

**STATE OF RHODE ISLAND**

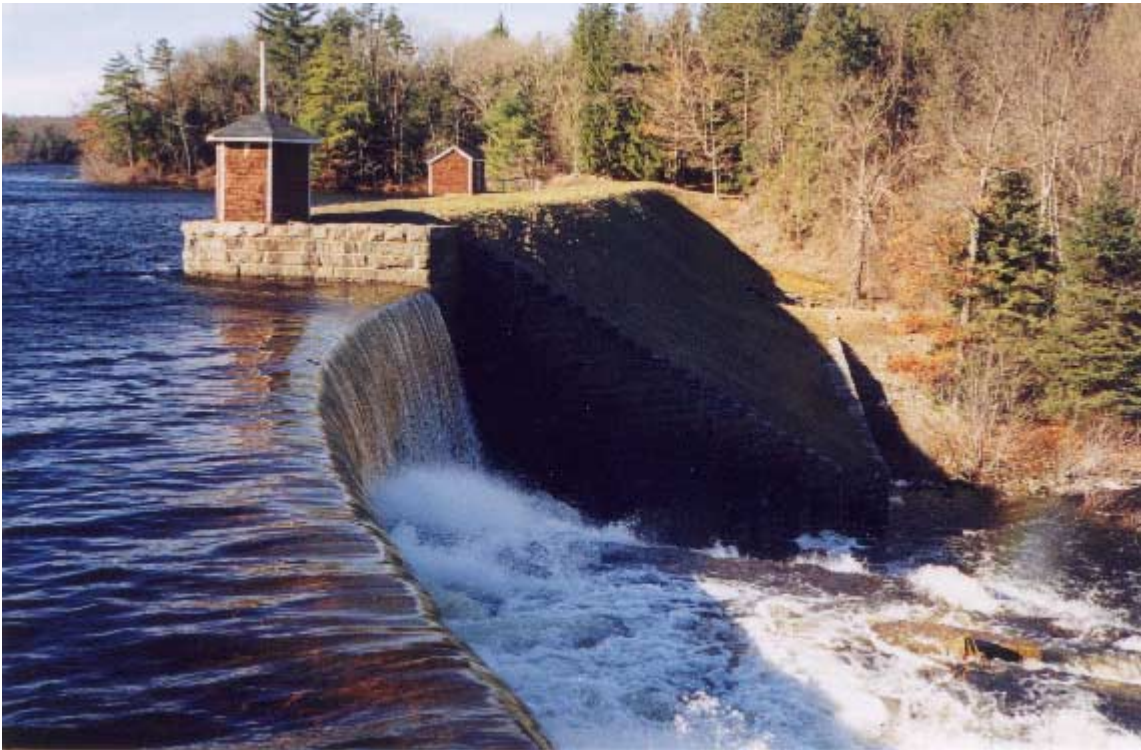
**2000**

Annual Report to the Governor

on the Activities of the

**DAM SAFETY PROGRAM**

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Dam No. 164 - Barden Reservoir Dam, Scituate

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Department of Environmental Management

Prepared by the Office of Compliance and Inspection

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## History of Rhode Island's Dam Safety Program

The Rhode Island dam inspection and inventory program had its inception in 1883, and was under the authority and responsibility of the Commissioner of Dams and Reservoirs. At that time, there were 86 dams included in the inventory records; today, there are 510 registered dams.

All of the 510 registered dams have been classified by size. This classification provides a relative description of Small, Medium or Large, based on the storage capacity and height of the impounded water. 195 of the dams meet or exceed the minimum criteria for a Small dam, and have been classified as Small, Medium or Large. These dams are ones that were thought to pose a threat to human life or property in the event of a dam failure. The remaining 315 dams are below the minimum criteria used to define a Small dam; however, for program identification reasons they have been classified as Small dams.

The 195 dams have also been classified to identify the potential hazard to human life and property in the event of a dam failure. These classifications are as follows:

High Hazard – Failure of the dam would most probably result in the loss of more than a few lives and extensive property damage.

Significant Hazard – Failure of the dam could possibly result in the loss of life and appreciable property damage.

Low Hazard – Failure of the dam would result in no apparent loss of life and only minimal or no property damage.

As is indicated above, these classifications relate to the potential for harm if the dam fails; it does not relate to the current condition of the dam. There are currently 16 high hazard dams, 41 significant hazard dams and 138 low hazard dams classified. The remaining 315 dams, whose size is below the minimum criteria used to define a Small dam (as explained above), have not been assigned a hazard classification but are assumed to be Low Hazard.

These hazard classifications were assigned in the late 1970's and early 1980's. However, due to additional development downstream of dams, some of the classifications may no longer be accurate. As indicated in the "Activities in 2000 - Grants" section of this report, the Department will be utilizing a Federal Emergency Management Agency (FEMA) grant to retain engineering services to update the downstream hazard classification ratings of certain dams.

As set forth in Rhode Island General Laws, Chapters 46-18 and 46-19, a dam owner has the responsibility for the safe operation of their dam, and is liable for the consequences of accidents or failures of the dam. In general, a dam owner is required to use "*reasonable care*" in the operation and maintenance of a dam and/or reservoir.

This responsibility includes the proper operation, maintenance, repair and rehabilitation of a dam, which are the essential elements in preventing a dam failure.

The regulations governing the administration and enforcement of Rhode Island's Dam Safety Program are contained in the General Laws of Rhode Island, Chapter 46-19. The Department of Environmental Management (DEM or Department) has the responsibility to inspect dams to determine their condition, to review and approve plans for construction or substantial alteration of a dam or reservoir and to order the owner to make repairs or to take other necessary action to make the dam or reservoir safe.

## **Inspection Program**

Each dam's classification and size determines the frequency of inspection. The higher the classification and size, the more frequently the inspection is conducted. A dam of any classification would also be inspected upon request by the owner, a town/city official, or by a person owning or representing property liable to damage from the dam.

The inspections performed by DEM are visual inspections and are conducted under a general inspection format based on guidelines established in 1976 by the United States Army Corps of Engineers (ACOE) for the National Program for the Inspection of (Non-Federal) Dams.

Following a visual inspection, a dam inspection report is prepared, identifying specific deficiencies and, when warranted, recommending corrective measures. A copy of the report is forwarded to the owner, with the expectation that the deficiencies will be corrected. However, unless the Department has determined that a dam is unsafe, the current law only authorizes the Department to recommend corrective measures, rather than requiring them. If a dam is determined to be unsafe, then the Department may order corrective actions.

## **Professional Associations**

Rhode Island has been a member of the Association of State Dam Safety Officials (ASDSO) since its inception in Denver, Colorado in 1984. ASDSO membership consists of state representatives along with corporate and individual members representing dam owners and professional engineering firms. ASDSO was formed to serve these initial functions:

- Improve efficiency and effectiveness of state dam safety programs;
- Foster public awareness;
- Facilitate inter-organizational, intergovernmental and interstate cooperation;
- Assist the dam safety community and provide a forum for the exchange of information;

- Provide representation of dam safety interests before state legislatures and before Congress; and
- Manage the association effectively through internal policies and procedures.

ASDSO has helped to improve dam safety in Rhode Island mainly through its sponsorship of regional dam safety workshops and its national annual conferences. In addition, various grants have provided funds for the purchase of computers, camera and video equipment and various types of field equipment to aid in the inspection and inventory of dams. These grant programs have also been supported, in part, by FEMA.

To further promote dam safety in Rhode Island and to foster interstate cooperation with our neighboring New England states, Rhode Island has been a member of the New England Association for Dam Safety (NEADS) since its inception in 1982. NEADS is comprised of delegates from each of the six New England states, each of whom is responsible for administering and/or managing the respective state's dam safety program.

## Activities in 2000

### Significant Hazard Dam Inspections

In 1999, a review of the Department's records indicated that many of the significant hazard dams had not been inspected for many years. Given the potential for loss of life and/or property damage in the event of failure of a significant hazard dam, the Department began inspection of these dams in 1999. The remaining 10 significant hazard dams were inspected in 2000, as follows:

Dam No.	Dam Name	City/Town	Embankment	Spillway	Gate
56	Woonsocket Falls	Woonsocket	N/a	Good	Good
70	Woonsocket No. 1	Lincoln / North Smithfield	Good to Fair	Fair	N/a
111	Waterman Lake	Glocester / Smithfield	Poor	Poor	Good
115	Slack	Smithfield	Fair	Good	Fair
131	Greystone	N. Providence / Johnston	Good to Fair	Fair	Good
164	Barden	Scituate	Good to Fair	Good to Fair	Not inspected
216	Wyoming Upper	Hopkinton / Richmond	Good to Poor	Fair	Poor
262	Locustville	Hopkinton	Fair	Fair	N/a
395	Lawton Valley	Portsmouth	Good to Fair	Good	Not inspected
485	Watson, Harold E.	Little Compton	Good to Fair	Good	Not inspected

N/a (not applicable) indicates that the component is not a part of this dam.

As part of each visual inspection, the condition of the major components of the dam were subjectively rated as Good, Fair or Poor. The major components of a dam are the embankment, the spillway and the drawdown gate. Good is defined as meeting minimum guidelines, whereas no irregularities are observed and the component appears to be maintained properly. Fair pertains to a component which requires maintenance which has not led to the requirement of repairs (i.e. missing mortar in a

masonry wall that has not yet caused displacement of the masonry units). Poor indicates a component that has progressed beyond improper maintenance and requires repair; the component no longer functions as it was originally intended (i.e. a drawdown gate with a removed lifting mechanism and a blocked outlet, or an earthen embankment with extensive, deep rooted vegetation). A component rated as poor requires an engineering evaluation and extensive work to return it to proper order.

All of the reports for the significant hazard inspections have been completed and mailed to the owners; however, one dam requires additional research to clarify ownership.

Low Hazard Dam Inspections

State law requires the Department to inspect any dam following a request by the owner or some other interested party which could receive harm by the failure of the dam. The following low hazard dams were inspected based on such requests:

Dam No.	Dam Name	City/Town	Embankment	Spillway	Gate
21	Cherry Valley	Glocester	Fair	Good	N/a
240	Yorker Mill	Exeter	Fair to Poor	Fair to Poor	Poor
247	Alton	Hopkinton / Richmond	Fair	Good	Not inspected
250	Shannock Mill	Richmond / Charlestown	N/a	Fair	Poor
254	Potter Hill	Hopkinton	N/a	Fair	Fair
397	New	Glocester	Poor	Poor	N/a
410	Standard Oil	East Providence			Failed
536	Mill	North Kingstown	Breached		
600	Mowry Meadow	Glocester	Poor	Poor	Fair to Poor

N/a (not applicable) indicates that the component is not a part of this dam.

All 9 of the inspection reports have been completed and 7 of them have been mailed to the owners. Two of the dams require additional research to identify the owners.

Dam no. 410 - Standard Oil in East Providence was inspected at the owner's request, following their discovery that a flow control plate had failed. This small dam is located in an isolated portion of a river and no known problems arose from the failure.

Dam no. 536 - Mill in North Kingstown was inspected following a breach of the earthen embankment. The breach caused a sudden release of the impounded water, to which Town officials responded. The release flooded downstream roads and a few basements. The Town investigated ownership of the dam, but did not reach a conclusion and the Department is not aware of any plans to repair of the dam.

In 1999, neighborhood concerns following Hurricane Floyd prompted DEM to inspect Dam no. 177 - Tiogue Lake in Coventry. The inspection was part of an ongoing investigation to determine if the dam, which is owned and operated by three separate parties, is maintained in a safe manner. The investigation has continued through 2000, and in July, the Department issued an informal enforcement action requiring a return of the spillway to its designed operation. Compliance has not yet been attained.

### Wood-Pawcatuck Dam Inspections

Working in conjunction with DEM's South County Watersheds' coordinator and the Division of Fish and Wildlife, five dams in the Wood-Pawcatuck watershed were selected for inspection. The dams are numbers 216, 240, 247, 250 and 254, as indicated in the preceding tables. The reports have been completed for all of the dams and they were mailed to three of the owners. Two of the dam owners remain to be identified.

### Grants

In May, the Department applied to FEMA for a grant to improve the Dam Safety Program. In June, FEMA made an award of \$45,327.00. The grant will be used to retain the services of a professional engineer to assign downstream hazard potential classifications for particular dams throughout the State.

### Dam Safety and Maintenance Task Force

On May 31 the Governor signed an executive order to create a Dam Safety and Maintenance Task Force. The Task Force was charged with developing recommendations for a comprehensive program of monitoring, maintenance and repairs that will enhance upkeep and safety of the dams in the State.

The Task Force, co-chaired by the Directors of DEM and of the RI Emergency Management Agency (RIEMA), was comprised of representatives of the RI Budget Office, the RI Clean Water Finance Agency, the Natural Resources Conservation Service, Public Works Directors for three Rhode Island municipalities, five dam associations, two dam owners, and four members of the General Assembly (not all General Assembly members were officially appointed to the task force).

The Task Force convened for 12 two hour sessions over a six month period, and finalized their recommendations in a report dated January 2001. The recommendations included legislative, regulatory, administrative and policy proposals designed to protect public safety, create an efficient approach to dam repairs and ensure a timely response should a community be threatened by a dam failure. The report was forwarded to the Governor and the General Assembly, and dam safety legislation was introduced in February 2001.

### Data Management

The Dam Safety Program continued to manage data, which included verifying dam locations on the Geographical Information System (GIS) database, identifying current dam owners and updating the database to include dam owners and inspection information. In addition, the GIS database was made available to other agencies.

### Public Outreach

In September, the Department participated as the host state for the ASDSO Annual Conference in Providence, which drew over 600 people. About 90 people attended a half-day bus tour of three area dams (Olney Dam in Lincoln Woods State Park, Stillwater Dam in Smithfield and Gainer Dam in Scituate).

Also in September, the Department completed color mapping of each high and significant hazard dam, including written directions to access the dam. These maps will be distributed to emergency management personnel within each municipality which could be affected by a failure or misoperation of any of the dams.

State Owned Dam Repairs

The Department continued to move forward under its Capital Development Projects program, undertaking the engineering evaluation, design and/or reconstruction at the following state owned dams:

Dam No.	Dam Name	City/Town
108	Stillwater	Smithfield
566	Bowdish	Glocester

The Department awarded a construction contract for \$852,043 to Cardi Corporation for repairs to Dam no. 566 - Bowdish, which is a high hazard dam. Repairs will include reconstruction of the earthen embankment and reinforcing it to withstand overtopping, constructing a new concrete spillway, replacing the low level outlet structure and related piping and providing an access road to the dam for maintenance purposes.

In 1999, the Department retained Louis Berger & Associates, Inc. to perform an engineering evaluation of Dam no. 108 - Stillwater, which is also a high hazard dam. Following receipt of the final report in April 2000, the Department prepared a scope of work to complete an engineering design and construction, at a budget of \$3,000,000.

This completes the activities performed in 2000.

For further information on the Dam Safety Program please contact David Chopy at 222-1360.