



Ohio Department of Natural Resources Division of Water Fact Sheet

Fact Sheet 02-63

Remediation Alternatives

The Division of Water, Dam Safety Engineering Program, has the statutory responsibility to ensure that human life, health, and property are protected from dam failures. The program regulates dams meeting certain height and storage criteria based on the provisions of the Ohio Revised Code (ORC) and Ohio Administrative Code (OAC). These criteria are listed in the ORC and OAC and in the Division of Water's Construction Permit and Dam Classification fact sheets. For all dams meeting these criteria, the program regulates their construction, operation, and repair to ensure that dams meet the required safety standards set forth in the ORC and OAC.

When the program finds that a dam has been constructed without a permit or that an existing dam does not meet the required safety standards, the Division of Water directs the owner to bring the dam into compliance. For a dam built without a construction permit, the owner would receive a letter that directs the owner to obtain a construction permit by following the construction permit requirements listed in the OAC and ORC. For an existing dam, the owner would receive a dam safety inspection report that lists required remedial measures. The owner must accomplish all of these required remedial measures. As alternatives to obtaining a construction permit or to accomplishing the required remedial measures listed in the inspection report, the owner may (a) remove the dam, (b) breach the dam, (c) modify the height of the dam to make it exempt from all or a portion of the construction permit and periodic inspection requirements, or (d) modify the purpose of the structure so that it does not meet the definition of a dam. Additional information about each of these alternatives is listed below.

Remove the Dam

Description: Dam removal consists of complete removal of the dam embankment to restore the original relief of the site. Removing the dam alleviates the need to obtain a construction permit or to accomplish the required remedial measures listed in the inspection report.

Requirements: The following items must be prepared by a registered professional engineer and submitted to the Division of Water for review and approval: a plan for lowering the lake level, construction plans and specifications for removing the embankment, plans and specifications for controlling sediment in the impoundment, a description of erosion protection in the breach and dam embankment foundation areas, and a

construction schedule. Other items may be required in certain circumstances. It is the responsibility of the owner to hire a qualified registered professional engineer.

Breach the Dam

Description: A breach is defined as an opening in a dam that prevents the dam from impounding a significant amount of water (see photograph). A breach extends from the upstream side of the embankment to the downstream side and typically has mild side slopes. A dam breach could be considered partial removal of a dam. Breaching the dam alleviates the need to obtain a construction permit or to address the required remedial measures listed in the inspection report.



Photograph of dam breach from downstream. White line shows former dam crest, and arrow shows center of breach.

Requirements: The following items must be prepared by a registered professional engineer and submitted to the Division of Water for review and approval: a plan for lowering the lake level, construction plans and specifications for constructing the breach, plans and specifications for controlling sediment in the impoundment, calculations or justification for sizing the breach, a description of erosion protection in the breach area, and a schedule for construction. Other items may be required in certain circumstances. It is the responsibility of the owner to hire a qualified registered professional engineer.

Modify the Height of the Dam

Description: Reducing the height of a dam reduces the dam's storage volume. This can make the dam exempt from the construction permit and periodic inspection requirements of the ORC or change the classification of the structure. Refer to

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the ORC for a complete description of the height and storage volume criteria. In summary, a dam is exempt from the construction permit and periodic inspection requirements when (a) it is not more than 6 feet high, or (b) it has not more than 15 acre-feet of storage volume at the top of dam elevation, or (c) it is not more than 10 feet high and has not more than 50 acre-feet of storage volume at the top of dam elevation. For reference, a dam that is 15 feet high and impounds a 2.5-acre lake has a storage volume of about 15 acre-feet. Modifying the dam to meet the above criteria alleviates the need to obtain a construction permit or to accomplish the required remedial measures listed in the inspection report.

The classification of a dam is based on three factors: the dam's height, storage capacity, and potential downstream hazard. Each factor is evaluated, and the final classification of the dam is based on the highest individual factor (Class I being the highest and Class IV being the lowest). When the classification based on downstream hazard is lower than the classification based on height and storage capacity, it is possible for the final classification of the dam to be changed if the height of the dam is reduced. In addition, reducing the height of a dam could change the potential impact of a dam failure on the downstream area, and thereby change the hazard classification. Changing the classification could alleviate the need to accomplish some or all of the required remedial measures listed in the inspection report. It should also be noted that Class IV dams do not require a construction permit; however, they do require submittal of the preliminary design report to the Division of Water for approval.

Requirements: The following items must be prepared by a registered professional engineer and submitted to the Division of Water for review and approval: a plan for lowering the lake level, detailed storage volume calculations, construction plans and specifications for lowering the dam crest, and supporting justification and calculations showing that the modified dam will operate safely. Other items such as a dam failure analysis may be required in certain circumstances. It is the responsibility of the owner to hire a qualified registered professional engineer.

Modify the Purpose of the Structure

Description: In accordance with OAC Rule 1501:21-3-01, the definition of a dam is "any artificial barrier together with any appurtenant works, which either does or may impound water or other liquefied material...A fill or structure intended solely for highway or railroad use that does not permanently impound water or other liquefied material as determined by the Chief is not considered a dam." It is possible to modify the dam so that it no longer meets the definition above. For example,

draining the lake and installing a culvert at the streambed elevation or modifying the existing spillway to be a culvert may be acceptable. This alleviates the need to obtain a construction permit or to address the required remedial measures listed in the inspection report.

Requirements: The following items must be prepared by a registered professional engineer and submitted to the Division of Water for review and approval: a plan for lowering the lake level, construction plans and specifications for the modification, plans and specifications for controlling sediment in the impoundment, calculations or justification for design, and a schedule for construction. Other items may be required in certain circumstances. It is the responsibility of the owner to hire a qualified registered professional engineer.

As a temporary measure, the lake level of a dam may be lowered and maintained at a lower level. A lower lake level makes the dam safer by reducing water pressure on the dam and its foundation, reducing the volume of water that would be released during a failure, and providing more flood storage capacity. Maintaining the lake at a lower lake level could allow for a less stringent time schedule for obtaining a construction permit, accomplishing required remedial measures, or modifying the size of the dam.

Other local, state, and federal approval may be required for the construction activities listed above. It is recommended that the owner contact the Ohio Environmental Protection Agency, Division of Surface Water - 401 Certification at (614) 644-2135, the local floodplain administrator, and the U.S. Army Corps of Engineers district office. You may also refer to the Division of Water web site to review "Stream Management Guide, Permit Checklist for Stream Modification Projects, Guide No. 6" for more information regarding other agency approval or to review all of the Division of Water fact sheets.

For additional information please contact:

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