

VERMONT CONSERVATION DESIGN

MAINTAINING AND ENHANCING AN ECOLOGICALLY FUNCTIONAL LANDSCAPE

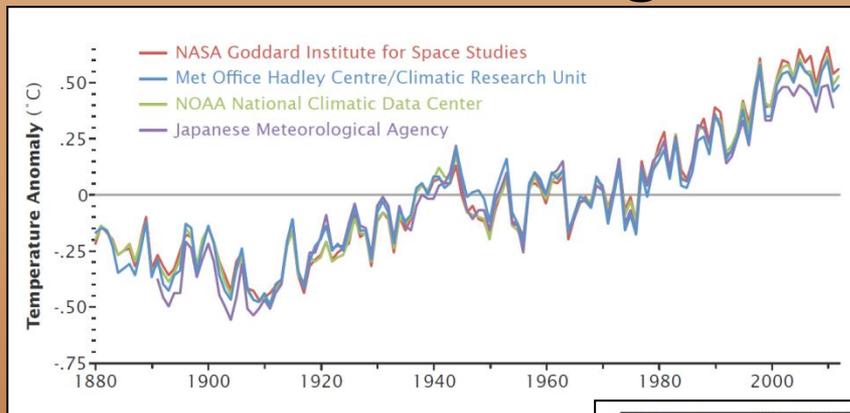


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J. Hilke & E. Thompson



Primary Threats to Biological Diversity

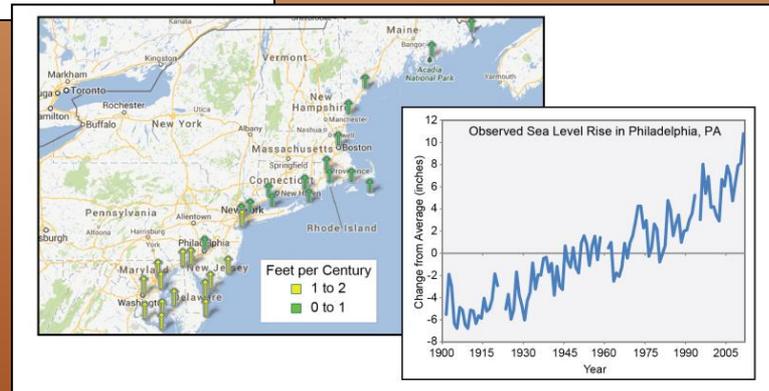
- Population growth
- Habitat loss
- Habitat fragmentation
- Non-native, invasive species
- Climate change – direct and compounding effects



Climate Change Impacts in the US, 2014

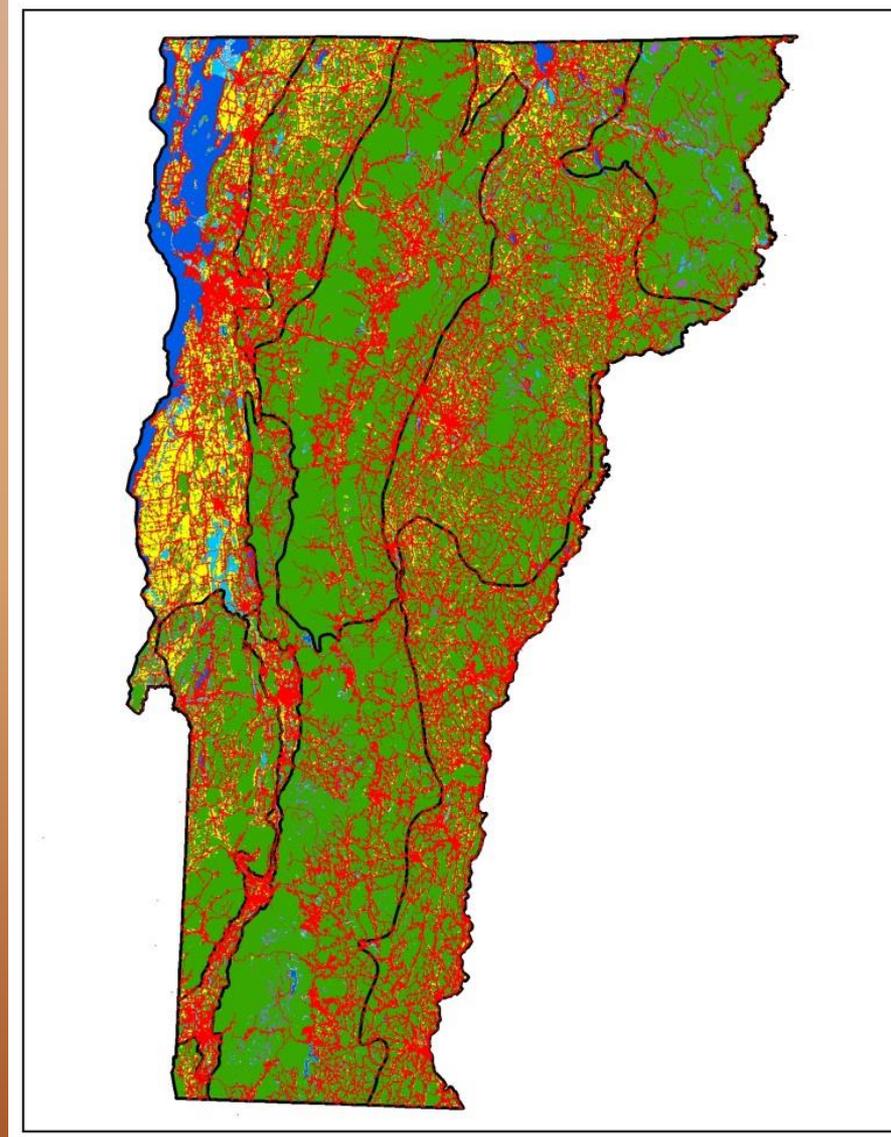


NASA



Much of Vermont is dominated by natural systems and we have a lot of opportunity to conserve biodiversity and facilitate climate change adaptation.

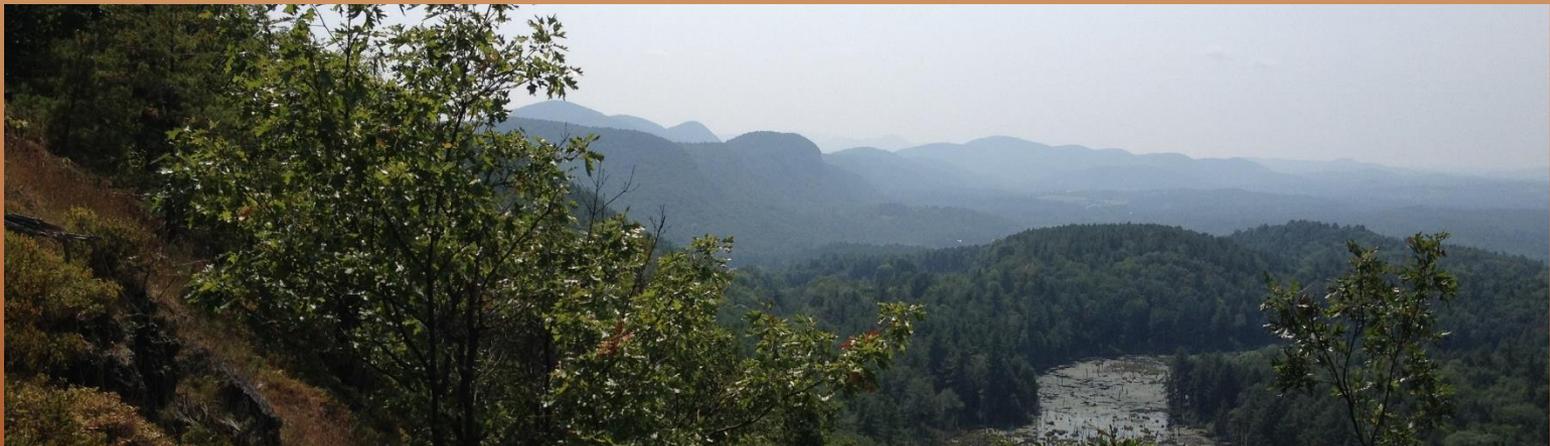
- **78 percent forested (but fragmented)**
- **abundant lakes and wetlands**
- **limy bedrock**
- **diverse topography**
- **low human population**
- **cultural interest in wildlife
and rural character**
- **But, also a lot of roads and
development**



VERMONT CONSERVATION DESIGN

A practical approach to protecting and enhancing an ecologically functional landscape into the future.

- Uses best available science and data.
- Uses two key landscape features: forest blocks and riparian areas.
- Applies the coarse filter-fine filter approach to conservation.



Collaborators:

VT Fish and Wildlife Department

Vermont Land Trust

The Nature Conservancy

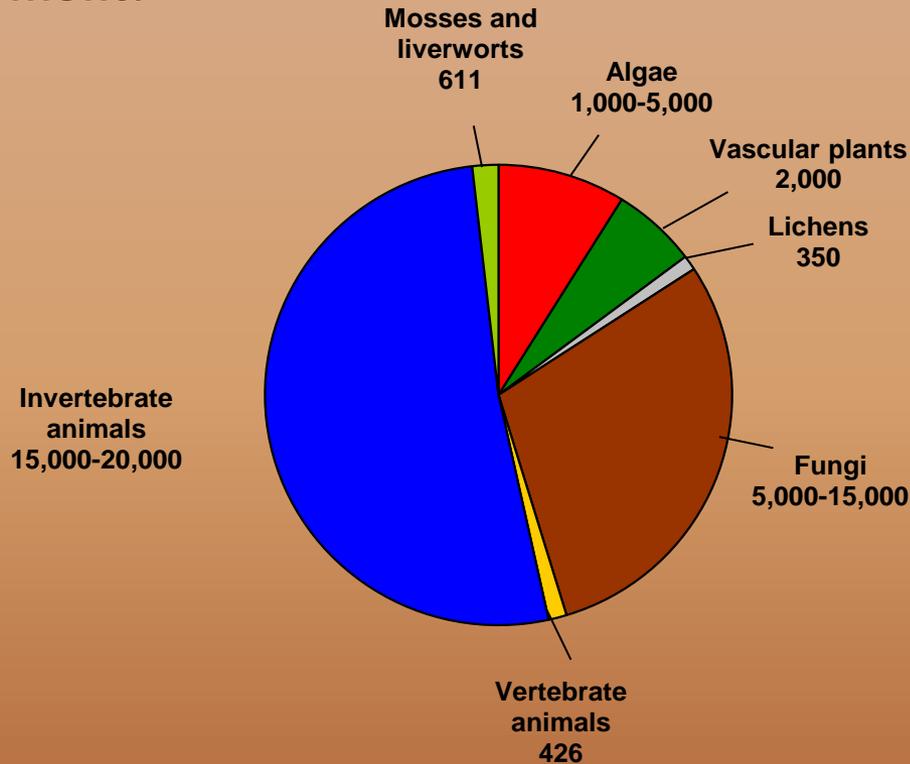
VT Department of Forests, Parks & Recreation

NorthWoods Stewardship Center



Given a broad goal of conserving biological diversity in Vermont...

And, an estimated 24,000 to 43,500 species in Vermont!



How do we protect them all?



Elfin Skimmer

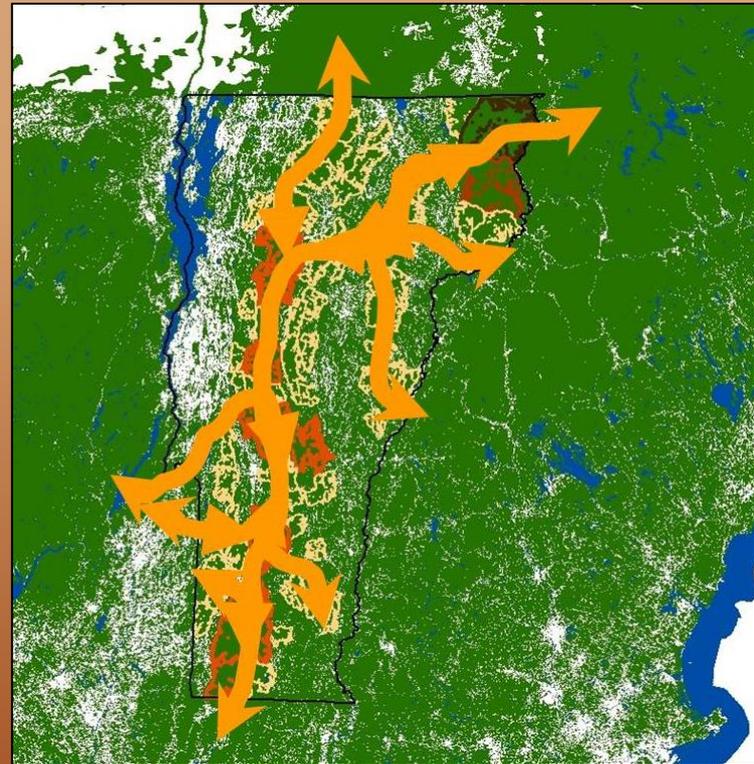
Coarse filter/fine filter approach to conservation

If examples of all coarse-filter elements are conserved at the scale at which they naturally occur, most of the species they contain – trees, mammals, birds, insects – will also be conserved. Some species will always need special attention.



Climate Change Considerations

- climate change has happened before
- rapid and uncertain changes
- our fragmented landscape
- need connectivity
- need to “conserve nature’s stage”



Conservation Design with Targets at Three Scales

Landscapes



Champlain Valley

Natural Communities



Dry Oak-Hickory-Hophornbeam Forest

Species



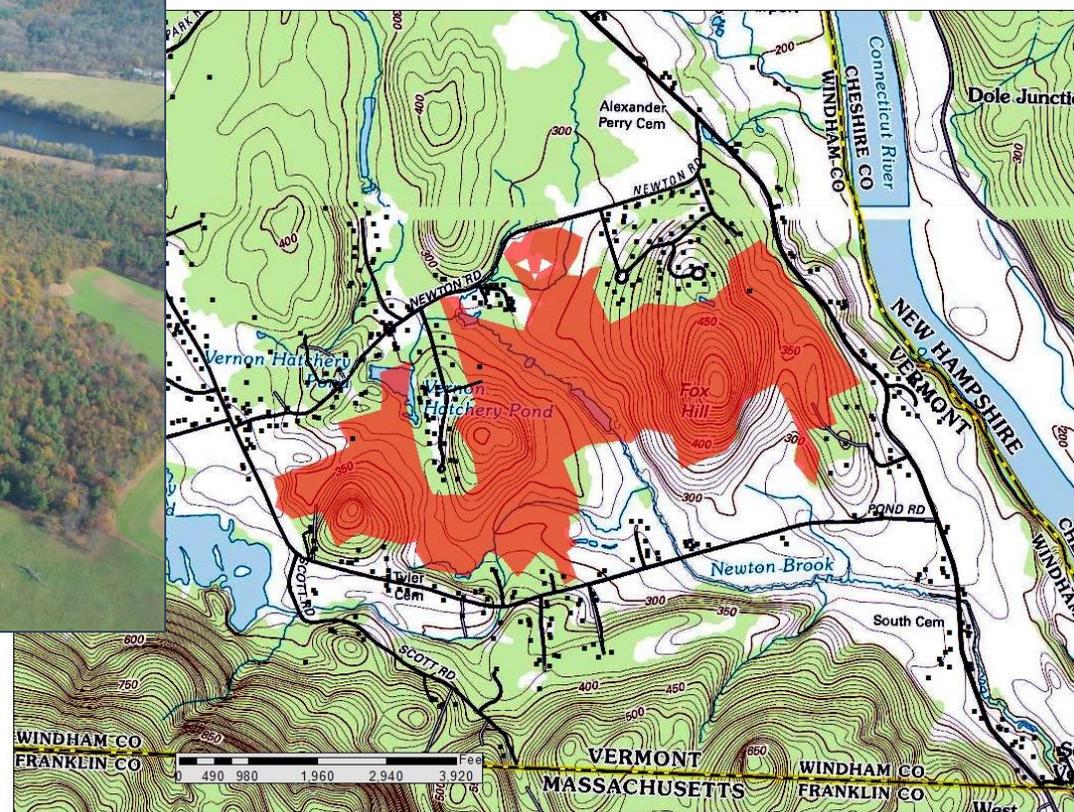
Southern Twayblade (*Listera australis*)

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

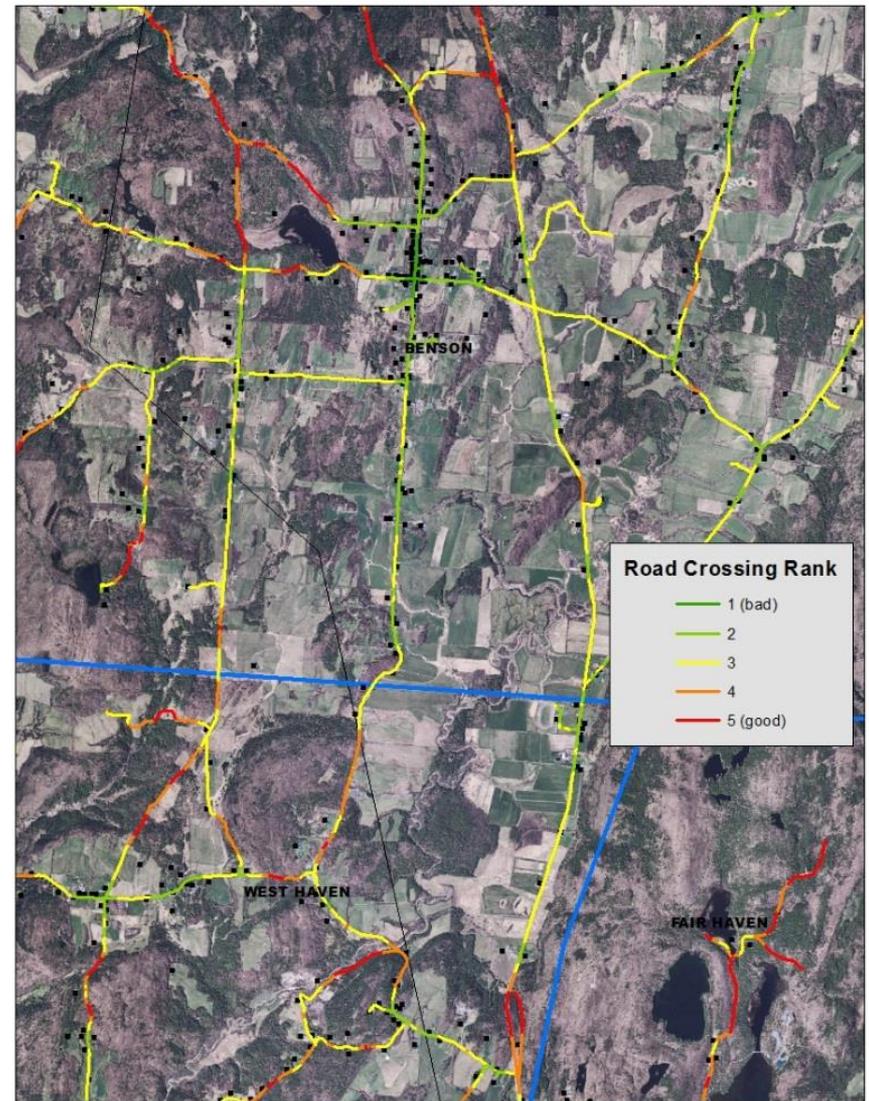
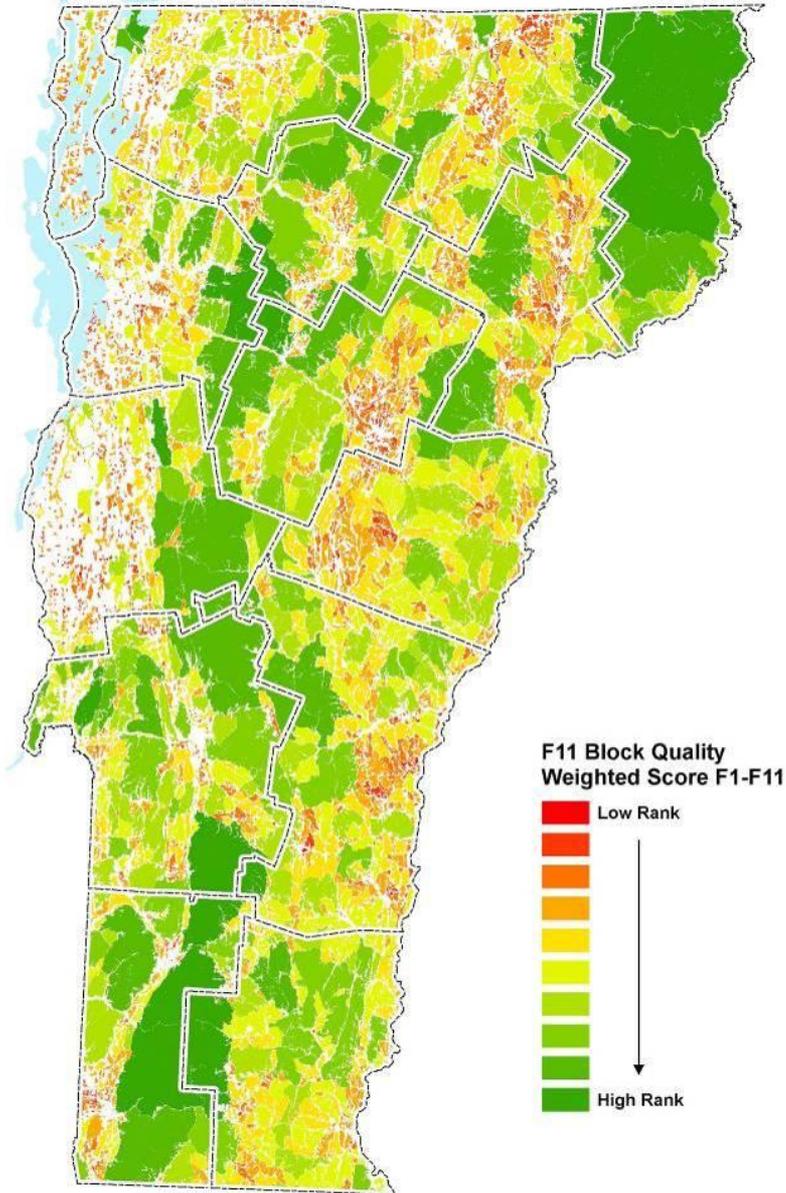
Upland and Wetland
Aquatic
Vernal Pools...
(next two years)

Rare Species
Grasslands
Spp of Greatest Cons. Need
Deer
Pollinators...
(next two years)

Forest Blocks: areas of contiguous forest and other natural habitats (wetlands, ponds, cliffs,...) that are unfragmented by roads, development, or agriculture.



Forest Block project



- 4,055 forest blocks identified
- Each block ranked for 11 biological and physical factors and total weighted score

Requirements for Maintaining an Ecologically Functional Landscape

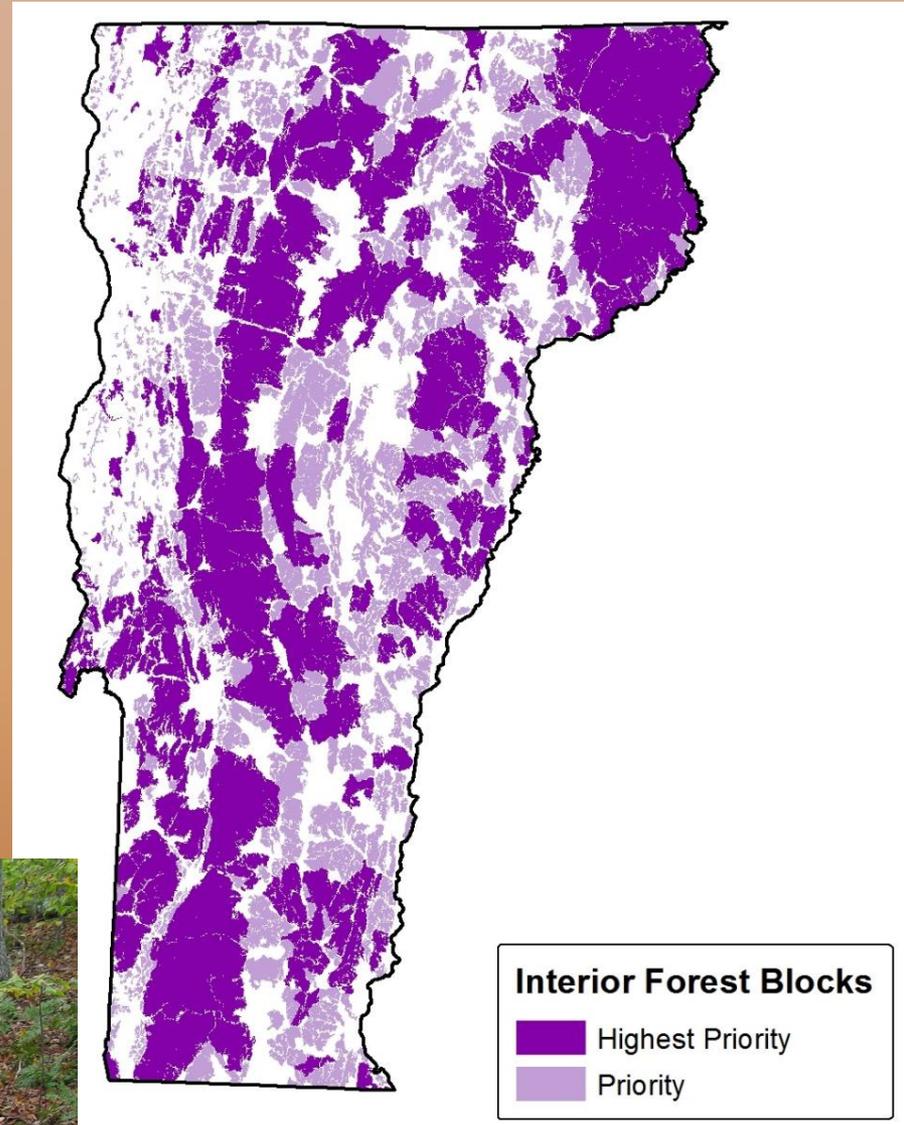
- **Maintain ecological functions of each landscape feature.**
- **Need the combined functions of all the landscape features.**
- **Fine filter conservation planning for species and habitats that need special attention.**
- **What is conservation?... all methods available to maintain the ecological functions of the feature.**
- **“Guidelines for maintaining ecological function” and “further prioritization” are provided for each landscape element.**
- **BioFinder website will be updated (<http://biofinder.vermont.gov/>)**

Interior Forest Blocks

Definition: Areas of contiguous forest and other natural communities and habitats that are unfragmented by roads, development, or agriculture.

Ecological Function:

- Ecological processes
- Air and water quality
- Flood resilience;
- Interior forest species
- Wide-ranging mammals
- Source populations
- Large, topographically diverse forest blocks allow species to shift in response to climate change.

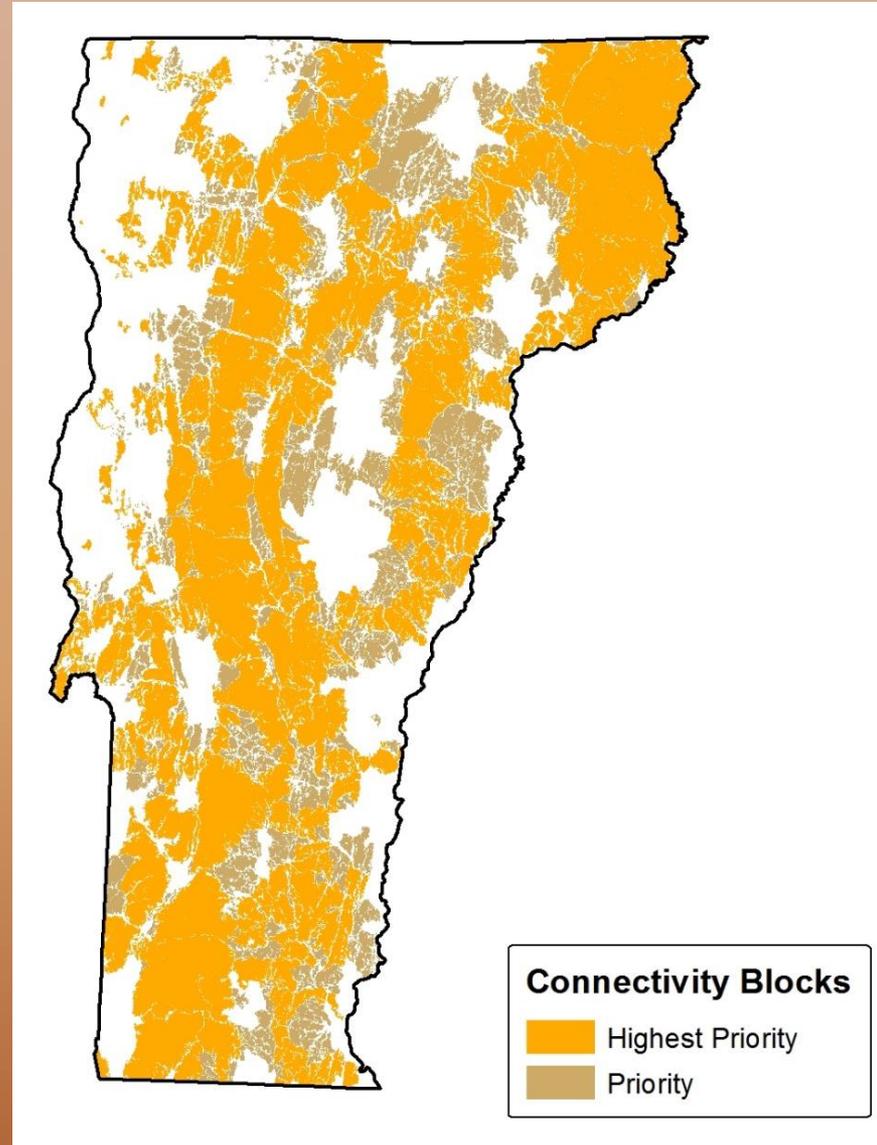


Connectivity Blocks

Definition: The network of forest blocks that together provide terrestrial connectivity at the regional scale (across Vermont and to adjacent states and Québec) and connectivity between all Vermont biophysical regions.

Ecological Function:

- Wide-ranging animal ranges
- Daily and annual habitat needs
- Young animal dispersal
- Plant and animal species range shift with climate and land uses change
- Genetic exchange and other processes

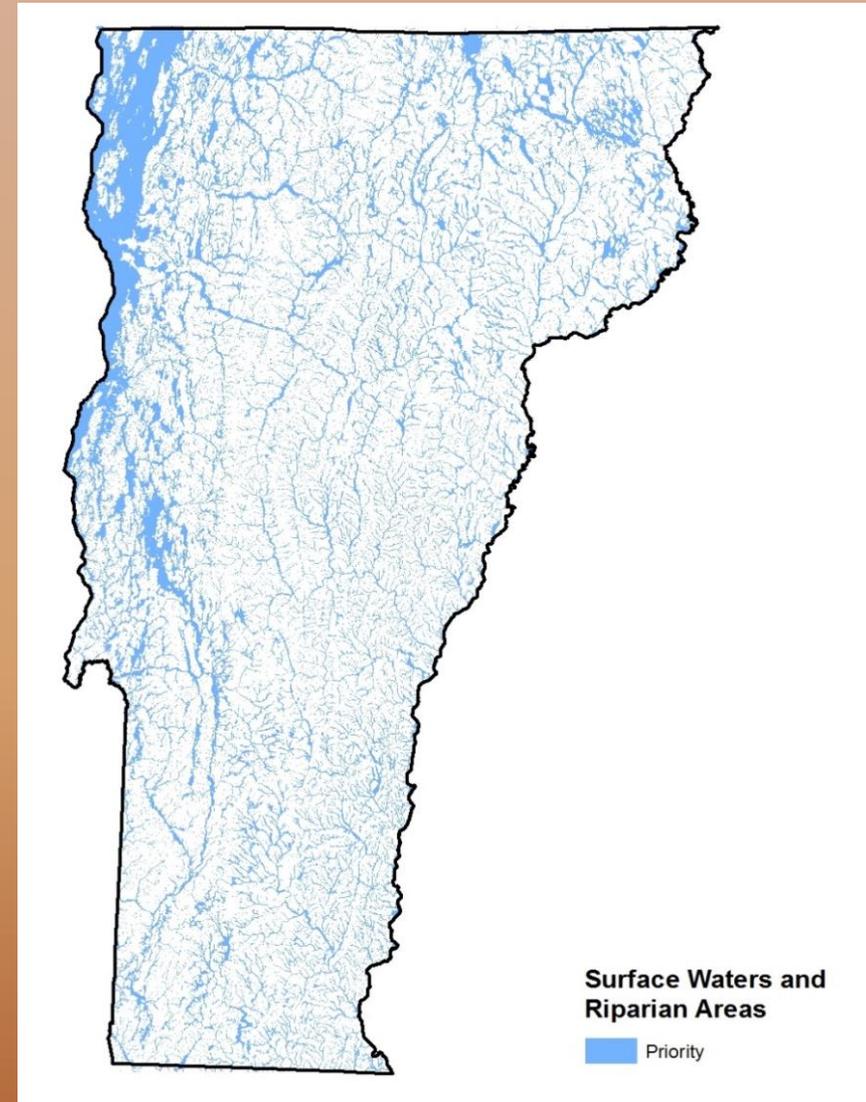


Surface Waters and Riparian Areas

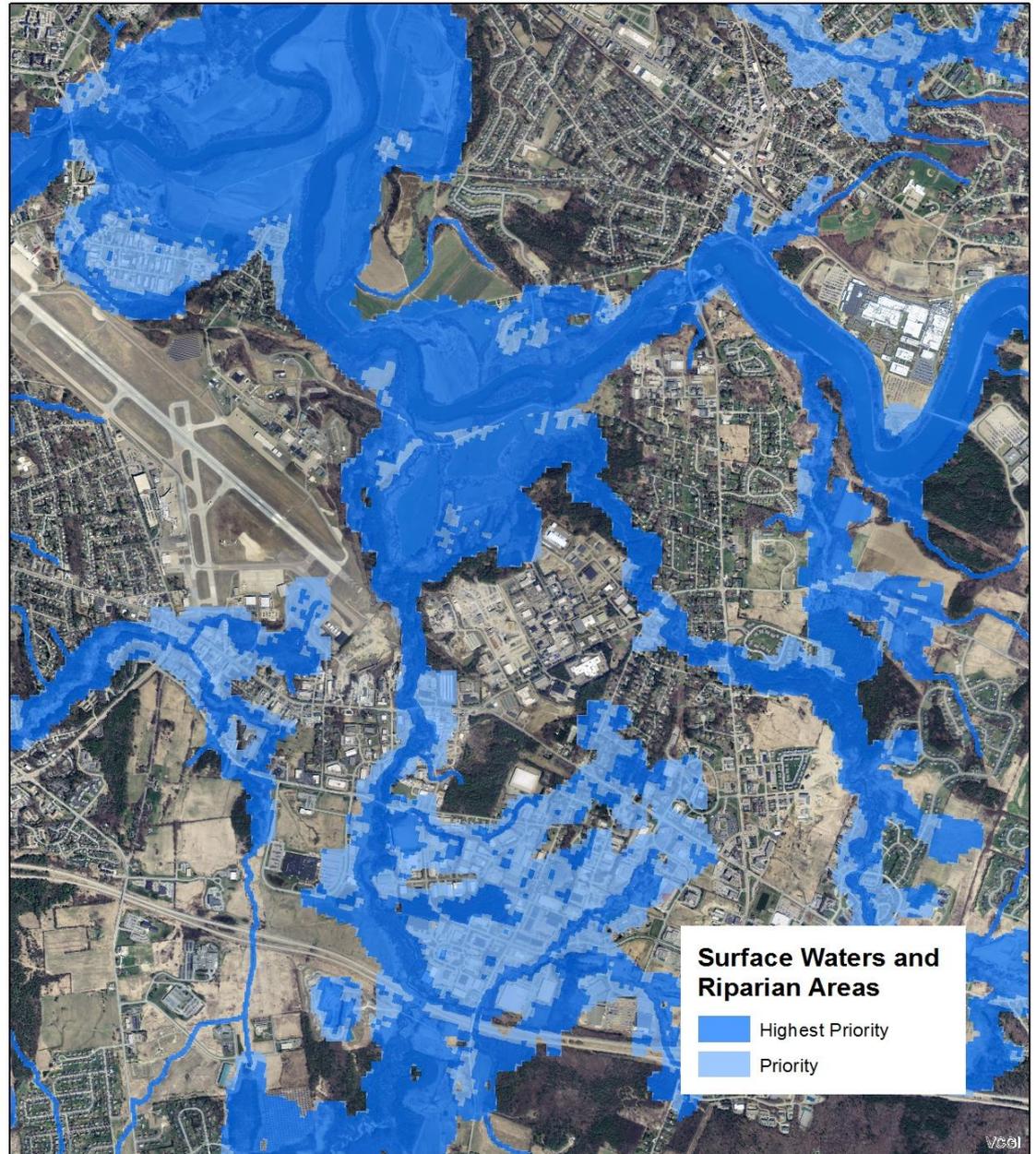
Definition: The network of all lakes, ponds, rivers, and streams, their associated riparian zones and valley bottoms in which geophysical processes occur, and their connections to groundwater.

Ecological Function:

- Aquatic species habitat
- River geomorphic stability and floodplain access
- Stabilize shorelines, store flood waters, filter and assimilate sediments and nutrients, shade adjacent surface water, and contribute organic matter
- Biodiversity – species and communities
- Wildlife corridors
- Plant and animal range shifts in response to climate change



Surface Waters and
Riparian Areas for the
South Burlington, Essex,
and Williston area.

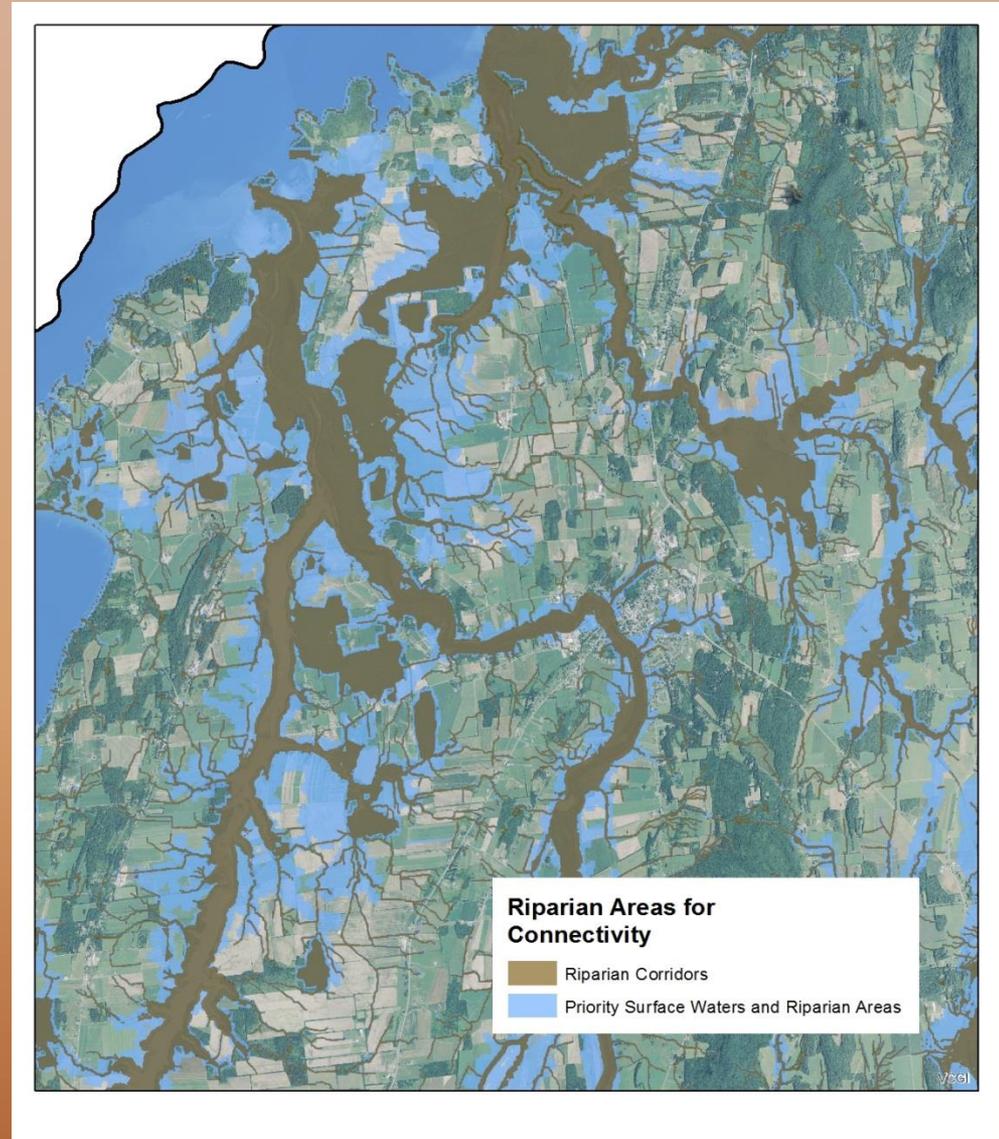


Riparian Areas for Connectivity (Riparian Corridors)

Definition: The connected network of riparian areas in which **natural vegetation occurs**, providing natural cover for wildlife movement and plant migration.

Ecological Function:

- Integrity of the lakes, ponds, rivers, and streams
- Wildlife cover movement
- Obligate habitat for mink, otter, beaver, and wood turtle
- Riparian areas and Connectivity Blocks together form a functional network.



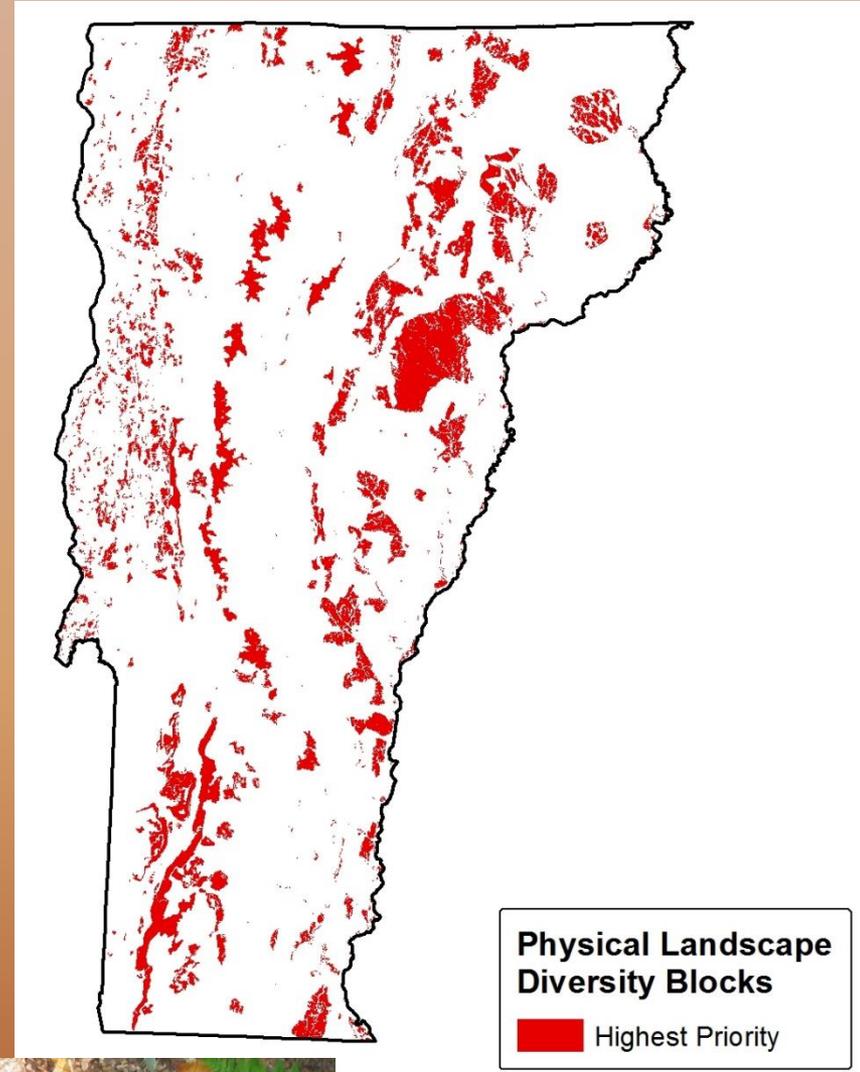
Vicinity of Ferrisburgh, Pantan, and Vergennes.

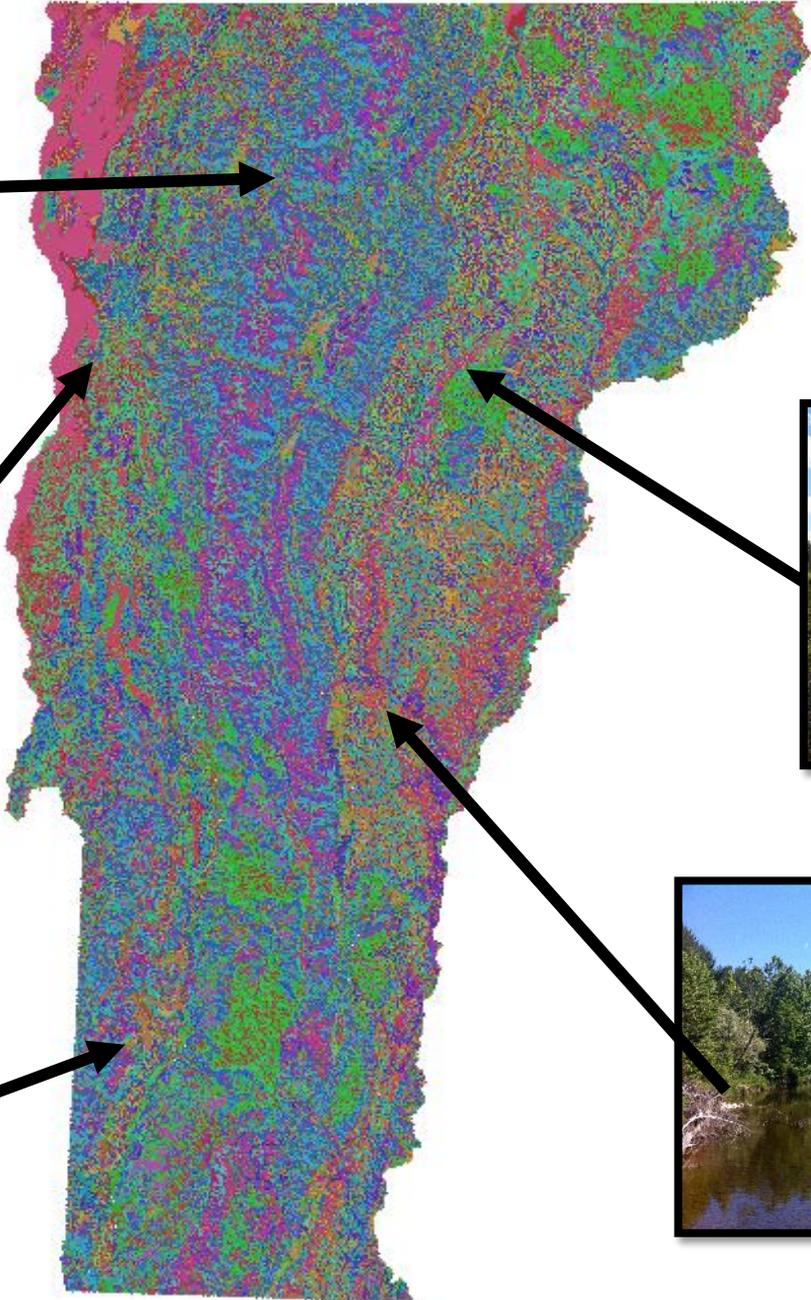
Physical Landscape Diversity Blocks

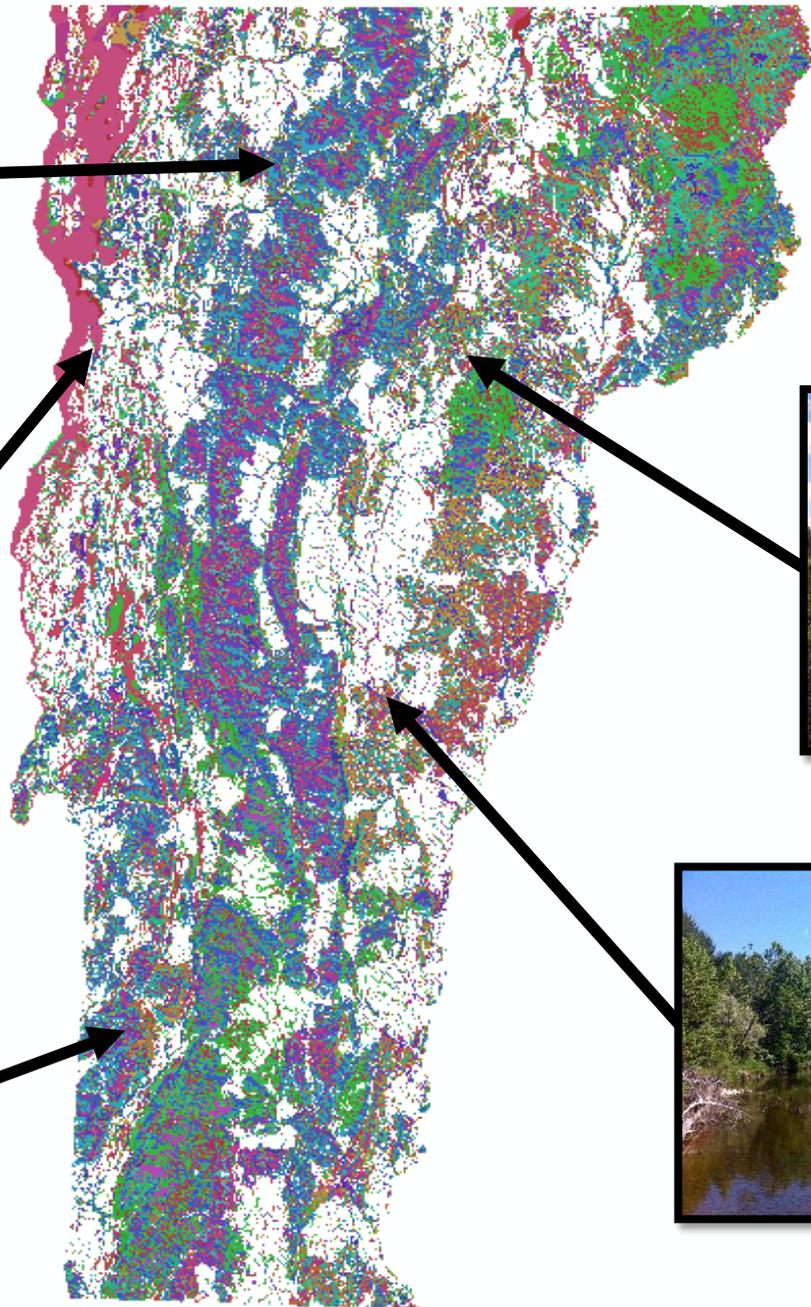
Definition: A set of forest blocks and other areas of natural vegetation that include physical landscape diversity features that are either rare in Vermont or under-represented in the other landscape elements.

Ecological Function:

- Physical landscape diversity (bedrock, soils, elevation, landform,...) represents potential biological diversity.
- “Conserving Nature’s Stage” – representing all elements of physical landscape diversity in a conservation design will conserve biological diversity and *the capacity to adapt to climate change*.





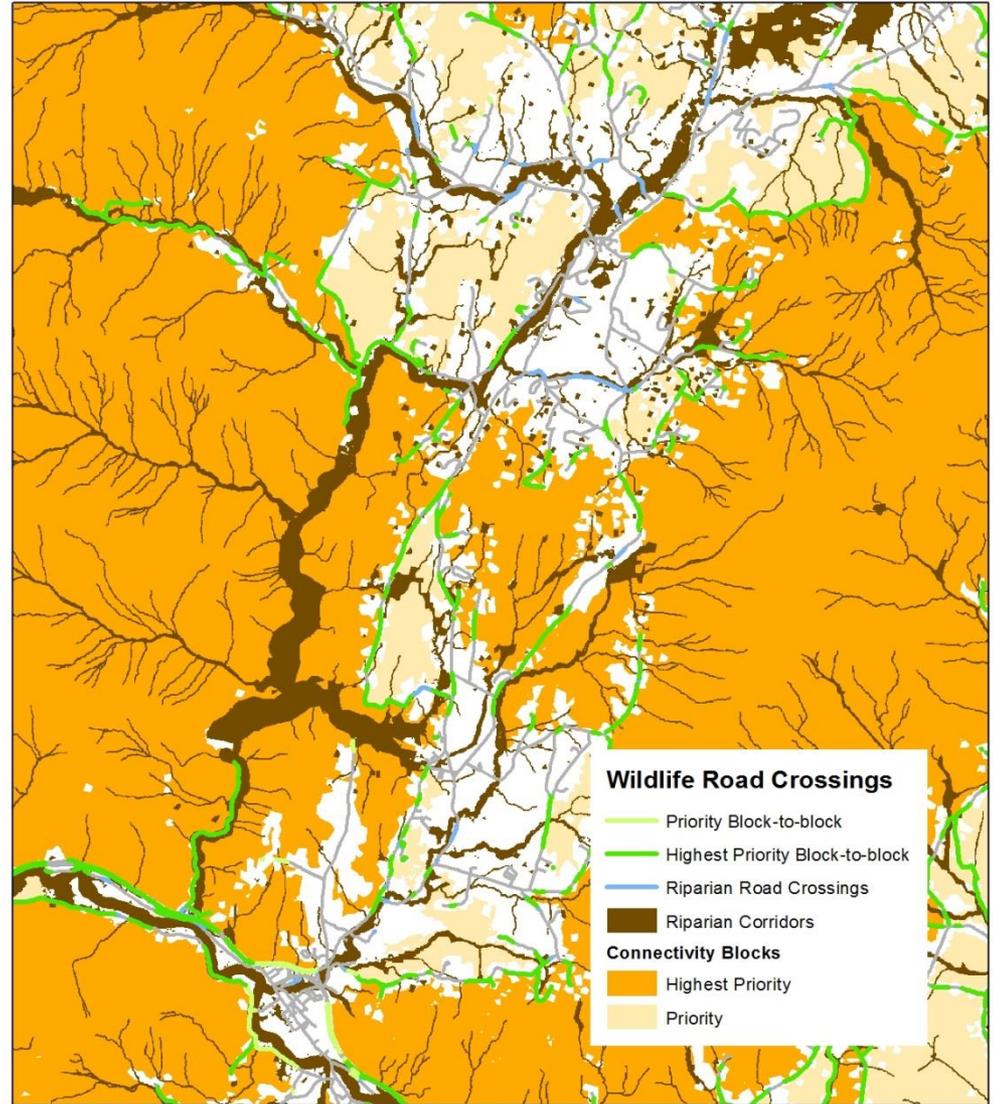


Wildlife Road Crossings

Definition: A section of road that crosses a wildlife corridor where the adjacent habitat quality is high, usually because the road is adjacent to a forest block; the road is the primary impediment to animal movement.

Ecological Function:

- Provide the best opportunity for wildlife movement and dispersal of other species across roads
- Wildlife road crossings over or under roads are critically important between adjacent forest blocks and along linear riparian area networks.



Waterbury-Stowe area

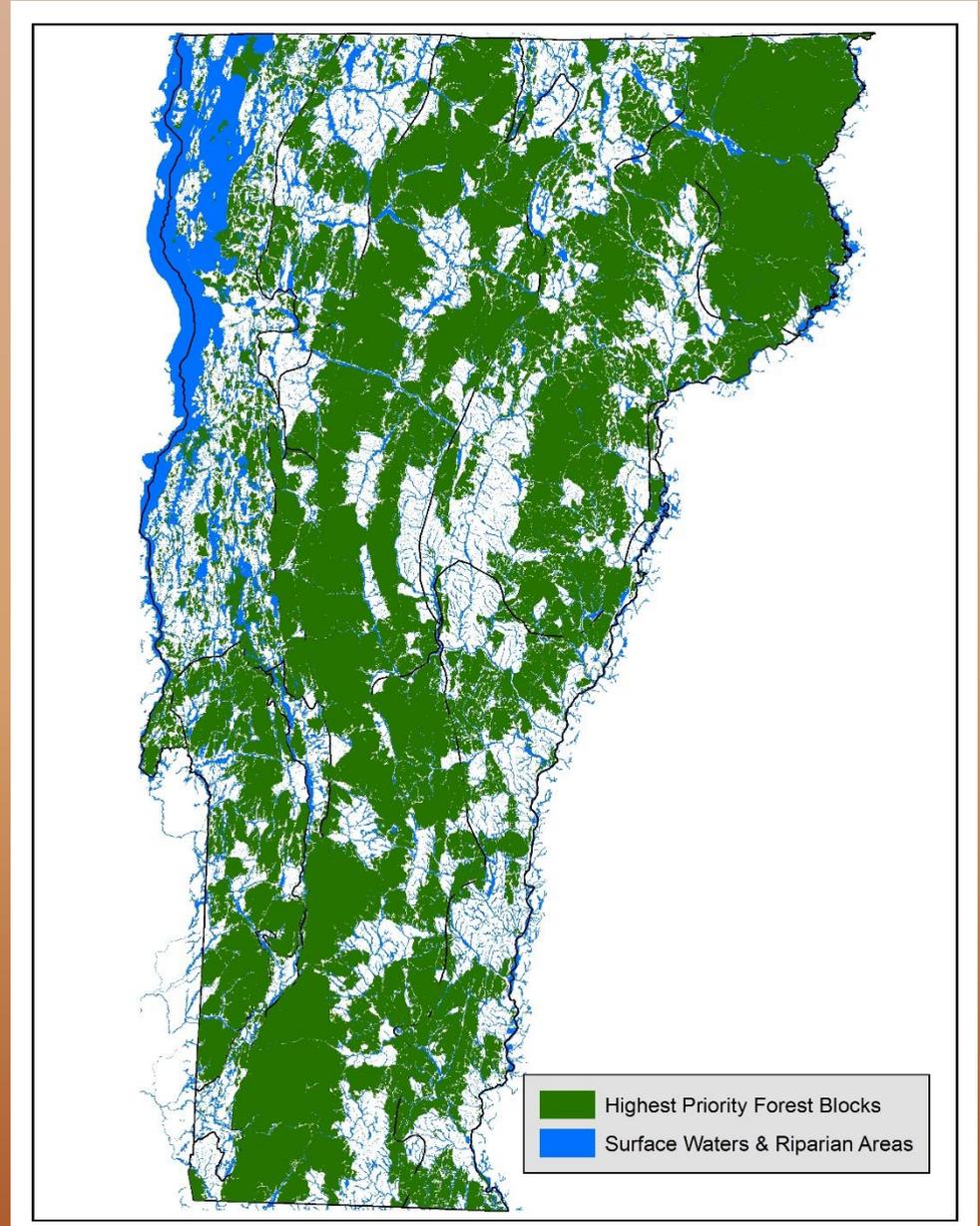
Putting it All Together: The Ecologically Functional Landscape

Requires conservation of all the landscape elements together.

The lands and waters identified are the areas of the state that are of highest priority for maintaining ecological integrity.

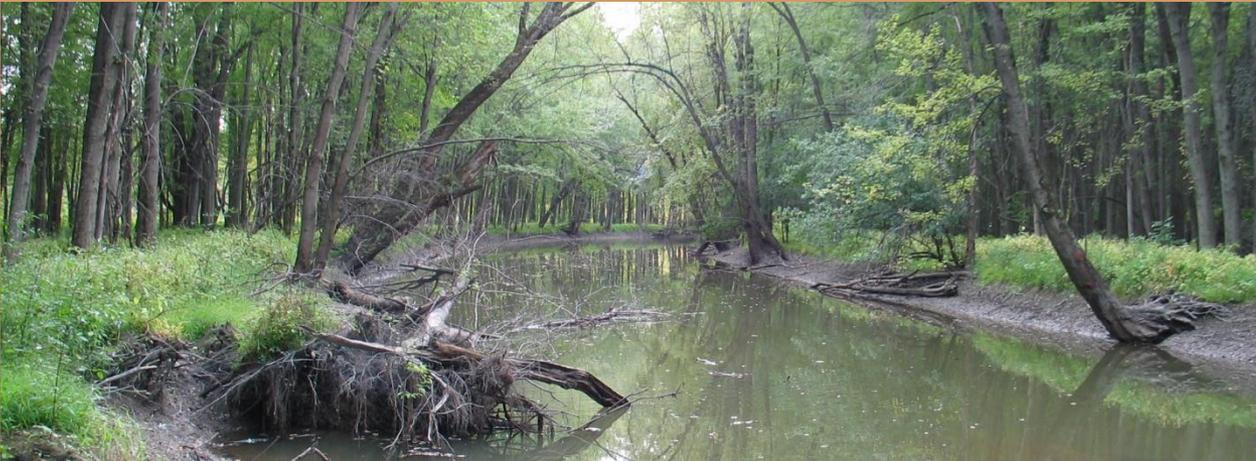
A connected landscape of large and intact forested habitat, healthy aquatic and riparian systems, and a full range of physical features.

Long term conservation of much of Vermont's biological diversity and the capacity of species and natural communities to adapt to climate change.



Some Thoughts and Perspectives

- **We should expect some decline in function – we cannot conserve it all.**
- **80 percent of Vermont is privately owned. Landowners decisions on management and stewardship hold the key.**
- **Can focus permanent conservation on key features.**





Keeping Forests as Forests maintains:

- **ecological functions and services**
- **climate change adaptation and resilience**
- **wildlife habitat**
- **biological diversity – species and communities**
- **forest management opportunities**
- **products we need**
- **cultural aesthetic**
- **sense of place**

Thank you... Questions? Discussion...

