

# *Vermont Dam Safety Program*



*Waterbury Dam*

**Senate Natural Resources and Energy  
January 30, 2025**

Ben Green, PE  
Dam Safety Engineer  
VTDEC Dam Safety Program

## Brief Dam Safety Program Overview

- Located in the Water Investment Division (WID) within VTDEC
- **"The mission of the DSP is to reduce risks to life, property, and the environment from dam incidents and dam failure through effective communication, education, regulation, and dam ownership"**
- RESPONSIBILITIES:
  - dam regulation
  - dam ownership
  - lands management
- CURRENT STAFFING:
  - (2) licensed engineers
  - (2) staff engineers
  - (1) program administrator/analyst
  - 4 new positions coming!
- HISTORY:
  - 1876 VT Enacts 1st in the Nation Dam Safety Law
  - 1929 VT Dam Permit Program Enacted
  - 1981/1982 Chapter 43: Dams Enacted
  - 2018 – Act 161, Dam Safety Rule Authority
  - 2023 – Act 121, RLF, increased staffing, PUC Dams, EOP Committee
- REGULATORY:
  - 10 V.S.A Chapter 43: Dams, Non-federal, Non-power dams (Rules in development)
- DAM OWNERSHIP: 14 dams including the (3) Winooski River Flood Control Dams.

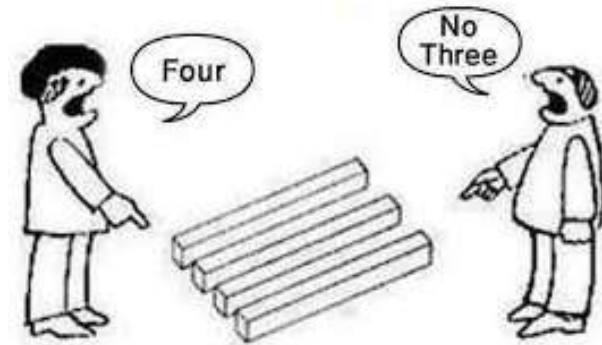


Silver Lake Dam

## Dam Safety 101 - Regulation of Dams in Vermont

Dams in Vermont regulated by one of four agencies:

1. Department of Environmental Conservation (DEC) = Non-hydropower, non-federal dams at the State Level
2. Public Utility Commission (PUC) = Hydropower Dams Constructed pre- 1935 at the State Level through 2028
3. Federal Energy Regulatory Commission (FERC) = Hydropower Dams Constructed post 1935 at the Federal Level
4. Federal Dams = Dams owned by the Corps, National Parks Service, or other Federal Entity



## Dam Safety 101 - Hazard Potential Classifications

- Potential for loss of life, property losses, lifeline losses, or environmental losses due to a dam failure or incident.

<b>Classification<sup>1</sup></b>	<b>Direct Loss of Life</b>	<b>Property Losses</b>	<b>Lifeline Losses</b>	<b>Environmental Losses</b>
<b>HIGH</b>	Probable or Certain (one or more) (extensive downstream residential, commercial, or industrial development)	Not considered for this classification	Not considered for this classification	Not considered for this classification
<b>SIGNIFICANT</b>	None expected	Major or extensive public and private facilities	Disruption of essential or critical facilities and access	Major or extensive mitigation required or impossible to mitigate
<b>LOW</b>	None expected	Private agricultural lands, equipment and isolated non-occupied buildings, non-major roads.	No disruption of services – repairs are cosmetic or rapidly repairable damage	Minimal incremental damage
<b>MINIMAL</b>	Same as LOW hazard, above			

1) Categories are based on overall dam performance and do not apply to appurtenances.

- Independent of condition rating of the dam.

## Dam Safety 101 - Vermont Dam Inventory / Natural Resources Atlas

- Contains ~1,119 records (active and historic sites)
- ~992 under jurisdiction of VTDEC (Non-Power, Non-Federal)  
**49 HIGH, 134 SIGNIFICANT, 248 LOW, ~561 MINIMAL or not rated**
- ~21 PUC (Hydropower pre-1935)  
**4 HIGH, 4 SIGNIFICANT, 13 LOW, 1 not rated**
- ~82 FERC (Power post-1935)  
**15 HIGH, 7 SIGNIFICANT, 46 LOW, 14 MINIMAL or not rated**
- ~24 other dams are under jurisdiction of Federal Government (USACE, National Park Service, US Forest Service, etc.)



VERMONT OFFICIAL STATE WEBSITE

AGENCY OF NATURAL RESOURCES

### DAMSINVENTORY

HOME DAMS PERMITS CONTACTS MAINTENANCE LOGINS

View Dams Record

Edit Close Tools ▶

Names/Location Contacts Permits Reservoir **Dam** Construction/Reconstruction

StateID: 226.01

Dam Type:	RE
Construction Type:	Zoned Earthfill
Core:	IEK
Foundation:	RSK
Low Level Outlet:	
Length:	2130.0
Height (feet):	187.0
Upstream Height (feet):	145
Structural Height (feet):	187
Hydraulic Height (feet):	183
Maximum Discharge (cfs):	84000
Principal Spillway:	
Principal Spillway Design Capacity (cfs):	
Principal Spillway Maximum Capacity (cfs):	
Auxiliary Spillway:	
Auxiliary Spillway Design Capacity (cfs):	

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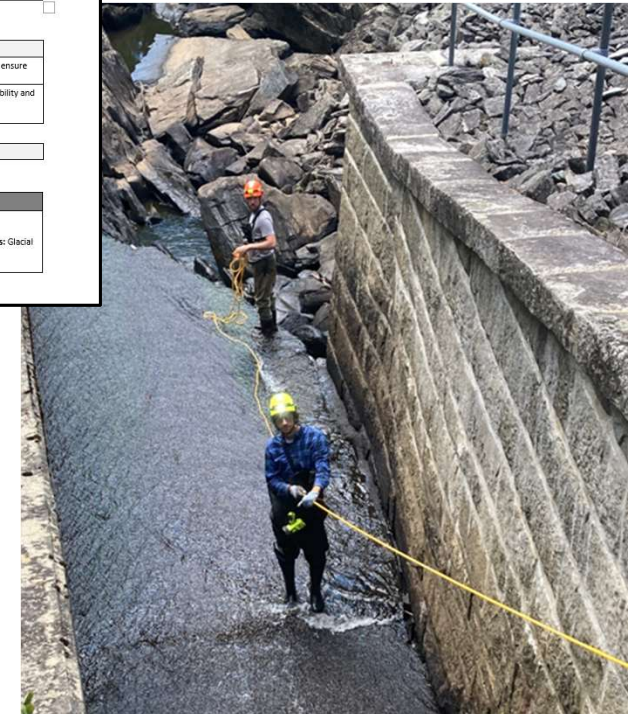
## DSP Regulatory - Periodic Inspections

- Performed according to schedule:

Periodic Inspections <sup>(1)</sup>	
Hazard Classification	Frequency
HIGH	2 years
SIGNIFICANT	5 years
LOW	10 years
MINIMAL	None

- Determine condition rating.
- Currently/historically performed by Program Staff, Rules allow for Program to require owners hire an engineer to perform.

VERMONT Department of Environmental Conservation		Dam Safety Program One National Life Drive Montpelier, VT 05602-0100 (802) 422-4299 benjamin.aron@state.vt.us	
Name: Lovell Lake		Town: Londonderry	
State ID: 115.02 NID ID: VT00079		Watershed: West River	
Hazard Class: High Hazard Potential		Stream: West River-TR	
Inspection Details			
Inspection date: 06/28/2021 11:00			
Inspection type: Periodic		Weather: Sunny, Cloudy, 84F	
Inspected by: Steven Hanna, Katherine King, Peyton Lienhart			
Dam Safety Recommendations			
<p>The following recommendations and remedial measures describe the recommended approach to address current deficiencies at the dam. Maintenance level activities can be performed by the Owner, while Studies and Analyses and Remedial Repair Recommendations will require the services of a qualified professional engineer registered in the State of Vermont who is experienced in dam safety engineering design, permitting, and construction.</p>			
<b>Overall dam condition:</b> <input checked="" type="checkbox"/> Satisfactory <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input type="checkbox"/> Unsatisfactory <input type="checkbox"/> Not Rated <small>*See general information section at the end of report for further details.</small>			
Maintenance level recommendations			
Spillways	<ul style="list-style-type: none"> <li>Maintain the principal and/or auxiliary spillway free of debris to ensure free-flow conditions.</li> </ul>		
Low-level outlets	<ul style="list-style-type: none"> <li>Test operate the low-level outlet twice yearly to maintain operability and check leakage.</li> <li>Remove debris and maintain outlet trash racks.</li> </ul>		
Studies and analysis			
Dam Information			
Type: Earth	Status: In Service	Construction date:	
Purpose: Recreation	Height: 16 ft	1850	
	Length: 125 ft	Foundation conditions: Glacial till	



## DSP Regulatory

### Dam Registration Program

- Annual fee to dam owners of dams that are capable of impounding >500,000 cf
  - **HIGH** hazard Dams = \$1,000
  - **SIGNIFICANT** hazard Dams = \$350
  - **LOW** Hazard Dams = \$200
- Designed ~2015 to provide additional funding
- Potential to raise ~\$130k annually

**Annual Dam Registration**  
VERSION 1.37

**INSTRUCTIONS**  
Register Your Dam(s) Online

**IMPORTANT:** Please do not fill out and submit this online form if you are not going to pay the annual dam registration electronically by credit card or electronic check. This form should only be used if you are paying electronically.

The benefits of completing the form online are that: the form will be pre-filled with data from the Vermont Dam Inventory database so there will be almost nothing you have to enter, if you have multiple dams they will all be registered in a single submittal, and you can pay the registration fee electronically by credit card or electronic check. If you have questions or need assistance with completing the online form, contact us by email at ANR.OnlineServices@vermont.gov or by phone at 802-272-4529.

Please review the following instructions before beginning your online registration:  
Follow these instructions to submit your annual dam registration electronically

**Registration Fees**

Your registration fee will be calculated by the system. The registration fee is based on the hazard class of the dam(s) as follows:

- \$200 per year for each **LOW** hazard dam
- \$350 per year for each **SIGNIFICANT** hazard dam
- \$1,000 per year for each **HIGH** hazard dam

**CONTACT INFORMATION**  
Contact  
Vermont Department of Environmental Conservation  
Water Investment Division  
Dam Safety Program  
Davis Building - 3rd Floor  
One National Life Drive  
Montpelier, VT 05620-3510

**Payment Remittance Address**  
Vermont Department of Environmental Conservation  
Water Investment Division  
Dam Safety Program  
Davis Building - 3rd Floor  
One National Life Drive  
Montpelier, VT 05620-3510

**CONTACTS**  
For issues with submitting payment contact:  
ANR.DamSafety@vermont.gov

### Recording Dams in Land Records

- Requirement of Act 161
- All dams in VDI must be recorded in the Land Records
- Help Dam Owners and new purchasers understand requirements of Dam Ownership
- 14 DEC Dams Recorded
- Preparing to start on other ANR Dams and HIGH Hazard Potential Regulated Dams

**VERMONT**  
Department of Environmental Conservation

**Dam Record Certificate**

This is an official record that Sarah Moore has confirmed the information below about Little Hoosier Pond dam is accurate. This notice is to be filed in the land records in accordance with the State of Vermont Dam Safety Rule §37-107 (pursuant to 10 V.S.A. Chapter 43, §1108).

**Per Rule §37-107 Dam Recording in Land Records:**  
Transfer of Ownership: The owner of a subject dam shall notify the Department of a pending transfer of legal title of their dam before the transfer occurs. Within 30 days of the transfer of ownership of a dam or property on which a dam is located, the new owner of the subject dam shall inform the Department in writing of the transfer. Upon receipt of such notice, a new Dam Record Certificate will be issued and recorded in accordance with the rule.

**Notifying the DEC - Dam Safety Program of Land Sales:** use Vermont's ANR Online. <https://anr.online.vermont.gov/>

Dam Name	StateID	Town(s)	Annual Registration Fee	SPAN
Little Hoosier Pond	56.02	Craftsbury	\$350	168-053-10780

Hazard Class	Status	Length (feet)	Height (feet)	Max Storage (acres feet)
Significant	In Service	200	7	1167.8

Owner(s): State of Vermont - DEC

Per the Dam Safety Rule §37-106 the dam owner is responsible for the safe management & operation of their dam in compliance with the rules. Owners are also responsible for the significant financial undertaking of dam ownership including, but are not limited to, maintenance, inspection, registration fees, emergency action plans (EAP).

Is Dam Subject to Periodic Inspections? Y Frequency 5 years

ANR Online Submission Number: HQ4-GGK3-264EW

**Land Recording Information**

Date of Recording SEPTEMBER 4, 2024 Town CRAFTSBURY  
Book 79 Page(s) 458

For Updated Dam Safety Program Contact Information Visit:  
<https://dec.vermont.gov/water-investment/dam-safety>  
Email: ANR.DamSafety@vermont.gov

SEP 10 2024

CRAFTSBURY TOWN CLERK'S OFFICE  
Recorded by Record  
SEPTEMBER 4 A.D. 20 24  
At 9 o'clock 30 Minutes 4 M  
and recorded in Vol. 79 Page 458  
of LAND RECORDS  
ATTEST: [Signature]  
Town Clerk 09/04



## DSP Regulatory - Dam Orders (Permits)

- Construction, alteration, rehabilitation, removal of dams >500,000 cf.
- Receive/process about 5 per year.
- Review application, analyses, basis of design report, plans, & specs.
- Public Comment Period
- Issue Dam Safety Order with Conditions or deny application.
- Monitor project, approve reservoir filling



UVM Lower Dam Removal, South Burlington



Curtis Pond Dam Rehabilitation, Calais

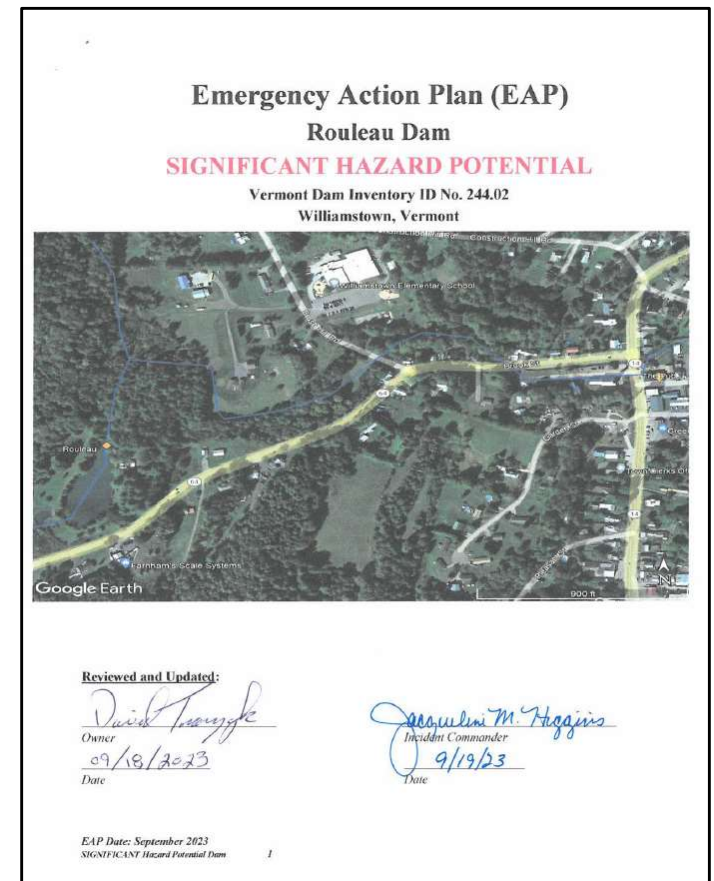


Gillett Pond Dam Replacement, Richmond



## DSP Regulatory - Emergency Action Planning (EAP)

- “written plan that identifies the area that would likely be inundated by dam failure and identifies Owner actions to protect life, property, lifelines, and the environment in the event of a dam incident or failure. Typically implemented in cooperation with the local, regional, and state emergency personnel.”
- Historically no authority to require dam owners to develop or maintain.
- New Rules will require development and updating.
- Many existing EAPs paid with FEMA Grant funds.
- EAP templates
- Simplified EAPs and Full EAPs
- Leveraging DSS-Wise Lite, free dam failure flood analysis software.



## DSP Dam Ownership - ANR-Owned Dams

- DEC directly owns 14 (including the 3 flood control dams)
- ANR owns ~100.
  - F&W (76)
  - FPR (15)

### TYPICAL TASKS

- *Site visits and checks*
- *Operation and Maintenance*
- *Emergency Action Planning*
- *Flood monitoring/operations*
- *Incident Response*
- *Capital Planning*
- *Design, permitting, construction*
- *Project Management*
- *Debris removal*
- *Beaver conflicts*
- *Mowing and Brushing Contract*



Lake Bomoseen Dam, Castleton



Waterbury Dam Tunnel

## DSP Dam Ownership - Winooski River Flood Control Dams

- Own/operate three HIGH hazard 1930s era USACE Flood Control Dams :

Waterbury Dam: 109 SM drainage area, 187 ft. tall, 2,100 ft. long.

Wrightsville Dam: 68 SM drainage area, 115 ft. tall, 1,525 ft. long.

East Barre Dam: 39 SM drainage area, 65 ft. tall, 1,460 ft. long. Dry pool.



Waterbury



Wrightsville



East Barre

## Flood Preparedness and Operations/Actions

- July 2023, December 2023, July/August 2024/Debby, December 2024
- At Waterbury Dam Pools-of-Record, 3rd, 4<sup>th</sup>, 5<sup>th</sup>, and 6<sup>th</sup> all in the last 12 years of 85-year history
- Work includes:
  - Planning, communications, step up of pre-event predictive modeling
  - Review Emergency Action Plans and readiness plans
  - Monitor and operate Flood Control Dams
  - Communicate with Downstream Communities, EMD/ICs, etc.
  - Communicate with regulated base
  - During flood and post-flood inspections
  - Evaluate ANR-owned Dams
  - Design and oversee implementation of temporary repairs (as needed)



Wrightsville Dam

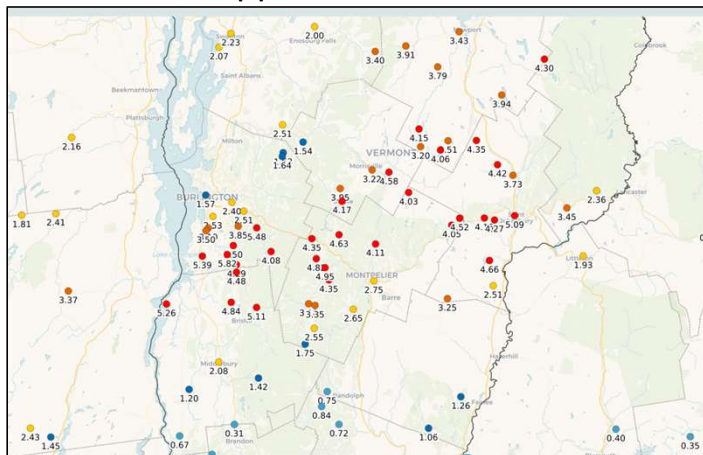


Waterbury Dam

## 2024 Storm Events

### July 10, 2024

- Peak rainfall in west to east in band across northern VT
- Peak rainfall approached 6 inches



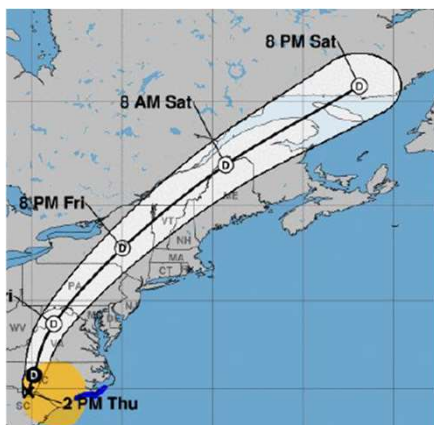
### July 30, 2024

837 AM EDT Tue Jul 30 2024

...PRECIPITATION REPORTS...

Location	Amount	Time/Date	Provider
...Vermont...			
...Caledonia County...			
St. Johnsbury 0.4 N	8.41 in	0645 AM 07/30	COCORAHS
Saint Johnsbury	8.04 in	0754 AM 07/30	ASOS
St Johnsbury 0.2 NW	7.40 in	0700 AM 07/30	COCORAHS
Danville 2.0 E	3.19 in	0605 AM 07/30	COCORAHS
Danville 0.4 N	1.87 in	0730 AM 07/30	COCORAHS
Barnet 3.5 W	1.55 in	0700 AM 07/30	COCORAHS
Wells River 2.1 NNW	1.27 in	0639 AM 07/30	COCORAHS
Lyndonville	0.91 in	0810 AM 07/30	CWOP
Lyndonville 1.1 W	0.70 in	0700 AM 07/30	COCORAHS
Sutton	0.55 in	0705 AM 07/30	COOP
...Essex County...			
0.9 N Brunswick Springs	1.08 in	0815 AM 07/30	HADS
Lunenburg 2.3 NNW	0.85 in	0530 AM 07/30	COCORAHS
...Franklin County...			
Montgomery 4.1 ESE	0.62 in	0700 AM 07/30	COCORAHS
...Orleans County...			
Morgan 6.7 SE	5.10 in	0530 AM 07/30	COCORAHS
Morgan Center	3.70 in	0815 AM 07/30	Public
Westfield 0.8 NNW	0.60 in	0700 AM 07/30	COCORAHS

### August 2024 – Tropical Storm Debby

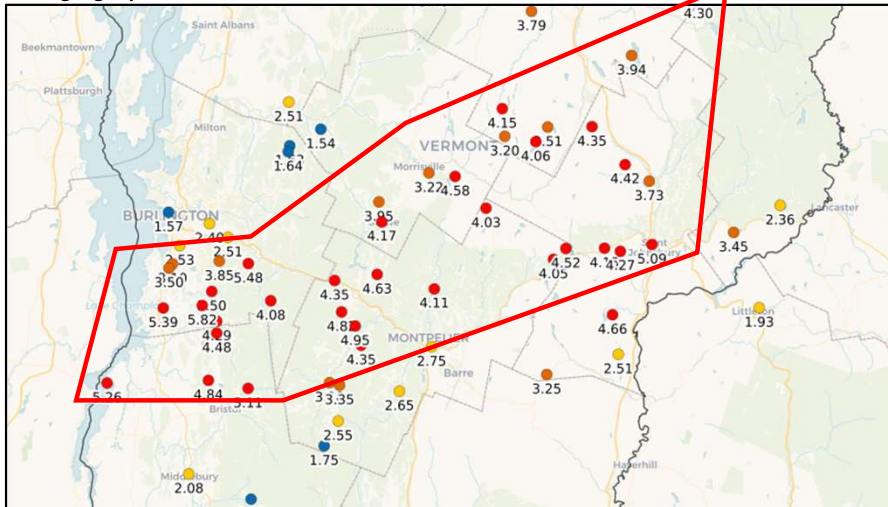


### December 2024

- Waterbury Dam – currently El. 589.7 and dropping at a rate exceeding 1 foot per day (0.2 feet above normal)
  - Est. Peak El. 609 (12/9/24 at 6PM)
  - Est. Peak El. 606.4 (~4.4 feet below reservoir restriction operation level) (12/10/24 at 3 PM)
- Wrightsville Dam – currently at El. 635.1 (1.1 foot above normal)
  - Est. Peak El. 672 (~13 feet below the auxiliary spillway crest) (12/9/24 at 6PM)
  - Est. Peak El. 668.4 (~16.6 feet below the auxiliary spillway crest) (12/10/24 at 3 PM)
- East Barre Dam: currently at El. 1127.8 (near normal)
  - Est. Peak El. 1,156 (~9 feet below auxiliary spillway crest) (12/9/24 at 6PM)
  - Est. Peak El. 1,154.2 (~10.8 feet below auxiliary spillway crest) (12/10/24 at 3 PM)

## July 10, 2024 Storm

Rain gauges per Cocorahs



- Remnants of Hurricane Beryl
- ~30 inspections performed across impacted area.
- No complete failures reported or observed
- Several dams damaged/overtopped, such as Harveys Lake Dam in Barnet, Lower Pond in Hinesburg, and Noyes Pond Dam in Groton
- Noyes Pond Dam required approximately \$60,000 in temporary repairs including buttressing failed spillway wall, sinkhole, and overtopping erosion repair



Noyes Pond Dam Storm Damage and Repairs

## Legislative/Regulatory Initiatives

- July 1, 2024 – Act 121 took effect.
- July 1, 2024 – DEC posts all Inspection Reports to VDI (publicly)
- July 1, 2024 – ANR Secretary calls first Emergency Operation Plan Study Committee Meeting
- December 15, 2024 – Emergency Operation Plan Study Committee Report due
- January 15, 2025 - Green River Reservoir Dam Study by to House and Senate
- July 1, 2025 – Act 161 Technical Standards Adopted
- July 31, 2025 - DEC and PUC to file Declaratory Orders to FERC
- January 1, 2026 – Report to House and Senate on PUC Transfer/FERC Determinations
- January 1, 2026 – Report to House & Senate on Act 161 (Dam Reg and other matters)
- July 1, 2028 - All PUC dams to DEC for safety regulation
- July 1, 2027 - Dam Safety Revolving Loan Fund Rulemaking Complete

<https://anrweb.vt.gov/DEC/DamsInventory/ListDams.aspx>

VERMONT OFFICIAL STATE WEBSITE  
AGENCY OF NATURAL RESOURCES  
**DAMS INVENTORY** DAM SAFETY PROGRAM (DSP) VERMONT OPEN GEODATA PORTAL NATURAL RESOURCES ATLAS  
DAMS PERMITS CONTACTS LINKS AND RESOURCES

List Dams records: No Records Found

Dam Name Containing:   
Contact Name Containing:   
Town Name Containing:   
Hazard Potential Classification:   
StateID is:   
ContactID/OwnerID is:   
RecordStatus:   
    
No Records Found

Browser tabs: Dam Safety Statute and Rules, Update Record In Dams Table, Chris DeVillers - President - No...  
URL: anrweb.vt.gov/DEC/DamsInventory/UpdateDams.aspx?D=1093&option=view

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DAMS PERMITS CONTACTS LINKS AND RESOURCES LOGIN PASSWORD RECOVERY

View Dams Record

Names/Location | **Contacts** | Permits | Reservoir | Dam | Construction/Reconstruction | Inspections | Other Info | Ownership Events | Map | Documents

Primary Name: Waterbury  
StateID: 226.01

Documents in Waterbury-226.01

Name	Size (kb)
EAP	
Inspections	
Pictures	





# Emergency Operations Planning Study Committee

## • Members:

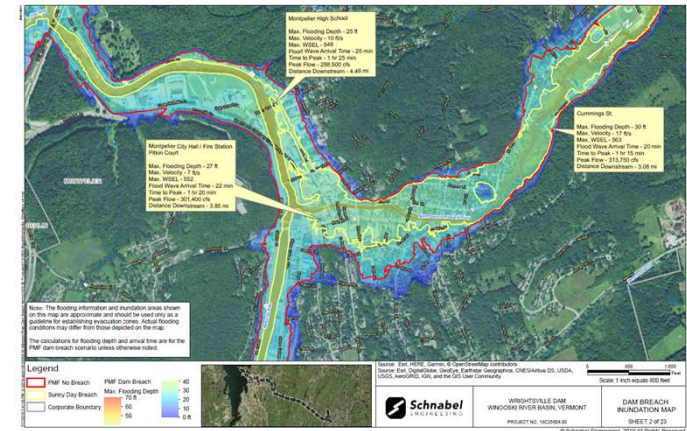
- EMDs and ICs from several communities
- Regional Planning Commissions
- Power and non-power dam owners
- Vermont Emergency Management
- VT Dam Safety Program

## • Charge:

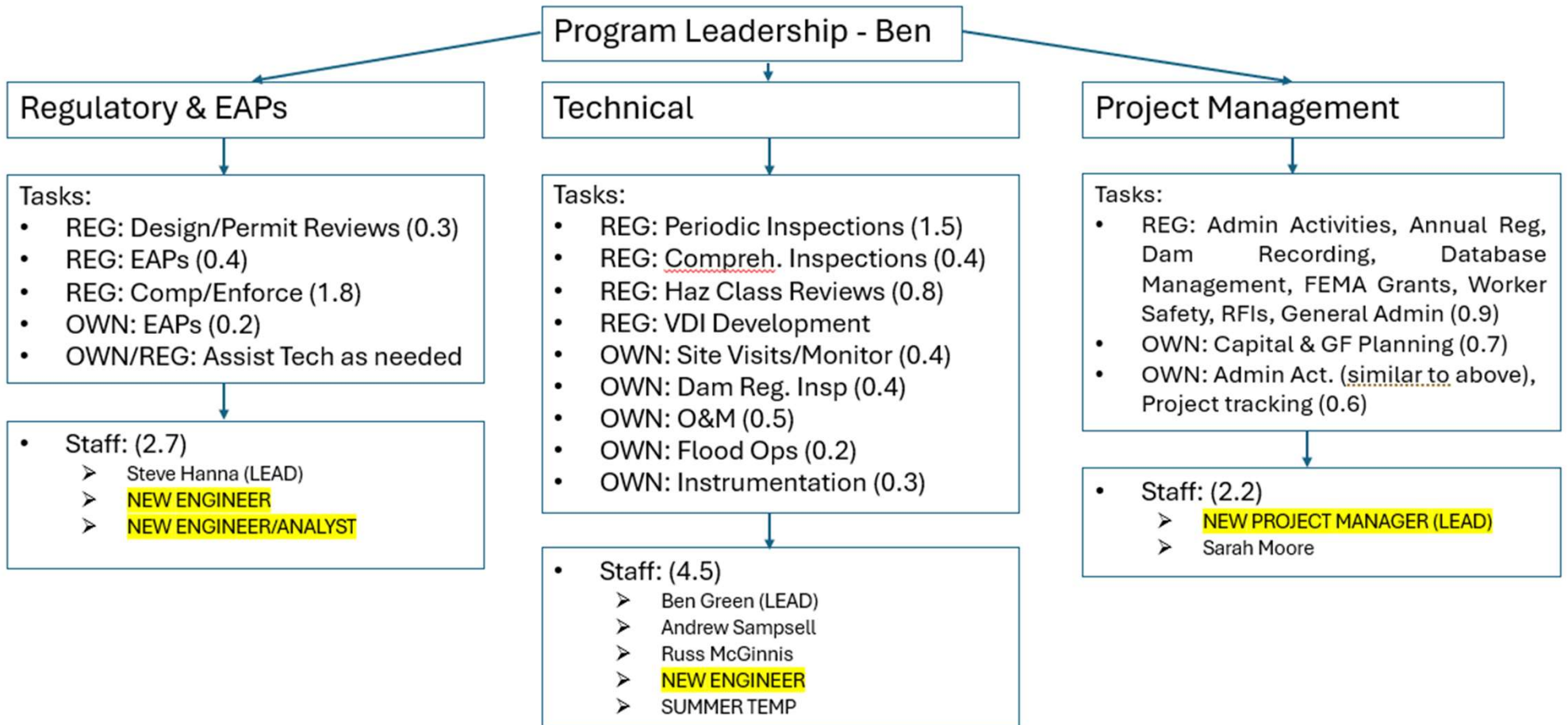
- Identify HIGH Hazard Potential Dams in Vermont
- Identify current dam emergency planning and implementation responsibilities
- Identify Regional Planning Commissions and how many HIGH Hazard potential dams are in each region.
- Recommend the content of regional dam emergency plans.
- Recommend who should prepare regional dam emergency plans.
- Develop cost estimates for regional dam emergency planning and implementation.

## • Status

- Three meetings completed
- EAP process reviewed
- EOP/Dam Annex/Local Emergency Planning Process reviewed
- Study of effective Examples in Vermont for supporting public safety
- Development of Recommendations



## Staffing Plan and Updates



## Rule Development

### **Standards Rules:**

- Dam Order Application Requirements
- Design, Planning, and Construction Requirements
- Inspection and O&M Requirements
- EAPs required for all SIGNIFICANT and HIGH hazard dams, updated every 2 years. Regional training/testing.
- Detailed technical standards:
  - H&H
  - Geotechnical & Structural
  - Mechanical
  - Instrumentation



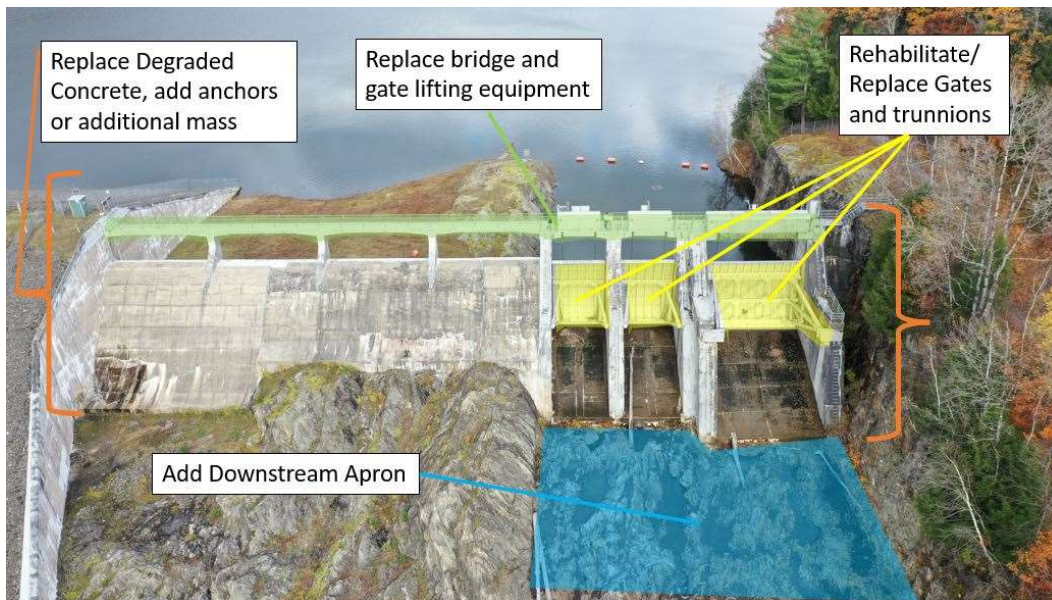
Lake Groton Dam, Groton

### **Revolving Loan Fund Rules:**

- Low or zero interest loans, starts with ~\$4M
- Design, Planning, Construction for rehabilitation, removal, breaching, draining, or other risk reduction action.
- Emergency and Non-emergency funding
- Requirements for access, subsidy, and alternative analyses

## Other Initiatives - Waterbury Dam

- In 2000s Radial Arm Flood Gate jamming, leading to Flood load restrictions on gates
- Section 1177, WIIN 2016 Funding, \$70-100M Project, US Army Corps New England
- General Assembly has allocated match needed for up to \$60M in Federal Funds
- Improvements to gates, concrete spillways, bridge, lifting equipment, discharge channel
- Mod. Study Draft under review, Design ~2025/2026, Construction ~2027/2028
- Tunnel and Penstock inspection project
- <https://dec.vermont.gov/water-investment/dam-safety/dec-owned-dams/waterbury-dam-spillway-project>



Head Gate in closed position during Fall 2024 pre-cleaning entry

## Other Initiatives - Work at State-Owned Dams

- Maintenance Contracting
- ANR-Owned HIGH and SIGNIFICANT Hazard Dam Risk Assessment
  - Rehabilitation Construction
    - Lake Carmi Dam
  - Rehabilitation Design
    - Noyes Pond Dam, Groton
  - Comprehensive Assessments
    - Silver Lake Dam, Barnard
    - Little Hosmer Pond Dam, Craftsbury
    - Gale Meadows Dam and Dike, Londonderry (F&W)
    - 6 additional Dams
  - Geotechnical Explorations
  - EAP Updates
  - Risk Reduction Measures – Prison Pond Dam, Windsor
  - Wrightsville and East Barre Dams
    - Geotechnical Exploration and Internal Erosion Study
    - Operational Flexibility/Flood Protection Improvement Project
    - Tunnel and Gate Maintenance Project



Knapp Site No. 1 Dam, Cavendish



Prison Pond Dam, Windsor

## Green River Reservoir Dam and Dike Study

- Legislature directed ANR to explore short- & long-term benefits and costs of State ownership.
- Budget: ~\$600,000 (State + MWL)
- Schedule: Target July 2025 completion
- Scope:
  - Existing Information Review (CEII)
  - Drone and Bathometric Survey
  - Dam and Hydropower inspection
  - Concrete and rock sampling/testing
  - Structural Analyses
  - Hydrologic/Hydraulic Analyses
  - Risk Assessment
  - Dam Valuation
  - Capital and Maintenance Cost Estimating
  - Alternatives Analyses:
    - ANR or MWL decommission power and lowers or removes dam.
    - ANR acquires facility and maintains it for power and recreation.
    - ANR acquires dam/dike and MWL maintains ownership of power works.
    - ANR acquires dam/dike, decommissions power, rehabilitates dam at current or lower level



**Thank you!**  
**Questions?**

Ben Green, PE  
Dam Safety Engineer  
VTDEC Dam Safety Program  
802-622-4093  
[Benjamin.Green@vermont.gov](mailto:Benjamin.Green@vermont.gov)



Wrightsville Reservoir