

## **Chapter 3**

### **Management Measures for Agricultural Sources**

#### **3.1 Introduction**

Ohio's climate, soils, and topography combine to provide an excellent area for agricultural production. Ohio has a diverse array of farm commodities, including lake state products (fruits, vegetables, and dairy) in Northeast Ohio, Appalachian products (tobacco) in Southern Ohio, and corn belt products (corn, soybeans, and hogs) in central and Western Ohio. Dairy and livestock production further contributes to Ohio's diverse agricultural production. According to the Ohio Department of Agriculture's (ODA's) 1997 Annual Report, there are 29,690 farms, with an average size of 211 acres, located in the 35 counties included in the § 6217 management area. Overall, agricultural land uses comprise approximately 73 percent of the total land uses in the Lake Erie Basin, and in some watersheds, intensive row crop agriculture exceeds 90 percent of the total land area.

Given the geographical extent of agricultural-related land uses, it is not surprising that agriculture represents a major source of nonpoint source pollution in Ohio's § 6217 management area. The amounts of nitrogen and phosphorus fertilizers, herbicides, insecticides, and sediment discharged from streams in the Lake Erie basin are higher than those from any other basin of the Great Lakes. Other activities associated with agricultural operations that have a direct impact on water quality in Ohio's Lake Erie basin include draining of wetland areas and channelization of streams, resulting in both increased sedimentation loading to surface waters and loss of habitat.

#### **3.2 Existing Programs**

Control of agricultural pollution in Ohio is covered by a multiplicity of existing laws, rules, and regulations. One of these is the ODNR Division of Soil and Water Conservation's authority to control erosion on agricultural and forest lands and to control animal waste discharges. Ohio also has a very strong and active SWCD program, with 88 separate districts employing over 400 staff. This, coupled with nearly 270 NRCS staff, provides a solid foundation to carry out agricultural pollution programs within the § 6217 management area and across the state. Agricultural pollution control also falls under the purview of Ohio EPA, which is responsible for enforcing certain state water pollution control laws and state water quality standards; ODA for agricultural pesticide use and distribution; and ODNR Division of Wildlife, which issues citations for pollution and stream littering offenses, especially when fish kills result. In addition, numerous other regulatory, voluntary, and incentive programs at the federal, state, and local levels are currently in place in Ohio to address the issue of agricultural nonpoint source pollution. A brief description of applicable existing agricultural pollution control measures and programs is provided below.

##### **Existing Programs—Federal**

A variety of federal programs provide educational, technical, and financial assistance/incentives for improving environmental quality by targeting nonpoint sources of pollution from agricultural operations. In Ohio, several existing federal voluntary and

incentive programs are administered by U.S. Department of Agriculture (USDA) agencies under the conservation provisions of the 1996 Farm Bill and other legislative programs.

- The **Highly Erodible Cropland Conservation, Swampbuster, and Sodbuster** programs require implementation of a site-specific conservation plan to reduce soil erosion on highly erodible lands, wetlands, or lands being brought into production.
- The **Conservation Reserve Program (CRP) and Conservation Reserve Enhancement Program (CREP)** provide rental payments, incentive payments, and cost-share assistance to landowners to protect highly erodible and environmentally sensitive lands with grass, trees, and other long-term cover to improve soil, water, and wildlife resources. CRP priority areas in Ohio include all lands draining into Lake Erie, and according to ODA's 1997 Annual Report, there are 169,741 acres enrolled in the CRP program for the 35 counties included in Ohio's § 6217 management area.
- The **Wetland Reserve Program (WRP)** is a voluntary wetland restoration incentive program that establishes permanent or 30- and 10-year conservation easements and restoration cost-share agreements with landowners to establish wetland protection and restoration as primary land uses for the duration of the agreement.
- The **Environmental Quality Incentive Program (EQIP)** provides technical assistance, cost-share and incentive payments, and educational assistance to landowners for the development and implementation of conservation practices and is targeted to specific resource concerns within state conservation priority areas. Statewide priority program areas in Ohio include soil loss, water quality, riparian areas, livestock waste and nutrient management, grazing, wildlife, and woodland management.
- The **Wildlife Habitat Incentive Program (WHIP)** provides financial incentives through five-year cost-share agreements to develop habitat for fish and wildlife on private lands through implementation of a wildlife habitat development plan.
- The **Conservation Farm Option (CFO)** program consolidates USDA payments under the WRP, CRP and EQIP payments for eligible producers of wheat, feed grains, cotton, and rice who implement a conservation plan addressing soil, water, and related resources, water quality, wetlands, and wildlife habitat.
- The **Forestry Incentive Program** is a voluntary incentive program for timber producers to implement erosion control BMPs.
- The **Conservation Operation and Grazing Lands Program** is a voluntary program that provides technical assistance through NRCS and local SWCDs for the implementation of conservation planning and practices.
- Provisions of the **Public Law 566 Watershed Protection and Flood Prevention Program** provide for technical and financial assistance to local organizations for implementing watershed protection; flood prevention; erosion and sediment control; water supply, water quality, fish and wildlife habitat enhancement; wetlands creation and restoration; and public recreation projects on a watershed basis.

## **Existing Programs—State and Local**

Nearly all enforcement action resulting from pollution originating from agricultural operations in Ohio is initiated by ODNR's Division of Wildlife. Under the authority of the **Stream Litter Law** (ORC 1531), the Division of Wildlife investigates stream pollution incidents and issues citations for stream littering offenses, particularly when wildlife or fish kills result. Citations for water quality violations resulting from farm-related discharges can also be issued by Ohio EPA under the authority of Ohio's **Water Pollution Control Laws** and **Water Quality Rules** (ORC 6111 and OAC 3745-1). The issuance of citations under these authorities often results from agency investigation of pollutant discharges triggered by direct observation of field personnel or by citizen complaints.

Ohio's **Agricultural Pollution Abatement Program** rules (ORC 1511.02, OAC 1501:15-5) establish statewide standards and procedures for the abatement of water pollution resulting from agricultural operations. The standards are used to determine if a water pollution problem exists and as a basis for the implementation of acceptable abatement/management plans and practices to prevent or eliminate a water pollution problem. The program is administered by ODNR's Division of Soil and Water Conservation in cooperation with local SWCDs. Technical assistance and cost-sharing is available to help owners and operators develop and evaluate alternatives for solving pollution problems and to help implement appropriate practices and develop related management plans to operate facilities without polluting public waters. Enforcement authority for controlling violations of the state standards under this program rests with the Chief of the Division of Soil and Water Conservation. Enforcement actions can be initiated when the division finds an apparent problem of agricultural pollution through its own observation, through notification by another agency, or through a written complaint.

Regulation of agricultural pesticide use is provided through Ohio's **Pesticide Licensing and Applicator Certification Program** and **Pesticide Registration Program** (ORC 921). Implementation and enforcement of these programs are carried out by ODA. ODA is also responsible for implementing and enforcing provisions of the Federal Insecticide, Fungicide and Rodenticide Act in Ohio, including certification and training of pesticide applicators, registering sellers, and testing products. ODA's **Clean Sweep Program** allows farmers and commercial users of pesticides to dispose of their no-longer-needed chemicals without charge, thereby removing potential pollutants from farmsteads and storage barns. The Pesticide Regulation Section also conducts collections of pesticide containers.

Ohio's **Groundwater Protection and Management Strategy** and **Source Water Protection Programs** establish initiatives to protect surface and groundwater sources from pollution. A groundwater testing program is being conducted as part of the Groundwater Protection and Management Strategy Program to determine if agricultural pesticide and nutrient use is causing or contributing to groundwater pollution in agricultural areas. Provisions of the Source Water Protection Program provide local public drinking water suppliers with the authority to control sources of pollution within vulnerable source water areas. In addition, authority provided under ORC 743.25 allows municipalities to protect, through regulation, the water quality of streams that are used for drinking or domestic purposes by that municipality. Such protective measures can be applied up to 20 miles from the municipality's borders.

Numerous voluntary and incentive conservation programs for agricultural pollution control exist at the state and local levels as well. The **Western Lake Erie Watershed CREP**, is a proposed local, state, federal, and private partnership program to improve water quality by reducing sediment pollution and nutrient runoff through installation of riparian area buffers and other BMPs. The proposed program will encompass the Maumee River, Sandusky River, Portage River, Huron River, Vermilion River, Black River, and Lake Erie Direct Drainage watersheds and targets 67,000 acres of riparian area habitat within approximately 4,665,000 acres of farmland. The Western Lake Erie Watershed CREP will improve water quality by reducing sediment pollution, nutrient loading, and flood damage through installation of riparian buffers, filter strips, windbreaks, wetlands, and other BMPs. The improved water quality will enhance terrestrial and aquatic wildlife habitat, especially for federally listed/candidates for the endangered species list. Should the proposal be approved and funded, the State of Ohio will provide \$3,530,900 annually to match \$16,754,000 federal dollars to enroll over 6,000 acres annually. Over ten years the State will contribute \$33,509,000 and the Federal government will provide \$167,545,000 to enroll 67,000 acres in the program. A copy of Ohio's CREP proposal for the Western Lake Erie watershed is provided in Appendix H.

The **Conservation Works of Improvement** program, administered by local SWCDs, provides funding and technical assistance for the implementation of natural resource management projects, such as drainage and erosion control, riparian buffer, and wetland treatment. **Conservation Action Projects**, administered by both industry and the SWCDs, provide education and technical assistance to encourage agricultural BMP use in Defiance, Fulton, Henry, Wood, and Lucas Counties. The **Special Water Quality Projects** program provides cost sharing for the installation of BMPs in priority watersheds. Education, technical, and cost assistance for implementation of nutrient management BMPs is provided to farmers through the **Manure Nutrient Management Program**, the **Precision Farming Program**, and the **Livestock Environmental Assurance Program**. The **Integrated Farm Management Program** provides technical assistance to participants to adopt site-specific farm management/conservation plans, and the **Integrated Crop and Pest Management Programs** provide financial and technical assistance for practices associated with chemical and pest management. The **Grazing Lands Conservation Initiative** provides educational and technical assistance to help people who own private grazing lands to implement conservation measures. Educational and technical assistance to implement agricultural BMPs is also provided to farmers through the **Farm \*A\* Syst Program**.

Financial assistance for the implementation of conservation and pollution prevention projects at agricultural facilities is also provided through grants and loans from ODNR's **NatureWorks** Program, Ohio EPA's **CWA Section 319 Grant Program**, and **Water Pollution Control Loan Fund**, and from the private industry-funded **Operation Greenstripe** program.

A comprehensive and accessible **Conservation & Water Quality Education** program for agricultural operations, which provides educational programs, technical assistance in the field, and information bulletins, is carried out by the OSUE offices located in each county.

### **3.3 § 6217(g) Management Measures**

#### **3.3.1 Erosion and Sediment Control Management Measure**

Apply the erosion component of a Conservation Management System (CMS) as defined in the Field Office Technical Guide of the U.S. Department of Agriculture—Soil Conservation Service to minimize the delivery of sediment from agricultural lands to surface waters, *or*

Design and install a combination of management and physical practices to settle the settleable solids and associated pollutants in runoff delivered from the contributing area for storms of up to and including a 10-year, 24-hour frequency.

#### **Applicability**

This management measure applies to activities that cause erosion on agricultural land and on land that is converted from other land uses to agricultural lands. Agricultural lands include:

- Cropland
- Irrigated cropland
- Range and pasture
- Orchards
- Permanent hayland
- Specialty crop production
- Nursery crop production

Since agricultural land uses comprise approximately 73 percent of land uses within Ohio's § 6217 management area, control of agricultural erosion and sediment delivery to surface waters, particularly in the predominantly agricultural regions of the Maumee and Sandusky watersheds, is a significant concern. Sediment delivery to Lake Erie, particularly in the western basin, has resulted in measured water quality impacts, including increases in nutrient levels and turbidity, damage to macrophyte and fish habitat, and increased dredging near the lake shore.

This management measure offers two alternatives to control erosion and sediment loss from agricultural activities: implementation of the erosion component of a CMS; or the use of "management and physical practices" to "settle the settleable solids and associated pollutants" generated by storms up to and including the 10-year, 24-hour event. Ohio's approach to controlling erosion from agricultural operations is to prevent erosion and transport of sediment from the field through the use of a CMS that is implemented through NRCS and state programs administered primarily at the local level. Estimating the actual expected sediment and pollution loading from such a storm event is extremely difficult, and the estimate would vary depending on the time of year that the storm occurs, antecedent soil moisture conditions at the time of the storm event, the land use in the watershed, the stage of crop development, and type of stream receiving the storm runoff. Also, these storm events tend to last for several days, and the impacts are seen over a period of days to weeks. Thus, the resultant sediment and pollutant loadings can vary widely, and practices designed to remove and settle all sediment and pollutants generated from such an event, depending on

actual conditions, would require a tremendous capacity in order to effectively treat the resultant runoff.

### ***Existing Programs and Enforceable Policies and Mechanisms***

Activities under a number of existing federal, state, and local programs implement the CMS component of this management measure. Agricultural pollution abatement programs, such as those fostering adoption of conservation tillage and use of soil testing to adjust fertilization rates, have resulted in significant changes in farming practices in Ohio. Some form of conservation tillage is now used on more than 50 percent of the total corn and soybean acreage in Northwestern Ohio. NRCS has estimated that achieving substantial sediment reductions in the nearshore waters of Lake Erie will require increasing the use of conservation tillage to between 65 percent and 70 percent of the total crop acreage. Implementation of conservation tillage and other pollution abatement programs to agricultural operations in Ohio has resulted in improvement. Water quality monitoring data collected since 1975 in the Maumee and Sandusky watersheds have shown a reduction in sediment and nutrient loadings from agricultural operations. Ohio has lost no-till ground in continuous no-till corn because of yield reductions. Although many farmers have converted to no-till soybeans, the soybean industry is experiencing a problem with the soybean cyst nematode which may affect no-till acreage. Crop rotation with corn is one method to control this; however, if the corn no-till yield problems are not addressed, farmers will likely go back to conventional tillage. Therefore, decreases in conservation tillage acreage may be possible. Following is a discussion of programs applicable to the implementation of this management measure. Applicable programs are summarized in Table 3-1 and are more fully described in Section 3.2.

Ohio's **Agricultural Pollution Abatement Program** incorporates erosion control specifications as set forth in USDA's Technical Guide into the provisions for the abatement and control of wind and water erosion. This program also provides cost-share monies from the state to assist landowners in installing needed practices that abate soil erosion or degradation of the waters of the state by soil sediment. Enforcement authority for pollution abatement provisions is provided by statute to ODNR and is usually initiated on a complaint-driven basis; additional enforcement mechanisms are provided by Ohio EPA citation for violation of water quality standards and by Division of Wildlife citation for wildlife kills or stream litter law violations.

Other existing federal and state programs in Ohio provide technical, cost assistance, and education to encourage the use of NRCS conservation practices that achieve compliance with this management measure (Table 3-1). Most of these programs are voluntary; however, some of the federal programs are incentive-based in that they require compliance with conservation measures as a condition of receiving USDA benefits. Evaluation of the effectiveness of measures implemented under the various federal programs are provided by agency spot checks and by ODNR's evaluation of Ohio's National Resource Inventory report. Enforcement under the federal incentive programs can include the revocation of funding and in some cases the repayment of funding already allocated.

### 3.3.2 Management Measure for Facility Wastewater and Runoff from Confined Animal Facility Management (Large Units)

Limit the discharge from the confined animal facility to surface waters by:

(1) Storing both the facility wastewater *and* the runoff from confined animal facilities that are caused by storms up to and including a 25-year, 24-hour frequency storm. Storage structures should:

- (a) have an earthen lining or plastic membrane lining, or
- (b) be constructed with concrete, or
- (c) be a storage tank;

and

(2) Managing stored runoff and accumulated solids from the facility through an appropriate waste utilization system.

#### Applicability

This management measure applies to all new facilities regardless of size and to all new or existing confined animal facilities that contain the following number of head or more:

	Head	Animal Units
Beef Feedlots	300	300
Stables (horses)	200	400
Dairies	70	98
Layers	15,000	150 (liquid system)
		495 (continuous watering)
Broilers	15,000	150 (liquid system)
		495 (continuous watering)
Turkeys	13,750	2,475
Swine	200	80

This management measure is not intended to duplicate standards or other criteria required by Ohio EPA in the issuance of Permits To Install and/or discharge permits under authority delegated by USEPA pursuant to 40 CFR 122.23.

Water pollution resulting from confined animal operations is a growing concern of citizens in the State of Ohio. Confined animal facilities in Ohio are increasing in number and size, and most, if not all, of the above-listed types of facilities currently exist within Ohio's § 6217 management area.

#### Existing Programs and Enforceable Policies and Mechanisms

Activities under a number of existing federal, state, and local programs implement the provisions of this management measure. Programs applicable to this management measure are summarized in Table 3-2 and are more fully described in Section 3.2.

Ohio's **Agricultural Pollution Abatement Program** incorporates management practices for handling waste waters as set forth in USDA's Technical Guide and as set out in the Ohio Livestock Manure and Wastewater Management Guide. Agricultural concentrated animal feeding operations are required to construct and manage waste facilities to withstand a storm up to 25-year, 24-hour frequency. This program also provides cost-share monies from the state to assist landowners in installing practices needed to prevent or abate degradation of waters of the state by confined animal facilities. In addition, concentrated animal feeding operations of >1,000 animal units are required to obtain an Ohio EPA Permit To Install and manure management plan under the state's water quality laws and rules. Animal operations of any size that convey a controlled, direct discharge (including through drainage ditches or tiles) to waters of the state are required to obtain an NPDES permit from Ohio EPA.

Enforcement authority for pollution abatement involving livestock operations is provided by statute to ODNR and is usually initiated on a complaint-driven basis; additional enforcement mechanisms are provided by Ohio EPA citation for violation of water quality standards and by Division of Wildlife citation for wildlife kills or stream litter law violations.

Ohio's **Groundwater Protection and Management Strategy** and **Source Water Protection Programs** establish initiatives to protect surface and groundwater sources from pollution. A groundwater testing program is being conducted as part of the Groundwater Protection and Management Strategy Program to determine if agricultural pesticides and nutrients are causing or contributing to groundwater pollution in agricultural areas. Provisions of the Source Water Protection Program provide local public drinking water suppliers with the authority to control sources of pollution within vulnerable source water areas. In addition, authority provided under ORC 743.25 allows municipalities to protect, through regulation, the water quality of streams that are used for drinking or domestic purposes by that municipality. Such protective measures can be applied up to 20 miles from the municipality's borders.

In addition, other existing federal and state programs in Ohio provide technical assistance, financial assistance, and education to encourage the use of BMPs that achieve compliance with this management measure (Table 3-2). Most of these programs are voluntary; however, some of the federal programs are incentive-based in that they require compliance with conservation measures as a condition of receiving USDA benefits. Evaluation of the effectiveness of measures implemented under the various federal programs are provided by agency spot checks and by ODNR's evaluation of Ohio's National Resource Inventory report. Enforcement under the federal incentive programs can include the revocation of funding, restoration of the practice to specifications, and, in some cases, the repayment of funding already allocated.

### **3.3.3 Management Measure for Facility Wastewater and Runoff from Confined Animal Facility Management (Small Units)**

Design and implement systems that collect solids, reduce contaminant concentrations, and reduce runoff to minimize the discharge of contaminants in both facility wastewater and in runoff that is caused by storms up to and including a 25-year, 24-hour frequency storm. Implement these systems to substantially reduce significant increases in pollutant loadings to groundwater.

Manage stored runoff and accumulated solids from the facility through an appropriate waste utilization system.

### **Applicability**

This management measure applies to all existing confined animal facilities that contain the following number of head:

	<b>Head</b>	<b>Animal Units</b>
Beef Feedlots	50–299	50–299
Stables (horses)	100–199	200–399
Dairies	20–69	28–97
Layers	5,000–14,999	50–149 (liquid system)
		165–494 (continuous watering)
Broilers	5,000–14,999	50–149 (liquid system)
		165–494 (continuous watering)
Turkeys	5,000–13,749	900–2,474
Swine	100–199	40–79

This management measure is not intended to duplicate standards or other criteria required by Ohio EPA in the issuance of Permits To Install and/or discharge permits under authority delegated by USEPA pursuant to 40 CFR 122.23.

### **Existing Programs and Enforceable Policies and Mechanisms**

Existing federal, state, and local programs that support the implementation of the provisions of this management measure are the same as those listed under Management Measure for Facility Wastewater and Runoff from Confined Animal Facility Management (Large Units) and in Table 3-2.

#### **3.3.4 Nutrient Management Measure**

Develop, implement, and periodically update a nutrient management plan to: (1) apply nutrients at rates necessary to achieve realistic crop yields, (2) improve the timing of nutrient application, and (3) use agronomic crop production technology to increase nutrient use efficiency. When the source of the nutrients is other than commercial fertilizer, determine the nutrient value and the rate of availability of the nutrients. Determine and credit the nitrogen contribution of any legume crop. Soil and plant tissue testing should be used routinely. Nutrient management plans contain the following core components:

- (1) Farm and field maps showing acreage, crops, soils, and waterbodies.
- (2) Realistic yield expectations for the crop(s) to be grown, based primarily on the producer's actual yield history, State Land Grant University yield expectations for the soil series, or NRCS Soils-5 information for the soil series.

- (3) A summary of the nutrient resources available to the producer, which at a minimum include: soil test results for pH, phosphorus, nitrogen, and potassium; nutrient analysis of manure, sludge, mortality compost (birds, pigs, etc.), or effluent (if applicable); nitrogen contribution to the soil from legumes grown in the rotation (if applicable); and other significant nutrient sources (e.g., irrigation water).
- (4) An evaluation of field limitations based on environmental hazards or concerns, such as: sinkholes, shallow soils over fractured bedrock, and soils with high leaching potential; lands near surface water; highly erodible soils; and shallow aquifers.
- (5) Use of the limiting nutrient concept to establish the mix of nutrient sources and requirements for the crop based on a realistic yield expectation.
- (6) Identification of timing and application methods for nutrients to: provide nutrients at rates necessary to achieve realistic crop yields; reduce losses to the environment; and avoid applications as much as possible to frozen soil and during periods of leaching or runoff.
- (7) Provisions for the proper calibration and operation of nutrient application equipment.

### ***Applicability***

This management measure applies to activities associated with the application of nutrients to agricultural lands. The use of nutrient application in Ohio agriculture is widespread and nonpoint pollution from agricultural nutrient applications has impacted surface waters in the § 6217 management area. Since the early 1970s numerous programs have been targeted to Ohio's largely agricultural Maumee and Sandusky watersheds as part of efforts to reduce nutrient loads to receiving waters. Documentation of fertilizer use indicates that the use of chemical fertilizers peaked in the early 1980s; since then, phosphorus fertilizer sales have decreased more than 40 percent while nitrate sales have decreased by about 10 percent. Water quality monitoring of these watersheds, underway since 1975, has shown significant downward trends in total and soluble phosphorus. However, nitrate concentrations have increased and pose a continuing threat to water quality.

### ***Existing Programs and Enforceable Policies and Mechanisms***

Activities under a number of existing federal, state, and local programs implement provisions of this management measure. In Ohio, concentrated animal feeding operations of >1,000 animal units are required by ORC 6111 to develop and implement a nutrient management plan. However, few other agricultural facilities have implemented a formal nutrient management plan and are not required to do so. Nutrient management for most agricultural facilities is accomplished primarily on a voluntary or incentive basis through implementation of recommended BMPs. Table 3-3 provides a summary of programs in Ohio applicable to this management measure; these programs are more fully described in Section 3.2.

Ohio's **Agricultural Pollution Abatement Program** incorporates management practices for handling waste waters as set forth in USDA's Technical Guide and as set out in the Ohio Livestock Manure and Wastewater Management Guide. This program also provides cost-share monies from the state to assist landowners in installing needed practices which prevent or abate degradation of waters of the state by confined animal facilities. Enforcement

authority for pollution abatement provisions is provided by statute to ODNR and is usually initiated on a complaint-driven basis; additional enforcement mechanisms are provided by Ohio EPA citation for violation of water quality standards, and by Division of Wildlife citation for wildlife kills or stream litter law violations. Compliance inspections and enforcement action for nutrient management planning required under ORC 6111 are usually initiated by complaint.

Enforcement action to abate nitrate pollution from agricultural operations can also be initiated under Ohio's safe drinking water laws. ORC 743.25 allows municipalities to protect, through regulation, the water quality of streams that are used for drinking or domestic purposes by that municipality. Such protective measures can be applied up to 20 miles from the municipality's borders. Ohio's **Groundwater Protection and Management Strategy** and **Source Water Protection Programs** establish initiatives to protect groundwater sources from pollution. Provisions of the **Source Water Protection Program** provide local public drinking water suppliers with regulatory authority to control sources of pollution within source water areas.

Other existing federal and state programs in Ohio provide technical, cost assistance, and education to encourage the use of BMPs that achieve compliance with this management measure (Table 3-3). Ohio's voluntary **Precision Farming/Manure Nutrient Management Program** provides education and technical assistance to help farmers determine a farm-specific nutrient application strategy that will ensure maximum utilization of the applied nutrients and minimize potential pollution hazards resulting from nutrient application. Program guidance includes recommended procedures for soil testing, determination of nutrient content and requirement, timing and application methods to reduce potential runoff, and proper calibration and operation of nutrient application equipment. Additional federal voluntary and incentive-based programs require compliance with conservation and nutrient management measures as a condition of receiving USDA benefits. Evaluation of the effectiveness of measures implemented under the various federal programs are provided by agency spot checks and by ODNR's evaluation of Ohio's National Resource Inventory report. Enforcement under the federal incentive programs can include the revocation of funding, restoration of practices, and, in some cases, the repayment of funding already allocated.

### **3.3.5 Pesticide Management Measure**

To reduce contamination of surface water and groundwater from pesticides:

- (1) Evaluate the pest problems, previous pest control measures, and cropping history;
- (2) Evaluate the soil and physical characteristics of the site including mixing, loading, and storage areas for potential leaching or runoff of pesticides. If leaching or runoff is found to occur, steps should be taken to prevent further contamination;
- (3) Use integrated pest management (IPM) strategies that: apply pesticides only when an economic benefit to the producer will be achieved (i.e., applications based on economic thresholds); and apply pesticides efficiently and at times when runoff losses are unlikely.

- (4) When pesticide applications are necessary and a choice of registered materials exists, consider the persistence, toxicity, runoff potential, and leaching potential of products in making a selection;
- (5) Periodically calibrate pesticide spray equipment; and
- (6) Use anti-backflow devices on hoses used for filling tank mixtures.
- (7) Provide for proper storage, handling, and disposal of pesticide materials.

### ***Applicability***

This management measure applies to activities associated with the application of pesticides to agricultural lands. Most of the pesticides in use today, at least those used on row crops in Ohio, dissolve more readily, have shorter half-lives, have minimal bioaccumulation effects and have smaller impacts on nontarget organisms than the organochlorine compounds used in the past. And, with the implementation of IPM and other BMPs, pesticide use amounts per acre are decreasing in Ohio. However, pesticide use is common in Ohio's § 6217 management area (particularly in the Maumee and Sandusky River basins where agricultural land use comprises over 80 percent of total land uses), and the potential of nonpoint contamination resulting from agricultural pesticide use remains an important water quality concern.

The Water Quality Laboratory at Heidelberg College began regular monitoring of several Ohio and Michigan tributaries to Lake Erie for a suite of pesticides in 1983. And, beginning in 1993, most Ohio public water systems have been required to periodically monitor for pesticides for which a Maximum Contaminant Level (MCL) has been established. The tributary monitoring data indicates that concentrations of pesticides rise rapidly during runoff of storm events following application, peak about the time of peak discharge, and decline slowly thereafter. The Sandusky and Maumee Rivers have substantially higher loads than the other tributaries, reflecting the extent of row crop agriculture in these basins. During storm events in the pesticide runoff season, individual samples commonly exceed the MCL for alachlor and atrazine in the Sandusky and Maumee Rivers. No long-term trends in pesticide concentrations are apparent in the tributary monitoring data to date.

### ***Existing Programs and Enforceable Policies and Mechanisms***

Ohio's approach to agricultural pesticide management incorporates activities under a number of existing federal, state, and local programs to implement the provisions of this management measure. A summary listing of applicable programs in Ohio are summarized in Table 3-4 and are more fully described in Section 3.2.

ODA's **Pesticide Program** sets regulatory standards for pesticide use, storage, and handling and establishes a pesticide applicator licensing/certification program. ODA also registers pesticides for use in Ohio. Additional enforcement mechanisms for nonpoint pollution caused by pesticides are provided by Ohio EPA citation for violation of water quality standards and by Division of Wildlife citation for wildlife kills or stream litter law violations. Voluntary **Integrated Pest Management** and **Integrated Crop Management** programs provide

education and technical assistance to landowners to implement BMP strategies for proper pesticide use.

Enforcement action to abate pesticide pollution from agricultural operations can also be initiated under Ohio's safe drinking water laws. ORC 743.25 allows municipalities to protect, through regulation, the water quality of streams that are used for drinking or domestic purposes by that municipality. Such protective measures can be applied up to 20 miles from the municipality's borders. Ohio's **Groundwater Protection and Management Strategy** and **Source Water Protection Programs** establish initiatives to protect groundwater sources from pollution. Provisions of the **Source Water Protection Program** provide local public drinking water suppliers with regulatory authority to control sources of pollution within source water areas.

Other existing federal and state programs in Ohio provide technical, cost assistance, and education to encourage the use of BMPs that achieve compliance with this management measure (Table 3-4). Most of these programs are voluntary; however, some of the federal programs are incentive-based in that they require compliance with conservation measures as a condition of receiving USDA benefits. Evaluation of the effectiveness of measures implemented under the various federal programs are provided by agency spot checks and by ODNR's evaluation of Ohio's National Resource Inventory report. Enforcement under the federal incentive programs can include the revocation of funding, reinstatement of BMPs, and, in some cases, the repayment of funding already allocated.

### **3.3.6 Grazing Management Measure**

Protect range, pasture, and other grazing lands:

- (1) By implementing one or more of the following to protect sensitive areas (such as streambanks, wetlands, estuaries, ponds, lake shores, and riparian zones): exclude livestock, provide stream crossings or hardened watering access for drinking, provide alternative drinking water locations; locate salt and additional shade, if needed, away from sensitive areas, or use improved grazing management (e.g., herding) to reduce the physical disturbance and reduce direct loading of animal waste and sediment caused by livestock; *and*
- (2) By achieving either of the following on all range, pasture, and other grazing lands not addressed under (1);
  - (a) Implement the range and pasture components of a Conservation Management System (CMS) as defined in the Field Office Technical Guide of the USDA-NRCS by applying the progressive planning approach of the USDA-Soil Conservation Service (NRCS) to reduce erosion, or
  - (b) Maintain range, pasture, and other grazing lands in accordance with activity plans established by either the Bureau of Land Management of the U.S. Department of the Interior or the Forest Service of USDA.

#### **Applicability**

This management measure applies to activities on irrigated and nonirrigated pasture and other grazing lands used by domestic livestock. Grazing activities in the § 6217 management area are very limited; most grazing activities in Ohio occur in Southeastern and Southwestern

Ohio. However, this management measure is included as part of this program plan and is addressed below.

### **Existing Programs and Enforceable Policies and Mechanisms**

Activities under a number of existing federal, state, and local programs implement the goals of this management measure. Grazing management in Ohio is accomplished primarily through voluntary or incentive-based implementation of Management Intensive Grazing and other grazing BMPs as specified by NRCS and state programs that are administered primarily at the local level. A summary listing of applicable programs in Ohio are summarized in Table 3-5 and are more fully described in Section 3.2.

Ohio's **Agricultural Pollution Abatement Program** incorporates erosion control specifications as set forth in USDA's Technical Guide into the provisions for the abatement and control of soil erosion. This program also provides cost-share monies from the state to assist landowners in installing needed practices that abate soil erosion or degradation of the waters of the state by soil sediment. Enforcement authority for pollution abatement provisions is provided by statute to ODNR and is usually initiated on a complaint-driven basis; additional enforcement mechanisms are provided by Ohio EPA citation for violation of water quality standards and by Division of Wildlife citation for wildlife kills or stream litter law violations.

Other existing federal and state programs in Ohio provide technical, cost assistance, and education to encourage the use of conservation practices that achieve compliance with this management measure (Table 3-5). Most of these programs are voluntary; however, some of the federal programs are incentive-based in that they require compliance with conservation measures as a condition of receiving USDA benefits. Evaluation of the effectiveness of measures implemented under the various federal programs are provided by agency spot checks and by ODNR's evaluation of Ohio's National Resource Inventory report. Enforcement under the federal incentive programs can include the revocation of funding, reinstatement of BMPs, and, in some cases, the repayment of funding already allocated.

### **3.3.7 Irrigation Water Management**

To reduce nonpoint source pollution of surface waters caused by irrigation:

- (1) Operate the irrigation system so that the timing and amount of irrigation water applied match crop water needs. This will require, as a minimum: (a) the accurate measurement of soil-water depletion volume and the volume of irrigation water applied, and (b) uniform application of water.
- (2) When chemigation is used, include backflow preventers for wells, minimize the harmful amounts of chemigated waters that discharge from the edge of the field, and control deep percolation. In cases where chemigation is performed with furrow irrigation systems, a tailwater management system may be needed.

The following limitations and special conditions apply:

- (1) In some locations, irrigation return flows are subject to other water rights or are required to maintain stream flow. In these special cases, on-site reuse could be precluded and would not be considered part of the management measure for such locations.

- (2) By increasing the water use efficiency, the discharge volume from the system will usually be reduced. While the total pollutant load may be reduced somewhat, there is the potential for an increase in the concentration of pollutants in the discharge. In these special cases, where living resources or human health may be adversely affected and where other management measures (nutrients and pesticides) do not reduce concentrations in the discharge, increasing water use efficiency would not be considered part of the management measure.
- (3) In some irrigation districts, the time interval between the order for and the delivery of irrigation water to the farm may limit the irrigator's ability to achieve the maximum on-farm application efficiencies that are otherwise possible.
- (4) In some locations, leaching is necessary to control salt in the soil profile. Leaching for salt control should be limited to the leaching requirement for the root zone.
- (5) Where leakage from delivery systems or return flows supports wetlands or wildlife protection areas, it may be preferable to modify the system to achieve a high level of efficiency and then divert the "saved water" to the wetland or wildlife protection area. This will improve the quality of water delivered to wetlands or wildlife protection areas by preventing the introduction of pollutants from irrigated lands to such diverted water.
- (6) In some locations, sprinkler irrigation is used for frost or freeze protection, or for crop cooling. In these special cases, applications should be limited to the amount necessary for crop protection, and applied water should remain on-site.

### ***Applicability***

This management measure applies to activities on irrigated lands, including agricultural crop and pasture land (except for isolated fields of less than 10 acres in size that are not contiguous to other irrigated lands); orchard land; specialty cropland; and nursery cropland. Irrigation activities in Ohio's § 6217 management area are limited and are not a significant source of nonpoint pollution in the Lake Erie Basin. However, irrigation may increase as new agricultural practices to increase yield are developed and implemented; therefore, this management measure is included as part of this program plan and is addressed below.

### ***Existing Programs and Enforceable Policies and Mechanisms***

A variety of state and federal agencies have provided funding for field demonstration projects implementing Wetland Reservoir Sub-Irrigation Systems. Demonstration projects have been established in the Maumee River Watershed in Defiance, Van Wert, and Fulton counties to show how construction and management of wetlands coupled with sub-irrigation can increase farm incomes and improve the environment. These systems link a wetland and water supply reservoir designed to collect surface drainage with a network of subsurface drainage pipes that can be used to sub-irrigate crops through the root zone. A properly designed Wetland Reservoir Sub-Irrigation System has the potential to produce zero discharge to streams. Although this is a relatively high-cost practice at the present time, the resulting increase in crop yield may lead to expanded future occurrence of irrigation systems in Ohio agriculture.

Several other voluntary or incentive federal and state programs in Ohio provide technical, cost assistance, and education to encourage the use of conservation practices that achieve compliance with this management measure (Table 3-6 and Section 3.2). Most of these

programs are voluntary; however, some of the federal programs are incentive-based in that they require compliance with conservation measures as a condition of receiving USDA benefits. Evaluation of the effectiveness of measures implemented under the various federal programs are provided through agency spot checks and through ODNR's evaluation of Ohio's National Resource Inventory report. Enforcement under the federal incentive programs can include the revocation of funding and in some cases the repayment of funding already allocated. Enforcement authority for pollution abatement provisions is provided by statute to ODNR and is usually initiated on a complaint-driven basis; additional enforcement mechanisms are provided by Ohio EPA citation for violation of water quality standards and by Division of Wildlife citation for wildlife kills or stream litter law violation.

### **3.4 Strategies and Recommendations**

Over the past two years several public participation processes were put in place to assess nonpoint sources of pollution in the coastal area and throughout the state. In September 1997, ODNR convened six committees to assess coastal nonpoint problems, including agriculture. Subsequently, the Department initiated a statewide nonpoint source planning process, creating ten work groups, one of which dealt with agricultural nonpoint source pollution. The work of both the coastal and statewide agricultural groups has been integrated here. What follows is a brief summary of the major agricultural pollution issues affecting coastal waters, major goals for program improvement, recommendations for pollution reduction, and initiatives of the State of Ohio for the next ten years based on those recommendations.

In addition to the general issues listed on page 2-13, pollution issues for coastal waters specific to agriculture include:

- Sedimentation caused by the erosion of cropland and transport of fine clay soils during storm events.
- High nutrient concentrations associated with the attachment of particulate phosphorus to sediment and the movement of soluble nitrogen and phosphorus from cropland.
- Alteration of stream habitat associated with the development of extensive artificial drainage systems.
- Violations of drinking water standards caused by pesticide runoff from cropland.

In general, livestock operations do not pose significant water quality problems in the coastal area; however, some areas, e.g., Fulton County, have significant numbers of hogs, and other areas are experiencing rapid growth of new operations, e.g., Seneca and Wyandot Counties.

Many programs are being conducted or are planned to reduce the impacts of these nonpoint source problems. In addition, trends in agricultural chemical use are reducing the amounts of pesticides and phosphorus being applied. However, several issues are a concern and require state, federal, and local intervention to help reverse trends, e.g., the decline of no till corn acreage in Northwest Ohio.

The control of agricultural nonpoint pollution in Ohio is currently provided by a variety of existing federal, state, and local programs which involve regulatory, incentive, and voluntary approaches to achieving substantial conformity with the specified management measures. In most cases, conformance with the management measures will be achieved by voluntary or

incentive-based implementation of BMPs and conservation planning. Enforcement authority is provided on a complaint-driven basis for livestock waste and erosion control; however, enforcement authority and mandatory implementation requirements are not currently provided for agricultural management measures.

Future efforts to improve implementation and enforcement of specific management measures will be directed to those areas where water quality impairments persist. Several recommendations for program improvement have been suggested by the coastal agricultural work group (Appendix F). The work group identified control of sediment erosion and improvement of manure, pesticide, and nutrient management as primary issues of concern. Major goals for program improvement will focus on efforts designed to achieve: 1) a 65 percent reduction in sediment transport as compared to 1975 water quality monitoring data; 2) an increase in the use of conservation tillage practices to between 65–70 percent of the total crop acreage; and 3) more nutrient management planning to reduce the amount of nitrates and pesticides in surface waters.

**The following recommendations were derived from coastal and statewide nonpoint source work groups. Although several recommendations are being implemented or are under consideration, taken as a whole they do not, at this time, represent policy adopted by the State of Ohio. Further evaluation and consensus building will be undertaken to allow Ohio to develop a comprehensive implementation agenda.**

**Objective 1**

Implement a comprehensive monitoring program to target nonpoint source pollution initiatives and provide an evaluation tool to determine the effectiveness of rural nonpoint source pollution abatement programs.

Objective 1 Recommendation	Measure of Success	Resources Needed	Responsible Agency	Time frame
Develop and implement program to annually track adoption and usage of conservation tillage practices.	Report and analysis of data collected	Funding from Lake Erie Protection Fund Staff	NRCS	Year 1 (and annually thereafter)
Expand the Lake Erie monitoring program in targeted watersheds to evaluate the extent of pesticide, sediment, and nutrient transport.	Water monitoring results, analysis, and data distributed to interested parties and available to the general public.	Funding Agency staff Shareholder input and support	ODNR Heidelberg College USGS	Year 1

## Objective 2

Develop and offer voluntary incentive programs to encourage local voluntary adoption of BMPs based on targeting by the water quality-monitoring program.

Objective 2 Recommendation	Measure of Success	Resources Needed	Responsible Agency	Time frame
Develop an incentive program to encourage landowner adoption of sediment entrapment practices such as water and sediment control basins and wetlands.	Reduction of sediment and attached pollutants to monitored waterbodies.	Funding Agency staff Partnership with local watershed group(s)	ODNR NRCS/FSA	Year 3
Develop or strengthen existing programs to encourage low input sustainable agriculture in targeted watersheds.	Reduction of pesticides and other pollutants in target watersheds. Number of farms that adopt sustainable management systems.	Agency staff Partnership with sustainable agriculture groups	Sustainable Agriculture Groups OSUE ODNR	Year 4
Develop a program to offer tax abatement to farmers implementing conservation BMPs in drinking water source supply watersheds.	Number of farms implementing targeted pollutant control BMPs. Reduction of targeted pollutant load in source water supply watershed. Reduction in treatment costs for source water supply.	Funding Watershed and community support Monitoring for targeting and evaluation	Farm Group(s) Ohio EPA ODNR County Auditors	Year 5
Develop and implement education and incentive program that promotes adoption of these BMPs: cover crops, filterstrips, grassed waterways and riparian areas, conservation tillage, manure storage and nutrient management, stripcropping, windbreaks.	BMPs adopted	Funding	OSUE SWCDs NRCS ODNR Ohio EPA	Years 1-5
Develop and implement a program that encourages private energy utilities to work with farmers and rural landowners to install BMPs that will earn the utility pollution credits.	Development and implementation of the program. Increase adoption of specific BMPs within targeted areas.	Funding Agency staff Private energy companies and utility leadership	OSUE ODNR Electric companies	Year 9

### Objective 3

Initiate, implement, and use the data from research to target nonpoint source pollution prevention efforts and develop science-based and economically sound pollution abatement initiatives.

Objective 3 Recommendation	Measure of Success	Resources Needed	Responsible Agency	Time frame
Develop a procedure to determine watershed nutrient budgets and predict levels of imbalance.	Procedure developed, evaluated, and distributed.	Funding Agency staff	OSUE/OARDC SWCDs NRCS	Year 5
Develop a research initiative to determine how Lake Erie streams assimilate sediment loads.	Data collected, analyzed and distributed.	Funding Agency Staff	ODNR USGS Ohio LE Office	Year 3
Develop research initiative to address slugs and gray spot on corn in reduced tillage systems.	Data collected, analyzed, and distributed.	Funding Agency Staff Support from Crop Consulting and Grain Industry	OSUE/OARDC Private Agriculture Industry	Years 2 and 3
Encourage producer education by agriculture industries of precision pesticide application and their help to mainstream the practices.	Wider adoption of precision pesticide application BMPs in Ohio	Funding Agency staff Agri-Business	OSUE/OARDC Agri-Business	Years 2-4
Evaluate riparian area impacts on water quality in targeted watersheds, specifically the effectiveness of different widths, plantings, and placement in the stream profile.	Report of findings and distribution to interested parties and available to the general public. Information will assist policy- and rule-making entities.	Funding Agency staff	OSUE/OARDC USGS ODNR Ohio LE Office GLNPO	Year 2
Develop and implement a source water protection program that prioritizes sensitive areas and stream corridor protection.	Source water protection and stream corridor protection program developed and implemented.	DWF Funding Agency staff	Ohio EPA Local Water Suppliers	Years 1-5
Standardize land application of manure, sludge, and other fertilizer recommendation and, where applicable, standards.	Ohio will have one standard for land application of nutrients.	Agency staff Public and industry support	ODNR NRCS ODA OSUE	Year 4

## Objective 4

Develop partnerships with private industry and local watershed or community organizations to initiate education programs and encourage voluntary adoption of BMPs.

Objective 4 Recommendation	Measure of Success	Resources Needed	Responsible Agency	Timeframe
Develop education program to assist in the use of precision pesticide application equipment.	Reduction of identified pesticides in targeted source water supply systems	Funding Greater interaction with and encouragement of commercial applicator industry	OSUE ODNR CCA Watershed Group(s)	Year 4
Develop economic fact sheets that indicate the benefits and costs of implementing BMPs in targeted watersheds.	Development of fact sheets Increased number of landowners who adopt BMPs	Funding Local Agency staff	OSUE Watershed Group(s) Ohio EPA Lake Erie Protection Fund	Years 2 and 3
Promote the establishment of new and protection of existing riparian areas to counter the misconception that "bare banks are better."	Increase in riparian areas along streams in targeted watersheds	GRF and USDA Funding Local Agency staff	OSUE ODNR USDA/NRCS SWCDs	Years 1-5
Revitalize project Greenstripe or similar program that combines public and private funds and efforts to encourage adoption of riparian areas and field buffers.	Riparian area and field buffers established and maintained	Funding Staff	ODNR SWCDs NRCS Agri-Industry	Years 1-5
Develop a marketing program for reduced rate pesticide application and IPM through the private crop consulting industry.	Reduction of the use of specific pesticides in targeted watersheds	Incentive Funding Crop Consulting Industry Cooperation	OSUE ODNR Private Crop Consulting Industry	Year 3

The State of Ohio will address the issues and recommendations of the respective work groups by implementing the following initiatives:

- Initiation of a CREP in cooperation with UDSA to protect 60,000 riparian acres and over 6,000 miles of stream in the west and west-central portions of the basin, which is the primary source area for sediment, pesticides, and nutrients. Acquisition of long-term and permanent easements along streams will also allow the demonstration of stream channel restoration utilizing two-stage channels and other mechanisms to promote riparian/floodplain retention and processing of sediment and nutrients. Research projects are underway to determine appropriate design standards to help overcome modification of natural channel morphology. Several other programs will complement CREP, including the Wetland Reserve Partnership Program, the regular

CRP, and the efforts of several basin land trusts to purchase conservation easements along basin streams and rivers.

- ODNR and other agencies and organizations are funding several applied research projects to overcome the wetness, disease, and weed problems associated with no-till and conservation tilled corn. The decline of conservation tillage on these acres is of great concern because of the beneficial impact the practice has had on reducing sediment and phosphorus loads to the Lake. Coupled with increased riparian buffers, expansion of conservation tillage is the favored strategy to reach Lake Erie's long-term sediment reduction targets. The state intends to continue directing resources to this issue by encouraging use of Section 319 and special funding from the State of Ohio for continued demonstration of improved conservation tillage and no-till techniques.
- Although existing trends indicate reduced pesticide use, efforts are underway by OSUE to expand the use of satellite tracking and precision application to maximize chemical inputs even further. Section 319 grants and state cost sharing have been used to help decrease the costs associated with this new technology. Additional efforts are underway to assist farm suppliers to purchase equipment and software, as well as providing incentives to farmers (such as covering the cost of additional soil testing) to encourage wider participation in demonstration and research projects.
- SWCDs are playing a stronger role in the siting and design of new livestock operations in the basin. Over the next two years, the Division of Soil and Water Conservation is also planning on adding two Pollution Abatement Specialists and two engineers to assist livestock farmers in the Lake Erie basin with development of nutrient management plans and design livestock waste holding facilities which meet state and federal standards. In addition, Ohio State University and OSUE will add three new livestock related positions to expand waste management and nutrient management training and research. Finally, legislative proposals are being considered to expand state regulatory authority over very large livestock operations and address NPDES permitting requirements for animal feeding operations. Ohio anticipates having stronger authority to deal with problem facilities and to require local approval of manure management plans.
- Sustainable agricultural programs are being conducted by OSUE in cooperation with several farm organizations such as the Innovative Farmers of Ohio.

Evaluation and tracking of the progress that existing programs have had on the control of agricultural nonpoint pollution is provided in Chapter 11 of this report. Ohio is fortunate to possess one of the finest tributary monitoring programs in the nation conducted by the Water Quality Laboratory at Heidelberg College. The ODNR Division of Soil and Water Conservation currently provides over \$200,000 annually to help maintain the program. Tributary monitoring will be the primary mechanism for evaluating the success of the agricultural pollution abatement program. Additional tributary monitoring will be carried out as part of the CREP to ascertain the impact that buffer strips and other practices have on sediment and chemical loading to Lake Erie by adding a permanent station on the Vermilion River.

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**Table 3-1. Agriculture Management Measure—Erosion and Sediment Control**

Program	Legislation	Regulation/Program	Applicable Measures	Status	Implementing Agency	Enforcement Provisions	Evaluation Measures
USDA Conservation Provisions	Farm Bill of 1996; Federal Agriculture Improvement & Reform Act of 1996; Food Security Act of 1985	Highly Erodible Cropland Conservation; Swampbuster; Sodbuster	Implementation of Conservation Plan	Voluntary Incentive	FSA/NRCS	Yes, If Receiving USDA Funding	Spot Checks; NRI Analysis
		Wetlands Reserve Program	Easement Program to Restore/Protect Wetlands	Voluntary Incentive	FSA/NRCS	Yes, If Receiving USDA Funding	Spot Checks; NRI Analysis
		Environmental Quality Incentives Program	Cost & Tech. Assist. for Implementation of Conservation Practices	Voluntary Incentive	FSA/NRCS	Yes, If Receiving USDA Funding	Spot Checks; NRI Analysis
		Wildlife Habitat Incentives Program	Cost Assist. for Implementation of Wildlife Habitat Development Plan	Voluntary Incentive	FSA/NRCS	Yes, If Receiving USDA Funding	Spot Checks; NRI Analysis
		Conservation Farm Option Program	Cost Assist. for Implementation of Conservation Plan, Practices	Voluntary Incentive	NRCS	Yes, If Receiving USDA Funding	
		Conservation Reserve Program	Cost Assist. for Long-Term Conversion of Cropland to More Stable Use	Voluntary Incentive	FSA/NRCS	Yes, If Receiving USDA Funding	Spot Checks; NRI Analysis
Conservation Operation and Grazing Lands Program	Soil Conservation Act of 1935		Tech. Assist. for Implementation of Conservation Plan, Practices	Voluntary	NRCS		
Public Law 566 Watershed Programs	Watershed Protection and Flood Prevention Act		Tech. & Cost Assist. for Establishing Conservation Measures	Voluntary Incentive	FSA/NRCS	Yes, If Receiving USDA Funding	
Ohio Agricultural Pollution Abatement Program	ORC 1511.02 ORC 1515.08 (SWCD)	OAC 1501:15-5	Criteria & Standards for Agricultural Water Quality BMPs; Cost-Sharing for Establishing BMPs; Education & Tech. Assist.	Regulatory Incentive	SWCD/ODNR	Yes	Complaint-Driven

**Table 3-1. Agriculture Management Measure—Erosion and Sediment Control**

Program	Legislation	Regulation/Program	Applicable Measures	Status	Implementing Agency	Enforcement Provisions	Evaluation Measures
Division of Wildlife Conservation Works of Improvement	ORC 1531 ORC 1515.08	OAC 1501:31	Damage to Wildlife/Habitat Funding & Tech. Assist. for Drainage/Erosion Control Projects	Regulatory Voluntary	DOW SWCD/ODNR	Yes - Citations None	Complaints-Observation Annual Maintenance Review; Spot Checks
Conservation Action Project			Education/Tech. Assist. to Encourage BMP Use	Voluntary	Industry, SWCD		
Special Water Quality Projects			Cost-Sharing for BMP Installation	Voluntary	NRCS/OEPA		
Conservation & Water Quality Education			Education, Cost & Tech. Assist., Special Projects	Voluntary	OSUE		
Clean Water Act, Section 319 NPS Grant Programs	ORC 6111	OAC 3745-1	Financial Assist. for Projects Implementing the State's NPS Management Program	Voluntary	OEPA/ODNR/ SWCD/HD; Local Watershed Groups		
Stream Bank Stabilization & Forest Buffer Project; Natureworks			Demonstration Projects; Tech. Assist. for Protection of Riparian Corridors	Voluntary Incentive	ODNR	Easements	
Operation Greenstripe			Funding to Establish Buffer Areas Along Cropland	Voluntary	FFA, Monsanto		
Western Lake Erie CREP			Funding to Establish Riparian Buffers and Other BMPs	Voluntary	FSA/NRCS, ODNR		

**Table 3-2. Agriculture Management Measure—Facility Wastewater and Runoff from Confined Animal Facility Management (Large and Small Units)**

Program	Legislation	Regulation/ Program	Applicable Measures	Status	Implementing Agency	Enforcement Provisions	Evaluation Measures
USDA Conservation Provisions	Farm Bill of 1996	Environmental Quality Incentives Program	Cost & Tech. Assist. for Implementation of Conservation Practices	Voluntary Incentive	FSA/NRCS	Yes, If Receiving USDA Funding	Spot Checks; NRI Analysis
Conservation Operation and Grazing Lands Program	Soil Conservation Act of 1935		Tech. Assist. for Implementation of Conservation Plan, Practices	Voluntary	NRCS		
Ohio Agricultural Pollution Abatement Program	ORC 1511.02 ORC 1515.08 (SWCD)	OAC 1501:15-5	Criteria & Standards for Agricultural Water Quality BMPs	Regulatory	SWCD/ODNR	Orders	Complaint-Driven
	ORC 1531	OAC 1501:31	Damage to Wildlife/Habitat	Regulatory	Division of Wildlife	Yes-Citations	Complaints-Observ.
Section 319 NPS Programs	Clean Water Act ORC 6111	OAC 3745-1	Financial Assist. for Projects Implementing the State's NPS Management Program	Voluntary Regulatory	OEPA/ODNR	Citations for Water Quality Violations	Water Quality Monitoring; Complaints
Special Water Quality Projects			Cost-Sharing for BMP Installation	Voluntary	NRCS/OEPA		
Water Pollution Control Loan Fund	ORC 6111		Low Interest Loans for Construction of Control Measures	Voluntary	OEPA		
Manure Nutrient Management Program			Education, Tech. Assist. & Cost Sharing for Imp. of Waste Mgmt. BMPs	Voluntary	ODNR, NRCS		
Livestock Environmental Assurance Program			Education/Tech. Assist. to Encourage BMP Use	Voluntary	Private Industry		
Farm*A*Syst Program			Education/Tech. Assist. to Encourage BMP Use	Voluntary	OEPA, OSUE, NRCS, ODNR, DSWC		
Source Water Protection Programs	SDWA, Section 1453 ORC 743.25		Protection of Drinking Water Sources from Potential Pollution Sources	Regulatory	OEPA, Local Jurisdictions	Yes, Local Restrictions Possible	
Groundwater Protection and Management Strategy	Safe Drinking Water Act		Testing for Nitrate Contamination in Drinking Water	Voluntary	OEPA		

**Table 3-3. Agriculture Management Measure—Nutrient Management**

Program	Legislation	Regulation/ Program	Applicable Measures	Status	Implementing Agency	Enforcement Provisions	Evaluation Measures
USDA Conservation Provisions	Federal Agriculture Improvement & Reform Act of 1996 Farm Bill of 1996	Conservation Reserve Program	Cost Assist. for Long-Term Conversion of Cropland to More Stable Use	Voluntary Incentive	FSA/NRCS	Yes, If Receiving USDA Funding	Spot Checks, NRI Analysis
		Environmental Quality Incentives Program	Cost & Tech. Assist. for Implementation of Conservation Practices	Voluntary Incentive	FSA/NRCS	Yes, If Receiving USDA Funding	Spot Checks, NRI Analysis
Conservation Operation and Grazing Lands Program	Soil Conservation Act of 1935		Tech. Assist. for Implementation of Nutrient Mgmt./Conservation Plans	Voluntary	NRCS		
Ohio Agricultural Pollution Abatement Program	ORC 1511.02 ORC 1515.08 (SWCD)	OAC 1501:15-5	Criteria & Standards for Agricultural Water Quality BMPs	Regulatory	SWCD/ODNR	Orders for Failure to Use BMPs	Water Quality Monitoring Complaints
Section 319 NPS Programs	ORC 1531	OAC 1501:31	Damage to Wildlife/Habitat	Regulatory	Division of Wildlife	Yes-Citations	Complaints-Observ.
	ORC 6111	OAC 3745-1	Financial Assist. for Projects Implementing the State's NPS Management Program; Nutrient Mgmt. Plans Req'd for Livestock Facilities >1,000 AU	Voluntary Regulatory	OEPA/ODNR	Citations for Water Quality Violations	Water Quality Monitoring Complaints
Precision Farming/ Nutrient Management Program			Cost & Tech. Assist. to Implement Nutrient Mgmt. & Innovative Technologies	Voluntary	Industry, OSUE, ODNR, SWCD, OEPA		
Integrated Crop Management			Education & Tech. Assist. to Implement Chemical Mgmt. BMPs	Voluntary	FSA, OSUE		
Integrated Farm Management Program			Education & Tech. Assist. to Adopt Site-Specific Farm Management Plans	Voluntary	SWCD/NRCS		
Special Water Quality Projects			Cost-Sharing for BMP Installation	Voluntary	FSA/OEPA		
Western Lake Erie CREP			Funding to Establish Riparian Buffers and Other BMPs	Voluntary	FSA/NRCS, ODNR		

**Table 3-3. Agriculture Management Measure—Nutrient Management**

<b>Program</b>	<b>Legislation</b>	<b>Regulation/ Program</b>	<b>Applicable Measures</b>	<b>Status</b>	<b>Implementing Agency</b>	<b>Enforcement Provisions</b>	<b>Evaluation Measures</b>
Conservation & Water Quality Education			Education, Tech. Assist.	Voluntary	OSUE		
Source Water Protection Programs	SDWA, Section 1453 ORC 743.25		Protection of Drinking Water Sources from Potential Pollution Sources	Regulatory	OEPA, Local Jurisdictions	Yes, Local Restrictions Possible	
Groundwater Protection and Management Strategy	Safe Drinking Water Act		Testing for Nitrate Contamination in Drinking Water	Voluntary	OEPA		

**Table 3-4. Agriculture Management Measure—Pesticide Management**

Program	Legislation	Regulation	Applicable Measures	Status	Implementing Agency	Enforcement Authority	Evaluation Measures
USDA Conservation Provisions	Federal Agriculture Improvement & Reform Act of 1996	Conservation Reserve Program	Cost Assist. for Long-Term Conversion of Cropland to More Stable Use	Voluntary	FSA/NRCS		Spot Checks; NRI Analysis
		Environmental Quality Incentives Program	Cost & Tech. Assist. for Implementation of Conservation Practices	Voluntary Incentive	FSA/NRCS	Yes, If Receiving USDA Funding	Spot Checks; NRI Analysis
Conservation Operation and Grazing Lands Program	Soil Conservation Act of 1935		Tech. Assist. for Implementation of Conservation/Pest Mgmt. Plan	Voluntary	NRCS		
Public Law 566 Watershed Programs			Tech. & Cost Assist. for Establishing Conservation Measures	Voluntary	NRCS/USDA	Yes, If Receiving USDA Funding	
Special Water Quality Projects			Cost-Sharing for BMP Installation	Voluntary	FSA/OEPA		
Conservation & Water Quality Education			Education, Tech. Assist.	Voluntary	OSUE		
Clean Water Act, Section 319 NPS Programs	ORC 6111	OAC 3745-1	Financial Assist. for Projects Implementing the State's NPS Management Program	Voluntary Regulatory	OEPA/ODNR	Yes-Citations for Water Quality Violations	Water Quality Monitoring; Complaints
Integrated Crop Management			Education & Tech. Assist. to Implement Chemical Mgmt. BMPs	Voluntary	FSA, OSUE		
Integrated Pest Management Program			Education & Tech. Assist. Re: Pesticide Mgmt.	Voluntary	OSUE, OSU		
Integrated Farm Management Program			Education & Tech. Assist. to Adopt Site-Specific Farm Management Plan	Voluntary	SWCD/NRCS		
Operation Greenstripe			Funding to Establish Buffer Areas Along Cropland	Voluntary	FFA, Monsanto		

**Table 3-4. Agriculture Management Measure—Pesticide Management**

Program	Legislation	Regulation	Applicable Measures	Status	Implementing Agency	Enforcement Authority	Evaluation Measures
Pesticide License Applicator Certif. Program; Pesticide Registration Program	ORC 921		Training/Licensing Program for Restricted Pesticide Use, Handling	Regulatory	OSUE, ODA	Yes	
Source Water Protection Programs	SDWA, Section 1453 ORC 743.25		Protection of Drinking Water Sources From Potential Pollution Sources	Regulatory	OEPA, Local Jurisdictions	Yes, Local Restrictions Possible	
Farm*A*Syst Program			Education/Tech. Assist. to Encourage BMP Use	Voluntary	OEPA, OSUE, ODNR, DSWC, NRCS		
Clean Sweep Program			Free Disposal for Unused Pesticides	Voluntary	ODA		
Groundwater Protection and Management Strategy	Safe Drinking Water Act		Testing for Nitrate Contamination in Drinking Water	Voluntary	OEPA		

**Table 3-5. Agriculture Management Measure—Grazing Management**

Program	Legislation	Regulation/ Program	Applicable Measures	Status	Implementing Agency	Enforcement Authority	Evaluation Measures
USDA Conservation Provisions	Farm Bill of 1996	Wetlands Reserve Program	Easement Program to Restore/Protect Wetlands	Voluntary Incentive	FSA/NRCS	Yes, If Receiving USDA Funding	Spot Checks; NRI Analysis
		Environmental Quality Incentives Program	Cost & Tech. Assist. for Implementation of Conservation Practices	Voluntary Incentive	FSA/NRCS	Yes, If Receiving USDA Funding	Spot Checks; NRI Analysis
Conservation Operation and Grazing Lands Program	Soil Conservation Act of 1935		Tech. Assist. for Implementation of Conservation Plan, Practices	Voluntary	NRCS	Yes, If Receiving USDA Funding	Spot Checks; NRI Analysis
	ORC 1531	OAC 1501:31	Damage to Wildlife/Habitats	Regulatory	Division of Wildlife	Yes-Citations	Complaints-Observ.
Conservation & Water Quality Education			Education, Tech. Assist.	Voluntary	OSUE		
Clean Water Act, Section 319 NPS Programs	ORC 6111	OAC 3745-1	Financial Assist. for Projects Implementing the State's NPS Management Program	Voluntary Regulatory	Ohio EPA/ODNR	Yes-for Confined Operations Only	
NatureWorks Streambank Stabilization & Forest Buffer Project			Tech. Assistance & Cost Sharing	Voluntary	ODNR		
Ohio Forage & Grassland Council; Great Lakes Grazing Council		Grazing Lands Conservation Initiative	Education & Technical Support	Voluntary	NRCS/OSUE		
Ohio Agricultural Pollution Abatement Program	ORC 1511.02 ORC 1515.08 (SWCD)	OAC 1501:15-5	Criteria & Standards for Agricultural Water Quality BMPs; Cost-Sharing for Establishing BMPs; Education & Tech. Assist.	Regulatory Incentive	SWCD/ODNR	Yes	Complaint-Driven

**Table 3-6. Agriculture Management Measure—Irrigation Water Management**

<b>Program</b>	<b>Legislation</b>	<b>Regulation</b>	<b>Applicable Measures</b>	<b>Status</b>	<b>Implementing Agency</b>	<b>Enforcement Authority</b>	<b>Evaluation Measures</b>
USDA Conservation Provisions	Farm Bill of 1996	Environmental Quality Incentives Program (ACP, WQIP)	Cost & Tech. Assist. for Implementation of Conservation Practices	Voluntary Incentive	FSA/NRCS	Yes, If Receiving USDA Funding	Spot Checks, NRI Analysis
Conservation Operation and Grazing Lands Program	Soil Conservation Act of 1935		Tech. Assist. for Implementation of Conservation Plan, Practices	Voluntary	NRCS	Yes, If Receiving USDA Funding	Spot Checks, NRI Analysis
Public Law 566 Watershed Programs			Tech. & Cost Assist. for Establishing Conservation Measures	Voluntary	NRCS/USDA	Yes, If Receiving USDA Funding	
Special Water Quality Projects			Cost-Sharing for BMP Installation	Voluntary	FSA/OEPA		
Conservation & Water Quality Education			Education, Tech. Assist.	Voluntary	OSUE		
Section 319 NPS Programs	Clean Water Act ORC 6111	OAC 3745-1	Financial Assist. for Projects Implementing the State's NPS Management Program	Voluntary Regulatory	OEPA/ODNR	Yes, Citations for Water Quality Violations	Water Quality Monitoring Complaints
Demonstration Projects			Field Demonstrations—Wetland Reservoir Subirrigation Systems	Voluntary	NRCS/OSUE		

