

I-89 Wildlife Connectivity Study

Presented by: Jed Merrow & James S. Andrews

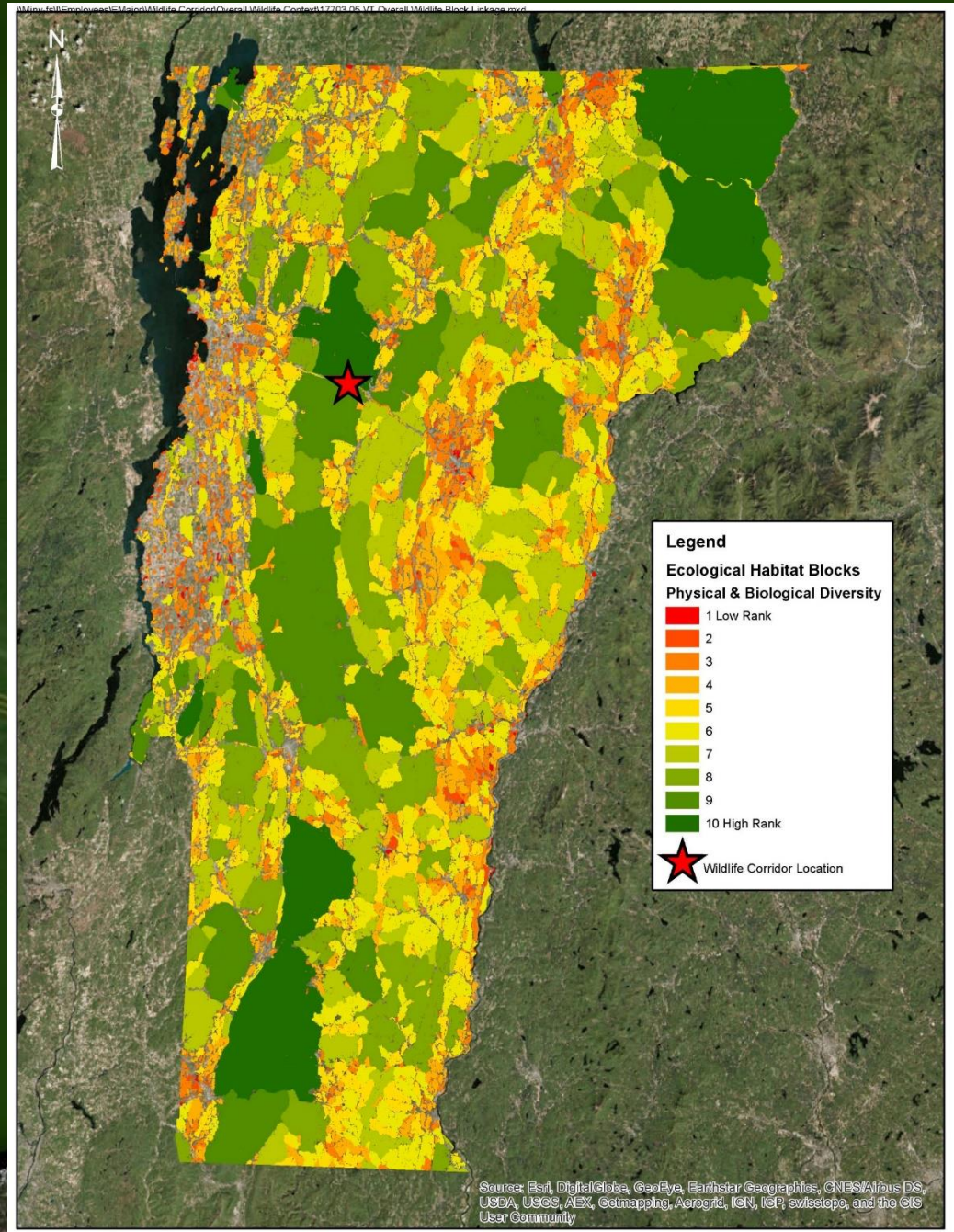


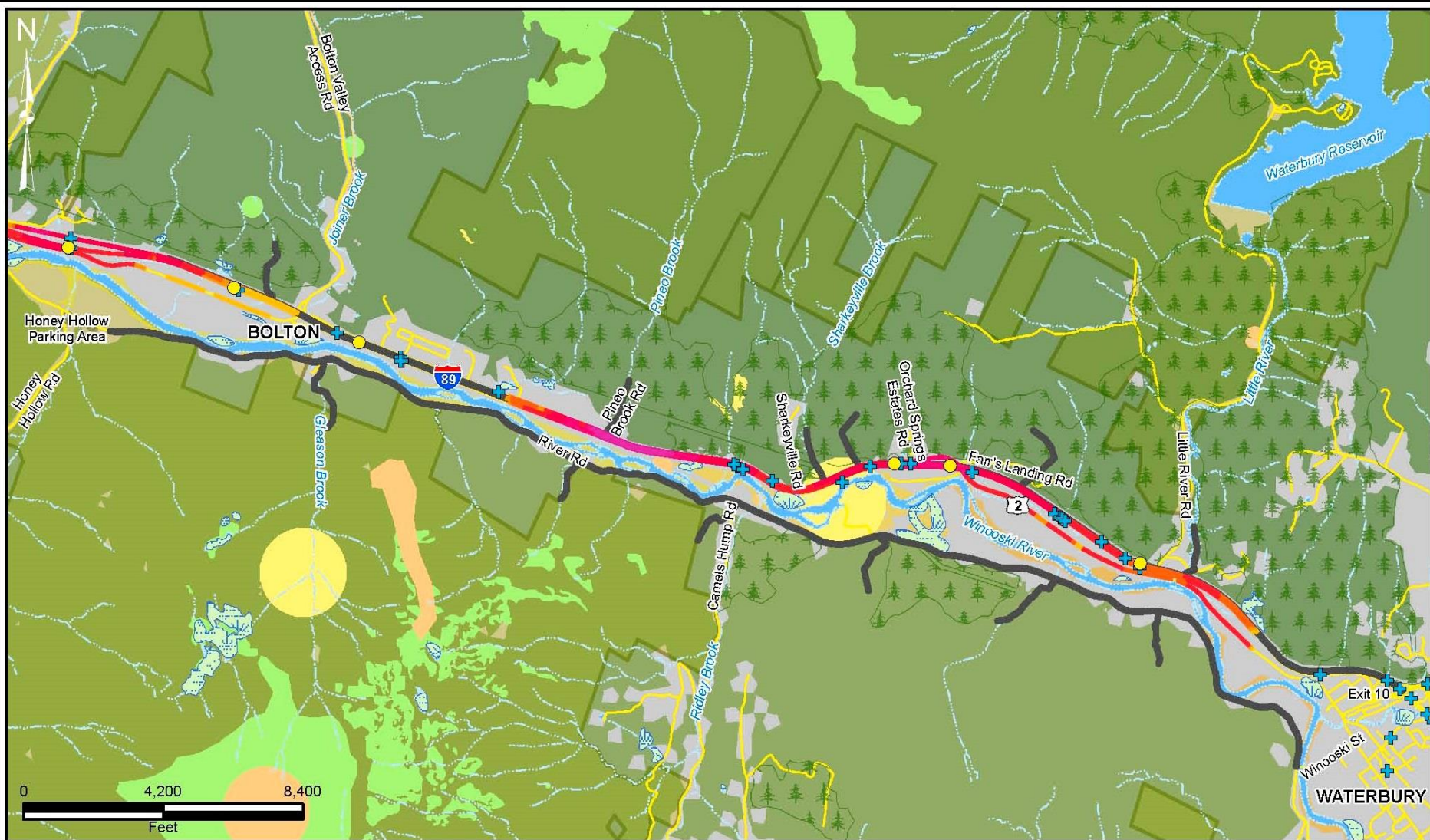
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In Conjunction with: James S. Andrews & Allan Thompson

I-89 Wildlife Connectivity Study





Legend

- Bear Roadkill
- + Moose Roadkill
- Very Rare Species
- Rare Species
- Uncommon Species
- Transects and Corridors
- VT Wetland Data
- Deer Wintering Areas
- Roads
- Bodies of Water
- Streams
- VT Public Lands

Ecologic Wildlife Crossing

- 5 Lo Road Crossings
- 5.5
- 6
- 6.5
- 7
- 7.5
- 8
- 8.5
- 9 Hi Road Crossings

Ecological Habitat Blocks Physical & Biological Diversity

- 1 Low Rank
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 High Rank

BOLTON-WATERBURY STP 2709(1)
WILDLIFE CONNECTIVITY PROJECT

HABITAT FEATURES & WILDLIFE CROSSING VALUES

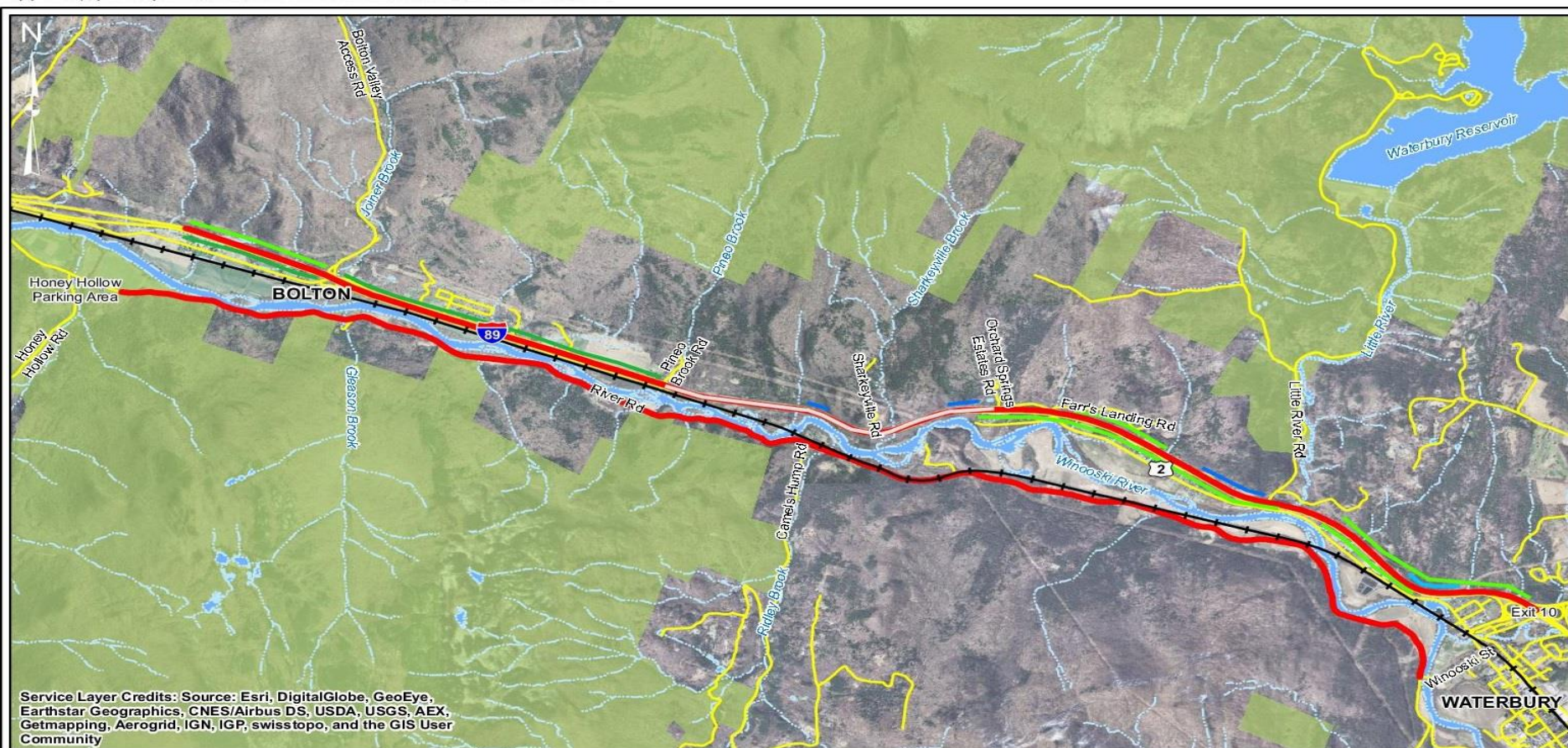
SCALE:
AS SHOWN

DATE:
MAY 2016

CREATED BY:
ECM

I-89 Wildlife Connectivity Study

Barriers to Wildlife Movement Across I-89



Legend

Railroad	Barrier Type
Streams	Chain Link Fence
Roads	Woven Wire Fence
Roadway Study Segments	Jersey in Median
VT Public Lands	Rock Cut
Bodies of Water	Rock Cut & Chain Link Fence

0 4,200 8,400
Feet

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STUDY AREA: I-89 BARRIERS

SCALE : AS SHOWN	DATE : APRIL 2016	CREATED BY : ECM
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Study Questions

Is the habitat in the vicinity rich in wildlife?

Is there an edge effect zone along the corridor?

Is the I-89/Route 2 corridor currently a fragmenting feature?

Is wildlife road mortality currently occurring?

Are existing culverts and bridges facilitating wildlife movement?

Would infrastructure modifications improve wildlife movements across barriers?



I-89 Wildlife Connectivity Study

Target Species

Primary

Coyote

Black Bear

Fisher

Bobcat

Deer

Moose

Mink

Otter

Secondary

Red Fox

Gray Fox

Cottontail Rabbit

Snowshoe Hare

Porcupine

Raccoon

Weasel

Skunk

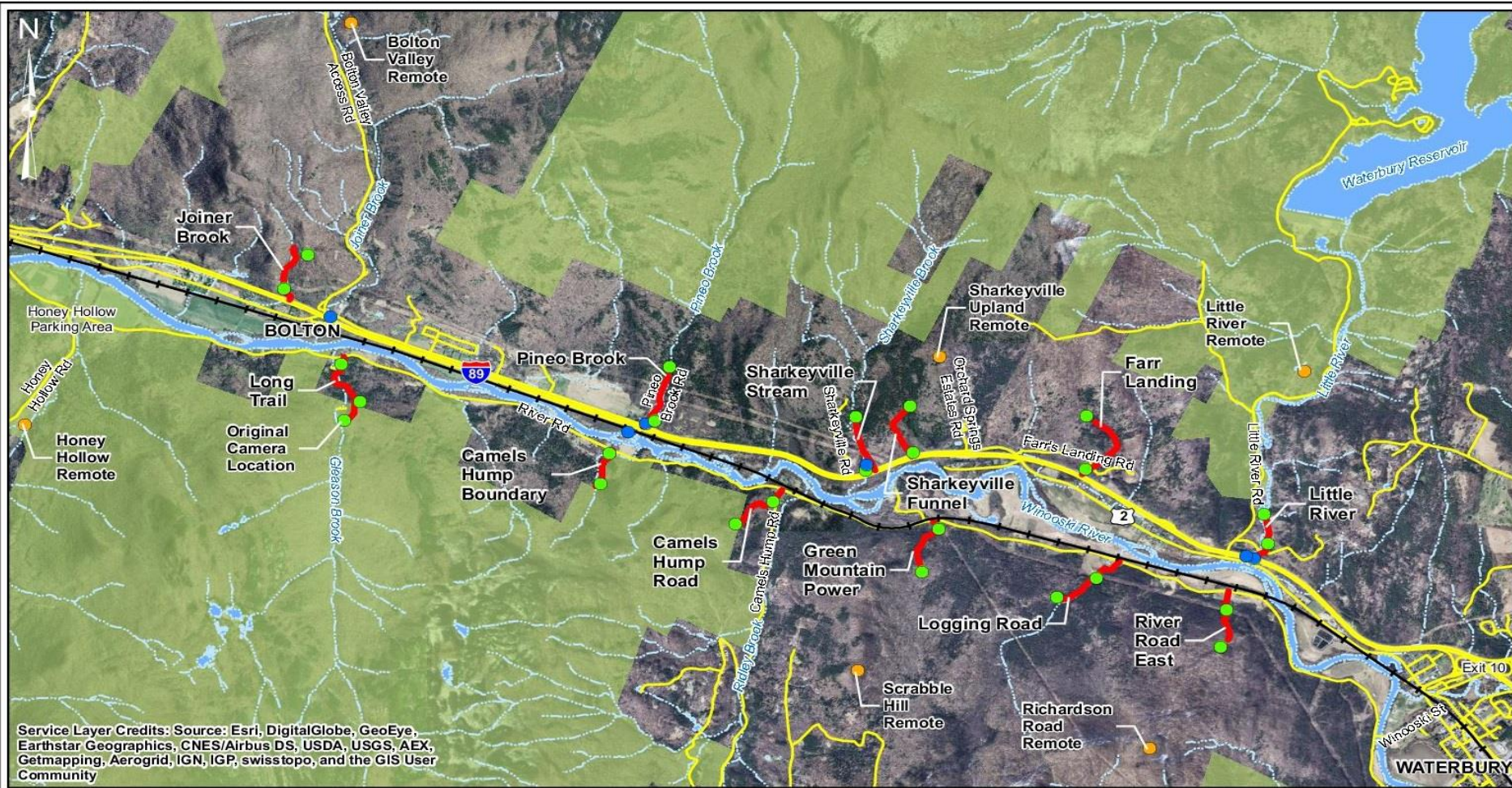


Trail Cameras – Study Design

- 9 cameras at four river/stream crossings
- Cameras at each end of 12 1600-foot transects perpendicular to road: north and south, “Near” and “Far”
- Remote cameras



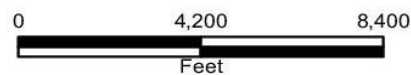
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Legend

	Streams
	Railroad
	Roads
	Transects
	VT Public Lands
	Bodies of Water
	Near/Far Camera
	Culvert/Bridge/River Camera
	Remote Camera

Camera Locations



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STUDY AREA: CAMERA STATIONS & TRANSECTS

SCALE:	DATE:	CREATED BY:
AS SHOWN	APRIL 2016	ECM

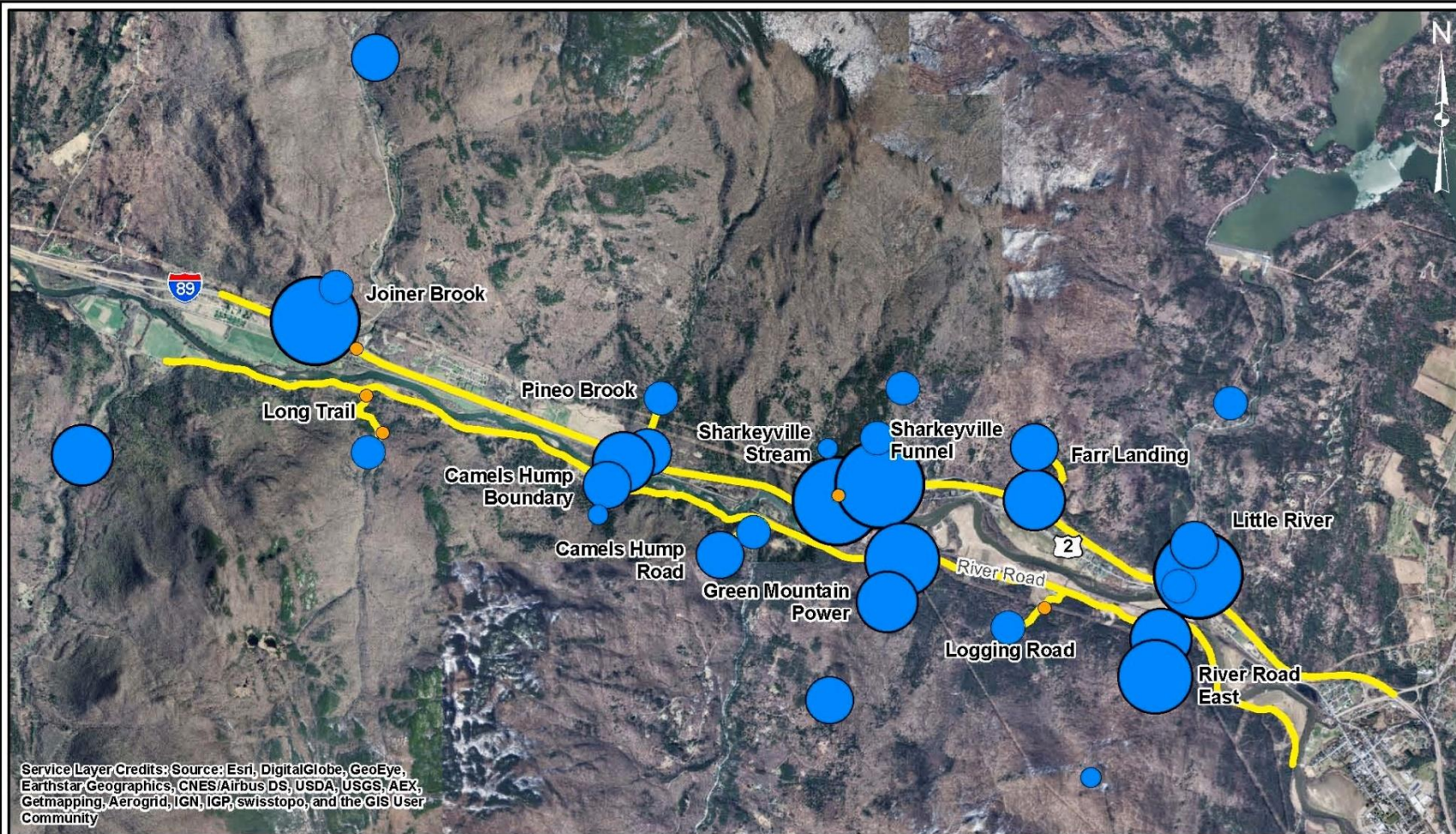
Trail Camera Species List

Primary Focus	
White-Tailed Deer	5102
Coyote	264
Black Bear	114
Moose	65
Fisher	13
Bobcat	9
Secondary Focus	
Fox	51
Raccoon	34



I-89 Wildlife Connectivity Study

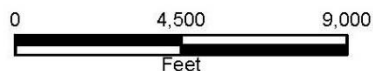
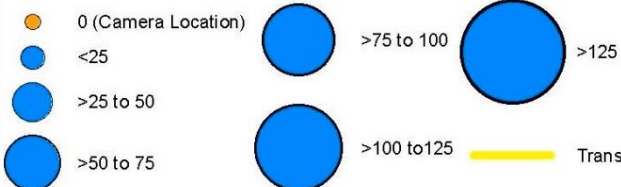
W:\jny-fs\Employees\EMajor\Wildlife Corridor\Camera Data\17703.05 VT Cameras Deer.mxd



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Legend

of White-Tailed Deer per Camera per Year of Deployment



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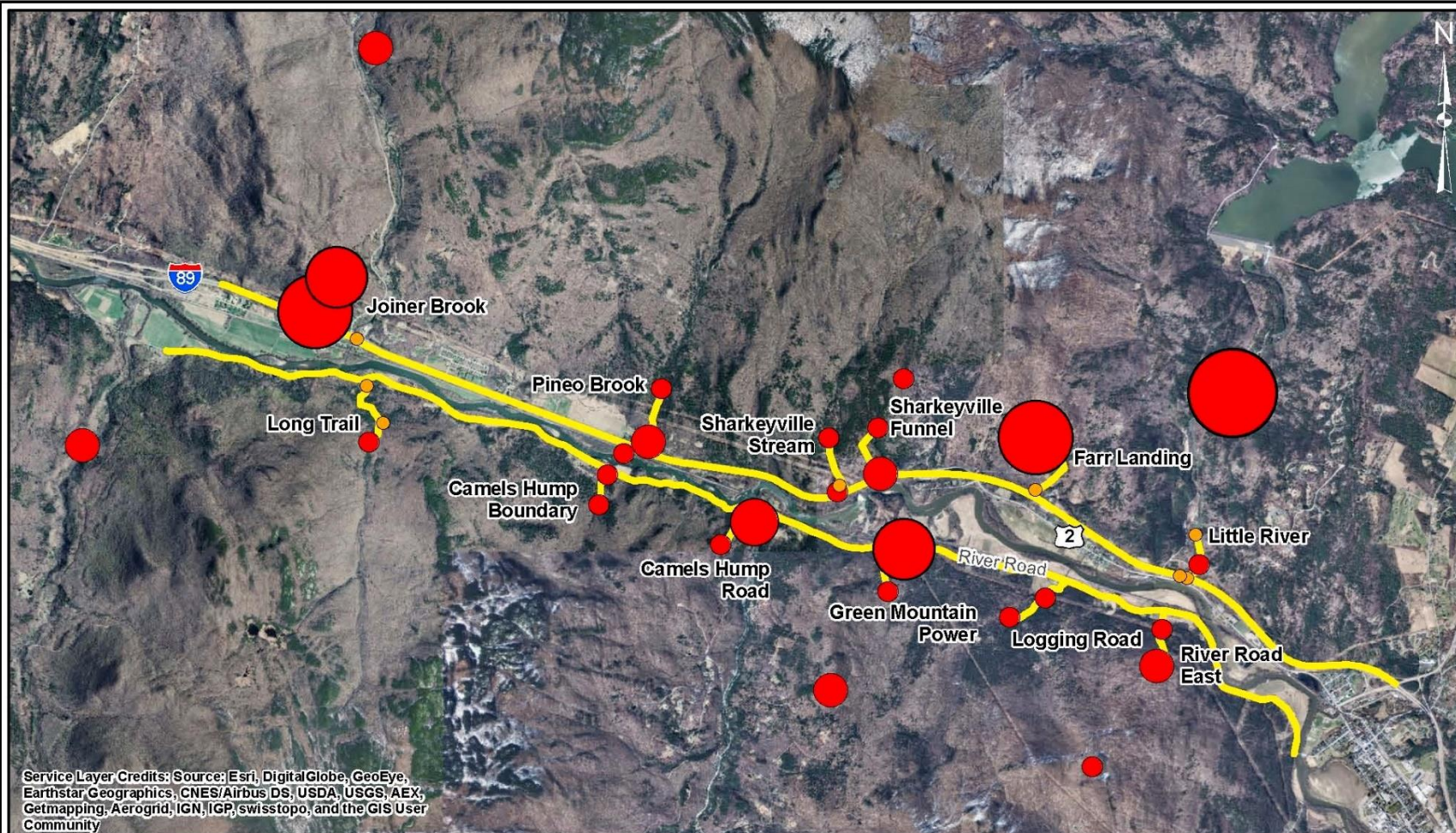
CAMERA TRACKING: WHITE-TAILED DEER

SCALE: AS SHOWN	DATE: APRIL 2016	CREATED BY: ECM
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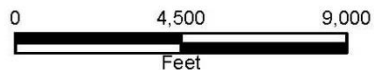
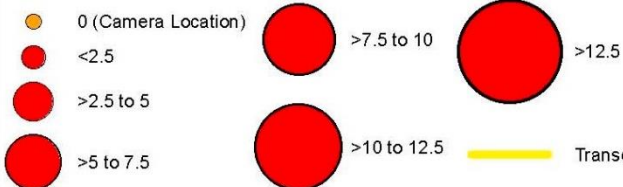
I-89 Wildlife Connectivity Study

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Legend

of Coyote per Camera per Year of Deployment



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WILDLIFE CONNECTIVITY PROJECT

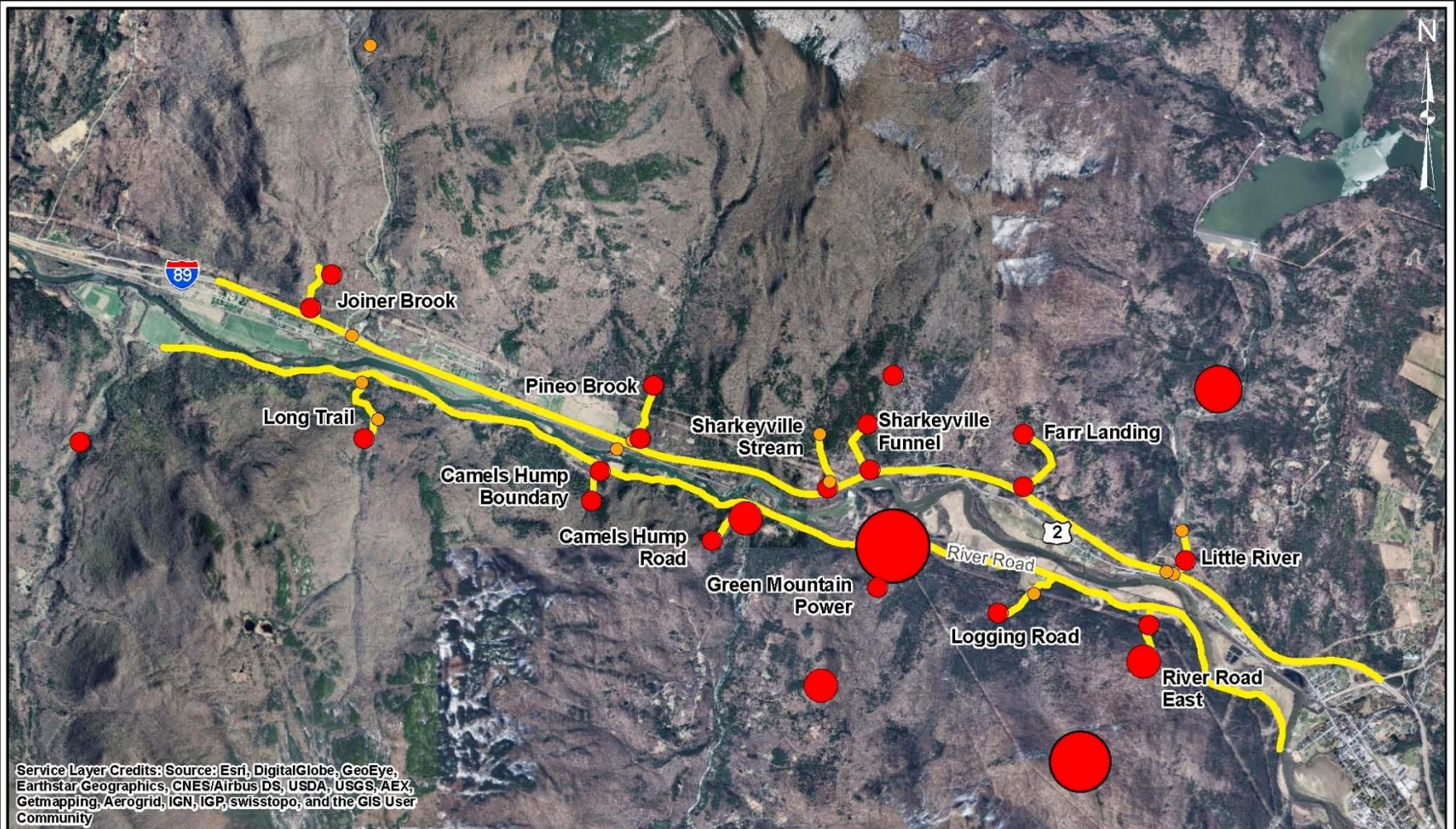
CAMERA TRACKING: COYOTE

SCALE: AS SHOWN	DATE: APRIL 2016	CREATED BY: ECM
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I-89 Wildlife Connectivity Study

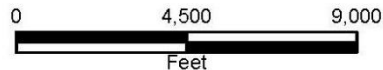
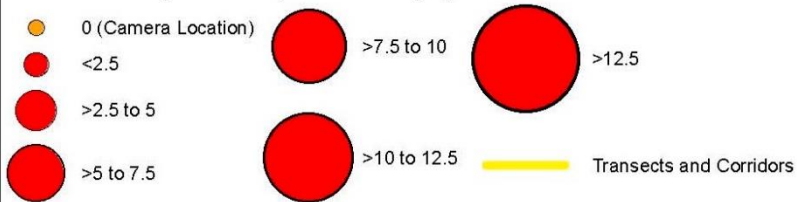
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Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar, Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Legend

of Black Bear per Camera per Year of Deployment



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WILDLIFE CONNECTIVITY PROJECT

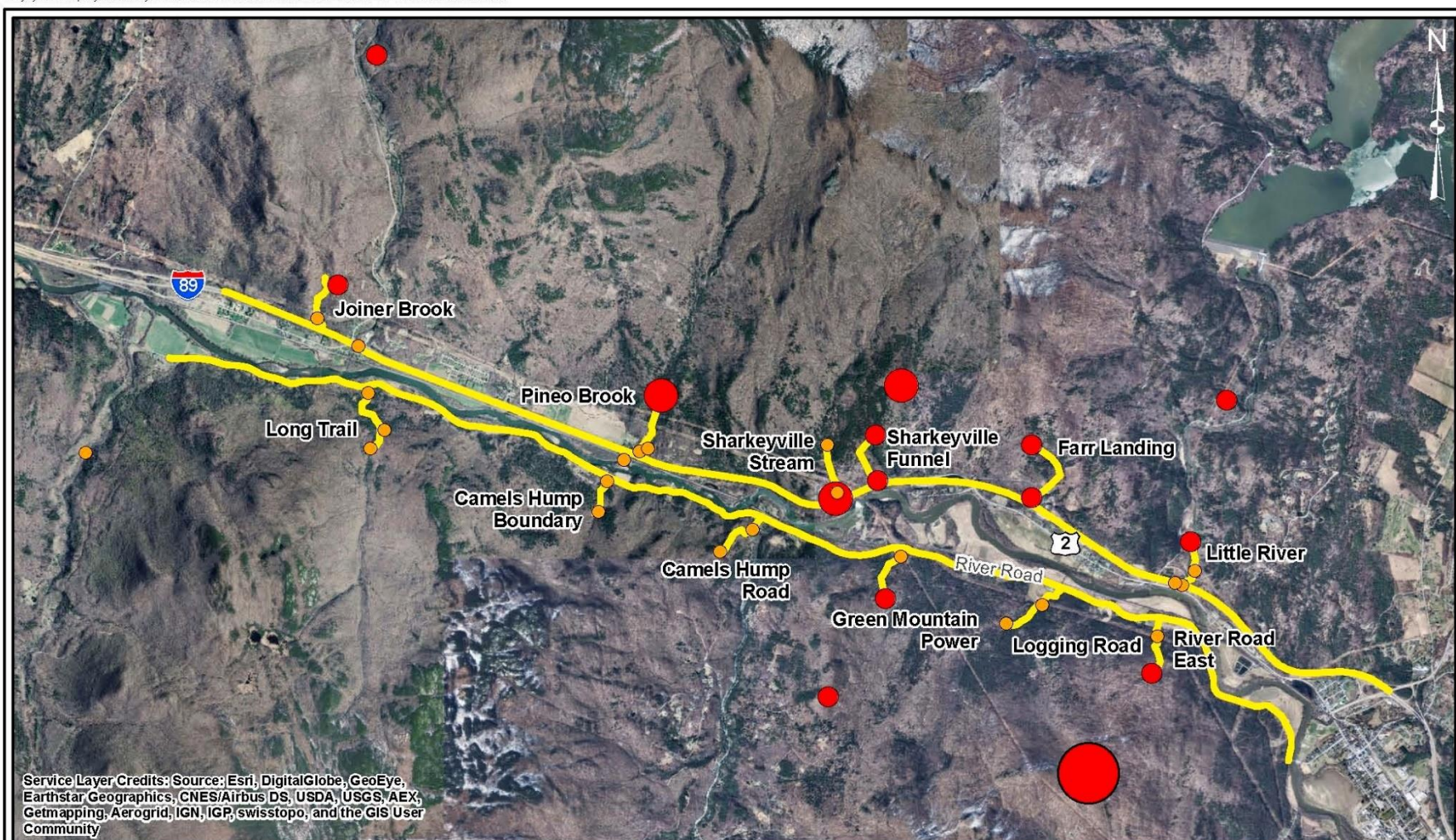
CAMERA TRACKING: BLACK BEAR

SCALE: AS SHOWN	DATE: APRIL 2016	CREATED BY: ECM
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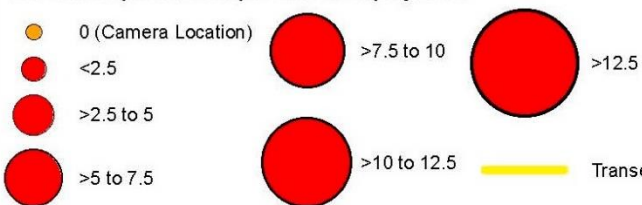
I-89 Wildlife Connectivity Study

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Legend

of Moose per Camera per Year of Deployment



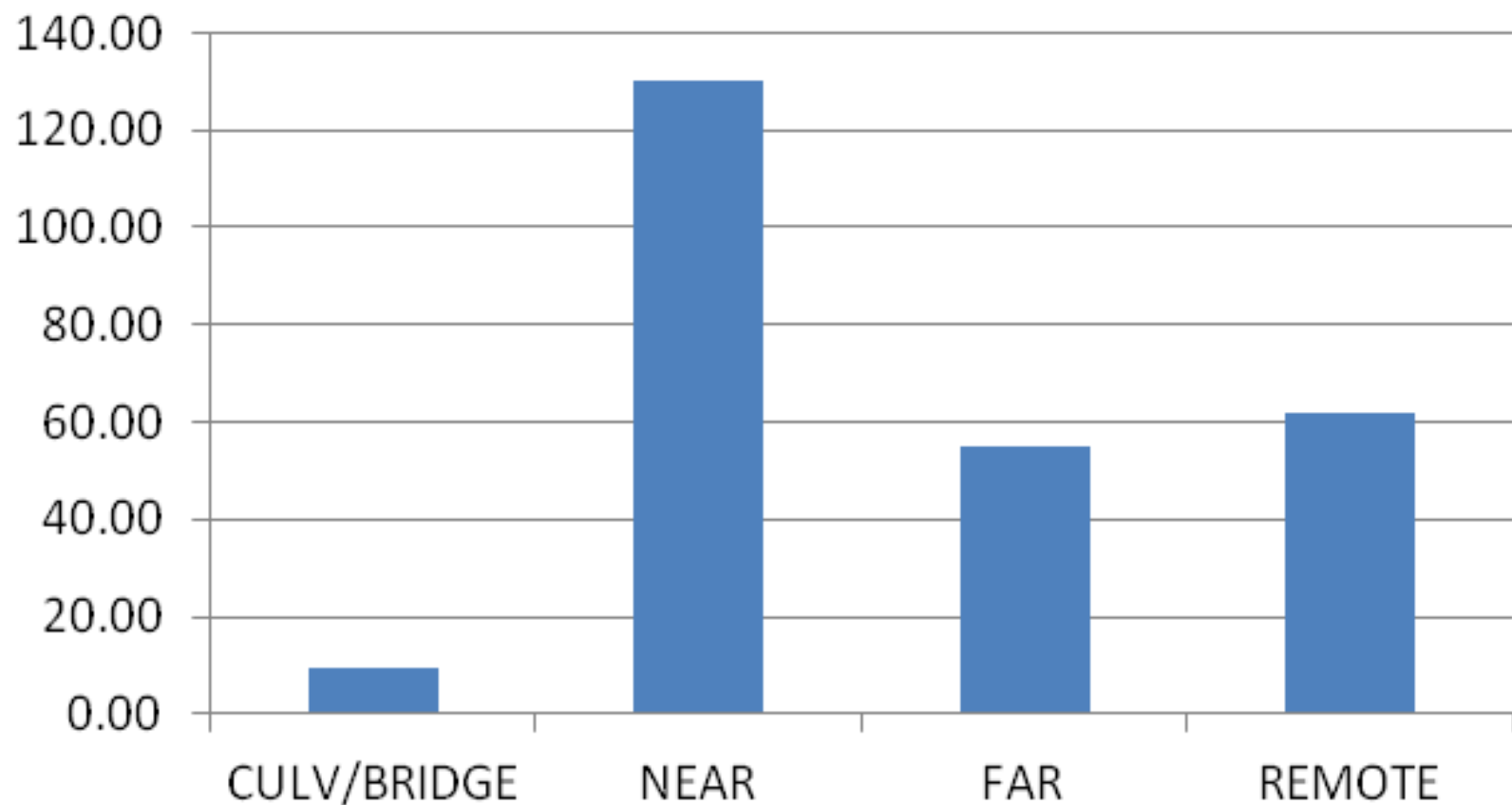
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**CAMERA TRACKING:
MOOSE**

SCALE: AS SHOWN	DATE: APRIL 2016	CREATED BY: ECM
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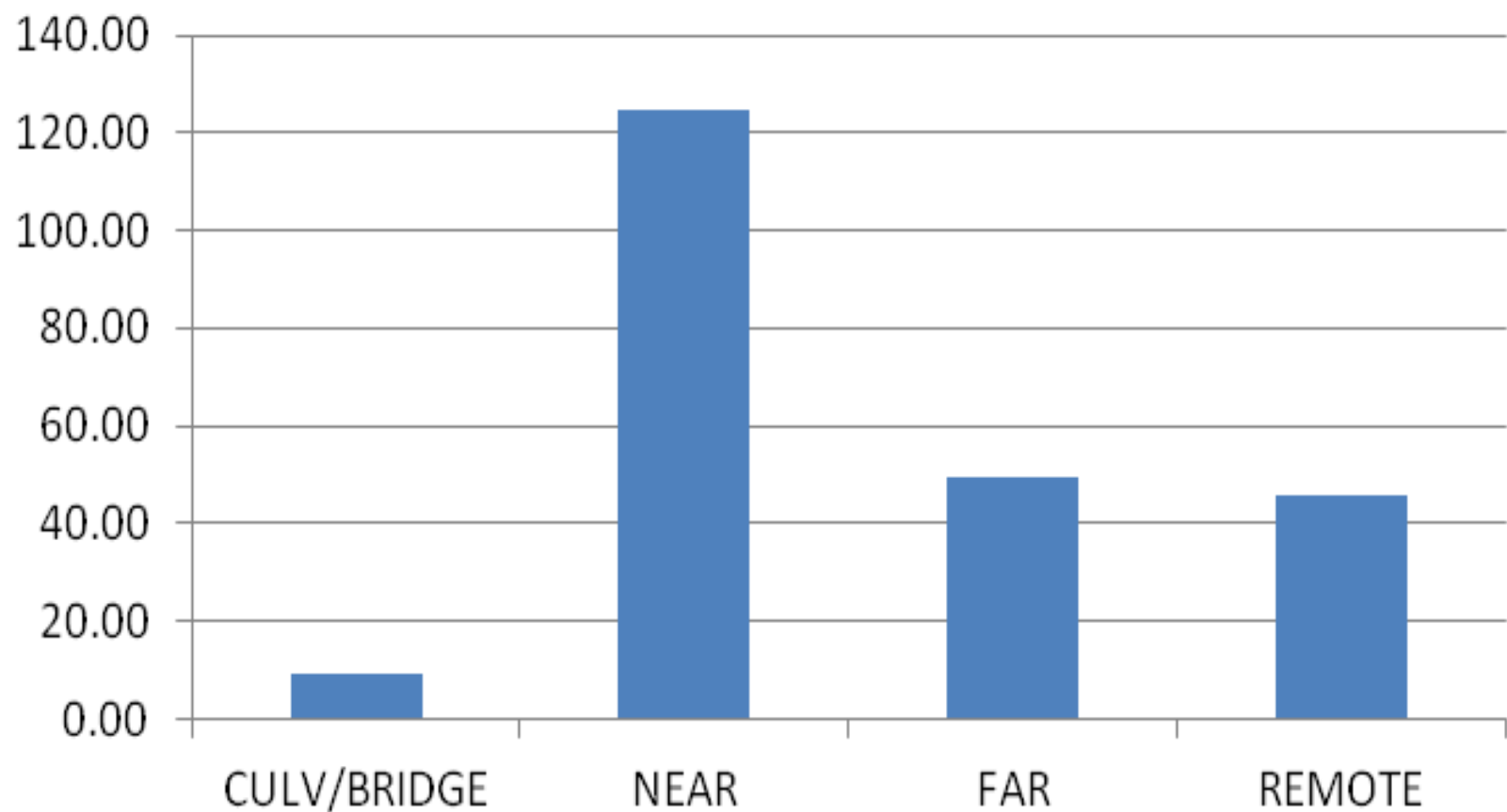
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NO. ANIMALS/CAMERA/YEAR - ALL PRIMARY SPECIES

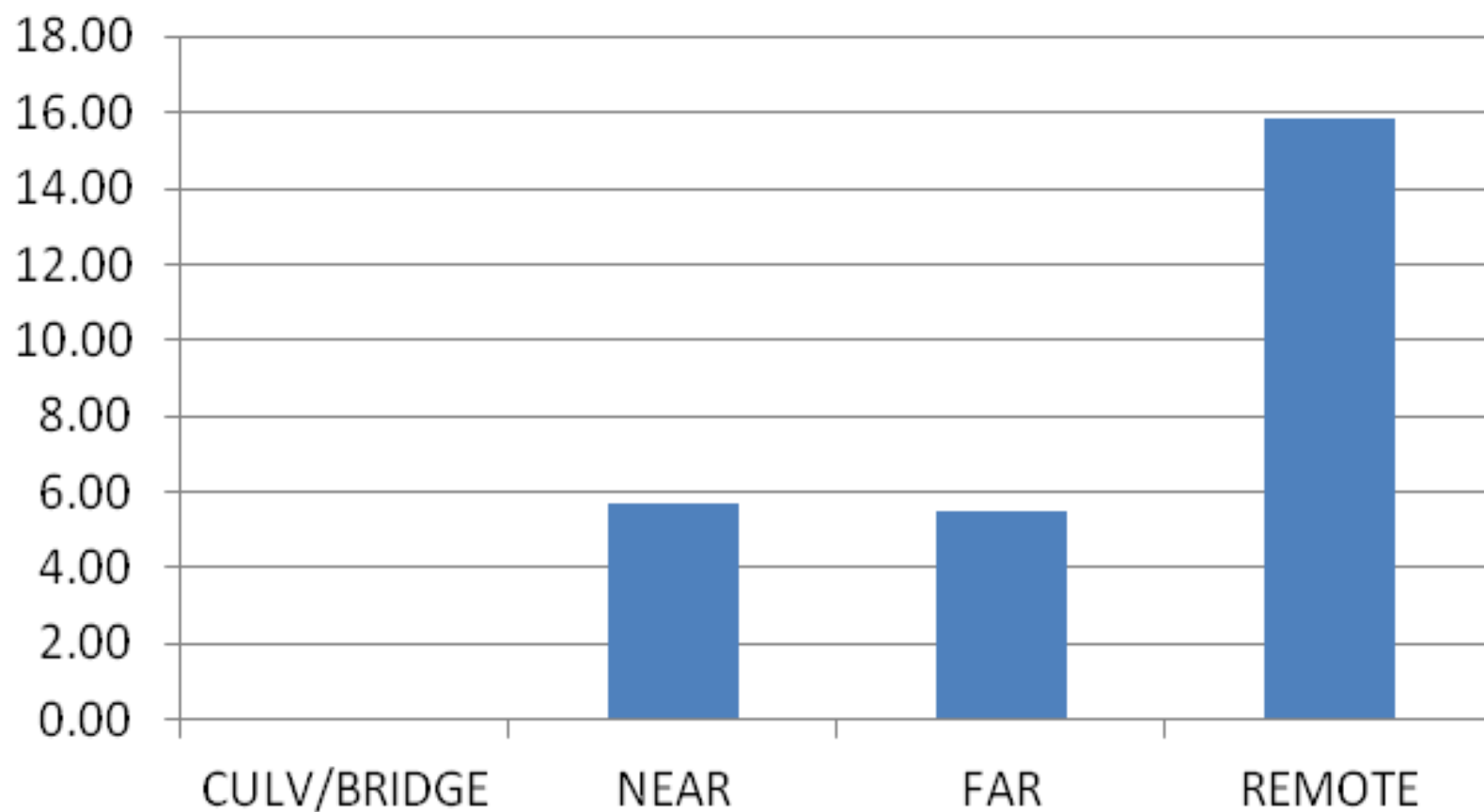


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NO. ANIMALS/CAMERA/YEAR - DEER

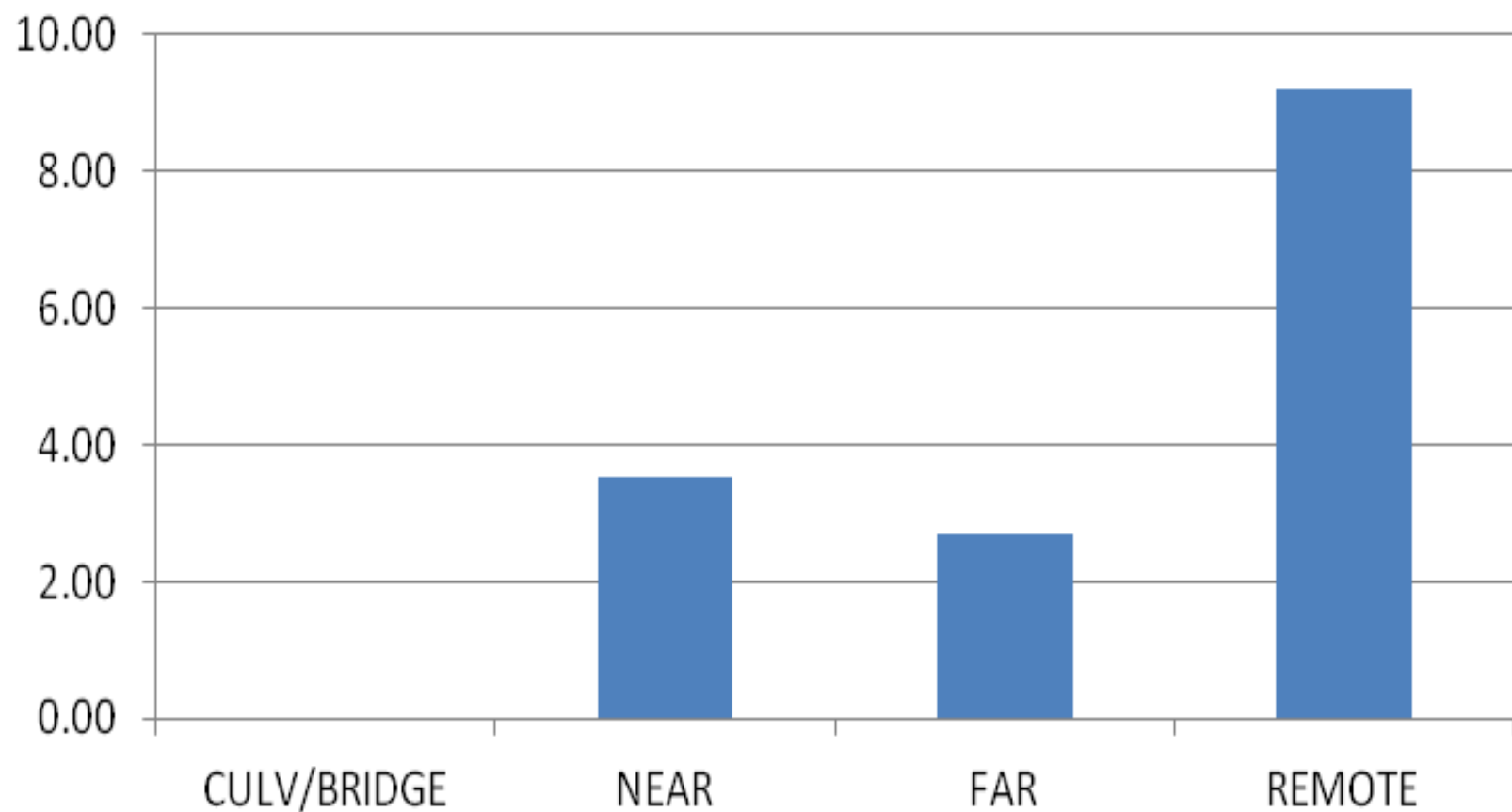


NO. ANIMALS/CAMERA/YEAR - PRIMARY SPECIES EXCL. DEER



I-89 Wildlife Connectivity Study

NO. ANIMALS/CAMERA/YEAR - COYOTE

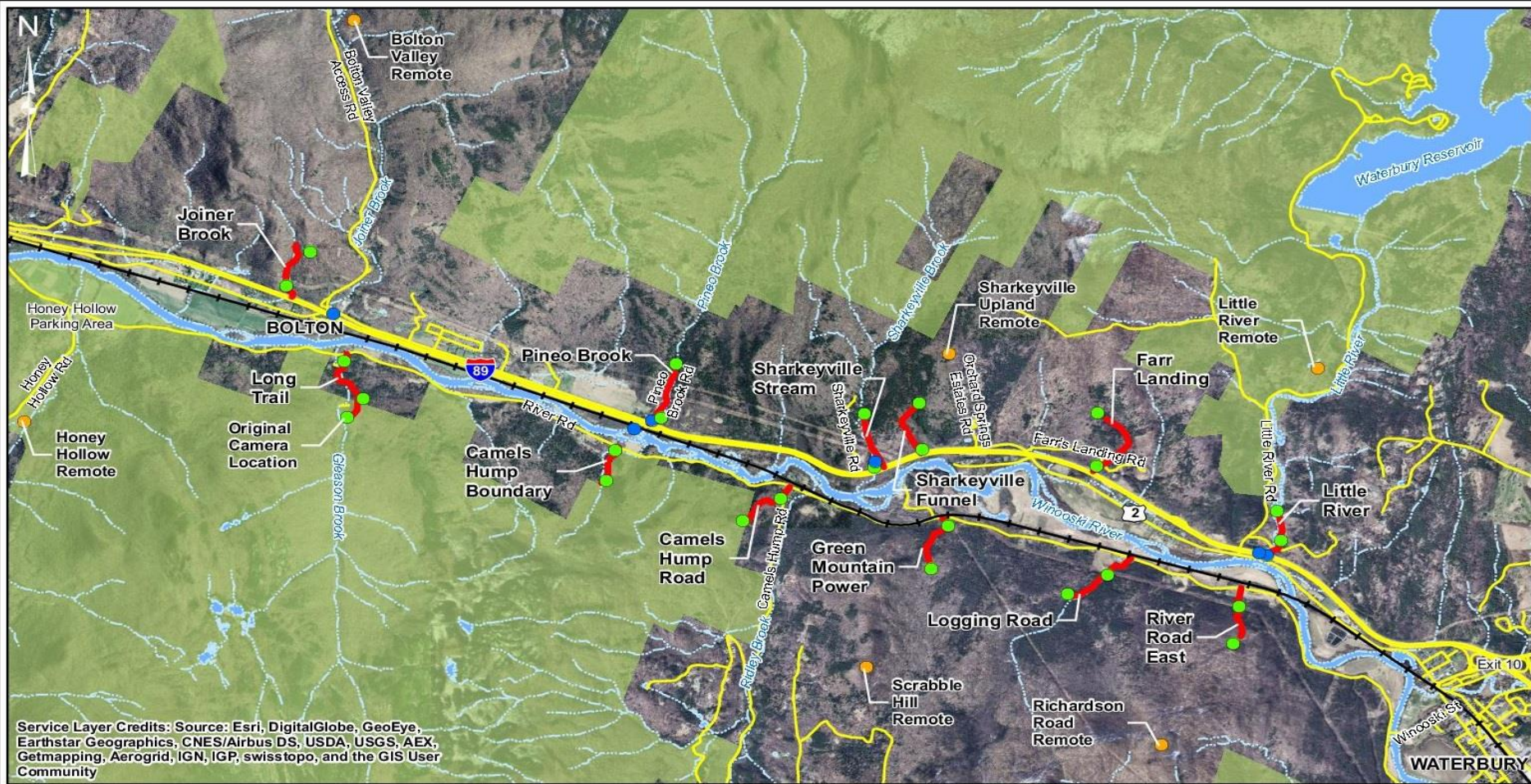


Winter Tracking – Study Design

- 12 1600-foot transects perpendicular to road
- Twice per winter
- I-89 corridor – 5 times over two winters
- River Road – 6 times over two winters



I-89 Wildlife Connectivity Study



Legend

- Streams
 - Railroad
 - Roads
 - Transects
 - VT Public Lands
 - Bodies of Water
- Camera Locations**
- Near/Far Camera
 - Culvert/Bridge/River Camera
 - Remote Camera

0 4,200 8,400
Feet

BOLTON-WATERBURY STP 2709(1)
WILDLIFE CONNECTIVITY PROJECT

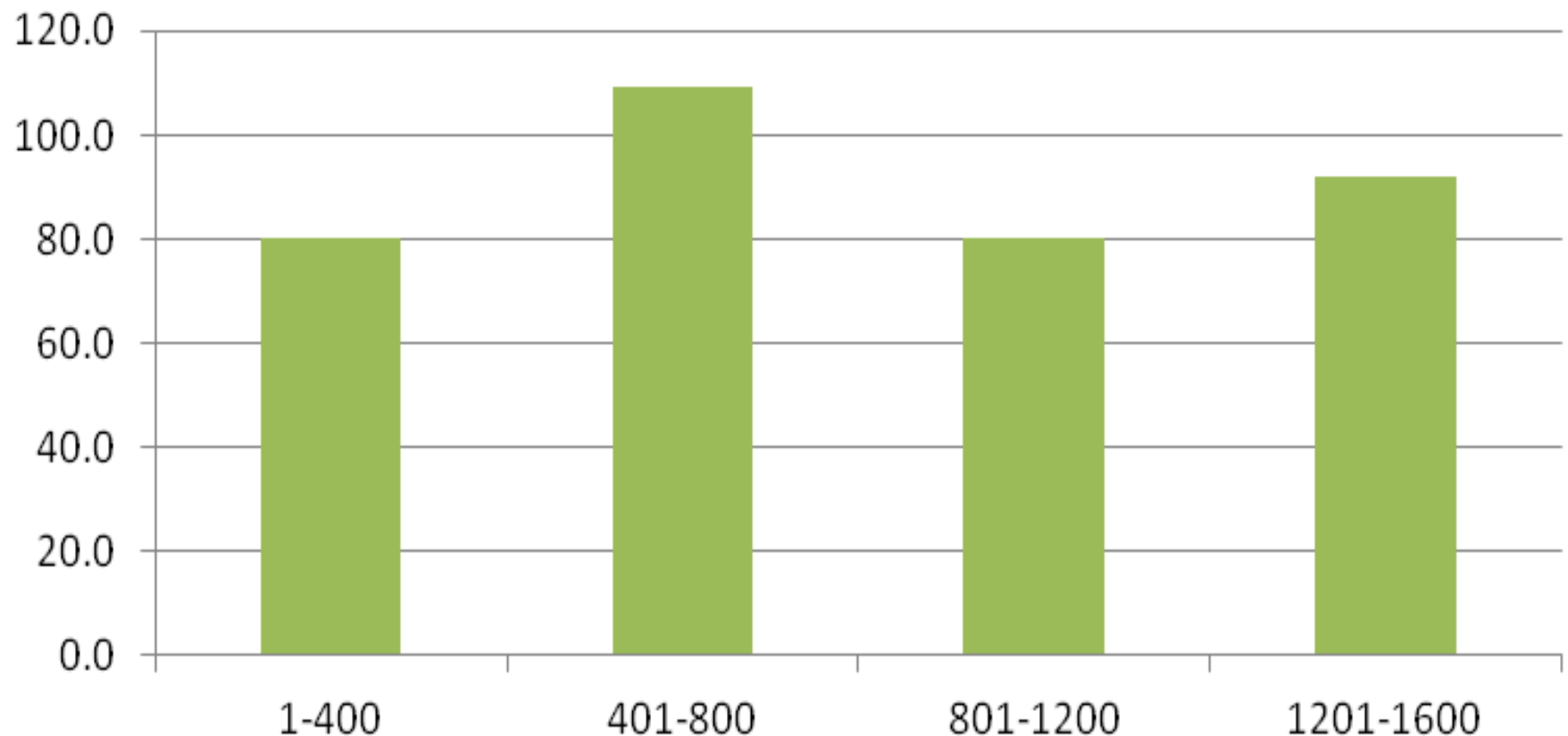
STUDY AREA:
CAMERA STATIONS & TRANSECTS

SCALE : AS SHOWN	DATE : APRIL 2016	CREATED BY : ECM
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I-89 Wildlife Connectivity Study

No. Tracks / 400 Feet / 90 Days, Primary Focus Species



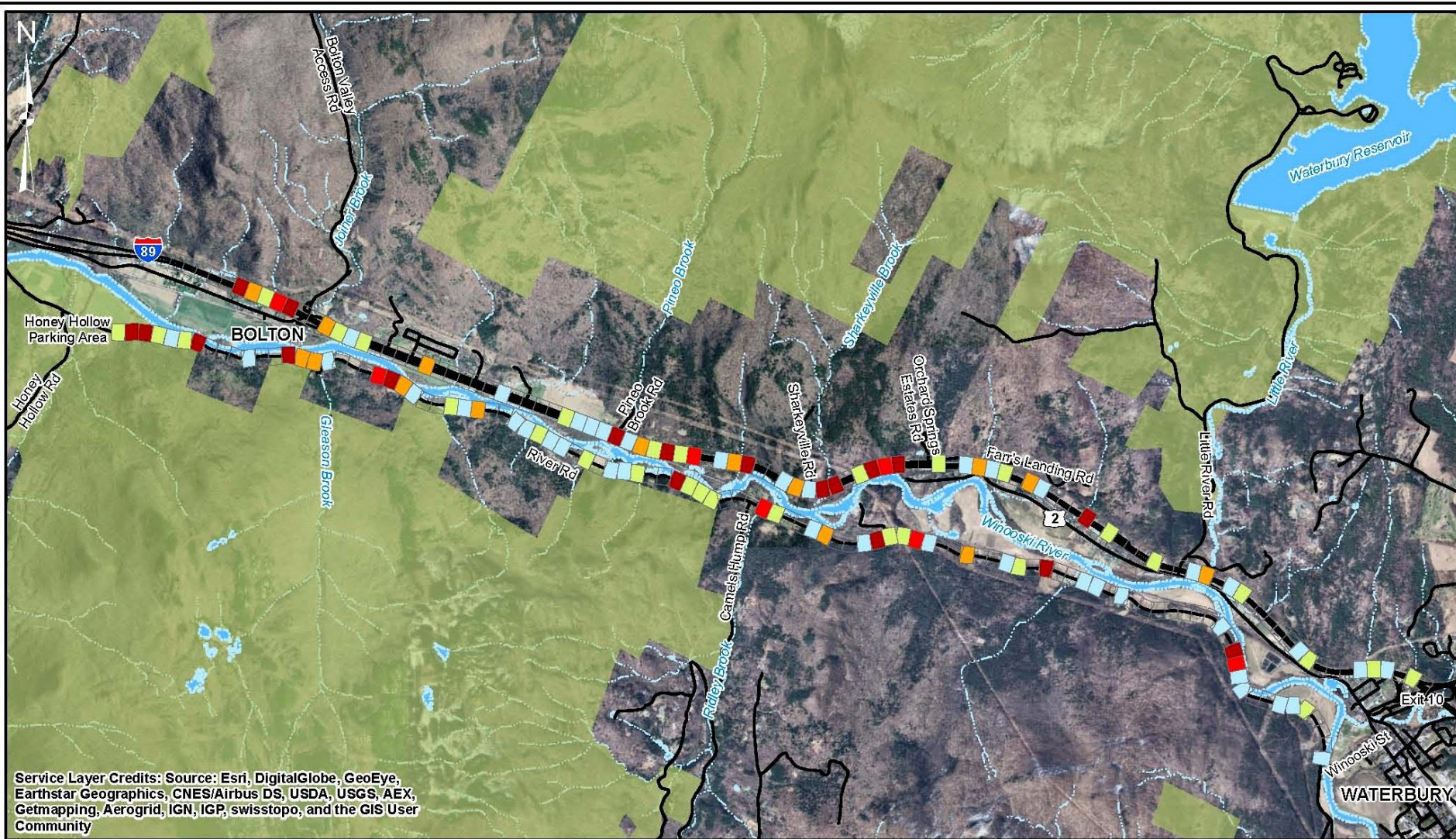
I-89 Tracking Summary

Track Location	Total Number of Track Sets	Percent of Total
Total tracks on or under I-89	285	100%
Road surface	203	71
Crossed both barrels	130	
Crossed part Way	73	
Culvert	53	19
Crossed both barrels	52	
Crossed part Way	1	
Bridges	29	10

I-89 Wildlife Connectivity Study

Comparison of transect and road permeability, assuming transect line represents 100% permeability

	Crossed Transect Line	Crossed River Road	Crossed I- 89 (Both Barrels)
All Animals	100%	42%	5%
Primary + Secondary	100%	21%	9%
Primary Focus	100%	15%	8%
Most Common Focus:			
Coyote	100%	22%	14%
Fox	100%	50%	13%
Deer	100%	8%	4%
Mink	100%	57%	70%
Fisher	100%	14%	3%

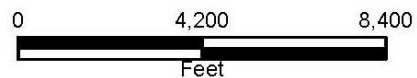


Legend

- Streams
- Roads
- VT Public Lands
- Bodies of Water

Tracks per 400 Feet per 90 Days

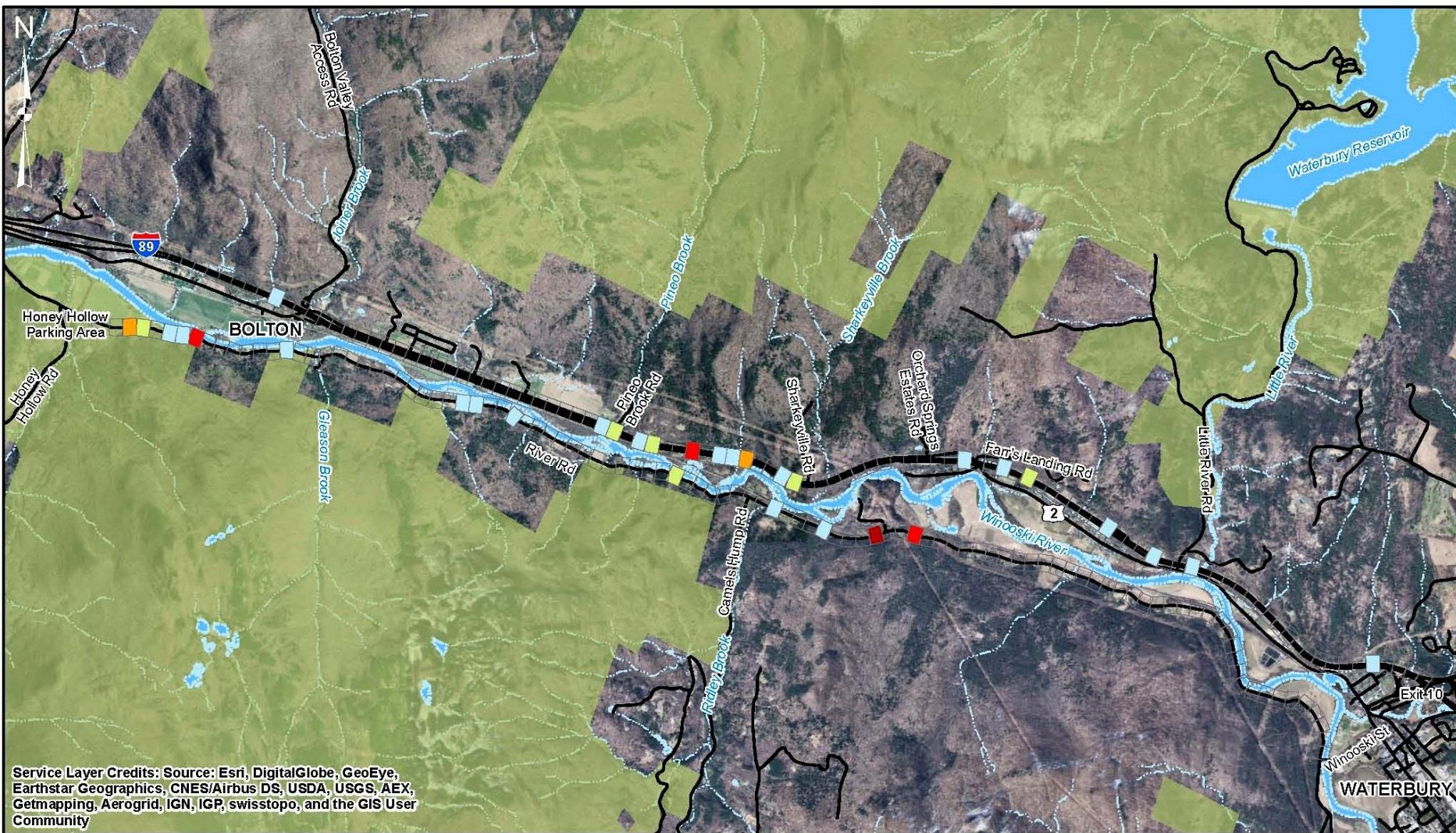
- 0
- <10
- >10 to 20
- >20 to 30
- >30 to 40
- >40



BOLTON-WATERBURY STP 2709(1) WILDLIFE CONNECTIVITY PROJECT

SUM OF TRACKS PER 400 FEET PER 90 DAYS PRIMARY FOCUS SPECIES

SCALE:	DATE:	CREATED BY:
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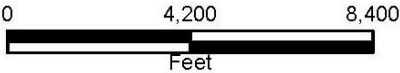
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Legend

- Streams
- Roads
- VT Public Lands
- Bodies of Water

Tracks per 400 Feet per 90 Days

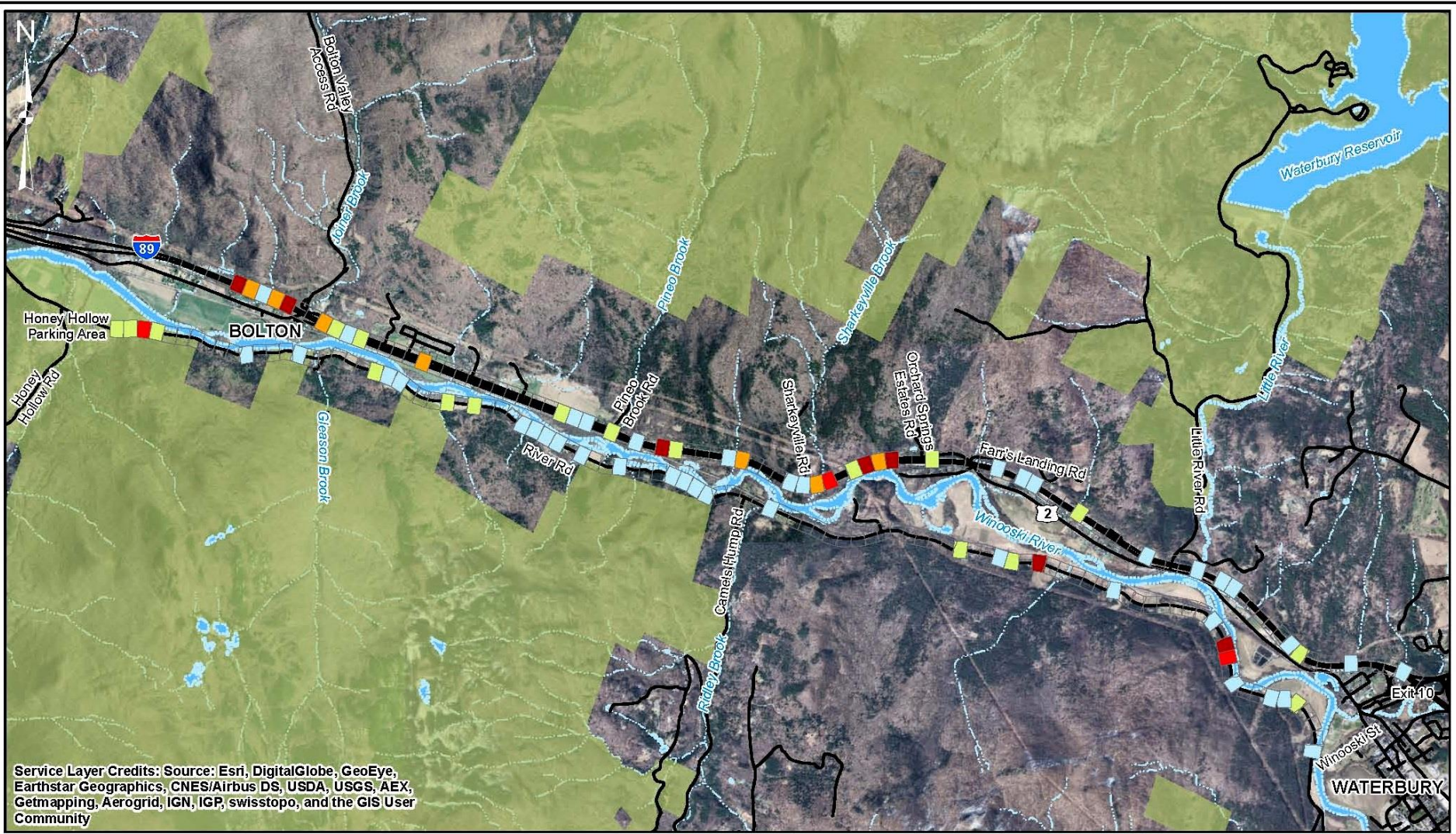
- 0
- <10
- >10 to 20
- >20 to 30
- >30 to 40
- >40



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 WILDLIFE CONNECTIVITY PROJECT

SUM OF TRACKS PER 400 FEET PER 90 DAYS
DEER

SCALE: AS SHOWN	DATE: MAY 2016	CREATED BY: ECM
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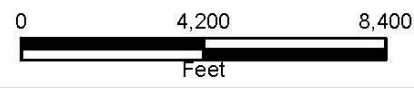


Legend

- Streams
- Roads
- VT Public Lands
- Bodies of Water

Tracks per 400 Feet Per 90 Days

0
<10
>10 to 20
>20 to 30
>30 to 40
>40



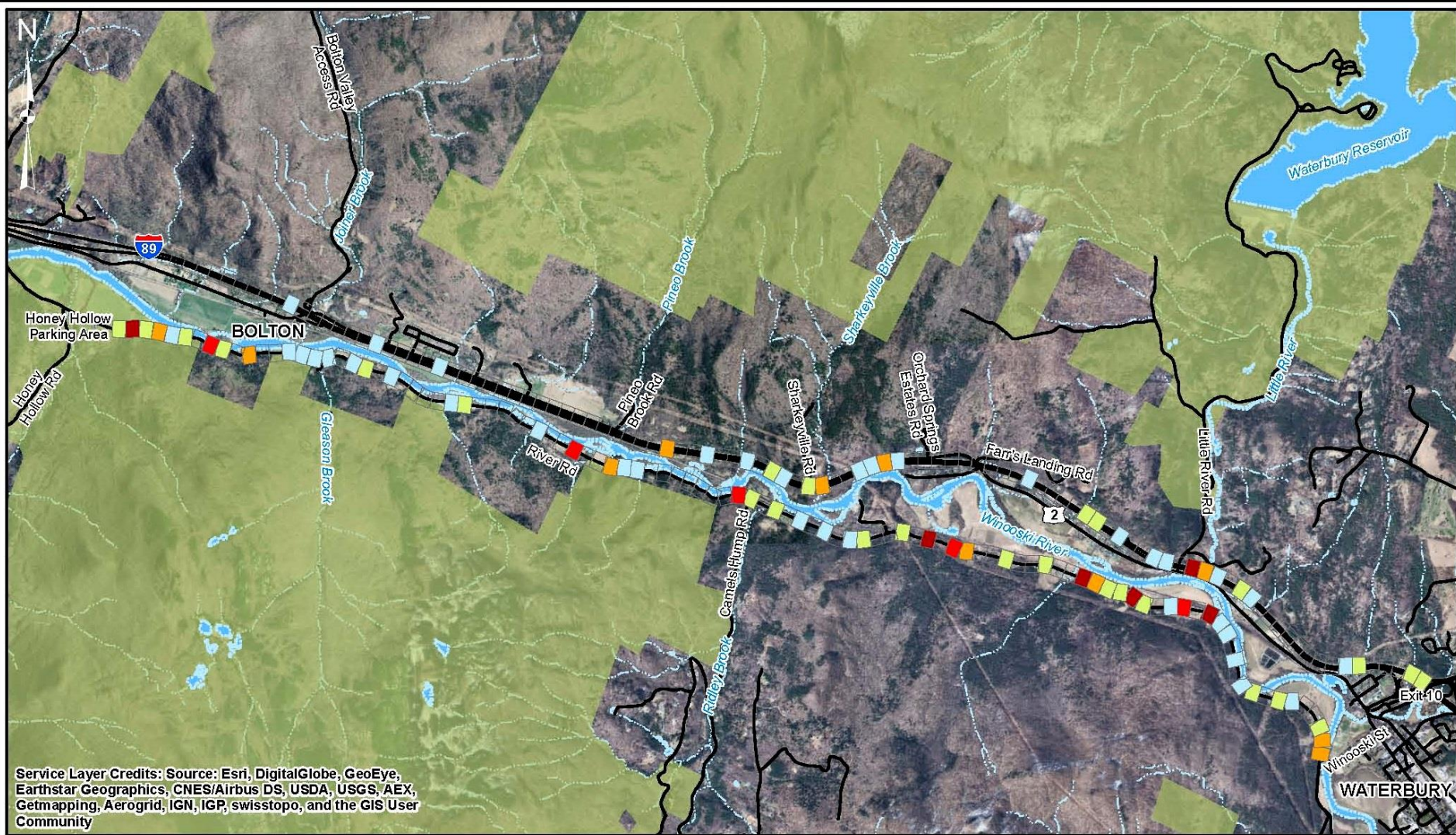
BOLTON-WATERBURY STP 2709(1)

WILDLIFE CONNECTIVITY PROJECT

SUM OF TRACKS PER 400 FEET PER 90 DAYS

COYOTE

SCALE: AS SHOWN	DATE: MAY 2016	CREATED BY: ECM
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Legend

- Streams
- Roads
- VT Public Lands
- Bodies of Water

Tracks per 400 Feet per 90 Days

- 0
- <10
- >10 to 20
- >20 to 30
- >30 to 40
- >40

0 4,200 8,400
Feet

BOLTON-WATERBURY STP 2709(1) WILDLIFE CONNECTIVITY PROJECT

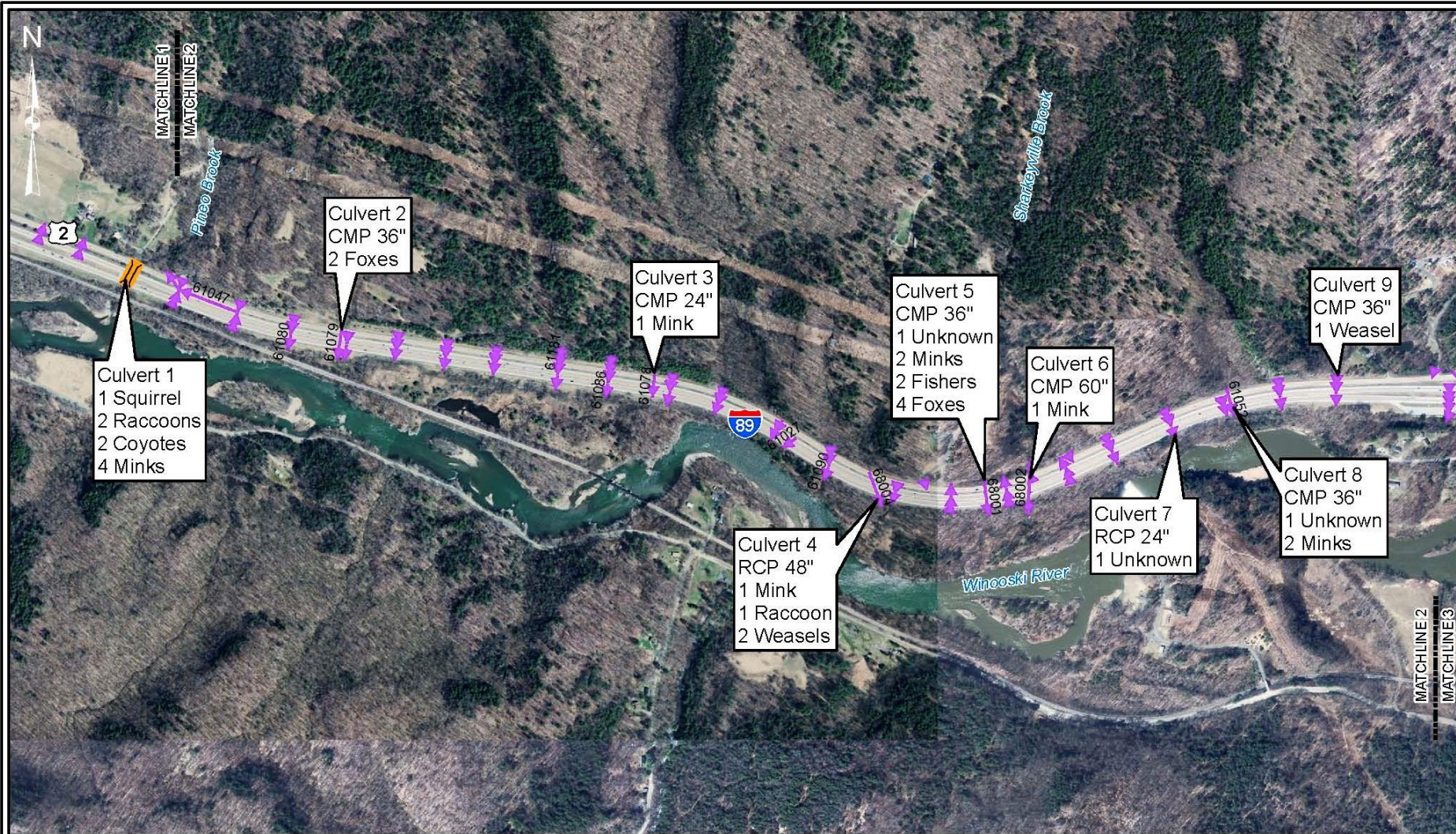
SUM OF TRACKS PER 400 FEET PER 90 DAYS FOX

SCALE:
AS SHOWN

DATE:
MAY 2016

CREATED BY:
ECM

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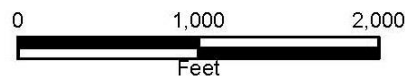
Legend



VTrans Large Culvert Inventory (VCGI)



VTrans Small Culvert Inventory



I-93 WILDLIFE CORRIDOR
VERMONT

CULVERTS & BRIDGES SPECIES TRACKS 2

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Study Questions

Is the habitat in the vicinity rich in wildlife?

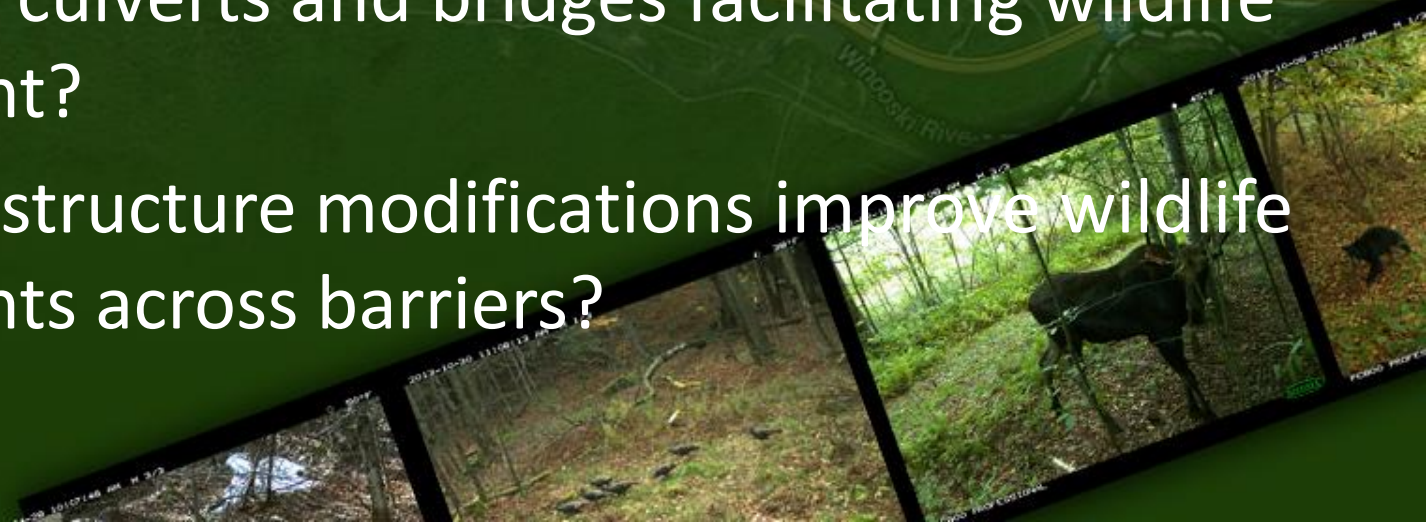
Is there an edge effect zone along the corridor?

Is the I-89/Route 2 corridor currently a fragmenting feature? Is there an edge effect zone?

Is wildlife road mortality currently occurring?

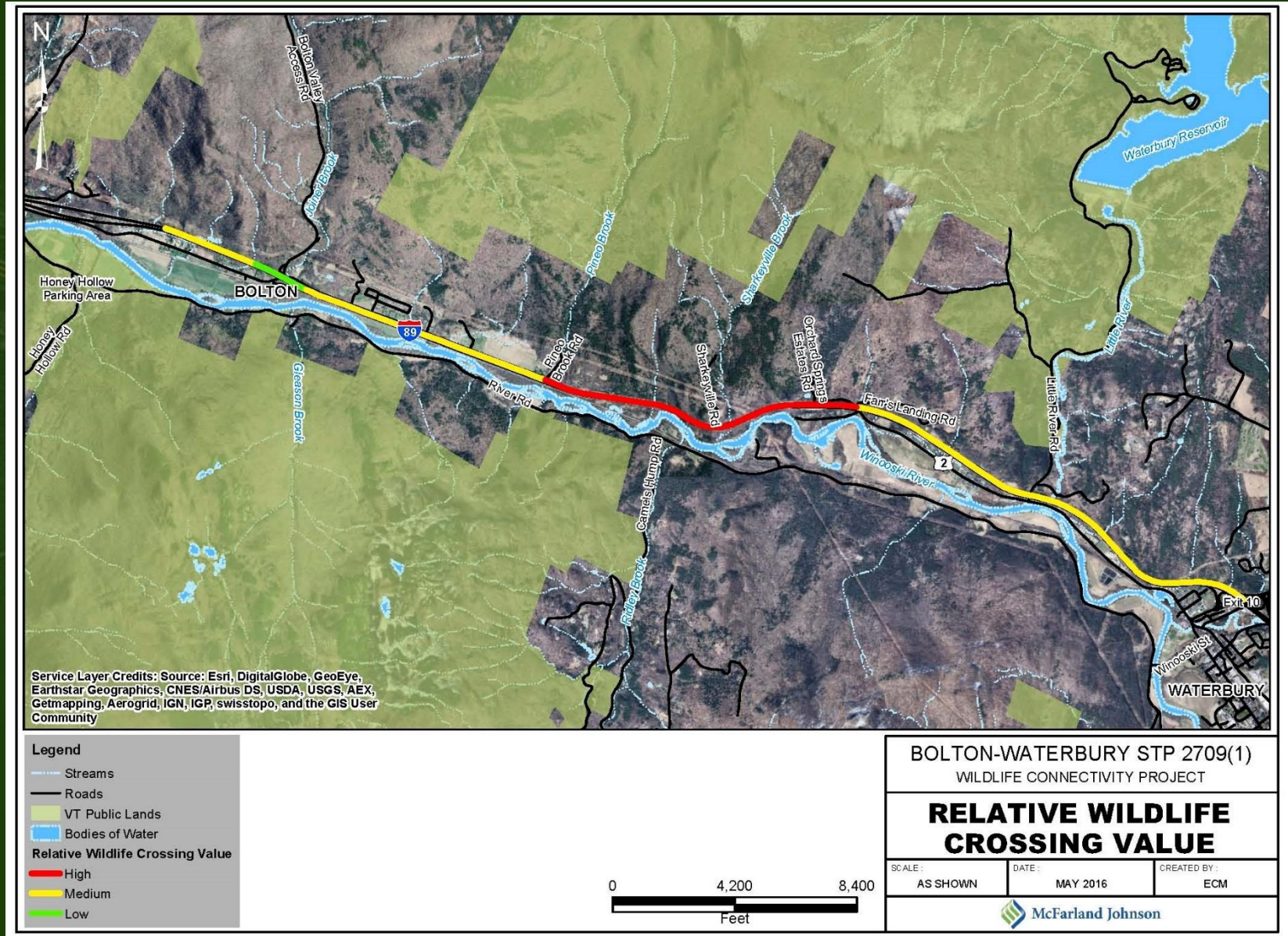
Are existing culverts and bridges facilitating wildlife movement?

Would infrastructure modifications improve wildlife movements across barriers?



I-89 Wildlife Connectivity Study

Prioritizing I-89 Segments for Habitat Connectivity



I-89 Wildlife Connectivity Study

Questions?

