



# Ohio Department of Natural Resources

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August 4, 2016

Mahoning County Auditor  
Cheri Lyn Donofrio  
120 Market Street  
Youngstown, OH 44503

RE: Woodside Lake Dam  
File Number: 1005-008  
Mahoning County

Dear Ms. Donofrio:

Neil Shop and Doug Evans of the Division of Water Resources conducted a safety inspection of Woodside Lake Dam on April 19, 2016 under the provisions of Ohio Revised Code (ORC) Section 1521.062 to evaluate the condition of the dam and its appurtenances. Thank you for joining them on that inspection. The division has the responsibility to ensure that human life, health, and property are protected from dam failures. Conducting periodic safety inspections and working with dam owners to maintain and improve the overall condition of Ohio dams are vital aspects of achieving this purpose. A copy of the laws and administrative rules for dam safety is available on the division's web site or by request.

The enclosed inspection report was generated based on available information obtained during and following the inspection, and is hereby provided for your review and action. Listed in the report are several repair, maintenance, and monitoring items that the dam owner is required by law to perform. As stated in the report, completion of some of these items will require the services of a professional engineer hired by the dam owner. The Chief of the Division of Water Resources must first approve any plans for modifications or repairs to the dam. Following approval of any engineered construction plans, all necessary repairs and/or modifications must be implemented by the owner under the supervision of a registered professional engineer. Completion of the required items in the report will improve the safety and overall condition of the dam. In lieu of completing the required items in the report, full compliance may also be achieved through one of the options listed in the enclosed "Remediation Alternatives" fact sheet.

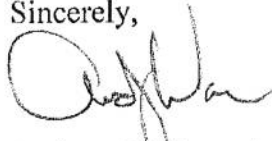
During the inspection, collapse of the left spillway sidewall and significant seepage through the right sidewall and embankment were noted. The dam and its spillway are in poor condition and steps must be taken to repair the dam within the next year before conditions worsen. You should consider lowering the pool level behind the dam by at least 2 feet until the dam is either properly repaired or breached. Please contact our office to discuss the next steps and options for lowering the pool level.

Woodside Lake Dam  
August 4, 2016  
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Guidelines for preparing an operation, maintenance, and inspection manual and guidelines for preparing an emergency action plan are enclosed, which are both required items for this dam. Also, to gain information that will help improve the inspection program, a short survey has been enclosed. Please complete the survey and return it in the self-addressed envelope provided. Your feedback is important.

Your cooperation in bringing this dam into compliance and reducing the overall risk of failure is appreciated. Please contact Mia Kannik with the Division of Water Resources at 614/265-6404 as soon as possible to discuss needed repairs or modifications to the dam, and the recommended pool level lowering.

Sincerely,



Andrew D. Ware, Acting Chief  
Division of Water Resources

ADW:nas

cc: Mia Kannik, P.E., Division of Water Resources

Enclosures

# DAM SAFETY INSPECTION REPORT

Woodside Lake Dam

File Number: 1005-008

Class II

Mahoning County, Austintown Township

Inspection Date: April 19, 2016



In accordance with Ohio Revised Code Section 1521.062, the owners of dams must monitor, maintain, and operate their dams safely. Negligence of owners in fulfilling these responsibilities can lead to the development of extremely hazardous conditions to downstream residents and properties. In the event of a dam failure, owners can be subject to liability claims.

The Chief of the Division of Water Resources has the responsibility to ensure that human life, health, and property are protected from the failure of dams. Conducting periodic safety inspections and working with dam owners to maintain and improve the overall condition of Ohio dams are vital aspects of achieving this purpose.

Representatives of the Chief conducted this inspection to evaluate the condition of the dam and its appurtenances under authority of Ohio Revised Code Section 1521.062. In accordance with Ohio Administrative Code Rule 1501:21-21-03, the owners of dams must implement all remedial measures listed in the enclosed report.

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## Required Remedial Measures

The requirements listed below are based on observations made during inspection, calculations performed, and requirements of the Ohio Administrative Code (OAC). A checklist noting all observations made during the inspection has been enclosed. References to right and left in this report are oriented as if you were standing on the dam crest and looking downstream.

**Engineer Repairs and Investigations:** The owner must retain the services of a professional engineer to address the following items. Plans, specifications, investigative reports, and other supporting documentation, as necessary, must be submitted to the Division of Water Resources for review and approval prior to construction. **The owner must complete these items and implement all engineered plans for improvement within 1 year unless otherwise stated.** A record of all repairs should be included in the operation, maintenance, and inspection manual.

1. The dam's discharge/storage capacity must be sufficient to safely pass the required design flood. Perform a hydrologic and hydraulic study to determine the adequacy of the dam's discharge/storage capacity to safely pass the required design flood. Prepare plans and specifications as necessary to increase the discharge/storage capacity to pass the required design flood. In accordance with OAC Rule 1501:21-13-02, the minimum design flood for Class II dams is 50 percent of the Probable Maximum Flood or the critical flood. See the Flood Routing Summary section of this report for additional information.
2. The entire spillway system must be replaced. Prepare plans and specifications for replacement of the spillway system. The condition of the spillway system must be monitored monthly and during large storm events for further deterioration. This item should be completed in coordination with Item 1 above.
3. The stability of the embankment must be maintained. Prepare plans and specifications for the repair of the concrete cutoff wall to the right of the right principal spillway sidewall, for the compacted fill that needs to be placed on the downstream slope where the seepage has eroded the slope, and for the installation of a seepage drain pipe behind the right principal spillway sidewall. The crack in the cutoff wall and overall stability of the embankment must be monitored monthly and during large storm events.
4. The owner must install a device to permit draining of the reservoir within a reasonable period of time in accordance with OAC Rule 1501:21-13-06. Prepare plans and specifications for the installation of such a device.

**Owner Repairs:** The owner must address the following items. The owner may perform the work or hire a contractor. Repair activities should be documented in the operation, maintenance, and inspection manual.

- No owner repairs for this report.
- Trees and brush are not permitted on embankment surfaces or earthen spillways.  
*Clear the trees, brush, and tall vegetation from the entire embankment and establish a healthy grass cover on the dam.*
- The embankment crest must have a uniform elevation.  
*Level the crest.*
- Rodent burrows weaken dam embankments and must be repaired. Rodent activity must be controlled.  
*Eliminate the rodent population and repair the rodent burrows on the dam.*
- The embankment and spillways must be protected from erosion. A healthy grass cover should be present on embankment and spillways as needed, and rock riprap must be cleared of vegetation and replenished periodically.

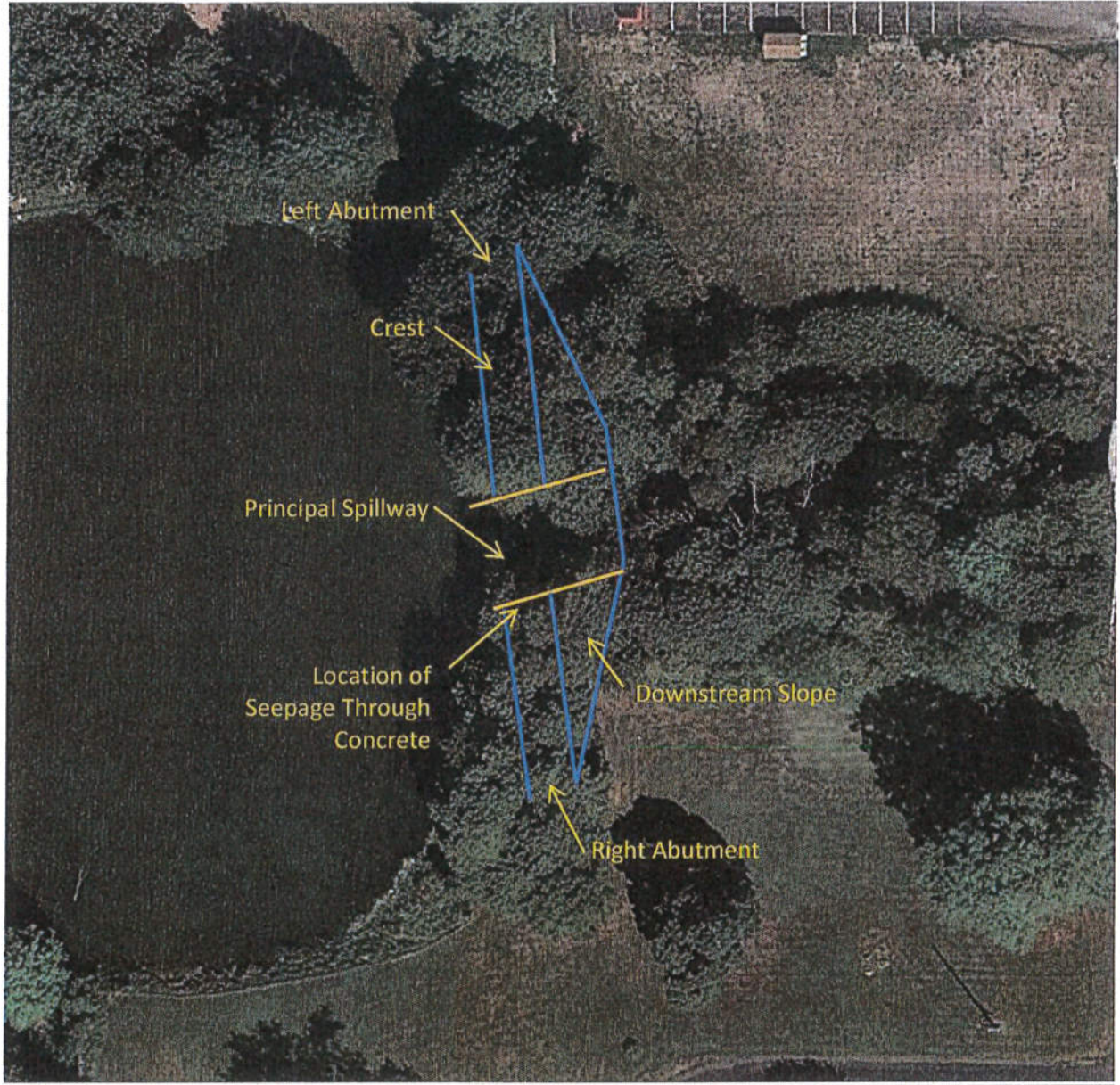
- A satisfactory trashrack and/or antivortex plate must be present at the inlet of the principal spillway.
- 
- Spillways must be able to flow at their full capacities; debris and vegetation must be periodically removed.
- 
- The lake drain must be operable and accessible. Routine maintenance of the lake drain should be performed annually and should include operation and lubrication of the valve/sluice gate in accordance with the manufacturer's specifications. Use caution if the operability is unknown. If the drain no longer functions contact the Division of Water Resources to discuss repair or replacement.
- 
- Embankment drains and spillway drains must be periodically maintained to ease monitoring and functionality. Pipe outlets should be marked and cleared regularly to allow the owner to quickly identify changing seepage conditions in the dam.
- 
- A spillway must convey flow without excessive leakage.
- 
- This dam must have an operation, maintenance, and inspection manual (OMI) and an emergency action plan (EAP). Prepare an OMI and/or an EAP and submit for approval. Guidelines for the preparation of these documents are included with this report.  
*This dam must have an operation, maintenance, and inspection manual (OMI) and an emergency action plan (EAP) in accordance with OAC Rule 1501:21-21-04. Prepare an OMI and an EAP. Guidelines for the preparation of these documents are included with this report.*
- 
- Flow through a deteriorated spillway subjects it to further deterioration and potentially failure.
- 
- Seepage from the dam must be controlled to prevent stability and maintenance problems. Monitor the seepage and/or wet area for any signs of increased flow, muddy flow, or instability on or adjacent to the embankment.
- 
- Remove the debris that has been dumped on the downstream slope.*
- 
- 

**Owner Dam Safety Program:** In accordance with Ohio Revised Code (ORC) Section 1521.062, the owner of a dam shall maintain a safe structure and appurtenances through inspection, maintenance, and operation. A dam, like any other part of the infrastructure, will change and deteriorate over time. Appurtenances such as gates and valves must be routinely exercised to ensure their operability. Inspection and monitoring of the dam identify changing conditions and problems as they develop, and maintenance prevents minor problems from developing into major ones. Dam owners must have these procedures documented in an OMI.

Despite efforts to provide sufficient structural integrity and to perform inspection and maintenance, dams can develop problems that can lead to failure. Early detection and appropriate response are crucial for maintaining the safety of the dam and downstream people and property. The ORC requires the owner to fully and promptly notify the Dam Safety Program of any condition which threatens the safety of the structure. A rapidly changing condition may be an indication of a potentially dangerous problem. The Dam Safety Program can be contacted at 614/265-6731 during business hours or at 614/799-9538 after business hours. Dam owners must have emergency preparedness procedures documented in an EAP.



## Sketch of Dam







Photograph No. 1: View of the upstream slope from the right abutment. Note the tall vegetation growing on the slope.



Photograph No. 2: Another view of the upstream slope.



Photograph No. 3: View of the crest from the right abutment.



Photograph No. 4: View of the downstream slope from the left end of the dam. Note the trees and brush on the slope.



Photograph No. 5: View of the downstream slope from the left end of the dam.



Photograph No. 6: View of the principal spillway weir.



Photograph No. 7: View of the principal spillway. Note the right sidewall has collapsed and has been washed downstream.



Photograph No. 8: View behind the left sidewall of the principal spillway. Note the large crack in the concrete and the large amounts of water seeping through.



Photograph No. 9: View of the left sidewall. The water leaking from the crack in the picture above is eroding the soil behind the sidewall and seeping through cracks in the sidewall.



Photograph No. 10: Another view of the left sidewall. Note the severe damage to the concrete.

## Dam Classification Checklist

Name of Dam: Woodside Lake Dam File Number: 1005-008  
 County: Mahoning Date: April 19, 2016 Engineer: NAS

The classification of a dam is based on three factors: the dam's height, storage capacity, and potential downstream hazard. The height of the dam is the vertical distance from the crest to the downstream toe. The storage capacity is the volume of water that the dam can impound at the top of dam (crest) elevation. The downstream hazard consists of roads, buildings, homes, and other structures that would be damaged in the event of a dam failure. Potential for loss of life is also evaluated. Various dam failure scenarios must be considered, and they include failures when the dam is at normal pool level and failures during significant flood events. Each of the three factors is evaluated, and the final classification of the dam is based on the highest individual factor. Class I is the highest and Class IV is the lowest. The classification of a dam can change based on future development along the downstream channel.

This checklist is intended to establish or verify the appropriate classification in accordance with the Ohio Administrative Code – it does not necessarily show all potential hazards or the full extent of inundation. In addition, elevations and dimensions are estimated.

<b>HEIGHT CLASSIFICATION</b>	<b>STORAGE CLASSIFICATION</b>	<b>EXEMPT~NON-REGULATED</b>
Dam Height = <u>15.00</u> feet	Stor. Capacity (top of dam)= <u>77.20</u> acre-feet	
<u>        </u> > 60' - Class I	<u>        </u> > 5000 acre-feet - Class I	<u>        </u> Height ≤ 6 feet
<u>        </u> > 40' - Class II	<u>        </u> > 500 acre-feet - Class II	<u>        </u> Storage ≤ 15 acre-feet
<u>        </u> > 25' - Class III	<u>    X    </u> > 50 acre-feet - Class III	<u>        </u> 6 ft. < Height < 10 ft. &
<u>    X    </u> ≤ 25' - Class IV	<u>        </u> ≤ 50 acre-feet - Class IV	<u>        </u> Stor. ≤ 50 ac-ft
<b>Height Class:</b>	<u>    IV    </u>	
<b>Storage Class:</b>	<u>    III   </u>	
<b>Hazard Class (see next page):</b>	<u>    II   </u>	<b>Estimated Population at Risk:</b> ( <u>  none  </u> 1-5 6-15 16+ )
<b>Final Class:</b>	<u>    II   </u>	

**Class Changed (Yes, No)**

## Potential Downstream Hazard

I	II	III	IV	-	-									
Probable loss of human life	Loss of public water supply or wastewater treatment facility, release of health hazardous waste	Flooding of structure or high-value property	Damage to high-value or Class I, II, III dam or levee	Damage to major road (US or state route), disruption of only access to residential or critical facility area	Damage to railroad or public utility	Damage to rural building, not otherwise high-valued property, or Class IV dam or levee	Damage to local road (county and township)	Loss restricted mainly to the dam or agricultural /rural land	No hazard to structure noted	No hazard assessment; further investigation needed	Distance downstream of dam to affected structure (feet)	Vertical distance from streambed to base of affected structure (feet)	Horizontal distance from stream to affected structure (feet)	
								A			-	-	-	Dam
							B				220	10	-	South Meridian Rd
									C		800	20	150	Church
		D									2700	7	50	Home

This checklist is intended to establish or verify the appropriate classification in accordance with the OAC – it does not necessarily show all potential hazards or the full extent of inundation.

### Sketch of Developments Downstream of Dam



## Flood Routing Summary

A dam must be able to safely pass severe flood events. A dam uses a combination of spillway discharge capacity and reservoir storage capacity, known as discharge/storage capacity, to prevent floodwater from overtopping the embankment crest and destabilizing the dam. When a dam has inadequate discharge/storage capacity, floodwater will overtop and erode the embankment. This can cause severe damage and dam failure.



Dam embankment prior to severe flood.



Erosion caused by floodwater overtopping the dam – a result of inadequate discharge/storage capacity.



Erosion caused by floodwater overtopping the dam – a result of inadequate discharge/storage capacity and debris obstructing the 5-foot-diameter spillway pipe.

As part of this inspection, the Division of Water Resources did not thoroughly investigate this dam's discharge/storage capacity or its ability to safely pass the required design flood. In 2003, the Division of Water Resources performed hydrologic and hydraulic calculations to estimate the size of the design flood and the discharge/storage capacity of the dam. These calculations were used in the flood routings to determine the maximum water surface elevation in the reservoir for various flood events.

Woodside Lake Dam is a Class II dam; therefore, in accordance with OAC Rule 1501:21-13-02, the required design flood is 50% of the Probable Maximum Flood (PMF) or the critical flood. This dam and its spillway system must safely pass the design flood without overtopping the embankment crest and destabilizing the dam. Flood routing calculations indicate that the dam can pass approximately 2% of the PMF; Woodside Lake Dam does not appear to be able to safely pass the design flood.





# Dam Inventory Sheet

Name: WOODSIDE LAKE DAM

File No: 1005-008

National #: OH03086

Reservoir:

Permit No.: N/A

Class (Ht-Vol): II (IV - III)

### Owner Information

Owner: State of Ohio

Owner Type: Public, State

Address: c/o Mahoning County Auditor  
120 Market Street

Multi-Dams: -

Parcel No.: 480050211000

City: Youngstown

State: OH

Zip: 44503

Contact: Cheri Lyn Donofrio

Phone No.: 330/740-2010

### Location Information

County: Mahoning

Latitude Deg.: 41

Min.: 04

Sec.: 45

Township: Austintown

Longitude Deg.: 80

Min.: 42

Sec.: 43

Stream: Factory Run Tributary To Mill Creek

USGS Quad.: Youngstown

USGS Basin No.: 05030103

### Design/Construction Information

Designed By: Unknown

Constructed By: Unknown

Completed:

Plan Available:

At:

Failure/Incident/Breach:

### Structure Information

Purpose: Unknown

Type of Impound.: Dam And Spillway

Type of Structure: Earthfill

Drainage Area (sq. miles): 2.61

or (acres): 1669

#### Embankment Data

Length (ft): 235

Upstream Slope: 2.5H:1V

Height (ft): 15

Downstream Slope: 1.5H:1V

Top Width (ft): 8

Volume of Fill (cub. yds.):

#### Spillway Outlet Works Data

Lake Drain: NONE

Principal: 40-FT-WIDE SANDSTONE BLOCK WEIR

Emergency: NONE

Maximum Spillway Discharge (cfs): 253

Design Flood: 0.50

Flood Capacity:

0.02

#### Dam Reservoir Data

Elevation (ft-MSL)\*

Area (acres)

Storage (acre-feet)

Top of Dam:

1059

18.4

77.2

Emergency Spillway:

Principal Spillway:

1057.3

11.7

51.9

Streambed:

1044

\*Elevations are not necessarily related to a USGS benchmark

Foundation:

### Inspection Information

Inspection History: 4/19/2016 NAS

Phase I:

6/8/2011 WDE

Other Visits:

1/21/2004 MEM

Inspection Year: D

### Operation Information/Remarks

Emergency Action Plan: Not Approved

Format: No Plan

OMI: No

Last Entry: 6/6/2016



**Upstream Slope**  Gradient: 2.5H:1V

Typical Problems: shoreline erosion, trees & brush, surface erosion, ruts, rodent burrows, earth slides, cracks

	None	Monitor	Repair	Engineer
- Trees and brush along slope			<input checked="" type="checkbox"/>	
- Tall vegetation along slope			<input checked="" type="checkbox"/>	
- Rodent burrows along shoreline			<input checked="" type="checkbox"/>	

**Crest**  Width (ft): 8  Length (ft): 235  Total Freeboard (ft): 1.70

Typical Problems: low areas, trees & brush, surface erosion, ruts, cracks

	None	Mon.	Rep.	Eng.
- Trees and brush			<input checked="" type="checkbox"/>	
- Multiple low areas along crest			<input checked="" type="checkbox"/>	
- Sparse areas of grass on right half			<input checked="" type="checkbox"/>	

**Downstream Slope**  Gradient: 1.5H:1V

Typical Problems: trees & brush, surface erosion, ruts, rodent burrows, earth slides, cracks, seepage

	None	Mon.	Rep.	Eng.
- Trees and brush along entire slope			<input checked="" type="checkbox"/>	
- Debris dumped onto downstream slope			<input checked="" type="checkbox"/>	
- Severe erosion on slope were seepage through cutoff wall is occurring				<input checked="" type="checkbox"/>

**Principal Spillway**  40-ft-wide Sandstone Block Weir

Typical Problems: Inlet obstructed, unsatisfactory trashrack/anti-vortex plate, material deterioration, misalignment, open joints, outlet erosion, outlet overgrown, undermining

	None	Mon.	Rep.	Eng.
- Left sidewall collapsed and washed away				<input checked="" type="checkbox"/>
- 150 GPM leaking through concrete behind right sidewall				<input checked="" type="checkbox"/>
- Seepage through right sidewall				<input checked="" type="checkbox"/>
- Uneven weir				<input checked="" type="checkbox"/>
- Severe damage to right sidewall				<input checked="" type="checkbox"/>

Sufficient measurements to perform hydraulics (dimensions, riser depth, outlet elevation)

**Emergency Spillway**  None  
 Freeboard (to normal pool, feet)

Typical Problems: Flowpath obstructed, material deterioration, erosion, misalignment, overgrown, undermining

- None

Required Action			
None	Monitor	Repair	Engineer
<input checked="" type="checkbox"/>			

Sufficient measurements to perform hydraulics (dimensions, breadth, side slopes)

**Lake Drain**  None

Typical Problems: Poor operating access, inoperable, deteriorated/missing components, outlet erosion

- None

None	Mon.	Rep.	Eng.
			<input checked="" type="checkbox"/>

**Other**

None	Mon.	Rep.	Eng.

All Field Data Gathered (inspector's initials): NAS NDE

**Site Sketch**

- 7.5' x 18' CONCRETE BOX Culvert @ Meridi Meridian Road.  
 Road Surface is 10' ABOVE STREAM channel.

- Home Located At 3174 Kingston Lane, First floor  
 is approx. 7' ABOVE Streambed and 50' FROM  
 Channel.

Investigate Downstream Hazard

## Agencies Associated with Dams and Lakes

The Division of Soil & Water Resources has the responsibility to ensure that human life, health, and property are protected from dam failures. The division provides fact sheets and dam safety information for dam owners on the division's web site: [www.dnr.state.oh/water](http://www.dnr.state.oh/water). Other governmental agencies are involved with the lakes and streams associated with dams, but have other responsibilities. Listed below are several relevant agencies that dam owners may be interested in contacting.

### County Emergency Management Agency



County Emergency Management Agencies (EMAs) serve the public in disaster preparedness, public safety, and emergency management at the county level. County EMAs are responsible for coordinating relief efforts related to manmade and natural disasters. In the case of a dam emergency, the County EMA is one of the dam owner's first contacts. Telephone: 330 740-2200  
State Web Site: <http://ema.ohio.gov/index.aspx>



### Soil & Water Conservation District

County soil and water conservation districts (SWCDs) serve communities by providing assistance to urban and agricultural land users. SWCDs specialize in soil erosion prevention and water management. Some of services offered by county SWCD offices include survey and design of grassed waterways, erosion control structures, surface and subsurface drainage, farm ponds, and livestock waste management facilities. SWCDs also sponsor a number of information and education programs. In addition to these services, SWCDs may utilize assistance from the USDA Natural Resources Conservation Service (NRCS) for some technical matters. [http://www.dnr.state.oh.us/H\\_Nav2/OFFICESWCDSDistrictOffices/tabid/9093/Default.aspx](http://www.dnr.state.oh.us/H_Nav2/OFFICESWCDSDistrictOffices/tabid/9093/Default.aspx)  
330-740-7995 - Telephone

### Natural Resources Conservation Service



Since 1935, the Natural Resources Conservation Service (originally called the Soil Conservation Service) has provided leadership in a partnership effort to help America's private landowners and managers conserve their soil, water, and other natural resources. NRCS employees provide technical assistance based on sound science and suited to a customer's specific needs. NRCS provides financial assistance for many conservation activities. Web Site: <http://www.nrcs.usda.gov/>

### Division of Wildlife



The Division of Wildlife within the Ohio Department of Natural Resources manages fish and wildlife of the state. The division offers assistance in stream improvement and pollution investigations and provides fishery information and publications on pond stocking. Information regarding pest and rodent control can be obtained by visiting the division website or by contacting the regional office. The Division of Wildlife should be contacted before starting any construction activity where loss of aquatic life is anticipated. 330-644-2293 - District Office 3  
<http://ohiodnr.com/Home/ContactUs/tabid/18270/Default.aspx> - Web Site

### Ohio Environmental Protection Agency



The Ohio Environmental Protection Agency (EPA) establishes environmental guidance and enforcement standards for the state. In particular, the Division of Surface Water provides assistance for matters pertaining to rivers, lakes, and streams in Ohio. The Division of Surface Water can provide information and assistance in developing best management practices for the control of point and non-point pollution sources and spills. Suspected pollution spills can be reported directly by using the Ohio EPA Spill Hotline at 1-800-282-9378. District Office Northeast: 330-963-1200  
State Web Site: <http://www.epa.state.oh.us/>

### OSU Extension



The Ohio State University (OSU) Extension utilizes knowledge and research developed by the Ohio Agricultural Research and Development Center, Ohio State, and other land-grant universities to assist communities, businesses, and individuals. In addition to a wide variety of community leadership and agricultural services for all ages, county OSU Extension offices offer information and assistance in agricultural water resource conservation and management, farm pond management, and safety, Ohio hydrologic cycles and non-point source pollution management. Information regarding dry hydrant fire protection and legal liabilities associated with farm ponds in Ohio can be found on the extension website. 330-263-3831 - Extension Region: North East  
<http://extension.osu.edu/locate-an-office> - Web Site