

# **Dam Drawdown During Emergency Flood Events**

## ***Vermont Dam Safety Program***



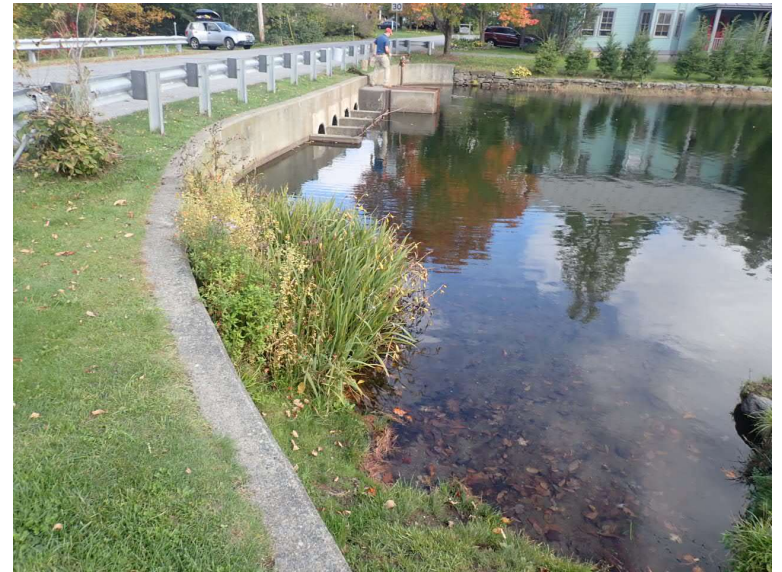
*Waterbury Dam, Waterbury*

**Senate Committee on Natural Resources and Energy**  
**H.397**  
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## **Brief Dam Safety Program (DSP) 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
  - (3) staff engineers/technician
  - (1) project manager
  - (1) program administrator
- **REGULATORY:**
  - 10 V.S.A Chapter 43: Dams, Non-federal, Non-power dams (Admin. Rules - 2020 / Standards Rules in development)
- **DAM OWNERSHIP:** 13 dams including the (3) Winooski River Flood Control Dams.



Silver Lake Dam

### Recommendation

*Dam owners with dams that could provide public safety and flood reduction benefits from pre-flood event drawdowns through temporary waiver of permits/environmental regulations should be required to develop an approved drawdown plan that includes communications, drawdown rates, target flows and levels, as well as monitoring and reporting requirements.*

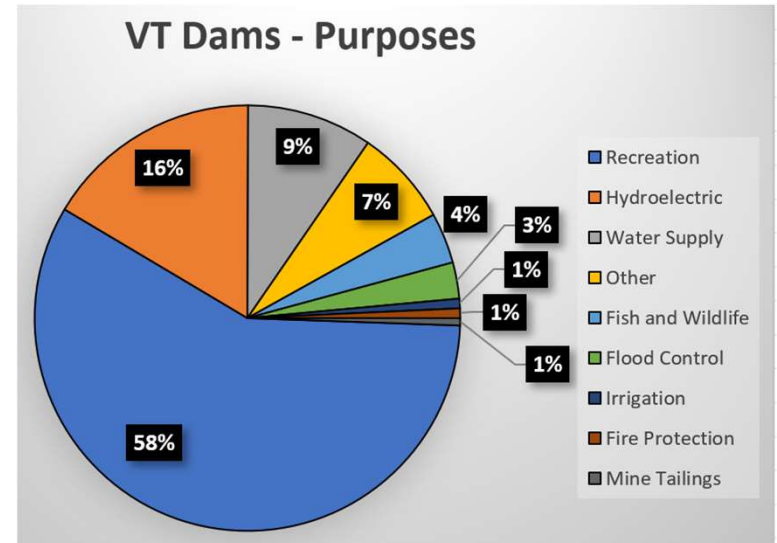
## Pre-event Dam Drawdown Potential Pros and Cons

- Pros:

- Reduce flood risk and flood loads on dams. Dam failure by flood overtopping is the most common dam failure mode.
- Use existing dam infrastructure to reduce downstream flooding/attenuate floods.
- Reduce flooding and damages to shoreline property.

- Cons:

- Dependent on dam configuration and drainage basin. Most dams not designed/configured for flood protection. May not be effective in all cases.
- Drawdown rates that are too rapid can damage dams.
- High outflows can cause undue erosion, or downstream channel/property damages.
- Outlet works used for drawdowns could fail (open/closed) resulting in unintended consequences.
- Requires diligent, active management, introduces additional human factors.
- Can have negative impacts to aquatic ecosystem in reservoir and downstream channel from unnatural levels and flows.



## **General Considerations**

- Dam owners hold all the risk and liability of dam safety and dam performance.
- Measures that give dam owners tools to make their dams safer and reduce flooding should be explored.
- Success of pre-event drawdowns for dam and public safety is nuanced:
  - Pre-event drawdowns are already occurring in a controlled and regulated way at many hydropower dams with Water Quality Certifications. It is also occurring outside of regulations in some cases.
  - To have a meaningful impact, several days of prior notice is needed to perform operations and allow time for controlled drawdown that balances the safety of the dam and the safe, available capacity of downstream water ways.
  - Lack of pre-planning could result in inefficiencies or unintended consequences.
- Controls should be considered to balance public safety and environmental impacts.
- Should only be considered at dams that are in satisfactory condition with reliable operable works at which pre-event drawdown can provide measurable benefits.

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4           (12)(A) In consultation with the Secretary of Natural Resources or  
5           designee, to authorize the Agency to waive applicable permits and restrictions  
6           under 10 V.S.A. chapter 47 or the Vermont Water Quality Standards to allow  
7           dams within the State to draw down water levels in anticipation of a flood  
8           event that is likely to cause substantial damage or injury to persons or property.  
9           Waivers may only be issued if the Governor, in consultation with the Secretary  
10           of Natural Resources or designee, has significant reason to believe doing so  
11           will decrease the risk of substantial damage to persons or property within the  
12           State. Dam operators operating under a waiver shall be required to make every  
13           effort to minimize the environmental impact of a water level drawdown under  
14           the authorized waiver.

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15 (B) Dam owners authorized to use a waiver under this subdivision  
16 (12) shall be required to develop a drawdown plan that is approved by the  
17 Secretary prior to implementation of a drawdown. The drawdown plan shall at  
18 minimum include the following:

- 19 (i) hydrologic and hydraulic modeling of the dam, reservoir, and  
20 downstream channel performed by an engineer experienced in dam safety  
21 engineering that proves the public safety benefit of pre-event drawdown:
- 1 (ii) dam owner communications with downstream communities  
2 and applicable regulators prior to and during drawdown operations;
- 3 (iii) maximum safe reservoir drawdown rates and outflows, as  
4 well as ramping rates for drawdown operations;
- 5 (iv) target drawdown elevation in the reservoir;
- 6 (v) refill plan if unable to achieve during storm event;
- 7 (vi) monitoring and reporting requirements of drawdown  
8 operations; and
- 9 (vii) documentation of plan updates and revisions over time.



# Thank you!

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Wrightsville Reservoir