed to upland areas immediately upon completion of construction. Any exposed slopes and stream banks must be stabilized immediately upon completion of the utility line. The utility line itself will require a Section 10 permit if in navigable waters of the United States. (See 33 CFR Part 322). (Section 404)

NWP #13 - Bank Stabilization. Bank stabilization activities necessary for erosion prevention provided:

a. No material is placed in excess of the minimum needed for erosion protection;
b. The bank stabilization activity is less than 500 feet in length;
c. The activity will not exceed an average of one cubic yard per running foot placed along the bank below the plane of the ordinary high water mark or the high tide line;
d. No material is placed in any special aquatic site, including wetlands;
e. No material is of the type or is placed in any location or in any manner so as to impair surface water flow into or out of any wetland area;
f. No material is placed in a manner that will be eroded by normal or expected high flows (properly anchored trees and treetops may be used in low energy areas); and,
g. The activity is part of a single and complete project.

Bank stabilization activities in excess of 500 feet in length or greater than an average of one cubic yard per running foot may be authorized if the permittee notifies the district engineer in accordance with the “Notification” general condition and the district engineer determines the activity complies with the other terms and conditions of the nationwide permit and the adverse environmental impacts are minimal both individually and cumulatively. (Sections 10 and 404)

NWP #14 - Road Crossing. Fills for roads crossing waters of the United States (including wetlands and other special aquatic sites) provided:

a. The width of the fill is limited to the minimum necessary for the actual crossing;
b. The fill placed in waters of the United States is limited to a filled area of no more than 1/3 acre. Furthermore, no more than a total of 200 linear feet of the fill for the roadway can occur in special aquatic sites, including wetlands;
c. The crossing is culverted, bridged or otherwise designed to prevent the restriction of, and to withstand, expected high flows and tidal flows, and to prevent the restriction of low flows and the movement of aquatic organisms;
d. The crossing, including all attendant features, both temporary and permanent, is part of a single and complete project for crossing of a water of the United States; and,
e. For fills in special aquatic sites, including wetlands, the permittee notifies the district engineer in accordance with the "Notification" general condition. The notification must also include a delineation of affected special aquatic sites, including wetlands.

Some road fills may be eligible for an exemption from the need for a Section 404 permit altogether (see 33 CFR 323.4). Also, where local circumstances indicate the need, district engineers will define the term "expected high flows" for the purpose of establishing applicability of this nationwide permit.

NWP #26 - Headwaters and Isolated Waters Discharges. Discharges of dredged or fill material into headwaters and isolated waters provided:

a. The discharge does not cause the loss of more than 10 acres of waters of the United States;
b. The permittee notifies the district engineer if the discharge would cause the loss of waters of the United States greater than one acre in accordance with the "Notification" general condition. For discharges in special aquatic sites, including wetlands, the notification must also include a delineation of affected special aquatic sites, including wetlands. (Also see 33 CFR 330.1(e); and
c. The discharge, including all attendant features, both temporary and permanent, is a part of a single and complete project.

For the purposes of this nationwide permit, the acreage of loss of waters of the United States includes the filled area plus waters of the United States that are adversely affected by flooding, excavation or drainage as a result of the project. The ten-acre and one-acre limits of NWP 26 are absolute, and cannot be increased by any mitigation plan offered by the applicant or required by the District Engineer.

NWP #27 - Wetland and Riparian Restoration and Creation Activities. Activities in waters of the United States associated with the restoration of altered and degraded non-tidal wetlands and creation of wetlands on private lands in accordance with the terms and conditions of a binding wetland restoration or creation agreement between the landowner and the U.S. Fish and Wildlife Service (USFWS) or the Natural Resources Conservation Service (NRCS); or activities associated with the restoration of altered and degraded non-tidal wetlands, riparian areas and

creation of wetlands and riparian areas on U.S. Forest Service and Bureau of Land Management lands, Federal surplus lands (e.g., military lands proposed for disposal), Farm Service Agency inventory properties, and Resolution Trust Corporation inventory properties that are under Federal control prior to being transferred to the private sector. Such activities include, but are not limited to: Installation and maintenance of small water control structures, dikes, and berms, backfilling of existing drainage ditches; removal of existing drainage structures; construction of small nesting islands; and other related activities. This nationwide permit applies to restoration projects that serve the purpose of restoring "natural" wetland hydrology, vegetation, and function to altered and degraded non-tidal wetlands and "natural" functions of riparian areas. For agreement restoration and creation projects only, this nationwide permit also authorizes any future discharge of dredged or fill material associated with the reversion of the area to its prior condition and us (i.e., prior to restoration under the agreement) within five years after expiration of the limited term wetland restoration or creation agreement, even if the discharge occurs after this nationwide permit expires. The prior condition will be documented in the original agreement, and the determination of return to prior conditions will be made by the Federal agency executing the agreement. Once an area is reverted back to its prior physical condition, it will be subject to whatever the corps regulatory requirements will be at that future date. This nationwide permit does not authorize the conversion of natural wetlands to another aquatic use, such as creation of waterfowl impoundments where a forested wetland previously existed. (Sections 10 and 404)

NWP #33 - Temporary Construction, Access and Dewatering. Temporary structures and discharges, including cofferdams, necessary for construction activities or access fills or dewatering of construction sites; provided the associated permanent activity was previously authorized by the Corps of Engineers or the U.S. Coast Guard, or for bridge construction activities not subject to Federal regulation. Appropriate measures must be taken to maintain near normal downstream flows and to minimize flooding. Fill must be of materials and placed in a manner that will not be eroded by expected high flows. Temporary fill must be entirely removed to upland areas following completion of the construction activity and the affected areas restored to the pre-project conditions. Cofferdams cannot be used to debater wetlands or other aquatic areas so as to change their use. Structures left in place after cofferdams are removed require a Section 10 permit if located in navigable waters of the United States. (See 33 CFR Part 322). The permittee must notify the district engineer in accordance with the "Notification" general condition. The notification must also include a restoration plan of reasonable measures to avoid and minimize impacts to aquatic resources. The district engineer will add special conditions, where necessary, to ensure that adverse environmental impacts are minimal. Such conditions may include: limiting the temporary work to the minimum necessary; requiring seasonal restrictions; modifying the restoration plan; and requiring alternative construction methods (e.g., construction mats in wetlands where practicable). This nationwide permit does not authorize temporary structures or fill associated with mining activities or the construction of marina basins which have not been authorized by the Corps. (Sections 10 and 404)

NWP #37 - Emergency Watershed Protection and Rehabilitation. Work done by or funded by the Natural Resources Soil Conservation Service qualifying as an "exigency" situation (requiring immediate action) under its Emergency Watershed Protection Program (7 CFR Part 624) and work done or funded by the Forest Service under its Burned-Area Emergency Rehabilitation Handbook (FSH 509.13) provided the district engineer is notified in accordance with the notification general condition.

Nationwide Permit Conditions: (covers all NWP permits). General Conditions: The following general conditions must be followed in order for any authorization by a nationwide permit to be valid:

1. Navigation. No activity may cause more than a minimal adverse effect on navigation.
2. Proper maintenance. Any structure of fill authorized shall be properly maintained, including maintenance to ensure public safety.
3. Erosion and siltation controls. Appropriate erosion and siltation controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills must be permanently stabilized at the earliest practicable date.
4. Aquatic life movements. No activity may substantially disrupt the movement of those species of aquatic life indigenous to the water body, including those species which normally migrate through the area, unless the activity's primary purpose is to impound water.
5. Equipment. Heavy equipment working in wetlands must be placed on mats or other measures must be taken to minimize soil disturbance.
6. Regional and case-by case conditions. The activity must comply with any regional conditions which may have been added by the division engineer (see 33 CFR 330.4(e)) and any case specific conditions added by the Corps.
7. Wild and Scenic Rivers. No activity may occur in a component of the National Wild Scenic River System; or in a river officially designated by Congress as a "study river" for possible inclusion in the system, while the river is in an official study status. Information on Wild and Scenic Rivers may be obtained from the National Park Service and the U.S. Forest Service. A section of the Red River in the Daniel Boone National Forest is currently the only wild and scenic river in Kentucky.
8. Tribal rights. No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.
9. Water quality certification. In certain states, an individual state water quality certification must be obtained or waived (see 33 CFR 330.4(c)).
10. Coastal zone management. In certain states, an individual state coastal zone management consistency concurrence must be obtained or waived. (see 33 CFR 330.4(d)). Not applicable in Kentucky.
11. Endangered Species. No activity is authorized under any NWP which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act, or which is likely to destroy or adversely modify the critical habitat of such species. Non-federal permittees shall notify the district engineer if any listed species or critical habitat might be affected or is in the vicinity of the project and shall not begin work on the activity until notified by the district

engineer that the requirements of the Endangered Species Act have been satisfied and that the activity is authorized. Information on the location of threatened and endangered species and their critical habitat can be obtained from the U.S. Fish and Wildlife Service, Cookeville, Tennessee.

12. Historic properties. No activity which may affect Historic properties listed, or eligible for listing, in the National Register of Historic Places is authorized, until the DE has complied with the provisions of 33 CFR 325, Appendix C. The prospective permittee must notify the district engineer if the authorized activity may affect any historic properties listed, determined to be eligible, or which the prospective permittee has reason to believe may be eligible for listing on the National Register of Historic Places, and shall not begin the activity until notified by the District Engineer that the requirements of the National Historic Preservation Act have been satisfied and that the activity is authorized. Information on the location and existence of historic resources can be obtained from the State Historic Preservation Office and the National Register of Historic Places (see 33 CFR 330.4(g)).
13. **Notification:**

(a) **Where required by the terms of the NWP, the prospective permittee must notify the District Engineer of the appropriate Corps of Engineers District (see map attached at end of this section) as early as possible and shall not begin the activity:** (1) Until notified by the District Engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or (2) If notified by the District or Division engineer that an individual permit is required; or (3) Unless 30 days have passed from the District Engineer's receipt of the notification and the prospective permittee has not received notice from the District or Division Engineer. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d) (2).

(b) The notification must be in writing and include the following information and any required fees: (1) Name, address and telephone number of the prospective permittee; (2) Location of the proposed project; (3) Brief description of the proposed project; the project's purpose; direct and indirect adverse environmental effects the project would cause; any other NWP(s), regional general permit(s) or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity; (4) Where required by the terms of the NWP, a delineation of affected special aquatic sites, including wetlands; and (5) A statement that the prospective permittee has contacted: (I) The USFWS/NMFS regarding the presence of any Federally listed (or proposed for listing) endangered or threatened species or critical habitat in the permit area that may be affected by the proposed project; and any available information provided by those agencies. (The prospective permittee may contact Corps District Offices for USFWS/NMFS agency contacts and lists of critical permit area that may be affected by the proposed project; and the available information, if any, provided by that agency.

(c) The standard individual permit application form (Form ENG 4345) may be used as the notification but must clearly indicate that it is a PDN and must include all of the information required in (b) (1)-(5) of General Condition 13.

(d) In reviewing an activity under the notification procedure, the District Engineer will first determine whether the activity will result in more than minimal individual or cumulative adverse environmental effects or will be contrary to the public interest. The prospective permittee may, at his option, submit a proposed mitigation plan with the predischarge notification to expedite the process and the District Engineer will consider any optional mitigation the applicant has included in the proposal in determining whether the net adverse environmental effects of the proposed work are minimal. The District Engineer will consider any comments from Federal and State agencies concerning the proposed activity's compliance with the terms and conditions of the nationwide permits and the need for mitigation to reduce the project's adverse environmental effects to a minimal level. The district engineer will upon receipt of a notification provide immediately (e.g., facsimile transmission, overnight mail or other expeditious manner) a copy to the appropriate offices of the Fish and Wildlife Service, State natural resource or water quality agency, EPA, and, if appropriate, the National Marine Fisheries Service. With the exception of NWP 37,. these agencies will then have 5 calendar days from the date the material is transmitted to telephone the District Engineer if they intend to provide substantive, site-specific comments. If so contacted by an agency, the District Engineer will wait an additional 10 calendar days before making a decision on the notification. The District Engineer will fully consider agency comments received within the specified time frame, but will provide no response to the resource agency. The District Engineer will indicate in the administrative record associated with each notification that the resource agencies' copies of notifications to expedite agency notification. If the District Engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse effects are minimal, he will notify the permittee and include any conditions he deems necessary. If the District Engineer determines that the adverse effects of the proposed work are more than minimal, then he will notify the applicant either: (1) that the project does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; or (2) that the project is authorized under the nationwide permit subject to the applicant's submitting a mitigation proposal that would reduce the adverse effects to the minimal level. This mitigation proposal must be approved by the District Engineer prior to commencing work. If the prospective permittee elects to submit a mitigation plan, the DE will expeditiously review the proposed mitigation plan, but will not commence a second 30-day notification procedure. If the net adverse effects of the project (with the mitigation proposal) are determined by the District Engineer to be minimal, the District Engineer will provide a timely written response to the applicant informing him that the project can proceed under the terms and conditions of the nationwide permit.

(e) Wetlands Delineations: Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic site. There may be some delay if the Corps does the delineation. Furthermore, the 30-day period will not start until the wetland delineation has been completed.

(f) Mitigation: Factors that the District Engineer will consider when determining the acceptability of appropriate and practicable mitigation include, but are not limited to: (1) To be practicable the mitigation must be available and capable of being done considering costs, existing technology, and logistics in light of overall project purposes; (2) to the extent appropriate, permittees should consider mitigation banking and other forms of mitigation including contributions to wetland trust funds, which contribute to the restoration, creation, replacement, enhancement, or preservation of wetlands. Furthermore, examples of mitigation that may be appropriate and practicable include but are not limited to: reducing the size of the project; establishing buffer zones to protect aquatic resource values; and replacing the loss of aquatic resource values by creating, restoring, and enhancing similar functions and values. In addition, mitigation must address impacts and cannot be used to offset the acreage of wetland losses that would occur in order to meet the acreage limits of some of the nationwide permits (e.g., 5 acres of wetlands cannot be created to change a 6 acre loss of wetlands to a one acre loss; however, the five created acres can be used to reduce the impacts of the six acre loss).

Conditions for Section 404 Only:

In addition to the General Conditions, the following conditions apply only to activities that involve the discharge of dredged or fill material and must be followed in order for authorization by the nationwide permits to be valid:

1. Water supply intakes. No discharge of dredged or fill material may occur in the proximity of a public water supply intake except where the discharge is for repair of the public water supply intake structures or adjacent bank stabilization.
2. Shellfish production. No discharge of dredged or fill material may occur in areas of concentrated shellfish production, unless the discharge is directly related to a shellfish harvesting activity authorized by nationwide permit 4.
3. Suitable material. No discharge of dredged of fill material may consist of unsuitable material (e.g., trash, debris, car bodies, etc.) and material discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act.)
4. Mitigation. Discharges of dredged or fill material into waters of the United States must be minimized or avoided to the maximum extent practicable at the project site (i.e., on-site), unless the DE has approved a compensation plan for the specific regulated activity.
5. Spawning areas. Discharges in spawning areas during spawning seasons must be avoided to the maximum extent practicable.
6. Obstruction of high flows. To the maximum extent practicable, discharges must not permanently restrict or impede the passage of normal or expected high flows or cause the relocation of the water (unless the primary purpose of the fill is to impound waters).
7. Adverse impacts from impoundments. If the discharge creates an impoundment of water, adverse impacts on the aquatic system caused by the accelerated passage of water and/or the restriction of its flow shall be minimized to the maximum extent practicable.
8. Waterfowl breeding areas. Discharges into breeding areas for migratory waterfowl must be avoided to the maximum extent practicable.
9. Removal of temporary fills. Any temporary fills must be removed in their entirety and the affected areas returned to their preexisting elevation.

Public Notice

US Army Corps
of Engineers
Louisville District

Public Notice No.: 199400024-GP40
Date: 10/01/94
Closing Date: 09/30/99

Please address all comments and inquiries to:
U.S. Army Corps of Engineers, Louisville District
ATTN: CEORL-OR-FS
P.O. Box 59
Louisville, Kentucky 40201-0059
Phone: (502) 582-5452

Notice For Reestablishment Of A General Permit

This notice announces the establishment of a General Permit by the Louisville District Corps of Engineers, in accordance with Title 33 CFR 325.5(c) (1), as published in the Federal Register, volume 51, No. 219, to issue a General Permit, pursuant to Section 404 of the Clean Water Act (CWA).

TYPE OF ACTIVITY: Sand and gravel dredging.

COVERAGE AREA: Streams in the Louisville District within the State of Kentucky, excluding navigable waters and those streams on the attached list.

SCOPE OF WORK: All activities necessary for the removal of sand and gravel that meets the requirements contained herein.

RESTRICTIONS: See conditions “a” through “s” of the attached Special Conditions for specific restrictions. The work authorized by this General Permit would also be subject to the attached General Conditions.

NOTIFICATION REQUIREMENTS: This General Permit does require written notification to the District Engineer prior to commencement of the authorized activity. However it does not require confirmation from the District Engineer that a proposed activity in full compliance with all terms and conditions of this general permit is authorized and may proceed. However, a general permittee may choose to request in writing a verification that the proposed activity is authorized and may proceed. However, a general permittee may choose to request in writing a verification that the proposed activity is authorized by this General Permit. This request must include the following information:

1. Name, address, and telephone number of the general permittee.
2. Location of the proposed work.
3. Brief description of the proposed work and its purpose.
4. General Permit Number.
5. Any other information that may be appropriate to this permit.

If the general permittee's written request for verification is complete, accurate, and made in good faith, and the Louisville District Office (District) does not respond to the inquiry within 20 days after receipt of such an inquiry, the general permittee may proceed with the activity. However, if the District later determines that the permittee's written request for verification was inaccurate, incomplete, or made in bad faith, and the activity was not in fact authorized by this general permit, the Federal Government may bring an appropriate enforcement action under 33 CFR 326.

EFFECTIVE PERIOD: This General Permit would be in effect for a period of 5 years. At the end of the fifth year, it would be re-evaluated and a decision made whether or not the permit should be renewed. The District Engineer may at any time during the 5-year period alter, modify, or revoke this permit if he deems such action to be in the public interest.

Special Conditions:

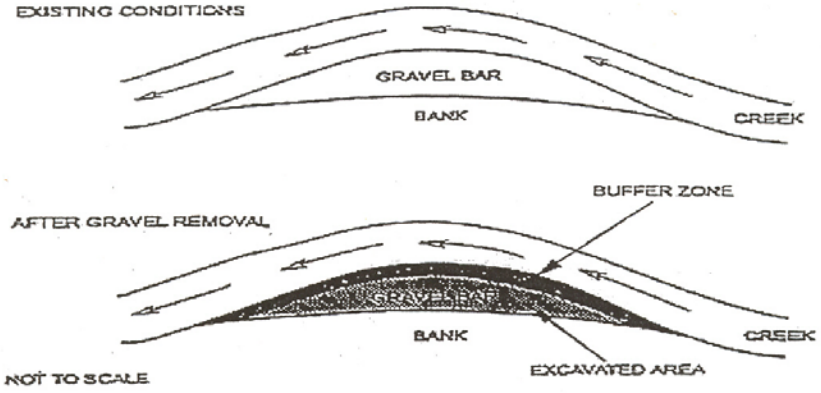
a. That the permittee conduct all work totally in the dry during low stream flow conditions only.
b. That no excavation be performed below the ordinary high water elevation (OHW) from April 15 through June 15.
c. That an undisturbed 10-foot buffer zone be left at all times between the excavation site and the stream flow.
d. That excavation equipment and trucks shall operate outside the streamflow at all times (except for bridge work).
e. That the bottom elevation of the completed excavation shall not be lower than one foot above the stream's normal water elevation.
f. That the permittee shall not stockpile excavated material on the gravel bar overnight. All material excavated shall be loaded onto trucks and hauled away to upland sites for use or storage.
g. That the permittee shall, after completion of each day's activity, level and smooth the entire work area in order to reduce erosion potential should high flow conditions occur during the excavation period.
h. That existing access roads to the gravel bar be utilized to enter and depart the work area with trucks and excavation equipment.
i. The removal of material from bridge opening be limited to the following:
   (1) Work confined to 75-feet from the centerline of the bridge upstream and downstream.
   (2) Material can only be removed to restore the original cross-section of the bridge opening.
j. No activity shall destroy a threatened or endangered species, as identified under the Endangered Species Act or amendments or endanger the critical habitat of such species, or occur in areas of concentrated shellfish production.
k. Any specific authorization granted by this General Permit is subject to revocation or modification by the District Engineer if in his opinion the activity so authorized:
   (1) is detrimental to the environment.
   (2) Is damaging to the general public interest.
l. The work does not involve the instream placement of any fill material, temporary or permanent, and that no equipment be operated in the streambed (except for the removal of material associated with bridge openings).

m. The work does not require the construction of any permanent structures in the stream.
n. The discharge of dredged or fill material shall neither be located with 2,000 feet upstream nor 300 feet downstream of a water supply intake operated by someone other than the applicant; or the applicant shall provide signed agreements reached with the intake operator, allowing such discharge of drudged or fill material.
o. The discharge may not occur in any wetland as defined in 33 CFR 328.3(7)(b), published in the Federal Register on November 13, 1986. The term "wetland" means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.
p. The discharge shall not occur in a designated component of the National Wild and Scenic Rivers System, or the State Wild and Scenic River System or in the Federal or Stated designated wildlife management area.
q. The discharge shall not disrupt the movement of those species of aquatic life indigenous to the water body.
r. The permittee will notify the Louisville District, Corps of Engineers and the Kentucky Division of Water, 15 days prior to the start of work.
s. That existing riparian vegetation on both stream banks and sand and gravel bars be left intact and totally undisturbed.

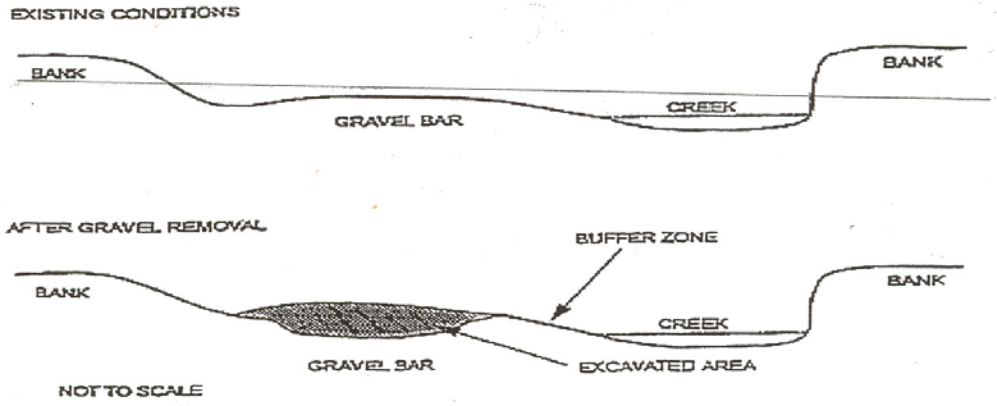
Definitions:

1. "In the dry" means that the work is completed in a manner so that no equipment or excavated material is in contact with flowing water and that the area in which dry ground and stream meet is not touched by any equipment, and that any water which infiltrates the excavation site is not pumped back into the stream.
2. "Ordinary high water elevation" means the line on the bank established by the change of water level in the stream. It can generally be identified by such things as a clear line on the bank where vegetation begins, a line of litter or debris on the bank, a line or area at which the bank soils change, or other features influenced by the surrounding area.
3. "Buffer zone" means an area of natural undisturbed material at the site which is left between the excavation area and the stream.

SAND AND GRAVEL REMOVAL
OVERVIEW



SAND AND GRAVEL REMOVAL
CROSS SECTION



General Conditions:

1. You must perform the activity authorized by this permit in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the authorized activity, although you may make a good faith transfer to a third party. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.
2. If you discover any previously unknown historic or archaeological remains while performing the activity authorized by this permit, you must immediately notify this office of your findings. We will initiate the federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.
3. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions of this permit.
4. You must allow representatives of this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of the permit.

Further Information:

1. Limits of this authorization.
    a. This permit does not obviate the need to obtain other Federal, State, or local authorizations required by law.
    b. This permit does not grant any property rights or exclusive privileges.
    c. This permit does not authorize any injury to the property or rights of others.
    d. This permit does not allow or sanction inference with any existing or proposed Federal project.
2. Limits of Federal Liability: In issuing this permit, the Federal Government does not assume any liability for the following:
    a. Damages to authorized project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.
    b. Damages to the authorized project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.
    c. Damages to persons, property, or to other authorized or unauthorized activities or structures caused by this authorized activity.
    d. Design or construction deficiencies associated with the authorized activity.
    e. Damage claims associated with any future modification, suspension, or revocation of the permit.
3. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

4. Reevaluation of Permit Decision: This office may reevaluate its decision on this authorization at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to the following:
   a. You fail to comply with the terms and conditions of this permit.
   b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (see 3 above).
   c. Significant new information surfaces which this office did not consider in reaching the original permit decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your authorization and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

5. Good Faith Transfer: If you sell the property associated with this authorization, you must have the new owner submit a statement accepting the transfer and agreement with the terms and conditions.

U.S. Corps of Engineers -- GP40, Sand and Gravel Extraction
Excluded Stream Locations within the Commonwealth of Kentucky
Louisville District

Licking River Basin

Stream	Location	County
Bucket Branch	Source to River Mile 0.1	Morgan
Craney Creek	Source to North Fork of Licking River	Rowan/Morgan
Devils Fork	Source to River Mile 0.2	Morgan
Licking River	River Mile 176.8 (Cave Run Lake Dam) to River Mile 165.0	Bath/Rowan
Licking River	River Mile 165.0 - River Mile 154.5	Bath/Rowan
Licking River	River Mile 115.0 - River Mile 18.9	Kenton/Campbell
Minor Creek River	Mile 2.89 to Craney Creek	Rowan
North Fork of Licking River	Source to River Mile 13.0	Morgan
North Fork of Triplett Creek	Source to Triplett Creek	Rowan
Slabcamp Creek	Basin	Rowan

Kentucky River Basin

Stream	Location	County
Buckhorn Creek	River Mile 6.8 - River Mile 4.4	Breathitt
Chimney Top Creek	Basin	Wolfe
Clear Creek	Source to River Mile 4.1	Woodford
Clemons Fork	Source to Buckhorn Creek	Breathitt
Coles Fork	Source to Buckhorn Creek	Breathitt
Dix River	River Mile 43.5 - River Mile 33.1 (headwaters to Herrington Lake)	Boyle/Garrard
Dix River	River Mile 2.9 to Kentucky River (Herrington Lake Dam)	Garrard/Mercer
Dog Fork	River Mile 1.0 to Swift Camp Creek	Wolfe
East Fork of Indian Creek	Source to Indian Creek	Menifee
Gladie Creek	Basin	Menifee
Indian Creek	River Mile 5.2 - River Mile 1.2	Menifee
Middle Fork of Red River	Source to River Mile 10.6	Powell
Muddy Creek	Source to River Mile 13.4	Madison
Parched Corn Creek	Source to Red River	Wolfe
Red River	River Mile 68.6 - River Mile 59.5	Menifee/Wolfe
Red River	River Mile 59.5 - River Mile 49.2	Powell
Right Fork of Buffalo Creek	Source to River Mile 1.1	Owsley
South Fork of Station Camp Creek	Source to River Mile 5.3	Jackson
Station Camp Creek	Source to River Mile 19.0	Estill
Sturgeon Creek	Source to River Mile 33.4	Lee
Swift Camp Creek	Source to Red River	Wolfe
Tight Hollow Creek	Source to Mill Creek	Wolfe
War Fork of Station Camp Creek	Source to River Mile 8.5	Jackson
War Fork of Station Camp Creek	River Mile 8.5 - River Mile 2.0	Jackson
War Fork of Station Camp Creek	River Mile 2.0 to Station Camp Creek	Jackson

Green River Basin

Stream	Location	County
Salt Lick Creek	Source to River Mile 5.3	Marion
Wilson Creek	Source to River Mile 12.2	Bullitt
Bacon Creek	Source to Headwaters of Nolin River Lake	Grayson/Hart
Barren River	River Mile 15.0 to Green River	Butler/Warren
Beaver Dam Creek	Source to River Mile 7.6	Edmonson
Beaver Dam Creek	River Mile 7.6 to Green River	Edmonson
Buffalo Creek	Source to Green River (in Mammoth Cave National Park)	Edmonson
Gasper Creek	Source to River Mile 32.3	Logan
Goose Creek	Source to River Mile 5.6	Casey
Green River	River Mile 305.6 to River Mile 291.0 (Green River Lake Dam)	Green
Green River	River Mile 250.2 - River Mile 230.0	Hart
Green River	River Mile 230.0 - River Mile 181.7	Edmonson
Green River	River Mile 168.0 - River Mile 148.0	Butler
Lick Creek	Source to West Fork of Drakes Creek	Simpson
Little Beaver Dam Creek	Source to River Mile 66.6	Warren
Little Russell Creek	Source to River Mile 1.1	Green
Lynn Camp Creek	Source to Green River	Hart
Underground River System	Mammoth Cave National Park	Edmonson/Hart/Barren
	Turnhole Spring Basin	Edmonson/Barren
	Echo River Basin	Edmonson
	Pike Spring Basin	Edmonson
	Mile 205.7 Spring Basin	Hart
	McCoy Spring Basin	Hart
	Suds Spring Basin	Hart/Barren
Nolin River	Source to River Mile 47.0 (Headwaters to Nolin Lake)	Hart/Grayson
Nolin River	River Mile 7.6 (Nolin Lake Dam) to Green River	Edmonson
Rough River	River Mile 89.3 (Rough River Lake Dam) to River Mile 72.4	Ohio/Grayson
Roundstone Creek	Source to Hwy 1140 (River Mile 3.5)	Hart
Sharp's Branch	Source to West Fork of Drakes Creek	Simpson
Trammel Fork	Source to Hwy 31E (River Mile 23.6)	Allen
Trammel Fork	River Mile 23.6 - River Mile 19.4	Allen

Ohio River Basin (Main Stream and Minor Tributaries)

Stream	Location	County
Doe Run Creek	Source to Hwy 1628 (River Mile 5.15)	Meade
Ohio River	River Mile 940.7 - River Mile 943.3	McCracken
Ohio River	River Mile 966.3 - River Mile 969.5	Ballard
Ohio River	River Mile 922.0 - River Mile 923.5 (Channel East of Towhead Island)	Livingston
Sinking Creek	Source to Hwy 259 (River Mile 4.0)	Breckinridge
Yellowbank Creek	Source to River Mile 4.4	Breckinridge

CORPS OF ENGINEERS DISTRICTS

See agency listings for addresses

KENTUCKY WILD RIVERS

River and Date Designated	County	Length (miles)	Corridor Acreage	Endpoints (Landmarks and River Miles)	Drainage Basin
Bad Branch 1986	Letcher	4.0	1,325	Headwaters to KY 932	Cumberland
Big South Fork Cumberland River 1972	McCreary	10.2	2,450	TN State Line to Blue Heron (Mile 55.2 to Mile 45.0)	Cumberland
Cumberland River 1972	McCreary Whitley	16.1	3,300	Summer Shoals to Lake Cumberland (Mile 574.6 to Mile 558.5)	Cumberland
Green River 1972	Edmonson Hart	26.0	6,500	East boundary of Mammoth Cave National Park to Lock and Dam No. 6 at Brownsville (Mile 207.7 to Mile 181.7)	Green
Little South Fork Cumberland River 1974	McCreary Wayne	10.4	1,400	KY 92 to Lake Cumberland (Mile 14.5 to Mile 4.1)	Cumberland
Martins Fork 1974	Harlan	3.9	680	Boundary of Cumberland Gap National Historic Park to KY 987 (Mile 31.3 to Mile 27.4)	Cumberland
Red River 1972	Wolfe Menifee	9.1	1,025	KY 746 to Swift Camp Creek (Mile 68.6 to Mile 59.5)	Kentucky
Rock Creek 1974	McCreary	18.0	6,150	TN State Line to White Oak Cr. (Mile 21.9 to Mile 3.9)	Cumberland
Rockcastle River 1972	Rockcastle Laurel Pulaski	15.9	3,350	KY 1956 at Billows to Lake Cumberland	Cumberland
TOTALS		114.0	26,380		

KENTUCKY WILD RIVERS SYSTEM

15.9 miles of the **Rockcastle River** between KY 1956 at Billows and the Lake Cumberland backwaters offer one of the most popular canoe runs in the eastern U.S. Swift currents twist between huge boulders and tumble over rock ledges. The hazardous "narrows" is a precipitous gorge bounded by 100-foot cliffs. The segment also offers opportunities for hiking, swimming, camping and shore fishing.

9.1 miles of the **Red River** between KY 746 and KY 715 tumble among huge boulders in a narrow, twisting and largely inaccessible hemlock gorge. Features and activities include natural arches, challenging white water, bass and muskellunge fishing, camping and exploring. An unusual array of wildflowers may be observed in season. In recognition of the river's exceptional qualities, the U.S. Congress recently designated 19.4 miles of the river, including the state-designated portion, as a component of the National Wild and Scenic Rivers System.

16.1 miles of the **Cumberland River** between Summer Shoals and the backwaters of Lake Cumberland wind among rugged mountain slopes rising over 400 feet above the stream. This stretch includes spectacular Cumberland Falls in Cumberland Falls State Resort Park. Special features include sheer cliff walls and large boulders in and about the river channel. Recreational opportunities include white water canoeing, rafting, camping, hiking and fishing.

4 miles of **Bad Branch** from its headwaters on Pine Mountain to KY 932 is within a very scenic gorge, rimmed by 100-foot cliffs and containing magnificent Bad Branch Falls. The stream area harbors a unique assemblage of rare plants and animals and myriad wildflowers. A portion of the gorge is a State Nature Preserve and offers excellent opportunities for nature study, hiking and wildlife observation.

26 miles of the **Green River** wind serenely through the spectacular Mammoth Cave National Park and extensive forested hillsides and limestone cliffs. River corridor features include riverside caves, cool springs harboring unusual cave fish and opportunities for island camping. Family canoeing is very popular on this placid river.

3.9 miles of **Martins Fork** between Cumberland Gap National Historic Park and KY 987 exemplify the clean, clear mountain streams of southeastern Kentucky. Swift, shallow waters decend amidst a dense hemlock and magnolia forest with striking mountain vistas on either side. Recreation is limited because the corridor lands are entirely in private ownership.

10.4 miles of the **Little South Fork** between KY 92 and the backwaters of Lake Cumberland offer beautiful scenery and mild white water canoeing in winter and spring. The corridor includes an impressive and remote cliff-lined gorge near the downstream terminus. Recreation is limited because land on both banks is entirely in private ownership.

18 miles of **Rock Creek** between the KY/TN state line and White Oak Junction flow through narrow valleys with steep wooded hillsides. The stream corridor features natural arches, rock shelters and exceptional trout fishing. An improved road paralleling the entire length provides opportunities for sightseeing, picnicking and camping. U.S. Forest Service developed recreation areas are located at Bell Farm, Hemlock Grove and Great Meadows, at the upstream end of the corridor.

10.2 miles of the **Big South Fork** between the KY/TN state line and Blue Heron offer one of the most popular canoe-camping runs in the eastern U.S. Located entirely within the Big South Fork National River and Recreation Area, administered by the National Park Service, river recreation is enhanced by spectacular vistas along the boulder-choked white water stream.

Agency/Agriculture Program Directory
Section I: Explanation of Abbreviations and Listings

ACOE: Army Corps of Engineers

AST: Above Ground Storage Tank

AWQA: Agriculture Water Quality Authority

BMPs: Best Management Practices

CAHs: Cold Water Aquatic Habitats

CES: Cooperative Extension Service

CFR: Code of Federal Regulations

CRP: Conservation Reserve Program

CWA: Clean Water Act

KDFWR: Kentucky Department of Fish and Wildlife Resources

DOC: Kentucky Division of Conservation

DOF: Kentucky Division of Forestry

DOT: Kentucky Department of Transportation

DOW: Kentucky Division of Water

DWM: Kentucky Division of Waste Management

EQIP: Environmental Quality Incentive Program

FIFRA: Federal Insecticide, Fungicide, and Rodenticide Act

FIP: Forestry Incentives Program

FOTG: *Field Office Technical Guide*

FSA: Farm Services Agency

FSA 1985: Food Security Act

GGPP: Generic Groundwater Protection Plan

ICM: Integrated Crop Management

IPM: Integrated Pest Management

KAR: Kentucky Administrative Regulations

KGS: Kentucky Geological Survey

KEPPC: Kentucky Environmental and Public Protection Cabinet

KRS: Kentucky Revised Statutes

KWQS: Kentucky Water Quality Standards

NPS: Nonpoint Source Pollution

NRCS: Natural Resources Conservation Service

PSTEAFC: Petroleum Storage Tank Environmental Assurance Fund Commission

RC&D: Resource Conservation and Development Program

SARA: Superfund Amendments and Reauthorization Act

SB 241: Kentucky Senate Bill 241 (Agriculture Water Quality Act)

SIP: Stewardship Incentive Program

SMZs: Streamside Management Zones

TSI: Timber Stand Improvement

UK: University of Kentucky

USDA: United States Department of Agriculture

USEPA: United States Environmental Protection Agency

UST: Underground Storage Tank

WBP: Water Bank Program

QC: Water Quality Certificate

WQIP: Water Quality Incentive Program

Agency/Agriculture Program Directory
Section II - Agency Addresses and Telephone Listings

Environmental & Public Protection Cabinet

Department for Environmental Protection		
24-hour Environmental Response Line	300 Fair Oaks	800/928-2380
(to report releases or spills)	Frankfort, KY 40601	502/564-2380
Division of Forestry	627 Comanche Trail	
	Frankfort, KY 40601	502/564-4496
Division of Water	200 Fair Oaks	
• Watershed Management Branch	Frankfort, KY 40601	502/564-3410
• Water Quality Certification Section		
• Wild Rivers Program		
Division of Waste Management	14 Reilly Road	
	Frankfort, KY 40601	502/564-6716
Division of Conservation	375 Versailles Road	
	Frankfort, KY 40601	502/573-3080

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	Capitol Annex, Suite 188	
	Frankfort, KY 40601	502/564-5126
Division of Pesticides	7th Floor Capital Plaza Tower	
	Frankfort, KY 40601	502/564-7274
State Veterinarian	7th Floor Capital Plaza Tower	
	Frankfort, KY 40601	502/564-3956

Cabinet for Health 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	502/564-3970
Division of Public Protection and Safety	275 East Main Street	
	Frankfort, KY 40601	502/564-4856

Public Protection & Regulation Cabinet

Kentucky Petroleum Storage Tank Environmental Assurance Fund Commission (PSTEAFC)	911 Leawood Drive Frankfort, KY 40601	502/564-5981 800/928-7782
State Fire Marshall	1047 US 127 South, Suite 1 Frankfort, KY 40601	502/564-3626

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 5-123 Ag. Science Bldg. Lexington, KY 40546-0091	859/257-4772

U.S. Army Corps of Engineers

Nashville District	P.O. Box 1070 Nashville, TN 37202-1070	615/736-5181
Memphis District	B-202 Clifford Davis Federal Bldg. 167 N Main Street Memphis, TN 38103-1849	901/544-3471
Huntington District	502 8th Street Huntington, WV 25701-2070	304/529-5210
Louisville District	P.O. Box 59 Louisville, KY 40201-0059	502/582-5452

Division of Water
Regional Office Listings

Bowling Green Regional Office
1508 Western Avenue
Bowling Green, KY 42104
(270) 746-7475 FAX (270) 746-7865
Attn: Bill Baker

Allen	Grayson	Simpson
Barren	Hart	Warren
Butler	Logan	Edmonson
Ohio		

Columbia Regional Field Office
2751 Campbellsville Road
Columbia, KY 42728
(270) 384-4734 FAX (270) 384-5199
Attn: Sara Sproles

Adair	LaRue	Pulaski
Boyle	Lincoln	Russell
Casey	Marion	Taylor
Clinton	Metcalfe	Washington
Cumberland	Monroe	Wayne
Green	Nelson	

Florence Regional Office
8020 Veterans Memorial Drive, Suite 110
Florence, KY 41042
(859) 525-4923 FAX (859) 525-4157
Attn: Todd Giles

Boone	Gallatin	Owen
Bracken	Grant	Pendleton
Campbell	Henry	Trimble
Carroll	Kenton	

Frankfort Regional Office
643 Teton Trail, Suite B
Frankfort, KY 40601
(502) 564-3358 FAX (502) 564-5042
Attn: Massoud Shoa

Anderson	Franklin	Mercer
Bourbon	Garrard	Montgomery
Clark	Harrison	Nicholas
Estill	Jessamine	Powell
Fayette	Madison	Robertson
		Scott
		Woodford

Hazard Regional Office
233 Birch Street, Suite 1
Hazard, KY 41701
Attn: Kim Farris, Acting

(606) 435-6022 FAX (606) 435-6024

Breathitt	Knott	Magoffin	Pike
Floyd	Lee	Martin	Wolfe
Johnson	Letcher	Perry	

London Regional Office
875 South Main Street
London, KY 40741
606-330-2080 FAX (270) 746-7865
Attn: Kimberly Farris

Bell	Knox	Owsley
Clay	Laurel	Rockcastle
Harlan	Leslie	Whitley
Jackson	McCreary	

Louisville Regional Field Office
9116 Leesgate Road
Louisville, KY 40222-5084
(502) 429-7122 FAX (502) 429-7125
Attn: Charlie Roth

Breckinridge	Meade
Bullitt	Oldham
Hardin	Shelby
Jefferson	Spencer

Madisonville Regional Office
625 Hospital Drive
Madisonville, KY 42431-1683
(270) 824-7529 FAX (270) 824-7070
Attn: Ed Carroll

Caldwell	Hancock	Muhlenberg
Christian	Henderson	Todd
Crittenden	Hopkins	Union
Daviess	McLean	Webster

Morehead Regional Office
525 Hecks Plaza Drive
Morehead, KY 40351
(606) 784-6634 FAX (606) 784-4544
Attn: Danny Fraley

Bath	Fleming	Mason
Boyd	Greenup	Menifee
Carter	Lawrence	Morgan
Elliott	Lewis	Rowan

Paducah Regional Office
130 Eagle Nest Drive
Paducah, KY 42003
Attn: Gaye Brewer

(207) 898-8468 FAX (270) 898-8640

Ballard	Fulton	Livingston
Calloway	Graves	Lyon
Carlisle	Hickman	Marshall
	Trigg	McCracken

Map of Division of Water Regional Offices
http://www.dep.ky.gov/regionaloffice/

Division of Water Regional Offices

Agency/Agriculture Program Directory
Section III - Cost Share Programs

STATE AGENCIES:

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:
Assistance to producers is available through cost share payments, incentive payments, education and technical assistance. The provisions are included in the current Farm Bill.

Agricultural Water Quality Incentive Program (WQIP)
The WQIP's intent is to encourage landowners and farm operators in targeted watersheds, as identified by EPA and approved by the Secretary of Agriculture, to develop and implement water quality protection practices with incentive payments. In return for annual incentive payments, producers will be required to develop a whole-farm water quality resource management plan and sign three- to five-year long term agreements to implement the plan. Contact the Natural Resources Conservation Service (NRCS).

Environmental Quality Incentives Programs (EQIP)
EQIP replaces the Agricultural Conservation Program and the Water Quality Incentive Program. Assistance to producers is available through cost share payments, incentive payments, educational and technical assistance.

Forestry Incentives Program (FIP)
The primary objective of FIP is to increase the future supply of high-grade timber on non-industrial, private land. The program is administered by NRCS with technical assistance from Kentucky Division of Forestry and NRCS. Cost sharing up to 65 percent is provided to assist with tree planting, timber stand improvement, or site preparation for natural regeneration. Contact NRCS or FSA.

Resource Conservation and Development (RC&D)
RC&Ds, funded through NRCS, consist of diverse groups of local volunteers brought together in a unique partnership to find solutions to their problems. The RC&D program assists people who protect their natural resources to improve the area's economy, environment, and living standards. Each RC&D Council (covering multi-county areas) defines its own goals and objectives to meet local needs. The RC&D commitment emphasizes one or more of the following areas: land conservation, community development, water management, and environmental concerns. Contact NRCS.

Water Bank Program (WBP)
The Water Bank Program was established to protect wetlands and adjacent cropland vulnerable to destruction and/or degradation, specifically habitat used by waterfowl. Producers eligible for WBP compete for funding at the state level, and must enter into a 10-year contract with NRCS. Contact NRCS.

Land Treatment Watershed Program
This program is authorized by PL-566 to accelerate land treatment in targeted watershed areas approved by the Secretary of Agriculture. Participating landowners are required to develop long term contracts and address all resource problems in return for cost share incentive payments to apply measures to solve the problems. The program is administered by NRCS. Contact NRCS.

Agency/Agriculture Program Directory
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 EPPC 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 (see address and telephone listings on pages 246-247): 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 US 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 (FSA).

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 Environmental and Public Protection 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 US 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.

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.”

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.

Procedure to Modify the Kentucky Agriculture Water Quality Plan or Any Regional Water Quality Plan

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.

Procedures for Alternative and Experimental Practices
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.

The Kentucky Agriculture Water Quality Plan

The Kentucky Agriculture Water Quality Act was enacted by the 1994 General Assembly to protect surface and groundwater resources from pollution as a result of agriculture and silviculture activities and to develop this Kentucky Agriculture Water Quality Plan. This publication is available at www.conservation.ky.gov.

Kentucky Division of Conservation
375 Versailles Road
Frankfort, Kentucky 40601
502/573-3080

Acknowledgment

The Kentucky Agriculture Water Quality Authority expresses sincere appreciation to the Agriculture Water Quality Core Staff, the Division of Conservation State Office Staff and to over two hundred and fifty (250) agriculture and silviculture producers, educators, technical and regulatory advisors across the state. It is their sincere interest, cooperation and dedication that made the development of this Statewide Water Quality Plan possible. Each of these stakeholders, individually and collectively made valuable contributions from their broad range of experience in Kentucky which were incorporated as part of this Kentucky Agriculture Water Quality Plan.

Editor: Barry L. Zalph, Ph.D., P.E., Louisville, Ky. 40206-2707