

New Vermont Mapping, Regulation, and Training to Enhance Floodplain Protection

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State Floodplain Manager
River Corridor & Floodplain Protection Program
Vermont Dept. of Environmental Conservation



WATERSHED
MANAGEMENT DIVISION

RIVERS PROGRAM



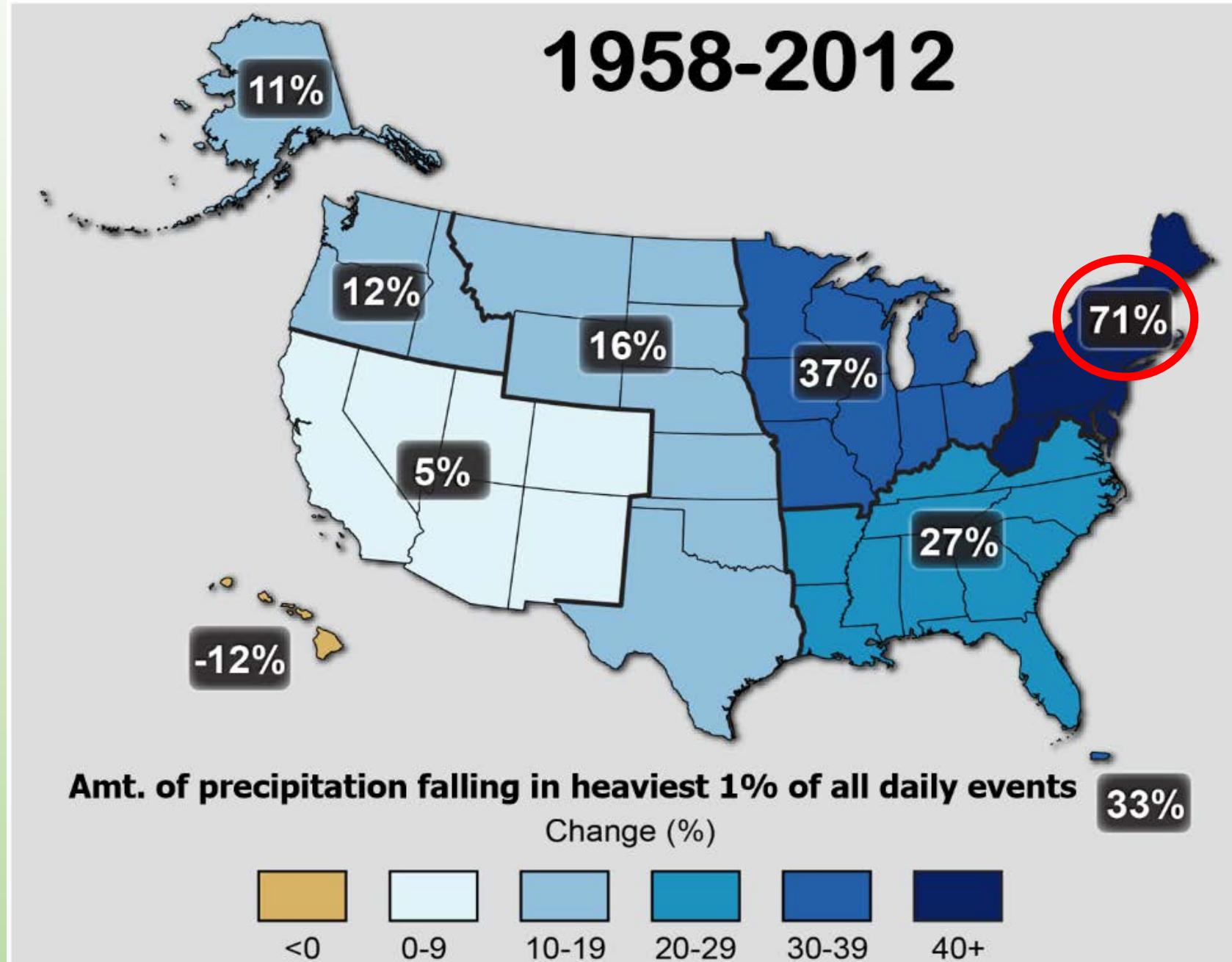
An aerial photograph of a river system. The river is highlighted with a thick red line, showing its meandering path through a landscape. The surrounding terrain is shown in shades of brown and tan, with some darker areas that might be forests or wetlands. The red line follows the main channel and some of the smaller tributaries, indicating areas of erosion or high risk.

Outline

1. VT context
2. Mapping
 - Inadequacy of FEMA/NFIP maps
 - River Corridors – Erosion Hazards
3. Package of tools
 - Model regulations
 - State authorities
 - Online Resources/tools
 - Incentives

Observed Change in Very Heavy Precipitation

1958-2012



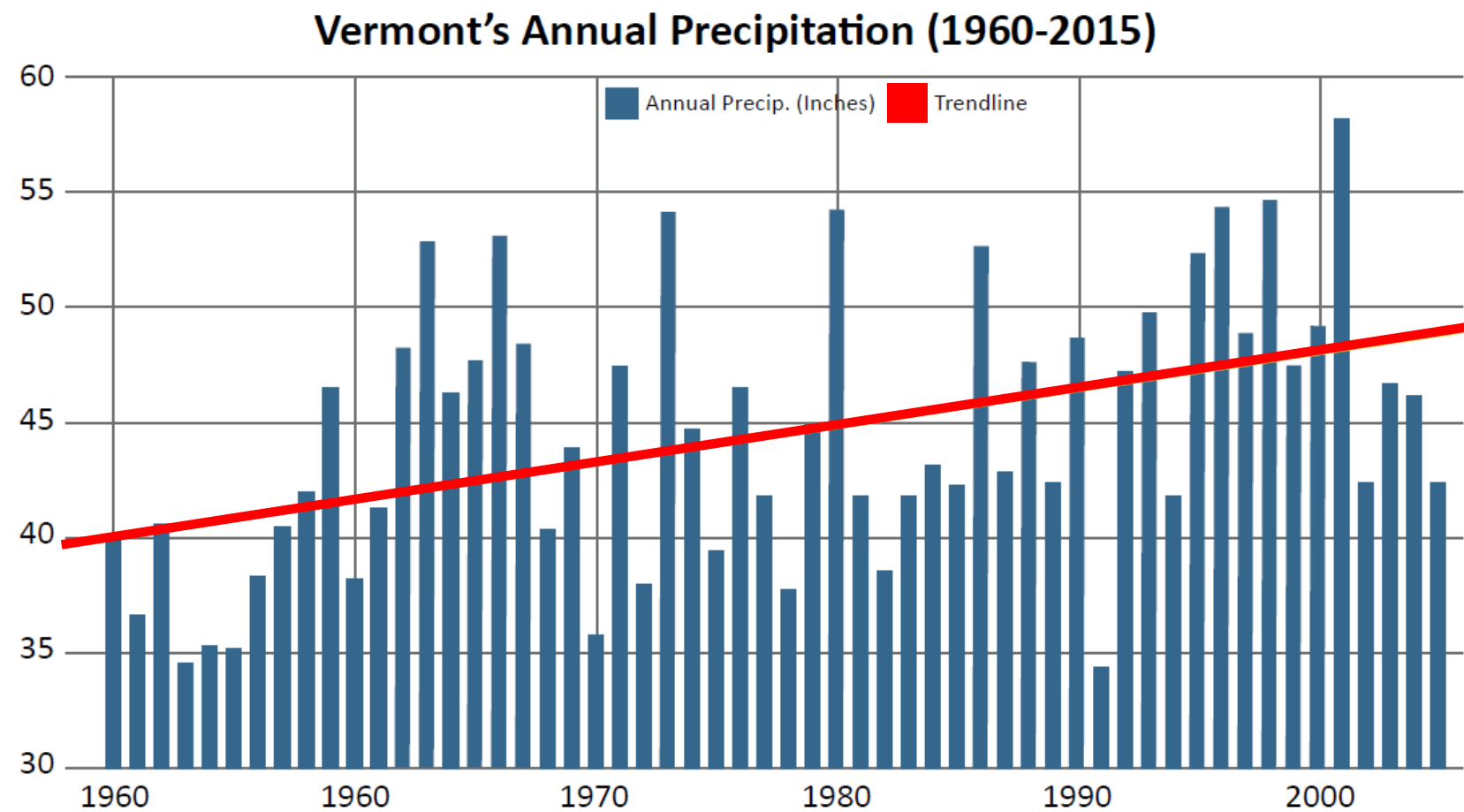
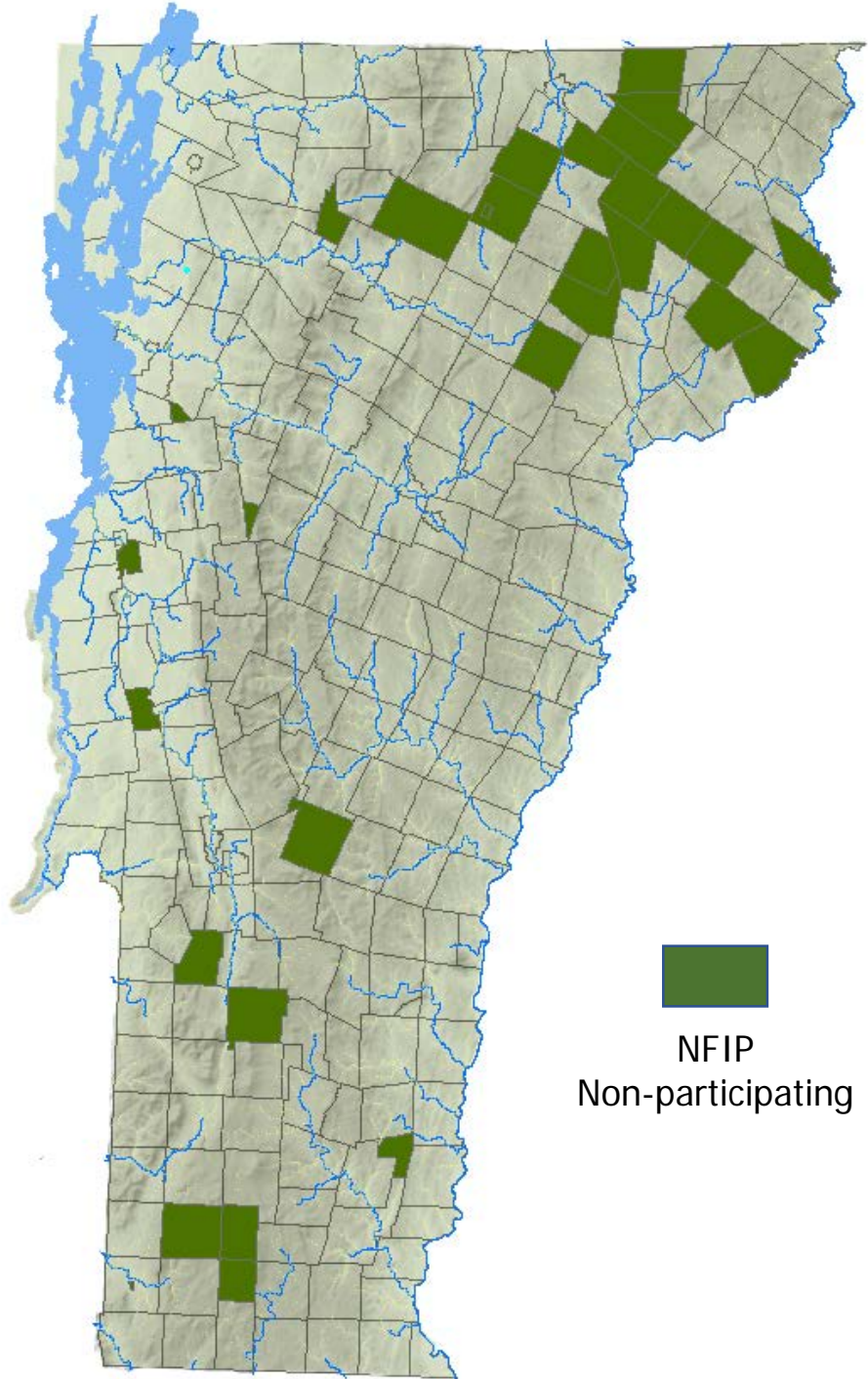


Figure 36: Vermont's annual precipitation (1960-2015)
Source: climatechange.vermont.gov

Mountainous Landscape

Runoff is delivered to the
drainage network *quickly*





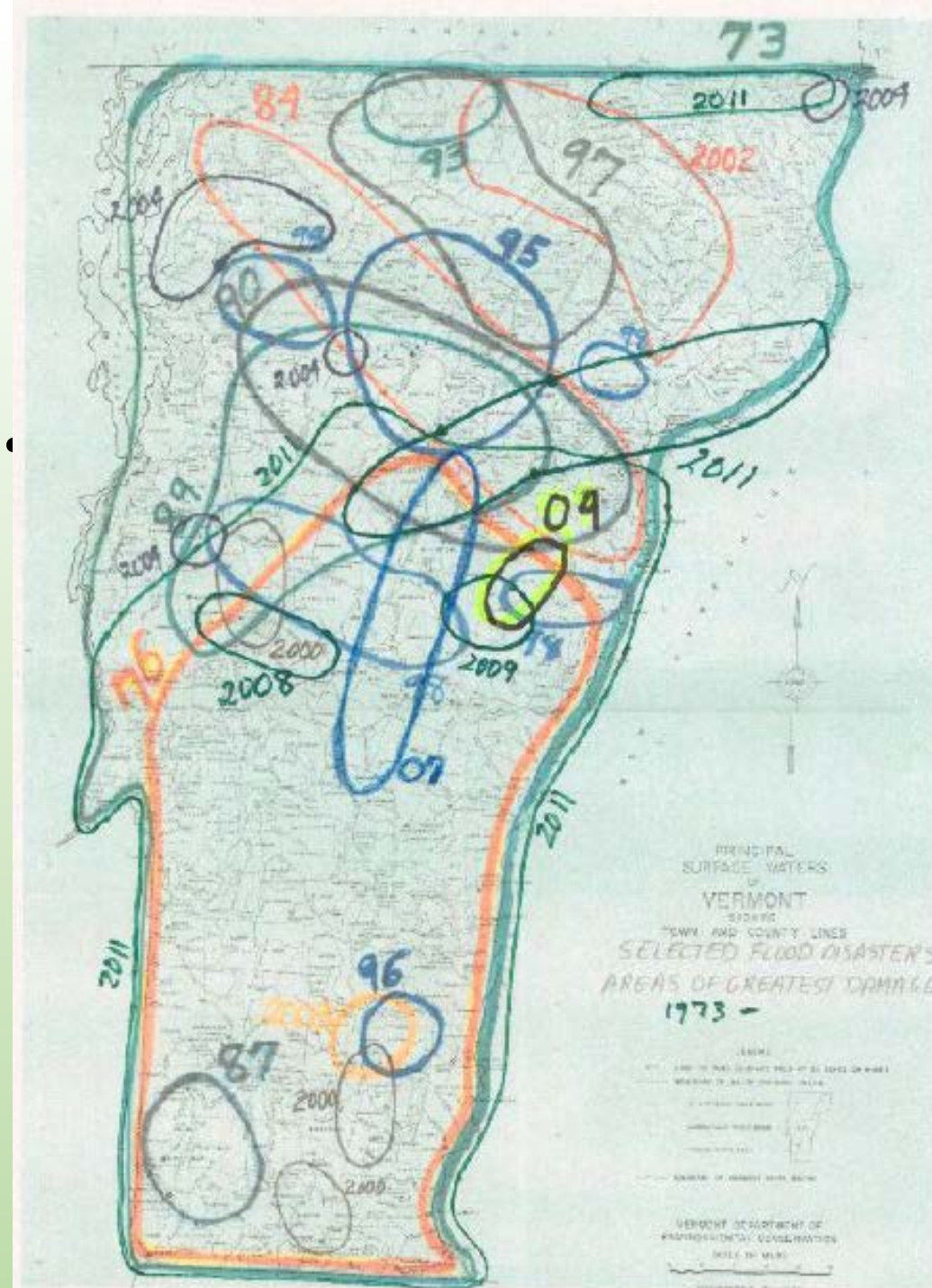
**249 communities enrolled
in NFIP (90%)**

**Most are rural towns and
villages**

**No county government
structure**

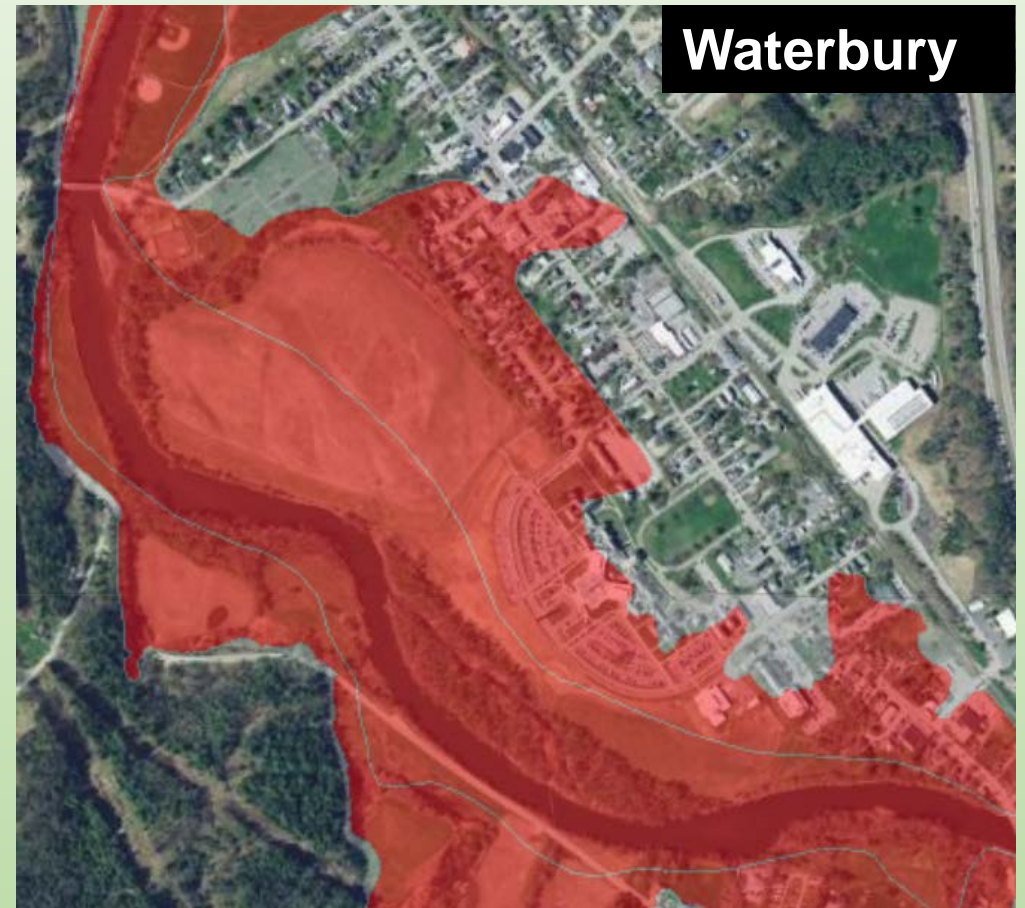
A Federal Flood Declaration Every Year...

29 since 1990

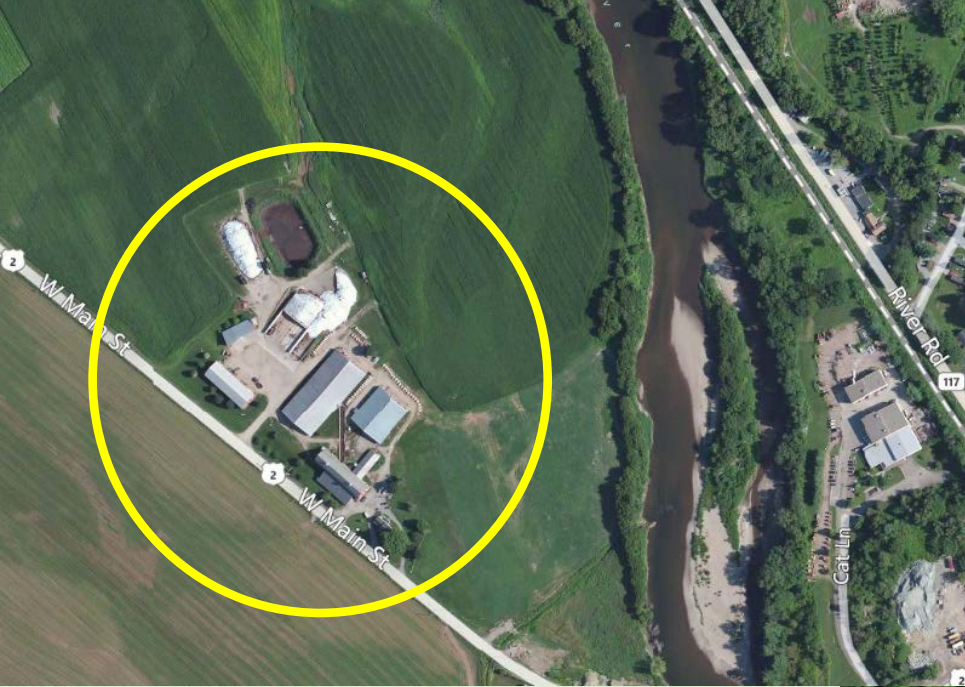


Flood Hazard Areas: Inundation

Waterbury, 2011

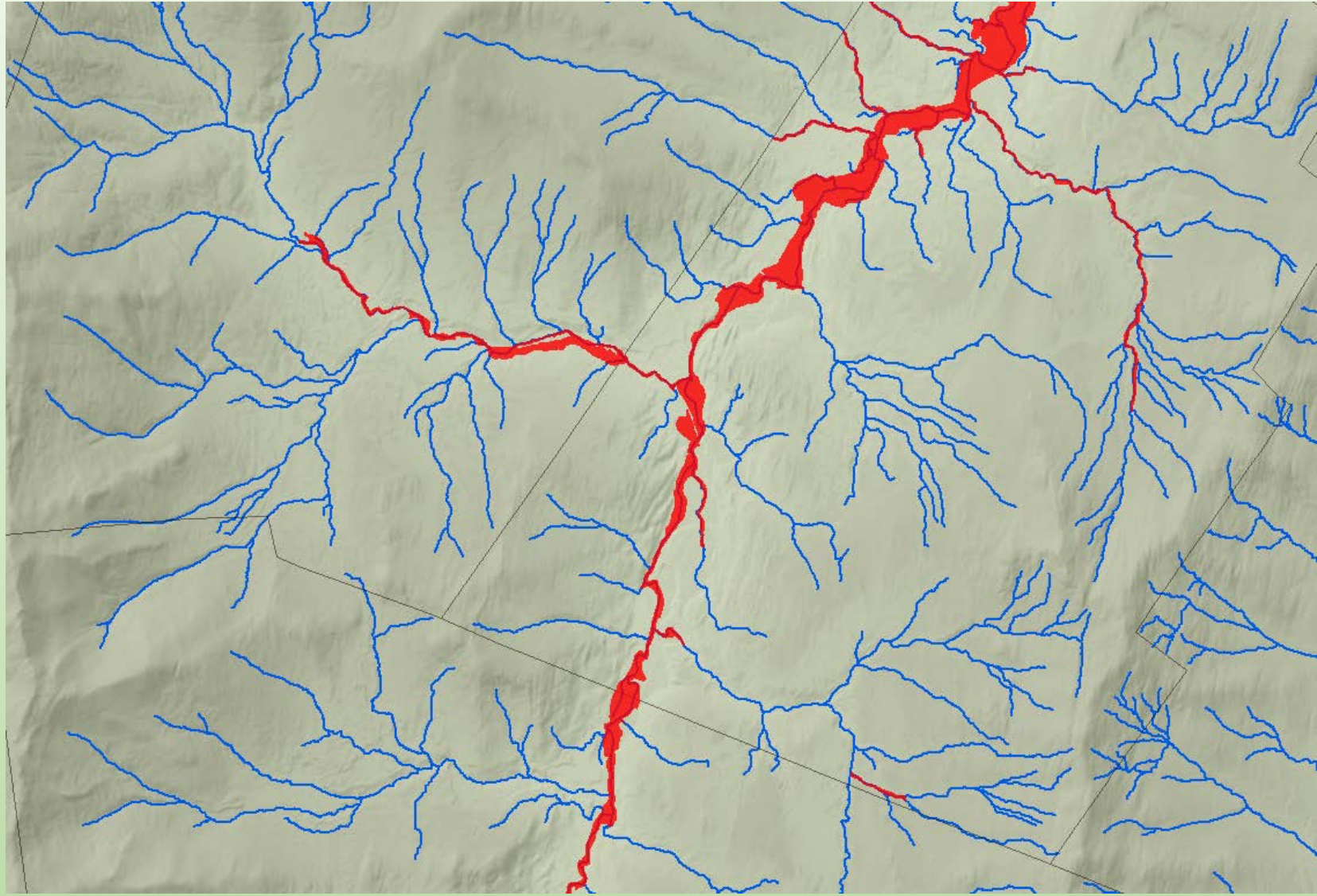






NFIP Inundation Maps are not enough....

80% of stream miles not mapped



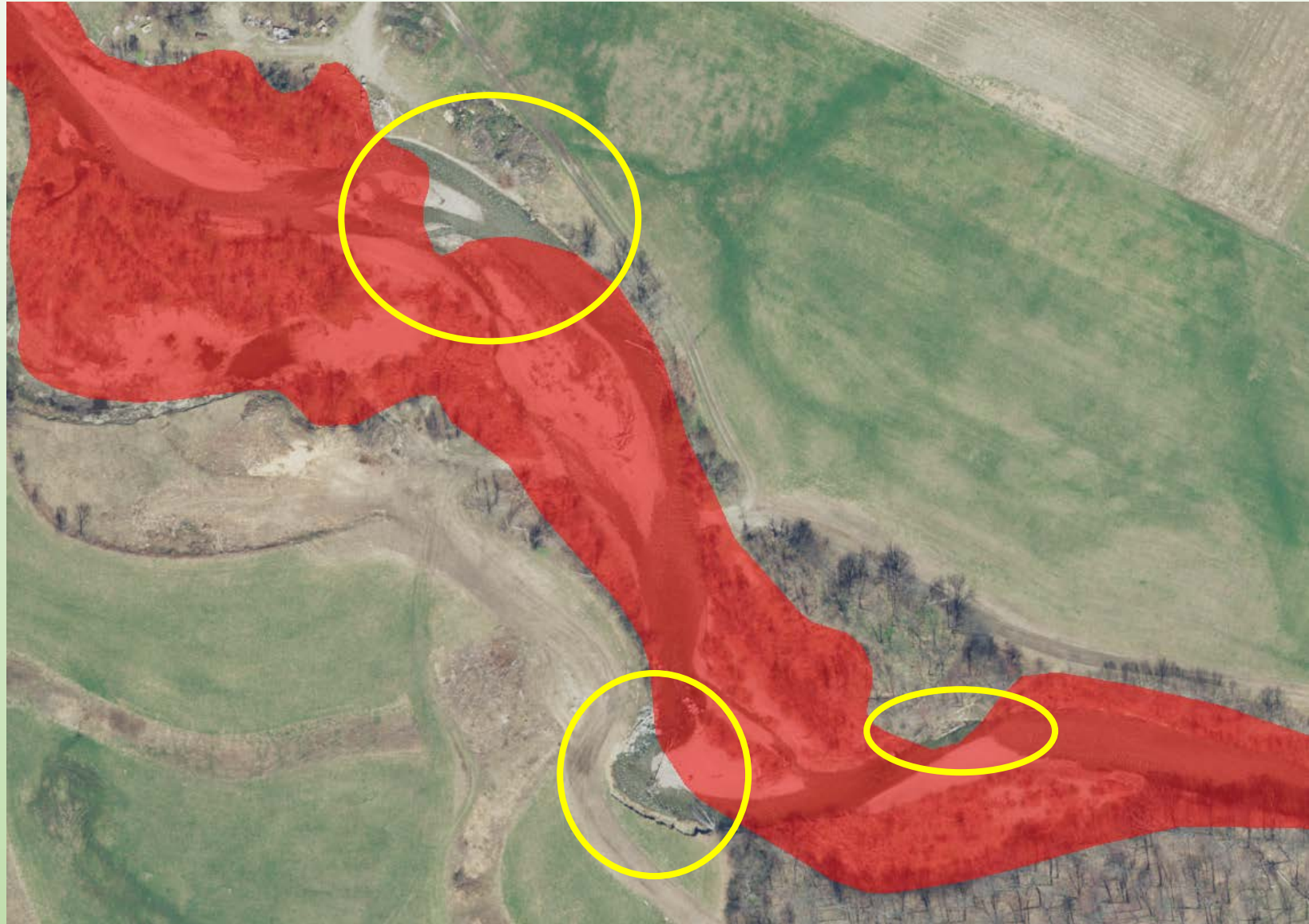
NFIP Inundation Maps are not enough....

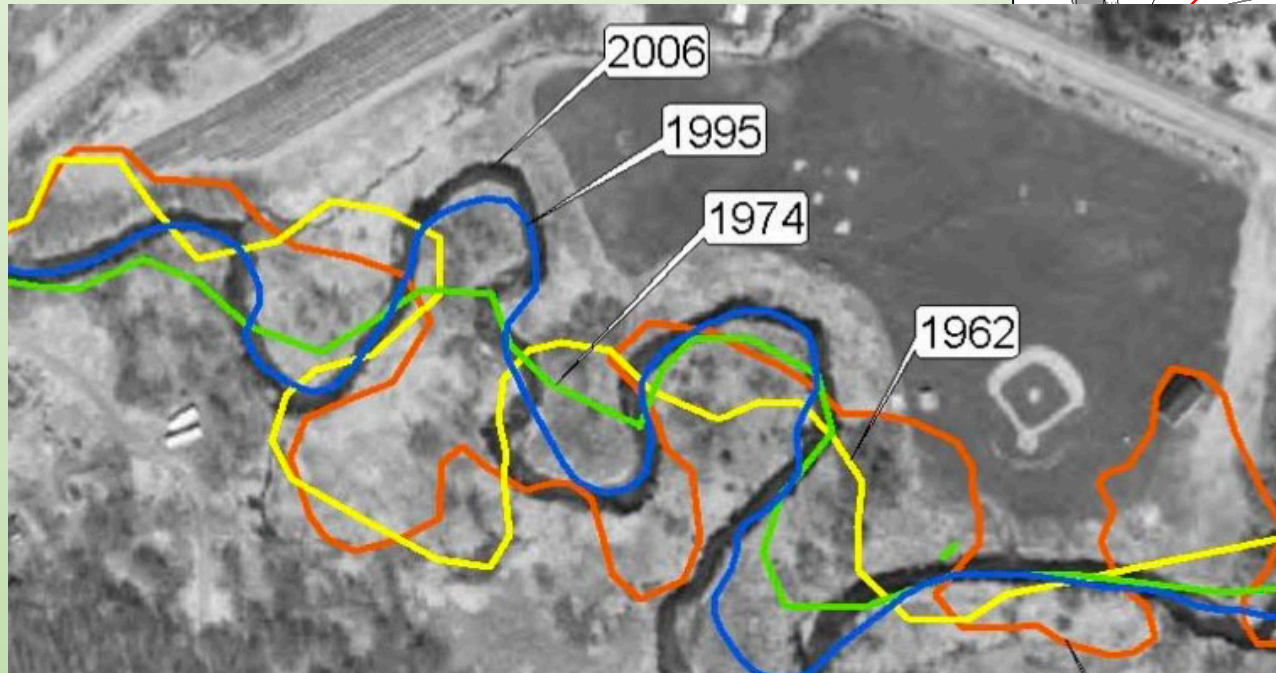
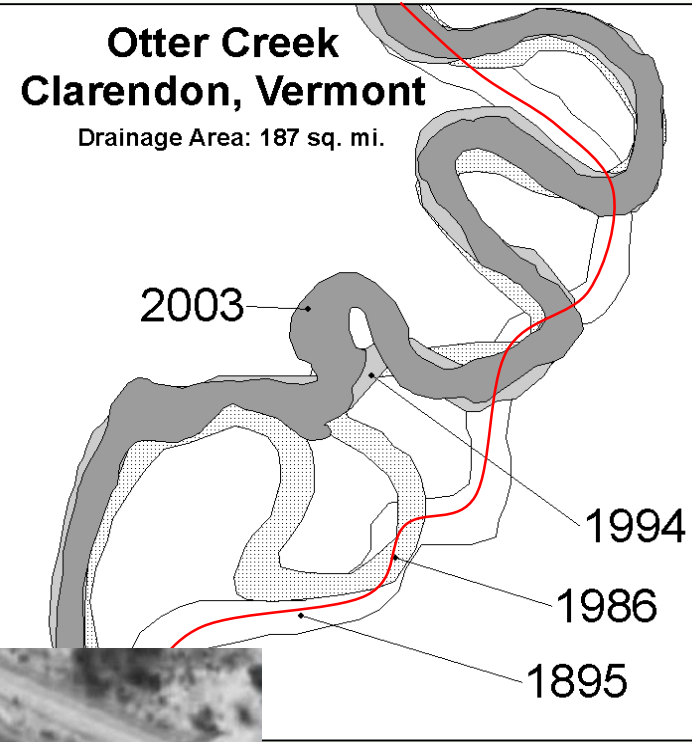
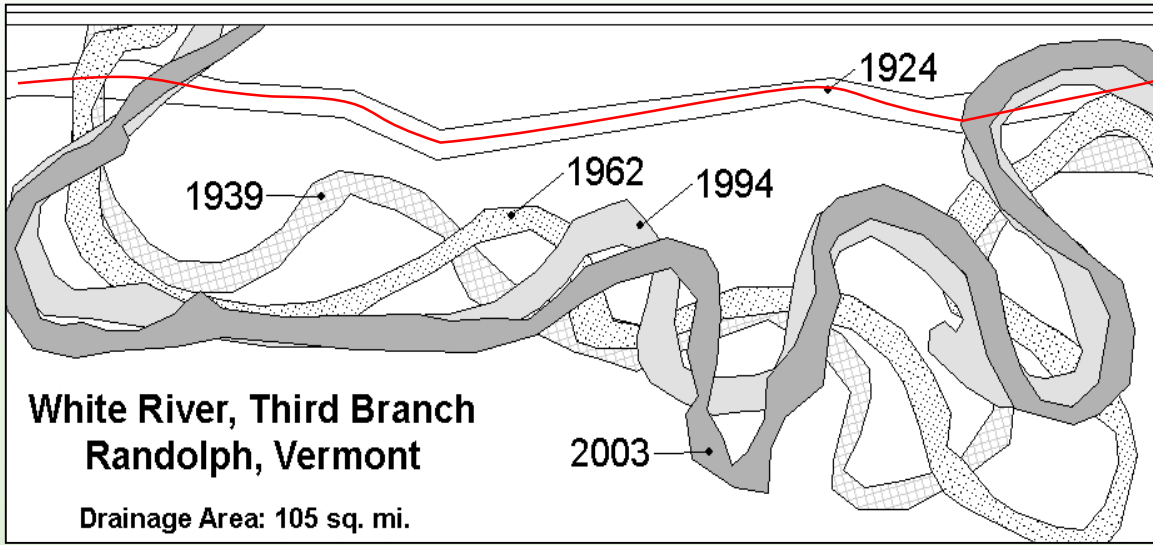
Do not show risk
on incised
reaches of river



NFIP Inundation Maps are not enough....

River processes
outpace
updates to
static
inundation
maps





Lewis Creek, Starksboro

Rochester, VT 2011

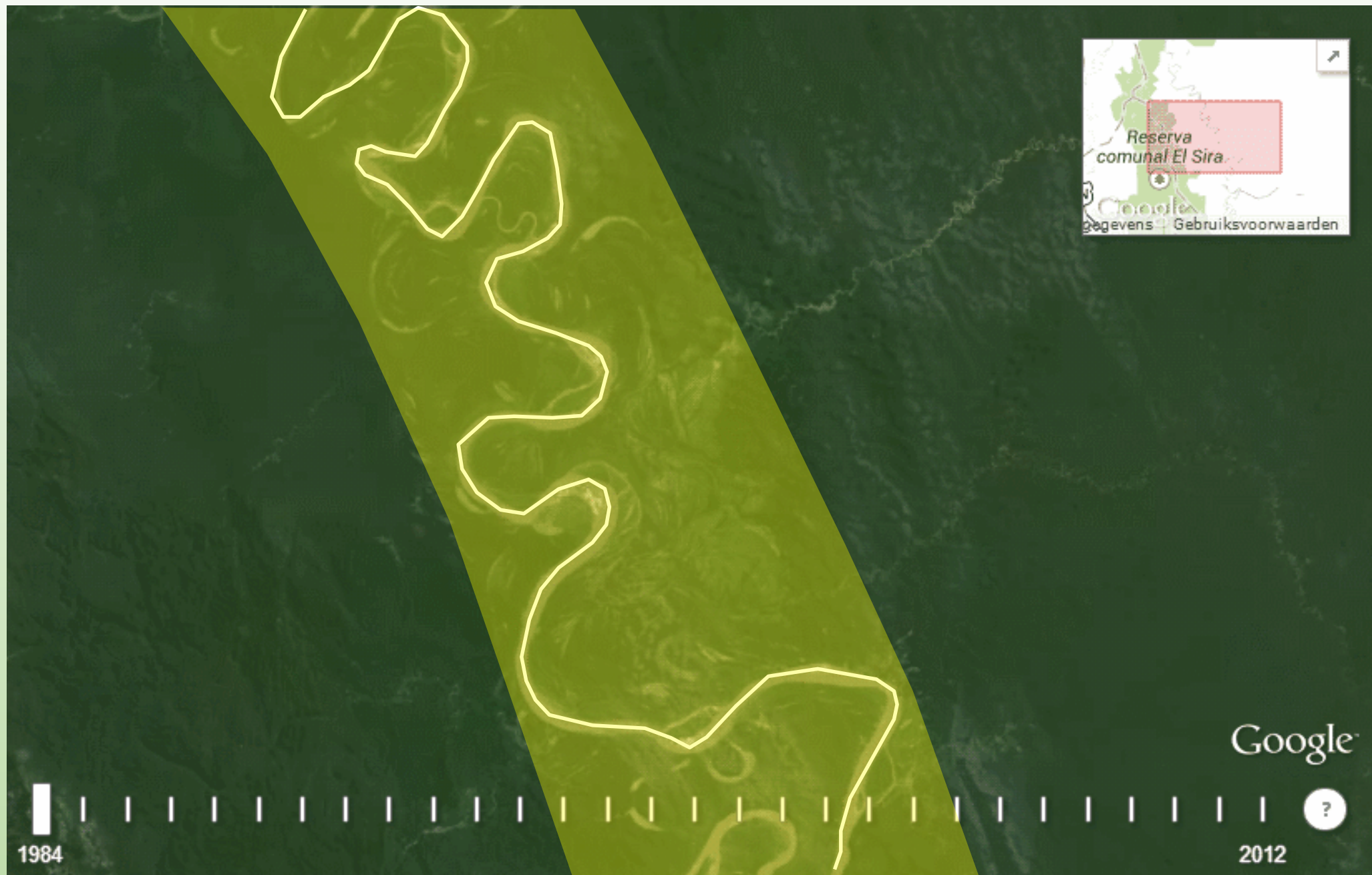


Chester, VT, 2011
Photo:Lars Gange Mansfield Heliflight

"Nature Bats Last."

Bob Irwin, President, American Rivers





River Corridor

The lateral area around the river necessary to achieve and maintain a stable (least erosive) condition

A way to factor the dynamic nature of rivers into planning and regulation



How to Map River Corridors

Vermont Stream Geomorphic Assessment
Phase 2 Handbook

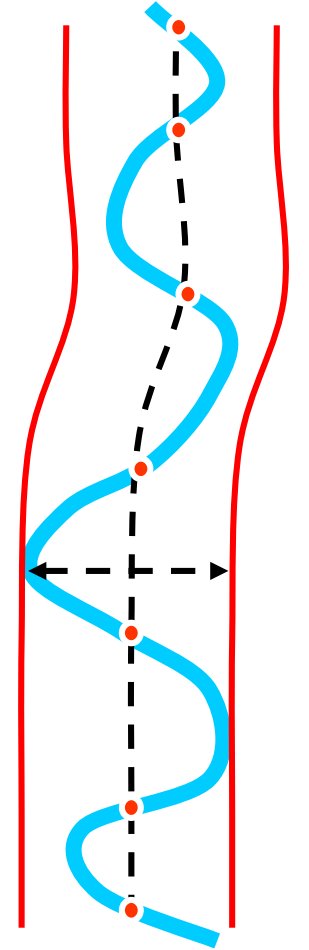
RAPID STREAM ASSESSMENT



FIELD PROTOCOLS

Vermont Agency of Natural Resources
April, 2003

Sensitivity	Belt Widths
Very Low (VL)	Reference channel width
Low (LW)	Reference channel width
Moderate (MD)	4 channel widths
High (HI)	6 channel widths
Very High (VH)	6 channel widths 8+ channel widths – E streams
Extreme (EX)	6 channel widths 8+ channel widths – D&E streams



Statewide River Corridor Map Layer



River Corridors as part of a No Adverse Impact Regulatory framework

Flood Hazard Area –
Inundation

River Corridor –
Erosion



River Corridors as part of a No Adverse Impact Regulatory framework

Municipal land use permitting
(NFIP)

State Model Regulations for
River Corridors



River Corridors as part of a No Adverse Impact Regulatory framework

1. State Land Use Permit (Act 250)
2. State Floodplain Rule (new 2015)



No Adverse Impact Standards

State regulations, model municipal bylaws:

1. Freeboard of 2 feet
2. Compensatory storage standard flood fringe
3. No increase in velocity in the floodway
4. Prohibit new critical facilities
5. regulate river corridors (manage for flood related erosion)





Home

Rising Danger - Flood Costs

Community Risk Assessment

River Corridors

Update Your Plans

Use Natural Flood Protection

Improve Infrastructure

Find Funding

Making It Happen

Get Help

Keep what works





Home

Rising Danger - Flood Costs

Community Risk Assessment

Community Reports

Map Tools

Vermont Flood Ready Atlas

River Corridors

Update Your Plans

Use Natural Flood Protection

Improve Infrastructure

FLOOD READY



342	Buildings in the Special Flood Hazard Area (SFHA) (estimated from e911 sites).
137	Flood Insurance Policies in SFHA (Zone A, AE, AO, A 1- 30)
40%	Percent of buildings in the SFHA with flood insurance in force.
8	Critical or public structures in SFHA or 0.2% flood hazard area (est. from e911 sites.)
11%	Percent of buildings in the SFHA.



FLOOD READY VERMONT

Home

Rising Danger - Flood Costs

Community Risk Assessment

River Corridors

Update Your Plans

Municipal Plan

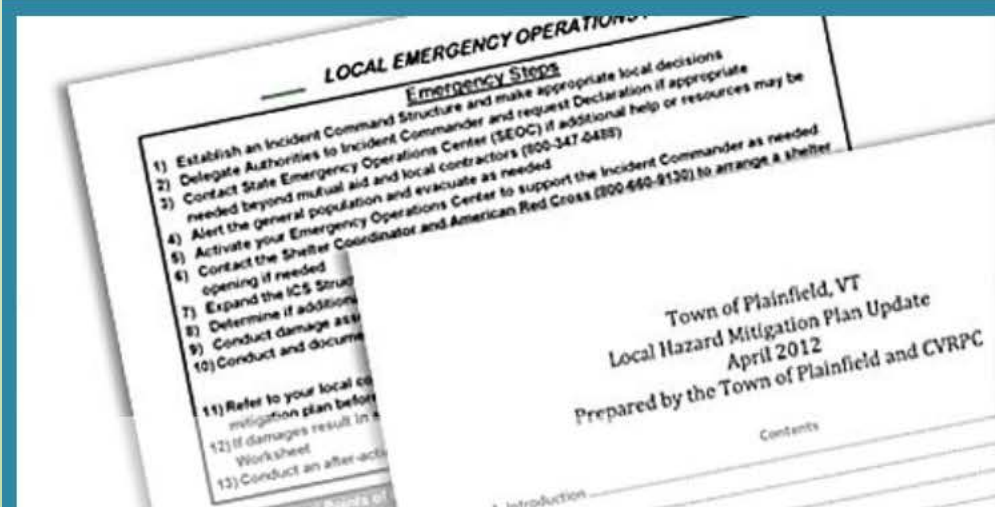
Local Hazard Mitigation Plan

Local Emergency Operations Plan

Find Example Plans

Use Natural Flood Protection

Improve Infrastructure





FLOOD READY VERMONT

Home

Rising Danger - Flood Costs

Community Risk Assessment

River Corridors

Update Your Plans

Use Natural Flood Protection

Improve Infrastructure

Roads and Culverts

Adapt Buildings and Infrastructure

Find Funding



Flood

- Videos,



SEARCH

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STATE OF VERMONT
Flood Training

SEARCH

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Basic Concepts

Case Studies

- Building a Resilient Community in Jeffersonville
- Guilford Adopts River Corridor Protection
- Mapping Montgomery

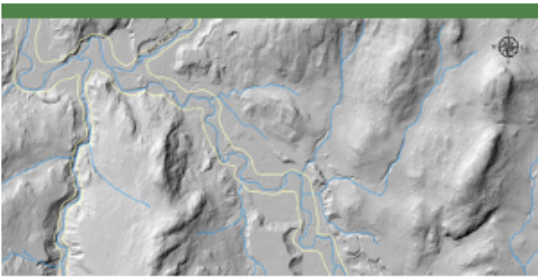
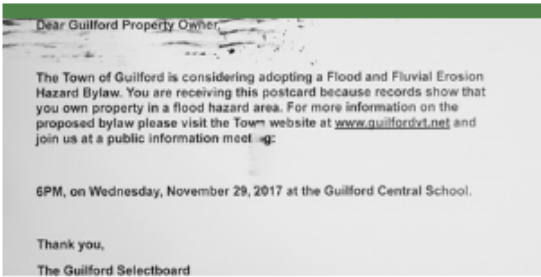
Protection Tools

Conclusion

Contact Us

VERMONT TOWNS ARE BUILDING FLOOD RESILIENCE

Meet people around Vermont who are taking action in their communities to decrease flood risk and increase flood resilience. Each community has a history of flooding, from the Great Flood of 1927 to Tropical Storm Irene. Building on the concepts of [River Corridors](#) and [no adverse impact](#), these communities are using planning and other tools to protect existing infrastructure, keep community members safe, and ensure future development happens in the right places.



Building a Resilient Community

VISIT JEFFERSONVILLE

River Corridor Protection

VISIT GUILFORD

Mapping the Past and Future

VISIT MONTGOMERY

Incentives



Communities that have adopted standards consistent with our model regulations get priority for funding

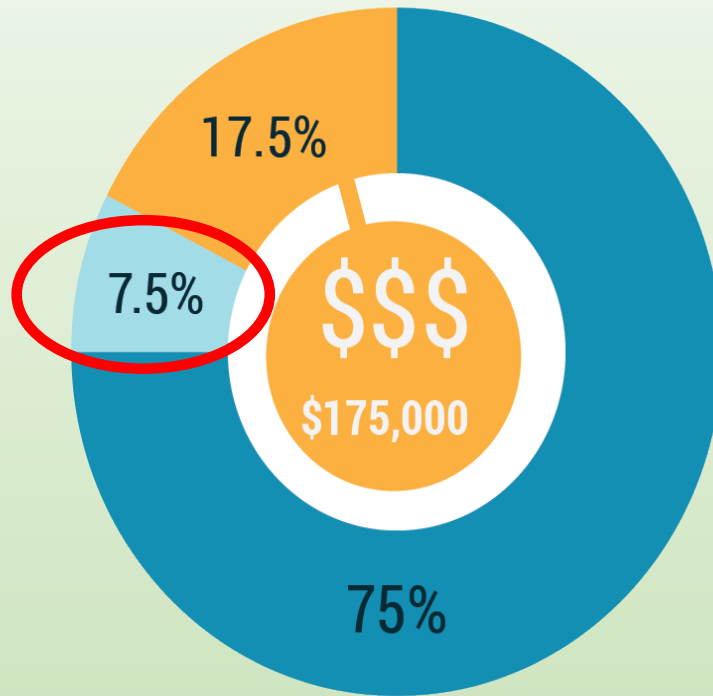
Emergency Relief & Assistance Fund (ERAF)

- State cost share on FEMA Public Assistance Grants
- Split non-federal match requirement with communities (12.5%)
- ERAF Rule amendment created a sliding scale - effective in 2014



Emergency Relief and Assistance Fund (ERAF) Rates

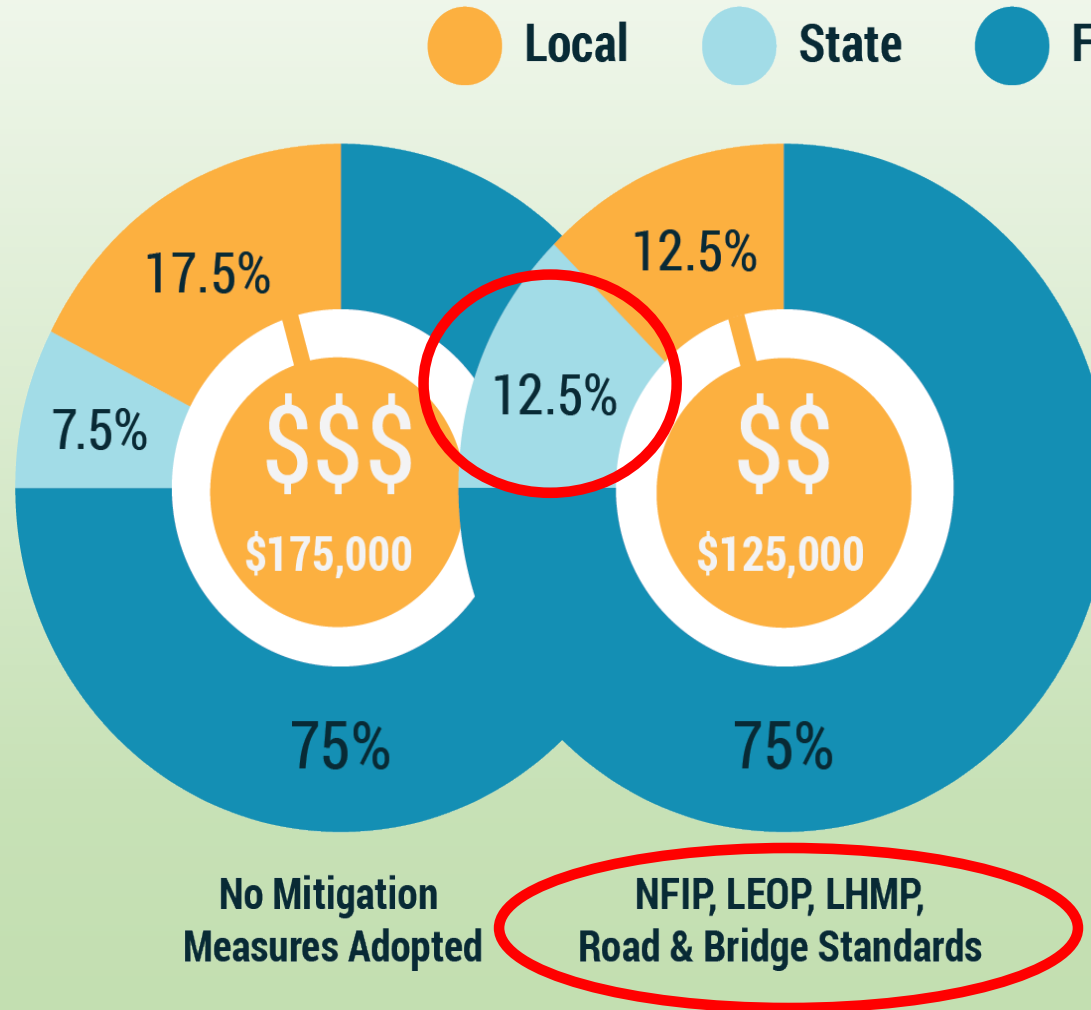
Local State Federal



No Mitigation
Measures Adopted

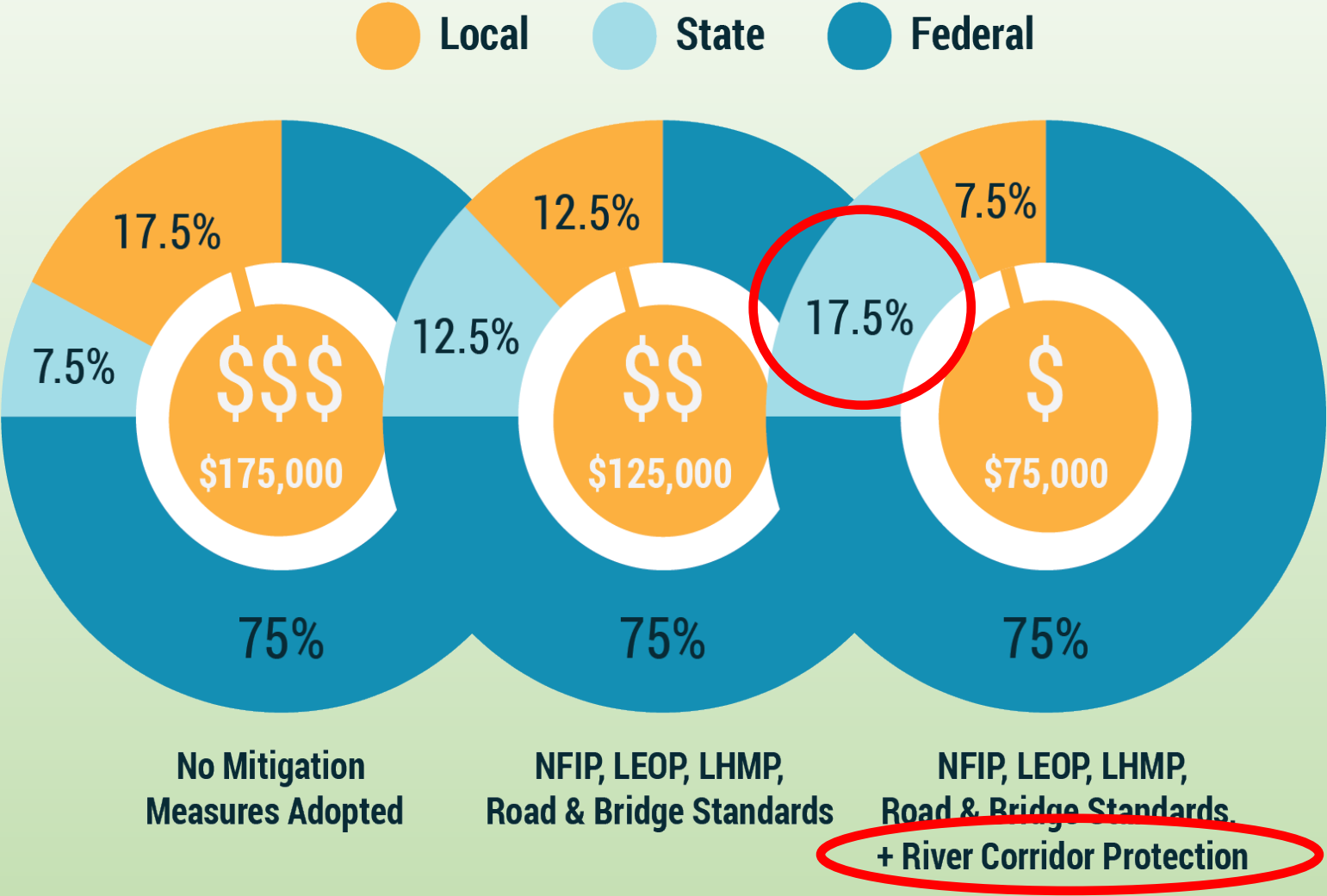
In the event of a \$1,000,000 recovery project, the dollar value shown would be the town's responsibility.

Emergency Relief and Assistance Fund (ERAF) Rates



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An aerial photograph of Vermont, showing its characteristic mountainous terrain and winding rivers. The entire image is overlaid with a semi-transparent green filter.

Thank You!

Questions?

Email or Call me if you want more info:

rob.evans@vermont.gov

802-490-6152