

VERMONT CONSERVATION DESIGN

for Senate Committee on
Natural Resources and Energy
January 23, 2025

Robert Zaino, Ecologist
Vermont Fish and Wildlife Department



AGENCY OF NATURAL RESOURCES



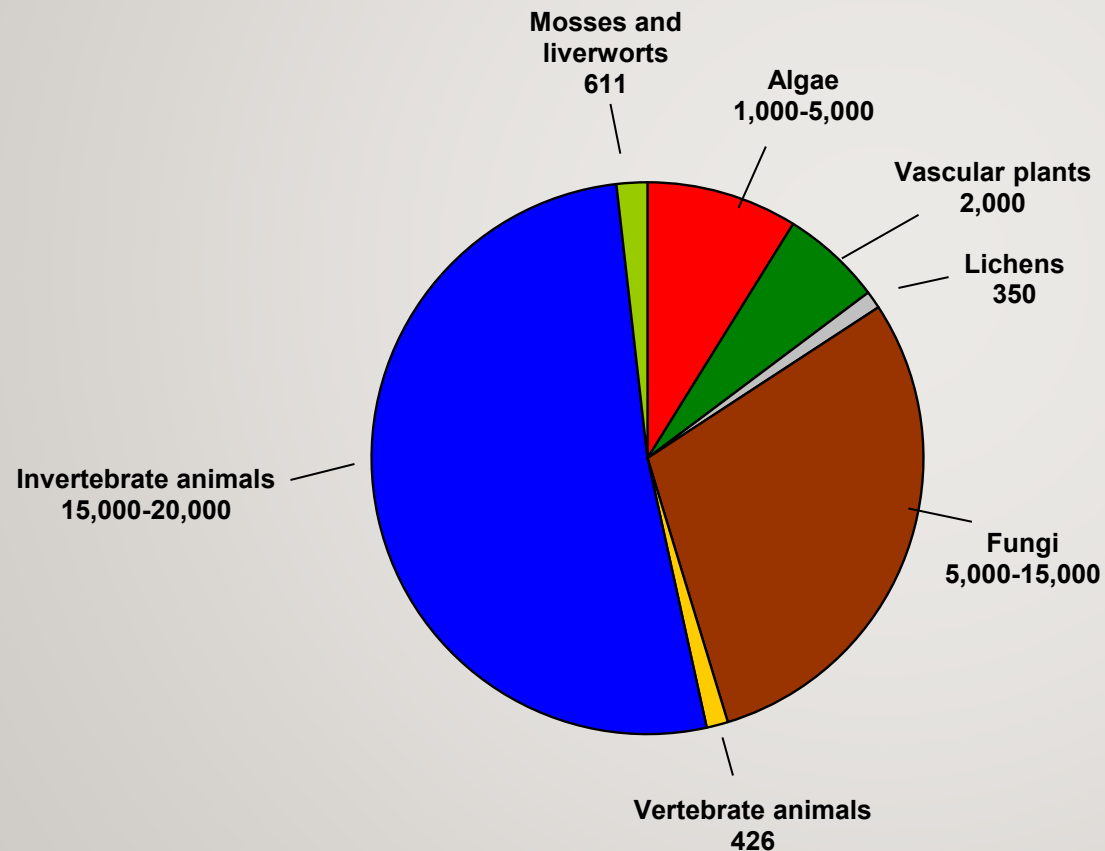
The Vermont Fish & Wildlife Department

The mission of the Vermont Fish & Wildlife Department is the conservation of our fish, wildlife, plants and their habitats for the people of Vermont



An estimated 24,000 to 43,500 species in Vermont!

How do we protect them all?



**Elfin
Skimmer**

COARSE FILTER/FINE FILTER APPROACH TO CONSERVATION



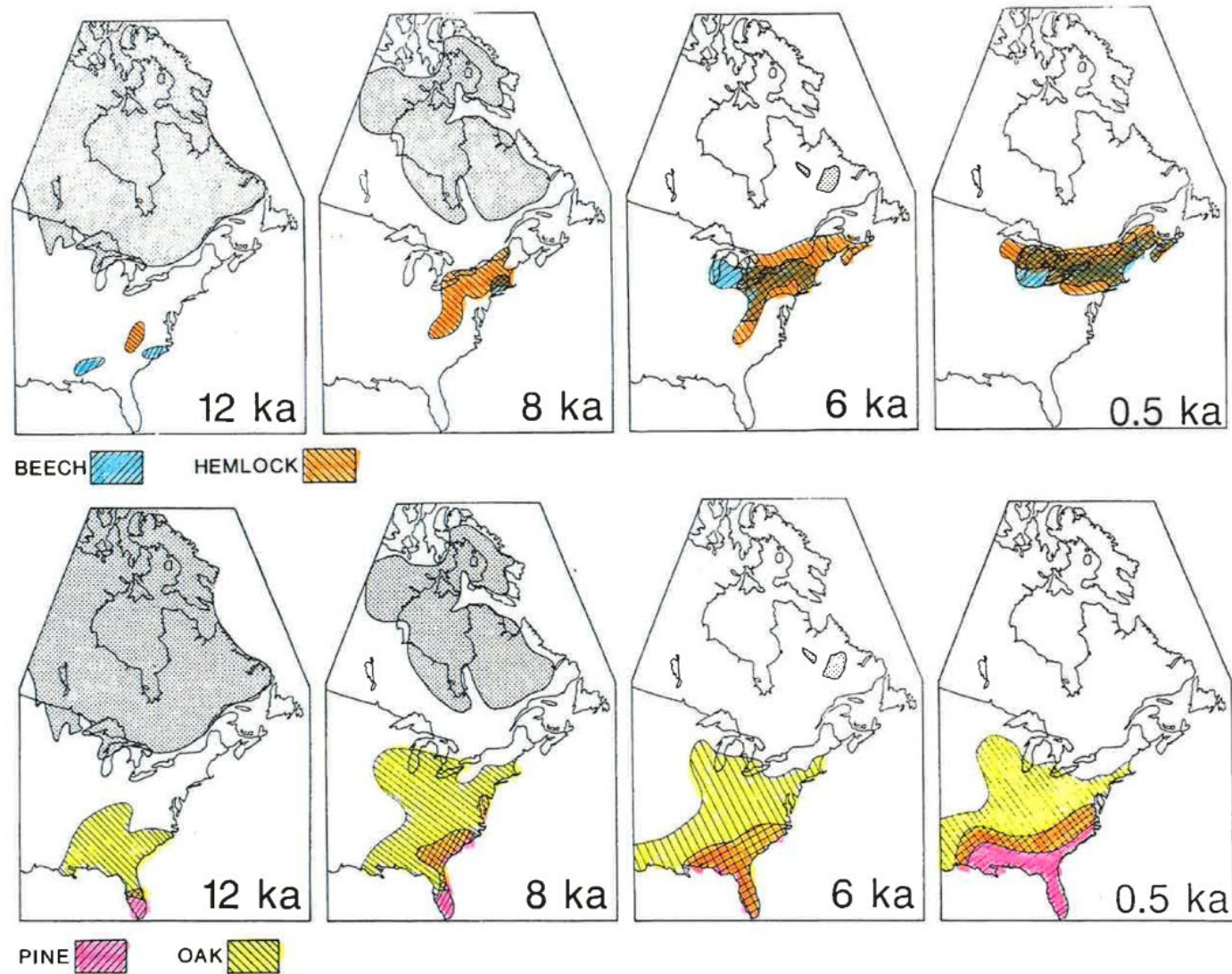
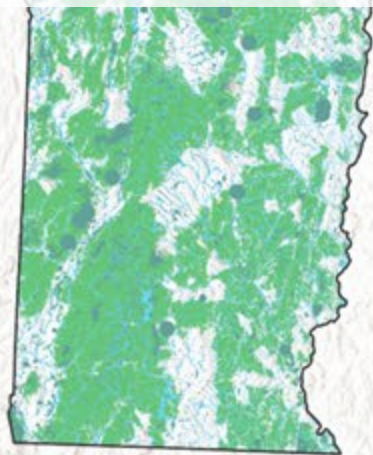


Figure 1. Location of regions with 5% beech (*Fagus*) pollen and 5% hemlock (*Tsuga*) pollen (in the upper row maps) and 20% southern pine (*Pinus*) pollen and 20% oak (*Quercus*) pollen (in the lower row of maps) at 12,000, 8,000, 6,000, and 500 yr B.P. with the stippled area in the north showing the shrinking Laurentide ice sheet from 12,000 to 6,000 yr B.P. Source: Modified from Plates 1 and 2 in Jacobson, Webb, & Grimm 1987.



*Vermont Conservation Design
is a science-based vision to sustain the state's
valued natural areas, forests, waters, wildlife,
and plants for future generations*






See VCD on

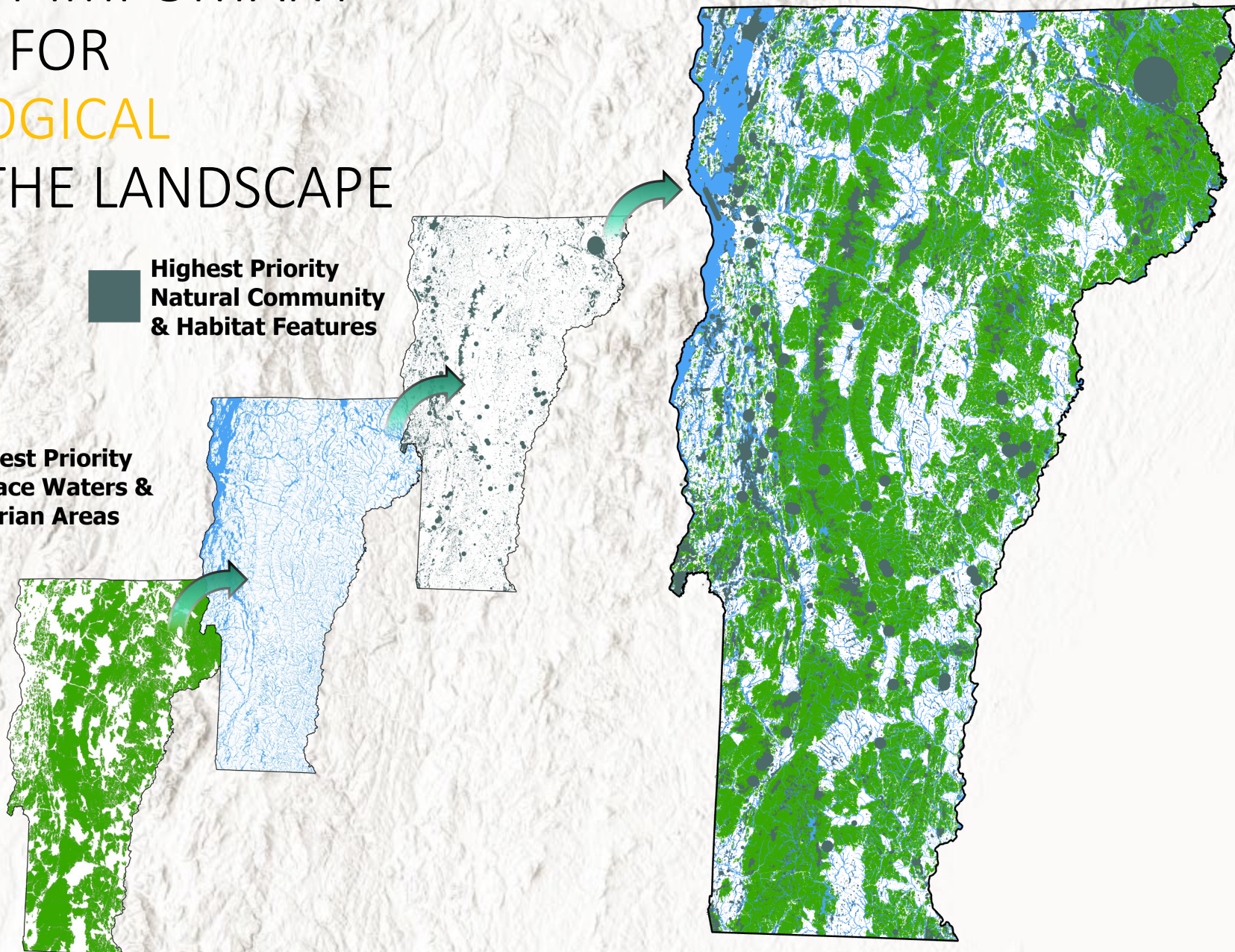


<https://anrmaps.vermont.gov/websites/BioFinder4/>

IDENTIFIES THE MOST IMPORTANT
LANDS AND WATERS FOR
MAINTAINING **ECOLOGICAL
FUNCTION** ACROSS THE LANDSCAPE

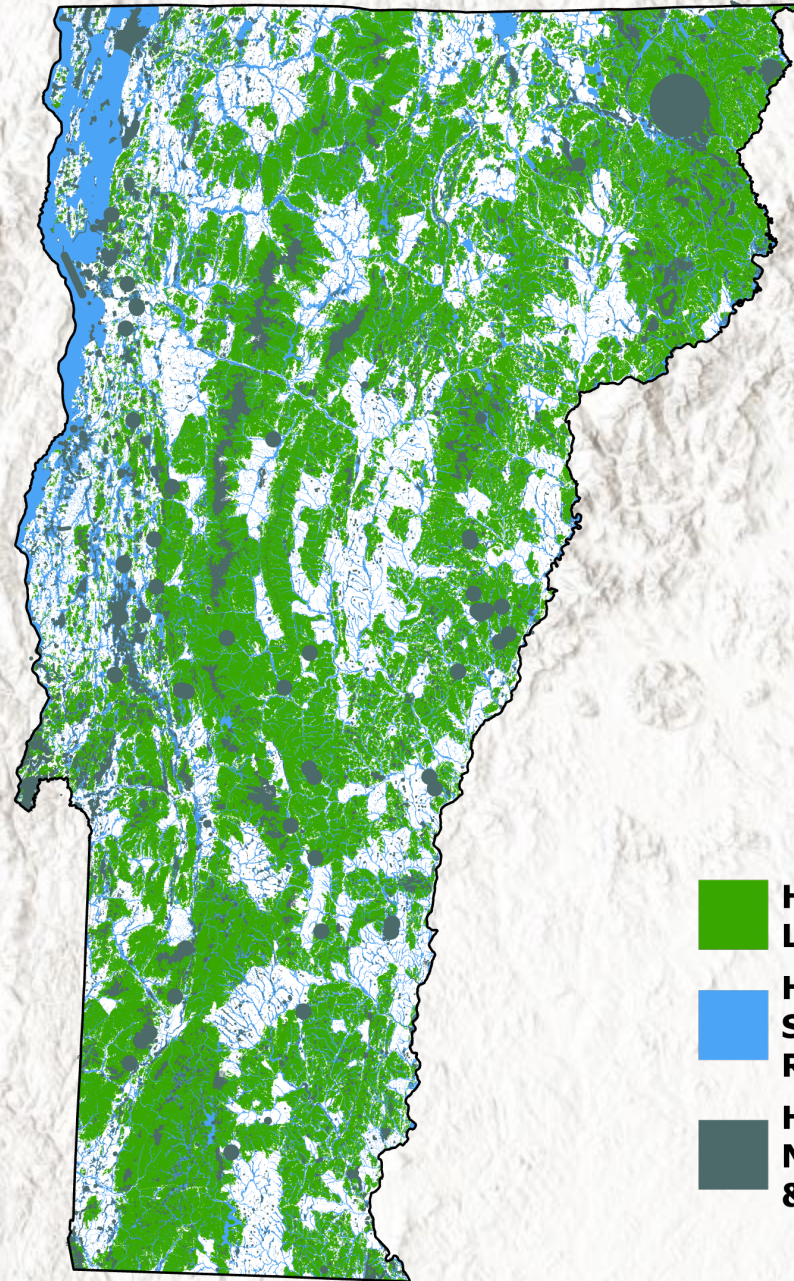
**Vermont Conservation Design
Ecologically Functional Landscape**

-  **Highest Priority
Natural Community
& Habitat Features**
-  **Highest Priority
Surface Waters &
Riparian Areas**
-  **Highest Priority
Landscape Blocks**



AN ECOLOGICALLY FUNCTIONAL LANDSCAPE IS...

- *Intact*
- *Connected*
- *Diverse*



CONSERVATION DESIGN AT THREE SCALES

Landscapes



- Interior Forest Blocks
- Connectivity Blocks
- Geological Diversity Blocks
- Surface Waters and Riparian Areas
- Riparian Areas for Connectivity

Natural Communities



- Natural Communities
- Young and Old Forest
- Aquatic Habitats
- Wetlands
- Grasslands/Shrublands
- Underground Habitats

Species



- *Species with very specific biological needs that will likely always require individual attention*



Forest Blocks

*also called
Habitat Blocks*

Areas of contiguous forest and other natural habitats that are bounded by roads, development, and agriculture.

An aerial photograph of a rural landscape with various fields and trees. A large, irregular area is highlighted in a bright orange color, representing forest blocks. The highlighted area includes several large, dense clusters of trees and smaller, scattered tree groups. The surrounding landscape consists of green and brown fields, some with roads or paths.

Forest Blocks

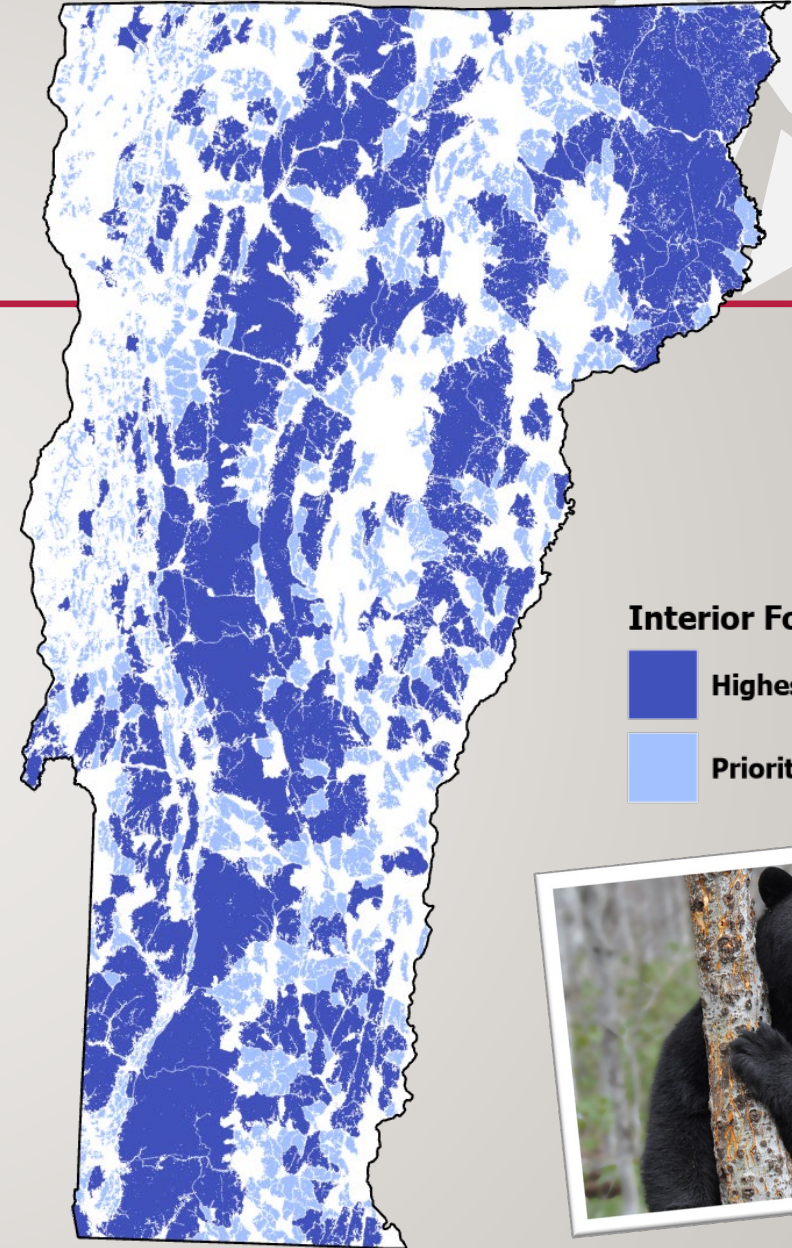
*also called
Habitat Blocks*

New in 2024



Much improved
mapping of
habitat blocks

INTERIOR FOREST BLOCKS

- The largest habitat blocks in each biophysical region provide the best **interior forest conditions**
- These are places with minimal external disturbance effects from forest fragmentation
- Size is the determining factor in block priority



Interior Forest Blocks

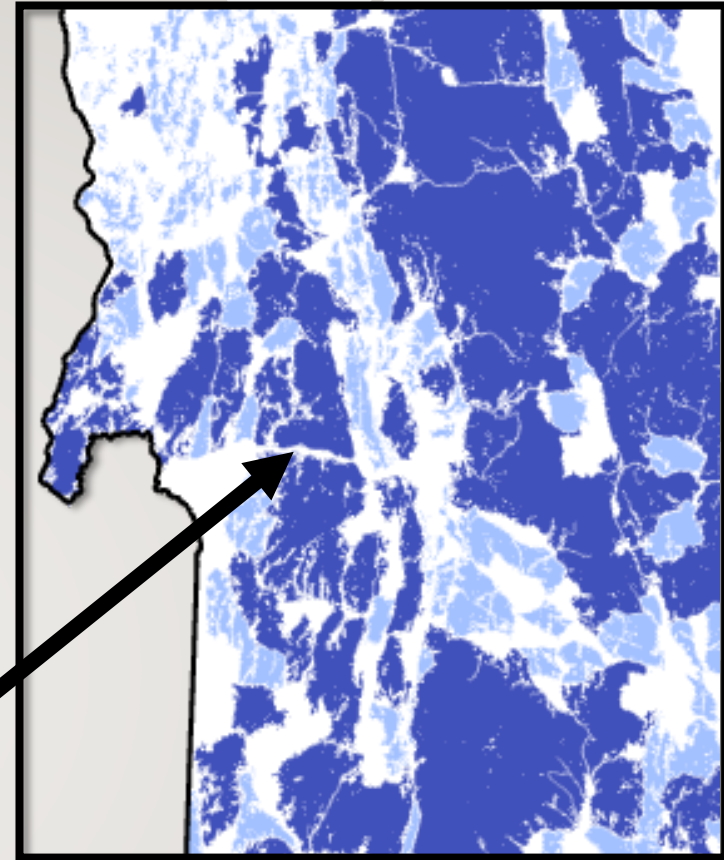
-  Highest Priority
-  Priority



Interior Forest Blocks

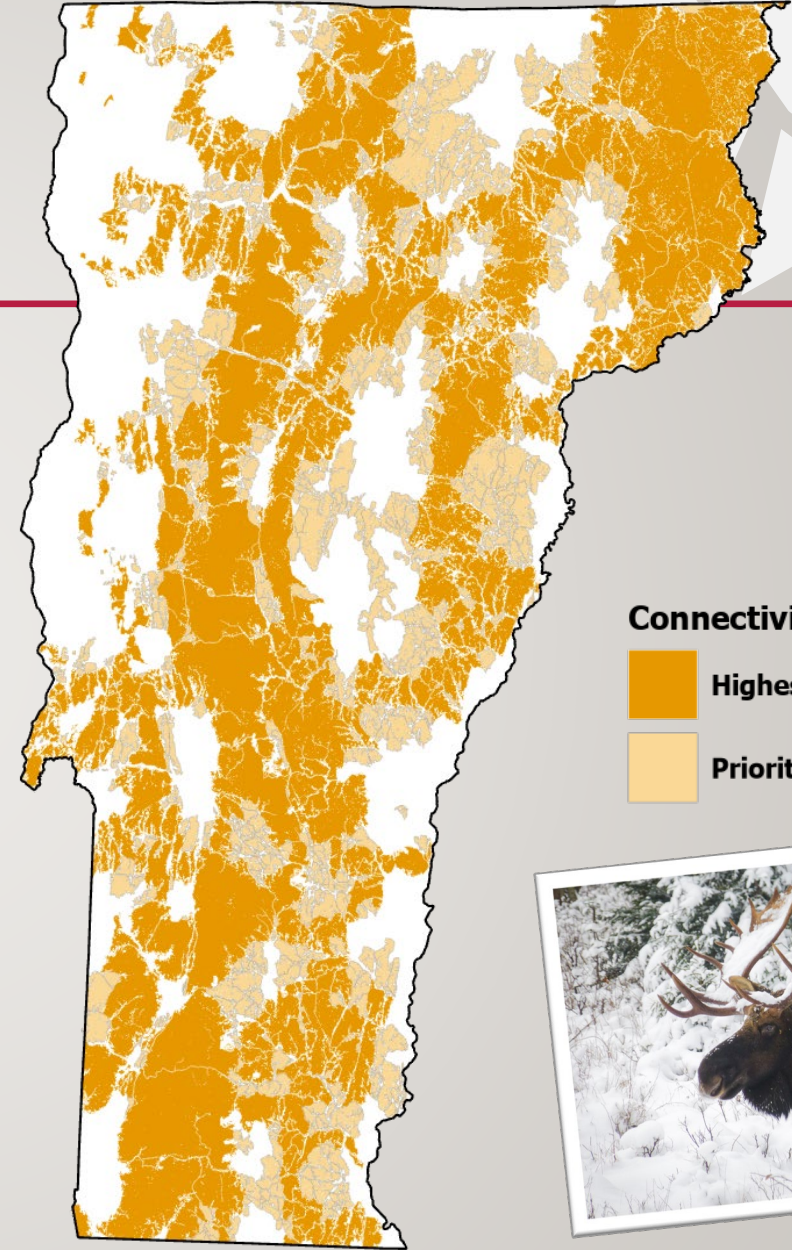
Guidelines for Maintaining Ecological Function:

- Avoid permanent interior fragmentation
- Limit development to the margins
- Maintain forest structure & distribution of age classes
- Minimize invasive species.





CONNECTIVITY BLOCKS

- A network of habitat blocks selected to promote **landscape connectivity** across Vermont
- Supports individual animal movements, as well as long-term shifts of plant and animal ranges
- Functions occur at edge of blocks as well as in the interior



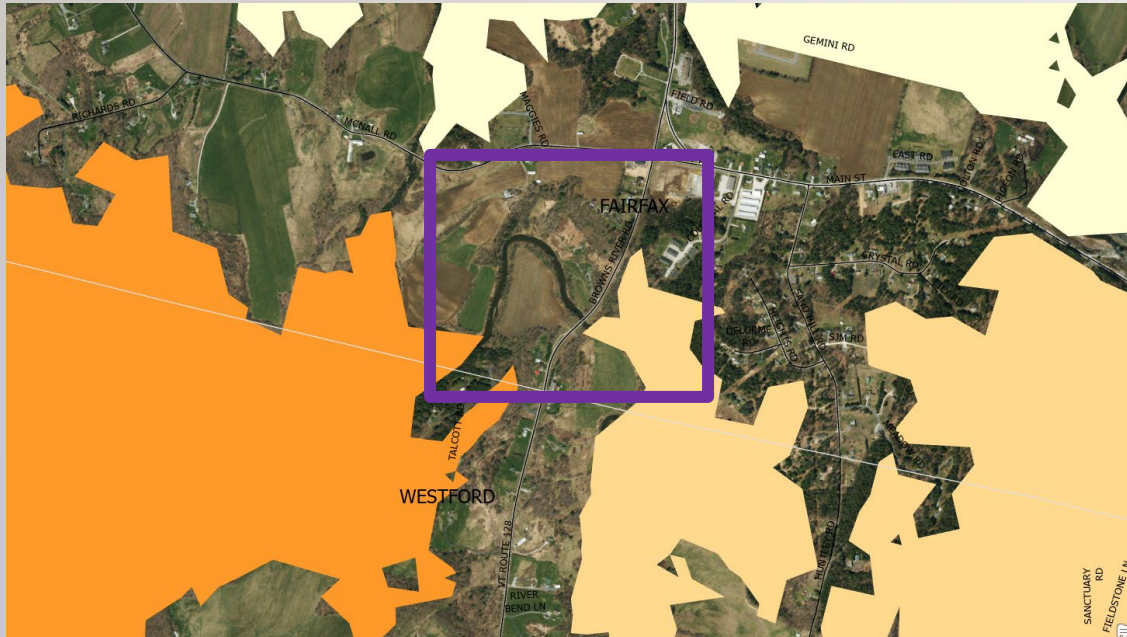
Connectivity Blocks

-  Highest Priority
-  Priority



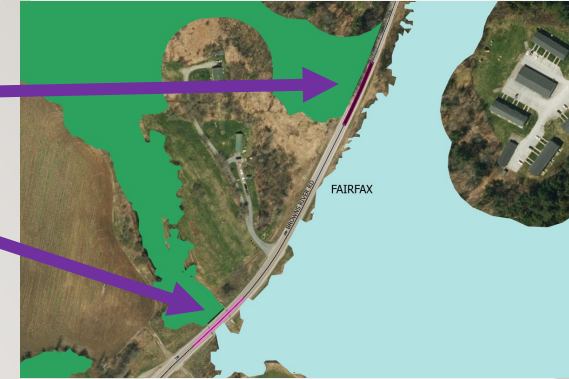
FOUNDATIONAL CONNECTIVITY SCIENCE

Ability to detect
connecting land



2011

Leads to better
Wildlife Road
Crossings



2023



2023

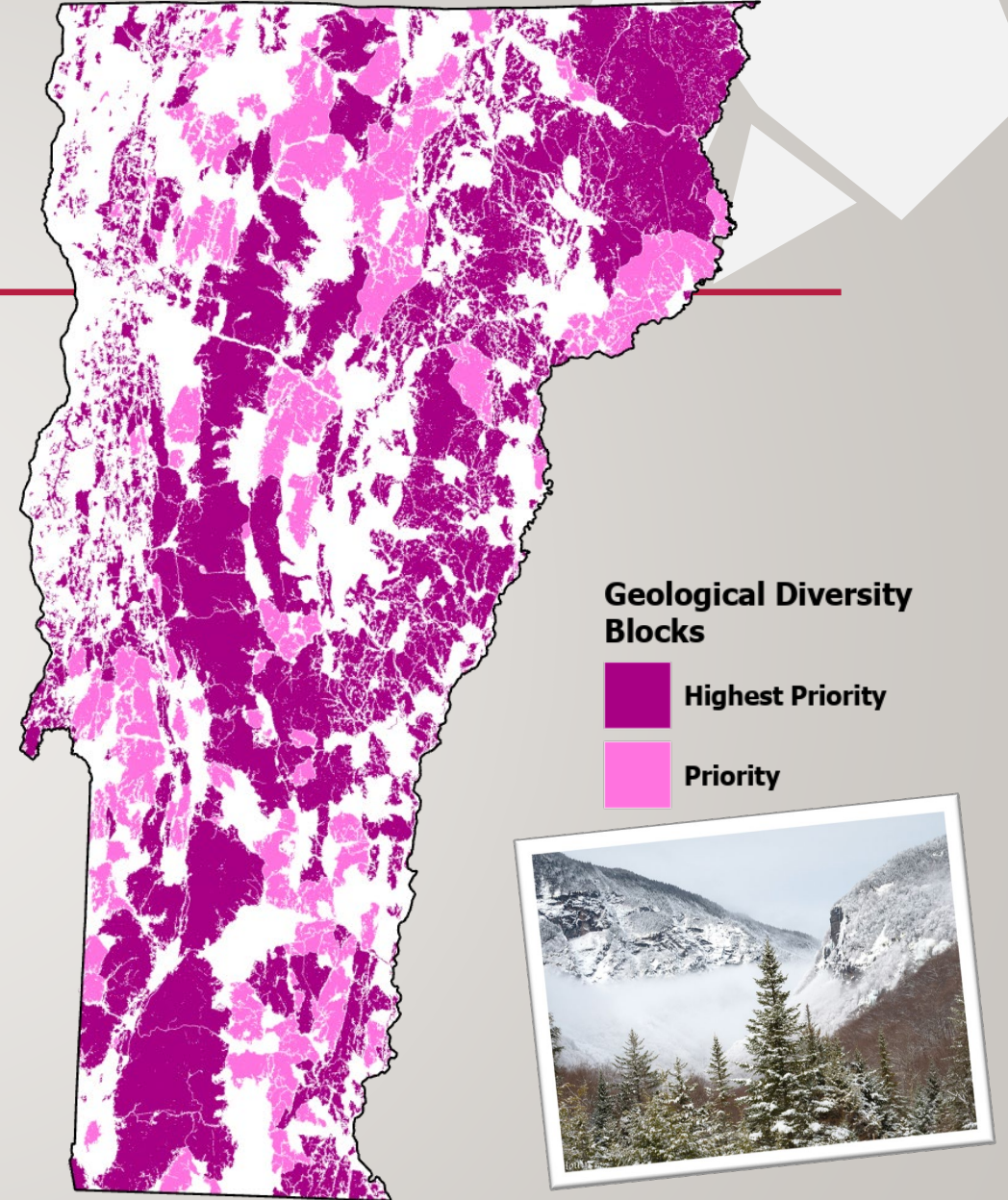
Wildlife Road Crossings

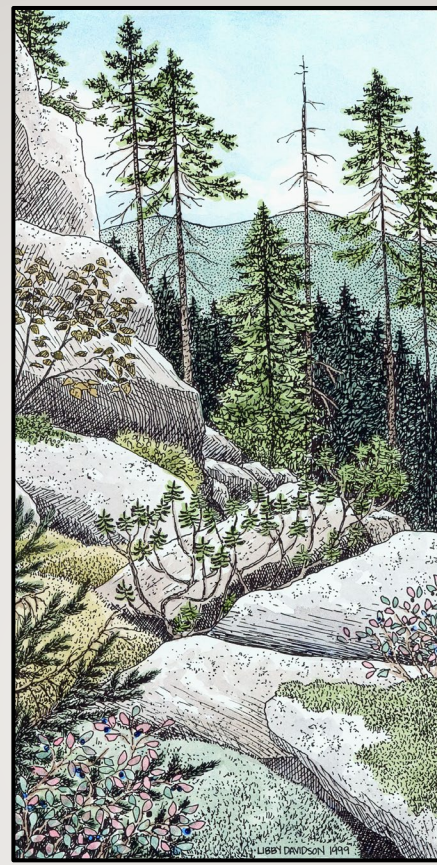
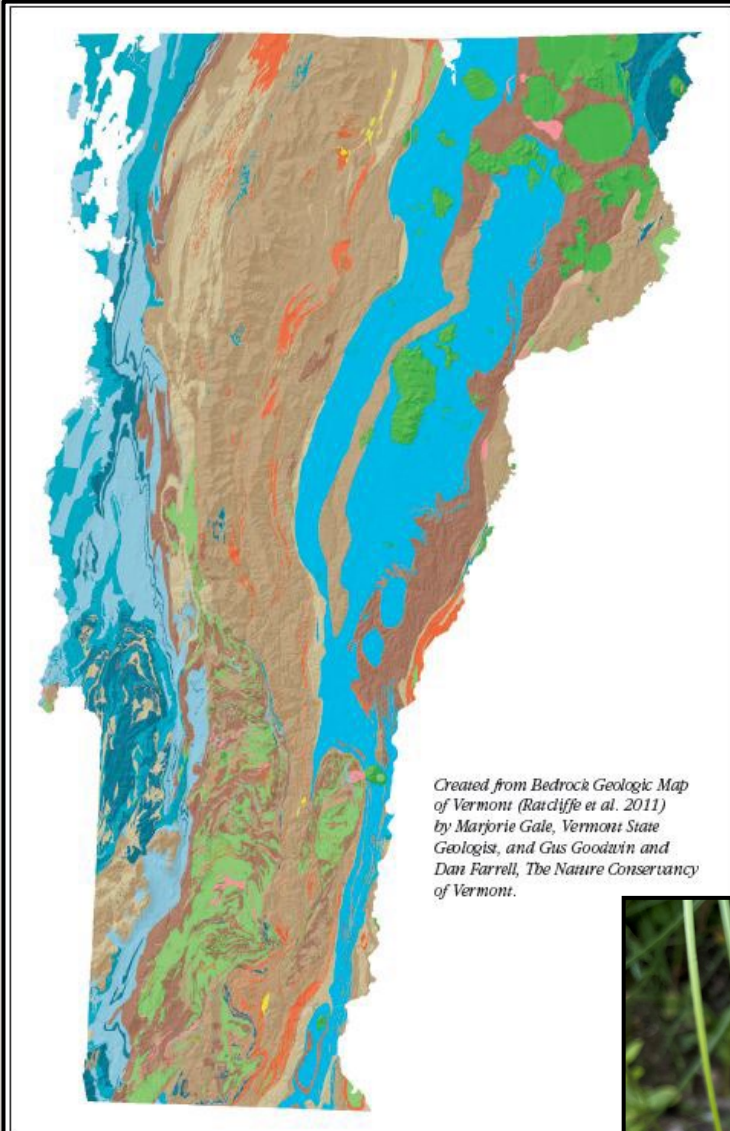
(a habitat-scale element)



GEOLOGICAL DIVERSITY BLOCKS

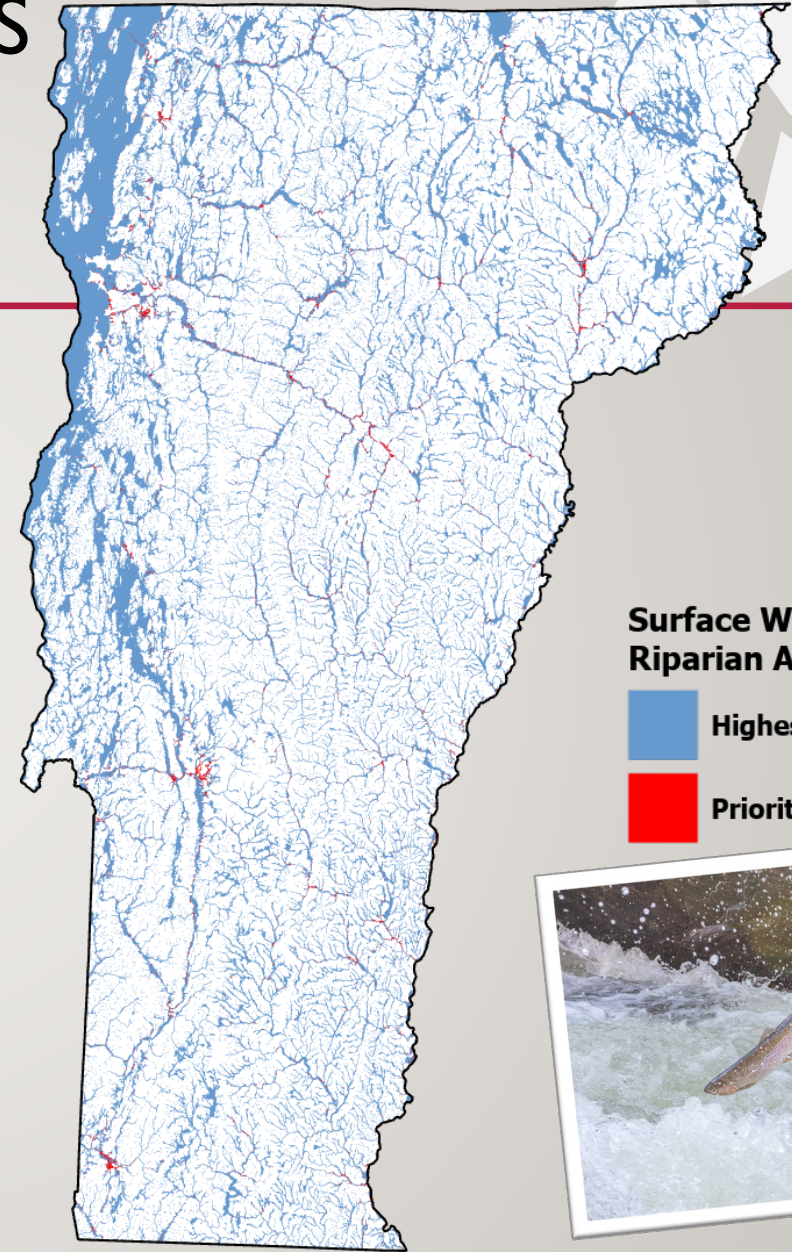
- A selection of habitat blocks that represents the full range of **physical landscape settings** across Vermont
- Diversity in enduring physical features gives rise to diversity in ecological communities
- Key to nature's climate resilience







SURFACE WATERS & RIPARIAN AREAS

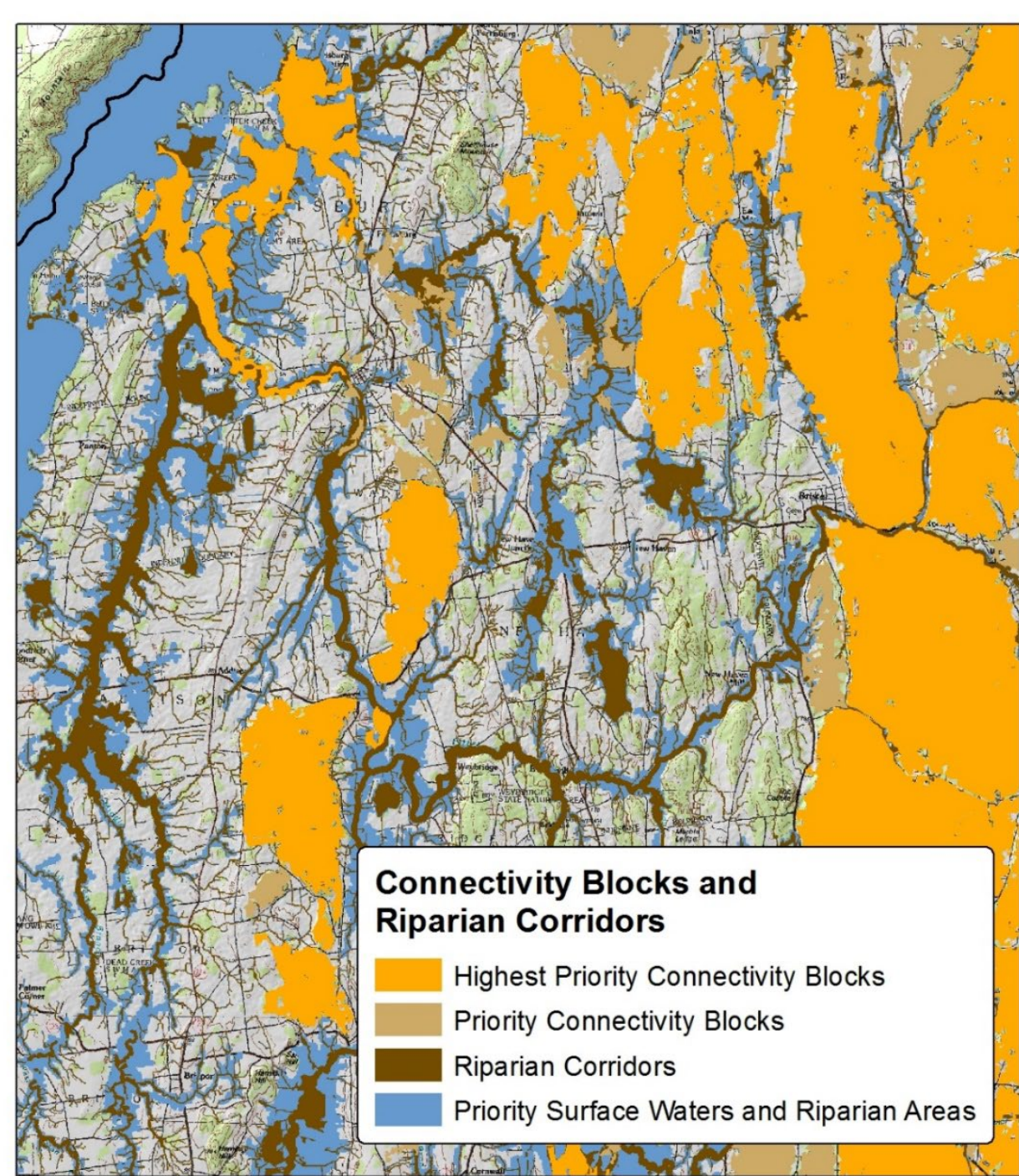
- The complete network of **lakes, ponds, rivers, and streams**, and their **vegetated margins**



Surface Waters & Riparian Areas

-  Highest Priority
-  Priority





Riparian Connectivity

Riparian areas can connect forest blocks

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Natural Communities



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Species



- *Species with very specific biological needs that will likely always require individual attention*

A photograph of a Red Oak-Northern Hardwood Forest. The trees are mostly without leaves, and the ground is covered in fallen brown leaves. The forest is on a hillside with some rocky outcrops.

Red Oak-Northern Hardwood Forest

A photograph of an Alpine Meadow. The landscape is rocky with patches of green and brown grass. In the background, there are blue mountains under a blue sky with some clouds.

Alpine Meadow

Natural Communities

Interacting assemblages of organisms, their physical environment, and the natural processes that affect them

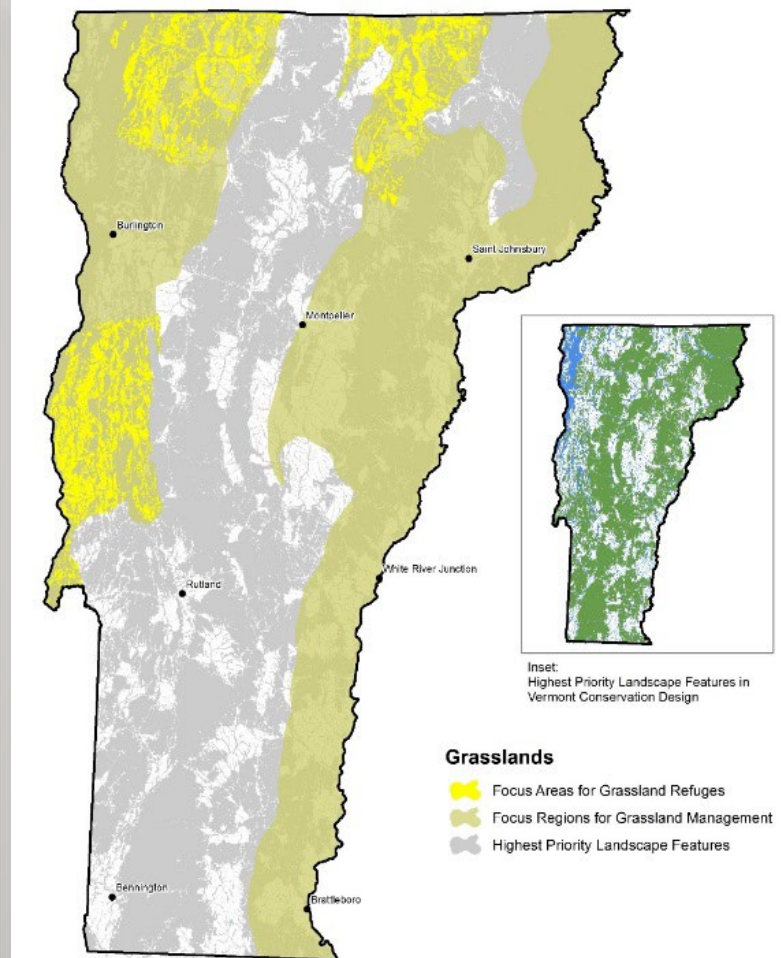
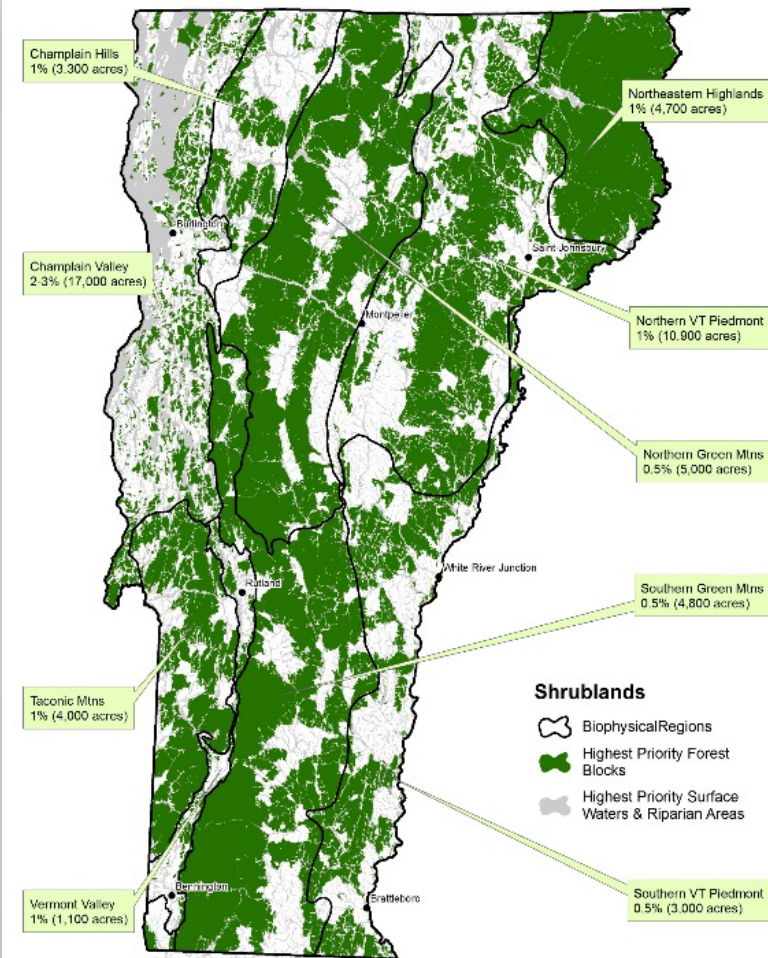
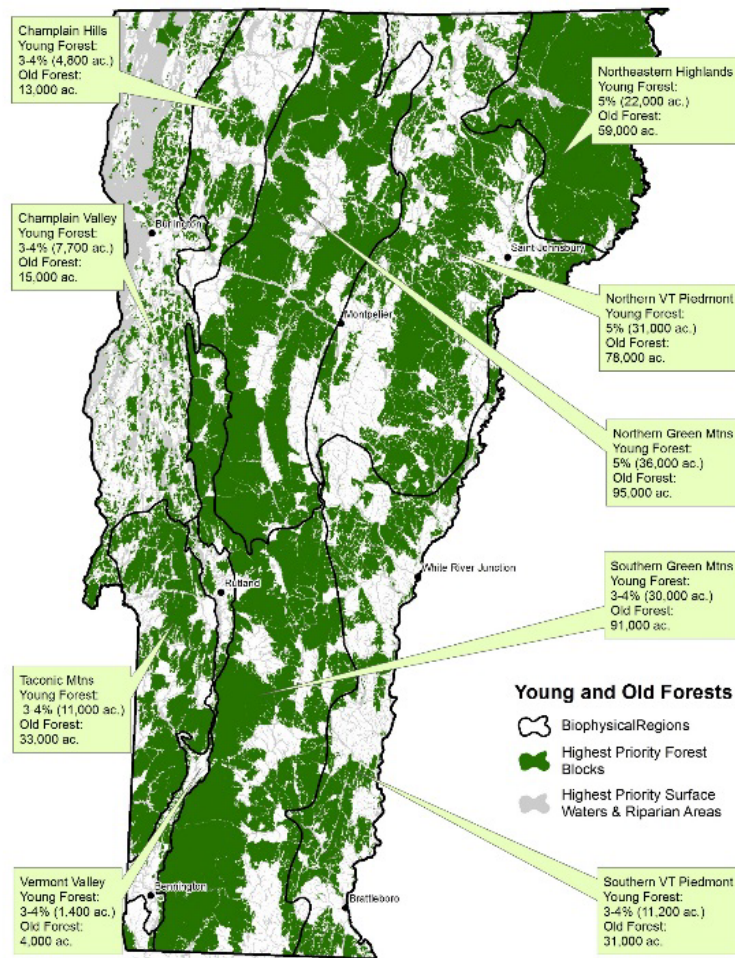
A photograph of a River Cobble Shore. The foreground is filled with smooth, grey river stones. A river flows in the middle ground, and a dense forest is visible in the background.

River Cobble Shore

A photograph of a Red Maple-Black Gum Basin Swamp. The scene is a dense forest with many green ferns in the foreground and several trees with characteristic bark patterns.

Red Maple-Black Gum Basin Swamp

Young and Old Forests, Shrublands, Grasslands



Young and Old Forests

Young and old forests support a great diversity of species and ecological processes

Targets:

- **3-5% young forest**
- **9% old forest**

Distributed across Vermont and proportional to matrix forest types

Ecological Functions:

- Young forests are habitat for many wildlife species, especially birds.
- Old forests allow for natural processes, have complex and diverse habitats, contribute to clean air and water, and are particularly resilient to change.



Photo: Shelby Perry



Grasslands

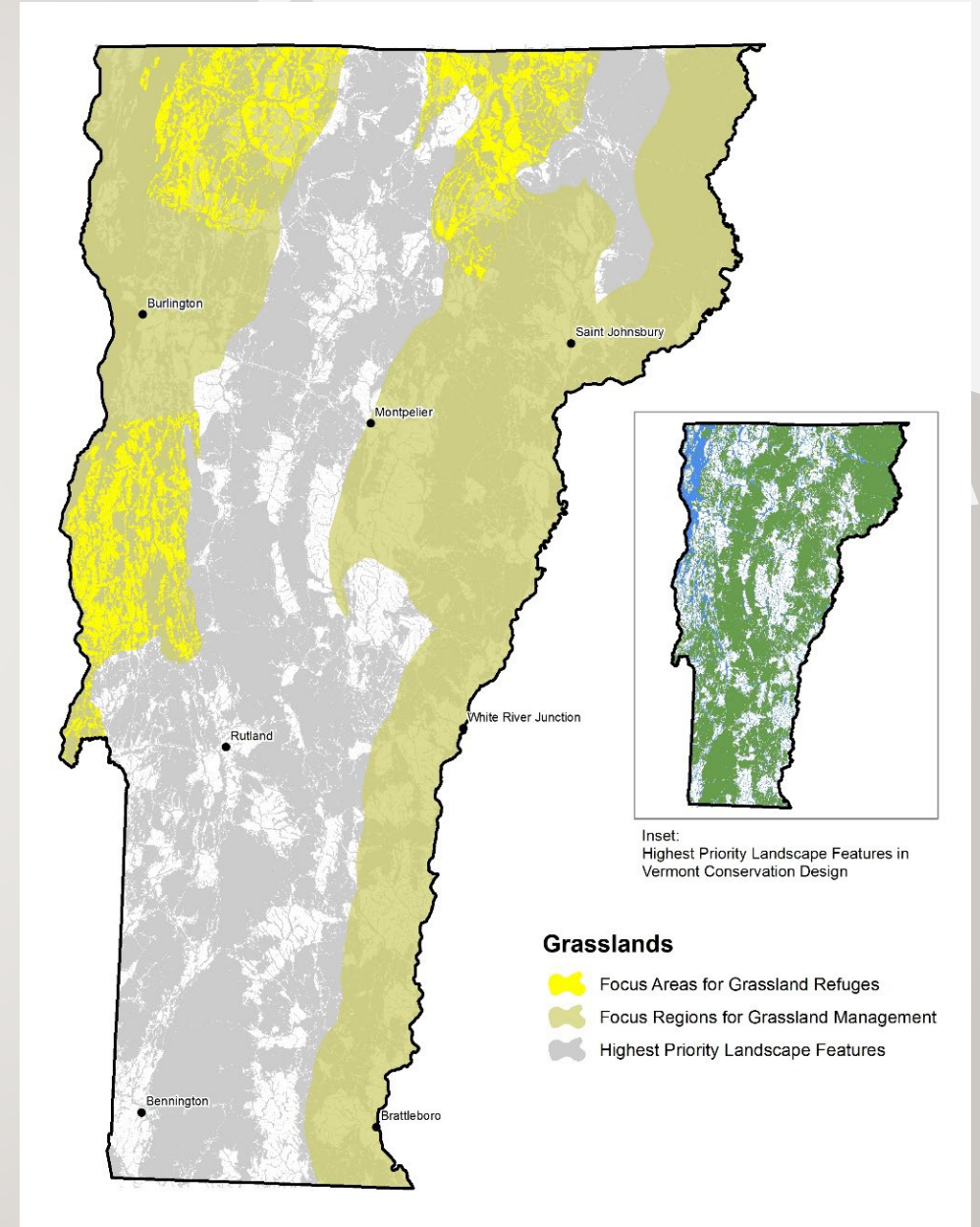
Grasslands are man-made habitats that support a unique set of species

Many bird species that need grasslands are in regional decline

“Lifeboat” of 7,500 acres to ensure these species remain in Vermont

Ecological Functions:

- Supports a suite of grassland-nesting birds such as Bobolink and Savannah Sparrow
- Habitat that has been lost in other parts of the country



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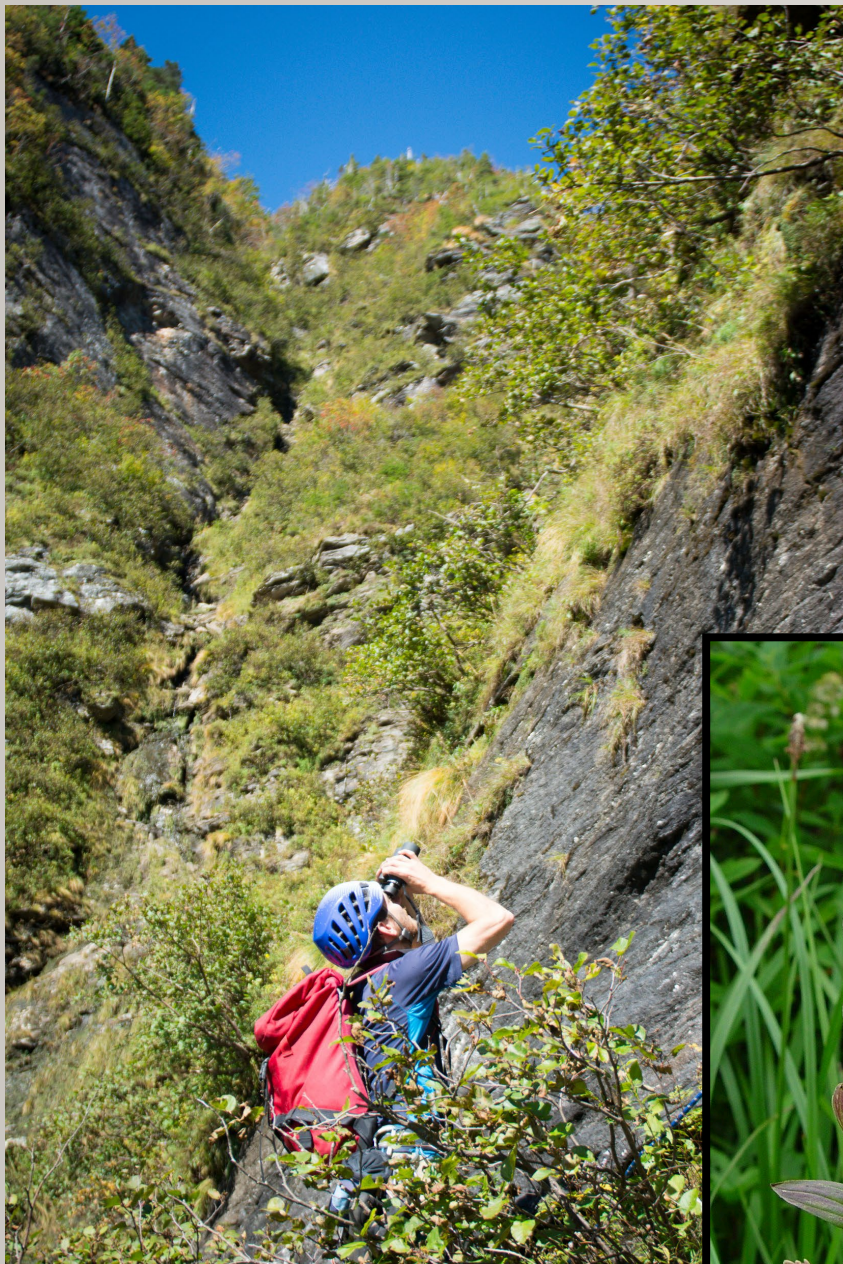


- Natural Communities
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Species



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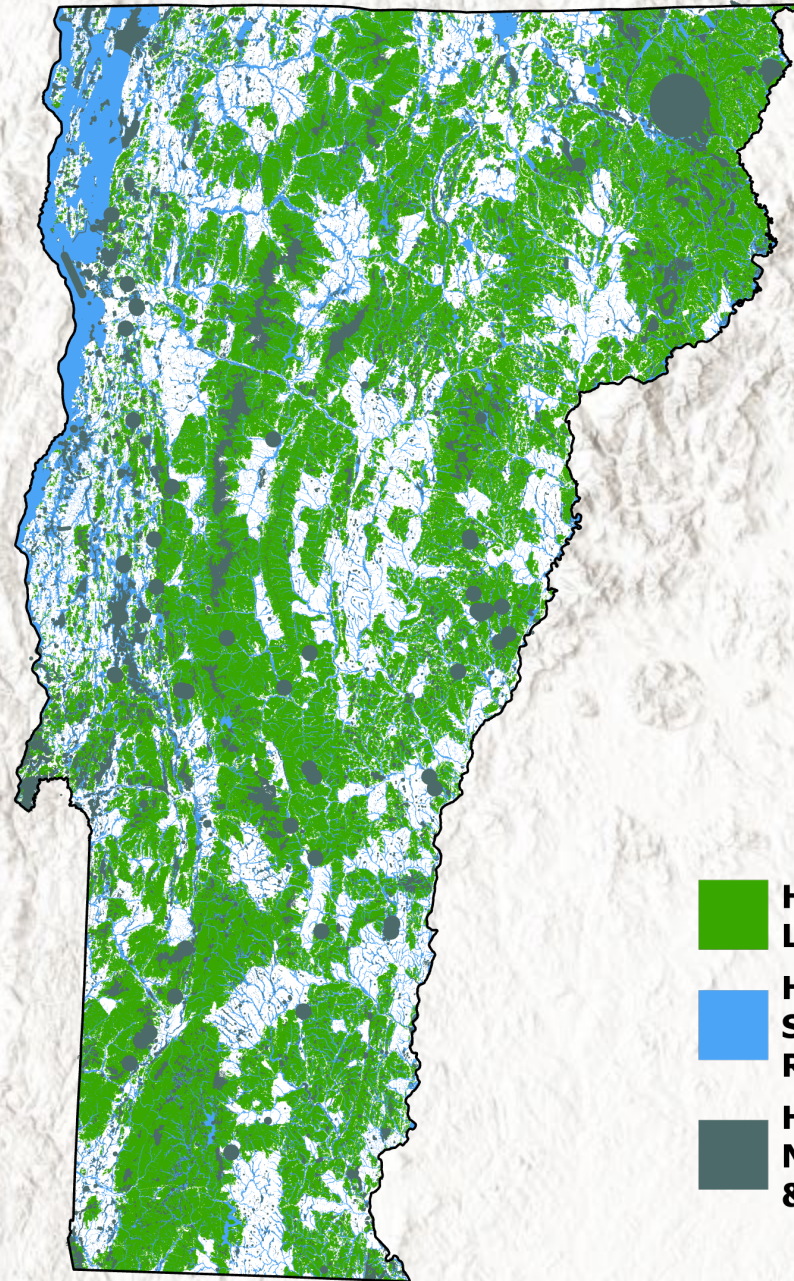
Northern pale painted cup



Spiny softshell turtle

AN ECOLOGICALLY FUNCTIONAL LANDSCAPE IS...

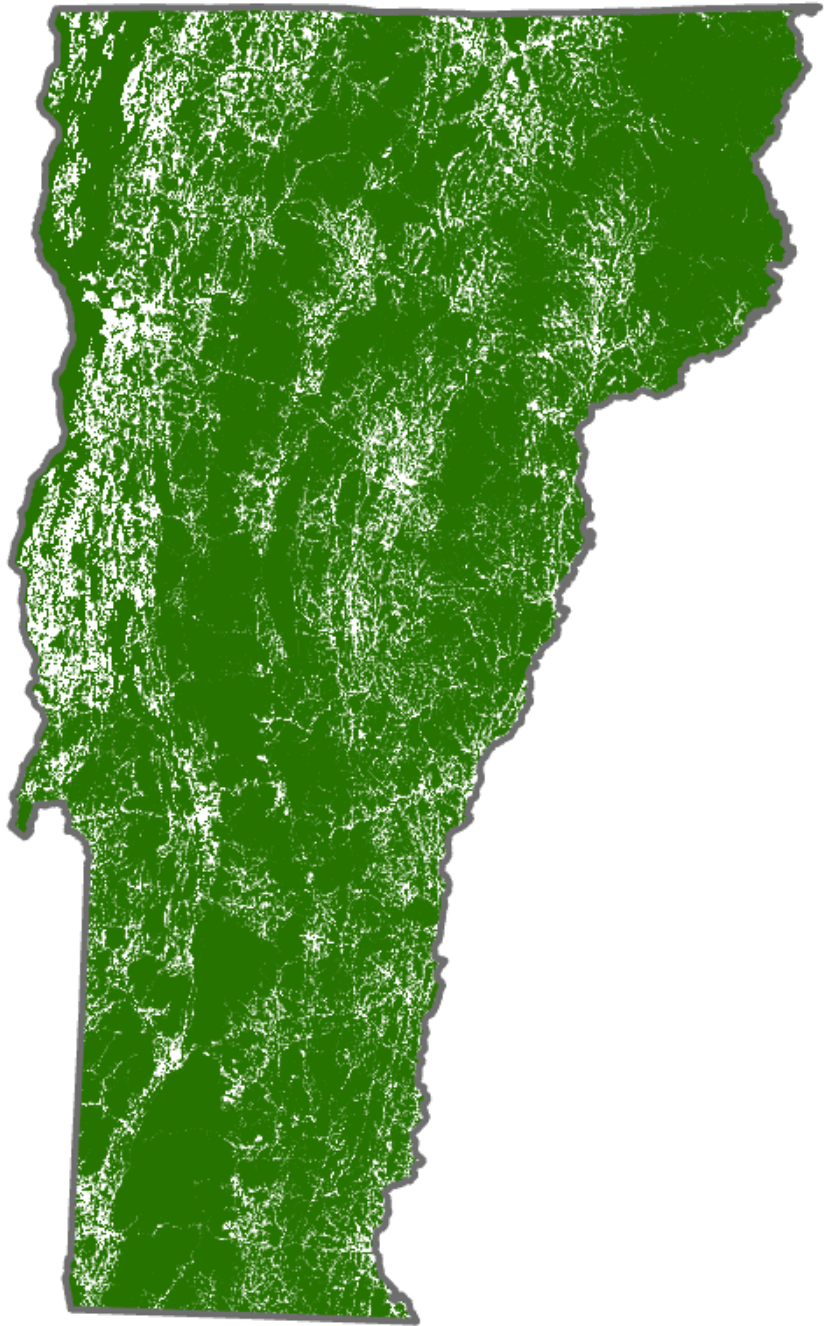
- *Intact*
- *Connected*
- *Diverse*

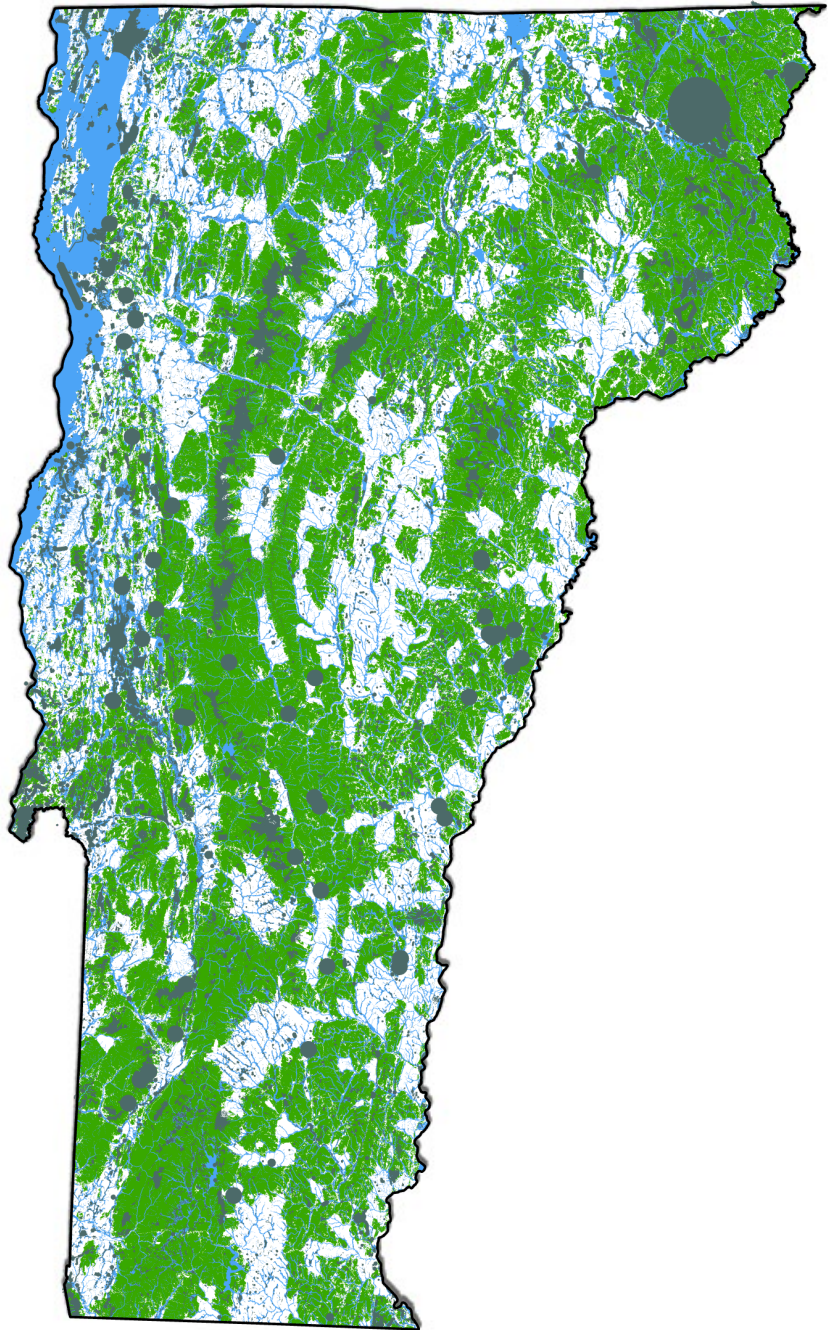




MAINTAINS NATURE AND THE BENEFITS IT PROVIDES

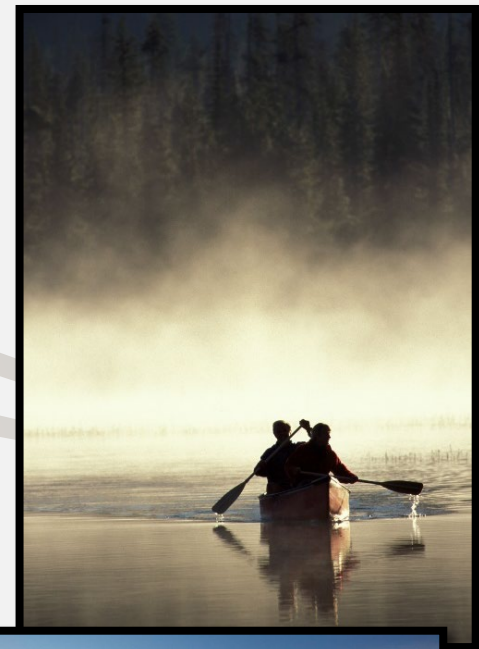
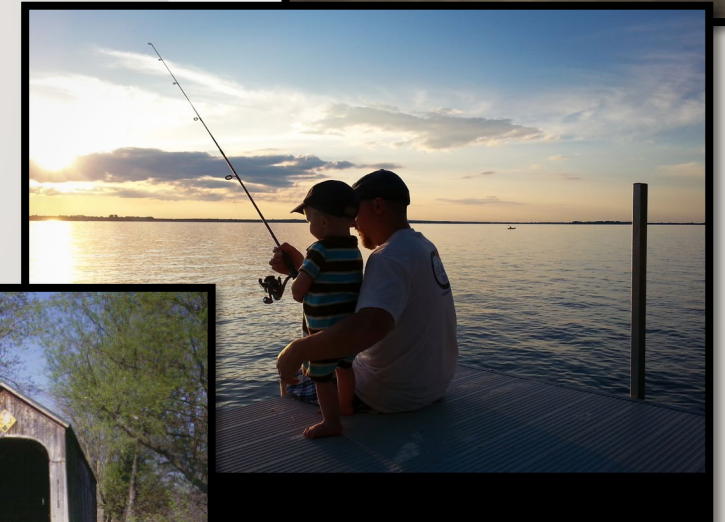
- *Maintains an intact, connected and diverse natural landscape*
- *Conserves species and natural communities*
- *Allows nature to adapt to a changing climate*





Sustains more than biodiversity

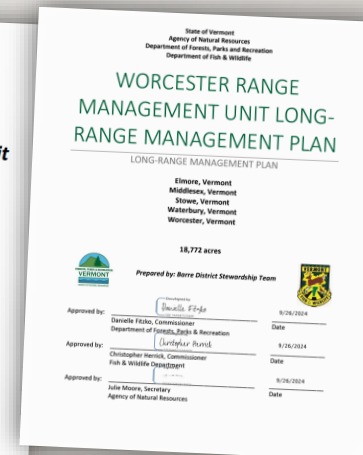
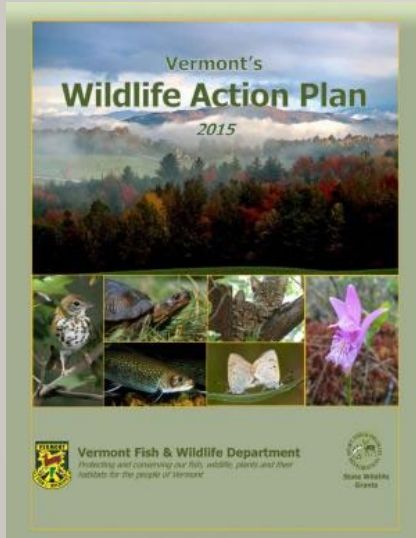
- **Outdoor recreation**
- **Clean water**
- **Sense of place and rural character**
- **Working farms and forests**
- **Nature's benefits**





VT FISH AND WILDLIFE DEPARTMENT USES VERMONT CONSERVATION DESIGN TO:

- help select new acquisitions of state lands
- inform our management of state lands
- provide technical assistance to landowners, as a way to put their individual property into a larger context
- inform our assessments of projects subject to Act 250, Section 248, and other regulatory review
- help towns apply Vermont Conservation Design in their planning efforts





Vermont's Initial Conserved Land Inventory

Select from the filter categories below to include in the dashboard elements. All records are shown by default.



Fee Organization Type(s)

- Federal
- Local Government
- Non-Governmental Organization
- Private
- State

Reset

Select all

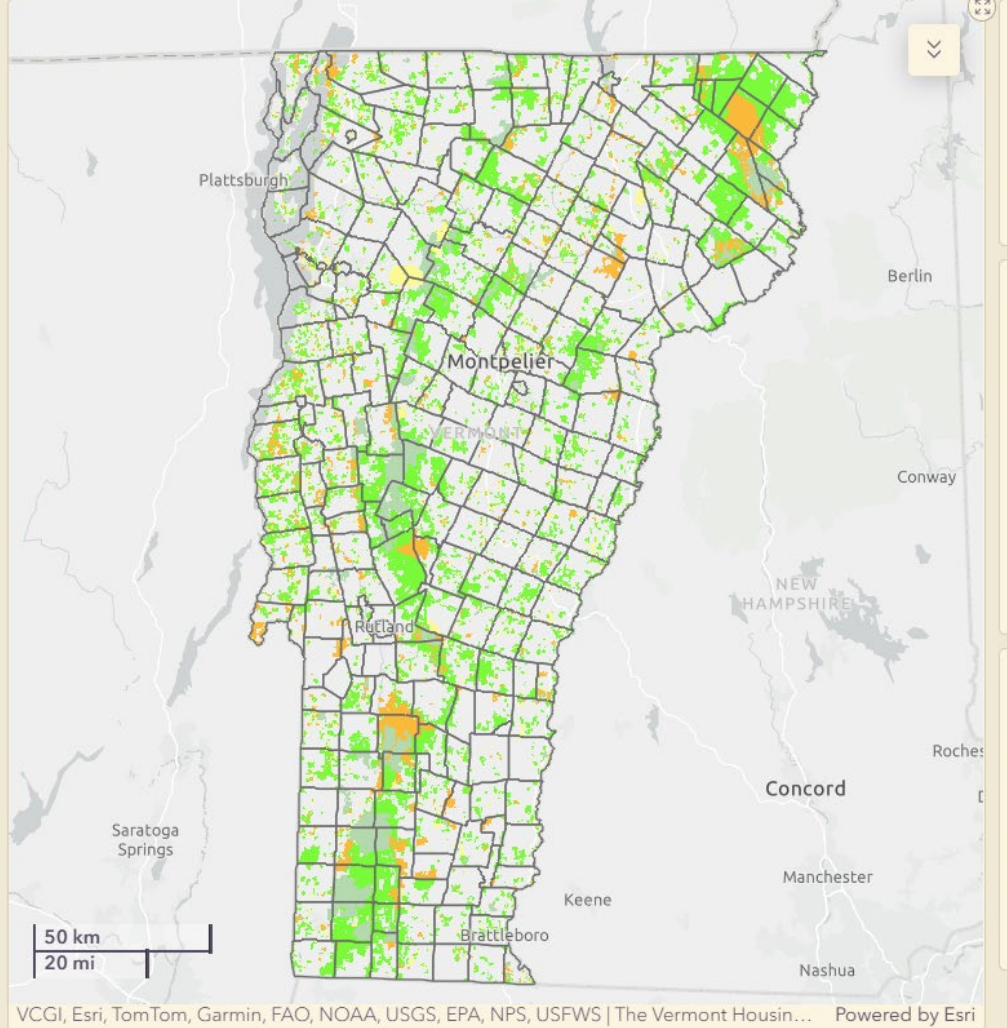


Conservation Category

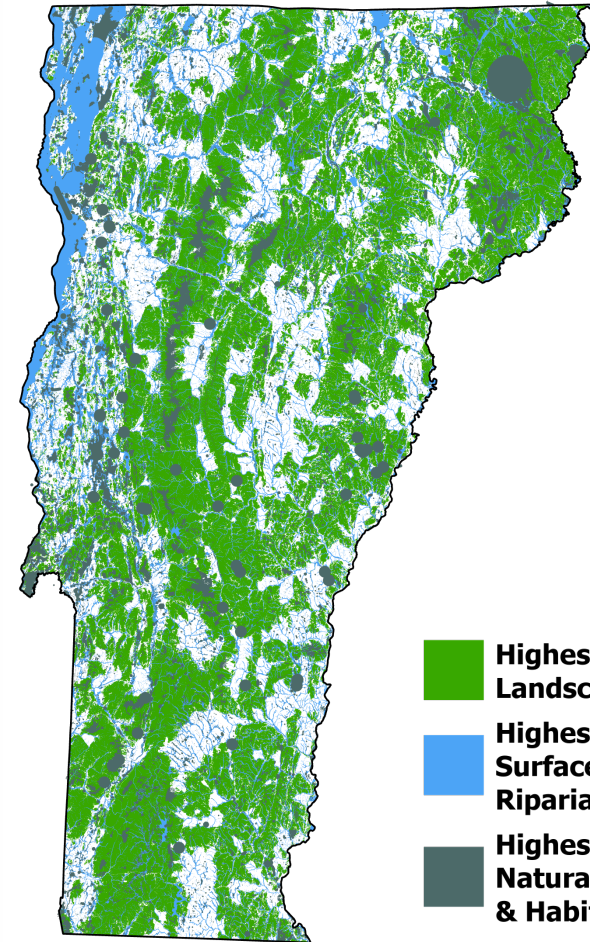
- Ecological reserve area
- Biodiversity conservation area
- Natural resource management area
- Uncategorized conserved area


Reset

Select all



VERMONT CONSERVATION DESIGN



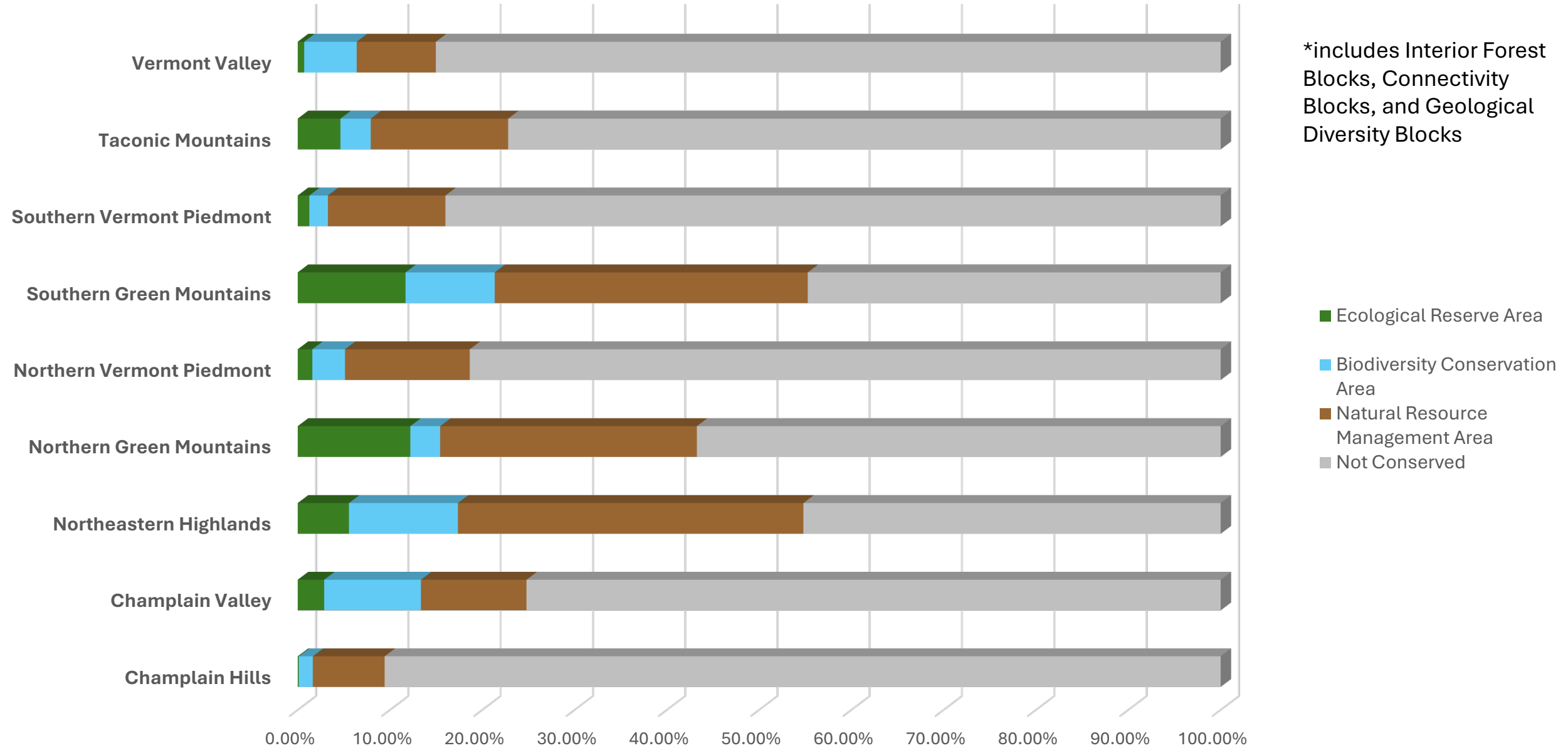
-  **Highest Priority Landscape Blocks**
-  **Highest Priority Surface Waters & Riparian Areas**
-  **Highest Priority Natural Community & Habitat Features**

(Remember permanent land conservation is just one of many tools for achieving VCD.)

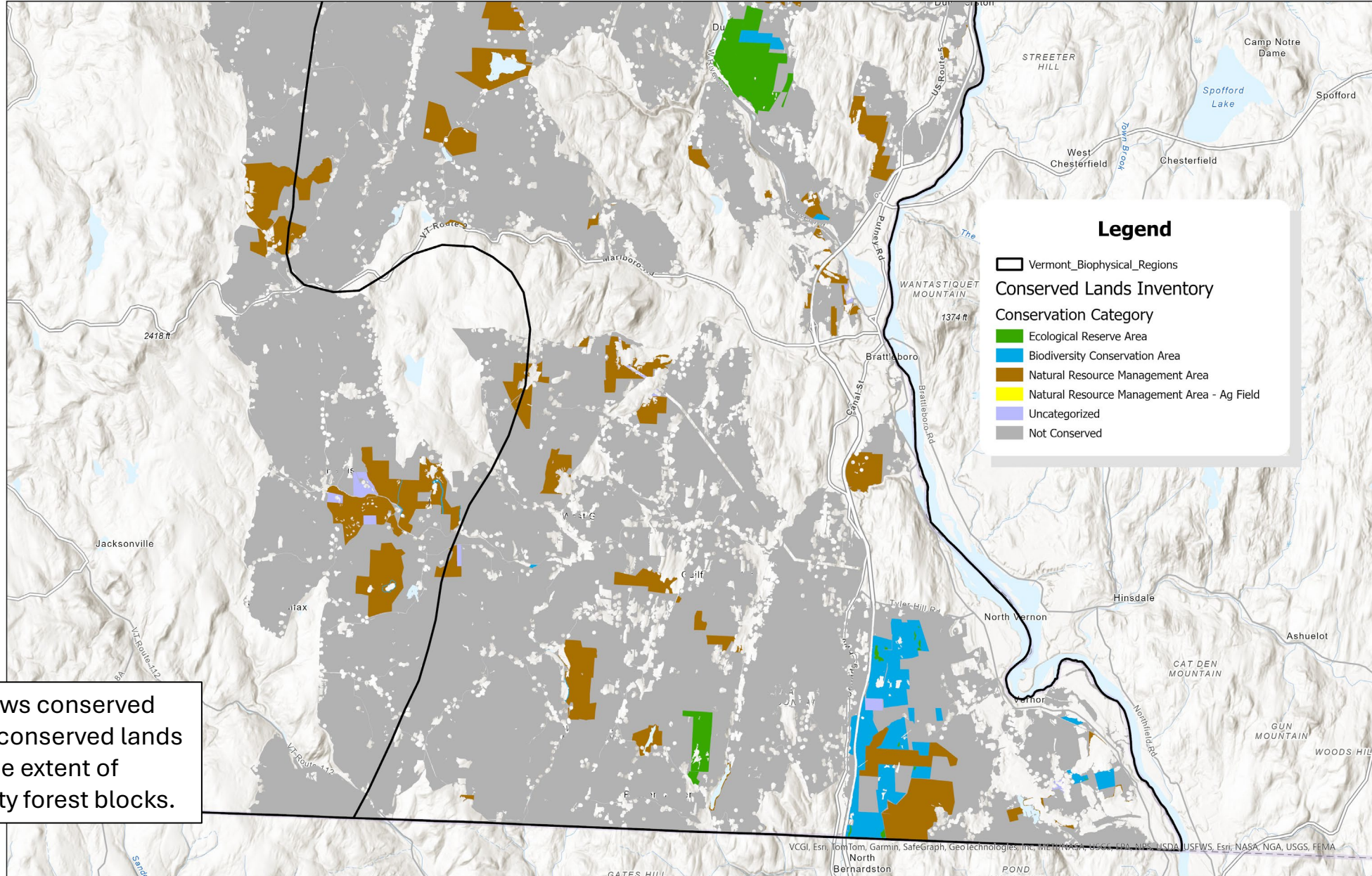
Percent of the land in each Conservation Category that overlaps Highest Priority and Priority Forest Blocks

	Overlaps VCD Highest Priority Forest Blocks	Overlaps VCD Priority Forest Blocks	Does Not Overlap a VCD Forest Block Priority
<i>Ecological Reserve Area</i>	98.58%	0.64%	0.78%
<i>Biodiversity Conservation Area</i>	91.16%	3.72%	5.12%
<i>Natural Resource Management Area</i>	75.68%	5.65%	18.67%

Conservation status of all VCD Highest Priority Forest Blocks,* by category, in each Biophysical Region



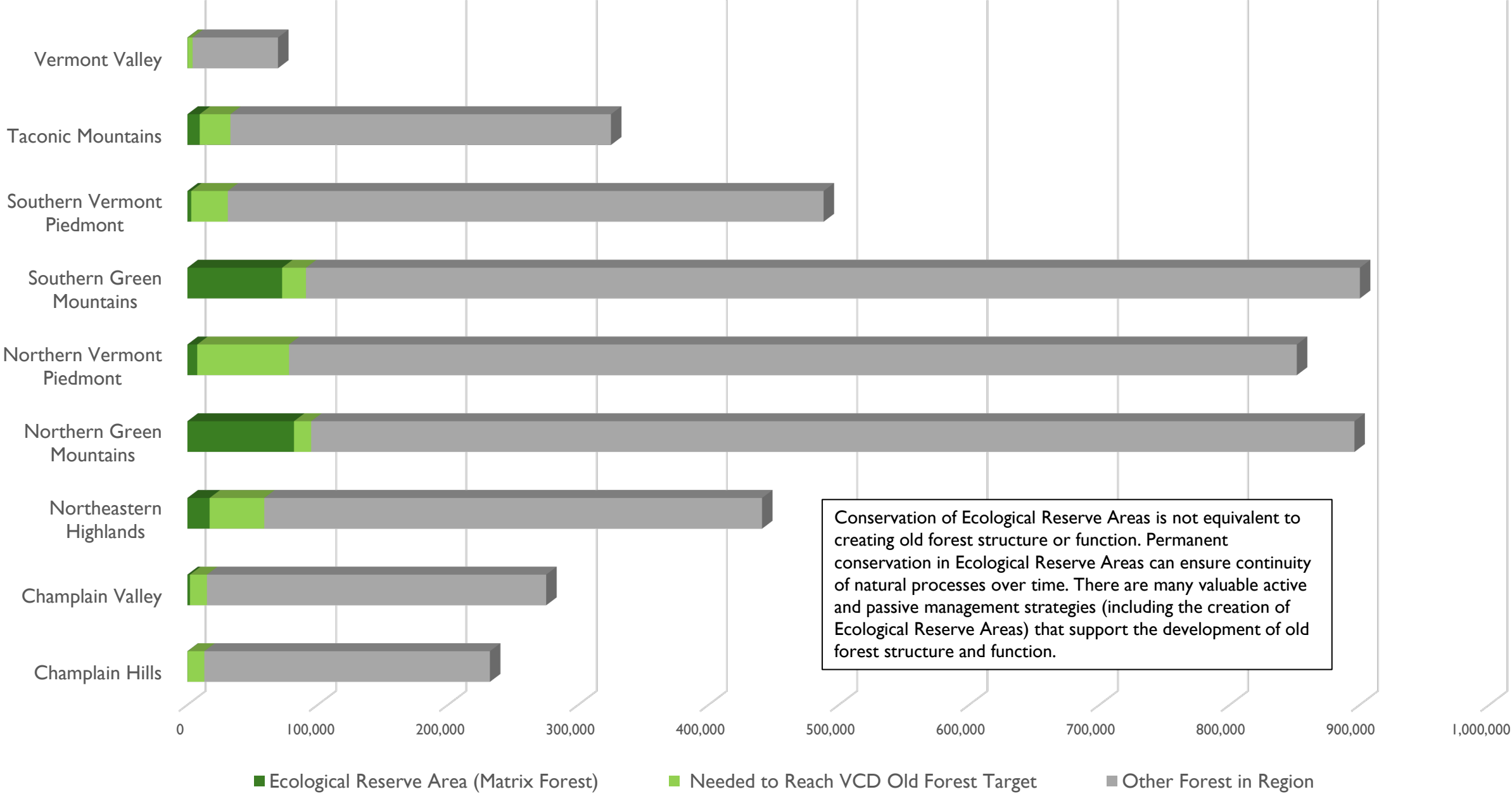
Example Map of all VCD Highest Priority Forest Blocks, by Conservation Category, near Brattleboro



This map shows conserved lands and unconserved lands *only* within the extent of highest priority forest blocks.

VCGI, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, Intel, Mapbox, OpenStreetMap, NPS, USDA, USFWS, Esri, NASA, NGA, USGS, FEMA

Spatial Contribution of Ecological Reserves to Permanently Protecting Future Old Forest



Conservation of Ecological Reserve Areas is not equivalent to creating old forest structure or function. Permanent conservation in Ecological Reserve Areas can ensure continuity of natural processes over time. There are many valuable active and passive management strategies (including the creation of Ecological Reserve Areas) that support the development of old forest structure and function.

■ Ecological Reserve Area (Matrix Forest) ■ Needed to Reach VCD Old Forest Target ■ Other Forest in Region

Some Final Thoughts

- **Scientific vision for the future of Vermont**
- **All the features are needed for ecological function**
- **Requires the full conservation toolbox, including voluntary landowner stewardship**
- **Nature and people can thrive in Vermont**



**Photo by
Susan
Morse**



Northwoods Stewardship Center
USDA Natural Resources Conservation Service
Vermont Coverts
National Wild Turkey Federation
University of Vermont
Middlebury College
VT Department of Environmental Conservation



Thank you
Questions?

<http://www.biofinder.vt.gov/>