PA Chesapeake Bay Phase II Watershed Implementation Plan
Lackawanna County Planning Targets

What are Planning Targets?

The Chesapeake Bay TMDL established regulatory waste load allocations and load allocations for nitrogen, phosphorus and total suspended solids (TSS) based in part on PA's Chesapeake Watershed Implementation Plan (WIP). To facilitate local implementation of necessary reduction actions to meet the allocations, EPA directed the Chesapeake watershed states to sub-divide the reductions by local areas. Pennsylvania chose to sub-divide loads at the county-level, as the EPA Chesapeake Bay watershed model is based in part on county level data. The county planning targets address only those loads that can be reduced by Best Management Practices (BMPs). This includes both regulatory and non-regulatory loads for agriculture, stormwater and forest. Wastewater treatment plant reductions are not addressed because they were previously addressed by the 2006 Chesapeake Bay Compliance Strategy.

The Draft County Planning Targets are generated from EPA's Chesapeake Bay Watershed Model input deck generated for the Phase II WIP, and may not reflect actual 2010 conditions or possible 2025 conditions. The targets are for planning purposes only, and do not become regulatory allocations at the county level. The identified Pollution Reduction Actions represent one scenario from the Watershed Model that meets the planning targets. There are other equally valid combinations of actions that could also meet the planning target.

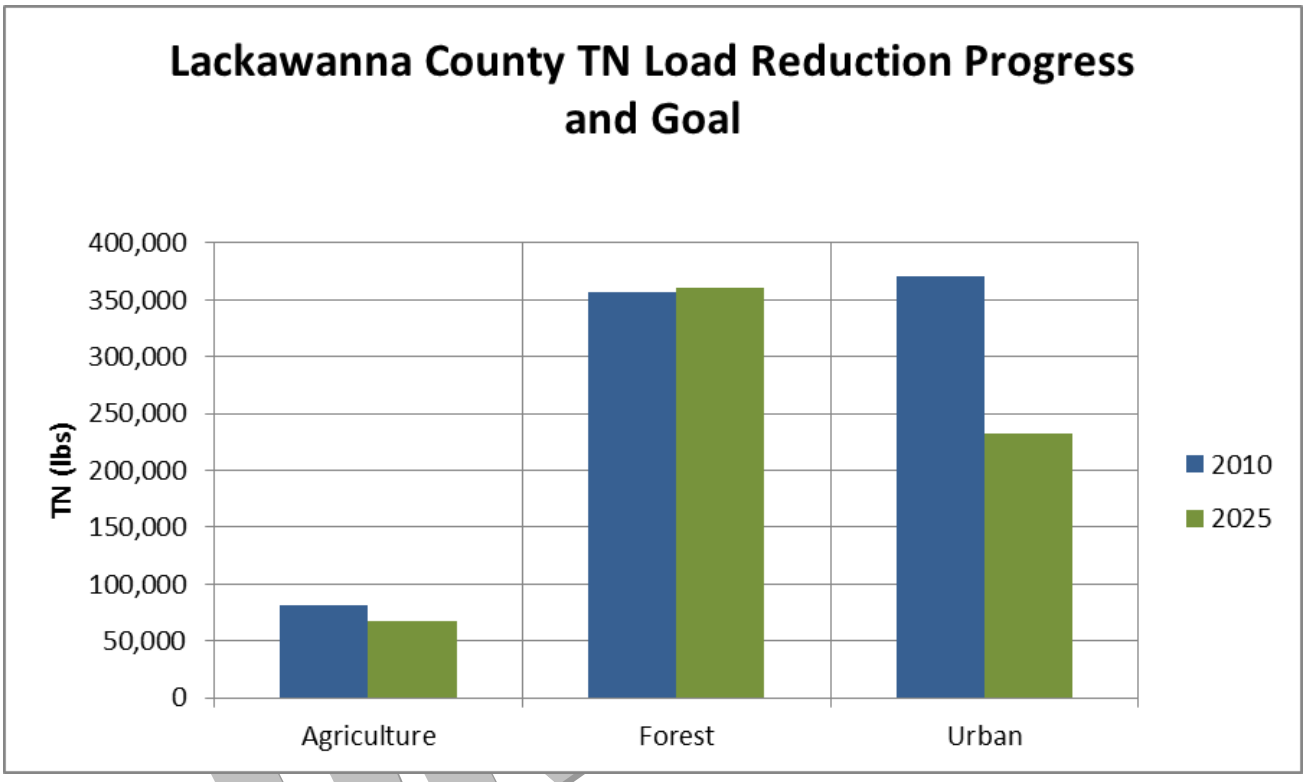
Nitrogen Planning Target	**Pounds**
2009 Progress Load	833,578
2010 Current Load	808,706
2017 Interim Planning Target – 60%*	730,226
2017 Nitrogen Reductions (2010 – 2017)	103,352
2025 Planning Target – 100%	661,324
2025 Total Nitrogen Reductions (2010 – 2025)	172,254

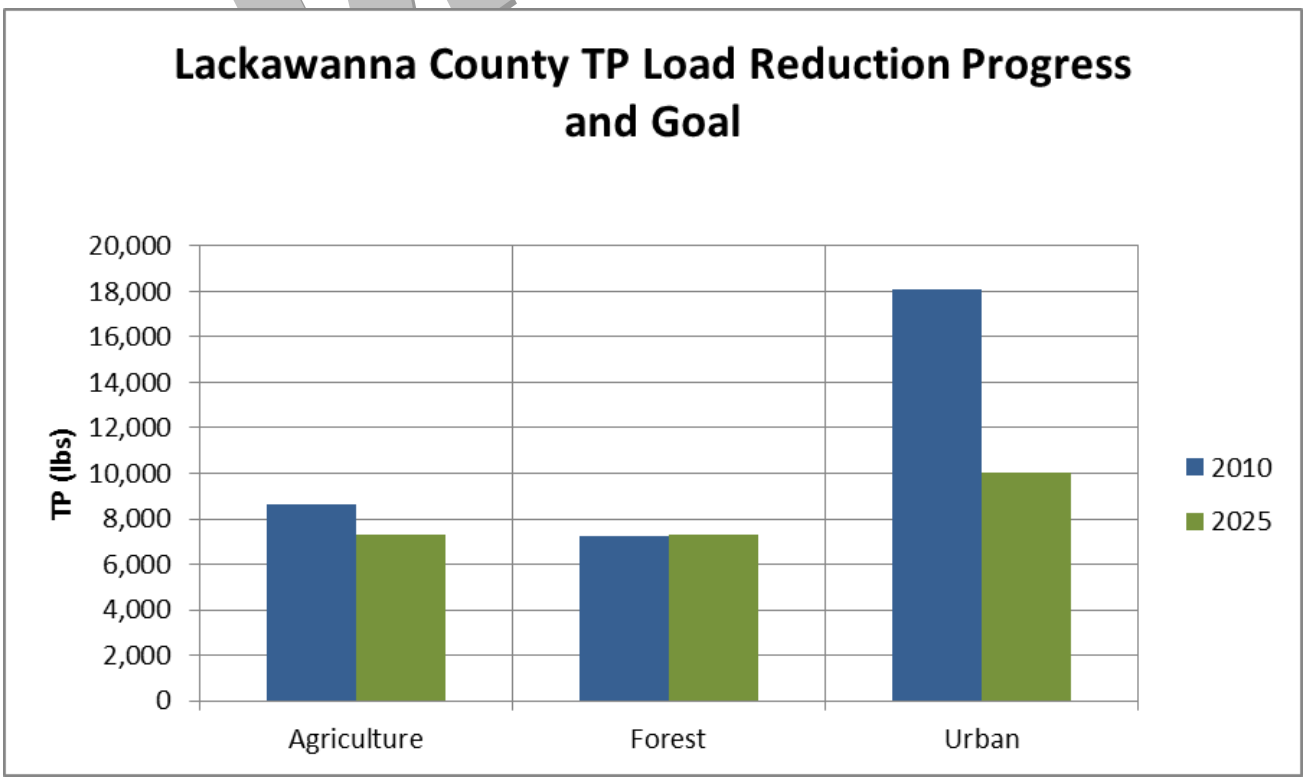
Phosphorus Planning Target	
2009 Progress Load	36,408
2010 Current Load	33,937
2017 Interim Planning Target – 60%*	29,371
2017 Phosphorous Reductions (2010 – 2017)	7,037
2025 Planning Target – 100%	24,680
2025 Total Phosphorous Reductions (2010 –2025)	11,729

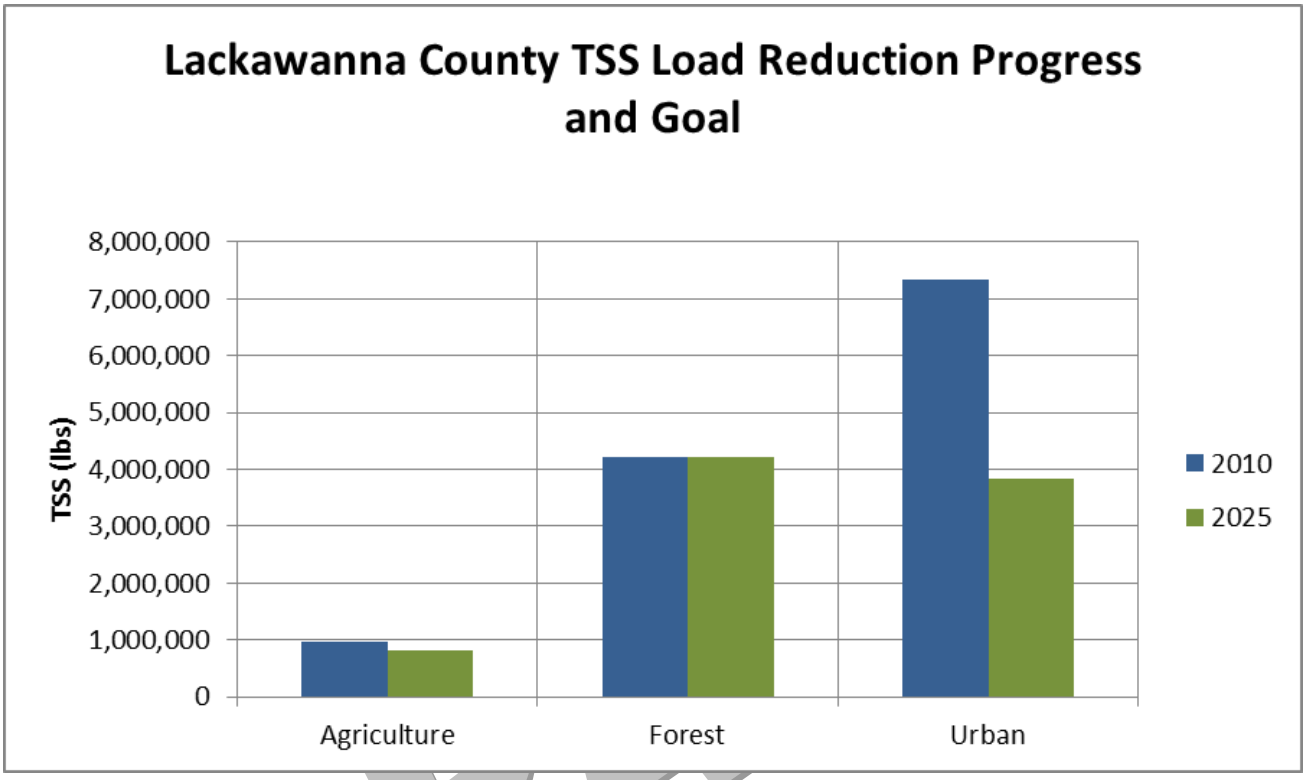
Total Suspended Solids (TSS) Planning Target	
2009 Progress Load	13,750,420
2010 Current Load	12,540,846
2017 Interim Planning Target – 60%*	10,813,488
2017 TSS Reductions (2010 – 2017)	2,936,932
2025 Planning Target – 100%	8,855,533
2025 Total TSS Reductions (2010 – 2025)	4,894,886

NOTE: * 60% of reductions from the 2009 progress load.

Nonpoint Source Pollution Reductions by Sector







County Land Use Distribution

Agriculture	**2010 Acres**	**2025 Acres**
Conventional Till Row Crops	933	565
Conservation Till Row Crops	287	572
Hay	13,733	13,296
Alfalfa	1,549	1,521
Pasture	4,746	4,256
Animal Feeding Operations	55	55
Concentrated Animal Feeding Operations	0	0
Nursery	46	46
Total Agriculture:	21,349	20,311
Urban		
Pervious Urban Land	23,340	22,972
Impervious Urban Land	9,087	9,031
Construction	76	76
Extractive	1,474	1,432
Combined Sewer System	25,692	25,725
Total Urban:	59,669	59,236
Forest	166,729	168,201
Total Acreage:	247,748	247,748

Pollution Reduction Actions

Agricultural Activities

BMP	Units	2010	2017*	2025
1. Animal Waste Management Systems	Systems	32.9	30.9	29.6
2. Barnyard Runoff Controls	Acres	0.0	21.9	36.5
3. Carbon Sequestration/ Alternative Crops	Acres	936.1	2.8	4.6
4. Capture Reuse +	Acres	0.0	960.0	975.9
5. Conservation Plans/SCWQA	Acres	9,947.2	15,532.5	19,256.0
6. Conservation Tillage	Acres	286.8	457.9	572.0
7. Continuous No-Till **	Acres	0.0	6.0	10.0
8. Cover Crops	Acres	36.5	457.9	738.9
9. Forest Buffers	Ag Acres	1,369.4	1,654.5	1,844.6
10. Grass Buffers	Ag Acres	117.3	186.5	232.6
11. Horse Pasture Management	Acres	0.0	0.0	0.0
12. Lagoon Covers +	Percent	0.0	6.0	10.0
13. Land Retirement/ Environmental Planting	Acres	3,638.4	3,638.4	3,638.4
14. Manure Injection	Acres	0.0	15.8	26.4
15. Manure/Litter Transport	Tons	0.0	0.0	0.0
16. Mortality Composters	Units	0.0	0.4	0.6
17. Non-Urban Stream Restoration	Feet	8,646.8	8,820.8	8,936.8
18. Nutrient Management	Acres	8,462.7	10,014.5	11,049.0
19. Off-Stream Watering without Fencing (Alternative Watering Facilities)	Acres	63.8	408.6	638.5
20. Pasture Fencing (Stream Access Control with Fencing)	Acres	164.8	164.8	164.8
21. Poultry and Swine Phytase	Percent	Poultry 100% Swine 0%	Poultry 100% Swine 59%	Poultry 100% Swine 99%
22. Poultry Litter Injection +	Acres	0.0	4.0	6.6
23. Poultry Litter Treatment (Alum) +	Percent	0.0	6.0	10.0
24. Precision Agriculture (Decision Agriculture)	Acres	0.0	494.5	824.2
25. Precision Feeding	Percent	0.0	45.0	75.0
26. Tree Planting	Ag Acres	939.9	1,104.0	1,213.4
27. Upland Precision Grazing	Acres	0.0	0.0	0.0
28. Upland Precision Rotational Grazing	Acres	1,020.1	2,578.8	3,618.0
29. Wetland Restoration	Acres	92.0	266.7	383.2

Urban/Suburban Activities

BMP	Units	2010	2017*	2025
30. Dry Detention Ponds/ Hydrodynamic Structures	Acres	4,824.0	2,790.7	1,435.2
31. Dry Extended Detention Ponds	Acres	1,637.1	1,516.0	1,435.2
32. Erosion and Sediment Control	Acres	76.2	981.8	1,585.5
33. Filtering Practices ***	Acres	0.0	11,127.4	18,545.7
34. Forest Buffers	Urban Acres	0.0	228.9	381.6
35. Grass Buffers	Urban Acres	0.0	203.6	339.4
36. Impervious Surface Reduction	Acres	0.0	56.8	94.6
37. Infiltration Practices ***	Acres	3,581.3	14,715.7	22,138.6
38. Septic System Hook-ups	Units	2,662.4	3,705.1	4,400.3
39. Street Sweeping	Acres	0.0	1,140.0	1,900.1
40. Tree Planting	Urban Acres	0.0	35.0	58.4
41. Urban Nutrient Management	Acres	0.0	7,592.7	12,654.6
42. Urban Sprawl Reduction	Acres	0.0	6.7	11.2
43. Urban Stream Restoration	Feet	0.0	815.7	1,359.5
44. Wet Ponds & Wetlands	Acres	729.0	3,736.0	5,740.7

Other Activities

BMP	Units	2010	2017*	2025
45. Abandoned Mine Reclamation	Acres	537.9	568.4	588.6
46. Dirt and Gravel Road Erosion and Sediment Control	Feet	52,790.8	91,995.1	118,131.4
47. Forest Harvesting Practices	Acres	514.7	469.3	439.0

NOTES:
*2017: 60% of 2025 BMPs.

**Continuous No-Till (CNT): This BMP was under projected in the 2025 WIP watershed model input deck because the EPA model does not recognize other BMPs when CNT is applied on conservation tillage acres.

***Filtering Practices & *** Infiltration Practices: These BMPs were over projected in the 2025 WIP watershed model input deck to compensate for the EPA model's inability to address stormwater treatment trains.

[+]BMP not previously included in Phase I reduction actions.

Pollution Reduction Actions

Agricultural Activities

1. Animal Waste Management Systems
Animal waste management systems are practices designed for proper handling, storage, and utilization of wastes generated from confined animal operations and include a means of collecting, scraping or washing wastes and contaminated runoff from confinement areas into appropriate waste storage structures. Lagoons, ponds, or steel or concrete tanks are used for the treatment and/or storage of liquid wastes. Storage sheds or pits are common storage structures for solid wastes. Controlling runoff from roofs, feedlots and "loafing" areas are an integral part of these systems.

2. Barnyard Runoff Controls
Barnyard Runoff Controls are designed to improve water quality, reduce soil erosion, increase infiltration, and protect structures. Controls may include structures that collect, control, and transport precipitation from roofs and additional structures or diversions to direct runoff away from barnyards, as well as to control runoff generated by barnyards. Vegetated treatment area may be included to improve water quality by reducing loading of nutrients, organics, pathogens, and other contaminants associated with barnyards.

3. Capture Reuse (Irrigation Water)
This practice involves the collection of runoff water from container nursery operations where runoff of irrigation water and leachate from plant containers grown on plastic or in greenhouses is routed to lined return ditches or piped to lined holding ponds. Ponds would be designed to retaining all excess irrigation water runoff or leachate and capturing the first one-half to one-inch of stormwater runoff. Water would be recirculated for irrigation in nursery and greenhouse operations or irrigated at the proper times of year on other vegetation capable of trapping nutrients at agronomic rates, such as cool season grasses.

4. Carbon Sequestration/Alternative Crops
Carbon Sequestration refers to the conversion of cropland to hay land (warm season grasses). The hay land is managed as a permanent hay land providing a mechanism for sequestering carbon within the soil.

5. Conservation Plans/SCWQA
Farm conservation plans are a combination of agronomic, management and engineered practices that protect and improve soil productivity and water quality, and prevent deterioration of natural resources on all or part of a farm. Plans may be prepared by staff working in conservation districts, natural resource conservation field offices or a certified private consultant. In all cases the plan must meet technical standards. Conservation plans are reported as total acres or on a specified landuse.

6. Conservation Tillage
Conservation tillage involves planting and growing crops with minimal disturbance of the surface soil. Conservation tillage requires two components, (a)

a minimum 30% residue coverage at the time of planting, and (b) a non-inversion tillage method. No-till farming is a form of conservation tillage in which the crop is seeded directly into vegetative cover or crop residue with little disturbance of the surface soil. Minimum tillage farming involves some disturbance of the soil, but uses tillage equipment that leaves much of the vegetation cover or crop residue on the surface.

7. Continuous No-Till

The Continuous No-Till BMP is a more comprehensive type of conservation tillage practice in which soil disturbance by plows, disk or other tillage equipment is eliminated. In most cases large amounts of crop residue are left on the surface to protect the soil from storm events. To be considered as no-till a minimum of 50% residue must be maintained. Continuous No-Till involves no-till methods on all crops in a multi-year rotation.

8. Cover Crops

Cereal cover crops reduce erosion and the leaching of nutrients to groundwater by maintaining a vegetative cover on cropland and holding nutrients within the root zone. This practice involves the planting and growing of cereal crops (non-harvested) with minimal disturbance of the surface soil. The crop is seeded directly into vegetative cover or crop residue with little disturbance of the surface soil. These crops capture or “trap” nitrogen in their tissues as they grow. By timing the cover crop burn or plow-down in spring, the trapped nitrogen can be released and used by the following crop. Cover crops may be considered to be either” Early” or “Late” Season types.

Early: To be eligible for level 1-reduction credits, the cover crop must be planted earlier than 7 days prior to the long-term published average date of the first killing frost in the fall.

Late: To be eligible for level 2-reduction credit, the cover crop must be planted within 7 days after the long-term published average date of the first killing frost in the fall.

Commodity cover crops differ from cereal cover crops in that they may be harvested for grain, hay or silage and they may receive nutrient applications, but only after March 1 of the spring following their establishment. The intent of the practice is to modify normal small grain production practices by eliminating fall and winter fertilization so that crops function similarly to cover crops by scavenging available soil nitrogen for part of their production cycle. This practice can encourage planting of more acreage of cereal grains by providing farmers with the flexibility of planting an inexpensive crop in the fall and delaying the decision to either kill or harvest the crop based on crop prices, silage needs, weather conditions, etc.

9. Forest Buffers - Agriculture

Agricultural riparian forest buffers are linear wooded areas along rivers, stream and shorelines. Forest buffers help filter nutrients, sediments and other pollutants from runoff as well as remove nutrients from shallow groundwater. The recommended buffer width for riparian forest buffers (agriculture) is 100 feet, with a 35 feet minimum width required.

10. Grass Buffers - Agriculture
Agricultural riparian grass buffers are linear strips of grass or other non-woody vegetation maintained between the edge of fields and streams, rivers or tidal waters that help filter nutrients, sediment and other pollutant from runoff. The recommended buffer width for riparian forests buffers (agriculture) is 100 feet, with a 35 feet minimum width required.

11. Horse Pasture Management
Horse pasture management includes maintaining a 50% pasture cover with managed grass species and managing high traffic areas. High traffic area management is utilized to reduce the highest load contributing areas associated with pasture lands, and maintaining a 50% cover will improve the pasture so erosion and nutrient loss is further reduced. High traffic areas are concentration areas within the pasture where the grass is sparse or nonexistent. These often are feeding areas, such as hay deposits around fence lines. These areas are treated as sacrifice areas.

12. Lagoon Covers
Permeable and impermeable covers of lagoons to prevent volatilization of ammonia. A cover can be, and is applied, to various species including swine and dairy.

13. Land Retirement/Environmental Planting
Agricultural land retirement takes marginal and highly erosive cropland out of production by planting permanent vegetative cover such as shrubs, grasses, and/or trees. Agricultural agencies have a program to assist farmers in land retirement procedures. Land retired and planted to trees is typically reported under “Tree Planting”.

14. Manure Injection
This practice involves the direct injection of manure slurry into soil. Direct injection is applicable to swine, dairy and beef species. Manure can be successfully injected in both conventional tillage and most no-till systems. This method allows a more precise application of manure to the fields so farmers are less likely to apply more manure than crops can utilize. Direct injection of manure slurry also provides a significant reduction in land application odor and ammonia emissions release when compared to conventional manure surface broadcasting.

15. Manure/Litter Transport
Alternative uses of manure/litter and manure/litter transport are practices that reduce or eliminate excess nutrient applications within the Chesapeake Bay by either transporting the manure/litter outside of the state’s portion of the Chesapeake Bay watershed, reducing the import of manure/litter into the Bay watershed, or finding an alternative use for the excess manure/litter. Excess manure is defined as manure nutrients produced within an area that exceeds the recommended application rates associated with the crops grown. Examples include fertilization of commercial tree plantations, research and development of

new fuel technologies, pellitizing for fertilizer, transport out of the watershed to other areas that need it, and electric generation.

16. Mortality Composters

A structure or device to contain and facilitate the controlled aerobic decomposition of manure or other organic material by micro-organisms into a biologically stable organic material that is suitable for use as a soil amendment. Mortality composters involve composting of dead animals (typically poultry, swine and bovine) in a designed, on-farm facility, with subsequent land application of the compost. This prevents the necessity to bury dead animals that could result in nutrient leachate, or rendering of dead animals for processing into animal feeds or incineration.

17. Non-Urban Stream Restoration

This practice involves treatments used to stabilize and protect banks of streams or constructed channels to prevent the loss of land, damage to land uses and to reduce offsite or downstream effects of sediment from bank erosion. This may include additional practices to stabilize the bed or bottom of a channel to prevent damaging aggradation of sediment or degradation of the stream bed by grazing animals.

18. Nutrient Management

Nutrient management involves implementation of a comprehensive plan that describes the optimum use of nutrients to minimize nutrient loss while maintaining yield. This activity details the type, rate, timing, and placement of nutrients for each crop. Soil, plant tissue, manure and/or sludge tests are used to assure optimal application rates. Plans should be revised every 2 to 3 years.

19. Off-Stream Watering without Fencing

Off stream watering in pasture without fencing requires the use of alternative drinking water troughs or tanks away from streams. This BMP may also include options to provide shade for livestock away from streams. Limited research has been conducted for this practice that documents changes in livestock behavior resulting in significantly less time spent near streambanks and in streams. The net effectiveness of the practice must reflect partial removal of livestock from near stream areas and relocation of animal waste deposition areas and heavy traffic areas surrounding water sources to more upland locations. This activity may include alternative water sources, tree plantings away from the stream, and stream crossings.

20. Pasture Fencing

Pasture fence involves installation of fencing that excludes narrow strips of land along streams from pastures and livestock. The implementation of stream fencing should substantially limit livestock access to streams but can allow for the use of limited hardened crossing areas where necessary to accommodate access to additional pastures or for livestock watering. Where no access to the stream is allowed, alternative off-stream watering may be provided. The fenced areas may be planted with trees or grass.

21. Poultry and Swine Phytase

Phytase can be included in poultry and swine diets by an integrator or other feed supplier. Manure phosphorous reductions occur because less phosphorous needs to be blended into feed rations, resulting in a phosphorous source reduction.

22. Poultry Litter Injection

The subsurface injection of poultry manure has been demonstrated in university and USDA-ARS research studies to significantly reduce nutrient losses for both surface runoff and ammonia emissions. Recent studies by universities and USDA-ARS indicate that dry manure injection is feasible and effective by utilizing current research technology. These systems are also consistent with the USDA-NRCS management requirements for high residue management systems; e.g. Continuous No-Till. This proposed practice is indicative of low disturbance soil injection systems and is not appropriate for tillage incorporation or other post surface application incorporation methods. The current placeholder effectiveness value for this practice has been proposed at 25% TN, 0%TP and 0%TSS, utilizing a conservative estimate in combined nutrient and sediment loss reductions by current university and ARS research as a reference. The proposed practice is applied on a per acre basis, and can be implemented and reported for cropland on both lo-till and hi-till land uses that receive manure, pasture and hay with manure.

23. Poultry Litter Treatment (Alum)

Surface application of alum, an acidifier, to poultry litter to acidify poultry litter and maintain ammonia in the non-volatile ionized form (ammonium).

24. Precision Agriculture

An agricultural management system that promotes variable monitoring of field crop yield to determine areas of the field where actual yield may be more or less due to variable field conditions. Nutrient applications are then adjusted to match areas of consistently low yield by applying less fertilizer and applying more fertilizer in areas that consistently provide a higher yield. The result is more efficient use of fertilizer. The goal is to improve farmers' profits and harvest yields while reducing the negative impacts of farming on the environment that come from over-application of fertilizers.

25. Precision Feeding

Precision feeding involves reduction in overfeeding of dairy and swine livestock through the formulation of improved feed rations to meet specific nutrient needs of individual operations. The practice includes the targeting of minimum nitrogen and phosphorus feed concentrations while maintaining acceptable production levels so as to minimize the quantity and nutrient content of animal manures.

26. Tree Planting - Agriculture

The tree planting BMP includes any tree planting on agricultural lands (particularly row crops), except those used to establish riparian forest buffers, targeting lands that are highly erodible or identified as critical resource areas. Tree planting is also called afforestation because it involves growing trees and converting the land use from agricultural to forest. This BMP results in a landuse

conversion from row crop to forest. It is assumed that the density of the plantings is sufficient to produce a forest like condition over time.

27. Upland Precision Grazing
This practice (also known as prescribed grazing) utilizes a range of pasture management and grazing techniques to improve the quality and quantity of the forages grown on pastures and reduce the impact of animal travel lanes, animal concentration areas or other degraded areas. This practice can be applied to pastures intersected by streams or upland pastures outside of the degraded stream corridor (35 feet width from top of bank). The modeled benefits of prescribed grazing practices can be applied to pasture acres in association with or without alternative watering facilities. They can also be applied in conjunction with or without stream access control. Pastures under such systems are defined as having a vegetative cover of 60% or greater.

28. Upland Precision Rotational Grazing
This practice utilizes more intensive forms of pasture management and grazing techniques (in comparison to prescribed grazing) to improve the quality and quantity of the forages grown on pastures and reduce the impact of animal travel lanes, animal concentration areas or other degraded areas of upland pastures. This activity can be applied to pastures intersected by streams or upland pastures outside of the degraded stream corridor (35 feet width from top of bank). The modeled benefits of this practice can be applied to pasture acres in association with or without alternative watering facilities. They can also be applied in conjunction with or without stream access control. This practice requires intensive management of livestock rotation, also known as Managed Intensive Grazing systems (MIG), that have very short rotation schedules. Pastures are defined as having a vegetative cover of 60% or greater.

29. Wetland Restoration
Agricultural wetland restoration activities re-establish the natural hydraulic condition in a field that existed prior to the installation of subsurface or surface drainage. Projects may include restoration, creation and enhancement acreage. Restored wetlands may be any wetland classification including forested, scrub-shrub or emergent marsh.

Urban/Suburban Activities

30. Dry Detention Ponds/Hydrodynamic Structures
Dry detention ponds are depressions or basins created by excavation or berm construction that temporarily store runoff and release it slowly via surface flow or groundwater infiltration following storms. Hydrodynamic structures are devices designed to improve quality of stormwater using features such as swirl concentrators, grit chambers, oil barriers, baffles, micro-pools, and absorbent pads that are designed to remove sediments, nutrients, metals, organic chemicals, or oil and grease from urban runoff.

31. Dry Extended Detention Ponds
Dry extended detention ponds are storm water design features that provide a gradual release of a specific volume of water in order to increase the settling of

pollutants and protect downstream channels from frequent storm events. Dry extended detention ponds are often designed with small pools at the inlet and outlet of the pond. These BMPs can also be used to provide flood control by including additional detention storage above the extended detention level.

32. Erosion and Sediment Control
Erosion and sediment control practices protect water resources from sediment pollution and increases in runoff associated with land development activities. By retaining soil on-site, sediment and attached nutrients are prevented from leaving disturbed areas and polluting streams. This activity may include the use of features such as a silt fence, slope drain, and permanent vegetation.

33. Filtering Practices
Filtering Practices capture and temporarily store the water quality volume and pass it through a filter of sand, organic matter and vegetation, promoting pollutant treatment and recharge. Examples practices include surface sand filters, swales, porous pavement, and bioretention areas (raingardens)

34. Forest Buffers – Urban
Urban riparian forest buffers are linear strips of maintained woody vegetation that buffer streams, rivers or tidal waters from urban and suburban activity. Forest buffers help filter nutrients, sediments and other pollutants from runoff, as well as remove nutrients from groundwater. The recommended width for riparian forest buffers (urban) is 50 feet with a 35 feet minimum.

35. Grass Buffers - Urban
Riparian grass buffers planted in urban areas are linear strips of grass or other non-woody vegetation maintained between the edge of fields and streams, rivers or tidal waters that help filter nutrients, sediment and other pollutant from runoff. The recommended buffer width for riparian grass buffers is 100 feet, with a 35 feet minimum width required.

36. Impervious Surface Reduction
This includes practices that reduce the total area of impervious cover and practices that capture stormwater and divert it to pervious areas, subsequently encouraging storm water infiltration. Example activities include natural area conservation, disconnection of rooftop runoff, porous pavement and rain barrels.

37. Infiltration Practices
Infiltration practices are used to capture and temporarily store the water quality volume before allowing it to infiltrate into the soil, promoting pollutant treatment and groundwater recharge. Examples include infiltration trenches, infiltration basins, and porous pavement.

38. Septic System Hook-ups
Septic connections/hookups represent the replacement of traditional septic systems with connection to wastewater treatment plants (WWTPs).

39. Street Sweeping
This practice involves routines sweeping of municipal streets on a repetitive basis using various motorized mechanical devices. Street sweeping ranks among the oldest practices used by communities for a variety of purposes to provide a clean and healthy environment, and more recently to comply with their National Pollutant Discharge Elimination System stormwater permits.

40. Tree Planting - Urban
Urban tree planting involves planting of trees on urban pervious areas at a density that would produce a forest-like condition over time. The intent of the planting is to eventually convert the pervious portion of urban area to forest. If the trees are planted as part of the urban landscape, with no intention to covert the area to forest, then this would not count as urban tree planting.

The “Mixed Open” land category is a combination of low intensity development, recreation areas, battlefields, golf courses, school recreation areas and other large tracts of herbaceous lands that are not directly associated with impervious acres, but are clearly not available as, or associated with, agricultural land. Mixed open tree planting includes any tree plantings on any site except those along rivers and streams, which are considered forested buffers and are treated differently. The definition of tree planting does not include reforestation.

41. Urban Nutrient Management
Urban nutrient management involves the reduction of fertilizer to grass lawns and other urban areas. The implementation of urban nutrient management is based on public education and awareness, targeting suburban residences and businesses, with emphasis on reducing excessive fertilizer use.

42. Urban Sprawl Reduction
This activity involves a change from urban to non-urban landuse in forecasted conditions. This is also known as urban growth reduction.

43. Urban Stream Restoration
Stream restoration in urban areas is used to restore the urban stream ecosystem by restoring the natural hydrology and landscape of a stream. Stream restoration in urban areas is used to help improve habitat and water quality conditions in degraded streams. Typically, streams in need of restoring have watershed conditions that have destabilized the stream channel and accelerated the erosion of stream banks. The objectives for stream restoration in urban areas include, but are not limited to, reducing stream channel erosion, promoting physical channel stability, reducing the transport of pollutants downstream, and working towards a stable habitat with a self-sustaining, diverse aquatic community.

44. Wet Ponds & Wetlands
Wet ponds and wetland practices implemented in urban areas collect and increase the settling of pollutants, and protect downstream channels from frequent storm events. Wet ponds retain a permanent pool of water. Examples include wet ponds, wet extended detention ponds, retention ponds and constructed wetlands.

Other Activities

45. Abandoned Mine Reclamation
Abandoned mine reclamation stabilizes the soil on lands mined for coal or affected by mining, such as wastebanks, coal processing, or other coal mining processes. Example activities include land grading, re-vegetation, tree planting, wetland development and the installation of surface water control measures such as diversions, waterways, and retention ponds

46. Dirt and Gravel Road Erosion and Sediment Control
This practice includes implementation of practices to stabilize dirt and gravel roads adjacent to streams. The purpose of this BMP is to significantly reduce the erosion of sediment and associated nutrients from the road and adjacent areas into the stream. Reduction in sediment runoff from dirt and gravel roads is accomplished through a combination of driving surface aggregates (DSA) to provide an erosion resistant surface, berm removal to eliminate channeling of water, additional drainage outlets to remove excess water, raising the road profile to promote drainage, and grade breaks to slow runoff.

47. Forest Harvesting Practices
Forest harvesting practices are a suite of BMPs that minimize the environmental impacts of road building, log removal, site preparation and forest management. These practices help reduce suspended sediments and associated nutrients that can result from forest operations. Example activities include Innovative road design, bridged stream crossings, preservation of stream and wetland buffers, soil stabilization, water bars, logging mats, road surfacing, broad-based dips and avoiding operations when very wet.