

# Using the Municipal Climate Change Vulnerability Indicators Tool

ANR Municipal Day  
November 1, 2024

# Agenda

- Overview
- Tool walk-through
- Use cases
  - Town Planning (General)
  - Local Hazard Mitigation Plan
  - Flood Recovery Community Conversations
  - Heat Vulnerability – Washington County

# The Municipal Vulnerability Indicators Tool (MVI) is...

- a **mapping tool** to help municipalities understand their vulnerabilities to climate change across several social, economic, and environmental factors.
- a **conversation resource** to inform towns' hazard mitigation plans, local energy plans, municipal plans, or other municipal documents.
- a set of **climate hazard data** that includes both historic data, and climate projections, where possible.

## Map Layers

- > Built & Physical Environment Domain
- > Community Domain
- > Social Domain
- > Economic & Job Domain
- > Infrastructure Domain
- > Natural Environment Domain
- > Other Vermont Hazard Vulnerability Projects
- ▼ Boundaries
  - Town Boundaries
  - County Boundaries
  - State Boundary
  - Regional Planning Commissions Boundaries
  - Distribution Utility Service Territory Boundaries
- > Hazards

### Map Layers

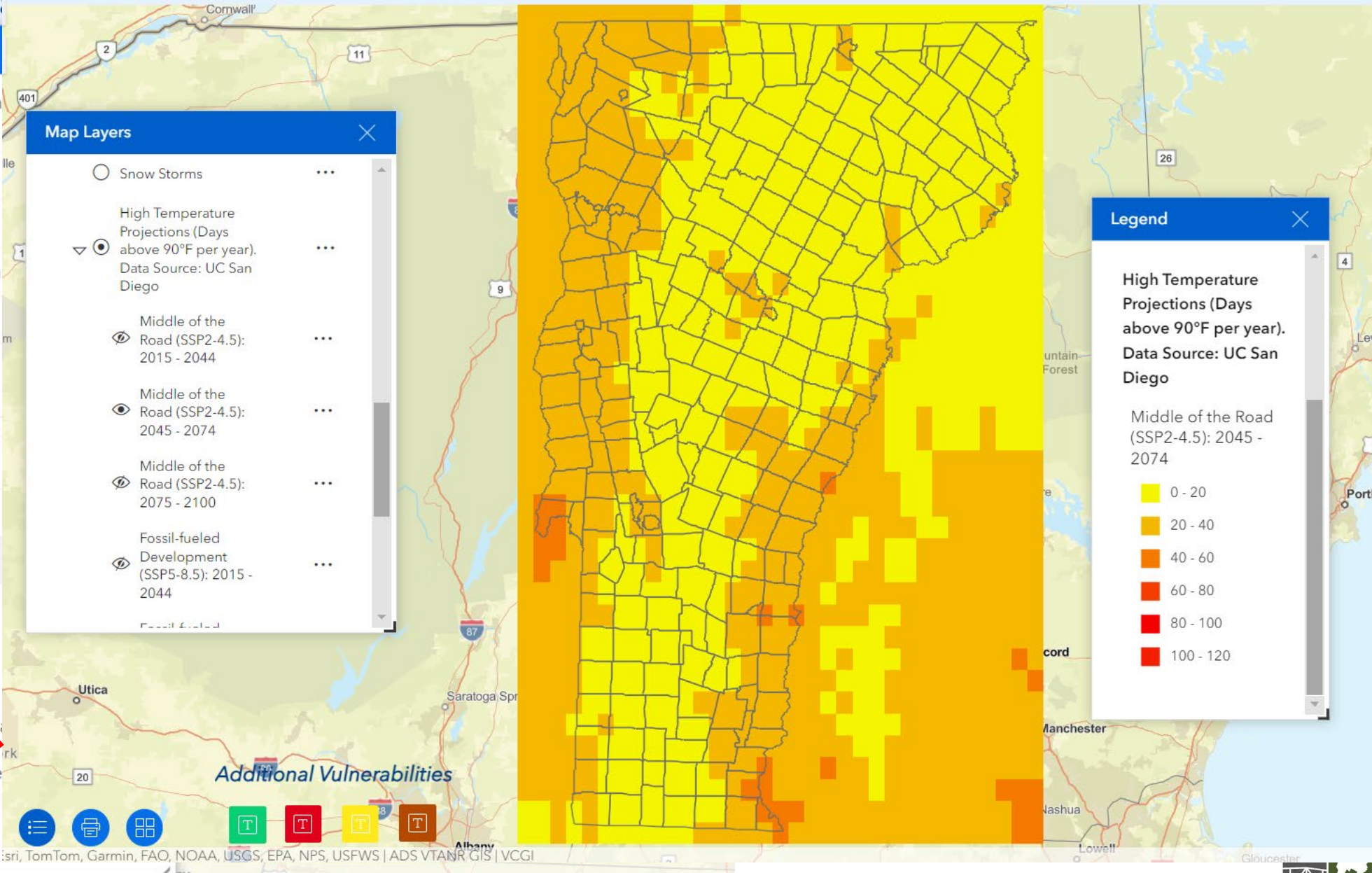
- Snow Storms
- High Temperature Projections (Days above 90°F per year). Data Source: UC San Diego
- Middle of the Road (SSP2-4.5): 2015 - 2044
- Middle of the Road (SSP2-4.5): 2045 - 2074
- Middle of the Road (SSP2-4.5): 2075 - 2100
- Fossil-fueled Development (SSP5-8.5): 2015 - 2044
- Fossil-fueled Development (SSP5-8.5): 2045 - 2074

### Legend

High Temperature Projections (Days above 90°F per year). Data Source: UC San Diego

Middle of the Road (SSP2-4.5): 2045 - 2074

- 0 - 20
- 20 - 40
- 40 - 60
- 60 - 80
- 80 - 100
- 100 - 120



# Climate Vulnerability Domains and Factors

## Social

- Population
- Income
- Elderly residents
- Children
- People with disabilities
- Single parent households
- Linguistic isolation
- No vehicle
- No internet
- Rentership
- Adult Asthma
- Race and Ethnicity
- Energy and transportation burden
- Hosing cost burden
- Access to healthy foods

## Community

- Municipal staff capacity
- Emergency Relief and Assistance Fund (ERAF) rates
- Designated areas
- Plan and regulation status
- Historic districts

## Economic and Jobs

- Outdoor worker
- Agriculture
- Tourism Industry

## Built and Physical Environment

- Emergency services
- Mobile homes
- Other household types
- Other site types
- Housing age
- Critical assets

## Infrastructure

- Roads, bridges, and culverts
- Airports
- Public transit
- Power lines
- Drinking water infrastructure
- Wastewater infrastructure
- Electric substations
- Power plants
- Impervious surfaces

## Natural Environment

- Municipal tree inventory
- Toxic or contaminated sites
- Conserved and protected lands
- Community and species-scale priorities
- Landscape-scale priorities

## Hazards

- Drought
- Extreme precipitation
- Fluvial Erosion-river corridors
- Hail
- Ice storms
- Invasive species
- Inundation flooding (FEMA)
- Inundation flooding (Lake Champlain)
- Landslides
- Snow storms
- High temperatures
- Low temperatures
- Wildlife
- Wind

# Training Materials

[www.climatechange.vermont.gov/mvi](http://www.climatechange.vermont.gov/mvi)

Launch the MVI Tool

MVI Introduction Video – February 20, 2024

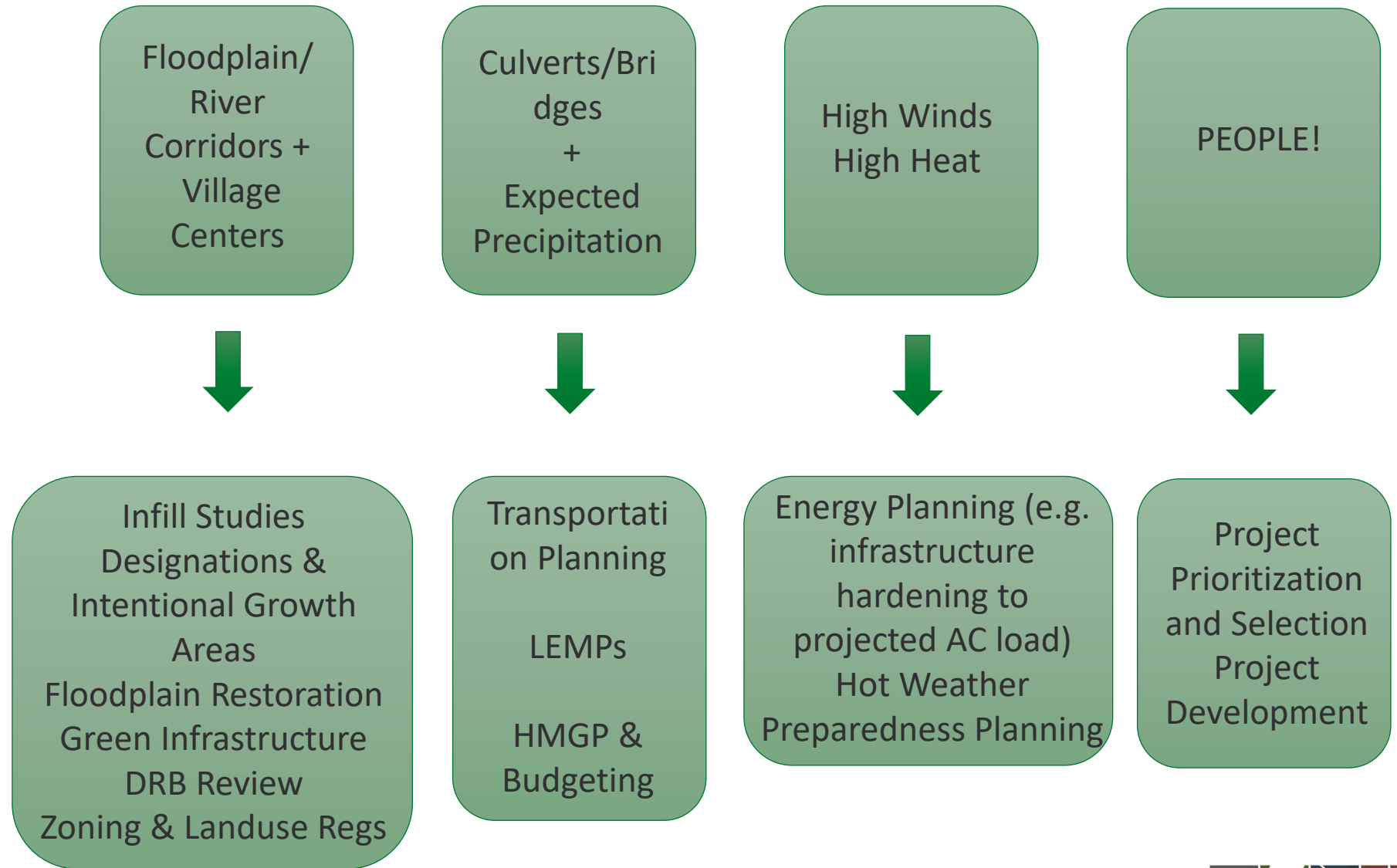
MVI User Guide

# Use Cases

- Town Planning (general)
- Local Hazard Mitigation Plan
- Flood Recovery Community Conversations
- Heat Vulnerability – Washington County



# Town Planning (General)





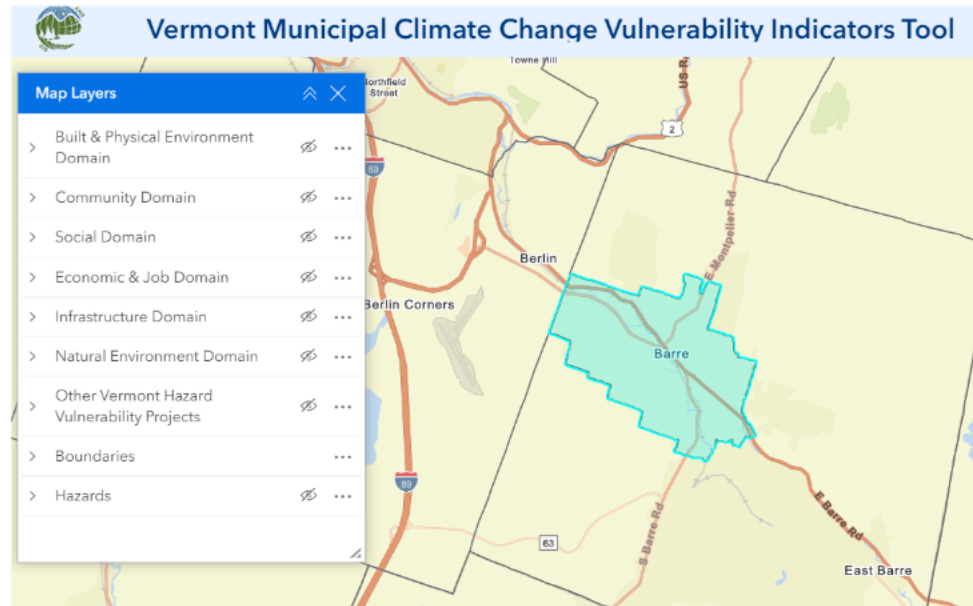
Grant Programs:  
eligibility and project  
development

Local Projects and  
Planning:  
- project prioritization

- project impacts  
(distribution of benefits  
& burdens)

-community outreach &  
engagement

- intersectional  
planning: health equity,  
transportation access,  
housing, +



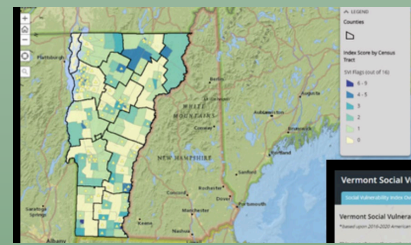
[MVI Tool \(2024\)](#)  
Washington County  
City Population: 8,590

**Flagged Factors that Contribute to Climate Vulnerability:**

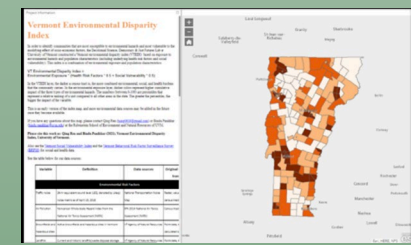
- Low Income Residents: 44%
- Elderly Residents: 13%
- People with Disabilities: 24%
- No Vehicle Access: 24%
- No internet access: 17%
- Transportation & Energy Burden: 12%
- African American: 1.7%
- Multiracial Residents: 3.9%
- Housing Built Prior to 2000: 92%
- Rentership Cost Burden: 22%

These factors are higher than the state average.

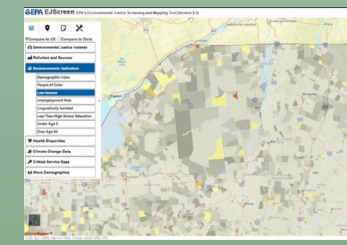
**Next Steps: Data & Resources**



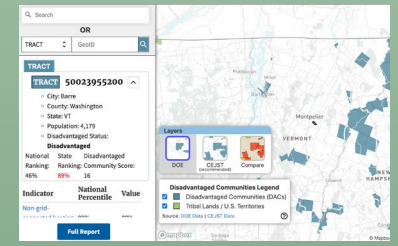
VT Dept Health Social Vulnerability Index



VT Environmental Disparity Index



EJ Screen



Energy Justice Mapping Tool- Disadvantaged Communities & Climate & Economic Justice Tool

# Local Hazard Mitigation Planning



MVI tool can help you get ready for meeting the FEMA LHMP standards, by providing a high-level climate vulnerability assessment of your community.

**Map Layers** ⌵ ✕

- People with Disabilities ⌵ ⋮
- Single Parent Households ⌵ ⋮
- Linguistic Isolation ⌵ ⋮
- Vehicle Access ⌵ ⋮
- Internet Access ⌵ ⋮
- Rentership ⋮
- > Race & Ethnicity ⋮
- > Housing Cost Burden ⋮
- Energy and Transportation Burden ⌵ ⋮
- Healthy Food Access ⌵ ⋮

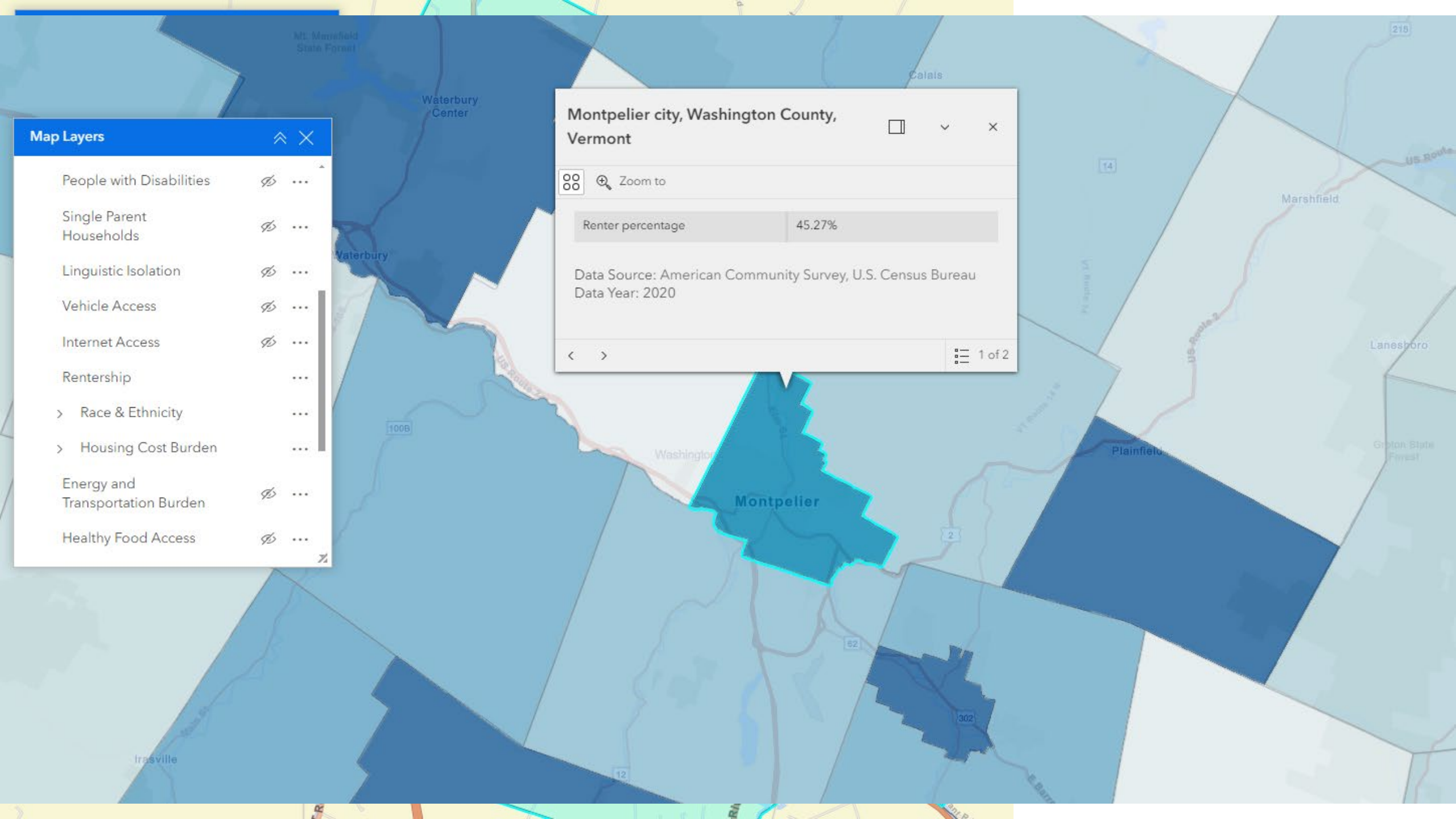
**Montpelier city, Washington County, Vermont** □ ⌵ ✕

⌵ 🔍 Zoom to

Renter percentage	45.27%
-------------------	--------

Data Source: American Community Survey, U.S. Census Bureau  
Data Year: 2020

⏪ ⏩ ☰ 1 of 2





**Map Layers**

- Invasive Species
- Inundation Flooding
  - FEMA National Flood Hazard. Data Source: FEMA
  - Lake Champlain Basin Flood. Data Source: VT Center for GIS.
  - IMG\_VCGI\_FLO ODINUNDATION\_WM\_v1
- Landslides
- Snow Storms
- High Temperature

**Critical Assets**

Zoom to

Type of Site	HEALTH CLINIC
Address	156 MAIN ST
Town	MONTPELIER
County	WASHINGTON
Source Origin	MUNICIPALITY
Update Date	1/29/2015, 10:38 AM

Data Source: Vermont Open Geodata Portal E911 Data  
Data Year: 2024

**Critical Assets**

Zoom to

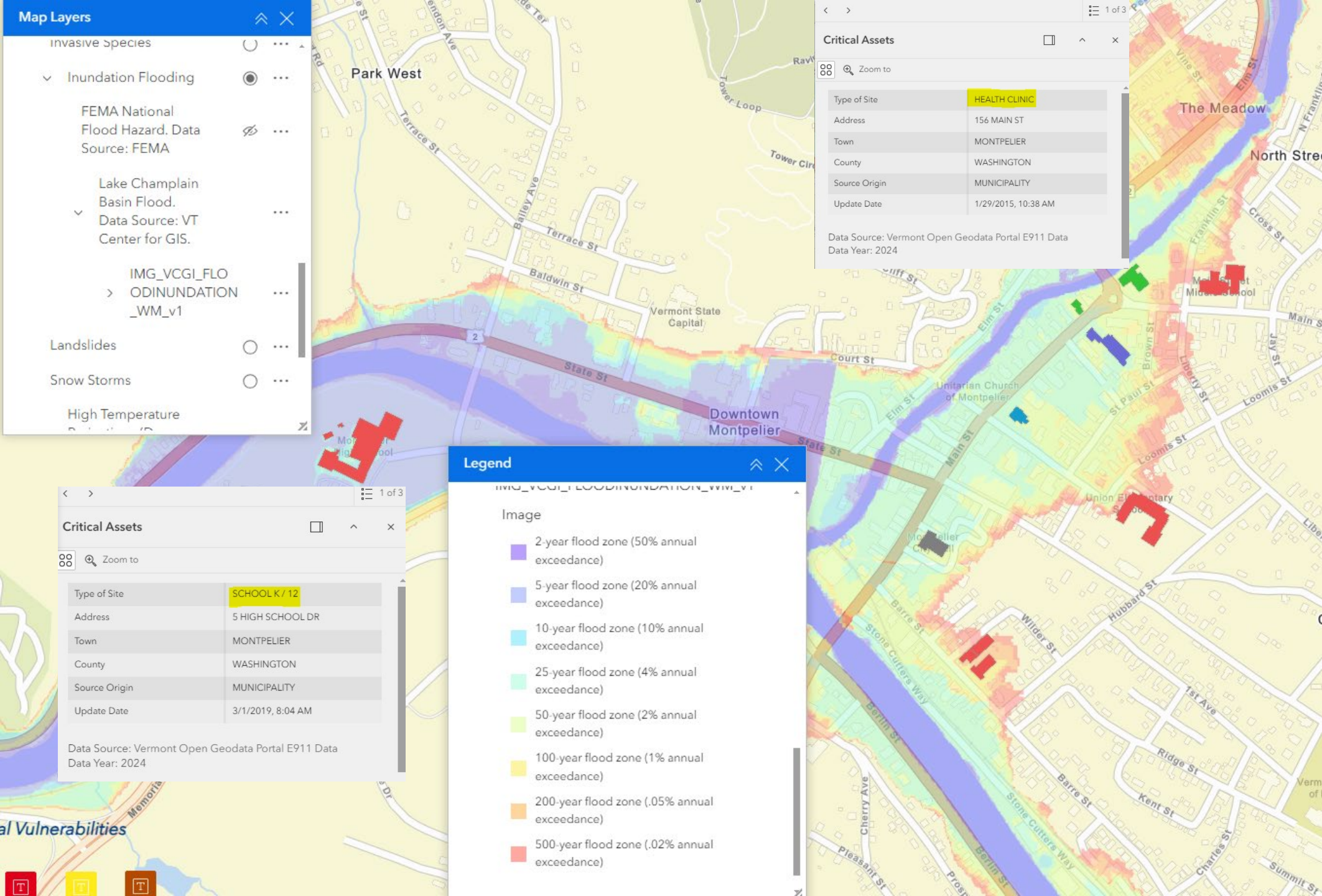
Type of Site	SCHOOL K / 12
Address	5 HIGH SCHOOL DR
Town	MONTPELIER
County	WASHINGTON
Source Origin	MUNICIPALITY
Update Date	3/1/2019, 8:04 AM

Data Source: Vermont Open Geodata Portal E911 Data  
Data Year: 2024

**Legend**

Image

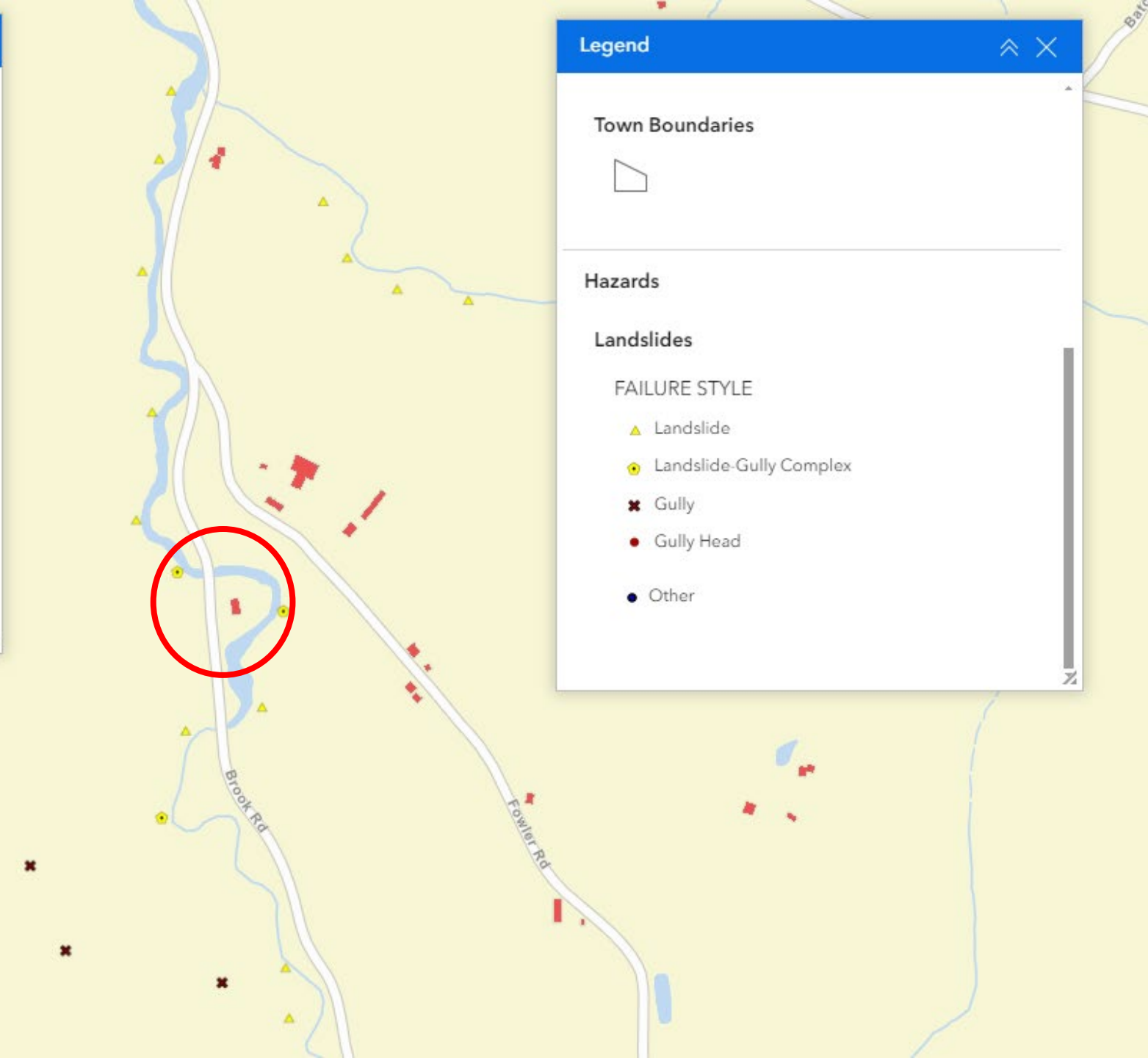
- 2-year flood zone (50% annual exceedance)
- 5-year flood zone (20% annual exceedance)
- 10-year flood zone (10% annual exceedance)
- 25-year flood zone (4% annual exceedance)
- 50-year flood zone (2% annual exceedance)
- 100-year flood zone (1% annual exceedance)
- 200-year flood zone (.05% annual exceedance)
- 500-year flood zone (.02% annual exceedance)



**Map Layers** [Up] [Close]

- Built & Physical Environment Domain ...
- Critical Assets [Off] ...
- Emergency Services [Off] ...
- Mobile Homes [Off] ...
- Other Site Types [Off] ...
- Residential Dwellings** ...
- > Housing Age ...
- Community Domain [Off] ...
- Social Domain [Off] ...
- Economic & Job Domain [Off] ...
- Infrastructure Domain [Off] ...

[Left Panel: Map Layers, Fluvial Corridor, VT DEC, Hail, Ice Storm, Invasive, Inur, Landsl, Snow S, Hig, Proj, abo, Dat, Die]



**Legend** [Up] [Close]

**Town Boundaries**

- [Symbol]

**Hazards**

**Landslides**

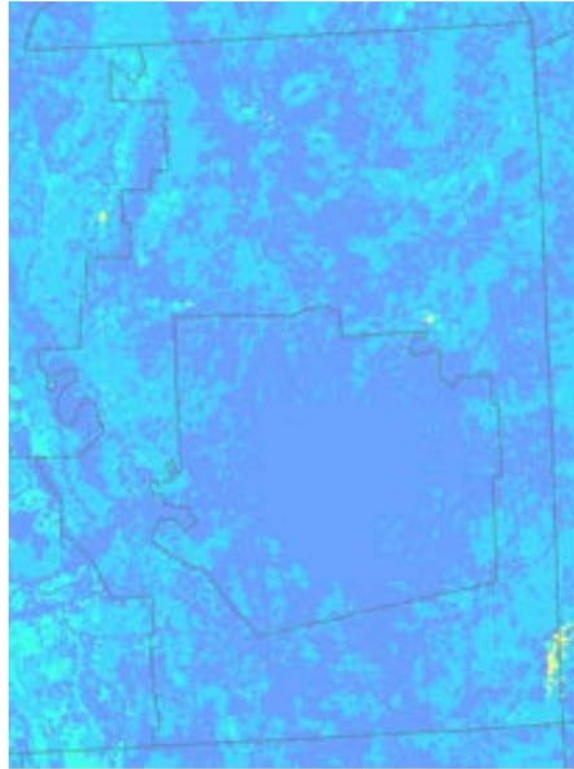
**FAILURE STYLE**

- [Yellow Triangle] Landslide
- [Yellow Circle] Landslide-Gully Complex
- [Black Cross] Gully
- [Red Circle] Gully Head
- [Blue Circle] Other



# NATURAL HAZARDS & RISKS

## Hazard Profile Basics



### WILDFIRE

Hazard Potential:

- Very low
- Low
- Medium low
- Medium
- Medium high



### INVASIVE SPECIES

 Emerald Ash Borer

### DROUGHT

17.48 - average number of weeks in severe to exceptional drought per year from 2000-2022

### SNOW STORMS

13.11 - average number of snow storms per year from 1996-2022

### ICE STORMS

0.04 - average number of ice storms per year from 1996-2022

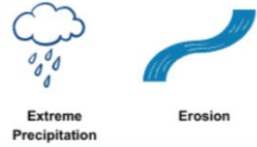
### EXTREME TEMPERATURE PROJECTIONS

0-20 - number of days **above 90-degrees F** projected between 2015-2044

120-140 - number of days **below 32-degrees F** projected between 2015-2044

# Hazard Profile Basics

## Bridport Hazard: Transportation Vulnerability



Transportation structures are exposed to threats from **flood inundation, erosion, and deposition.**

The Municipal Vulnerability Indicators Tool includes information from the Vermont Transportation Resilience Planning Tool (TRPT).

TRPT identifies bridges, culverts, and road embankments that are vulnerable to damage from floods, estimates that risk and the criticality of roadway segments.

### Transportation Resilience Planning

#### Bridges

- high
- med
- low
- unknown

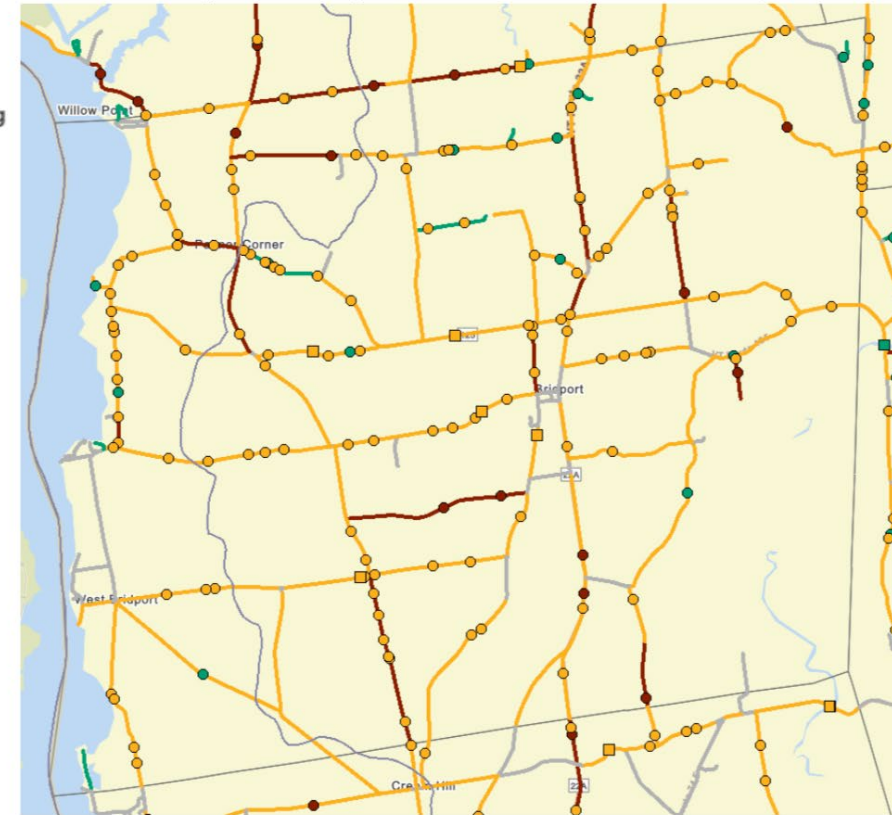
#### Culverts

- high
- med
- low

#### Roads

- high
- med
- low
- unknown

### MVI Map: Transportation Vulnerability



<https://climatechange.vermont.gov/mvi>

In Bridport, the highest vulnerability and greatest criticality road segments are Rattling Bridge Road, Swinton Road, Town Line Road, Bridge Road, Basin Harbor Road, and East Street

#### MVI Activated "Open" Layers:

1. Other Vermont Hazard Vulnerability Projects > Transportation Resilience Planning > Bridges
2. Other Vermont Hazard Vulnerability Projects > Transportation Resilience Planning > Culverts
3. Other Vermont Hazard Vulnerability Projects > Transportation Resilience Planning > Roads



# LHMP: Local Planning Team Risk Assessment & Community Engagement

## Natural Hazards: Winter and Spring 2023 Which are the Most Important for Orange to Plan For?

**Place 3  
Dots**

**Flooding**  
Road and Stream Drainage



Dots Placed: 12\*

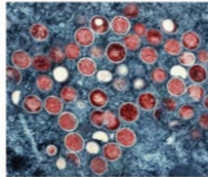
\*one responder put all three dots on this hazard

**Severe Winter Weather**  
Heavy Snow, Extreme Cold, Ice Storm



Dots Placed: 9

**Infectious Disease Outbreak**  
Residents dispersed, a lot of space—allows residents to keep distance



Dots Placed: 1

Write In  
Is a different hazard more important?  
Please add it below!

None

**Severe Storm**  
Thunderstorms, High Winds, Lightning, Heavy Rain, Hail, etc.



Dots Placed: 9

**Heat and Drought**



Dots Placed: 1

**Other Hazards:**

Invasive Species (Emerald Ash Borer, Dutch Elm Disease, others?)

Wildfire (Historically not a concern, but with increasingly dry conditions a lot of fuel accumulation)

**Dots Placed: 1**

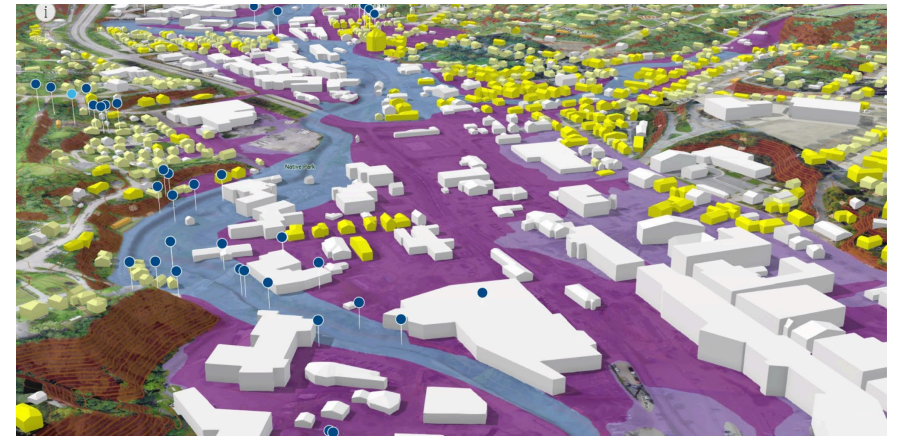
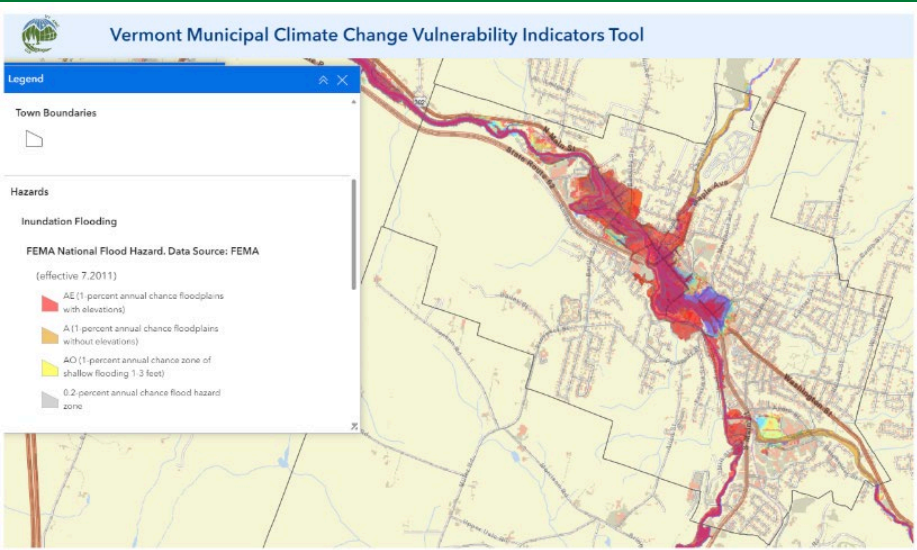
Dam Failure

Hazardous Material Spills

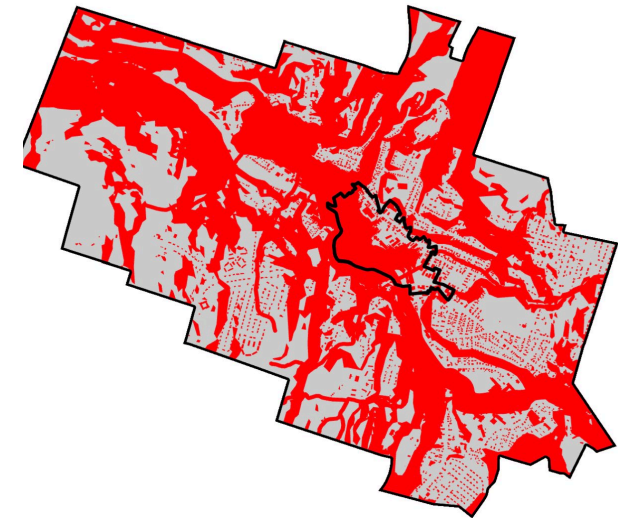
Structure Fires (chimney fires)

Write In





Tracking recent events, impacts, and extent

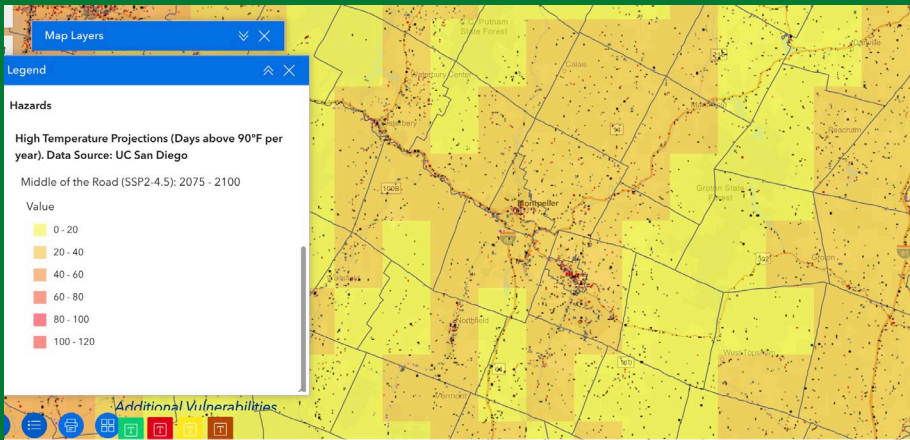


Hydrological studies and far more!

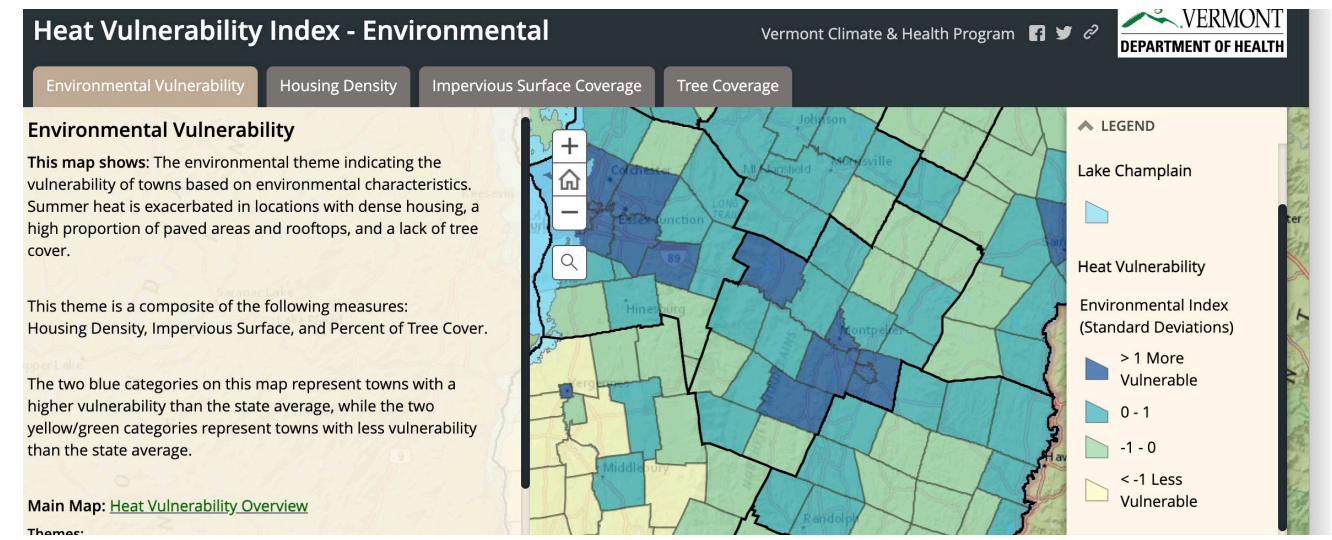
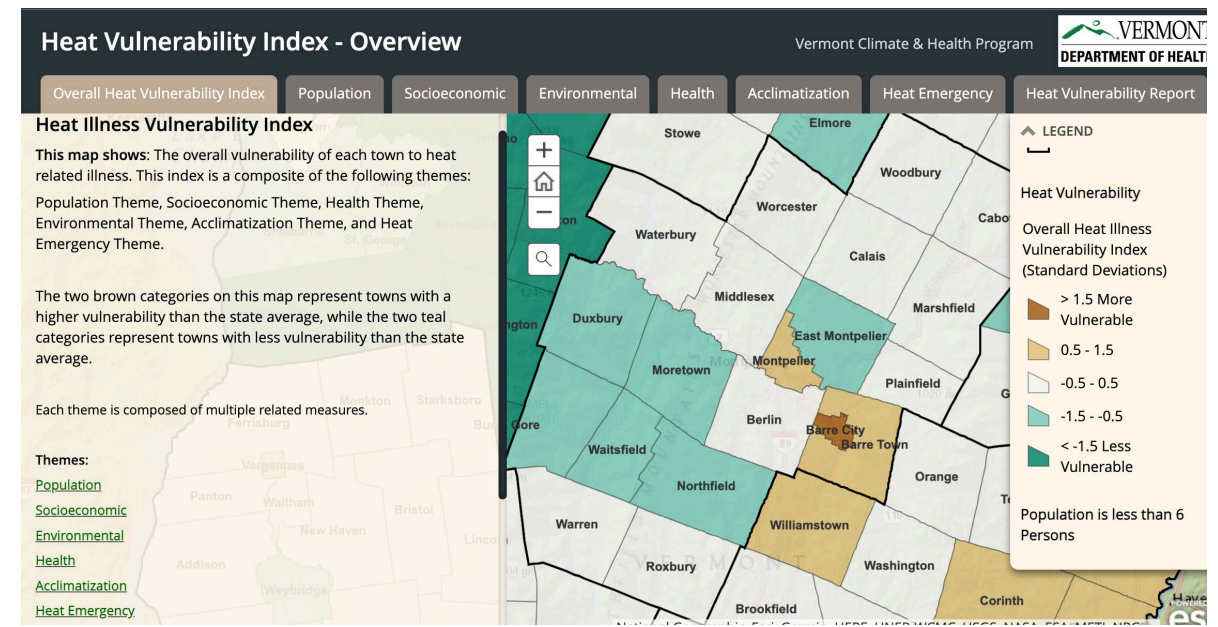
Infill Analyses and Development Limiting Factors

# Supporting Flood Recovery Community Conversations & Next Steps





# Heat Vulnerability... from data to action (and people!)



# Tips!

- Pay Attention to Data Resolution (Scale)
- Pay attention to Source (and follow links)
- Change the transparency of layers so you can understand how they interact
- Start by toggling everything on and off!
- Supplement with local data, how can you track and build datasets that fill gaps?
- Pull up and navigate in your planning discussions, during community conversations, etc!
- Reach out to your RPC or the Climate Action office for support!

# Thank you!

Sam Lash

Climate & Energy Planner

Central Vermont Regional Planning Commission

[lash@cvregion.com](mailto:lash@cvregion.com)

Marian Wolz

Resilience & Adaptation Coordinator

ANR Climate Action Office

[marian.wolz@vermont.gov](mailto:marian.wolz@vermont.gov)