



# Rural Resilience in a Changing Climate

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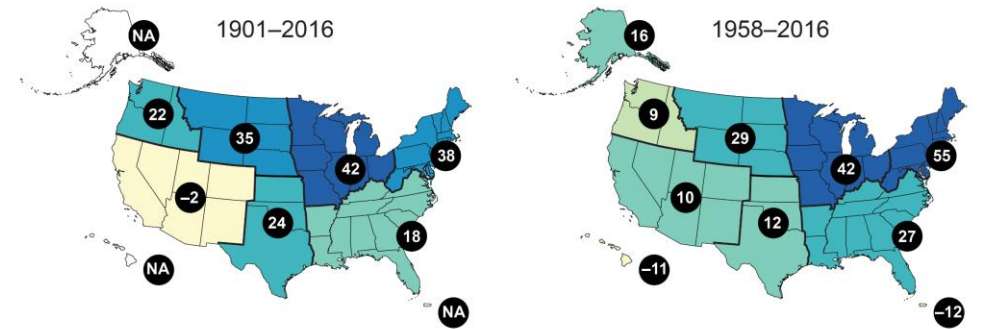
October 31, 2019



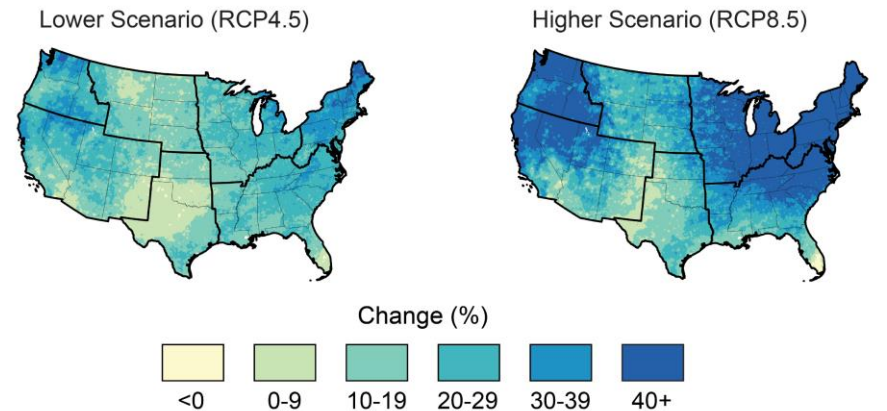
# Increased Frequency of Severe Storms



Observed Change in Total Annual Precipitation  
Falling in the Heaviest 1% of Events



Projected Change in Total Annual Precipitation  
Falling in the Heaviest 1% of Events by Late 21st Century



# Vermont Following Climate Trends

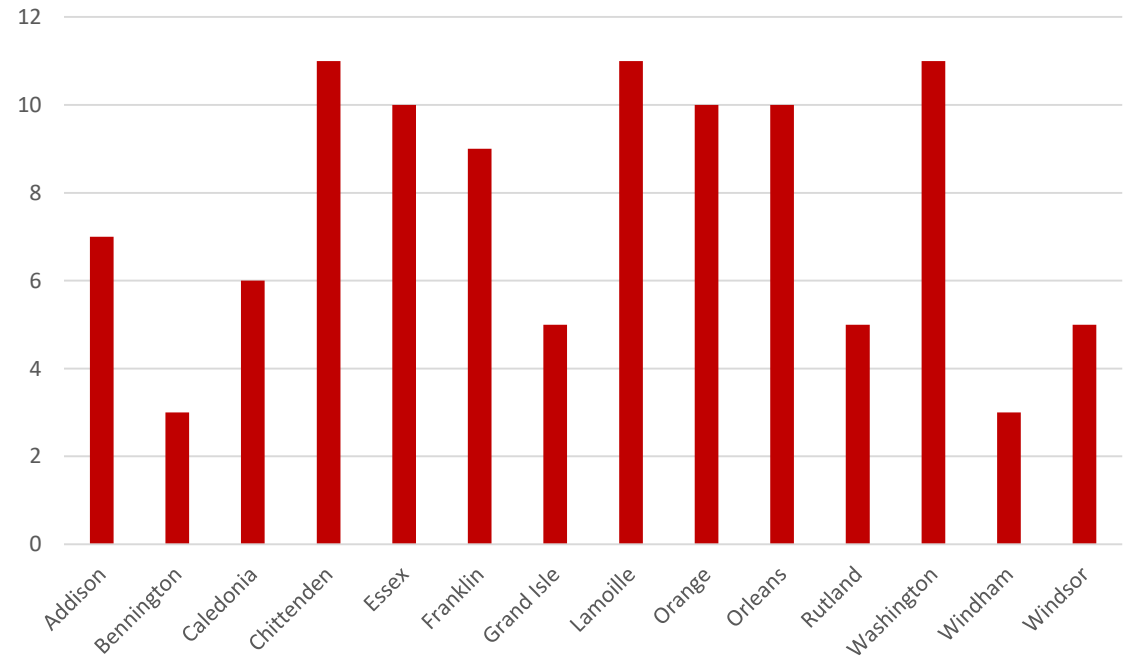
Disasters from 2010-2019: **17\***

Disasters from 2000-2009: 6

*\*1 pending disaster declaration request from 10/31/19 event*



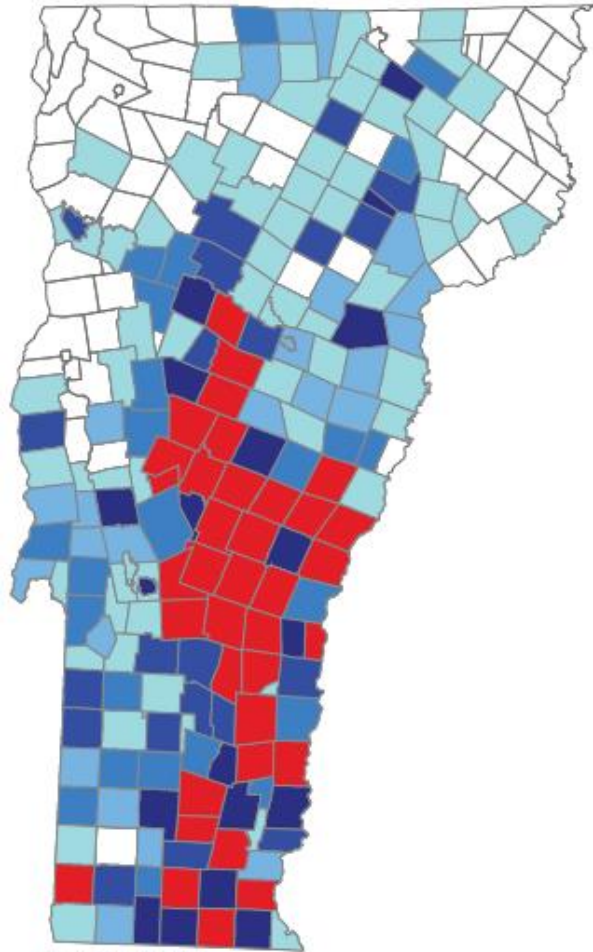
# of Disasters (2010-2019)



Source: fema.gov

# Financial Impact of Climate Change

DR-4022: Tropical Storm Irene, September 2011



Total: \$210,461,000

≤ \$50,000

\$50,001 - \$100,000

\$100,001 - \$250,000

\$250,001 - \$500,000

\$500,001 - \$1,000,000

≥ \$1,000,001

## Financial Impact of Disasters (2010-2019)\*

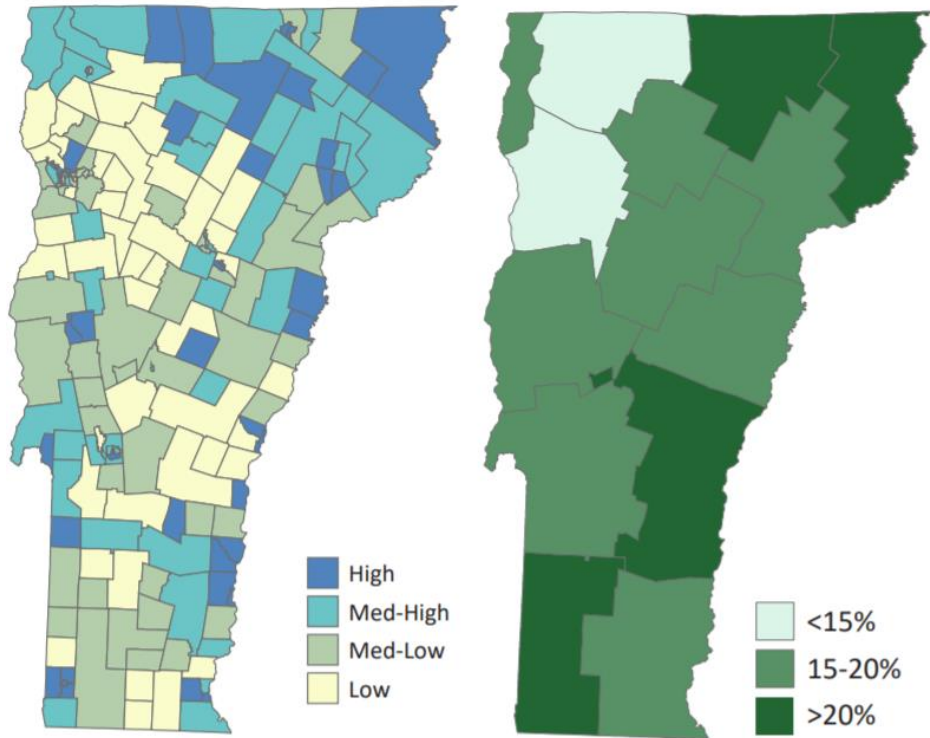
Total Federal Value	<b>\$288,374,173</b>
Total State/Local Value	<b>\$40,809,355</b>
Average per disaster	<b>\$19,363,737</b>
Average per disaster (w/o Irene)	<b>\$7,538,893</b>

*\*numbers only represent damage to public infrastructure (i.e. do not include private property damages)*

# Vermont's Most Vulnerable are Disproportionately Affected

**Social Vulnerability**

**Vermonters 65+ yrs**








Source: 2018 VT State Hazard Mitigation Plan



12% of Mobile Homes in Parks located in floodplains  
vs.  
4% of Single Family Homes located in floodplains

# Investing in Our Resilience

National Benefit-Cost Ratio (BCR) Per Peril <i>*BCR numbers in this study have been rounded</i>		Beyond Code Requirements	Federally Funded
<b>Overall Hazard Benefit-Cost Ratio</b>		<b>\$4:1</b>	<b>\$6:1</b>
	<b>Riverine Flood</b>	<b>\$5:1</b>	<b>\$7:1</b>
	<b>Hurricane Surge</b>	<b>\$7:1</b>	Too few grants
	<b>Wind</b>	<b>\$5:1</b>	<b>\$5:1</b>
	<b>Earthquake</b>	<b>\$4:1</b>	<b>\$3:1</b>
	<b>Wildland-Urban Interface Fire</b>	<b>\$4:1</b>	<b>\$3:1</b>

## Projects/Initiatives:

- Floodplain restoration
- Wetland restoration
- Buyouts of flood-damaged/vulnerable homes
- Culvert upsizing
- Road relocation

## Outcomes:

- Improved public safety
- Decreased long-term financial burden
- Improved natural systems
- More resilient communities

Source: fema.gov

# Climate Mitigation & Adaptation Co-Benefits: An Opportunity for VT

## Otter Creek Wetland/Floodplain Restoration

- Acts as a natural barrier
- \$1.8m in avoided damages during TS Irene\*
- \$126,000-\$450,000 annual savings\*
- Co-benefits:
  - Flood reduction
  - Water quality improvement
  - Carbon sequestration/storage
  - Critical species habitat

*\*Source: 2016 Gund Institute & Rubenstein School study*





**Chris Company, Exec. Director  
Windham Regional Commission**



# Tasha Wallis, Exec. Director Lamoille County Planning Commission

