

Habitat Connectivity Analysis for the Essex — Saxon Hill Connectivity Project

May 14, 2025



Table of Contents

1. Executive Summary	1
2. Introduction.....	1
3. Background	1
4. Habitat & Connectivity Assessment.....	2
Study Area	2
Methods	2
Wildlife Utilization & Habitat Types	3
Wildlife Connectivity	5
5. Recommendations	10
Wildlife Habitats	10
Wildlife Connectivity	11

1. Executive Summary

- Wildlife, and habitats supporting their populations, are present within the Study Area.
- Wildlife connectivity opportunities in and out of the Study Area are present, but generally quite limited and highly compromised.
- Discourage further development and consider improvements to benefit wildlife movement in highly compromised corridor areas.
- New trail designs should consider wildlife movement and minimize human presence in and near valley bottoms, wetlands, and existing trail-free zones.
- Reduce trail density and redundant trails where possible.
- New trail layouts should be reviewed on the ground for impacts to sensitive wildlife habitats and corridors, as well as natural resource permitting considerations early in the planning process.

2. Introduction

Arrowwood Environmental (AE) was retained by CRO Planning & Design as a team member for the Essex — Saxon Hill Connectivity Project (Project) in Essex, Vermont. AE's scope of work includes:

- Habitat Connectivity Analysis in the area between Saxon Hill, the Mathieu Town Forest, and the core forest block east of Highway 289. Conduct overall habitat and connectivity assessment and identify opportunities and constraints for improving habitats and habitat connectivity.
- Rapid Field Assessment. Identify sensitive habitats and wetlands after future trail opportunities are mapped and flagged.

3. Background

The connectivity corridor between Saxon Hill, the Mathieu Town Forest, and the core forest block east of Highway 289 (the Connectivity Corridor) includes a series of mostly forested natural areas located in the southeast corner of the Town of Essex. These forested areas exist within a network of residential, commercial, and industrial development, as well as roads and highways. The surrounding development significantly reduces and concentrates the amount of available habitat on the landscape and impedes wildlife movement.



The Connectivity Corridor contains a network of public and private pedestrian trails. The Project seeks to analyze recreational trail connectivity in this area and identify trail expansion, trail redesign, and implementation planning in support of municipal recreational and transportation planning goals. The Project provides an opportunity to plan trail connectivity and habitat connectivity together such that both are sustainable into the future.

4. Habitat & Connectivity Assessment

Study Area

The study area covers the natural areas bounded by Highway 15 to the north, Highway 289 to the west, south to Alder Brook's southern crossing under Highway 289, and east to Sand Hill Rd. The study area contains a mixture of public and private ownership.

Methods

AE ecologists visited the study area four times between December 2024 and May 2025.

- December 13, 2024. A site visit was conducted with representatives from CRO, the town of Essex, and other project partners, to look at the culvert containing Alder Brook as it crosses Highway 289.
- March 4th, 2025. Winter tracking was conducted focusing on wildlife activity and road crossings within the Connectivity Corridor.
- March 27th, 2025. Remote cameras deployed, with additional site review of natural communities, forest structure, and wildlife sign in the southern portion of the study area.
- April 24th, 2025. Remote cameras retrieved and the interior of the Mathieu Town Forest property was also visited to assess habitat quality in that portion of the Study Area.



Figure 1. Fisher tracks.



Wildlife tracking activities were conducted during winter months with adequate snow cover to facilitate species identification where possible.

Remote cameras were placed in areas of suspected wildlife movement into and out of the study area. Cameras were placed away from human use as much as possible and baited with sardines to encourage exploration by wildlife species, especially wide-ranging predators.

Wildlife Utilization & Habitat Types

Evidence for use of the Connectivity Corridor by a wide range of wildlife species was found during the field studies. Notable observations include abundant presence of deer, raccoon, coyote, and fisher in the upland forests. Widespread beaver activity and the sighting of male and female wood turtles (uncommon in Vermont) were noted in the valley-bottom wetlands.

The study area contains mature forests that have formed over glaciolacustrine delta deposits of sand over silt. These delta deposits are flat with well-draining soil, except where streams have cut valleys over the past 10,000 years. Most of the high flat areas in the study area have been developed, and the forested areas are typically restricted to the steep slopes cut by Alder Brook and its tributaries.

The higher portions of the delta deposits support sandier, dryer soils, while the valleys and gulleys descend into finer soils that retain higher moisture and often form wetland communities associated with adjacent stream channels. These gradients of soil texture, soil moisture, and shade created by the downcutting of streams and tributaries create a variety of plant communities and habitat features. Throughout the study area, abundant trees include hemlock, red oak, white pine, red maple, American beech, and yellow birch.



Figure 2. Gray fox west of Allen Martin Parkway



Hemlock Forests

Considerable portions of the study area contain hemlock forests on steeper slopes. These hemlock stands offer protection to deer and other animals during periods of cold and deep snow. Abundant deer beds and activity were found in some of these stands.

Valley-Bottom Wetlands

A second notable habitat feature are the scattered valley bottom wetlands found along much of Alder Brook and its larger tributaries. These natural openings are maintained in an open state by beavers, saturated soils, and flood events. These wetlands provide areas of concentrated wildlife value because of their relative remoteness, access to water and food, as well as the presence of less-common



Figure 3. Valley-bottom wetland features. Clockwise from top left: Wood turtle, raccoon tracks, looking down into a valley-bottom wetland, beaver feeding sign.



younger or more open forest canopy conditions. Sign of beaver, deer, and raccoon were especially abundant in the valley bottom wetlands, and a pair of uncommon wood turtles were observed in one of the wetlands in the Mathieu Town Forest. The linear nature of these wetlands, in combination with the steep sidewalls make them preferred travel corridors for terrestrial wildlife, as well as important pathways for aquatic and semi-aquatic species.

Wildlife Refugia (Trail-Free Zones)

The third notable habitat feature within the study area are the existing trail-free zones, which act as wildlife refugia. Many animals, such as deer, fisher, and bobcat, require trail free areas, where they are not disturbed by people or dogs, to rest and rear their young. Conservation science often considers a 300-foot buffer to trails and development when designating a “trail-free zone”, but the study area contains very few places more than 300 feet from such features. Given the existing conditions and level of human activity, a 150-foot impact area is more realistic for demarking trail-free zones in this landscape as illustrated on the attached map.

Wildlife Connectivity

Wildlife connectivity within and, more importantly in and out of the study area remains functional, but is nearing the limit of viability. It is likely that some native wide ranging wildlife species are already excluded from this area and further fragmentation could pose an existential threat to many more wildlife species in this area.

Saxonhollow Park

Saxonhollow Park is located in one of the few remaining important habitat connectivity corridors in the study area. In limited field investigation, deer were noted moving between the forest edge west of the park near the corner of Saxonhollow Drive and Allen Martin Parkway, and the forest edge east of the park, at the intersection of Sand Hill Road and Allen Martin Parkway. Interestingly, during the survey period, no deer sign was found within the park, and the deer seemed to be using the short stretch of Allen Martin Parkway rather than crossing through the park.



The lack of understory vegetation, limited canopy cover, residential activity, and traffic pose limits to this area as quality wildlife corridor. These landscape conditions likely explain the lack of species diversity noted here during the field assessment.



Figure 4. Left: Deer tracks crossing through the Saxonhollow Park corridor in March. Right: The same intersection in April. Note lack of understory to provide visual refuge to wildlife.

Southeastern Sand Hill Rd

In the southeastern corner of the study area there is a narrow ~100-foot-wide band of forest that likely serves as a wildlife corridor for small and medium-sized mammals between the Forestdale Natural Area and the Saxon Hill forest block. This corridor crosses Saxonhollow Drive and Sand Hill Road and runs between the backyards of houses on Greenbriar Drive and Hillside Circle. Tracks of a fisher were observed at the end of this corridor. The distance with which animals need to move in proximity to houses (~1600 feet) may be more of a deterrent to deer and other larger wildlife than to some small and medium sized mammals such as fisher. In addition, the residential homes may be attracting scavengers such as racoon and skunk, that in turn draw small mammal predators like the fisher observed. Almost the entirety of this corridor is privately owned in a patchwork of over 20 individual landowners. With such an ownership



makeup, its viability is at risk from additional fragmentation and disturbance in a piecemeal fashion.



Figure 5. Left: Narrow corridor between houses along Sand Hill Rd. Right: High quality cover up to road edge, contrasted with lawn, which does not provide cover. Bottom: The corridor would improve along Saxonhollow drive if natural vegetation were allowed to grow closer to the sidewalk.



Allen Martin Parkway West

At the western end of Allen Martin Parkway is a small informal parking area with access to the trail network. The area west of the parking area is infrequently mowed and is naturally revegetating. This area likely functions as a wildlife movement corridor, extending from the Saxonhill Park corridor. A likely red fox track was noted in this clearing during one of the field visits, and remote cameras captured coyote activity just 200' west of this clearing.



Figure 6. Left: Coyote near Allen Martin Parkway West. Right: This area will improve for wildlife if natural vegetation were restored (either actively or passively).

Highway 289 South

The confluence of Alder Brook and an unnamed tributary is a valuable resource for wildlife and provides a natural movement corridor south to the Winooski River. The area where Alder Brook crosses the southern end of Highway 289 contained sign of beaver, fisher, raccoon, and deer. Alder Brook crosses through a long and narrow culvert under 289, which is undersized for wildlife crossing function. More likely, wildlife is moving through here into and out of the larger study area and crossing 289 overland a bit north of the culvert.





Figure 7. Top: Raccoon, fisher, and coyote photographed near the Alder Brook Hwy 289 South crossing. Bottom: Alder Brook crossing under Hwy 289. The culvert is currently undersized for best wildlife crossing function.

Highway 289

The entire Highway 289 transportation corridor acts as a diffuse east-west movement corridor for wildlife. Deer and other medium size mammals likely move over the surface of the highway at night, while shyer and less mobile animals may be restricted to the few stream culverts. Highway 289 is a significantly fragmenting feature in this area, and traffic volumes on 289 will play a significant role in controlling when wildlife is most active in this corridor.



Alder Brook Northeast

This potential wildlife corridor was not assessed on the ground but likely serves as an important yet vulnerable resource. Alder Brook crosses roads and goes through development near the intersection of Routes 15 and 128. The riparian zone and remaining forest fragments along the stream provide some of the only remaining connection between the study area and the less developed northern portions of Essex and into Westford.

Overall Study Area

From a wildlife and habitat connectivity standpoint, the study area is best described as a critical stepping stone between the larger contiguous habitat to the south along the Winooski River, the Saxon Hill Park to the east, and the Browns River basin to the north. While some wildlife make their living entirely within the study area, most probably need to move to and from areas outside to fulfill their needs. The study area functions as a stop-over and resting point for wildlife negotiating the surrounding developed landscape.

5. Recommendations

Wildlife Habitats

Hemlock Forests

Dense hemlock forests suitable for sheltering deer during heavy snows are found throughout the study area. Maximizing the area of trail-free zones in the hemlock forests will help maintain function of these features.

Valley-Bottom Wetlands

Wetlands are extremely valuable for wildlife. Within the study area, wetlands are commonly long and linear, and located along streams. These areas provide important wildlife habitat. Trail crossings, and especially trails parallel to these linear features, should be minimized as much as possible.

Wildlife Refugia (Trail-Free Zones)

Existing trail-free zones should be maintained as much as possible. However, because trail connectivity is a high priority in this densely populated area, some new trails within wildlife refugia may be considered. The following sequence of recommendations can be applied for reviewing new trails:

- Locate new trails to avoid wildlife refugia.



- If new trails are necessary/desired within wildlife refugia, minimize impact by locating them on the outer edge of the refugia.
- Minimize trail crossings of wildlife refugia to those necessary for trail connectivity.
- Evaluate the existing network for redundant trails with an eye toward abandoning lower priority trails to increase refugia where possible.

Wildlife Connectivity

Best Practices

Trails and human use can be compatible with wildlife movement provided that basic best practices are followed within wildlife corridors. These best practices include:

- Maintaining as much natural cover as possible within the corridor, and on both sides of a road crossing. This includes canopy cover, shrub cover, and other materials such as dead logs and rocks.
 - Avoid human infrastructure such as parking areas, buildings, and fencing that might sever wildlife connectivity.
 - Infill development should not be allowed if it reduces the width of the corridor to less than 250 feet.
 - Road and trail corridors should be as narrow as possible, and natural vegetation should be maintained as close to the road and/or trail edge as possible.
 - Natural surface trails are preferred over paved and hardened surfaces.
- Reduce artificial lighting at night as much as possible. Unnecessary lights should be avoided, and necessary lights should follow these practices:
 - Direct artificial lights downwards.
 - Do not direct lights towards or into a forest block or corridor.
 - Use amber- or yellow-colored lights (1500-2400 kelvins).
 - Use time-restricted lighting. Adapt light timing (for example, using timers and motion sensors) to provide light only when it is required. Motion sensor lights should not, however, be used near corridors, where they can lead to disorientation and act as a movement barrier to wildlife.



- The existing trail network should be evaluated for redundant trails in the vicinity of corridor areas with an eye toward minimizing trail density as much as possible.

Saxonhollow Park

Saxonhollow Park exists on private land, already contains human infrastructure, and is vulnerable to losing its ability to support wildlife movement. Further development within the corridor along Allen Martin Parkway, Saxonhollow Drive, and Sand Hill Road could eliminate its ability to function. We recommend that no further development within the corridor occurs without careful assessment of its impact on wildlife movement.

The Saxonhollow Park Corridor currently functions poorly for the movement of many wild mammals. Its function could be improved by providing a corridor of natural cover at least 50 feet wide along the northern edge of the park from Saxonhollow Drive on the west to Sand Hill Rd on the east. Recognizing that this habitat improvement measure may not be compatible with the community use of Saxonhollow park, a compromise plan would be to provide a corridor of native plant landscaping running east to west through the park that is designed to maintain a sense of openness and security for people, while providing low cover for traveling wildlife. Components could include:

- Span the park's northern edge 15-50 feet wide, east to west, and include minimal breaks for walking trails if necessary.
- Plant occasional trees and low growing native shrubs and groundcover such as hemlock (*Tsuga canadensis*), maple-leaved viburnum (*Viburnum acerifolium*), witch hazel (*Hamamelis virginiana*), shadbush (*Amelanchier laevis* or *Amelanchier arborea*), beaked hazelnut (*Corylus cornuta*), low sweet blueberry (*Vaccinium angustifolium*), wintergreen (*Gaultheria procumbens*), Canada mayflower (*Maianthemum canadense*), sessile-leaved bellword (*Uvularia sessilifolia*), and partridgeberry (*Mitchella repens*). Non-invasive ornamentals could be considered in addition.
- Place logs, occasional cobble, or boulders for wildlife cover.

Southeastern Sand Hill Rd

Limit or prohibit further development within the corridor without careful assessment of its impact on wildlife movement. Private landowner should be encouraged to maintain natural vegetation and refrain from restricting wildlife movement. More natural vegetation to the sidewalk along Saxonhollow Drive could improve wildlife movement through this area. New trails at the ends of this corridor should be avoided. There are already multiple trails at the west end



of this corridor, west of Saxonhollow Drive- if trail consolidation is possible in that area it would be beneficial.

Allen Martin Parkway West

The wildlife corridor function of this area could be improved if the early successional part of the corridor is allowed to revegetate, and forest cover is maintained on both sides of Laurel Drive. Wildlife movement could be compatible with limited trail infrastructure provided a significant amount of contiguous natural vegetation is maintained.

Highway 289 South

The forested corridor along the east side of Highway 289 is an important habitat feature and funnel for wildlife movement. Trails should be located away from the valley bottom or close to Alder Brook.

Future culvert and/or bridge upgrades should be designed to accommodate wildlife movement by spanning at least 1.2 bankfull widths, and ideally 2 bankfull widths, leaving a terrestrial shelf in most flow conditions. A culvert could accommodate people and wildlife movement if wide enough, however parallel infrastructure may serve both needs better. In general, wildlife movement pathways that cross under bridges function better than those that pass through culverts, and all crossings function better when they are as short as possible, and when they have as much natural light and open space as possible.

As of the date of this reporting, the preliminary design for a trail parallel to US 289 descends to the inlet of the Alder Brook culvert at this location. Due to the wildlife activity in this area, positioning this trail above the culvert closer to the highway is recommended.

Further assessment is required to assess this corridor in relation to other habitat areas to the south. But in general, avoiding new development and trail infrastructure close to the stream and riparian edges is recommended.

Highway 289

Vegetation should be maintained as close to the highway and/or trail edge as possible to accommodate wildlife movement across the road. Wildlife movement could be encouraged to pass under the road if culverts and/or bridges are upgraded to accommodate wildlife movement. An ideal scenario would include a wildlife overpass allowing open-air crossing of 289, however this may be cost prohibitive for the benefit it would provide. A focused study that evaluates preferred wildlife crossing locations along the stretch of 289 would inform future design elements for a trail paralleling the highway.



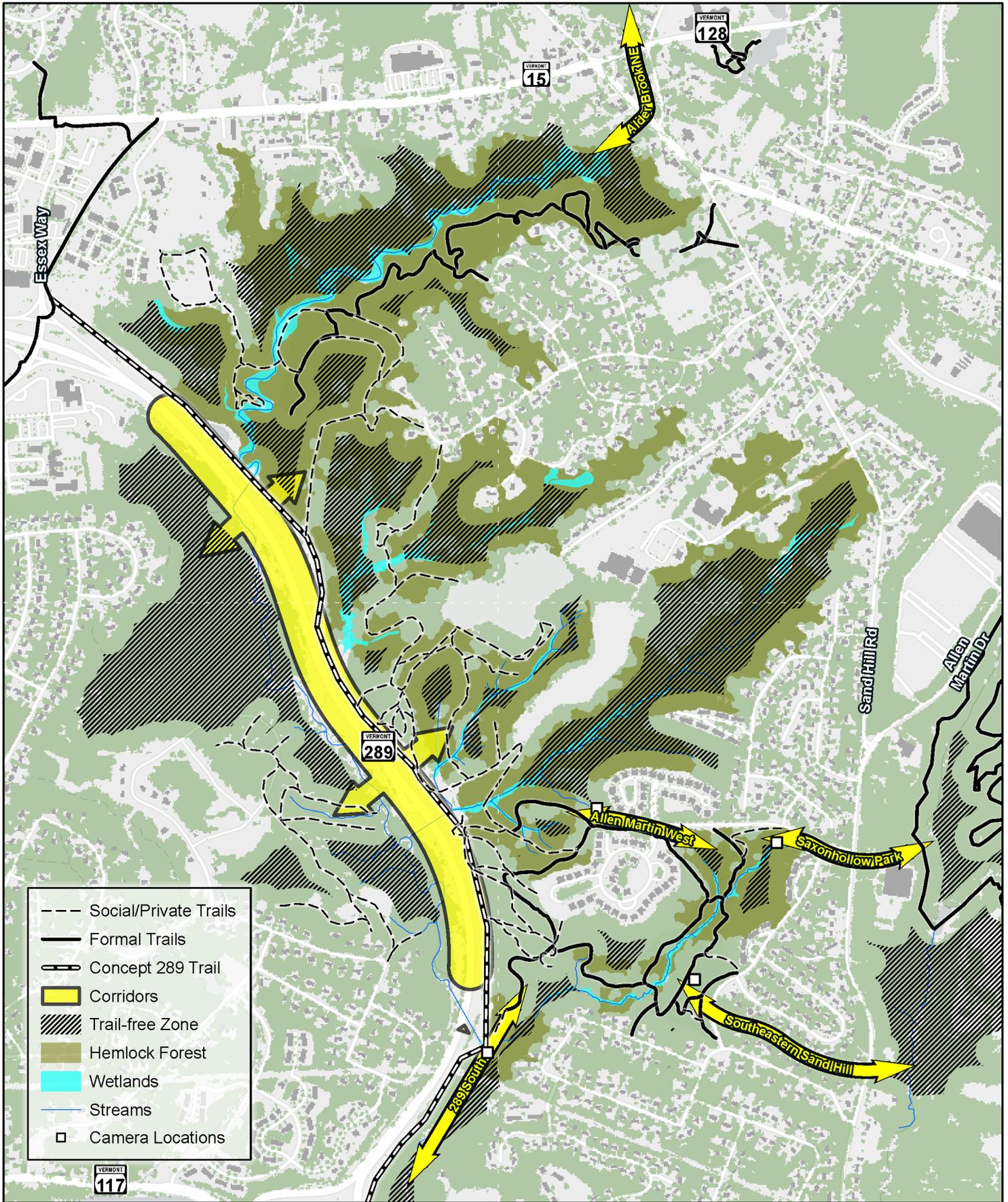
Alder Brook Northeast

Any trail infrastructure should follow best practices to avoid severing wildlife connectivity in this corridor. Further assessment is required to assess this corridor in relation to other habitat areas.

Further Study

The study area contains important habitat areas and wildlife movement corridors within a fragmented landscape. Broad studies to assess forest blocks and habitat connectivity at a town-wide scale could be important for protecting the remaining wildlife populations and ecosystem function before habitat fragmentation leads to permanent habitat impairment.





- Social/Private Trails
- Formal Trails
- Concept 289 Trail
- Corridors
- ▨ Trail-free Zone
- Hemlock Forest
- Wetlands
- Streams
- Camera Locations

Essex-Saxon Hill Connectivity Project Wildlife & Connectivity Assessment

Monday, May 19, 2025 File: CRO_Essex:8.5x11 Report
 Prepared By: A Worthley NAD 1983 StatePlane Vermont FIPS 4400 Feet

