VERMONT CONSERVATION DESIGN

MAINTAINING AND ENHANCING AN ECOLOGICALLY FUNCTIONAL LANDSCAPE

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Eric Sorenson, Robert Zaino, Jens Hilke - Vermont Fish and Wildlife Department
and
Elizabeth Thompson - Vermont Land Trust

VERMONT FISH & WILDLIFE

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CONSERVING LAND FOR THE FUTURE OF VERMONT

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Steering Committee

John Austin, VT Fish and Wildlife Department
Jayson Benoit, NorthWoods Stewardship Center
Jeff Briggs, VT Department of Forests, Parks & Recreation
Dan Farrell, The Nature Conservancy
Jens Hilke, VT Fish and Wildlife Department
Jon Kart, VT Fish and Wildlife Department
Jane Lazorchak, VT Fish and Wildlife Department
Paul Marangelo, The Nature Conservancy
Doug Morin, VT Fish and Wildlife Department
Steve Parren, VT Fish and Wildlife Department
Nancy Patch, VT Department of Forests, Parks & Recreation
Rose Paul, The Nature Conservancy
Kim Royar, VT Fish and Wildlife Department
Mark Scott, VT Fish and Wildlife Department
Eric Sorenson, VT Fish and Wildlife Department
Liz Thompson, Vermont Land Trust
Bob Zaino, VT Fish and Wildlife Department

Introduction

Vermont has a rich natural heritage and legacy, treasured by Vermonters and visitors alike. Strong public support for conservation is evidenced by numerous public surveys (Roman and Ericson 2015). Vermonters strongly value wildlife, nature, and the state's rural, sparsely developed landscape, including the working lands supporting forestry and agriculture.

This valued natural legacy is threatened. Development and fragmentation of natural habitats, the spread of non-native and invasive plants and animals, and the effects of a changing climate all have the potential to dramatically alter Vermont's natural landscape and the native plants and animals that rely on it. Nevertheless, thanks to the resilience of our forests and natural communities, much of the state is currently in good ecological condition. Following the severe deforestation and soil loss of the heavily agricultural 19th century, Vermont is now largely forested, with many large and intact forest blocks. Vermont's small size belies its rich diversity of species and habitats. The state has many pristine lakes and wetlands; abundant calcium-rich bedrock which supports high species diversity, rare species, and productive forests; and a range of elevations and soil types from the clay soils of Addison County to the rugged alpine summit of Mount Mansfield.

These ecological conditions and strong public support for conservation highlight the opportunity that now exists to protect biological diversity.

Maintaining and enhancing ecological function across the landscape is fundamental to conserving biological diversity. Ecological function – the ability of plants and animals to thrive, reproduce, migrate, and move as climate changes and the ability of natural ecosystems to function under natural processes – is served by high-quality terrestrial and aquatic habitat, natural connections across the landscape, a wide variety of habitat features from low elevation to high, clean water, and healthy rivers, streams, lakes, ponds, and wetlands.

We present a practical approach to protecting and enhancing ecological function into the future. This approach, a landscape-level conservation design for Vermont, is based on a rigorous scientific process using the best available data. The lands and waters identified here are the areas of the state that are of highest priority for maintaining ecological integrity. Together, these lands comprise a connected landscape of large and intact forested habitat, healthy aquatic and riparian systems, and a full range of physical features (bedrock, soils, elevation, slope, and aspect) on which plant and animal natural communities depend. When conserved or managed appropriately to retain or enhance ecological function, these lands will sustain Vermont's natural legacy into the future.

Coarse-filter Conservation Approach

It would be overwhelming to identify and manage for the individual needs of the thousands of species of plants, animals, invertebrates, and fungi in Vermont. The coarse-filter conservation approach treats larger-scale components (or "elements") of the landscape as proxies for the species they contain (Panzer and Schwartz 1998; Molina et al. 2011; Shuey et al. 2012). If examples of all coarse-filter elements are conserved at the scale at which they naturally occur, most of the species they contain—from the largest trees and mammals to the smallest insects—will also be conserved (Hunter 1991; NCASI 2004; Schulte et al. 2006). This approach is well-documented in the scientific literature (Jenkins 1985; Noss 1987; Hunter et al. 1988; Hunter 1991; Noss and Cooperrider 1994; Haufler et al. 1996; Jenkins 1996; Poiani et al. 2000; USDA 2004).

The coarse-filter conservation approach can provide for the habitat needs of many of Vermont's species, allowing for efficiency in conservation planning and design. This project focused on identifying landscape-level coarse filters. We have very high confidence that this conservation design identifies areas essential for the long-term functioning of Vermont's landscape and the species it contains. However, coarse-filter conservation alone cannot adequately address all the needs of Vermont's species, habitats, and natural communities. Very rare species, whose distribution on the landscape is too infrequent and unpredictable to be captured by most coarse filters, and species with very specific habitat needs (such as grassland nesting birds that in Vermont are only associated with very specific agricultural mowing regimes) require additional considerations. A complementary "fine-filter" conservation approach is needed for these species and habitats, and we are planning to address a conservation design for these species and habitats in a subsequent project.

Methods and Results

Our first step in applying the coarse-filter approach to this project was to list landscape scale elements that could serve as coarse filters and the finer scale elements that could effectively be captured by each. The list of finer scale elements included a broad range of ecological processes, natural communities, habitats, and species. Analyses of the effectiveness of several proposed coarse filters were compiled in a tabular format. This analysis informed our selection efforts. The table is a significant product of this project and serves as a strong conceptual foundation for identifying those landscape elements that most effectively represent the ecologically functional landscape needed to support most of the fine filter elements into the future. The table will be expanded in a later phase of the project to include many more natural communities, habitats, and species and will be the basis for identifying which of these finer scale elements are not "captured" by the landscape scale coarse filters and therefore need specific conservation and/or management attention.

Based on these first steps, we selected five landscape elements from an initially longer list as collectively being the most effective and parsimonious for maintaining an ecologically functional landscape. These are:

1. Interior Forest Blocks
2. Connectivity Blocks
3. Surface Waters and Riparian Areas
4. Riparian Areas for Connectivity
5. Physical Landscape Diversity Blocks

We also identified Wildlife Road Crossings as a key element of the conservation design. Wildlife road crossings are road segments with suitable habitat on both sides of the road. Although not actually a coarse filter, wildlife road crossings are essential to the success of the five chosen landscape elements and therefore are a critical component of maintaining and enhancing Vermont's ecologically functional landscape.

When the ecological functions of each of these landscape elements are maintained and enhanced, and when each is conserved at the appropriate scale and distribution across the landscape, the majority of Vermont's species and natural communities are very likely to be conserved even as the climate changes.

While each landscape element is important on its own, it cannot function in isolation. Maintaining or enhancing an ecologically functional landscape in Vermont depends on both the specific functions of each element, and the ability of the landscape elements to function together. Interactions between elements are what support Vermont's environment and are essential for long-term conservation of Vermont's biological diversity and natural heritage.

Each of these landscape elements is described below, and a map shows the areas identified as "priority" and "highest priority" for each. The highest priority areas are those that are critical for maintaining an ecologically functional landscape. The priority areas are also important but there is more flexibility available for conserving ecological function within these areas. The highest confidence in maintaining an ecologically functional landscape will be achieved by conservation of both priority levels for all of these landscape level elements.

The following maps of landscape level elements identify a large percentage of Vermont's lands and waters for conservation priority. We are highly confident that ecological functions must be maintained within these areas if Vermont is to have an ecologically functional landscape into the future.

Conserving Ecological Function

It is important to note that the goal for all of these areas is to maintain the ecological functions provided by that landscape element. For example, the goal for Interior Forest Blocks is to maintain the unfragmented, interior forest of these areas that provides critical habitat for many species of plants and animals. There is considerable leeway on what can happen within a forest block and still maintain interior forest function. For example, most forest management activities are compatible with maintaining the long-term interior forest functions for these blocks, providing these activities are thoughtfully planned.

Many tools can be used to achieve the overall goal of retaining ecological function. With approximately 80% of Vermont's land privately-owned, management and stewardship of private lands will be an essential path to success. Other tools include conservation easements, local planning and zoning, state regulations, and ownership by a state or federal agency or a private conservation organization. This document and these maps do not provide the detail as to which of these tools are best suited to specific places, but there are recommendations for further prioritization filters that users can apply to make these decisions.

Each section below provides guidelines on what is needed to maintain ecological functions for that element.

Landscape Element Descriptions and Maps

Interior Forest Blocks
Definition: Areas of contiguous forest and other natural communities and habitats (such as wetlands, ponds, and cliffs) that are unfragmented by roads, development, or agriculture. Forest blocks were identified, mapped, and ranked by Sorenson and Osborne (2014).

Ecological Function: Forest blocks provide many ecological and biological functions critical for protecting native species and the integrity of natural systems (Austin et al. 2004), including:

- Supporting natural ecological processes such as predator-prey interactions and natural disturbance regimes;
- Helping to maintain air and water quality and flood resilience;
- Supporting the biological requirements of many plant and animal species, especially those that require interior forest habitat or require large areas to survive;
- Supporting viable populations of wide-ranging animals by allowing access to important feeding habitat, reproduction, and genetic exchange; and
- Serving as habitat for source populations of dispersing animals for recolonization of nearby habitats that may have lost their original populations of those species.

In addition, large, topographically diverse forest blocks will allow many species of plants and animals to shift to suitable habitat within a forest block in response to climate change within the next century without having to cross developed areas to other forest blocks (Beier 2012).

Priority Areas for Maintaining an Ecologically Functional Landscape:

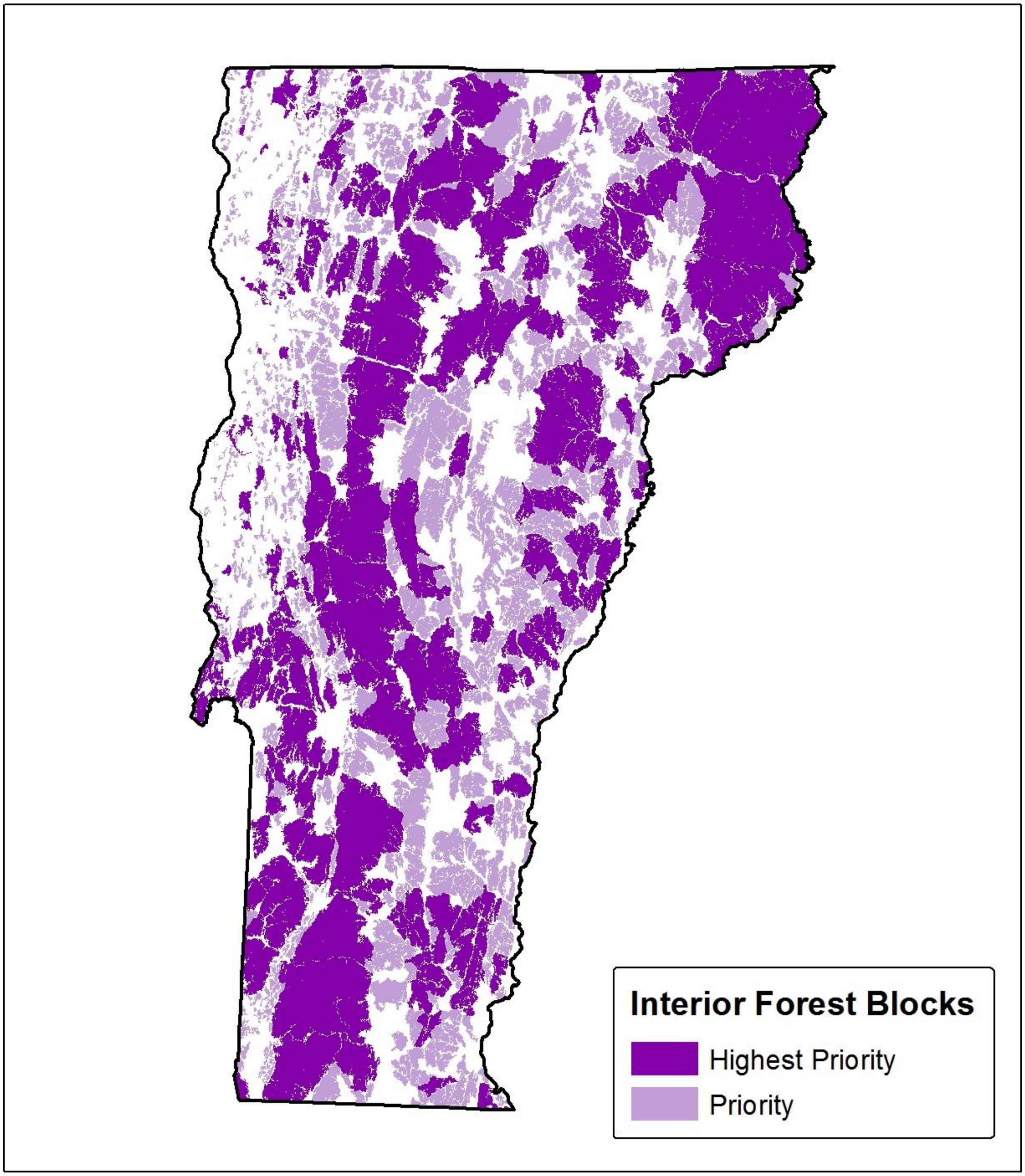
These are highly ranked forest blocks from all biophysical regions that provide important interior forest habitat and provide ecological support to the highest priority Forest Interior Blocks.

Highest Priority: These are the largest and/or highest ranked forest blocks from all biophysical regions that provide the foundation for interior forest habitat and associated ecological functions.

Guidelines for Maintaining Ecological Function: The primary goal is to maintain the interior forest conditions that forest blocks provide by avoiding permanent interior forest fragmentation resulting from development. Limited development on the margins of existing large forest blocks may not have significant adverse effects as long as it does not reduce connectivity between blocks and does not encroach into the forest block interior. Forest management that maintains forest structure within the block and results in a distribution of all age classes is compatible with maintaining interior forest conditions over the long term.

Further prioritization for conservation could be achieved using the following filters:

1. Areas also mapped as highest priority Connectivity Blocks.
2. Forest blocks with high "total weighted block scores" or high scores for any of the 11 individual biological or physical diversity factors (Sorenson and Osborne 2014).
3. Presence of rare or Vermont-responsibility geophysical settings, such as calcareous bedrock or clay soils.
4. High score in regional resilient sites analysis (Anderson et al. 2012).
5. High score for forest productivity (Vermont Land Trust 2007).



Map 1. Interior Forest Blocks showing Priority and Highest Priority blocks.

Connectivity Blocks

Definition: Landscape connectivity refers to the degree to which blocks of suitable habitat are connected to each other (Noss and Cooperrider 1994). Connectivity Blocks are 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. There is a high level of connectivity within individual forest blocks. The proximity of one forest block to another, the presence of riparian areas, and the characteristics of the intervening roads, agricultural lands, or development determine the effectiveness of the network of Connectivity Blocks in a particular area.

Ecological Function: A network of Connectivity Blocks allows wide-ranging animals to move across their range, allows animals to find suitable habitat for their daily and annual life needs, allows young animals to disperse, allows plant and animal species to colonize new and appropriate habitat as climate and land uses change, and contributes to ecological processes, especially genetic exchange between populations (Austin et al. 2004). Maintaining the landscape connectivity function requires both Connectivity Blocks and Riparian Areas for Connectivity, especially in highly fragmented areas of Vermont. There is general agreement among conservation biologists that landscape connectivity and wildlife corridors can mitigate some of the adverse effects of habitat fragmentation on wildlife populations and biological diversity (Beier and Noss 1998; Noss and Cooperrider 1994; Haddad et al. 2003; Damschen et al. 2006). Specifically, climate change adaptation is enhanced if the long distance movements of plants and animals is supported by a combination of short movements within large, topographically diverse forest blocks and short corridor movements between forest blocks (Beier 2012).

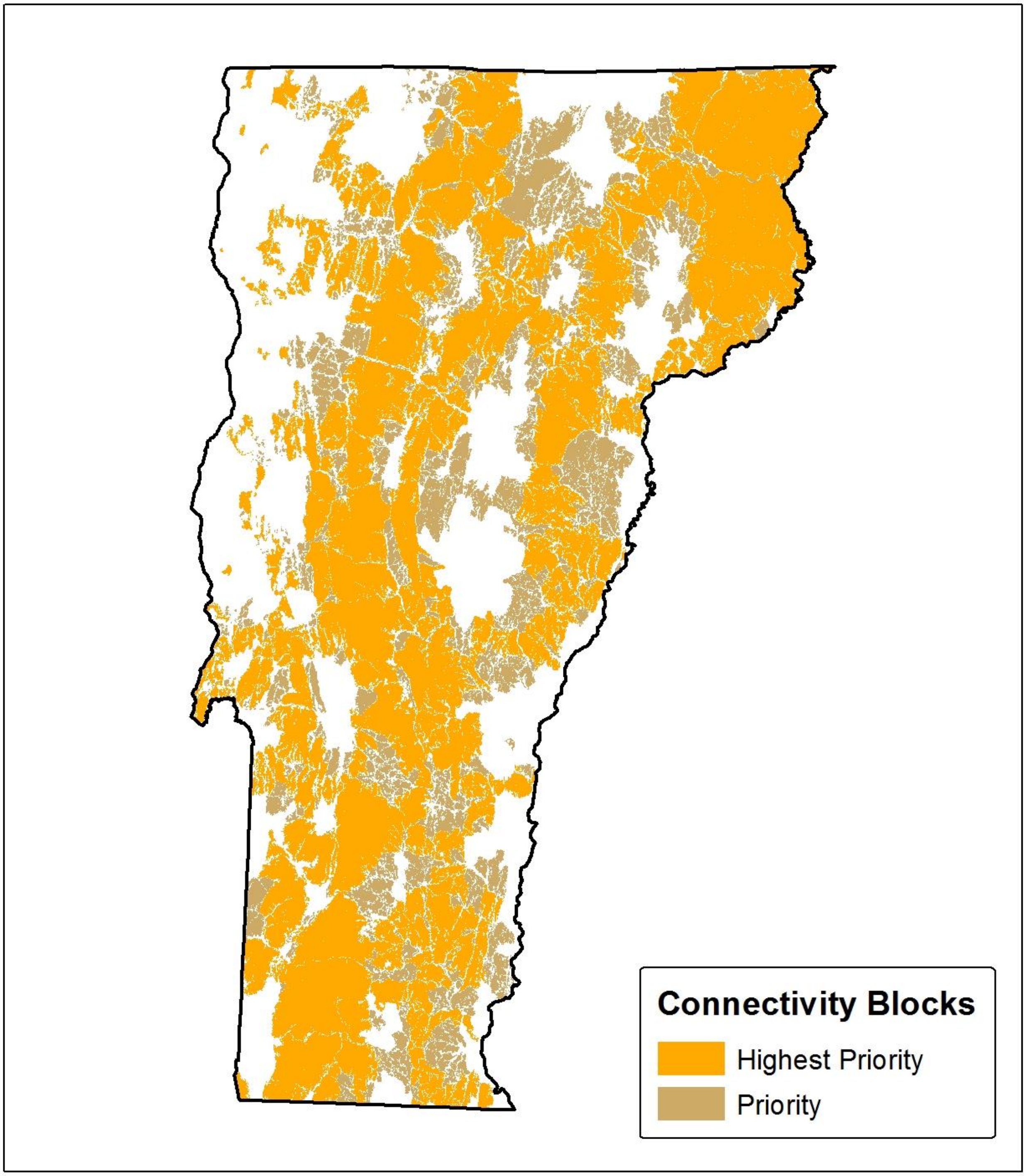
Priority Areas for Maintaining an Ecologically Functional Landscape:

> These are the forest blocks that provide a major supporting connectivity function for the "backbone" of highest priority Connectivity Blocks. They also provide alternative pathways for connectivity, as redundancy is a critical safeguard in ensuring the long term effectiveness of the connectivity network.
>
> <u>Highest Priority</u>: The terrestrial "backbone" of forest blocks is a subset of all Connectivity Blocks that provides connectivity to all biophysical regions. The "backbone" incorporates the spines of the major mountain ranges, connections outside Vermont to unfragmented habitat, and anchor blocks in fragmented biophysical regions based on abundant known occurrences of rare species and significant natural communities. Small forest blocks are included at pinch-points in the connectivity network as they are critical stepping stones.

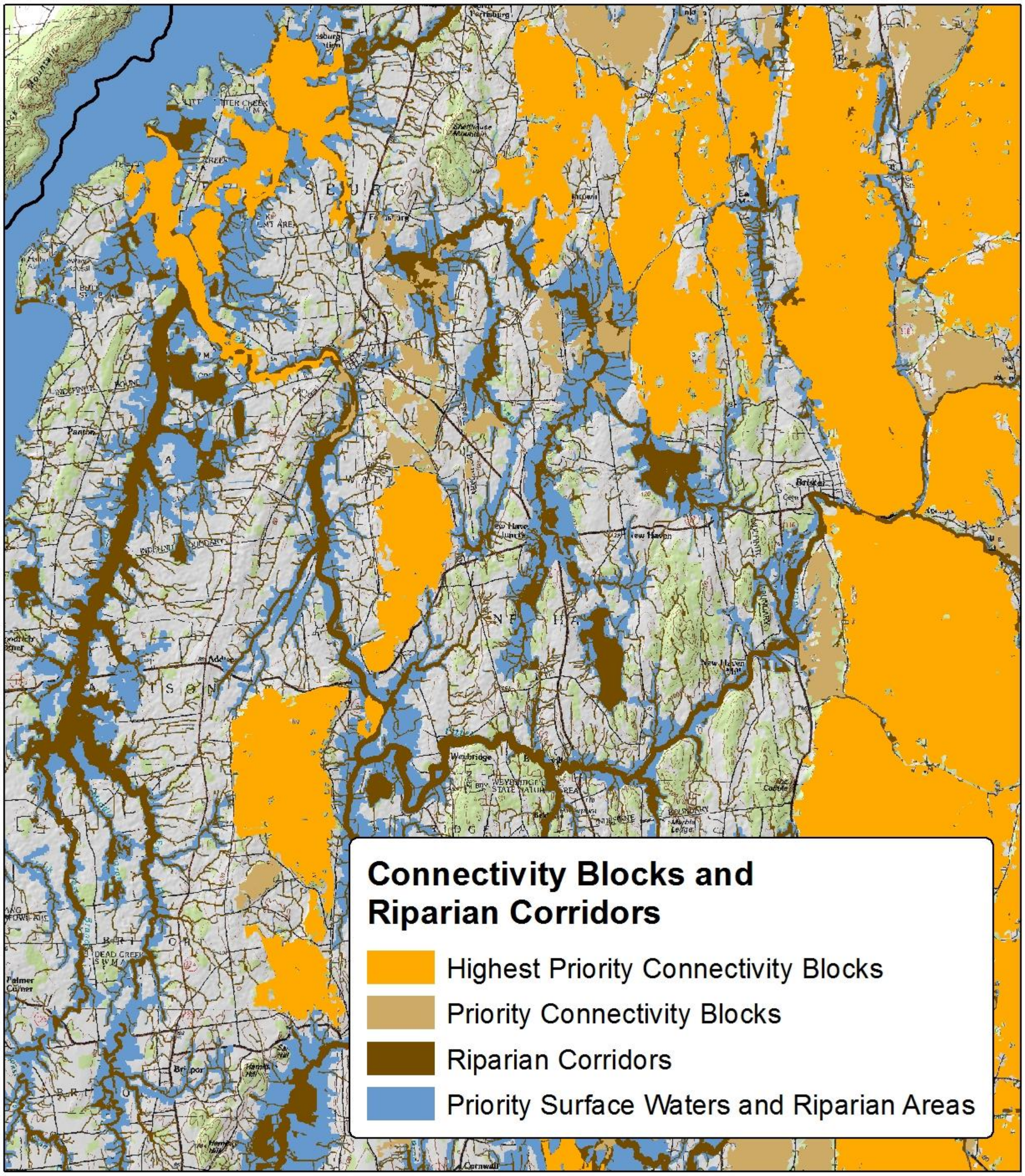
Guidelines for Maintaining Ecological Function: Similar to Interior Forest Blocks, it is important to maintain the interior forest conditions in Connectivity Blocks by avoiding permanent interior forest fragmentation resulting from development. Connectivity within forest blocks will remain high if they remain unfragmented. For Connectivity Blocks it is also critically important to maintain or enhance the structural and functional connectivity that occurs on the margins of these blocks where they border other blocks. This can be accomplished by maintaining forest cover along the margins and by limiting development in these areas of block-to-block connectivity.

Further prioritization for conservation could be achieved using the following filters:

1. Blocks that serve as stepping-stones in fragmented regions.
2. Anchor blocks are the largest blocks in the network and these need permanent conservation of their cores and the margins that border other blocks in order to secure the connectivity function.
3. Pinch points or bottle-necks in the connectivity network where animal movement or connectivity is narrowed due to adjacent development or fragmentation.



Map 2. Connectivity Blocks showing Priority and Highest Priority blocks.



Map 3. Connectivity Blocks and Riparian Corridors showing how the two landscape elements function together to provide connectivity in the fragmented Champlain Valley.

Surface Waters and Riparian Areas

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

Ecological Function: Vermont's rivers, streams, lakes, and ponds provide vital habitat for a rich assemblage of aquatic species, including fish, amphibians, reptiles, invertebrates (e.g., insects, mussels, snails, worms, freshwater sponges), and plants. This represents an enormous contribution to Vermont's biological diversity. The ecological integrity of an aquatic system is dependent on the condition of the watershed in which it occurs, but is also critically tied to the condition of the riparian area adjacent to the stream or pond. For stability, rivers and streams must have access to their floodplains and freedom to meander within their valley bottoms or river corridors. Naturally vegetated riparian areas provide many significant ecological functions, including stabilizing shorelines against erosion, storage of flood waters, filtration and assimilation of sediments and nutrients, shading of adjacent surface waters to help moderate water temperatures, and direct contribution of organic matter to the surface water as food and habitat structure. Riparian areas are also very essential habitat for many species of wildlife that are closely associated with the terrestrial and aquatic interface, including mink, otter, beaver, kingfisher, spotted sandpiper, and wood turtle. The shorelines and riparian areas of rivers and lakes support floodplain forests, several other rare and uncommon natural communities, and many species of rare plants and animals. In addition to these ecological functions that are tied to aquatic systems, the linear network of riparian areas provides a crucial element of landscape connectivity for plant and animal movement in response to climate change (Beier 2012). Although many riparian areas and river corridors are highly altered by agriculture, roads, and urbanization, the risk of flooding serves as a natural deterrent for future development. Riparian areas also respond rapidly to restoration efforts (Beier 2012).

Priority Areas for Maintaining Ecologically Functional Landscape:

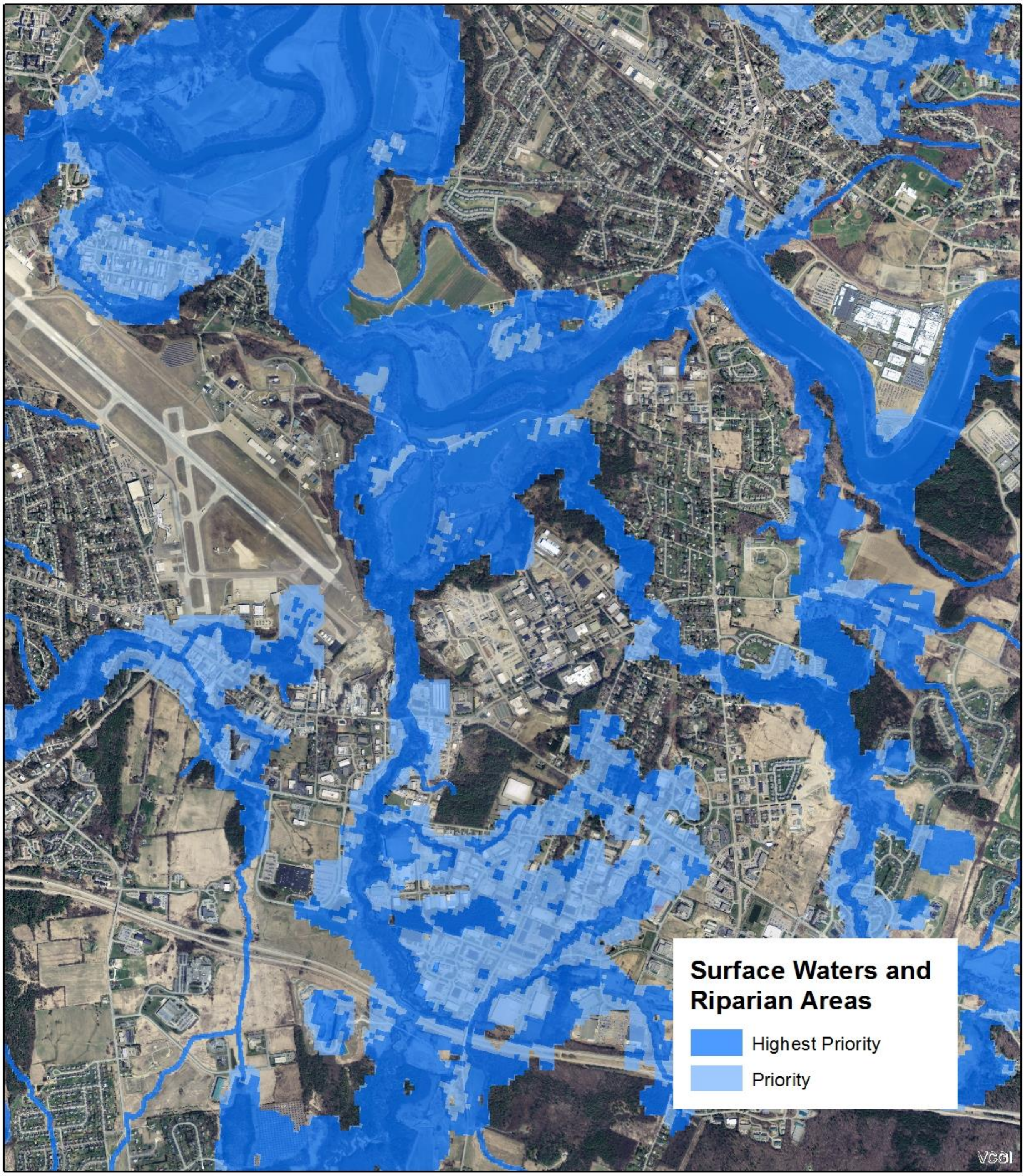
> All of the aquatic network of lakes, ponds, rivers, and stream and the valley bottoms in which the rivers and streams occur; to be conserved or managed in such a way as to achieve full functioning of all natural processes.
>
> <u>Highest Priority</u>: All of the aquatic network of lakes, ponds, rivers, and streams and the valley bottoms in which the rivers and streams occur, excluding developed land and including the Vermont hydrography layer and a buffer that is proportional to stream order.

Guidelines for Maintaining Ecological Function: Restoration is needed in order for Surface Waters and Riparian Areas to provide full ecological functions. Specifically, river channel equilibriums need to be maintained or restored. Natural vegetation should be maintained or restored in undeveloped riparian areas of rivers, streams, lakes, and ponds of adequate width to maintain water quality, stabilize shorelines, provide shade and biological support for aquatic systems, maintain biological diversity, and provide functional connectivity, both aquatic and terrestrial.

Further prioritization for conservation could be achieved using the following filters:

1. River Corridors as mapped by Vermont Department of Environmental Conservation (DEC).
2. Priority reaches as identified by DEC geomorphic assessments.
3. Priority reaches as identified by Flood Resilience Coarse Screen (Schiff et al. 2015).
4. Best Lakes Analysis, Lakes and Ponds Management and Protection Program, VT DEC.
5. Impaired stream reaches targeted for restoration and reference stream reaches targeted for conservation, VT DEC.

Map 4. Priority Surface Waters and Riparian Areas for Vermont



Map 5. 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: In addition to supporting the integrity of the lakes, ponds, rivers, and streams that they border, naturally vegetated riparian areas are especially important for providing cover for wildlife movement and other important wildlife habitat, such as nesting habitat for birds. Many wildlife species use riparian corridors for travel to find suitable habitat to meet their life requisites, but certain species are almost entirely restricted to riparian areas, including mink, otter, beaver, and wood turtle. The linear nature of riparian areas contributes to their function as movement corridors for wildlife. Roads, development, and agricultural lands fragment the Vermont landscape. The combination of Riparian Areas for Connectivity and Connectivity Blocks provide the best available paths for connectivity across the landscape, especially in highly fragmented areas of Vermont.

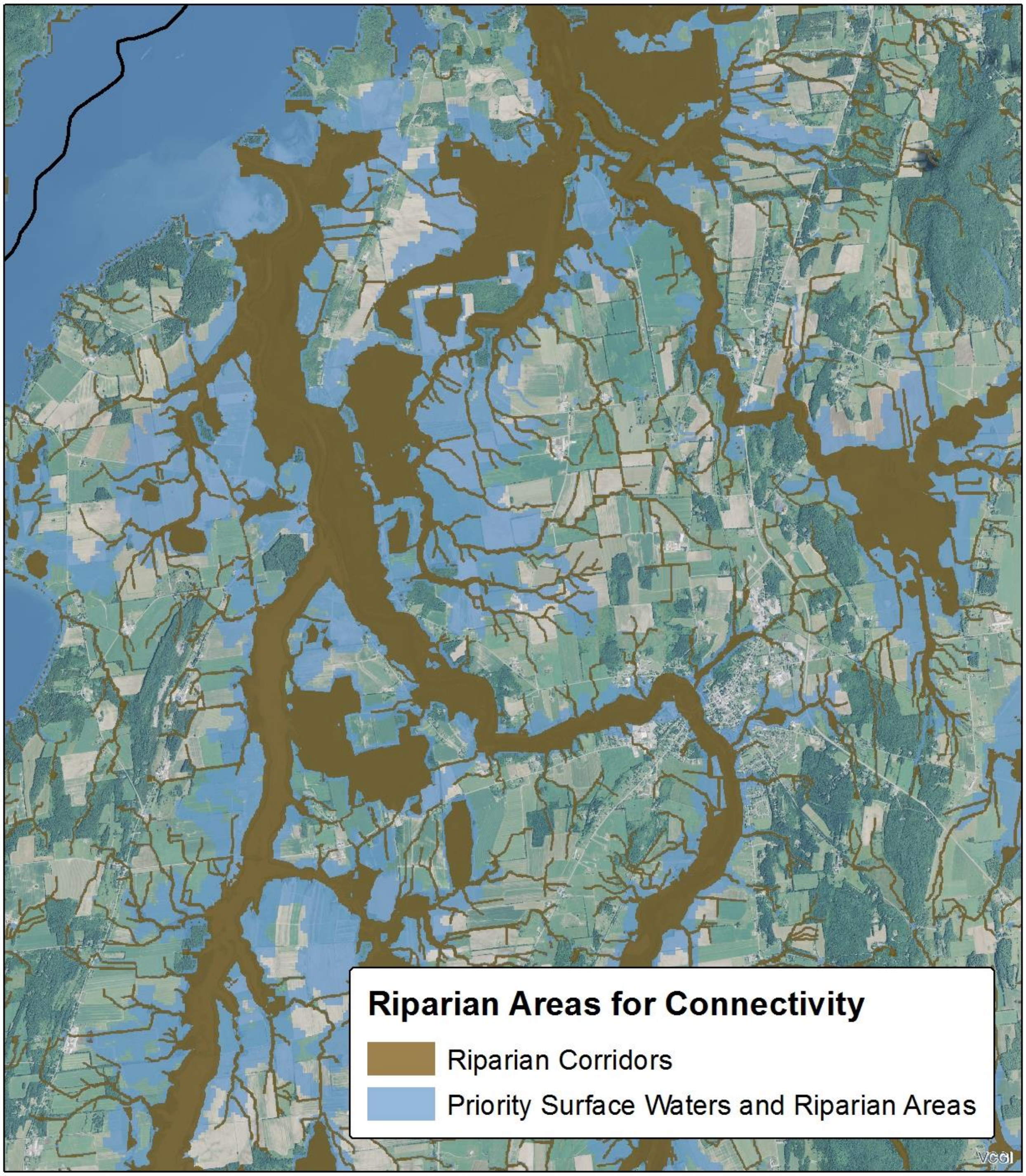
Priority Areas for Maintaining an Ecologically Functional Landscape:

All of the aquatic network of lakes, ponds, rivers, and stream and the valley bottoms in which the rivers and streams occur; to be conserved or managed in such a way as to achieve full functioning of all natural processes.

Highest Priority: All of the aquatic network of lakes, ponds, rivers, and streams and the valley bottoms in which the rivers and streams occur, excluding developed land and agricultural land and including Vermont hydrography layer and a buffer that is proportional to stream order.

Guidelines for Maintaining Ecological Function: Restoration is needed to provide a fully functioning network of riparian areas that support connectivity. Restoration of natural vegetation is needed for river and stream shorelines where it does not exist now, and especially in riparian areas that provide the best available terrestrial connectivity between relatively isolated Connectivity Blocks. The width of naturally vegetated riparian areas needed to provide riparian connectivity varies from 100 feet or less on some small streams (50 feet each side) to 600 feet or more (300 feet on each side) for larger rivers or riparian areas that span long distances of otherwise unsuitable habitat.

Further prioritization for conservation could be achieved using the following filters:
1. A 300 foot buffer on rivers, streams, lakes, and ponds, which provides functional connectivity for many wildlife species.
2. Narrower buffers can provide functional connectivity for some species, such as mink.
3. A specific set of riparian areas that connect blocks in fragmented regions such as the Champlain Valley.
4. Presence of rare species or significant natural communities.



Map 6. Riparian Areas for Connectivity (Riparian Corridors) and Priority Surface Water and Riparian Areas in the vicinity of Ferrisburgh, Panton, 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 land and water areas identified as highest priority for Interior Forest Blocks, Connectivity Blocks, and Surface Waters and Riparian Areas. The Physical Landscape Diversity Blocks complement the other block types and riparian areas in order to more fully represent the full spectrum of physical landscape diversity that is important for an ecologically functional landscape. Physical landscape diversity is represented in this conservation design by rare Land Type Associations (Ferree and Thompson 2008) and Ecological Land Units stratified by elevation, adapted from Ferree and Anderson (2008).

Ecological Function: Physical landscapes (often referred to as enduring features) are the parts of the landscape that resist change. They are the hills and valleys, the underlying bedrock, and the deposits left behind by glaciers. They remain largely unchanged when changes in land cover and wildlife occur, as plants and animals move, and even as the climate changes. However, these physical landscapes cannot continue to drive ecological processes or support plants, animals, or natural communities if they are developed or otherwise significantly altered by human activities.

If nature is likened to a dramatic play, it's possible to think of the enduring features as the stage and the individual species as the actors. The play is the natural communities, habitats and species that occur in a given place at a given time, but regardless of the action, the stage does not change. The importance of "conserving nature's stage" is that we can be much more confident in our ability to conserve biological diversity and maintain a functional landscape into the future, with the capacity to adapt and be resilient to climate change, if all elements of physical landscape diversity are represented in the conservation design (Anderson & Ferree 2010; Beier and Brost 2010; Beier et al. 2015).

Priority Areas for Maintaining an Ecologically Functional Landscape:

All are in the highest priority category.

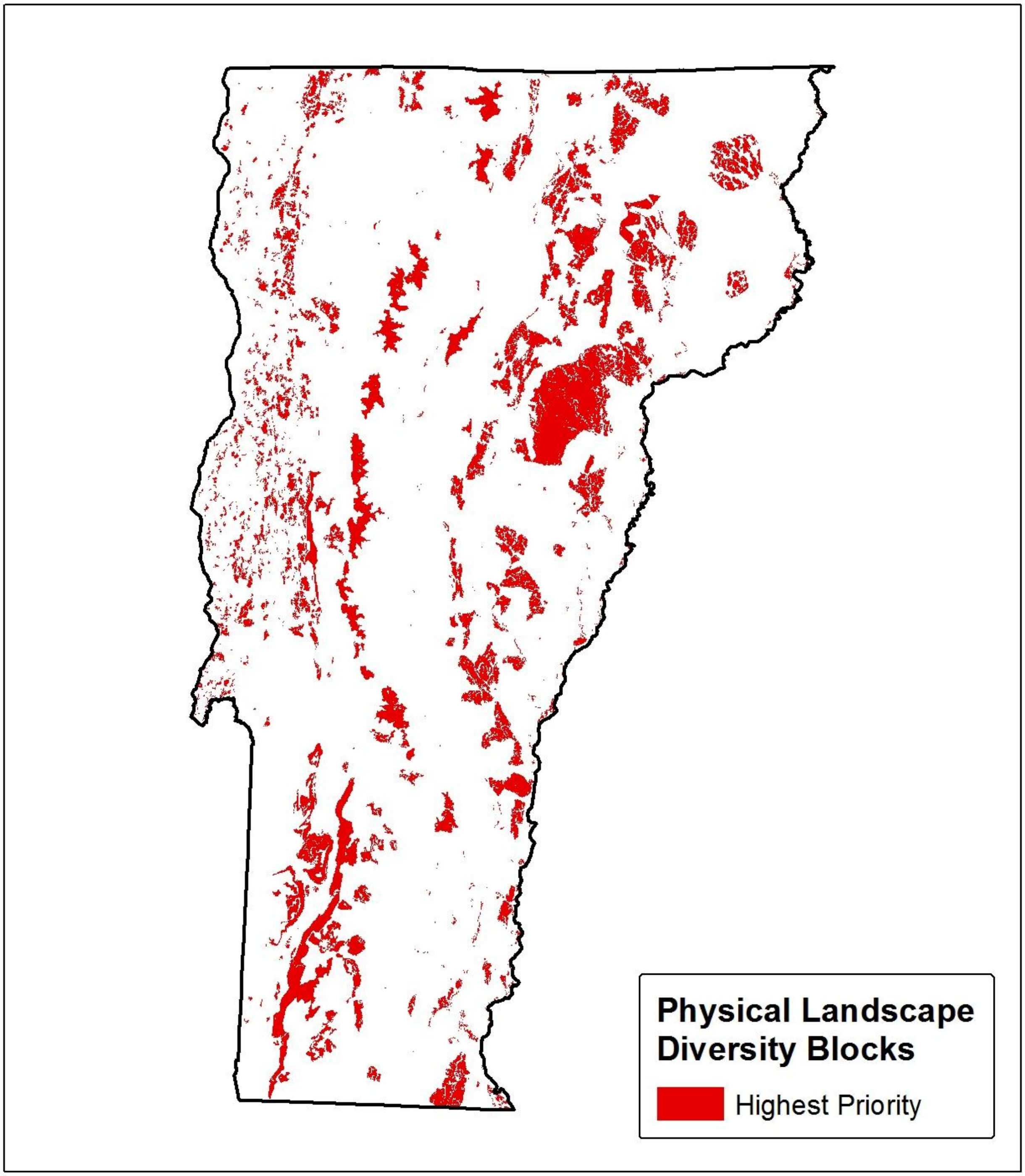
<u>Highest Priority</u>: All of the identified forest blocks and other areas of natural vegetation which contain physical landscape diversity features that are either rare, under-represented in other block types or the riparian areas, or for which Vermont has a regional responsibility (especially calcium-rich bedrock).

Guidelines for Maintaining Ecological Function: Maintain or restore natural vegetation and limit development. Forest management that maintains forest structure within and results in a distribution of all age classes is very compatible with maintaining the physical landscape diversity functions.

Further prioritization for conservation could be achieved using the following filters:

1. Blocks containing the rarest landscape diversity features.
2. Blocks containing landscape features that are underrepresented on conserved lands.

3. Blocks containing limestone or other calcareous bedrock types.
4. Clay soil lands that are marginal for agricultural uses and/or adjacent to other clayplain fragments.



Map 7. Physical Landscape Diversity Blocks showing Highest Priority blocks and other areas of natural vegetation.

Wildlife Road Crossings

Definition: A section of road that crosses a wildlife corridor where the adjacent landscape quality and permeability are high, usually because the road is adjacent to a forest block, and the road is the primary impediment to animal movement. Likely wildlife road crossings are identified statewide in the habitat block project (Sorenson and Osborne 2014).

Ecological Function: Wildlife corridors (also referred to as wildlife connecting habitat) are lands and waters that connect larger patches of habitat together within a landscape and allow the movement, migration, and dispersal of animals and plants (Austin et al. 2004). Roads represent a barrier to wildlife movement and dispersal of many other species, including some plants. Sections of roads that have suitable habitat on both sides are more likely to allow wildlife movement and dispersal of other species and, therefore, these sections of roads are critical components of maintaining or enhancing an interconnected, ecologically functional landscape. Wildlife road crossings that provide connectivity over or under roads are critically important between adjacent forest blocks and along linear riparian area networks.

Priority Areas for Maintaining an Ecologically Functional Landscape:

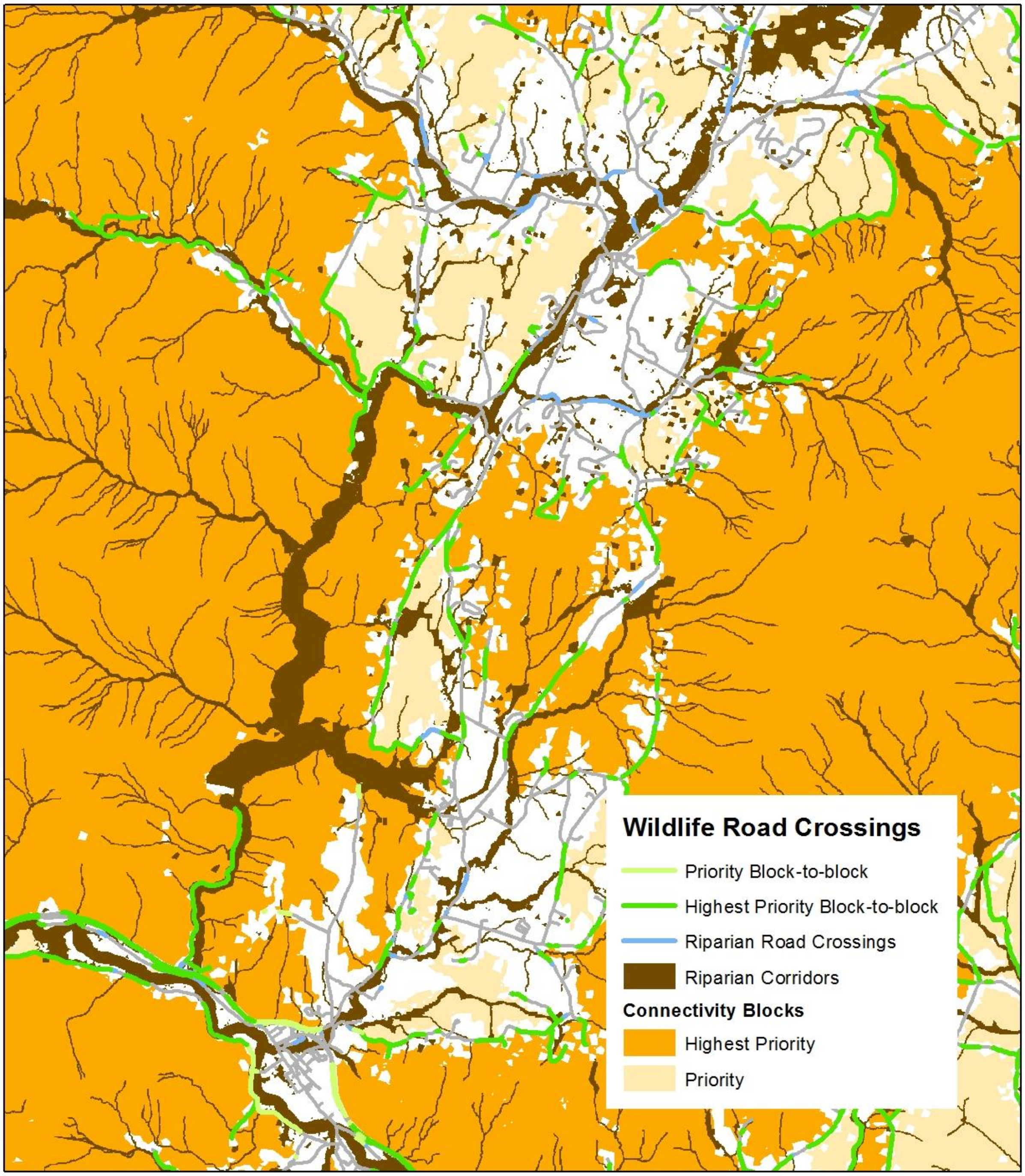
The same as highest priority, but also including those wildlife road crossings rated moderate to high (Sorenson and Osborne 2014) that provide connections to areas adjacent to but not included within the network of Connectivity Blocks and Interior Forest Blocks.

<u>Highest Priority</u>: All of the wildlife road crossing segments with a moderate to high score (Sorenson and Osborne, 2014) that occur between Connectivity Blocks, Interior Forest Blocks, and within Surface Water and Riparian Areas.

Guidelines for Maintaining Ecological Function: Structural connectivity across identified wildlife road crossings is provided by the presence of forest cover, wetlands, or other natural habitat. Maintaining this natural cover is critical to maintaining structural connectivity. Maintaining or restoring natural vegetation on both sides of identified road crossing segments will maximize the effectiveness of the road crossing for connectivity. Forest management that maintains forest cover adjacent to the road is compatible with this function. Roadside development that further restricts animal movement is detrimental to connectivity and in some cases may result in a particular road crossing ceasing to provide connecting function. Road and highway structures that allow or promote animal movement, such as bridges and oversized culverts, and limiting the use of structures that impede movement, such as fences and roadside barriers, are effective in promoting wildlife passage across roads.

Further prioritization for conservation could be achieved using the following filters:

1. Areas with documented successful wildlife crossings (such as Critical Paths).
2. Known pinch points in the connected network of blocks and riparian areas.



Map 8. Wildlife Road Crossings for the Waterbury-Stowe area and including Interior Forest Blocks, Connectivity Blocks, Surface Waters and Riparian Areas.

Putting it All Together: The Ecologically Functional Landscape

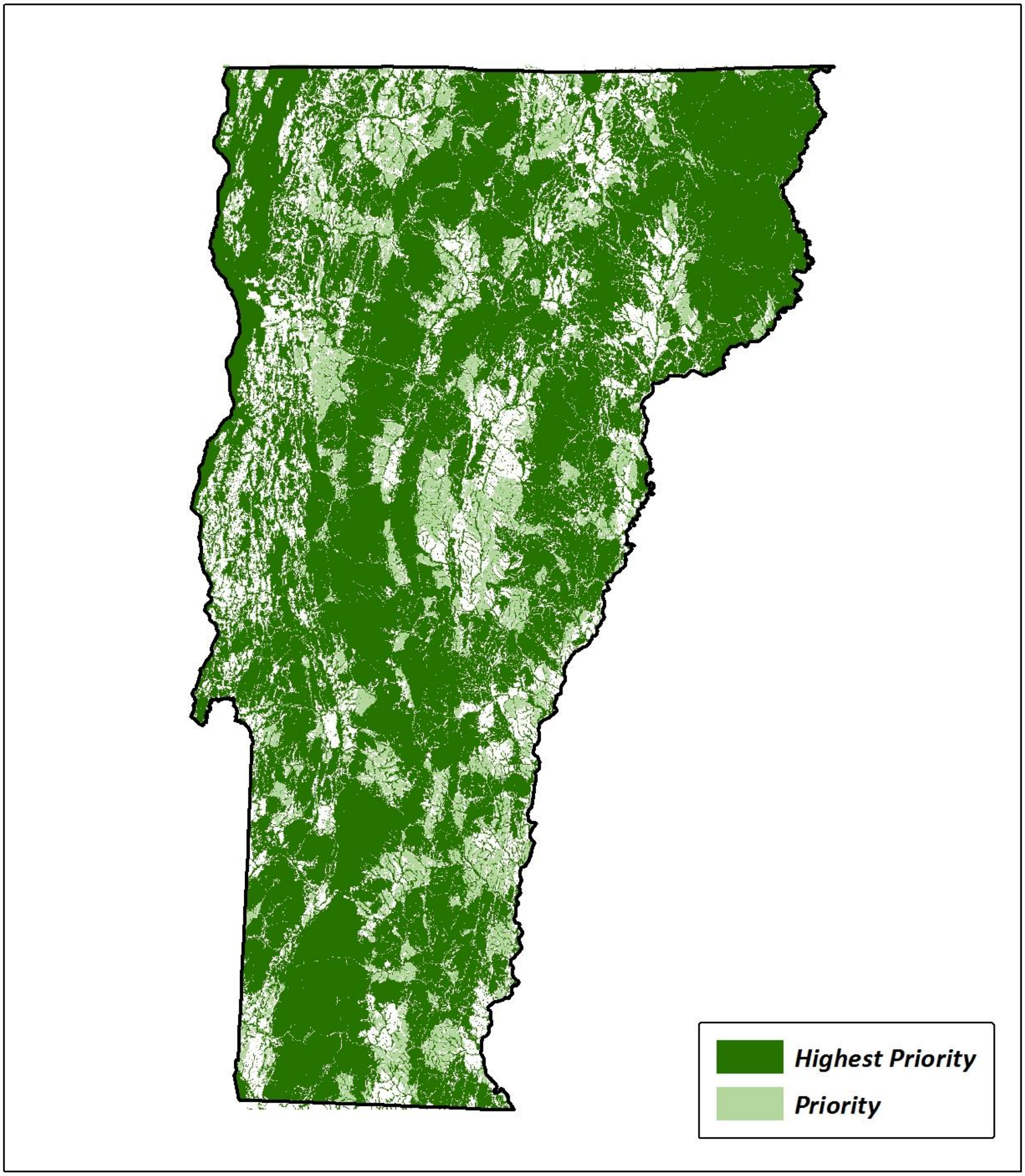
Maintaining or enhancing an ecologically functional landscape in Vermont depends on conservation of all the landscape elements together: Interior Forest Blocks; Connectivity Blocks; Surface Waters and Riparian Areas; Riparian Areas for Connectivity; and Physical Landscape Diversity Blocks. It is the specific functions of each landscape level element and the complementarity of these landscape level elements functioning together that are critical for long term conservation of much of Vermont's biological diversity and natural heritage.

The following map shows the ecologically functional landscape conservation design, with all five landscape elements included.

It is our hope that this information will inform land management, local planning, and land conservation decisions throughout Vermont. Private landowners, municipalities, state agencies, and conservation organizations should find this information helpful as we all work together for a vibrant and healthy Vermont, now and into the future.

Further Information

For more detailed information on this project, its data layers, and its potential applications, please visit (BioFinder website: http://biofinder.vermont.gov/) or contact (Jens Hilke; jens.hilke@vermont.gov). Any of the authors can also help with interpretation of the information.



Map 9. The Highest Priority and Priority portions of the Ecologically Functional Landscape, including Interior Forest Blocks, Connectivity Blocks, Surface Waters and Riparian Areas, Riparian Areas for Connectivity, and Physical Landscape Diversity Blocks.

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