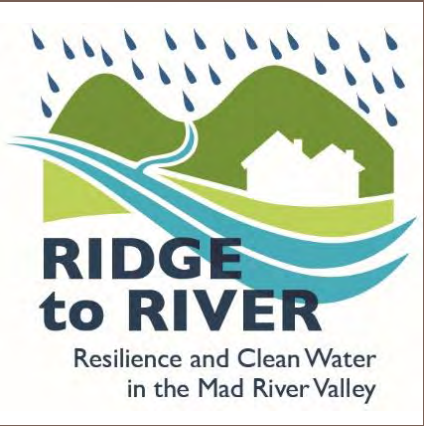


Photo: Mansfield Flight



RESILIENCE & CLEAN WATER FOR THE MAD RIVER VALLEY

Corrie Miller, Executive Director
Friends of the Mad River



R2R Community Taskforce



Official Town Representatives

Duxbury: John Murphy (SB)
Alan Quackenbush (PC)

Fayston: Jared Cadwell (SB)
Carol Chamberlin (PC)

Moretown: John Hoogenboom (SB)
Dara Torre (PC)

Waitsfield: Sal Spinosa (SB)
Brian Voigt (PC)

Warren: Bob Ackland (SB)
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Businesses and Citizens:

Zeke Church,
Sugarbush Property Group, Inc.

Richard Czaplinski, FMR & Warren

Brad Long, Waitsfield

Kinny Perot, FMR & Warren

Barry Simpson, Warren Public Works

Margo Wade, Sugarbush Resort

Supporting Organizations:

Friends of the Mad River (FMR)

Mad River Valley Planning District

Central Vermont Regional Planning Commission

FRIENDS OF THE MAD RIVER



Friends of the Mad River (FMR) is committed to **informed and active stewardship** of the Mad River and its 144 square mile watershed.

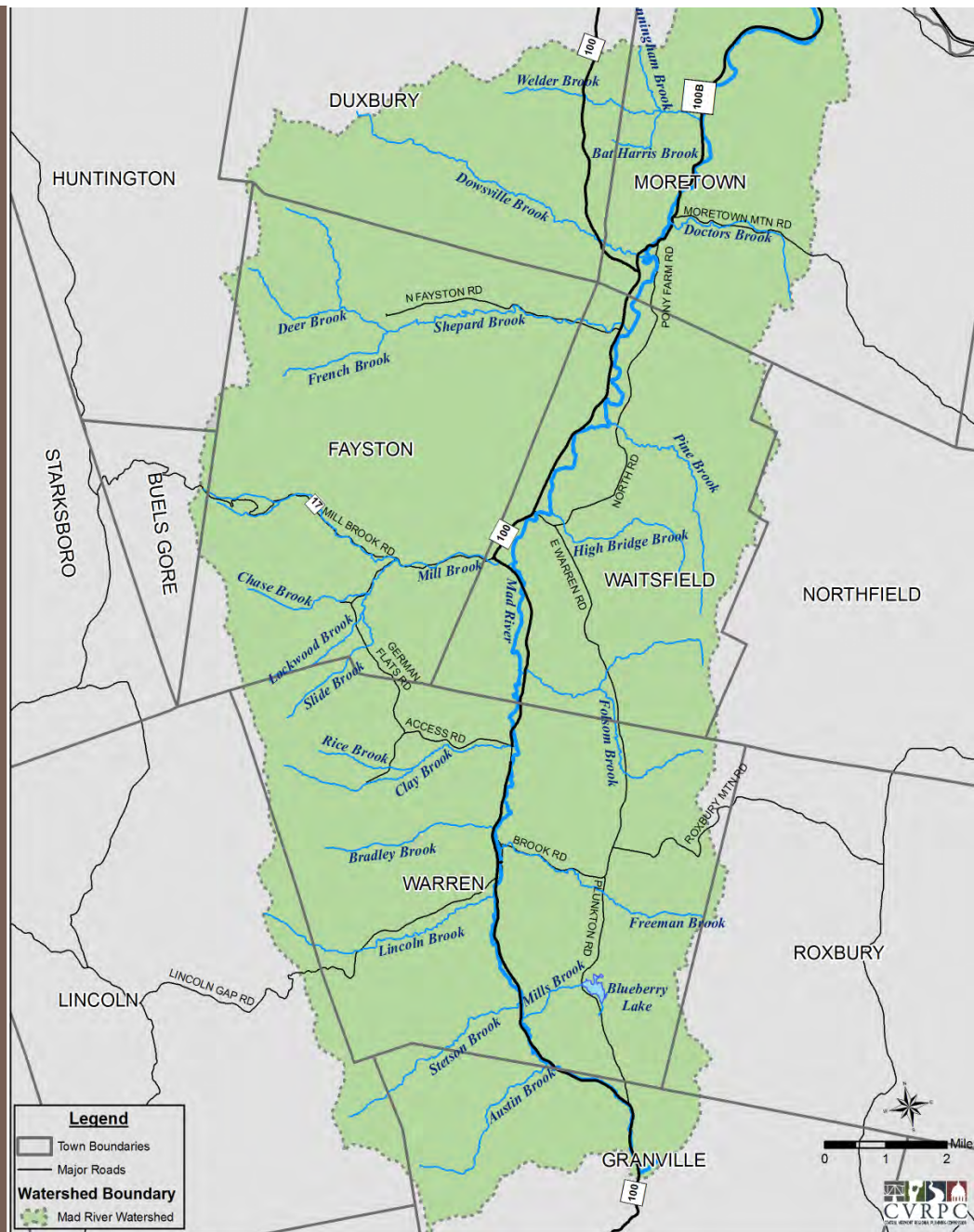
Friends of the Mad River works with the MRV community to:

- monitor ecological conditions and conduct relevant research;
- foster appreciation and understanding of our valued watershed resources;
- help communities find solutions to problems that threaten them;
- and implement projects that conserve or restore the watershed's resources.

The Mad River Watershed

The river connects our community.

Its clean water is a measure of our community's success as stewards of the land.



REMEMBER...

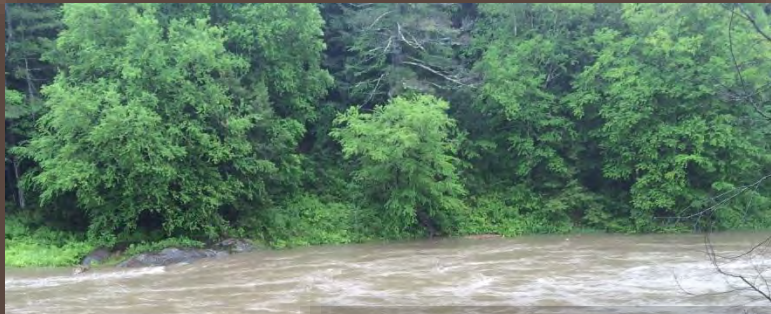


Photo: David Garten



Photo: EmberPhoto

We've Come So Far, Yet...



Photos, in order:
Corrie Miller, Mike Ware,
FMR, Kim Greenwood

Vulnerability is Not our Story...



Photo: Burlington Free Press



Photo: David Garten

Our Community is Strong and Smart & Our Future is Bright...

- **We can** carry forward that same sense of camaraderie following Tropical Storm Irene to strengthen our watershed community so that it is less vulnerable in the future.
- **We can** work with our neighbors to develop home-grown, innovative, proactive solutions.



2015 Leahy Center Environmental Summit



Photo: Leahy Staff

An Opportunity for Resilience

If we *slow down* rainwater and snowmelt and help it *sink into the ground* ...

- we are less vulnerable in larger floods
- we reduce infrastructure maintenance costs
- we benefit from cleaner water

→ Multiple Benefits!



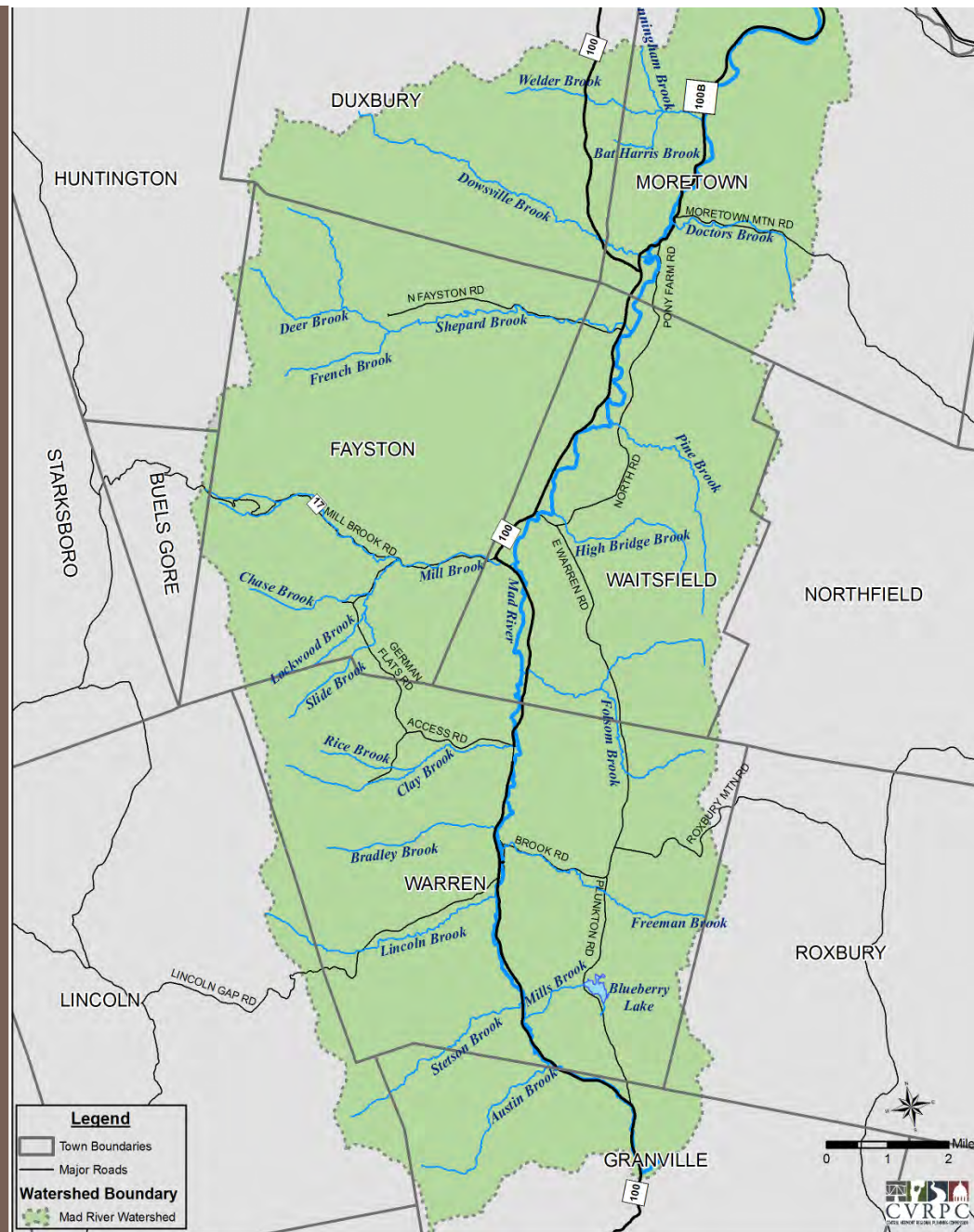
A Watershed –Wide Problem

The river & watershed connect our community.

Upstream & Downstream

Mountain & Valley

Uphill & Downhill



5 Watershed Towns – Support & Involvement



HIGH MEADOWS
FUND



Photo Above:
Joshua Schwartz

Photo Below:
Corrie Miller

R2R Community Taskforce



A Mad River Valley Coalition for
Clean Water and Resilience

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Taskforce...

The Community Taskforce is working to strengthen the MRV's resilience and water quality with improved stormwater management.

- Learning
- Sharing
- Acting





MRV Land Uses that Increase Stormwater Runoff Volume & Velocity



MRV Land Uses that Increase Stormwater Runoff Volume & Velocity

- Public Roads





Road Runoff Causes
Maintenance Issues



Road Runoff Carries **Pollutants and
Sediment** to Rivers/Streams

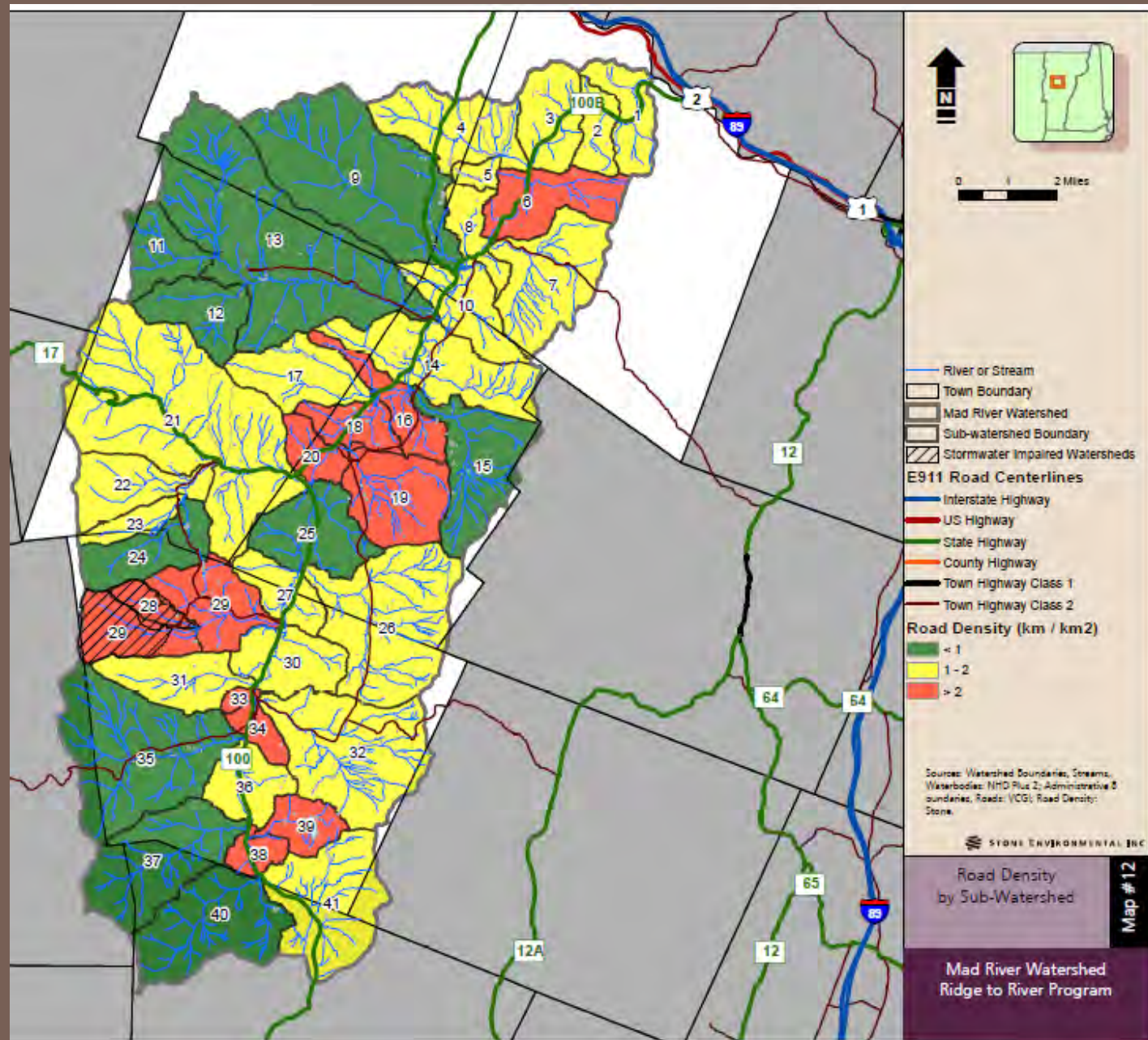


Roads Act as **Fast** Route to
Streams → Flash Flooding

Subwatersheds with High Density of Public Roads

- High Bridge Brook
- Mad Direct in Waitsfield
- Rice Brook
- Clay Brook
- Mills Brook
- Mad Direct in Warren Village

Red = Densities > 2 km/km²



MRV Land Uses that Increase Stormwater Runoff Volume & Velocity

- Public Roads
- Private Roads & Driveways



Often in Highest, Steepest Areas



No Maintenance Standards



Few Construction Standards

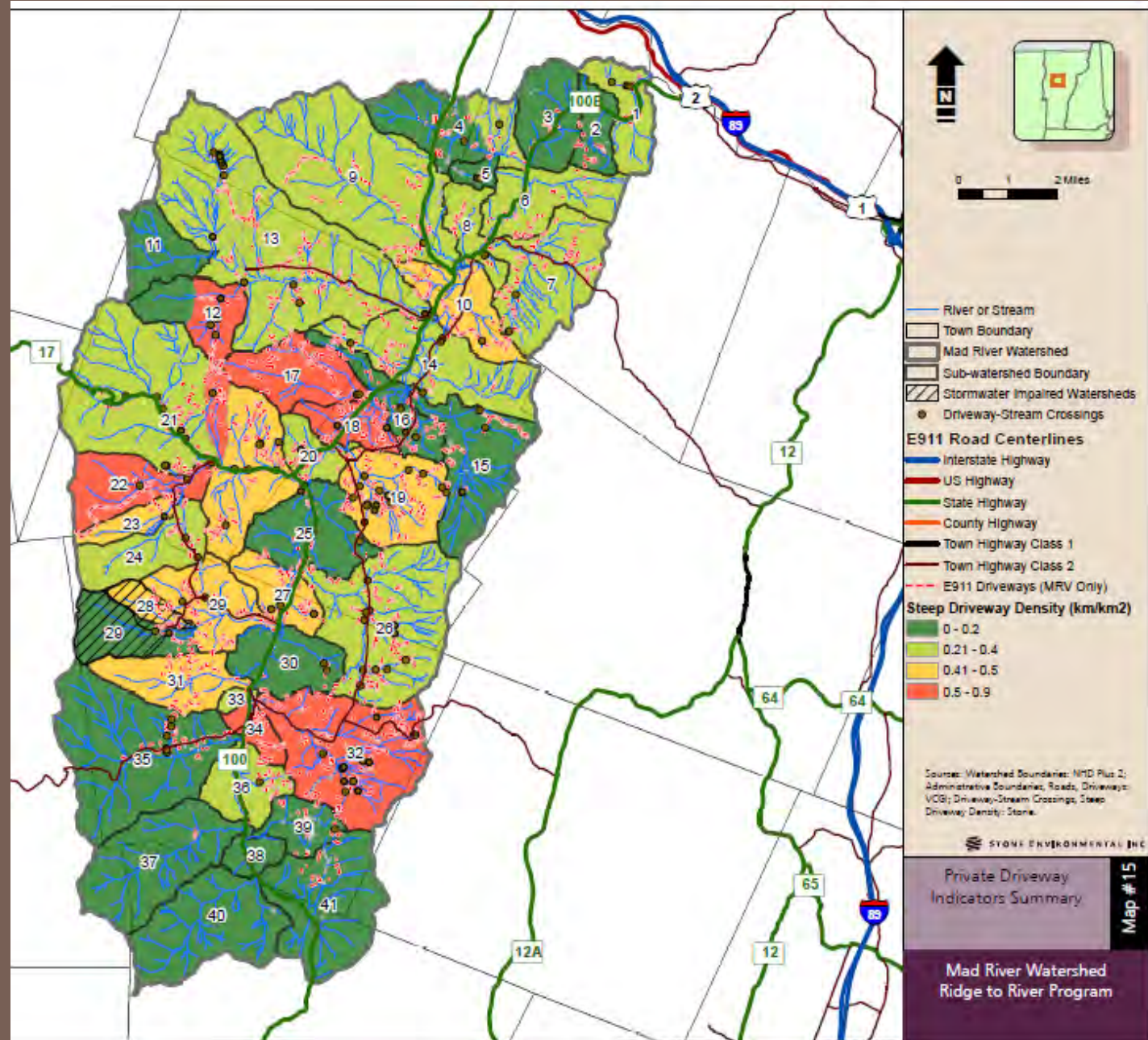
Private & Public Roads in the MRV

- 437 miles of roadway in the MRV
- 290 miles are **public**, maintained by VTrans & municipalities (66%)
- 147 miles are **private** roads and driveways (33%)
- Of private roads & drives, 60 miles (40%) have slopes $> 15\%$

Subwatersheds with High Density of Steep Private Driveways

- French Brook
- Unnamed (around Center Fayston Rd)
- Chase Brook
- Freeman Brook
- Mad Direct in Warren Village

Red = Densities $> 0.5 \text{ km/km}^2$



Interface between Private & Public Roads



MRV Land Uses that Increase Stormwater Runoff Volume & Velocity

- Public Roads
- Private Roads & Driveways
- Residential Development



Rooftops and Lawns



Bing maps/Pictometry

Scattered Residential
Development,
with Many Streams



Often in Highest, Steepest Areas

MRV Land Uses that Increase Stormwater Runoff Volume & Velocity

- Public Roads
- Private Roads & Driveways
- Residential Development
- Village Development



Large Parking Lots & Rooftops

Settlement Close to Rivers & Streams



Direct Pipes to River

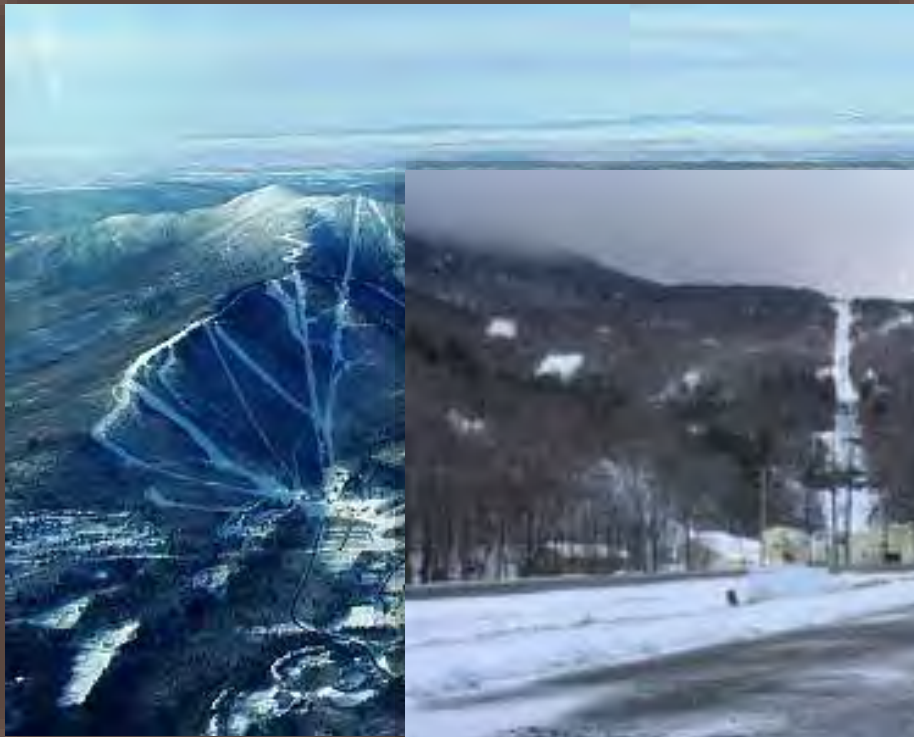
Aging, Outdated Infrastructure

MRV Land Uses that Increase Stormwater Runoff Volume & Velocity

- Public Roads
- Private Roads & Driveways
- Residential Development
- Village Development
- Resort Development



Sensitive, Erodeable Soils



Steep Slopes



MRV Land Uses that Increase Stormwater Runoff Volume & Velocity

- Public Roads
- Private Roads & Driveways
- Residential Development
- Village Development
- Resort Development
- Agriculture





MRV Land Uses that Increase Stormwater Runoff Volume & Velocity

- Public Roads
- Private Roads & Driveways
- Residential Development
- Village Development
- Resort Development
- Agriculture
- Forestry





Why Am I Telling You This?

- Our community's resilience is in our hands.
 - "Slow It, Spread It, Sink It!"
- Mad River Valley Growth
- Problems move downhill & downstream, and become more problematic.
 - What starts as a neighbor's issue becomes your issue
- Problems come from all different land uses and it takes everyone in the community working together.
- Small actions can make a difference collectively.
- Flood resilience, clean water, and reduced long-term costs go hand in hand.

Opportunities for Resilience



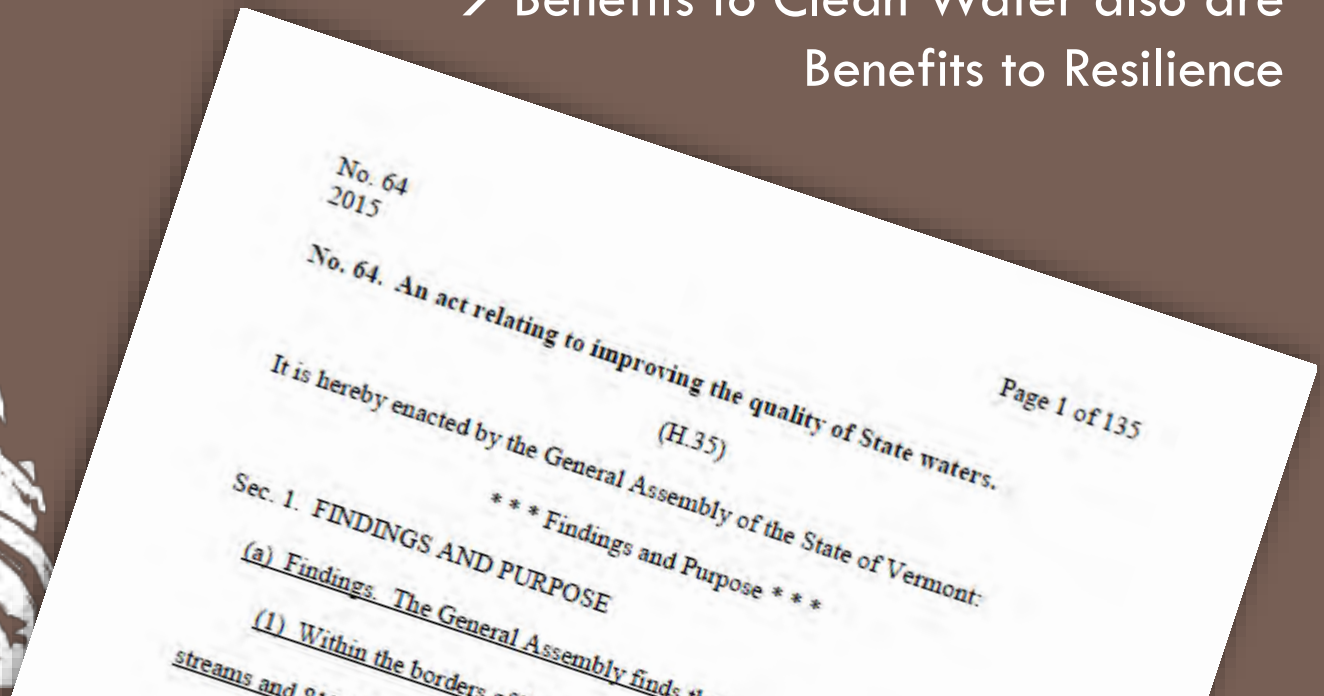
Vermont Clean Water Act (Act 64) – 2015

Ridge to River Goals Related to Act 64:

- Meet impending State requirements with solutions that work for the MRV community
- Help the community adjust to new regulations

→ There will be growing pains

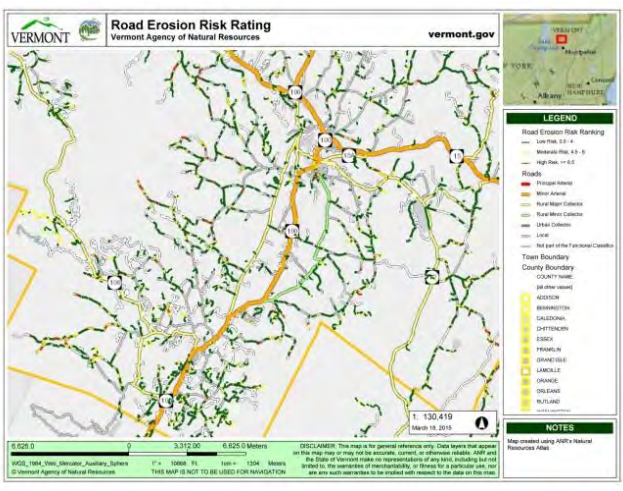
→ Benefits to Clean Water also are
Benefits to Resilience



Municipal Road General Permit – ≤Jan 2018

Starting in 2018, Municipalities will be required by Vermont's Clean Water Act (2015) to bring road drainage systems up to basic standards and apply corrective measures to reduce erosion in hydrologically connected sites.

Inventory



Prioritize



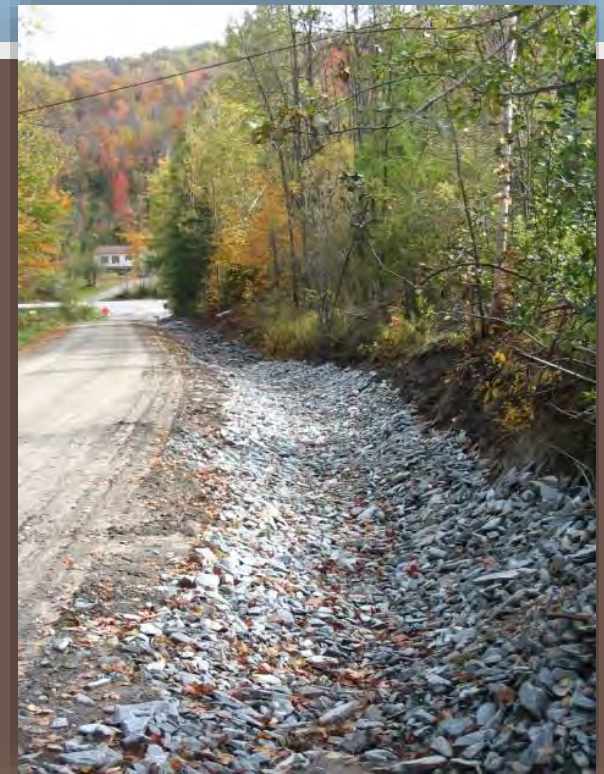
Implement



Duxbury, Moretown & Waitsfield –
Completed in 2016
Warren – Coming in 2017

Remediation using Best
Management Practices (BMPs)

Grass-lined
drainage
ditches



Best Management Practices

Stone-lined ditches and check dams

Turn outs

Properly- sized drainage
culverts

Culvert headers



Proper road crowning

State is Offering Assistance to Towns

- Funding, Outreach and Technical Assistance, & Shared Equipment

Water Quality BMPs = Good Road Drainage =

Long-term \$\$ Savings!

Fewer Flood Vulnerabilities!



Developed Lands – Act 64

Existing Development

- > 3 acres existing impervious requires a permit



Gaps can be addressed in local planning and zoning and in non-regulatory approaches

Improved Baseline Land Management Practices

- **Agriculture** – Required Agriculture Practices (RAPs)
Legislative Committee on Administrative Rules (LCAR) hearing on 11/3/16
- **Forestry** – Acceptable Management Practices (AMPs)
Effective as of Oct 22, 2016
- Clean Water Fund provides funding for implementation
- “Keep Forests Forest” is Good for Resilience!

Landowners have the power to employ practices that go above-and-beyond regulatory minimums.

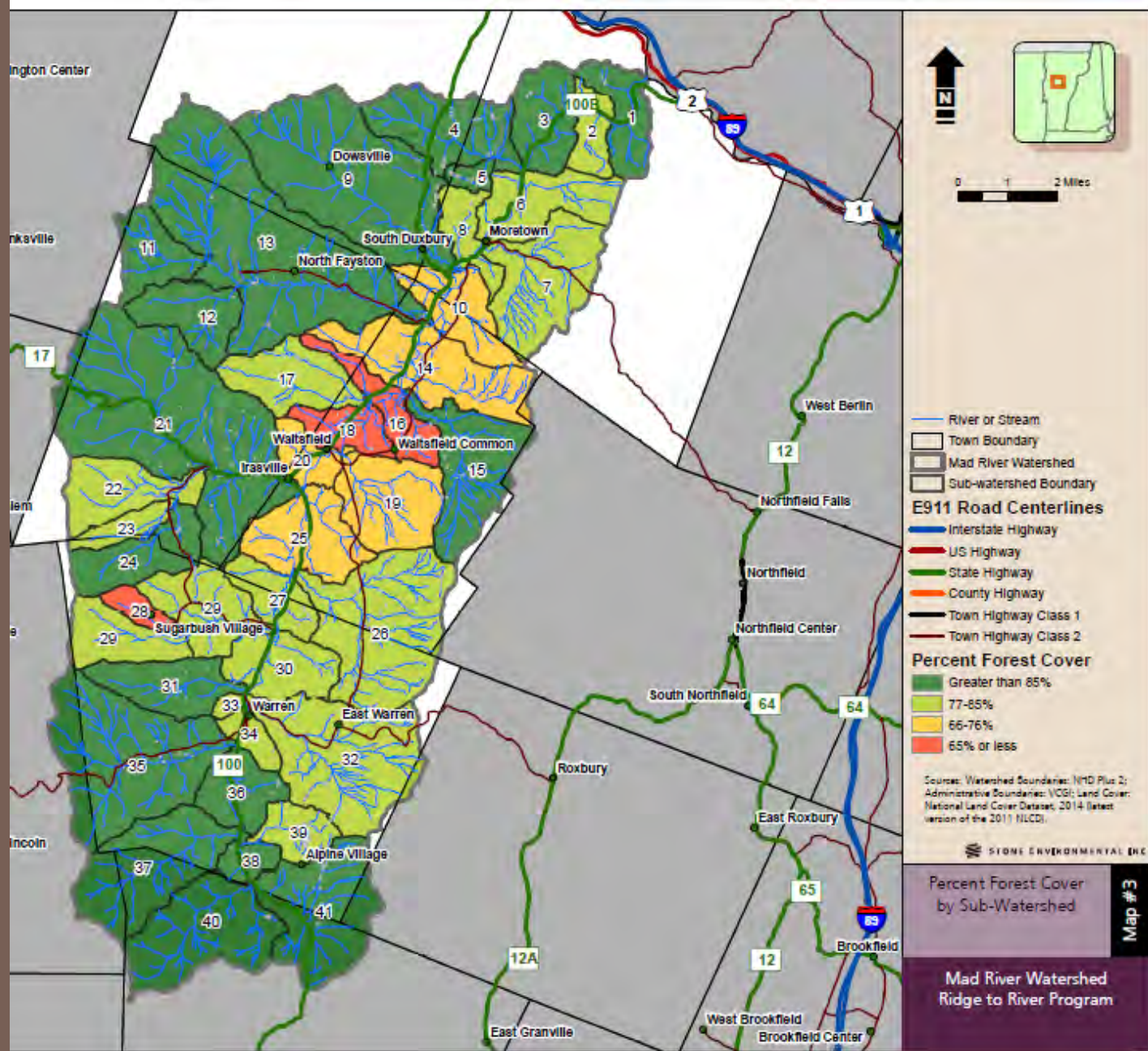
Keep Forests as Forests

- Studies in Pacific Northwest mark an observed transition in downstream channels from minimally to severely degraded stream conditions when forest cover threshold is below 65%.
- Between 2001-2011, the National Land Cover Database shows that within the Mad River Watershed:
 - 468 acres of “Forest” cover changed to “Shrubland/Herbaceous” class
 - 34 acres of “Forest” cover changed to “Developed” land cover class
 - ~500 acres of forest cover lost in 10 years

Forest Cover Percentages by Subwatersheds

- Mad Direct in Waitsfield
- Rice Brook
-
- High Bridge Brook
- Mad Direct in Waitsfield

Red = < 65% forest cover



Existing Residential Development

Not Regulated in Water Quality Act – no “stick”
No Significant Additional State Funding – no “carrot”

- Existing Private Roads & Driveways

- Owners/Managers can apply same BMPs recommended for town roads and save money over the long-term

- Existing Homes

- Owners/Managers can apply Green Stormwater Infrastructure (GSI) retrofits to reduce runoff – like raingardens and rain barrels

→Ridge to River developing program for working with private landowners to slow, spread and sink rain and snow melt.



Ridge to River – Next 6 Months

- Engage the community & solicit input
- Continue seeking opportunities for resource sharing among towns, especially with regard to road maintenance
- Work with local schools to reduce runoff from campuses
- Provide home site audits to homeowners and technical assistance about how they can reduce runoff on their properties
- Work with Valley Planning Commissions to consider opportunities for enhancing stormwater management in planning and zoning

The Moral of the Story



Photo: Joshua Schwartz

EMBRACING A MAD RIVER COMMUNITY FORUM + RESILIENCE CELEBRATION

**WEDS. DECEMBER 7 • 5:30-7:30 PM
BIG PICTURE THEATER, WAITSFIELD**

**Join us to celebrate the Valley's progress since Irene
and learn about building a stronger future.**

RIDGETORIVER.ORG

Free Refreshments • Cash Bar
Drink Specials • Live Music

Brought to you by the Ridge to River Initiative, Friends of
the Mad River and Mad River Valley Planning District.



TAKE THE RIDGE TO RIVER SURVEY + WIN CASH!

Online at ridgetoriver.org. Paper copies at libraries or town offices.

Thank you. Questions?

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