I-89 Wildlife Connectivity Study

Presented by: Jed Merrow & James S. Andrews

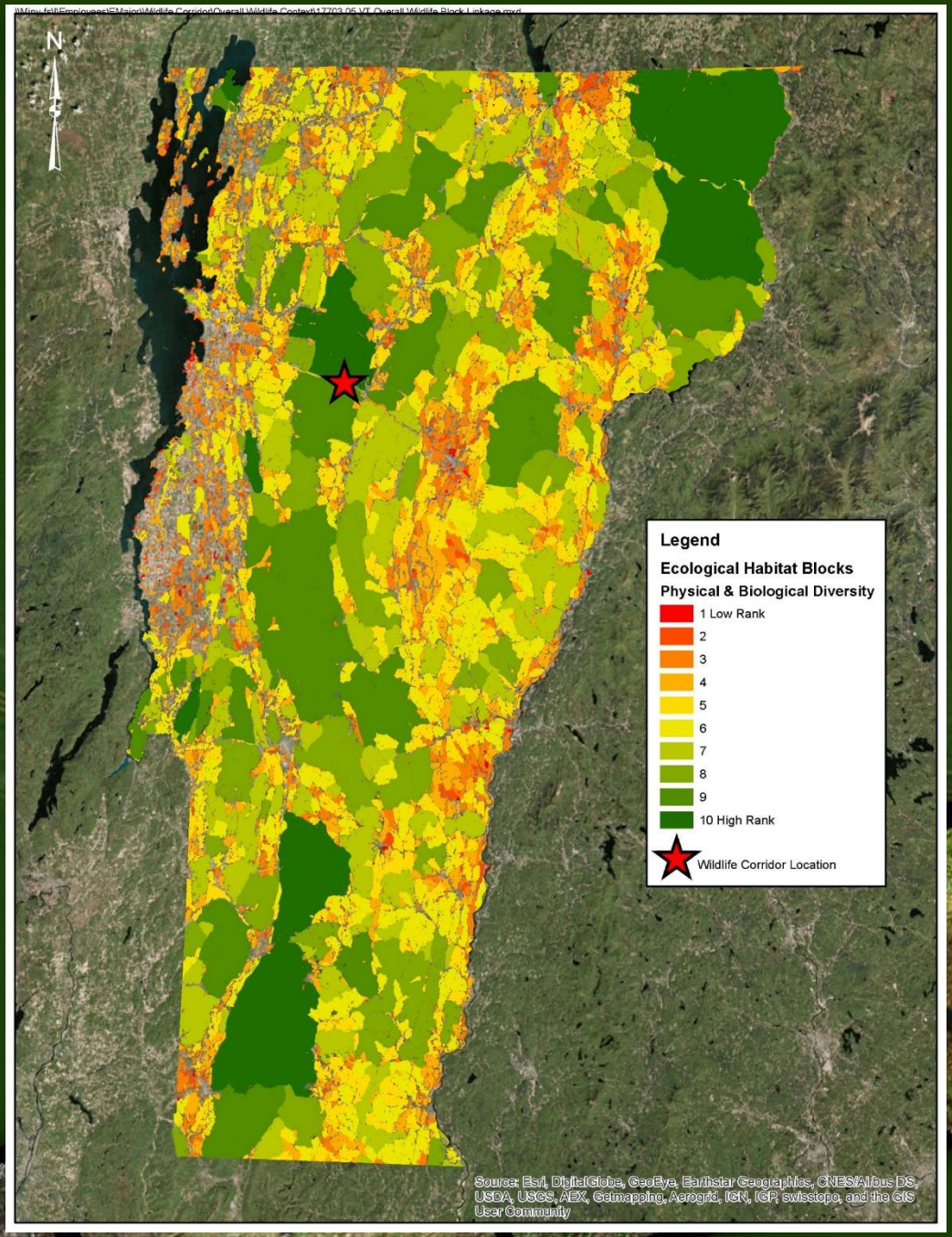
McFarland Johnson

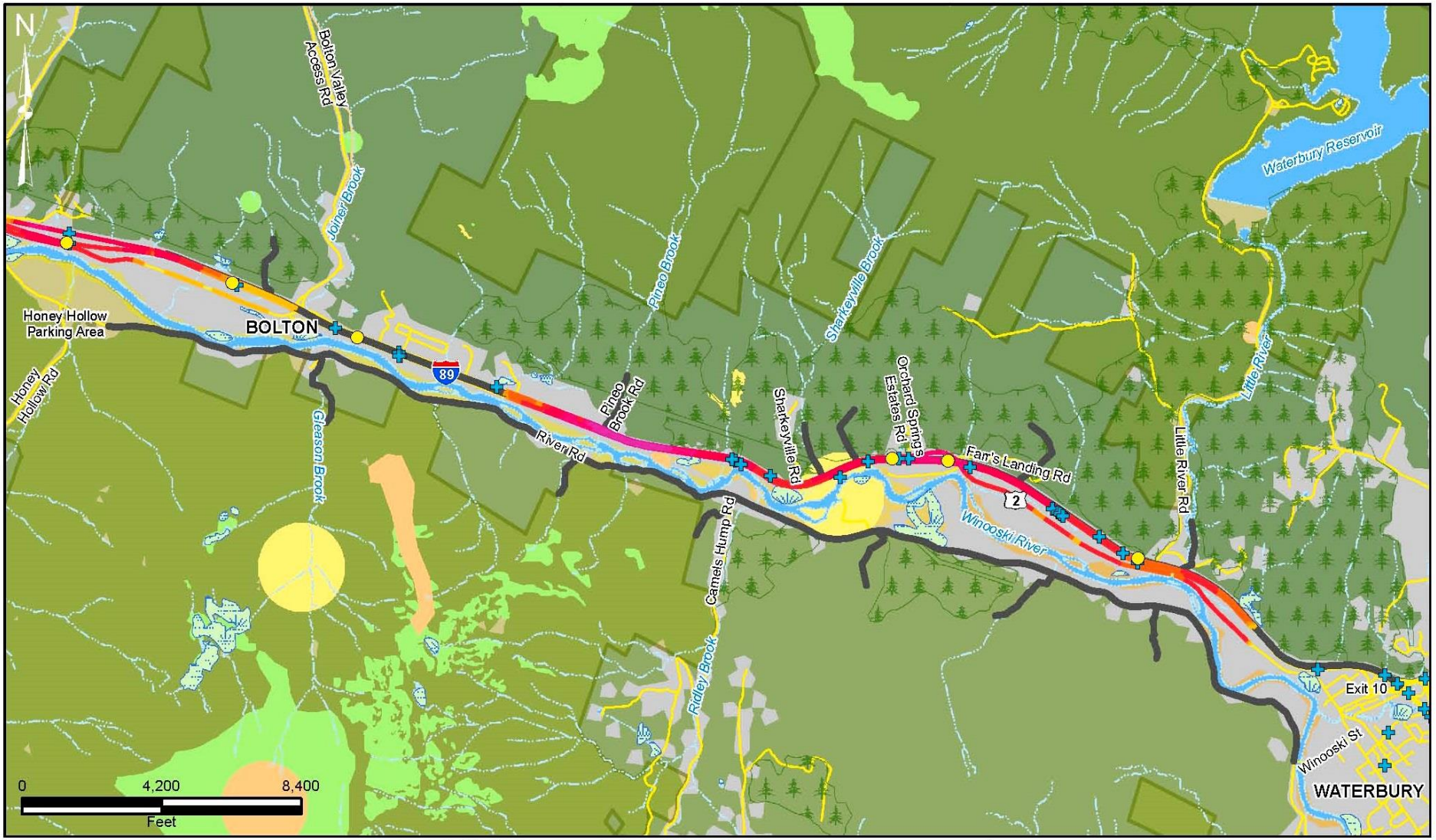
VERMONT FISH & WILDLIFE

VTrans Working to Get You There
Vermont Agency of Transportation

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

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WILDLIFE CONNECTIVITY PROJECT

HABITAT FEATURES & WILDLIFE CROSSING VALUES

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

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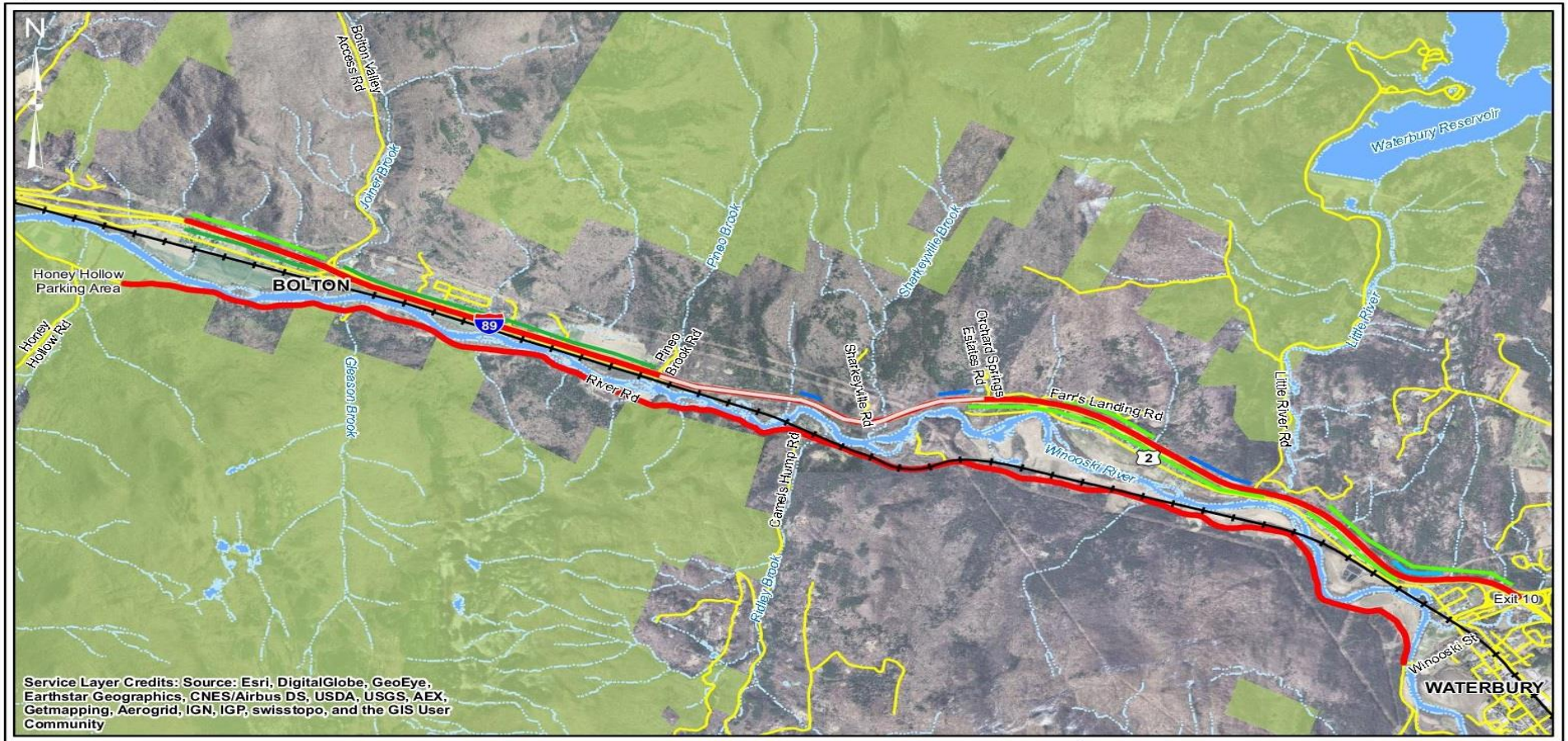
Barriers to Wildlife Movement Across I-89



Legend

- Railroad
- Streams
- Roads
- Roadway Study Segments
- VT Public Lands
- Bodies of Water

Barrier Type

- Chain Link Fence
- Woven Wire Fence
- Jersey in Median
- Rock Cut
- Rock Cut & Chain Link Fence

0 4,200 8,400
Feet

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STUDY AREA:
I-89 BARRIERS

SCALE :	DATE :	CREATED BY :
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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?

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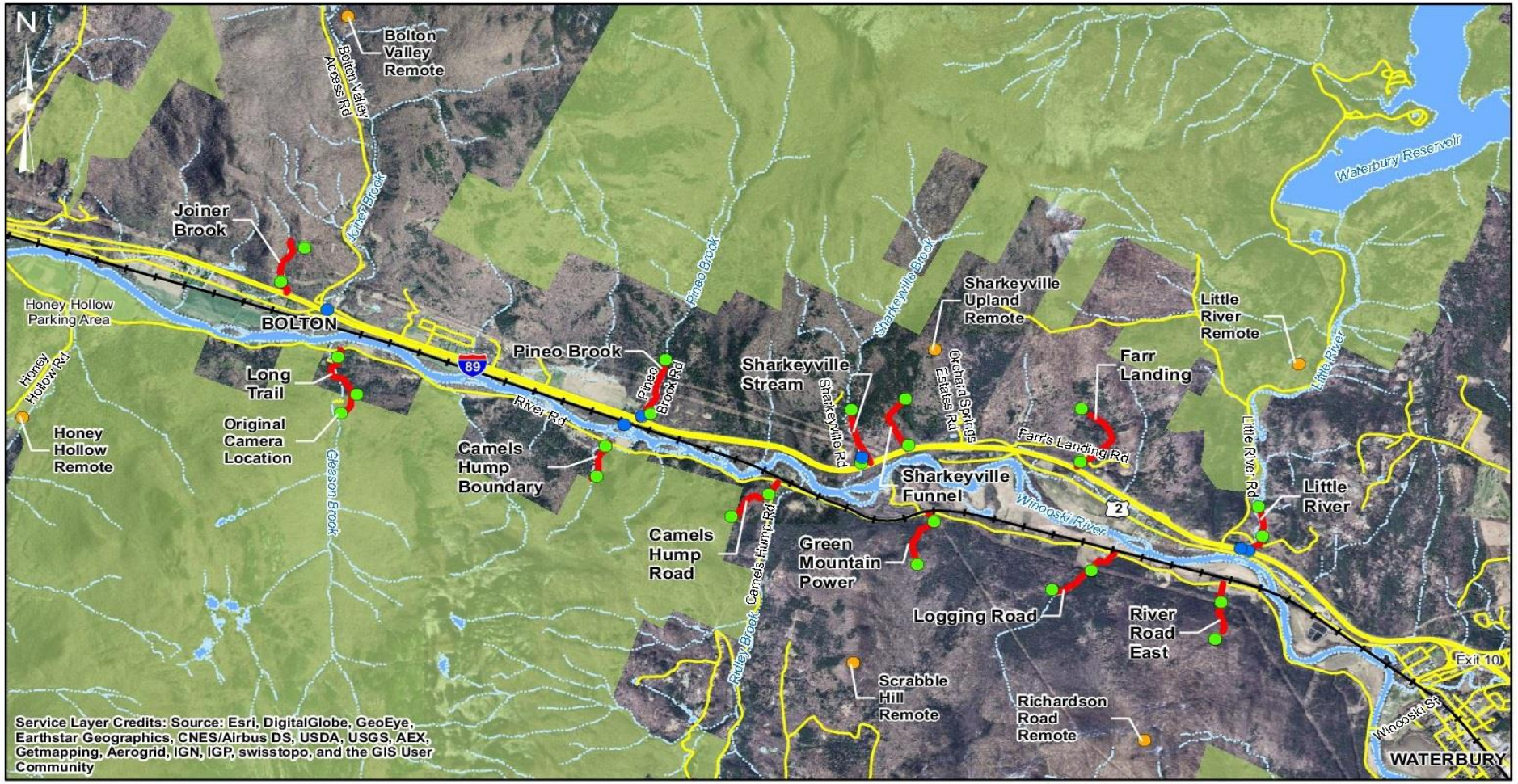
Target Species

Primary	Secondary
Coyote	Red Fox
Black Bear	Gray Fox
Fisher	Cottontail Rabbit
Bobcat	Snowshoe Hare
Deer	Porcupine
Moose	Raccoon
Mink	Weasel
Otter	Skunk

Trail Cameras – Study Design

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

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

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STUDY AREA:
CAMERA STATIONS & TRANSECTS

SCALE :	DATE :	CREATED BY :
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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

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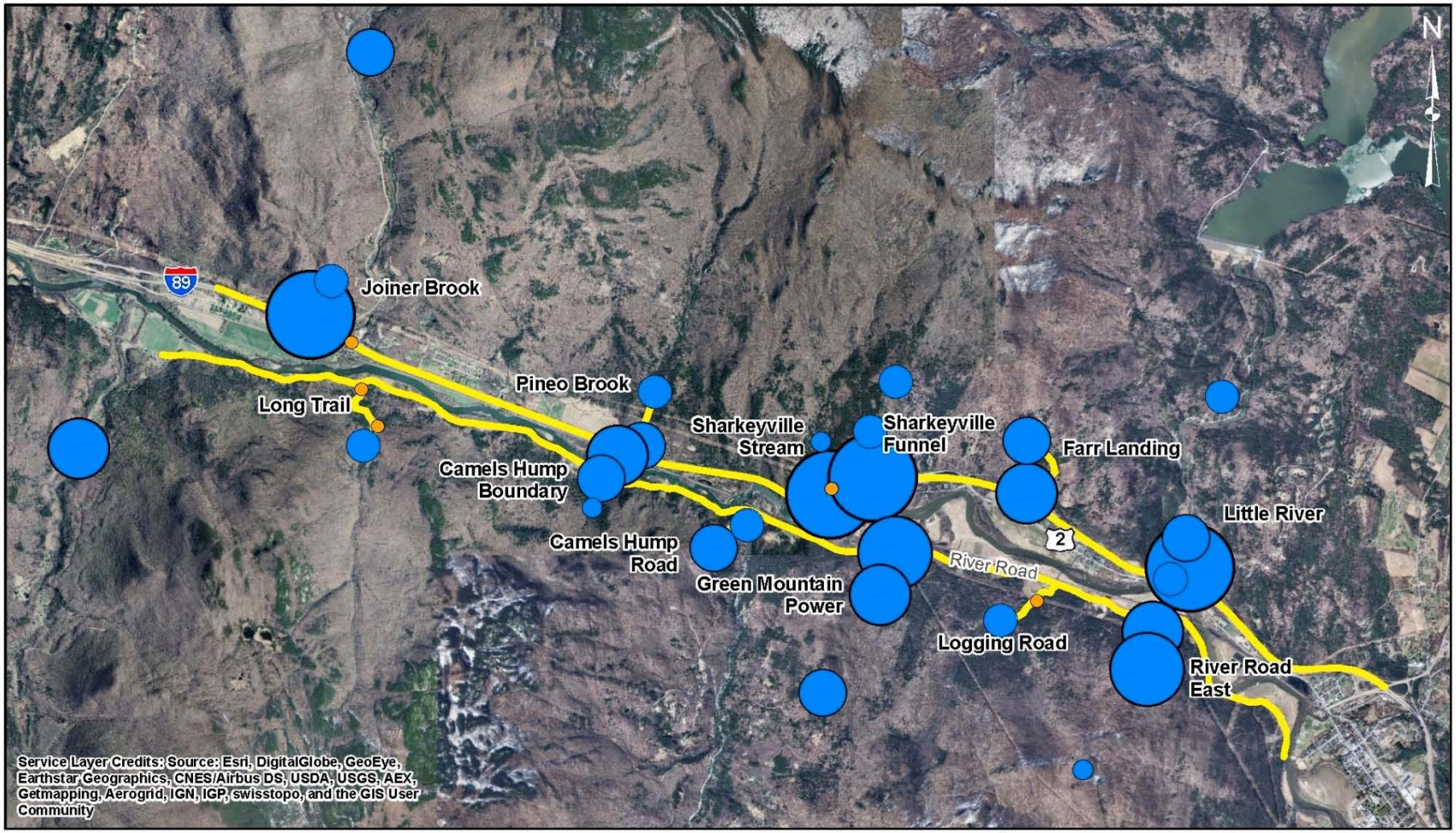

Legend

# of White-Tailed Deer per Camera per Year of Deployment

- 0 (Camera Location)
- <25
- >25 to 50
- >50 to 75
- >75 to 100
- >100 to125
- >125
- Transects and Corridors

0 4,500 9,000

Feet

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CAMERA TRACKING: WHITE-TAILED DEER

SCALE :	DATE :	CREATED BY :
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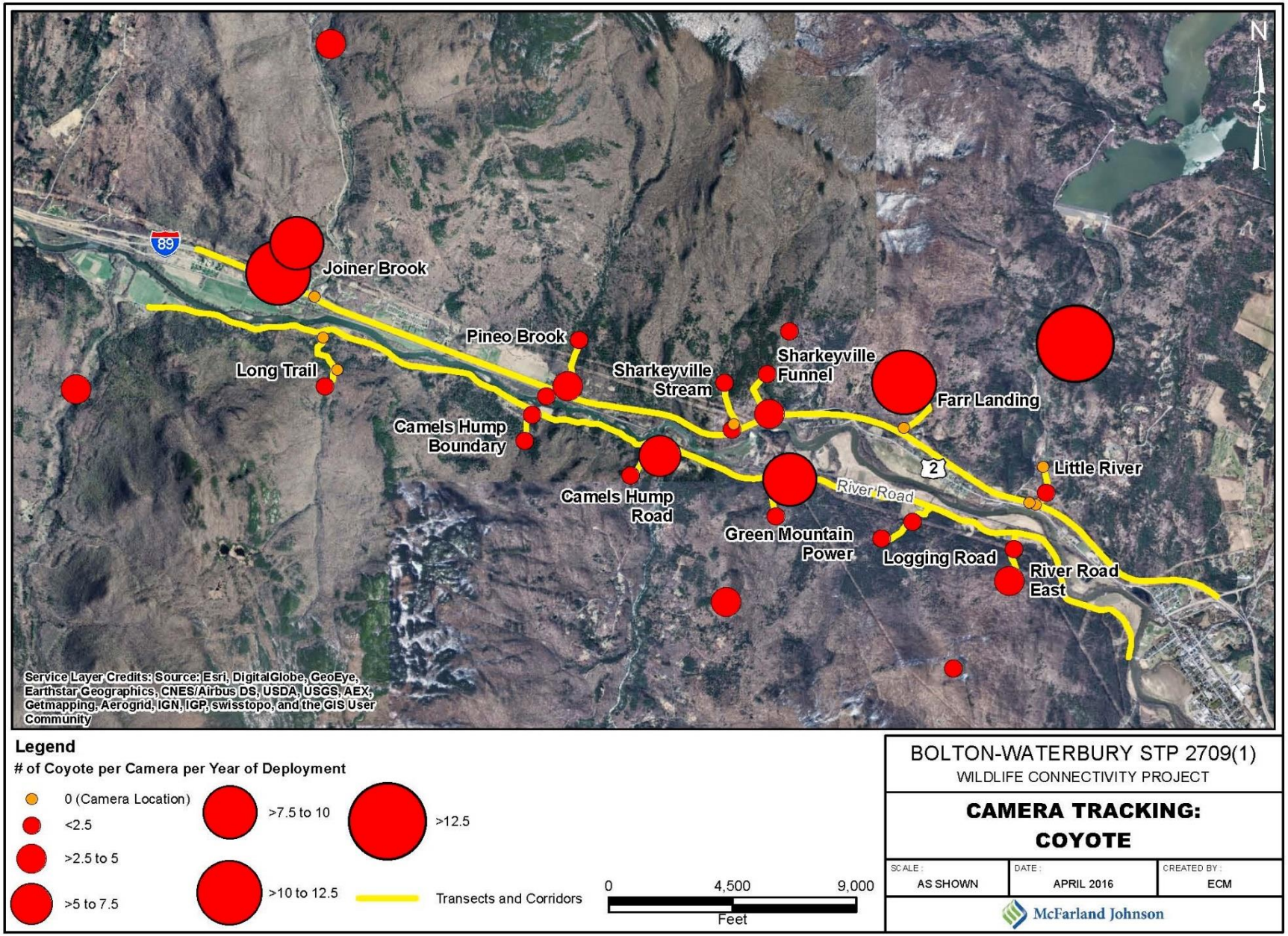

Legend

# of Coyote per Camera per Year of Deployment

- 0 (Camera Location)
- <2.5
- >2.5 to 5
- >5 to 7.5
- >7.5 to 10
- >10 to 12.5
- >12.5
- Transects and Corridors

0 4,500 9,000
Feet

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CAMERA TRACKING: COYOTE

SCALE :	DATE :	CREATED BY :
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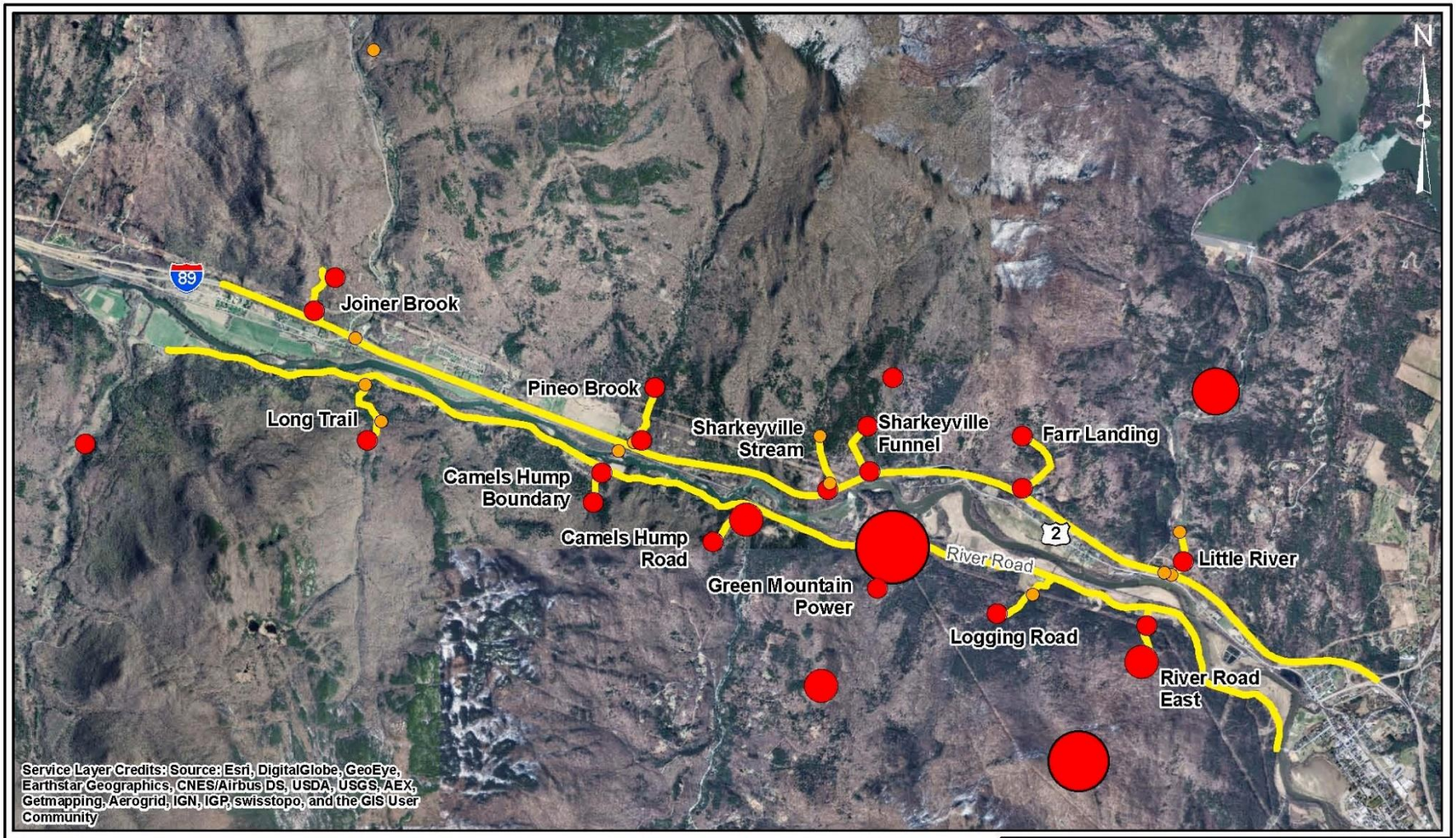

Legend

# of Black Bear per Camera per Year of Deployment

- 0 (Camera Location)
- <2.5
- >2.5 to 5
- >5 to 7.5
- >7.5 to 10
- >10 to 12.5
- >12.5
- Transects and Corridors

0 4,500 9,000
Feet

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CAMERA TRACKING: BLACK BEAR

SCALE :	DATE :	CREATED BY :
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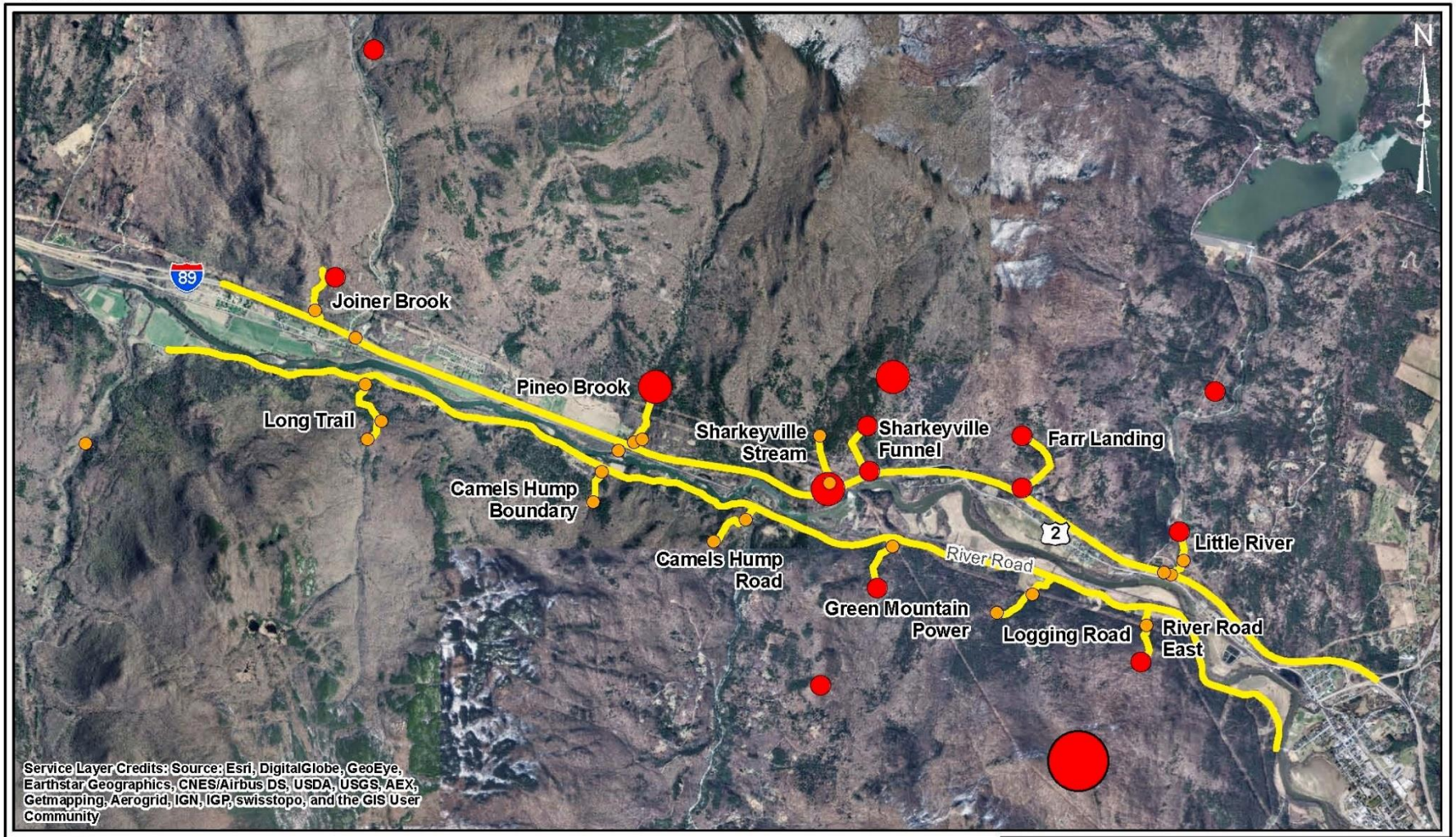

Legend

# of Moose per Camera per Year of Deployment

- 0 (Camera Location)
- <2.5
- >2.5 to 5
- >5 to 7.5
- >7.5 to 10
- >10 to 12.5
- >12.5
- Transects and Corridors

0 4,500 9,000
Feet

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CAMERA TRACKING: MOOSE

SCALE :	DATE :	CREATED BY :
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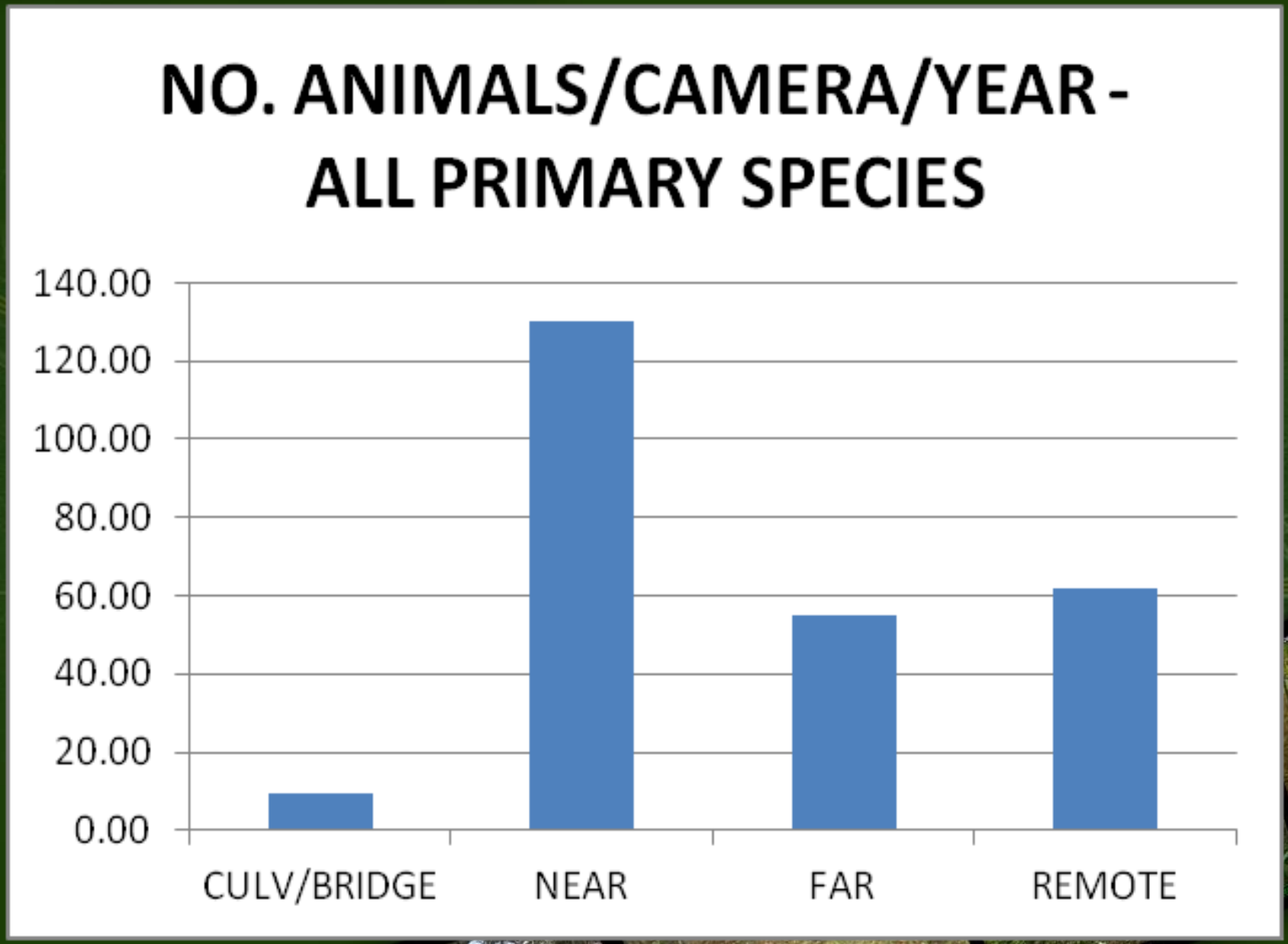

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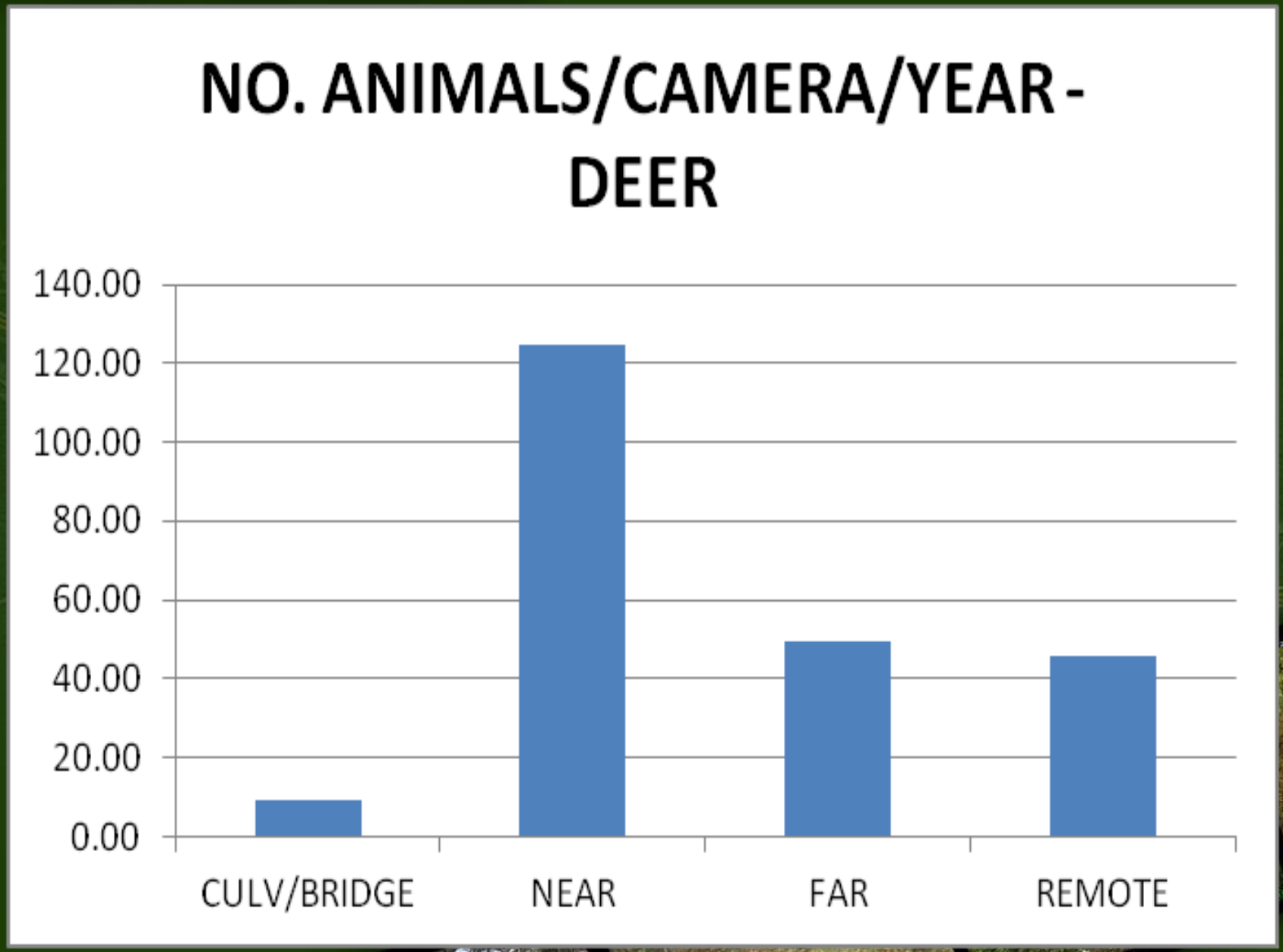

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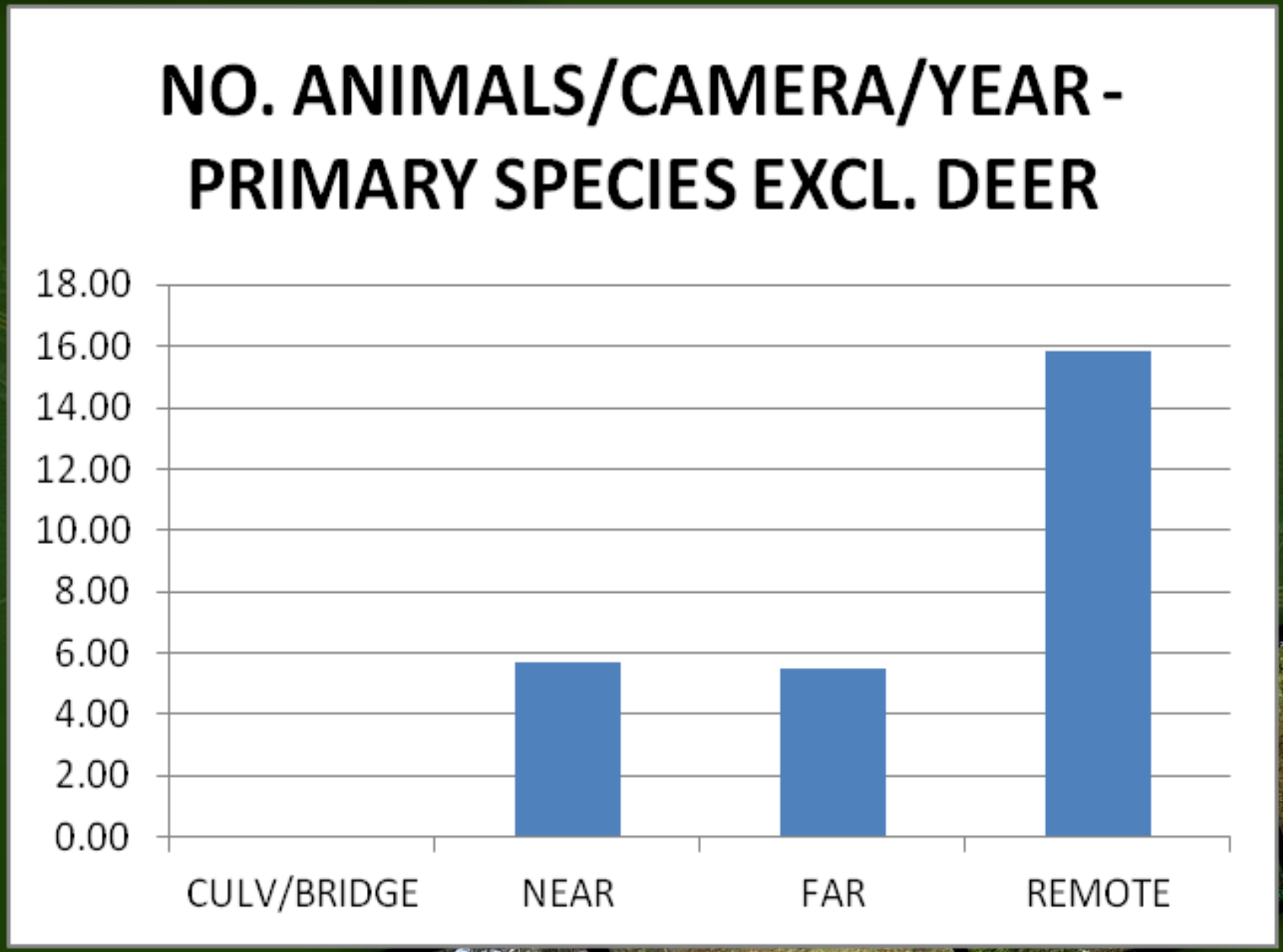

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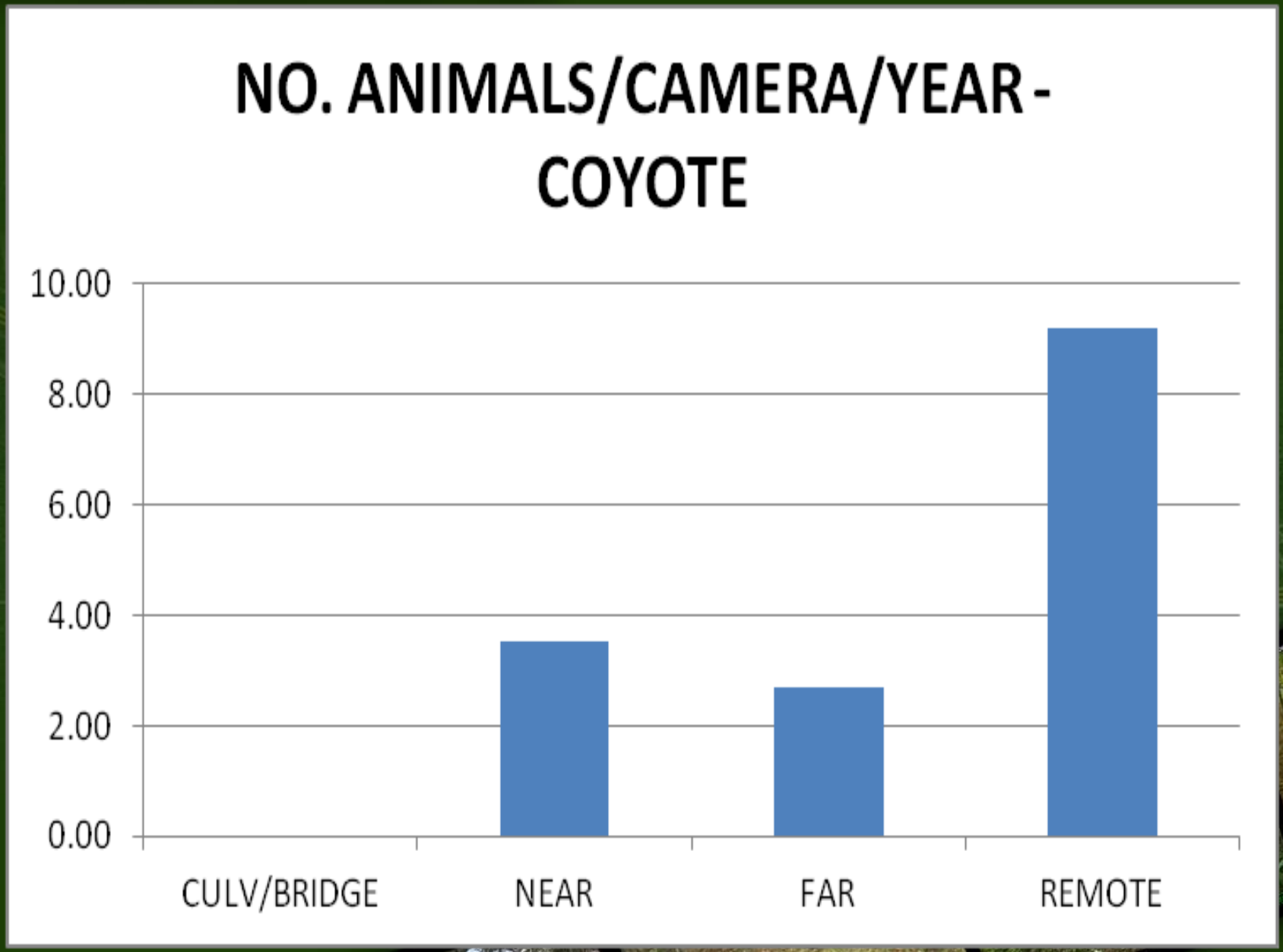

Winter Tracking – Study Design

- 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

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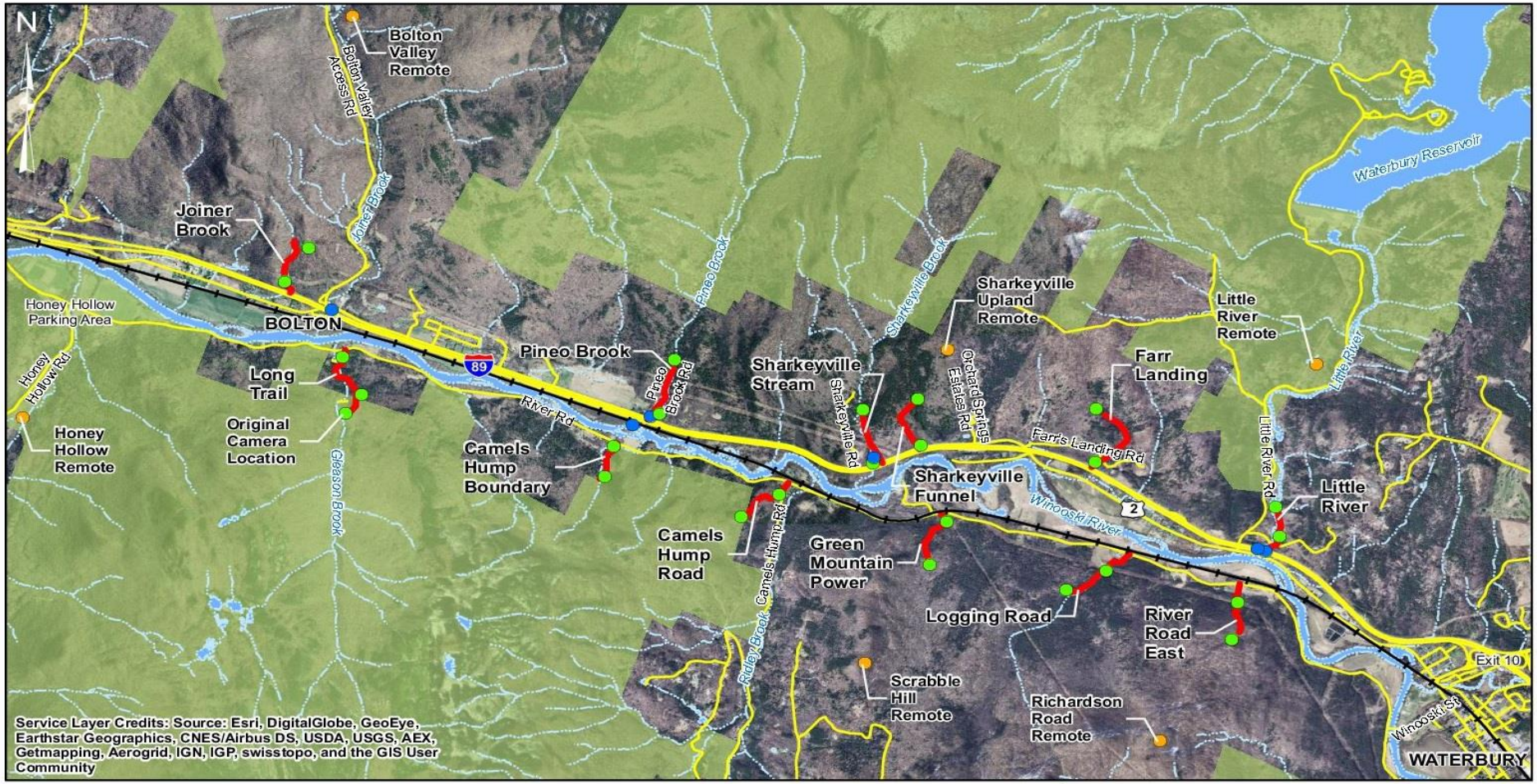

Legend

- 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

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WILDLIFE CONNECTIVITY PROJECT

STUDY AREA: CAMERA STATIONS & TRANSECTS

SCALE :	DATE :	CREATED BY :
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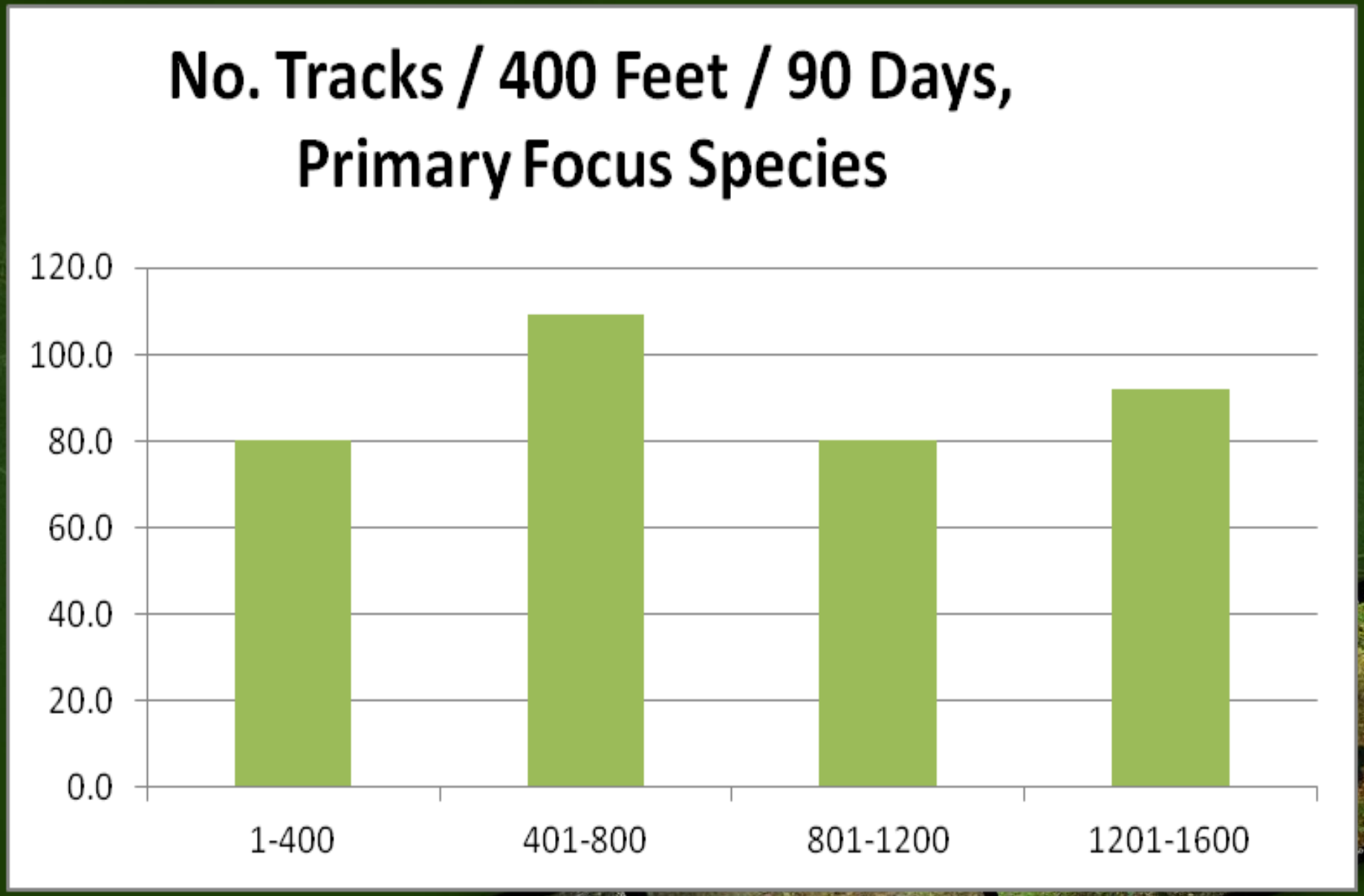
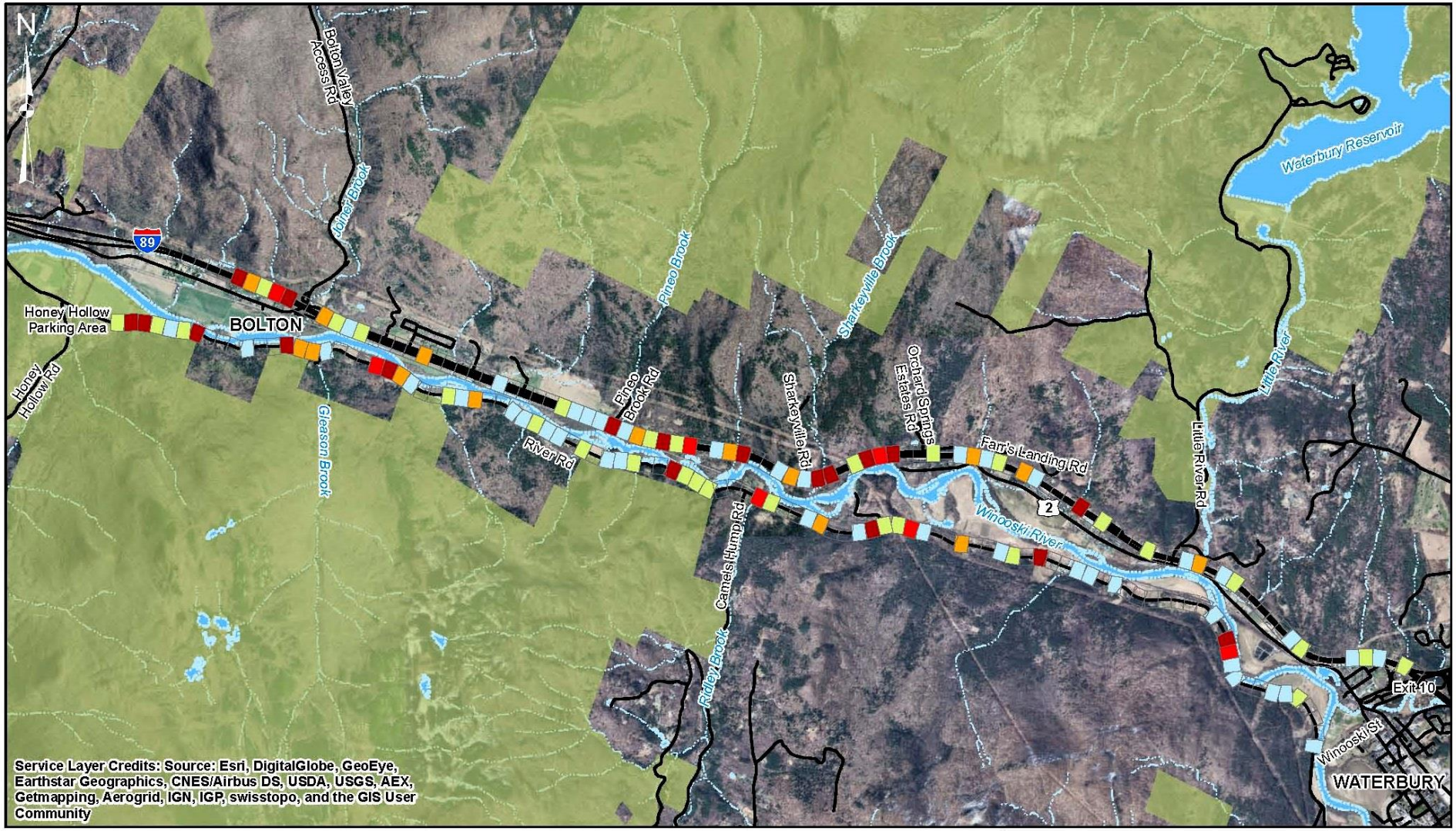


I-89 Tracking Summary

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

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

0 4,200 8,400
Feet

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WILDLIFE CONNECTIVITY PROJECT

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

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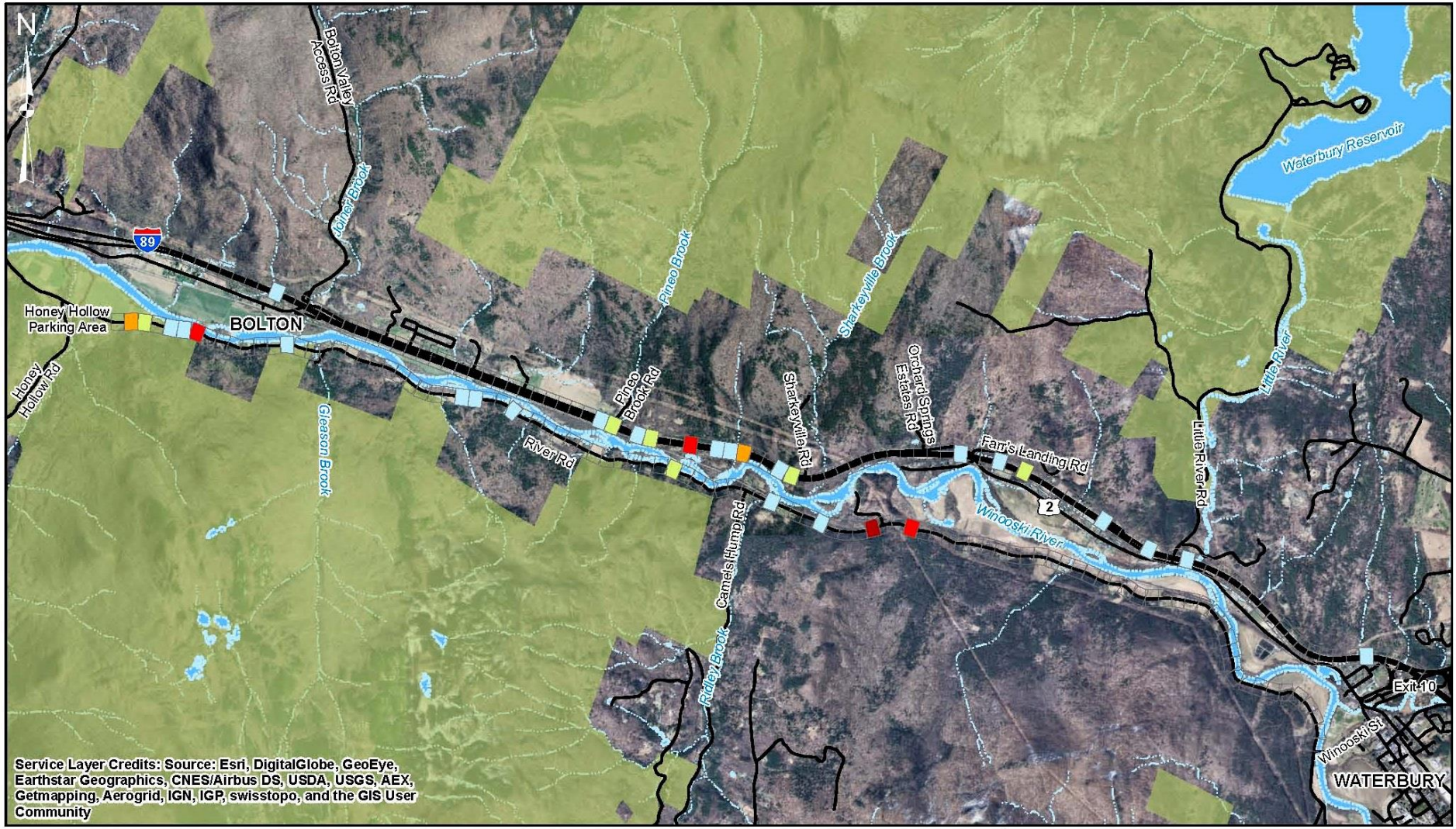

Legend

- 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

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SUM OF TRACKS PER 400 FEET PER 90 DAYS
DEER

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

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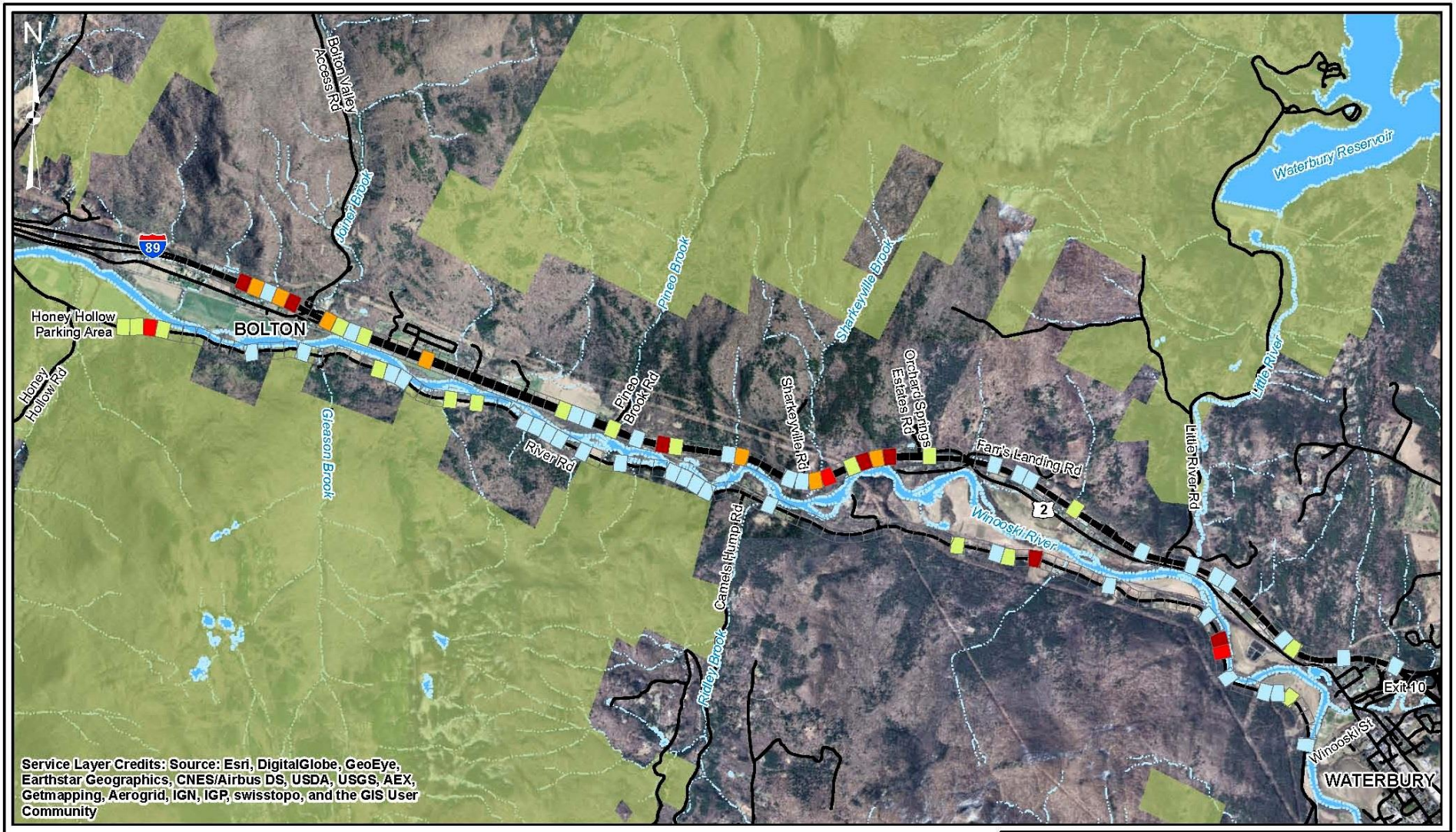

Legend

- 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
COYOTE

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

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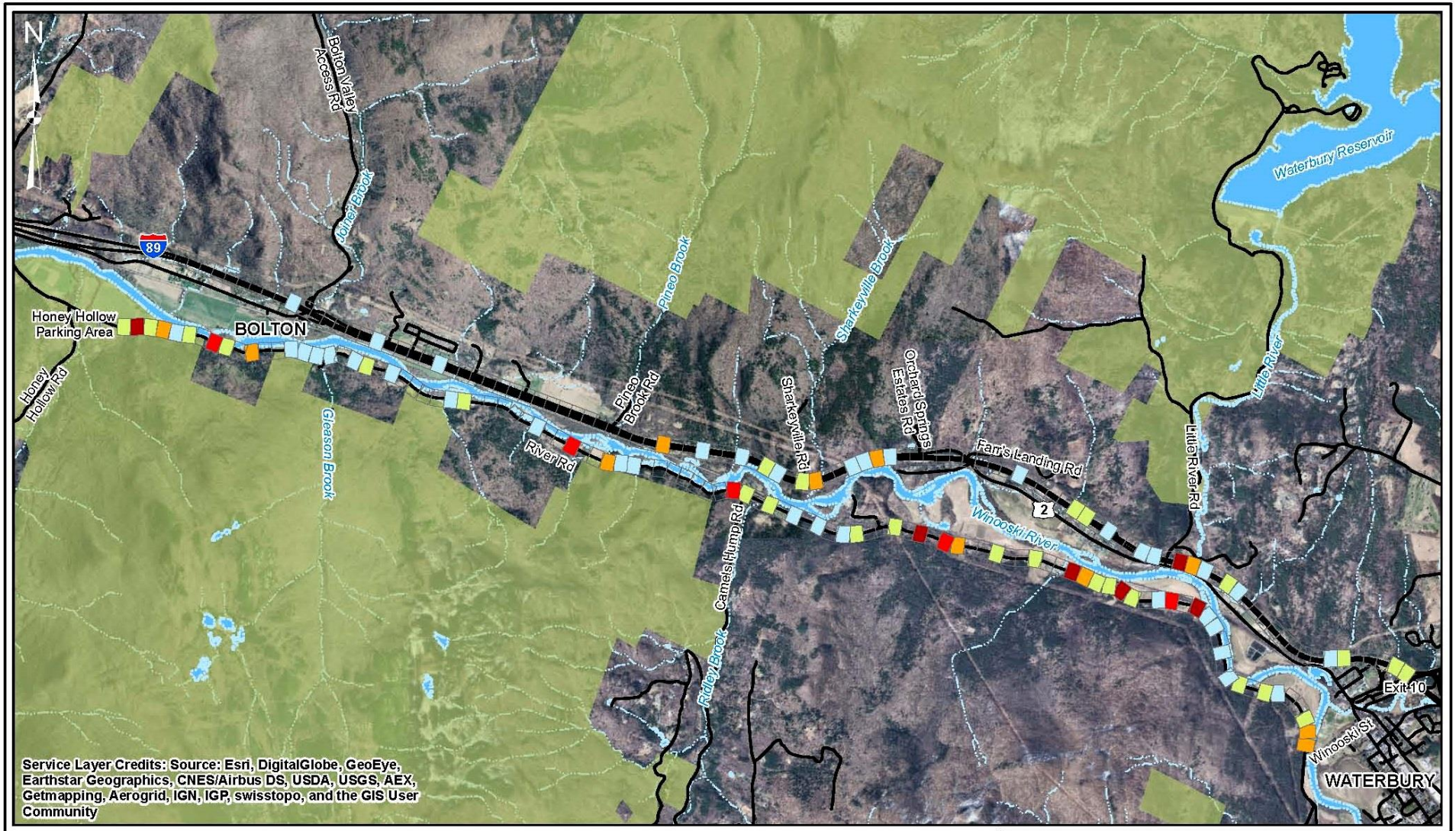

Legend

- 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 :	DATE :	CREATED BY :
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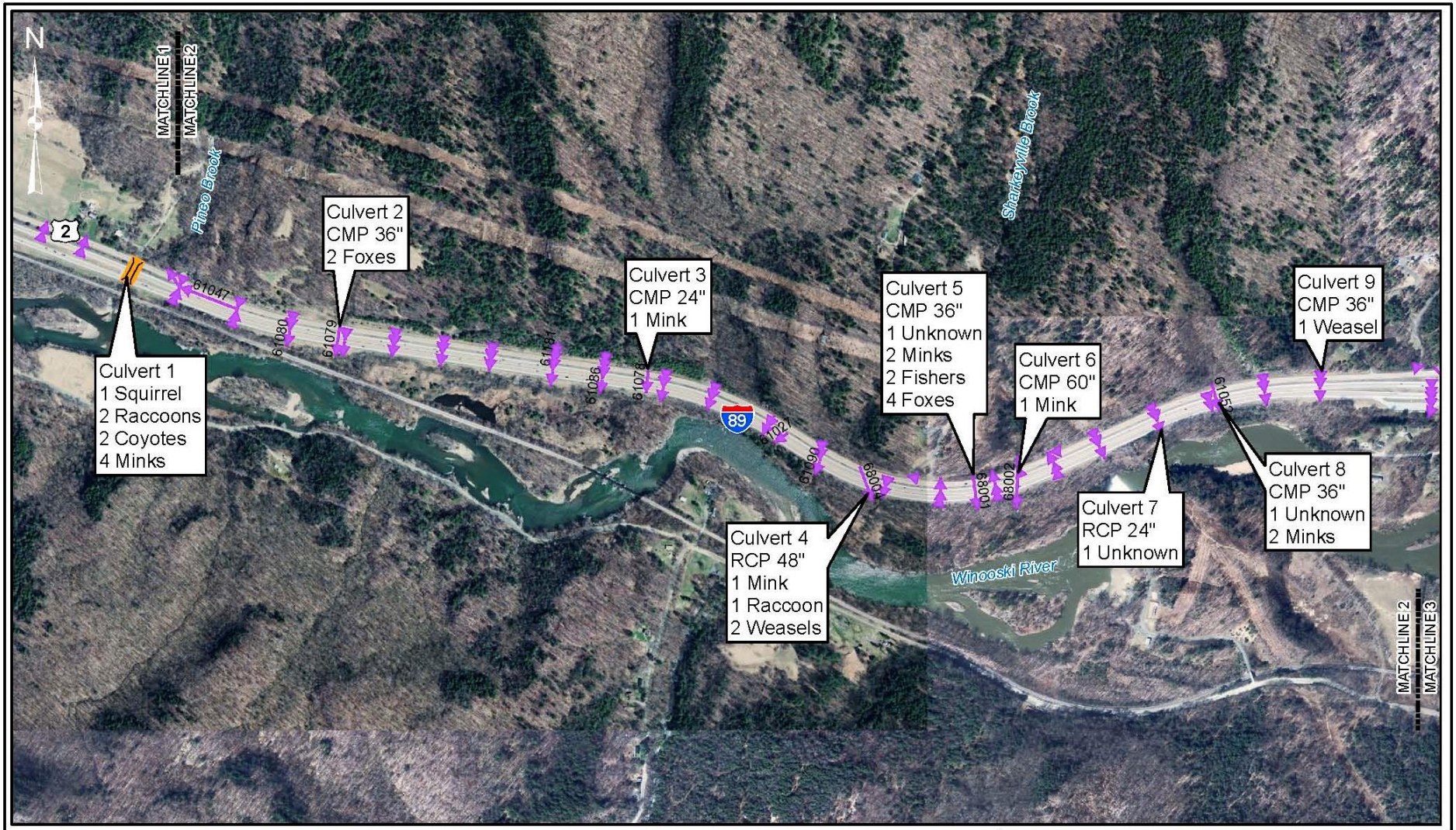

Legend

- VTrans Large Culvert Inventory (VCGI)
- VTrans Small Culvert Inventory

0 1,000 2,000
Feet

I-89 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?

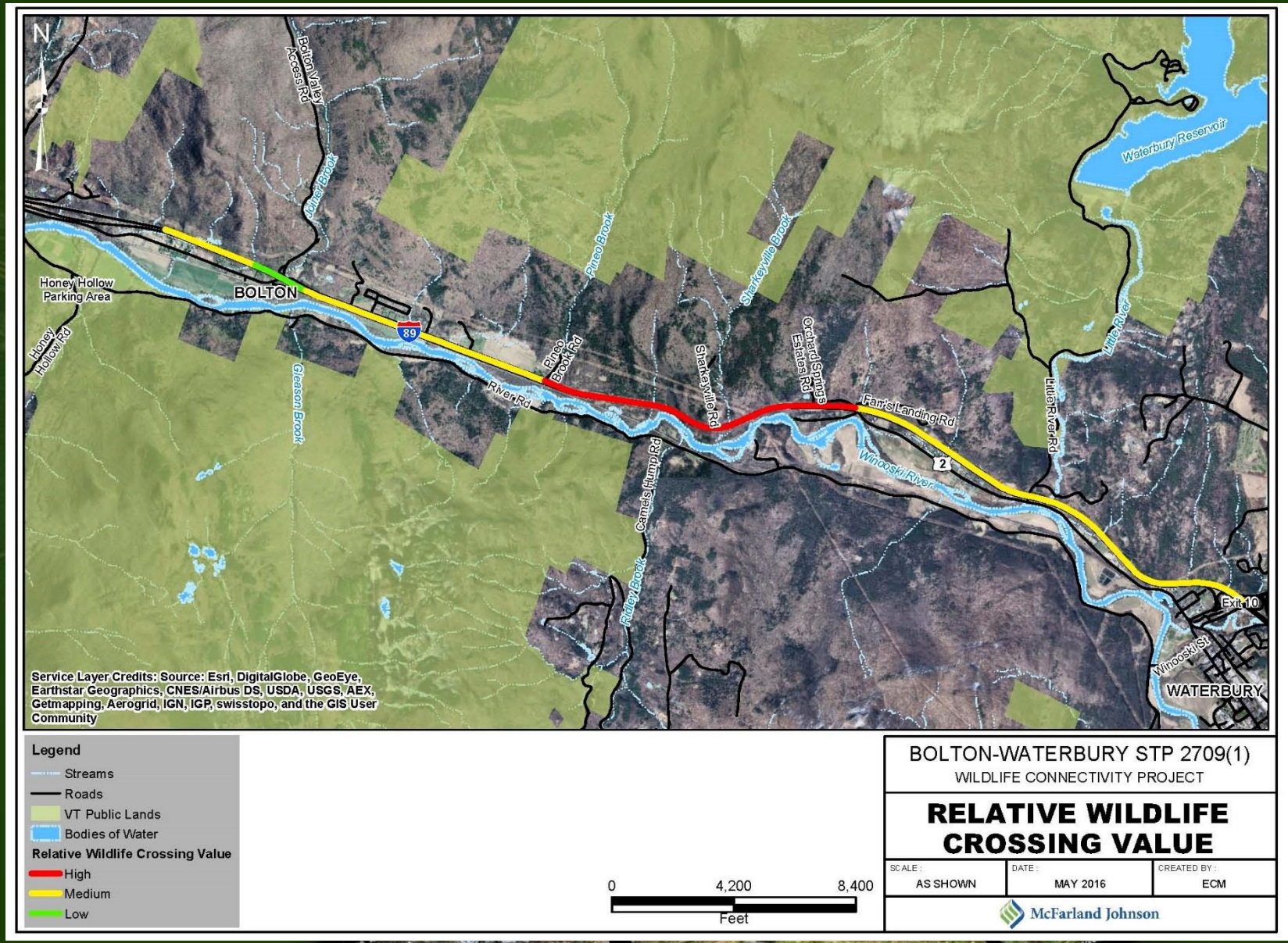
Is wildlife road mortality currently occurring?

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



Questions?