

Natural Heritage Element Inventory and Assessment for the Town of Essex, Vermont October 23rd, 2007



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1.0 Introduction

In March 2007, Arrowwood Environmental was retained by the Town of Essex, Vt. to conduct a Natural Heritage Inventory and Assessment in coordination with an Open Space Plan being prepared by Front Porch Community Planning and Design of Bolton, Vt. The purpose of this inventory was to map and assess the natural heritage elements that are important to the preservation of biological diversity in the Town of Essex. This information will be used to inform town planning decisions, further define the town's sense of community, and to establish priorities for preserving significant resources.

The scope of the project, as per the March 13, 2007 kick-off meeting, included the following:

- Wildlife Habitat: Inventory and map critical habitat features and travel corridors;
- Significant Natural Communities: Update 1991 natural communities map;
- Wetlands: Update existing wetlands resource map; and
- Vernal Pools: Remotely inventory and map potential vernal pool locations.

The methodology used in mapping and assessing these resources is presented in Appendix 1. The results of the inventory are divided into the four resource areas and presented below.

2.0 Wetlands

The wetland inventory phase of this project revealed the presence of 430 wetlands comprising approximately 3081 acres in the town of Essex. This includes wetlands that were confirmed by field work as well as wetlands that are considered "potential" wetland sites and require field verification. The wetlands previously mapped in the town by the National Wetlands Inventory (NWI) Map consisted of 532 sites totaling 1660 acres. Much of the discrepancy between the number and acreage of wetlands comes from the interpretation of the Color Infrared (CIR) Aerial Photographs and the presence of wet agricultural lands. While the NWI maps showed many small wetlands within an agricultural field, Arrowwood Environmental (AE) mapped many such sites as a single large potential wetland, resulting in fewer, larger wetlands.

The number, type, and size of the wetland natural communities mapped in Essex are presented in Table 1. As can be seen from this table, there are 16 different wetland types mapped in the town. Some of the mapped types, such as the Agricultural Fields, Old Fields and Ponds, are not considered natural communities but were mapped for their potential regulatory status and functioning on the landscape. Other types, such as the Beaver Wetlands, Floodplain Forests, and Red Spruce-Hardwood Swamps actually consist of multiple natural communities. These multiple communities were lumped into the mapping units shown below because of the difficulty in mapping specific communities on a town-wide scale. Table 2 shows the different natural communities that may be present in the mapping units.

Table 1. Wetland Communities Mapped in Essex

Community Type	Number of Sites	Average Acreage	Total Acreage
Agricultural Field	38	26.0	989.7
Alder Swamp	40	7.4	294.9
Beaver Wetland	26	5.0	129.9
Cattail Marsh	8	3.1	24.6
Deep Broadleaf Marsh	2	5.2	10.3
Floodplain Forest	17	8.6	145.5
Hemlock Swamp	1	2.5	2.5
Northern Hardwood Seepage Forest	9	2.6	23.7
Old Field	38	7.0	266.4
Open Water	13	3.1	40.4
Pond	80	0.4	35.1
Red Maple-Black Ash Swamp	23	14.3	329.6
Red Spruce-Hardwood Swamp	5	29.3	146.6
Seep	2	0.6	1.1
Shallow Emergent Marsh	123	4.8	591.5
Spruce-Fir-Tamarack Swamp	5	9.9	49.7
TOTAL	430	--	3081

Table 2. Natural Communities Present in the Wetland Mapping Units

Mapping Unit	Natural Communities
Alder Swamp	Alder Swamp* Alluvial Shrub Swamp
Red Maple-Black Ash Swamp	Red Maple-Black Ash Seepage Swamp Calcareous Red Maple-Tamarack Swamp Red Maple-Acidic Basin Swamp* Red Maple-Red Spruce Swamp
Beaver Wetland	Shallow Emergent Marsh* Alder Swamp Open Water beaver flooding* Deep Broadleaf Marsh
Floodplain Forest	Silver Maple-Ostrich Fern Floodplain Forest* Sugar Maple-Ostrich Fern Floodplain Forest
Red Spruce-Hardwood Swamp	Red Maple-Northern White Cedar Swamp Hemlock-Hardwood Swamp Red Spruce-Hardwood Swamp

* indicates the most common community found within the mapping unit

Significant Wetland Communities

For the purposes of this inventory, a wetland is deemed significant for the unique natural communities present or for the functions and values that it performs on the landscape. For natural communities, the significance of a particular wetland is ranked as being either “Locally Significant” or “State Significant”. A state significant wetland natural community hosts an exemplary example of the natural community when compared to other wetlands across the state. A locally significant natural community often falls just shy of state significance, but when compared to other sites in the town or region, stands out as important.

Wetlands in Essex were also analyzed for their functions and values. The list of functions and values criteria for determining the significance of wetlands is presented in Appendix 1. Wetlands that perform a wide variety of functions and values or perform select functions exceptionally, are considered locally significant for their functions and values.

A total of 34 wetlands in Essex were considered either locally or state significant for either functions and values, natural communities or both of these factors. These wetlands are contained within the wetland complexes summarized in Table 3. Following Table 3 is a brief narrative of each of these sites. The attribute table which accompanies the digital Wetland Inventory map also contains more specific information about each of these sites.

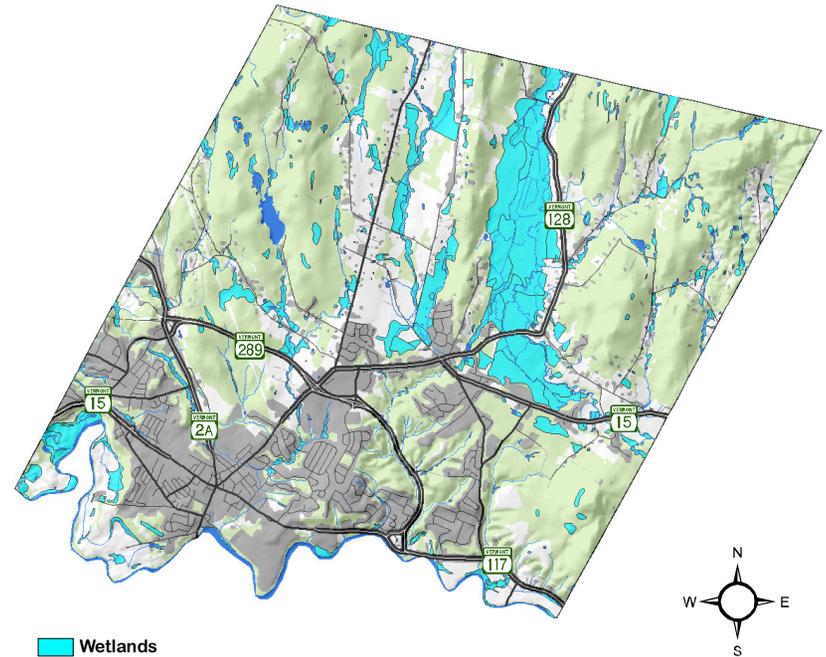


Figure 1. Essex Wetland communities

Table 3. Significant Wetland Communities

Site Name	Natural Communities Present	Total Acreage	Justification for Significance	Level of Significance
Brown's River Swamp	Red Maple-Black Ash Swamp Alder Swamp	362	Natural Communities and Functions and Values	State (in part)
Lost Nation Swamp	Red Maple-Black Ash Swamp	39	Natural Community	Local
Winooski Oxbow Wetlands	Red Maple-Black Ash Swamp Shallow Emergent Marsh Floodplain Forest Deep Broadleaf Marsh	36	Functions and Values	Local
Saxon Hill Swamp	Red Spruce-Hardwood Swamp	29	Natural Community	Local
Essex Center Swamp	Red Spruce-Hardwood Swamp	91	Natural Community	Local
Westford Swamp	Spruce-Fir-Tamarack Swamp	22	Natural Community	State
Indian Brook Wetlands	Beaver Wetlands Shallow Emergent Marsh Open Water Wetland	44	Functions and Values	Local
Alder Brook Wetlands	Spruce-Fir-Tamarack Swamp Shallow Emergent Marsh Alder Swamp	169	Natural Communities and Functions and Values	Local
68 Acres Wetland	Floodplain Forest Cattail Marsh Red Maple-Black Ash Swamp Shallow Emergent Marsh	148	Natural Communities and Functions and Values	State (in part)

A brief description of each of the significant wetlands along with the justification for significance is provided below. In some cases field work for these assessments was conducted during this inventory. In other cases, the assessments were made based on data collected on previous field visits and obtained from the Non-game and Natural Heritage Program. Remote assessments, allowing for broader landscape patterns and hydrologic connections to be analyzed, often supplemented the field data.

Brown's River Swamp

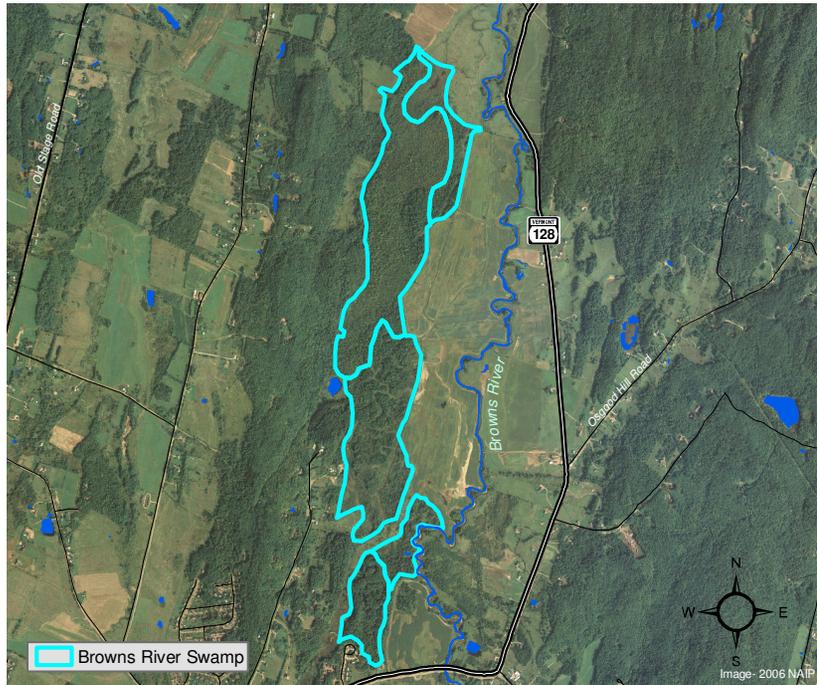


Figure 2. Browns River Swamp

The Brown's River Swamp wetland is the largest wetland complex in the town of Essex. It sits in the low lands of the Brown's River Valley and extends for 2.5 miles between Rte 128 and Chapin Road. Despite its size and location, however, it is not likely noticed by most town residents because it cannot be readily seen from the roads, sits on private property and is not easily accessed. This wetland consists of Alder Shrub Swamps and a large forested swamp together totaling 362 acres.

There are three occurrences of Alder Swamp in this wetland complex. The southern occurrence sits along the banks of the Brown's River while the others occupy areas around tributaries. The forested swamp is a hardwood dominated community with a mixture of cedar, fir and hemlock trees as co-dominants. The main body of the forested swamp sits in the northern occurrence. The southern occurrence doesn't appear to be as wet and requires field confirmation. Historical logging (especially of cedar) and draining along the eastern side may have caused some disturbance to the natural condition of the swamp.

Despite these disturbances, these forested and shrub swamps are considered significant for the natural communities that are present and for the functions and values that they perform on the landscape. Existing in the low area along the Brown's River, these wetlands are important for water quality, erosion control, wildlife habitat, and floodwater control.

Management Recommendations

As mentioned above, this wetland is important for a wide variety of functions and values, including water quality of the Brown's River. Any action that would negatively affect these functions should be avoided. This includes any further ditching along the eastern side of the wetland. Since this wetland sits entirely on

private land, cooperation of the landowner in any management plan should be sought. Efforts to conserve the swamp and the lands buffering the swamp should be considered. These could include conservation easements, purchasing development rights or merely working with the landowners on appropriate management of the site.

In terms of water quality in the Brown's River east of these wetlands, it may also be advantageous to work with the landowners to develop a riparian buffer along the River. A vegetated buffer can help slow floodwaters, act to filter out excessive nutrients from floodwaters, prevent erosion along the stream banks and provide valuable wildlife habitat in the Brown's River valley.

Lost Nation Swamp

The Lost Nation Swamp is a 39 acre hardwood swamp that sits just south of Lost Nation Road. While this swamp is likely significant for wildlife habitat and water quality functions, its real importance lies in the natural community that is present. The swamp is dominated by hardwood trees such as red maple and black ash. The western end of the swamp also has tamarack in the canopy. This swamp is floristically very diverse and is a very good example of this community in the region. This site is a C-ranked community, which indicates that the site is locally significant.

Management Recommendations

In order to maintain the integrity of the natural communities in this swamp, a buffer zone of 100 feet should be maintained between the wetland edge and any development activity.

Fragmenting features such as roads or driveways should also avoid both the wetland and the wetland buffer. Any activity such as ditching that can disrupt the hydrology of the swamp should be avoided. If undertaken, logging should only occur in a winter with ample snow cover and frozen soils.

Winooski Oxbow Wetlands

The Winooski Oxbow wetlands are a series of 7 different occurrences of 4 different natural communities along the Winooski River in the south east corner of the town. The site occurs in the floodplain of the Winooski River and many of the wetlands are associated with an old oxbow that has been largely cut off from the river. This site, however, still likely floods



Figure 3. Floodplain forest along the Winooski River

during periods of high water. The landscape position and hydrology have created a wide diversity of different wetland communities at this 36 acre site. These wetlands perform a wide variety of functions and values. As mentioned above, the wetlands are likely important in floodwater retention and attenuation. The stable riverbanks help prevent erosion and can provide fish habitat. The diversity of wetland types here provide habitat to a wide variety of wildlife. The persistent vegetation and slow moving water can act to filter out nutrients from the water, performing valuable water quality functions.

Management Recommendations

Like the 68 Acres wetland site, this wetland complex occurs along the floodplain of the Winooski River. As such, it is a valuable asset as a natural area along a major river corridor. Intact Floodplain Forest communities in particular are uncommon in Vermont because most have been converted to agriculture. These communities are one of the most degraded and fragmented wetland community types in the region. At the same time, they are one of the most highly functioning wetland communities because of their close association with surface waters. In many places, all that remains of floodplain forests is a thin strip of trees along the riverbank. This can be seen on either side of the Winooski Oxbow wetlands. Increasing the width of these forests can create viable riparian buffers that can filter excessive nutrients from the rivers during flood events and provide valuable wildlife habitat. Conservation or floodplain forest restoration projects with willing landowners should be encouraged in this area.

Furthermore, encroachment into this wetland by development or agriculture should be discouraged. A buffer of 100 feet between the wetland boundary and development should be maintained in

order to protect the integrity of the wetland community and ensure its continuing functioning on the landscape.

The nature and condition of this site should be assessed in the field.

Saxon Hill Swamp and Essex Center Swamp

The Saxon Hill and Essex Center swamps are two very similar swamps that are located just east of Essex Center. These two swamps are currently separated by Rte 15 but in the past, may have been connected. These swamps are hardwood dominated swamps with varying amounts of conifers such as white cedar, red spruce, hemlock and balsam fir. These are floristically diverse swamps with abundant hummocks of peat moss, ferns, sedges and wetland shrubs and herbs. These swamps are C-ranked natural communities and are thus considered locally significant.

Management Recommendations

In order to maintain the integrity of the natural communities in the swamps, a buffer zone of 100 feet should be maintained between the wetland edge and any development activity. This may be particularly difficult for these two swamps given their proximity to Essex Center. Nevertheless, any features such as roads or driveways that fragment the swamps or disrupt the hydrology of the swamps should be avoided. Any logging activity in the swamp should be discouraged. If undertaken, logging should only occur in a winter with ample snow cover and frozen soils.

Westford Swamp

As the name implies, this swamp sits mostly in the town of Westford. Of this 100 acre swamp, approximately 22 acres occur in the northeast corner of Essex along Osgood Hill Road. This is a very diverse wetland with communities such as a Black Spruce-Tamarack Bog, a Spruce-Fir-Tamarack Swamp and a Red Maple-Black Ash Swamp occurring in the same wetland basin. This diversity of wetland types, the condition of the communities and the landscape context make this swamp unique in the Champlain Valley. For these reason, this wetland is considered to be state significant.

Management Recommendations

Given the location of Westford Swamp it is unlikely that major development will encroach upon this swamp. However, in the event of such an occurrence, it is recommended that a 100 foot buffer be maintained between the wetland edge and any development. This buffer will ensure that the community remains undisturbed and intact.

Indian Brook Wetlands

The Indian Brook wetlands are a series of 6 wetlands that are all variations of a marsh community type wetland. Most of these wetlands are considered Shallow Emergent Marshes, though some are much wetter and are mapped as “Open Water”. These sites approach Deep Broadleaf Marshes. Most have, at some point, been influenced by beaver activity. This results in the nature of the wetland fluctuating over time as beavers move in and out of the area. Regardless of the classification of these sites, they are very important for wildlife in the area. They provide

habitat for a wide range of species such as moose, deer, bear, otter, mink, songbirds, waterfowl, reptiles and amphibians. This mosaic of undisturbed forest and diverse wetlands is also unique (in Essex and the region) in that it occurs largely on public land.



Figure 4. The Indian Brook wetlands provide valuable wildlife

Management Recommendations

Since these wetlands occur largely on public land, potential for degradation is minimal (as long as the land remains in public ownership). The land managers of the Winooski Valley Park District should be made aware of the findings of this report. Hiking trails in the vicinity of the wetlands can be developed as

long as they do not go through the wetlands. Motorized vehicles in or near the wetlands should be discouraged.

Alder Brook Wetlands

The Alder Brook Wetlands consists of two separate wetland complexes along Alder Brook. The first complex consists of a large Shallow Emergent Marsh flanked by two conifer swamps. These wetlands total approximately 82 acres and sit near the headwaters of Alder Brook. The southern part of the marsh appears to be adjacent to an old agricultural field that may have been ditched. The northern section, however, appears to be undisturbed. Beaver have created numerous dams and ponds along Alder Brook throughout this marsh.

The second wetland complex consists of two Shallow Emergent Marshes totaling 50 acres and a 16 acre shrub swamp along Alder Brook. While both communities (especially the marsh) are likely somewhat disturbed and colonized by invasive species they are considered locally significant for the 2.5 mile long buffer that they provide along Alder Brook. This buffer is likely used by wildlife, helps prevent erosion, and, most importantly, helps to maintain water quality in the Brook.

Neither of these sites was visited during the field component of this inventory. The assessment is made based on remote sources. Field work should be conducted to further the understanding of these wetlands.

Management Recommendations

Since the value of these wetlands lies primarily in the buffer that they create along Alder Brook, this buffer should be maintained.

The Vermont Significant Wetland Inventory Map (VSWI) shows only sections of the long Alder Brook corridor as mapped wetland. The actual wetland, however, likely includes the entire area as presented in the attached Wetland Inventory map (wetland #187 and 192). Encroachment into this buffer by agriculture or development should be discouraged. In cases where a widening of the buffer is possible, this should be encouraged. A wider buffer will allow for greater wetland functioning including a greater ability for the wetland to filter out excessive nutrients before reaching Alder Brook.

68 Acres Wetland

The 68 Acres wetland complex was originally named for the 68 acre floodplain forest that exists on the site. The floodplain forest as mapped during this inventory is closer to 79 acres, though some of these areas should be field checked. In addition, Another 15 acre floodplain forest to the south of the large forest is included as well. The wetland complex also includes 10 acres of Cattail Marsh, 39 acres of Shallow Emergent Marsh, and a small 8 acre hardwood swamp. The diversity of wetland types and the large size of this wetland are impressive, especially for a wetland that occurs along a major river.

As mentioned above, many of the floodplain forests in the state have been converted to agriculture. The remaining sites are generally small, fragmented and in poor condition. That is why this floodplain forest is so unique. While there are some areas of invasion by non-native species, many areas appear to be in undisturbed condition. The condition of the community, its size and the fact that it is somewhat buffered from agriculture and development make this a state significant site.

In addition to the natural community rank of the floodplain forest, the other wetlands surrounding it make up an extremely diverse and highly functioning wetland complex. Being located along the river, it is significant for erosion control and fisheries. The diverse mixture of wetland types, including open water,



Figure 5. The 68 Acre Wetland has a broad diversity of wetland types

herbaceous wetland, forested wetland and riparian area make this a valuable haven for a wide variety of wildlife. Floodwater attenuation and nutrient filtering also occur in these wetlands where the floodwaters are slowed and stored during high water events. Being publicly owned, the site is also important for open space, recreation and education. Overall, this wetland complex is a valuable public resource both in terms of the use that it gets by

the public and in terms of the ecologic functioning on the landscape.

Management Recommendations

With public ownership and management by the Winooski Valley Park District, it is unlikely that development will threaten these wetland communities. While invasive plants can become an issue in these wetlands, control and monitoring of these species is taking place, as evidenced by the informational placards along the hiking trails.

3.0 Vernal Pools

Vernal pools are seasonal wetlands that typically contain water during the wet spring months but become dry as the summer progresses. These isolated wetlands typically occur under a forest canopy, lack fish, and provide habitat to a wide variety of wildlife.

A total of 19 vernal pool locations were identified and mapped during the remote inventory and field work. Due to limited field time, only two of these locations could be confirmed. As can be seen from the map, most of these vernal pools are located east of Indian Brook or scattered throughout the forests in the northeast corner of town.

As explained in the methodology, remote mapping of vernal pools can be a difficult undertaking. It is therefore necessary to field verify and assess each of these sites if time and landowner permission allow. The following management recommendations are presented for pools that have confirmed use by vernal pool wildlife.



Figure 6. Vernal pools such as this occur throughout the northern part of Essex

Vernal Pool Management Recommendations

As can be seen on figure 7, two buffer areas are shown around each vernal pool. These buffer distances are based on the work of Semlitsch (1998), Calhoun and Klemens (2002), Calhoun and deMayandier (2004). The first buffer distance is 100' in diameter and is important because the density of amphibians within this area is very high both during the

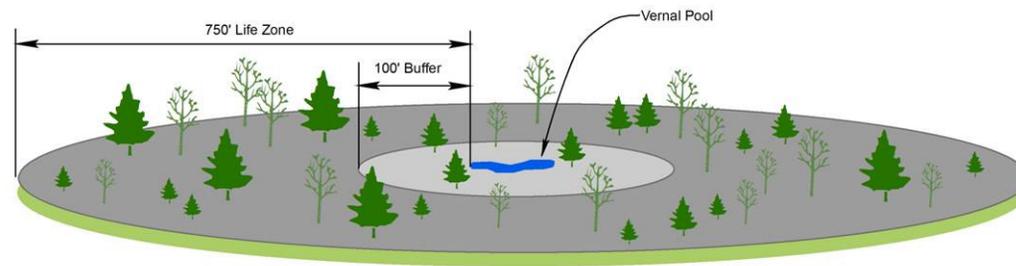


Figure 7. Vernal pool buffer recommendations

spring breeding period and the fall juvenile dispersal period. The nature of the forest immediately around the vernal pool has a tangible affect on the nature of the pool itself. Shading from surrounding trees can drastically prolong the hydroperiod of a pool. In addition, leaf litter that enters the pool from the surrounding trees forms the basis for the food chain in the vernal pool ecosystem.

The condition of the forest in this 100' buffer zone is therefore strongly linked to the condition of the vernal pool itself. For this reason, it is recommended that the vernal pool envelope be managed in a way that will not interfere with the functioning of the vernal pool. This includes maintaining a complete forested cover within this envelope. Light thinning of forest trees is, in most cases, acceptable but should come no closer than 25' to the pool's edge. Since many amphibians require un-compacted soils and a dense leaf litter on the forest floor, logging should occur when the soils are frozen and there is adequate snow cover. The creation of ruts in this area can often disrupt the hydrology of the nearby vernal pool. Development and other barriers to amphibian movement should be avoided within this buffer zone.

The next buffer shown on figure 7 is calculated at 750' from the vernal pool edge. This is termed the "amphibian life zone" or the "critical terrestrial habitat". Amphibians that breed in vernal pools spend most of their adult lives in the forests surrounding their natal pools. These amphibians require a forest with dense leaf

litter, decomposing woody debris, un-compacted soils, and adequate canopy cover. If logging is to occur in this area, it should occur in the winter when the ground is frozen and there is adequate snow cover. In addition, it is recommended to maintain 75% forested cover within this life zone to retain adequate habitat for forest dwelling amphibians. Ruts that occur in the life zone can fill with water and create population sinks as amphibians lay eggs in the ruts and never reach the more reliable vernal pool. Compaction of the soil can also result in direct loss of habitat for mole salamanders.

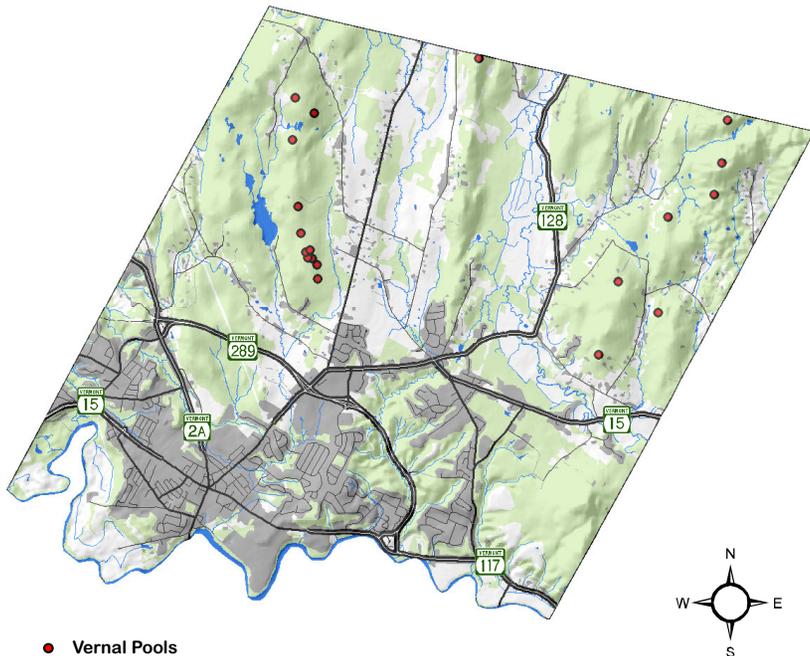


Figure 8. Essex Vernal Pools

4.0 Upland Natural Communities

The significant upland natural communities of Essex were identified and mapped in 1991 during an NNHP inventory of Biological Natural Areas of Chittenden County (Engstrom et.al. 1991). Due to time constraints, the mapping of new upland natural communities did not occur during this inventory. Rather, the focus of the current inventory was to update the existing data on each of these areas. This was done by examining the sites with remote sources in order to determine if any encroachment or visible degradation has taken place. Field visits were made to sites in which landowner permission could be obtained.

The NNHP program currently tracks only 2 upland natural communities in the town of Essex, the Sunderland Headwater Woods and the Vermont's Sandplain site. The 1991 inventory described two other sites as significant natural communities. These sites, Sandhill Slope and Overlook Park, consist of highly degraded and fragmented remnants of the Sandplain community. As such, they are not included in this updated site list as significant natural communities. Given, however, that they are the site of numerous rare plants, they should be managed for the preservation of those rare species. Other sites from the 1991 inventory such as the Champlain Valley Fairgrounds and the Essex Elementary School site are also site of rare plants and should be managed for the preservation of those rare species.

The two known significant upland Sandplain natural communities in Essex are briefly discussed below.

Vermont's Sandplain

The original Sandplain forest at this site occupied a little less than 5 acres and was composed of pitch pine and white pine trees mixed with black and red oak. The review of current aerial photographs reveals that much of the site has been developed. The forest that remains on the site is approximately 3 acres, but given that the site did not receive a field visit, it is unclear how much of these 3 acres are occupied by the Sandplain forest. A current field assessment is needed to update the significance of this natural community, but it is likely that the site would be downgraded to locally significant.

Sunderland Headwater Woods

This site was referred to as “Little Gap Woods” in the 1991 inventory report. The name, however, has been updated by the NNHP. This site consists of a small, dry Sandplain forest near the headwaters of Sunderland Brook. Unlike most Sandplain remnants in Essex, this site is somewhat buffered from development by forest. The actual Sandplain forest totals approximately 7 acres and appears to have had no development encroachment since the original inventory. This site is likely the least disturbed occurrence of this community remaining in Essex and therefore remains a locally significant site.

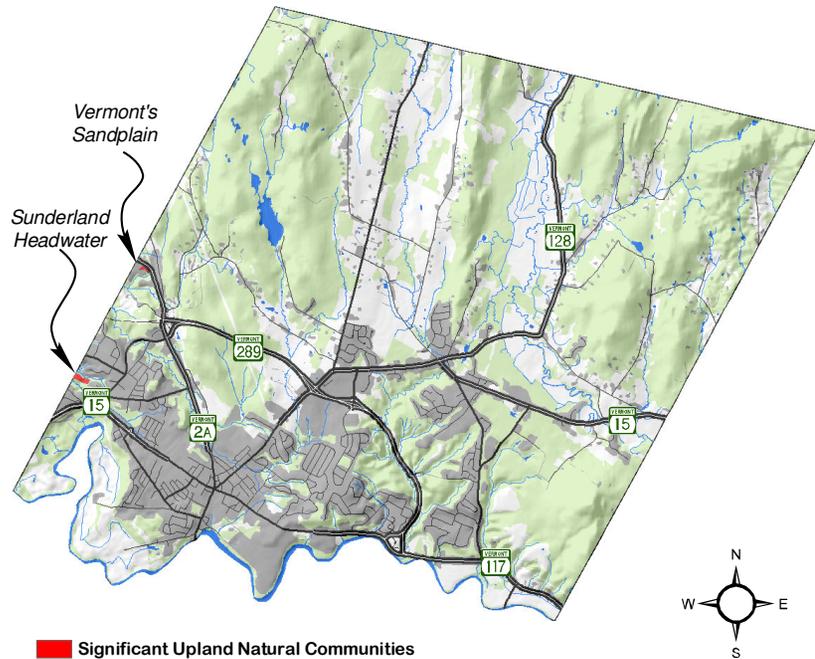


Figure 9. Essex Significant Natural Communities

Management Recommendations for Significant Upland Communities

Both of the significant natural community types in Essex are Pine-Oak-Heath-Sandplain forests. These Sandplain forests once occupied much of the towns of Milton, Colchester, Essex, and South Burlington. They occur on sandy, glacial outwash soils (usually Adams and Windsor soil types) only in these towns and in small, isolated sites along the lower Connecticut River in Vermont. This is one of the rarest and most endangered natural communities in the state. Because of the flat topography and well-drained soils, these sites are in high demand for development. There remains only about 4% of the original Sandplain communities left in the state. These sites are also typically home to a wide array of rare plant species that are adapted to the dry, sandy conditions. The preservation and management of these sites is complicated by the fact that the community was historically maintained by fire.

Despite these challenges, the conservation of these sites should be a priority for town planners. As mentioned above, these sites are one of the most at-risk communities in the region and often are home to many rare species. In addition, since not all of these sites have been mapped, special care should be taken on potential development sites that occur on Adams and Windsor soils. These two soil types may host remnant Sandplain communities and rare plant occurrences.

Working with willing landowners on conserving these sites should be a priority for the conservation commission or a group of concerned citizens. Developing conservation easements, purchasing development rights, working with landowners on management plans or other proactive conservation efforts would be beneficial in helping to conserve this imperiled natural community in Vermont.

5.0 Wildlife Habitat

Wildlife Habitat in the Town of Essex is an ever-changing mosaic as humans and wildlife continually adjust and readjust to each other's presence. The landscape constantly changes as active agricultural lands go fallow and as humans increasingly settle in Essex. The landscape as wildlife habitat can only be viewed from the perspective of the wildlife that live there.

The Essex urban core, largely concentrated in the southern portion of Essex is a highly developed, and for most wildlife, a highly fragmented series of smaller woodlots, isolated wetlands, and streamside environments where the human presence is found. Southern Essex is home to species of wildlife that can live in this

fragmented environment where roads, houses, industry, and people and their pets are found. Here white-tailed deer, red fox, skunk, and raccoons still find available space to live. These species do not have requirements for large wild lands free of human interference. Occasionally, a large animal such a moose or bear will be observed in the south, but for the most part, the breeding ranges of these and other more wary wildlife is located to the north.

Essex residents may do most of their wildlife viewing and gain most of their satisfaction from wildlife while remaining in their neighborhoods and backyards. Here residents see groundhog, squirrels and chipmunks, red fox, turkeys, the occasional deer, and songbirds at their feeders. Geese are seen flying over in spring and fall.

In the north, particularly the north-central portion of the Town of Essex, agricultural lands share the landscape with forests, and wetlands providing habitat for a rich diversity of wildlife. Moving within and among these diverse habitats are waterfowl, herons, hawks, coyote, moose, and mammals that inhabit the waterways such as raccoon, snakes, mink and muskrat. Red fox, songbirds, rabbits, squirrels and other species utilize hedgerows as habitat and to aid their movements across the landscape. Bear take to these corn fields for feasts when food is not available in the woods.

Much of the landscape in the northern portion of Essex is dominated by forests with both broad-leaved deciduous and needle-leaved evergreen trees. Both play a role in providing critical wildlife habitat in the extensive forests in north Essex and wildlife include both of these forest types within their home ranges. The evergreen forests provide habitat for warblers and other songbirds as well as cover for over-wintering deer, woody

bark for the hemlock-loving porcupine, and food and cover for the snow-shoe hare. The fisher, bobcat, and coyote utilize these habitats for feeding, and all species scavenge dead deer in these habitats that have succumbed to the harshness of winter.

Deciduous forests, especially those that are multi-layered, provide habitat and important food resources to a wide-variety of birds, including hawks, owls and songbirds. Thick vegetation translates into security cover for small mammals such as rabbits and hares and hunting grounds for the fisher. The hard and soft fruits and nuts provided by black and choke cherry, serviceberry, beech and oak, and the berry-producing shrubs provide important food for white-tailed deer, wild turkey, bear and other species.



Figure 10. Indian Brook Reservoir

Indian Brook Reservoir is one of those environments where a diversity of wildlife habitats is present. Open water and wetland habitats provide a great opportunity to observe flocking geese, herons, and ducks. The trails in the woods take the public deep into habitats of towering hemlock forests and wetlands where porcupine, coyote, fisher, deer, bear and moose can sometimes be observed. Vernal pools, which provide secure breeding habitat for a variety of amphibians are concentrated here as well in the large forested area in the north eastern section of Essex.

Within all of Essex we find specific wildlife habitats on the smaller scale. Throughout Essex, mice, moles, voles, songbirds, and certain reptiles and amphibians are commonplace. Within a woodlot, old rotting logs on the ground provide a rich habitat for these small animals. Also scattered throughout Essex are habitat features such as ledges and large individual boulders, large den trees, and old orchards which provide crucial breeding and feeding habitats for a variety of wildlife.

In this investigation and report, the larger Contiguous Habitat Units (CHU) serve as the starting unit of measure and description. Within each of these areas are described core habitat (remote from most human activities), wetlands, forested riparian areas and other habitat types where wildlife live and reproduce. These are meaningful in terms of individual species habitats (such as deer and deer over wintering habitat, and bear and beech stands) as well as management of these areas by people in the Town of Essex.

Below is a descriptive analysis of the wildlife habitat elements assessed (on the ground and remotely) and following the descriptions, a discussion of the Contiguous Habitat Units themselves.

Description of Wildlife Habitat Features

Core Area

Core habitat is forested wildlife habitat that is far removed from human activities and their artifacts such as roads, houses, and active farmlands. This remote wildlife habitat is qualitatively distinct from small fragmented areas in that it provides important mating, nesting, feeding, and denning habitats for species that cannot survive in more fragmented landscapes. These animals also require travel corridors between various landscape patches that provide these elements.

A wide-variety of birdlife in the northeast utilizes the larger contiguous forests available only in core areas. These birds include species such as the broad-winged and red-shouldered hawks, owls, and forest songbirds like the ovenbird, wood thrush, scarlet tanager, pileated woodpecker, and the Canada and black and white warblers. Several of these species suffer from greater nest predation (by animals such as squirrels, raccoons, snakes and other birds) and nest parasitism (by other birds such as the brown-headed cowbird) where nesting grounds are near human disturbance. Bird populations throughout Chittenden County, therefore, benefit from the deep forest “interior” habitat provided by core areas, see Figure 11 for core locations.

Remote wildlife habitat found in core areas can provide the various habitat elements for wide-ranging species such as fisher, bobcat, and black bear. Core areas are often hilly or mountainous, without easy access, and only rarely or seasonally visited by landowners, hunters, and loggers. Wide ranging species thrive in the remote habitat of the core areas.

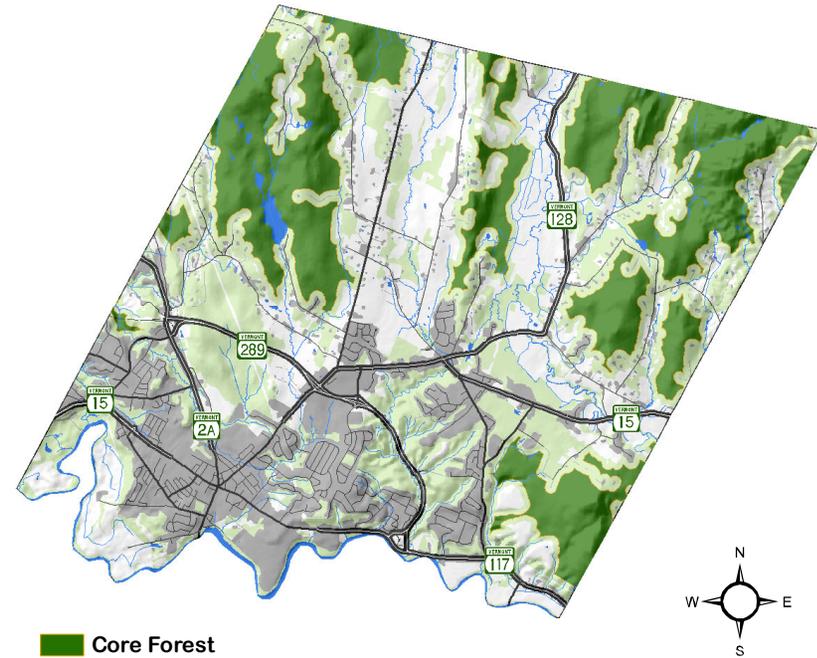


Figure 11. Core Habitat Map

Core areas are often the most important “source areas” where reproductively active female bear, bobcat, fisher, and coyote have their young and contribute to the overall population of these species. In general, the larger the core area size, the greater the population (and territories) of individual species it can support. Larger populations are generally more stable over longer periods. Core areas often provide the breeding grounds and nurseries that support relatively high populations of these deep forest species. Although most human wildlife observations may be near town, within our small woodlots and crossing roads, it is these core areas that produce a surplus of young and without them populations would likely go into decline.

Approximately 7625 acres of core habitat were identified within the study area.

Horizontal Diversity

Horizontal diversity is a measure of the change in vegetative types across an area of undeveloped land (i.e., core areas). These patterns or changes can result from differing bedrock and soil types, or past land use or management activities.

In general, the greater the change in vegetative diversity across a core area, the greater the overall species diversity of animals within that area. This applies most directly to mammals, such as fox, coyote, deer, moose and black bear, but horizontal diversity is also applicable to bird species. Mammals and birds often need

Core ID	Core Acres	Horizontal Diversity
1	639	High
2	2065	Low
3	180	High
4	823	High
5	1492	Mod
6	340	Mod
7	266	Low
8	134	High
9	296	Low
10	377	Mod
11	198	Mod
12	815	Mod

Table 4. Core Horizontal Div.

different vegetative structure and species composition to fulfill various habitat needs. For instance taller trees may be needed for nesting activity of a bird while the preponderance of the feeding activities of this bird may be on smaller saplings or shrubs. Black bear may utilize mid to older American beech trees for fall feeding and then travel to beaver-dam wetlands for spring and summer feeding and utilize areas of dense cover for travel corridors. A wide variety of habitat types can translate into more prey opportunities for predators.

When species specific habitat features on the landscape are not otherwise limiting an increase in horizontal diversity usually produces an increase in mammalian and bird species diversity.

Forested Riparian Habitat

Forested streamside riparian habitats are important for species that utilize the aquatic habitats, terrestrial vegetation and cover that are provided. Riparian forested vegetation anchors the stream shoreline and limits streambank erosion. It also provides shade and provides coarse woody debris to streams that adds to the stream structural and substrate diversity as well as provides food that fuels stream food chains.

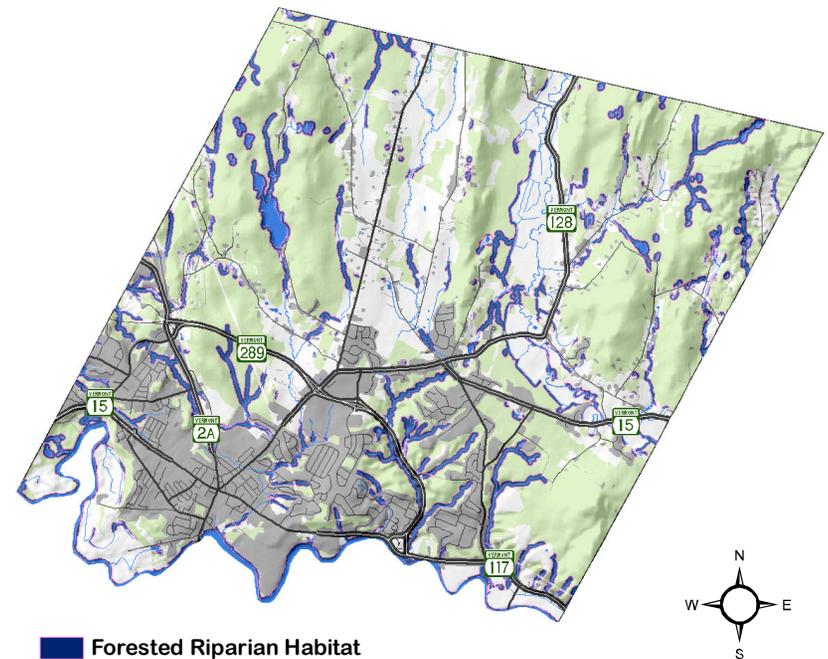


Figure 12. Forested Riparian Habitat

Amphibians such as the green frog and the Northern dusky salamander live along streams in forested habitat and utilize the adjacent riparian environment. The raccoon and long-tailed weasel use streamside forested habitats to hunt for food and for denning habitat. The moose and white-tailed deer use streams and streamside forested habitats for cover and water. Aquatic animals such as the river otter and beaver use streamside vegetation for cover, denning and food. Several species of bats such as the little brown myotis and the big brown bat use these environments to hunt for insects. Birds such as the belted kingfisher, wood duck, red-shouldered hawk, snipe, Eastern screech and barred owl, the wood pee-wee and alder flycatcher, American gold finch, tufted titmouse, and the yellow, Canada, and cerulean warblers make extensive use of forested riparian habitats.

There are approximately 167 miles of river and stream mapped in the town of Essex, and just over 3435 acres of forested riparian habitat was identified.

Deer Winter Habitats

In years where significant amounts of snow accumulate in the woods, white-tailed deer utilize evergreen forests for habitat. Evergreen trees intercept snow as it falls to the ground generally resulting in shallower snow depths. These habitats offer an overhead canopy of needles that shield deer from the cold. Deer congregate in these areas when snow depths exceed about 15 inches and remain until the snow melts in spring. These winter habitats can be critical in limiting the energy expenditures of deer and supporting the overall survival of this species in the north.



Figure 13. Hemlock deer winter habitat in CHU 1

Deer winter habitat that faces into the sun (either west or south) is often more valuable than east or north facing areas. Eastern hemlock, balsam fir, and Northern white-cedar stands provide the best cover and food value to deer, but pine and spruce will sometimes be utilized. These deer winter habitats are also home to bobcat, coyote, and scavenging bears that come looking for live deer to eat during the winter or carrion to scavenge in spring. Other animals such as evergreen-loving birds, porcupines and fox utilize these habitats during other seasons.

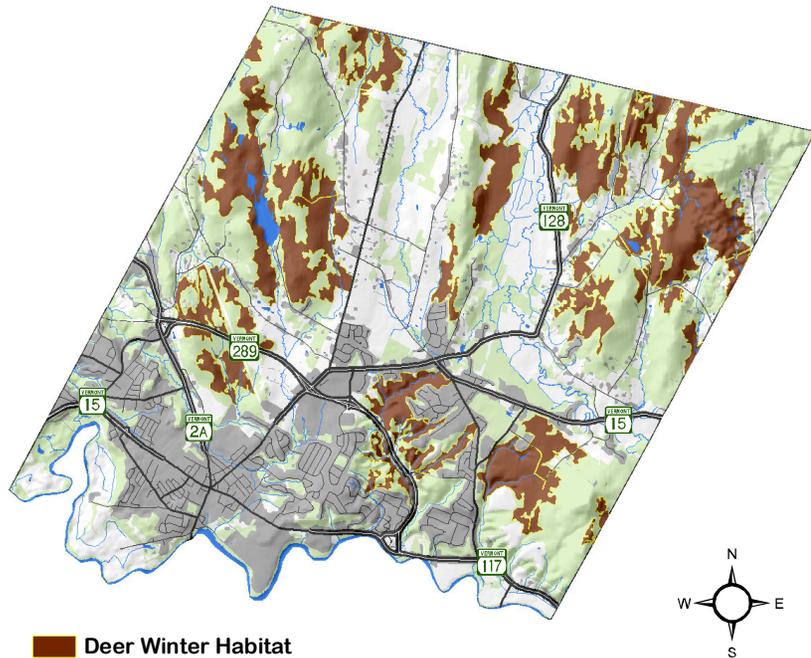


Figure 14. Deer winter habitat

AE mapped 4891 acres of deer winter habitat in the study area, the State of Vermont had previously mapped 1679 acres.

Mast Stands

Masting trees are those which synchronize fruit production in an area. In the town of Essex, masting trees are generally American beech trees.

When beech stands are remote, use by black bear is generally higher than stands near human activities. Wildlife attracted to the fruits of American beech (beechnuts) include squirrels, wild turkey, deer, and bear.

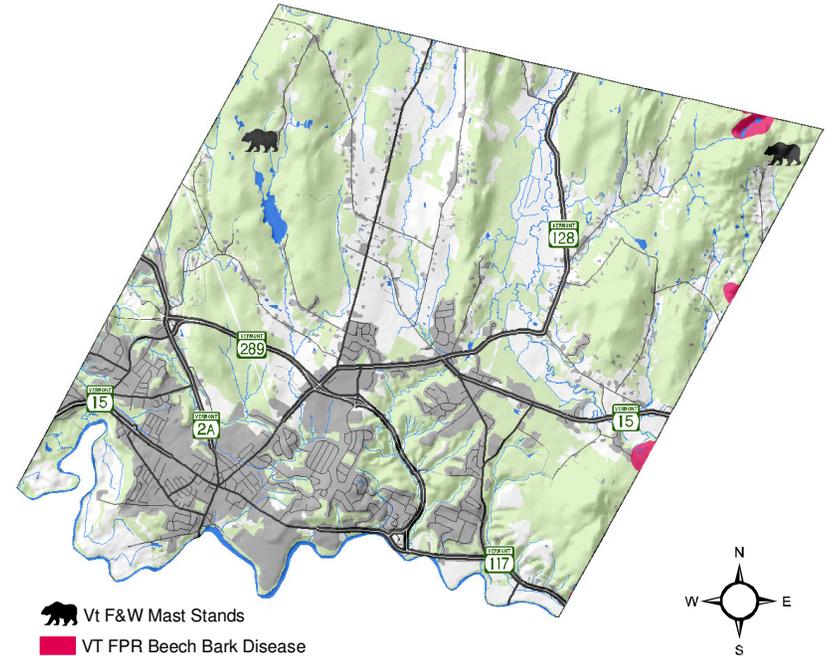


Figure 15. Known mast stands in Essex

Bear will climb the trees in fall to gather beechnuts, leaving scars from their climbing activities. They often return in spring and

scavenge beechnuts from the ground under the beech trees. Bears act in a similar fashion in search of acorns from oak trees, however, their climbing activities do not usually leave persistent scars and their use is therefore difficult to detect on the tree itself.

Mast stands were not re-mapped for this project, however two existing sources were used to identify mast stands, particularly American beech. Vermont Fish and Wildlife maintains a database of known mast stands, represented by points, and the Vermont Department of Forest Parks and Recreation annually maps forest disease, including beech bark disease.

Wetlands

Wetlands are habitats that are transitional between aquatic habitats and terrestrial habitats. Wetlands are a combination of hydric soils, hydrophytic plants, and the presence of water itself.

Wetlands associated with water bodies provide habitat for muskrat, river otter, mink, moose and deer, fisher and bobcat, raccoon, spawning fish, and birdlife such as herons, ducks, geese, shorebirds, northern harriers, and a wide variety of songbirds.

Forested swamps are visited by over-wintering deer, bear, fisher, raccoons and coyotes, as well as other species of wildlife. Prey species (such as snowshoe hares and mice) can be common in wetlands and thus they are attractive to predators. Sedges and other broad-leaved herbaceous plants support a rich food chain that herbivores such as deer and moose enjoy.

Wetlands that contain open water (but not fish) can serve as breeding habitat for a variety of frogs and salamanders. Many wetlands are breeding grounds for the insects that amphibians eat.

The Wetlands Inventory Map created for this study (including potential vernal pools) is discussed elsewhere in this report.

Travel Corridors

Travel corridors are places where landscape and land use characteristics combine to form an area where wildlife can move across roads to and from habitat areas. Many species of wildlife utilize a diversity of different habitat and plant community types within their home ranges (or territories). Wildlife move across the landscape for a variety of reasons but generally they move in search of new territories, food resources, and/or potential mates.

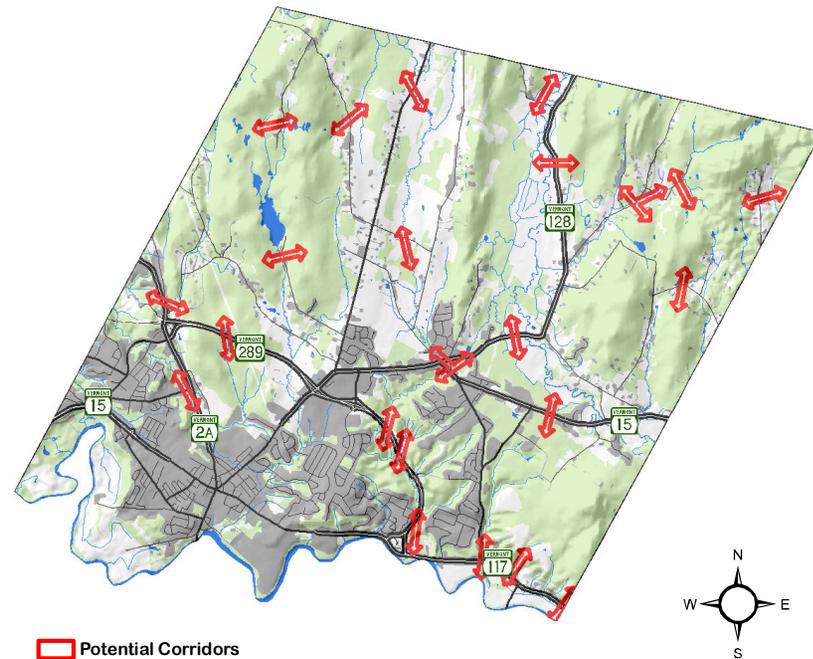


Figure 16. Potential wildlife travel corridors

A good example to illustrate seasonal wildlife movements is that of the black bear in Vermont. The black bear typically moves in spring from its high, remote denning areas to wetlands (often forested seeps) lower on the landscape. In summer bear will seek berry patches in openings and along old logging roads within the forest. In fall, bears will move to beech stands, orchards, or possibly corn fields depending on the availability of natural foods in the forest.

The corridors presented in this report are considered potential, that is their level or presence of use is unknown, but habitat characteristics suggest the general area may be used by any number of species for travel across roads or developed areas while moving from one habitat feature to another. Use by specific species is not suggested within the confines of this project, but could range from amphibians such as frogs and salamanders to wide ranging mammals such as moose, black bear and bobcat.

Detailed discussion of corridor assessment methodology is provided in Appendix 1, Section G.

A total of 22 potential corridors were identified within the study area. As mentioned in the methodology (Appendix 1, Section G) these corridors were not field verified or assessed.

Land conservation of connecting lands, in conjunction with improved riparian buffers and structures that provide wildlife safe travel, will aid in maintaining a healthy and diverse wildlife population throughout the area.

Contiguous Habitat Units (CHUs)

Contiguous Habitat Units are a combination of several different wildlife habitat types combined to form a unit of relatively continuous wildlife habitat. The largest forested area, often the most valuable wildlife habitat is the core area (largely free from most human activities). In constructing CHUs the core areas are combined with forested riparian habitats, wetlands, deer wintering habitat and mast stands. In some cases, these specific wildlife habitat features (like riparian areas) may not add new area to the already mapped central core (they are already subsumed within the core area boundary), while in other cases (when they are

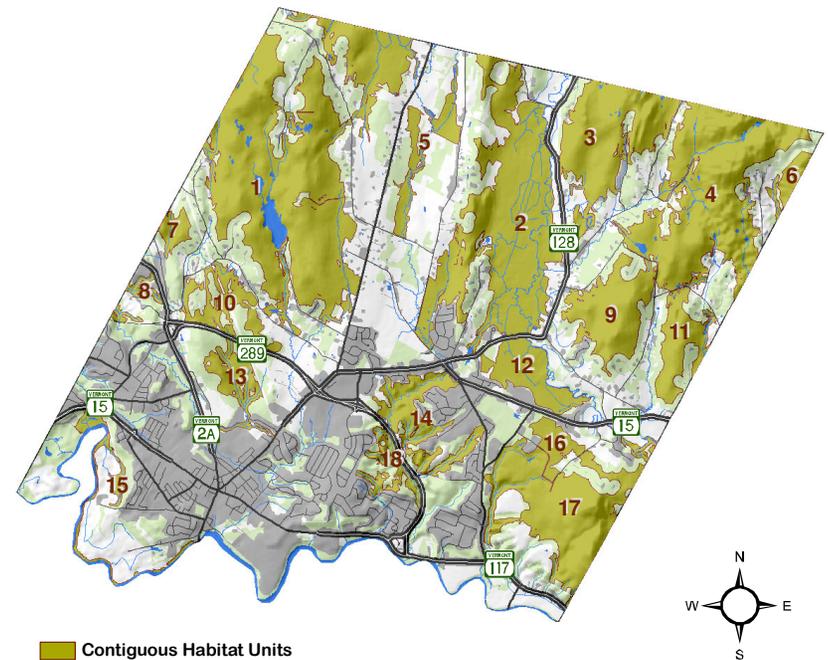
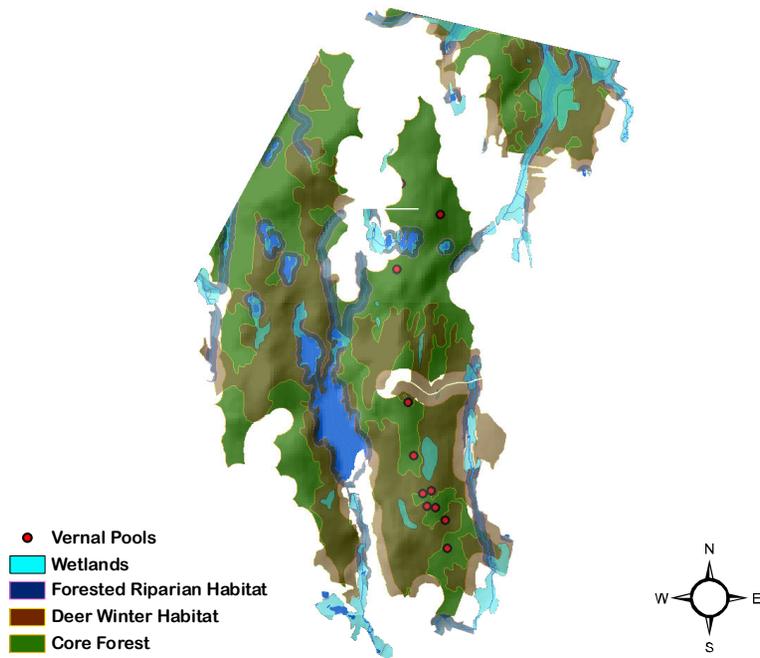


Figure 17. Contiguous Habitat Units

tangential but not within the mapped core area) they add new area and additional acreage to the CHU.

A total of 18 contiguous wildlife habitat units (CHUs) were identified in the town study area, see Appendix 1, Section E for methodology. The 18 CHUs comprise a total land area of 9565 acres, of which 5428 acres is considered core habitat. A summary data table is provided in Appendix 2 detailing the individual habitat elements within all the CHUs. A discussion of the CHUs is provided below, with the larger ones discussed first.

CHU#1



Significant Habitat Information

- 2486 acres total
- 1990 acres Core Habitat
- 1295 acres Deer Wintering Habitat
- 312 acres Wetlands
- Ledge Habitat
- State Mapped Mast Stand
- 10 Vernal Pools
- Movement Corridors

Discussion of Wildlife Features

CHU#1 is located in the north western portion of Essex and is one of the largest CHU's in the Town, extending into Milton, Colchester and Westford.



Figure 19. Indian Brook wetlands

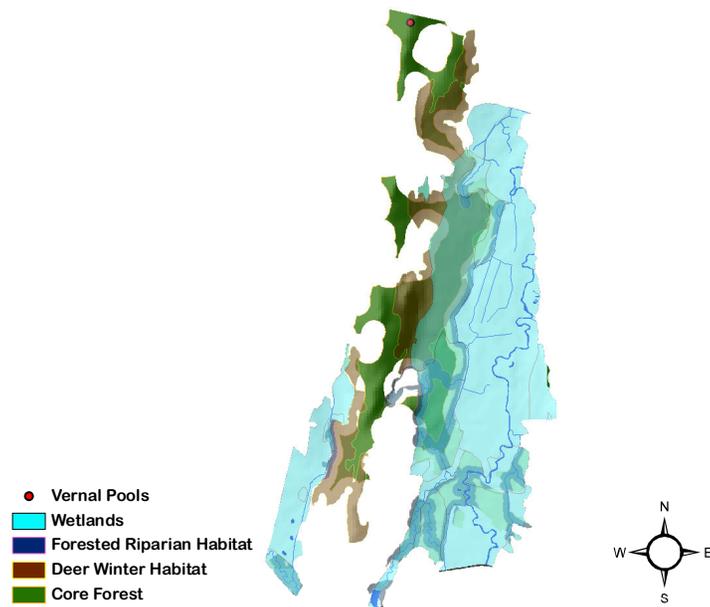
CHU#1 core area is approximately 2000 acres in size providing extensive habitat for wild species such as black bear, moose and fisher. This deep woods core area also provides extensive bird habitat. Large sections in CHU#1 consist of Eastern hemlock forest which serves as white-tailed deer wintering yards and porcupine habitat. Ledges and rocky areas provide refuge for porcupine, bobcat, fisher, raccoon and ruffed grouse. The State of Vermont Fish and Wildlife Department has also mapped a mast stand within this unit which is potentially utilized by bear. Onsite investigation did not locate this stand.

The Indian Brook Reservoir is located within this CHU, which along with this area's other open water wetlands, streams, and riparian habitat provide habitat for fish and amphibians, waterfowl, shorebirds, raccoon mink, muskrat, river otter and other species.

Potential movement corridors were identified within the unit, and between CHU#2 and CHU#6.

Canoeing, swimming, hiking, family outings, skiing and other recreational opportunities are focused near the Indian Brook Reservoir and wildlife viewing opportunities abound within this CHU.

CHU#2



Significant Habitat Information

- 1566 acres total area
- 431 acres Core Habitat
- 382 acres Deer Wintering Habitat
- 1144 acres Wetlands
- Ledge Habitat
- 1 Vernal Pool
- Movement Corridors

Discussion of Wildlife Features

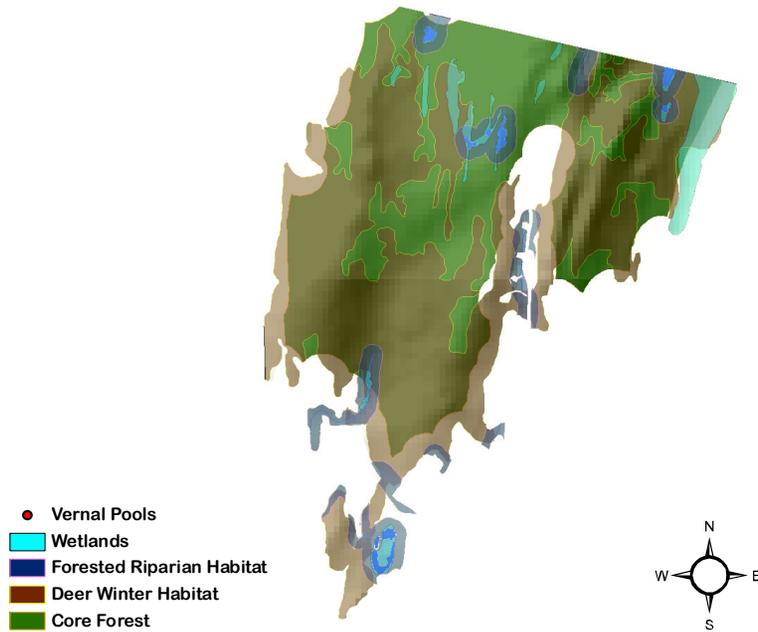
CHU#2 is a large section of wild land located in the north central part of the Town. Significant areas of CHU#2 consist of wetlands, much of it as old agricultural lands, but some of it very significant treed swampland as well as the Brown's River marsh wetlands. The Brown's River, and its associated wetlands provide habitat for fish, waterfowl, shorebirds, and species such as mink and otter.

Core area provide habitat for moose, white-tailed deer, coyote, fisher and black bear. This area has significant habitat for over-wintering white-tailed deer. It also contains potential ledge habitat adjacent to forest and wetlands which could be utilized by bobcat, raccoon, porcupine, fisher, ruffed grouse, and other wildlife.

Potential movement corridors were identified between CHU#2 and CHU#3, as well as corridors between CHU#12 and wild areas to the north, extending into the town of Westford.

This CHU provides significant bird and other wildlife viewing opportunities.

CHU#3



Significant Habitat Information

- 731 acres total area
- 563 acres Core Habitat area
- 497 acres Deer Wintering Habitat
- 43 acres Wetlands
- Ledge Habitat
- Movement Corridor

Discussion of Wildlife Features

CHU#3 is also located in north central Essex adjacent to forested land in Westford.

This CHU contains large sections of evergreen forest which are utilized by white-tailed deer as over-winter habitat, especially those areas on small ridges. Areas of ledge within the CHU provide habitat for bobcat, porcupine, and raccoon.

As discussed above, a potential movement corridor has identified between CHU#3 and CHU#2.

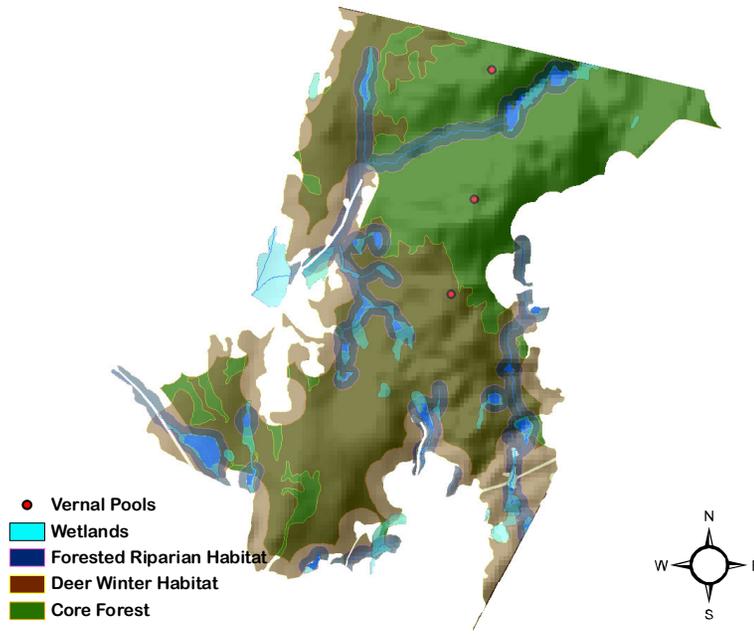
CHU#3 also contains many open-water wetlands, several of which are connected by old beaver wetlands that provide habitat for species such as mink and muskrat, coyote, birds such as waterfowl, herons, shorebirds, and breeding habitat for amphibians.



Figure 22. Wetland complex in CHU 3

This CHU has some open water wetlands, or shallow water ponds that have seen historical utilization as great-blue heron breeding areas (rookeries). Within these wetlands are also sign of bear, coyote, and moose.

CHU#4



Significant Habitat Information

- 1365 acres total area
- 1031 acres Core habitat area
- 822 acres Deer Wintering Habitat
- 107 acres Wetlands
- Ledge Habitat
- Mast Stands
- 3 Vernal Pools
- Movement Corridor

Discussion of Wildlife Features

CHU#4 is an extensive wild land located in the north eastern section of Essex bordering additional forestland in Westford and Jericho.

CHU#4 provides over 1000 acres of core habitat removed from human interference. Deep forest bird life and large wild mammals such the moose, bear, bobcat and fisher thrive here.

This landscape consisting of extensive forest, wetland, and streams has extensive white-tailed deer over-winter habitat that is well utilized. A wide-variety of wildlife concentrate their movements in riparian zones-especially areas with thick woody plant cover. Old beaver flowages and shallow ponds are linked throughout the CHU by streams and streamside riparian habitat. Beaver are still active within this CHU. These beaver-influenced wet landscapes provide habitat for ducks, shorebirds, belted kingfisher, woodpeckers, moose, mink, muskrat, and river otter.

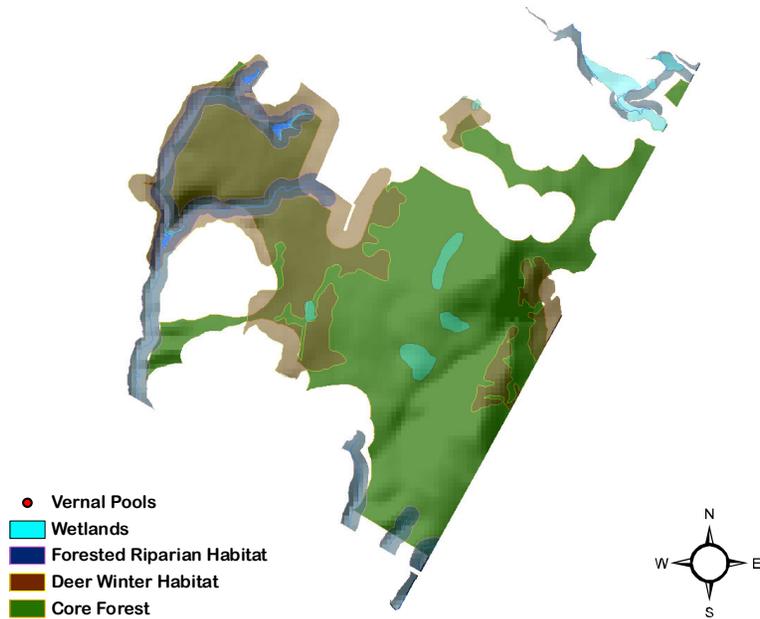
Raccoons, coyote, and bear also inhabit these woods. Bear sign was observed near the beaver flowages, and at least 2 mast stands utilized for bear are located within or near this CHU. Ledge habitat provides cover, security, and breeding habitat for raccoons, porcupine, fisher, bobcat and ruffed grouse.



Figure 24. Bear scat in CHU 4

A potential movement corridor was identified between CHU#4 and CHU#6.

CHU#17



Significant Habitat Information

- 894 acres total area
- 698 acres Core Habitat
- 349 acres Deer Wintering Habitat
- 38 acres Wetlands
- Riparian Habitat
- Ledge Habitat
- Movement Corridor

Discussion of Wildlife Features

CHU#17 is located in the south east section of Essex and is adjacent to relatively wild forestland in Jericho. It contains substantial evergreen winter habitat for white-tailed deer. It also provides over 3 miles of riparian and stream habitat for fish, amphibians, raccoon, white-tailed deer, coyote, wild turkey, birds such as belted kingfisher and other species. Based on review of USGS topographic maps and orthophotographs, Saxon Hill may provide ledge habitat for a wide-variety of wildlife. The Saxon Hill area also potentially contains seepage forest that provides habitat for moose, amphibians, and other species. A potential movement corridor was identified between CHU#17 and the Winooski River to the south.

Smaller CHUs:

CHU#5

Significant Habitat Information

- 214 acres total area
- 209 acres Wetlands

Discussion of Wildlife Features

CHU#5 is an irregularly shaped, relatively level/flat CHU in the north central portion of the town. This CHU consists of predominantly old fields, riparian habitat along Alder Brook, shrub wetlands, and marsh habitat. The unit contains some open water areas, providing habitat for muskrat, mink, raccoon, northern harrier, fish, ducks, shorebirds, and amphibians. Beaver likely have a significant influence on the landscape in CHU#5.

Because of the open nature of this CHU it provides opportunities for wildlife viewing.

CHU#6

Significant Habitat Information

- 86 acres total area
- 67 acres Core Habitat
- 10 acres Wetlands
- Ledge Habitat
- State Mapped Mast Stands
- Movement Corridor

Discussion of Wildlife Features

CHU#6 is located in the far north eastern corner of Essex bordering forestland in Jericho to the east. The greater portion of this CHU is located in the town of Jericho.

This CHU consists of mostly northern hardwood forest and could contain extensive American beech dominated forests. Beech forests provide mast for species such as white-tailed deer, wild turkey, bear, and other species. The State of Vermont Department of Fish and Wildlife has mapped one such mast stand directly adjacent to this unit, which likely extends into the unit.

Based on review of USGS topographic maps and orthophotographs, a west-facing hill in the northern portion of this unit has potential ledge habitat. A stream (tributary to the Brown's River) and a shrubby and open wetland also provide habitat for amphibians, red fox, and coyote within this unit.

A potential movement corridor was identified between CHU#6 and CHU#4.

CHU#7

Significant Habitat Information

- 73 acres total area
- 65 acres Core Habitat

Discussion of Wildlife Features

CHU#7 is located along the western boundary of the town and extends into Colchester. This unit provides a smaller habitat base for wildlife. It has a relatively small core area but is adjacent to an equally large wooded wild land in Colchester. It provides space for wildlife but does not contain many specific wildlife habitat elements such as ledges, streams, and wetlands.

CHU#8

Significant Habitat Information

- 53 acres total area
- 7 acres Core Habitat
- 13 acres Wetlands
- Movement Corridor

Discussion of Wildlife Features

CHU#8 is located along the western boundary of the town. The majority of the unit extends into the town of Colchester with only two small fingers present in Essex.

This relatively small CHU provides a diversity of forested and wetland habitats that continue into the town of Colchester. This area is small enough to provide all edge habitat with no deep woods, core habitat. A potential movement corridor was identified between CHU#8 and CHU#10.

CHU#9

Significant Habitat Information

- 452 acres total area
- 377 acres Core Habitat
- 198 acres Deer Wintering Habitat
- 4 acres Wetlands
- 2 Vernal Pools

Discussion of Wildlife Features

CHU#9 is located within the eastern central portion of Essex. This area provides only limited core habitat values. It is forested with some white-tailed deer over-wintering habitat. CHU#9 also contains swamps and a marsh tucked into a densely treed forested landscape which provides excellent habitat for wildlife.

CHU#10

Significant Habitat Information

- 227 acres total area
- 189 acres Deer Wintering Habitat
- 52 acres Wetlands
- Riparian Habitat
- Movement Corridors

Discussion of Wildlife Features

CHU#10 is located within the central western portion of Essex. This unit is fully contained within the town boundaries.

This CHU is a large forested area with extensive white-tailed deer winter habitat. An extensive forested swamp community also provides habitat for moose, fisher, and other animals.

CHU#10 provides for streamside riparian habitat along a tributary to Indian Brook. Riparian habitat is important for birds, raccoons, and other wildlife.

This unit offers a potential movement corridor crossing VT-289 in a north-south direction most directly into CHU#13. A second possible movement corridor was identified between CHU#13 and CHU#8.

CHU#11

Significant Habitat Information

- 262 acres total
- 198 acres Core Habitat
- 66 acres Deer Wintering Habitat
- 14 acres Wetlands
- Riparian Habitat
- 1 Vernal Pool
- Ledge Habitat

Discussion of Wildlife Features

CHU#11 is located along eastern central boundary of Essex and extends into Jericho.

This unit is a mix of deciduous and conifer forests and the latter are State mapped deer wintering areas. CHU#11 has wetland habitat that is significant for water-dependent wildlife. In addition CHU#11 provides riparian habitat for wildlife movements and overall habitat. Based on review of USGS topographic maps and orthophotographs, it may also contain potential ledge habitat. This unit is situated in a generally forested matrix and may be visited by large wide-ranging wildlife such as moose and predators.

CHU#12

Significant Habitat Information

- 287 acres total
- 281 acres Wetlands
- Riparian Habitat
- Movement Corridor

Discussion of Wildlife Features

CHU #12 is located along the eastern portion of Essex and is fully contained within the town boundaries.

This CHU has a large agricultural component, with approximately 140 acres of agricultural fields.

This CHU has an equally large wetland and riparian zone (along the Brown's River) component. Red spruce-hardwood swamps, and red maple-black ash swamps comprise over 150 acres of this unit. Waterfowl, shorebirds, mink, muskrat, raccoon, red fox, white-tailed deer, amphibians, and other wildlife utilize this area. The Essex Center Swamp is located in this CHU.

CHU#12 may serve as an important landscape connection between northern and southern wildlife habitat in the eastern section of Essex. Potential movement corridors were identified within the unit and also between CHU#12 and units #14 and #16. This CHU provides wildlife viewing opportunities.

CHU#13

Significant Habitat Information

- 186 acres total area
- 125 acres Deer Wintering Habitat
- 4 acres Wetlands
- Riparian Habitat
- Movement Corridor

Discussion of Wildlife Features

CHU#13 is one of the few CHU's located to the south of VT-289, in the south eastern portion of the town. Given this unit's close proximity to the urban core, it is an especially important wildlife habitat. It has extensive area that is mapped by the State of Vermont as deer wintering area, as well as extensive stream and streamside riparian habitats associated with tributaries of Indian Brook. A potential movement corridor, as discussed above, was identified between CHU#13 and CHU#10.

CHU#14

Significant Habitat Information

- 333 acres total area
- 317 acres Deer Wintering Habitat
- 7 acres Wetlands
- Riparian Habitat
- Movement Corridor

Discussion of Wildlife Features

CHU#14 is located near the urban Essex core in the southern central portion of the town. Alder Brook provides nice stream and riparian habitat utilized by raccoon, white-tailed deer and water-loving birdlife. White-tailed deer most likely do not utilize this area in winter although the State has mapped a deer wintering yard within the unit.

This forested area is fairly isolated within developed land and is not likely to provide large enough habitat for species such as bear, fisher and moose. Potential movement corridors were identified between CHU#14 and CHU#12, CHU#18 and CHU#16.

CHU#15

Significant Habitat Information

- 111 acres total area
- 63 acres Wetlands
- Riparian Habitat

Discussion of Wildlife Features

CHU#15 is located in the south eastern corner of the town. This unit consists of floodplain forest, oxbow open water wetlands, marsh habitat, and hardwood swamps along the Winooski River. Areas that flood might be significant fish breeding grounds. Areas with open water are significant habitat for osprey, waterfowl, shorebirds, belted kingfisher, river otter, mink, raccoon, red fox, coyote, white-tailed deer, and other wildlife. This wetland-floodplain complex provides excellent wildlife viewing opportunities.

CHU#16

Significant Habitat Information

- 119 acres total area
- 115 acres Deer Wintering Habitat
- 34 acres Wetlands
- Movement Corridor

Discussion of Wildlife Features

CHU#16 is located in close proximity to the Essex urban core, in the south eastern portion of the town. The area contains hemlock and red maple-black ash swamps which provide cover and food for wildlife such as red fox, white-tailed deer, coyote, and hawks. It also contains State mapped deer



Figure 26. Hemlock swamp in CHU 16

over-wintering habitat, however its use in winter is diminished by the presence of mechanized winter recreation. There appears to be a snowmobile trail through the center of the forested area. A potential movement corridor was identified between CHU #16 and CHU#12.

Because of the presence of trails and people this unit provides some wildlife viewing opportunities.

CHU#18

Significant Habitat Information

- 121 acres total area
- 85 acres Deer Wintering Habitat
- Riparian Habitat
- Movement Corridor
- Ledge Habitat

Discussion of Wildlife Features

CHU#18 is located in the central southern portion of the town. This CHU has extensive waterways associated with Alder Brook at its small tributaries, riparian habitats, and white-tailed deer winter habitats. These waterways may provide movement corridors for streamside wildlife such as mink, otter, and belted kingfisher that move under VT-289 between CHU#18 and CHU#14. Based on review of USGS topographic maps and orthophotographs, this area may also provide ledge habitat that could be utilized by raccoon, coyote, porcupine, and ruffed grouse.

Management Recommendations for Wildlife Habitat

Contiguous Habitat Units with Core Habitat Units: The Core Habitat Units described above are areas with core habitat, forest interior habitat and generally a wide-diversity of wildlife habitat elements. They provide important habitat for large, wide-ranging wildlife such as black bear as well as specific habitat features critical for a wide variety of other species.

- Forest fragmentation in these CHUs should be discouraged. Roads, housing and most other human activities should be restricted to the periphery of these units.
- Forest management activities that support a diversity of forest and early successional natural communities are an appropriate use of these areas.



Figure 27. Forest management practices creating early succession forest in CHU#4.

- Connections between the various wildlife habitats/elements within the units should be maintained.
- To maintain deep forest habitat for many declining songbirds, heavy forest cutting which promotes the development of edge conditions should be limited in these areas.

Contiguous Habitat Units Consisting of Areas Dominated by Forested Riparian Areas, Wetlands, and Potential Wildlife Travel Corridors (CHUs: #5, # 8, #10#-15, #17-#18)

These relatively smaller CHUs are generally located in the southern, human developed, and fragmented portion of Essex. However they often are important in providing movement corridors and the only available wildlife habitat in these areas. They are vulnerable to fragmentation and a diminution of use by wildlife.

- Connections between the various wildlife habitats/elements within the units should be maintained.
- Human development activities such as roads, housing etc. should be strongly discouraged within these areas.
- Water flow in stream and wetlands should be maintained at conditions which promote the continued use of these areas by fish and wildlife.

Bear Habitat: Black bear require extensive remote areas to meet their yearly habitat requirements. Large, non-road areas must be preserved to maintain sustainable populations within the Town of

Essex. Bears must continue to have access to mast stands and forested wetlands. Bear habitat management can also focus on beech stands that have documented bear use.

- Mapped beech stands and forested wetlands utilized by bear should be protected from development activities with buffers ¼ mile in extent. A professional biologist should address potential impacts to bear and their populations in these cases.
- Harvesting of beech (healthy or lightly diseased) that shows current or historic use by bear should be discouraged.

Ledge, Talus, and Cliff Habitats: Ledge, talus and cliff habitats are utilized by nesting birds, resting wildlife, and in some cases denning bobcats and porcupine.

- Human development activities should be discouraged on and near ledges, talus, and cliffs.
- A minimal 100' buffer should be maintained between these habitats and human development activities.

Deer Winter Habitat: These habitats might be critical to the survival and maintenance of deer populations in the Town of Essex. Without deer over-winter habitat preservation, deer populations within the area could decline.

- Deer over-winter habitats identified in this report should be protected from human activities by 300' buffers.
- A professional biologist should assess potential impacts from human development activities (except forest management activities) proposed within 300' of deer winter habitats.

Forested Riparian Communities: Forested riparian habitats offer important wildlife habitat and provide cover for wildlife movement.

- Wherever possible, forested riparian communities should not be fragmented by human activities.
- Forest management activities in forested riparian communities should utilize selective harvesting techniques only and maintain a continual forest cover.

Travel Corridors: Functioning travel corridors allow for the movement of wildlife across the landscape. Conservation of wildlife travel corridors is often a difficult undertaking in that much of the negative impact to these features happens slowly over time. The affect on a particular corridor from one residential development, for example, may be small. Over the years, however, as more small development occurs, the once functioning travel corridor may receive less use and eventually disappear. Concrete management recommendations for the travel corridor presented here are, therefore, difficult to develop. The following steps, however, will increase the knowledge about the specific corridors in the towns and enable planners to draw more specific conservation guidelines.

- Conduct field verification studies to identify and characterize the important travel corridors within the Town of Essex and especially those presented in this study.
- Prioritize the importance of these travel corridors for conservation action.

- Take steps to conserve the most important travel corridors by creating isolation buffers around them to maintain wildlife movement patterns.
- Limit development to the outside edge of corridors and encourage screening, natural color schemes and other actions to limit negative effects of development in or near corridors.
- Important black bear corridors are especially vulnerable and may require buffers of up to ¼ mile in extent.
- Improve vegetated buffer conditions along the Winooski River and Brown's River and their tributaries to provide protected movement opportunities for wildlife.

7.0 Conclusions

Essex, located within Chittenden County provides a picture of the contrasts and challenges facing many Vermont towns in the 21st Century. The town of Essex is perhaps unique in the Champlain Valley in that it has retained a significant amount of remote, forested lands and open space despite experiencing tremendous growth in the last 25 years. How does Essex accommodate its increasing residential and industrial base while continuing to provide habitat for its wildlife. Essex is home to a wide variety of upland and wetland natural communities and can only maintain its current wildlife diversity by actively seeking to conserve and protect these wildlife habitats. Essex has undertaken this investigation to better understand the nature and specifics of their natural resources and to plan for protecting these resources for their own sake and to enhance the quality of life for its residents.

The quality of life in Essex, as in all Vermont, that makes this area attractive to live and work is the clean water to fish and swim in, the woods to walk and hunt in, and the clean air to breathe. We are hopeful that Essex will use the information within this report to carve out a home for wildlife, woods and wetlands as well as its citizens.

Essex, while known throughout Vermont as a great place to seek employment, is also surprisingly bountiful in its forests, wetlands, and other wildlife habitats, as well as recreational opportunities. It is our hope and belief that the Town of Essex recognizes the importance of its wildlife, wildlife habitat, and recreational opportunities and will continue to seek protection and wise stewardship of all of these areas.

What we have presented in this report is essentially a snapshot of a place where wildlife and human habitats are ever-changing. The wildlife habitats and people will push up against each other for some time to come. Hopefully the information contained here will inform the citizenry, developers, and town planners in Essex and Chittenden County in general, and provide a basis for informed decisions that will promote both conservation and human activities side by side. The natural resource inventory process is an ongoing endeavor constantly in need of fresh information. It is our hope that over the years, the Town of Essex will continue to map and assess their natural features and add to this snapshot in time.

8.0 References

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