

# **Route 2 Wildlife Tunnel Monitoring** **Year 1 Report**

**Town of Concord, MA**

**Massachusetts Department of Environmental Protection**  
**Wetlands and Waterways**  
**December 2016**

Prepared for:  
Massachusetts Department of Transportation  
10 Park Plaza  
Boston, MA 02116

BSC Project No. 89546.01

---

Prepared by:



33 Waldo Street  
Worcester, MA 01608

TABLE OF CONTENTS.....	i
<b>1.0</b> INTRODUCTION .....	1
<b>2.0</b> Study Area .....	1
2.1 Track Beds and Camera Traps .....	1
2.2 Road Mortality Survey .....	2
2.3 Snow Tracking .....	2
<b>3.0</b> Methodology .....	3
3.1 Track Beds.....	3
<b>3.1.1</b> Installation.....	3
<b>3.1.2</b> Monitoring and Data Collection .....	4
3.2 Camera Traps .....	4
<b>3.2.1</b> Installation.....	4
<b>3.2.2</b> Monitoring and Data Collection .....	5
3.3 Roadkill Survey.....	5
3.4 Snow Tracking .....	6
<b>4.0</b> Results.....	6
4.1 Track beds .....	6
4.2 Camera Traps .....	8
4.3 Road Mortality Survey .....	10
<b>4.3.1</b> Northeast Quadrant .....	12
<b>4.3.2</b> Northwest Quadrant .....	12
<b>4.3.3</b> Southeast Quadrant .....	13
<b>4.3.4</b> Southwest Quadrant .....	13
4.4 Snow Tracking .....	14
<b>5.0</b> Discussion .....	14
5.1 Track Beds.....	15
5.2 CAMERA TRAPS .....	16
5.3 Road Mortality Survey .....	17
5.4 Snow Tracking .....	18
<b>6.0</b> Summary and Recommendations .....	18

- APPENDIX A: Figures
- APPENDIX B: Monitoring Protocol and Correspondence
- APPENDIX C: Photographs
- APPENDIX D: Track Bed Datasheets
- APPENDIX E: Road Mortality Survey Datasheets

## **1.0 INTRODUCTION**

As part of the Route 2 Crosby's Corner Safety Improvement Project (the "Project"), the Massachusetts Department of Transportation (MassDOT) constructed a wildlife tunnel adjacent to Mill Brook (a perennial stream) which provides habitat connectivity and safe passage for wildlife. The wildlife tunnel was constructed under Route 2 in the Town of Lincoln, Massachusetts and is located east of Sandy Pond Road (Figure 1, Appendix A). The tunnel spans a total of 130 feet, bisecting the State Route 2 (i.e., Concord Turnpike) corridor. It is eight feet wide and six feet tall with one foot of unconsolidated earth graded in the bottom for a final height of five feet. Construction of the tunnel was completed in the fall of 2015.

MassDOT received a Wetland Variance Decision (Transmittal No. 203-0824) under the Massachusetts Wetlands Protection Act (WPA) and Water Quality Certification and Variance Decision (Transmittal No. X235691) for the Project. Special Condition 27 of the Variance required MassDOT to develop a wildlife monitoring protocol to document the efficacy of the wildlife tunnel.

The final monitoring protocol proposed by MassDOT (provided in Appendix A) was approved by the Massachusetts Division of Fish and Wildlife (MassDFW) via their letter response on 17 November 2015 (Appendix B). As part of that Plan, three track beds and three camera traps were installed at the tunnel, a road mortality survey was completed, and snow-tracking was conducted. Further details describing the implementation of the monitoring plan are included in Section 3.0.

Monitoring of the wildlife tunnel is to occur for up to five years. This is the first year of monitoring and shall serve as the Year 1 monitoring period.

## **2.0 STUDY AREA**

### **2.1 Track Beds and Camera Traps**

The study area for the track beds and camera traps is limited to the immediate area of the tunnel. Track beds and camera traps were installed at each entrance as well as in the center of the tunnel. The tunnel consists of a substrate of exposed loose soil with a high gravel

and cobble content. The walls and ceiling of the tunnel are comprised of concrete. The tunnel exits to upland slopes that transition to surrounding habitat, including uplands and wetlands.

## **2.2 Road Mortality Survey**

The road mortality survey includes an area extending 25 feet from the edge of Route 2 and extends east and west on both sides of the corridor by 500 feet. Route 2 conveys traffic east and west, bisecting high quality wildlife habitat in the vicinity of the wildlife tunnel. The Route 2 corridor is divided by Jersey barriers, retaining walls, and/or chain-link fence in the vicinity of the tunnel. Habitats to the north and south of Route 2 in proximity to the tunnel consist of residential housing, constructed stormwater basins, successional mixed coniferous/deciduous upland forest, and a wetland mosaic comprised of forested and emergent habitats and an associated perennial stream (i.e., Mill Brook). Residences are located south of the wildlife tunnel along Drake Park Road and Sandy Pond Road (Figure 2). No residences are located north of the tunnel within the study area. Constructed stormwater wetlands are located to the north (CSW #2) and south (CSW #1). The adjacent forests consist of a mix of coniferous and deciduous species dominated by white pine (*Pinus strobus*), oaks (*Quercus* spp.), black cherry (*Prunus serotina*), red maple (*Acer rubrum*), and glossy buckthorn (*Frangula alnus*). Wetlands are located north and south of the tunnel and are associated with Mill Brook. The wetlands are palustrine forested wetlands dominated by red maple, speckled alder (*Alnus incana*), red osier dogwood (*Cornus racemosa*), lurid sedge (*Carex lurida*), tussock sedge (*Carex stricta*), skunk cabbage (*Symplocarpus foetidus*), and spotted joe-pye weed (*Euthrochium maculatum*). Mill Brook is documented as a perennial watercourse that flows north across Route 2 via a 30-inch culvert located approximately 30 feet east of the wildlife tunnel, although, during the summers of 2014, 2015, and 2016 Mill Brook stopped flowing.

## **2.3 Snow Tracking**

The snow tracking survey includes a 25-foot radius from the north and south entrances of the tunnel as well as any discernable tracks or sign that may be able to be identified in the tunnel.

## **3.0 METHODOLOGY**

The approved Plan protocol requires that track bed monitoring be conducted for eight weeks between April 15 and June 15. Since construction in the vicinity of the track beds precluded initiation of monitoring by April 15, BSC Group, Inc. (BSC) coordinated with MassDFW and Mr. Scott Jackson from the University of Massachusetts (UMass) Extension regarding a later start time. Based on Mr. Jackson's input, the April/May period would have captured vernal pool species; however, those species would not necessarily be the subject of this monitoring. Mr. Jackson noted that the May/June period is a good time to monitor for turtles. He further noted that extending into July would capture mammals and wild turkey (*Meleagris gallapavo*), for example. Therefore, Mr. Jackson agreed that it was acceptable to extend the dates from May to July as long as the monitoring period is still eight weeks. Mr. Jackson also confirmed the placement of the track pads (see Section 3.1.1) and approved the use of the specific cameras placed (see Section 3.2.1).

### **3.1 TRACK BEDS**

#### **3.1.1 Installation**

Three track beds were installed at the wildlife tunnel on 17 May 2016. The track beds were constructed from 2x4 pressure-treated lumber and assembled with 90-degree angle brackets. Track beds were eight feet wide and six feet long and spanned the width of the tunnel. Each bed was inset flush to existing grade. Finely-graded sand was placed into the frames to within approximately 0.5-in of the top. After the sand was evenly spread, a soft-bristled broom was used to smooth the surface of the sand. When crossing the track beds, great care was taken not to accidentally transfer soil into the sand bed or to disturb the sand.

One bed was installed at the north and south entrances and one bed installed in the middle. The northern track bed was set so that the bed was flush with the entrance of the tunnel and extended inward six feet. The middle bed was set at approximately 75 feet in the center of the tunnel. The southern bed was installed so that approximately half of the bed was in the tunnel and half extended beyond the entrance. This was done to capture data on wildlife attempts at crossing the tunnel wherein individuals may approach the tunnel, but not actually enter or cross through the tunnel successfully. Steep grades immediately adjacent to the northern entrance prevented this configuration for the north bed; therefore, the track bed was installed interior to the tunnel entrance. Following track bed installation, exposed soils in proximity to the entrances were seeded with a native grass seed mix to stabilize the soils. Photographs of the track beds are provided in Appendix C.

### **3.1.2 Monitoring and Data Collection**

Track beds were monitored twice weekly for eight weeks beginning 24 May 2016 and extending to 22 July 2016. Each individual track path or other wildlife sign (e.g., scat) captured within the track beds was photographed with a photomacrographic scale placed adjacent to the sign during each monitoring event. Care was taken not to impact tracks before they were recorded. Track paths and sign were identified to species level when possible or characterized according to similar group (e.g., rodent, canine, salamander, etc.) A degree of certainty ranging from 1 (uncertain) to 4 (very certain) was assigned to each track path or sign. The number and direction of track paths and sign was also recorded for each track bed by sketching the general location and path of each track on a bed-specific datasheet. Photographs of the captured tracks and sign are included in Appendix C. Completed datasheets are provided in Appendix D. In addition to recording tracks and sign within the track beds, signs of wildlife immediately adjacent to the beds was also recorded.

Following completion of the track bed survey window, data collected was analyzed for crossing rates by comparing the number of individuals identified at each crossing to the number which crossed all three beds (and therefore assumed to have successfully crossed the tunnel).

## **3.2 CAMERA TRAPS**

### **3.2.1 Installation**

A camera trap was installed on the eastern wall of the wildlife tunnel adjacent to each of the track beds. Camera traps consisted of Reconyx PC900 HyperFire Professional Covert Camera Traps enclosed in a HyperFire Series Heavy Duty Security Enclosure which was secured with shackle-protected padlocks. Cameras and security enclosures were attached to Reconyx Heavy Duty Swivel Mounts which were fastened to pressure-treated lumber mounting blocks. The blocks were then secured to the walls of tunnel with heavy-duty construction adhesive 32 inches from existing grade, approximately half-way up the tunnel wall. The camera traps were located at the corners of the track beds and angled approximately 45-degrees across the beds and slightly downward. The north and south cameras were angled towards the openings of the tunnel in an effort to capture wildlife attempts as well as successful tunnel crossings. Photographs of the cameras are located in Appendix C. Cameras were programmed so that ten images were captured in rapid-fire succession every time the sensor was triggered. Each camera utilized lithium batteries and

included a 32-gigabyte (GB) SanDisk (SD) card. Silica packets were also placed inside each camera box to reduce the potential of moisture damage.

The mounting blocks with the attached mounting brackets were installed on 20 May 2016. The remaining camera trap components were installed on 24 May 2016 to allow the adhesive sufficient time to cure prior to the addition of the heavy weight of the cameras, security boxes, and padlocks.

### **3.2.2 Monitoring and Data Collection**

Cameras were monitored twice a week concurrently with the track beds between May and July 2016. Following the completion of track bed monitoring, the cameras were monitored every two weeks until 31 October 2016 at which time the cameras, including security enclosures and mounts, were removed for the winter. During each monitoring event, the camera trap assembly was inspected for damage, signs of wear, or other conditions that could lead to trap failure. Additionally, each SD card was exchanged for a blank card and the batteries were inspected and replaced if necessary. Once a month the silica packets were replaced.

Captured images were downloaded and sorted by survey period. Images were then characterized by the species which were captured. Each individual that was captured was analyzed to determine if their individual tracks could be discerned from that specific track bed. Representative photographs are provided in Appendix C.

### **3.3 ROADKILL SURVEY**

An area 25 feet wide from the edge of Route 2 as well as the Route 2 travel corridor itself was investigated via a meander survey for any road mortalities for a distance of 500 feet on either side of the wildlife tunnel in both directions. In addition to recording road mortality, any signs of wildlife (e.g., scat, tracks, feathers, etc.) were also noted. Individuals were classified to species if possible and the location of the carcass or sign was sketched on a datasheet (Appendix D). The survey was divided into four quadrants with the wildlife tunnel serving as the central axis. The west bound lane of Route 2 was included in the northern quadrants while the east bound land was included in the southern quadrants.

In addition, the Town of Concord Public Works Department and the MassDOT Highway Department were contacted weekly to record data on any road mortalities that may have been recorded and subsequently removed (e.g., deer strikes).

### **3.4 SNOW TRACKING**

Snow tracking was to be conducted after each snowfall event between one to three inches. Tracks within 25-feet of the north and south entrances and any tracks that could be identified as occurring within the tunnel were documented and recorded on datasheets.

## **4.0 RESULTS**

### **4.1 TRACK BEDS**

In total, 18 unique species were identified. Table 1 provides a summary of the recorded wildlife track observations. Turtles, field mice, and raccoons (*Procyon lotor*) were most frequently documented within the track pads. Rodents, meadow jumping mice (*Zapus hudsonias*), squirrels (*Sciurus* spp.), fox, and fisher (*Martes pennanti*) were frequently recorded but were not abundant. Human tracks were also recorded occasionally. Species that rarely used the tunnel included American toad (*Anaxyrus americanus*), birds, eastern cottontail (*Sylvilagus floridanus*), groundhog (*Marmota monax*), Virginia opossum (*Didelphis virginianus*), striped skunk (*Mephitis mephitis*), American mink, coyote (*Canis latrans*), and white-tail deer (*Odocoileus virginianus*).

The majority of the species were predominantly moving north through all of the track beds; however, rodents, meadow jumping mice, and Virginia opossum appear to be traveling south more frequently, although only slightly. Track paths north (n=361) were more frequent than paths south (n=167).

All three track beds were crossed with similar frequency with the northern track bed recording 178 track paths, 177 track paths in the middle bed, and 173 paths in the southern bed. However, although track frequency was similar across all three beds, only 53 successful crossings were recorded (46 north, 7 south) by five species. Turtles successfully crossed the tunnel most frequently (n=23), followed by raccoons (n=16), field mice (n=11), fisher (n=2), and deer (n=1). Table 2 summarizes successful tunnel crossings.

**Table 1. Summary of Track Bed Utilization**

Taxonomic Name	Common Name	South Track Bed		Middle Track Bed		North Track Bed		TOTAL	
		North	South	North	South	North	South	North	South
Testudinidae spp.	Turtle	48	15	43	6	29	1	<b>120</b>	<b>22</b>
<i>Anaxyrus americanus</i>	American toad	1	0	0	0	0	0	<b>1</b>	<b>0</b>
Aves spp.	Bird spp.	2	1	0	0	2	0	<b>4</b>	<b>1</b>
Rodentia spp.	Rodent	1	5	3	5	1	3	<b>5</b>	<b>13</b>
Neotominae spp.	Field mouse	12	8	34	11	37	13	<b>83</b>	<b>32</b>
<i>Zapus hudsonius</i>	Meadow jumping mouse	3	4	2	1	4	4	<b>9</b>	<b>9</b>
<i>Tamias striatus</i>	Eastern striped chipmunk	3	1	4	2	1	1	<b>7</b>	<b>4</b>
<i>Sciurus</i> spp.	Squirrel	0	4	4	4	3	1	<b>7</b>	<b>9</b>
<i>Sylvilagus floridanus</i>	Eastern cottontail	1	0	0	0	0	0	<b>1</b>	<b>0</b>
<i>Marmota monax</i>	Groundhog	1	1	0	0	1	0	<b>4</b>	<b>3</b>
<i>Didelphis virginiana</i>	Virginia opossum	0	2	0	0	0	0	<b>0</b>	<b>2</b>
<i>Mephitis mephitis</i>	Striped skunk	2	1	4	0	1	1	<b>7</b>	<b>2</b>
<i>Procyon lotor</i>	Raccoon	18	20	22	8	33	13	<b>73</b>	<b>41</b>
Canidae spp.	Fox	0	4	6	4	9	4	<b>15</b>	<b>12</b>
<i>Canis latrans</i>	Coyote	1	1	2	0	0	0	<b>3</b>	<b>1</b>
<i>Neovison vison</i>	American mink	1	0	0	0	0	0	<b>1</b>	<b>0</b>
<i>Martes pennanti</i>	Fisher	7	6	6	5	5	5	<b>18</b>	<b>16</b>
<i>Odocoileus virginianus</i>	White-tail deer	1	0	1	0	1	0	<b>3</b>	<b>0</b>
<b>TOTAL</b>		<b>100</b>	<b>73</b>	<b>131</b>	<b>46</b>	<b>130</b>	<b>48</b>	<b>361</b>	<b>167</b>

**Table 2. Summary of Successful Tunnel Crossings**

Taxonomic Name	Common Name	Track Beds		Camera Traps	
		North	South	North	South
Testudinidae spp.	Turtle	22	1	-	-
<i>Chrysemys picta</i>	Eastern painted turtle	-	-	2	1
Neotominae spp.	Field mouse spp.	9	2	0	0
<i>Sciurus carolinensis</i>	Eastern gray squirrel	0	0	0	1
<i>Marmota monax</i>	Groundhog	0	0	0	1
<i>Procyon lotor</i>	Raccoon	12	4	5	22
<i>Martes pennanti</i>	Fisher	2	0	0	0
<i>Odocoileus virginianus</i>	White-tail deer	1	0	1	0
<b>TOTAL</b>		<b>46</b>	<b>7</b>	<b>8</b>	<b>25</b>
- species not observed					

## 4.2 CAMERA TRAPS

The camera traps captured a total of 18 wildlife species. Table 3 summarizes the successful captures of the three camera traps. The most common species captured was raccoon. Meadow jumping mice, gray fox (*Urocyon cinereoargenteus*), fisher, eastern painted turtles (*Chrysemys picta*), and gray squirrels (*Sciurus carolinensis*) were also frequently observed. Rare occurrences included American robin (*Turdus migratorius*), blue jay (*Cyanocitta cristata*), chipping sparrow (*Spizella passerina*), song sparrow (*Melospiza melodia*), rodent species, field mice, eastern striped chipmunks (*Tamias striatus*), red squirrels (*Sciurus hudsonicus*), groundhogs, Virginia opossums, striped skunks, and deer.

The majority of species were recorded moving north through the tunnel, similar to the track beds. However, contrary to the results from the track beds, wildlife movements through the tunnel captured by the camera traps showed that wildlife crossed both north and south with relatively similarity (north, n=165; south n=171). Eastern painted turtles, American robin, field mice, red squirrel, Virginia opossum, striped skunk, gray fox, fisher, and deer were observed moving north more frequently. Meadow jumping mice, eastern striped chipmunk, eastern gray squirrel, groundhog, and raccoon were observed moving south more frequently.

Each of the three camera traps were crossed with slightly differing frequencies, with the north trap recording 177 captures, 117 captures in the middle trap, and 146 captures in the southern trap. The northern trap captured 21% more captures than the southern trap and 51% more captures than the middle trap. The camera traps recorded a total of 33 successful crossings (8 north, 25 south) by five species. Raccoons crossed most frequently (n=27), followed by turtles (n=3), eastern gray squirrels (n=1), groundhogs (n=1), and deer (n=1). Table 2 summarizes successful tunnel crossings.

**Table 3. Summary of Camera Trap Captures**

Taxonomic Name	Common Name	North Camera Trap			Middle Camera Trap			South Camera Trap			TOTAL
		North	South	Attempt	North	South	Attempt	North	South	Attempt	
<i>Chrysemys picta</i>	Eastern Painted Turtle	4	1	0	3	2	0	2	1	0	<b>13</b>
<i>Turdus migratorius</i>	American robin	0	0	0	0	0	0	3	0	0	<b>3</b>
<i>Cyanocitta cristata</i>	Blue jay	0	0	1	0	0	0	0	0	0	<b>1</b>
<i>Spizella passerina</i>	Chipping sparrow	0	0	0	0	0	0	0	0	1	<b>1</b>
<i>Melospiza melodia</i>	Song sparrow	0	0	2	0	0	0	0	0	0	<b>2</b>
Rodentia spp.	Rodent spp.	0	0	4	0	0	0	0	0	0	<b>4</b>
Neotominae spp.	Field Mouse spp.	0	0	0	0	0	5	2	2	1	<b>10</b>
<i>Zapus hudsonius</i>	Meadow jumping mouse	1	2	6	0	0	0	0	5	15	<b>29</b>
<i>Tamias striatus</i>	Eastern striped chipmunk	0	0	1	0	1	0	1	2	0	<b>5</b>
<i>Tamias carolinensis</i>	Eastern gray squirrel	0	5	0	2	3	0	0	2	0	<b>12</b>
<i>Tamias hudsonicus</i>	Red squirrel	1	0	0	0	0	0	0	0	0	<b>1</b>
<i>Marmota monax</i>	Groundhog	1	2	0	0	2	0	1	1	0	<b>7</b>
<i>Didelphis virginiana</i>	Virginia opossum	2	0	0	0	0	0	1	0	0	<b>3</b>
<i>Mephitis mephitis</i>	Striped skunks	2	0	0	1	0	0	0	2	0	<b>5</b>
<i>Procyon lotor</i>	Raccoon	40	62	14	36	49	0	21	56	8	<b>286</b>
<i>Urocyon cinereoargenteus</i>	Gray fox	9	0	0	2	1	1	0	2	0	<b>15</b>
<i>Martes pennanti</i>	Fisher	14	1	0	6	2	0	5	2	4	<b>14</b>
<i>Odocoileus virginianus</i>	White tailed deer	0	0	0	0	0	0	1	0	0	<b>1</b>
<b>TOTAL</b>		<b>76</b>	<b>73</b>	<b>28</b>	<b>51</b>	<b>60</b>	<b>6</b>	<b>38</b>	<b>79</b>	<b>29</b>	<b>446</b>

### 4.3 ROAD MORTALITY SURVEY

No wildlife strikes other than small reptiles, birds, and small mammals were observed. A total of 11 species remains were observed (mostly in the southwest quadrant). Eastern painted turtles were the most common species remains encountered (n=198). Other species remains were infrequent and observed within the roadway with obvious indications of vehicle strikes (i.e., flattened) and included snapping turtle (*Chelydra serpentina*), northern leopard frog (*Lithobates pipiens*), American toad, northern water snake (*Nerodia sipedon*), eastern garter snake (*Thamnophis sirtalis*), eastern striped chipmunk, Canada goose (*Branta canadensis*), mourning dove (*Zenaida macroura*), star-nosed mole (*Condylura cristata*), voles (Arvicolinae spp.), unidentified rodents, and Virginia opossum. The majority of the remains were located within the vehicular travel corridor with only occasional encounters along an adjacent road or the adjacent vegetated habitats. Table 4 summarizes the results of the road mortality survey

Other wildlife signs observed including scat, tracks, burrows, and numerous live encounters. Frequently observed wildlife included pickerel frogs (*Lithobates palustris*) (live encounters), raccoon (scats and tracks), Canada geese (scat and live encounters), voles (burrows and live encounters), eastern painted turtles (live encounters), and deer (scat and tracks). The following sections summarize the results of road mortality survey in each of the four quadrants.

The Town of Concord responded that they were only responsible for a small portion of the western section of Drake Park Road and did not collect road strike data for other portions of the Route 2 corridor. No wildlife strikes were reported by the Town. No wildlife strikes were reported by MassDOT within the study area for the road mortality survey.

**Table 4. Summary of Road Mortality Observations**

Taxonomic Name	Common Name	NE Quad		NW Quad		SE Quad		SW Quad		TOTAL	
		Remains	Other Sign	Remains	Other Sign	Remains	Other Sign	Remains	Other Sign	Remains	Other Sign
<i>Esox niger</i>	Chain pickerel	-	1	-	-	-	-	-	-	0	1
<i>Chelydra serpentina</i>	Snapping turtle	1	-	-	-	1	-	-	-	2	0
<i>Chrysemys picta</i>	Eastern painted turtle	-	1	-	-	1	64	197	36	198	101
<i>Lithobates palustris</i>	Pickerel frog	-	11	-	5	-	7	-	-	0	23
<i>Lithobates pipiens</i>	N. leopard frog	-	-	-	-	-	2	1	-	1	2
<i>Hyla versicolor</i>	Gray tree frog	-	-	-	-	-	1	-	-	0	1
<i>Anaxyrus americanus</i>	American toad	-	-	-	-	-	14	1	-	1	14
<i>Neroida sipedon</i>	Northern water snake	-	-	-	-	-	-	1	-	1	0
<i>Thamnophis sirtalis</i>	Eastern garter snake	1	3	-	4	-	1	-	2	1	10
<i>Meleagris gallopavo</i>	Wild turkey	-	1	-	1	-	-	-	-	0	2
<i>Branta canadensis</i>	Canada goose	-	9	-	-	-	26	1	1	1	36
<i>Corvus brachyrhynchos</i>	American crow	-	1	-	-	-	-	-	-	0	1
Strigiformes spp.	Owl	-	-	-	-	-	-	-	2	0	2
<i>Buteo jamaicensis</i>	Redtail hawk	-	-	-	2	-	1	-	-	0	3
<i>Zenaida macroura</i>	Mourning dove	-	-	-	-	-	-	1	-	1	0
Aves spp.	Bird	-	2	-	-	-	-	-	-	0	2
<i>Condylura cristata</i>	Star-nosed mole	-	-	-	-	-	-	1	-	1	0
Arvicolinae spp.	Vole	-	9	1	12	-	-	-	-	1	21
Rodentia spp.	Unidentified rodent	-	1	1	3	-	1	-	-	1	5
<i>Tamias striata</i>	Eastern striped chipmunk	-	-	-	3	-	-	2	4	2	7
<i>Didelphis virginianum</i>	VA Opossum	-	-	-	-	1	-	-	-	1	0
<i>Procyon lotor</i>	Raccoon	-	96	-	12	-	22	-	4	0	134
Canidae spp.	Fox	-	-	-	-	-	-	-	-	0	0
<i>Martes pennant</i>	Fisher	-	-	-	1	-	-	-	-	0	1
<i>Odocoileus virginianus</i>	White-tail deer	-	17	-	3	-	13	-	2	0	35
NA	Unidentified spp.	-	1	-	-	-	1	-	-	0	2
<b>TOTAL</b>		<b>2</b>	<b>153</b>	<b>2</b>	<b>46</b>	<b>3</b>	<b>153</b>	<b>205</b>	<b>51</b>	<b>212</b>	<b>403</b>

### 4.3.1 Northeast Quadrant

The northeast quadrant consistently contained sign of wildlife usage by raccoon, deer, wild turkey, pickerel frogs, and voles as evidenced by live encounters, scat and tracks. Within the Route 2 west bound corridor, the only wildlife strike recorded was a large common snapping turtle. The results of the road mortality survey in the northeast quadrant are presented in Table 5.

*Table 5 Summary of Northeast Quadrant Wildlife Encounters*

<b>Taxonomic Name</b>	<b>Common Name</b>	<b>Sign</b>
<i>Esox niger</i>	Chain pickerel	Encounter
<i>Chelydra serpina</i>	Common snapping turtle	Remains
<i>Chrysemys picta</i>	Eastern painted turtle	Encounter
<i>Lithobates palustris</i>	Pickerel frog	Encounter, scat
<i>Thamnophis sirtalis</i>	Eastern garter snake	Encounter, remains
Aves spp.	Unidentified bird	Tracks, feather
<i>Branta canadensis</i>	Canada goose	Scat
<i>Buteo jamaicensis</i>	Redtail hawk	Call, flyover
Rodentia spp.	Unidentified rodent	Scat
Arvicolinae spp.	Vole	Burrow, encounter, remains
<i>Procyon lotor</i>	Raccoon	Tracks, scat
<i>Odocoileus virginianus</i>	White-tail deer	Tracks, scat
Canidae spp.	Fox	Scat
Unidentified spp.	NA	Scat

### 4.3.2 Northwest Quadrant

Wildlife sign within the northwest quadrant was scarce. Frequent sign by raccoon, white tail deer, voles, and eastern garter snakes were recorded. Observed evidence was generally limited to live encounters, burrows, tracks, scat, and remains. No wildlife strikes were observed the Route 2 west bound corridor. The results of the road mortality survey in the northwest quadrant are presented in Table 6.

**Table 6 Summary of Northwest Quadrant Wildlife Encounters**

<b>Taxonomic Name</b>	<b>Common Name</b>	<b>Sign</b>
<i>Thamnophis sirtalis</i>	Eastern garter snake	Encounter
<i>Lithobates palustris</i>	Pickerel frog	Encounter
<i>Meleagris gallopavo</i>	Wild turkey	Tracks
<i>Corvus brachyrhynchos</i>	American crow	Call, flyover
Rodentia spp.	Unidentified rodent	Remains, scat
<i>Tamias striatus</i>	Eastern striped chipmunk	Encounter
Arvicolinae spp.	Vole	Burrow, encounter, remains
<i>Procyon lotor</i>	Raccoon	Tracks, scat
<i>Martes pennanti</i>	Fisher	Scat
<i>Odocoileus virginianus</i>	White-tail deer	Tracks

### 4.3.3 Southeast Quadrant

The southeast quadrant experienced a high volume of wildlife sign from eastern painted turtles, raccoons, deer, American toads, and Canada geese as evidenced by remains, live encounters, tracks, and scat. Wildlife mortality observed within this quadrant included eastern painted turtles and a common snapping turtle as evidenced by remains recorded within the adjacent vegetated habitat. No wildlife strikes were observed within the Route 2 east bound travel corridor. The results of the road mortality survey in the southeast quadrant are presented in Table 7

**Table 7 Summary of Southeast Quadrant Wildlife Encounters**

<b>Taxonomic Name</b>	<b>Common Name</b>	<b>Sign</b>
<i>Chelydra serpentina</i>	Common snapping turtle	Remains
<i>Chrysemys picta</i>	Eastern painted turtle	Encounter, remains
<i>Anaxyrus americanus</i>	American toad	Encounter
<i>Lithobates palustris</i>	Pickerel frog	Encounter
<i>Lithobates pipiens</i>	Northern leopard frog	Encounter
<i>Thamnophis sirtalis</i>	Eastern garter snake	Encounter
<i>Branta canadensis</i>	Canada goose	Encounter, tracks, scat
Rodentia spp.	Unidentified rodent	Tracks
Canidae spp.	Fox	Scat
<i>Odocoileus virginianus</i>	Whitetail deer	Tracks, scat
<i>Procyon lotor</i>	Raccoon	Tracks, scat

### 4.3.4 Southwest Quadrant

The southwest quadrant experienced a very high number of eastern painted turtle strikes (n=197). Other remains observed also included northern leopard frog, American toad,

northern water snake, mourning dove, star-nosed mole and eastern striped chipmunk. The results of the road mortality survey in the southeast quadrant are presented in Table 8

**Table 8 Summary of Southwest Quadrant Wildlife Encounters**

<b>Taxonomic Name</b>	<b>Common Name</b>	<b>Sign</b>
<i>Chrysemys picta</i>	Eastern painted turtle	Encounter, remains
<i>Lithobates pipiens</i>	Northern leopard frog	Remains
<i>Hyla versicolor</i>	Gray tree frog	Encounter
<i>Bufo americanus</i>	American toad	Remains
<i>Nerodia sipedon</i>	Northern water snake	Remains
<i>Thamnophis sirtalis</i>	Eastern garter snake	Encounter
<i>Buteo jamaicensis</i>	Red-tail hawk	Call
Aves spp.	Unidentified owl	Pellets
<i>Zenaida macroura</i>	Mourning dove	Remains
<i>Condylura cristata</i>	Star-nosed mole	Remains
Arvicolinae spp.	Vole	Tunnel
<i>Tamias striatus</i>	Eastern striped chipmunk	Burrow, encounter, remains
<i>Procyon lotor</i>	Raccoon	Tracks
<i>Odocoileus virginianus</i>	White-tail deer	Tracks
<i>Martes pennant</i>	Fisher	Scat

#### 4.4 SNOW TRACKING

Snow tracking did not occur during the 2016 survey period since there was insufficient snowfall during the survey period (i.e., 1 to 3 inch storms). Thus, there is no data to report.

#### 5.0 DISCUSSION

Tack bed utilization showed that a variety of wildlife are actively using the tunnel. Species that are most adaptable to anthropogenic impacts (e.g., raccoon and mice) utilized the tunnel most consistently over the course of the eight-week survey period. However, other species that are commonly found in developed environments (e.g., squirrels, opossum, groundhogs, etc.) were infrequently documented. Sporadic utilization of the tunnel by those species could be resultant from multiple factors. Extensive high-value habitat exists on both sides of the Route 2 travel corridor for small mammals. As a result, the need to cross the heavily travelled road could have been negated. Additionally, there was little evidence of infrequently observed wildlife outside of the tunnel which may be indicative that few individuals are typically in this area. The presence of predators such as raccoon, fox, and fisher may also have deterred species utilization of the tunnel.

The lack of utilization by some species was surprising. Opossum, cottontail, groundhog, and deer were only sporadically observed and other species such as wild turkey were never identified within the tunnel. Underutilization of the tunnel by these species may be affected by numerous factors including species densities in the immediate vicinity of the area, preferred crossings outside of the study area, and avoidance of the tunnel. These species may become more frequent users of the tunnel over time as they become more comfortable with it.

Although turtles were overwhelmingly the most frequently observed species, their occurrence was short and represented a brief exodus migration. Interestingly, the vast majority of the turtles observed were travelling north; however, no turtles were observed travelling back south later in the season. It is possible that chronic drought resulted in preferred habitats at higher gradients to the south becoming dry and that turtles migrated to more consistently ponded habitats to the north. This hypothesis is supported by personal communications with neighbors living along Sandy Pond Road and Drake Park Road south of the tunnel and in informal conversations with MassDOT staff and Dave Paulsen from MassDFW. Neighbors reported that habitats adjacent to their home typically contained extensive wetlands with sporadic ponds; however, in recent years, those habitats have consistently become drier and that in 2016, the area which usually ponds did not contain any standing water at any time. Additionally, local conservation groups working in the vicinity of the Walden Pond State Reservation also reported very high numbers of turtles migrating south. A neighbor along Drake Park Road indicated that he had never experienced such a mass migration of turtles on his property in the 40 years that he had lived there. Turtle strikes were far more common than any other species. Their inability to overcome obstacles (e.g., jersey barriers), slow pace, and their tendency to rest on warm surfaces (i.e., pavement) resulted in a very high mortality rate.

## **5.1 TRACK BEDS**

Using track beds and camera traps together to document wildlife utilization of the tunnel was beneficial. Both methods provided unique benefits that worked well in concert with each other. The following provides a brief analysis of the pros and cons of each system, how they worked together, the challenges that were encountered, and recommendations on how the monitoring study could be enhanced in the following seasons.

The track beds regularly recorded many species and individuals that crossed over them; however, given the limits of sand to effectively capture quality tracks, it was difficult to properly identify the individual tracks to species level. Sand does not capture tracks as well as other natural mediums such as snow or mud. The tracks that are left often appear artificially weathered, are more susceptible to weather conditions (e.g., wind, rain, etc.), and are more difficult to accurately identify.

Species with very distinct tracks were easier to consistently identify to species level than others (e.g., deer, human). Some tracks were so similar that they could only successfully be identified to particular species “group” (e.g., field mice, birds, etc.) Additionally, tracks that were first laid down were frequently compromised by the tracks of individuals traversing the tunnel later during the survey period. This often resulted in difficulty identifying tracks to species level, the number of individuals, and/or the direction of travel.

Additionally, as the season progressed, the north and south beds encountered periods of aggressive weed growth within the sand medium. This resulted in frequent false triggers of the camera sensors and reduced the effectiveness of the track beds to record wildlife tracks within the areas of vegetative growth. Lastly, over the course of the survey period, the sand within the beds settled as a result of rain, vibration, and other factors. This resulted in the level of sand reducing from approximately 0.25-inch from the top of the frames to approximately one inch from the top. Additional sand was added early during the monitoring; however, settling of the sand continued to be problematic.

## **5.2 CAMERA TRAPS**

The camera traps were able to capture clear pictures of many species that crossed through the track beds. Additionally, the traps provided confirmation of which species were utilizing the tunnel, especially when the tracks had been compromised by other individuals, weather conditions, or other factors. In several instances, tracks that were believed to be of raccoon were positively identified as fisher as a result of successful trap captures. The traps also allowed for species identification of individuals with tracks of similar character such as species of Canids and similar species of aquatic turtles. Additionally, the traps provided insightful information about which individuals successfully traversed the tunnel and at what times wildlife utilized the tunnel most frequently.

However, there were several challenges to effectively capture pictures of the wildlife that were traversing the tunnel. In conversations with MassDFW and MassDOT, the height of the cameras was established at 32 inches above grade at the corner of the track beds. The hypothesis was that the elevated angle of the camera would allow for a greater overall view of the track beds and would provide for the greatest length of travel by wildlife through the camera width of view to be successfully captured. However, the security mounts provided limited flexibility to adjust the angle of the camera and the height at which they were installed created blind spots along the wall they were installed. These two limiting factors resulted in numerous missed captures. Additionally, the narrow width of field prevented the cameras from successfully capturing many individuals who were either travelling too fast (e.g., fishers running through the tunnel) or that were too small to trigger the sensor

(e.g., rodents, most turtles, etc.) On several occasions, the angle of each camera was slightly altered to provide a better angle of the track bed in an attempt to successfully capture more individuals.

In addition to determining successful traverses of the tunnel, the monitoring study also sought to document passage attempts by wildlife. During the study design, it was determined that the cameras for the north and south traps would face down the tunnel looking towards the entrances. As a result of the limited range of the security mounts and the limited view of the cameras, views of the tunnel entrances were not possible. Thus, attempts at crossing were restricted to photos of wildlife entering and leaving the same entrance. Documentation of wildlife at the entrances that did not at least partially enter the tunnel were not captured.

Lastly, effective programming of the cameras proved to be difficult. Due to varying site conditions, several programming configurations were tested. Originally, the cameras were configured to take three photos in rapid succession every time the sensor was triggered. The first images captured demonstrated that many of the individuals were moving too quickly through the tunnel. By the time the sensor was triggered and the first images were taken, the animal had already successfully passed through the camera's range or the camera only captured part of the animal. Multiple options were tested including taking more pictures per trigger, altering the light settings and trigger options, and taking time lapse photos. The configuration that appeared to work most effectively consisted of having the cameras take ten rapid fire pictures every time the sensor was triggered. In most instances, this setup was effective in being able to successfully capture at least some portion of the animal that triggered the sensor. However, this also resulted in a large amount of data each time the images were downloaded, much of which were "null" images wherein no individuals were captured.

### **5.3 Road Mortality Survey**

The road mortality survey was very effective at determining what species were not utilizing the wildlife tunnel. The walking meander surveys provided an effective method of documenting wildlife; however, the danger of the Route 2 travel lanes prevented extensive investigation of wildlife remains. With the exception of the high rate of mortality for eastern box turtles, relatively few individuals were killed as a result of vehicular strikes within the study area. Additionally, some of the remains encountered, were likely not resultant from vehicles, although those instances were infrequent. The main causes of vehicular strikes resulted from slow-moving species (i.e., turtles) and an inability of species to escape the travel corridor.

The high number of turtle strikes and other frequently observed sign (e.g., scat/tracks) made it difficult to identify what had already been counted during surveys. Consistently using the same investigators and sketching the approximate locations on individual datasheets aided in identifying which individuals had already been observed.

#### **5.4 Snow Tracking**

The lack of sufficient snowfall during the survey period prevented any snow tracking. If satisfactory levels of snow accumulated, it would have provided an effective means of documenting wildlife attempts at utilizing the tunnel as well as individuals which passed by the tunnel but did not attempt to use it.

## **6.0 SUMMARY AND RECOMMENDATIONS**

Documenting wildlife usage of the tunnel underpass utilizing a combination of track beds and camera traps has been a success. Despite the challenges noted above, the methodology of utilizing multiple techniques provided a more thorough collection of data and should continue. However, in order to improve the quality of data collected and to ensure better success with each methodology, the recommendations and improvements are provided. Additionally, although the tunnel is well-utilized by a variety of species and is frequently used, additional recommendations to reduce vehicle strikes and increase utilization of the tunnel are included below.

#### Track Beds

- Line the beds with geotextile/weed barrier to reduce vegetative growth through the tracking medium (i.e., sand); and
- Refill the beds to within 0.25-inches with fine sand to replace the volume of settled sand.

#### Camera Traps

- Relocate the traps lower on the wall so that the motion sensors are just above the top of the track bed frames so more wildlife trigger the sensors;
- Reposition the traps to the center of the length of the track beds so the camera angle can be better manipulated to encounter a greater number of individuals as they cross the beds; and
- Add two additional camera traps that are installed outside of the tunnel and positioned to aim towards the entrances down the tunnel to document wildlife

attempts.

#### Road Mortality Survey

- GPS locate and/or remove remains and/or other signs during each survey period to avoid potential double counting of remains. However, this is only feasible on less travelled roads.

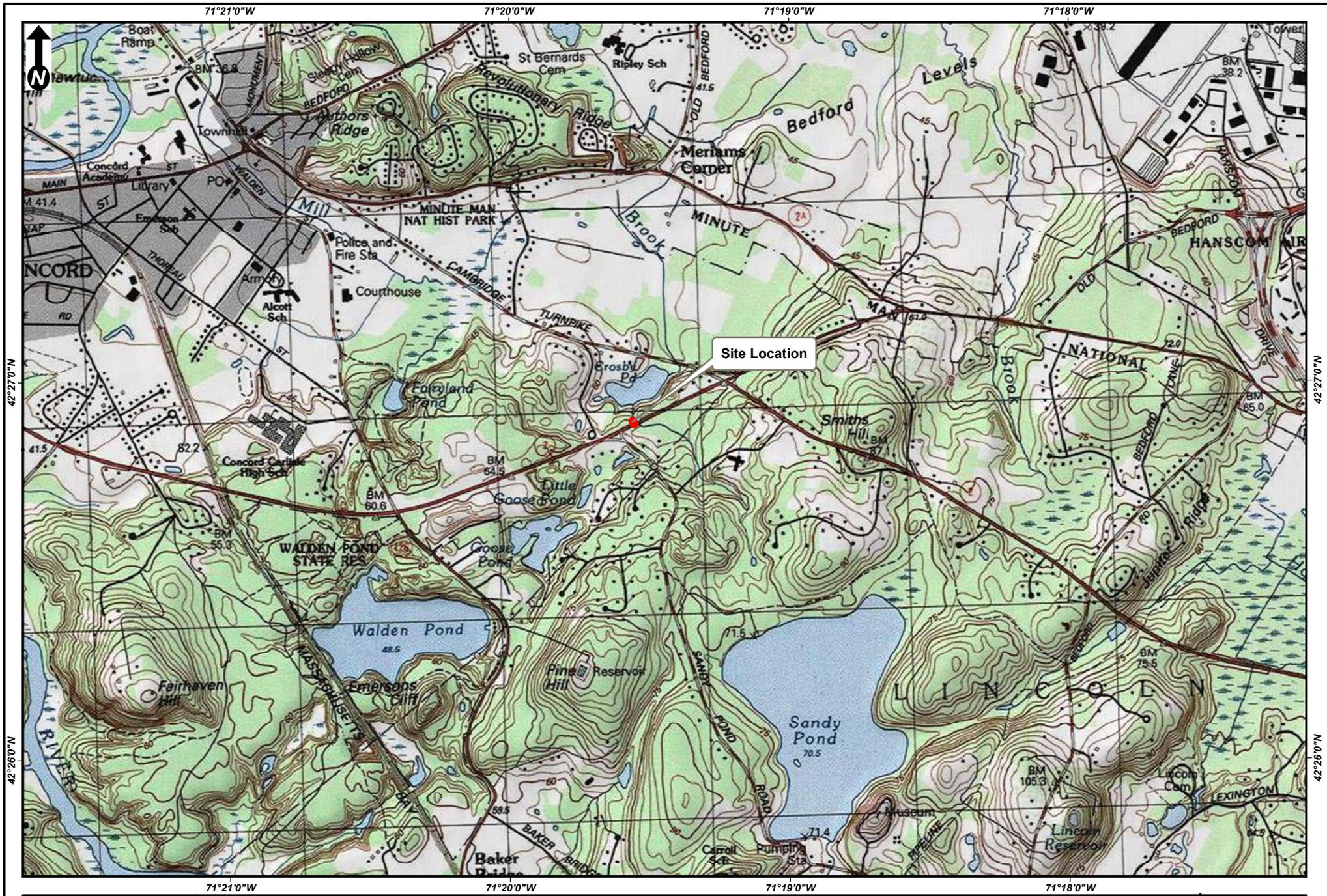
#### Jersey Barriers

- Provide more frequent wildlife breaks between the jersey barriers to provide trapped wildlife more opportunities to escape the travel corridor.

Wildlife quickly began utilizing the tunnel for passage as soon as it was available. Numerous species were documented immediately and additional species were observed as the season progressed. It is expected that use of the tunnel will continue to grow as species become accustomed to its presence and construction adjacent to the tunnel begins to dwindle. As adjacent habitats continue to mature and wildlife becomes more comfortable with utilizing the tunnel as a primary means of migration and movement between preferred habitats, it can be expected that utilization of the tunnel both in species composition and frequency will increase. Continued monitoring of the tunnel in future years is recommended.

## **APPENDIX A**

### FIGURES

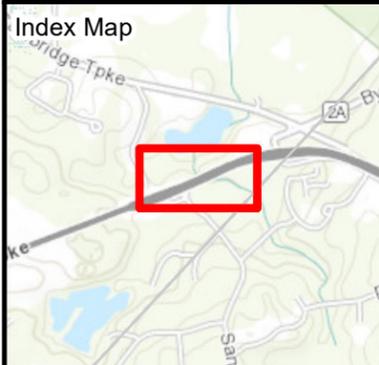
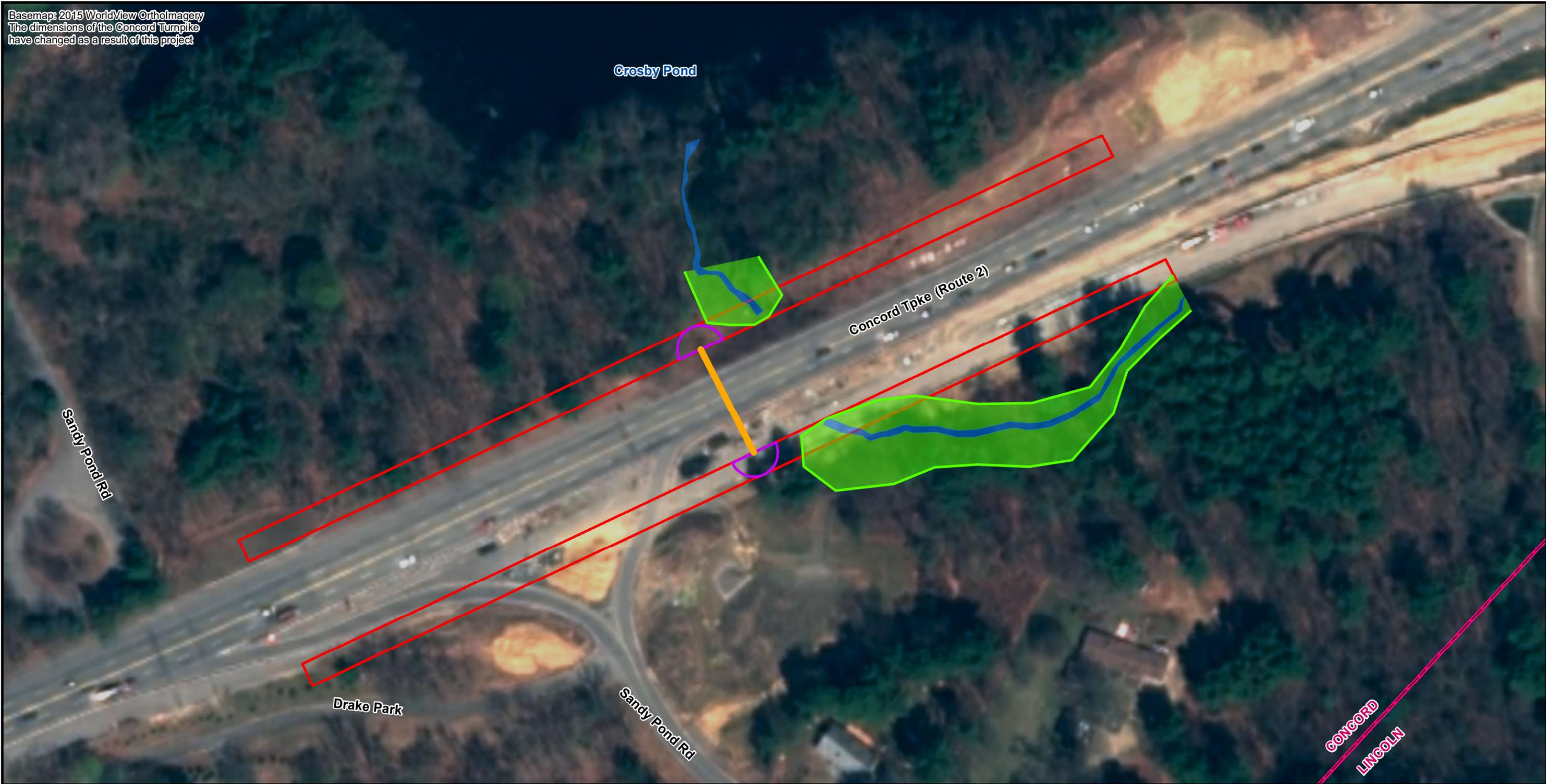


Scale:  
1 inch = 2,000 feet  
(page size: 8.5 X 11)  
0 1,000 2,000  
Feet

**ROUTE 2 CROSBY CORNER INTERCHANGE IMPROVEMENT PROJECT**  
**USGS Site Location Map**  
**Concord, MA**

Source: USGS, 1982-1990; MADOT, 2005; MassGIS, 2008  
**massDOT**  
**BSC GROUP**

Basemap: 2015 WorldView Orthoimagery  
 The dimensions of the Concord Turnpike  
 have changed as a result of this project



**Legend**

- Wildlife Tunnel
- Road Mortality Survey Area
- Snow Tracking Area
- Surveyed Wetland Line
- Surveyed Wetland Area
- Estimated Stream Bank

1 inch = 100 feet

0 100 200  
Feet

**ROUTE 2 CROSBY CORNER INTERCHANGE  
 IMPROVEMENT PROJECT**

**Wildlife Tunnel Monitoring**

Concord, MA

Figure 2

## **APPENDIX B**

### MONITORING PROTOCOL AND CORRESPONDENCE



Deval L. Patrick, Governor  
Richard A. Davey, Secretary & CEO  
Frank DePaola, Administrator



October 30, 2013

Ms. Lisa Rhodes  
Wetlands and Waterways Program  
Massachusetts Department of Environmental Protection  
One Winter Street  
Boston, MA 02108

**SUBJECT: Concord- Lincoln – Roadway Reconstruction and Related Work (Including 1 Bridge and 14 Retaining Walls) along a Section of Route 2 (Crosbys Corner Interchange)**

**Re: Contract No. 71104, MassDEP Transmittal No: X235691  
Massachusetts Wetlands Protection Act Variance Decision Lincoln (File No. 203-0824) and Concord (File No. 137-1059) dated August 5, 2011  
Special Condition 27 – Wildlife Culvert Passage Monitoring Plan**

Dear Ms. Rhodes:

Attached please find MassDOT's revised Wildlife Culvert Passage Monitoring Plan which is being submitted as required by Special Condition 27 of the above referenced Variance Decision. Special Condition 27 requires that MassDOT perform a baseline wildlife habitat evaluation and develop and submit to MassDEP for review and written approval a plan to monitor the efficacy of the wildlife habitat culvert for 5-years after completion of construction. MassDOT submitted the original Monitoring Plan on September 13, 2013, and this revision is being submitted in response to comments from MassDEP received via email on September 30, 2013.

A wildlife habitat assessment was performed in 2007 and is described in the attached report titled Compensatory Mitigation Report (Attachment A, Section 1.6 dated August 22, 2011). Information from this assessment was also included in the 2011 Notice of Intent filing for this project. In addition, a baseline wildlife habitat assessment describing pre-construction conditions was prepared by AECOM in September 2013 (Attachment B).

Special Condition 27 also requires consultation with the Division of Fish and Game as well as the UMass-Amherst Extension's Natural Resources & Environmental Conservation Program. Representatives from these two groups reviewed the original Monitoring Plan and provided feedback (Attachment C). This revised Plan incorporates the comments that were received during that consultation.

For more information or if you have questions regarding this Wildlife Culvert Passage Monitoring Plan please contact Sandra Sprague at 857-368-9572 or at [Sandra.j.sprague@state.ma.us](mailto:Sandra.j.sprague@state.ma.us).

Respectfully Submitted,



Jessica Kenny  
Manager of Environmental Compliance for Construction  
MassDOT Highway Division

Enclosure:

Wildlife Culvert Passage Monitoring Plan  
Attachment A: Compensatory Mitigation Report  
Attachment B: Baseline Wildlife Habitat Assessment  
Attachment C: Documentation of Correspondence/Consultation

cc. P. DiPietro (MassDEP), T. Maquire (MassDEP), L. Langdon (MassDEP), P. Sneringer (USACOE), D. Kaye (CCC), T. Gumbart (LCC), B. Polley (MassDOT), M. Cain (MassDOT), M. Hayden (MassDOT), S. McArthur (MassDOT), S. Herbster (MassDOT), I. Hegemann, J. McCluskey, D. Lowry

## **Wildlife Culvert Passage Monitoring Plan**

### **Route 2 Crosby's Corner Safety Improvement Project, Concord, MA**

**DEP File No. NE 137-1059**

#### **Background**

As part of the Route 2 Crosby's Corner Safety Improvement Project in Concord, MA, MassDOT is constructing a wildlife passage culvert, measuring 6.6 feet high by 8 feet wide and 130 feet long, adjacent to the Mill Brook culvert to improve habitat connectivity (Figure 1). Special Condition 27 of the MassDEP Wetland Variance decision for this Project requires that MassDOT develop and submit to MassDEP for review and written approval a plan to monitor the efficacy of the wildlife habitat culvert for 5-years after completion of construction.

MassDOT has developed the following Wildlife Passage Monitoring Plan consistent with FHWA guidance on monitoring highway mitigation measures designed to benefit local wildlife populations (Clevenger and Huijser, 2011), and also with reference to other similar efforts in the Commonwealth where monitoring of wildlife passage culverts has been implemented. The objective of this Plan is simply to determine whether wildlife are using the crossing structure and if so, which species and how frequently. The primary components of the Plan include a Passage Assessment on both sides of Route 2, installation and monitoring of tracking beds and remote-trip cameras on both sides of Route 2, and requirements for data collection, analysis and reporting.

#### **Wildlife Habitat Evaluation**

An understanding of baseline wildlife habitat conditions has been established using established landscape and habitat assessment criteria, as well as drawing from previous wildlife habitat evaluations of the site from the project permitting efforts (e.g., the MWPA Notice of Intent, which provided the MADEP detailed wildlife habitat evaluation for this location, as well as the Section 404 permitting). Attachment B to this Plan provides the pre-construction wildlife habitat assessment; Attachment A provides the Compensatory Mitigation Report for the project (dated August 2011), which includes substantial information that relates to the baseline habitat conditions of the site and local vicinity. These habitat descriptions and evaluations will be taken into consideration in the assessment of the results of the monitoring program described below.

#### **Wildlife Passage Monitoring**

Research conducted by Rogers et. al. (2009) indicated that both track beds and remote trip cameras had advantages and disadvantages in capturing movement of wildlife through the passages, and both were necessary for a complete assessment of passage use by local wildlife. In addition, it is often difficult to distinguish "approaches" versus "passes" of wildlife through the tunnel when remote-trip cameras are placed at only one end of the structure (Kintsch and Cramer, 2011; Lydia Rogers, Concord Wildlife Passages Task Force, *Personal Communication*). Therefore, track beds and cameras will be placed at both ends of the tunnel.

Monitoring will be conducted throughout the complete first growing season (March 1 through October 31) and then curtail in subsequent monitoring years depending on results of previous year (i.e., adaptive monitoring plan). For example, if the first year of monitoring demonstrates a high diversity and frequency of passage use by local wildlife, monitoring efforts in Year-2 may be reduced to focus on periods typical of elevated wildlife activity (i.e., spring time). Any reduction in monitoring effort beyond Year-1 will be implemented only with the expressed approval of MassDEP. Year-1 monitoring frequencies are described in greater detail below.

#### Track Beds

Track beds will be 6X8 feet (spanning the entire width of the passage) and located at each entrance to the passage as well as in the middle portion of the culvert. Approximately 3 inches depth of very fine sand (e.g., separator sand) will be contained within a wooden frame constructed of pressure treated 2X4 inch lumber and inset flush with the ground surface.

Monitoring and maintenance of track beds should consider the variability in wildlife movements and the efficiency of the monitoring efforts. Therefore, monitoring will occur within a time-subset of the complete survey window and during a period typical of elevated wildlife activity. For eight weeks between April 15 and June 15, track beds will be monitored 2X per week. Tracks will be identified to species when possible, or categorized as small mammal (e.g., mice, voles), other mammal, reptile or insect. Confirmation of species identification by a second, qualified individual may be required. Track direction will be recorded, and track identification will be categorized with some ratings of degree of certainty (e.g., 1-4; certain to uncertain). Crossing rates will be calculated for each species following (Rogers et. al., 2009). Data tabulation and processing will include basic summary statistics (e.g., species, frequency, etc.), plot/document any trends (e.g., by year, month, time of day, species, etc.), and document successful passages versus attempts.

Photographic documentation and identification will follow Rezendes (1999) and will include one overall view of the entire track bed, and close up photos of tracks with a ruler placed in for scale. Track beds will be erased using a fine-bristled push broom after each inspection is complete.

#### Remote-trip Cameras

Habitats directly adjacent to the proposed wildlife passage include Crosby Pond, Mill Brook, bordering vegetated wetlands and associated riparian zones, which function as suitable habitat for a diversity of amphibians and reptiles. In addition, wildlife habitat evaluations conducted in the vicinity prior to construction by The Louis Berger Group, Inc. (2010) reported observations of predated turtle nests and an assortment of frogs and salamanders.

Remote-trip cameras are typically triggered by a Passive Infra-Red (PIR) sensor which detects abrupt changes in temperature from background temperature. This mechanism does not detect ectothermic (i.e., cold-blooded amphibians and reptiles) animals because they are generally the same temperature as their environment. In addition, small mammals (e.g., mice and voles) are often missed because the heat differential is insufficient to trigger the camera (Rogers et. al., 2009). Motion-sensing infrared digital cameras will be considered for use (such as a Silent Image Professional Model PM35M13 Reconyx, or comparable); alternatively, a modified trigger design will be considered for use (<http://www.itswildlifecameras.com/>), which uses a garage door/photoelectric beam sensor to fire the camera. Anytime the beam, which will span the width

of the passage, is broken, the camera takes a picture. It is anticipated that this approach will document a greater diversity of wildlife than standard PIR cameras and may eliminate the need for track bed inspections in successive monitoring years.

Life-span of the camera battery is the limiting factor in this system and will determine the duration between inspections. The camera battery lasts for approximately 400 pictures depending on how many are taken at night. Therefore, inspections will initially occur every 2-3 weeks from March 1 through October 31 of Year-1 to replace batteries and download pictures, but may be adjusted depending on level and timing of activity in the wildlife passage.

Cameras will be mounted at the passage entrance, up high and angled slightly down towards the ground, and down the length of the passage. The garage door sensor will be placed several feet into the passage so that only animals completely within the passage are photographed and to ensure enough time after triggering to photograph the animal (i.e., account for slight delay in recording of first image following a trigger event). Wooden camera mounts will be affixed to concrete walls using heavy-duty construction adhesive; security boxes will be used to minimize the threat of vandalism and/or theft.

Photographs will be catalogued with species identification, date, time, and direction of travel and tracked in an excel table. Confirmation of species identification by a second, qualified individual may be required. Crossing rates for each species will be calculated (# of crossings divided by # of days). Photographic evidence will be compared with track bed inspections.

#### **Additional Requirements**

On each occasion that the cameras and sand-tracking beds are monitored, a survey will also be conducted to assess wildlife road-kill incidences in proximity to the wildlife culvert. The survey will encompass a 25-foot wide swath within 1000 feet of the culvert (500 feet in each direction) on both the north and south sides of the highway. This area will be traversed on the forest side of the guardrail, with documentation of all observed road kill specimens. In addition, snow tracks will be inventoried on three days per year with fresh snow fall of less than three inches but more than one inch; methods employed will be similar to those described in Bellis et al (2013)..

Standardized data collection is critical for obtaining useful information over long-term research programs and equally important for comparison among studies. Field notes shall be kept in a project designated field book and/or on standardized field data forms. Immediately upon returning from the field, personnel shall double-check all field notes and data sheets for completeness and legibility, and then enter these data into a digital format (e.g., database or digital version of field datasheets). All photographic evidence shall be stored on a backed-up network drive.

A designated ecologist responsible for implementation and/or overseeing the activities described in this monitoring plan shall be a certified ecologist or wildlife biologist, or person with a minimum of 5 years experience working with wildlife. Any personnel conducting field research other than the designated ecologist shall receive training directly from the ecologist and demonstrated the knowledge, skills and abilities necessary to perform the procedures and collect accurate data.

## **Reporting**

Year-1 of the monitoring will require two reports; an interim report (submitted by July 15<sup>th</sup>) will focus on a comparison between track bed monitoring and remote-trip cameras to assess their effectiveness in capturing wildlife usage of the passage, and a year-end report (submitted by December 31<sup>st</sup>) will summarize crossing rates using all Year-1 photographic evidence, and present results of the wildlife habitat evaluation. Subsequent monitoring years will require only one year-end report submitted by December 31<sup>st</sup> of each year. Reports should also include, but not be limited to; names of biologist performing the work, a description of condition and functionality of adjacent habitats with supporting photographic evidence, condition of the wildlife passage and anecdotal observations such as road-killed animals or other evidence of passage avoidance, vandalism and human use of passage or adjacent habitats. A final summary report will be prepared to consolidate the results of the monitoring program and draw conclusions, lessons learned, and recommendations for other similar efforts.

## **Consultation**

Special Condition 27 of the MassDEP Variance requires that "development of this plan shall include consultation with the Division of Fish and Game, as well as the UMass-Amherst Extension's Natural Resources & Environmental Conservation Program in the Department of Natural Resources Conservation." MassDOT has complied with this requirement during development of the monitoring plan by reaching out to Mr. David Paulson at the Natural Heritage and Endangered Species Program (NHESP) within the Division of Fish and Game, as well as to Dr. Scott Jackson at UMass-Amherst. Attachment C to this Monitoring Plan provides documentation of some of the pertinent correspondence which MassDOT has had toward compliance with this condition. Recommendations made by UMass Amherst Extension's Natural Resources and Environmental Conservation Program and the Massachusetts Division of Fish and Game have been specifically incorporated into the Monitoring Plan, and/or are responded to in the documentation provided in Attachment C.

## Literature Cited

Bellis, M.A., C. Griffin, P. Warren, and S.D. Jackson. 2013. Utilizing a multi-technique, multi-taxa approach to monitoring wildlife passageways in southern Vermont. *Oecologia Australis* 17(1): 111-128.

Clevenger, A.P. and M. P. Huijser. 2011. Wildlife crossing structure handbook design and evaluation in north America. Federal Highway Administration Publication No. FHWA-CFL/TD-11-003.

Swain, P.C. and J.B. Kearsley. 2001. Classification of the natural communities of massachusetts (version 1.3). Massachusetts Division of Fisheries and Wildlife. Westborough, MA.

Cowardin, L.M., V. Carter V., F.C. Golet, E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Fish and Wildlife Service Report No. FWS/OBS/-79/31. Washington, D.C.

Kintsch, J. and P.C. Cramer. 2011. Permeability of existing structures for terrestrial wildlife: A passage assessment system. Research Report No. WA-RD 777.1. Washington State Department of Transportation, Olympia, WA.

Rogers, L., D. Stimson, K. Holden, D. Kay, D. Kaye, R. McAdow, B. Metcalfe, B. Windmiller, and N. Charney. 2009. Wildlife tunnels under a busy, suburban boston roadway. Pages 102-115 in *Proceedings of the 2009 International Conference on Ecology and Transportation*, edited by Paul J. Wagner, Debra Nelson, and Eugene Murray. Raleigh, NC: Center for Transportation and the Environment, North Carolina State University, 2010.

MassDEP. 2006. Massachusetts wildlife habitat protection guidance for inland wetlands. Department of Environmental Protection, Bureau of Resource Protection, and Wetland and Waterways Program. Boston, Massachusetts. USA.

The Louis Berger Group, Inc., 2010. Route 2 crosby's corner interchange safety improvement project: Towns of Lincoln and Concord, Notice of Intent.

Rezendes, P. 1999. Tracking and the art of seeing: How to read animal tracks and sign. Second edition. New York: HarperCollins Publishers, Inc.



**Legend**

- NHESP Certified Vernal Pools
- NHESP Priority Habitats of Rare Species
- NHESP Estimated Habitats of Rare Wildlife
- DEP Wetlands
- Open Water
- Reservoir
- Stream
- Town Boundaries



**Crosby's Corner Improvement Project  
Wildlife Passage Monitoring Plan**

Concord, Massachusetts

SCALE	DATE	PROJECT NO.
1:12000	09/13	60278-817

**AZCOM**

Figure Number

1

## Lowry, Dennis

---

**From:** Paulson, David (FWE) [david.paulson@state.ma.us]  
**Sent:** Wednesday, October 09, 2013 12:03 PM  
**To:** Lowry, Dennis  
**Cc:** Egan, Scott; McArthur, Susan (DOT); Herbster, Stephanie (DOT)  
**Subject:** RE: Route 2 Crosbys Corner Wildlife Culvert

Dennis,

Thank you for the follow-up. I look forward to reviewing the revised plan.

All the best,

Dave

---

**From:** Lowry, Dennis [mailto:Dennis.Lowry@aecom.com]  
**Sent:** Wednesday, October 09, 2013 11:01 AM  
**To:** Paulson, David (FWE)  
**Cc:** Egan, Scott; McArthur, Susan (DOT); Herbster, Stephanie (DOT)  
**Subject:** RE: Route 2 Crosbys Corner Wildlife Culvert

Hi Dave: thanks so much for getting back to us with these helpful comments. We are incorporating them into a revised Plan that will be submitted to DEP, and you will be copied. We have provided responses to your comments below (see the text in red). We will be back to you shortly with the revised Plan.

Thanks, Dennis

---

**From:** Paulson, David (FWE) [mailto:david.paulson@state.ma.us]  
**Sent:** Monday, October 07, 2013 11:14 AM  
**To:** Lowry, Dennis  
**Cc:** Egan, Scott; McArthur, Susan (DOT); Herbster, Stephanie (DOT)  
**Subject:** RE: Route 2 Crosbys Corner Wildlife Culvert

Dennis,

Thank you for submitting the wildlife monitoring plan to the Division for review. Overall, the plan looks good. I do have a few comments/addition.

- 1) What is the "finished" inside dimensions of the culvert. For example, if you use a 8'x8' box culvert and if you add 2' of natural substrate, it functionally becomes a 6'x8' opening.

The project was designed in meters (and feet). The culvert is 1.83 m x 2.44 m (6'x8') set at invert 43.3 m with approximately 300 mm (1') of a natural bottom. See attached sheet. Please note that during permitting, the Concord Conservation Commission suggested reducing the height of the culvert to 5 feet to minimize the use of the culvert by humans. It was agreed that adding the one-foot of soil in the bottom would accomplish that while encouraging wildlife use.

- 2) Given the length of the tunnel, I may suggest using 3 cameras and 3 track beds inside the crossing structure. A camera and bed at each end of the structure and one of each in the middle.

We believe that a camera at each end should be sufficient to document use of the culvert for corridor passage.

The SVT monitoring has included only one culvert, and some questions have arisen about full passage function, which is why we have proposed one at each end. Adding a third camera and bed in the middle would be a substantial increase in cost/effort, and would not add commensurate information, in our opinion.

- 3) Do we anticipate the structure being prone to flooding? This was seen in one of the structures that SVT previously monitored.

The structure will not be prone to flooding. A 30-inch diameter culvert which conveys Mill Brook exists just east of the proposed wildlife culvert. The drainage conveying Mill Brook will remain and will be extended to match the new roadway width. The culvert provides a hydraulic connection from Wetland C-A to Wetland C-C. The FEMA 100-year floodplain exists on the north side of Route 2 within wetland C-C with an elevation of 40.2 m. HEC RAS computer modeling was used to calculate the water surface elevations and limits of the 0.1 percent floodplain within the project area. The analysis predicted a ponding elevation of 42.94 m. To be certain that the proposed wildlife crossing would not convey flow or experience flooding, the wildlife culvert invert elevation was set at 43.4 m or .46 (1.5 ft) above the 100-year flooding event.

- 4) As always, it may be worth adding security boxes to the cameras.

Security boxes for each camera are proposed. Please let us know if you would like the details of these.

- 5) How far in each direction from the structure will the road kill survey extend? At what frequency will it be surveyed? It may be worth coordinating with the town/state DOT to ensure that they are not dragging road kill off the road before you get there to survey. In addition to the road itself, it will be important to survey a reasonable distance from the road edge in order to capture animals that end-up just off the road.

The Sudbury Valley Trustees group only did this from a moving car for safety reasons (very narrow shoulder and fast moving traffic). MassDOT is now proposing as part of the monitoring to walk on the forest side of the guardrail (both north and south of route 2) and survey a 25-foot wide swath within 1000 feet of the culvert (500 feet each way) each time the cameras and sand-tracking beds are checked.

- 6) Reporting: It will be important to include basic summary statistics: count data (species, frequency, etc..), plot/document any trends (by year, month, time of day, species, etc..), and how many documented successful passages vs. attempts. With 3 track beds and cameras you may be able to document crossing attempts.

This was attempted to be covered in the statement that "Crossing rates will be calculated for each species following Rogers et al. (2009)" where they documented these types of data. However, we will clarify this in the revised Plan.

- 7) Lastly, there should be a final summary report. Agreed, this will be clarified in the revised Plan.

Once again thank you again for your time and effort. Please let me know if you have any questions or comments.

All the best,

Dave

---

**From:** Lowry, Dennis [<mailto:Dennis.Lowry@aecom.com>]  
**Sent:** Wednesday, October 02, 2013 2:25 PM  
**To:** Paulson, David (FWE)  
**Cc:** Egan, Scott; McArthur, Susan (DOT); Herbster, Stephanie (DOT)  
**Subject:** Route 2 Crosbys Corner Wildlife Culvert

Hi Dave: we had traded voice-mails a couple of weeks ago regarding a wildlife monitoring plan for the wildlife culvert MassDOT has installed near Crosby's Corner on Route 2 in Concord. The DEP Variance for this project required the monitoring plan, and required that DOT consult with DFG on it (see Condition 27 from the Variance below). To comply with that, if you could review this monitoring plan and provide an email to document that you were consulted with, that would be much appreciated. Of course, if you have comments (positive or otherwise), that would be useful as well. If you wanted to talk about the plan or have questions, Scott Egan would likely be the best to call (cell is 603-547-5651), or feel free to call me at 508-361-1850.

Thanks, Dennis

27. Applicant shall develop and submit to MassDEP for review and written approval a plan to monitor the efficacy of the wildlife habitat culvert for 5-years after completion of construction. A baseline wildlife habitat evaluation on the northern and southern side of Route 2 in the vicinity of the existing Mill Brook culvert shall be performed so that monitoring of the new wildlife habitat culvert can document whether the wildlife habitat mitigation culvert is successful in enhancing wildlife habitat and habitat connectivity on both sides of Route 2. Development of this plan shall include consultation with the Division of Fish and Game, as well as the UMass-Amherst Extension's Natural Resources & Environmental Conservation Program in the Department of Natural Resources Conservation. Applicant shall submit this monitoring plan at least 120 days prior to alteration of Resource Areas or BZ. MassDEP may require additional mitigation if the proposed mitigation is insufficient to replicate, restore and protect wildlife habitat in the Project vicinity.

**Dennis Lowry**

Senior Program Manager/Wetland Ecologist  
AECOM Environment  
Rocky Hill, CT/Chelmsford, MA  
508-361-1850 (cell)  
860-263-5810 (office)  
[dennis.lowry@aecom.com](mailto:dennis.lowry@aecom.com)

**AECOM**

500 Enterprise Drive, Suite 1A  
Rocky Hill, CT 06067

**AECOM**

250 Apollo Dr., Chelmsford, MA 01824  
[www.aecom.com](http://www.aecom.com)

**Lowry, Dennis**

**From:** Scott Jackson [sjackson@umext.umass.edu]  
**Sent:** Tuesday, October 22, 2013 11:17 PM  
**To:** Lowry, Dennis  
**Cc:** McArthur, Susan (DOT); Herbster, Stephanie (DOT); Egan, Scott; Lisa Rhodes; David Paulson  
**Subject:** Re: Route 2 Crosby's Corner Wildlife Culvert  
**Attachments:** Bellis et al..pdf

Hi Dennis,

I have reviewed your monitoring plan for the Crosby's Corner wildlife crossing structure. Here are my comments.

- 1) I recommend that you use Reconyx cameras. They seem to out-perform other available options in terms of both functionality and reliability.
- 2) I concur with Dave Paulson that a third track bed and camera set up would be useful midway through the structure. There is a danger that wildlife will enter and then leave both ends of the structure without passing through. The track beds and cameras will record entrances at one end and exits at the other but it would not be possible to conclusively know how many pass-throughs were achieved. An animal recorded at the third monitoring station midway through the structure would not guarantee that the animal passed all the way through but it seems likely that if they reached the midpoint they probably completed the journey to the other side. It might be possible to use time stamps from the cameras to determine whether an exit was a failed rather than successful passage attempt. However, I suspect that you will get more tracks than photos and it will not always be possible to match tracks with animals in the photos. You might be able to get away with just a track bed in the middle location rather than a track bed and camera.
- 3) I would strongly urge you to consider snow tracking in winter whenever conditions are appropriate. Snow tracking will allow you to record animals that are moving in the vicinity of the structure but that fail to use it. Records of passage use are far more useful if you can get some indication of how often animals avoid the structure altogether. See the attached article for a snow tracking methodology we used to monitor a pair of structures in southern VT.

Feel free to contact me if you have questions or would like to discuss the project further.

Best,

Scott

On 10/18/2013 10:27 AM, Lowry, Dennis wrote:

Hi Scott: I understand that Stephanie Herbster at DOT touched base with you on the monitoring plan for the wildlife culvert under Route 2 in Concord near Crosby's Corner. Thanks for your willingness to review the materials and offer comments, as DEP is requiring such input. We have received comments from Dave Paulson at HESP, and have updated the materials to reflect his comments. DEP also requested an assessment of baseline habitat conditions as part of this submittal. The updated materials are attached, so it only makes sense to have your review be done with these comments/updates incorporated. Attachment C provides the email from Dave and specific responses, and the word document attached provides the updated monitoring plan; feel free to comment on the word doc in review mode for your convenience....or in any other way that is best for you.

Thanks again, Dennis

Dennis Lowry

1

Senior Program Manager/Wetland Ecologist  
AECOM Environment  
Rocky Hill, CT/Chelmsford, MA  
508-361-1850 (cell)  
860-263-5810 (office)  
[dennis.lowry@aecom.com](mailto:dennis.lowry@aecom.com)

AECOM  
500 Enterprise Drive, Suite 1A  
Rocky Hill, CT 06067

250 Apollo Dr., Chelmsford, MA 01824  
[www.aecom.com](http://www.aecom.com)

**From:** Scott Jackson [<mailto:sjackson@umext.umass.edu>]  
**Sent:** Wednesday, October 09, 2013 8:21 PM  
**To:** Egan, Scott  
**Cc:** McArthur, Susan (DOT); Herbster, Stephanie (DOT); Lowry, Dennis  
**Subject:** Re: Route 2 Crosby's Corner Wildlife Culvert

Hi Scott,

I will try to take a look at this some time next week.

Best,

Scott

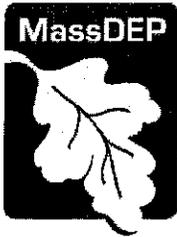
On 10/2/2013 4:51 PM, Egan, Scott wrote:

Dear Mr. Jackson-

Dennis Lowry and I recently developed this wildlife monitoring plan for a wildlife culvert MassDOT has installed near Crosby's Corner on Route 2 in Concord, Massachusetts. The DEP Variance for this project required the monitoring plan, and required that DOT consult with the UMass-Amherst Extension's Natural Resources & Environmental Conservation Program on it (see Condition 27 from the Variance below). To comply with that, if you could review this monitoring plan and provide an email to document that you were consulted with, that would be much appreciated. Of course, if you have comments (positive or otherwise), that would be useful as well. If you wanted to talk about the plan or have questions, please feel free to contact me at 603-547-5651, or Dennis Lowry (cell is 508-361-1850).

Thank you,  
Scott

2



Commonwealth of Massachusetts  
Executive Office of Energy & Environmental Affairs

## Department of Environmental Protection

One Winter Street Boston, MA 02108 • 617-292-5500

DEVAL L. PATRICK  
Governor

RICHARD K. SULLIVAN JR.  
Secretary

KENNETH L. KIMMELL  
Commissioner

November 27, 2013

Ms. Jessica Kenny  
Manager of Environmental Compliance for Construction  
MassDOT Highway Division  
Ten Park Plaza, Suite 4160  
Boston, MA 02116

RE: Concord-Lincoln Roadway Reconstruction and Related Work, Route 2 (Crosbys Corner Interchange); Wetland Protection Act Variance Decision (File No. 203-0824) and Water Quality Certification and Variance Decision (Transmittal No. X235691);  
Special Condition 27: Wildlife Culvert Monitoring Plan

Dear Ms. Kenny

This is in response to your October 30, 2013 submittal of a Wildlife Culvert Passage Monitoring Plan as required by the Wetland Protection Act Variance Decision (File No. 203-0824) and Water Quality Certification and Variance Decision (Transmittal No. X235691) ("Variance") Special Condition 27 for the referenced project.

On September 19, 2013 you submitted a wildlife monitoring plan to belatedly comply with Special Condition 27. In our September 30, 2013 response to that submittal, we informed you that the wildlife habitat evaluation submitted was prepared for the purpose of the Notice of Intent review (2 years prior to issuance of the Variance) and was not suitable as a baseline study needed to meet this condition. In the same response, we attached a baseline study plan that was prepared for another project as an example of what was required. Condition 27 specifically requires consultation with the Division of Fish and Game ("DFG"), as well as the UMass-Amherst Extension's Natural Resources & Environmental Conservation Program in the Department of Natural Resources Conservation ("UMass") during development of the plan and submittal of the plan to MassDEP at least 120 days prior to alteration of wetland resource areas. Compliance with this condition would have avoided any confusion over the requirement. Thus, Attachment A and Attachment B of your October 30, 2013 submittal do not meet the requirements of Special Condition 27 for a baseline study, and we regret that at this date it is too late to do so since construction is already well underway.

This information is available in alternate format. Call Michelle Waters-Ekanem, Diversity Director, at 617-292-5751. TDD# 1-866-539-7622 or 1-617-574-6868  
MassDEP Website: [www.mass.gov/dep](http://www.mass.gov/dep)

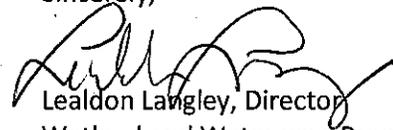
Printed on Recycled Paper

We have reviewed the post-construction monitoring plan and approve it subject to the following requirements:

- 1) Commitments included in the October 30, 2013 *Wildlife Culvert Monitoring Plan, Route 2 Crosby's Corner Safety Improvement Project, Concord MA DEP File No. NE 137-1059* are a requirement of this approval.
- 2) As recommended by both the DFG and UMass, three cameras and three track beds shall be used to monitor the wildlife culvert. The current proposal only includes two cameras. Placement shall include one camera and one track bed at each end and one camera and track bed midway through the culvert. Security boxes for each camera are recommended.
- 3) Cameras shall be Reconyx cameras as recommended by UMass. Consultation with UMass shall be included with any request to MassDEP to use alternative technology.
- 4) Snow tracking shall be implemented whenever conditions are appropriate, and in accordance with UMass recommendations.
- 5) Coordination with the Town/MassDOT District Office shall occur to ensure that road kill are documented in an acceptable manner to DFG. The final report shall include evidence of such coordination with the Town/MassDOT, records of road kill in the vicinity of the project prior to construction (if they exist) and post-construction, analysis of patterns and changes post-construction.
- 6) In accordance with Variance Special Condition 27, monitoring of the wildlife culvert will occur for 5-years after completion of construction. No reduction in monitoring effort is approved at this time.

Please be reminded of Special Condition 18 which states "The Applicant is responsible for compliance with the terms and conditions of this Variance. In addition to the Applicant, MassDEP may also take action against the construction contractor(s) for failure to comply with the terms and conditions of this Variance." Please contact Lisa Rhodes at (617) 292-5512 or Philip DiPietro at (978) 694-3251 if you have any questions.

Sincerely,



Lealdon Langley, Director  
Wetland and Waterways Program

Cc via email  
Susan McArthur, MassDOT  
Scott Jackson, UMass  
David Paulson, DFG

## Bernier, Chase

---

**From:** Bernier, Chase  
**Sent:** Wednesday, December 21, 2016 12:23 PM  
**To:** 'Richard Reine'  
**Subject:** RE: Crosby Corner MassDOT Wildlife Monitoring

Hi Rich

Our monitoring protocol states that our review area is 25-feet from the Route 2 road shoulder and does not include Drake Park Road (officially). We monitored a wider area to document species that may have been located directly adjacent to our survey area, especially as it related to a high number of turtle strikes.

Only small mammals and reptiles/amphibians were documented in the vicinity of Drake Park Road. Have you heard anything regarding any larger vehicle strikes (e.g., deer) in this area?

Thanks,

-Chase.

---

**From:** Richard Reine [mailto:[rreine@concordma.gov](mailto:rreine@concordma.gov)]  
**Sent:** Thursday, May 26, 2016 8:50 AM  
**To:** Bernier, Chase <[cbernier@bscgroup.com](mailto:cbernier@bscgroup.com)>  
**Subject:** RE: Crosby Corner MassDOT Wildlife Monitoring

Chase - Aside from a small westerly section of Drake Park Road, the study area delineated is primarily within the MassDOT State ROW for which we do not respond to road kill or collect data. Can you clarify and also provide the length of time for active data collection? Thanks, Rich

**Richard K. Reine, PWLF** | **Public Works Director**

Phone 978.318.3201 | Fax 978.287.4762 | E-mail [rreine@concordma.gov](mailto:rreine@concordma.gov)

**Town of Concord, MA** | 133 Keyes Road | Concord, MA 01742

---

**From:** Bernier, Chase [mailto:[cbernier@bscgroup.com](mailto:cbernier@bscgroup.com)]  
**Sent:** Wednesday, May 25, 2016 10:43 AM  
**To:** Richard Reine  
**Subject:** Crosby Corner MassDOT Wildlife Monitoring

Mr. Reine

We are currently implementing a wildlife monitoring plan on behalf of MassDOT as part of the wildlife tunnel project underneath Route 2 in Concord. Part of that monitoring, as required by the approved permit, requires

coordination with Town regarding any wildlife roadkill incidents that occur within the Route 2 corridor 500-ft east and west of the tunnel as well as along Drake Park Road and Sandy Pond Road (see the attached image).

Could you direct me to the person who would be able to provide this information? We would like to contact them once a week for information on the number and species that may have been collected by the Town.

Best Regards,

**Chase Bernier, CWB** | Ecological Scientist

---

**[BSC Group](#)**

33 Waldo Street | Worcester | MA 01608

cell | 845-702-6498

direct | 617-896-4528

main | 508-792-4500

## Bernier, Chase

---

**From:** Herbster, Stephanie (DOT) <stephanie.herbster@state.ma.us>  
**Sent:** Thursday, August 25, 2016 7:46 AM  
**To:** Bernier, Chase  
**Subject:** RE: Wildlife Roadkill Data

Great! Thank you

---

**From:** Bernier, Chase [mailto:[cbernier@bscgroup.com](mailto:cbernier@bscgroup.com)]  
**Sent:** Friday, August 05, 2016 2:58 PM  
**To:** Herbster, Stephanie (DOT)  
**Subject:** RE: Wildlife Roadkill Data

Hi Stephanie

Please see the attached form. I've added landmarks that should be easily identifiable. Please let me know if you need anything else.

As a side note, I downloaded the images yesterday from the last two weeks and we got some great shots of deer, gray fox, and fisher moving through the tunnel (see attached).

Thanks,

-Chase

---

**From:** Herbster, Stephanie (DOT) [mailto:[stephanie.herbster@state.ma.us](mailto:stephanie.herbster@state.ma.us)]  
**Sent:** Monday, July 25, 2016 10:23 AM  
**To:** Bernier, Chase <[cbernier@bscgroup.com](mailto:cbernier@bscgroup.com)>  
**Subject:** RE: Wildlife Roadkill Data

So we received no further comments. Once the landmarks are added can you finalize and send to me so I can get the forms to the District? Thanks, Stephanie

---

**From:** Herbster, Stephanie (DOT)  
**Sent:** Friday, July 15, 2016 9:58 AM  
**To:** 'Bernier, Chase'  
**Subject:** RE: Wildlife Roadkill Data

This looks pretty straight forward and the District is reviewing. One comment we have gotten is to add some sort of landmark at the westerly and easterly ends of the sketch to establish limits. Or maybe use an aerial view?

---

**From:** Bernier, Chase [mailto:[cbernier@bscgroup.com](mailto:cbernier@bscgroup.com)]  
**Sent:** Tuesday, July 12, 2016 3:15 PM  
**To:** Herbster, Stephanie (DOT)  
**Subject:** RE: Wildlife Roadkill Data

Hi Stephanie

My apologies; I thought we had sent this to you earlier. In essence, this is a quick datasheet that should provide all the information we need (e.g., date, species, and approximate location). Let me know if you have any questions.

Thanks,

-Chase.

---

**From:** Herbster, Stephanie (DOT) [<mailto:stephanie.herbster@state.ma.us>]  
**Sent:** Thursday, June 23, 2016 1:13 PM  
**To:** Bernier, Chase <[cbernier@bscgroup.com](mailto:cbernier@bscgroup.com)>  
**Subject:** RE: Wildlife Roadkill Data

Chase,

Have you had a chance to draft up a tracking sheet for the District to review? Thanks, Stephanie

---

**From:** Bernier, Chase [<mailto:cbernier@bscgroup.com>]  
**Sent:** Wednesday, May 25, 2016 10:51 AM  
**To:** Herbster, Stephanie (DOT)  
**Cc:** Hegemann, Ingeborg E.  
**Subject:** Wildlife Roadkill Data

Hi Stephanie

We are working on coordinating with MassDOT regarding the roadkill survey for the wildlife tunnel monitoring. Would you be able to direct us to who the best person to contact at MassDOT would be for that information?

Thanks,

**Chase Bernier, CWB | Ecological Scientist**

---

**BSC Group**

33 Waldo Street | Worcester | MA 01608

cell | 845-702-6498

direct | 617-896-4528

main | 508-792-4500