

Glossary of Terms

100-year flood: A flood having a 100-year recurrence interval. Calculated according to historical data about rainfall and stream stage for a particular location, the probability that a specific river will reach a particular water level is once in 100 years. In other words, a flood of this magnitude has a 1 percent chance of happening in any year. (*Adapted from the USGS Water Science School website, at www.water.usgs.gov/edu/100yearflood.html.)*

The **100-year floodplain** is therefore all the land inundated by a 100-year flood.

A

Aerial photo: A photograph taken from an aircraft.

Orthophoto or orthophotograph: An orthophoto is an aerial photo that has been matched with mapping coordinates so that locations align geographically with other maps.

B

Bat hibernaculum: A place, usually a cave or a mine, that provides a constant temperature and protection for winter bat hibernation (*From [Conserving Vermont's Natural Heritage](http://ConservingVermont.com), at vtfishandwildlife.com/sites/fishandwildlife/files/documents/Get%20Involved/Partner%20in%20Conservation/Conserving_Vermont's_Natural_Heritage.pdf*)

Biodiversity: The variety of life in all its forms and all the interactions between living things and their environment. Biodiversity is measured at the following levels: ecosystem, landscape, community, species, and genetic. (*From [Conserving Vermont's Natural Heritage](http://ConservingVermont.com), at vtfishandwildlife.com/sites/fishandwildlife/files/documents/Get%20Involved/Partner%20in%20Conservation/Conserving_Vermont's_Natural_Heritage.pdf*)

BioFinder: This online mapping resource is both a database and mapping tool for identifying Vermont's lands and waters supporting high priority ecosystems, natural communities, habitats, and species. The most comprehensive assessment of its kind in Vermont, BioFinder was developed by the Agency of Natural Resources and partners to further

our collective stewardship and conservation efforts. The resource highlights an interconnected network of forests, streams, and physical landscape features that drive Vermont's ecological function. It can be found at anr.vermont.gov/maps/biofinder

Biophysical region: Biophysical regions divide Vermont into areas with like physical features. Each of these regions shares similarities in climate, bedrock, geologic history (glacial deposits, flooding, etc.), topography, [land use](#) history, and hydrology (water flow patterns). When conducting planning, these biophysical regions can be used as a lens through which to assess [conservation](#) priorities. For example, what may be a common species in one biophysical region of Vermont may be rare in another. In the area in which it is rare, conserving habitat for that species may be a way to preserve biodiversity.

Buffer: An area managed in a way that shields an ecologically sensitive area—a stream or wetland, for example—from the direct impacts and influences of human activities. Buffers reduce the contrast between the type of management applied to the sensitive area (generally somewhat hands-off) and the surrounding, more human-altered matrix. Generally, a buffer is managed to retain forest or other natural habitat, although it can be compatible with some human activities.

When used in a mapping context, a buffer refers to the area within a specified distance of a chosen feature on the map. For example, buffer of 10 feet can be applied to the mapped centerline of a chosen section of stream, to depict the approximate width of the stream.

C

Clayplain forest: Clayplain forest is a unique natural community that grows on the clay soils of the Champlain Valley. It is dominated by oaks and hickories, and prior to European-American settlement, it was the dominant forest type in the Champlain Valley. Because the deep, rich, soils and flat topography provided ideal agricultural lands, most clayplain forests were cleared and are now quite rare.

Climate change: Refers to any significant change in the measures of climate lasting for an extended period of time. In other words, climate change includes major changes in temperature, precipitation, or wind patterns, among other effects, that occur over several decades or longer. (*From the Environmental Protection Agency January 19, 2017 website*)

Community scale: In the context of this guide, the community scale includes the components and process that occur between groups of plants and animals as they interact with one another and with their physical environment. For example, mast stands are described at this scale because they are associated with a particular set of physical features, plants, and wildlife that function together as a community.

Community values mapping: This phrase refers to a specific community-driven planning and mapping exercise intended to identify and rank locations of high public value within particular geographic boundaries. The product of the exercise is a GIS-based map depicting community values that can be integrated with other map data, such as comparisons with locations of high ecological value.

Component: In this guide, we use component to refer to general categories of natural heritage elements found on a landscape. These can be natural or cultural and may include physical landforms, land cover, water resources, vegetation types, human land use, cultural boundaries, wildlife resources, and more. Each inventory layer in Part I of this guide represents a separate landscape component.

Connectivity: Ecologically, this refers to the capacity of individual species to move between areas of habitat via corridors and linkage zones (Meiklejohn et al.)

In this guide, we also use the word to indicate the degree to which similar landscape elements are connected to each other so as to facilitate the movements of organisms and ecological processes between them (*adapted from Staying Connected Initiative definition*).

We refer to **landscape connectivity** as a network that links large blocks of contiguous, unfragmented habitat (**interior forest blocks**) with those forested habitat blocks that have good cover but are not large enough themselves to maintain populations of wide-ranging species (**connecting blocks**). While interior forest blocks provide the principle home areas for

many species, connecting blocks are necessary for wildlife movement. At a fine scale, **riparian connectivity** and **wildlife road crossings** are also key to this connected network, without which there can be little genetic exchange between populations. Read more about connectivity in *Conserving Vermont's Natural Heritage*, at vtfishandwildlife.com/sites/fishandwildlife/files/documents/Get%20Involved/Partner%20in%20Conservation/Conserving_Vermont's_Natural_Heritage.pdf starting on page 48.

Connectivity block (or connecting habitat):

Connecting habitat links larger patches of habitat within a landscape, allowing the movement, migration, and dispersal of animals and plants. Riparian areas along streams and rivers, strips of forest cover between developed areas, and even hedgerows/ fencerows all represent potential connecting habitat for wildlife and other organisms. Sometimes these habitats are called corridors even though they are not always linear, as the term implies. (*Adapted from Staying Connected Initiative definition.*)

Conservation: The careful preservation and protection of something; especially planned management of a natural resource to prevent exploitation, destruction, or neglect. (*From the Merriam-Webster Online Dictionary www.merriam-webster.com/dictionary/conservation.*)

In this guide, we keep our use of the word broad, including any strategy that can aid in the protection or thoughtful use of the natural landscape to maintain or enhance its healthy condition.

Conservation easement: A voluntary, legal agreement between a landowner and a land trust or government agency that permanently limits uses of the land in order to protect its conservation values. It allows landowners to continue to own and use their land, and they can also sell it or pass it on to heirs. The limits of the conservation easement 'run with the land,' meaning that even if the land is inherited or sold the restrictions stay in place. (*Land Trust Alliance definition, found at www.landtrustalliance.org/what-you-can-do/conservation-options*)

Conservation fund: A dedicated pot of money that can be used for conservation projects. These can be raised in response to an immediate opportunity or they can be put into a reserve fund so that money is available when opportunities arise in the future, serving as a “savings account” that can be carried forward into future fiscal years. The most common method in Vermont of raising money for a conservation fund is through a direct appropriation at Town Meeting. *(Adapted from Community Strategies for Vermont’s Forests and Wildlife, found at www.vnrc.org/wp-content/uploads/2013/08/VNRC-Forestland-Conservation-10-1-links.pdf)*

Conservation planning: Conservation planning is the foundation of any community’s efforts to protect the natural resources and values that are important to a community. For Vermont towns, this can take the form of either a stand-alone natural resources and open space plan (which must then be incorporated into the town plan by reference) or chapters in the municipal plan that address natural resource concerns. Effective conservation planning begins with high quality data and broad community input, includes clearly articulated and measurable objectives, and lists a series of implementation steps. *(From Vermont Natural Resources Council website, at www.vnrc.org/resources/community-planning-toolbox/tools/conservation-and-open-space-plans/)*

Conservation subdivision: A method for promoting conservation by requiring creative development design that allows for the same number of homes to be built as in a standard subdivision, but in a less land-consumptive manner. At least 50 percent of the remaining land is permanently protected and added to an interconnected network of open space. *(Adapted from Community Strategies for Vermont’s Forests and Wildlife, found at www.vnrc.org/wp-content/uploads/2013/08/15.-Subdivision-Regulations.pdf)*

Conservation zoning districts: Typically encompass areas defined by the presence of one or more natural features such as blocks of productive forest land, important wildlife habitat, wildlife corridors and crossing areas, rare plant communities, high elevations, scenic ridgelines, steep slopes, wetlands, riparian and water source protection areas. A conservation district can limit development and impose standards to protect locally significant resources, for example, to avoid forest

fragmentation, or to ensure that the design and siting of development minimizes adverse impacts to identified resources. *(From Community Strategies for Vermont’s Forests and Wildlife, found at www.vnrc.org/wp-content/uploads/2013/08/12.-Conservation-Zoning-Districts.pdf)*

Conserved land: In this guide, we use the phrase conserved land to refer to land protected in some way from development. This includes private land placed under a conservation easement, private land owned by a conservation organization (such as The Nature Conservancy or other land trust), or public land on which restrictions have been placed to prohibit development. In the case of conservation easements, certain land use rights—generally including the right to develop—have been sold or donated by a landowner to a land trust or other entity. These restrictions on land use are tied to the deed to the land, so that future owners are bound by the same legalities as current.

While we use the phrase conservation to include a much broader range of activities (see entry above), we define conserved land as only that land with permanent or semi-permanent restrictions.

Contiguous habitat: Contiguous habitat is an area of forested land with either no roads or low densities of class III or IV roads and little or no human development. Contiguous forest areas may have various age classes of forest cover and, in fact, may be composed of other habitat types such as wetlands or old meadows that are part of the overall contiguous habitat complex. Ideally, these areas are connected with other similar areas so that the animals that use them can move freely to other forested areas and habitats. *(From Conserving Vermont’s Natural Heritage, at vtfishandwildlife.com/sites/fishandwildlife/files/documents/Get%20Involved/Partner%20in%20Conservation/Conserving_Vermont's_Natural_Heritage.pdf)*

Critical habitat: Refers to a specific geographic area(s) that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection. Critical habitat may include an area that is not currently occupied by the species but that will be needed for its recovery. *(From U.S. Fish & Wildlife Service website, at www.fws.gov/endangered/what-we-do/critical-habitats-faq.html)*

Current Use Program: Vermont's Use Value Appraisal (UVA) Program (also known as Current Use) enables eligible private lands where owners practice long-term forestry or agriculture to be appraised based on the property's value of production of wood or food rather than its residential or commercial development value. The Department of Taxes, Division of Property Valuation and Review (PV&R) is the lead agency, but the County Foresters help to administer the Forestry Use Value Appraisal portion of the program. (From fpr.vermont.gov/forest/your-woods/use-value-appraisal, with more information available at the same site.)

D

Deer wintering yard or Deer wintering area: White-tailed deer in Vermont live near the northern limit of their range in eastern North America. To cope with Vermont's severe climatic conditions, deer have developed a survival mechanism that relies upon the use, access, and availability of winter habitat. These habitat areas are known as deer wintering areas, deer winter habitat or, more commonly, "deer yards." Deer winter habitat is defined as areas of mature or maturing softwood cover, with aspects tending towards the south, southeast, southwest, or even westerly and easterly facing slopes. Here, the snow tends to be shallower after big storms, and deer can "yard-up" without wasting energy. (From *Conserving Vermont's Natural Heritage*, at vtfishandwildlife.com/sites/fishandwildlife/files/documents/Get%20Involved/Partner%20in%20Conservation/Conserving_Vermont's_Natural_Heritage.pdf)

Development: In this guide, we use the phrase development to include buildings and area cleared around buildings, parking areas, lawns, gravel pits, construction, engineering or mining operations, and any material change to the use of land.

Development review standards: Requirements, found in a zoning bylaw or subdivision regulation, which a proposed development must meet. (From *Community Strategies for Vermont's Forests and Wildlife*, at vnrc.org/wp-content/uploads/2013/08/11.-Writing-Standards-for-Development-Review.pdf)

Digital mapping: The process of collecting data and creating a virtual image that represents a particular geographic area.

In some cases, physical maps can be digitized to create a virtual image that is visually identical to the physical map. With the aid of a Geographic Information System (GIS), the digital map can then be geographically matched with other data in order to conduct spatial analyses. Many digital maps, however, originate through the interpretation of virtual data such as aerial photographs, radar, or other remote sensing techniques.

Disturbance: In ecological terms, disturbance is an event or force, of nonbiological or biological origin, that brings about mortality to organisms and changes in their spatial patterning in the ecosystems they inhabit (From *Encyclopedia Britannica*, at www.britannica.com/science/ecological-disturbance). Examples include wind, floods, disease, fire, climate phenomena, and many forms of human land use.

E

Early successional habitats: Young trees and shrubs, often occupying recently disturbed sites and areas such as abandoned farm fields, provide unique and important habitat for many wildlife. Some of the tree and shrub species that colonize abandoned agricultural land and disturbed sites include grey birch, dogwood, aspen species, cherry, willow, and alder. Due to the propensity of these plant species to quickly colonize disturbed sites, they are often referred to as pioneer species. (From *Conserving Vermont's Natural Heritage*, at vtfishandwildlife.com/sites/fishandwildlife/files/documents/Get%20Involved/Partner%20in%20Conservation/Conserving_Vermont's_Natural_Heritage.pdf)

Ecological function: The ability of plants and animals to thrive, reproduce, migrate, and move as the [climate changes](#), and the ability of natural ecosystems to function under natural processes. Ecological function 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. (Learn more from the *Vermont Conservation Design report*, found at vtfishandwildlife.com/conserve/vermont-conservation-design)

In this guide, mapping the ecologically functional landscape is also a process used to determine ecological priorities for conservation efforts. This method identifies the features most important for

maintaining landscape function, including interior forest blocks, connectivity features, surface waters and riparian areas, and physical landscape diversity, and links them together.

Ecological hotspot: Hotspots are specific locations on the landscape with high ecological value. In this guide, we use the phrase to describe locations where multiple important ecological components occur in the same geographic area. In other words, wetlands, large interior forest blocks, and rare physical features are all important on their own, but locations in which all of these (or other) important features are present can be considered hotspots with an even higher ecological value. In these locations, conservation efforts are likely to have a high ecological payback.

Ecologically Significant Treatment Areas (ESTAs): This is a designation used by Vermont's Use Value Appraisal (Current Use) program to recognize areas particularly sensitive to forest management practices. These include old forests, state-significant natural communities, rare, threatened and endangered species, riparian areas, forested wetlands and vernal pools. While most forest land enrolled in Use Value Appraisal must be actively managed for timber or regeneration, those lands qualifying as ESTAs may be excluded from this requirement.

Endangered species: The term endangered generally refers to species whose continued existence as a viable component of the state's wild fauna or flora is in jeopardy.

A **threatened species** is one whose numbers are significantly declining because of loss of habitat or human disturbance, and unless protected will become an endangered species. *(The above are both Vermont Fish & Wildlife Department definitions, found at vtfishandwildlife.com/conserve/conservation-planning/endangered-and-threatened-species)*

Extinct species: A species no longer in existence.

Extirpated species: A species no longer surviving in regions that were once part of their range. *(The above two definitions are from the U.S. Fish & Wildlife Service Glossary, at www.fws.gov/Midwest/endangered/glossary/index.html)*

Extirpated species can be considered to be locally extinct.

Endangered Species Act of 1973: Aims to provide a framework to conserve and protect endangered and threatened species and their habitats. By providing states with financial assistance and incentives to develop and maintain conservation programs, the Act serves as a method to meet many of the United States' international responsibilities to treaties and conventions such as the Convention on International Trade of Endangered Species of Wild Fauna and Flora and the Western Hemisphere Convention. *(From the U.S. Fish & Wildlife website, at www.fws.gov/international/laws-treaties-agreements/us-conservation-laws/endangered-species-act.html)*

Enduring features: Also called **Physical features** or **Physical landscapes**, 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 the same even when changes in land cover and wildlife occur. They remain the same as plants and animals move, and they remain the same even as the climate changes. *(From *Conserving Vermont's Natural Heritage*, at vtfishandwildlife.com/sites/fishandwildlife/files/documents/Get%20Involved/Partner%20in%20Conservation/Conserving_Vermont's_Natural_Heritage.pdf)*

Extirpated species: A species no longer surviving in regions that were once part of their range. [Locally extinct.]

Endangered: The classification provided to an animal or plant in danger of extinction within the foreseeable future throughout all or a significant portion of its range.

Extinct species: A species no longer in existence [anywhere].

(All definitions from U.S. Fish & Wildlife Service Glossary, at www.fws.gov/Midwest/endangered/glossary/index.html)

F

Field inventory or field assessment: These phrases are used in this guide to describe a natural resources evaluation process that takes place in the location of interest. We use these phrases to distinguish from those inventories and assessments that are conducted remotely, such as from the interpretation of aerial photos or from radar data-collection techniques.

Fluvial erosion hazard: Fluvial (or river-related) erosion hazards refer to major streambed and streambank erosion associated with the often catastrophic physical adjustment of stream channel dimensions (width and depth) and location that can occur during flooding. Fluvial erosion becomes a hazard when the stream channel that is undergoing adjustment due to its instability threatens public infrastructure, houses, businesses, and other private investments.

A **fluvial erosion hazard area** includes the stream and land adjacent to the stream. It identifies an area where stream processes may occur that enable the stream to re-establish and maintain a stable slope and dimensions over time. Boundaries attempt to capture lands most vulnerable to fluvial erosion in the near term and indicate the type, magnitude, and frequency of fluvial adjustments anticipated during flood events.

Floodplain: An area of low-lying ground adjacent to a river, formed mainly of river sediments and subject to flooding. For planning purposes, a floodplain can be considered to be the land inundated by water during a flood event. Since floods can be of varying levels of magnitude, a floodplain is often identified by the frequency with which it floods. For example, the 100-year floodplain is the land inundated by water on an average of once every hundred years; a flood of this magnitude has a one percent chance of occurring in any given year.

Fragmentation: When roads, land clearing, development, or other land uses divide forests, waterways, or other natural habitats into smaller and smaller areas, the process is called fragmentation. Depending on the location and scale, fragmentation can negatively affect plant and animal species, wildlife habitat (called habitat fragmentation), and water quality.

G

Geographic Information System (GIS): This phrase refers to computer mapping tools and resources. When digital information is geographically referenced (meaning that the information is linked to specific places on the earth, using a system such as Latitude/Longitude) it can be used to create map layers as well as to perform analyses and even model

hypothetical situations (“what if?” scenarios). (From Vermont Center for Geographic Information webpage, at www.vcgi.vermont.gov/resources/what_is_gis)

Grassland: Grasslands are open lands dominated by grasses, sedges, and other low vegetation, with few trees or shrubs. Grasslands can include wetlands with low vegetation, too, as well as land actively managed by people such as hay fields. In fact, most of Vermont’s grasslands are associated with current or past agricultural practices. Over time, most grasslands naturally grow woody vegetation and become shrubland, and these shrublands in turn become forest if left unmanaged. Vermont’s grasslands are therefore inherently ephemeral. Still, they provide important habitat to many species, especially birds.

H

Habitat block: Habitat blocks are areas of at least 20 acres of contiguous habitat that are unfragmented by roads, development, or agriculture. Vermont’s habitat blocks are primarily forests, but they also include wetlands, rivers and streams, lakes and ponds, cliffs, and rock outcrops. Forests included in habitat blocks may be young, early-successional stands, actively managed forests, or mature forests with little or no recent logging activity. The defining factor is that there is little or no permanent habitat fragmentation from roads, agricultural lands and other forms of development within a habitat block. For the purposes of this guide, a Class 3 road is considered a fragmenting feature, but a Class 4 road is not.

Hydrography: The science of surveying and charting bodies of water, such as seas, lakes, and rivers. (From the Oxford Online Dictionary, found at www.oxforddictionaries.com/us/definition/american-english/hydrography)

I

Impervious surface: In an ecological context, this phrase refers to surfaces that are impenetrable to water. It is generally used in the context of surface water and runoff, referring to structures such as roads, parking lots, rooftops, heavily compacted soils, etc. that change the flow of water by prohibiting infiltration into the soil. In areas with a high density of impervious surfaces, the resulting

runoff after a rainfall or snowmelt event can be associated with the overloading of a stormwater system or other drainage challenges.

Impact fee program: A regulatory tool in which developers are required to pay a fee toward the protection or restoration of town-owned open space lands, forests, parks, or recreation areas in exchange for developing land identified by a community as important.

Interior forest block: A subset of habitat blocks, these are areas of the most highly contiguous forest and other natural habitats that are unfragmented by roads, development, or agriculture. While most of what is defined as Vermont's interior forest blocks are primarily forests, they may also include wetlands, rivers and streams, lakes and ponds, cliffs, and rock outcrops. Interior forest blocks may comprise young, early-successional stands, actively managed forests, or mature forests with little or no recent logging activity; the defining factor is that there is little or no permanent habitat fragmentation from roads, agricultural lands and other forms of development within an interior forest block.

L

Land cover: Records the natural landscape as surface components: forest, water, wetlands, urban, etc.

Land use: Documents human uses of the landscape: residential, commercial, agricultural, etc.

Landscape scale: This guide categorizes ecological components into three scales: the **Landscape scale**, the **Community scale**, and the **Species scale**. In this context, the Landscape scale refers to those habitats that extend across town, regional, and even state boundaries—forest networks, waterways, and physical landforms—that are the basic building blocks for ecological processes. This scale is used to capture a sense of overall ecological function of a region as a whole, without consideration for the needs of individual natural communities or species.

Land trust: A private, nonprofit organization that conserves land either through land acquisition or by acquiring conservation easements. The land trust is then responsible for the stewardship of this land in perpetuity, either through active management or by ensuring that the terms of a conservation agreement are upheld.

Land use: Documents human uses of the landscape: residential, commercial, agricultural, etc.

Land cover: Records the natural landscape as surface components: forest, water, wetlands, urban, etc.

Lowland: In this guide, lowlands include the valleys, meadows, and floodplains that surround the state's larger rivers, lakes, and wetlands. They are distinguished from uplands, which are the hills, ridges, and mountains.

M

Management plan: In this guide, management plan refers to a blueprint for the way land and associated water resources will be treated in the future, including both short-term and long-term goals and activities. Usually, management plans are created at the scale of an individual property.

Map layer: In this guide, each distinct dataset that appears on a map is referred to as a layer or map layer. For example, we could digitally create a map that includes the location of conserved lands, wetlands, surface water, and vernal pools. Each of these individual datasets would be considered a layer.

Mast: The fruit and seeds of shrubs and trees that are eaten by wildlife. Hard mast refers to nuts (especially those of beech and oak trees), whereas soft mast refers to berries and fruits of a number of species (such as black cherry, raspberry, blackberry, and apple).

Mast Stands: While most forested areas contain at least a few mast producing trees and shrubs, forests producing significant concentrations of mast are much less common. In BioFinder, a beech or oak Mast Stand exhibits bear scarring on at least 15-25 tree trunks and/or shows some evidence of use by bears. These mast production areas are important to myriad wildlife species and crucial to the survival of Vermont's black bear population.

Monitoring program: Ecological monitoring programs are generally established in order to derive knowledge about how the plants, animals, natural processes, air, water, or soil present in an area change over time. These changes may be studied to assess the way processes or populations fluctuate naturally over time, or they may be established in order to measure the impact of a particular change, such as a flood event or a new development. They include a systematic sampling process in which data is collected and then analyzed.

Municipal plan (or Town plan): A plan written by a town or municipality to provide a framework toward attaining community aspirations through public investments, land use regulations, and other implementation programs such as a state-designated downtown or village centers, business improvement districts, or land conservation programs. It can also qualify the community for state grants to fund improvements or receive specialized technical assistance. (*From the Vermont Agency of Commerce and Community Development's Planning Manual, at www.accd.vermont.gov/sites/accdnew/files/documents/CD/CPR/DHCD-Planning-Manual-Module1.pdf*)

N

Natural area: While this term is sometimes used to identify only those areas supporting populations of rare or endangered species or uncommon physical landscapes, this guide uses the phrase to describe any area that is managed in a way that allows natural processes to predominate, with minimal human intervention.

Natural community: An interacting assemblage of plants and animals, their physical environment, and the natural processes that affect them. These assemblages of plants and animals repeat across the landscape wherever similar environmental conditions exist. (*Adapted from [Conserving Vermont's Natural Heritage, at \[vtfishandwildlife.com/sites/fishandwildlife/files/documents/Get%20Involved/Partner%20in%20Conservation/Conserving_Vermont's_Natural_Heritage.pdf\]\(http://fishandwildlife.com/sites/fishandwildlife/files/documents/Get%20Involved/Partner%20in%20Conservation/Conserving_Vermont's_Natural_Heritage.pdf\)](http://fishandwildlife.com/sites/fishandwildlife/files/documents/Get%20Involved/Partner%20in%20Conservation/Conserving_Vermont's_Natural_Heritage.pdf)*) More information about natural communities can be found in *Wetland, Woodland, Wildland: A Guide to the Natural Communities of Vermont*, by Elizabeth Thompson and Eric Sorenson.

Rare natural community: The Vermont Fish & Wildlife Department uses a ranking scheme that is part of the national Natural Heritage methodology to describe the relative rarity of natural community types in Vermont. The range is from S1 (very rare) to S5 (common and widespread). S1 and S2 natural community types are considered rare for BioFinder.

Uncommon natural community: S3 and S4 natural community types are considered uncommon for BioFinder. While these natural community types are generally uncommon naturally, since their soils are uncommon, some have been made more uncommon by the conversion of habitat for agricultural or development purposes.

Common natural community: Using the same ranking system, S5 communities are considered common.

Significant natural community: Only those natural communities considered significant at the state level are mapped in BioFinder and the maps associated with this guide. In addition to the rarity ranking described above, all mapped natural communities are also assigned a quality rating that ranges from A (excellent) to D (poor) based on size, condition, and landscape context. Occurrences of rare natural communities are considered significant when their quality is ranked A, B, or C. Uncommon natural communities are significant when they have a quality rank of A or B. Only A-quality occurrences of common natural communities are considered significant. (*Adapted from ANR's "Guidelines for the Conservation and Protection of State-Significant Natural Communities," at anr.vermont.gov/sites/anr/files/col/planning/documents/guidance/VFWD%20Natural%20Community%20Conservation%20Guidelines%2010-21-2004.pdf*)

Natural cover: Any type of vegetation that wildlife can use for shelter. This includes forest, wetland, and shrubs. Developed land, roads, crops, grasslands, and pasture are not considered natural cover.

Natural heritage: All the natural resources valued by a place's residents and visitors. In many Vermont communities, these include forests, clean waters, vibrant fisheries, healthy wildlife populations, rare species, significant natural communities, and biodiversity. (*Adapted from Conserving Vermont's Natural Heritage, at vtfishandwildlife.com/sites/fishandwildlife/files/documents/Get%20Involved/Partner%20in%20Conservation/Conserving_Vermont's_Natural_Heritage.pdf*)

Natural resources: Materials or substances such as minerals, forests, water, and fertile land that occur in nature and can be used for economic gain. (*From the Oxford English Dictionary, www.oxforddictionaries.com/us/definition/american-english/natural-resources*)

In this guide, the phrase is used broadly to include any feature of the natural landscape valued by our human communities in any way. In addition to economic gain, this can include cultural, ecological, personal, and other means of assessing value.

Natural Resources Atlas: This publicly available online mapping resource is intended to provide geographic information about environmental features and sites. In addition to map navigation tools, the Atlas allows users to link to documents, generate reports, export search results, import data, search, measure, mark-up, query map features, and print PDF maps. It was created by Vermont's Agency of Natural Resources and can be found at anr.vermont.gov/maps/nr-atlas.

Non-regulatory tool: In this guide, we use this phrase to describe strategies for implementing planning goals that do not involve bylaws or legal requirements. In a land use context, examples include encouraging the creation of land stewardship or management plans, education initiatives, and incentives programs.

A **regulatory tool** is a strategy for implementing planning goals that does involve bylaws or other legal processes. Examples include defining standards for a development review process, establishing zoning districts or subdivision regulations, and the creation of road and trail policies.

O

Orthophoto or orthophotograph: An orthophoto is an aerial photo that has been matched up with mapping coordinates so that specific locations align geographically with other maps, taking a flat photograph and adjusting it for the curvature of the earth.

Aerial photo: A photograph taken from an aircraft.

Overlay District: A resource-based zoning district that is superimposed over underlying zoning districts to limit the impacts of development on resources that have been identified for special consideration. Since overlay districts follow the resource, they may apply to only a portion of a parcel, allowing development on land outside of the overlay district, while protecting resources on land within the district. (*Adapted from Community Strategies for Vermont's Forests and Wildlife, at vnrc.org/wp-content/uploads/2013/08/14.-Overlay-Districts.pdf*)

P

Palustrine: Wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens. (*from U.S. Fish & Wildlife definition at www.fws.gov/wetlands/Documents/classwet/palustri.htm*)
In locations near the ocean, the word can also include tidal areas with low salinity.

Patch (as in **Vegetation Patch** or **Habitat Patch**): In this guide, the term patch refers to a relatively small area of intact vegetation or habitat surrounded by something different, often development, agriculture, or other human-influenced environments, although the surrounding area could simply be a different type of vegetation or habitat. Patches often provide resources or refuge to certain wildlife species but often lack sufficient size or condition to act as these species' core habitat.

Physical landscape: Physical landscapes (also called 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. In this guide and on the Natural Resources Atlas, physical landscapes are represented as **Rare**, **Responsibility** and **Representative**.

Rare physical landscapes are those that cover less than 4.5 percent of Vermont's land area. These represent rarity in the physical landscape.

Responsibility physical landscapes are those that may be common in our region, but they are rare overall. For example, calcium-rich landscapes are fairly typical in much of Vermont, but because they are rare in a larger regional context, species requiring these areas rely heavily on our landscape for their continued presence.

Representative physical landscapes are particular examples of more common physical landscape types, selected because they are in the best condition and/or have the largest patch size compared to others of the same type.

Protected area: A geographically defined area designated or regulated and managed to achieve specific conservation objectives. (*From the Convention on Biological Diversity, found at www.cbd.int/protected/pacbd/*) While specific objectives may change between one place and another, development is generally limited or prohibited.

R

Rare species: A rare species of plant or animal is one that has only a few populations in the state and that faces threats to its continued existence in Vermont. The Vermont Fish & Wildlife Department uses a ranking scheme to describe the relative rarity of species in Vermont, using a national Natural Heritage methodology. The range is from S1 (very rare) to S5 (common and widespread). Species are assigned a rarity rank based on the number of known individuals, the population size statewide, and the degree to which the populations are threatened. Rare species are generally considered to be those with twenty or fewer populations statewide, whereas **uncommon species** are generally considered those with more than 20 but 80 or fewer populations statewide.

Regional Planning Commission (RPC): A body that provides planning guidance and structure for numerous member municipalities within a defined area of Vermont. RPCs create regional plans that identify areas and activities of regional significance or potential impact, promote coordination between

member municipalities, and provide guidelines for municipal planning activities. They also advise those municipalities in their individual planning processes, provide technical and legal assistance for creating and implementing municipal plans and related bylaws and implementation activities, and review municipal plans for compliance with state and regional regulations, among other activities. Learn more at www.vapda.org/.

Regulatory tool: In this guide, we use this phrase to describe strategies for implementing planning goals that involve bylaws or other legal requirements or processes. Examples include defining standards for a development review process, establishing zoning districts or subdivision regulations, and the creation of road and trail policies.

A **non-regulatory tool** is a strategy for implementing planning goals that do not involve bylaws or legal requirements. In a land use context, examples include encouraging the creation of land stewardship or management plans, education initiatives, and incentives programs.

Restoration: In ecology, this word refers to the process of "re-establishing the structure, productivity and species diversity of the forest originally present. In time, ecological processes and functions will match those of the original forest." (*Lamb and Gilmour 2003, found at cmsdata.iucn.org/downloads/rehabilitation_and_restoration_of_degraded_forests.pdf*)

Riparian area: The word riparian literally means "of, or pertaining to, the bank of a river or lake." Riparian areas are ecosystems comprised of streams, rivers, lakes, wetlands, and floodplains that form a complex and interrelated hydrological system. These ecosystems extend up and down streams and along lakeshores and include all land that is directly affected by surface water (Quoted from Verry et al., 2000).

Riparian ecosystems are generally high in biological diversity. They are "characterized by frequent disturbances related to inundation, transport of sediments, and the abrasive and erosive forces of water and ice movement that, in turn, create habitat complexity and variability...resulting in ecologically diverse communities" (Quoted from Verry et al., 2000).

Riparian wildlife connectivity: This phrase refers to lands along streams, rivers, lakes and ponds used by wildlife and plants to move. Sometimes these areas are called **riparian corridors** even though they are not always linear, as the term implies. Also see **habitat connectivity**.

River easement: A conservation easement that allows a river to change its course naturally over time, without human interference.

Runoff: Surface runoff is water from rain, snowmelt, or other sources that flows over the land surface. When runoff flows along the ground, it can pick up soil contaminants such as petroleum, pesticides, or fertilizers that become discharge or overland flow. *(Excerpted From Science Daily's Reference Terms, found at www.sciencedaily.com/terms/surface_runoff.htm)*

S

Satellite imagery: An image captured from a satellite. There are several types of satellite images. Some are basic photographic images (see aerial photo or orthophoto) that capture the visible landscape from above. Some use other technologies, such as infrared sensors, which measure the heat emitted from different parts of the land or atmosphere. In addition to being used purely as visual images, some satellite images can be analyzed or interpreted to suggest other data, including elevation, land cover, weather, and much more.

Setback: For municipal planning and implementation purposes, a setback is a distance between a structure or land use activity and a feature such as a property line, road, or a natural element like a riverbank, vernal pool, or forest. In standards or bylaws, municipalities can require a minimum or maximum setback from a defined feature to achieve a particular planning goal.

Shrubland: These are areas dominated by low, dense shrub vegetation such as dogwood, willow, tall grasses, and sedges. They are often associated with the margins of grassland habitats and are influenced by human activities such as agriculture or active land management, as well as by natural disturbances.

Grassland: Grasslands are open lands dominated by grasses, sedges, and other low vegetation, with few trees or shrubs. Grasslands can include wetlands with low vegetation, too, as well as land actively managed by people such as hay fields. In fact, most of Vermont's grasslands are associated with current or past agricultural practices. Over time, most grasslands naturally grow woody vegetation and become shrubland, and these shrublands in turn become forest if left unmanaged. Vermont's grasslands are therefore inherently ephemeral. Still, they provide important habitat to many species, especially birds.

Species assemblage: A group of species that share similar ecological or habitat requirements and are likely to be found together.

Species richness or Biological richness: The number of species present in a sample, community, or taxonomic group. Species richness is one component of the concept of species diversity, which also incorporates evenness, that is, the relative abundance of species. Species diversity is one component of the broader concept of biodiversity. *(From the Encyclopedia of Earth, found at www.eoearth.org/view/article/156216/)*

Species scale: This guide categorizes ecological components into three scales: the **Landscape scale**, the **Community scale**, and the **Species scale**. In this context, the species scale refers to those habitats necessary for the survival of specific fish, wildlife, and plants. For example, wildlife crossings are locations where bear, bobcat, fisher, and other wide-ranging species are most likely to cross roads as they travel to meet daily or seasonal dietary needs, disperse to find mates, or fulfill other requirements. While they tend to be small in size, species-scale components are essential for maintaining biodiversity by supporting species with a known conservation need in the state or region.

Standards (as in Road or Trail Standards): In the context of planning, standards are defined sets of principles that guide the implementation of a plan or its associated bylaws. Standards generally include a list of recommended or required practices for achieving a particular goal.

Stewardship: This word is often used in the context of land use planning and management to refer to the manner in which we care for land. Rather than referring to any specific practices, stewardship encompasses an ethic of responsible land use that includes a thoughtful evaluation of land use activities and their impacts to natural features and human communities.

Subdivision regulation: A regulatory strategy used to guide the pattern of development within a community. Subdivision regulations evaluate the impact of land subdivision on natural resources, allowing communities to control both the configuration of lots and the location and extent of site disturbance, site improvements, and the future location of development, roads, building sites, and supporting infrastructure within lots. (*Adapted from Community Strategies for Vermont's Forests and Wildlife, at www.vnrc.org/wp-content/uploads/2013/08/VNRC-Forestland-Conservation-10-1-links.pdf*)

Substrate: The surface or material on which an organism or ecosystem lives.

Succession: Ecological succession refers to more-or-less predictable and orderly changes in the composition or structure of an ecological community. Succession may be initiated either by formation of new, unoccupied habitat (e.g., a lava flow or a severe landslide) or by some form of disturbance (e.g. fire, severe windthrow, logging) of an existing community. (*From Science Daily's Reference Terms, at www.sciencedaily.com/terms/ecological_succession.htm*)

Surface water: In this guide, BioFinder, and the Natural Resources Atlas, surface water includes all areas inundated by water (rivers, streams, lakes, and ponds). When surface water appears as a map component, it includes the entire valley bottom in which a river or stream has migrated over time and in which flooding is expected.

Surficial materials (or Surficial geology): This phrase is used to describe the sands, gravels, clays, peats, and other deposits found on top of the bedrock as a result of either glacial activity or post-glacial events like flooding. Bedrock and surficial geology together have a profound influence on the soils in which Vermont's plants grow. (*Adapted from Conserving Vermont's Natural Heritage, at vtfishandwildlife.com/*)

[sites/fishandwildlife/files/documents/Get%20Involved/Partner%20in%20Conservation/Conserving_Vermont's_Natural_Heritage.pdf](http://sites.fishandwildlife/files/documents/Get%20Involved/Partner%20in%20Conservation/Conserving_Vermont's_Natural_Heritage.pdf))

Examples of surficial materials include till—piles of rocks and debris left behind by glaciers that cover most of the bedrock in the state—and the deep clay deposits of the Champlain Valley left by post-glacial lakes.

T

Tax stabilization program: A program in which a municipality enters into a contract with owners, lessees, or operators of land in order to promote a particular goal, such as forestry and open space preservation. These contracts can be written to stabilize taxes in a variety of ways: by fixing property values, tax rates, or the amount or percentage of annual tax assessed. (*Adapted from Community Strategies for Vermont's Forests and Wildlife, at www.vnrc.org/wp-content/uploads/2013/08/VNRC-Forestland-Conservation-10-1-links.pdf*)

Threatened species: A species whose numbers are significantly declining because of loss of habitat or human disturbance, and unless protected will become an endangered species. (*From Vermont Fish & Wildlife Department website, at vtfishandwildlife.com/conservel/conservation-planning/endangered-and-threatened-species*)

An **endangered species** generally refers to a species whose continued existence as a viable component of the state's wild fauna or flora is in jeopardy. (*Also from Vermont Fish & Wildlife Department website*)

Town forest: Land owned by a municipality in order to protect a water supply, produce timber, provide recreation opportunities, supply affordable firewood, maintain wildlife habitat, or other purposes fulfilling a municipality's goals. (*Adapted from Community Strategies for Vermont's Forests and Wildlife, at www.vnrc.org/wp-content/uploads/2013/08/VNRC-Forestland-Conservation-10-1-links.pdf*)

Town plan (or Municipal plan): A plan written by a town or municipality to provide a framework toward attaining community aspirations through public investments, land use regulations, and other implementation programs such as a state-designated downtown or village centers, business improvement

districts, or land conservation programs. It can also qualify the community for state grants to fund improvements or receive specialized technical assistance. (From the Vermont Agency of Commerce and Community Development's Planning Manual, at www.accd.vermont.gov/sites/accdnew/files/documents/CD/CPR/DHCD-Planning-Manual-Module1.pdf)

U

Uncommon Species: These are defined by the Natural Heritage Inventory of the Vermont Fish & Wildlife Department as facing a “moderate risk of extinction or extirpation due to restricted range, relatively few populations or occurrences (often 80 or fewer), recent and widespread declines, or other factors.”

Rare species face a higher risk of extirpation and generally have 20 or fewer populations statewide. The Vermont Fish & Wildlife Department uses a ranking scheme to describe the relative rarity of species in Vermont, using a national Natural Heritage methodology.

Upland: An area of high or hilly land. In this guide, uplands are distinguished from the lowlands which are the valleys, meadows, and floodplains that surround rivers, lakes, or wetlands.

Use Value Appraisal: Vermont's Use Value Appraisal (UVA) Program (also known as Current Use) enables eligible private lands where owners practice long-term forestry or agriculture to be appraised based on the property's value of production of wood or food rather than its residential or commercial development value. The Department of Taxes, Division of Property Valuation and Review (PV&R) is the lead agency, but the County Foresters help to administer the Forestry Use Value Appraisal portion of the program. (From fpr.vermont.gov/forest/your-woods/use-value-appraisal, with more information available at the same site)

V

Vermont Conservation Design: This phrase refers to a map-based blueprint for conservation developed by the Vermont Fish & Wildlife Department to aid in prioritizing the protection and enhancement of ecological function across Vermont. This blueprint maps the priority and highest priority network that together maintains the ecologically

functional landscape, based on the identification of connections between 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, this network will sustain Vermont's natural legacy into the future.

Vernal pool: Vernal pools are small, ephemeral pools that occur in natural basins within upland forests. They typically have no permanent inlet or outlet streams and generally last only a few months and then disappear by the end of summer, although some pools may persist in wet years. The periodic drying prevents the establishment of fish populations, supporting a specialized assemblage of species that can include amphibians, insects, mollusks, and other invertebrates.

W

Water quality: Water quality measurements can contain diverse components. Assessments could include measures of bacteria levels, the concentration of dissolved oxygen, quantities of solids suspended in the water, algal growth, heavy metals, herbicides, or pesticides. Whether water quality is “good” or “bad” depends on the intended use of the water; water for human consumption may have a different threshold of each measurement than natural ecosystems. However “poor” water quality can pose risks for both human and ecosystem health, if these thresholds are exceeded.

Water resource: Typically, a water resource is a source of water that is useful or potentially useful in some way.

In this guide, the phrase includes all surface water: streams, rivers, lakes, ponds, wetlands, and vernal pools.

Wetland: Wetlands are vegetated ecosystems characterized by abundant water. Wetlands include the vegetated, shallow-water margins of lakes and ponds and the seasonally flooded borders of rivers and streams. They occur in an amazing diversity of topographic settings across the landscape, including basins, seepage slopes, and wet flats. All wetlands have three characteristics in common. First, all are inundated by or saturated with water during varying

periods of the growing season. Second, they contain wetland or hydric soils, which develop in saturated conditions and include peat, muck, and mineral soil types. Finally, wetlands are dominated by plants that are adapted to life in saturated or inundated soils. Vermont's wetlands range in size from vernal pools and seeps that may be a few hundred square feet or less to vast swamps and marshes occupying thousands of acres along Otter Creek and Lake Champlain.

Swamps are wetlands dominated by woody plants, either trees or shrubs.

Marshes are wetlands dominated by herbaceous plants.

Fens are peat-accumulating open wetlands that receive mineral-rich groundwater.

Bogs are also peat-accumulating wetlands but are isolated from groundwater or surface water runoff by deep peat and therefore receive most of their water and nutrients from precipitation.

Vernal pools are small, isolated, seasonally inundated wetlands typically surrounded by upland forests.

A wetland complex is an area that includes two or more wetlands in close proximity that influence one another in function. The complex area usually includes the riparian areas that connect each wetland to the next.

Wide-ranging species: A species whose movements extend across a large geographic area. Some wide-ranging species move these distances on a regular basis, as when maintaining a large home range to access a variety of food sources (e.g. black bear). Others may move only seasonally (e.g. with a moose that inhabits different habitat types in summer and in winter).

Wildlife: Definitions of wildlife vary to a surprising degree. In this guide, we generally include both animals and plants in our definition, although the phrase often places emphasis on animals more than plants. In terms of wildlife management, fish and other aquatic organisms are often separated when

referring to wildlife, with the word emphasizing terrestrial organisms, as in the agency title "Vermont Fish & Wildlife Department." While these words are sometimes separated for practical management purposes, the agency recognizes fish as a component of wildlife, and fish should be assumed to be included in this guide's use of the word.

Wildlife corridor: Components of the landscape that provide a continuous or near continuous pathway that may facilitate the movement of target organisms or ecological processes between areas of core habitat.

Wildlife road crossings: In general, these are locations where animal wildlife are likely to cross roads. In this guide, this phrase often refers to an assessment of structural components, since data on actual wildlife movement is scarce. These structural assessments consider locations where there is forest and/or other natural vegetation on both sides of a road, an absence of guardrails, a gentle gradient, and other roadside factors to predict the ease of movement for a variety of wildlife species. While this assessment is not specific to particular species, it offers a generalized sense of where the greatest variety of species is likely to move. See also **habitat connectivity**.

Working forest: This phrase refers to forests that generate economic benefits. This usually indicates timber but can also include products such as maple syrup, Christmas trees, or other forest products.

Z

Zoning: Zoning bylaws are a regulatory strategy used by local governments to manage land use by defining districts where different uses—houses, car dealerships, day care centers, outdoor recreation, and much more—can occur. Zoning bylaws also regulate physical characteristics of development within each district such as lot sizes, setbacks, and septic system requirements. (*Adapted from www.vnrc.org/wp-content/uploads/2013/08/VNRC-Forestland-Conservation-10-1-links.pdf*)

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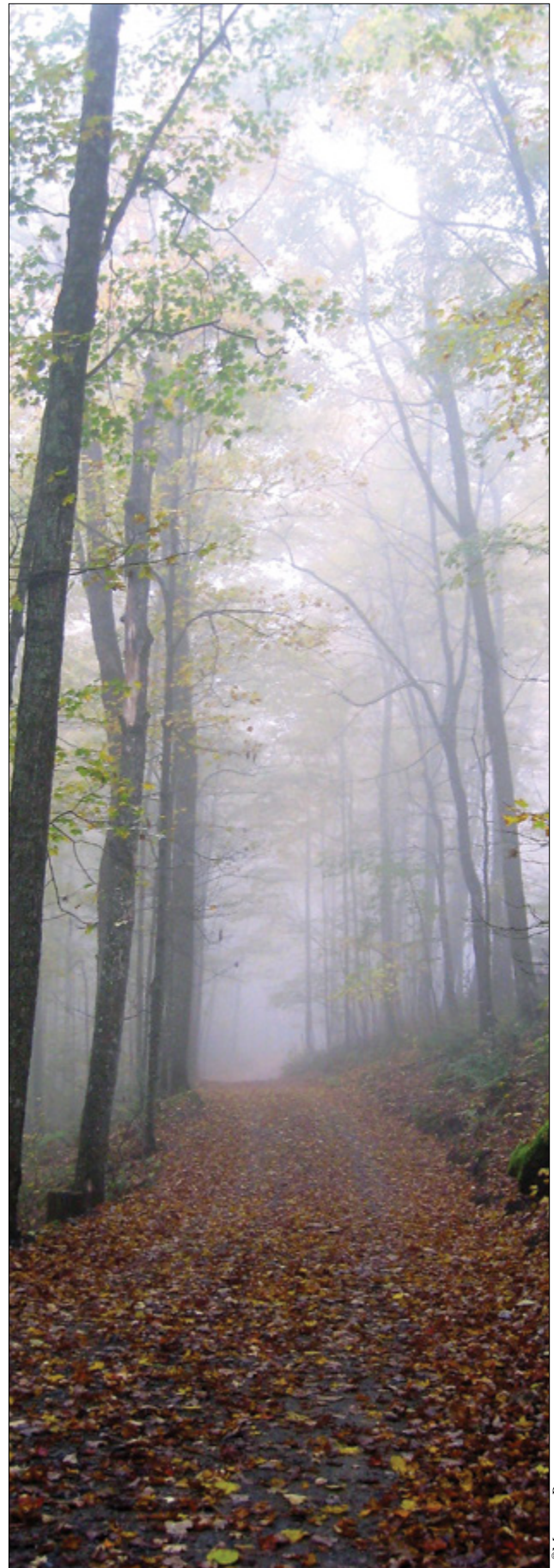
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End Notes

Map 2: Land Cover

¹ There are two land cover data sources available in Vermont: the Coastal Change Analysis Program (C-CAP), displayed here, and the National Land Cover Database (NLCD). The two databases are similar in many ways, and both are equally useful. We chose C-CAP because it is stronger at differentiating between wetland types, but planners with mapping experience who have different goals in mind, identifying agricultural land for example, may prefer NLCD.

Map 3: Forest Pattern

¹ See <https://legislature.vermont.gov/assets/Documents/2016/Docs/ACTS/ACT171/ACT171%20Act%20Summary.pdf> for more information about Act 171.

² Contact Vermont Fish & Wildlife Department's Community Wildlife Program for more information on conducting field inventories.

³ The Bobolink Project has management guidelines for grassland birds at www.bobolinkproject.com/docs/NRCS_Grassland_leaflet.pdf.

⁴ EQIP or other NRCS programs may be available to assist some landowners with these practices. Delaying mowing until after the nesting season is one common practice to help grassland birds.

⁵ See www.nrcs.usda.gov/wps/portal/nrcs/site/vt/home/ for more information about United States Department of Agriculture programs.

⁶ See www.fws.gov/lcfwro/pdf/PFW1.pdf for more information about the Partners for Fish & Wildlife Program in Vermont.

⁷ See www.bobolinkproject.com/docs/NRCS_Grassland_leaflet.pdf.

⁸ See www.fpr.vermont.gov/forest/your_woods/mgmt_plans for more information about management plans.

⁹ See www.vpic.info/Publications/Reports/Implementation/ImpactFees.pdf to learn more about impact fee programs.

¹⁰ See www.fpr.vermont.gov/forest/your_woods/use_value_appraisal for more information about the Use Value Appraisal (Current Use) program in Vermont.

¹¹ See www.vtcoverts.org/ to learn more about Vermont Coverts.

¹² See www.vermontwoodlands.org/ for more information about the Vermont Woodlands Association.

¹³ See www.nrcs.usda.gov/wps/portal/nrcs/site/vt/home/ for more information about NRCS in Vermont.

¹⁴ See www.vacd.org/conservation-districts/ for more information about Vermont's Natural Resources Conservation Districts.

¹⁵ See page 22 in *Community Strategies for Vermont's Forests and Wildlife* for more information on using the Current Use program in planning.

¹⁶ See page 25 in *Community Strategies for Vermont's Forests and Wildlife* for more information on using conserving land as a community strategy.

¹⁷ See page 31 in *Community Strategies for Vermont's Forests and Wildlife* for more information on town forests.

¹⁸ See page 63 in *Community Strategies for Vermont's Forests and Wildlife* for more information on Road and Trail Standards.

¹⁹ See page 16 in *Community Strategies for Vermont's Forests and Wildlife* for more information on certification programs.

²⁰ See page 36 in *Community Strategies for Vermont's Forests and Wildlife* for more information on writing standards for development review.

Map 5: Water

¹ The full citation for this book is: Chase, V., L. Demming, and F. Latawiec. 1995. *Buffers for Wetlands and Surface Waters: A Guidebook for New Hampshire Municipalities*. Concord, NH: Audubon Society of New Hampshire.

² DEC's Rivers Webpage has links to many resources, at www.dec.vermont.gov/watershed/rivers.

³ DEC's Lakes and Ponds Webpage has links to many resources, at www.dec.vermont.gov/watershed/lakes-ponds.

⁴ More information about writing clear definitions can be found on page 68 in *Community Strategies for Vermont's Forests and Wildlife*.

⁵ See www.dec.vermont.gov/sites/dec/files/wsm/rivers/docs/rv_RiverCorridorEasementGuide.pdf for more information about River Corridor Easements.

⁶ See page 36 in *Community Strategies for Vermont's Forests and Wildlife* about writing standards for development review.

⁷ Town Road Management Standards can be found at www.dec.vermont.gov/watershed/stormwater/permit-information-applications-fees/municipal-roads-program. Following these standards is required by statute.

⁸ See [www.fpr.vermont.gov/sites/fpr/files/About_the_Department/Rules_and_Regulations/Library/Riparian%20Final%20Guidelines%20\(signed%20copy\)_resized.pdf](http://www.fpr.vermont.gov/sites/fpr/files/About_the_Department/Rules_and_Regulations/Library/Riparian%20Final%20Guidelines%20(signed%20copy)_resized.pdf) for the guidelines used by the Vermont Agency of Natural Resources in riparian areas of ANR-owned lands.

⁹ More information on invasive species can be found at www.anr.vermont.gov/about_us/special-topics/invasive-species.

¹⁰ Find resources about Green Infrastructure for Homeowners at the Vermont Department of Environmental Conservation website.

¹¹ See www.floodready.vermont.gov/improve_infrastructure.

¹² Acceptable Management Standards for Maintaining Water Quality of Logging Jobs in Vermont is available at www.fpr.vermont.gov/about_us/rules_regulations/amps.

¹³ Learn more about the Vermont Wetland Rules at www.dec.vermont.gov/watershed/wetlands/jurisdictional/rules.

¹⁴ More information about writing clear definitions can be found on page 68 in *Community Strategies for Vermont's Forests and Wildlife*.

¹⁵ See page 25 in *Community Strategies for Vermont's Forests and Wildlife* for more information on using conserved land as a community strategy.

¹⁶ See www.dec.vermont.gov/watershed/wetlands for more information on Vermont Wetlands.

¹⁷ See www.fpr.vermont.gov/sites/fpr/files/Forest_and_Forestry/Your_Woods/Library/Forest%20Land%20Eligibility%20and%20Definitions.pdf for more information on ESTAs.

¹⁸ See page 36 in *Community Strategies for Vermont's Forests and Wildlife* about writing standards for development review.

¹⁹ See pages 41-62 in *Community Strategies for Vermont's Forests and Wildlife*.

²⁰ See Vermont's Wetlands Rules at www.dec.vermont.gov/watershed/wetlands/jurisdictional/rules.

²¹ See www.dec.vermont.gov/watershed/wetlands/protect/restore for information about wetlands restoration.

²² See page 63 in *Community Strategies for Vermont's Forests and Wildlife* for more information on road management standards.

²³ For more information, contact your regional NRCS office.

²⁴ Learn more about the National Wetlands Inventory at www.fws.gov/wetlands/.

²⁵ The Vermont DEC Wetlands Section webpage is at www.dec.vermont.gov/watershed/wetlands.

²⁶ See www.fpr.vermont.gov/forest/your_woods/mgmt_plans for more information about management plans.

²⁷ See page 36 in *Community Strategies for Vermont's Forests and Wildlife* about writing standards for development review.

²⁸ See page 50 in *Community Strategies for Vermont's Forests and Wildlife* for more information about Overlay Districts.

²⁹ More information about zoning and subdivision regulations is available on pages 41-62 of *Community Strategies for Vermont's Forests and Wildlife*.

Map 6: Wildlife Resources at the Community and Species Scales

¹ See page 25 in [*Community Strategies for Vermont's Forests and Wildlife*](#) for more information on using conserved land as a community strategy.

² See page 36 in [*Community Strategies for Vermont's Forests and Wildlife*](#) about writing standards for development review.

³ See www.fpr.vermont.gov/sites/fpr/files/Forest_and_Forestry/Your_Woods/Library/Forest%20Land%20Eligibility%20and%20Definitions.pdf.

⁴ Overlay Districts are described on page 50 in [*Community Strategies for Vermont's Forests and Wildlife*](#).

⁵ More information about writing clear definitions can be found on page 68 in [*Community Strategies for Vermont's Forests and Wildlife*](#).

⁶ See page 25 in [*Community Strategies for Vermont's Forests and Wildlife*](#) for more information on using conserved land as a community strategy.

⁷ See pages 41-54 in [*Community Strategies for Vermont's Forests and Wildlife*](#) for more information about strategies involving zoning.

⁸ Learn more about ESTAs through Vermont Department of Forests, Parks, and Recreation. Eligible land is described at www.fpr.vermont.gov/sites/fpr/files/Forest_and_Forestry/Your_Woods/Library/Forest%20Land%20Eligibility%20and%20Definitions.pdf.

⁹ See www.anr.vermont.gov/about_us/special-topics/invasive-species for more information about invasive species.

¹⁰ Landowner incentives programs include those found at www.nrcs.usda.gov/wps/portal/nrcs/site/vt/home/, www.fws.gov/lcfwro/pdf/PFW1.pdf, www.vtfishandwildlife.com/get-involved/partner-in-conservation/eqip-for-wildlife-habitat, or www.fpr.vermont.gov/forest/your_woods/cost_share.

¹¹ See page 25 in [*Community Strategies for Vermont's Forests and Wildlife*](#) for more information on using conserved land as a community strategy.

¹² See pages 41-54 in [*Community Strategies for Vermont's Forests and Wildlife*](#) for more information about strategies involving zoning.

¹³ Learn more about ESTAs through Vermont Department of Forests, Parks, and Recreation. Eligible land is described at www.fpr.vermont.gov/sites/fpr/files/Forest_and_Forestry/Your_Woods/Library/Forest%20Land%20Eligibility%20and%20Definitions.pdf.

¹⁴ Learn more about town forests on page 31 of [*Community Strategies for Vermont's Forests and Wildlife*](#).

¹⁵ More information about writing clear definitions can be found on page 68 in [*Community Strategies for Vermont's Forests and Wildlife*](#).

¹⁶ See page 25 in [*Community Strategies for Vermont's Forests and Wildlife*](#) for more information on using conserved land as a community strategy.

¹⁷ See page 36 in [*Community Strategies for Vermont's Forests and Wildlife*](#) about writing standards for development review.

¹⁸ See pages 41-54 in [*Community Strategies for Vermont's Forests and Wildlife*](#) for more information about strategies involving zoning.

¹⁹ Learn more about Access Management at www.vnrc.org/resources/community-planning-toolbox/tools/access-management/.

²⁰ Learn more about improving culverts and road infrastructure at www.floodready.vermont.gov/improve_infrastructure/roads_culverts.

²¹ See pages 41-54 in [*Community Strategies for Vermont's Forests and Wildlife*](#) for more information about strategies involving zoning.

²² See page 25 in [*Community Strategies for Vermont's Forests and Wildlife*](#) for more information on using conserved land as a community strategy.

²³ Learn more about ESTAs through Vermont Department of Forests, Parks, and Recreation. Eligible land is described at www.fpr.vermont.gov/sites/fpr/files/Forest_and_Forestry/Your_Woods/Library/Forest%20Land%20Eligibility%20and%20Definitions.pdf.

²⁴ See page 36 in [*Community Strategies for Vermont's Forests and Wildlife*](#) about writing standards for development review.

Determining the Ecological Context

¹ The Common Natural Communities category captures several elements that appear in Part I as their own entities, including deer wintering habitat.

Including Community Values

² Learn more about the Vernal Pool Mapping Project and the Vermont Center for Ecostudies at www.vtecostudies.org/projects/forests/vernal-pool-conservation/vermont-vernal-pool-mapping-project/.

Developing and Choosing Options

³ Learn more about Vermont's Use Value Appraisal program at www.fpr.vermont.gov/forest/your_woods/use_value_appraisal.

⁴ The *Planning Manual* is available online at www.accd.vermont.gov/community-development/town-future/municipal-planning-manual.

⁵ Learn more about Municipal Planning Grants at www.accd.vermont.gov/community-development/funding-incentives/municipal-planning-grant.

Appendix A: Strategies and Components

¹ Contact Vermont Fish & Wildlife Department's Community Wildlife Program for more information on conducting field inventories, at www.vtfishandwildlife.com/get-involved/partner-in-conservation/community-wildlife-program.

² More information about writing clear definitions can be found on page 68 in *Community Strategies for Vermont's Forests and Wildlife*.

³ See www.vtfishandwildlife.com/learn-more/landowner-resources for resources available through Vermont Fish & Wildlife Department. Vermont Department of Forests, Parks, and Recreation has additional resources at www.fpr.vermont.gov/forest/your_woods.

⁴ See page 36 in *Community Strategies for Vermont's Forests and Wildlife* about writing standards for development review.

⁵ For more information, see www.vtconservation.com/about-conservation-commissions/.

⁶ See page 31 in *Community Strategies for Vermont's Forests and Wildlife* for more information about Conservation Funds and Town Forests.

⁷ See page 54 in *Community Strategies for Vermont's Forests and Wildlife* for more information about subdivision regulations.

⁸ See www.fpr.vermont.gov/forest/your_woods/use_value_appraisal for more information about Vermont's Use Value Appraisal program.

⁹ See page 25 in *Community Strategies for Vermont's Forests and Wildlife* for more information on using conserved land as a community strategy.

¹⁰ See page 31 in *Community Strategies for Vermont's Forests and Wildlife* for more information about Conservation Funds and Town Forests.

¹¹ See www.fpr.vermont.gov/forest/your_woods/mgmt_plans for more information about management plans.

¹² See www.vpic.info/Publications/Reports/Implementation/ImpactFees.pdf to learn more about Impact Fees.

¹³ See www.fpr.vermont.gov/forest/your_woods/use_value_appraisal for more information about Vermont's Use Value Appraisal program.

¹⁴ The Vermont Coverts website can be found at www.vtcoverts.org/

¹⁵ See www.vermontwoodlands.org/ for the Vermont Woodlands Association webpage.

¹⁶ See www.nrcs.usda.gov/wps/portal/nrcs/site/vt/home/ for the Vermont NRCS webpage.

¹⁷ See www.vacd.org/conservation-districts/ to learn more about Natural Resources Conservation Districts across Vermont.

¹⁸ Learn more about Local Tax Stabilization on page 22 of *Community Strategies for Vermont's Forests and Wildlife*.

¹⁹ See page 25 in *Community Strategies for Vermont's Forests and Wildlife* for more information on using conserved land as a community strategy.

²⁰ See page 31 in *Community Strategies for Vermont's Forests and Wildlife* for more information about Conservation Funds and Town Forests.

²¹ More information about road and trail policies can be found on page 63 in [*Community Strategies for Vermont's Forests and Wildlife*](#).

²² See page 16 in [*Community Strategies for Vermont's Forests and Wildlife*](#) for strategies to sustain working forests.

²³ See page 36 in [*Community Strategies for Vermont's Forests and Wildlife*](#) about writing standards for development review.

²⁴ See page 25 in [*Community Strategies for Vermont's Forests and Wildlife*](#) for more information on using conserved land as a community strategy.

²⁵ To learn more about River Corridor Easements, see www.dec.vermont.gov/sites/dec/files/wsm/rivers/docs/rv_RiverCorridorEasementGuide.pdf.

²⁶ See page 36 in [*Community Strategies for Vermont's Forests and Wildlife*](#) about writing standards for development review.

²⁷ Town Road Management Standards can be found at www.dec.vermont.gov/watershed/stormwater/permit-information-applications-fees/municipal-roads-program. Following these standards is required by statute.

²⁸ See [www.fpr.vermont.gov/sites/fpr/files/About_the_Department/Rules_and_Regulations/Library/Riparian%20Final%20Guidelines%20\(signed%20copy\)_resized.pdf](http://www.fpr.vermont.gov/sites/fpr/files/About_the_Department/Rules_and_Regulations/Library/Riparian%20Final%20Guidelines%20(signed%20copy)_resized.pdf) for the guidelines used by the Vermont Agency of Natural Resources in riparian areas of ANR-owned lands.

²⁹ Learn more about invasive species at www.anr.vermont.gov/about_us/special-topics/invasive-species.

³⁰ Find resources about Green Infrastructure for Homeowners at the [Vermont Department of Environmental Conservation](#) website.

³¹ See www.floodready.vermont.gov/improve_infrastructure.

³² Learn more about acceptable management practices at www.fpr.vermont.gov/about_us/rules_regulations/amps.

³³ EQIP or other NRCS programs may be available to assist some landowners with these practices. Delaying mowing until after the nesting season is one common practice to help grassland birds.

³⁴ See www.bobolinkproject.com/docs/NRCS_Grassland_leaflet.pdf.

³⁵ See www.nrcs.usda.gov/wps/portal/nrcs/site/vt/home/.

³⁶ See www.fws.gov/lcfwro/pdf/PFW1.pdf for a brochure about the Partners for Fish & Wildlife program in Vermont.

³⁷ See www.bobolinkproject.com/docs/NRCS_Grassland_leaflet.pdf.

³⁸ See page 25 in [*Community Strategies for Vermont's Forests and Wildlife*](#) for more information on using conserved land as a community strategy.

³⁹ See page 36 in [*Community Strategies for Vermont's Forests and Wildlife*](#) about writing standards for development review.

⁴⁰ See www.fpr.vermont.gov/forest/your_woods/use_value_appraisal for more information about Vermont's Use Value Appraisal program.

⁴¹ Conservation zoning is described on page 41 in [*Community Strategies for Vermont's Forests and Wildlife*](#).

⁴² Overlay districts are described on page 50 in [*Community Strategies for Vermont's Forests and Wildlife*](#).

⁴³ Learn more about Access Management at www.vnrc.org/resources/community-planning-toolbox/tools/access-management/.

⁴⁴ Information about conservation easements is available on page 25 in [*Community Strategies for Vermont's Forests and Wildlife*](#).

⁴⁵ See pages 41-54 in [*Community Strategies for Vermont's Forests and Wildlife*](#) for more information about strategies involving zoning.

⁴⁶ Learn more about ESTAs through Vermont Department of Forests, Parks, and Recreation. Eligible land is described at www.fpr.vermont.gov/sites/fpr/files/Forest_and_Forestry/Your_Woods/Library/Forest%20Land%20Eligibility%20and%20Definitions.pdf.

⁴⁷ See page 31 in [*Community Strategies for Vermont's Forests and Wildlife*](#) for more information about Conservation Funds and Town Forests.

⁴⁸ Learn more about invasive species at www.anr.vermont.gov/about_us/special-topics/invasive-species.

⁴⁹ A few incentives programs can be found at www.nrcs.usda.gov/wps/portal/nrcs/site/vt/home/, www.fws.gov/lcfwro/pdf/PFW1.pdf, www.vtfishandwildlife.com/get-involved/partner-in-conservation/eqip-for-wildlife-habitat, or www.fpr.vermont.gov/forest/your_woods/cost_share.

⁵⁰ Information about management plans can be found at www.fpr.vermont.gov/forest/your_woods/mgmt_plans.

⁵¹ See page 36 in *Community Strategies for Vermont's Forests and Wildlife* about writing standards for development review.

⁵² Overlay districts are described on page 50 in *Community Strategies for Vermont's Forests and Wildlife*.

⁵³ See pages 41-62 in *Community Strategies for Vermont's Forests and Wildlife*.

⁵⁴ See page 25 in *Community Strategies for Vermont's Forests and Wildlife* for more information on using conserved land as a community strategy.

⁵⁵ See the Vermont Department of Environmental Conservation's Wetlands page at www.dec.vermont.gov/watershed/wetlands.

⁵⁶ Learn more about ESTAs through Vermont Department of Forests, Parks, and Recreation. Eligible land is described at www.fpr.vermont.gov/sites/fpr/files/Forest_and_Forestry/Your_Woods/Library/Forest%20Land%20Eligibility%20and%20Definitions.pdf.

⁵⁷ See page 36 in *Community Strategies for Vermont's Forests and Wildlife* about writing standards for development review.

⁵⁸ See pages 41-62 in *Community Strategies for Vermont's Forests and Wildlife*.

⁵⁹ Find Vermont's Wetlands Rules at www.dec.vermont.gov/watershed/wetlands/jurisdictional/rules.

⁶⁰ Learn more about wetland restoration at www.dec.vermont.gov/watershed/wetlands/protect/restore.

⁶¹ More information about road and trail policies is available on page 63 in *Community Strategies for Vermont's Forests and Wildlife*.

⁶² For more information, contact your regional NRCS office.

⁶³ See page 25 in *Community Strategies for Vermont's Forests and Wildlife* for more information on using conserved land as a community strategy.

⁶⁴ For example, see *Landowner Guide: Habitat Management for Lands in Vermont*, available at www.vtfishandwildlife.com/about-us/fish-wildlife-store.

⁶⁵ See www.vtfishandwildlife.com/sites/fishandwildlife/files/documents/Conserve/RegulatoryReview/Guidelines/Management_Guidelines_for_Optimizing_Mast_Yields_in_Beech_Mast_Production_Areas.pdf for guidance on optimizing mast yield.

⁶⁶ For more information, contact your regional NRCS office.

⁶⁷ See page 36 in *Community Strategies for Vermont's Forests and Wildlife* about writing standards for development review.

⁶⁸ Learn more about ESTAs through Vermont Department of Forests, Parks, and Recreation. Eligible land is described at www.fpr.vermont.gov/sites/fpr/files/Forest_and_Forestry/Your_Woods/Library/Forest%20Land%20Eligibility%20and%20Definitions.pdf.

⁶⁹ See page 25 in *Community Strategies for Vermont's Forests and Wildlife* for more information on using conserved land as a community strategy.

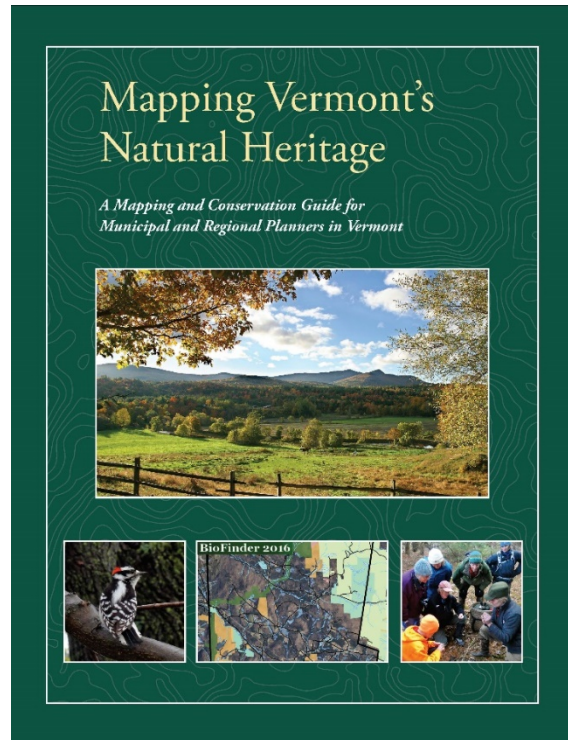
⁷⁰ Overlay Districts are described on page 50 in *Community Strategies for Vermont's Forests and Wildlife*.

⁷¹ Learn more about ESTAs through Vermont Department of Forests, Parks, and Recreation. Eligible land is described at www.fpr.vermont.gov/sites/fpr/files/Forest_and_Forestry/Your_Woods/Library/Forest%20Land%20Eligibility%20and%20Definitions.pdf.

⁷² See page 36 in *Community Strategies for Vermont's Forests and Wildlife* about writing standards for development review.

Mapping Vermont's Natural Heritage

This is one chapter of a larger publication called *Mapping Vermont's Natural Heritage: A Mapping and Conservation Guide for Municipal and Regional Planners in Vermont*. Please visit <https://anr.vermont.gov/node/986> for additional information or to see the entire guide.



Authors:

Monica Przyperhart, Fish & Wildlife Specialist
Jens Hawkins-Hilke, Conservation Planner
John M. Austin, Wildlife Biologist

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