

PA Chesapeake Watershed Implementation Plan

Example County Reduction Targets

What are Reduction 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. To facilitate local implementation of necessary reduction actions to meet the allocations, EPA directed the Chesapeake watershed jurisdictions to sub-divide the reductions by local areas. Pennsylvania chose to sub-divide at the county-level, as the EPA Chesapeake Bay watershed model is based in part on county level data. The reduction 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 Chesapeake Bay watershed model that meets the reduction targets. There are other equally valid combinations of actions that could also meet the reduction target.

Nitrogen Reduction Target

1985 Baseline Load	XXX
2009 Current Load	XXX
2017 Interim Reduction Target	XXX
2017 Nitrogen Reductions	XXX

Phosphorus Reduction Target

1985 Baseline Load	XXX
2009 Current Load	XXX
2017 Interim Reduction Target	XXX
2017 Phosphorous Reductions	XXX

Total Suspended Solids (TSS) Reduction Target

1985 Baseline Load	XXX
2009 Current Load	XXX
2017 Interim Reduction Target	XXX
2017 TSS Reductions	XXX

Pollution Reductions by Source

Nitrogen Reductions
Phosphorous Reductions
TSS Reductions

3 Pie charts

- Agriculture %
- Urban/Suburban %
- Wastewater %
- Forest %

Pollution Reduction Actions by 2017

Abandoned Mine Reclamation	xx acres
Animal Waste Management Systems	xx units
Carbon Sequestration/Alternative Crops	xx acres
Conservation Plans/SCWQA	xx acres
Continuous No-Till	xx acres
Cover Crops (late planting)	xx acres
Dirt and Gravel Road Erosion and Sediment Control	xx feet
Enhanced Nutrient Management	xx acres
Erosion and Sediment Control	xx acres
Forest Buffers (all land uses)	xx acres
Forest Harvesting Practices	xx acres
Grass Buffers	xx acres
Land Retirement	xx acres
Mortality Composters	xx units
Non-Urban Stream Restoration	xx feet
Nutrient Management	xx acres
Off-Stream Watering with Fencing	xx acres
Off-Stream Watering w/ Fencing & Rotational Grazing	xx acres
Off-Stream Watering without Fencing	xx acres
Other Conservation Tillage	xx acres
Poultry Litter Transport Out of Watershed	xx tons
Poultry Litter Transport Into Watershed	xx fewer tons
Poultry Phytase	xx pounds P
Septic Connections	xx
Tree Planting	xx acres
SWM Practices	xx acres
Urban Stream Restoration	xx feet
Wetlands	xx acres
Heavy Truck Anti-Idling Rule	xx fewer hours
Wastewater Treatment Plant Nutrient Reduction	xx plants

Resource Contacts

- Technical Assistance
- Financial Assistance

Pollution Reduction Actions

1. Abandoned Mine Reclamation

xxx acres

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. Examples: Land grading, re-vegetation, tree planting, wetland development and the installation of surface water control measures such as diversions, waterways, and retention ponds

2. Animal Waste Management Systems

xxx units

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. Examples: Lagoons, ponds, steel tanks and storage sheds

3. 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 and control runoff from barnyards. Vegetated treatment area may be included to improve water quality by reducing loading of nutrients, organics, pathogens, and other contaminants associated with barnyards.

4. Capture/Reuse

5. Carbon Sequestration/Alternative Crops

xxx acres

Conservation Cover and Soil Management Systems

6. Conservation Plans/SCWQA

xxx acres

Farm conservation plans are a combination of agronomic, management and engineered practices that protect and improve soil productivity and water quality, and to 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. The following landuse categories are associated with Conservation Planning. Farm Plans on Conventional Till; Farm Plans on Conservation Till; Farm Plans on Hay; Farm Plans on Pasture.

7. 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.

8. Continuous No-Till

xxx acres

The Continuous No-Till BMP is a crop planting and management 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.

9. Cover Crops

xxx acres

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. Examples: Early and Late Season Cover Crops

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. Examples: 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.

10. Dirt and Gravel Road Erosion and Sediment Control

xxx feet

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 the nutrients within the sediment 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.

11. Dry Detention Ponds

Dry detention ponds and hydrodynamic structure practices are used to moderate flows and remain dry between storm events. These are storm water design features that provide a gradual release of water in order to increase the settling of pollutants and protect downstream channels from frequent storm events. A variety of products for these storm water inlets known as swirl separators, or hydrodynamic structures, are modifications of the traditional oilgrit separator and include an internal component that creates a swirling motion as storm water flows through a cylindrical chamber. These designs allow sediment to settle out as storm water moves in this swirling path. Additional compartments or chambers are sometimes present to trap oil and other floatables. Examples: Dry pond, underground dry detention facility.

12. Erosion and Sediment Control

xxx acres

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. Examples: Silt fence, slope drain, permanent vegetation

13. Enhanced Nutrient Management

xxx acres

Enhanced nutrient management is intended to provide incentives through yield insurance for crop losses to farmers who apply nitrogen and phosphorus at levels below their recommended application rates. Participating farmers would be paid to apply 15 percent to 25 percent less nutrients on crops than is recommended in their Nutrient Management Plan. The intent is to reduce potential nutrient losses.

14. 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. Examples: Dry extended detention pond, extended detention basin and enhanced extended detention

15. Urban 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: Surface sand filter, swale, bioretention areas (raingardens)

16. Forest Buffers - Agriculture

xxx acres

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 groundwater. The recommended buffer width for riparian forest buffers (agriculture) is 100 feet with a 35 feet minimum width required.

17. 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. Examples: Buffer strips

Mixed open 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 easily associated with impervious acres, but are clearly not available as, or associated with, agricultural land. Mixed open riparian forest buffers are areas of trees usually accompanied by other vegetation, that are adjacent to a body of water and which: maintain the integrity of stream channels; reduce the impact of upland pollution sources by trapping, filtering, and converting sediments, nutrients, and other chemicals; and supply food, cover, and thermal protection to fish and other wildlife. The recommended width for riparian forest buffers (mixed open) is 100 feet with a 35 feet minimum.

18. Forest Harvesting Practices

xxx acres

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. Examples: 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

19. Grass Buffers

xxx acres

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.

20. 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.

21. Impervious Surface Reduction

Impervious surface reduction 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. Examples: Natural area conservation, disconnection of rooftop runoff, rain barrels

22. Urban 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: Infiltration trench, infiltration basin, porous pavement

23. Land Retirement/Environmental Planting

xxx acres

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 reported under "Tree Planting".

24. Mortality Composters

xxx units

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 routine animal mortality 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. Mortality composting can be, and is applied, to various species including poultry, ????

25. Non-Urban Stream Restoration

xxx feet

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 bed or bottom of a channel to prevent

damaging aggradation of sediment or degradation of the stream bed swine and dairy calves.

26. Nutrient Management

xxx acres

BMP Definition: Nutrient management plan (NMP) implementation (crop) is a comprehensive plan that describes the optimum use of nutrients to minimize nutrient loss while maintaining yield. A NMP 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.

Off-Stream Watering with & without Fencing

xxx acres

Stream protection with fencing with off stream watering incorporates both alternative watering and installation of fencing that involves narrow strips of land along streams to exclude livestock. The fenced areas may be planted with trees or grass, but are typically not wide enough to provide the benefits of buffers. 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. Examples: Stream fencing, alternative water sources, stream crossings

Off stream watering in pasture without fencing requires the use of alternative drinking water troughs or tanks away from streams. The 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. Examples: Alternative water sources, tree plantings away from the stream, stream crossings

Off stream watering with stream fencing and rotational grazing (pasture) combines stream fencing and alternative watering with cross fencing systems to create paddocks to enable rapid grazing of small areas in sequence. Once an area is intensively grazed of most vegetative matter, the animals are moved to another paddock to enable recovery of the pasture grasses. This BMP is beneficial in removing animals from stream areas, but may be offset by an increased animal stocking rate per acre. This increases the concentration of animal manure per acre and may adversely impact the quality of surface water runoff. Examples: Managing forage height through mechanical means, stocking rates, supplemental feeding and other methods

Off-Stream Watering w/ Fencing & Rotational Grazing

xxx acres

Off-Stream Watering without Fencing

xxx acres

28. 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 is provided. The fenced areas may be planted with trees or grass.

29. Precision Agriculture

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.

30. Street Sweeping

31. Tree Planting

xxx acres

The tree planting (row crop) BMP includes any tree planting on agricultural lands, 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 land use 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. Examples: Conservation Reserve Program land, converted from row crop to forest.

32. Upland Precision Grazing

33. Urban Grass Buffers

34. Urban Sprawl Reduction

35. Urban Nutrient Management

36. Urban Tree Planting

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

Mixed open 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 easily 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.

37. Upland Precision Rotational Grazing

38. Urban Stream Restoration

xxx feet

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 eroded 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. Stream restoration activities in urban areas should result in a stable stream channel that experiences no net aggradation or degradation over time.

39. Wetland Restoration

xxx acres

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.

40. Wet Ponds & Wetlands

BMP Definition: Wetponds and wetland practices collect and increase the settling of pollutants and protect downstream channels from frequent storm events. Wetponds retain a permanent pool of water. Examples: Wetpond, wet extended detention pond, retention pond and constructed wetlands.

41. Dairy 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 livestock manure.

42. Swine 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 livestock manure.

43. Manure Transport

Alternative uses of manure/manure transport is the practice of reducing or eliminating excess nutrient applications within the Chesapeake Bay by either transporting the manure outside of the Chesapeake Bay watershed or finding an alternative use for the excess manure. Excess manure is defined as manure nutrients produced within an area that exceeds the recommended application rates associated with the crops grown. Examples: Fertilization of commercial tree plantations, research and development of new fuel technologies, pelletizing for fertilizer, transport out of the watershed to other areas that need it, and electric generation.

44. Septic System Hook-ups

xxx

Septic connections/hookups represent the replacement of traditional septic systems with connection to and treatment at wastewater treatment plants (WWTPs).

45. 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.

xx. Poultry Phytase

xxx pounds P

Other Conservation Tillage

xxx acres

Poultry Litter Transport Out of Watershed

xxx tons

Poultry Litter Transport Into Watershed

xxx fewer tons

SWM Practices

xxx acres

Heavy Truck Anti-Idling Rule

xxx fewer hours

Wastewater Treatment Plant Nutrient Reduction

xxx plants

