

Forest Blocks and Connectors

Vermont Act 171 encourages municipalities to address the conservation of forest blocks, wildlife habitat, and habitat connectors, as well as to support local forest products businesses, in their town plans. The statute states that “Vermont's forestlands should be managed so as to maintain and improve forest blocks and habitat connectors.”¹ A land use plan is suggested, which consists of a map and statement of present and prospective land uses, that indicates those areas that are important as forest blocks and habitat connectors and plans for land development in those areas to minimize forest fragmentation and promote the health, viability, and ecological function of forests. A plan may include specific policies to encourage the active management of those areas for wildlife habitat, water quality, timber production, recreation, or other values or functions identified by the municipality. ¹ PLANNING: A Key

Step Towards Protecting Forest and Wildlife Resources, Act 171 Guidance, VT ANR, pp. 7-8

Forests are integral to the character and functionality of Cornwall’s landscape. They provide numerous services to the town and the people and wildlife which live here. Forests play a role in maintaining clean groundwater for our wells, help to absorb contaminants from air pollution to clean the air we breathe, and provide a place of respite and peace which contributes to our quality of life. Forests provide natural flood mitigation, both through absorption of water and moderating its movement over land. The forests of the Cornwall swamp provide critical habitat to numerous unique and threatened species and the mature oak and beech forests of the Ledge and Snake Mountain provide food sources to wildlife, like bear and deer. Aside from the value they provide in the robust ecology, the creatures and plants our forests harbor can reduce and manage pests for us. Forests also are a significant part of Vermont’s economy. According to the Vermont Agency of Natural Resources (2018) 12% of Vermont’s GDP (20,000 jobs) has been associated with forests annually generating \$1,500,000,000 from forest products, \$1,900,000,000 from forest recreation and tourism and \$685,000,000 from hunting, fishing and wildlife viewing. Fall foliage tourism has made up 25% of Vermont’s income from tourism. ² Implementing Act 171: Land Use Planning to Address Forest Fragmentation, 2018, 3rd Edition In Cornwall, forest products such as maple syrup, Christmas trees and wreaths, and firewood have provided income for some residents.

Forests in Vermont have a dramatic history. Cut heavily for timber in the early decades of European colonization and settlement, clearing continued for agriculture purposes until the 1880s, when estimates suggest that 63% of the state was cleared of forest. Steady reforestation across the state started from that time until the late 20th century when population increases and development patterns began to encroach on the reforested land. Cornwall’s development pattern matches this state-wide trend towards prioritizing privacy and scenic views. This pattern leads to greater “parcelization” - larger blocks of land and forest are subdivided into smaller parcels for residential development. This development, with its attendant infrastructure (roads, utilities, and buildings), affects the internal

¹ 24 V.S.A. § 4302(c)(6)(C).

workings of forest blocks. Resulting breakup, or fragmentation, of the forest, can affect the landscape beyond the footprint of these built elements for a distance of as much as three hundred feet. Over time progressive parcelization, even at low density, can have a cumulative effect of much wider clearing and makes forests less effective at performing the services and functions discussed above. For a more detailed discussion of the effects on forest fragmentation, please see the 2015 Vermont Forest Fragmentation Report to the Vermont Legislature.

While the amount of forested land in Cornwall has increased since the late 19th century, forest fragmentation remains a significant threat to the town's natural heritage because of our pattern of development. It is likely that in the past nearly all of the upland forests were entirely cleared for grazing and fuelwood, and even the large forested wetlands along Otter Creek were selectively harvested for cedar poles and firewood. This history has left its mark on today's forested areas. Although the total forested area is likely greater now than at any point since the mid-1800's, when Cornwall's sheep industry relied on extensive land clearing, the town's tendency toward smaller parcel and higher value development increases the threat of fragmentation.

The Vermont Agency of Natural Resources through its Vermont Conservation Design initiative has generated maps identifying Highest Priority and Priority Interior Forest Blocks as well as Highest Priority and Priority Connectivity Forest Blocks statewide as a resource for municipal planning and conservation strategies. This mapping provides the foundation for the Town of Cornwall Forest Integrity map.

Definitions

“Forest Block” means a contiguous area of forest in any stage of succession, not currently developed for other uses. These areas can include recreational trails, wetlands, and agricultural and silvicultural uses currently exempt from municipal land use regulation.

“Habitat Connectivity Block” means land or water that links wildlife habitat within a landscape, allowing the movement and migration of animals and plants and the functioning of ecological processes. These connect core habitat, allowing for genetic exchange across populations of far-ranging animal species, with places of diversity in the physical landscape as well as the riparian network. They may include recreational trails, wetlands, and agricultural and silvicultural uses currently exempt from municipal land use regulation

Maintaining large blocks of existing forest habitat and connections between those forest blocks is one of the best ways to ensure conservation of forest-reliant species. Conservation measures that can protect and enhance native forests and wildlife include keeping existing forested areas forested; maintaining large blocks and clusters of forest; allowing abandoned fields to regrow to

forest; enhancing with planting native stock; maintaining tree and shrub cover in fencerows; building structures, roads, driveways and utilities outside of forest patches; creating ‘soft edges’ where possible; and using a consulting or county forester to plan tree harvests.

Cornwall has a number of excellent resources to draw from in identifying ecologically important forested areas and wildlife. The Cornwall Conservation Commission initiated and contracted Brett Engstrom, consulting Botanist and Ecologist, to conduct an Ecological Inventory (2013-2015) which includes a map of Potential Connectivity Habitat for Wildlife. The primary focus of the inventory was to identify natural communities of state and local significance, species of greatest conservation need, large and more intact forest blocks, riparian areas of special importance for watershed health, and potential connectivity habitat. In 2016, the Cornwall Planning Commission, the Cornwall Conservation Commission, and the Cornwall School organized and conducted a workshop where Cornwall residents defined on maps areas of Historic, Community Place, Scenic, Recreation, Wildlife, Farm and Working Land, Potential Energy Location and Hunting & Fishing values. The result was a collection of maps showing the different areas of value plus a composite map showing all the areas of value and how they overlapped. The workshop was directed by Jens Hilke, Conservation Planning Biologist from the VT Fish & Wildlife Department and included sixty participants. Furthermore, for many parts of town, aerial photos of the landscape exist from 1942,² which allow the identification of locations that have remained forested from that time to the present. These forested areas tend to have few invasive species and have greater natural integrity.

Cornwall contains several large areas of contiguous forestland that have been identified and mapped as “Highest Priority” and “Priority” Forest Blocks through Vermont Conservation Design by the VT Agency of Natural Resources. The Cornwall Ecological Inventory³ describes the ecological characteristics and conditions of these forested areas, which contain the greatest diversity of both natural communities, and native plant and animal species, in the municipality.

Highest Priority Forest Blocks

These Forest Blocks have been identified as the highest priority across the state for maintaining interior forest. These are the largest and highest ranked forest blocks from all biophysical regions that provide the foundation for interior forest habitat and associated ecological functions. In the Champlain Valley, these blocks are larger than 250 acres. Two Highest Priority Forest Blocks have been described in Cornwall and are identified as Cornwall Swamp and Snake Mountain South,

² You can find historical aerial imagery from 1942 and 1962 in an interactive map, here: <https://www.arcgis.com/home/webmap/viewer.html?webmap=6dfd5c4cf59c4ef482cdab41cfe4edc7&extent=-73.3169,43.9356,-73.0049,44.0793>

³ An Ecological Inventory of Cornwall, Vermont For the Town of Cornwall
By Brett Engstrom Consulting Botanist and Ecologist Marshfield, Vermont 19 May 2015

Cornwall Swamp

The Cornwall Swamp in southeastern Cornwall, sometimes referred to as Otter Creek Swamp or the Cedar Swamp, is part of an enormous, 15,000 acre wetland complex along Otter Creek from Brandon north to Middlebury. The Otter Creek Swamp complex is the most biologically diverse wetland complex in New England. The complex is an important lowland habitat bridge for wide-ranging animals including bobcat and bear and is an important stopover area for migratory waterfowl in the region. Cornwall Swamp was designated a National Natural Landmark by the U.S. National Park Service in 1974, and a substantial part of the swamp is protected through conservation ownership by the Vermont Agency of Natural Resources and The Nature Conservancy.

As the largest and wildest forest block in Cornwall by far, Cornwall Swamp is a major wildlife area for the town. Because of its size and unfragmented character, it can act as a “source” or production area for a wide variety of wildlife to leave and inhabit riskier and less productive habitats in town (Engstrom 2015, pp. 58-61). Part of the forest block is upland area on the Swamp Westside Hills, which contains mapped deer wintering area and a variety of large mammals, including bobcat and catamount, have been reported in the area. (Engstrom 2015, pp. 54-57). These adjoining wetlands and upland buffer are the only mapped deer wintering area in Cornwall, and the only noted bear habitat.

In the 2016 Cornwall community values mapping workshop, the Cornwall Swamp block was identified by residents as one of the areas of town with the greatest number of values, primarily those of scenic, recreation, wildlife, and hunting and fishing.

Snake Mountain South

The Snake Mountain South forest block extends south into northwest Cornwall from Bridport. The block provides a connection to the larger forest block around the Snake Mountain peak on the Addison-Weybridge town line. Parts of that larger forest block are owned by the Vermont Fish & Wildlife Department as a Wildlife Management Area, and other pieces are owned by The Nature Conservancy. The portion in Cornwall is west of Snake Mountain Road and is privately owned.

The Snake Mountain South forest block is located on a quartzite hill produced by an ancient thrust fault, where older, limestone-containing rock was pushed up over younger rock. The limestone greatly enhances the fertility of the soils, allowing a small band of the diverse Transition Hardwoods Limestone Forest community type on the steep, rocky, west-facing slope. The more gently sloping terrain is a Mesic Maple-Ash-Hickory-Oak Forest natural community. The top portion of the hill was already forested in 1942 and has fewer invasive species like common buckthorn and honeysuckle.

Priority Forest Blocks

Priority Interior Forest Blocks are highly ranked forest blocks from all biophysical regions that contain important interior forest habitat and provide ecological support to the Highest Priority Forest Interior Blocks. Seven Priority Forest Blocks have been described in Cornwall and are identified as The Ledges North, The Ledges South, Beaver Brook/The Gully Forest, Ledge Creek, West Cornwall Ridge, Otter Creek Swamp north of Morse Road, Parkhill and Delong Hill.

Many of these blocks of land feature prominently in the Cornwall landscape and in the daily lives of the people in town. Beyond the ecological value, these landscapes are part of the fabric of what makes Cornwall the town it is for the people who live here and travel through. Planning for these areas means we are not just considering the ecological or economic impact of forests, but the experience of residents and travelers through our town. Please note the number associated with each section heading provide location references for the Forest Block map.

The Ledges North (1)

The Ledges are the west-facing limestone cliffs and forested ridge that can be seen driving east on Route 125 from the Lemon Fair floodplain. It is part of a major limestone ridge system that extends from Sperry Road into Weybridge. This rocky forest is the largest single block of upland forest in Cornwall and is a site of unusually high biodiversity significance. The Ledges North has a high biodiversity strongly associated with limestone, with uncommon and state-significant natural communities (Engstrom 2015, pp. 34-37).

It likely has wildlife corridor connections to Weybridge and the Ledges to the south across Route 125, and potentially the Lemon Fair.

The Ledges South (3)

This southern continuation of The Ledges rocky ridge system is bisected by Route 125 from the forest area to the north. It also has high biodiversity strongly associated with limestone. The cliffs and the apron of rocky woods in the talus below the cliffs host significant examples of uncommon natural communities in Vermont, and the rocky limestone forest found above the cliffs is unusually extensive and contains remarkably few invasive plants, hence significant on the state-level. Several small water features, such as a spring, small perched marsh and shrub swamp, and vernal pool, provide important ecological/habitat diversity to the site. There are at least ten uncommon plants and two state-threatened plant species (Engstrom 2015, pp. 22-25).

The wooded area north of Tulley Rd. and east of Beaver Brook makes up the western part of this forest block and provides a Beaver Brook-Ledges Connection. It is made up of a pre-1942 band of transition hardwoods limestone forest and temperate hemlock-hardwood forest associated with the

north-south aligned limestone ledge system, along with successional clayplain forest areas to the west (Engstrom 2015, pp. 1-3).

Altogether, this is the largest upland forest block in Cornwall, which is important to a wide variety of forest dwelling animals, including large mammals, such as deer and bobcat, forest interior songbirds, and salamanders.

Beaver Brook/The Gully (2)

The Beaver Brook drainage and adjacent uplands extends from Route 74 downstream (northerly) to Route 125. It contains two rare natural communities in Vermont: Mesic Clayplain Forest and Sand-Over-Clay Forest. Because it has been continuously forested for over 75 years (and likely never cleared), the clayplain forest has remarkably few invasive plants. The area is dissected by several stream drainages, the largest locally referred to as “The Gully”. The east and south sides of the forest block abut wetlands associated with Beaver Brook, all influenced by the hydrology of the Lemon Fair River. The wetland types within this area are diverse, including seeps, cattail marshes, and alluvial meadows, with beaver activity creating its own habitat.

The mature clayplain forest, ravine forest, successional clayplain forest, and variety of riparian features make this great wildlife habitat that has been noted by residents. Wildlife likely travel from this block to the Lemon Fair River across Route 125, continuing to Snake Mountain South, as well as to the Priority Connectivity Blocks (E) along Sperry Road. (Engstrom 2015, pp. 42-45).

Ledge Creek (4)

This forest block includes Ledge Creek headwaters from Cobbs Corners north to Route 125. A large portion of the area is owned by Middlebury College and has been ecologically evaluated and inventoried (Lapin, 2011)⁴. A large acreage of former fields has been reforested in the form of conifer plantations and now include an understory of native hardwood species beneath the overstory of White and Red Pines (*Pinus strobus*, *P. resinosa*, respectively), White Spruce (*Picea glauca*), and to a lesser extent, European Larch (*Larix decidua*). The block also contains a 25-acre pond, open wetlands, Beaver Brook, agricultural hay fields and hedgerows, and old fields in various states of succession that are dominated by white pine or are shrubland (Lapin 2011, pp. 1-9).

The forest block includes excellent examples of the two dominant ecosystem types of the southern Champlain Valley—transition hardwood limestone forest and clayplain forest, as well as an area of mesic maple-ash-hickory-oak forest that was used as a sugarbush and never cleared. (Lapin 2011, pp. 2-4).

⁴ Marc Lapin, 2011- Ecological Evaluation and Management Plan, Lands of Willard and Carolyn Jackson and adjacent properties of Middlebury College

The diverse habitats in this forest block support numerous species of birds, small and medium-sized mammals, and reptiles and amphibians that utilize the brook and wetlands. One landowner within the forest block has observed and recorded more than 128 bird species and observed White-tailed Deer, Moose, Bobcat, Red Fox, Eastern Coyote, and Beaver. Wild Turkeys, Porcupines, Red-spotted Newts and several species of frogs and turtles have also been observed on the property. The section of Route 125 due north of the forest block is modeled to have the highest wildlife crossing value possible, with the section of Route 30 south of the lands receiving a moderate score, illustrating the important role that this forested area plays in the larger landscape (Lapin 2011, pp. 9-10).

West Cornwall Ridge (5)

This forest block sits on the top of the broad, flat-topped ridge that runs north to south on the west side of Cornwall, between West Street and N. Bingham Street. Woodlots in the block were present in 1942 aerial photographs, which suggests that it may never have been cleared for agriculture. These woods are known by town residents for good wildlife habitat, including turkey, deer, fox, porcupine, bobcat, coyote, opossum, painted turtle, bluebird, and migratory raptors (Engstrom 2015, pp. 10-12).

Otter Creek Swamp north of Morse Road (6)

This large forested wetland straddling the Middlebury town line north of Morse Road drains south into Cornwall Swamp, hence should be thought of as the north arm of Cornwall Swamp. It contains a combination of Red or Silver Maple-Green Ash Swamp and Red Maple-Black Ash Seepage Swamp natural communities, with a peninsula of Mesic Clayplain Forest. As part of the large Otter Creek swamp complex, these maple-ash swamps are recognized as significant on the state-level. The 5-acre Mesic Clayplain Forest is a locally significant natural community and lacks invasive plants, it appears to be a very natural example of clayplain forest. (Engstrom 2015, pp. 62-65).

Parkhill (7)

This Forest Block is divided into two sections by Parkhill Road. The area north of Parkhill Road is the headwaters of Beaver Brook. Only the western corner was forested in 1942, but the area has regrown and now forms part of the forested corridor connecting Cornwall Swamp to the Lemon Fair via Beaver Brook. It was not inventoried in 2015. The area south of Parkhill Road is a 150-acres site with an impressive diversity of both upland and wetland habitats and natural communities

The bulk of the upland forests are mature hardwoods of the Mesic Maple-Ash-Hickory-Oak Forest natural community, and there is an adjacent pocket of Transition Hardwoods Limestone Forest associated with limestone ledges. Wildlife travel corridors were reported both due east of the site, leading directly to Cornwall Swamp, and crossing DeLong Road to the southwest (Engstrom 2015, pp. 50-53).

DeLong Hill (8)

DeLong Hill is the highest point in town at an elevation of 580 feet. This forest block is narrow, but extends south into Whiting, and the Cornwall Swamp and adjacent wetlands to the south are only about one mile away and likely connected by wildlife moving across Route 30. The area contains Transition Hardwoods Limestone Forest, Mesic Maple-Ash-Hickory-Oak Forest, along with limestone slabs and solution cavities. In some areas, invasives like honeysuckle and buckthorn crowd out native species thereby diminishing the diversity and condition of the native species, and the quality of the limestone forest natural community. In the closed canopy limestone forest areas which were forested in the 1942 aerial photos, the invasives are mostly kept in check. (See Engstrom 2015, pp. 46-49).

Other Important Forest Areas

Bingham's Woods

Though not a large forest block (73 acres), Dr. Bingham's Woods is an important piece of intact, natural forest in the upper Beaver Brook drainage. Dr. Bingham's Woods is located just north of the intersection of Route 74 and Bingham Street. The unique site features a beautiful wooded ravine and adjacent gently sloping terrain with a variety of soils, which stands out clearly in the 1942 photos as mature, intact, mixed forest. Within the ravine hemlocks grow to over 100 feet tall. This forest block is and will continue to be an important wildlife linkage habitat in the Beaver Brook watershed. (Engstrom, pp. 38-41).

A recently approved subdivision by Beaver Brook Properties LLC (2020) in the area of the Dr. Bingham's Woods involved the conveyance of a conservation easement on 125 acres out of the 167 acre development property to The Vermont Land Trust which will restrict future use for agricultural and forestry purposes. In addition, the developer plans to permanently protect another 20 acres of the property from development.

Clayplain Forest Fragments

Clay-soil lake plain or “Clayplain” forest, dominated the clay soil areas of the Champlain Valley prior to European settlement. Due to the fertile soil’s suitability for agriculture, much of the original extent of this forest type has been cleared, leaving only fragments. These areas are important “stepping stones” for wildlife and are a regional priority for protection and enhancement.

Clayplain forests are home to a diversity of trees, shrubs and herbs due to the soil’s high fertility, the moderate climate, and a patchy mosaic of scattered wet depressions. The tree species include shagbark hickory, white, bur, swamp, and red oaks, sugar, red, and silver maples, white, black, and green ash, American elm, basswood and American beech. These species, and the large nut crops they produce, provide great habitat for wildlife including bobcat, wild turkey, white-tailed deer, and gray squirrel.

Habitat Connectivity Blocks

Habitat Connectivity Blocks are the forest, riparian and surface waters that provide connectivity at a local, state and regional scale (across Vermont and to adjacent states and Québec) as well as connectivity between all Vermont biophysical regions. These blocks connect core habitat, allowing for genetic exchange across populations of far-ranging animal species, with places of diversity in the physical landscape as well as the riparian network.

Two Highest Priority and Four Priority Connectivity Blocks have been described in Cornwall and are identified below. Protection and enhancement of the margins of these blocks especially where they intersect other habitat and forest blocks can be accomplished by maintaining natural stream buffers, shrub and tree cover and limiting development in these areas of connectivity. Please note the letters associated with each block are references for the Forest Block map.

Highest Priority Connectivity Blocks

A. North Cornwall, along the Lemon Fair River. Primarily clayplain forest.

B. North Cornwall, along Lemon Fair Road- the remnant woodlands at this site and the site not visited downstream (#9) on the west bank are important for wildlife and ecological diversity of the river valley. (See Engstrom 2015, pp. 30-33).

Priority Connectivity Blocks

C. Northeast Cornwall, on either side of Route 125 with significant wildlife crossing predicted.

D. Northeast Cornwall, between Ridge Road and Cider Mill Road.

E. Central Cornwall, on either side of Sperry Road. Primarily clayplain forest. (See Engstrom 2015, pp. 4-9).

F. Several forest fragments, some clayplain forest, in Central Cornwall, along Routes 30 and 74.

Wildlife Connectivity

Cornwall's forests, like many in the Champlain Valley, exist as islands in a chain. Connecting the islands with sufficient corridors for the passage of wildlife is as important as maintaining the forest blocks themselves. The many species that populate Vermont's forests have varying needs from forests in size and scale. Larger species like coyote, bear, and bobcat (all regular residents of Cornwall) need large connected blocks to ensure sufficient genetic diversity and healthy populations. Other species like deer can exist on the edge of forests, but again need the ability to travel and have forest cover to limit snow depths for their wintering areas.

Riparian Areas are ecosystems extending up and down rivers, streams and along lakeshores, in which natural vegetation occurs, providing natural cover for wildlife movement and plant migration. The greatest wildlife linkages in Cornwall are predicted along Beaver Brook and the Lemon Fair River, as well as within the Cornwall Swamp and Middlebury Swamp forest blocks.

Cornwall residents have identified wildlife travel corridors across Route 30 from Cornwall Swamp to the DeLong and Parkhill Forest Blocks, as well as the Priority Connectivity Blocks (F) along Route 30 and Route 74. Swamp Road and Morse Road are likely crossed by significant wildlife, including the uncommon Blue-spotted salamander, within and between Cornwall Swamp and Middlebury Swamp, but these roads have relatively little traffic. Blue-spotted salamanders have also been documented along sections of West Street. Wildlife has been observed crossing from the northeastern side of Middlebury Swamp across Route 30 to reach the Ledge Creek forest block.

A 2006 analysis (Vermont Wildlife Linkage Habitat Analysis) identified areas along Route 125, primarily at the Beaver Brook and Lemon Fair Crossing, as well as below the dam at Jackson Pond (Ledge Creek Forest Block to Priority Connectivity Block C), as areas of significant wildlife crossing value.

Conserved Lands

Over the years a fair amount of land has been conserved in Cornwall as can be seen in the Forest Blocks and Conserved Lands map. The State owns as Wildlife Management Areas, a significant portion of the Cornwall Swamp in the southeastern corner of town as well as the portion along the Lemon Fair River south of Snake Mountain. Additional land throughout Cornwall, primarily agricultural, has been conserved by private property owners through conservation easements with the Vermont Land Trust and the Middlebury Area Land Trust. In terms of forest conservation, there are

private properties with conservation easements covering portions of the Cornwall Swamp Highest Priority Block and the Ledges South and Beaver Brook/Gully Priority Forest Blocks where Clayplain Forest fragments occur.

Suggested Goal/Policies:

GOAL 4

Maintain and improve the integrity of Cornwall's existing Forest Blocks

- Create 'Special Features Overlay Map' to guide development decisions on projects that could otherwise fragment contiguous forest blocks and significant wildlife corridors.
- Support efforts by landowners, land trusts, state and federal agencies and other organizations to conserve forest blocks and wildlife corridors in identified priority areas.
- Through the Cornwall Conservation Commission, enhance the 2015 Ecological Inventory of Cornwall to field-verify and prioritize the town's principal wildlife habitat and corridors and add other significant areas missing from the Inventory.
- Revise the zoning approval and development review processes to require applicants to identify the Vermont Agency of Natural Resources defined Highest Priority and Priority Forest Blocks and Wildlife Corridors that would be impacted by a proposed development and encourage development that does not fragment or create adverse impact to these forest blocks and wildlife corridors.
- Through the Cornwall Conservation Commission, better inform the community about the concept of forest integrity.
- Collaborate with neighboring towns in identifying and maintaining forest and connectivity blocks that cross town boundaries. (This item to be relocated and incorporated into the *Compatibility* section of the Town Plan).
- Work with the Town Highway Department to identify and, where practical, adopt road management practices that minimize hazards in identified wildlife road crossing areas.