

**VERMONT**  
**Department of Environmental Conservation**  
**Dam Safety Program**



*Wrightsville*

**Senate Natural Resources and Energy**  
**S.213**

**January 25, 2024**

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Dam Safety Engineer  
VTDEC Dam Safety Program

# Request

- **“a prioritized list of dams at risk, condition in general and costs expected”**
- Hazard Potential Classification and Condition Rating information HIGH and SIGNIFICANT hazard potential dams in Inventory (source: Periodic and Rapid Inspections by DSP)
- Risk Prioritization:
  - HIGH Hazard Potential Dam in POOR Condition Risk Assessment, 7 dams (source: Contracted study with GZA GeoEnvironmental, Inc.)
  - 18 ANR-Owned HIGH/SIGN Hazard Potential Dams Risk Assessment (source: Contracted Study with RTI International)
- Costs Expected:
  - Limited
  - Cursory Post-July 2023 Flood Compliance Costs ~\$60M
  - Typical Dam Rehabilitation Project Costs

# HIGH Hazard Potential Dams

- Out of 44 Dams in Inventory 9 are POOR condition, ~20%
- State Dams: 2 POOR
- Local Gov. Dams: 4 POOR
- Private Dams: 3 POOR

Name	State ID	Hazard Potential	Owner Type	Rating
Silver Lake	11.01	High	S	Poor
Indian Brook Reservoir	69.01	High	L	Poor
St. Albans North Reservoir	70.01	High	L	Poor
Institute Pond	119.01	High	P	Poor
Thurman W. Dix Reservoir	147.01	High	L	Poor
Crescent Lake	184.03	High	P	Poor
Ryder Pond	243.04	High	P	Poor
Lake Sadawga West Dike	243.11	High	S	Poor
East Long Pond	252.02	High	L	Poor

Key:

- Owner Type: P = Private, S = State, L = Local Gov.
- Data from Oct. 2023

# SIGNIFICANT Hazard Potential Dams

- Out of 132 Dams in Inventory, 59 are POOR/UNSATISFACTORY condition, ~45%
- State Dams: 7 POOR, 1 UNSATISFACTORY
- Local Gov. Dams: 14 POOR, 1 UNSATISFACTORY
- Private Dams: 31 POOR, 5 UNSATISFACTORY

Name	State ID	Hazard Potential	Owner Type	Rating
Southern Vermont Orchard	17.07	Significant	P	Poor
Sunrise Lake	18.02	Significant	P	Poor
Munger	18.05	Significant	P	Poor
Newbrough Upper	20.06	Significant	P	Poor
Blodgett	24.02	Significant	P	Poor
Jones Mill	26.03	Significant	S	Poor
Norton Brook	31.01	Significant	P	Poor
Holdens Pond	32.05	Significant	P	Unsatisfactory
West Hill Pond	39.01	Significant	P	Poor
Mirror Lake	40.03	Significant	P	Poor
Curtis Pond	40.09	Significant	L	Poor
Smugglers Notch Village	41.02	Significant	P	Poor
Pine Pond	43.08	Significant	P	Poor
Knapp Brook Site No. 1	44.04	Significant	S	Poor
Upper Chester Reservoir	48.01	Significant	L	Unsatisfactory
Mill Pond	51.02	Significant	P	Poor
Prentiss Pond	60.02	Significant	L	Poor
Marble Mill	60.06	Significant	P	Poor
Silver Lake	79.02	Significant	L	Poor
Caspian Lake	87.01	Significant	L	Poor
Noyes Pond	88.06	Significant	S	Poor
Hardwick Lake	93.01	Significant	L	Poor
Wright Reservoir	94.05	Significant	L	Poor
Lower Pond	97.02	Significant	P	Poor
Abatiell	99.04	Significant	P	Poor
Williams	115.01	Significant	L	Poor
Gale Meadows	115.07	Significant	S	Poor
Equinox Pond	121.02	Significant	P	Poor
Sunset Lake	122.01	Significant	L	Poor
Kenny Pond	139.01	Significant	P	Poor
Vatters Pond	143.02	Significant	P	Unsatisfactory

Newman	152.05	Significant	P	Poor
Lower Moore Pond	156.03	Significant	P	Poor
Amherst Lake	156.05	Significant	P	Poor
Rockefeller	156.07	Significant	P	Poor
Olympus Pool	160.02	Significant	L	Poor
Reynolds Reservoir	160.03	Significant	L	Poor
Lake Casper	171.08	Significant	L	Poor
Lake John	171.09	Significant	L	Poor
Dunklee Pond	173.02	Significant	P	Unsatisfactory
Upper Eddy Pond	174.05	Significant	P	Poor
Colton Pond	188.03	Significant	S	Poor
Kent Pond	188.09	Significant	S	Poor
Baldwin Pond	197.01	Significant	P	Poor
Bloch	199.07	Significant	P	Unsatisfactory
Hands Mill	225.01	Significant	L	Poor
Springfield Reservoir	229.02	Significant	L	Poor
Northeast Developers	230.04	Significant	P	Poor
Middle Brook	231.01	Significant		Poor
Shippee Pond	243.08	Significant	P	Poor
Prison Pond	248.07	Significant	S	Poor
Strattonwald	249.01	Significant	P	Poor
Stratton Mountain Lake	249.02	Significant	P	Poor
Woodbury Upper	252.06	Significant	P	Poor
South Woodbury Pond	252.09	Significant	P	Poor
Adams Reservoir	253.03	Significant	S	Poor
Cox Reservoir	254.03	Significant	P	Poor
Carlton Reservoir	254.04	Significant	P	Poor
Rouleau	244.02	Significant	P	Unsatisfactory

**Key:**

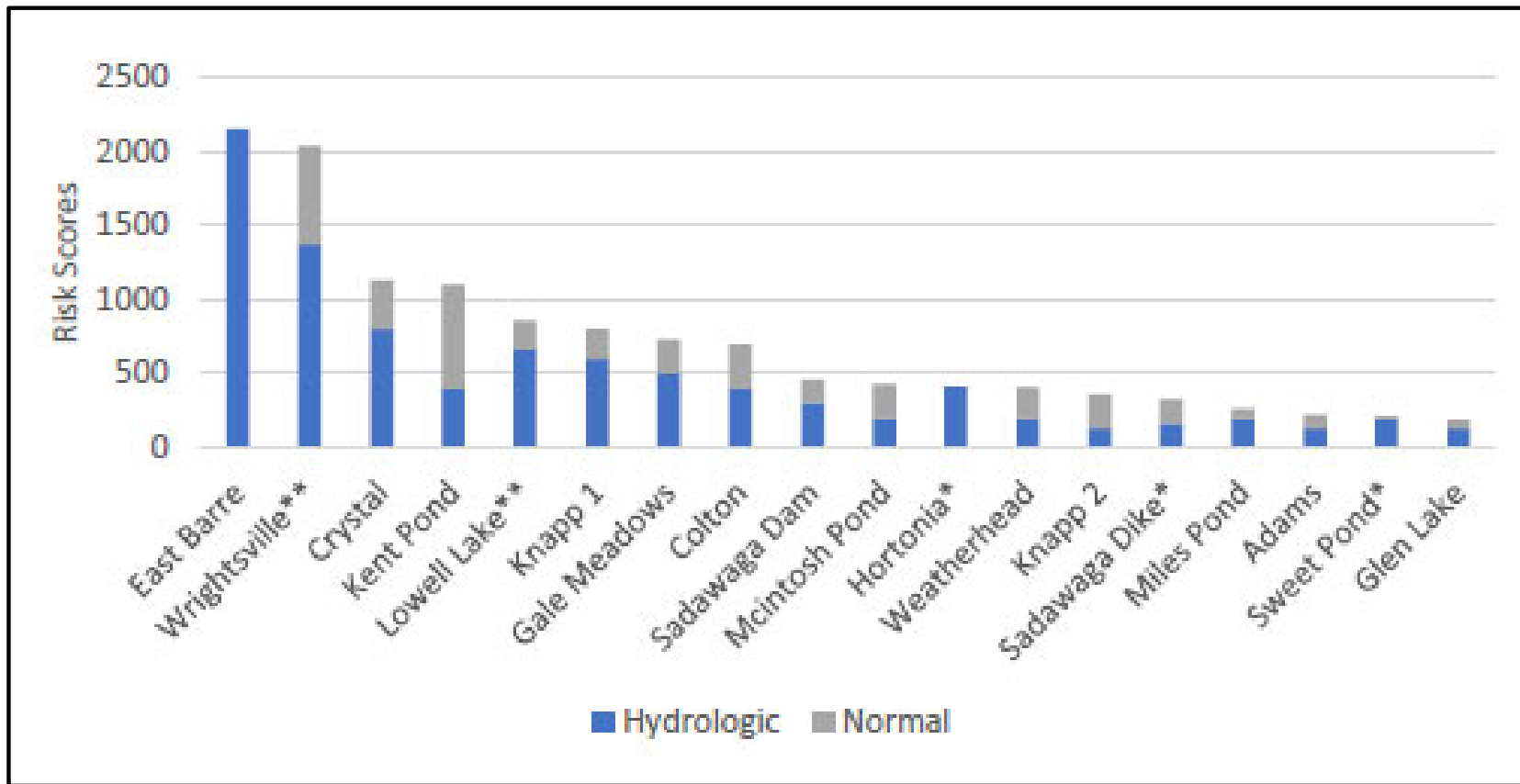
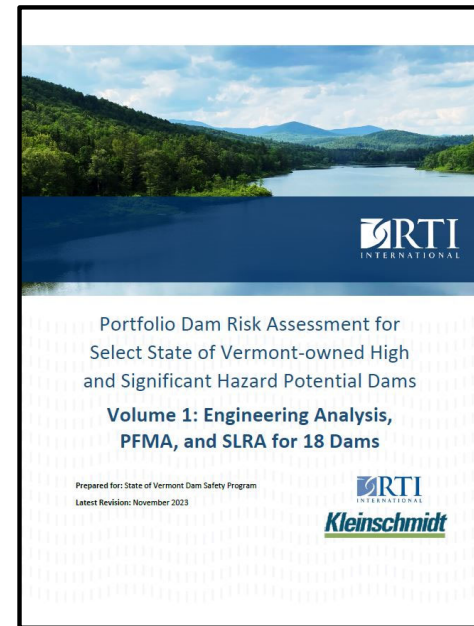
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# Emergency and Non-Emergency Projects

- Emergency Projects:
  - Temporary Risk Reduction of critical, time sensitive safety or risk reduction measures.
    - Emergency Action Planning
    - Water level lowering/drainage
    - Partial/Full breach
    - Stabilization
    - Collaboration with Permit Agencies, Engineering, Construction
    - Example: Rouleau Dam in Fall 2023, Unsafe Dam, Emergency Action Planning, Partial Breaching to set project up for future Removal, currently at \$40k.
  
- Non-Emergency Projects:
  - Permanent Risk Reduction of important safety or risk reduction measures.
    - Repair
    - Rehabilitation
    - Removal
    - Example: Noyes Pond Dam, \$1.7 to \$1.9M (Assessment, Design, Construction)

# ANR DAM RISK ASSESSMENT

- 18 ANR Dams, HIGH and SIGNIFICANT Hazard Potential
- Better understand vulnerabilities and consequences of these dams
- Develop Risk Ranking for project prioritization /“buy-down” risk/allocate limited funds
- Cost \$445,000, completed 12/31/2023, (RTI International).



# HHPD RISK ASSESSMENT

- Completed December 2023
- Figures from Portfolio Dam Risk Assessment Report by GZA GeoEnvironmental, Inc.

<i>Owner</i>	<i>Dam Name</i>	<i>Town</i>	<i>State ID</i>	<i>NID ID</i>	<i>Dam Type</i>
City of Barre	Thurman W. Dix Reservoir Dam	Orange	147.01	VT00069	Earthen
City of St. Albans	St. Albans North Reservoir Dam	Fairfax	70.01	VT00058	Earthen
Hardwick Electric Department	East Long Pond Dam	Woodbury	252.02	VT00185	Earthen/Gravity
	Wolcott Dam	Wolcott	251.04	VT00179	Gravity
Lyndon Institute	Institute Pond Dam	Lyndon	119.01	VT00216	Earthen
Town of Essex	Indian Brook Reservoir Dam	Essex	69.01	VT00055	Gravity
Town of St. Johnsbury	Stiles Pond Dam	Waterford	227.01	VT00054	Earthen/Gravity

Rank	Dam	Modified SLPRA Score	Life Safety Consequences						Downstream Economic Impacts	
			Fair Weather Failure			Incremental PMF Failure			Fair Weather Failure	Incremental PMF Failure
			PAR	Loss of Life		Incremental PAR	Incremental Loss of Life			
				Best Est.	Range		Best Est.	Range		
1	East Long	1850	129	0.3	0-5	25	1.4	0-3	\$8,313,000	\$9,032,000
2	Indian Brook	1650	712	5.3	0-9	52	18	1-33	\$8,185,000	\$15,043,000
3	Stiles	1500	5	0	0-0	10	3	2-5	\$1,643,000	\$11,371,000
4	Wolcott	1400	6	0	0-0	2	7.7	4-13	\$54,000	\$3,090,000
5	Institute	1200	9	0	0-0	8	0	0-1	\$140,000	\$1,320,000
6	Thurman	1000	7	0	0-0	1,536	7.1	0-17	\$530,000	\$96,321,000
7	St Albans	800	5	0	0-0	17	1.6	0-3	\$181,000	\$444,000

Modified SLPRA Score = Summation of 4 highest rated risks for each dam.

PAR = Population at Risk.

# Typical Vermont Dam Rehabilitation Project

- Comprehensive Assessment (Range ~\$50k to \$200k):
  - Fill data gaps to support engineering studies, such as:
    - Topographic/Detail Survey
    - Resource assessment for environmental permitting
    - Historic/archeologic assessment
    - Special inspections (ie. Underwater, pipes, drainage systems, etc.)
  - Engineering Analyses:
    - Hydrologic and Hydraulic Analyses
    - Structural/Geotechnical Analyses
    - Potential Failure Mode Analyses/Risk Assessment
    - Alternative Analysis with Cost and Permitting Considerations (No Action, Dam Removal, Rehabilitation options)
  
- Design and Permitting of Selected Alternative (~\$50k to \$150k):
  - Preliminary Design Concept, review with Regulators
  - 50% Design Review
  - Final Design
  - Environmental and Dam Safety Permitting
  
- Construction (~\$250k to \$750k or higher):
  - Bidding and Contracting
  - Construction phase engineering (monitoring, reporting, issue resolution, closeout)
  - Construction (mobilization, water control, work, substantial and final completion)
  - Post-construction/First filling monitoring and reporting



**Thank you!  
Questions?**



View from Wrightsville Dam

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