

Climate Resilience across VT State Government

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A wide-angle photograph of a sunset over a large body of water, likely a lake or ocean. The sky is filled with soft, horizontal clouds colored in shades of orange, yellow, and blue. In the foreground, the dark silhouettes of tree branches and leaves frame the scene. The water reflects the warm colors of the sunset.

Agenda

- Planning
- Design
- Land Protection & Restoration
- Built Infrastructure





Resilience

The capacity of individuals, communities, and natural and built systems to withstand and recover from climatic events, trends, and disruptions.

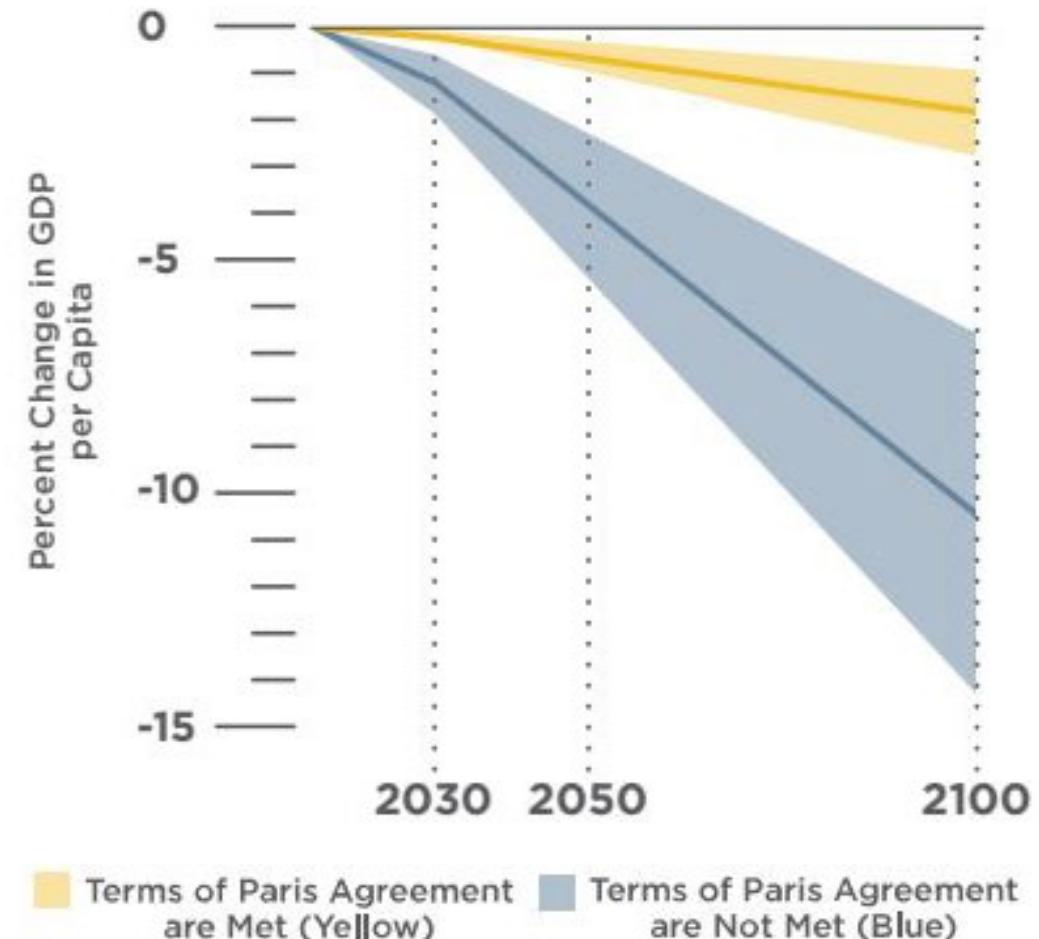
Adaptation

Refers to adjustments in ecological, social, or economic systems in response to actual or expected climatic stimuli and their effects or impacts.

Even if we
stop carbon
output
tomorrow....

Maine State Climate Plan

Figure 3: The Costs of Climate Change in GDP.



Wide band of color displays rate of adaptation to climate change.
Top of band = rapid, Center/solid line = moderate, Lower = very slowly

Source: "Long-Term Macroeconomic Effects of Climate Change: A Cross-Country Analysis."
by Matthew E. Kahn et. al. National Bureau of Economic Research, August 2019

- State Government is doing a lot to build Vermont's resilience
- We need to INCREASE our support for these programs
- Develop new strategies and programs to help the state prepare for the anticipated effects of climate change
- What is the best mix of tools?

Existing Tools

New Tools

Scale of Implementation is a Major Issue



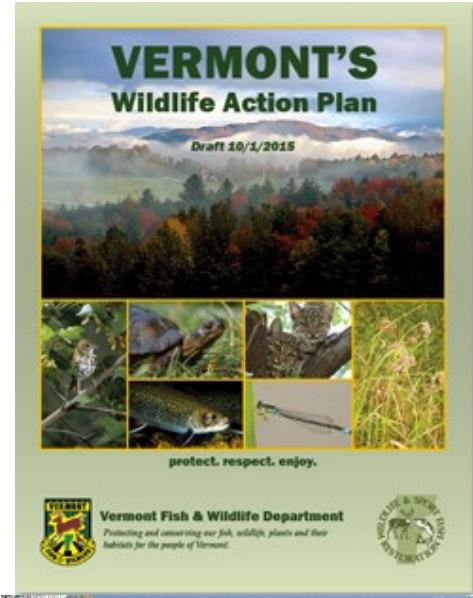
A photograph showing several people, including a man in a dark jacket and a woman in a maroon vest, looking down at a large map spread out on a table. They appear to be discussing or planning something related to the map.

Planning

- State Hazard Mitigation Plan
- Land Use Planning
- Transportation Planning
- Energy Planning
- Operational Planning



State Planning

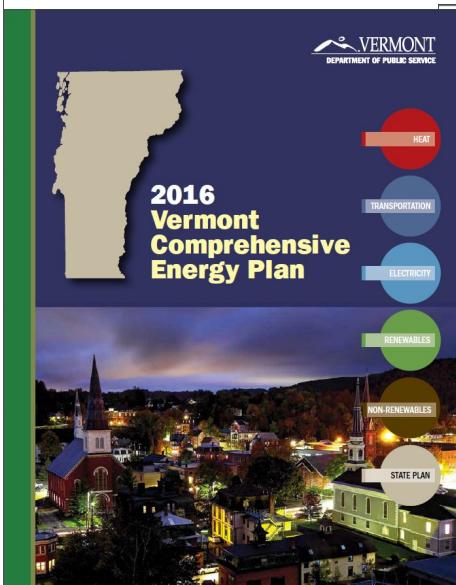


Revised State Template for the
Consolidated State Plan
The Elementary and Secondary Education Act of 1965, as
amended by the Every Student Succeeds Act



U.S. Department of Education
Issued: March 2017

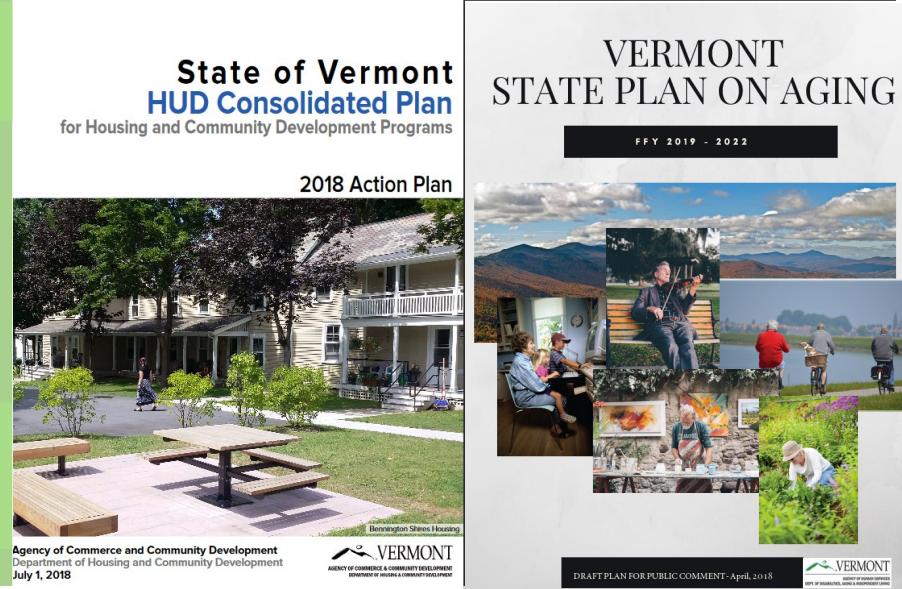
OMB Number XX
Expiration Date:



2018

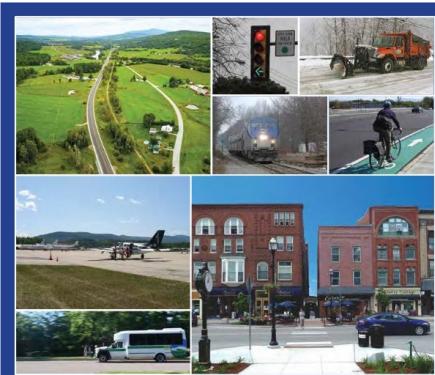
Vermont Telecommunications Plan

Vermont Department of Public Service
Telecommunications Plan (Title II)
Issued pursuant to 30 V.T.A. § 202(e)(4) &(f)
November 14, 2018



Vermont Statewide Comprehensive
Outdoor Recreation Plan (SCORP)

2014-2018



2040

Vermont Long-Range
Transportation Plan

PREPARED BY VERMONT AGENCY OF
TRANSPORTATION - 2018



VERMONT
STATE PLAN ON AGING

FFY 2019 - 2022



Vermont 2020
Comprehensive Economic Development Strategy



Prepared by the
Agency of Commerce and Community Development,
The Vermont CEDS Committee and the Garnet Consulting Group.

Updated February 2016



2018 Vermont State Hazard Mitigation Plan



2018 Vermont State Hazard Mitigation Plan

*Making Vermont safer and more resilient in the
face of climate change and natural disasters*





Chapter 117 (24 V.S.A. §4302) – 14 state planning and development goals

COORDINATION ACROSS DIFFERENT SCALES OF PLANNING IN VERMONT



State Planning Goals

The state has 14 specific planning goals.



Regional Plans

Regional plans must be consistent with the state planning goals.



Municipal Plans

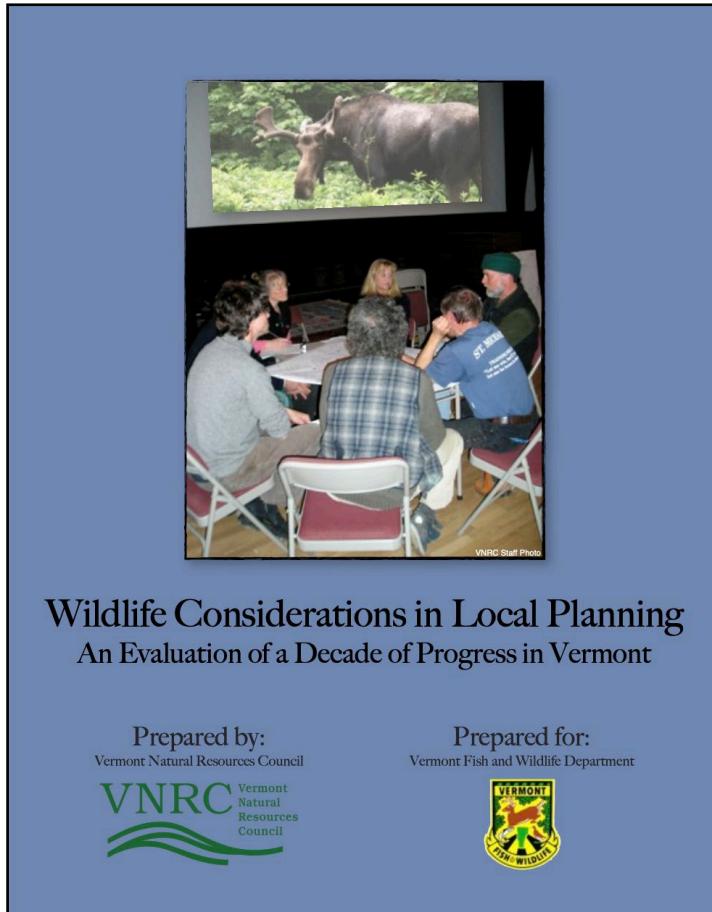
In order to have a regionally approved plan, municipal plans must be compatible with the regional plan and consistent with the state planning goals.

84% of municipalities have a plan
78% of municipalities regulate land use.

Land Use Planning

Most land use planning is done at municipal level – usually by volunteers

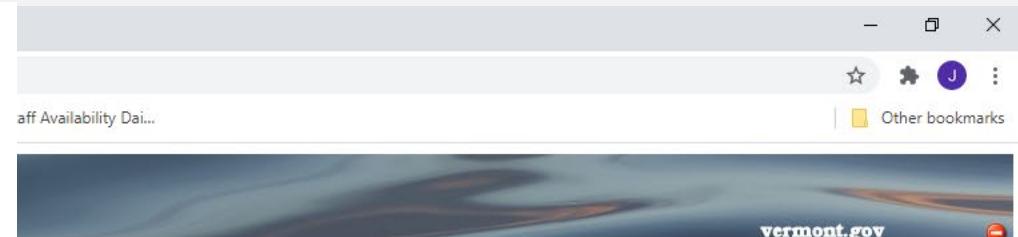
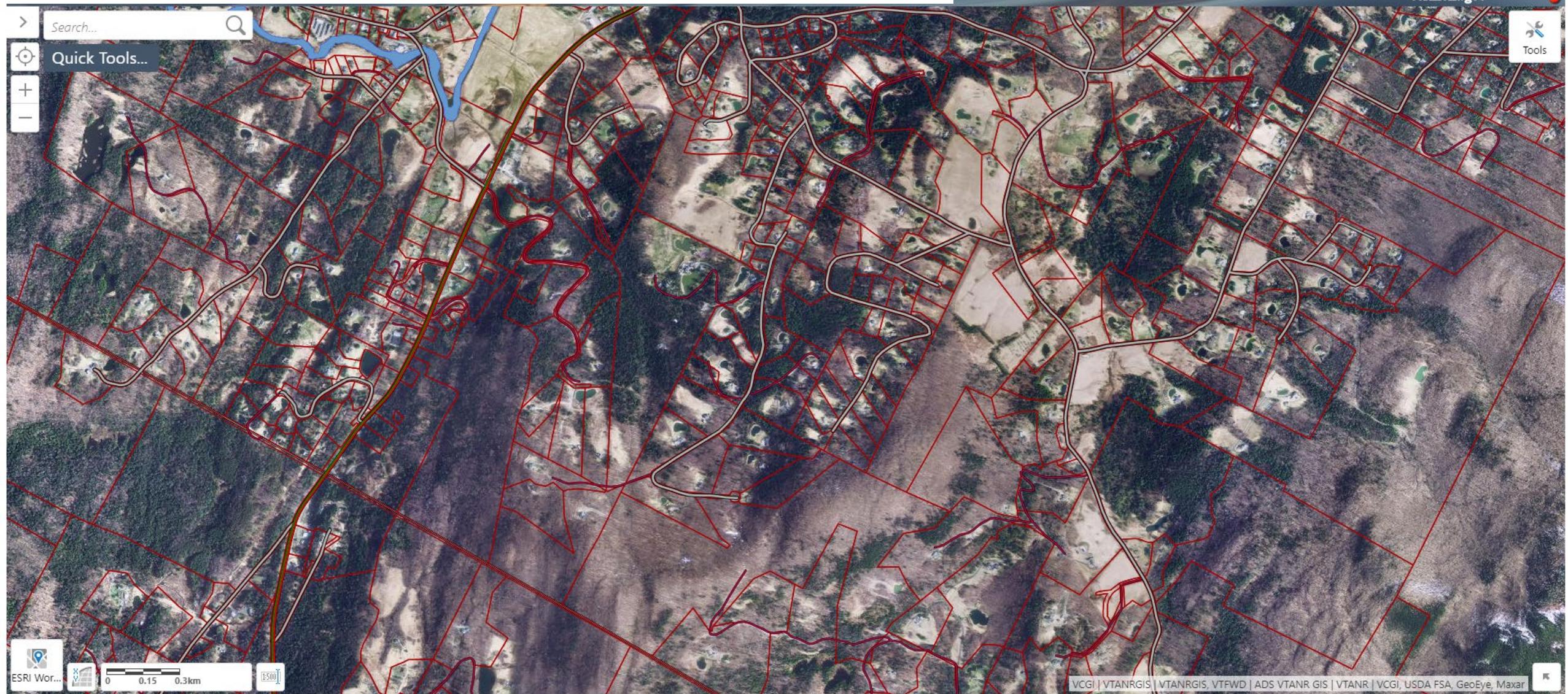
Review of Town Plans, Bylaws, and Subdivision Regulations



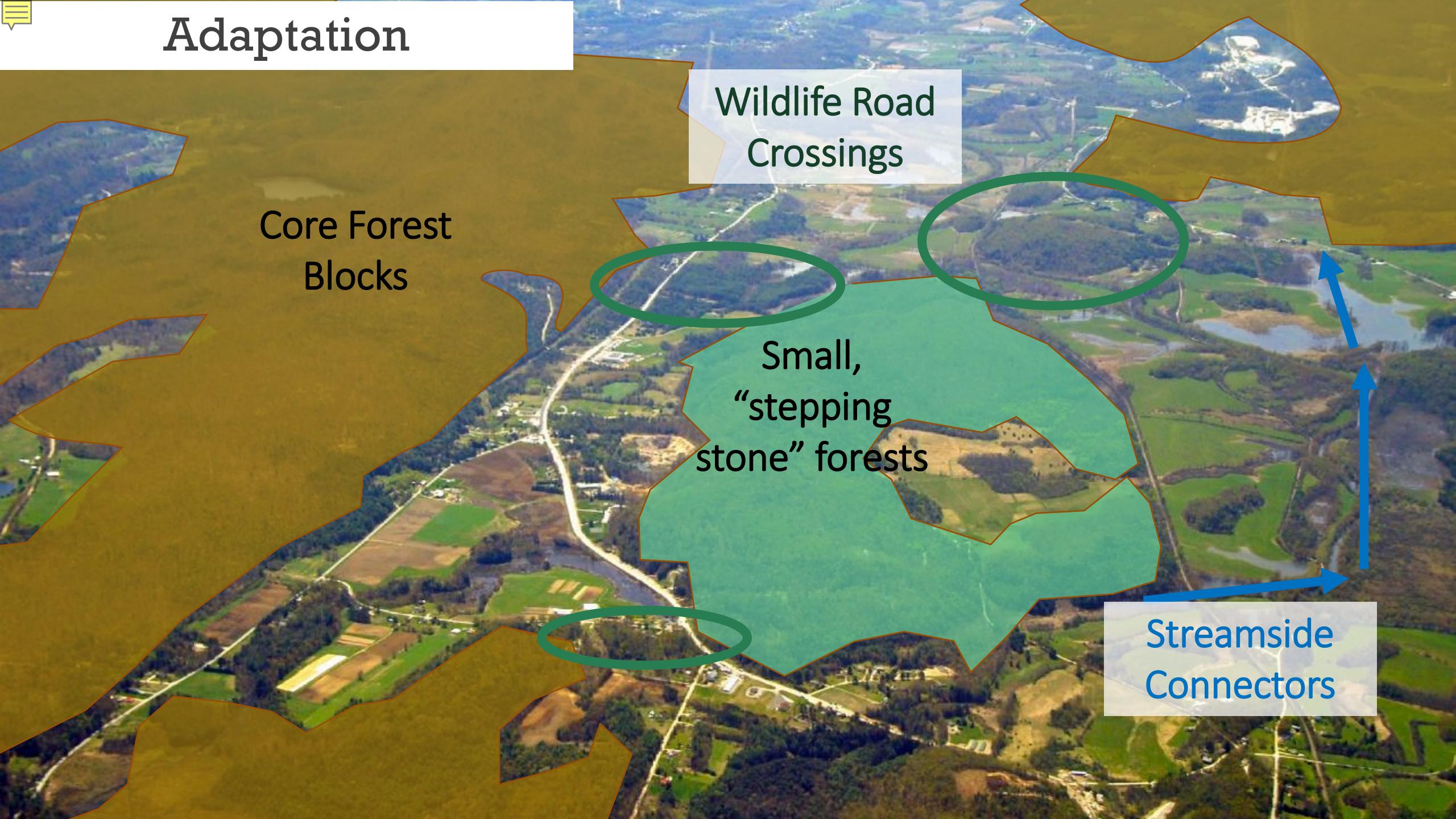
- Partnership between VNRC and Vermont Fish and Wildlife Dept.
- Comprehensive review of all town plans, zoning bylaws, and subdivision regulations in VT.
- Conducted every ten years.
- Includes information about natural resource mapping, inventories, recommended natural resource policies, Act 171 planning, habitat elements (including attention to connectivity), zoning for natural resource protection, development review standards, and utilization of subdivision regulations, etc.



Changing Pattern



Adaptation



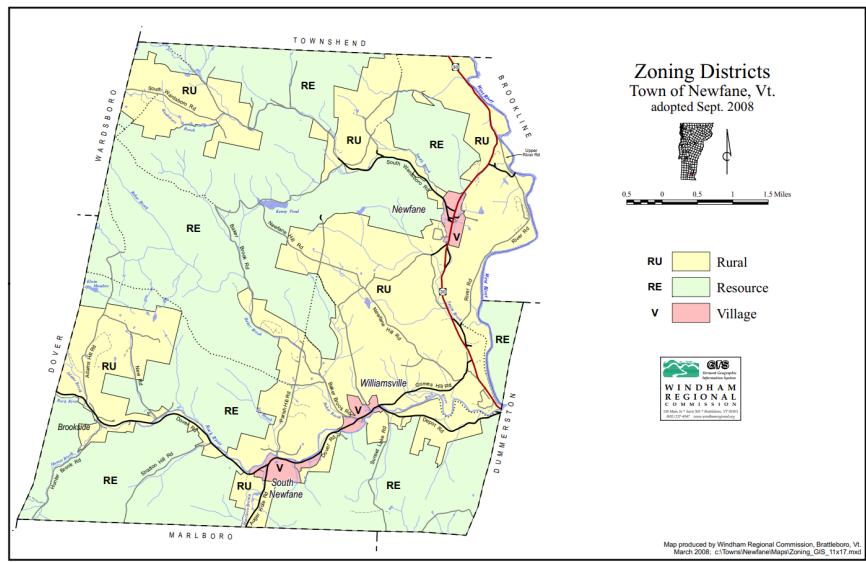
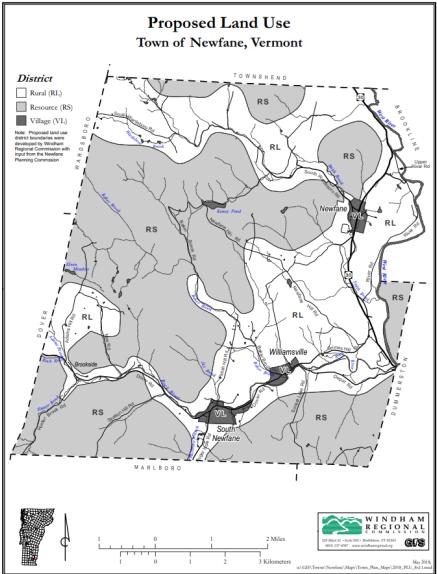
Planning in the built environment



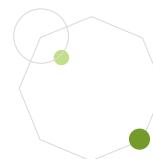
compact development pattern
matters

underpins our brand, economy
and quality of life

Land Use Planning Technical Assistance



Regional Planning Commissions



Land Use Planning Technical Assistance



Community Wildlife Program, Vermont
Fish & Wildlife Department
Conservation Planning Technical
Assistance

County Foresters, Urban Community
Forestry Program, Vermont Department
of Forests, Parks, & Recreation

Watershed Management Division,
Department of Environmental
Conservation





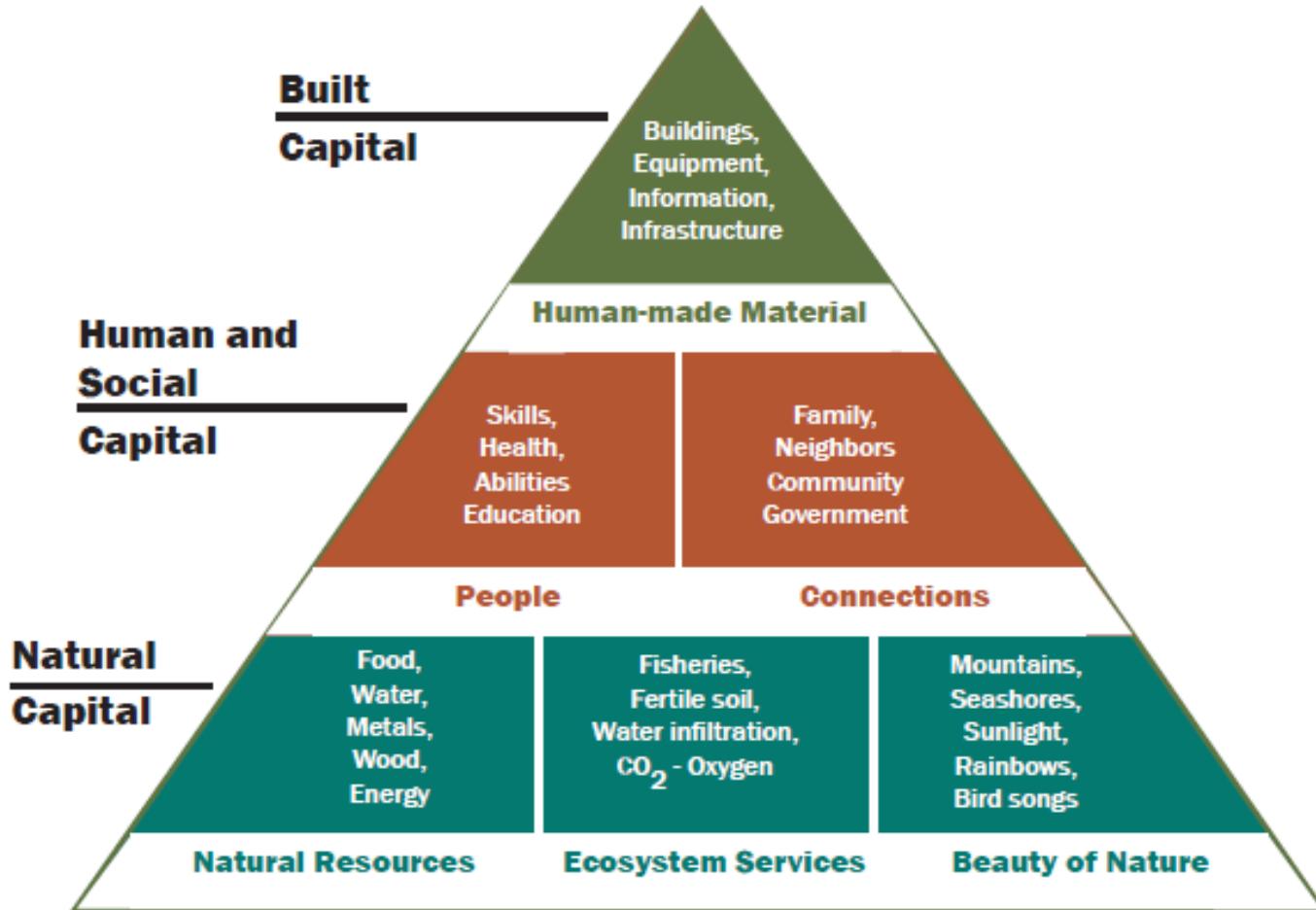
VT 73 bridge at VT 100



AOT Incident Management System & Continuity of Operations



Community Capitol



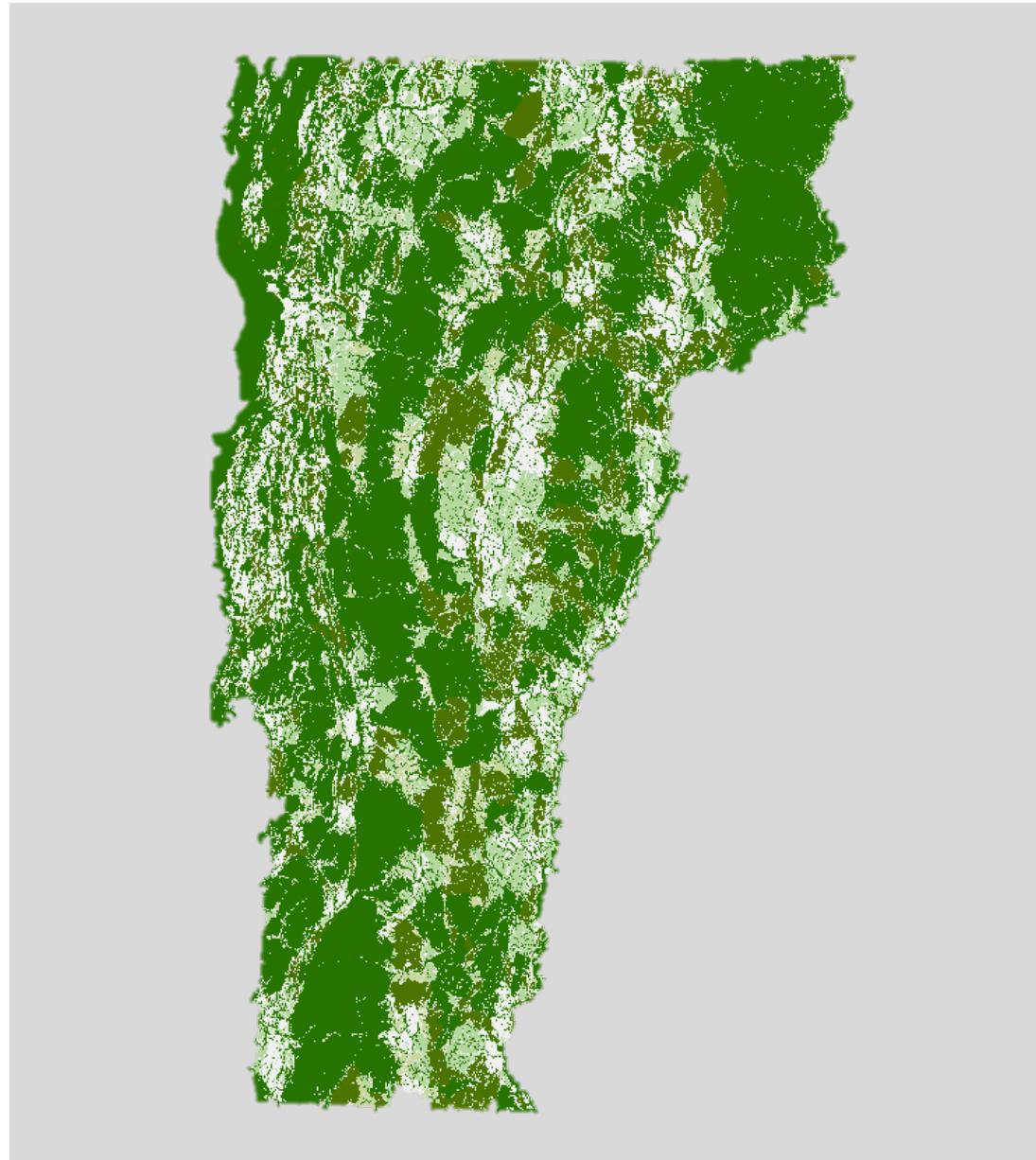
Training our people

- Rivers and Roads Department of Environmental Conservation, Vermont Fish & Wildlife Department AOT
- Highways and Habitats
- Flood Ready Vermont Website
- Flood Training Vermont Website
- Vermont Department of Forests, Parks, & Recreation Adaptive Silviculture Assistance on Private Lands





Vermont Conservation Design



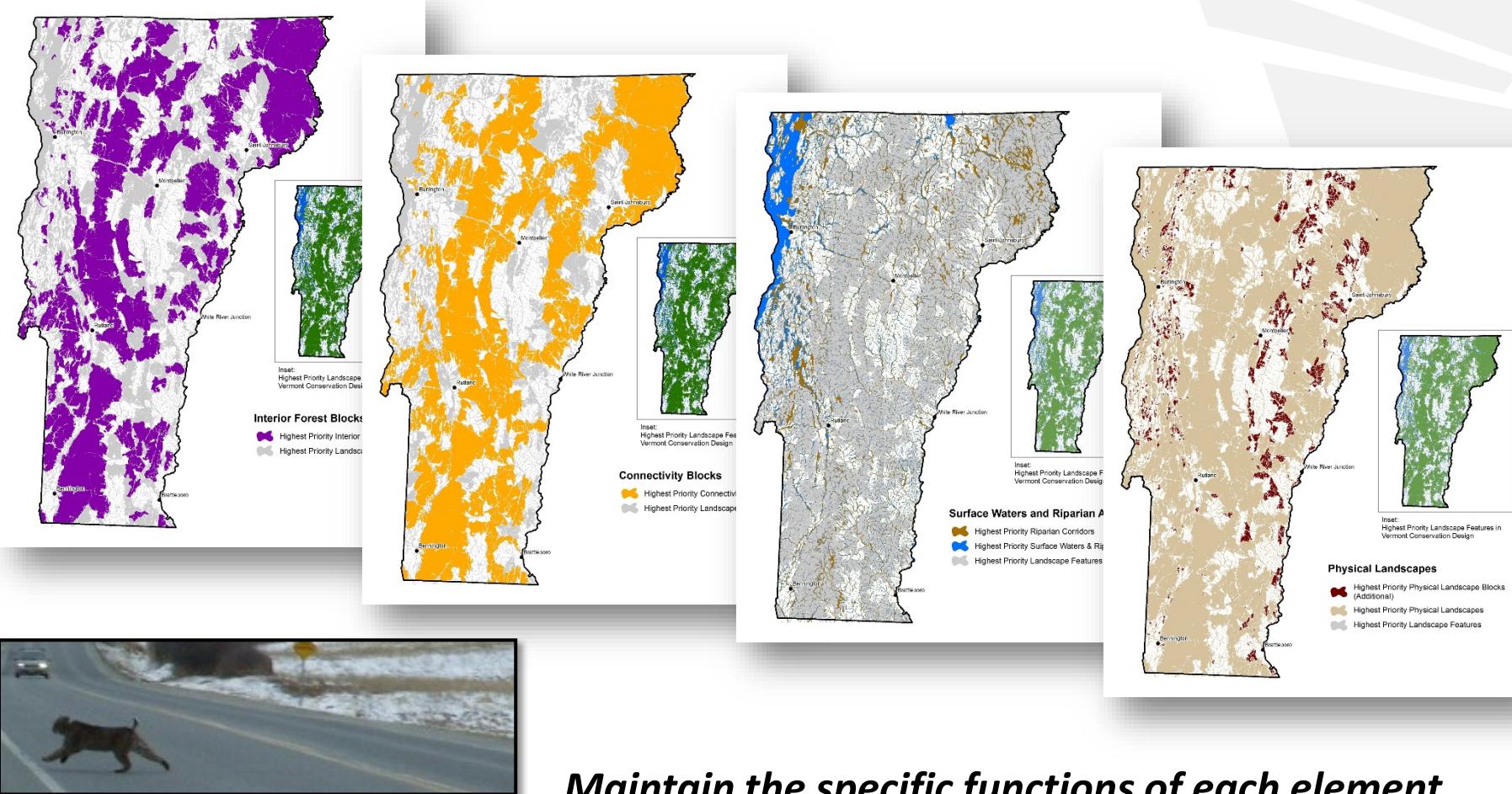
Designing a Resilient Future

Strategy to protect and enhance ecological function into the future

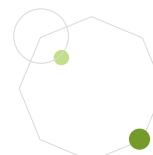
Components of the Resilient Landscape

Intact and Connected Forest Blocks, Surface Waters and Riparian Areas

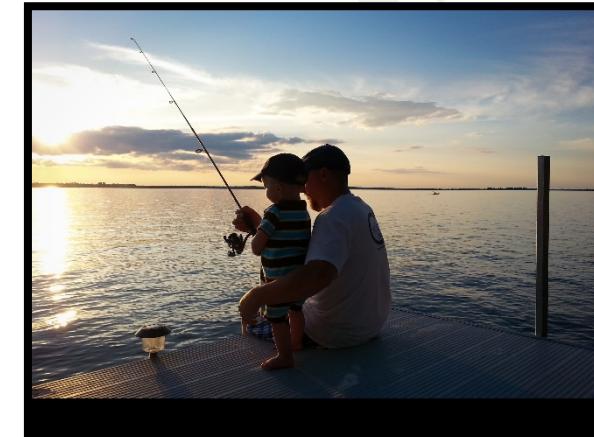
- Intact
- Connected
- Diverse



Maintain the specific functions of each element



- **Carbon Sequestration**
- **Animal Movement and Migration**
- **Outdoor recreation**
- **Clean water**
- **Rural character**
- **Working farms and forests**
- **Nature's benefits**



Statewide River Corridor Map Layer

S State Hazard Mitigation Plan (SH) | 2018 SHMP Executive Summary | Vermont ANR - Natural Resource +

Not secure | anrmaps.vermont.gov/websites/anra5/

Apps BioFinder PAGE BioFinder 3.0 AVCC Timesheet Atlas ANR Google Maps VT Planning Atlas VT Geodata Portal SCI Add LOG - CWP Staff Availability Dai... Other bookmarks

Natural Resources Atlas
VERMONT Vermont Agency of Natural Resources vermont.gov

Layers Quick Tools...

Atlas Layers Filter Layers...

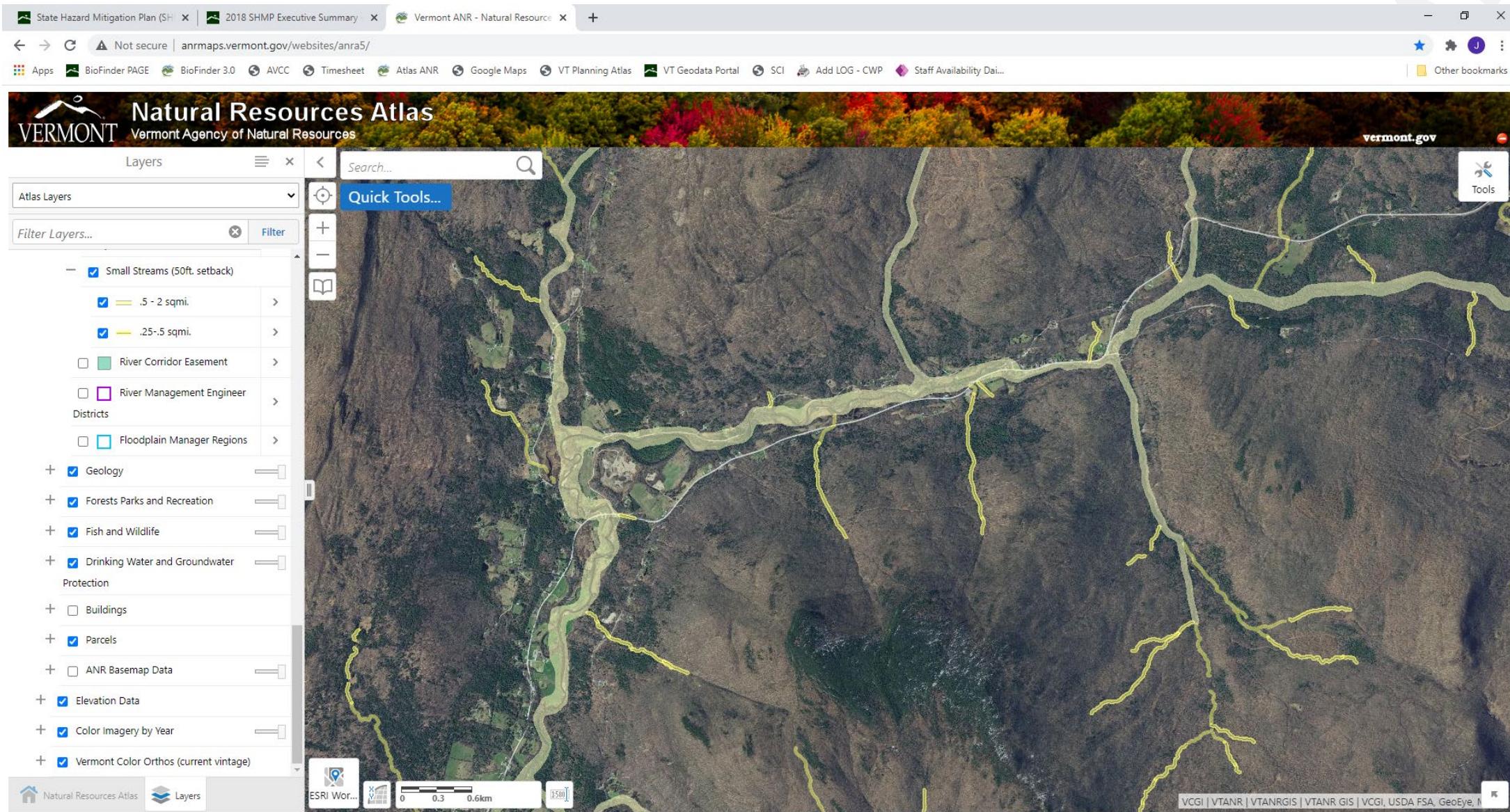
Small Streams (50ft. setback)
.5 - 2 sqmi.
.25-.5 sqmi.
River Corridor Easement
River Management Engineer
Floodplain Manager Regions

Districts

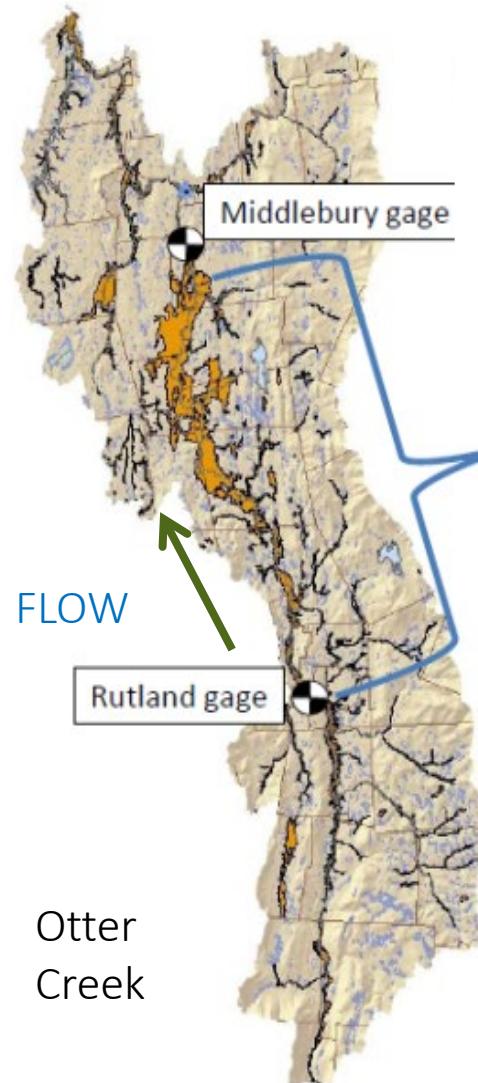
Geology
Forests Parks and Recreation
Fish and Wildlife
Drinking Water and Groundwater Protection
Buildings
Parcels
ANR Basemap Data
Elevation Data
Color Imagery by Year
Vermont Color Orthos (current vintage)

ESRI Wor... 0 0.3 0.6km 150

Natural Resources Atlas Layers VCGI | VTANR | VTANRGIS | VTANR.GIS | VCGI, USDA FSA, GeoEye, N

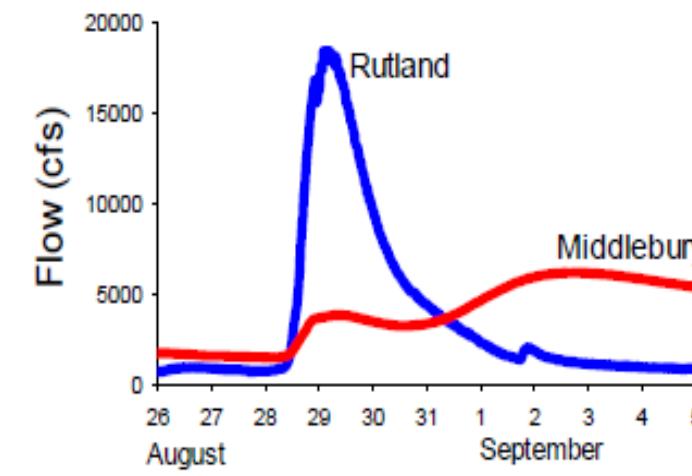


Wetlands & Floodplains at Work



Wetlands & floodplains protect downstream communities!

-  Floodplains
-  Wetlands



Hydrograph during Irene

Floodplain & Wetland Restoration

Includes dam removals, floodplain reconnection , habitat enhancement (in-channel features, buffer plantings).

- Vermont River Conservancy Whetstone Brook Floodplain Restoration
- Melrose Terrace Demolition and Floodplain Restoration
- Ludlow Drainage Project
- Highgate Landslide Slope Stabilization
- Huntington Property Buyouts
- Hands Mill Dam Removal in Washington
- Cross Brothers Dam Removal in Northfield



Wetland Acquisition and Restoration

- Wetlands contain a disproportionate amount of the earth's total soil carbon; holding between 20 and 30% of soil carbon despite occupying 5–8% of its land surface.
- Lots of programs working on wetland conservation and restoration in VT.
Highlights include:
- VFWD's partnership with DEC to use EPA dollars to acquire and restore wetlands
- NRCS's Wetland Easement Program
- Vermont' In-Lieu-Fee Program



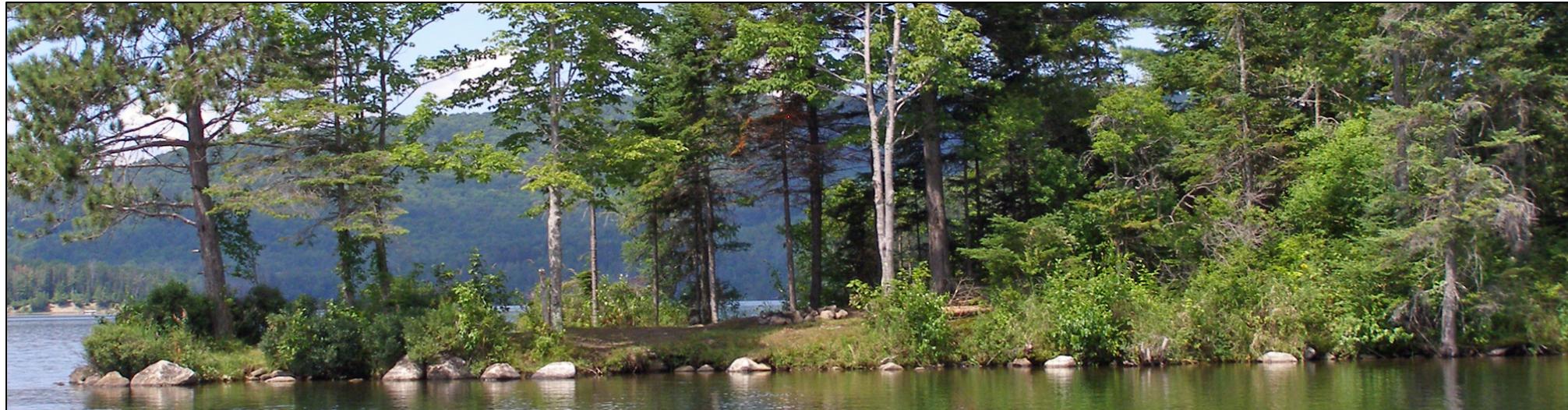
Landscape-Scale Land Protection

Large-Scale Forest Conservation Occurring across the state by Federal Government, State and Non-profits

(Recent Examples include Birdseye acquisition by VFWD, Glebe Mountain acquisition by TNC and Brownsville acquisition by VFPR – all thousands of acres in size)

Forest Legacy Program

- Most effective funding source to conserve large-scale forestlands in Vermont
- Partnership between Federal government, state (run by VFPR), non-profits and landowners
- Up to \$20 million/year to conserve working forests through both conservation easements and fee acquisitions
- Conserved more than 75,000 acres in Vermont since the first project in 1992 in Granby at Cow Pond (10,000 acres in fee, 65,000 acres in easement and an additional 30,000 acres in match tracts)



Molly's Falls
Pond State Park,
Forest Legacy
Acquisition

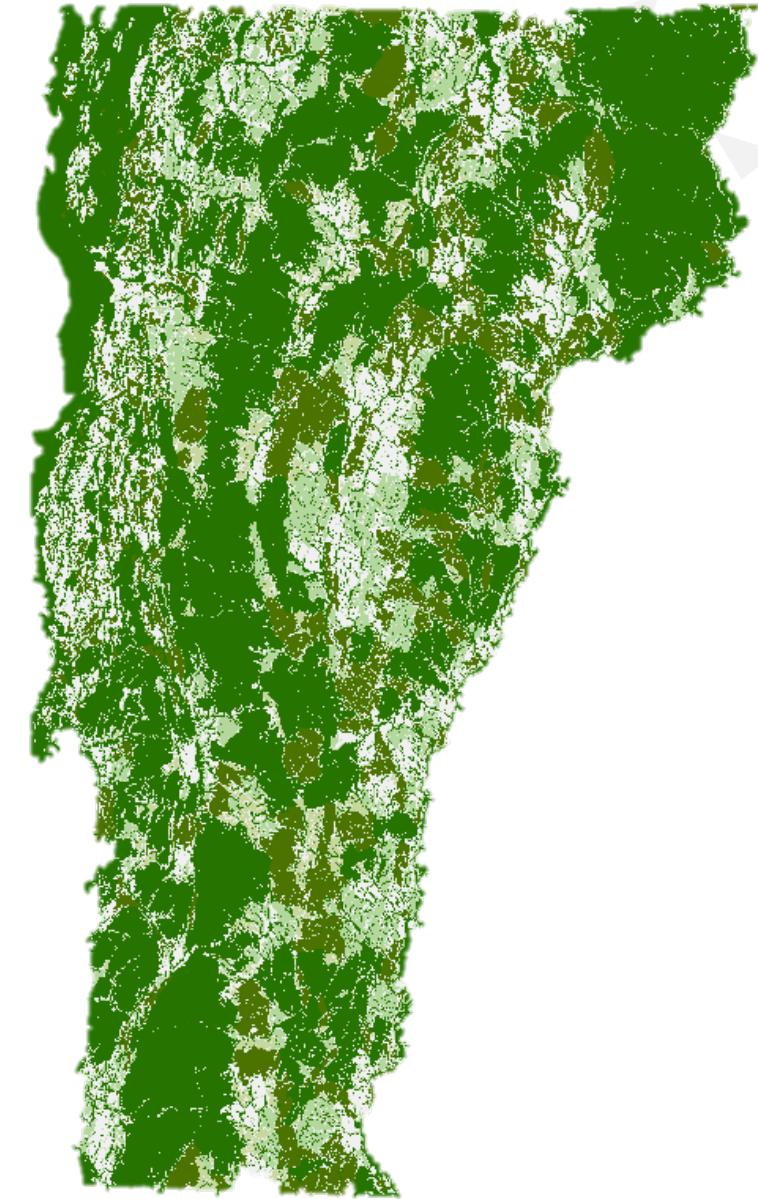


Partnerships

- Investing in coordination across silos
- Multi-pronged Approach to Conservation

34% of the Vermont Conservation Design Highest Priority area is permanently conserved (as of 2019)

43% of the Vermont Conservation Design Highest Priority area is in the Use Value Appraisal Program



FEMA Hazard Mitigation Grant Programs

- Emergency Relief & Assistance Fund (ERAF)
- Hazard Mitigation Grant Program (DR-4474)
- Building Resilient Infrastructure and Communities Grant Program



Regulatory Work

Changes to Act 250?

Act 171 Forest Integrity

Implementation of Shoreland
Protection Permitting Program

Municipal Roads General Permit
(Stormwater)

VT Stormwater Management
Manual/Operational Permitting



A photograph showing a person standing in a shallow stream, holding a clipboard and pen. They are wearing dark clothing and are positioned under a large, dark, curved concrete pier of a bridge. The pier is surrounded by lush green vegetation and mossy rocks. The water in the stream is clear and flowing. The overall scene suggests a field survey or inspection of infrastructure in a natural setting.

Transportation Infrastructure



Transportation Infrastructure



Hyde Park Centerville Brook 2006



2015

Hydraulics Manual Update
Town Highway Road and Bridge Standards

Transportation Resilience Planning Tool

VERMONT Vermont Transportation Flood Resilience Planning Tool

Watershed List ▾

Welcome to the Vermont Transportation Flood Resilience Planning Tool. Use this planning tool to observe:

- Road, bridge, and culvert **vulnerability** due to flood inundation, erosion, and deposition hazards;
- The importance, or **criticality**, of an asset to resilient transportation network function and access to essential facilities;
- **Risk**, or the combination of vulnerability and criticality; and
- An initial list of **mitigation** strategies to reduce hazards to roads, bridges, and culverts.

This tool is for planning purposes only and findings must be confirmed in the field prior to seeking funding and initiating design.

Begin by selecting a watershed from the list or searching a Town or location. Note that this website is still under development and predictions do not exist for all watersheds as indicated by the gray shading on the map.

[Download data \(ZIP file\)](#) [Help](#)

Asset Risk Chart Table **Clear all**

Criticality >

low risk **Vulnerability >**

Asset Details

MAIN RD

Vulnerability	Overall Score: 4/10
▶ Inundation	Score: 4/10
▶ Erosion	Score: 1/10
▶ Deposition	Score: 2/10
Criticality	Overall Score: 2/10
▶ Strategies	Overall Count: 7
▶ Asset Info	

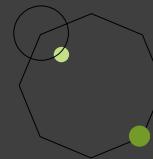
VERMONT



State Government is doing a lot to build Vermont's resilience

Scaling implementation for existing tools likely to be more important than creating new programs and strategies

FOR FUTURE GENERATIONS





Thank You

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<https://vtfishandwildlife.com/> 🌐

