MUNICIPAL, PRIVATE AND STATE-OWNED DAMS REPAIR AND FUNDING ISSUES

WATER SUSTAINABILITY COMMISSION NOVEMBER 15, 2011

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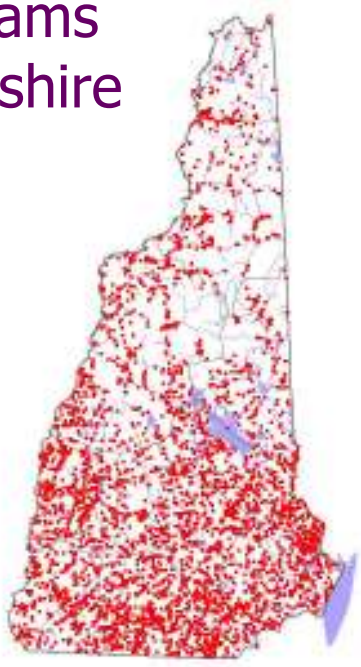
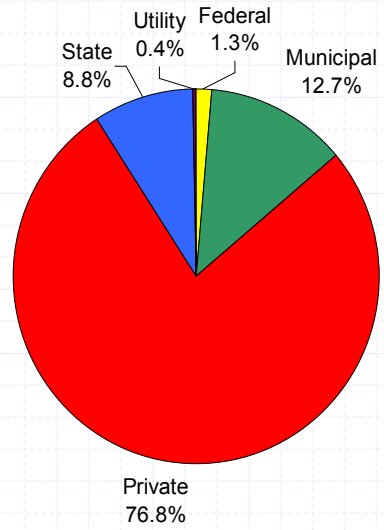
NEW HAMPSHIRE DEPARTMENT OF Environmental Services

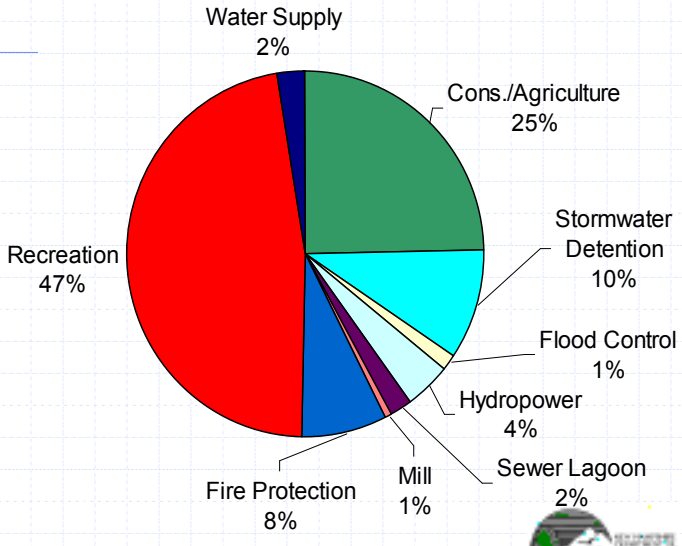
Location of Dams in New Hampshire



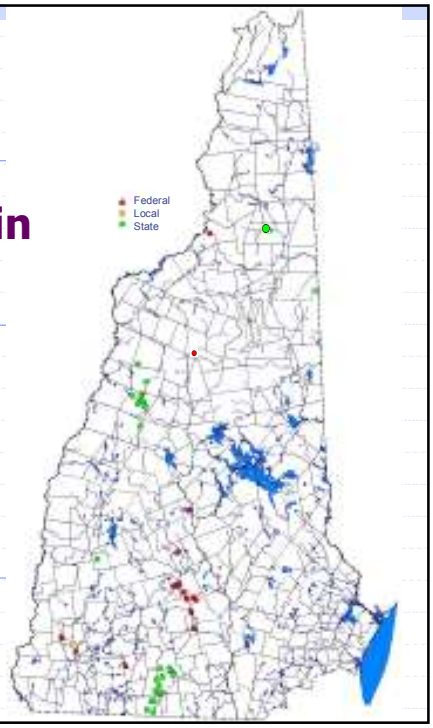
Dam Ownership in New Hampshire

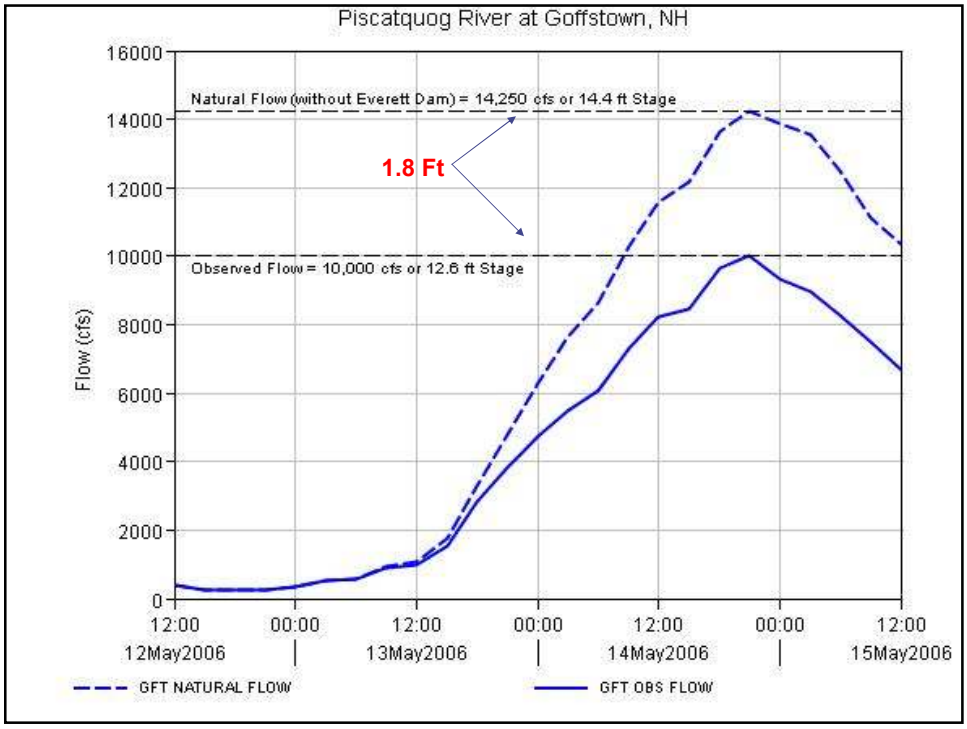


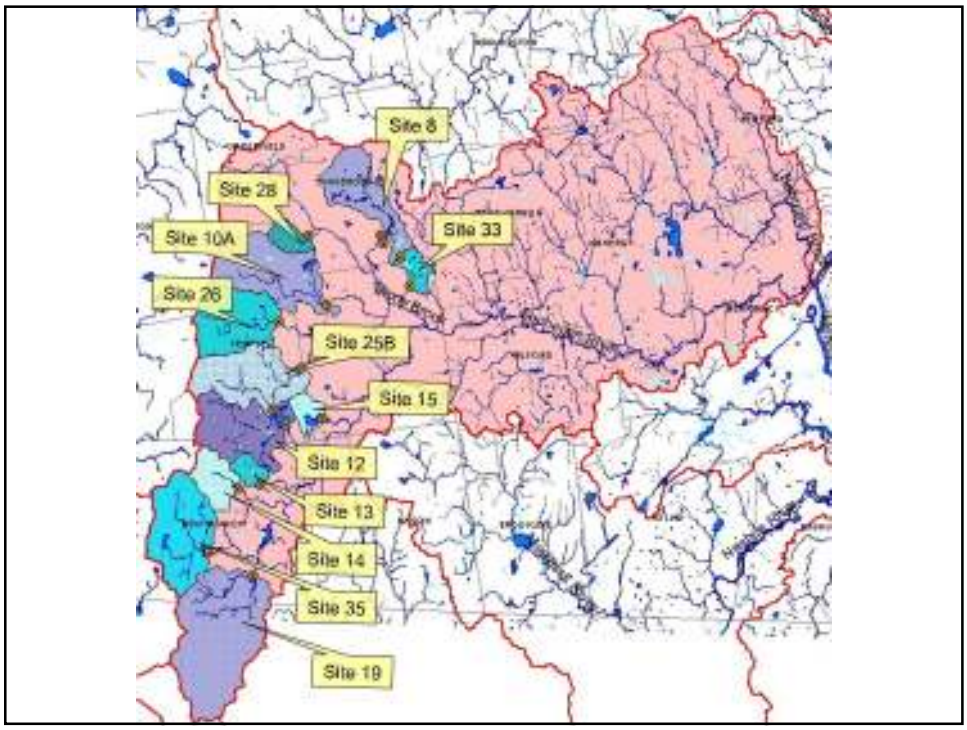
Functions of Dams in New Hampshire



Flood Control Dams in New Hampshire




Piscatquog River at Goffstown, NH
Natural Flow (without Everett Dam) = 14,250 cfs or 14.4 ft Stage
1.8 Ft
Observed Flow = 10,000 cfs or 12.6 ft Stage
Flow (cfs)
16000
14000
12000
10000
8000
6000
4000
2000
0
12:00
12May2006
00:00
13May2006
12:00
00:00
14May2006
12:00
00:00
15May2006
12:00
GFT NATURAL FLOW
GFT OBS FLOW


Site 8
Site 28
Site 10A
Site 33
Site 26
Site 25B
Site 15
Site 12
Site 13
Site 14
Site 35
Site 19


NORTHWOOD LAKE
PLEASANT LAKE

CRITICAL INFRASTRUCTURE IN NEW HAMPSHIRE'S DAM SECTOR

TIER I DAMS

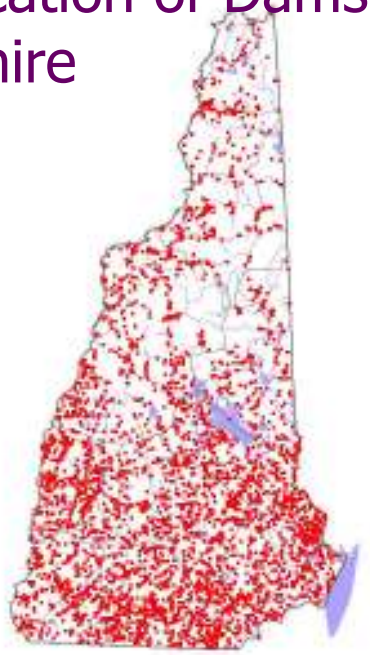
DAM NO.	DAM NAME	OWNER	TOWN	PURPOSE	POPULATION AT RISK			POWER		WATER SUPPLY
					HOUSES	STATE ROADS	TOWN ROADS	CAPACITY (KW)	ENERGY (MWH)	POPULATION SERVED
140.17	MOORE RESERVOIR DAM	TRANSCANADA HYDRO NORTHEAST	LITTLETON	Power	4,370			190,000	302,600	N/A
162.01	COMERFORD STORAGE DAM	TRANSCANADA HYDRO NORTHEAST	MONROE	Power	2,185			140,400	344,800	N/A
194.12	MURPHY DAM AKA LAKE FRANCIS	NH DES WATER DIVISION	PITTSBURG	Multi-Purpose	1,058	21	161	N/A	N/A	N/A
134.15	WILDER DAM	TRANSCANADA HYDRO NORTHEAST	LEBANON	Power	1,017	150	11	35,600	170,400	N/A
209.05	ARLINGTON MILLS RES WHEELER DAM	TOWN OF SALEM	SALEM	Water Supply	862	14	42	N/A	N/A	18,000
150.06	MASSABESIC LAKE DAM	MANCHESTER WATER WORKS	MANCHESTER	Water Supply	126	6	20	N/A	N/A	133,000
13.01	TOWER HILL POND DAM	MANCHESTER WATER WORKS	AUBURN	Water Supply	28	4	30	N/A	N/A	133,000
165.04	BOWERS DAM	PENNICHUCK WATER WORKS INC	NASHUA	Water Supply	8	2	8	N/A	N/A	90,000
165.05	HARRIS POND DAM	PENNICHUCK WATER WORKS INC	NASHUA	Water Supply	4	0	4	N/A	N/A	90,000
165.06	SUPPLY POND DAM	PENNICHUCK WATER WORKS INC	NASHUA	Water Supply	3	0	3	N/A	N/A	90,000

TIER II DAMS

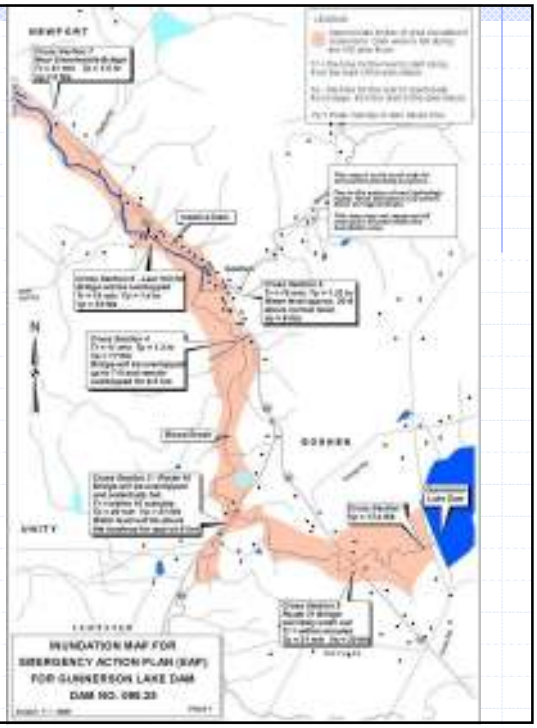
DAM NO.	DAM NAME	OWNER	TOWN	PURPOSE	POPULATION AT RISK			POWER		WATER SUPPLY
					HOUSES	STATE ROADS	TOWN ROADS	CAPACITY (KW)	ENERGY (MWH)	POPULATION SERVED
51.13	PENACOOK LAKE DAM	CITY OF CONCORD	CONCORD	Water Supply	33	1	4	N/A	N/A	43,000
148.13	BELLAMY RESERVOIR DAM	CITY OF PORTSMOUTH PUBLIC WORKS DEPT	MADBURY	Water Supply	128	4	18	N/A	N/A	33,000
206.01	WOODWARD POND DAM	CITY OF KEENE PUBLIC WORKS DEPT	ROXBURY	Water Supply				N/A	N/A	25,000
206.03	BABBIDGE RESERVOIR DAM	CITY OF KEENE PUBLIC WORKS DEPT	ROXBURY	Water Supply				N/A	N/A	25,000
82.02	EXETER RESERVOIR DAM	TOWN OF EXETER PUBLIC WORKS	EXETER	Water Supply	7	1	1	N/A	N/A	11,000
47.14	RICE RESERVOIR DAM	CITY OF CLAREMONT	CLAREMONT	Water Supply	35	10	2	N/A	N/A	9,000
47.30	WHITEWATER BROOK DAM	CITY OF CLAREMONT	CLAREMONT	Water Supply	92	2	20	N/A	N/A	9,000
108.05	LOWER RESERVOIR DAM	HANOVER WATER WORKS CO	HANOVER	Water Supply	1	1	2	N/A	N/A	8,500
108.06	UPPER RESERVOIR DAM	HANOVER WATER WORKS CO	HANOVER	Water Supply	3	0	4	N/A	N/A	8,500
108.14	HANOVER CENTER RESERVOIR DAM	HANOVER WATER WORKS CO	HANOVER	Water Supply	27	0	8	N/A	N/A	8,500
117.01	VERNON DAM	TRANSCANADA HYDRO NORTHEAST	HINSDALE	Power				28,000	122,300	N/A
150.01	AMOSKEAG DAM	PSNH	MANCHESTER	Power				16,000	83,000	N/A
24.04	SMITH DAM	PSNH	BERLIN	Power	18	0	3	13,000	104,261	N/A
27.12	GARVINS FALLS DAM	PSNH	BOW	Power	53	1	18	12,100	53,000	N/A
162.02	MONDOES RESERVOIR DAM	TRANSCANADA HYDRO NORTHEAST	MONROE	Power				10,560	51,000	N/A
93.01	GREGG FALLS DAM	NH DES WATER DIVISION	GOFFSTOWN	Power	258	2	32	3,820	8,733	N/A
116.04	JACKMAN RESERVOIR DAM	PSNH	HILLSBOROUGH	Power	163	2	22	3,200	9,340	N/A
121.19	HOPKINTON FLOOD CTRL DAM	US ARMY CORP OF ENGINEERS	HOPKINTON	Flood Control	262	3	44	N/A	N/A	N/A

Hazard Classification of Dams in New Hampshire

High Hazard	134
Significant Hazard	164
Low Hazard	544
Non-Menace	1,773
TOTAL	2,615



Emergency Action Plans Inundation Mapping



Population At Risk Downstream of High and Significant Hazard Dams In New Hampshire

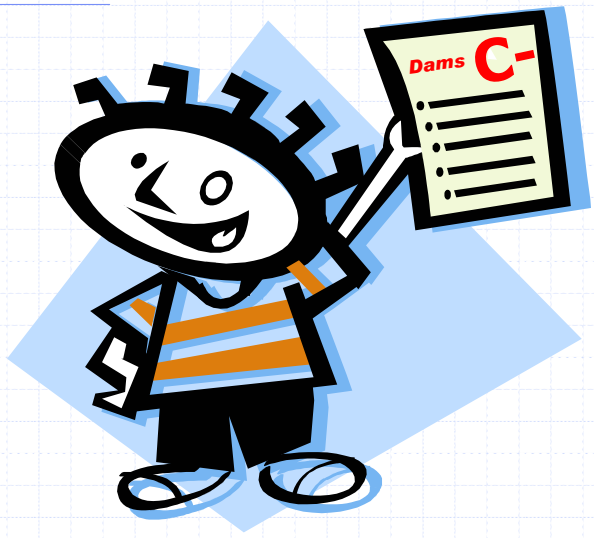
- More than 26,000 houses
- More than 560 State Road Crossings
- More than 2,500 Town Road Crossings

Periodic Inspection Schedule

Hazard Potential Classification	Number of Structures	Inspection interval	Scheduled Inspections Per Year	Scheduled Inspections Per Month
High	99	1 yrs	99	14
Significant	147	2 yrs	49	7
Low	485	5 yrs	97	14

7 month average inspection year, May through November

NH ASCE 2011 Report Card



2011 Report Card

- Growing and aging inventory of dams
- Increased number of deficiencies
- Lack of resources to maintain private and municipally-owned dams

Outstanding Letters of Deficiency

	Municipal	Private
High Hazard	23	19
Significant Hazard	27	14
Low Hazard	33	78
TOTAL	83	93

ESTIMATE OF NEEDS

- Approximately 50% of dams with outstanding letters of deficiency require major structural reconstruction
- Per project cost estimate = $750k

SUMMARY OF DAM INFRASTRUCTURE NEEDS MUNICIPAL AND PRIVATELY-OWNED DAMS

Owner	Estimated No. of Projects	Estimated Total Present Costs
Municipal	40	$30,000,000
Private	45	$33,750,000
TOTAL	85	$63,750,000

STATE DAM LOAN/GRANT FUNDING PROGRAM SUMMARY

STATE	PROGRAM TYPE	PROGRAM NAME	SOURCE OF FUNDING	ELIGIBILITY	LOAN/GRANT AMOUNT	TERM OF LOAN	EVALUATION CRITERIA	PERMITTING/ INSPECTION/ MONITORING
AZ	Loan or grant	Dam Repair	Legislature, Lien fund, Inspection fees, filing fees, principle and interest from previous loans	State engineer determines dam to be dangerous to life, non-emergency	Loan- cost of project Grant – portion of cost of project	Up to 20 years at 3-6% interest, depending on length	Determined by State Engineer	
MD	Loan and planning assistance	Maryland Environmental Service	State Agency/Non-profit Corporation	Counties, utilities and private groups. Need to have established service district for water supply, resource reclamation, dredging or stormwater				
MA	Grants		Funding through DEM. In past $5 million. No new appropriation.	Local communities for repairs or removal	75% of the project, local share can be in-kind contributions			
NJ	Revolving loan fund New grant fund for municipally owned dams	Dam Restoration and Clean Water Trust Fund	$20 million - $5M for state high hazard dams $15 M loans. In 2000 an additional $9.5 was added.	Local units of governments, private owners can be co-applicants	Cost of project for loans Up to 100% for grants	Up to 20 years @2% assessed against real estate benefited	Priority ranking system for type/size of dam/ impoundment, hazard, magnitude of problem, etc...	Must be compliant with all state dam safety requirements
NY	grants	Clean Water/ Clean Air Bond Act	$17 M bonding	Municipality for dam safety projects	75% of eligible project (25% local match) $300,000 cap per project			
OH	Revolving loan fund	Ohio Water Development Authority	Revolving loan fund	Owner must under mandate from ODNR. Dam Safety Loan Program – Local units of gov., state, districts Dam Safety Linked Deposit Program – private owners/org.	Cost of project	5-25 years at lower than market rate	Applicant needs user charges or revenue to cover loan payment	Must have inspection report and approval of plans from ODNR
PA	Revolving loan fund	Pennvest	Revolving loan fund, $2 billion from state general purpose funds	Projects associated with wastewater, water supply or stormwater	Up to cost of project	20-30 years at low interest		
UT	Loans or grants	Utah Board of Water Resources	$4.5 from general revenue and 0.8 cent sales tax (created originally to deal with flood control problems)	High hazard dam owners. Mandated repairs	80-95% grant for irrigation or water supply dams, loans or grants for other owners		Ranking by state engineer based on severity of deficiencies and population at risk	Can be used for non-structural alternatives.
WI	grants	DNR Municipal Dam Grant Program	$11.6 M of bonding over 10 years. Currently fully subscribed	Local units of government and Lake Districts	50-50 grants up to a $200,000 maximum for		Ranking by code criteria based on hazard, financial need and size	Must be under order or directive of DNR for dam safety deficiencies.

Chapter 272:5 Laws of 2008

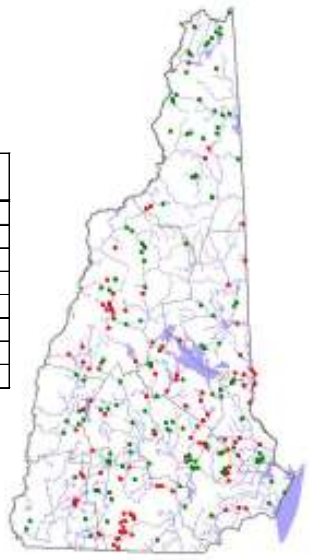
- Established Dam Maintenance Revolving Loan Fund in RSA 482:5-a to provide low interest loans for repair of privately-owned dams.
- No loans until fund balance >$25,000
- DES must establish rules for disbursement and repayment of loans

DES River Restoration and Dam Removal Program

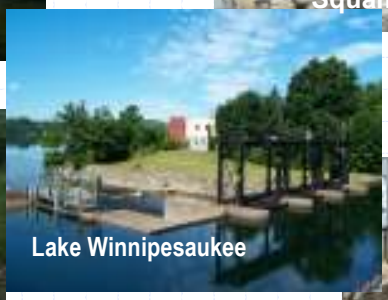
- We assist
  - Dam owners
  - General public
  - Government agencies
  - Consultants
- Information about dam removal as an option
- Help in obtaining funds to offset costs
- Guidance throughout the permitting process

State Dams

AGENCY	Hazard Classification				TOTALS
	HIGH	SIG.	LOW	NM	
DES	40	24	43	6	113
NHFG	4	7	45	46	102
DRED	2	3	9	14	28
DOT	0	4	3	16	23
UNH	1	1	0	2	4
Glencliff	0	0	0	2	2
Veterans Home	0	0	0	2	2
TOTAL	47	39	100	88	274



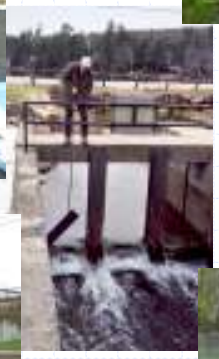
Recreational Resources

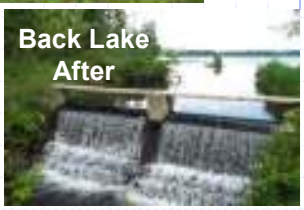


Population At Risk Downstream of State Owned High and Significant Hazard Dams

- More than 4,000 houses
- More than 130 State Road Crossings
- More than 800 Town Road Crossings

Dam Operations

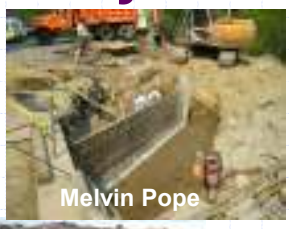




Emergency Operations

Dam Maintenance Crew

Recently Completed Projects



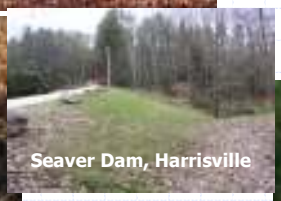
Dams in Need of Repair


Mendums Dam, Nottingham


Souhegan #15 Dam, Wilton


Pittsfield Mill Dam, Pittsfield


Ossipee Dam, Effingham


Seaver Dam, Harrisville


Pawtuckaway Lake, Nottingham

Leased Dams


Pontook


Squam Lake


Lakeport


York


Avery


Steels Pond


Lochmere


Hadley Falls


Pittsfield


Gregg Falls


Kelley Falls

Watson

Lease Terms

Dam	Lease Terms	Power Purchaser	Purchase Rate ($/kwh)
Steels Pond	20% of Gross Revenue	PSNH	0.1077 to 0.1443
Squam Lake	20% of Adjusted Gross Revenue	PSNH	0.10 to 0.11
Lochmere	26% of Adjusted Gross Revenue	PSNH	0.09
York (Briar Hydro)	3.5% of Adjusted Gross Revenue	PSNH	0.10 to 0.11
Watson-Waldron	11% of Gross Revenue	PSNH	0.1077 to 0.1443
Pontook	19.5 % of Gross Revenue	USGen NE	0.06
Gregg Falls	25-38.5% of Adjusted Gross Revenue	PSNH	0.1166 to 0.1274
Hadley Falls	6% of Adjusted Gross Revenue	PSNH	0.0761 to 0.1035
Lakeport	4% of Adjusted Gross Revenue	PSNH	0.1283
Avery	20% of Adjusted Gross Revenue	PSNH	0.1248 to 0.1678
Kelley Falls	5% of Adjusted Gross Revenue	PSNH	0.09
Pittsfield Mill	10% of Adjusted Gross Revenue	PSNH	0.1442

RSA 374-F
Electric Utility Restructuring

Utilities must take all reasonable measures to mitigate stranded costs, including renegotiation of power purchase contracts

New Power Purchase Rates

Dam	Power Purchaser	Rate ($/kwh)	Rate ($/kwh)
Steels Pond	PSNH	0.1077 to 0.1443	0.05
Squam Lake	PSNH	0.10 to 0.11	0.10 to 0.11
Lochmere	PSNH	0.09	Market
York (Briar Hydro)	PSNH	0.10 to 0.11	0.10 to 0.11
Watson-Waldron	PSNH	0.1077 to 0.1443	0.1077 to 0.1443
Pontook	Brascan	0.06	0.036
Gregg Falls	PSNH	0.1166 to 0.1274	Market
Hadley Falls	PSNH	0.0761 to 0.1035	Market
Lakeport	PSNH	0.1283	Market
Avery	PSNH	0.1248 to 0.1678	Market
Kelley Falls	PSNH	0.09	0.09

Dam Maintenance Fund Revenue

	Original Projection	Revised Projection
Steels Pond	$74,000	$23,500
Squam Lake	$3,500	$1,000
Lochmere	$35,000	$5,000
York (Briar Hydro)	$88,400	$98,400
Watson-Waldron	$14,700	$13,200
Pontook	$745,000	$414,200
Gregg Falls	$430,000	$125,000
Hadley Falls	$3,000	$3,000
Lakeport	$13,000	$4,000
Avery	$33,000	$14,100
Kelley Falls	$27,400	$4,000
Pittsfield Mill	$9,800	$0
TOTALS	$1,476,800	$705,400

State Legislative Actions

- SB 488 committee to study the effects of electric utility restructuring on state dams and the alternatives for funding the operation and maintenance of state-owned dams
  - Final Report submitted December 1, 2004
  - Proposed recommendations for alternative funding sources
    - Unrefunded gas tax
    - Shoreland assessment fees

State Owned Dams in Need of Repair

- Average capital cost is approximately $365,000 per project
- 48 dams, given the 6/yr. completion rate, results in meeting the identified dam infrastructure needs by the close of 2017
- In reality, an additional demand of 3 to 5 dams can be expected to be added to the list of 48 each year – increasing the annual infrastructure funding need by over $2M

NEW HAMPSHIRE
DEPARTMENT OF
Environmental Services

Water Division

Dam Bureau