

STATE OF RHODE ISLAND

2010

Annual Report to the Governor
on the Activities of the

DAM SAFETY PROGRAM



Failed section of Blue Pond Dam (no. 229) in Hopkinton

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 records; today, there are 671 inventoried dams. A list of these dams, sorted by town and river, is attached.

STATUTES

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

The criteria 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) has the responsibility to cause to be inspected dams to determine their condition, to review and approve plans for construction or substantial alteration of a dam, to order the owner to make repairs or to take other necessary action to make a dam safe.

In 2001, Section 46-12.2-2 was amended, authorizing the Clean Water Finance Agency to issue loans for projects associated with dam safety.

In 2005, Chapter 45-62 (Dam Management Districts) was added, authorizing municipalities to create dam management districts for dam repairs, maintenance, management and/or removal.

In 2006 two amendments to Chapter 46-19 were enacted. Section 4 was amended to authorize DEM, in an emergency, to take necessary actions to mitigate an unsafe condition at a dam and to assess the costs of those actions against the dam owner. Section 9 was amended to require a city or town where a high or significant hazard dam is located, and to require a state agency that owns a high or significant hazard dam, to complete by July 1, 2008, an Emergency Action Plan (EAP) for the dam. Rhode Island's Emergency Management Agency is responsible for coordinating development of the EAPs and must give final approval for the EAP to be considered complete.

GOVERNOR'S TASK FORCE ON DAM SAFETY AND MAINTENANCE

In May 2000, Governor Almond issued Executive Order 00-6, *Creation of 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 the Rhode Island Emergency Management Agency, was comprised of representatives of the Rhode Island Budget Office, the Rhode Island Clean Water Finance Agency, the Federal 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.

Although the proposed legislation developed by the Task Force was not enacted, DEM identified a number of recommendations that have been implemented through regulation (see *Dam Safety Regulations* on page 4).

DAM SAFETY REGULATIONS

In 2002, DEM began drafting Dam Safety Regulations to incorporate those recommendations from the Governor's Task Force on Dam Safety and Maintenance (see page 3) that can be implemented within the framework of the existing statute.

In 2005, DEM completed a preliminary draft of the Dam Safety Regulations. DEM then invited former members of the Task Force to participate in an initial review of the draft Dam Safety Regulations and incorporated many of their suggestions into a revised draft. In conjunction with draft Dam Safety Regulations, DEM drafted amendments to the Freshwater Wetlands Regulations to streamline approvals for repair of high and significant hazard dams.

In October 2006, DEM held a workshop on the draft Dam Safety Regulations. About 55 people attended the 2 hour workshop, which resulted in many questions and comments, both at the workshop and in follow-up letters. In December 2006, DEM forwarded to the workshop attendees a written response to comments, along with revised draft regulations reflecting comments, as appropriate.

DEM then initiated the formal process of promulgating the regulations. On July 23, 2007, a notice was placed in the Providence Journal newspaper, notifying the public that DEM was seeking comment on the proposed Dam Safety Regulations at a public hearing to be held on August 23, 2007, at the DEM headquarters. About 10 people attended the public hearing and one person submitted formal comments (these comments were also previously submitted to DEM in a May 2007 letter, to which DEM responded in writing). The public comment period remained open following the hearing for 30 days until September 24, 2007; no additional comments were received.

Since no new comments on the proposed Dam Safety Regulations were received during the public hearing and comment period, DEM executed the regulations and filed them with the Secretary of State on November 30, 2007. The regulations, which are available on DEM's website at <http://www.dem.ri.gov/pubs/regs/regs/compinsp/dams07.pdf>, became effective on December 20, 2007 and include the following:

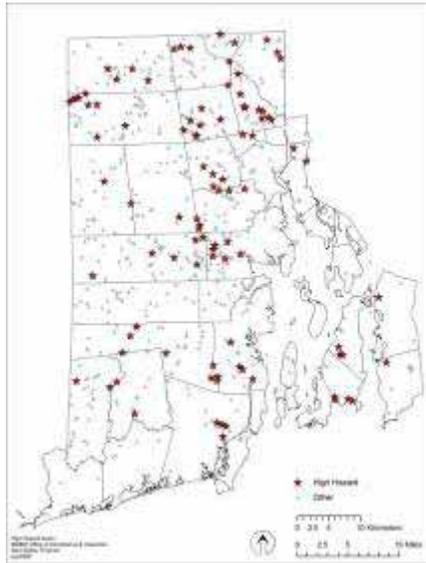
- Definitions of important terms including dam, hazard classifications, maintenance, repair and unsafe dam;
- Assignment of a hazard classification to each dam in the state inventory;
- Requirement that owners register their dams and notify DEM when ownership is transferred (no associated fee);
- A schedule for visual inspections of high and significant hazard dams;
- Procedure to streamline repair of high and significant hazard dams (no associated permit fee); and
- A procedure for dam owners to take emergency actions at high and significant hazard dams.

In June 2007, DEM's Freshwater Wetlands Regulations were amended to allow high and significant hazard dam repair requests to be approved under the Dam Safety Regulations. The Dam Safety Program coordinates such requests with the Freshwater Wetlands Program.

DAM CLASSIFICATIONS

Inventoried dams are classified by size and hazard ratings. The size classification provides a relative description of small, medium or large, based on the storage capacity and height of the impounded water. The hazard classification relates to the probable consequences of failure or misoperation of the dam; it does not relate to the current condition or the likelihood of failure of the dam. The hazard classifications are defined in the Dam Safety Regulations, as follows:

High Hazard – means a dam where failure or misoperation will result in a probable loss of human life.



High Hazard Dams

Significant Hazard – means a dam where failure or misoperation results in no probable loss of human life but can cause major economic loss, disruption of lifeline facilities or impact other concerns detrimental to the public's health, safety or welfare. Examples of major economic loss include washout of a state or federal highway, washout of two or more municipal roads, loss of vehicular access to residences, (e.g. a dead end road whereby emergency personnel could no longer access residences beyond the washout area) or damage to a few structures.



Significant Hazard Dams

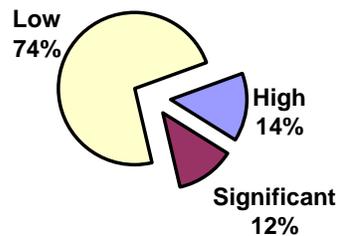
Low Hazard – means a dam where failure or misoperation results in no probable loss of human life and low economic losses.



Low Hazard Dams

There are 97 high hazard dams, 83 significant hazard dams, and 491 low hazard dams, with a total active inventory of 671 dams. The following chart illustrates the percentage of dams in each classification:

Hazard Classifications (Percent of Total Active Inventory)



INSPECTION PROGRAM

In accordance with the Dam Safety Regulations, a dam's hazard classification determines the inspection frequency. Visual inspections of high hazard dams are required to be performed every two years and significant hazard dams every five years. Low hazard dams are inspected every five years to determine whether downstream conditions have changed over time that warrant raising the hazard classification to significant or high. A high or significant hazard dam is also visually inspected upon request by any person who has cause to believe that an unsafe dam exists. In addition, a visual inspection will be performed whenever DEM has cause to believe that an unsafe dam exists, to determine if the dam is unsafe.

The visual inspections performed are conducted under a general inspection format based on guidelines established in 1976 by the United States Army Corps of Engineers for the National Program for the Inspection of (Non-Federal) Dams. A visual inspection may be performed by DEM or by an engineer hired by the dam owner.

As part of each visual inspection, the condition of the major components of the dam are subjectively rated as *good*, *fair* or *poor*. The major components of a dam are the embankment, the spillway and the low level outlet. *Good* is defined as meeting minimum guidelines, where no irregularities are observed and the component appears to be maintained properly. *Fair* is defined as a component that requires maintenance. *Poor* is defined as a component that has deteriorated beyond a maintenance issue and requires repair; the component no longer functions as it was originally intended.

A detailed investigation may be required if a visual inspection leads to a determination that a dam is or may be unsafe. A detailed investigation may include studies, investigations and analyses appropriate to evaluate the structural safety and hydraulic capacity of a dam or reservoir and appurtenant works, such as soil analysis, concrete or earth stability analysis, materials testing, foundation explorations, hydraulic and hydrologic analysis, including basin studies, flood potential, and an analysis of the dam's ability to pass flood waters.

Following a visual inspection performed by DEM, 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. If a dam is determined to be unsafe, then DEM will order corrective action.

ACTIVITIES IN 2010

UNSAFE DAMS

One of DEM's primary responsibilities in the Dam Safety Program is to identify unsafe dams and take appropriate action to return the dams to a safe condition. An unsafe dam is a high or significant hazard dam whose condition is such that an unreasonable risk of failure exists.

Following a visual or detailed inspection of a dam, the owner is notified of any condition that DEM considers to be unsafe. Notification is in the form of a Notice of Violation and Order (NOV), which sets forth the unsafe condition/s and requires the owner to make the dam safe.

In 2010, DEM was addressing 10 unsafe dams, as indicated below:

TOWN	DAM NO.	DAM NAME	HAZARD CLASSIFICATION	EMBANKMENT	SPILLWAY	LOW LEVEL OUTLET	OWNER
Cranston	172	Cranston Print Works	High	Fair to Poor	Fair	Poor	Cranston Print Works Company
Glocester	555	Hawkins	High	Poor	Poor	Poor	Glocester Land Trust
Hopkinton	229	Blue	Significant	Breached	Fair	Poor	Ashville Corp
Johnston	168	Oak Swamp	High	Fair to Poor	Fair to Poor	Poor	Town of Johnston
Johnston	169	Almy	High	Poor	Poor	Poor	Town of Johnston
Johnston	170	Simmons Upper	High	Poor	Fair	Poor	Town of Johnston
Johnston	171	Simmons Lower	High	Poor	Poor	Poor	Town of Johnston
Lincoln	295	Limerock	High	Poor	Fair	Poor	Town of Lincoln
North Providence	084	Wenscott	High	Fair	Fair	Poor	Town of North Providence
Smithfield	120	Sprague Upper	High	Poor	Good	Poor	Greater Providence YMCA

A summary of the conditions at each dam follows:

Dam number 172 (Cranston Print Works) in Cranston

DEM's engineering consultant (see *Grants to DEM* on page 21) inspected the dam in October 2009 and submitted the inspection report to DEM in June 2010. The report indicated that the low level outlet was inoperable and dense vegetation prohibited inspection of part of the dam. DEM issued the owner (Cranston Print Works) an NOV in October 2010 for these unsafe conditions. The owner quickly hired an engineer to address the unsafe conditions, which were completed in December 2010.

Dam number 555 (Hawkins) in Gloucester

DEM's engineering consultant (see *Grants to DEM* on page 21) inspected the dam in October 2009 and forwarded the report to DEM in June 2010. The report stated that excessive vegetation inhibited a complete inspection of the dam and severe leakage in one of the outlet pipes posed unsafe conditions. DEM issued an NOV to the owner (Gloucester Land Trust) in November 2010 to address the unsafe conditions. The owner requested a hearing on the NOV, which is before DEM's Administrative Adjudication Division (AAD).

Dam number 229 (Blue) in Hopkinton

DEM's engineering consultant inspected the dam to reassess its hazard classification (see *Grants To DEM* on page 21) and submitted a draft report dated March 2007 to DEM recommending the dam be classified as a significant hazard. In addition to the classification, the report advised DEM of a potential unsafe condition. That is, significant leakage at two locations along with other stability problems including the downstream masonry wall tipping slightly downstream, downward movement of the material on the upstream and downstream slopes, and sinkholes on the crest were observed. DEM issued an informal written notice to the dam owner in April 2007. The notice required the owner to temporarily lower the impoundment such that leakage no longer posed a safety threat, and to develop a report specifying how the dam would be returned to a safe condition. Due to the significant leakage and lack of precipitation, the water level dropped without further intervention.

In February 2008, DEM inspected the dam following heavy rains. The water level was 6 to 12 inches higher than it was during an inspection in November 2006 and was 6 to 12 inches below the crest of the spillway. The areas of significant leakage through the earthen embankment appeared unchanged.

In March 2008, the owner submitted a freshwater wetlands permit application to DEM proposing to permanently lower the water level. The proposal included construction of a new spillway at an elevation about 7.5 feet lower than the existing spillway. In addition to the physical modifications, the owner applied to the Dam Safety Program to reduce the hazard classification from significant hazard to low hazard.

In January 2009, DEM forwarded comments to the owner's engineer, requesting additional information to support the request for the hazard classification change. In a subsequent telephone conversation, the engineer indicated that the freshwater wetlands permit issues would be addressed first. The dam safety issues would be addressed next, either by reclassifying the dam to a low hazard or by leaving the dam as a significant hazard, requiring that seepage along the length of the embankment be addressed.

In March 2010, during heavy rain and flooding conditions (see *Requested Inspections* on page 13), approximately 25 feet of the dam failed, suddenly releasing the impoundment, and likely contributing to the reports of downstream damage to private property and extensive damage to local roads. Fortunately, no injuries or loss of human life occurred.

In August 2010, DEM issued an NOV to the dam owner for failure to maintain the dam in a safe condition and assessed a penalty of \$59,747. The owner requested a hearing on the NOV, which is before DEM's Administrative Adjudication Division (AAD).



Breached section of Blue Dam (No. 229) in Hopkinton

Dam number 168 (Oak Swamp) in Johnston

DEM inspected the dam in September 2008. An informal written notice was forwarded to the owner (Town of Johnston) in July 2009, which advised the town that a complete visual inspection of the dam could not be performed due to the presence of excessive vegetation on and adjacent to the dam. The notice required the town to cut or remove sufficient vegetation from the dam and within 15 feet of the downstream toe of the dam, to allow inspection. In August 2009, the town notified DEM that the vegetation was removed.

DEM inspected the dam on June 4, 2010. The dam was determined unsafe due to an inoperable low level outlet and sever erosion on several areas of the embankment. An NOV was issued to the town in October 2010 for the unsafe conditions. The town requested a hearing on the NOV, which is before AAD.

Dam number 169 (Almy) in Johnston

DEM inspected the dam in September 2008. An informal written notice was issued to the owner (Town of Johnston) in December 2008. The notice advised the town that a complete visual inspection could not be performed due to excessive vegetation on the dam, the low level outlet was inoperable and the spillway did not function as originally constructed. The notice required the town to cut sufficient vegetation to allow DEM to perform a complete visual inspection of the dam and to develop a reasonable schedule to address the other two unsafe conditions. In July 2009, the town stated that vegetation removal would commence following removal of vegetation from the Oak Swamp Dam (see paragraph above).

DEM inspected the dam in July 2010 and determined the dam unsafe for the same reasons noted in the notice. An NOV was issued to the town in October 2010 for the unsafe conditions. The town requested a hearing on the NOV, which is before AAD.

Dam number 170 (Simmons Upper) in Johnston

DEM inspected the dam in September 2010. The dam was determined unsafe due to an inoperable low level outlet and excessive vegetation the prohibited a complete inspection. An NOV was issued in October 2010 to the owner (Town of Johnston) to address these conditions. The town requested a hearing on the NOV, which is before AAD.

Dam number 171 (Simmons Lower) in Johnston

DEM inspected the dam in September 2010 and determined it unsafe due to an inoperable low level outlet, a spillway that no longer functioned as originally constructed, severe erosion in the embankment and excessive vegetation that prohibited a thorough inspection. An NOV was issued in October 2010 to the owner (Town of Johnston) for the unsafe conditions. The town requested a hearing on the NOV, which is before AAD.

Dam number 295 (Limerock) in Lincoln.

DEM's engineering consultant inspected the dam and advised DEM, in their hazard classification report dated January 2004 (see *Grants To DEM* on page 21), of conditions present at the dam which could lead to an unsafe condition. DEM inspected the dam in March 2004. The inspection revealed that the condition of the spillway was inadequate and the dam was unsafe. In April 2005, DEM issued an informal written notice to the owner (Town of Lincoln). The notice required that the town perform frequent inspections of the dam, lower the impoundment as a temporary measure and retain an engineer to develop a plan that described how the dam would be made safe. In October 2005, the town submitted an engineering report to DEM that presented options for addressing both the short term and long term safety of the dam. In 2006, the town implemented the short term measures. The town and their engineer met with DEM in July 2007 to review progress and verify that the proposed direction of permanently lowering the water level was feasible. During 2007, the town continued monitoring the dam on a regular basis and worked with partners collecting data to be used for the DEM permitting process.

In February 2008, DEM inspected the dam following heavy rain. The water level was 2 to 4 inches above the spillway crest and the water was flowing freely. Debris in the emergency spillway had been removed and it was available for use, although the water level was not high enough to flow through it.

In July 2008, DEM issued a NOV to the town. The NOV required the town to make the dam safe and assessed a penalty of \$1,000, which continued to accrue per day unless the town demonstrated that reasonable efforts were made to comply promptly with the NOV.

In March 2009, DEM and the town entered a Consent Agreement to resolve the NOV. As a result, the town paid a \$500 penalty and in September 2009, submitted plans to DEM with proposed repairs to return the dam to a safe condition. DEM reviewed the plans and requested additional information in October 2009, and the approval process continued through the end of the year.

In June 2010, DEM approved the plans to repair the dam. The work includes replacing the spillway, adding a new low level outlet to replace the inoperable ones and regrading the earthen embankment. The town received construction bids in July 2010 and began construction in September 2010.

Dam number 084 (Wenscott) in North Providence

DEM's engineering consultant (see *Grants to DEM* on page 21) inspected the dam in November 2009 and submitted the inspection report to DEM in June 2010. The dam was determined unsafe because the low level outlet was inoperable. DEM issued a NOV to the owner (Town of North Providence) in November 2010 for the unsafe condition. The town requested a hearing on the NOV, which is before AAD.

Dam number 120 (Sprague Upper) in Smithfield

DEM's engineering consultant (see *Grants to DEM* on page 21) inspected the dam in November 2009 and forwarded the report to DEM in June 2010. The report revealed that the dam was unsafe due to an inoperable low level outlet and excessive vegetation on the embankment that prohibited its inspection. DEM issued an NOV to the owner (Greater Providence YMCA) in November 2010 for the unsafe conditions. The owner requested a hearing on the NOV, which is before AAD.

COMPLIANCE INSPECTIONS

The Dam Safety Regulations (see page 4) require visual inspection of high hazard dams every two years and significant hazard dams every five years.

High Hazard Dam Inspections

Thirty-six high hazard dams were inspected in 2010. The inspections were completed by DEM, by the dam owner's engineer or by an engineering consultant hired by DEM using a Federal Emergency Management Agency (FEMA) grant (see page 21). The reports were submitted to DEM in 2010.

TOWN	DAM NO.	DAM NAME	EMBANKMENT	SPILLWAY	LOW LEVEL OUTLET
Burrillville	008	Harrisville	(1)	(1)	(1)
Burrillville	010	Mapleville	(1)	(1)	(1)
Burrillville	016	Pascoag Upper	(1)	(1)	(1)
Burrillville	572	Wilbur	(1)	(1)	(1)
Coventry	167	Flat River	(1)	(1)	(1)
Coventry	176	Coventry	(1)	(1)	(1)
Coventry	177	Tiogue	(1)	(1)	(1)
Coventry	371	Pearce	(1)	(1)	(1)
Cranston	166	Curran Upper	(1)	(1)	(1)
Cranston	198	Curran Lower	(1)	(1)	(1)
Exeter	219	Boone	(1)	(1)	(1)
Exeter	239	Slocum	(1)	(1)	(1)
Exeter	240	Yorker Mill	(1)	(1)	(1)
Exeter	527	Metcalf Wildlife	(1)	(1)	(1)
Hopkinton	262	Locustville	(1)	(1)	(1)
Johnston	168	Oak Swamp	Fair to Poor	Fair to Poor	Poor
Johnston	169	Almy	Poor	Poor	Poor
Johnston	170	Simmons Upper	Poor	Fair	Poor
Johnston	171	Simmons Lower	Poor	Poor	Poor
Lincoln	097	Butterfly	(1)	(1)	(1)
Lincoln	104	Bleachery	(1)	(1)	(1)
Lincoln	391	Handy Upper	(1)	(1)	(1)
Lincoln	408	Bridlewood	(1)	(1)	(1)
Lincoln	649	Bridlewood Upper End	(1)	(1)	(1)
North Kingstown	615	Rodman Mill	(1)	(1)	(1)
North Kingstown	710	Slocum Road Upper	(1)	(1)	(1)
Smithfield	126	Georgiaville	(1)	(1)	(1)
South Kingstown	425	Wakefield	(1)	(1)	(1)
South Kingstown	426	Peace Dale	Poor	Fair	Not Applicable
South Kingstown	525	Hefler Farm	(1)	(1)	(1)
Tiverton	742	Creamer	(1)	(1)	(1)
Warwick	764	Grist Mill Apartments	(1)	(1)	(1)
Warwick/West Warwick	145	Natick	(1)	(1)	(1)
West Warwick	147	Riverpoint Upper	(1)	(1)	(1)
West Warwick	148	Arctic	(1)	(1)	(1)
Woonsocket	621	Holley Lane	(1)	(1)	(1)

(1) Inspection reports are under review and/or owners are being determined. The reports will be forwarded to the dam owners, along with any required actions, in 2011.

DEM received reports for 20 high hazard dams inspected in 2009 by an engineering consultant hired by DEM using a FEMA grant (see page 21).

TOWN	DAM NO.	DAM NAME	EMBANKMENT	SPILLWAY	LOW LEVEL OUTLET
Burrillville	003	Wilson	Fair	Fair	Good
Cranston	172	Cranston Print Works	Fair to Poor	Fair	Poor
Cranston	320	Stone	Fair to Poor	Good to Poor	Not Applicable
Cranston	373	Clarke's Upper	(1)	(1)	(1)
Glocester	022	Keech	Fair	Fair	Fair
Glocester	165	Ponaganset	Good to Fair	Good to Fair	Good
Glocester	401	Lake Washington	(1)	(1)	(1)
Glocester	555	Hawkins	Poor	Poor	Poor
Glocester	556	Clarkville	Poor	Poor	Not Applicable
Glocester	727	Bowdish Lower	(1)	(1)	(1)
Lincoln	101	Barney	(2)	(2)	(2)
North Providence	084	Wenscott	Fair	Fair	Poor
North Providence	760	Louisquisset Flood Control	(1)	(1)	(1)
North Smithfield	043	Slatersville Upper	(1)	(1)	(1)
North Smithfield	046	Slatersville Middle	(1)	(1)	(1)
North Smithfield	048	Forestdale	(1)	(1)	(1)
Smithfield	115	Slack	Fair	Good	Good
Smithfield	116	Hopkins	Fair	Fair	Not Applicable
Smithfield	120	Sprague Upper	Poor	Good	Poor
Smithfield	121	Sprague Lower	(1)	(1)	(1)

- (1) Inspection reports are under review and/or owners are being determined. The reports will be forwarded to the dam owners, along with any required actions, in 2011.
- (2) The dam was inspected by DEM in April 2009. The report has not yet been completed. The findings from the report will be included in the report for the inspection that is scheduled for 2011.

Significant Hazard Dam Inspections

Fourteen significant hazard dams were inspected in 2010. The inspections were completed by DEM or by an engineering consultant hired by DEM using a FEMA grant (see page 21). The reports were submitted to DEM in 2010.

TOWN	DAM NO.	DAM NAME	EMBANKMENT	SPILLWAY	LOW LEVEL OUTLET
Burrillville	027	Sucker	(1)	(1)	(1)
Burrillville	035	Gilleran	(1)	(1)	(1)
Burrillville	051	Nichols	(1)	(1)	(1)
Coventry	151	Quidnick Upper	(1)	(1)	(1)
Coventry	157	Harris	(1)	(1)	(1)
Coventry	187	Middle	(1)	(1)	(1)
Cumberland	081	Robin Hollow	(1)	(1)	(1)
East Greenwich	432	Gale Farm Upper	(1)	(1)	(1)
Hopkinton	225	Wincheck	(1)	(1)	(1)
Hopkinton	274	Harris	(1)	(1)	(1)
Hopkinton	440	Hoxie Farm	(1)	(1)	(1)
North Smithfield	067	Todd's	(1)	(1)	(1)
Smithfield	109	Stillwater	(1)	(1)	(1)
Warwick	669	Dave's Marketplace	(1)	(1)	(1)

- (1) Inspection reports are under review and/or owners are being determined. The reports will be forwarded to the dam owners, along with any required actions, in 2011.

Requested Inspections – March/April Flood

DEM inspects any high or significant hazard dam upon request by any person who has cause to believe the dam is unsafe. In 2010, DEM received numerous inspection requests.

Over a two day period in the end of March 2010, 8 to 11 inches of rain fell on most of the state. This resulted in flooding across most of the state and massive flooding along the Pawtuxet and Pawcatuck Rivers. Flood conditions continued into April 2010, (the storm is referred to as the March/April Flood) and inspections of the following dams were requested.

TOWN	DAM NO.	DAM NAME	HAZARD CLASSIFICATION	REASON FOR INSPECTION	NO. OF INSPECTIONS	CONCLUSION
Burrillville	035	Gilleran	Significant	Embankment washout	1	Founded – No imminent danger
Charlestown/ Richmond	249	Horseshoe Falls	Significant	Dam breached	3	Unfounded – Continue to monitor
Coventry	152	Mill	Significant	Failure of adjacent bridge abutment	4 (includes 1 by ACOE)	Founded – Continue to monitor
Coventry	175	Quidnick	Significant	Embankment overtopping	1	Founded – No imminent danger
Cranston	372	Clark's Lower	Low	General condition	2	Founded – Continue to monitor
Cranston	373	Clark's Upper	High	General condition	2	Unfounded
Exeter	188	Millbrook	Low	Dam breached	1	Founded – No imminent danger
Exeter	219	Boone	High	General condition	2 (includes 1 by ACOE)	Unfounded
Foster	347	Young's	Low	Downstream road overtopped	Not inspected	Unknown
Glocester	Not in State Inventory	Harmony Hill	Not Classified	Major embankment erosion	1	Founded – No imminent danger
Glocester	165	Ponaganset	High	Pond within 1 ft of overtopping	1 (dam owner)	Unfounded
Glocester/ Smithfield	111	Waterman	High	General condition	1	Unfounded
Hopkinton	222	Moscow	Low	Dam cracking	Not inspected	Unknown
Hopkinton	225	Wincheck	Significant	Pond with 1 in of overtopping	1 (ACOE)	Unfounded
Hopkinton	229	Blue	Significant	Dam breached	1 (dam owner's engineer)	Founded
Hopkinton	274	Harris	Significant	Dam breaching	1	Unfounded
Hopkinton/ Richmond	247	Alton	Significant	Dam breached	2	Unfounded
Hopkinton/ Westerly	253	Bradford	Low	General condition	Not inspected	Unknown
Narragansett	732	Sprague Lower	Low	Dam breached	1	Founded – No imminent danger
North Kingstown	693	Slocum Woods	High	General condition	1	Founded
North Kingstown	710	Slocum Upper	High	Overtopped & breached	1	Unfounded
Providence	089	Geneva	Significant	Dam breached	1	Founded – No imminent danger
Scituate	160	Hope	Significant	Raceway overtopping	2	Founded
South Kingstown	236	Glen Rock	Low (S/B Significant)	Dam breached	1	Founded – No imminent danger
Warwick	450	Keith Farm	Low (s/b high)	Embankment	2	Founded –

TOWN	DAM NO.	DAM NAME	HAZARD CLASSIFICATION	REASON FOR INSPECTION	NO. OF INSPECTIONS	CONCLUSION
				overtopping		Continue to monitor
Warwick/ West Warwick	145	Natick	High	General condition	1	Unfounded
West Warwick	148	Arctic	High	General condition	3	Founded – continue to monitor

ACOE – Army Corps of Engineers

A summary of the inspections follows:

Dam number 035 (Gilleran) in Burrillville

DEM received a report from the Town of Burrillville’s emergency management agency that earth had washed away from the dam and water was flowing through the stone face. The town was not able to locate the owner and had no option but to stabilize the area. About a 40 foot section of the crest of the earthen embankment, up to about 3 feet deep, had eroded away. The town placed sand bags along this area of the crest to minimize water flow and stop the erosion. DEM later contacted the owner who repaired the dam (see *Repair Approvals* on page 19).

Dam number 249 (Horseshoe Falls) in Charlestown/Richmond

DEM received a report that the dam breached. Although water was flowing over the entire dam (spillway and embankments), it did not breach. Flow subsided over subsequent inspections and the dam appeared stable.



Horseshoe Falls (No. 249) in Charlestown/Richmond, during and after March/April Flood

Dam number 152 (Mill) in Coventry

DEM received a report that a road bridge located immediately downstream of the spillway was compromised. The bridge abutment, which formed the river channel at that point, had undermined and washed out, causing the bridge to settle. There was concern over how failure of the bridge could affect the dam and whether the bridge abutment was part of the embankment of the dam. The water level was about 8 inches from the top of the dam and there were too many unknowns regarding the potential affect of the bridge failure on the dam, so the local emergency management official made the decision to temporarily evacuate residents in the potential flood path should the dam fail. The next day the water level dropped 3 feet and the dam appeared stable. The bridge was subsequently removed and is schedule for replacement, along with reconstruction of the abutment.

Dam number 175 (Quidnick) in Coventry

DEM received a report that water overtopped the embankment. Although the water level was a few inches below the top of the dam, the owner said water did flow over it the previous day. Sand bags were placed on low areas to limit flow. Although an area of erosion developed during the event, it was relatively minor and repaired soon after.

Dam number 372 (Clark's Lower) in Cranston

DEM received a report of a general concern with the dam. Water was flowing over and through sections of the dam, which appeared to be constructed on large bedrock outcroppings. The water level had dropped prior to a subsequent inspection and although flow continued through the dam, the dam did not appear to pose an imminent danger.



Looking upstream at Clarke's Lower Dam (No. 372) in Cranston

Dam number 373 (Clarke's Upper) in Cranston

DEM received a report of a general concern with the dam. The water level was about 6 inches from the top of the dam but the dam appeared stable. The water level dropped by about 6 inches prior to a subsequent inspection and the dam appeared stable.

Dam number 188 (Millbrook) in Exeter

DEM initially received a report that the Metcalf Wildlife Marsh (dam no. 527), which is a high hazard dam also located in Exeter, breached. It was determined that the dam was actually Millbrook (no. 188), a low hazard dam. The dam was breached.

Dam number 219 (Boone) in Exeter

DEM received a report of an unspecified concern with the dam. The dam was inspected on different days by the Army Corps of Engineer (ACOE) and DEM. No problems were observed.

Uninventoried dam (Harmony Hill) in Gloucester

DEM received a report of major erosion. There was major erosion, however, the size of the dam and downstream conditions revealed that the dam was a low hazard and not of concern from a dam safety perspective.

Dam number 165 (Ponaganset) in Gloucester

DEM received a report that the water level was within 12 inches of the top of the dam and contacted the dam owner, who inspected the dam and reported that no problems were observed.

Dam number 111 (Waterman) in Gloucester/Smithfield

DEM received a report of a general concern with the condition of the dam. No problems were observed.

Dam number 225 (Wincheck) in Hopkinton

DEM received a report from the dam owner that the water level was within 1 inch of flowing over the dam and that sand bags were placed on the low area. The water level at the time of the inspection was 6 inches below the top of the dam, and the dam was not in imminent danger.

Dam number 229 (Blue) in Hopkinton (also see Unsafe Dams on page 7)

DEM received a report that the dam had breached. A 25 foot section of the dam completely washed away and the water level had dropped to the base of the section. The remainder of the dam appeared stable.

Dam number 274 (Harris) in Hopkinton

DEM received a report that the dam was breaching. An initial inspection from the downstream road revealed no concerns. A subsequent inspection indicated possible overtopping of the embankment. The water level was 3 to 4 inches above the spillway crest and the dam appeared stable.

Dam number 247 (Alton) in Hopkinton/Richmond

DEM received a report that the dam breached. The water level was about 1 foot below the top of the dam and the downstream water level was within a couple of feet of the top of the dam. The upstream level had dropped to about 2.5 feet below the top of the dam on a subsequent inspection. The dam appeared stable.

Dam number 732 (Sprague Lower) in Narragansett

DEM received a report that the significant hazard Sprague Upper Dam (number 733) had breached. It was determined that the Sprague Lower Dam (number 732), a low hazard dam, was actually the dam that breached. The breach was about 25 feet long, and the town had filled the breach with stone and earth material. The dam was not of concern from a dam safety perspective.

Dam number 693 (Slocum Woods) in North Kingstown

DEM received a report that the dam overtopped and a section of the embankment washed away. A section of the secondary spillway contained bare soil and heavy equipment tire tracks, indicative of recent work, however, there were no issues of immediate concern.

Dam number 710 (Slocum Upper) in North Kingstown

DEM received a report that the dam overtopped and a section of the embankment washed away. No problems were observed. DEM later learned that the dam was incorrectly identified and the actual dam of concern was Slocum Woods (no. 693).

Dam number 089 (Geneva) in Providence

DEM received a report that the dam breached. It appeared that the spillway and training walls were undermined and settled, allowing flow over and around the structures and reducing the water level to a meandering stream channel. The displaced structures were eventually removed and the dam no longer exists.

Dam number 160 (Hope) in Scituate

DEM received a report that flow in the raceway that provides water to the hydroelectric facility was overtopping. The raceway is downstream of the dam itself and its condition does not affect the safety of the dam. The water level was about 2 feet below the top of the dam, which appeared stable.

Dam number 236 (Glen Rock) in South Kingstown

DEM received a report that the dam breached. A 20 foot section of embankment washed away and Usquepaug Road, which is immediately downstream of that section of the dam, was heavily damaged and closed.



Looking across and upstream at the failed section of Glen Rock Dam (No. 236) in South Kingstown

Dam number 450 (Keith Farm) in Warwick

DEM received a report that the dam was overtopping. About 6 inches of water was flowing over sections of the embankment but the dam was not eroding. The water level had dropped about 18 inches prior to a subsequent inspection and, although there was some erosion damage on the crest of the dam, the dam appeared stable.



Keith Farm Dam (No. 450) in Warwick, during the March/April Flood

Dam number 145 (Natick) in Warwick/West Warwick

DEM received a report of a general concern with the dam. No problems beyond its general lack of maintenance were observed.

Dam number 148 (Arctic) in West Warwick

DEM received a report of general concern with the dam. The water level was slightly above the embankment (at its highest point during the March/April Flood). The owner continuously monitored the dam and spent thousands of dollars constructing a temporary bridge to allow equipment to access the left side of the dam (blocked by a building), placed several thousand sand bags on the embankments and attempted various methods to manually remove flashboards that did not automatically break away prior to the water level rising to an unsafe level. The dam did not breach but had severe scouring both upstream and downstream of the spillway.



Arctic Dam (No. 148) during the March/April Flood

Following the March/April Flood, DEM contacted local emergency management officials throughout the state to determine if they monitored the high and significant hazard dams in their communities and learn of any concerns. For those dams the town had not monitored, DEM attempted to contact the dam owner, if known. DEM inspected each dam that it could not verify had been monitored during the March/April Flood. No imminent danger was discovered at any of the dams, as indicated in the following table:

TOWN	DAM NO.	DAM NAME	HAZARD CLASSIFICATION	CONCLUSION
Coventry	176	Coventry	High	No imminent danger
Coventry	185	Black Rock	High	No imminent danger
Coventry	371	Pearce	High	No imminent danger
Cumberland	074	Miscoe	High	No imminent danger
Foster	349	Spear	High	No imminent danger
Glocester	727	Bowdish Lower	High	No imminent danger
Lincoln	099	Moffett	High	No imminent danger
Lincoln	649	Bridlewood Upper	High	No imminent danger
North Providence	760	Louisquisset	High	No imminent danger
North Smithfield	048	Forestdale	High	No imminent danger
Smithfield	121	Sprague Lower	High	No imminent danger
Warwick	764	Grist Mill	High	No imminent danger

Requested Inspections – Other

In addition to inspections requested as a direct result of the March/April Flood, the following two dams were requested to be inspected.

TOWN	DAM NO.	DAM NAME	HAZARD CLASSIFICATION	REASON FOR INSPECTION	CONCLUSION
Johnston	127	Belknap	Significant	Displaced stone	Unfounded
Tiverton	742	Creamer	High	Pond just overtopping	Founded

Dam number 127 (Belknap) in Johnston

In late April 2010, the DEM received a report that rocks had been displaced from the dam. Although some areas of stone were missing or displaced, no area appeared to be severely disrupted and the dam appeared safe.

Dam number 742 (Creamer) in Tiverton

In February 2010, DEM received a report that the water level was up to the crest of the earthen embankment. The water level was elevated due to a blocked, culverted outlet. The dam owner was not known, so the Tiverton public works officials entered the pond to dislodge debris from the outlet, allowing water to flow from the pond and lower it to a safe level.

REPAIR APPROVALS

In 2010, DEM issued approvals to repair the following dams:

TOWN	DAM NO.	DAM NAME	HAZARD CLASSIFICATION	REPAIR
Burrillville	035	Gilleran	Significant	Storm related erosion of the earthen embankment
Glocester	023	Smith & Sayles	Significant	Repair low level outlet discharge pipe
Lincoln	295	Limerock	High	Replace the spillway and low level outlet with a new vault structure & regrade embankment
Newport/ Middletown	585	Easton South	High	Repairs and improvements to the earthen embankment

DAM OWNER / CONTACT INFORMATION

DEM's records for the owners of dams that were previously classified as high or significant hazard are fairly accurate; however, about 35 dams previously classified as low hazard that were reclassified to significant hazard or high hazard have questionable owner information. DEM legal counsel has been researching ownership of these dams as time allows.

Orphan Dams

DEM has identified 46 high and significant hazard dams with unknown owners, for which there is no known entity that monitors the dams. DEM refers to these dams as orphan dams.

TOWN	DAM NO.	DAM NAME	HAZARD CLASSIFICATION
Burrillville	001	Wallum Lake	Significant
Burrillville	015	Union Mill	Significant
Glocester	021	Cherry Valley	Significant
Glocester	032	Snakeskin	Significant
Burrillville	039	Spring	Significant
North Smithfield	048	Forestdale	High
Burrillville	051	Nichols	Significant
North Smithfield	067	Todd's	Significant
Cumberland	074	Miscoe	High
Lincoln	099	Moffett	High
Smithfield	121	Sprague Lower	High
Smithfield	123	Hawkins	Significant
Warwick/West Warwick	145	Natick	High
Coventry	152	Mill	Significant
Coventry	157	Harris	Significant
Scituate	160	Hope	Significant
Coventry	176	Coventry	High

TOWN	DAM NO.	DAM NAME	HAZARD CLASSIFICATION
Coventry	177	Tiogoe	High
Coventry	185	Black Rock	High
Coventry	186	Upper	Significant
Coventry	187	Middle	Significant
Hopkinton	227	Ashville	Significant
Hopkinton / Richmond	247	Alton	Significant
Richmond	273	Wood River Junction	Significant
Hopkinton	285	Langworthy	Significant
Johnston	323	Caesarville	Significant
Foster	349	Spear	High
Coventry	371	Pearce	High
Glocester	381	Sucker Brook Bridge	Significant
Glocester	401	Lake Washington	High
New Shoreham	424	Block Island Rod & Gun Club	Significant
East Greenwich	432	Gale Farm Upper	Significant
Hopkinton	440	Hoxie Farm	Significant
West Warwick	455	Bouchar Farm	Significant
Johnston	504	Dexter Farm	Significant
South Kingstown	525	Hefler Farm	High
Foster	526	Gorham, N. Farm	Significant
North Kingstown	550	Hamilton	Significant
Lincoln	649	Bridlewood Upper End	High
Warwick	669	Daves Marketplace	Significant
North Kingstown	704	Secret	Significant
Glocester	727	Bowdish Lower	High
Little Compton	746	Adamsville	Significant
Charlestown	758	Cross Mills	Significant
North Providence	760	Louisquisset Flood Control	High
Warwick	764	Grist Mill Apartments	High

DAM REMOVALS

DEM was involved with the removal of two dams in 2010, both of which were for the purpose of fish passage.

TOWN	DAM NO.	DAM NAME	RIVER	HAZARD
Warwick	143	Pawtuxet Lower	Pawtuxet River	Low
Charlestown / Richmond	250	Shannock Mill	Pawcatuck River	Low

Dam number 250 (Shannock Mill) in Charlestown/Richmond

In 2009, DEM issued a permit for removal dam, which was completed in the summer of 2010.

Dam number 143 (Pawtuxet Lower) in Warwick

A permit application was submitted to DEM in June 2010 and it is expected that the permit will be issued and the dam removed in 2011.

REGISTRATION

In 2008 DEM began registering dams. The process involves mailing a registration form to each owner of a high hazard or significant hazard dam and formally notifying the owner of the dam's hazard classification. The owner then has a specific time period to return a completed registration form or to appeal ownership and/or the hazard classification. There is no fee to register a dam and the main purpose of the registration form is to obtain up-to-date contact information on the dam owner.

DEM has mailed about 160 registration letters through 2010, with the remainder scheduled to be mailed as time allows and as the dam owners are determined (see *Dam Owner/Contact Information* on page 19 above). Following receipt of completed registration forms, DEM issues a certificate of registration to the owner, identifying the proper name, registration number and hazard classification of the dam. The registration process has been completed for the following dams:

TOWN	DAM NO.	DAM NAME	HAZARD
Burrillville	003	Wilson Reservoir	High
Glocester	022	Keech Pond	High
Glocester	556	Clarkville Pond	High

GRANTS TO DEM

From 2000 through 2010, DEM received grants totaling \$447,199 from the Federal Emergency Management Agency (FEMA) National Dam Safety Program.

In the mid 2000's a substantial amount of the grant funds were used for engineering services to assess the hazard classification of about 200 dams throughout the state. A typical inundation map is shown below. The hypothetically failed Creamer Pond Dam is in the bottom right corner of the photo and the blue area indicates the expected path of the released water. This dam is classified as a high hazard.



Creamer Pond Dam (No. 742), Tiverton

The 2009 FEMA grant was \$65,145. About 70%, or \$46,860, was used for engineering services to visually inspect high hazard and significant hazard dams and complete inspection reports. Following receipt of the inspection reports from the engineer, DEM reviews the report and forwards a copy of each report to the dam owner with recommendations for repairs or maintenance and/or an order to correct unsafe conditions (see *Unsafe Dams* on page 7).

About 25%, or \$15,786, of the 2009 grant was to be used by the Emergency Management Agency (EMA) to complete Emergency Action Plans (see page 23) for high hazard dams. However, EMA did not believe they needed assistance at that time and DEM submitted a grant amendment request to FEMA, proposing to use the money for visual inspections of additional high and significant hazard dams. FEMA neither approved the request nor provided a response with the reasoning.

The 2010 FEMA grant was awarded in September 2010 for \$60,422. The grant will be used to fund the following projects:

- \$41,000 – engineering services to visually inspect high hazard and significant hazard dams and complete inspection reports
- \$7,045 – assist RI Emergency Management Agency (RIEMA) in the development of emergency action plans for high hazard and significant hazard dams
- \$5,000 – transfer of paper records onto laptop computers for field use
- \$3,400 – engineering services to hazard classify two dams
- \$2,800 – purchase of a color digital scanner/sender
- \$1,120 – purchase of three camera phones and one year service contract

INTERAGENCY COORDINATION

In August 2010, DEM and the United States Department of Agriculture Natural Resources Conservation Service entered into a Memorandum of Understanding to “provide a mechanism to foster interaction and coordination between” the two agencies.

Beginning in June 2010, DEM and the Rhode Island Emergency Management Agency (RIEMA) met several times during the year to improve communication and response to dam safety emergencies. In December 2010, DEM met with RIEMA to assist with the review of the section of the Emergency Action Plans (see *Emergency Action Plans* on page 23) that describes when the plan must go into effect.

MEETING/SEMINAR ATTENDANCE

DEM participated in the following meetings and seminars, and provided an overview of the Dam Safety Program and the Dam Safety Regulations, as needed:

In March 2010, three DEM engineers attended a training course entitled *Woody Vegetation and Wildlife on Earthen Dams* presented through the Association of State Dam Safety Officials (ASDSO). The engineers received a detailed overview of the problems associated with tree and animal presence on dams. The course was informative, as tree growth is very common on Rhode Island dams.

In June 2010, DEM attended a Hurricane Conference presented by the Rhode Island Emergency Management Agency (RIEMA). The purpose of the conference was to bring emergency responders throughout the state together in preparation of hurricane season.

In June 2010, DEM attended a post March/April Flood workshop facilitated by RIEMA. The attendees were mainly those who responded to incidents resulting from the March/April Flood (see *Requested Inspections* on page 13). One of the topics discussed was the expectation from local officials that DEM inspect a dam quickly in response to a reported problem (see *Program Limitations* on page 25).

In September 2010, DEM attended a meeting of the Rhode Island Association of Emergency Managers. The association consists of RIEMA officials and local emergency management officials and discussions included how to better respond to local emergencies. DEM attended the meeting as a follow-up to the March/April Flood (see *Requested Inspections* on page 13), with a goal of discussing ways in which interaction between DEM and emergency management officials could improve. Areas of potential improvement included the following: a better method of identifying dams when contacting DEM for assistance; amending legislation to require a dam owner to sign the emergency action plan; forming volunteer dam watchers to monitor dams with unknown owners; and developing a strategy to remove unsafe dams with unknown owners.

In September 2010, one DEM engineer attended ASDSO's annual dam safety conference in Seattle. In addition to the knowledge learned at the seminars, the conference provided a good source of networking among dam safety officials from other states and businesses.

In December 2010, DEM met with officials from the American Red Cross to discuss the Red Cross providing volunteer dam watchers. The volunteers would receive training to monitor high hazard and significant hazard dams that are currently not monitored by the owners or local officials during major storms such as the March/April Flood. The volunteers would report any observed unsafe conditions to DEM. The Red Cross was unable to assist in this effort, but did provide DEM with advice on another organization that might be able to assist.

DEM OWNED DAM REPAIRS

DEM continued to move forward under its Capital Development Projects program, undertaking the engineering evaluation, design and reconstruction at the following DEM owned dam:

TOWN	DAM NO.	DAM NAME	HAZARD CLASSIFICATION
Cranston	166	Curran Upper	High

In 2008, an engineering consultant was selected to develop the final design for the reconstruction project. Development of the final design plans continued through 2009. In 2010 negotiations proceeded with an adjacent property owner to acquire property to allow reconfiguration of the downstream spillway channel. The current discharge channel places flow along the toe of the earthen embankment; the revised design will move flow away from the dam after it passes the spillway. The goal is to begin construction in September 2011.

EMERGENCY ACTION PLANS

Rhode Island General Laws Section 46-19-9 requires a city or town in which a high hazard or significant hazard dam is located, and a state agency that owns a high hazard or significant hazard dam, to complete by July 1, 2008, an Emergency Action Plan (EAP) for the dam (see *Statutes* on page 3). An EAP is a formal document that identifies potential emergency conditions at a dam and specifies pre-planned actions to be followed to minimize loss of life and property damage. The law mandates that the Rhode Island Emergency Management Agency (RIEMA) coordinate development of the EAPs and give final approval for an EAP to be considered complete. The law also requires DEM and the Rhode Island League of Cities and Towns to cooperate with RIEMA.

DEM owns all 12 of the state-owned high and significant hazard dams:

TOWN	DAM NO.	DAM NAME	HAZARD CLASSIFICATION
Cranston	198	Curran Lower	High
Cranston	166	Curran Upper	High
Cranston	340	Meshanticut Park	Significant
Exeter	221	Browning Mill	High
Glocester	566	Bowdish	High
Glocester	018	Burlingame Upper	High
Glocester	499	Durfee Hill Wildlife Marsh #2	Significant
Hopkinton / Richmond	216	Wyoming Upper	High
Lincoln	102	Olney	High
Little Compton	474	Simmons	Significant
North Kingstown	444	Silver Spring	High
Smithfield	108	Stillwater	High

In October 2007, RIEMA presented a draft EAP template to DEM and the League of Cities and Towns for review. DEM provided comments to RIEMA which made changes to the template and finalized it.

The EAP template was presented to city and town officials in January 2008. The officials were informed that DEM would provide dam failure inundation maps for all high hazard and significant hazard dams, for use in completing the EAPs. As the inundation maps were finalized, DEM mailed them to the appropriate municipalities.

Through 2010, RIEMA received a total of 82 draft EAPs, none of which have been approved. No EAPs have been submitted by DEM for the 12 state-owned dams.

DAM MANAGEMENT DISTRICTS

Rhode Island General Laws Chapter 45-62 authorizes cities and towns to create dam management districts for the maintenance and repair of dams within their boundaries. As of the end of 2010 the following two districts have been created:

TOWN	DAM NO.	DAM NAME	HAZARD CLASSIFICATION
Burrillville	016	Pascoag Upper	High
Exeter	219	Boone	High

The first such district was created in 2008 by the Town of Exeter for the *Boone Lake Dam (No. 219)*, which is a privately owned, high hazard dam. A board of directors has been appointed, bylaws have been established, and the district has an approved budget.

In 2009 the Towns of Burrillville and Glocester created the second such district for the *Pascoag Reservoir Upper Dam (No. 16)*. The dam is a privately owned, high hazard dam. The dam is located in Burrillville and Glocester. A board of directors has been appointed, and the board is currently developing bylaws.

PROFESSIONAL ASSOCIATIONS

Rhode Island has been a member of 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.

PROGRAM LIMITATIONS

STAFFING

Currently, the Dam Safety Program has 1.5 full time equivalents (FTEs), consisting of 1.3 FTEs (engineers/inspectors), 0.1 FTEs (management) and 0.1 FTEs (administrative/clerical). To successfully meet the requirements of the current statute and the Dam Safety Regulations, DEM needs one additional FTE (engineer/inspector).

The 0.3 FTEs (engineers/inspectors) above are two engineers who were previously assigned to perform other work. In 2009, DEM began training the engineers, with the intent of having them provide assistance with dam inspections. Training continued in 2010 and both engineers performed dam inspections. One engineer will perform inspections only during major storms (such as the March/April Flood) and the other engineer will assist with day to day management of the program, including inspections during major storms.

FINANCIAL ASSISTANCE FOR REPAIRS

The Governor's Dam Safety and Maintenance Task Force concluded that repairs to bring all Rhode Island dams up to current safety standards could cost on average as much as \$800,000 per dam. The Governor and General Assembly recognized the need for financial assistance and enacted legislation to assist owners with the cost of dam repair. In 2001 the Clean Water Finance Agency (CWFA) was authorized to issue loans for projects associated with dam safety. Unfortunately, the costs are so overwhelming that most owners are unable to afford to pay the principal, let alone the interest, on the loans from the CWFA. Recognizing this problem, in 2005 cities and towns were authorized to create dam management districts to, among other things, collect funds for the maintenance and repair of dams.

INSPECTION LIMITATIONS

By law, DEM is required to cause to be inspected all the dams in the state. However, the visual inspections performed by the Dam Safety Program do not involve full engineering analyses of the structural integrity of dams. DEM does not have the staff or the financial resources to ensure that such detailed inspections are completed. Although a visual inspection can provide indicators of underlying problems, an engineering analysis is sometimes needed to more fully assess the condition of the dam.

TECHNICAL GUIDANCE DOCUMENTS

DEM has made available a technical guidance document titled, *Dam Safety – An Owner's Guidance Manual*, prepared by the Federal Emergency Management Agency (FEMA) and the State of Colorado. The document is available on DEM's website at

<http://www.dem.ri.gov/programs/benviron/compinsp/pdf/damguide.pdf>. Although it is a useful document, DEM would like to develop technical guidance documents specific to Rhode Island. Such documents would better assist both dam owners and consultants in understanding requirements in the Dam Safety Regulations.

This completes the annual report on dam safety and the activities performed by DEM in 2010. For further information on the Dam Safety Program please contact David Chopy at (401) 222-1360, extension 7400.