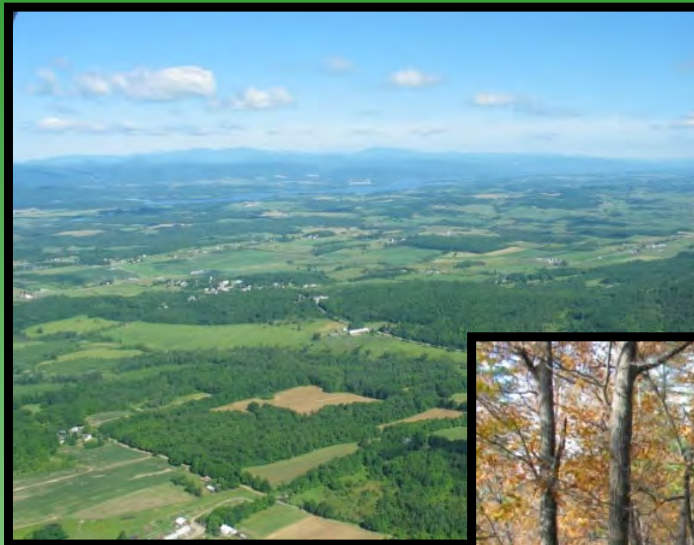


VERMONT CONSERVATION DESIGN

A VISION FOR AN ECOLOGICALLY FUNCTIONAL LANDSCAPE



House Committee on
Environment and Energy
February 9, 2023



Robert Zaino
Vermont Fish and Wildlife Dept.

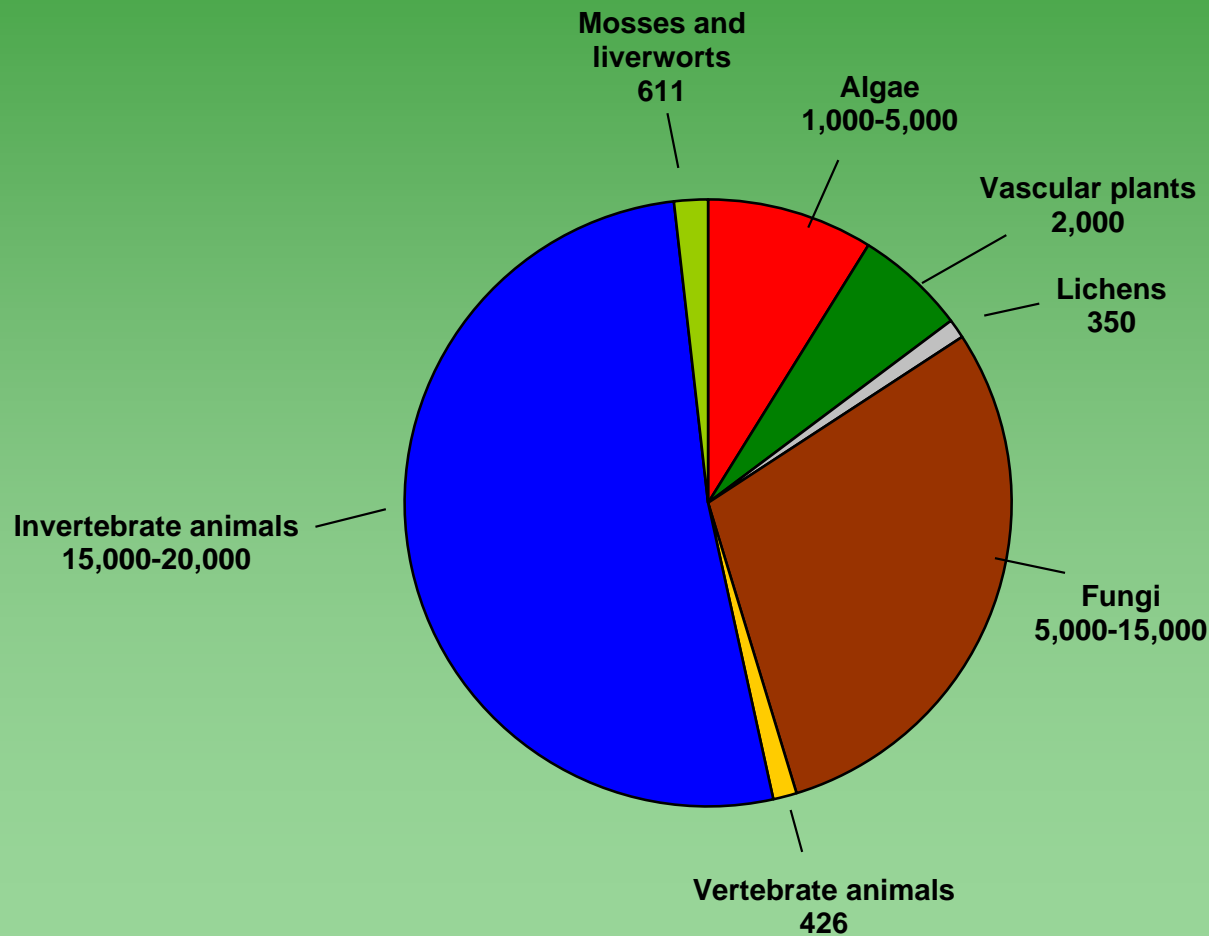
The Vermont Fish & Wildlife Department

*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!

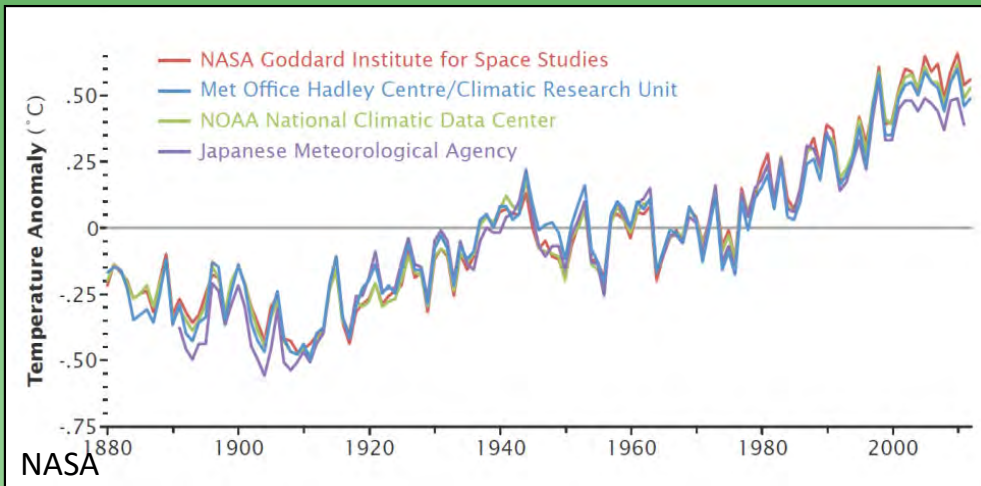
How do we protect them all?



Elfin
Skimmer

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

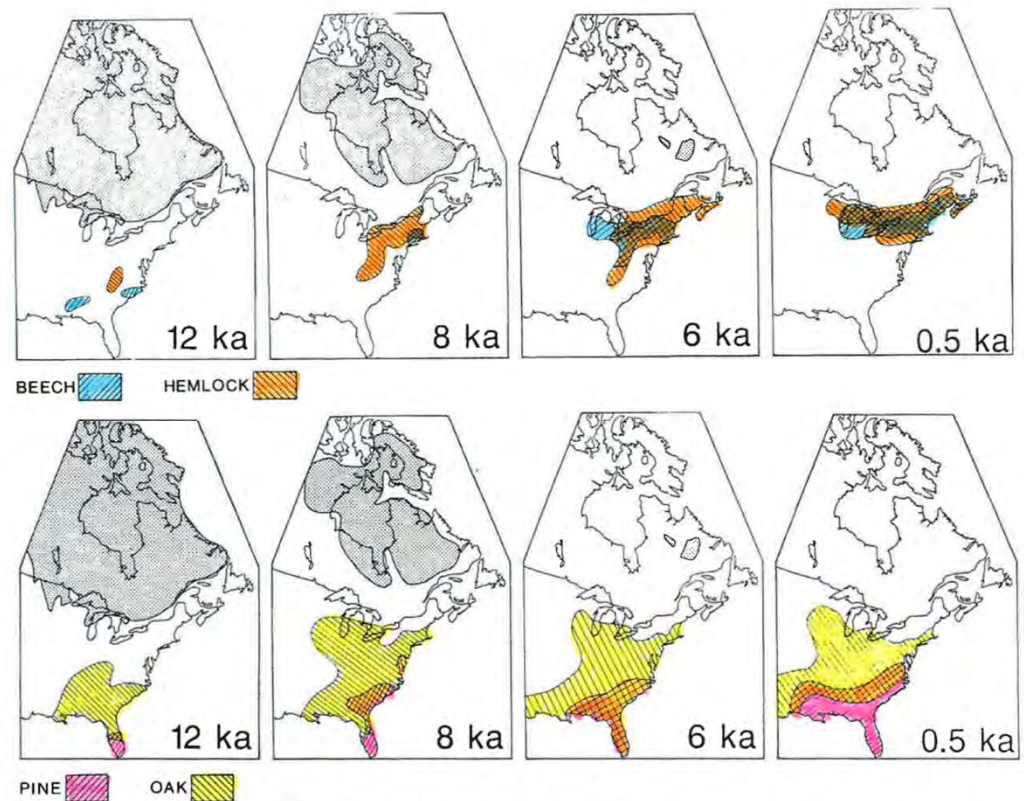
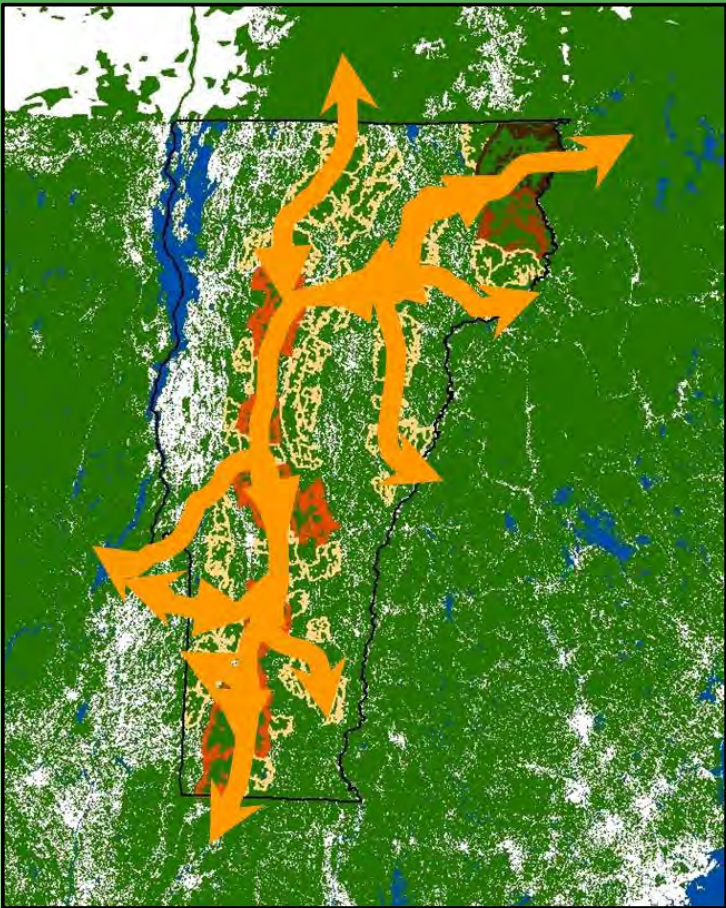
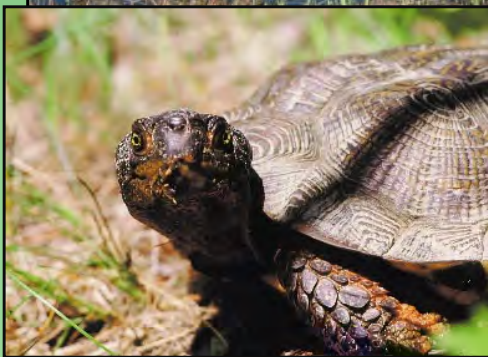


Figure 1. Location of regions with 5% beech (*Fagus*) pollen and 5% hemlock (*Tsuga*) pollen (in the upper row maps) and 20% southern pine (*Pinus*) pollen and 20% oak (*Quercus*) pollen (in the lower row of maps) at 12,000, 8,000, 6,000, and 500 yr B.P. with the stippled area in the north showing the 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.

Coarse filter/fine filter approach to conservation

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



VERMONT CONSERVATION DESIGN

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

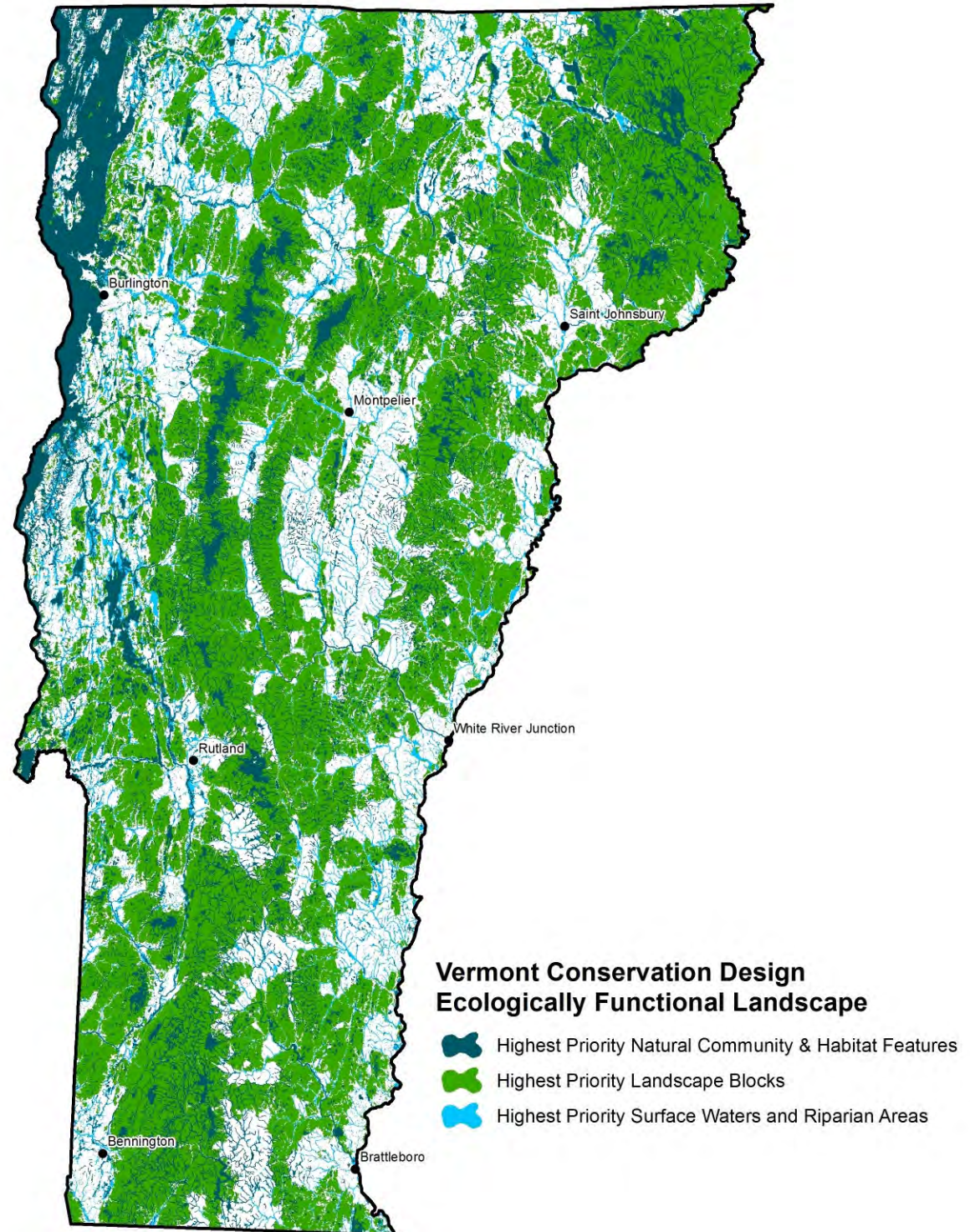
- Applies the coarse filter-fine filter approach
- Uses simple, recognizable features
- Depends on thoughtful stewardship and management



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



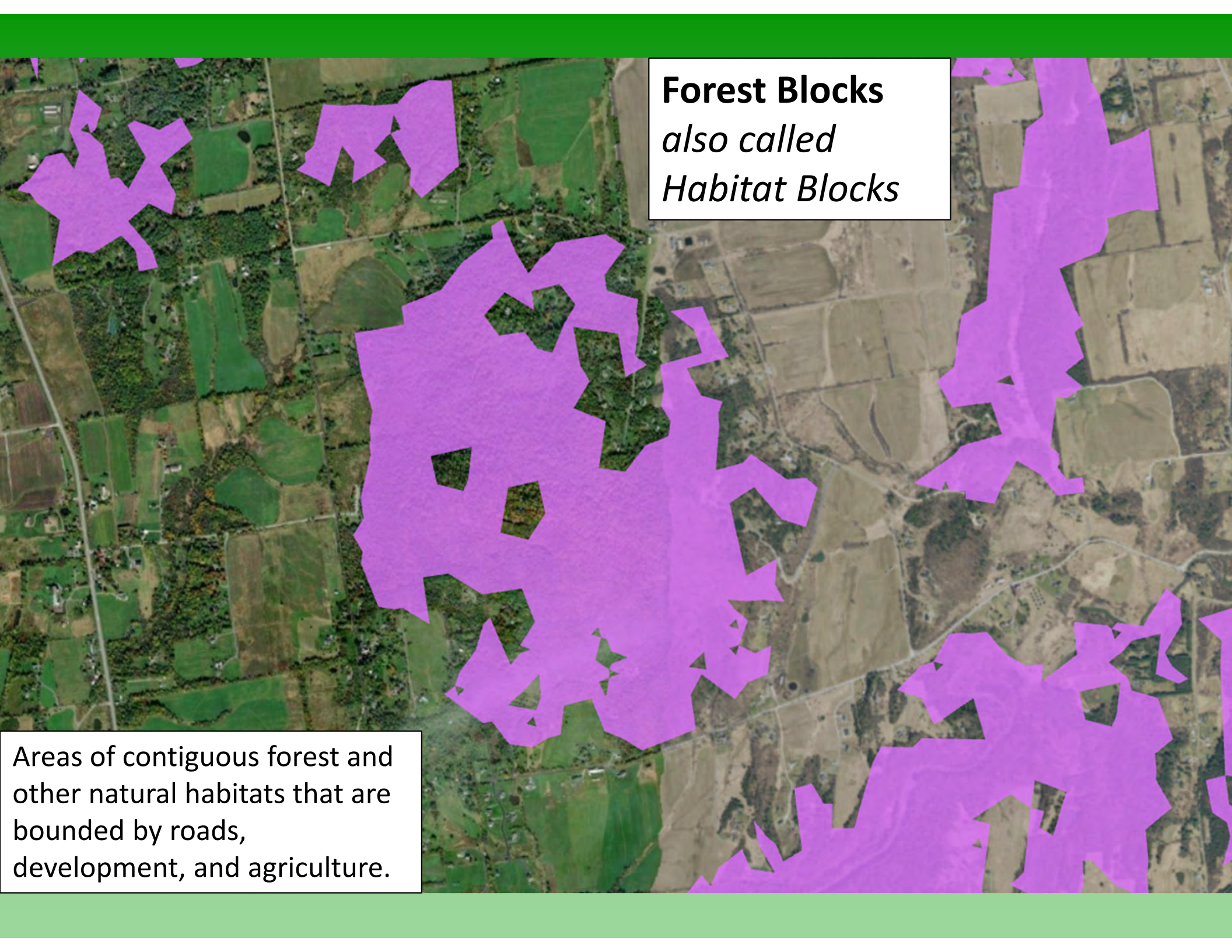
Species



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

An aerial photograph of a rural landscape. The image shows a mix of green fields, brown agricultural fields, and roads. Several irregular, jagged purple shapes are overlaid on the image, highlighting specific areas of forest and natural habitats. These shapes are scattered across the landscape, with a large, central one and several smaller ones around it. The purple color is a solid, bright magenta. The background is a mix of green and brown, representing different types of land use.

Forest Blocks
also called
Habitat Blocks

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

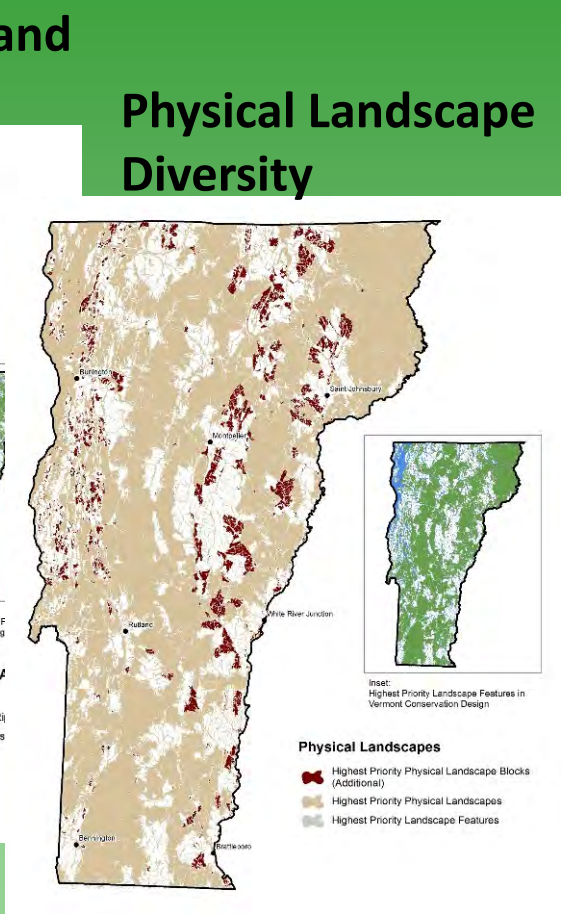
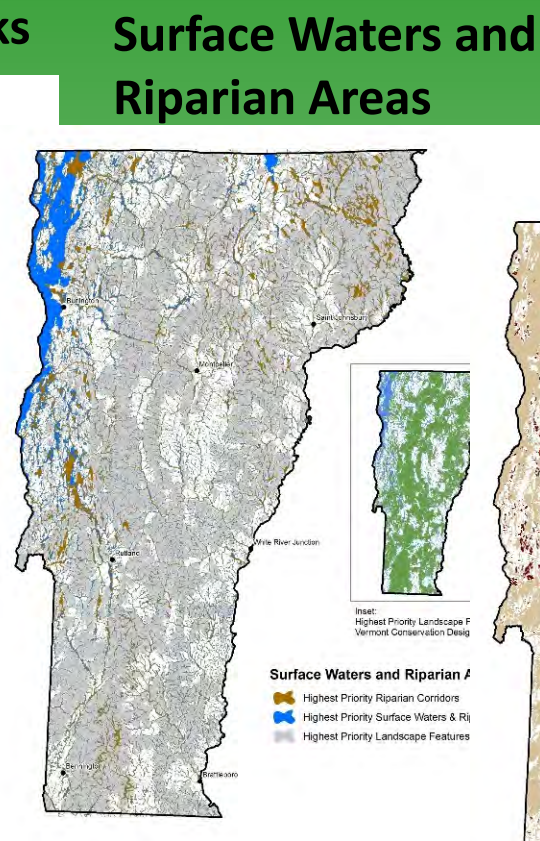
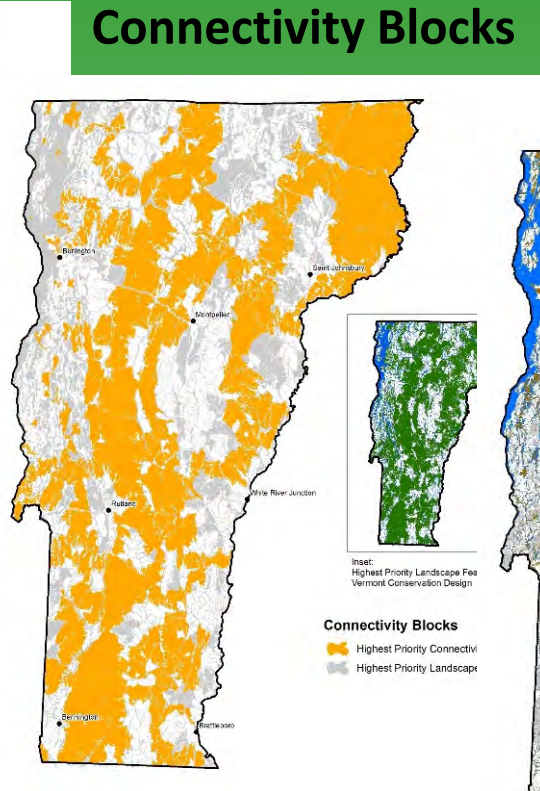
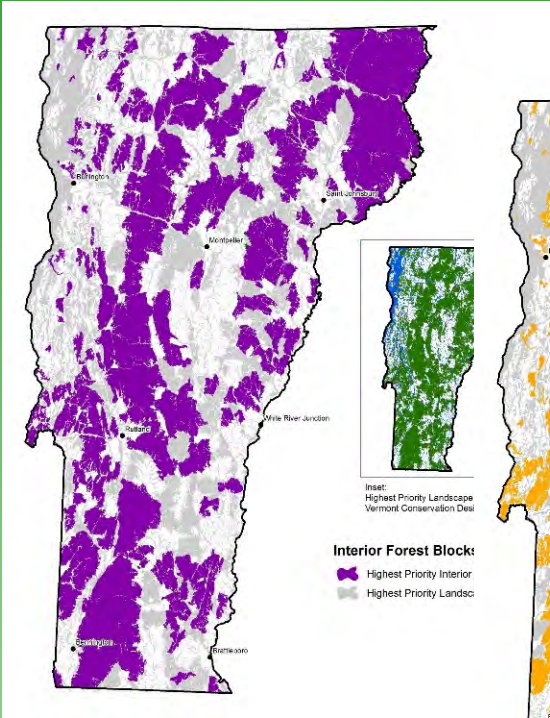
Intact and Connected Forest Blocks Surface Waters and Riparian Areas

Interior Forest Blocks

Connectivity Blocks

Surface Waters and Riparian Areas

Physical Landscape Diversity



Wildlife Road Crossings

Maintain the specific functions of each element

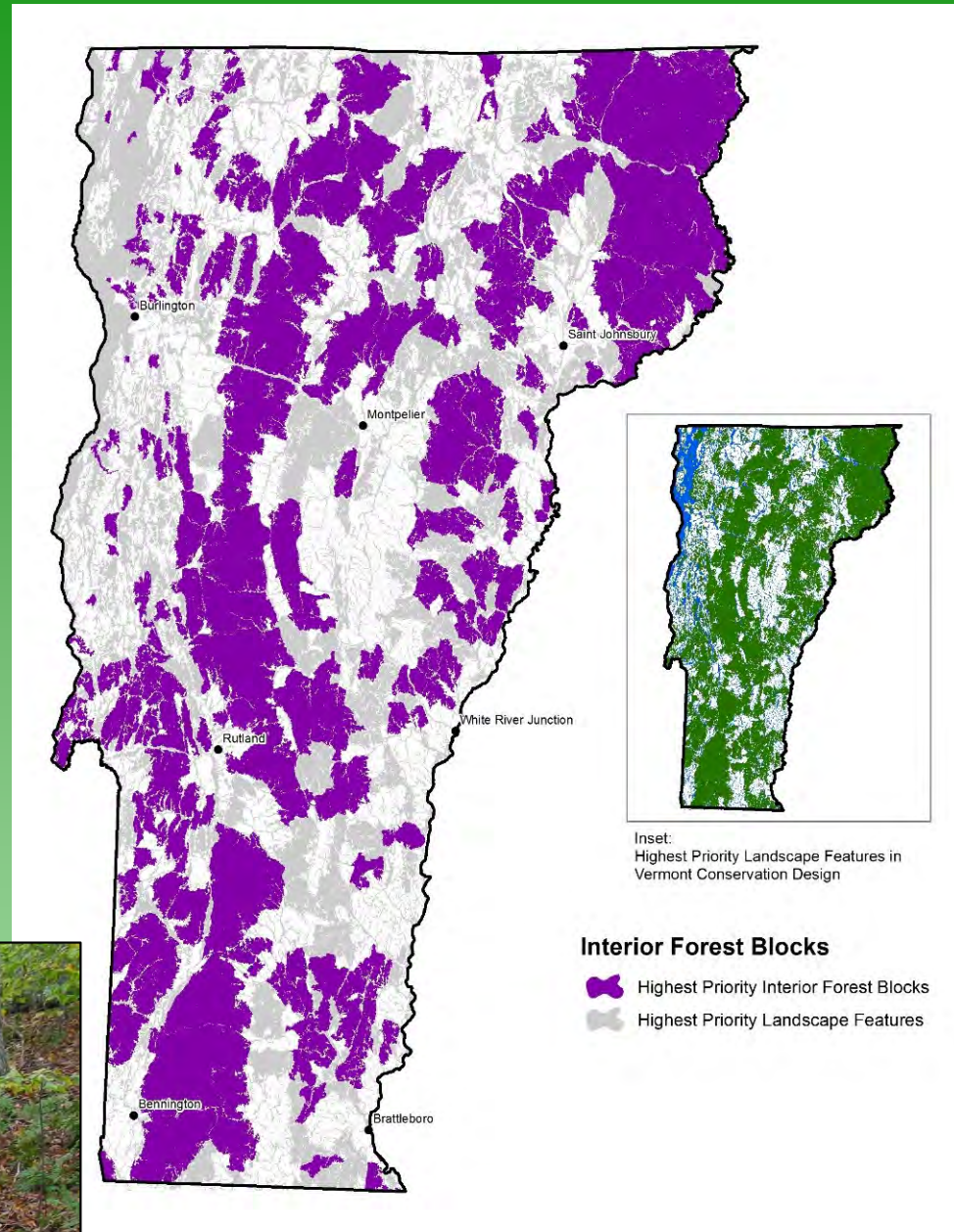
Interior Forest Blocks

The best examples of interior forest in each region of Vermont

Places where species and ecological process exist with minimal disturbance

Ecological functions:

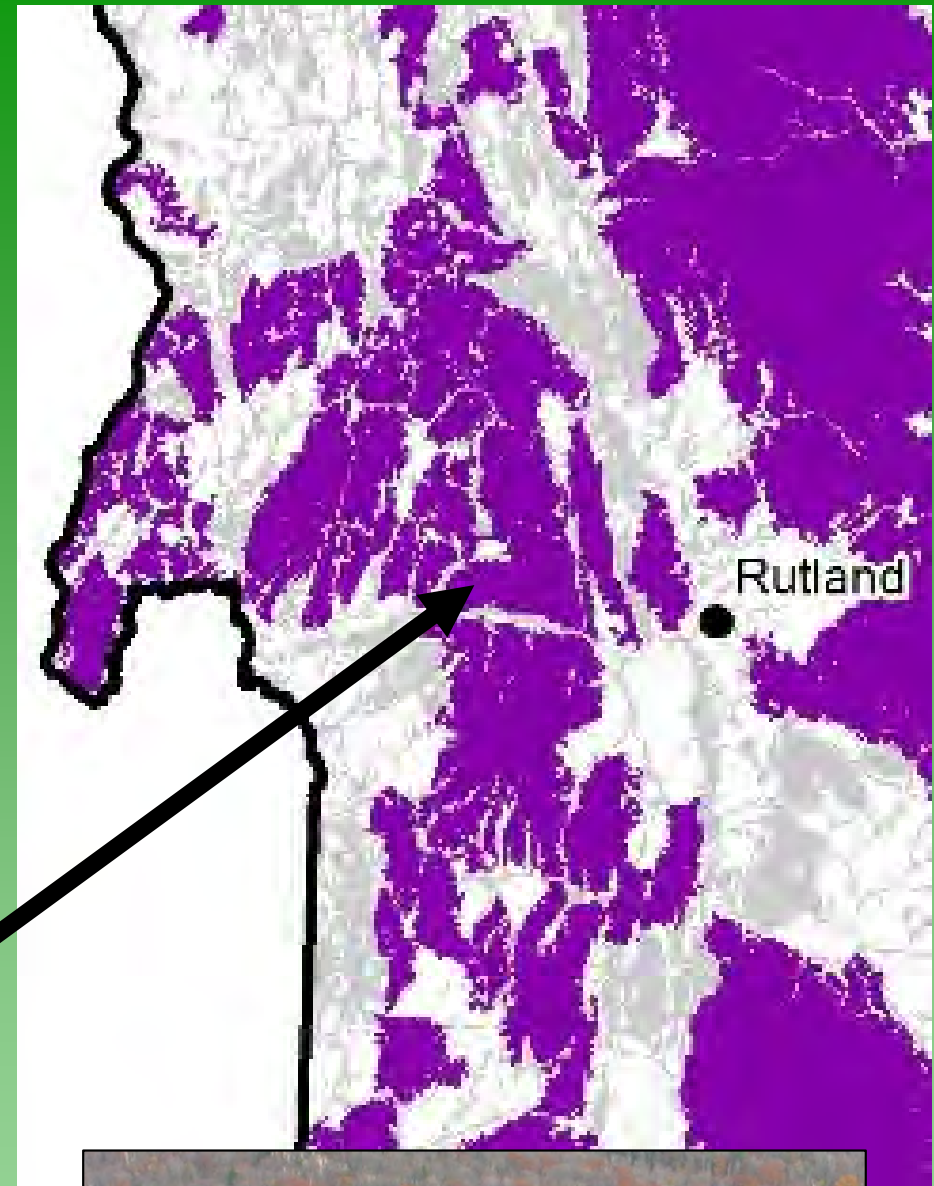
- Interior forest species
- Wide-ranging mammals
- Air and water quality
- Flood resilience
- Ecological processes
- Species can shift and adapt within blocks



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.



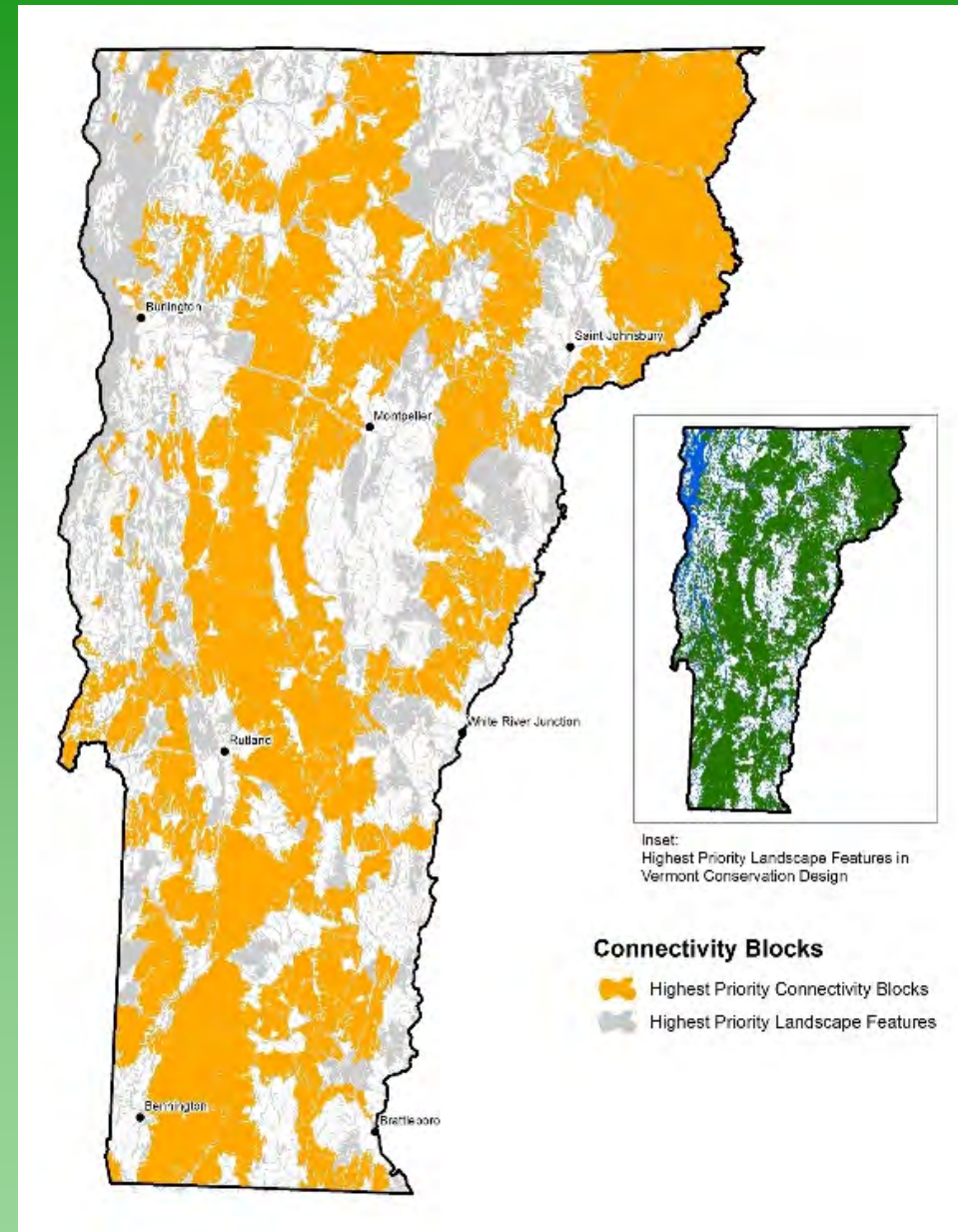
Connectivity Blocks

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



Inset:
Highest Priority Landscape Features in
Vermont Conservation Design

Connectivity Blocks

- Highest Priority Connectivity Blocks
- Highest Priority Landscape Features

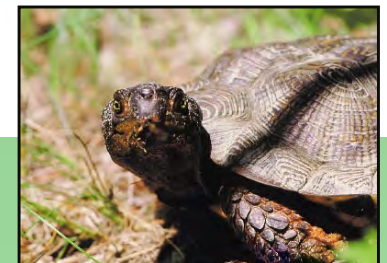
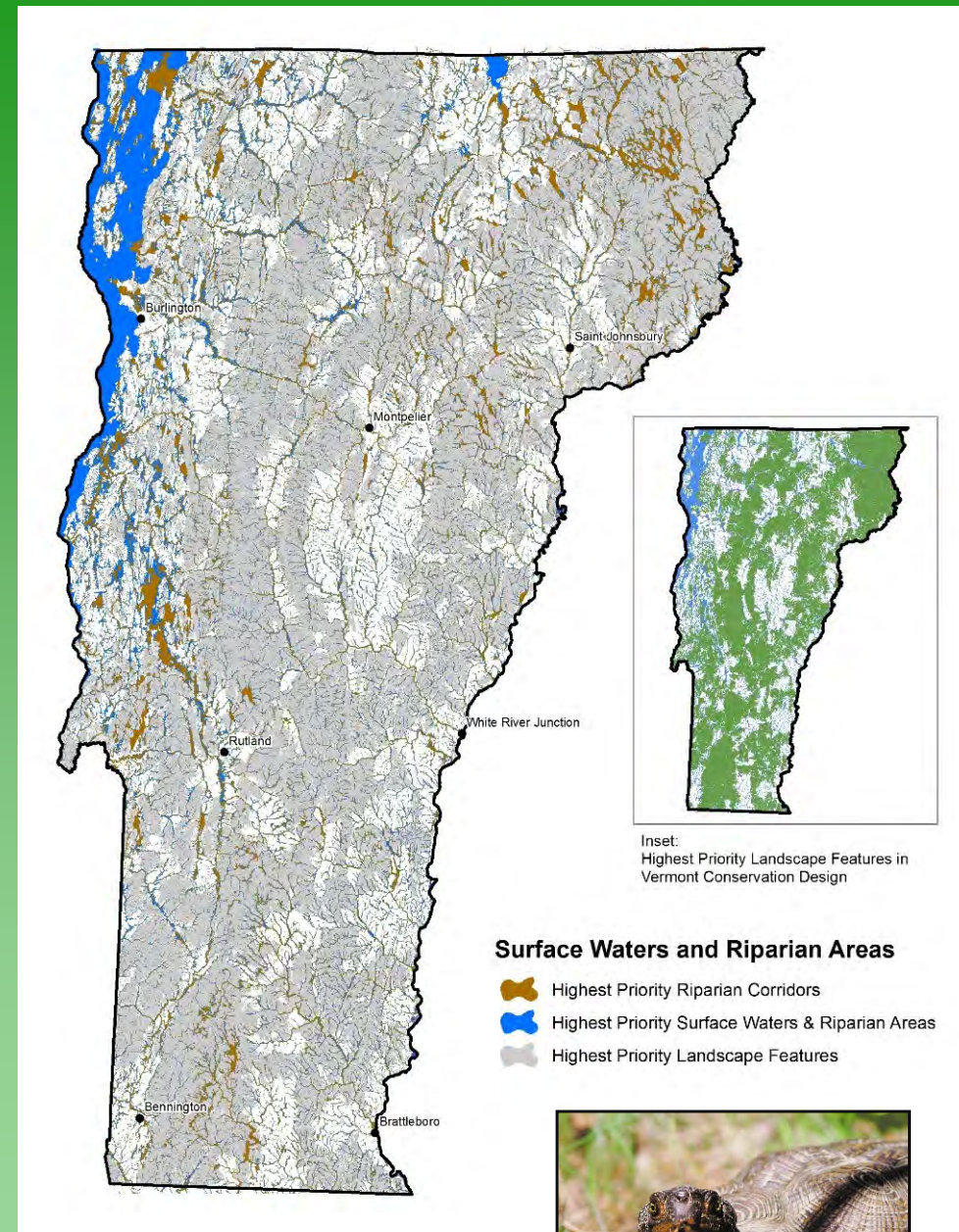
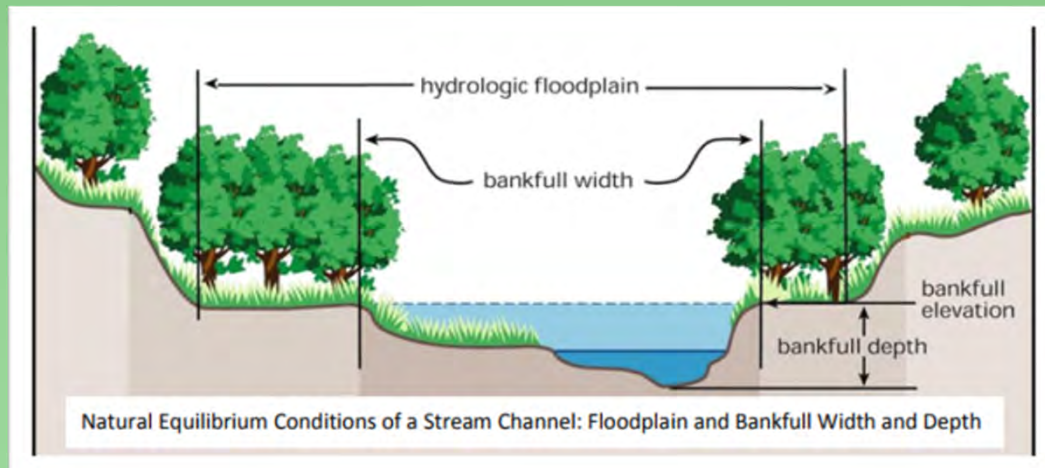
Surface Waters and Riparian Areas

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

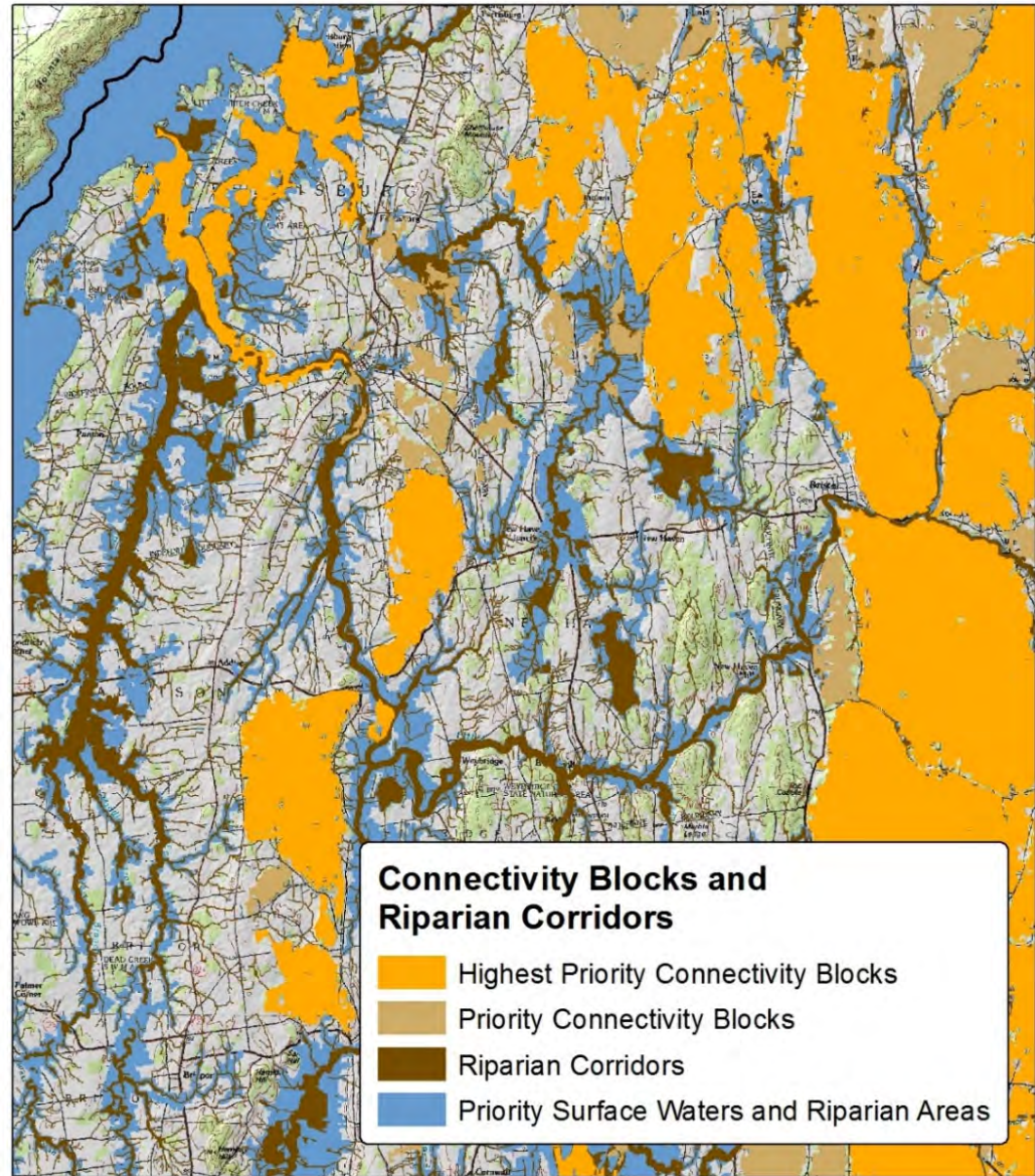


Riparian Connectivity





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

We need to restore riparian vegetation.



Connectivity Blocks and Riparian Corridors

-  Highest Priority Connectivity Blocks
-  Priority Connectivity Blocks
-  Riparian Corridors
-  Priority Surface Waters and Riparian Areas

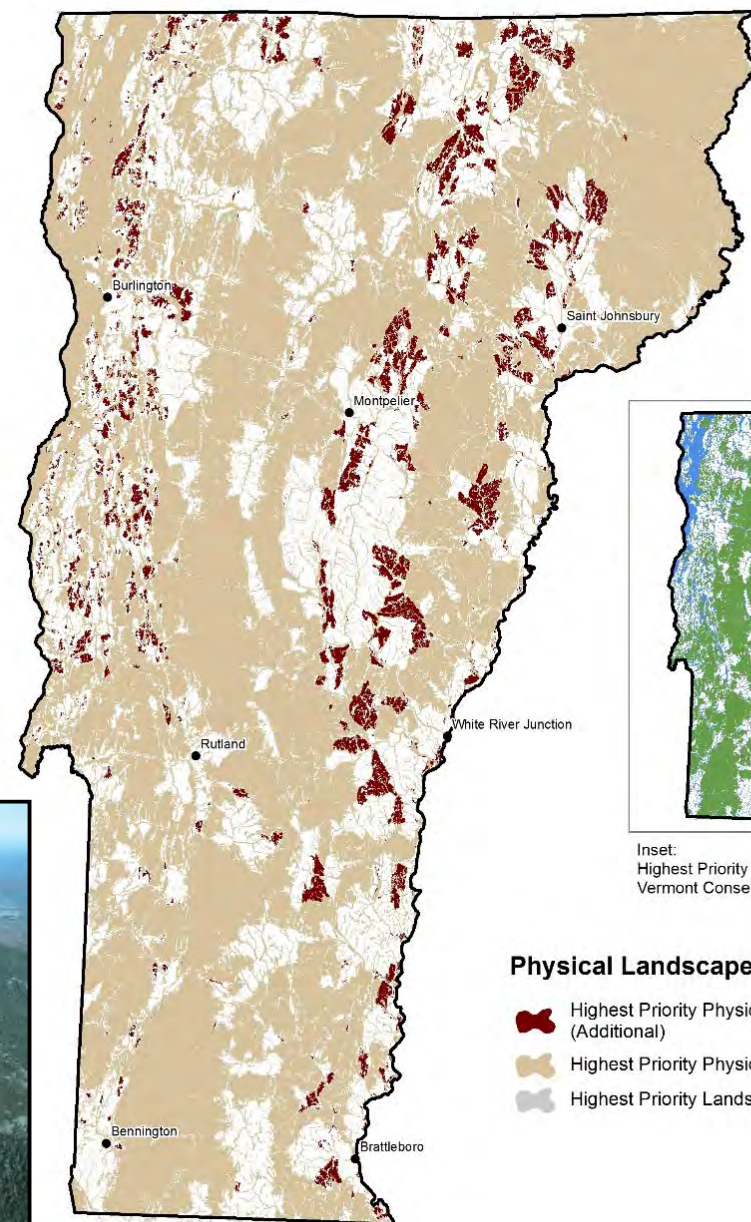
Physical Landscape Diversity Blocks

Represents Vermont's full diversity of elevation, geology, and landforms

Critical for climate resilience




Ecological functions:

- Meets current and future habitat needs
- Species can shift ranges in response to climate change



Inset:
Highest Priority Landscape Features in
Vermont Conservation Design

Physical Landscapes

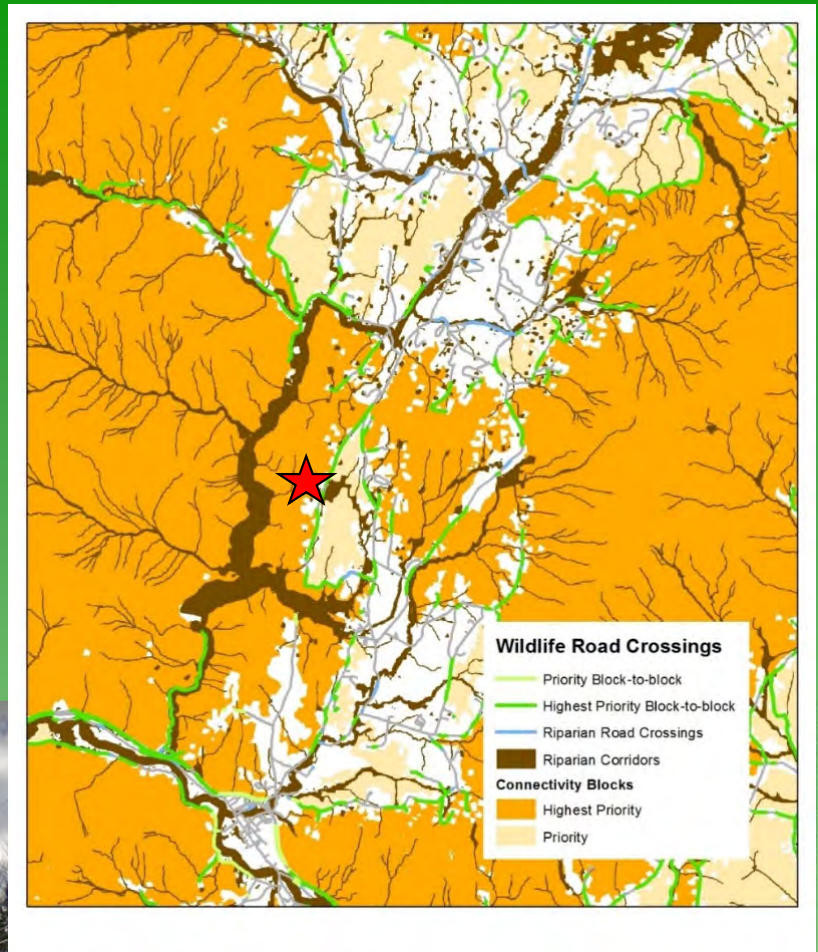
-  Highest Priority Physical Landscape Blocks (Additional)
-  Highest Priority Physical Landscapes
-  Highest Priority Landscape Features



Wildlife Road Crossings



Photo:
Noel Dodge



Conservation Design at Three Scales

Landscapes



Natural Communities



Species

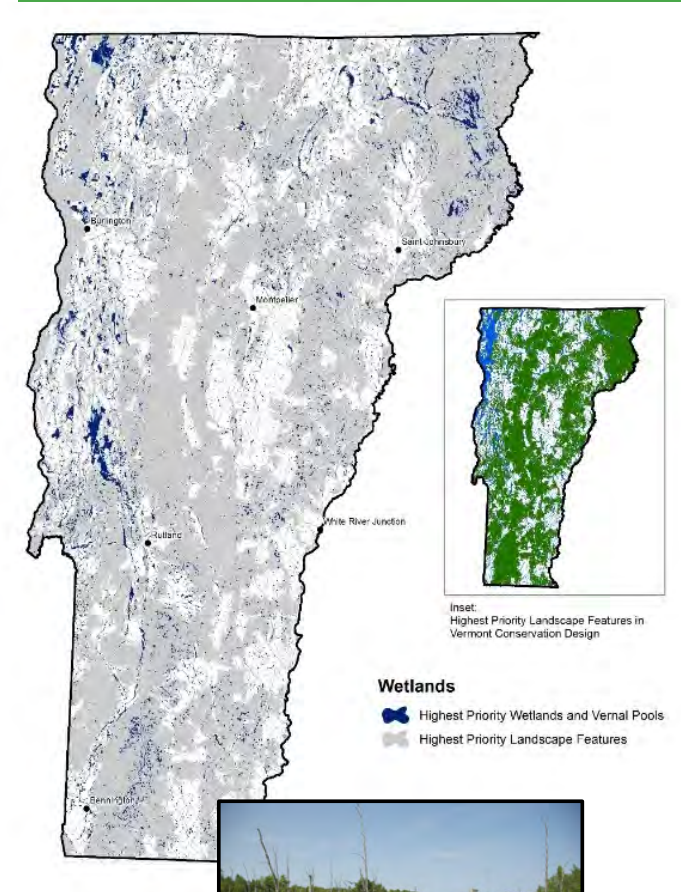
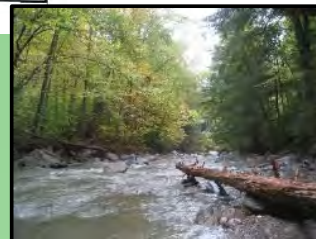
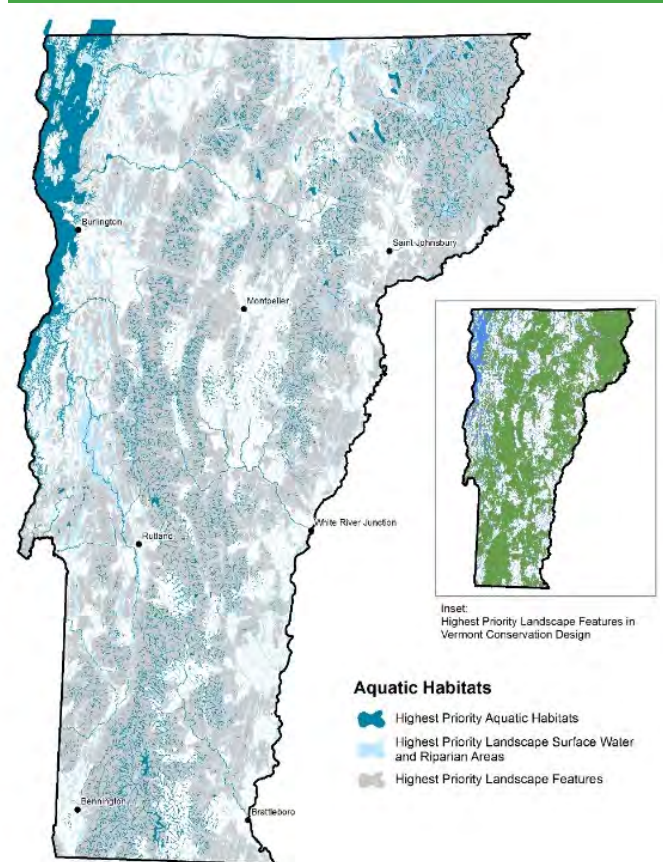
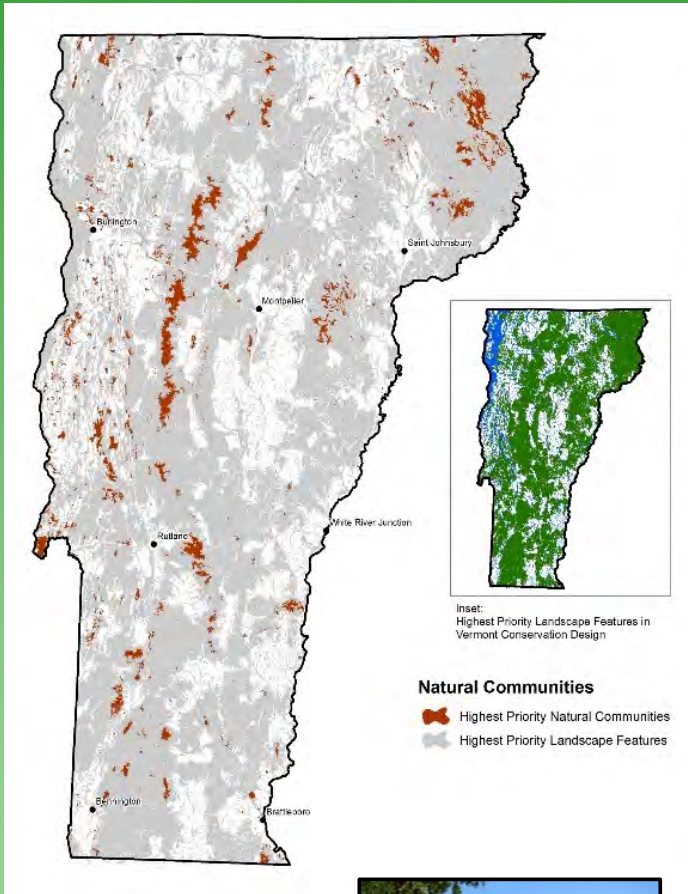


Interior Forest Blocks
Connectivity Blocks
Surface Waters and Riparian Areas
Riparian Areas for Connectivity
Physical Landscapes
Wildlife Road Crossings

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

Terrestrial Natural Communities, Aquatic Habitats, Wetlands, & Caves



Natural Communities

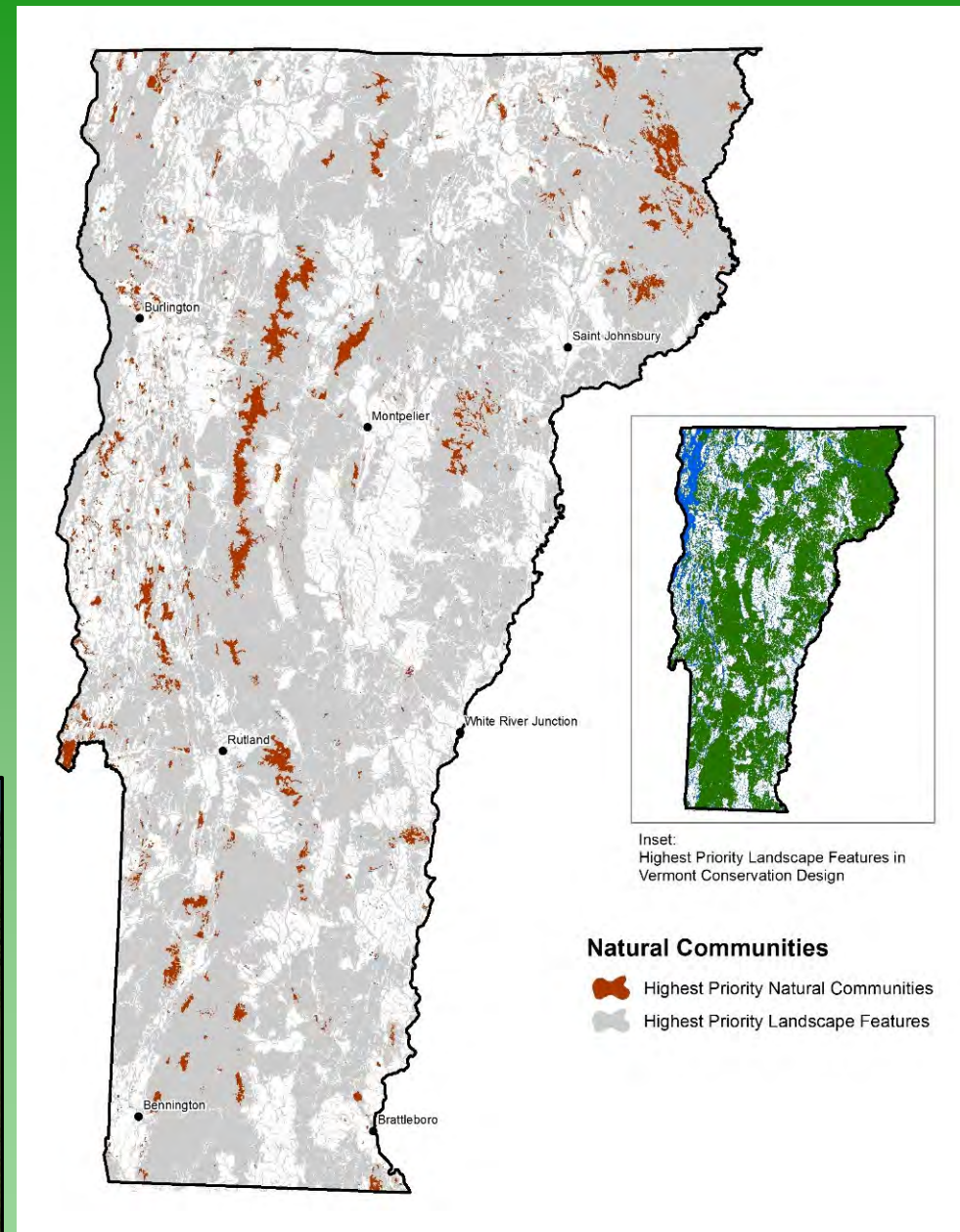
Vermont's original natural habitats

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

Matrix forests conserved by forest blocks and old forests

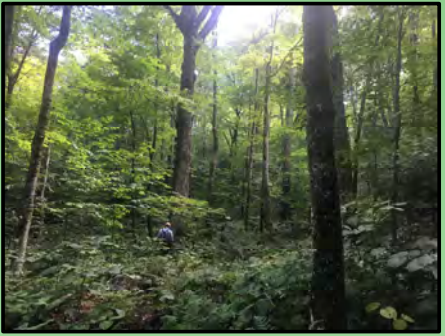
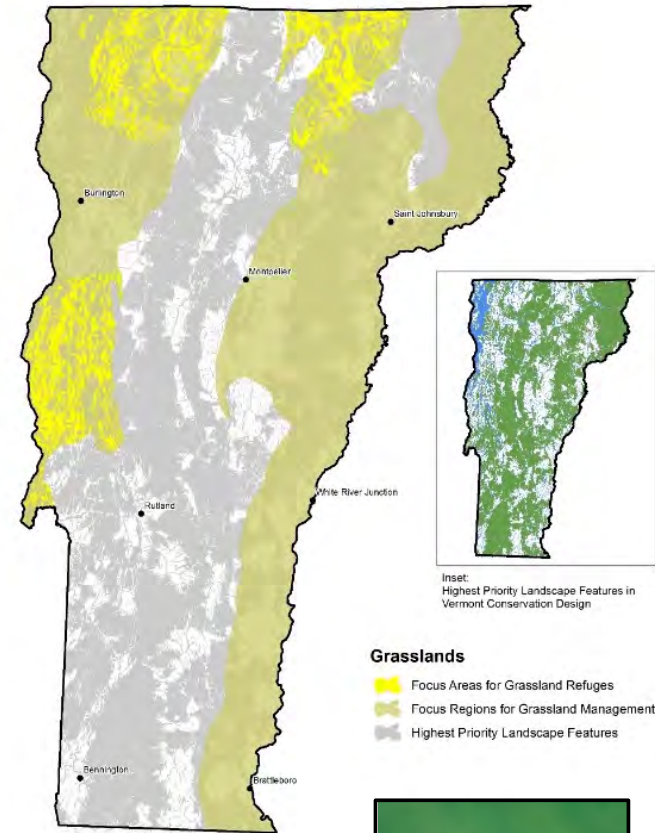
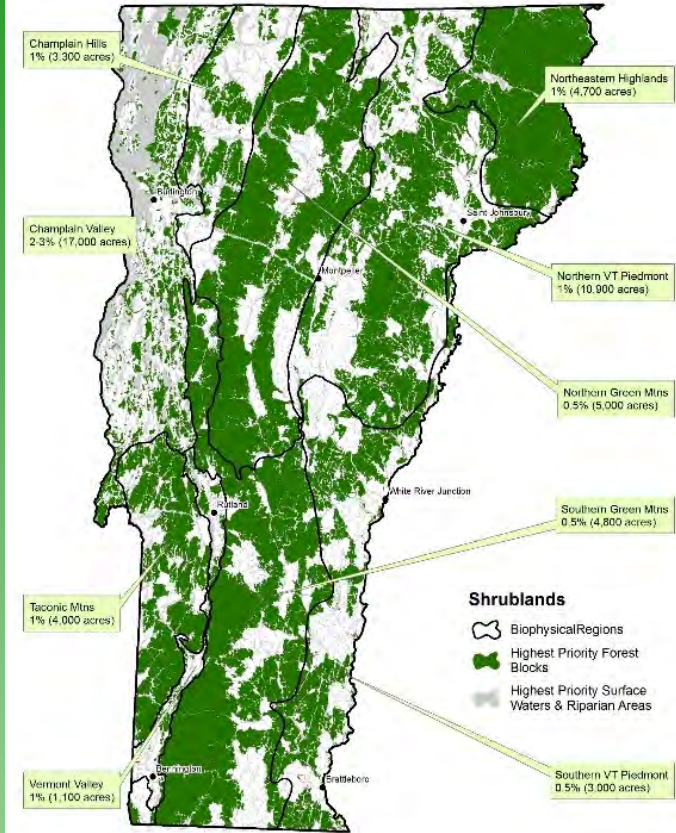
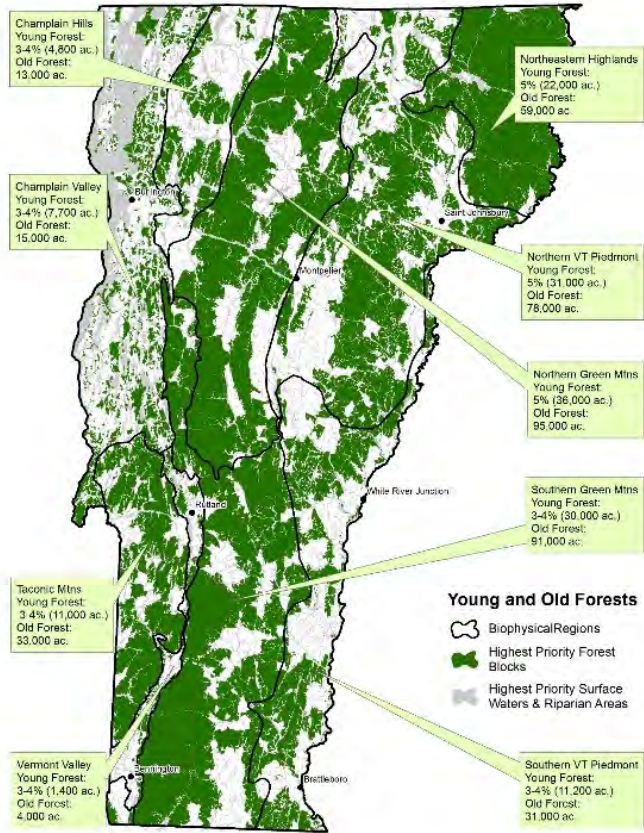
Ecological Functions:

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





Young and Old Forests, Shrublands, Grasslands



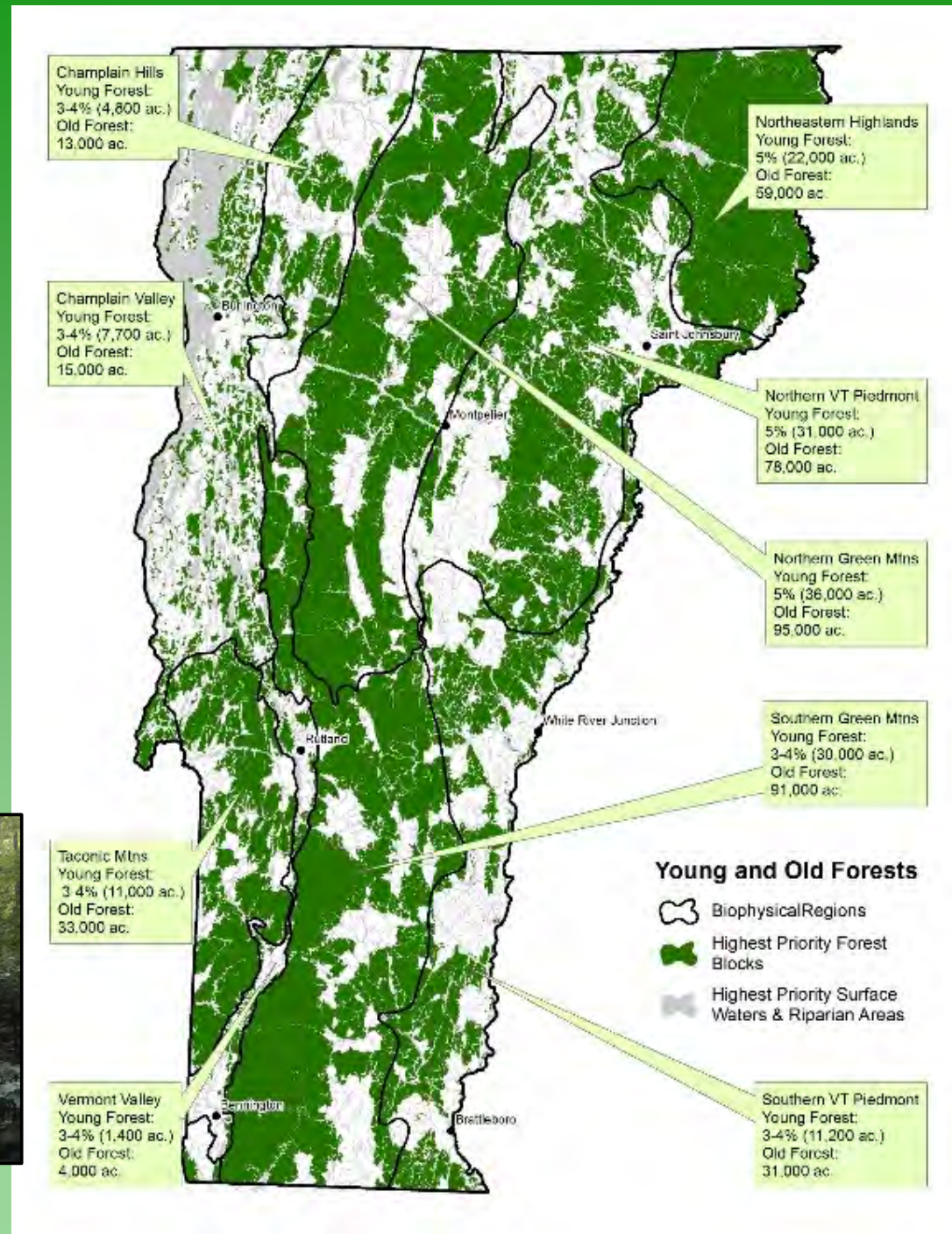
Young and Old Forests

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.



Grasslands

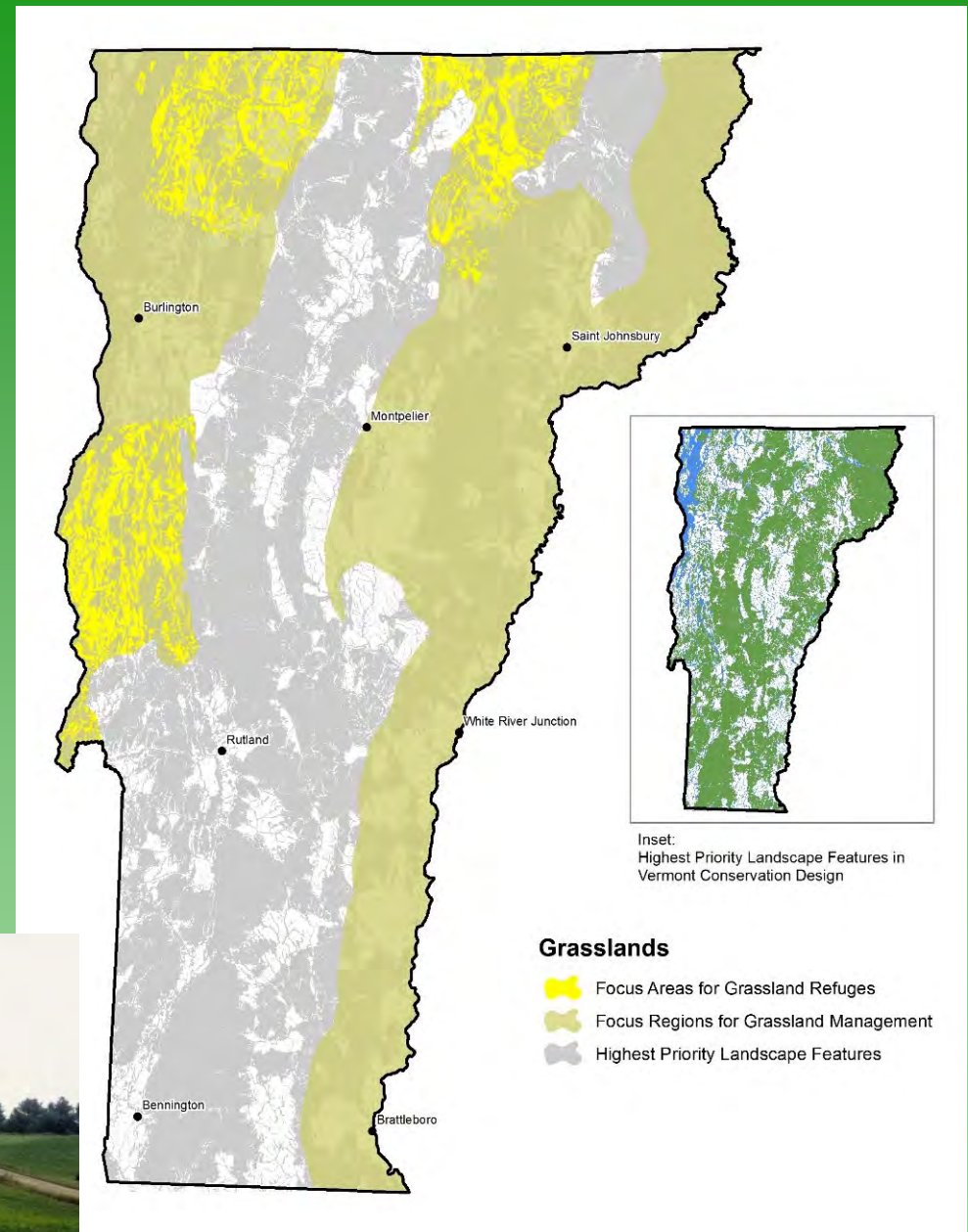
Grasslands are man-made habitats that support a unique set of species

Many bird species that need grasslands are in regional decline

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

Ecological Functions:

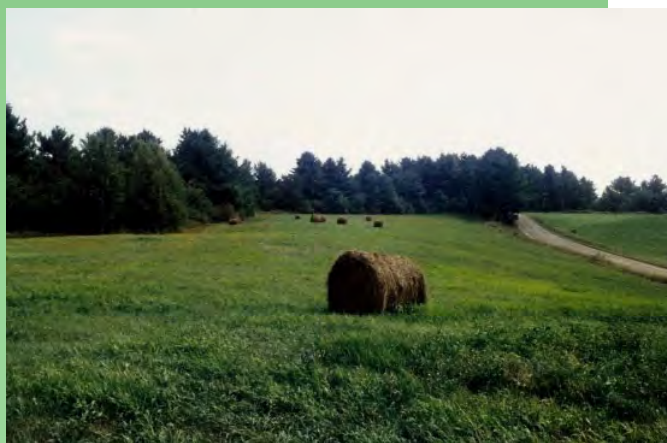
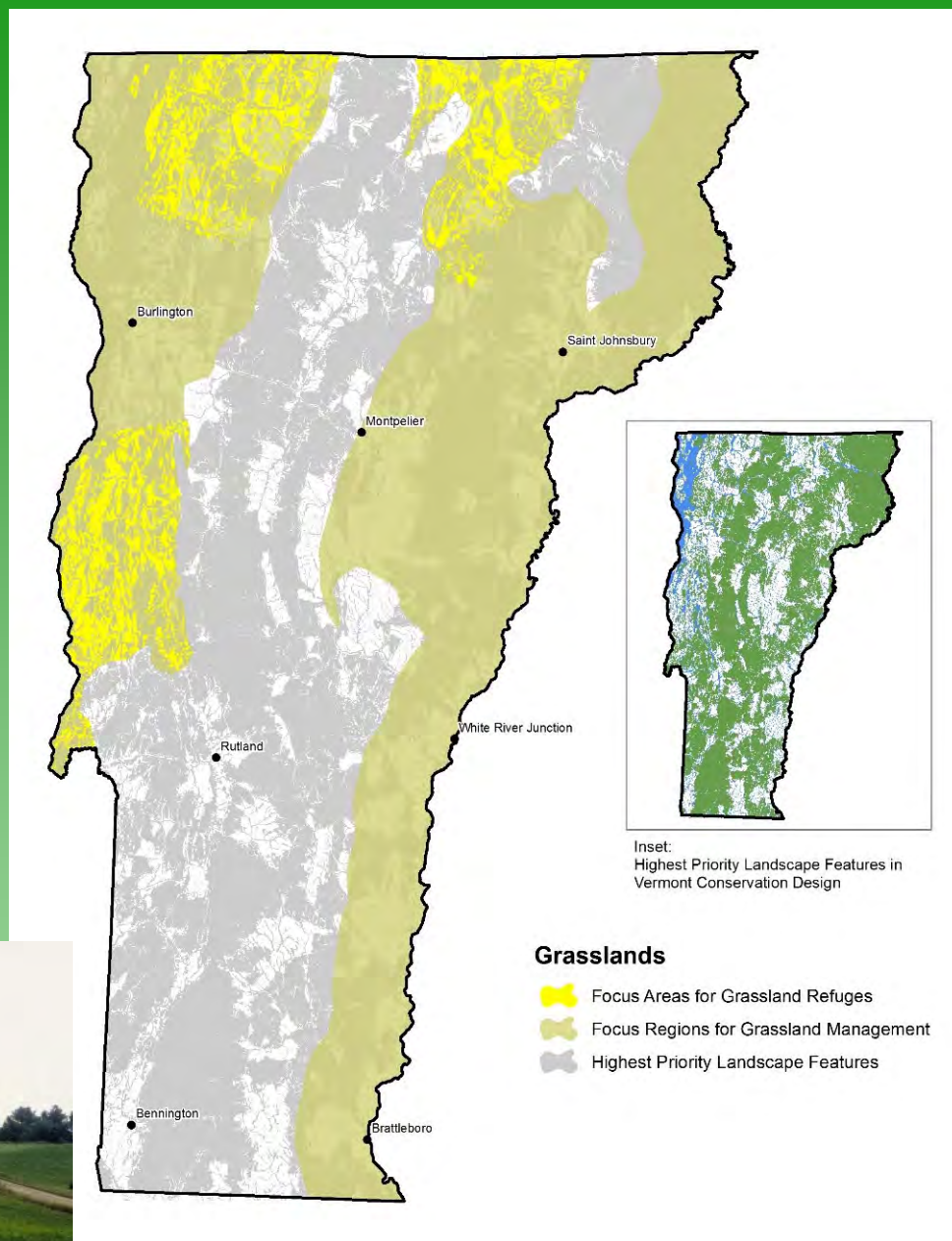
- Supports a suite of grassland-nesting birds such as Bobolink and Savannah Sparrow
- Habitat that has been lost in other parts of the country



Grasslands and Shrublands

Guidelines for Maintaining Ecological Function:

- Grassland patches >25 acres; ideally >250 acres
- Mow at least annually to maintain suitable grass composition
- But no mowing during May – August to protect nests
- Minimize/avoid tree islands or hedgerows in fields



Conservation Design at Three Scales

Landscapes



Natural Communities



Species



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Northern pale painted cup

Spiny softshell turtle

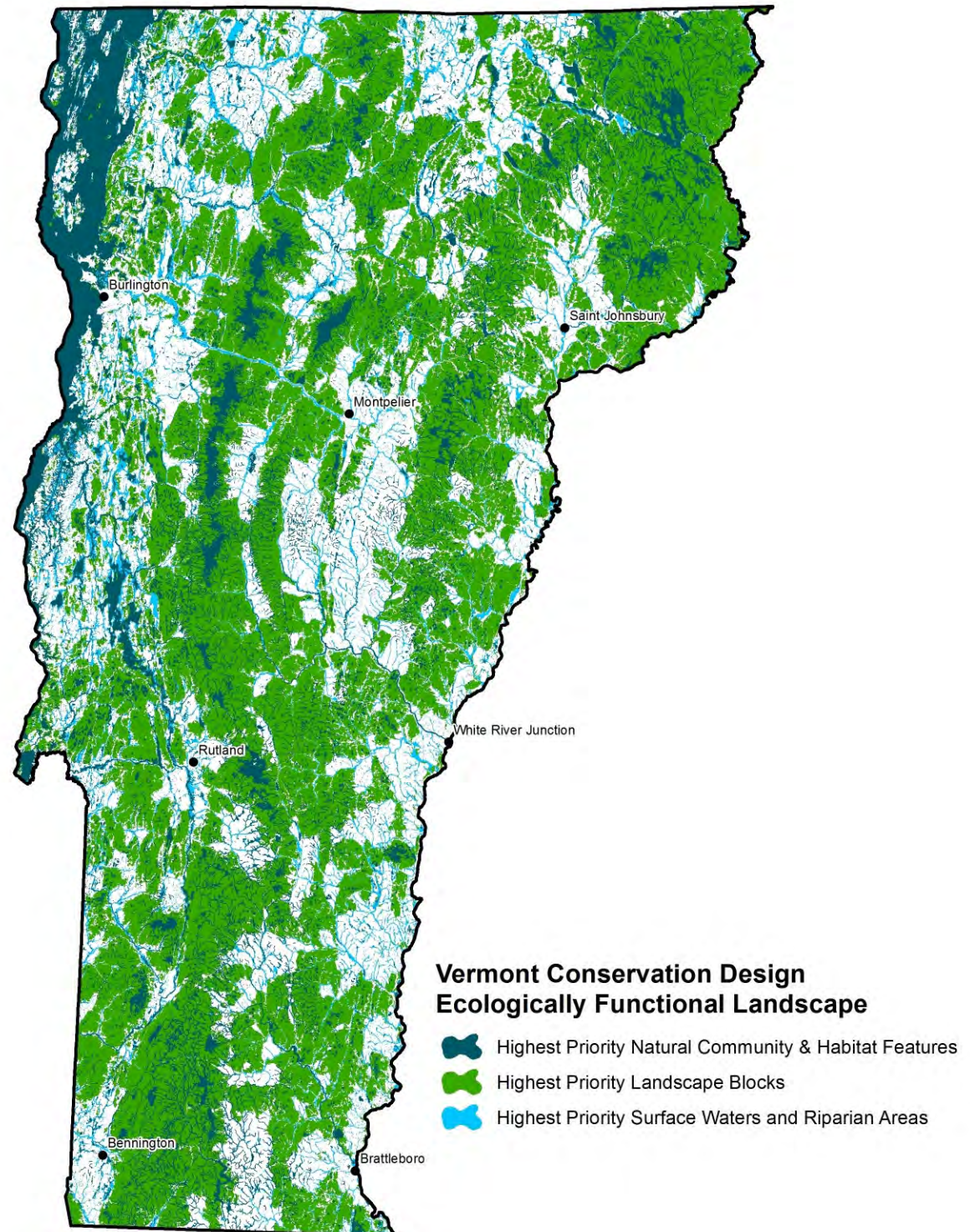


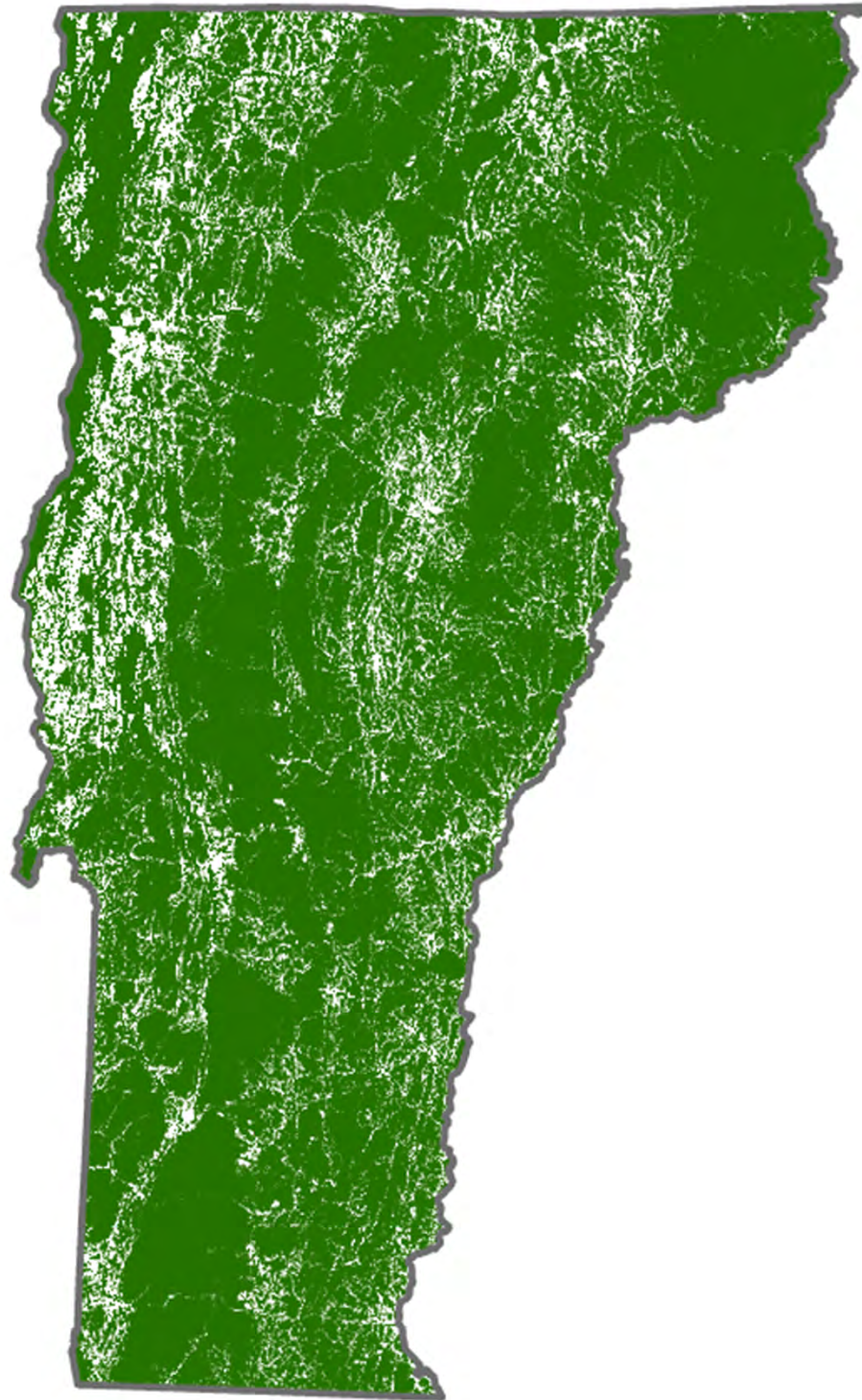
Vermont Conservation Design

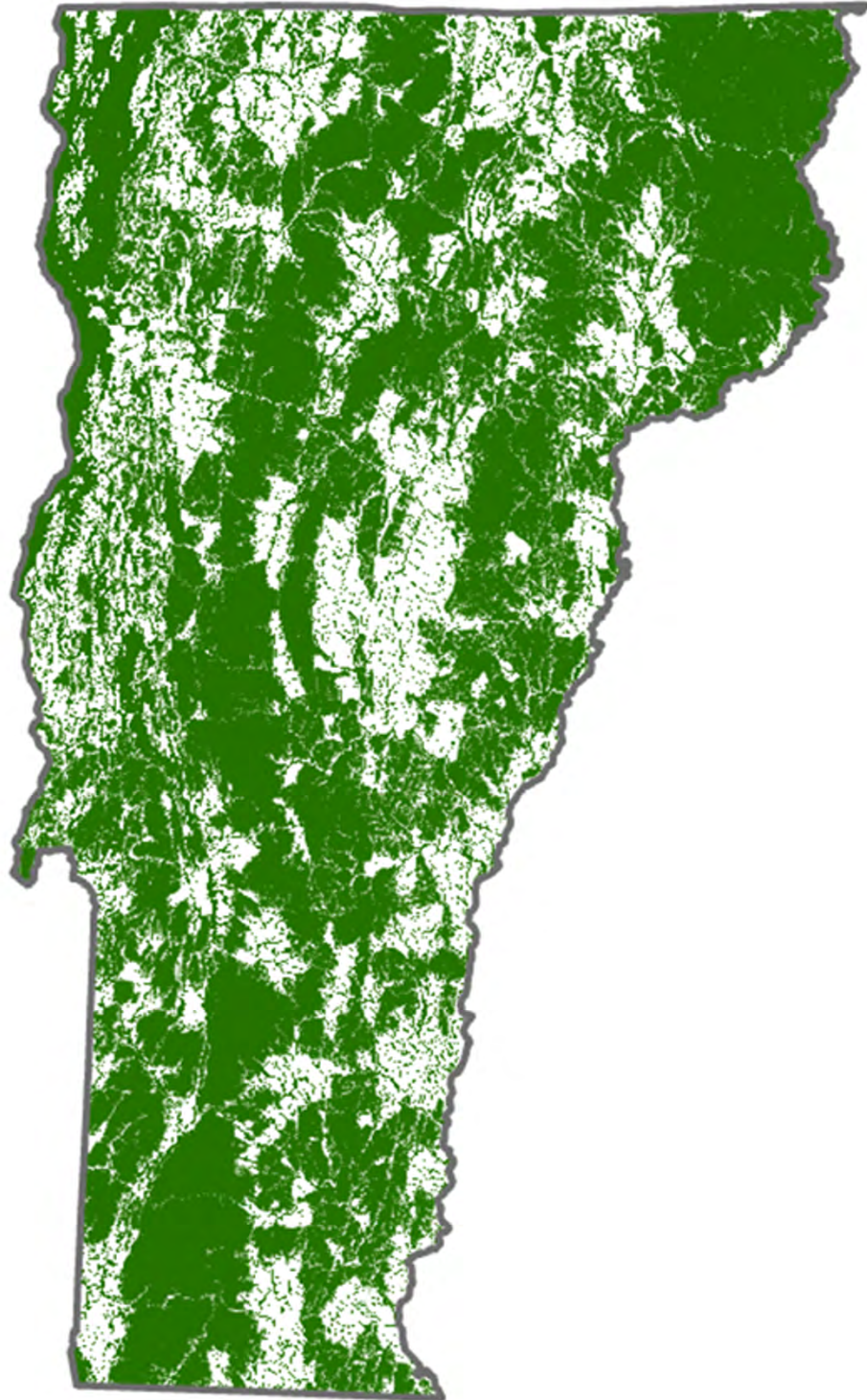
Maintains an intact, connected and diverse natural landscape

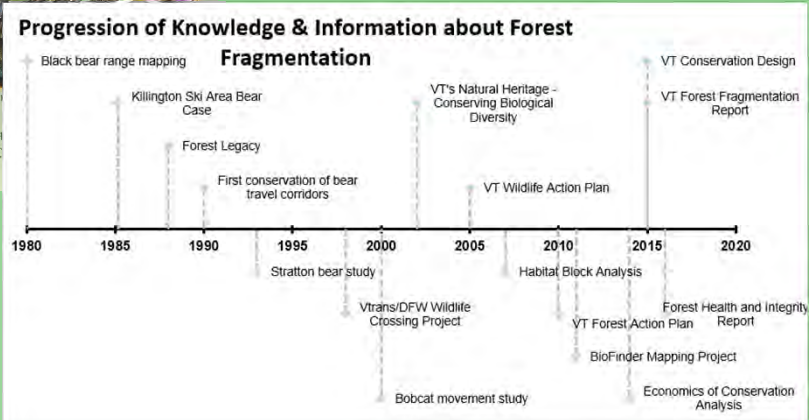
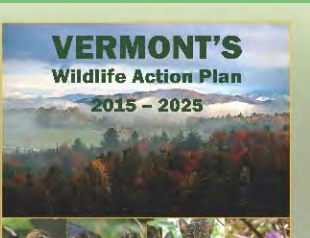
Conserves species and natural communities

Allows nature to adapt to a changing climate

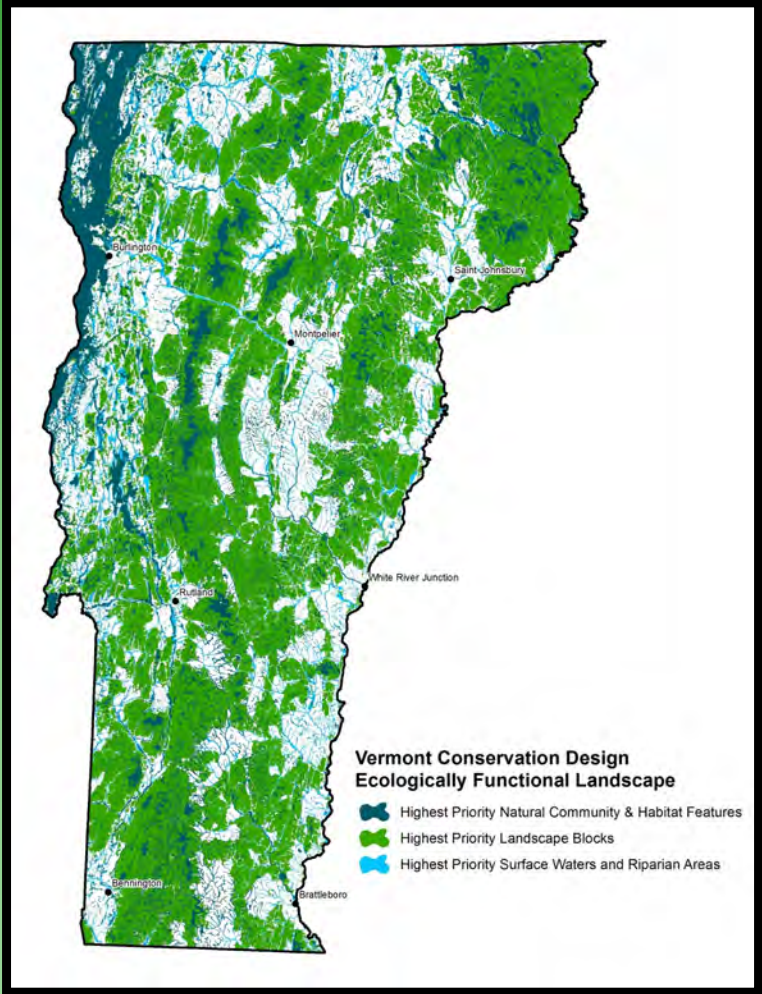








Vermont Conservation Design



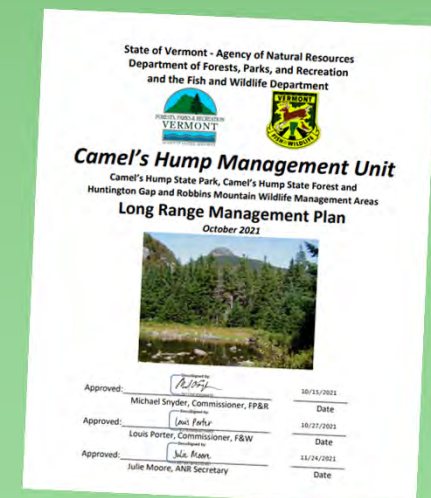
Vermont Conservation Design Science Partners

- VT Department of Forests, Parks, and Recreation
- VT Department of Environmental Conservation
- Vermont Land Trust
- The Nature Conservancy
- Northwoods Stewardship Center
- USDA Natural Resources Conservation Service
- Vermont Coverts
- National Wild Turkey Federation
- Northeast Wilderness Trust
- University of Vermont
- Middlebury College



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



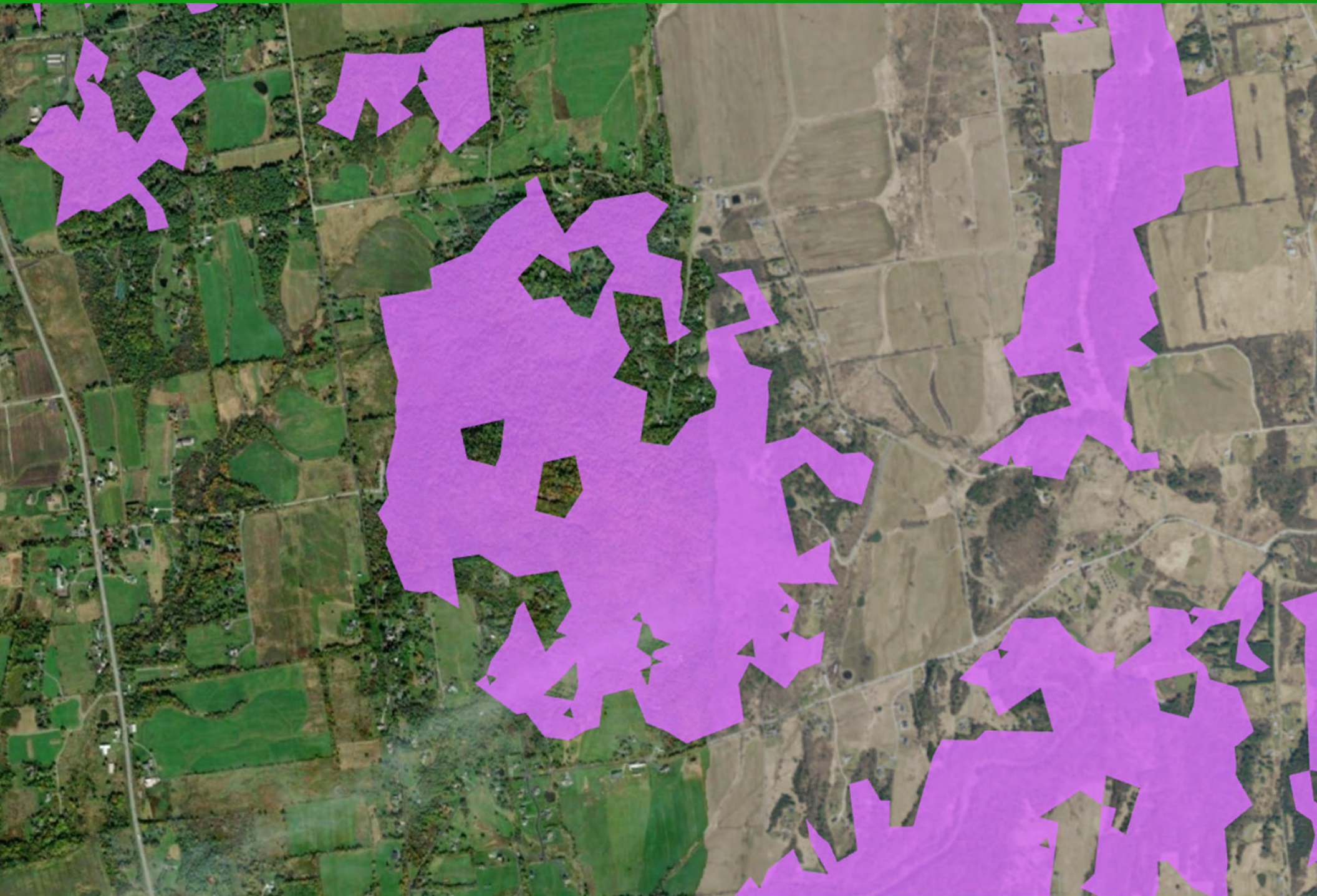
Vermont Conservation Design is not

- A map of land that must be permanently conserved, though permanent conservation is an important tool.
- A good jurisdictional trigger for Act 250 and other regulatory processes.
- Chiseled in stone. We expect science will continue to advance, our mapping tools will improve, and the ecologically functional landscape will evolve in response to development and other land use changes.

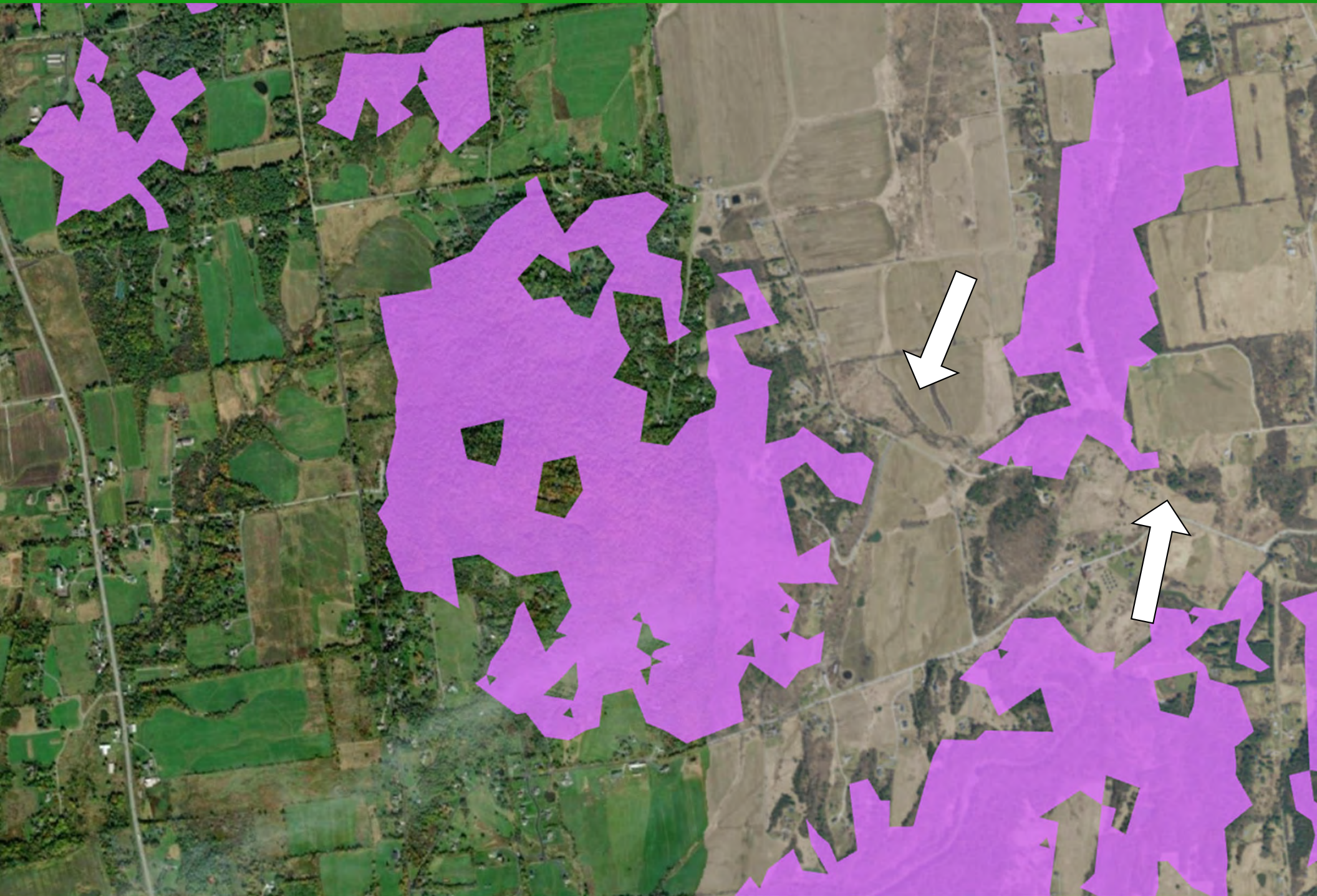
Vermont Conservation Design Update

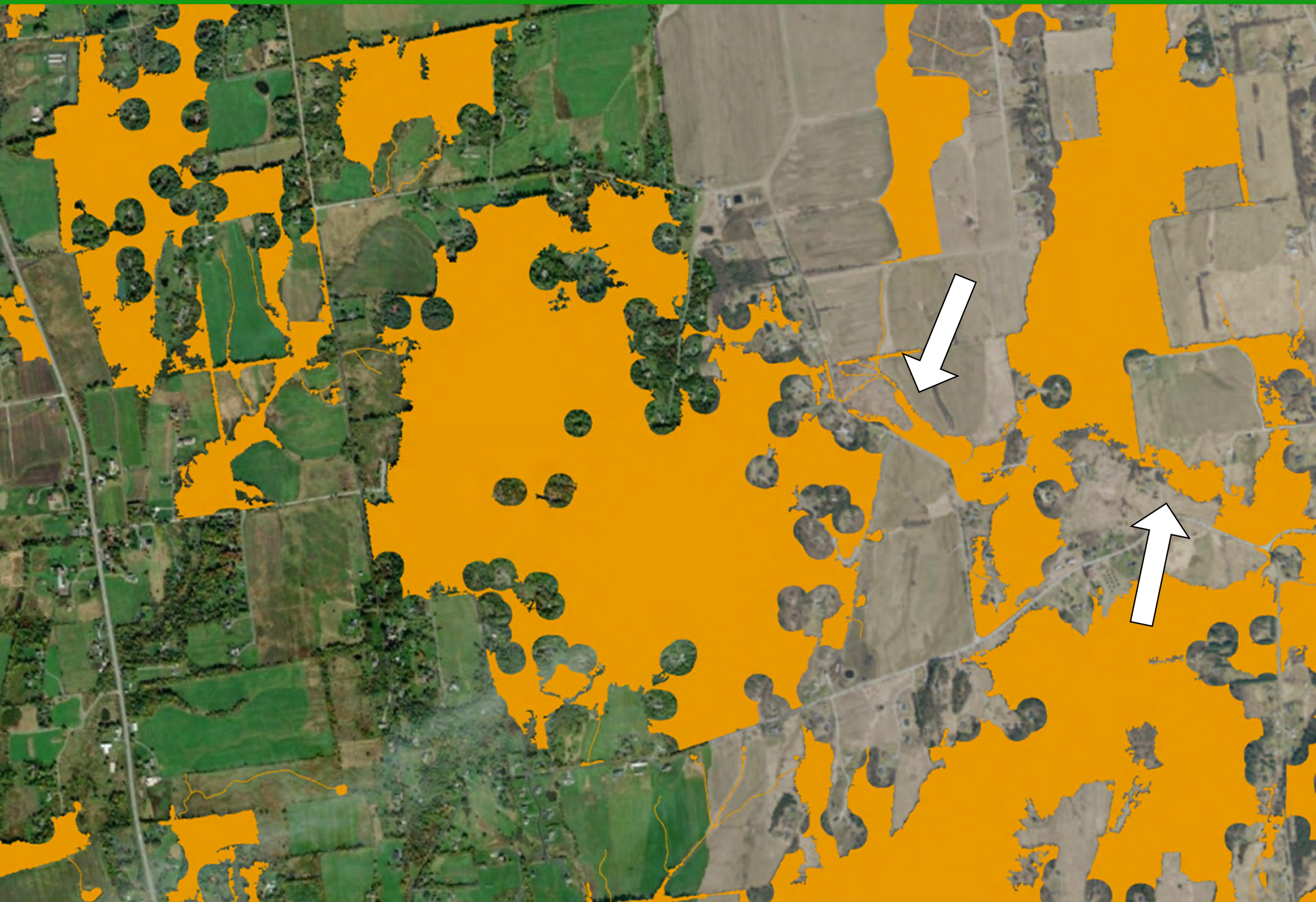
- **Very high confidence in core concepts and the broad outlines of the Vermont Conservation Design network**
- **Scientific understanding of Vermont's ecological features is always getting better (ANR's inventory work)**
- **As a result, we will continue to refine and improve the prioritization in Vermont Conservation Design**











Expected in 2023:

- **New mapping and prioritization of three elements of Vermont Conservation Design:**
 - Interior Forest Blocks
 - Connectivity Blocks
 - Physical Landscape Diversity Blocks
- **New report reflecting the updates**
- **New mapping and data will be incorporated onto the Biofinder Website:**
<https://anrmaps.vermont.gov/websites/BioFinder/>

Some Thoughts and Perspectives

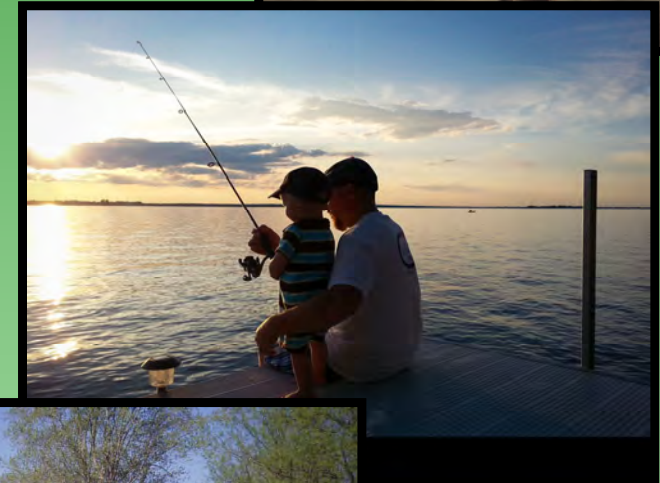
- Scientific vision for the future of Vermont
- Landowners and their decisions are key to success
- All the features are needed for ecological function
- Unifies many aspects of conservation, without being prescriptive



Photo by
Susan
Morse

Sustains more than biodiversity

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



- What types of conservation and management are needed for each element of Vermont Conservation Design?
- What is the broad conservation status of each element of the ecologically functional landscape in Vermont Conservation Design?
- What places and elements within Vermont Conservation Design are best suited to permanent land conservation?



Thank you... Questions?

