

RIVER RESTORATION THROUGH DAM REMOVAL

RESTORING WATERS FOR RESILIENCE



Karina Dailey, Restoration Ecologist,
Vermont Natural Resource Council, kdailey@vnrc.org



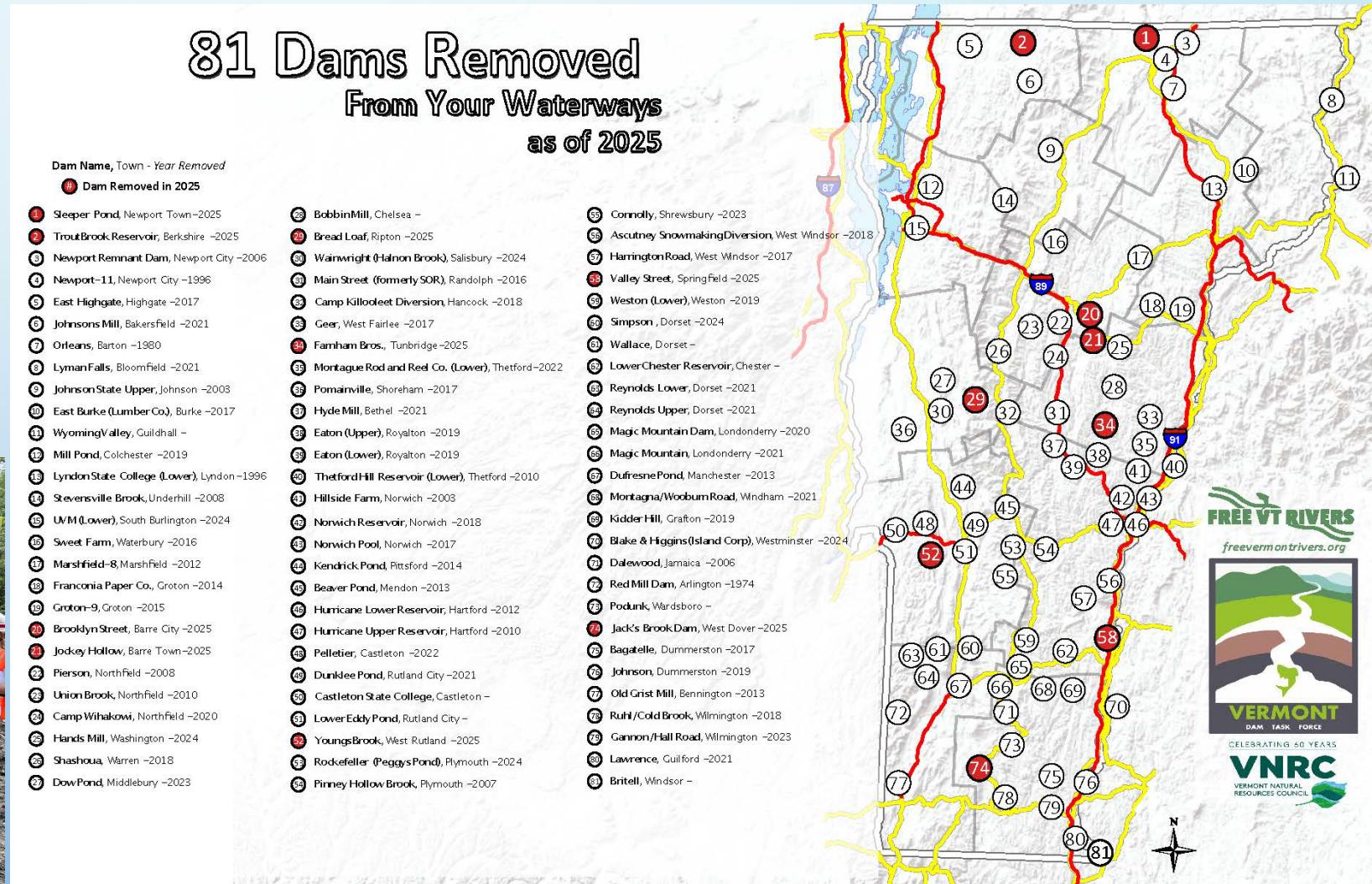
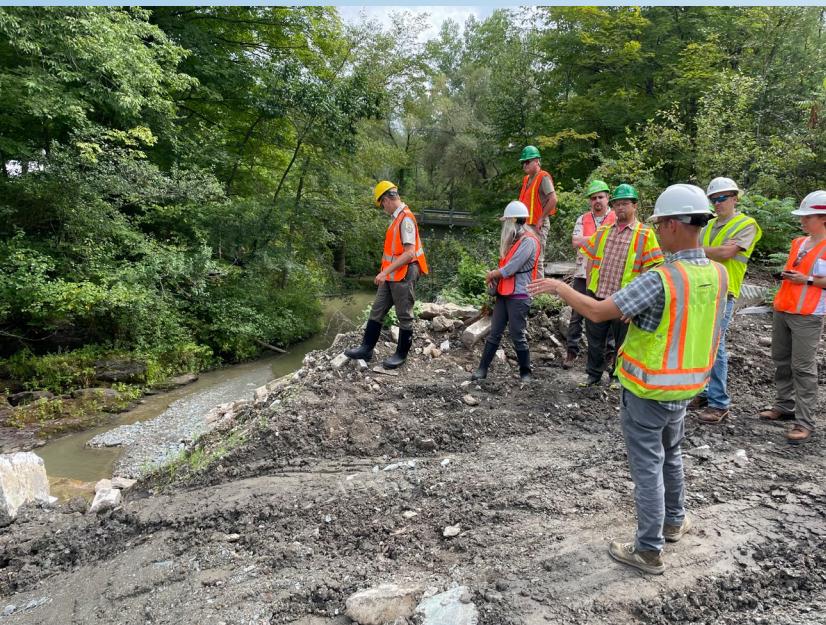
TWO PROBLEMS:

- HUNDREDS OF AGEING, ABANDONED DAMS OBSTRUCTING OUR WATERWAYS AT RISK OF FAILURE AND NO PUBLIC BENEFIT
- SUPPORT FOR REMOVAL BUT NOT AT THE SCALE NEEDED TO ADEQUATELY ADDRESS THE ISSUE – PROCESS IS CONVOLUTED



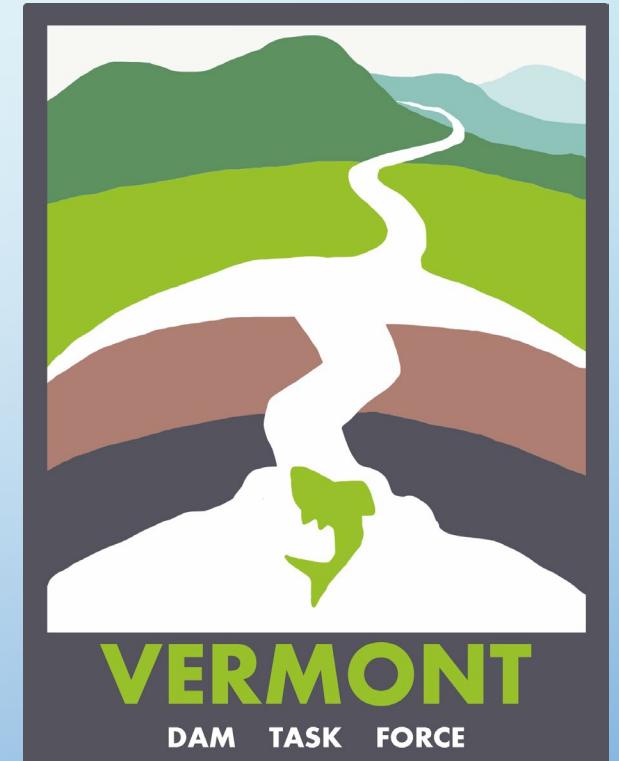
WHAT ARE WE DOING? THE VERMONT DAM REMOVAL INITIATIVE

- RAISE AWARENESS
- IDENTIFY DERELICT DAMS
- PRIORITIZE PROJECTS
- COLLABORATE
- REMOVE DAMS AND RESTORE RIVERS



REMOVING DAMS - 2025 HIGHLIGHTS:

- 9 DAMS REMOVED IN 9 TOWNS (RIPTON, BARRE TOWN, TUNBRIDGE, NEWPORT TOWN, BERKSHIRE, WEST DOVER, SPRINGFIELD, BARRE AND WEST RUTLAND)
- 125 MILES OF RIVER WAS RECONNECTED.
- 6100 LINEAR FT OF STREAM CHANNEL RESTORED
- 10 ACRES OF FLOODPLAIN RESTORED
- 1 SIGNIFICANT HAZARD DAM REMOVED & 9 DAMS IN POOR CONDITION
- \$4 MILLION SPENT WITHIN THE LOCAL ECONOMY
- IMPROVED ACCESS AND RECREATIONAL OPPORTUNITIES ON RIVERS
- IMPROVED RIVERS HEALTH, WATER QUALITY AND WILDLIFE HABITAT
- IMPROVED FLOOD RESILIENCE AND PUBLIC SAFETY
- BRINGS COMMUNITIES TOGETHER
- 8 ORGANIZATIONS REMOVED DAMS IN 2025, SO MANY PARTNERS AT THE TABLE



IMPLEMENTING NATURE- BASED SOLUTIONS

- VERMONT'S CLIMATE ACTION PLAN
- THE GOVERNOR'S RESILIENCE IMPLEMENTATION STRATEGY
- VT CONSERVATION DESIGN
- VERMONT'S HAZARD MITIGATION PLAN
- THE LAKE CHAMPLAIN TMDL
- ALL OF THESE PLANS FOCUS ON LEVERAGING NATURAL SYSTEMS FOR FLOOD MITIGATION, BIODIVERSITY, AND CARBON SEQUESTRATION



Brandy Brook, Fluidstate Consulting 2025

THE GOAL: MAKE US SAFER AND MANAGE RIVERS TOWARD EQUILIBRIUM CONDITION

- REDUCE RISK TO PEOPLE AND PROPERTY
 - DAM REMOVAL TODAY CAN PREVENT MULTIPLE FUTURE PROPERTY BUYOUTS
- RECONNECT RIVERS FOR FLOOD AND DROUGHT RESILIENCE, WATER QUALITY DEGRADATION, AND BIODIVERSITY DECLINE
- SAVE TAXPAYER DOLLARS ON DISASTER RECOVERY (VT SPENDS TENS MILLIONS ANNUALLY)



FLOODS OF 2023 & 2024

- JULY 2023 FLOOD -DAM SAFETY COMPLETED INSPECTIONS AT 400 DAMS.
- 5 DAMS FAILED, 53 WITH MAJOR DAMAGE, AND 57 WERE OVERTOPPED FROM FLOODING WITH OVER 7INCHES OF RAIN
- TIMING IS CRITICAL, URGENCY IS REAL (INCREASED INTEREST IN DAM REMOVAL, AND RECOGNIZED BENEFIT OF NATURE – BASED SOLUTIONS
- DAMS COST \$ TO MAINTAIN/REPAIR
- LOTS OF DAMS EITHER NEEDING TO BE REPAIRED OR CONSIDERING REMOVAL



“Unstable dam has town on edge”

Times Argus, July 18, 2023 – Rouleau Pond Dam

“Dam Scary: Intense Storms Push Vermont’s Aging Structures to the Brink”

Seven Days, July 26, 2023

HOW SAFE ARE OUR DAMS?

- “HIGH HAZARD—POTENTIAL DAMS NATIONWIDE HAVE INCREASED BY 20% SINCE 2012, DRIVEN MOSTLY BY INCREASED DEVELOPMENT IN DOWNSTREAM AREAS” – 2025 NATL INFRASTRUCTURE REPORT CARD
- ANR’S VT DAM SAFETY HAS JURISDICTION OF OVER 900 DAMS (NON- POWER, NON-FEDERAL) -
- 44 ARE HIGH HAZARD, 133 ARE SIGNIFICANT, 252 ARE LOW HAZARD, OVER 500 ARE EITHER NOT RATED OR MINIMAL HAZARD
- ANR OWNS 100 DAMS – 80% ARE MORE THAN 50 YEARS OLD AND 40% ARE IN POOR OR UNSATISFACTORY CONDITION

additional strain to the nation’s dams. For example, in Vermont, the average age of the state’s dams is 89 years. Because of this, many of Vermont’s dams were not built using modern codes and standards; thus, they are not designed to withstand increasingly heavy and frequent rain events. Unfortunately, in July 2023, prolonged heavy rainfall over 48 hours produced between three and nine inches of rain in some parts of the state, which resulted in historic flooding and placed significant strain on Vermont’s aging dams. Following the flooding, state dam inspectors assessed 400 dams across the state and found that 57 dams were overtopped by flooding, 50 dams sustained “notable damage,” and five dams failed.⁶

WHAT HAVE WE DONE ABOUT IT? - ACT 161

ACT 161 (REGULATION OF DAMS) PHASE 1 – ADMINISTRATIVE COMPLETE:

- REFINED DEFINITION OF A “DAM”
- DAM OWNER OBLIGATION AND RESPONSIBILITY
- PUBLIC INVENTORY, RECORDING DAMS IN LAND RECORDS
- HAZARD POTENTIAL DEFINITIONS UPDATED TO MATCH NATIONAL INVENTORY
- PERIODIC INSPECTION SCHEDULE
- COMPLIANCE WITH INSPECTION RESULTS

PHASE 2 DELAYED – TECHNICAL STANDARDS RULEMAKING:

- DAM ORDER APPLICATION REQUIREMENTS
- DESIGN, PLANNING, AND CONSTRUCTION REQUIREMENTS
- OPERATION & MAINTENANCE REQUIREMENTS
- INSPECTION, MONITORING, RECORD KEEPING, AND REPORTING
- CRITERIA FOR HAZARD POTENTIAL CLASSIFICATION
- EMERGENCY ACTION PLANS (EAPS) UPDATES
- DETAILED TECHNICAL STANDARDS



WE NEED TO IMPLEMENT - ACT 121 FLOOD SAFETY ACT

WATERSHED SCALE APPROACH TO PUBLIC SAFETY & RESILIENCE

- LIMIT DEVELOPMENT IN MOST DANGEROUS AND FLOOD-VULNERABLE AREAS
- STRENGTHEN OVERSIGHT AND MAINTENANCE REQUIREMENTS FOR DAM OWNERS AND INVEST IN THE REMOVAL OF DAMS THAT EXACERBATE FLOODING, TOGETHER ENHANCING PUBLIC SAFETY.
- IMPROVE WETLAND MAPPING AND REPORTING OF WETLANDS- GUIDED BY SCIENCE.



RESTORATION - MEET THE SCALE OF THE NEED

PROCESS IS SLOW, PROJECTS ARE DELAYED, FUNDING IS FINITE AND THERE IS A TIMELINE

PERMITS ARE MANY – WE NEED A UNIFIED APPROACH:

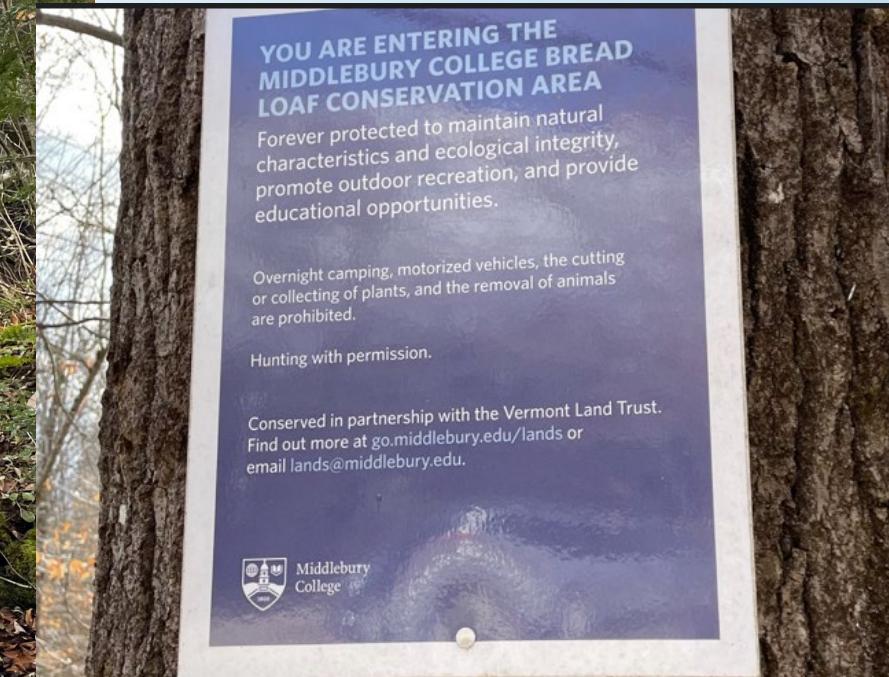
- STREAM ALTERATION PERMIT,
- DAM SAFETY ORDER,
- DEC WETLANDS REVIEW AND/OR PERMIT,
- RARE AND THREATENED SPECIES REVIEW,
- SECTION 401 WATER QUALITY CERTIFICATION, STORMWATER CONSTRUCTION PERMIT,
- INSIGNIFICANT WASTE MANAGEMENT EVENT PERMIT,
- SHORELAND PROTECTION PERMIT

FUNDING IS A PUZZLE

RIVER RESTORATION CAN INCLUDE DAM REMOVAL , CULVERT REPLACEMENT, BERM REMOVAL AND FLOODPLAIN RESTORATION PROJECTS



BREADLOAF DAM REMOVAL, RIPTON



Pre-Bid Meeting Attendance List
Breadloaf Mountain Dam Removal
4/11/2025

Company

Boulder Excavation

Goodhue Excavation

Naylor & Bleen

Acker Excavating

Birdseye Site Works

SJW docks

DeBisschop Escavating

Daniels

Belden Construction LLC.

Steady Prop Maintenance

Champlian Construction Co Inc.

Sloan's Excavating

Whipple

Canonica Landworks

Hilltop

Kingsbury Companies, LLC

J. Merrill Construction



FEMA



Department of Public Safety
Vermont Emergency Management





Big Picture:

- Project Identified in 2021 by OCNRCD
- 88 year old dam (1938)
- Permits = 3 x 3 (intake)
- Engineer: SLR, Contractor: Goodhue
- Brandy Brook is reconnected
- August, 2025 – 23 Day removal!



STATISTICS							
Min	\$ 15,000	\$ 10,250	\$ 70,000	\$ 70,000	\$ 3,500	\$ 8,000	\$ 265,500
Max	\$ 189,570	\$ 75,000	\$ 170,000	\$ 558,769	\$ 50,000	\$ 91,563	\$ 837,074
Mean	\$ 76,181	\$ 32,594	\$ 110,178	\$ 167,853	\$ 12,405	\$ 33,662	\$ 432,873
Standard Deviation	\$ 56,110	\$ 21,919	\$ 36,001	\$ 141,886	\$ 13,857	\$ 25,430	\$ 182,439
Engineer's Construction Estimate							
	\$ 35,000	\$ 30,000	\$ 135,400	\$ 110,000	\$ 6,000	\$ 31,000	\$ 347,400

<https://www.youtube.com/watch?v=kj9rP4kD-IE>

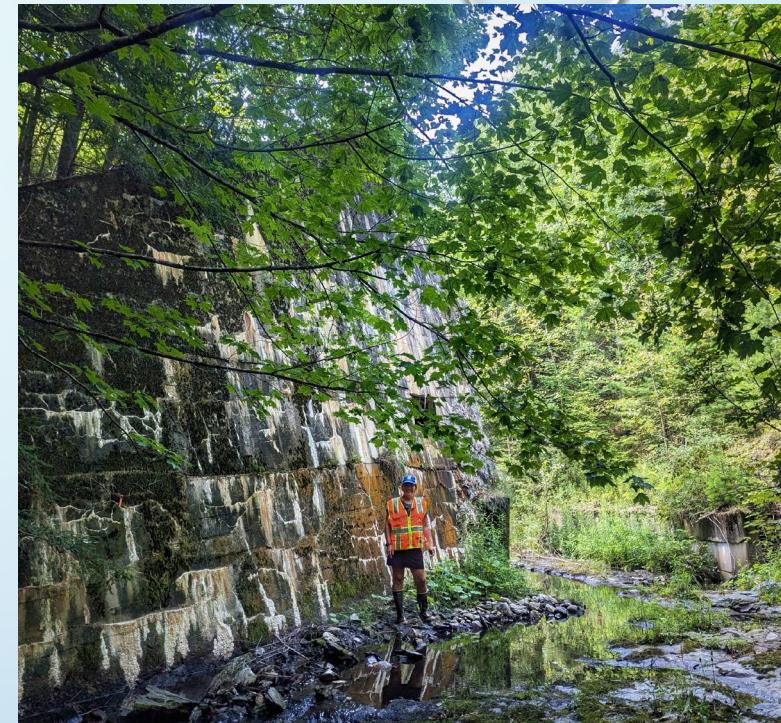


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YOUNGS BROOK DAM REMOVAL, WEST RUTLAND

Overview:

- Earth and concrete Dam 250 ft long 50 ft high
- Significant hazard
- Blocking 4 miles upstream
- Water supply reservoir for the town in the 1920s
- The reservoir and dam were abandoned in 1985 and breached during a storm event ten years later
- The breach caused infrastructure damage – safety risk
- Restoration:
- 560-foot-long pilot channel
- ½ an acre of Floodplain restored
- Future tree plantings planned
- The channel is finding its equilibrium



REMOVAL



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DAM REPAIR AND PUBLIC GOOD

- DAM SAFETY REPORTED THAT 53 DAMS SUSTAINED MAJOR DAMAGE IN THE 2023 STORM EVENT – (NON POWER – NON FEDERAL DAMS)
- A DAM ORDER IS NEEDED FOR REPAIR OR REMOVAL
- FOR REPAIR UNDER 10 V.S.A. SECTION 1086 – DETERMINATION OF PUBLIC GOOD – GREATEST BENEFIT TO THE PEOPLE OF VERMONT
- DAM REPAIR OR SHOULD THE DAM BE THERE?



MARBLE MILL DAM REPAIR EXAMPLE

- WEST BRANCH OF THE BATTEN KILL WHICH IS DESIGNATED AS AN OUTSTANDING RESOURCE WATER
- PRIVATELY-OWNED DAM WITH NO PUBLIC ACCESS
- WORLD-CLASS TROUT FISHERY AND BLOCKS FISH ACCESS TO UPSTREAM HABITAT AND A CLASS I WETLAND (DORSET MARSH)
- IMPOUNDMENT INCREASES THE DOWNSTREAM TEMPERATURE THROUGH SOLAR HEATING OF THE IMPOUNDMENT, AS WELL AS OTHER EFFECTS ON VERMONT WATER QUALITY STANDARDS PARAMETERS
- BLOCKS RECREATIONAL ACCESS TO THE RIVER AND DEGRADES PUBLIC RECREATIONAL OPPORTUNITIES FOR FISHING AND SWIMMING.
- DOES THIS DAM SERVE THE PUBLIC GOOD?



Brook Trout Survey, VT FWD 2023

RESTORING WATERS FOR RESILIENCE

- LOTS OF OLD DAMS
- INCREASED FREQUENCY OF SEVERE WHETHER EVENTS - FLOODS
- LOTS OF DAMAGED FROM FLOODS, LOTS OF WORK TO DO!
- VERMONTERS CONSIDER DAMS A MORE URGENT ISSUE - SAFEST DAM IS NO DAM
- IMPROVED UNDERSTANDING OF NATURE BASED SOLUTIONS
- WE ARE ALL DOING GOOD WORK!
- RESTORATION PROJECTS ARE COMPLEX, WE NEED TO MEET THE SCALE OF THE NEED AND NOT GET BOGGED DOWN BY THE PROCESS
- OPPORTUNITY TO RE-CONSIDER PUBLIC GOOD CRITERIA PRIOR TO DAM REPAIR



Photo Credit, Corrie Miller, LCBP

