

**STATE OF VERMONT DAM SAFETY PROGRAM
 FACILITIES ENGINEERING DIVISION
 DEPARTMENT OF ENVIRONMENTAL CONSERVATION
 AGENCY OF NATURAL RESOURCES
 February, 2015**

1. Number of Dams

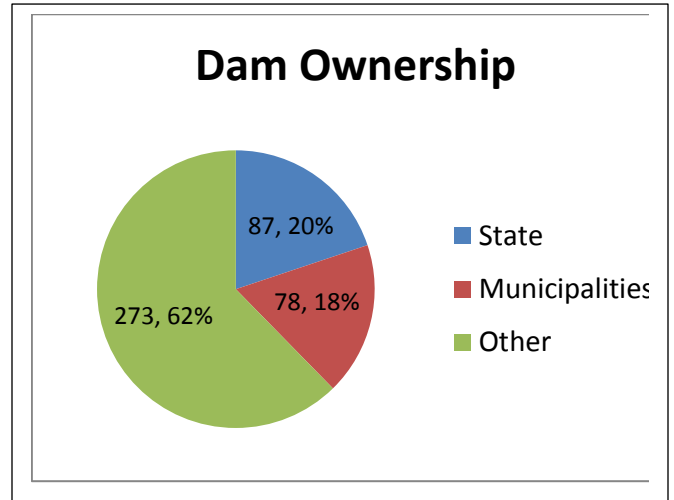
- There are 1217 inventoried dams in Vermont
- 520 of these are subject to 10 V.S.A. Chapter 43 (Dams) §1082 (dams capable of impounding more than 500,000 cubic feet or 3,740,000 gallons requiring authorization to construct, alter, or remove).
- 438 of the 520 are under jurisdiction of the Department of Environmental Conservation (DEC), 79 by PSB and 3 by NRCD.
- Of the 438 under jurisdiction of DEC Dam Safety, 39 are high hazard, 113 are significant hazard, and 286 are low hazard.

		<u>Loss of life</u>	<u>Economic loss</u>
39	High hazard:	More than few	Excessive
113	Significant hazard:	Few	Appreciable
286	Low hazard	None expected	Minimal

2. Ownership

Of the 438 under jurisdiction of the DEC:

- State of Vermont owns 87 dams
 - ANR 84 – 58 DFW, 14 DEC, 12 FPR
 - AOT 2
 - State College System 1
 - Of the 87 state owned dams, 8 are high hazard
- Municipalities own 78 dams
 - Of these, 20 are high hazard
- The remaining 273 owned by:
 - Ski areas
 - Individuals
 - Foundations or Trusts
 - Trout Clubs
 - Homeowner Associations and Fire Districts



3. What the Dam Safety Program does

Staff of 2 full time Engineers in Dam Safety, 1 or 2 summer interns (typically mid-May to mid-August). Primary objective is to protect public safety through permits, inspections, and informing dam owners of responsibilities, liabilities, and proper operation and maintenance of dams.

- Review applications and issue permits (Chapter 43 orders) for construction, alterations, or removal of jurisdictional size dams.
 - Determine authorization per §1082
 - Review applications per §1083, §1087
 - Notice of application per §1085

- Determination of public good per §1086
- Fish and Wildlife investigations per §1084
- Issue 5 to 6 permits in average year
- Inspections per §1105
 - Goal is to do >100 per year, concentrate on jurisdictional size first
 - Ideally, all of the high hazard (39) yearly
 - Ideally, Significant hazard every 3 to 5 years (110 of 113 have been inspected within last 5 years)
 - Low hazard every 5 to 10 years (160 of 286 have been inspected within last 10 years)
 - As time allows, we will inspect smaller dams (<500,000 cubic feet) if requested by owner
- Unsafe Dam proceedings per §1095
 - Initiated by petition of interested persons or municipality, or agency having jurisdiction
 - Requires investigation, hearing, and order directing repairs or other actions if dam is found unsafe.
 - Used infrequently (14 times since 1955). Program strives to educate, recommend repairs or maintenance through inspection program, but will use unsafe dam proceeding if necessary.
 - Unsafe Dam Revolving Loan Fund Rules effective February 2014
- Emergency Action Plans (EAP)
 - Ongoing project, plans are developed for monitoring protocol, inundation mapping, and notification procedures in the event of severe storms or imminent dam failure.
 - Approximately 83% of high hazard dams have EAPs, working towards having a plan for all high hazard dams.
 - Renewed interest in this project, mostly due to downstream development and homeland security.
- Educate dam owners and the public
 - Telephone conversations or site visits.
 - Meet with dam owners, committees, Town officials.
 - Maintain website with dam safety information; maintain Natural Resource Atlas Dam Layer.
- Monitor and Operate the three Winooski River flood control dams owned by DEC
 - Wrightsville, East Barre, Waterbury
 - Waterbury is inspected weekly, monitored daily due to recent completion of seepage control project
 - East Barre, Wrightsville levels monitored daily, inspected monthly
- Provide engineering services for the 84 dams owned by the Agency of Natural Resources.
 - Identify deficiencies through inspection program
 - Identify projects on 5 year action plans
 - Identify projects suitable for the Federal Water Resources Development Act (Section 543)
 - Request capital funding for projects
 - Do in house engineering or consult
 - Obtain permits and manage the project

4. Recent projects/expenditures

- Silver Lake Dam, Barnard. Fall 2010 – Spring 2011. Slip lined outlet pipes, repairs to concrete and steel grating.
- Lake Groton Dam, Groton. Fall 2011. Replaced 50 feet of deteriorated spillway, including stop log channels.
- Great Hosmer Pond Dam, Craftsbury. Summer 2012. Replaced deteriorated dam.
- Waterbury Dam, Waterbury. Summer 2012 through summer 2015. Major maintenance cycle (seepage control system maintenance, cleaning of dewatering wells, and conduit filter drain pipe).
- Wolcott Pond Dam, Wolcott. Design underway to replace outlet barrel and repairs to principal spillway structure. 30% design completed, hope to reconstruct fall of 2015.
- Dufresne Pond Dam, Manchester. Dam removed summer 2013.
- Lake Sadawga design. Replacement spillway under design. To be replaced 2015 or 2016.

FY 16 and FY 17 Dam Safety - State-Owned Dams Repairs and Major Maintenance

The requested funds will be used for repair, major maintenance, and specialized engineering assessments of state-owned dams. The following is a summary of the dams and brief description of the work we are proposing to accomplish with FY16 and FY17 capital funds.

FY 16 Requests \$538,580

Waterbury Dam ¹

Dam Safety Assurance Assessment - \$350,000 in FY16

This amount is the 35% non-federal share needed to enter into a cooperative agreement with the U.S. Army Corps of Engineers to perform a dam safety assurance evaluation and risk assessment on the Dam. The assessment is necessary due to the recent issuance of the 401 certification which eliminates the winter draw down of the reservation once the spillway is replaced. Total project cost is estimated at \$1 million.

Sadawga Lake Dam - \$75,000 in FY16
Balance of funding needed for the spillway replacement.

Wolcott Dam - \$13,580 in FY16
The balance of funding needed for a new outlet pipe and trash rack. The project can be bid with the funds that were appropriated, however additional money may be needed depending on bid outcome.

Crystal Lake Dam - \$50,000 in FY16
Conduct an assessment of leakage from the foundation of the dam and develop a cost estimate for repairs. Based on annual inspections, the leakage has been increasing over the years.

Lake Bomoseen Dam - \$50,000 in FY16
Repair deteriorated and cracked concrete in sluiceway and on spillway. May be able to wait until next budget cycle or allocate money from maintenance fund.

FY 17 Requests \$750,000

Waterbury Dam (2 projects) ¹

Seepage Control Modifications - \$175,000 in FY17

This amount is to pay for specialty contractor to provide required major maintenance on the seepage control system.

Spillway Replacement Design ^{1,2} - \$525,000 in FY17

This is the estimated non-federal share to design the dam's spillway replacement. The project was identified as critical in 2005 and the flood control capacity of the reservoir has been reduced as a result. Stabilizing the reservoir pool in a safe manner depends on spillway replacement. Total cost of design is estimated at \$4 million. The \$525,000 is a portion of the 35% state cost share.²

Wrightsville & East Barre Dams - \$50,000 in FY17
Assessment is needed to determine the condition of the outlet tunnels at these two flood control dams. This assessment was recommended during the annual inspection by the U.S. Army Corps of Engineers.

¹ The \$1,050,000 requested for Waterbury Dam in FY 16 and FY 17 would not be needed if the responsibility for Waterbury Dam is turned over to the US Corps of Engineers by July 1, 2015.

² An additional \$875,000 is projected to be needed in FY18 to meet the State's 35% obligation. This obligation would not be needed if Waterbury Dam is turned over to the US Corps of Engineers