



Dam Safety Fact Sheet

Owner Responsible for Inspections

STATE OF WISCONSIN • DEPARTMENT OF NATURAL RESOURCES • BUREAU OF WATERSHED MANAGEMENT

SCOPE OF OWNER RESPONSIBILITY

Dam inspections are the responsibility of the dam owner and an important part of proper maintenance of a dam. A regular dam inspection program can identify problems and unsafe conditions that could result in dam failure.

An inspection program starts during construction of the dam and continues for the life of the dam. **A dam is an active structure** constructed of materials that are subject to erosion, movement, corrosion and deterioration by wind, water, ice and temperature extremes. A well-documented inspection program will track this deterioration and identify needed repairs and maintenance items.

In addition to regular inspections, it is important for the owner to thoroughly inspect a dam during a flood event to identify emergencies, and after a flood event to ensure all operational parts of the dam still work and no serious structural damage has been done.

Dam owners must become familiar with their dams and are responsible for hiring consulting engineers to inspect their dams on a scheduled basis. A dam may consist of any or all of the following: earthen embankments, concrete structures, abutments, groins, appurtenant works, spillways and water control structures, and locks (see the Dam Safety website for definitions of the parts of a dam <http://dnr.wi.gov/topic/Dams/documents/FSNomenclature.pdf>.)

All parts of the dam will be inspected during a safety inspection. Inspection checklists available on our website cover all parts of the dam, and make it easier to inspect without overlooking important sections. When conducting the required safety inspections for your dam, the engineer inspector you hire should use these checklists.

Dam safety inspections that consulting engineers perform on behalf of dam owners will consist of a visual inspection for dam defects, and documentation and inventory of the features of the dam. A dam safety inspection report will then be prepared and sent to the Department for review. Often, the past history of the dam will dictate the scope of a specific inspection. Finally, further investigation into serious deficiencies will be required as follow-up to gain compliance with all applicable safety requirements.

Visual Inspection - The visual inspection consists of two major tasks; a check for defects at the dam that affect the safety of the dam and an evaluation of the land uses downstream from the dam.

Defects – The inspection for defects involves an examination of the dam site and the features of the dam for damage, deterioration, failed components, poor maintenance, and other problems that could impact the life, integrity, or safety of the dam.

Defects may include seepage, erosion, malfunctioning equipment, rodent burrows, cracked or spalling concrete, unwanted growth of woody vegetation, etc. The inspection need not involve soil borings, concrete sampling or other invasive evaluation, but it should identify if that level of in-depth analysis might be needed as a follow-up.

Cracks, gullies, and joint separations should be measured and photographed so the rate of deterioration can be determined. If seepage weirs have been installed on the dam, readings of the weirs should be done on a regular basis and the logs submitted as part of the inspection reports. All deficiencies should be documented with photographs. The inspector should identify when gates were last fully exercised and recommend a testing interval as part of the inspection report.

The presence of proper safety signage and designated portage routes should be noted. NR 330 requires installation of a dam warning sign that is visible a minimum of 300 feet upstream from the dam. A portage sign may also be required.

Downstream Land Use – The inspector must document development such as homes, businesses and other public uses downstream of the dam for the purposes of determining the dam's final hazard rating. The presence of any land-use control such as zoning or restrictive use covenants in the downstream area should be noted in the

inspection report. Maps and/or aerial photography may also be consulted, but the inspection process should include a visual check on downstream development.

Compliance Evaluation – As part of the inspection, the dam must be evaluated for compliance with sections NR 333, NR 330 and NR 116, Wis. Adm. Code. The engineer inspector will fill out a process checklist (available on the DNR Dam Safety Website) to ensure that the dam is meeting the standards in the codes.

Dams without a formal hazard rating will need a dam failure analysis performed as a follow-up to the inspection. The spillway capacity of the dam must meet the capacity requirements for the dam's final hazard rating as defined in NR 333.06.

An up-to-date Inspection, Operation & Maintenance Plan (IOM) and Emergency Action Plan (EAP) are needed for all large dams. If these plans are not already developed at the time of the inspection, they will be required as follow-up and this should be a requirement in the inspection report submitted to the Department.

The Department's historic file information, including construction plans if available, will be stored on the Department web pages for the use by the dam owner and the owner's consultant. If the information is not yet available through the web pages, the owner or consultant can view the paper files for an individual dam by contacting the Water Management Engineer for the county in which the dam is located.

Field Surveys and Inventory – The need to perform a survey or take other measurements will depend on the individual dam. Many dams have detailed plans on file with elevations and dimensions. However, dams that have never been surveyed or had their features inventoried will need to be surveyed and documented.

In some cases, benchmarks for vertical and horizontal control will need to be established. For dams with detailed design information, the survey may consist of simply shooting the water levels upstream and downstream, and coordinating the elevation with any onsite gauges to determine compliance with operating orders. If undocumented alterations have occurred to the dam, inventorying them will be necessary.

Please refer to the Dam Inspection Checklist on the website at: <http://dnr.wi.gov/topic/Dams/documents/DamInspectionChecklist.pdf>, for recommendations on a survey of your dam.

Dam Safety Inspection Report – Within 90 days of the completion of the inspection, a report (two hard copies and one electronic (PDF) copy) shall be submitted to the DNR for review and concurrence.

The report should be a summary of the findings of the inspection. It should list the defects identified for all parts of the dam. The consulting engineer will need to make follow-up directives for repairs or further investigation. The directives should have timeframes for completion listed. A list of suggested timeframes is provided on the Dam Safety website: <http://dnr.wi.gov/topic/Dams/documents/TimeFramesforDamInspectionDirectives.pdf>.

All dams that do not already have a dam failure analysis will be required to complete one. The suggested timeframe document should be referenced to set the schedule based on the estimated hazard of the dam. The dam owner will be required to upgrade spillway capacity or make other alterations unless and until a detailed dam failure analysis is performed upon which a formal final hazard rating can be set.

Inspection checklists should be included as part of the inspection report, as should photographs of the dam and survey data and logs. Inspection reports and related documentation shall be submitted to the Department's Water Management Engineer who covers the county where the dam is located. Two hard copies and one electronic copy (PDF) of the report and supporting documentation must be submitted. A staff listing by county and service center is at <http://dnr.wi.gov/topic/Dams/regionalcontacts.html>.

For more information on dam safety either go to the [WDNR Dam Safety Program](#) or write to:

Department of Natural Resources
Dam Safety Program, WT/3
101 South Webster Street
P. O. Box 7921
Madison, WI 53707-7921
Email: damsafety@wisconsin.gov

