

VERMONT CONSERVATION DESIGN

A VISION FOR AN ECOLOGICALLY FUNCTIONAL LANDSCAPE



House Committee on
Natural Resources, Fish,
and Wildlife

January 27, 2021



Eric Sorenson
Ecologist



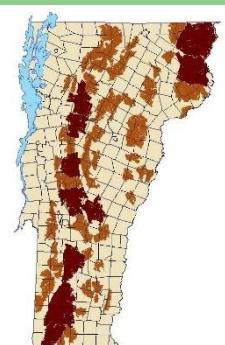
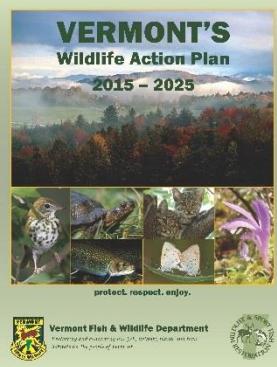
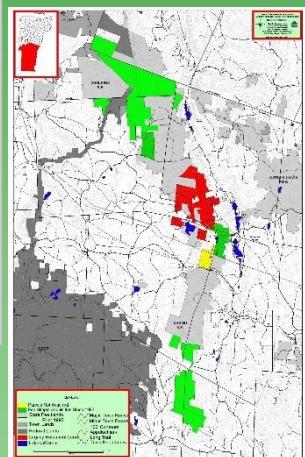
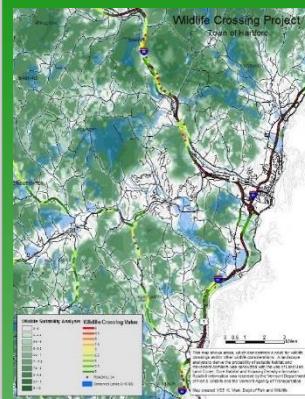
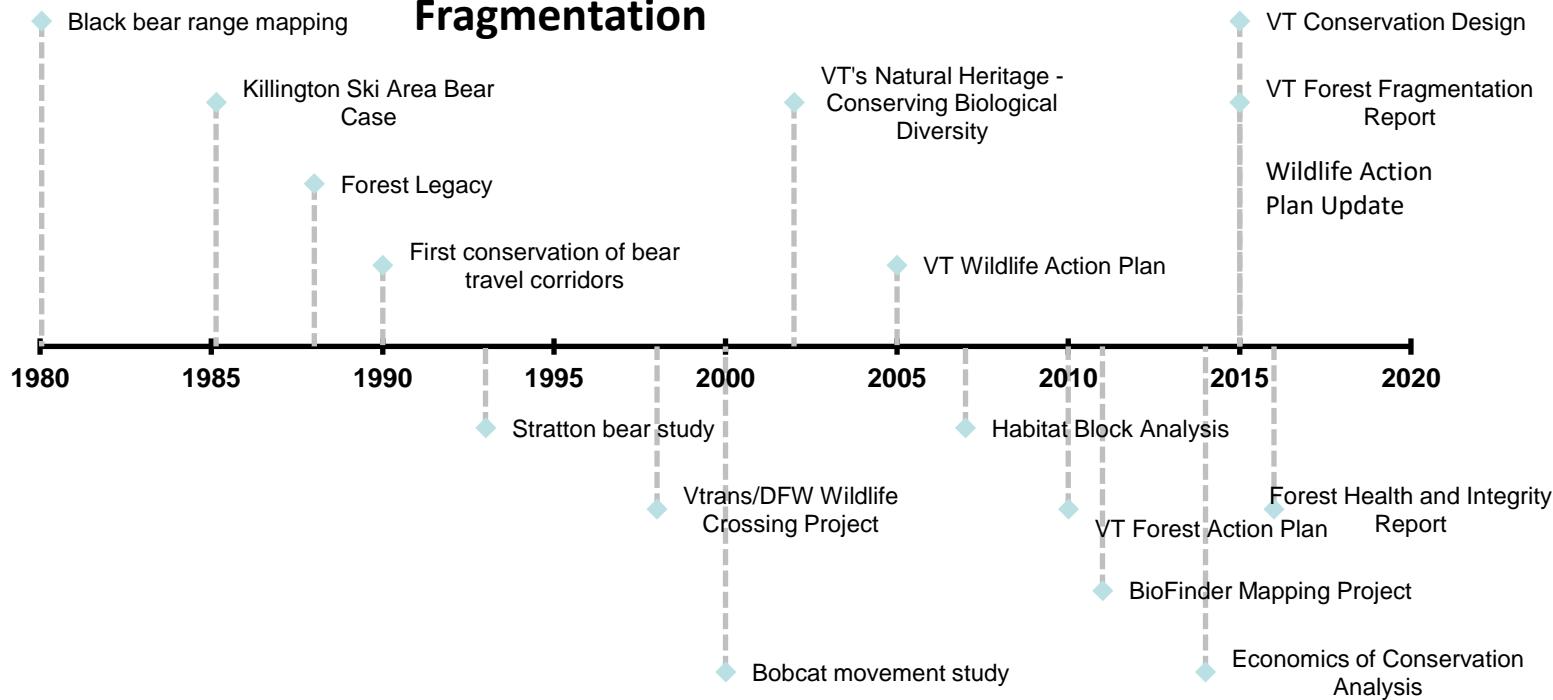
Bear Swamp, Wolcott

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*

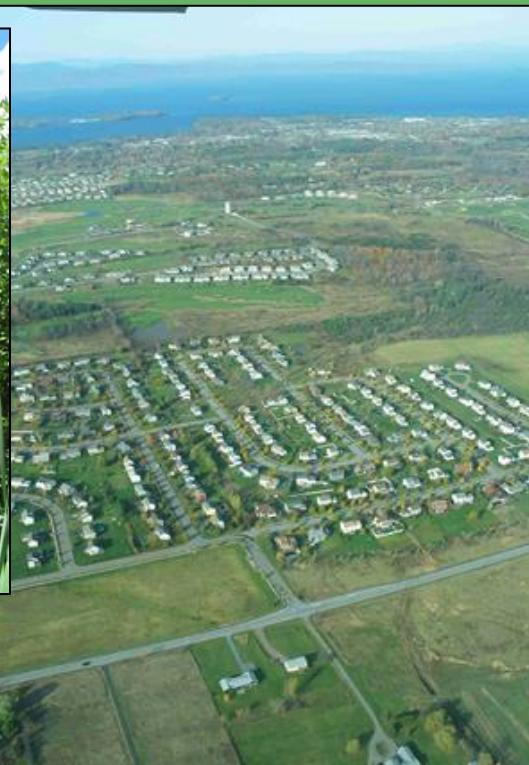
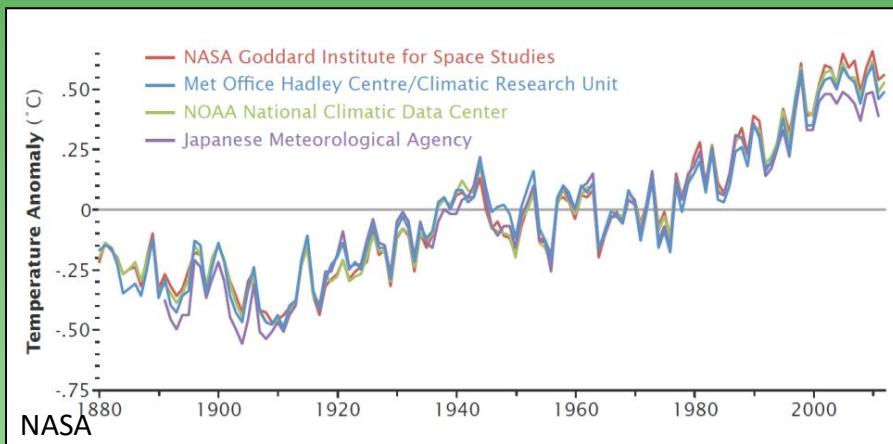


Progression of Knowledge & Information about Forest Fragmentation



Threats to Biological Diversity

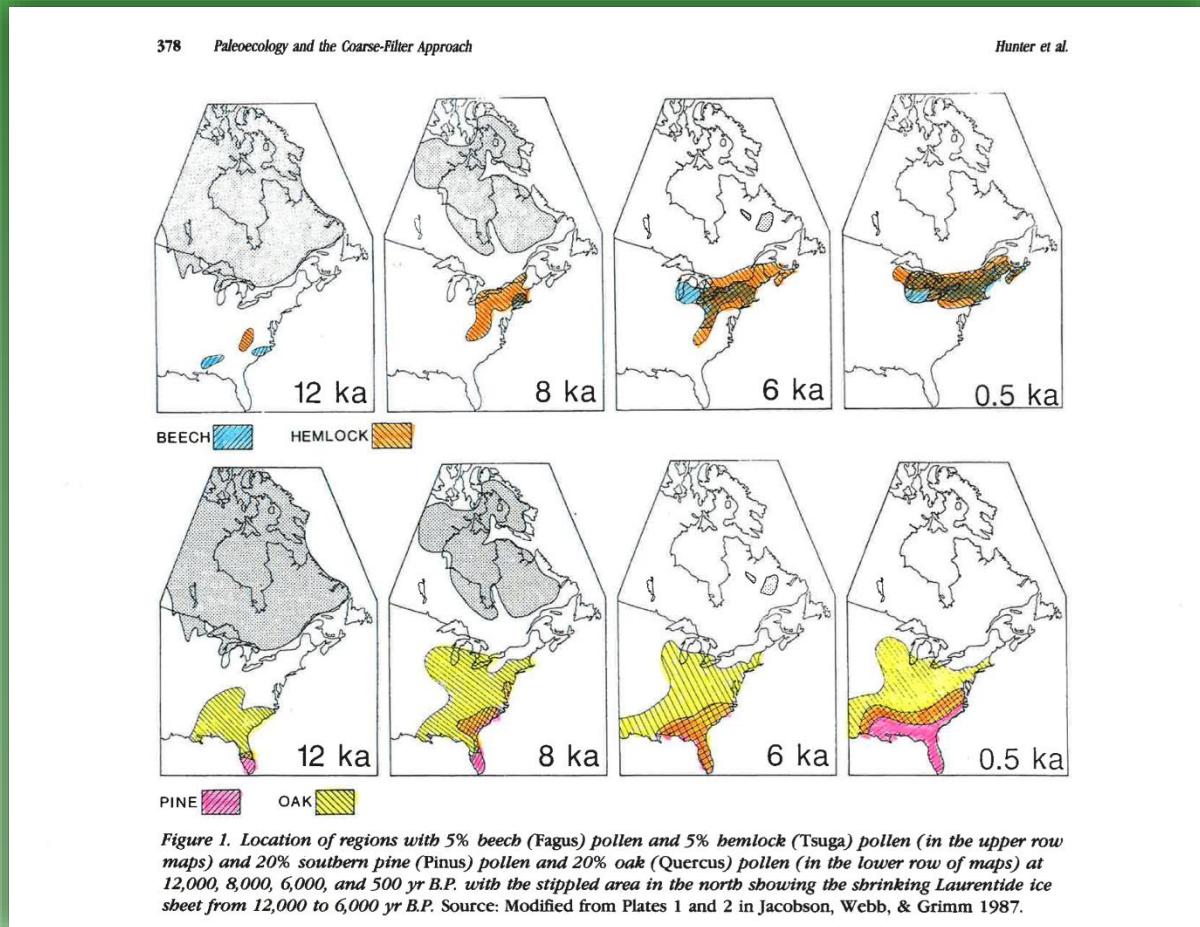
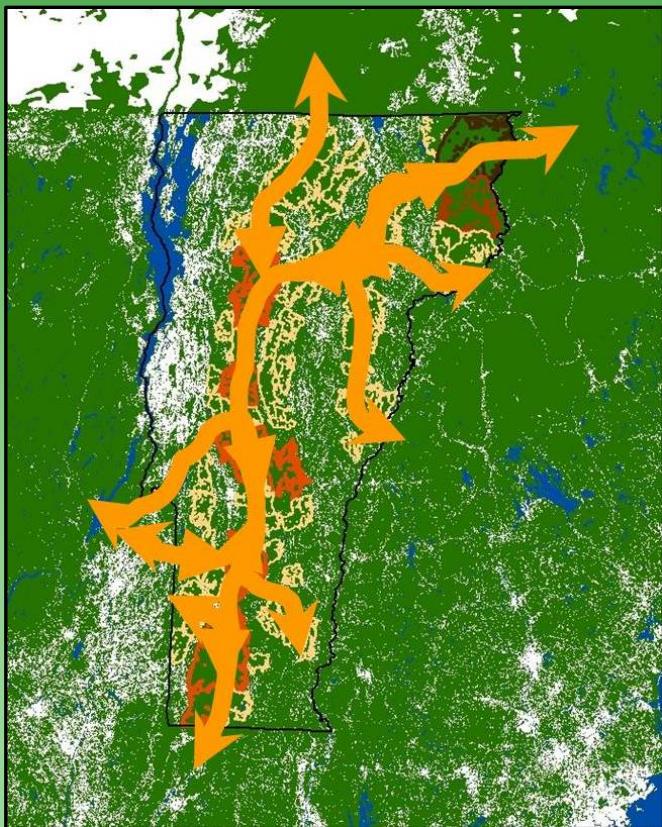
- Population growth
- Habitat loss
- Habitat fragmentation
- Non-native, invasive species
- Climate change – direct and compounding effects



New!

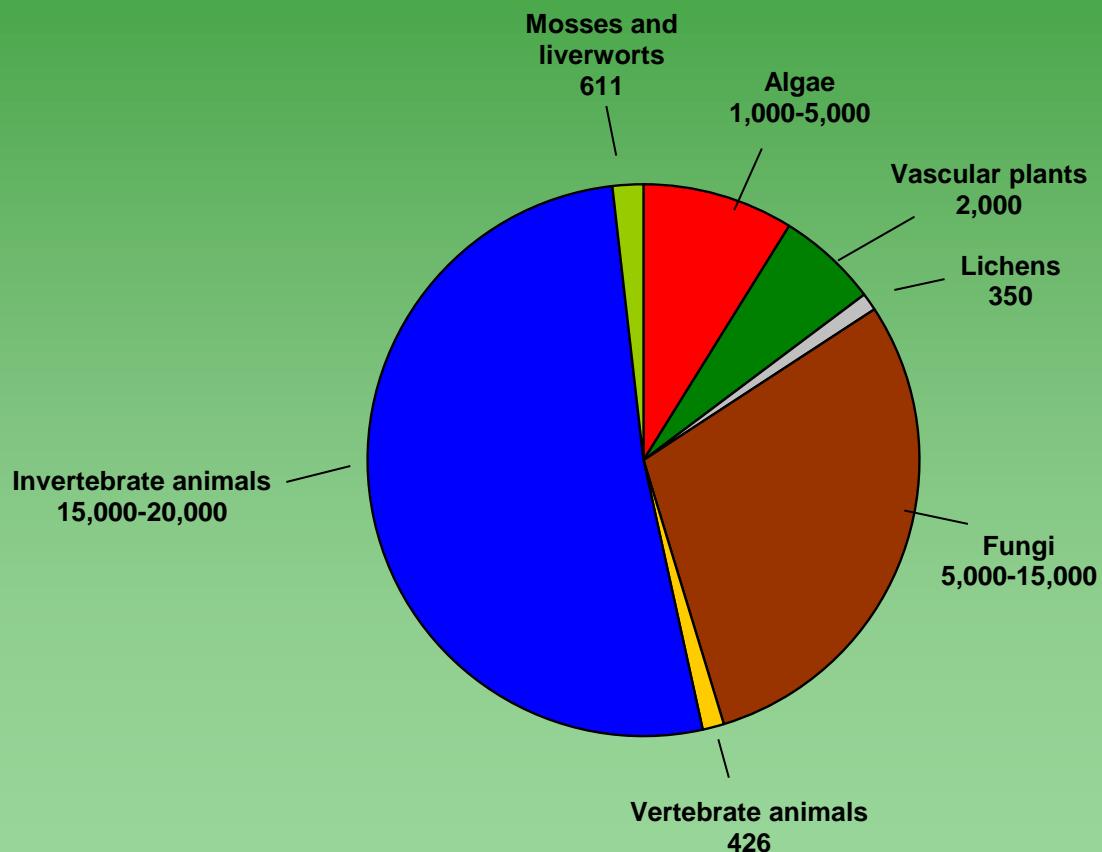
Climate Change

- rapid and uncertain change
- species will shift independently
- need connectivity – species and processes
- need to “conserve nature’s stage” – physical landscape



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

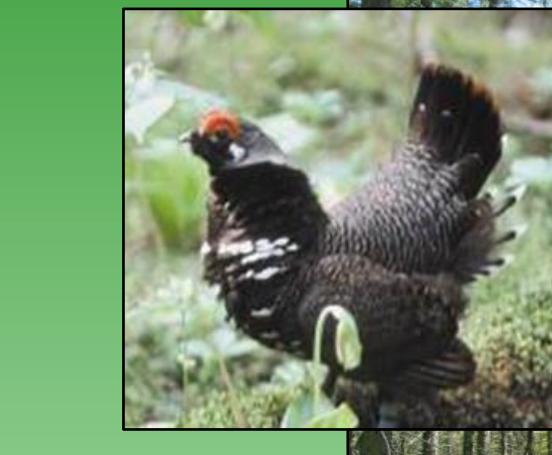
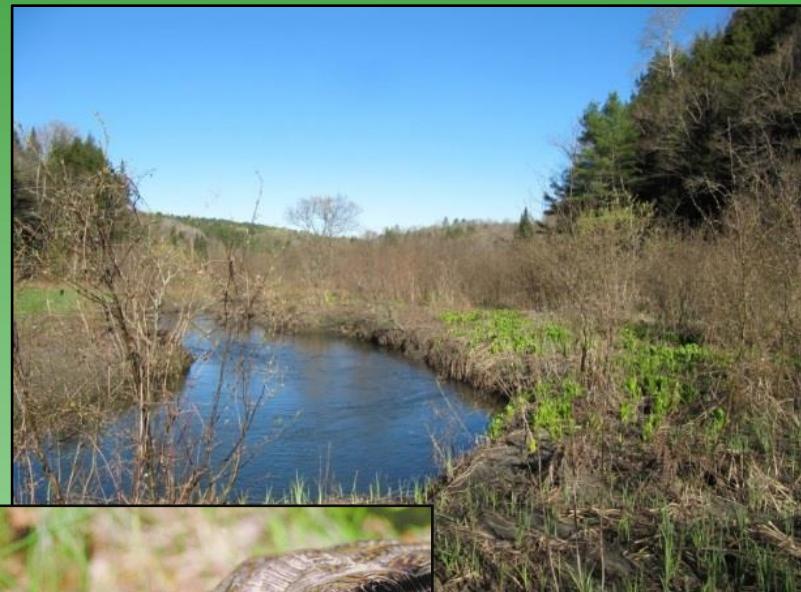
How do we protect them all?



Elfin
Skimmer

Coarse filter/fine filter approach to conservation

- *Well-recognized, efficient approach to conservation*
- *Originally a combination of natural communities & species conservation efforts*



A wide-angle photograph of a mountainous landscape. In the foreground, there are several ridges covered with dense forests, showing a mix of green and autumn-colored trees. The terrain is rugged and hilly. In the background, the mountains continue into a distant horizon under a clear, pale blue sky.

We need coarser filters

VERMONT CONSERVATION DESIGN

A practical, scientific vision for sustaining Vermont's ecologically functional landscape for the future.

- Applies the **coarse filter-fine filter** approach
- Uses simple, **recognizable features** (forest blocks and riparian areas)
- Depends on thoughtful stewardship and management



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Collaborators:

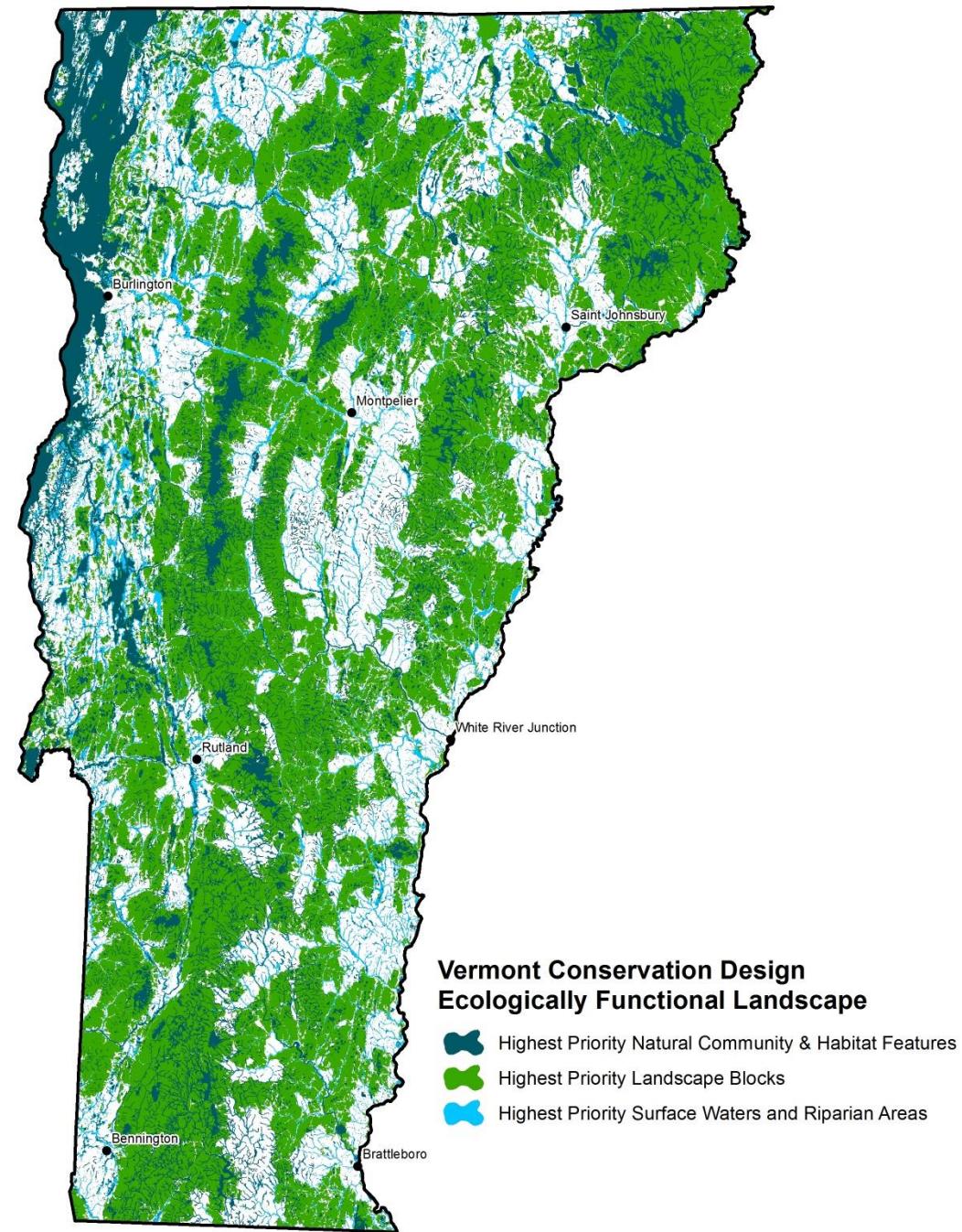
VT Fish and Wildlife Department
Vermont Land Trust
The Nature Conservancy
VT Department of Forests, Parks & Recreation
VT Department of Environmental Conservation
Northwoods Stewardship Center
USDA Natural Resources Conservation Service



Ecologically Functional Landscape

- Intact
- Connected
- Diverse

A set of coarse-filter features which, if appropriately conserved and managed for their ecological functions, offer high confidence in maintaining biological diversity and ecological processes into the future.



Conservation Design at Three Scales

Landscapes



Natural Communities



Species



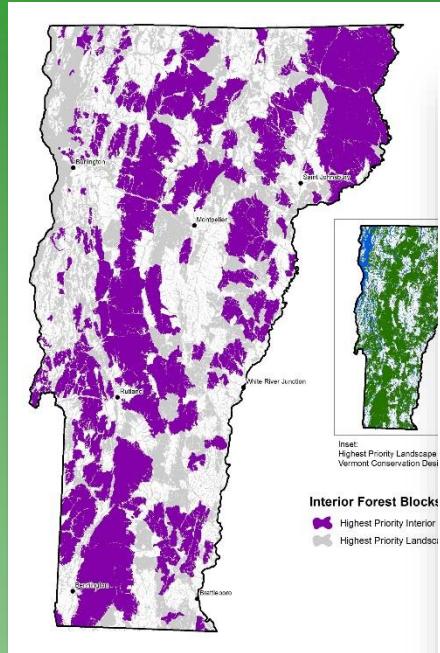
Interior Forest Blocks
Connectivity Blocks
Surface Waters and Riparian Areas
Riparian Areas for Connectivity
Physical Landscapes
Wildlife Road Crossings

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

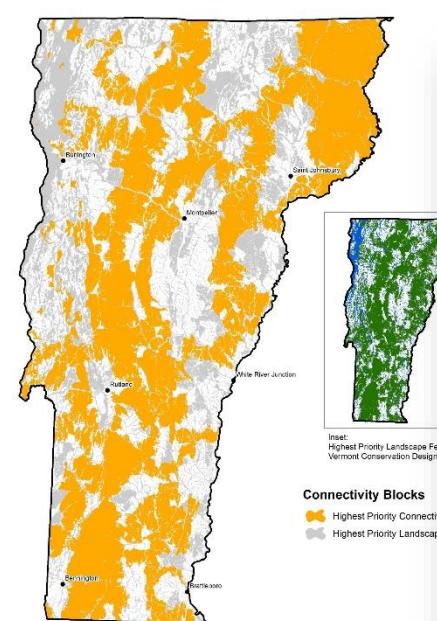
Species with very specific biological needs that will likely always require individual attention

Intact and Connected Forest Blocks Surface Waters and Riparian Areas

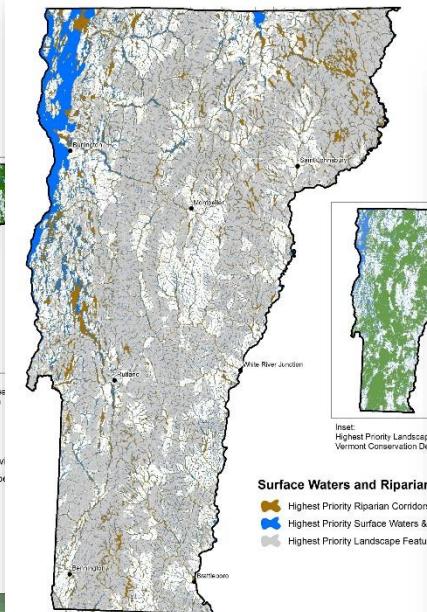
Interior Forest Blocks



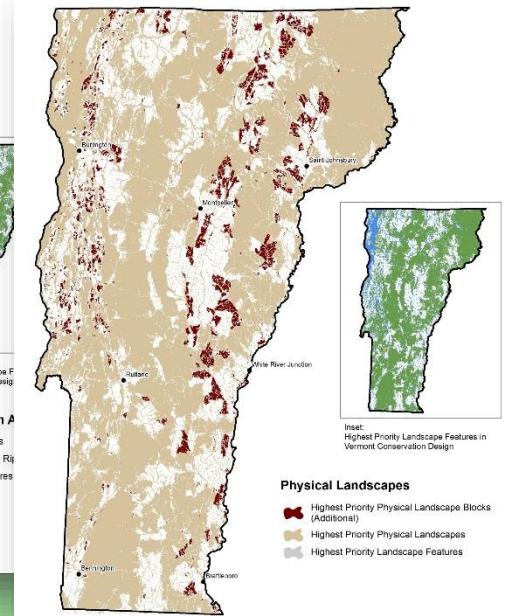
Connectivity Blocks



Surface Waters and Riparian Areas



Physical Landscape Diversity



Wildlife Road Crossings

Maintain the specific functions of each element

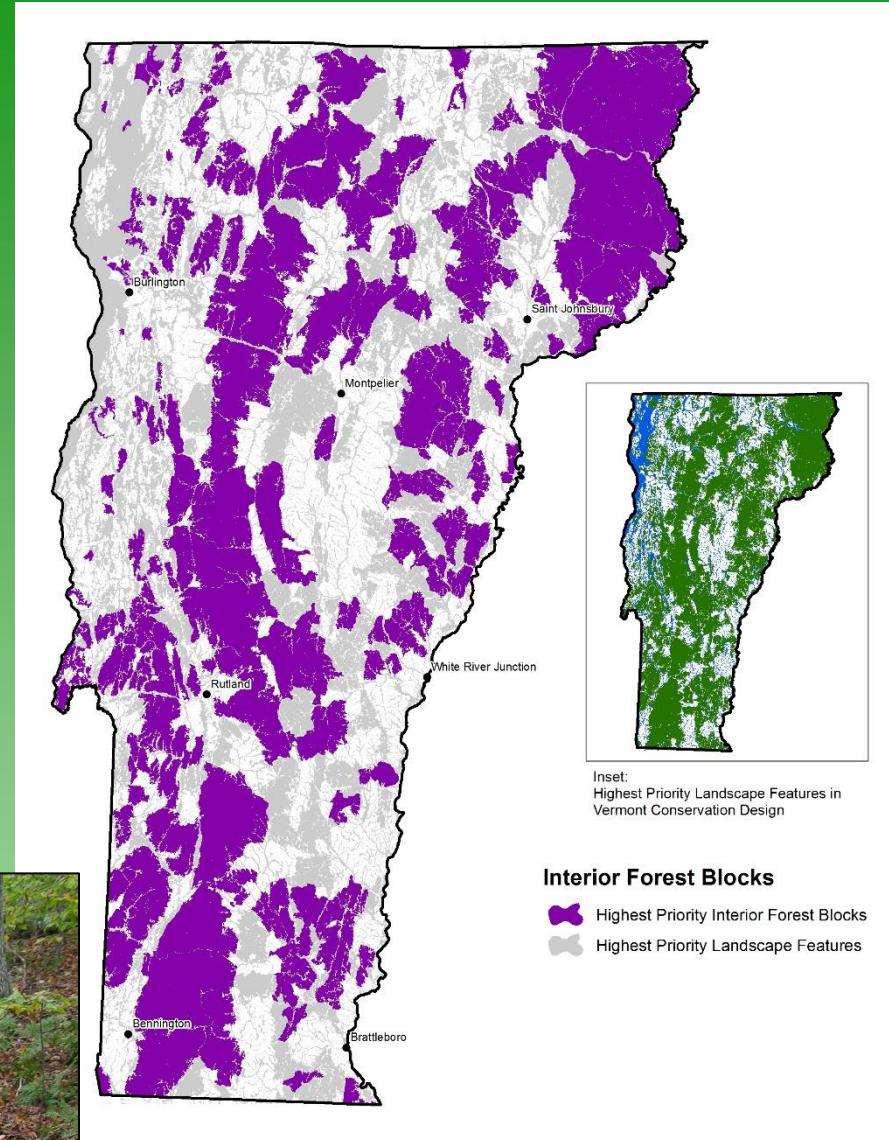
Interior Forest Blocks

The best examples of interior forest in each region of Vermont

Places where species and ecological process exist with minimal disturbance

Ecological functions:

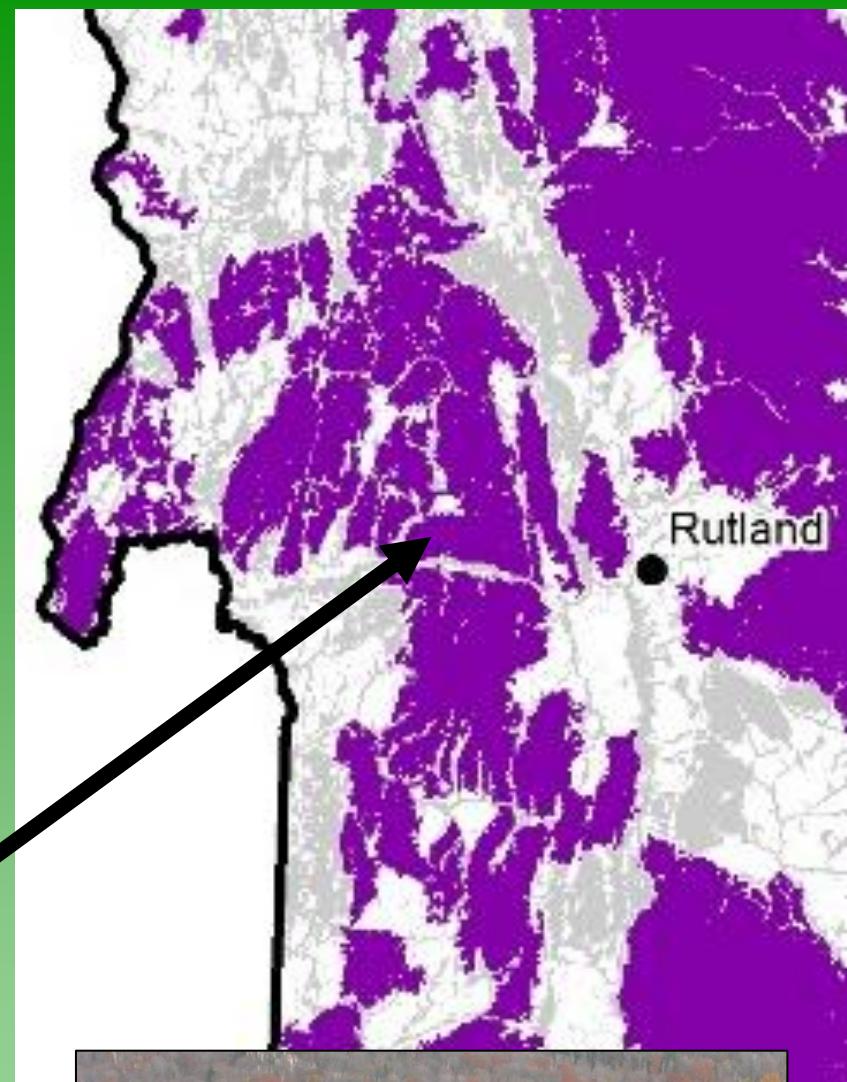
- Interior forest species
- Wide-ranging mammals
- Air and water quality
- Flood resilience
- Ecological processes
- Species can shift and adapt within blocks



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.



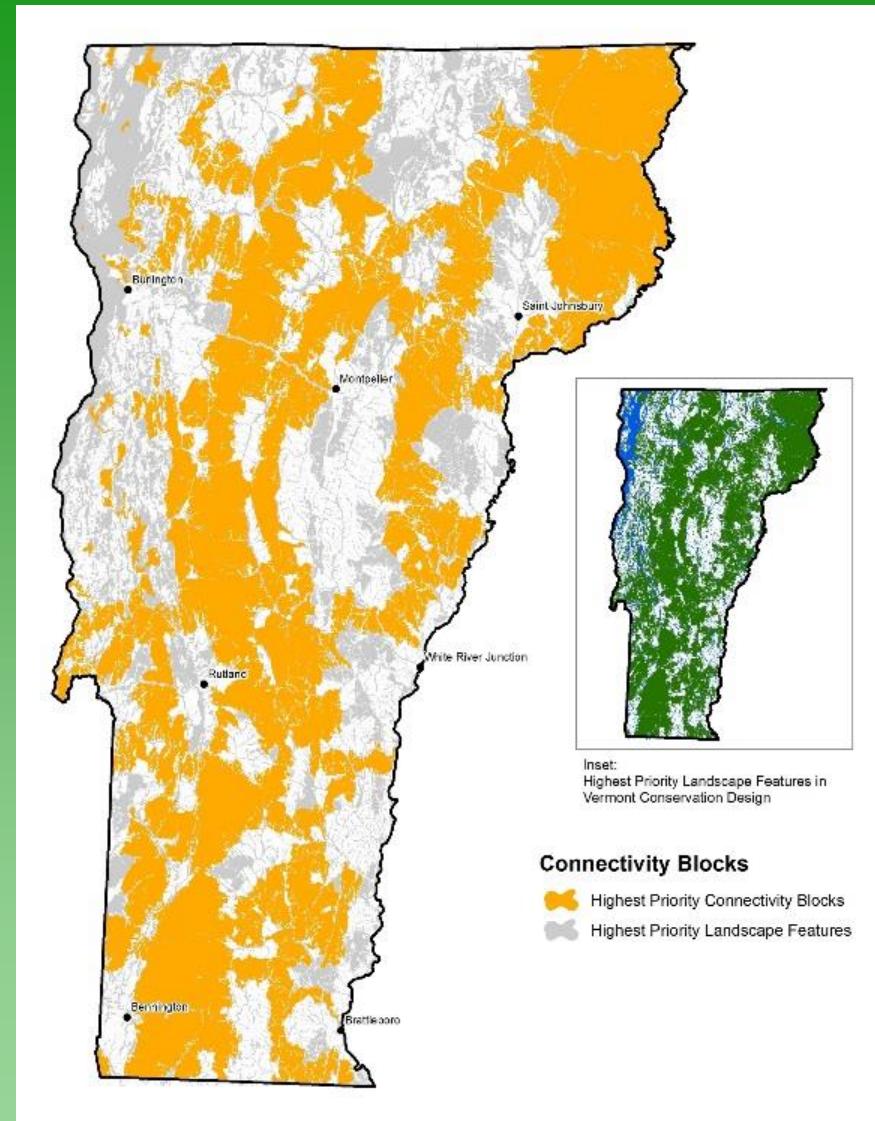
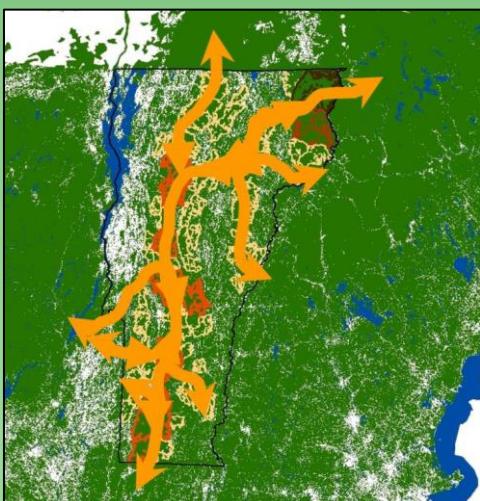
Connectivity Blocks

The network of forest blocks that are critical for wildlife movement and species ranges shifts

Connects within Vermont and to adjacent states and Québec

Ecological Functions:

- Wildlife movement and dispersal
- Habitat for wide-ranging mammals
- Genetic exchange
- Plant and animal range shifts in response to climate change
- Reduces extinction risks



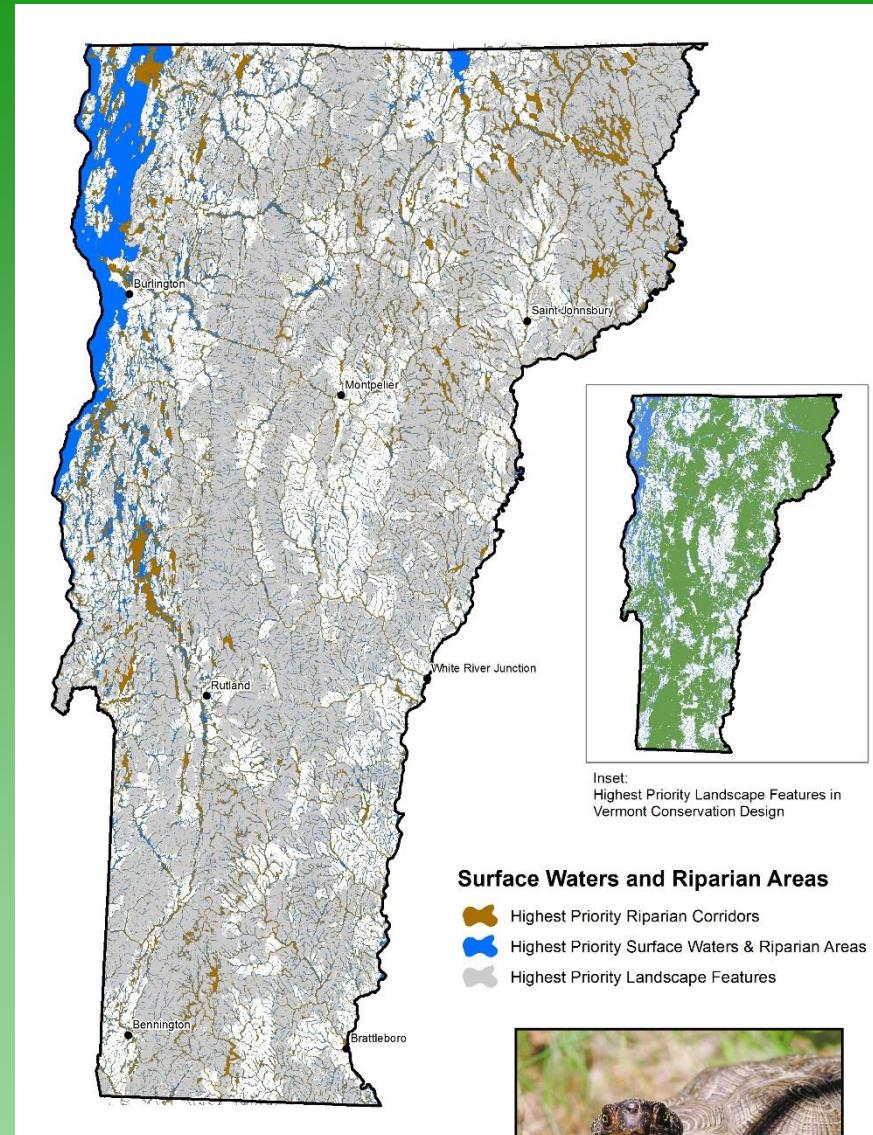
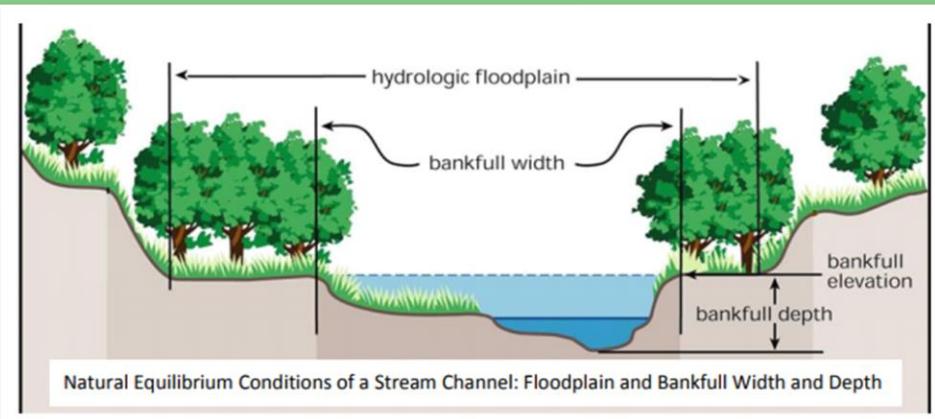
Surface Waters and Riparian Areas

Every river, stream, lake, pond and riparian area in Vermont

Entire network contributes to biodiversity and ecological function

Ecological Functions:

- Habitat for aquatic species
- Water quality
- Flood protection
- Terrestrial species habitat
- Wildlife movement
- Plant and animal range shifts in response to climate change

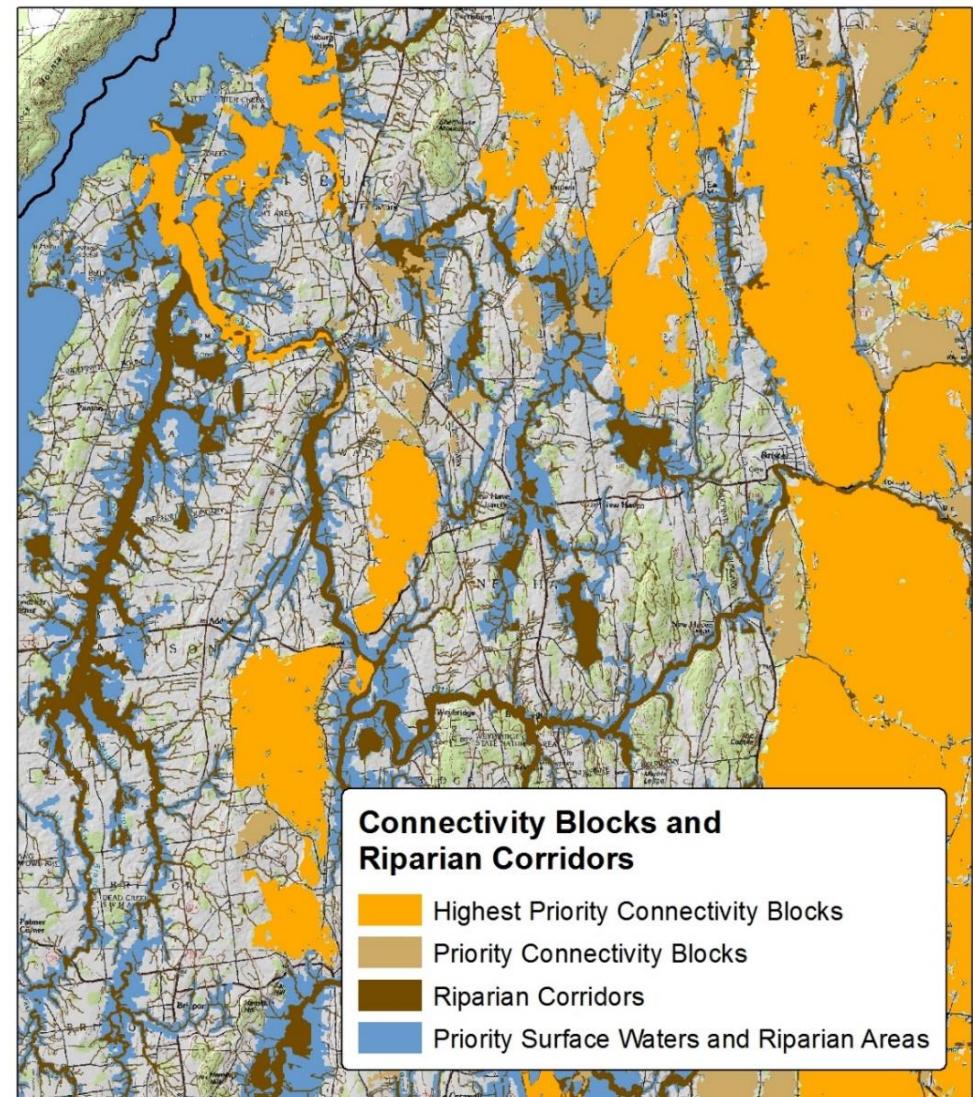


Riparian Connectivity



In parts of the state, riparian areas are the only connections between forest blocks

We need to restore riparian vegetation.



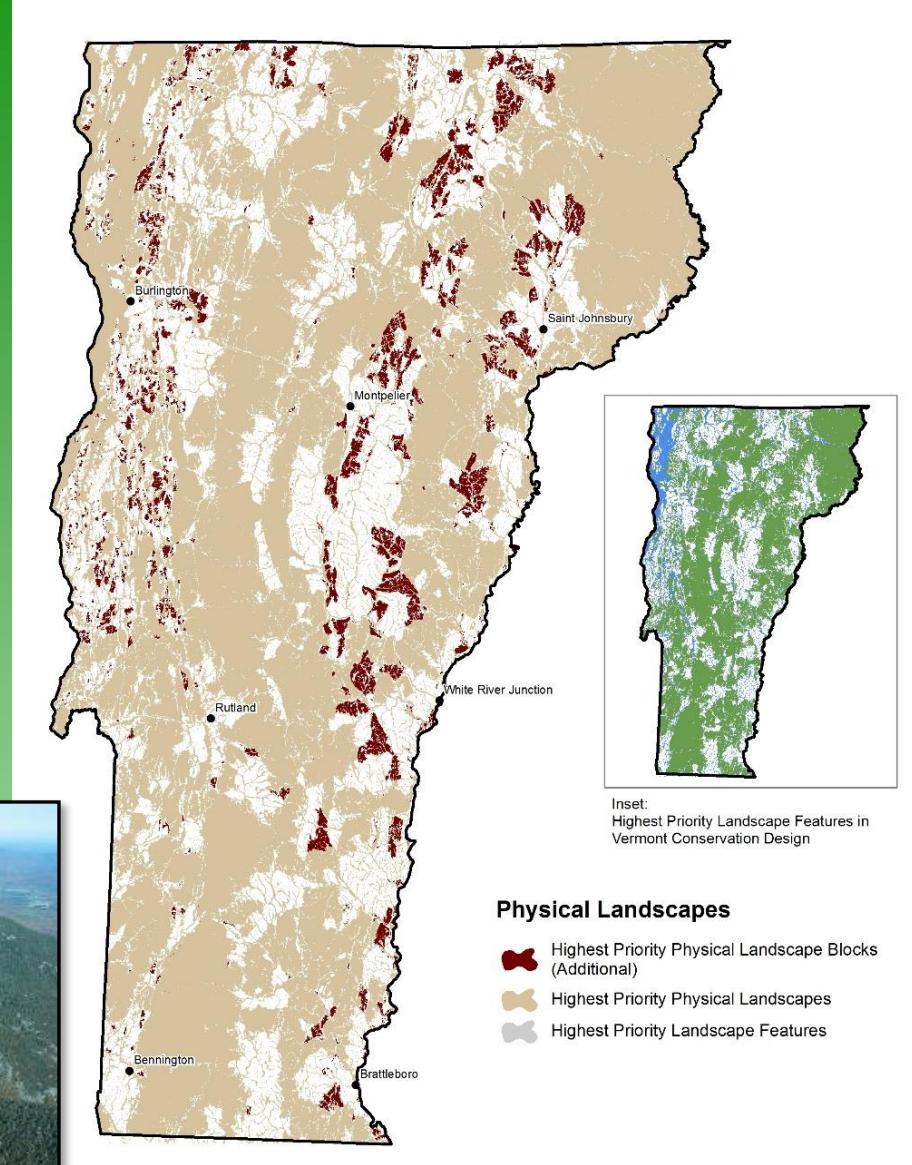
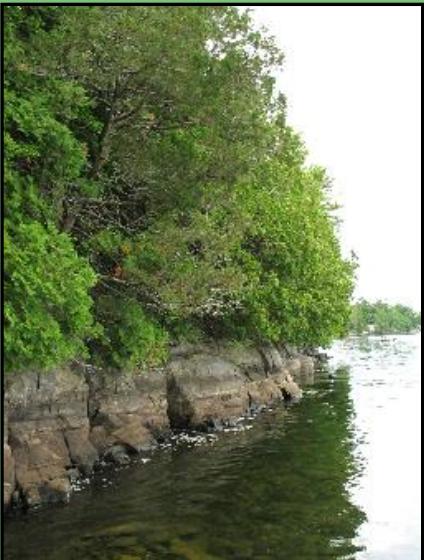
Physical Landscape Diversity

A set of forest blocks that ensure we conserve Vermont's full diversity of elevation, geology, and landforms

"Conserve nature's stage"

Ecological functions:

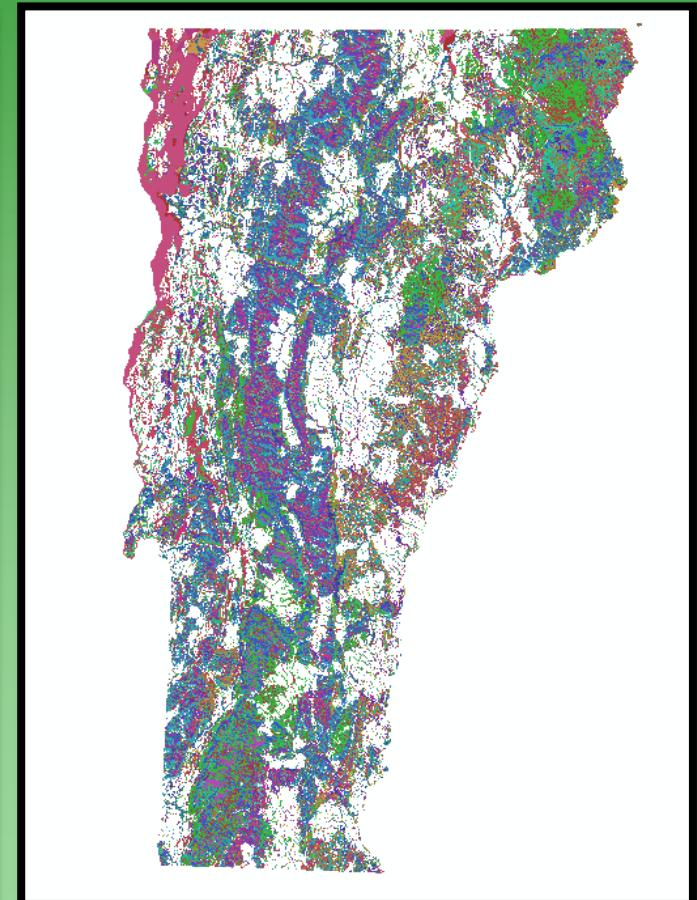
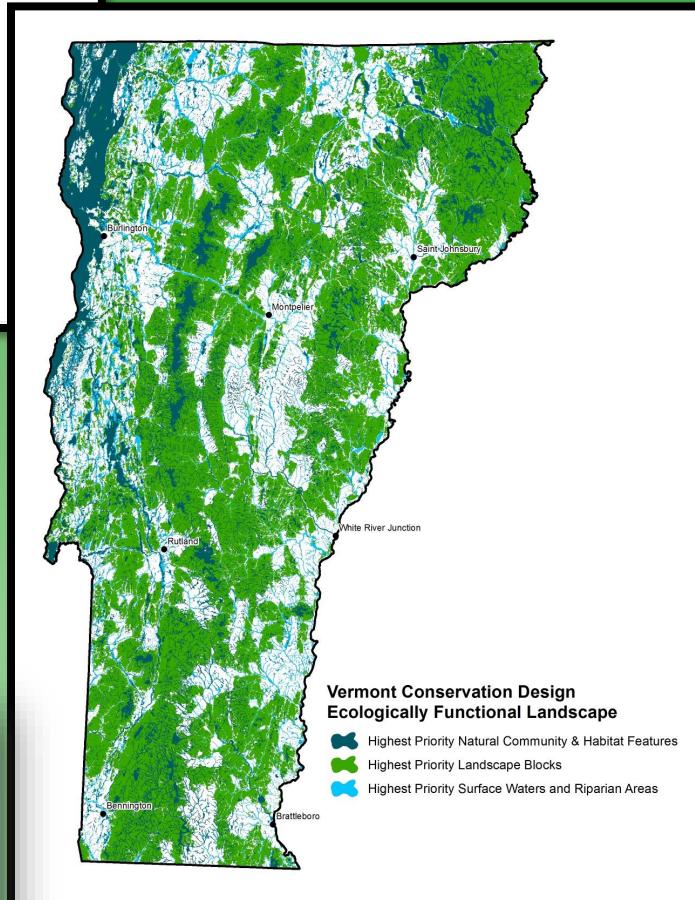
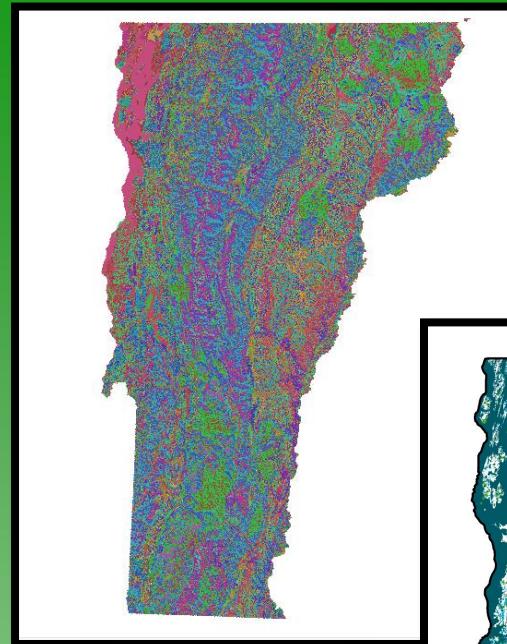
- Habitat for species that use specific physical settings (e.g. those found on calcium-rich rock)
- Species can shift to new settings in a changing climate



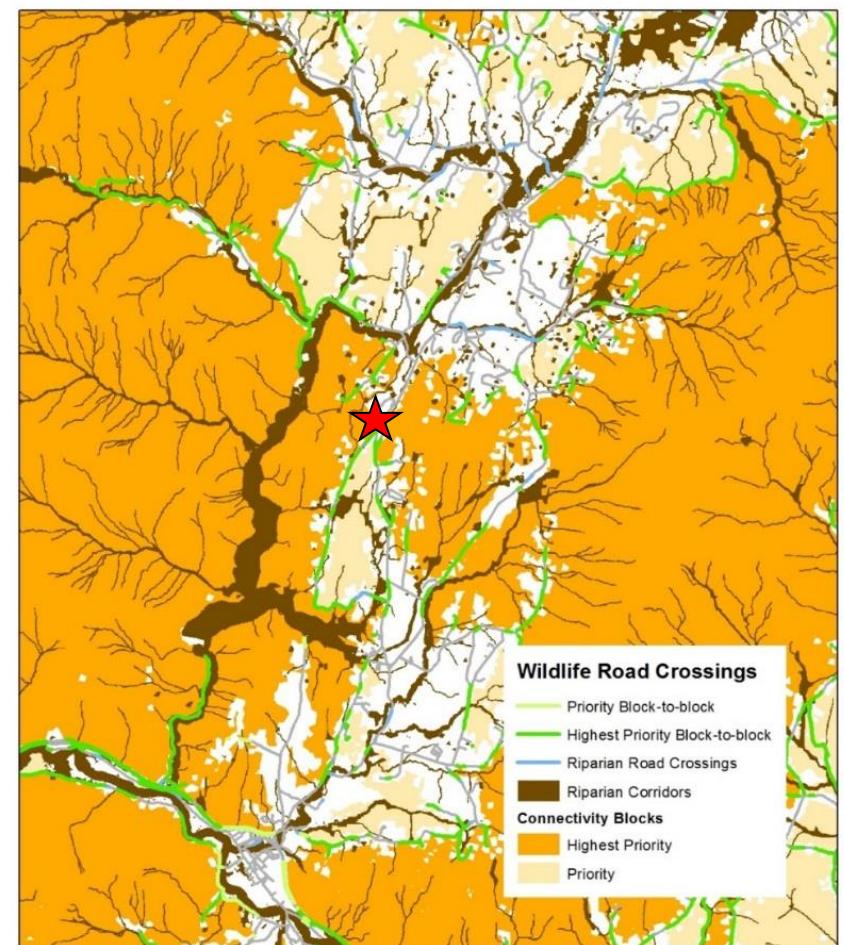
Physical Landscape Diversity

459 unique combinations of elevation, geology, and landform all represented within the highest priority landscapes

Ex. Low elevation : Calcareous sed/metased : Hill (gentle slope)



Wildlife Road Crossings



Conservation Design at Three Scales

Landscapes



Natural Communities



Species



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Natural Communities

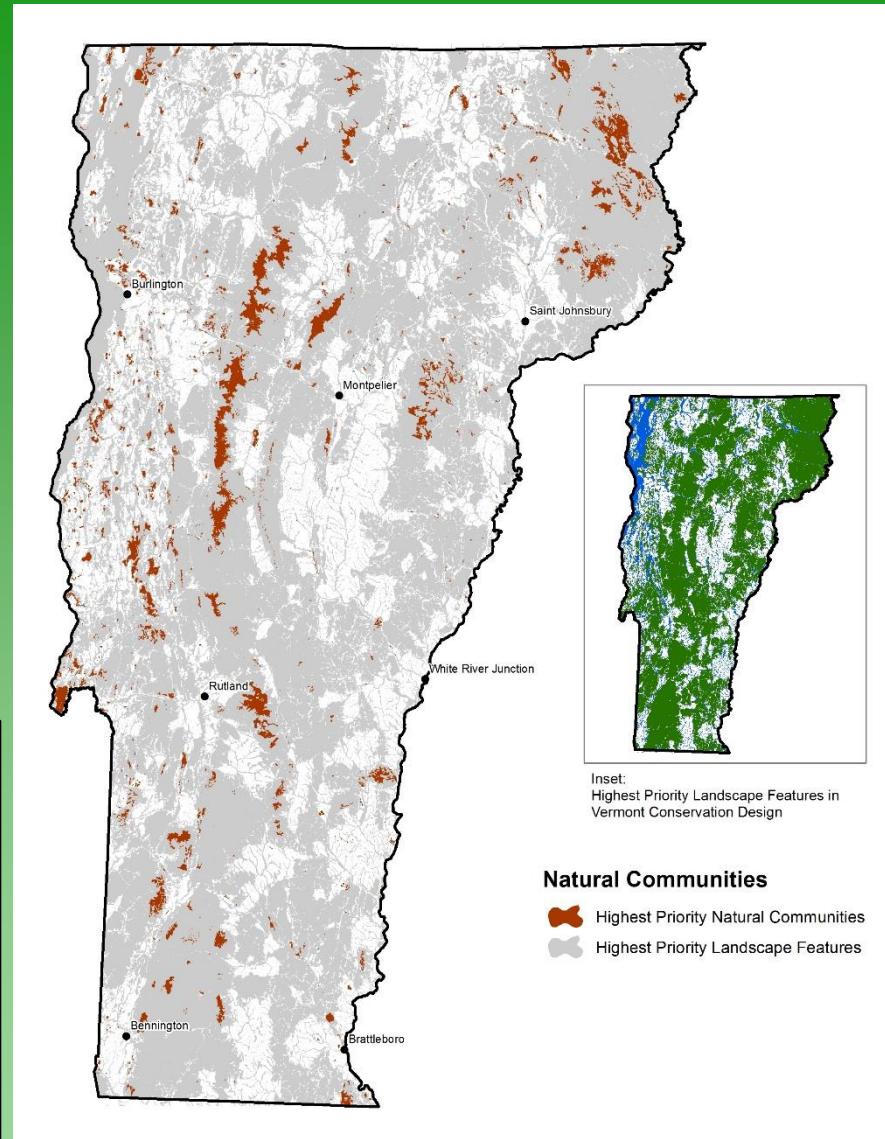
Vermont's original natural habitats

All examples of rare types and 50% of the examples of more common types

Matrix forests conserved by forest blocks and old forests

Ecological Functions:

- Coarse filters for most of our native species
- Places that will always support unique assemblages of biodiversity, even in a changing climate













Young and Old Forests

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

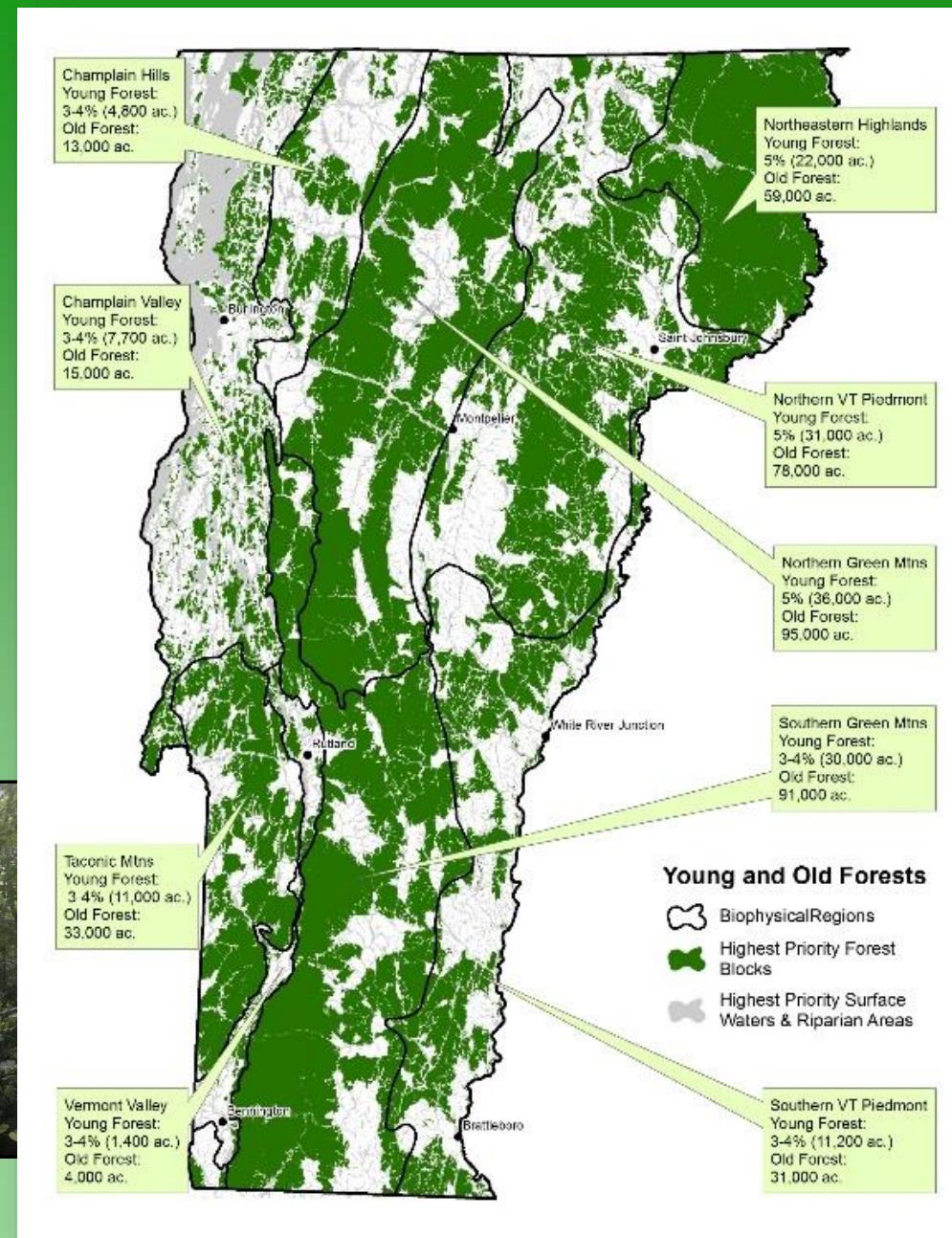
Target of 3-5% young forest and 10% old forest, distributed across Vermont and proportional to matrix forest types

Ecological Functions:

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



Balance!



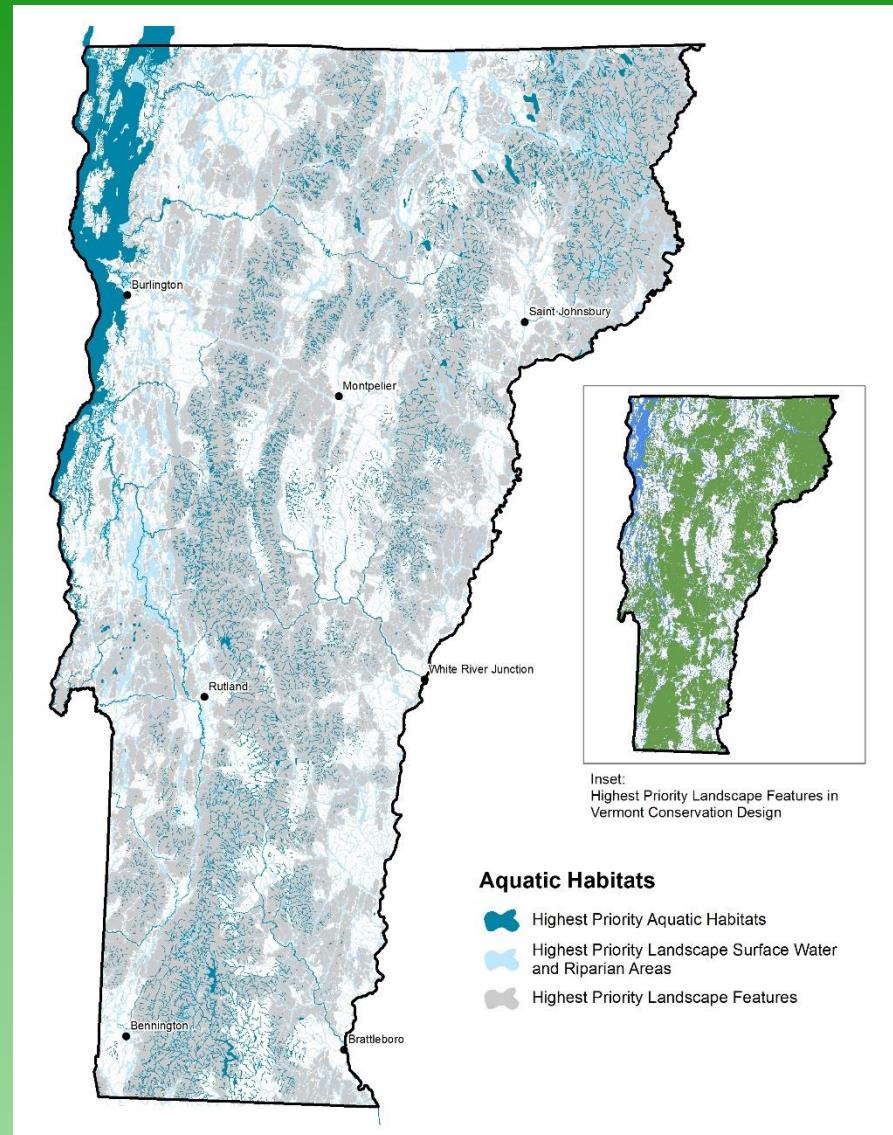
Aquatic Habitats

The river and stream segments, and lakes and ponds that make unique contributions to biological diversity

Need to be conserved as part of the larger network of surface waters and riparian areas

Ecological Functions:

- Habitat for rare and specialist species
- Physical diversity of aquatic systems
- Cold water refugia



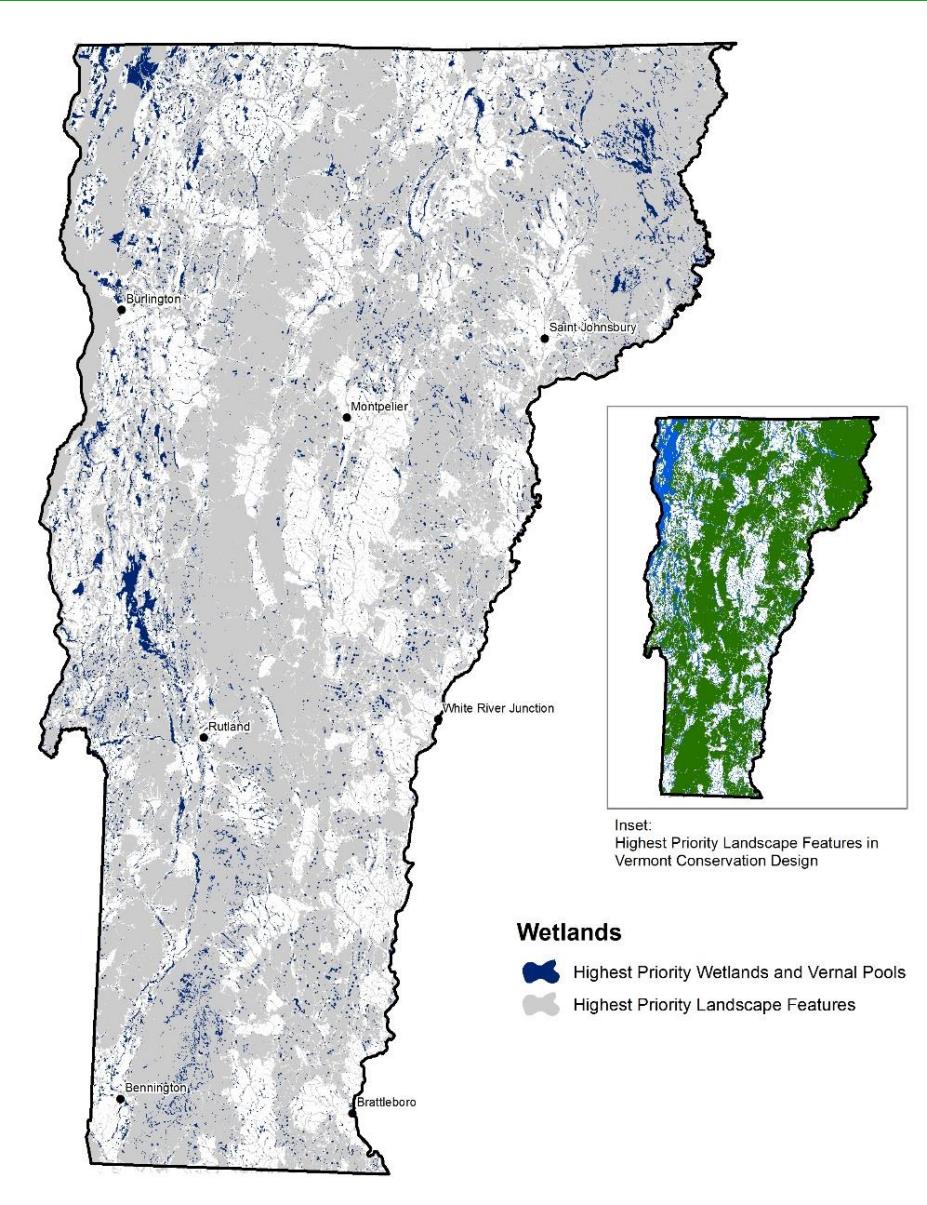
Wetlands

Vermont's wetlands provide irreplaceable habitats and ecological functions

Almost all of Vermont's wetlands and vernal pools are highest priority

Ecological Functions:

- Fish and wildlife habitat
- Many rare species are found only in wetlands
- Flood protection
- Water quality
- Ground water protection



Grasslands and Shrublands

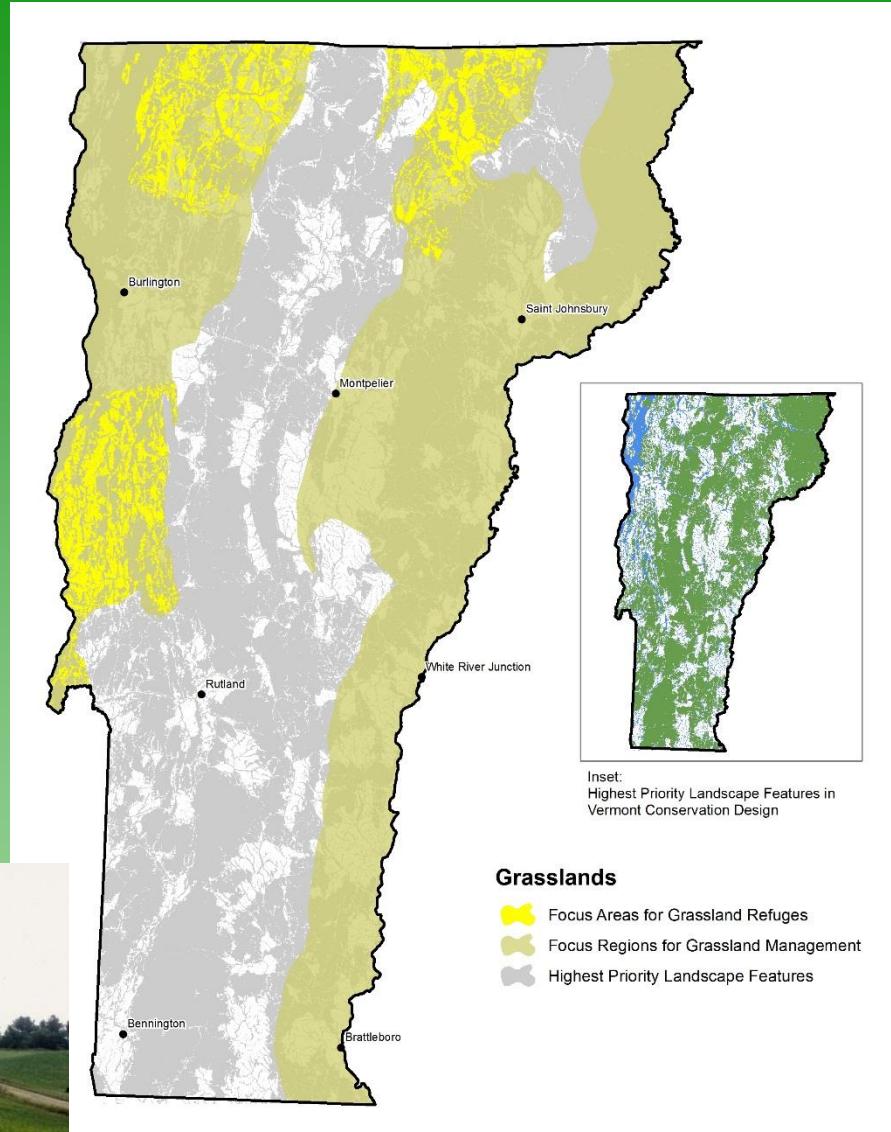
Grasslands and shrublands are man-made habitats that support a unique set of species

Many bird species that need grasslands or shrublands are in regional decline

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

Ecological Functions:

- Supports a suite of grassland-nesting and shrubland nesting birds
- Habitat that has been lost in other parts of the country



Underground Habitats

Caves and mines are our subterranean natural communities

We know much about the bats that use these places, but invertebrates, fungi, algae, and other species are likely present as well

A set of caves and mines, but not mapped so we can protect sensitive sites

Ecological Functions:

- Supports hibernating bats and likely many other species
- Habitat that has been lost in other parts of the country



Conservation Design at Three Scales

Landscapes



Natural Communities



Species



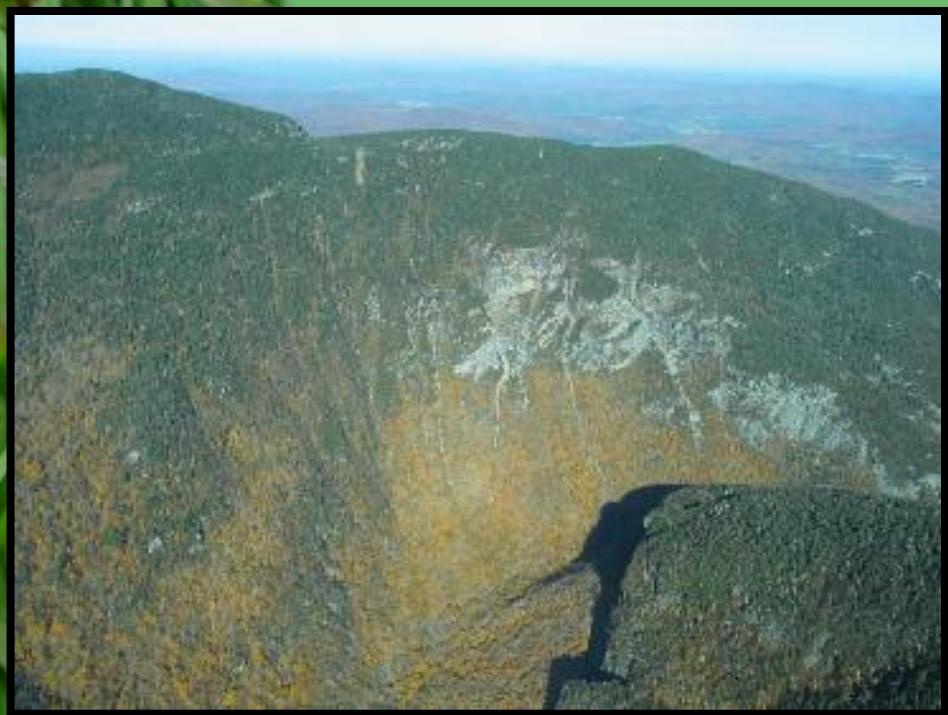
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Northern pale painted cup
(Castilleja septentrionalis)



Spiny softshell turtle

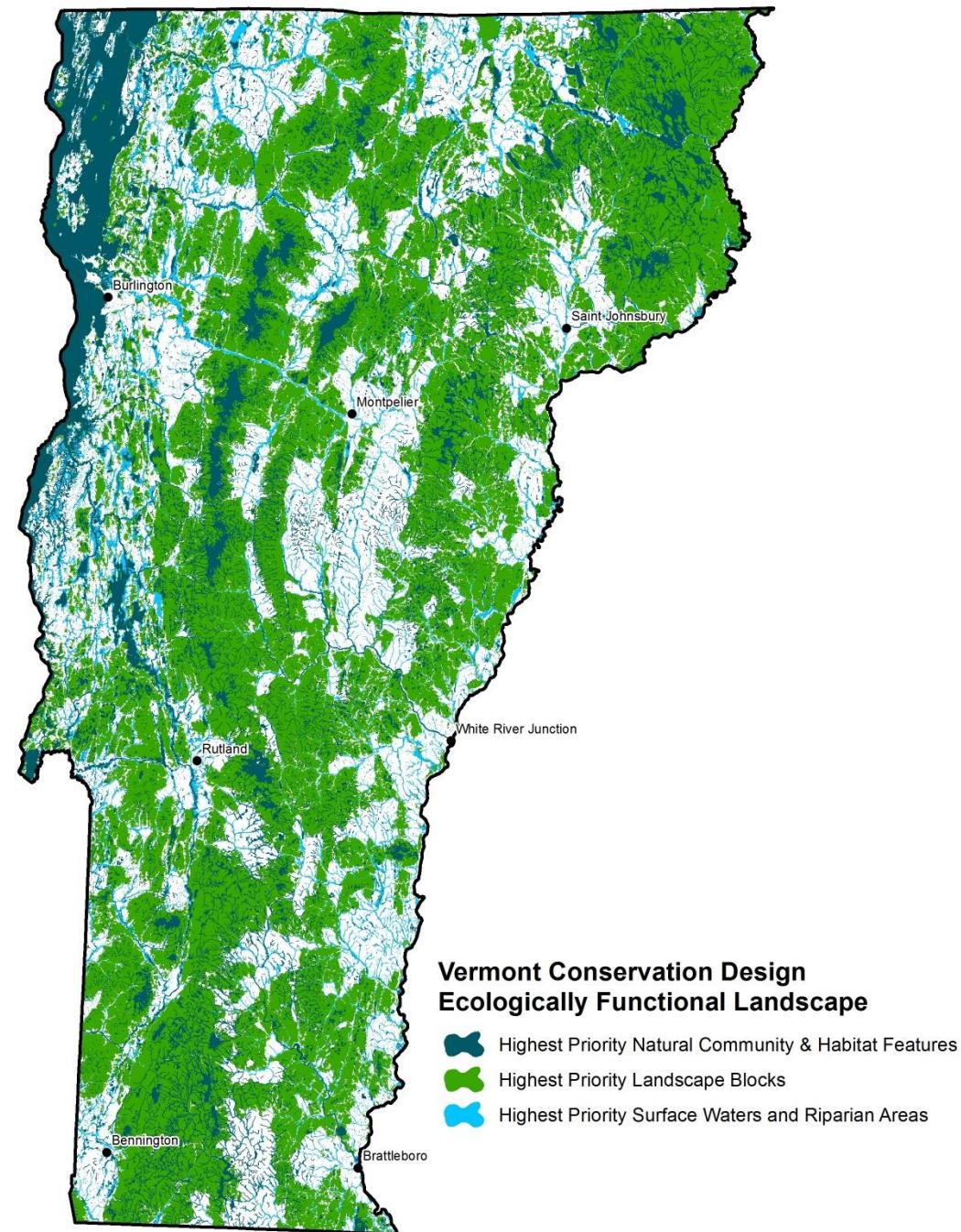


Vermont Conservation Design

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



Some Thoughts and Perspectives

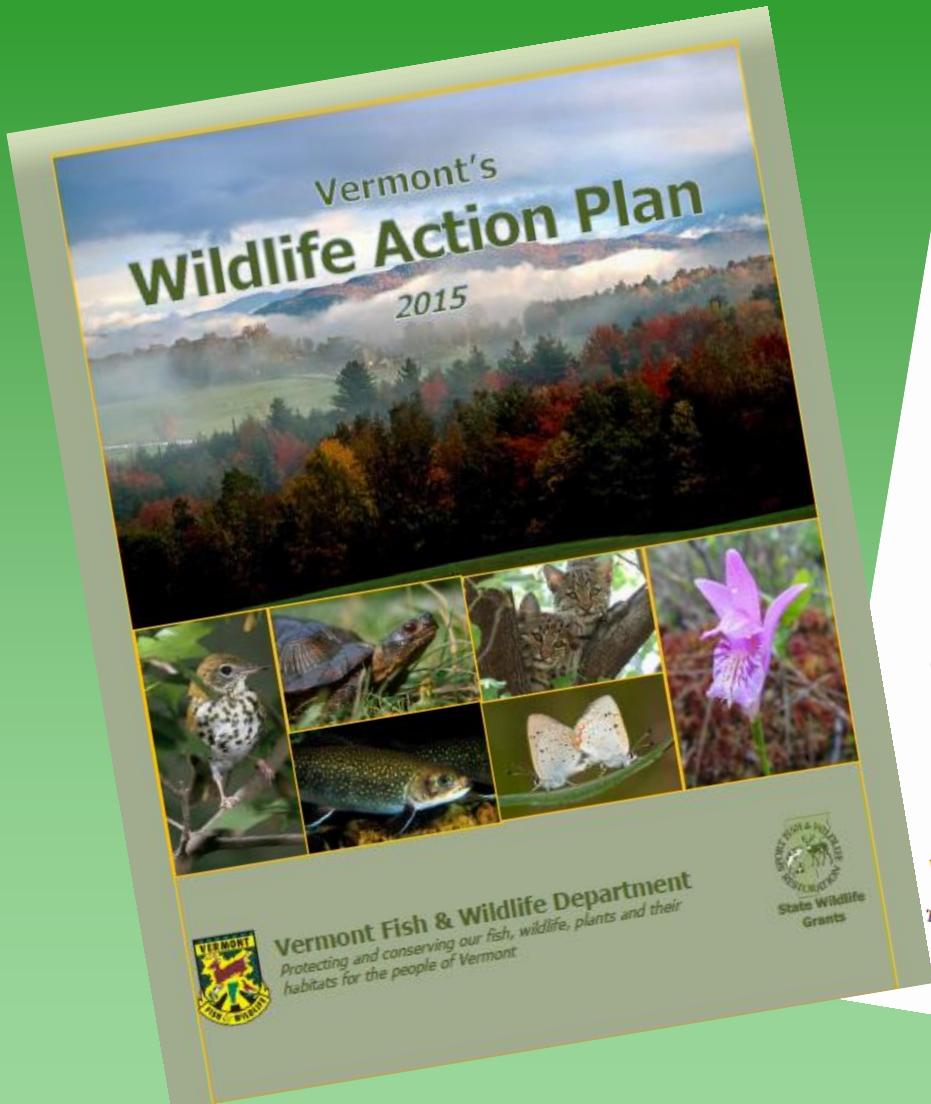
- Vision for the future of Vermont.
- Landowners and their decisions are key to success.
- All the features are needed for ecological function.
- Unifies many aspects of conservation, without being prescriptive.
- Supports Vermont's social and economic values.



Photo by
Susan
Morse

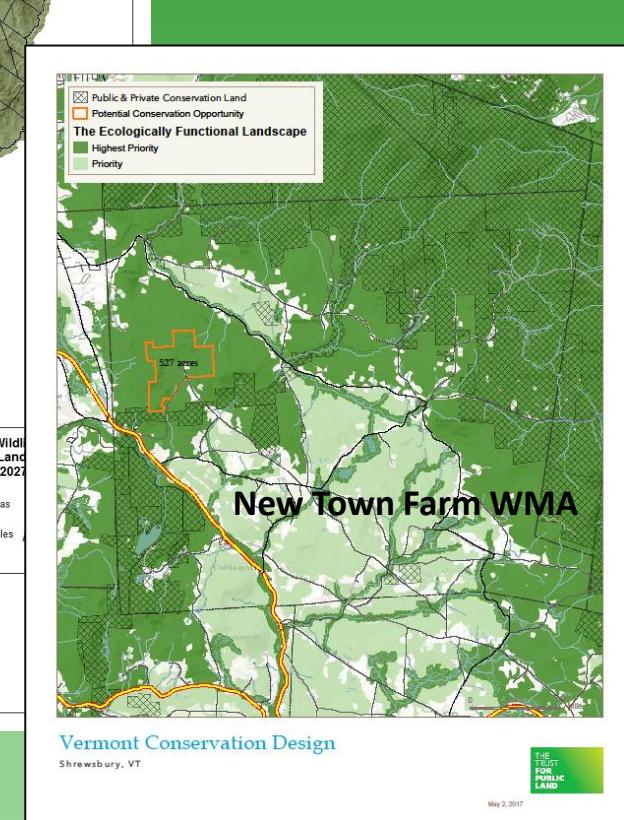
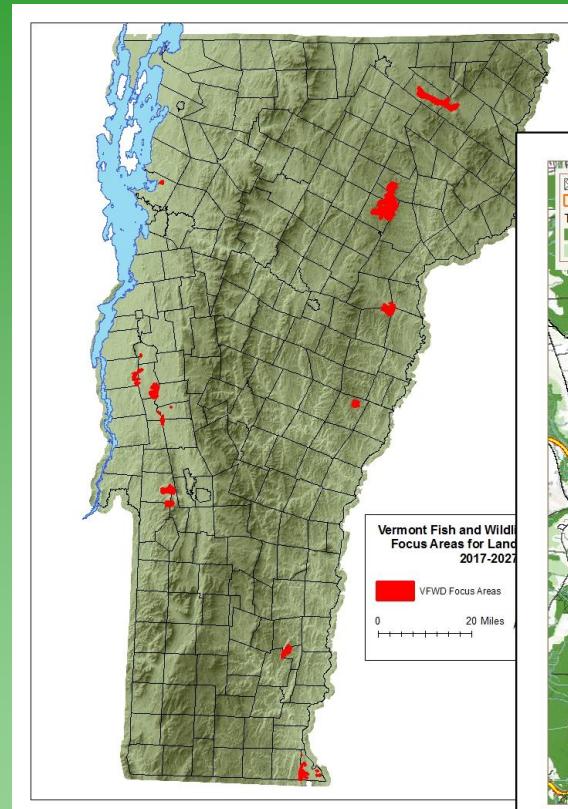
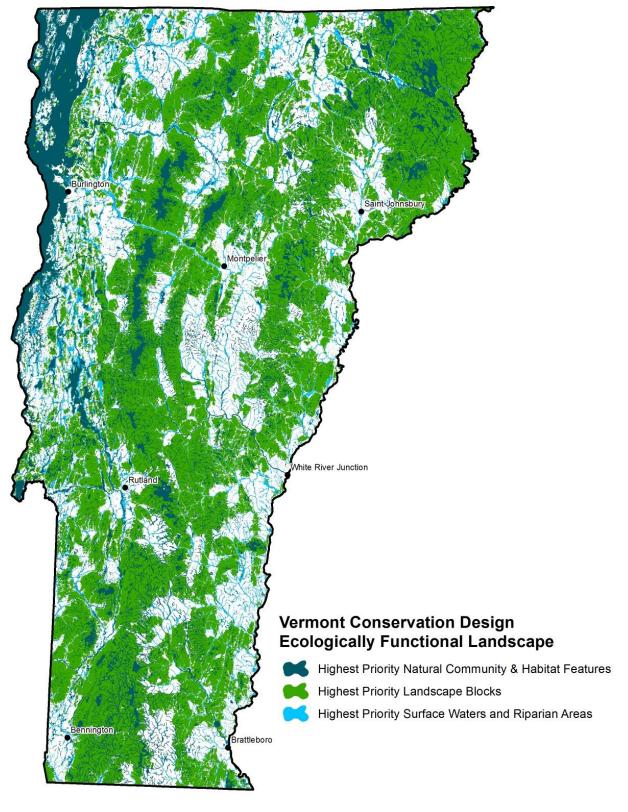
How is Vermont Conservation Design Being Used

- VT Wildlife Action Plan (2015) and Big Game Management Plan



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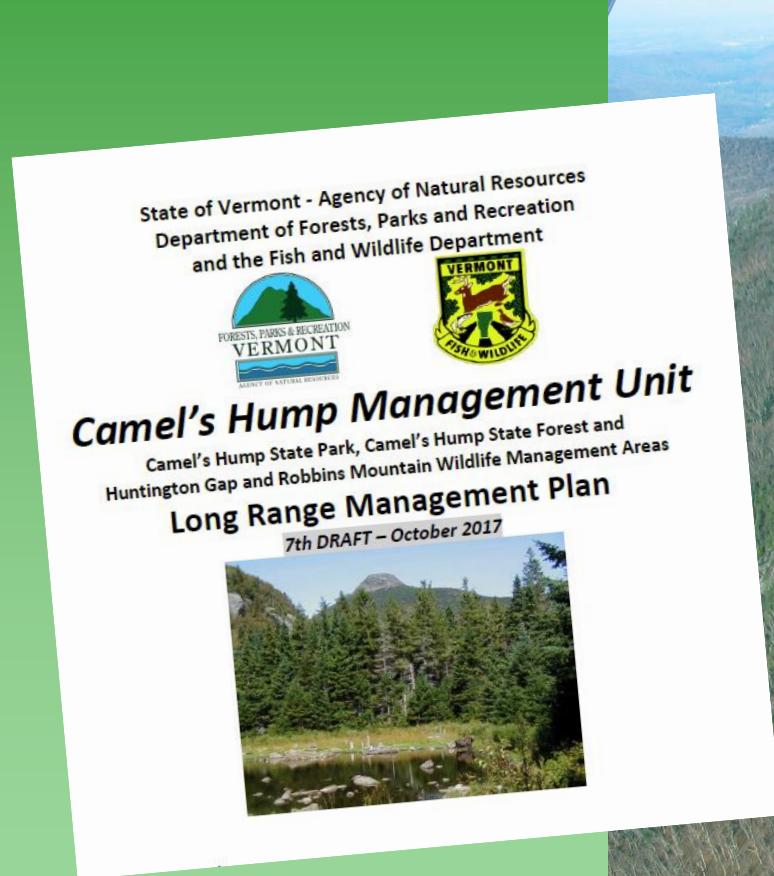
- VT Wildlife Action Plan (2015) and Big Game Management Plan
- Land acquisition priorities



Vermont Land Trust, The Nature Conservancy in Vermont, Conservation Fund, Trust for Public Lands all use VCD as one of their tools for evaluating land conservation projects.

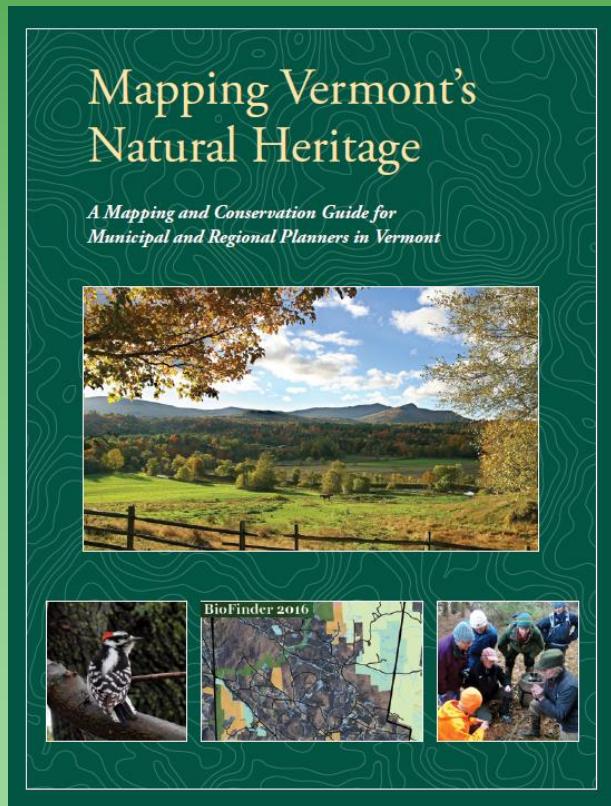
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- VT Wildlife Action Plan (2015) and Big Game Management Plan
- Land acquisition priorities
- State lands management
- Municipal planning technical assistance



VFWD's Community Wildlife Program has worked with all Vermont towns!

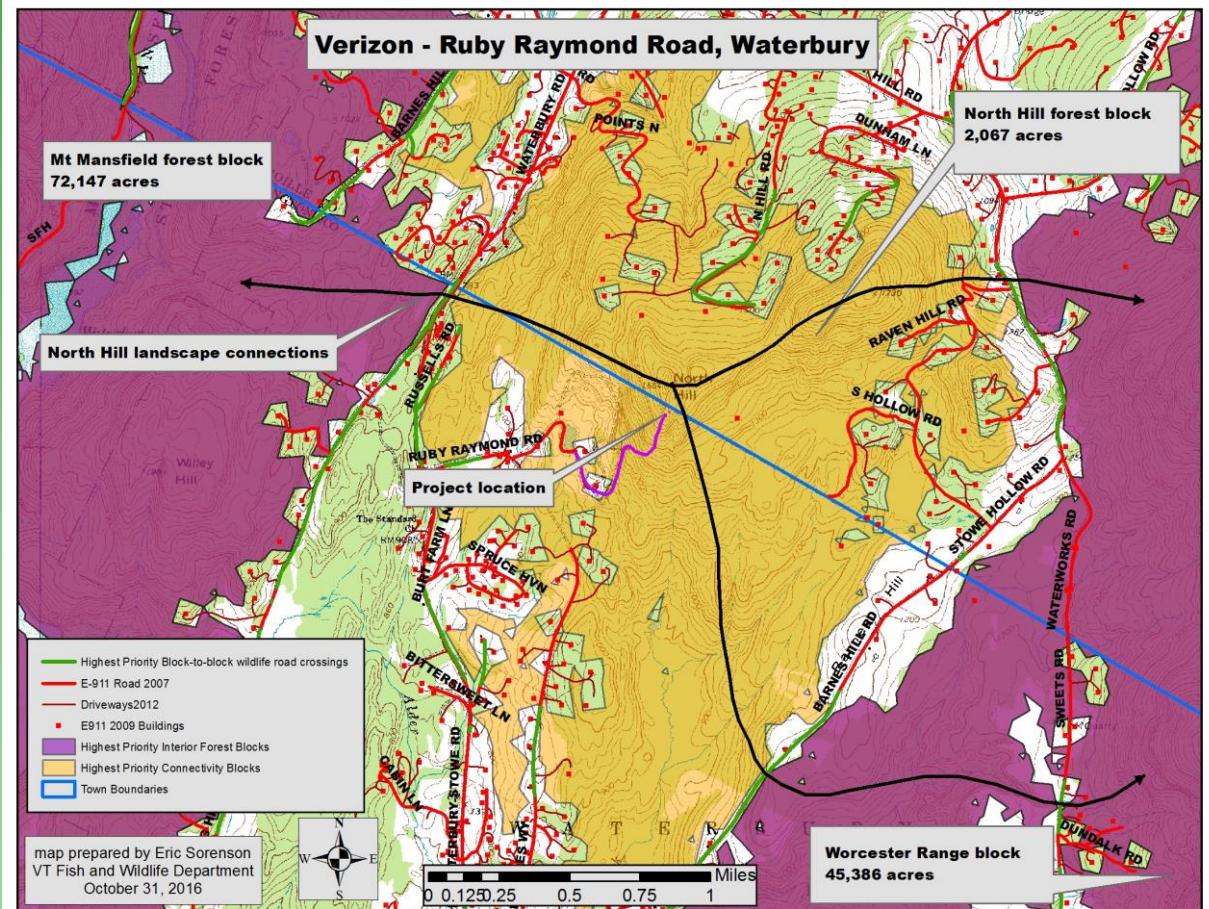


<https://anrmaps.vermont.gov/websites/BioFinder/>

How is Vermont Conservation Design Being Used

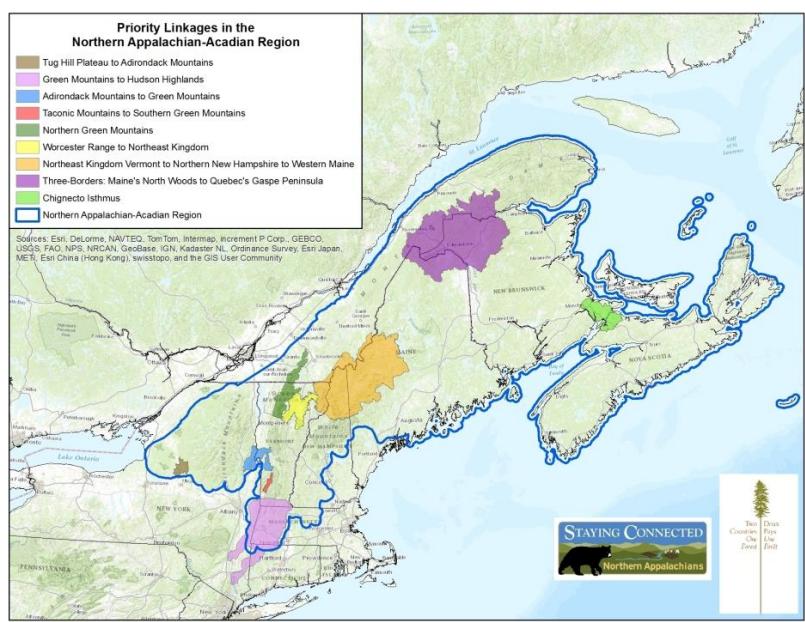
- VT Wildlife Action Plan (2015) and Big Game Management Plan
- Land acquisition priorities
- State lands management
- Municipal planning technical assistance
- Regulatory review

VCD is a tool for reviewing impacts to forest fragmentation and landscape connectivity in Section 248 and Act 250



How is Vermont Conservation Design Being Used

- VT Wildlife Action Plan (2015) and Big Game Management Plan
- Land acquisition priorities
- State lands management
- Municipal planning technical assistance
- Regulatory review
- Riparian areas/floodplain restoration priorities
- Natural Heritage Inventory landscape condition assessment
- Inform regional landscape connectivity efforts



Thank you... Questions?

