

VERMONT CONSERVATION DESIGN

**for House Committee on
Energy and Digital Infrastructure**

**Robert Zaino, Ecologist
Vermont Fish and Wildlife Department**



AGENCY OF NATURAL RESOURCES



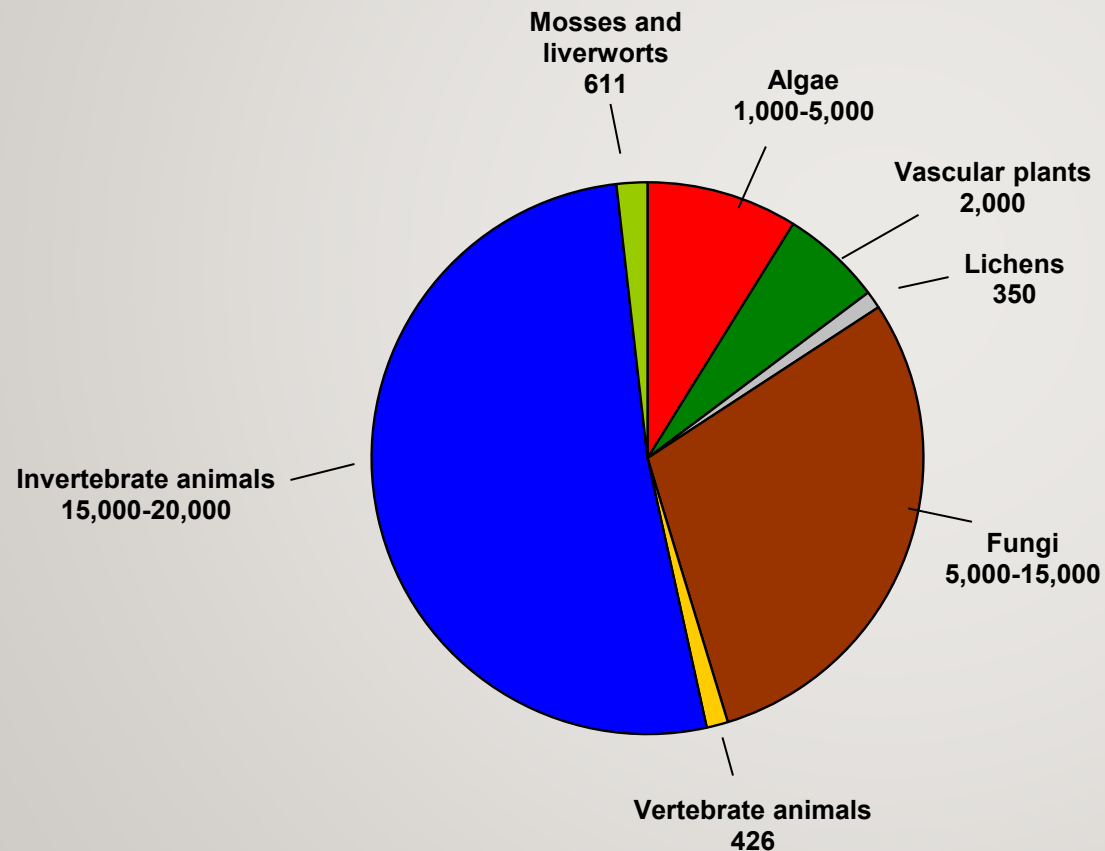
The Vermont Fish & Wildlife Department

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



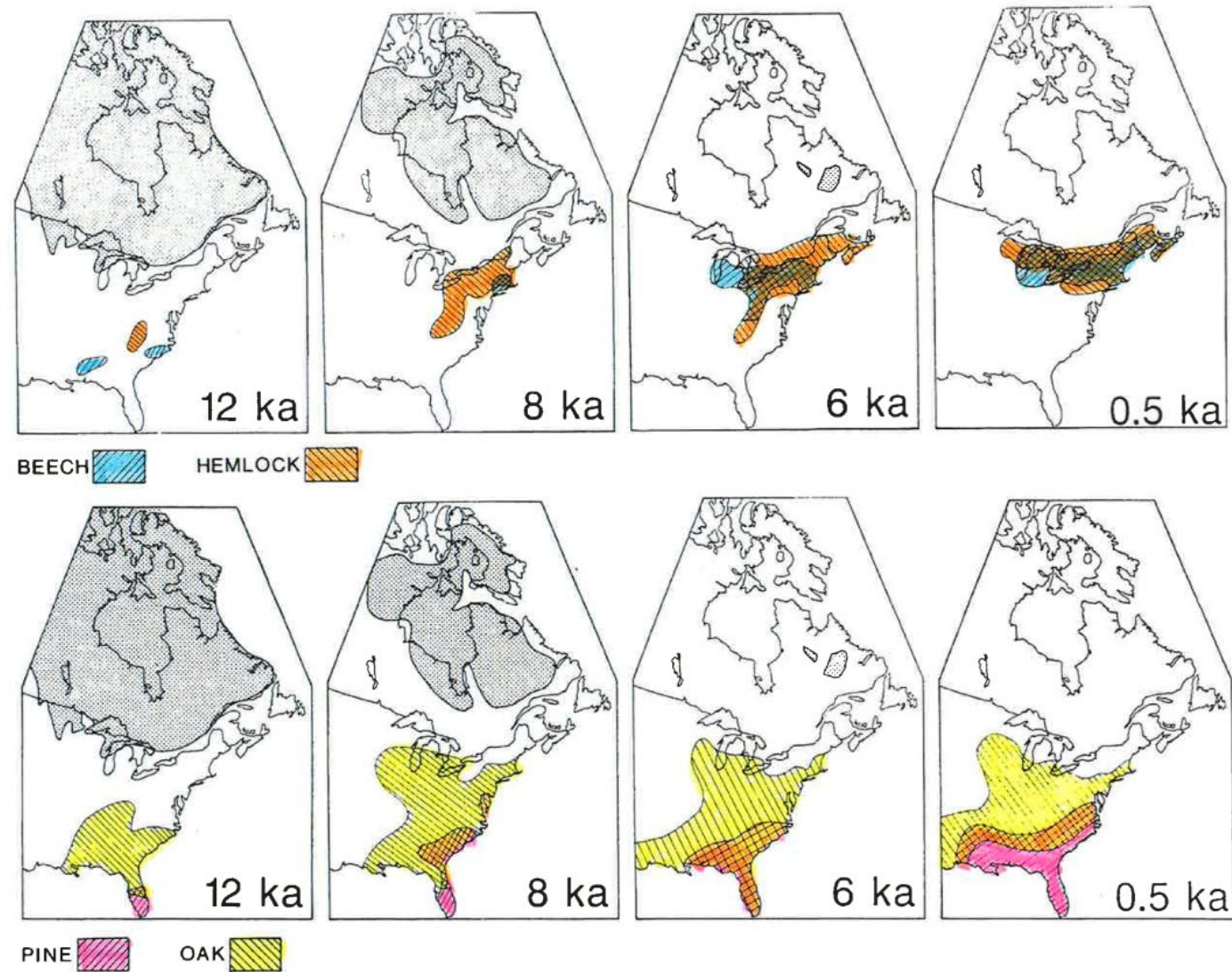
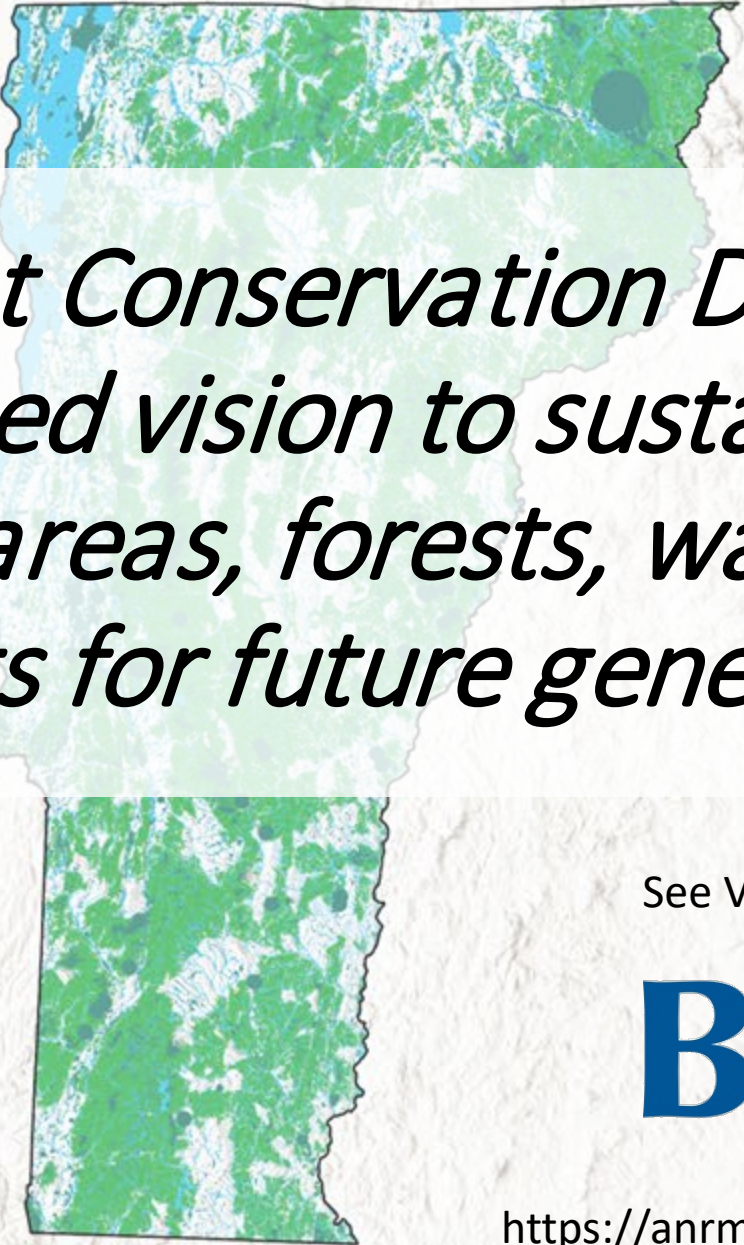


Figure 1. Location of regions with 5% beech (*Fagus*) pollen and 5% hemlock (*Tsuga*) pollen (in the upper row maps) and 20% southern pine (*Pinus*) pollen and 20% oak (*Quercus*) pollen (in the lower row of maps) at 12,000, 8,000, 6,000, and 500 yr B.P. with the stippled area in the north showing the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

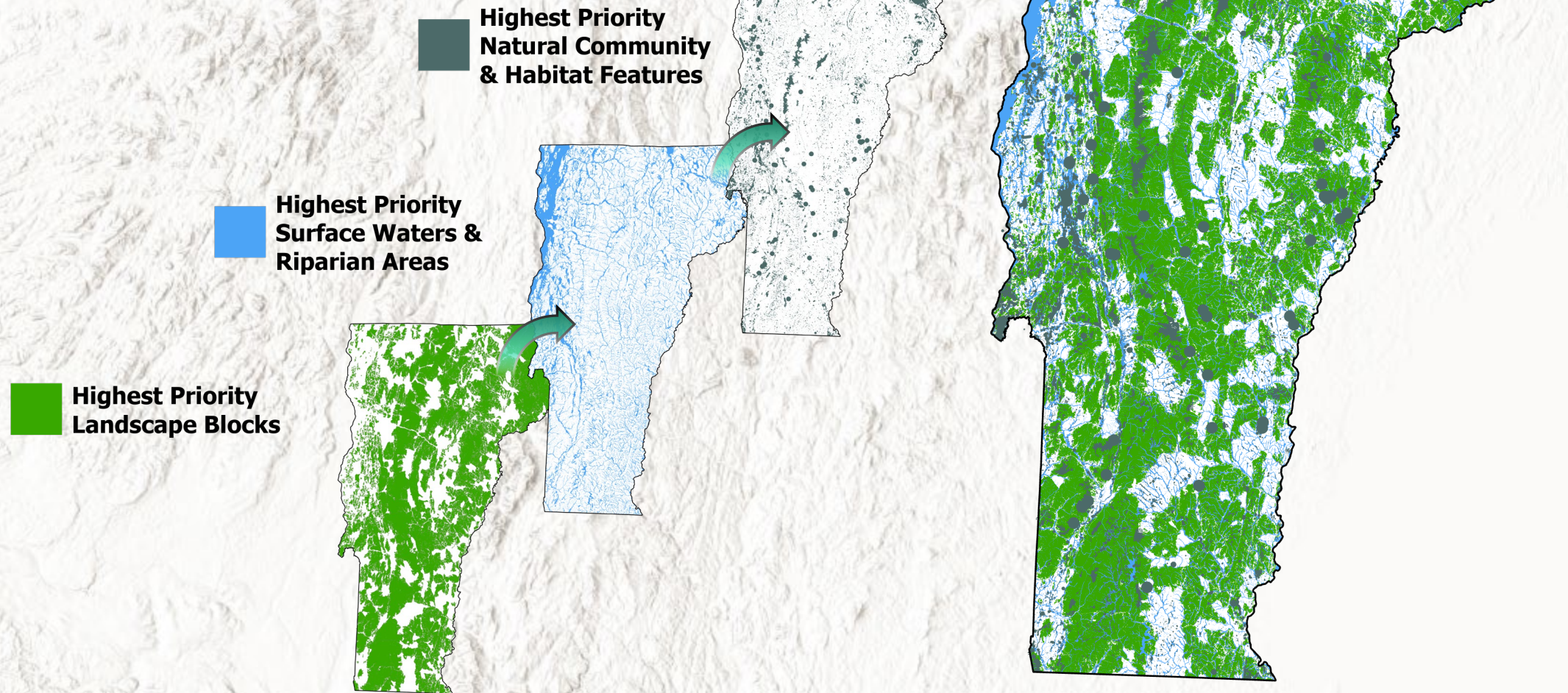


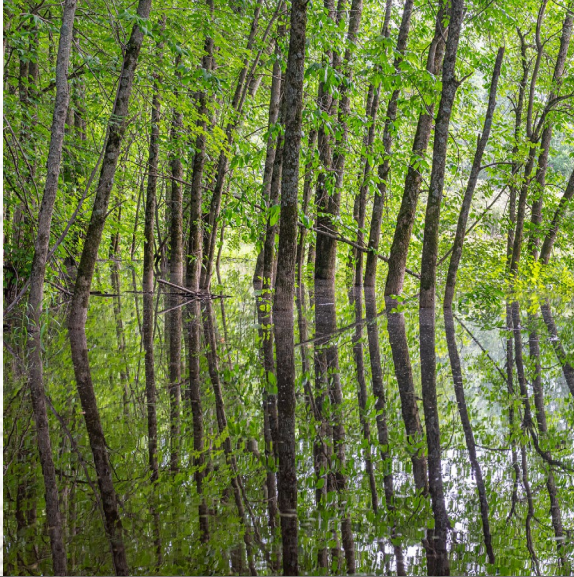
See VCD on



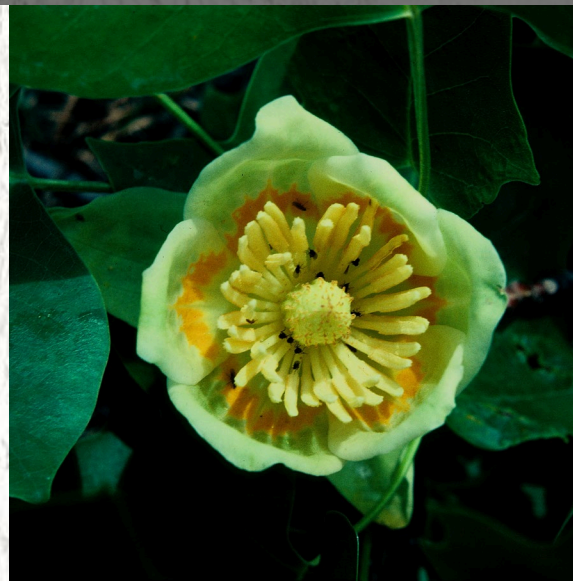
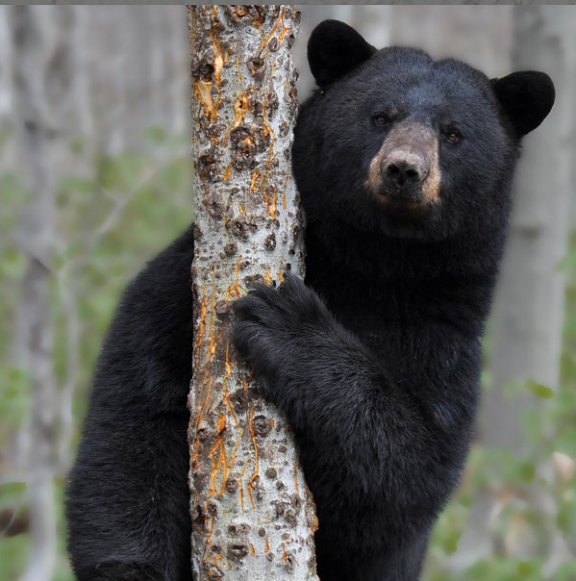
<https://anrmaps.vermont.gov/websites/BioFinder4/>

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



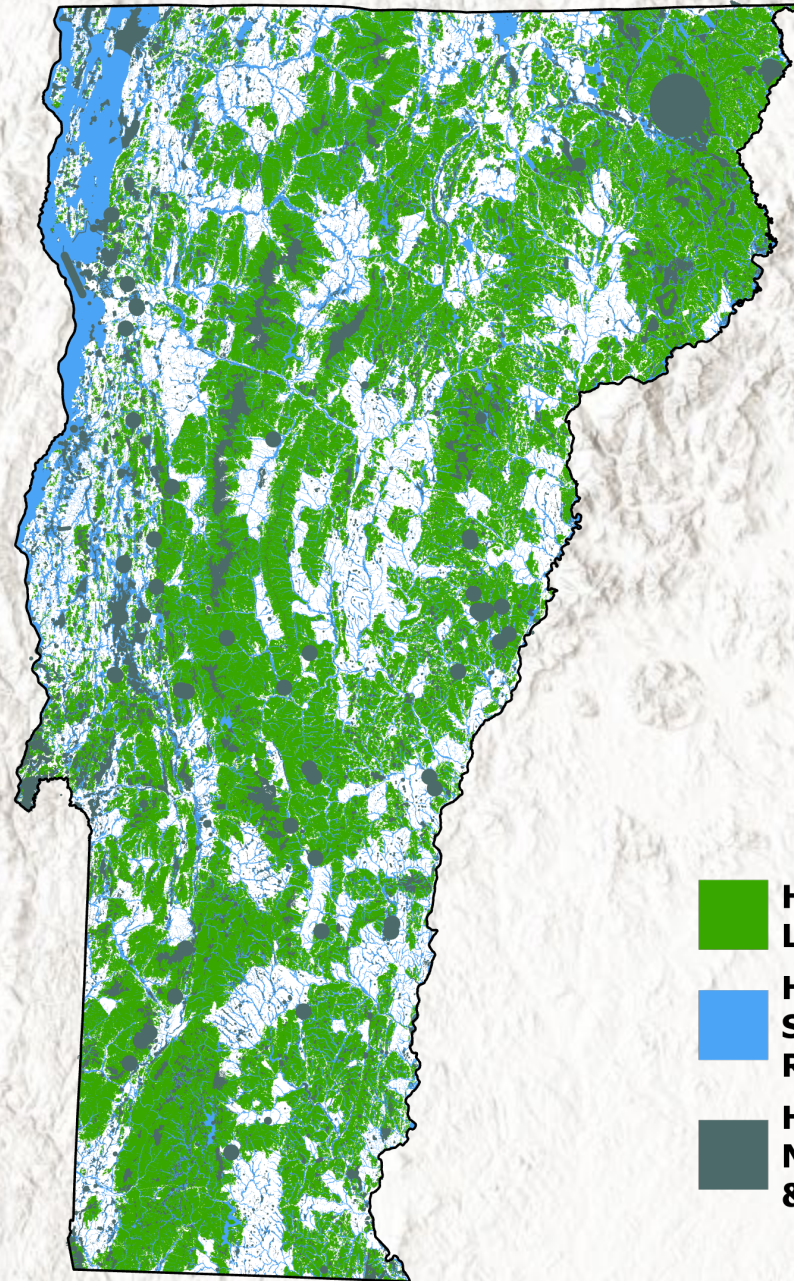


Ecological Function is the degree to which an ecosystem can function under natural processes – allowing all its plants and animals to thrive, reproduce, migrate, and move in response to environmental change.



AN ECOLOGICALLY FUNCTIONAL LANDSCAPE IS...

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



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

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

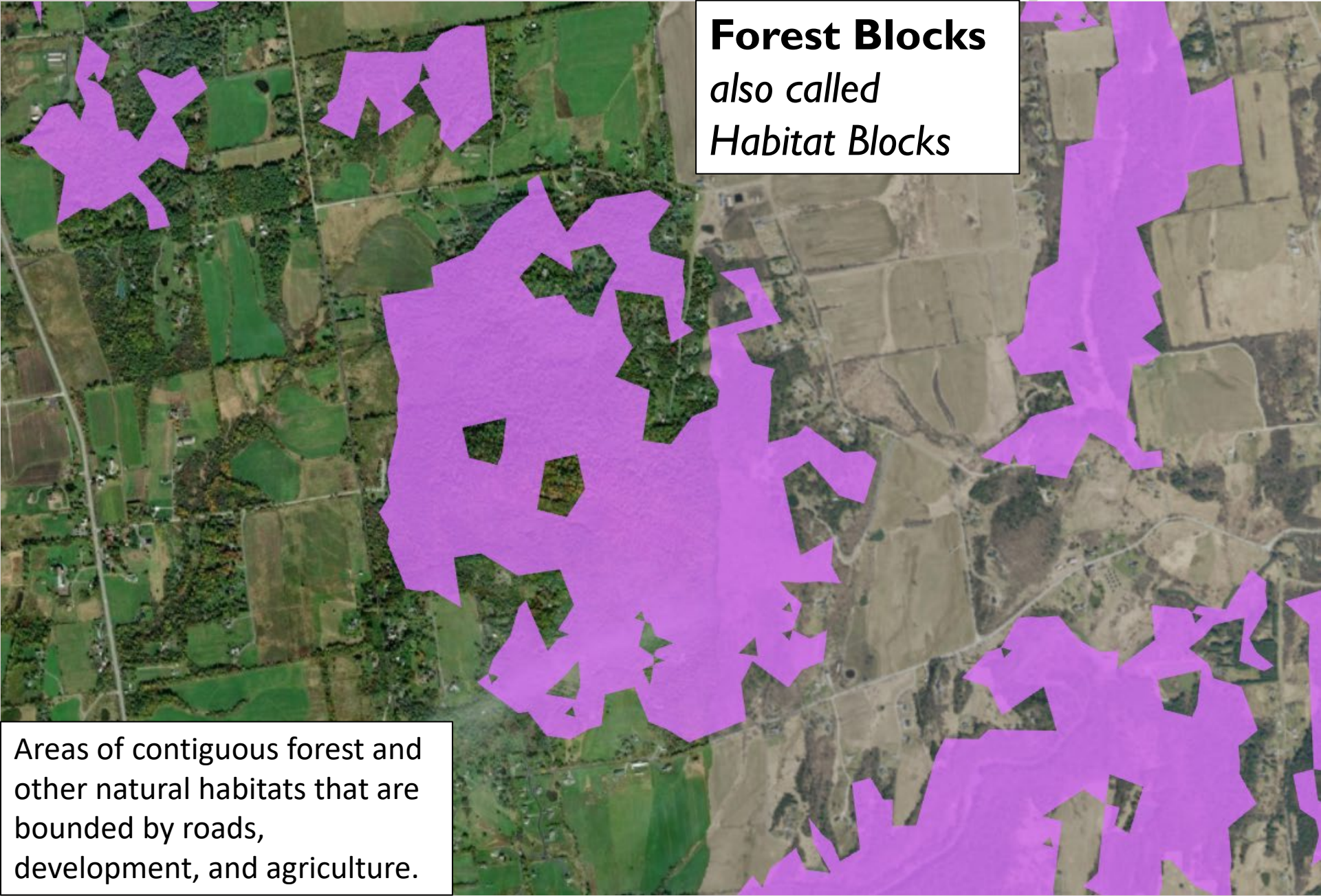


- Natural Communities
- Young and Old Forest
- Aquatic Habitats
- Wetlands
- Grasslands/Shrublands
- Underground Habitats

Species



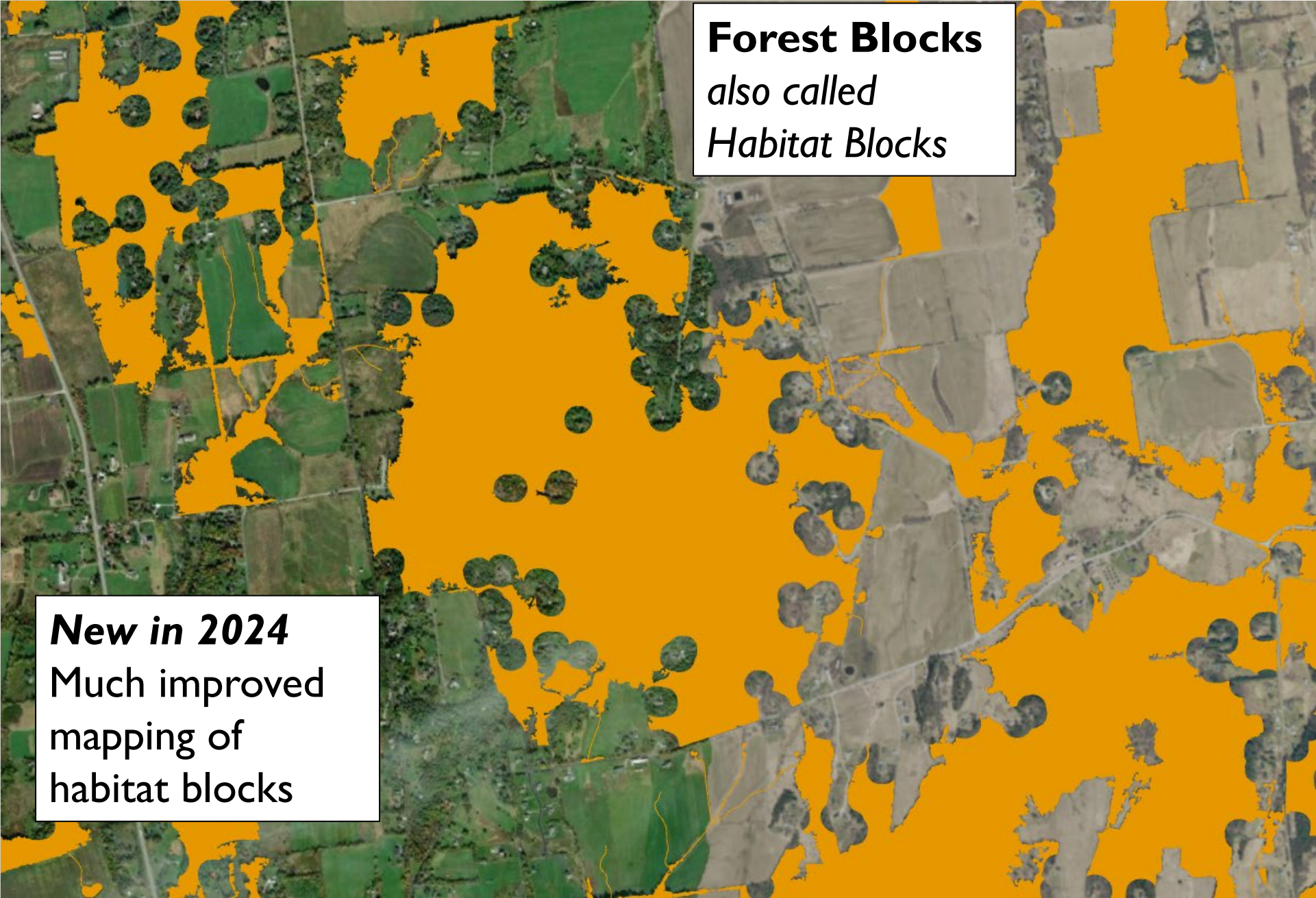
- *Species with very specific biological needs that will likely always require individual attention*



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 featuring a mix of green fields, brown agricultural land, and clusters of trees. Large, irregular areas are highlighted in a solid orange color, representing designated habitat blocks. These blocks are scattered throughout the landscape, often following the edges of fields or surrounding tree clusters. Two text boxes are overlaid on the image: one in the top right and one in the bottom left.

Forest Blocks

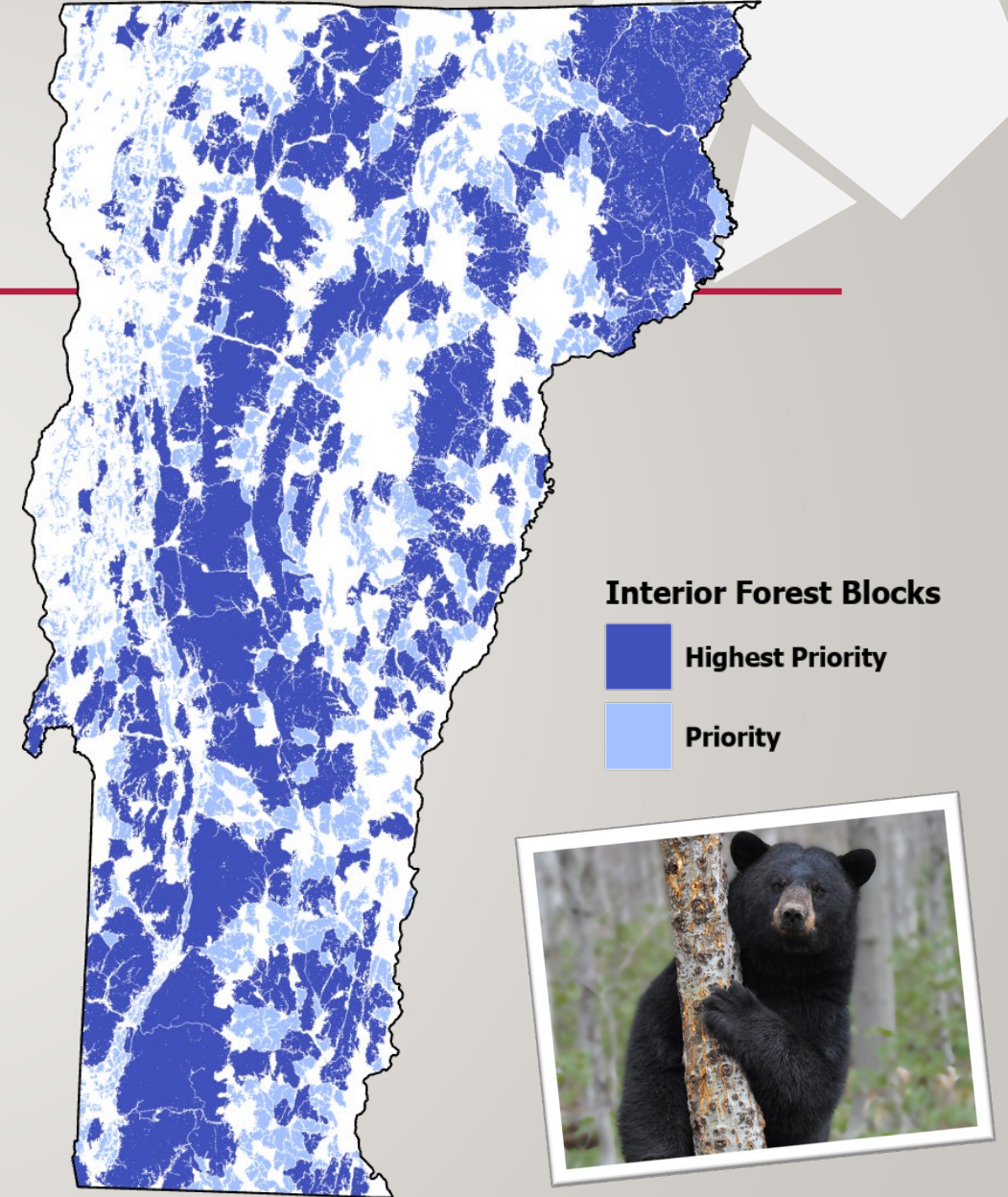
*also called
Habitat Blocks*

New in 2024

Much improved
mapping of
habitat blocks

INTERIOR FOREST BLOCKS

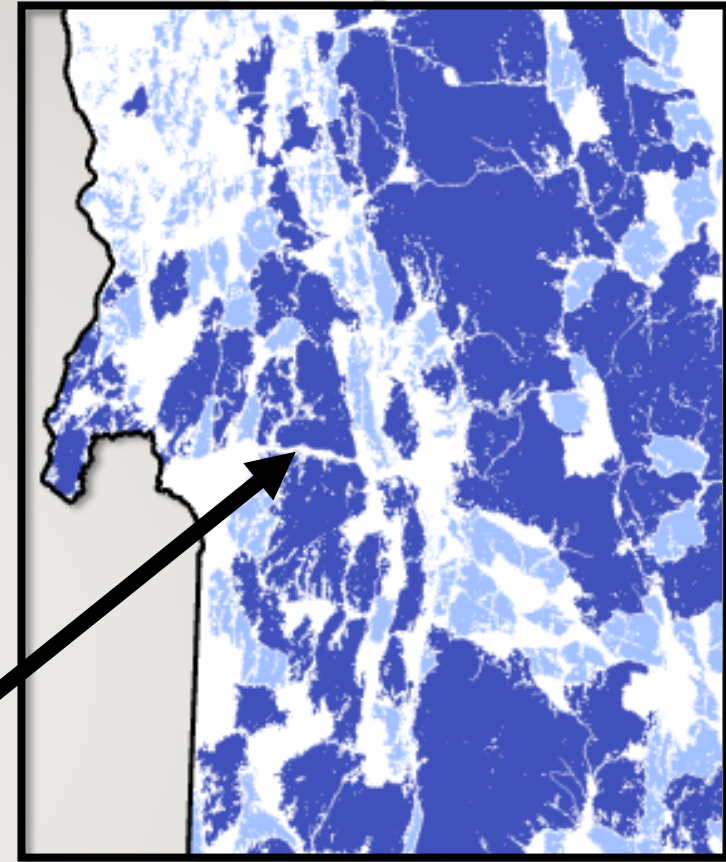
- The largest habitat blocks in each biophysical region provide the best **interior forest conditions**
- These are places with minimal external disturbance effects from forest fragmentation
- Size is the determining factor in block priority



Interior Forest Blocks

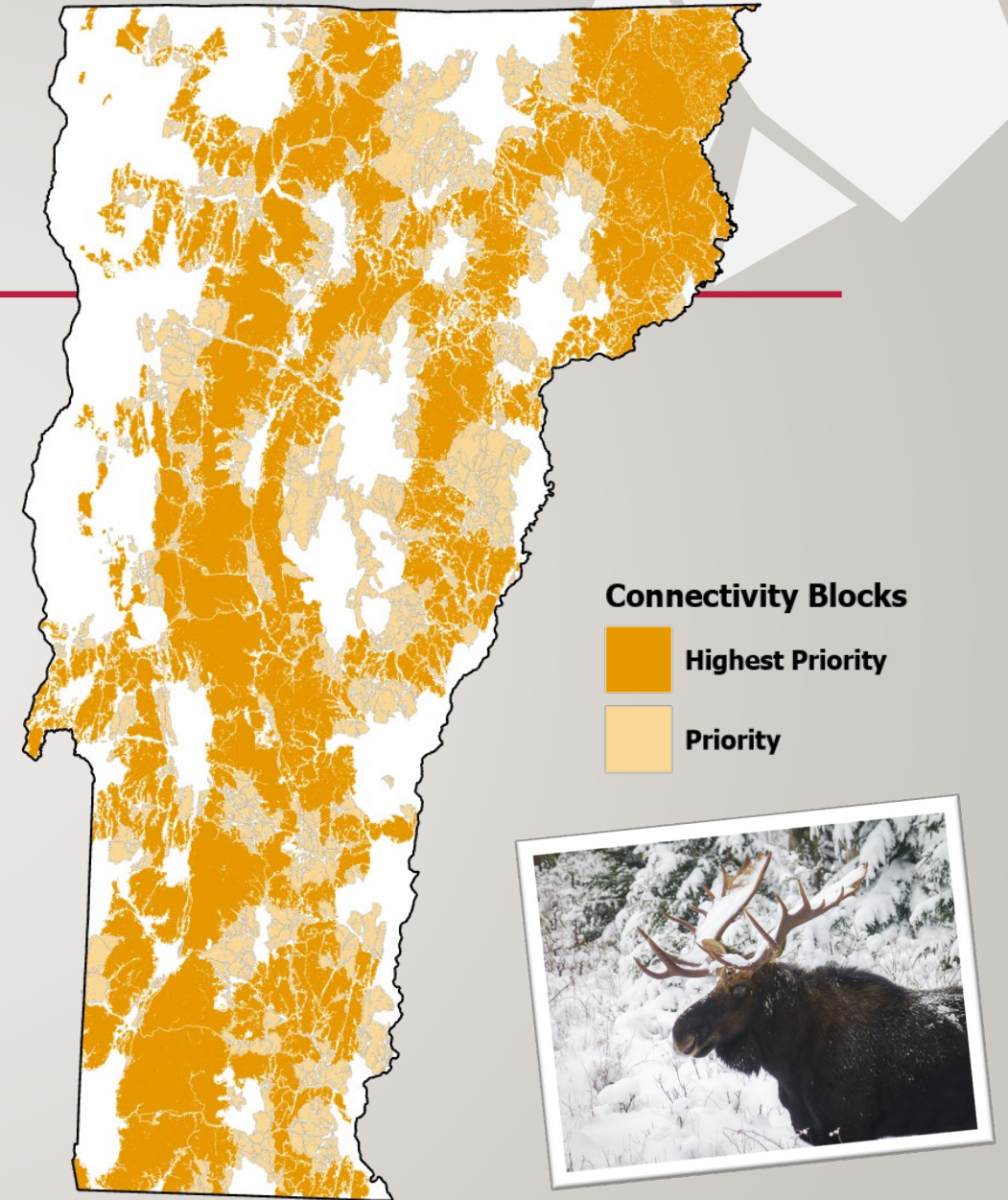
Guidelines for Maintaining Ecological Function:

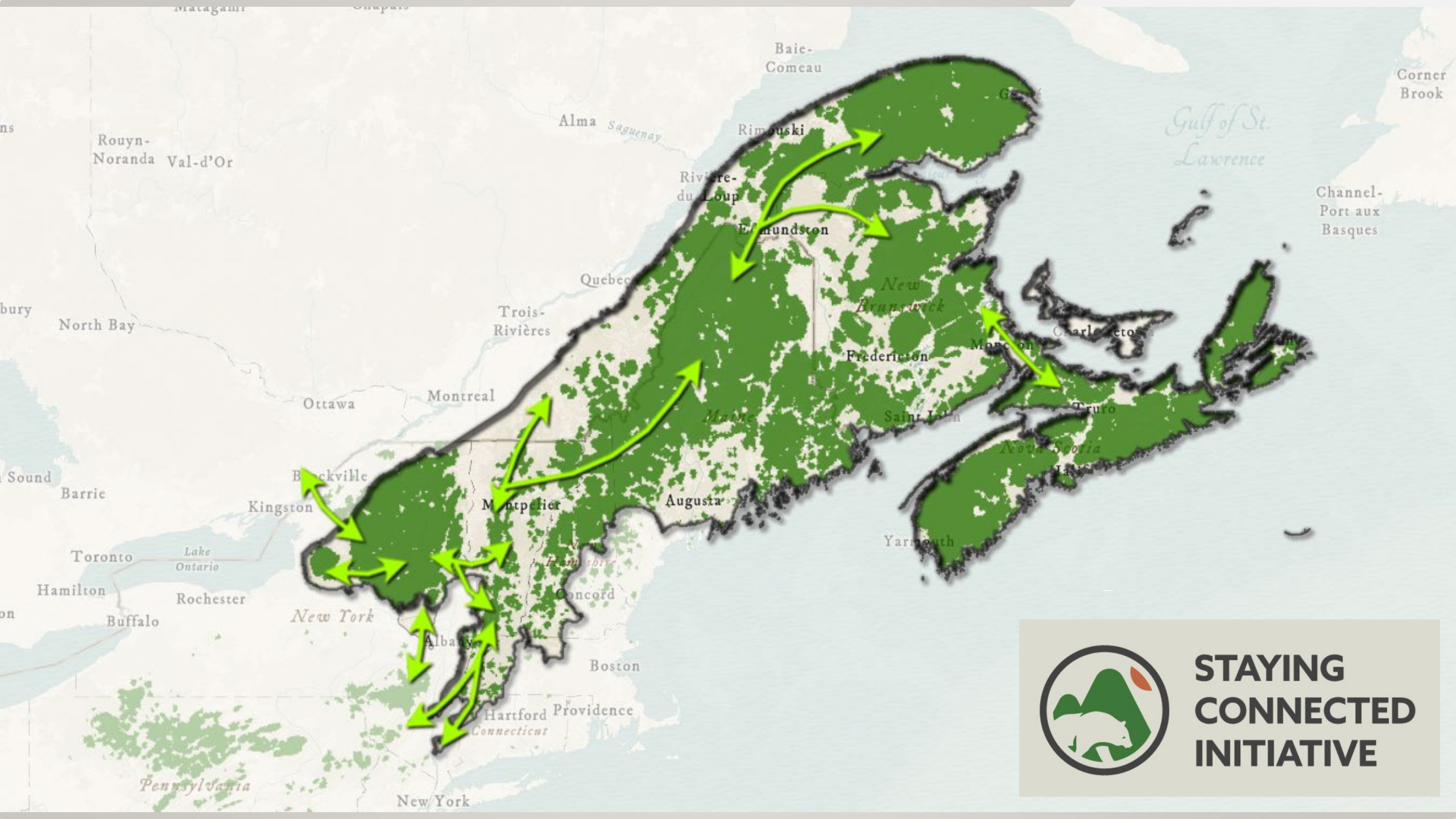
- Avoid permanent interior fragmentation
- Limit development to the margins
- Maintain forest structure & distribution of age classes
- Minimize invasive species.



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

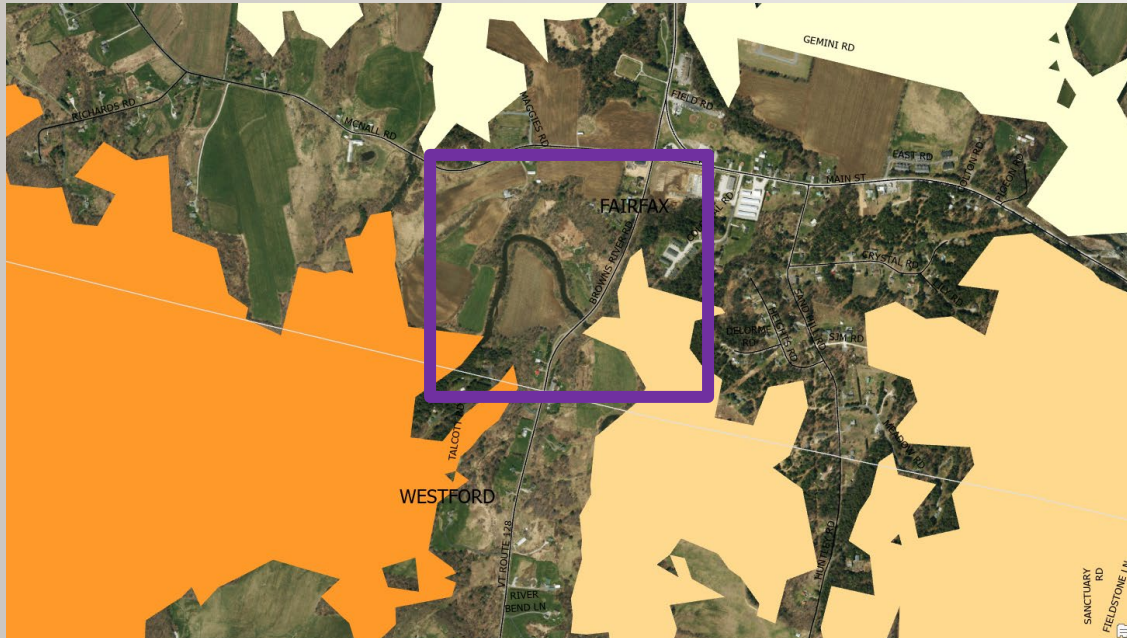




**STAYING
CONNECTED
INITIATIVE**

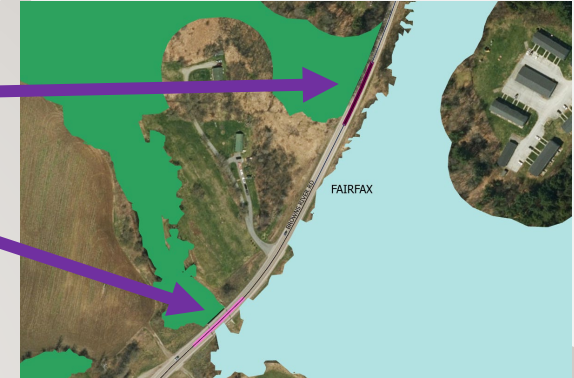
FOUNDATIONAL CONNECTIVITY SCIENCE

Ability to detect
connecting land



2011

Leads to better
Wildlife Road
Crossings



2023



2023

Wildlife Road Crossings

(a habitat-scale element)



OVERLAPPING ISSUES

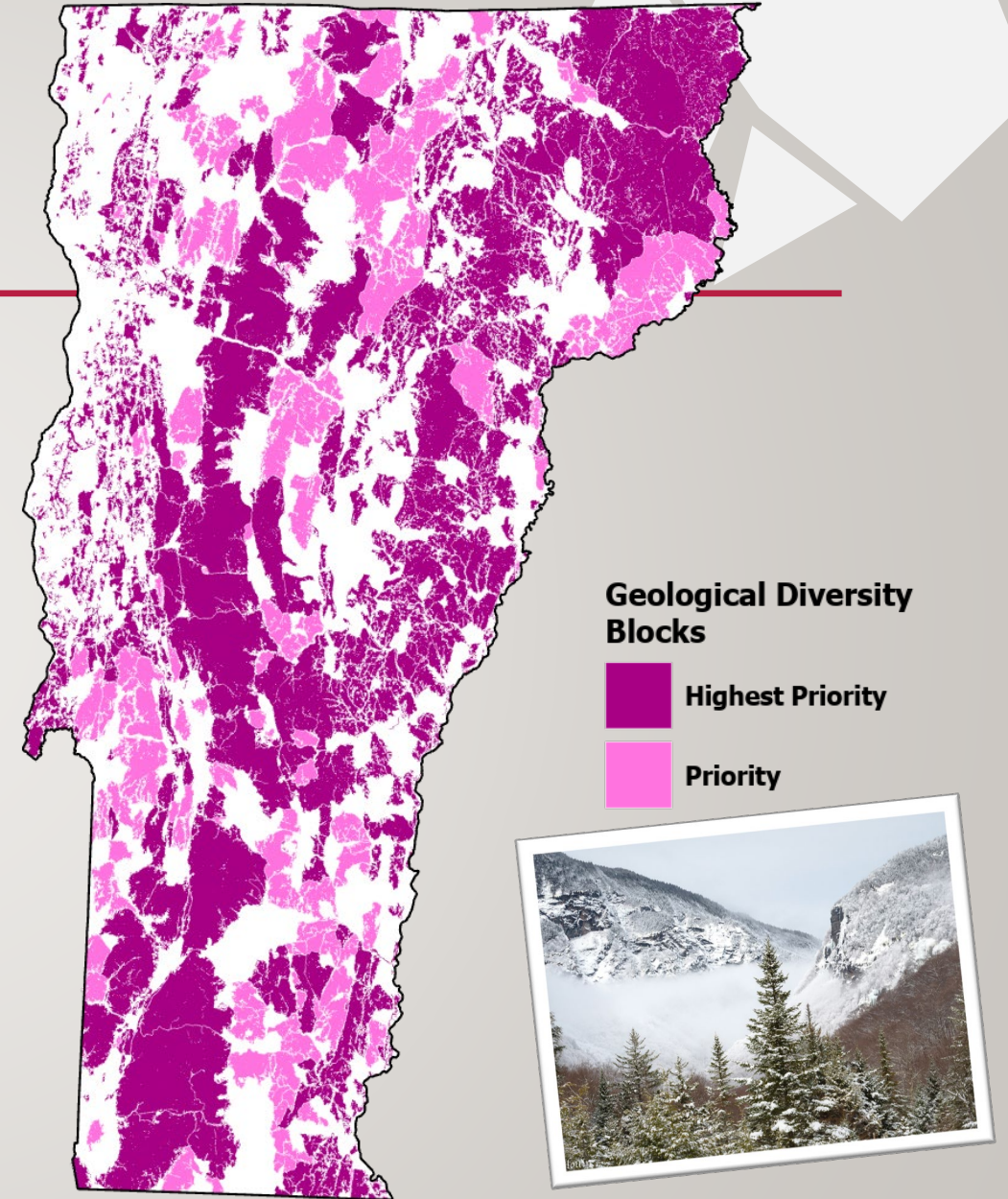


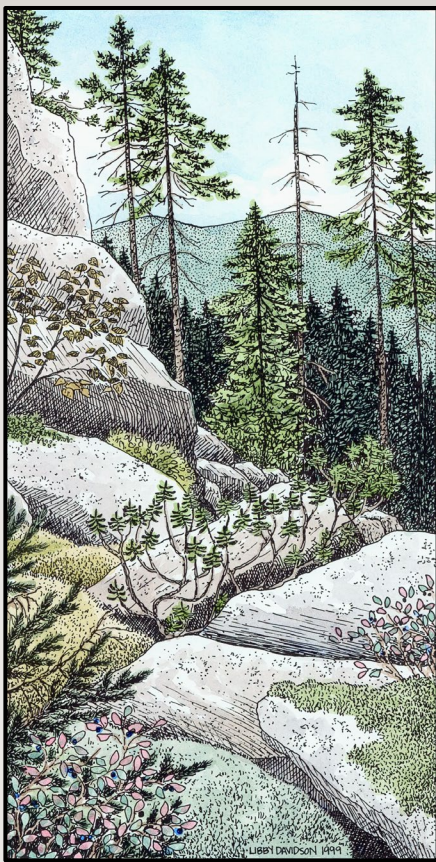
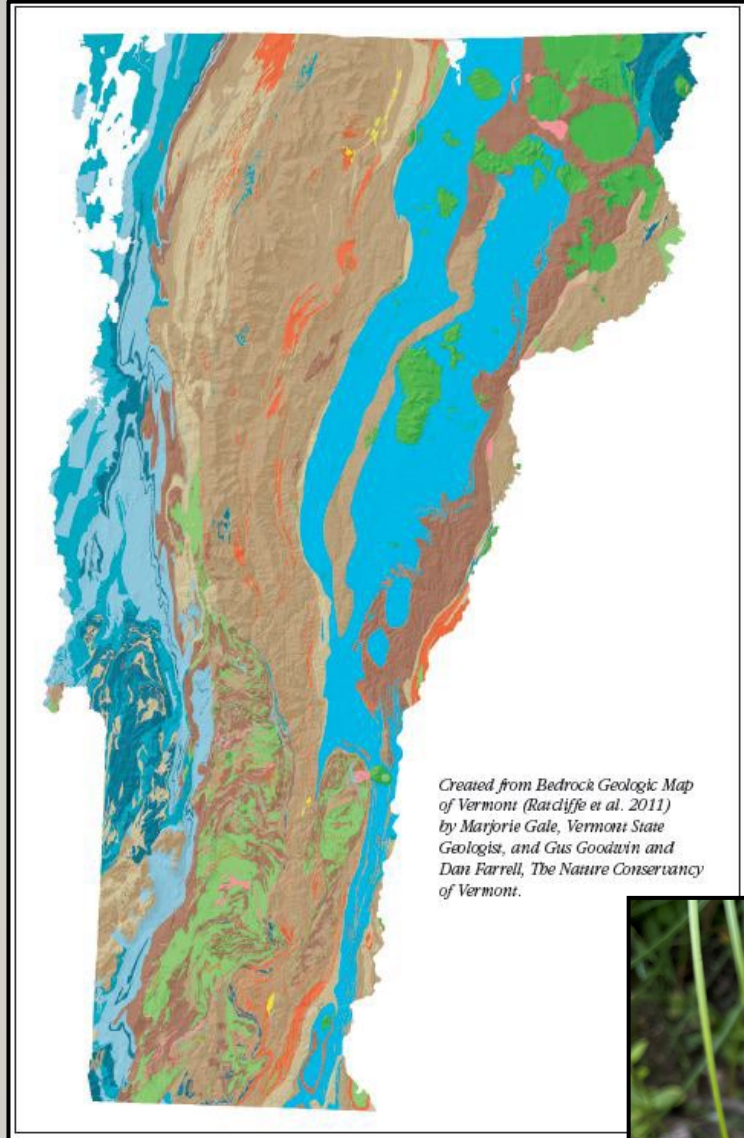
Resilience Planning
Aquatic Organism
Passage
Flood waters and
debris
Terrestrial animal
movement



GEOLOGICAL DIVERSITY BLOCKS

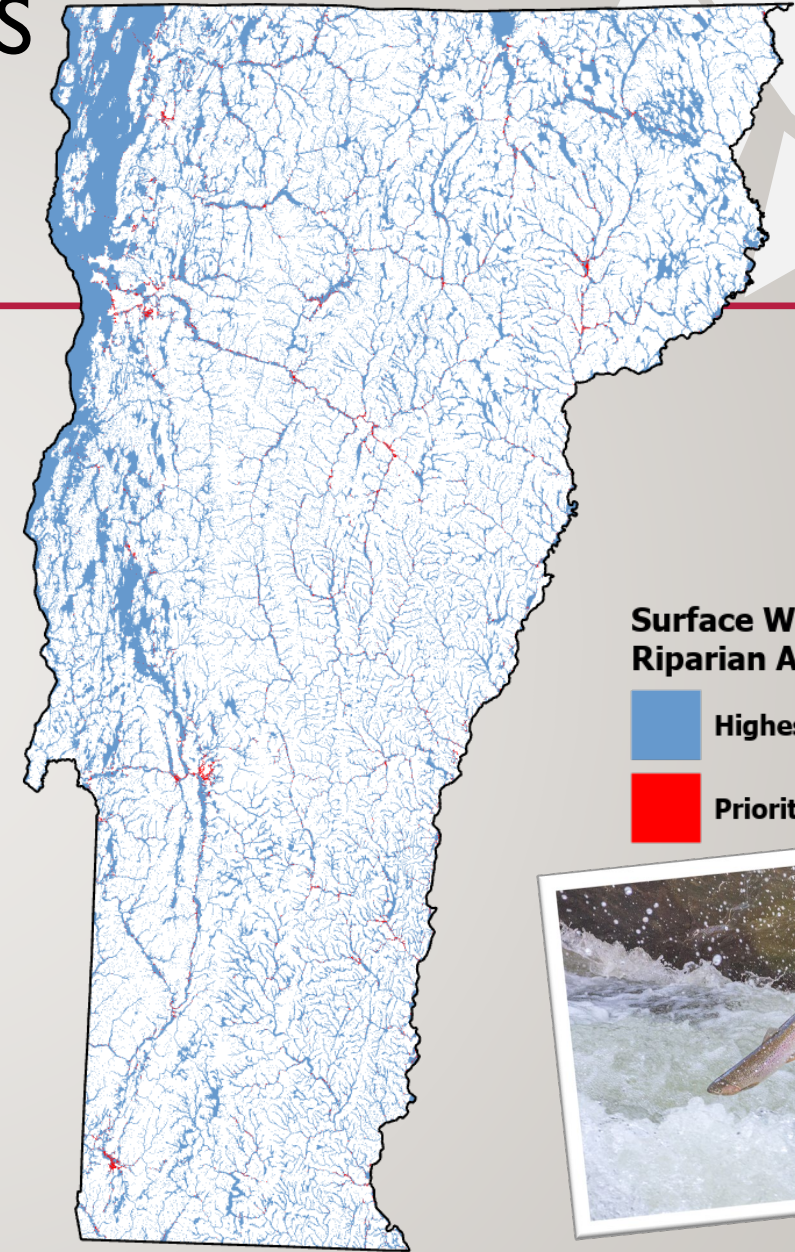
- A selection of habitat blocks that represents the full range of **physical landscape settings** across Vermont
- Diversity in enduring physical features gives rise to diversity in ecological communities
- Key to nature's climate resilience



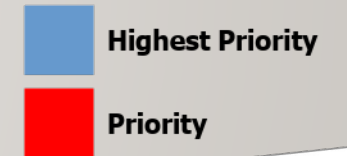


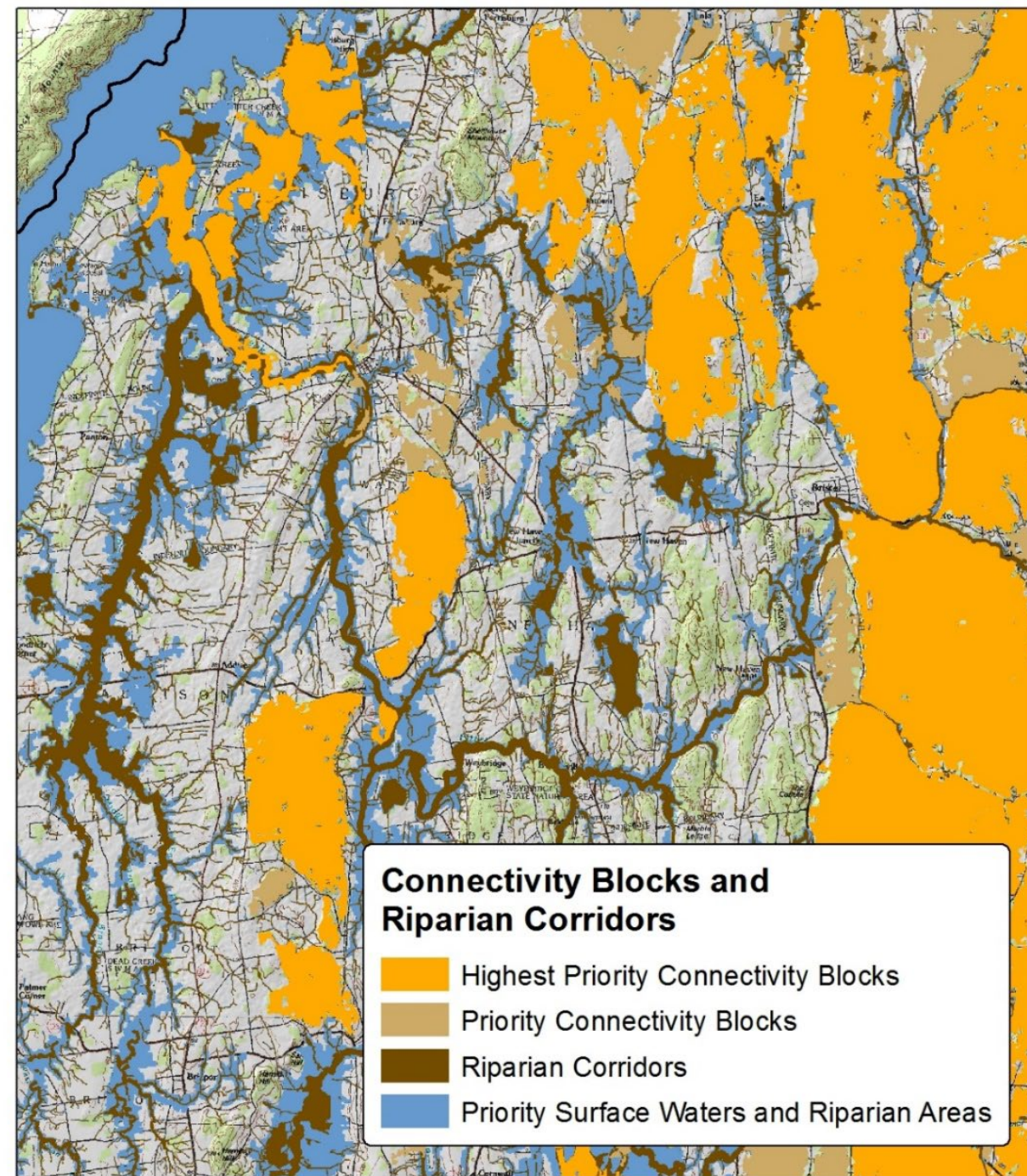
SURFACE WATERS & RIPARIAN AREAS

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



Surface Waters & Riparian Areas





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 forest with many bare trees and a ground covered in fallen brown leaves, suggesting an autumn scene. The trees are thin and light-colored.

Red Oak-Northern Hardwood Forest

A photograph of a rocky alpine meadow with patches of green and brown grass. In the background, there are blue mountains under a blue sky with some clouds.

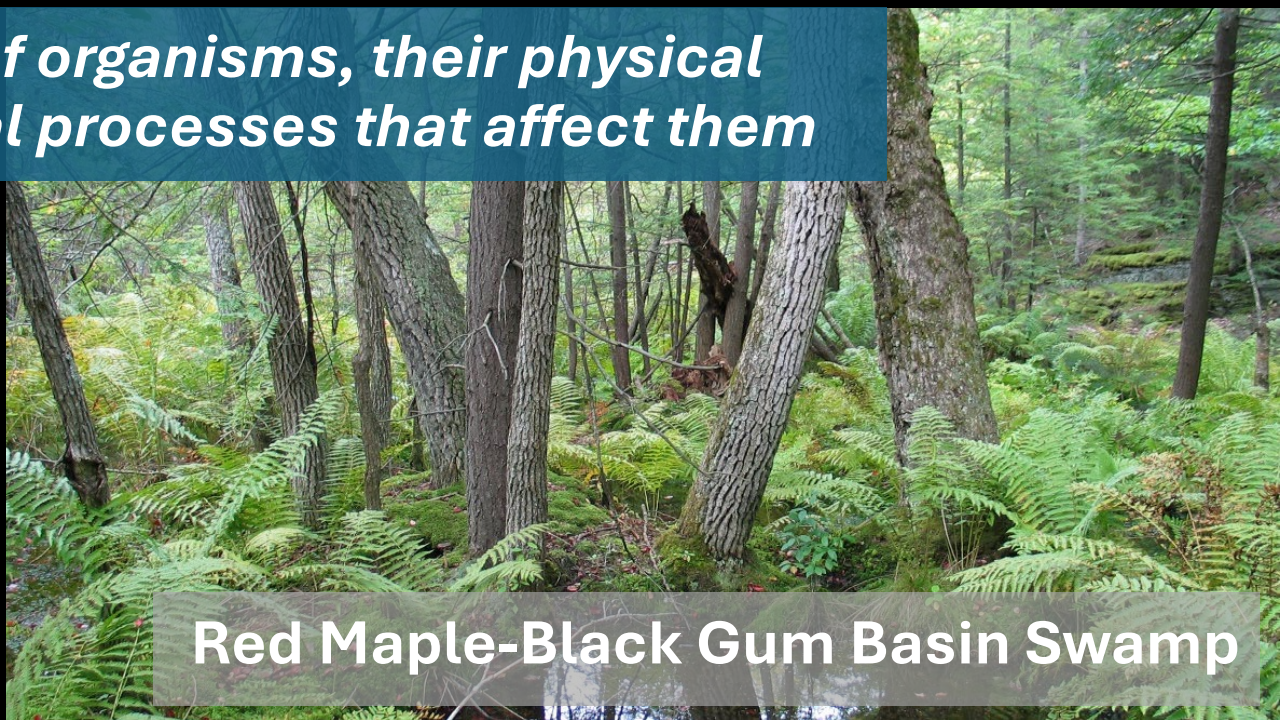
Alpine Meadow

Natural Communities

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

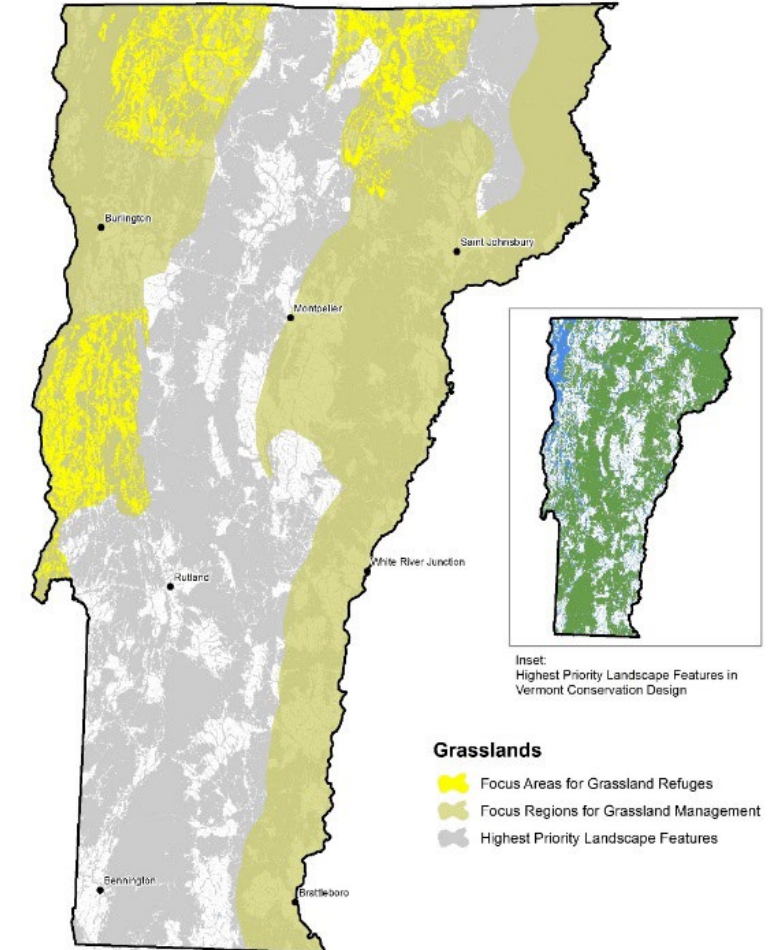
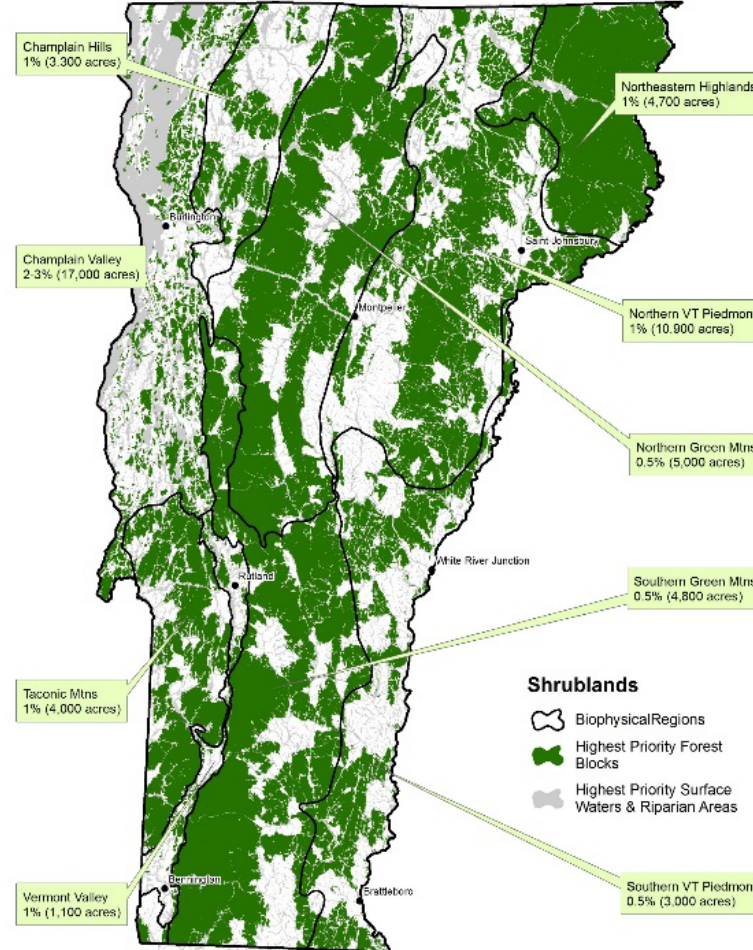
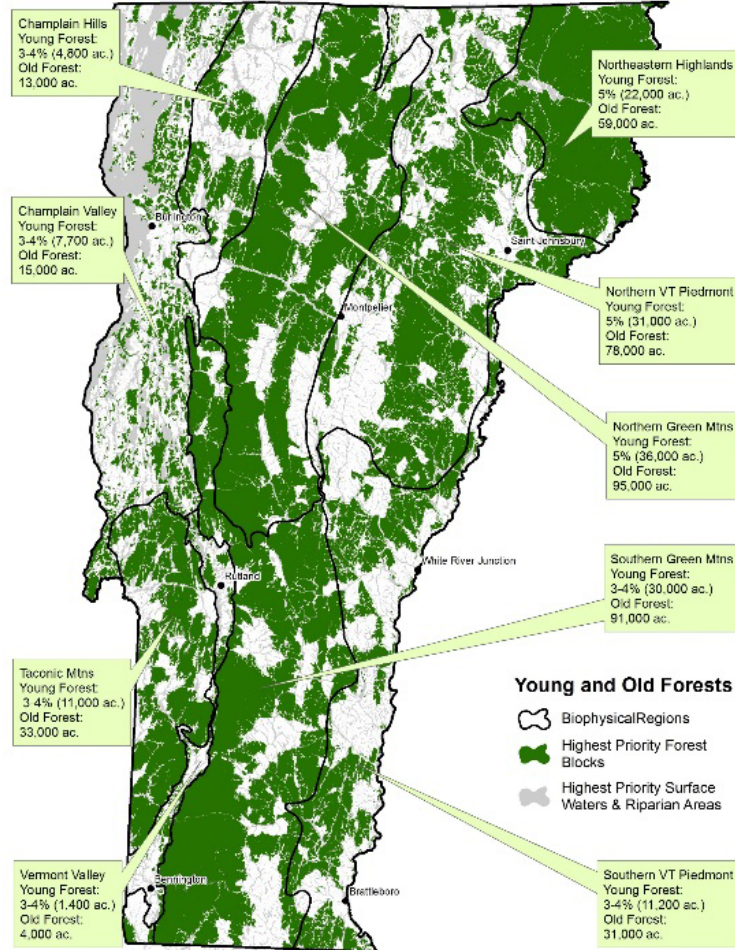
A photograph of a riverbank covered in smooth, grey river cobbles. The river water is visible on the right side of the frame.

River Cobble Shore

A photograph of a swampy forest floor with many green ferns and tree trunks. The ground appears wet and mossy.

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

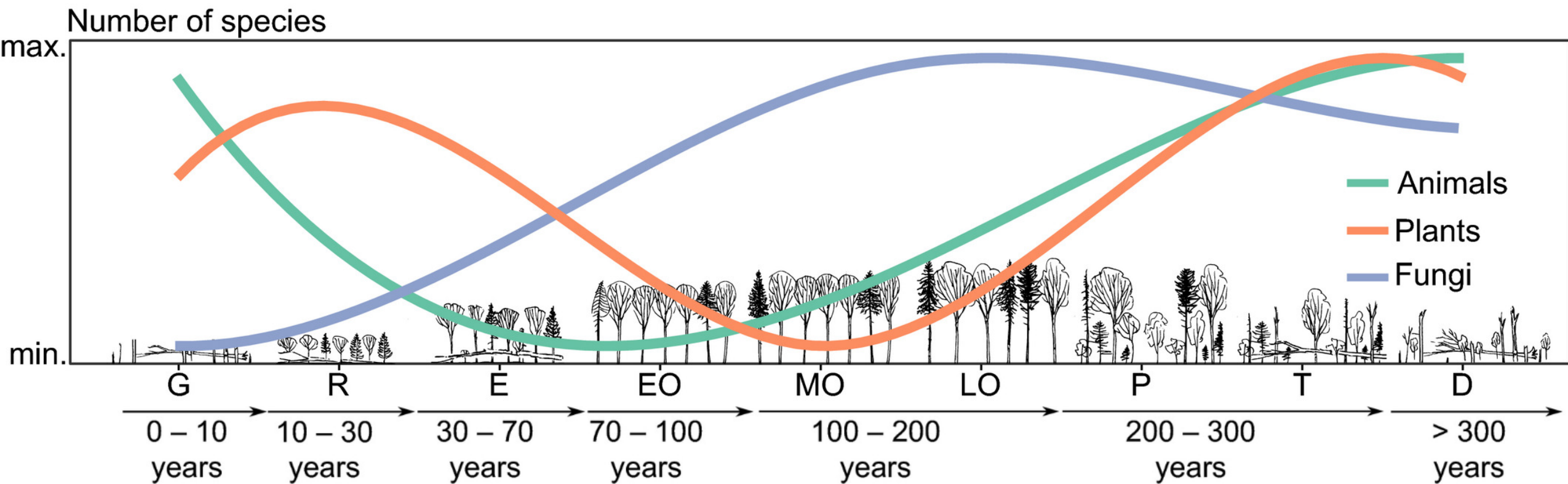
Ecological Functions:

- 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.



Young Forest

Old Forest



Middle-aged Forest

Grasslands

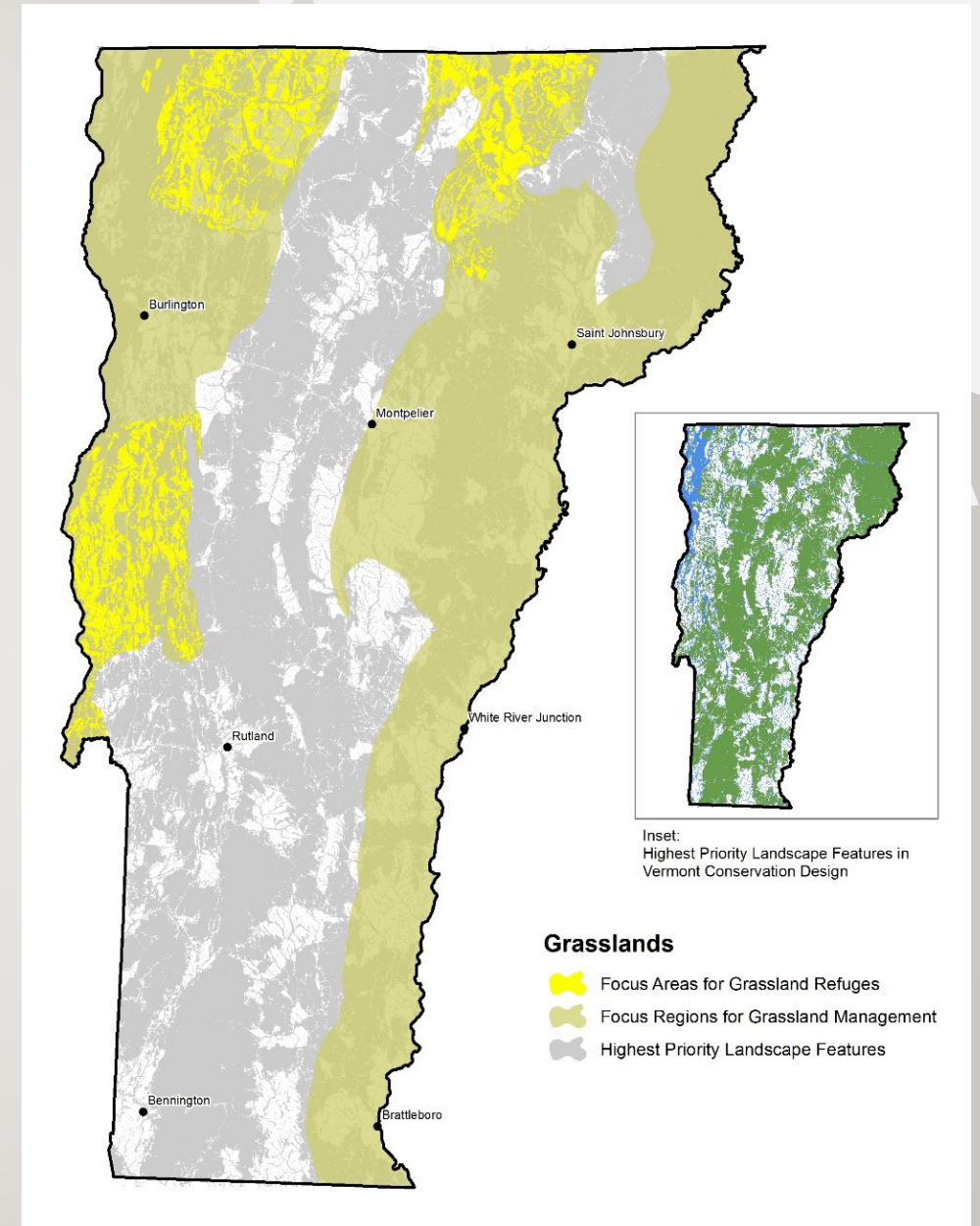
Grasslands are man-made habitats that support a unique set of species

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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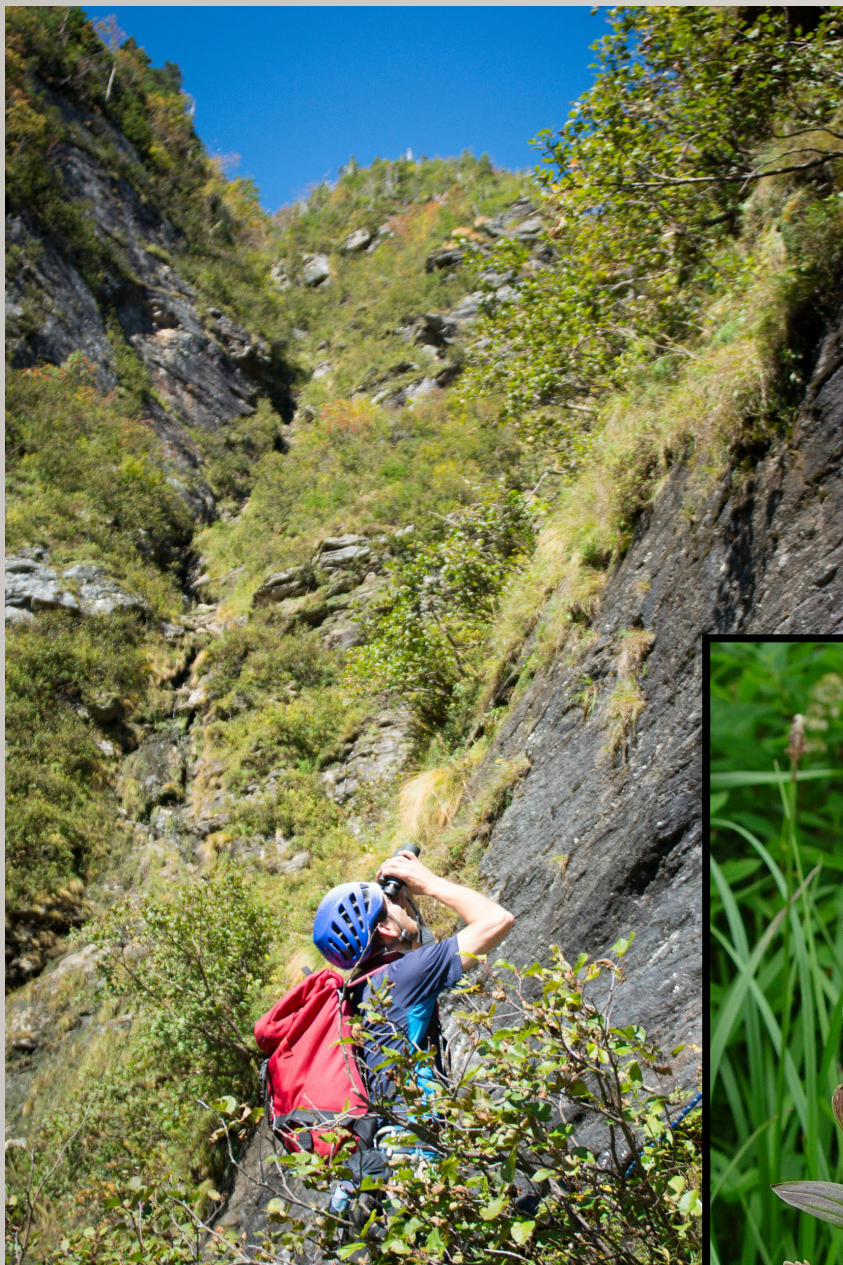


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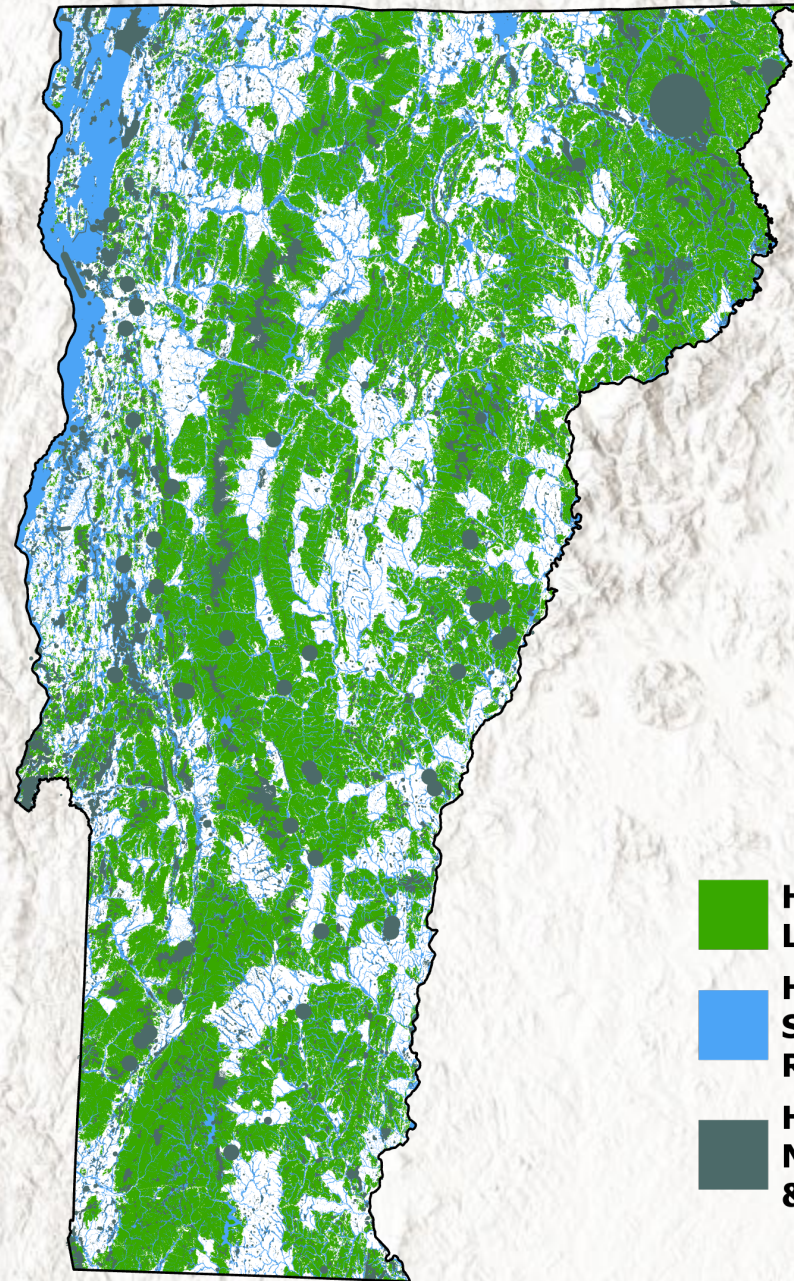
Northern pale painted cup



Spiny softshell turtle

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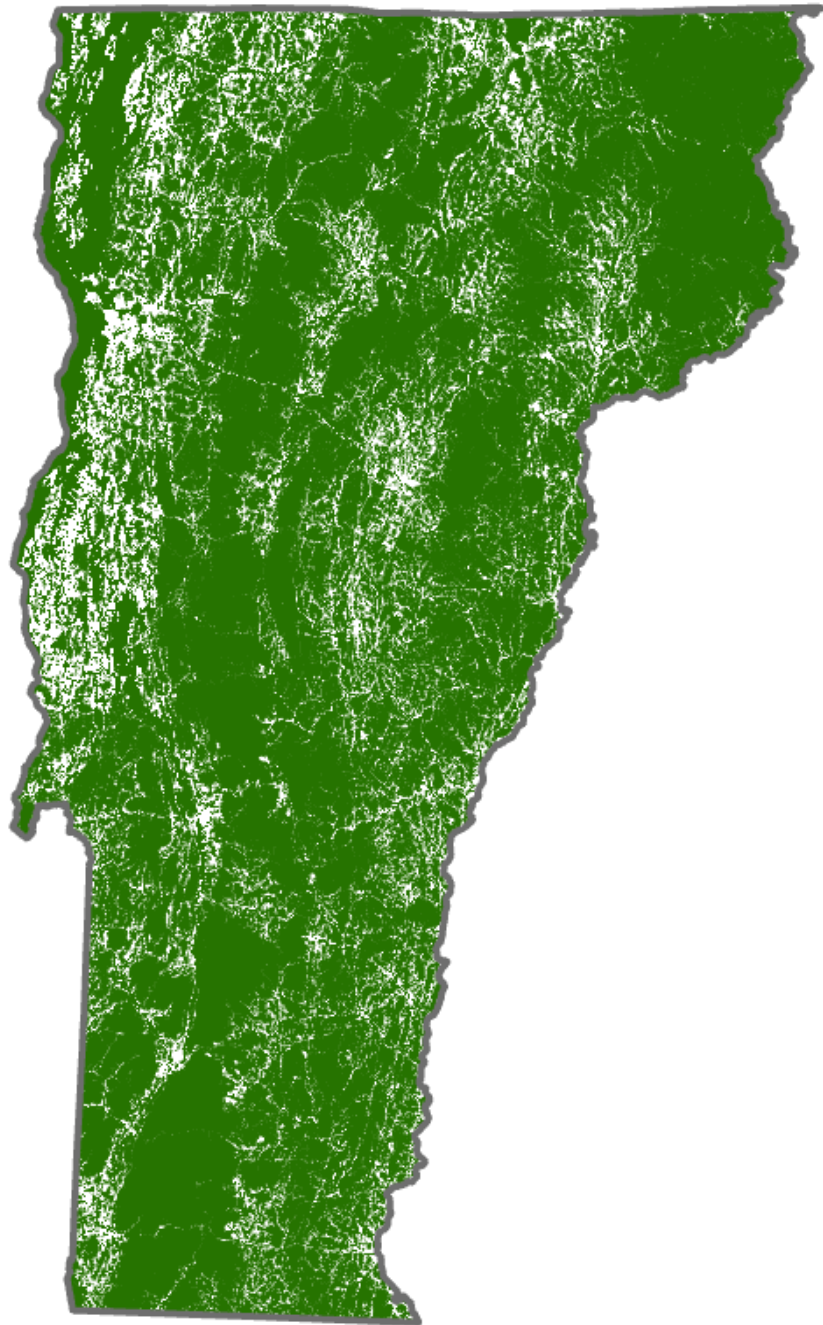


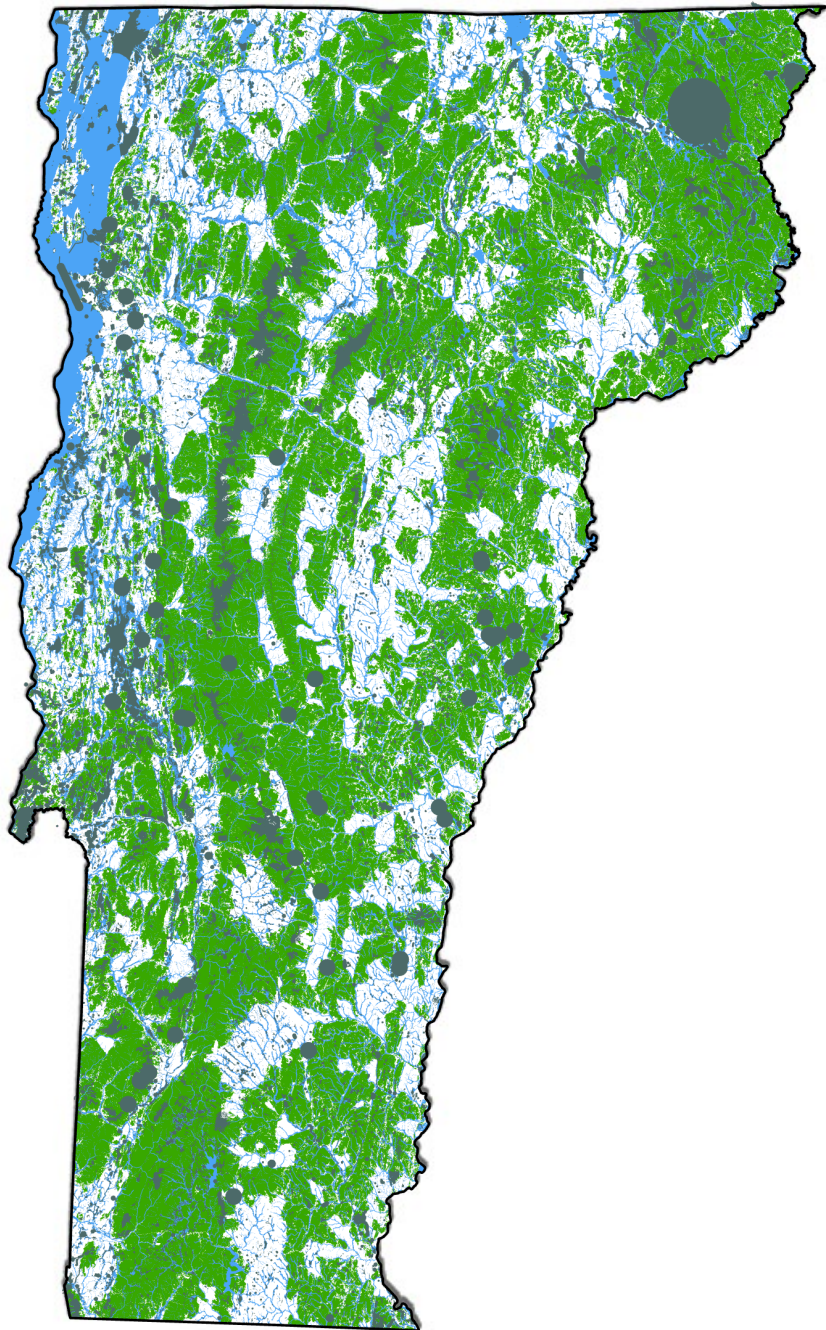
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MAINTAINS NATURE AND THE BENEFITS IT PROVIDES

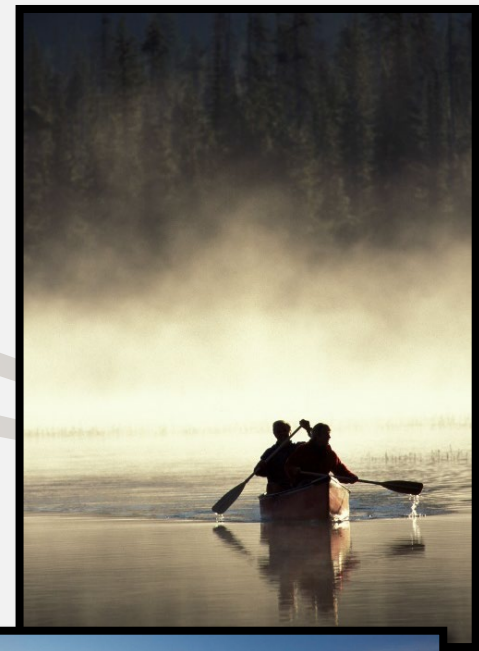
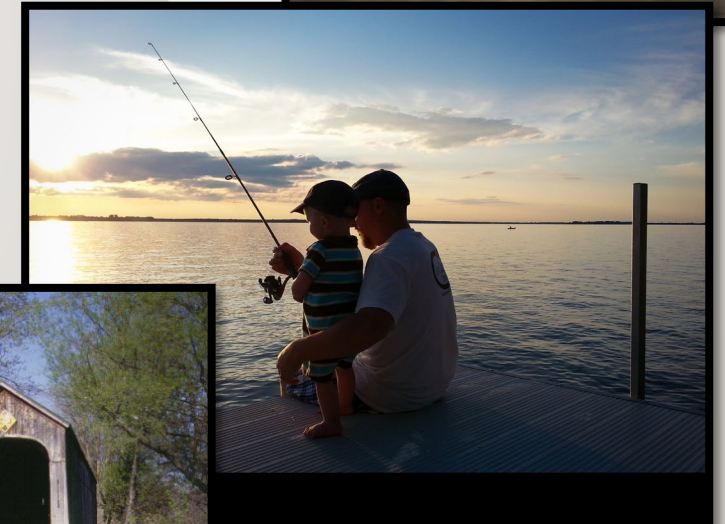
- *Maintains an intact, connected and diverse natural landscape*
- *Conserves species and natural communities*
- *Allows nature to adapt to a changing climate*





Sustains more than biodiversity

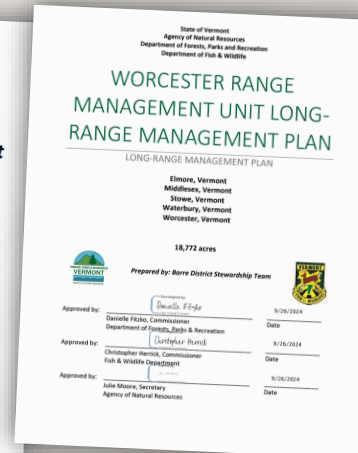
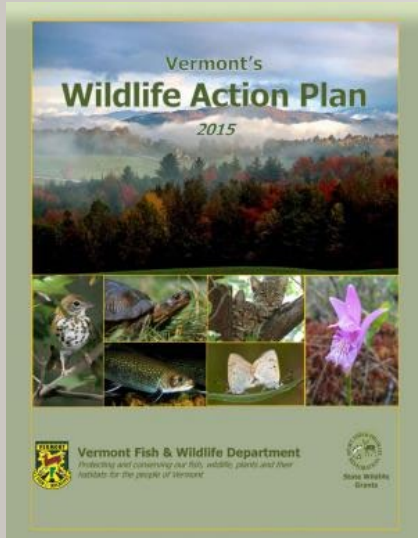
- **Outdoor recreation**
- **Clean water**
- **Sense of place and rural character**
- **Working farms and forests**
- **Nature's benefits**





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 CONSERVATION DESIGN AND ENERGY SITING

- Act 174 Guidance
 - VCD landscape features are already included as ‘possible constraints’
 - RTE species, significant natural communities, vernal pools, and wetlands are included as ‘known constraints’
- VFWD reviews Section 248 projects
 - “Will not have an undue adverse effect on... the natural environment”
 - We consider forest blocks and connectivity, as well as finer-scale features like grassland bird habitat, RTE species, and rare natural communities.

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/>