Greater Burlington Area Wildlife Corridor Analysis

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Introduction

Wildlife is an important part of the Vermont landscape. Many species of wildlife have been observed in the greater Burlington area, thus it is crucial that wildlife are able to live and move about the pieces of acceptable habitat found there. Successful wildlife movement through cities is essential to maintain the integrity of Vermont's larger landscape.

Wildlife corridors are pathways for animals to move through the land and are a way to counter blockages in and around the city (Newark 1993). Urban corridors provide connectivity, link green spaces, and minimize the negative potential effects of fragmentation on wildlife. They also provide important recreational, leisure, and nature experiences for people (Douglas and Sadler 2011).

The parks and protected lands in and around Burlington provide habitat for native Vermont fauna, such as fox, bobcat, and deer. However, the wildlife in this area still faces the burdens and effects of habitat segregation. The following is a list of recommendations that we have proposed to increase ease of travel for observed wildlife. A number is associated with each type of recommendation and a letter associated with each specific method for mitigation. Following the list of recommendations is a compilation of observed wildlife corridors and the potential barriers that wildlife may face in the greater Burlington area. We have assigned recommendations and specific mitigation methods to each of these observed corridors and/or barriers using this number and letter system. These recommendations are based on the types of animals observed at each site and the potential challenges they face there. They can also be used when considering the planning for future wildlife corridors.

Recommendations and Mitigation Methods

1. MITIGATION METHODS THAT ATTEMPT TO INFLUENCE DRIVER BEHAVIOR

a. Public Information and Education: An attempt at increasing driver safety through awareness concerning impacts, causes, and high-risk locations of wildlife-vehicle collisions. Possible methods include general messages in the media, videos, brochures, posters, and bumper stickers. This outreach effort is thought to work best in conjunction with other wildlife-vehicle collision mitigation methods listed below.

b. Improvement in Driver Attentiveness Using Warning Signs: Signage can consist of standard signs, large nonstandard signs, seasonal signs, and animal detection systems. These signs attempt to help drivers become aware of a wildlife-vehicle collision area and consequentially change their behavior accordingly.

c. Increase in Visibility to Drivers by the Addition of Roadway Lighting: Adequate lighting of the roadway attempts to give the driver more time to notice an animal crossing the road with increased visibility. By providing more time to react, a driver may be able to respond to an animal in or near the roadway and potentially avoid a collision.

d. Increase in Visibility to Drivers by Vegetation Removal: Roadside vegetation may obscure wildlife attempting to cross the roadway. Its removal would increase the driver's ability to detect these animals and respond accordingly to avoid a collision. Furthermore, the removal of

vegetation may reduce the attractiveness of roadside forage and cover for animals and also grant increased visibility of oncoming traffic to those animals attempting to cross.

e. Reduction of the Posted Speed Limit: By reducing speed limits, the driver's ability to detect animals in and near the roadway can be increased allowing drivers to respond accordingly to avoid a collision.

f. Posting of Advisory Speed Limits: In certain areas, the speed limit may not need to be reduced; yet, a repost of the advisory limit draws attention to the appropriate speed. By reposting the current advisory speed limits in an area of high-risk wildlife-vehicle collisions, drivers may reduce their speed which can ultimately lower the risk of collision.

2. MITIGATION METHODS THAT SEEK TO INFLUENCE ANIMAL BEHAVIOR

a. Deer Reflectors and Mirrors: Minor roadside installments act as visual wildlife repellants by reflecting the headlights of passing vehicles into the surrounding roadside. Colored reflected light flashes into roadside habitat and on the road deterring animals from attempting to cross the road. In particular, deer have been found to respond with alarm and flight.

b. Removal of Carcasses Along Transportation Corridors: Besides yielding aesthetic benefits, the removal of carcasses will decrease the presence of a potential food source for animals, particularly scavengers. In turn, this can make the roadway less attractive to animals and decrease their vulnerability to wildlife-vehicle collisions.

c. Increase Median Width: By increasing the area between two roads, a refuge is created for animals trying to cross several lanes of traffic that is moving in opposite directions. However, concrete median barriers can cause animals to pause at the barrier or turn around, increasing their time in the roadway.

3. MITIGATION METHODS THAT SEEK TO PHYSICALLY SEPARATE ANIMALS FROM THE ROADWAY

a. Wildlife Fencing: To separate animals from the roadway fencing from 6.5 to 8 ft. in height can be applied to the roadsides. Fences are commonly made of page wire or cyclone fence material with wooden or metal fence posts. For large mammals and particularly ungulate species, the standard height of wildlife fencing is currently 8 ft. It is commonly suggested that wildlife fencing be used in conjunction with wildlife overpasses or underpass. Furthermore, a one-way gate or an escape ramp should be included to act as a getaway route for animals that make their way onto the road.

b. Boulders at Fence Ends: Fence ends can become sites of high-risk for wildlife-vehicle collisions. To counter this phenomenon, boulders approximately 1 cubic foot in size placed at the ends of fencing will discourage animals from crossing at fence ends because they are deterred by the unstable substrate that the boulders create.

c. Long Tunnels and Bridges Over Landscapes: Tunnels and bridges that are at least several hundred meters long are often built due to the nature of the substrate underneath them (e.g. through a mountain, across a wetland). These large and open structures can be used to allow wildlife to cross over or under roadways avoiding wildlife-vehicle collisions.

d. Wildlife Underpasses and Overpasses: Typically combined with wildlife fencing, an overpass or underpass is used to provide a safe crossing opportunity for animals. The optimal overall design of this structure is site and species specific. Installing a wildlife underpass or overpass greatly increases the effectiveness of the fencing, reducing the chances that animals will break through the fence.

4. CULVERT IMPROVEMENT

a. Bury Perched Pipes: A perched pipe culvert is typically described as a metal pipe culvert with one or both outlets raised above the natural substrate. This height difference can cause transportation problems for species such as fish, amphibians, and small mammals that cannot traverse the resulting gap. By burying the pipe into the ground and eliminating this gap, animal species can more readily use the culverts as corridors.

b. Add Ledges to Existing Culverts: Certain animals, such as bobcat or fox, will not use a culvert for transportation if water is the dominant substrate running through it. By adding concrete or rock edges along the inside edges of a culvert, a dry path is created for those animals that might otherwise not use the passageway.

c. Increase the Size of Existing Culverts:
If a culvert is too small, it may only be accessible or attractive to smaller species of wildlife. By increasing the size, a culvert can be used by an increased number of animals of a larger size.

Descriptions of Corridors and Barriers Surveyed

1. North Avenue Between North Beach and the Ethan Allen Homestead: This area of Burlington is a major barrier for wildlife that are looking to move between open landscape around the Ethan Allen Homestead and forested land near North Beach. This barrier location is dominantly residential with a speed limit of 30 mph. Along the east side of North Avenue there is a steep slope of forested land. Route 127 is at the bottom of that slope, creating a second barrier (listed below). The western side of North Avenue has homes with open lawns and a sloping forested landscape beyond them. There is a significant amount of noise pollution from traffic and other human activities. Recommendations and mitigation methods: 1A, 1B, 1C, 1E, 2B, 3A, 3B

2. Route 127 Connecting Ethan Allen Park and the Winooski River Corridor: This stretch of highway has a speed limit of 50 mph and runs parallel to a section of the Winooski River to the east, approximately 30 yards away. Within that 30 yards is the Burlington Bike Path and chain linked fencing that is the average height of four feet. On the west side of the highway, there is forested area connecting to Ethan Allen Park. Recommendations and mitigation methods: 1A, 1B, 1C, 1E, 2B, 3A, 3B, 3D

3. Grove Street Between Centennial Woods and the Winooski Valley Parks District: This corridor is between SD Ireland Co. and a small parking lot on the east side of Grove Street. There is forested area on both sides of the street and underneath the road is a buried pipe culvert that is approximately 4.5 feet in diameter. On the east side of Grove Street, there is another buried pipe culvert, approximately 7 feet in diameter, leading to a gully that ultimately drains into the Winooski River. Both culverts have standing water in them but there are no blockages. The length of the culverts is such that there is an open field of view through them from either end. There are no signs of possible erosion around either structure and the dominant substrates in each culvert are water and sand. There is chain link fencing between the gully and SD Ireland Co.'s property which is approximately 5 feet in height. It has no preventative topping such as barbed wire, a lipped wall, or an overhang to discourage wildlife from climbing over. There are many dead snags and other vegetation that could act as natural ladders which could support the weight of small mammals. The speed limit for this area of Grove Street is 25 mph and the forested landscape continues along both sides of the road beyond the studied location. Recommendations and mitigation methods: 1A, 1B, 1C, 1F, 2A, 2B, 3A, 3B, 4B, 4C

4. Interstate 89, North of Exit 14W: There are two pipe culverts at this location stretching below the entirety of the interstate highway. They are perched pipes that are approximately 8 feet in diameter and water is the dominant substrate. The area at the end of the culverts is open field leading toward forested area. At this confluence, there is old chain link fencing that is approximately 5 feet in height. There is no preventative fence topping and no vegetation or natural ladders are visible on or near the fencing. The median of the highway is grassy and approximately 10 feet wide and the speed limit in the location is 55 mph. There is a significant amount of atmospheric emissions, light, and noise pollution in the studied location due to the dense traffic of the interstate. Recommendations and mitigation methods: 1A, 1B, 1C, 1F, 2A, 2B, 2C, 3A, 3B, 4A, 4B

5. Roosevelt Highway (Route7/Route 2) in Colchester Approximately 2 Miles NE of the I-89 Access Point in Winooski: The speed limit here is 50 mph and there is a downward slope on both sides of the road with dense concealing vegetation. Two metal pipe culverts were found at the base of the slope, both leading into small wetland areas as water is the dominant substrate. They are both approximately 4 feet in diameter and 40-50 feet long with an open field of view. The location is polluted with noise and atmospheric emissions from traffic. Recommendations and mitigation methods: 1A, 1B, 1C, 1D, 1F, 2A, 2B, 3A, 3B, 4B, 4C

6. Intersection of Roosevelt Highway, Bay Road, and Route 2A in Colchester: This is a busy location with a fair amount of traffic moving through the intersection. There is a small stream that meanders through the area. It flows under the Roosevelt Highway through a concrete box culvert that is approximately 15 feet high and 10 feet wide. It then proceeds along a private yard and underneath Bay Road through another concrete box culvert. This box culvert is approximately 10 feet high and 10 feet wide and has ledges on both inside edges. Light and noise pollute the studied location due to traffic and street lights at the intersections. The speed limit is

40 mph along the Roosevelt Highway, which is the dominant road through the intersection. There is no dense concealing vegetation on the immediate roadsides but there is natural vegetation surrounding and leading up to the entrance of both culverts. Recommendations and mitigation methods: 1A, 1B, 1E, 2B, 4B

7. Intersection of the Roosevelt Highway and Interstate 89 in Colchester: Due to dense traffic, there is a significant amount of atmospheric emissions, light, and noise pollution. The speed limit varies depending on the road from 35 mph and 65 mph. The land alongside the roads are small open fields leading to forested areas. There are two perched pipe culverts stretching below the entirety of Interstate 89. Recommendations and mitigation methods: 1A, 1B, 1C, 1E, 1F, 2A, 2B, 3A, 3B, 4A