

# **Chapter 7**

## **Management Measures for Hydromodification**

### **7.1 Introduction**

The alteration of Ohio's waterways has been an inevitable consequence of the state's economic growth and development. Settlers found the soils of Ohio to be generally well-suited for farming, except for wetness limitations on approximately half of the land. Extensive drainage systems were installed to drain the wetlands and make the land habitable and productive. As population and commerce expanded, dams were constructed for flood control, to provide public water supplies, and to create recreational lakes; and channels were dredged to facilitate navigation on waterways. While these types of hydrologic modifications contributed significantly to the economic growth and development of Ohio, they also drastically altered the natural environment. Over 95% of the state's wetlands were converted to agricultural or urban land uses, and many miles of natural stream habitat were degraded by channel modification (Figure 7-1). Nonpoint source impacts resulting from hydromodification activities in Ohio include short- and long-term water quality degradation, accelerated erosion and sedimentation, destruction of aquatic habitat, and impairment or elimination of certain beneficial functions performed by Ohio's waters.

The leading sources of impairment are illustrated in Figure 7-1. In 1998, hydromodification became the leading source of impairment, overtaking point sources for the first time. Hydromodification refers to physical alterations of streams that alter flow. Many activities are classified as hydromodification, including channelization, damming, dredging, changing floodplain functions, increasing impervious surface in the watershed, removing riparian (streamside) vegetation, and modifying streambanks.

Rivers are highly complex systems influenced by a number of variables, and, as is the case with so many natural systems, if one variable is changed, it produces change in the others. The most important variables in natural stream function are:

- **Flow:** The volume and velocity of water delivered to the stream.
- **Gradient:** The slope of the streambed.
- **Sediment Load:** The amount of natural sediment delivered to and transported by the river system.
- **Channel Shape:** The physical structure of the channel, its links with the floodplain and the degree of meander (sinuosity).

Changes in any of these variables affect the balance of the river system and can produce degradation of downstream reaches. If changes are made in streams that affect the flow, gradient, sediment load, or channel shape, the downstream reaches will adjust to accommodate the volume of water available, the channel's characteristics, and the velocity necessary to transport the sediment load. Often, downstream problems, like flooding, bank erosion, and deepening of channels, can be directly attributed to upstream degradation.

Healthy headwater streams provide ecological benefits by:

- Removing and sequestering pollutants before they reach the stream and as they are transported downstream.
- Supplying organic material (branches and leaves) that form the energy base of a healthy food chain.
- Increasing the trophic state of nutrients as simple nutrients are incorporated into the food web (macroinvertebrates, fish, etc.).
- Providing unique habitats for key aquatic species, some of which are rare, endangered, or threatened species.
- Lessening floodwaters and maintaining baseflow groundwater storage.
- Providing the gravel of stream beds and riffles while cycling fine sediments into long-term storage as floodplains

In a natural system, streams provide four basic functions:

- Drainage of overland flow—headwater stream areas form the principal interface between land and water resources. They collect water runoff and deliver it downstream in a more concentrated pattern.
- Trapping of pollutants and sediments—in natural headwater streams, the near-stream areas and unconcentrated nature of flow allows for pollutants and sediments to be trapped in organic matters of the riparian areas. Nitrogen, phosphorus, and sediments are all trapped by natural headwaters.
- Water storage and slow release—headwater stream areas have a great capability to store water in their banks, beds, and floodplains and later release this water in a gradual manner which serves to replenish and maintain base flows.
- Basic energy supply—organic materials contributed by headwater stream areas form the basis for healthy aquatic life. Debris from wooded riparian corridors, filter strips and overland flow is delivered to the stream and forms the basic building blocks for the aquatic food web.

Hydromodification activities adversely affect these functions.

Hydromodification, the direct physical alteration of habitats, is the most prevalent source of degradation in streams (Ohio EPA, *The State of the Aquatic Ecosystem*, 1998). The major reasons for such alterations are agricultural activities (such as drainage) and suburban and urban development (e.g., flood control, construction). Modifications can include activities that encroach on a stream's riparian area, as well as direct modifications to the channel itself. Historically, agriculture has been the most prevalent source of impairment, but urban development activities are increasing at a rapid rate, and the impacts on surface waters are among the most severe and least restorable. Hydromodification activities are listed and described below:

- Widening, deepening of channel (channelization, dredging)—Manipulating width or depth variable to increase channel capacity.

- Stream relocating—Moving streams to the property edge to maximize amount of developable areas in new land development projects resulting in channelization and loss of habitat.
- Decreasing channel length—Cutting off oxbows or natural stream meanders to maximize land availability and facilitate development projects resulting in channelization and loss of habitat.
- Headwater stream and wetlands fills—Filling in headwater streams and small wetlands (such as vernal pools or swales) and routing runoff into detention ponds or into ditches.
- Straightening—Steepening the gradient to increase the flow velocity.
- Levee construction—Confining floodwaters by raising the height of the channel banks.
- Bank stabilization—Use of structures and hard engineering (e.g., gabions, riprap, steel piles) to control bank erosion.
- Clearing and snagging—Decreasing the hydraulic resistance and increasing the flow velocity by removing obstructions. (Note: These are hydromodifications that the USACE may not regulate.)
- Riparian encroachment—Clearing stream or river banks of trees and woody vegetation to decrease resistance and increase the flow velocity or merely to provide a view of the river or creek. (Note: This is a hydromodification that the USACE may not regulate.)
- Flow regulation—Impoundments, water withdrawal, and dams constructed for flood control, water supply, or power generation.
- Bridge construction—Construction of river crossings that may require culverts or structures in the river that change the flow pattern or channel slope.
- Culverting—Construction of stream or ravine crossings with tube or box culverts alters stream bottom substrate and banks.
- Draining, filling—Removing water from natural wetlands by increasing the rate of drainage to provide faster delivery to the river system; loss of groundwater recharge areas.

Other activities that affect the function of streams are those that change runoff patterns and alter the amounts of natural inputs (e.g., sediment, organic matter). Increasing impervious surfaces, directing roof runoff directly into storm sewers, concentrating runoff, or piping small streams change the velocity, volume, and delivery patterns of runoff, disturbing natural balances of the water courses.

## **7.2 Hydromodification Activities that Impact Coastal Waters**

Hydromodification activities that can impact coastal waters are separated into three categories: channelization and channel modification activities, construction and operation of dams, and streambank and shoreline erosion. Channelization or channel modification activities can result in habitat alteration, an increase in sediment erosion, transport, and

deposition, and the increased movement of nonpoint source pollutants downstream. Dam siting, construction, and operation can adversely impact the hydraulic regime, the quality of surface waters, and habitat in the stream or river where the dam is located. The erosion of shorelines and streambanks can have adverse impacts on riparian habitat due to increased sediment loads, turbidity, and nutrients.

### **7.2.1 Channelization and Channel Modification**

Channelization and channel modification are terms used to describe river and stream channel engineering undertaken for the purpose of flood control, navigation, and drainage improvement, and include such activities as straightening, widening, deepening, or relocating existing stream channels.

### **7.2.2 Dams**

For the purposes of this plan, dams are defined as constructed impoundments that are either: (1) 25 feet or more in height and greater than 15 acre-feet in capacity, or (2) 6 feet or more in height and greater than 50 acre-feet in capacity. The siting and construction of a dam can be undertaken for many purposes, including flood control, power generation, irrigation, livestock watering, fish farming, navigation, municipal water supplies, and recreation. A variety of impacts can result from the siting, construction, and operation of dams. The siting of dams can result in the inundation of wetlands, riparian areas, and fastland (the area landward of the bank) in upstream areas of the waterway and can reduce or eliminate the downstream flooding needed by some wetlands and riparian areas. Dams can also impede or block migration routes of fish. Dam construction activities can cause increased turbidity and sedimentation in the waterway. Fuel and chemical spills resulting from dam construction and operation, and the cleaning of construction equipment, also have the potential for creating nonpoint source pollution. The operation of dams can also generate nonpoint pollution effects from the controlled release of water, such as increased loads of BOD, phosphorus, nitrogen, changes in pH, increased erosion of the streambed and scouring of the channel below the dam, and changes in water temperature in downstream portions of the waterway.

### **7.2.3 Streambank and Shoreline Erosion**

Streambank erosion refers to the loss of fastland along nontidal streams and rivers, and shoreline erosion refers to the loss of beach or fastland of coastal bays or estuaries. The erosion of shorelines and streambanks is a natural process that can have either beneficial or adverse impacts on the creation and maintenance of riparian habitat. Eroded streambank sediments are deposited in the stream channel and are used as instream habitat during the life stages of many benthic organisms and fish. Eroded shoreline material helps to maintain the beach as a natural barrier between the open water and coastal wetlands and forests. Excessively high sediment loads resulting from erosion, however, can smother habitat for aquatic insects and submerged aquatic vegetation beds, cover shellfish beds, fill riffles and pools, and contribute to increased levels of turbidity and nutrients.

### 7.3 Existing Programs

Authorities under a variety of existing federal, state, and local programs in Ohio encourage or mandate implementation of management measures as discussed herein for the control of nonpoint pollution from hydromodification activities.

Proponents of hydromodification projects must submit plans to the USACE for approval under the **Rivers and Harbors Act of 1899** if the project involves construction, excavation, or deposition of materials in or affecting U.S. navigable waters. The USACE issues Section 404 permits for hydromodification activities under authorization of the Clean Water Act. Ohio has also placed conditions on a number of **Section 404 Nationwide Permits** to further protect wetlands and riparian habitat. Ohio EPA uses its existing permitting authority under the **Section 401 Water Quality Certification Program** (CWA) to require more stringent protection of streams and wetlands. Certain dredging activities may not be regulated by the USACE due to the court overturning the Tulloch Rule. Depending on how the dredging is conducted, a Section 404 permit might not be needed and therefore, Ohio EPA would not be able to regulate that activity under the Section 401 Water Quality Certification program.

Ohio's **Submerged Lands Lease Program** stipulates that ODNR review and make recommendations for any proposed project that would occupy the waters and underlying lands of Lake Erie.

Additional enforceable controls that can be invoked to reduce the effects of nonpoint pollution from hydromodification activities include Ohio EPA's authority under the **Clean Water Act** to enforce water quality standards (OAC 3745-1), and the Division of Wildlife's authority under the **Stream Litter Law** to prevent stream litter or other discharges that kill or endanger wild animals and stream life. ODNR's Division of Wildlife also has broad authority to protect Ohio's wild animals and, in fact, holds in trust ownership and title to all wild animals. This authority provides a strong foundation for protection of aquatic resources.

Other programs exist to encourage the adoption of BMPs and permanent protection of riparian corridors by sharing the cost of these practices with landowners. ODNR, through the Divisions of Natural Areas and Preserves, Soil and Water Conservation, Forestry, and Wildlife have been working together to promote and demonstrate biotechnical engineering solutions to restore stream banks and improve aquatic habitat. The Division of Forestry's **Stewardship Incentive Program** provides financial assistance up to 75 percent for landowners to stabilize stream banks and riparian corridors with woody vegetation. The Division of Wildlife, in conjunction with its ownership of the state's fish and wildlife resources, provides technical information to help assure protection of these resources during and following hydromodification activities. ODNR's Division of Soil and Water Conservation, through its **NatureWorks** Program, is emphasizing riparian area protection and restoration of stream habitat through the purchase of permanent conservation easements on riparian areas. More than \$1 million in state funds have been devoted to this purpose in the coastal area over the past two years. The Division of Soil and Water Conservation is also working to demonstrate BMPs that will improve habitat conditions on local agricultural ditches. **Ohio's Scenic Rivers Program** discourages hydromodification projects that would affect the natural qualities for which a scenic river has been designated and prohibits channel modifications within any wild, scenic, or recreational river without plan approval by the Director of ODNR. 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.

Several ODNR divisions have prepared educational fact sheets for landowners on stream restoration. ODNR and Ohio EPA are currently working on the development of a statewide **Stream Management Program** to emphasize stream and riparian area preservation. The agencies are cooperating to produce a video demonstrating BMPs and have produced a Stream Management Notebook updating the 1986 Ohio Stream Management Guide. Ohio uses the guidelines in *Rainwater and Land Development* to establish BMPs for construction sites, including avoidance of hydromodification, as well as practices that lessen the damage to stream integrity. These guidelines are required as part of Ohio EPA's NPDES Stormwater Program. The ODNR Division of Soil and Water Conservation is also developing engineering standards and specifications for restoring stream integrity based on natural channel design.

ODNR is cooperating with Ohio's SWCDs to initiate or complete the restoration and enhancement of riparian habitat along 1,000 miles of stream per year. The Ohio legislature recently approved \$2 million per year for the **CREP** affecting two thirds of Ohio's Lake Erie basin. This program is expected to fund the protection of over 6,000 miles of stream corridors within the next 15 years.

Currently, ODNR is drafting a Stream Mitigation Policy that provides guidance to project reviewers and outlines a strategy to mitigate for projects that decrease stream integrity and function.

## **7.4 § 6217(g) Management Measures: Channelization and Channel Modification**

### **7.4.1 Management Measure for Physical and Chemical Characteristics of Surface Waters**

- (1) Evaluate the potential effects of proposed channelization and channel modification on the physical and chemical characteristics of surface waters in coastal areas;
- (2) Plan and design channelization and channel modification to reduce undesirable impacts; and
- (3) Develop an operation and maintenance program for existing modified channels that includes identification and implementation of opportunities to improve physical and chemical characteristics of surface waters in those channels.

#### **Applicability**

This management measure applies to public and private channelization and channel modification activities in order to prevent the degradation of physical and chemical characteristics of surface waters from such activities in the § 6217 management area. This management measure applies to any proposed channelization or channel modification projects, including levees, to evaluate potential changes in surface water characteristics, as well as to existing modified channels that can be targeted for opportunities to improve the

surface water characteristics necessary to support desired fish and wildlife. The purpose of this management measure is to ensure that the planning process for new hydromodification projects addresses changes to physical and chemical characteristics of surface waters that may occur as a result of the proposed work. The three effects of channelization and channel modification that affect the physical and chemical characteristics of surface waters addressed in this management measure are: changed sediment supply, reduced freshwater availability, and accelerated delivery of pollutants.

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

Approaches to this management measure take two forms (1) a regulatory permit process and (2) an educational/cost-share strategy.

Under regulatory programs, proponents of new hydromodification projects involving channelization or alteration of wetlands must submit plans and obtain a permit from the USACE. Its authority, under the Rivers and Harbors Act of 1899, requires a permit if the project involves construction, excavation, or deposition of materials in or affecting U.S. navigable waters. Section 404 of the Clean Water Act also requires a USACE permit for most hydromodifications. A number of hydromodification projects are under a *Nationwide Permit* which allows for a streamlined permitting process. Ohio EPA has placed additional conditions on these Nationwide Permits in order to provide stronger protection for wetland and stream integrity. In addition, hydromodification projects must obtain a Section 401 permit under Ohio EPA's Water Quality Certification Program. The Section 401 certification requires additional protection for Ohio's water resources. Certain dredging activities may not be regulated by the USACE due to the court overturning the Tulloch Rule. Depending on how the dredging is conducted, a Section 404 permit might not be needed and therefore, Ohio EPA would not be able to regulate that activity under the Section 401 Water Quality Certification program. **Ohio's Scenic Rivers Program** discourages hydromodification projects that would affect the designated portions of scenic rivers such as the Maumee and Sandusky and prohibits channel modifications within any wild, scenic, or recreational river without plan approval by the Director of ODNR.

When channelization results in the severe degradation of habitat or water quality, enforcement action can be initiated by ODNR's Division of Wildlife under the authority of **ORC 1531**, and by Ohio EPA under the authority of **ORC 6111** and **OAC 3745-1** to abate the cause of the degradation. These mechanisms, however, are often not used for degradation from hydromodification since there are no water quality standards that exist for physical characteristics, and it is difficult to prove degradation using existing standards or damage recovery policies.

The voluntary implementation of BMPs to maintain and restore existing modified channels is strongly encouraged. ODNR's various divisions have been working together to promote stream protection and demonstrate biotechnical engineering solutions to restore stream banks and improve aquatic habitat. The Division of Forestry's **Stewardship Incentive Program** provides financial assistance up to 75 percent for landowners to stabilize stream banks and riparian corridors with woody vegetation. The Division of Wildlife, in conjunction with its ownership of the state's fish and wildlife resources, provides technical information to help assure protection of these resources during and following hydromodification activities. ODNR's Division of Soil and Water Conservation, through its **NatureWorks Program**, is

emphasizing riparian area protection and restoration of stream habitat through the purchase of permanent conservation easements on riparian areas. More than \$1,000,000 in state funds have been devoted to this purpose in the coastal area over the past two years. The Division of Soil and Water Conservation is also working to demonstrate BMPs that will improve habitat conditions on local agricultural ditches. In addition, several divisions are preparing educational fact sheets for landowners on stream restoration. The practices described in the fact sheets have been published as part of Ohio's post-development BMPs for construction sites. The **Conservation Works of Improvement** program, administered by local SWCDs, provides funding and technical assistance for the implementation of BMPs when initiating natural resource management projects that involve hydromodification activities. The Ohio legislature recently approved \$2 million per year for the **CREP**, affecting two thirds of Ohio's Lake Erie basin. This program is expected to fund the protection of over 6,000 miles of stream corridors within the next 15 years.

The science of river morphology has, in recent years, become significantly more standardized. In Ohio, a concerted effort is underway to incorporate a better, more technical understanding of river morphology into our existing water resource protection strategies. This effort can be put in three broad categories:

- General recognition of riparian systems as a pollution control BMP. Morphologically sound riparian systems are better able to purify water flowing through them and they are more resilient to pollutant loads.
- Stream assessment may be improved by classifying geomorphic character. Work is now being done to establish the correlation of channel type with stream quality.
- Incorporating natural channel stability concepts into channel modification for the purpose of restoration.

After three years of exploring the relationship between river morphology and water quality, Ohio is incorporating a better understanding of river form and process into its water resource protection strategies, regulatory requirements, and design standards. Standards are being developed to facilitate the process of incorporating natural channel design into hydromodification projects. State agencies will use these standards when reviewing and approving permits and making recommendations for mitigating stream alterations.

The primary focus of Ohio's nonpoint source pollution control program is the prevention of nonpoint source problems through application of BMPs. For natural streams, lakes, and wetlands that have not been altered, hydromodification is considered a last resort to solving land and water management and development problems. The implementation of BMPs for the maintenance of existing modified channels is strongly encouraged. ODNR and Ohio EPA are currently developing statewide stream management policies with an emphasis on preservation, and technical guidelines and standards to restore channel integrity so diverse aquatic life can be supported.

Table 7-1 provides a summary listing of the existing programs in Ohio that apply to the implementation of this management measure.

## **7.4.2 Instream and Riparian Habitat Restoration Management Measure**

- (1) Evaluate the potential effects of proposed channelization and channel modification on instream and riparian habitat in coastal areas;
- (2) Plan and design channelization and channel modification to reduce undesirable impacts; and
- (3) Develop an operation and maintenance program with specific timetables for existing modified channels that includes identification of opportunities to restore instream and riparian habitat in those channels.

### **Applicability**

This management measure pertains to surface waters where channelization and channel modification have altered or have the potential to alter instream and riparian habitat such that historically present fish or wildlife are adversely affected. This management measure applies in the § 6217 management area to any proposed channelization or channel modification project to determine changes in instream and riparian habitat and to existing modified channels to evaluate possible improvements to instream and riparian habitat.

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

Existing state, federal, and local programs that support the implementation of the provisions of this management measure are the same as those listed under Management Measure for physical and chemical characteristics of surface waters (Table 7-1).

## **7.5 § 6217(g) Management Measures: Dams**

### **7.5.1 Management Measure for Erosion and Sediment Control**

- (1) Reduce erosion and, to the extent practicable, retain sediment on-site during and after construction, and
- (2) Prior to land disturbance, prepare and implement an approved erosion and sediment control plan or similar administrative document that contains erosion and sediment control provisions.

### **Applicability**

This management measure applies in the § 6217 management area to the construction of new dams, as well as to construction activities associated with the maintenance of dams. The purpose of this management measure is to prevent sediment from entering surface waters during the construction or maintenance of dams. This measure does not apply to projects that fall under NPDES jurisdiction.

ODNR's Division of Water has identified more than 50,000 dams in Ohio. Most dams in Ohio, however, are small and are constructed by farmers and other private individuals for water supply, recreation, swimming, and fishing purposes. Dams that fall under state jurisdiction are classified as follows:

- Class I—Dams having a storage volume >5,000 acre-feet or a height of >60 feet.

- Class II—Dams having a storage volume >500 acre-feet or a height of >40 feet.
- Class III—Dams having a storage volume >50 acre-feet, or a height of >25 feet.
- Class IV—Dams that are 25 feet or less in height and have a storage volume <50 acre-feet.

Of the over 50,000 dams identified by ODNR in Ohio, slightly over 1,000 statewide and 400 in the § 6217 management area meet the definition of a dam for the purposes of this plan.

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

Proponents of new hydromodification projects involving dam construction must submit plans to the USACE for approval under the **Rivers and Harbors Act of 1899** if the project involves construction, excavation, or deposition of materials in or affecting U.S. navigable waters. In addition, dam projects involving federal funding must undergo an environmental assessment process under **NEPA**. Projects that involve placement of fill in wetlands or stream channels are required to obtain a Section 404 permit and Section 401 water quality certification under the Clean Water Act. Ohio has also placed additional conditions on **Section 404 Permits** to further protect wetlands and riparian habitat. Existing authority under the **Section 401 Water Quality Certification Program** is used to provide more protection and regulate proposed activities that may result in further degradation of water quality in Ohio's surface waters. The state **Wild & Scenic Rivers Program** discourages hydromodification projects that would affect the natural qualities for which a scenic river has been designated and prohibits dam construction within any wild, scenic, or recreational river without plan approval by the Director of ODNR. When dam construction or maintenance results in the severe degradation of habitat or water quality, enforcement action can be initiated by ODNR's Division of Wildlife under **ORC 1531**, and by Ohio EPA under the authority of the **Clean Water Act ORC 6111** and **OAC 3745-1**, to abate the cause of the degradation.

The **Dam Safety Program**, administered by ODNR's Division of Water, requires that owners planning to construct a dam that will fall under Classes I and II submit an application for a dam construction permit. Permit applications must contain a preliminary and final design report detailing dam design, location, site conditions, and intended purpose. Currently, only the endangering of human life, health, or property are considered when reviewing applications for the impacts of the proposed dam construction. However, the law allows the Chief of the Division of Water to require any other studies, investigations, and pertinent information as deemed necessary as part of the permit application process. Periodic inspections of permitted dams, at a frequency of not more than every five years, are also performed by the Division of Water as part of this program. Construction of dams involving areas greater than 5 acres are required by Ohio EPA to obtain a permit and follow the erosion and sediment control provisions as specified under the **NPDES Stormwater Program**, which uses the guidelines and specifications in *Rainwater and Land Development*.

Table 7-2 provides a summary listing of the existing programs in Ohio that apply to the implementation of this management measure.

### **7.5.2 Management Measure for Chemical and Pollutant Control**

- (1) Limit application, generation, and migration of toxic substances;
- (2) Ensure the proper storage and disposal of toxic materials; and,
- (3) Apply nutrients at rates necessary to establish and maintain vegetation without causing significant nutrient runoff to surface waters.

#### **Applicability**

This management measure applies in the § 6217 management area to the construction of new dams, as well as to construction activities associated with the maintenance of dams. The purpose of this management measure is to prevent downstream contamination from pollutants associated with dam construction activities. This measure addresses fuel and chemical spills associated with dam construction, as well as concrete washout and related construction activities. Since there are over 400 structures meeting the CZARA definition of “dam” in Ohio’s § 6217 management area, this management measure is addressed as part of Ohio’s CNPCP plan.

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

Requirements under several existing federal, state, and local programs in Ohio implement the chemical control provisions of this management measure. A listing of the existing programs that implement this management measure is provided in Table 7-3.

The **Dam Safety Program**, administered by ODNR’s Division of Water, requires that owners planning to construct a dam that will fall under Classes I and II submit an application for a dam construction permit. Permit applications must contain a preliminary and final design report detailing dam design, location, site conditions, and intended purpose. Currently, only the endangering of human life, health, or property are considered when reviewing applications for the impacts of the proposed dam construction. However, the law allows the Chief of the Division of Water to require any other studies, investigations, and pertinent information as deemed necessary as part of the permit application process.

State authority to enforce the control of construction site chemicals can be invoked by Ohio EPA under the **Clean Water Act** to enforce water quality standards, and under **RCRA** to regulate the storage, disposal, application, generation and migration of toxic and hazardous substances; by ODA under its **Pesticide Licensing and Registration Program** to regulate pesticide use; and by the Division of Wildlife’s authority under ORC 1531 to prevent stream litter or other discharges that kill or endanger wild animals and stream life.

### **7.5.3 Management Measure for Protection of Surface Water Quality and Instream and Riparian Habitat**

Develop and implement a program to manage the operation of dams in coastal areas that includes an assessment of:

- (1) Surface water quality and instream and riparian habitat and potential for improvement; and
- (2) Significant nonpoint source pollution problems that result from excessive surface water withdrawals.

## ***Applicability***

This management measure applies in the § 6217 management area to dam operations that result in the loss of desirable surface water quality, and of desirable instream and riparian habitat. The purpose of this management measure is to protect the quality of surface waters and aquatic habitat in reservoirs and in the downstream portions of rivers and streams that are influenced by the quality of water contained in the releases from reservoir impoundments.

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

Ohio does not currently have any regulatory or voluntary programs specifically targeted to the operation of dams in the state. However, when dam operation or maintenance results in the severe degradation of habitat or water quality, enforcement action can be initiated under various programs. ODNR's Division of Wildlife can initiate enforcement action to abate water quality degradation of Ohio's streams under the authority of **ORC 1531**. The Division of Wildlife can remove dams that obstruct the migration of fish under authority of Ohio's **Hunting and Fishing Law (ORC 1533)**, and the Division of Natural Areas and Preserves has removed dams on scenic rivers under authority of the **Wild & Scenic River Program**. The Ohio EPA also has authority under the **Clean Water Act, ORC 6111 and OAC 3745-1**, to take enforcement action to abate water quality violations resulting from the placement or operation of dams on Ohio's waterways. See Table 7-4 for a listing of existing programs applicable to this management measure.

## ***7.6 § 6217(g) Management Measures: Streambank and Shoreline Erosion***

### ***7.6.1 Management Measure for Eroding Streambanks and Shorelines***

- (1) Where streambank or shoreline erosion is a nonpoint source pollution problem, streambanks and shorelines should be stabilized. Vegetative methods are strongly preferred unless structural methods are more cost-effective, considering the severity of wave and wind erosion, offshore bathymetry, and the potential adverse impact on other streambanks, shorelines, and offshore areas.
- (2) Protect streambank and shoreline features with the potential to reduce NPS pollution.
- (3) Protect streambanks and shorelines from erosion due to uses of either the shorelands or adjacent surface waters.

## ***Applicability***

This management measure applies in the § 6217 management area to eroding shorelines in coastal bays and eroding streambanks in coastal rivers and creeks that constitute a nonpoint source pollution problem in surface waters in Ohio. The erosion of shorelines and streambanks can contribute significantly to nonpoint source pollution in surface waters. The intent of this measure is to promote the implementation of streambank and shoreline stabilization techniques that will be effective in controlling coastal erosion wherever it is a source of nonpoint pollution.

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

When streambank and shoreline stabilization projects involve placing fill into waters, the Clean Water Act requires a Section 404 permit and a Section 401 Water Quality Certification. Ohio uses these two programs to require measures that avoid, minimize, or reduce the impact of such projects.

Projects to stabilize streambanks in state scenic rivers are reviewed and approved by ODNR's Division of Natural Areas and Preserves, with final approval by ODNR's director.

ODNR, through the Divisions of Natural Areas and Preserves, Soil and Water Conservation, Forestry, and Wildlife have been working together to promote and demonstrate biotechnical engineering solutions to restore stream banks and improve aquatic habitat. Several divisions are preparing educational fact sheets for landowners on stream restoration; practices described in the fact sheets have been published as part of the post-development BMPs for construction sites.

The Division of Forestry's **Stewardship Incentive Program** provides financial assistance up to 75 percent for landowners to stabilize stream banks and riparian corridors with woody vegetation. The Division of Wildlife, in conjunction with its ownership of the state's fish and wildlife resources, provides technical information on streambank stabilization to help assure protection of these resources. ODNR's Division of Soil and Water Conservation, through its **NatureWorks Program**, is emphasizing riparian area protection and restoration of stream habitat. More than \$1 million in state funds have been devoted to this purpose in the coastal area over the past two years.

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.

ODNR and Ohio EPA are currently working to produce a video demonstrating BMPs and a Stream Management Notebook that will update the 1986 Ohio Stream Management Guide.

ODNR is cooperating with Ohio's SWCDs to initiate or complete the restoration and enhancement of riparian habitat along 1,000 miles of stream per year. The Ohio legislature recently approved \$2 million per year for the **CREP**, affecting two thirds of Ohio's Lake Erie basin. This program is expected to fund the protection of over 6,000 miles of stream corridors within the next 15 years.

See Table 7-5 for a summary of existing programs in the State of Ohio that are applicable to the implementation of this management measure.

## **7.7 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 hydromodification. Subsequently, ODNR initiated a statewide nonpoint source planning process, creating ten working groups. The work group addressing headwater streams issues

developed recommendations relevant to controlling nonpoint source pollution from hydromodification activities.

The work from the coastal and statewide work groups has been integrated here. What follows is a brief summary of the major hydromodification pollution issues affecting coastal waters, recommendations for their reduction, and the program priorities of the State of Ohio for the next five years.

Hydromodification is the leading source of impairment in Ohio’s water resources. Most of the problems associated with hydromodification stem from the fact that physical alterations upset the natural balance of streams and produce unintended, adverse downstream changes. Ohio’s streams are under tremendous pressure from human activity. As more is learned about the importance of maintaining stream functions and work progresses on the protection of these vital links between the land and the water, the state has learned how activities can be carried out with minimal impacts. Some general principles apply:

- Maintain natural flow volumes, velocities and delivery patterns.
- Avoid changing stream gradient.
- Control excess sediment delivery to the stream.
- Maintain or restore natural channel shape.
- Avoid encroaching on the stream’s riparian area.
- Maintain channel length.
- Avoid increasing entrenchment.

Federal, state, and local programs currently provide both regulatory and voluntary measures to mitigate or lessen the effects of hydromodification on Ohio’s water resources.

**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**

Improve and enforce regulations and design standards to protect streams and natural stream function.

Objective 1 Recommendation	Measure(s) of Success	Resource(s) Needed	Responsible Organization(s)	Time Frame Beginning
Develop design criteria for constructing channels according to natural channel design and based on regional reference reaches.	Design criteria developed	Staff Funding Research Tech. assistance	ODNR USGS	Year 3

Objective 1 Recommendation	Measure(s) of Success	Resource(s) Needed	Responsible Organization(s)	Time Frame Beginning
Develop criteria and regional conditions for Ohio under Section 401/404 permitting program to provide more geographically appropriate conditions/requirements for headwater stream protection.	Revised criteria, guidance, and conditions for Section 401/404 permit adopted  ODNR Stream Mitigation Guidance document developed	Staff Technical assistance  Mitigation fund established	Ohio EPA  ODNR	Year 1
Develop process for state agency review of projects under Section 401/404 permit program during planning/design rather than after plan/design is complete.	Pre-planning conferences on all Section 401/404 permitted projects: -implement on 50% of projects within 1 year -implement on 75% of projects within 2 years -implement on 100% of projects within 3 years	Staff  Technical assistance	Ohio EPA	Year 1
Develop consistent standards for protection of headwater streams to enhance protection efforts.	Definition of and standards for headwater streams developed	Staff  Technical assistance	ODNR  USACE  NRCS  Ohio EPA	Year 1
Develop model Stream Protection Regulations including floodplain ordinances that protect natural stream functions for adoption by local planning agencies, municipalities, counties and local jurisdictions.	Model regulations developed	Staff  Technical assistance	ODNR	Year 1
Encourage local governments, nonprofit organizations, and planning agencies to prepare comprehensive land use plans and develop incentives that encourage preservation of wetlands and other environmentally sensitive areas.	Planning processes underway in 5 communities	Staff  Technical Asst.  Funding	ODNR  County Commissioners Assoc.  Township Trustees Assoc.  Ohio Municipal League	Year 3
Develop stream mitigation guidelines and fund to provide guidance and incentives for projects requiring stream alteration.	Stream Mitigation Guidance established  Mitigation fund established	Staff	ODNR	Years 1-2

<b>Objective 1 Recommendation</b>	<b>Measure(s) of Success</b>	<b>Resource(s) Needed</b>	<b>Responsible Organization(s)</b>	<b>Time Frame Beginning</b>
Integrate stream protection standards and specifications into agency policies, manuals, and handbooks and standard drawings to improve consistency in engineering design and construction statewide.	Revised NRCS and ODOT standards and specifications Revised OSUE, Ohio EPA, and ODNR guidance	Staff Technical assistance	ODOT ODNR NRCS County Engineers	Years 2-4
Provide funds to research and develop standards and guidance for methods that maintain natural channel function and integrity while still providing adequate drainage.	Final standards and guidance document adopted	Staff Funding	ODNR Ohio EPA NRCS OSUE Ohio LE Office	Year 2
Identify dams that are no longer used, assess adverse effects of such dams to hydraulic regime, quality of surface waters, habitat in waterway, and sediment loading. Assess effects and feasibility of removal; implement removal of dams where appropriate.	Policies developed	Staff Funding Technical Asst.	ODNR	Year 3
Revise rules and policies under ORC Chapters 1501 and 1513 to increase protection of streams including: more stringent adherence to avoidance and minimization of impacts to streams, e.g., mining through streams, casting overburden into stream channels and constructing sediment ponds in streams.	Establish design criteria for steep streams Revised rules and policies	Staff Technical assistance	ODNR	Year 1
Research & analyze effectiveness of state laws related to pollution control & habitat protection (e.g., ORC Chapter 1531).	Stronger authorities	Legislation and/or rule & policy changes	ODNR OEPA	Year 2

Objective 1 Recommendation	Measure(s) of Success	Resource(s) Needed	Responsible Organization(s)	Time Frame Beginning
Update enabling legislation in Township, County and Municipal Regulations (ORC 519, 303, 711) to include <i>general welfare</i> to enable adoption of local stream protection ordinances.	Adoption of revised regulations	CZMA grants	ODNR County Commissioners Association Ohio Municipal League Township Trustees Association	Years 2-3
Encourage local stormwater permittees to assess & revise standards to increase protection of small stream channels.	Revised local stormwater standards to protect natural channel functions	Technical assistance Model ordinances Rule or policy changes	Ohio EPA	Years 2-3
Expand oversight authority on highway project contracts to improve compliance with requirements for erosion and sediment control, mitigation requirements for stream impacts, and add provisions for fines for noncompliance.	Increased inspection and enforcement on major projects	Staff for inspection and enforcement	ODOT	Year 3
Revise Water Quality Standards, OAC 3745 to establish use designation, water quality criteria, and physical standards for headwater streams.	Revised WQ Standards to include headwater use designation and criteria and physical standards	Rule revision	Ohio EPA	Years 3-4
Revise fine structure, under authority granted in ORC 1531, for fish kills to include penalties for the killing or taking of mussels, macroinvertebrates, and small fish.	New or increased fines for taking of headwater and non-game species	Policy or legislative changes	ODNR	Years 3-5

## Objective 2

Improve voluntary protection of streams and natural stream function by providing incentives to private land interests.

Objective 2 Recommendation	Measure(s) of Success	Resource(s) Needed	Responsible Organization(s)	Time Frame Beginning
Increase funding for federal and state programs providing landowner incentives for protection of riparian areas and wetlands in perpetuity (e.g., WRP, CRP, CREP, WHIP, NatureWorks).	8000 miles of new riparian buffers	Funding	FSA NRCS ODNR SWCDs	Years 1-10
Develop pilot projects/demonstrations illustrating natural channel design concepts.	10 projects/demonstrations implemented	Grants & GRF funding	ODNR OEPA NRCS ODOT	Years 1-5
Increase use of Ohio's WPCLF to partner with and initiate programs to help finance purchase of permanent conservation easements and match other monies for riparian area protection.	Increase percentage of NPS funded projects to 25%	Policy Projects submitted	Ohio EPA DEFA	Year 1
Increase technical assistance and financial support for local river and watershed protection groups and establish permanent funding source for developing local river or watershed group organizational structure and writing local watershed plans, including riparian area protection.	\$1,000,000 for watershed coordinators	Funding Staff Training	ODNR FSA NRCS OSUE	Year 1
Create voluntary register for properties along headwater streams for recording voluntary deed restrictions to protect riparian corridors.	Expanded state easement database	Staff time	ODNR	Year 3
Develop, expand, and provide funding for local green space or greenway programs to preserve and set aside existing areas of woods, streams, wetlands and natural areas, making streams top priorities for green space protection.	Funding established through environmental bonds	Funding	ODNR Ohio EPA Ohio Conservation Voters and other state and local environmental groups	Year 2

<b>Objective 2 Recommendation</b>	<b>Measure(s) of Success</b>	<b>Resource(s) Needed</b>	<b>Responsible Organization(s)</b>	<b>Time Frame Beginning</b>
Endorse national Conservation and Reinvestment Act to provide funding (from offshore oil and gas drilling revenues) for habitat protection, and encourage use of funds to protect stream habitats.	Establish policy for use of funds prioritizing protection of stream habitats by committing 25% of funds to stream protection	Funding Policy	ODNR	Year 3
Utilize transportation funding (TEA-21) to restore and enhance headwater streams and riparian corridors.	Develop demonstration projects in conjunction with highway reconstruction	Federal and state funding	ODOT	Years 1-5
Develop and offer incentives and initiate annual awards and recognition program for developers of innovative projects that incorporate stream protection practices in new developments.	Program established 1 developer recognized per year	CZMA grants Staff	SWCDs ODNR Area Planning Agencies	Year 5

### **Objective 3**

Offer training and education on the functions of streams and the importance of maintaining natural stream integrity.

<b>Objective 3 Recommendation</b>	<b>Measure(s) of Success</b>	<b>Resource(s) Needed</b>	<b>Responsible Organization(s)</b>	<b>Time Frame Beginning</b>
Increase public awareness and education on why streams are important, and how they can be protected, including importance and value of preserving natural integrity of streams.	Develop 2 marketing pieces per year	Funding Staff	ODNR Ohio EPA OSUE	Year 1
Support educational efforts of local river or watershed groups that engage in activities that encourage watershed residents to appreciate the values and functions of natural streams.	Fund 5-10 education activities per year	Funding	ODNR Ohio EPA NRCS OSUE	Year 1

<b>Objective 3 Recommendation</b>	<b>Measure(s) of Success</b>	<b>Resource(s) Needed</b>	<b>Responsible Organization(s)</b>	<b>Time Frame Beginning</b>
Ensure that all state and federal agency personnel involved in channel design or in direct contact with landowners are trained in fluvial geomorphology and how to apply natural stream functions and principles to Ohio stream types.	50 employees trained per year	Staff Training	NRCS ODNR OSUE	Year 2
Implement training program for local officials, consultants, engineers and equipment operators to develop understanding of stream function and offer alternatives to traditional drainage and bank erosion control practices.	50 people trained per year	Staff Training	ODNR OSU/OSUE	Year 2
Develop training program for conservancy districts to introduce wetland and stream function concepts and develop alternatives to traditional drainage and flooding control practices introducing protection of streams and wetlands as part of their flood control mission.	5 people trained per year All conservancy districts involved within 3 years	Staff Training	ODNR Ohio EPA NRCS OSU/OSUE	Year 2
Provide training opportunities for on-site decision makers (construction site engineers and equipment operators) to develop understanding of natural stream function and installation to protect streams.	25 people trained per year	Staff Training	ODNR ODOT Ohio EPA SWCDs OSU/OSUE	Year 2
Provide tools to local governments and organizations to assist with land use planning efforts and stream protection: maps of stream locations, GIS, planning models, model ordinances, model regulations, technical assistance, and water quality data.	Assist 5 local governments per year	Staff	ODNR Ohio EPA NRCS	Years 2-3
Provide training and information to regional, city, and county planners; land use attorneys; consulting firms; and	25 people trained per year	Staff Training	ODNR OSUE	Year 3

<b>Objective 3 Recommendation</b>	<b>Measure(s) of Success</b>	<b>Resource(s) Needed</b>	<b>Responsible Organization(s)</b>	<b>Time Frame Beginning</b>
other land use decision makers to develop understanding of the importance and value of streams.				
Require training for supervising engineers and equipment operators on state or federally funded highway projects to develop understanding of stream functions and how to protect them during construction.	20 people trained per year	Staff Training	ODOT	Year 3
Add natural stream integrity protection training components to existing programs such as Project WET, Project WILD and Project Learning Tree.	Training components added to 1 program per year	Staff	ODNR	Year 4

**This page intentionally left blank.**

**Table 7-1. Channelization and Channel Modification Measures—Physical and Chemical Characteristics of Surface Waters and Instream and Riparian Habitat Restoration**

Program	Legislation	Regulation	Applicable Measures	Status	Implementing Agency	Enforcement Authority	Evaluation Measures
	Rivers and Harbors Act of 1899 Section 10		River & Stream Channel Dredging/Engineering	Regulatory	USACE	Permit	
	Clean Water Act Section 401, 404		Discharge of Dredge/Fill Material into Waterways	Regulatory	USACE, Ohio EPA	Permit/Certification	
Ohio Scenic Rivers Program	ORC 1501.17; 1517.16		Channel Modification Plan Approval Required	Regulatory	ODNR	Plan Review & Approval	
Sec. 319, NPS Program	Clean Water Act ORC 6111	OAC 3745-1	Water Quality Standards TMDLs, Antidegradation	Regulatory	Ohio EPA	Citation for Water Quality Violations	Water Quality Monitoring; Complaints
Stream Management Program			Cost & Tech. Assist. Hydromod. and Water Management BMPs	Incentive	ODNR Tech Asst. Education		
Conservation Works of Improvement Program	ORC 1515		Cost & Tech. Assist. Hydromod. and Water Management Projects	Incentive	ODNR		
	Stream Litter Law ORC 1531		Prohibits Placement of Litter of Any Kind in Any Watercourse. Provides Public Trust Ownership of All Wildlife.	Regulatory	ODNR Division of Wildlife	Citation/Fines Wildlife Officers	
Stewardship Incentive Program			Cost-share Assist. for Implementation of Streambank Restoration BMPs	Incentive	ODNR		
NatureWorks Program			Cost-share Assist. for Stream/ Riparian Easements	Incentive	ODNR		
Western Lake Erie CREP			Funding to Establish Riparian Buffers and Other BMPs	Incentive	FSA/NRCS, ODNR		

**Table 7-2. Dams Measure—Erosion and Sediment Control**

Program	Legislation	Regulation	Applicable Measures	Status	Implementing Agency	Enforcement Authority	Evaluation Measures
	Rivers and Harbors Act of 1899 Section 10		River & Stream Channel Dredging/Engineering	Regulatory	USACE	Permit	
	Clean Water Act Section 401, 404		Discharge of Dredge/Fill Material into Waterways	Regulatory	USACE, Ohio EPA	Permit/Certification	
Ohio Scenic Rivers Program	ORC 1501.17, 1517.16		Channel Modification Plan Approval Required	Regulatory	ODNR	Plan review/ approval	
Sec.319, NPS Program, Stormwater Program	Clean Water Act ORC 6111	OAC 3745-1	Water Quality Standards TMDLs, Antidegradation	Regulatory	Ohio EPA	Citation for Water Quality Violations	Water Quality Monitoring; Complaints
Dam Safety Program	ORC 1521; OAC 1501:21		Construction Permits Req'd for Dams; Water Management BMPs	Regulatory	ODNR	Permit	
	Stream Litter Law ORC 1531		Prohibits Placement of Litter of Any Kind in Any Watercourse. Provides Public Trust Ownership of All Wildlife.	Regulatory	ODNR Division of Wildlife	Citation/Fines Wildlife Officers	
	National Environmental Policy Act		Environmental Assessment of Federally-Funded Actions	Regulatory	ODOT		

**Table 7-3. Dams Measure—Chemical and Pollutant Control**

<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>
Dam Safety Program	ORC 1521; OAC 1501:21		Construction Permits Req'd for Dams; Water Management BMPs	Regulatory	ODNR	Permit	
Sec. 319, NPS Program	Clean Water Act ORC 6111	OAC 3745-1	Water Quality Standards TMDLs, Antidegradation	Regulatory	Ohio EPA	Citation for Water Quality Violations	Water Quality Monitoring; Complaints
	Resource Conservation and Recovery Act Subtitle D (Solid Waste Management) ORC 3734 Subtitle C (Hazardous Waste Management)	OAC 3745-27-05 OAC 3745-50	Regulates Disposal of Solid & Hazardous Wastes	Regulatory	Ohio EPA	Citation	
Pesticide License Applicator Certif. Program	ORC 921.01		Training/Licensing Program for Restricted Pesticide Use, Handling	Regulatory	OCES, ODA	Citation	
	Stream Litter Law ORC 1531		Prohibits Placement of Litter of Any Kind in Any Watercourse. Provides Public Trust Ownership of All Wildlife.	Regulatory	ODNR Division of Wildlife	Citation/Fines Wildlife Officers	

**Table 7-4. Dams Measure—Protection of Surface Water Quality and Instream and Riparian Habitat**

<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>
Sec. 319, NPS Program	Clean Water Act ORC 6111	OAC 3745-1	Water Quality Standards TMDLs, Antidegradation	Regulatory	Ohio EPA	Citation for Water Quality Violations	Water Quality Monitoring; Complaints
	Stream Litter Law ORC 1531		Prohibits Placement of Litter of Any Kind in Watercourse. Public Trust Ownership of Wildlife.	Regulatory	ODNR Division of Wildlife	Citation/Fines Wildlife Officers	
	Hunting and Fishing Law ORC 1533		Obstructions to Natural Transit of Fish Prohibited	Regulatory	ODNR	Citation	
Ohio Scenic Rivers Program	ORC 1501.17; 1517.16		Channel Modification Plan Approval Required	Regulatory	ODNR	Plan Review/Approval	

**Table 7-5. Streambank and Shoreline Erosion Measure—Eroding Streambanks and Shorelines**

Program	Legislation	Regulation	Applicable Measures	Status	Implementing Agency	Enforcement Authority	Evaluation Measures
	Clean Water Act Section 401, 404		Discharge of Dredge/Fill Material into Waterways	Regulatory	USACE; Ohio EPA	Permit	
Conservation Works of Improvement Program	ORC 1515		Cost & Tech. Assist. Hydromod. and Water Management Projects	Incentive	ODNR		
Stewardship Incentive Program			Cost Assist. for Implementation of Streambank Restoration BMPs	Incentive	ODNR		
NatureWorks Program			Cost Assist. for Stream/Riparian Restoration	Incentive	ODNR		
Ohio Scenic Rivers Program	ORC 1501.17, ORC 1517.16		Channel Modification Plan Approval Required	Regulatory	ODNR	Plan review/ Approval	
Western Lake Erie CREP			Funding to Establish Riparian Buffers and Other BMPs	Voluntary	FSA/NRCS, ODNR		



