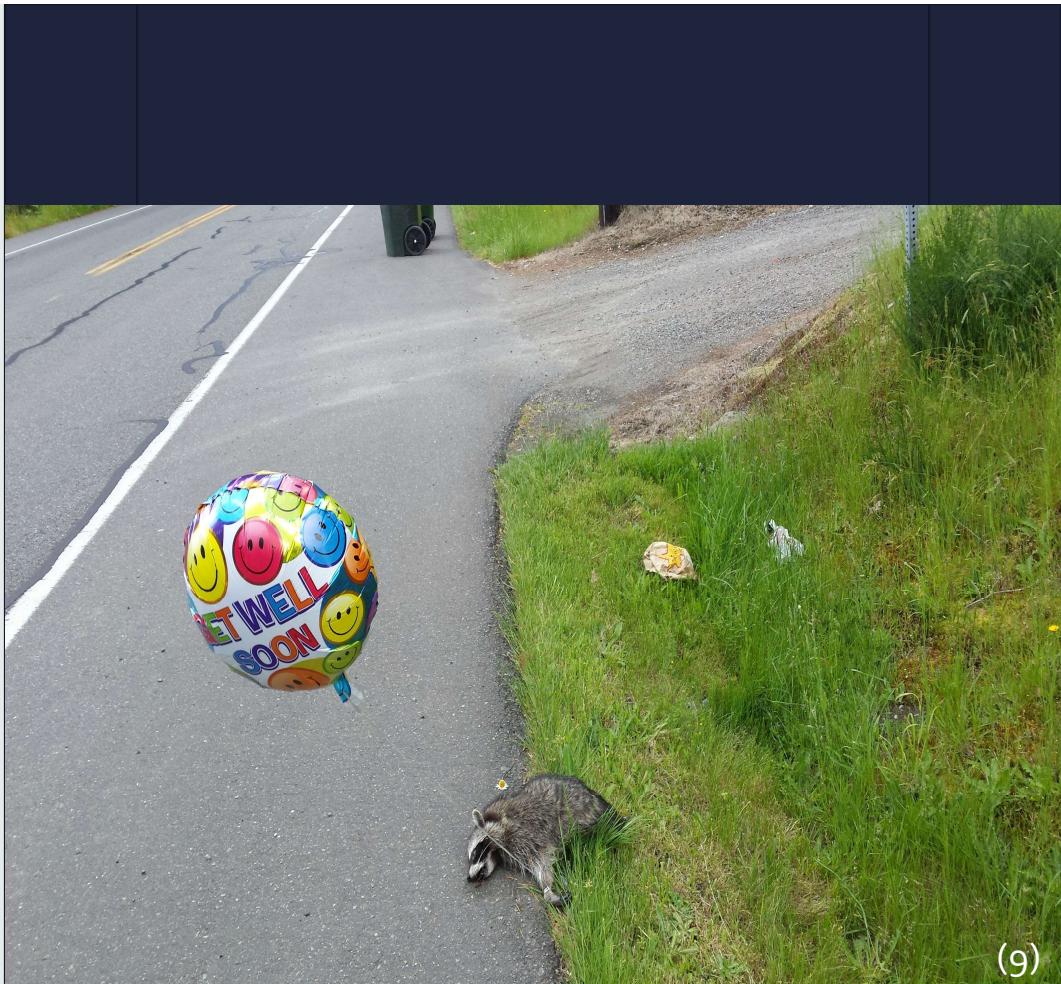


The use of road kill surveys to predict road mortality hotspots in northeastern North Carolina

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Content

- Background Information
- Method of Collection
- Method of Analysis
- Results
- Discussion
- Conclusion



(9)

Why is this important?

- In the United States, roads account for >20% of land use with 6,586,610 kilometers of roads (6).
- Human Injuries
 - Wildlife-vehicle collisions claim hundreds of human lives, tens of thousands of injuries (6).
 - Financial burdens of medical bills and vehicle repairs
- Damage caused
 - Annually approximately 720,000 to 1.5 million deer-vehicle crashes are reported.
 - The ~1.5 million deer-vehicle crashes which leads to ~\$1.1 billion in vehicle damages (7).
- Wildlife road mortalities have surpassed hunting as the leading direct human cause of vertebrate mortality (7).



Photo: CBC

Alligator River National Wildlife Refuge

- 619 km² of wildlife refuge in North Carolina
- Managed by U.S. Fish and Wildlife Services
- Pocosin Habitat
 - Low Shrub, High Shrub, Pond Pine Cane, and Pond Pine Shrub
- Species Present
 - Red Wolf- federally listed endangered.
 - Black bears
 - Yellow Rumped Warbler
 - Southern Toad
 - Eastern Mud Turtle
 - Many other species



© Melissa McGaw



Site Location

- Alligator River National Wildlife Refuge
 - US 64 approximately 19 km (12 mi)
 - Connects Raleigh to the Outer Banks
 - Currently 2-lane 55mph
- US Fish and Wildlife Services
 - North Carolina Department of Transportation was required by law to do an evaluation of the road mortality before expansion
 - Planned widening to 4-lane divided highway 70mph



Methods for Data Collection

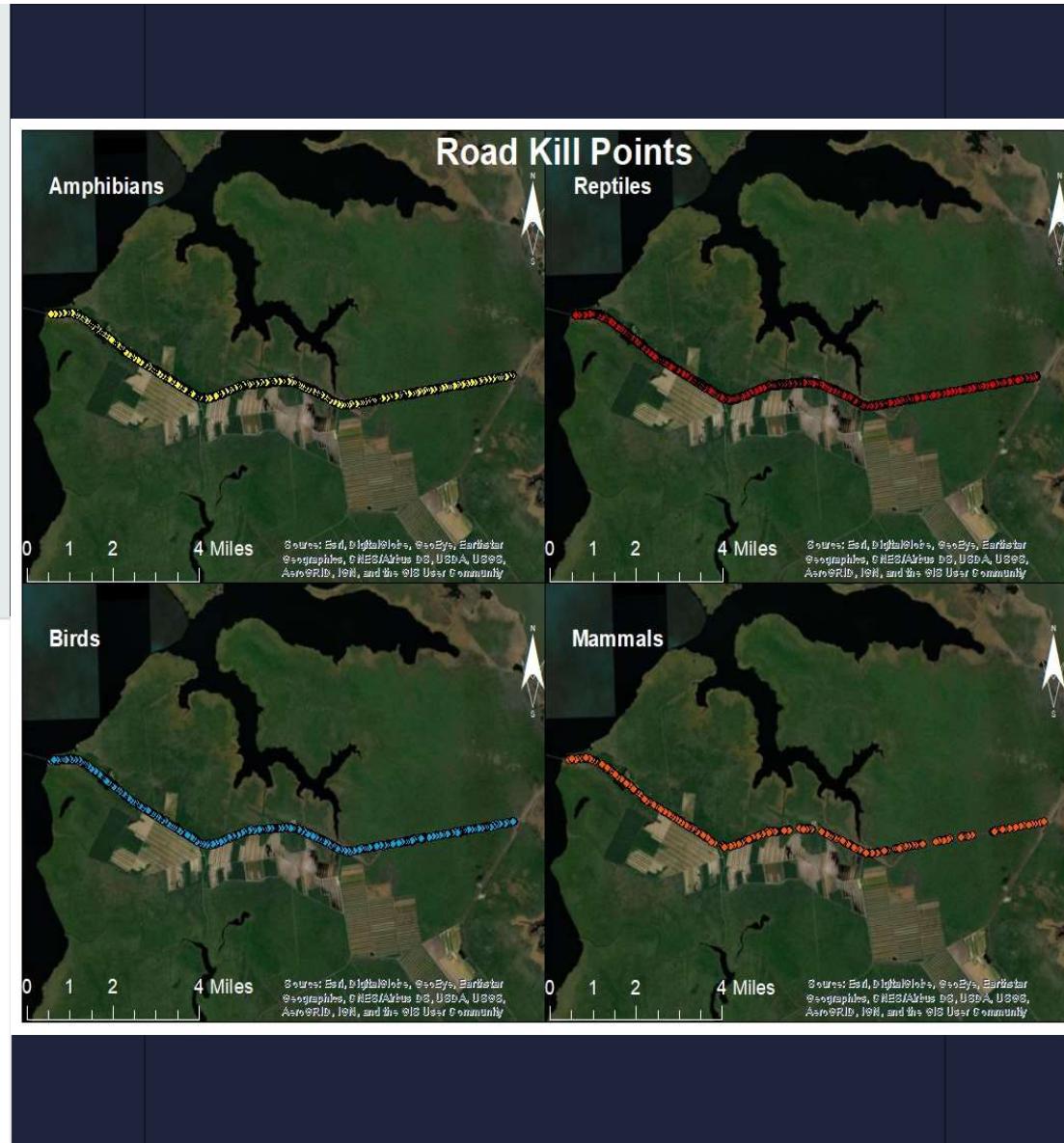
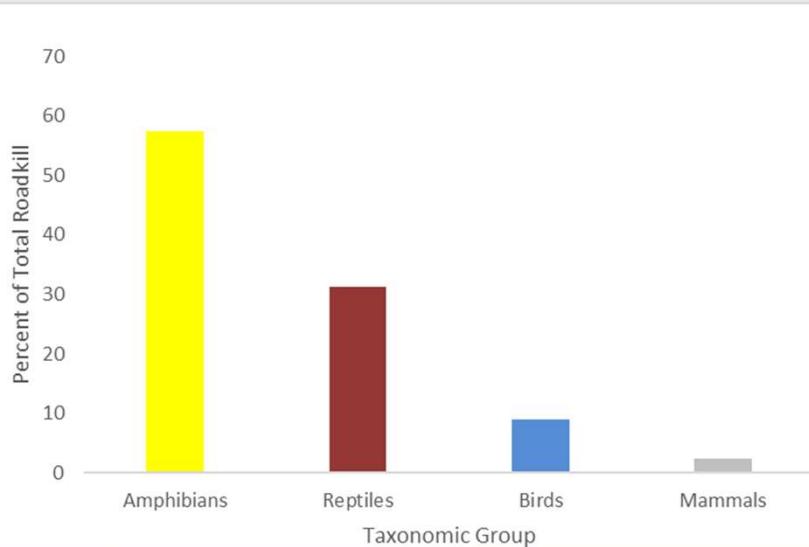
- From 2009-2011
 - April-August collection was every 7 days
 - September-March collection was every 14 days
 - Many species are hibernating so there is less species activity.
- Using UTM coordinates all vertebrate animal mortality were recorded
 - Including taxonomic level, date, sex, age and location on roadway.
 - All road kills were removed or marked with paint to avoid double counts.



Road Kill Points

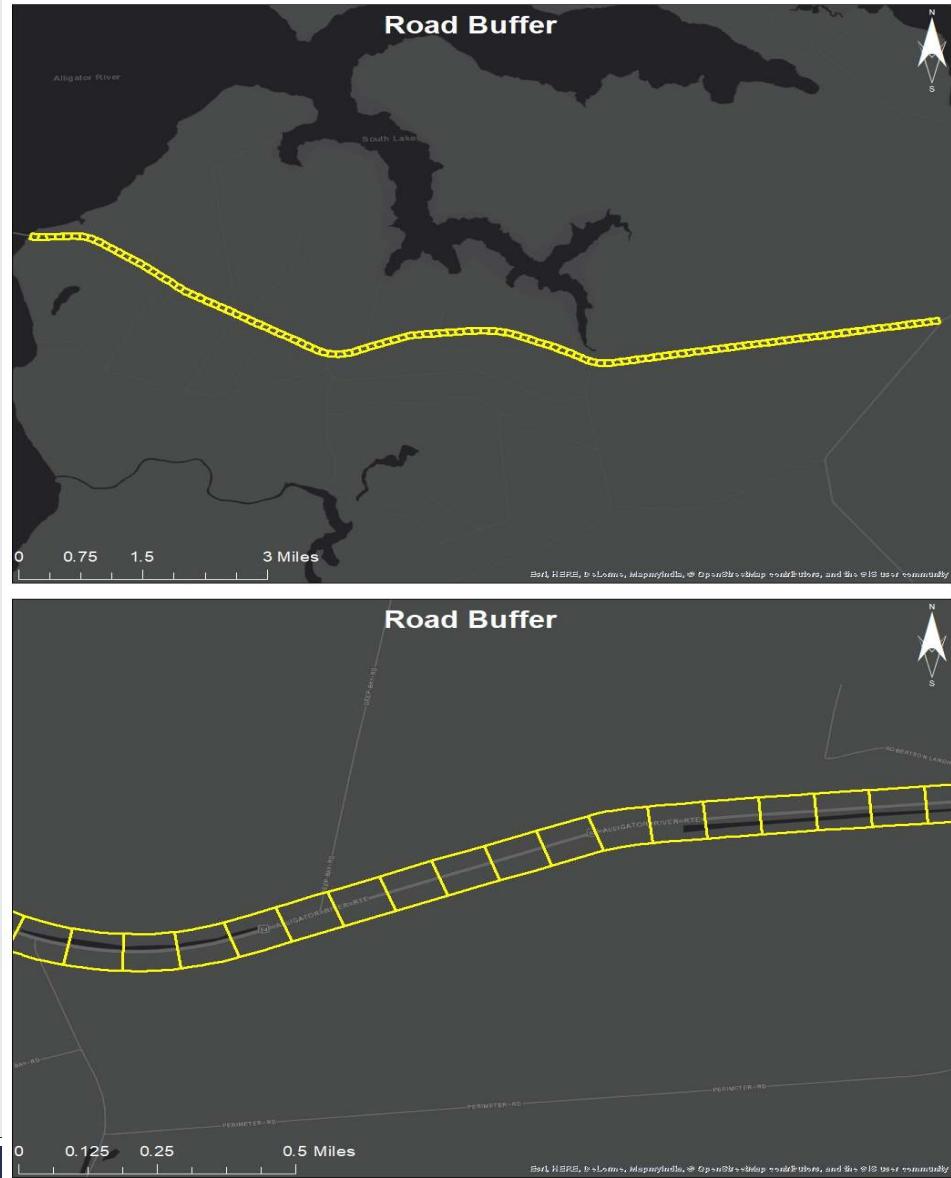
12,443 road kill points

- 3898 Reptile Points
- 297 Mammal Points
- 1103 Bird Points
- 7145 Amphibian Points

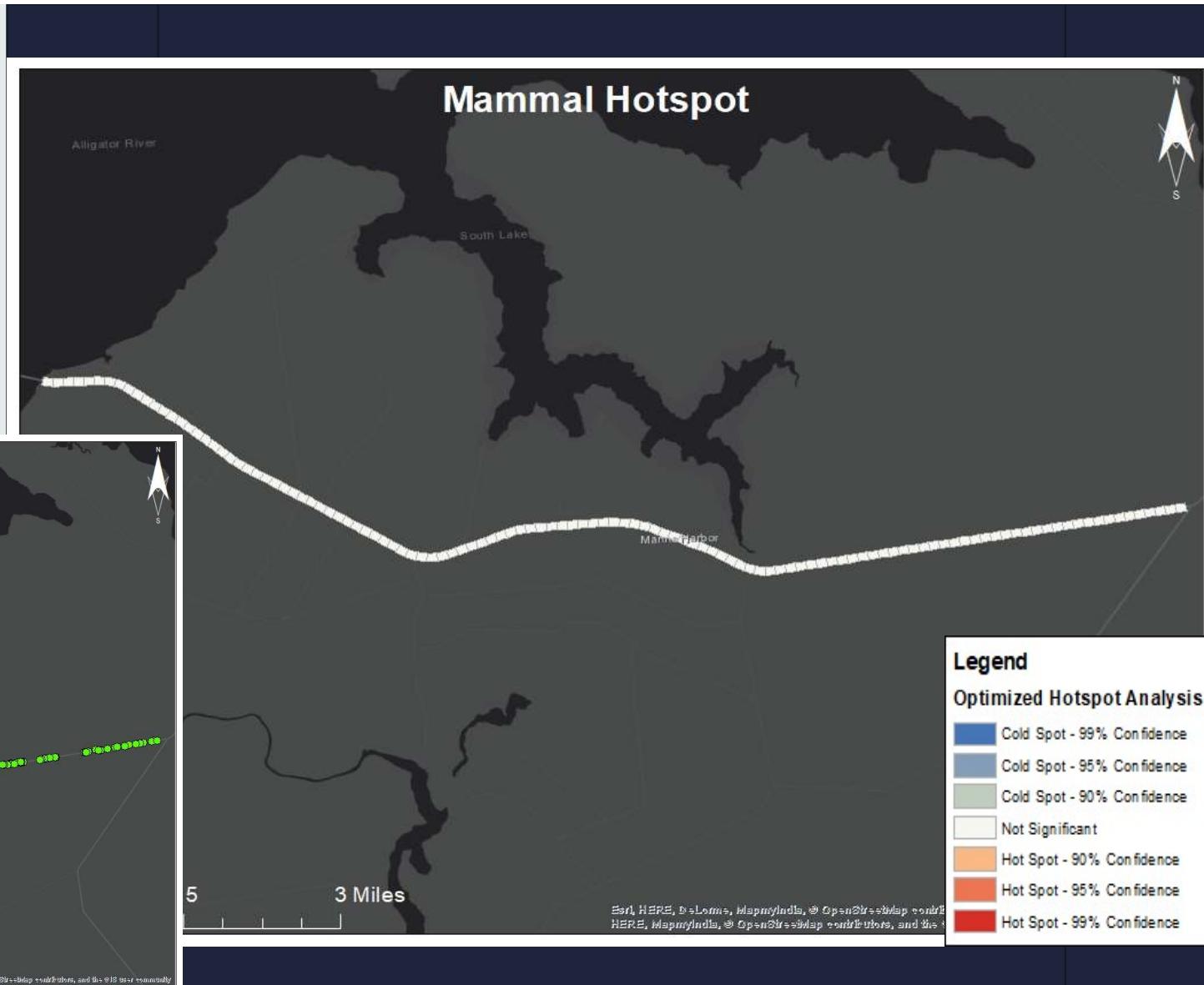


Methods of Analysis

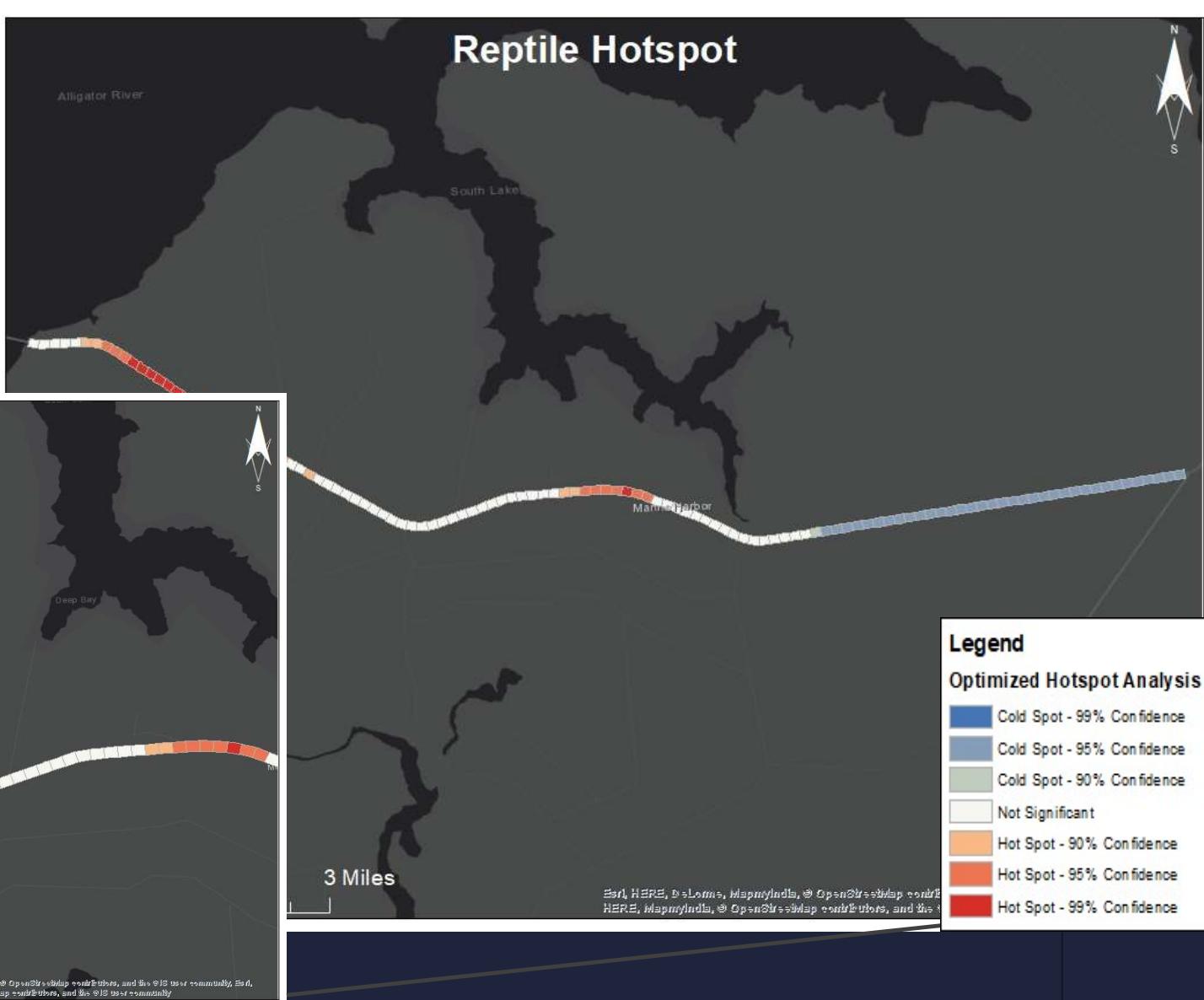
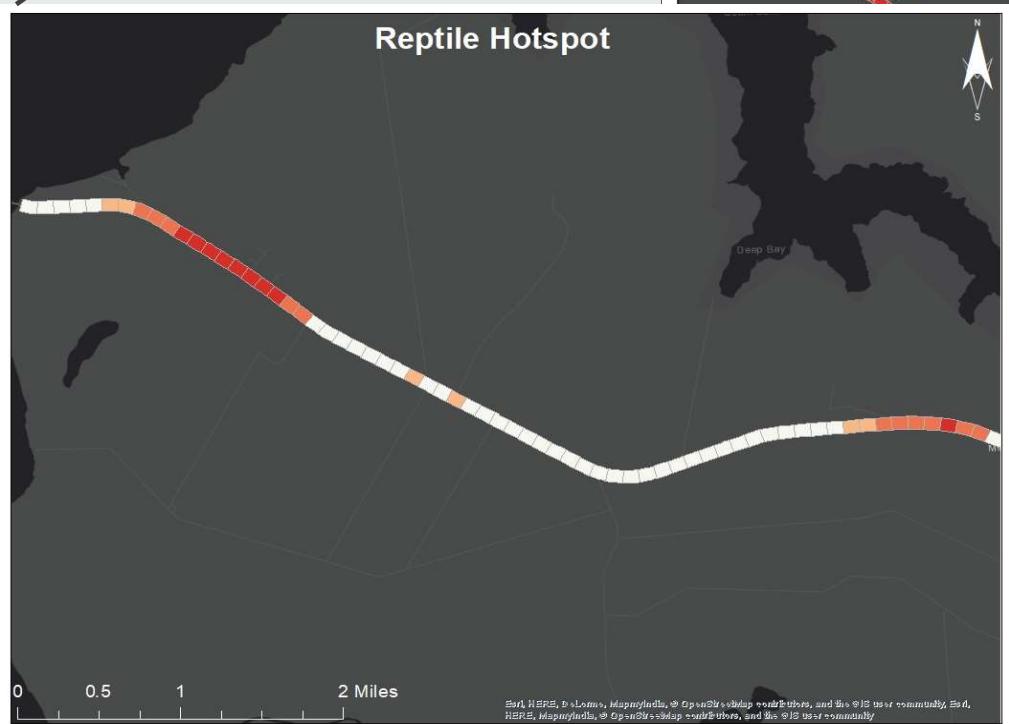
- Tenth of a Mile Buffer
 - 117 segments
- Count buffer
 - HWY 64 Buffer was joined to the road kill points to count how many of each points are in each segments.
- Spatial Weights Matrix
- Optimized Hot Spot Analysis



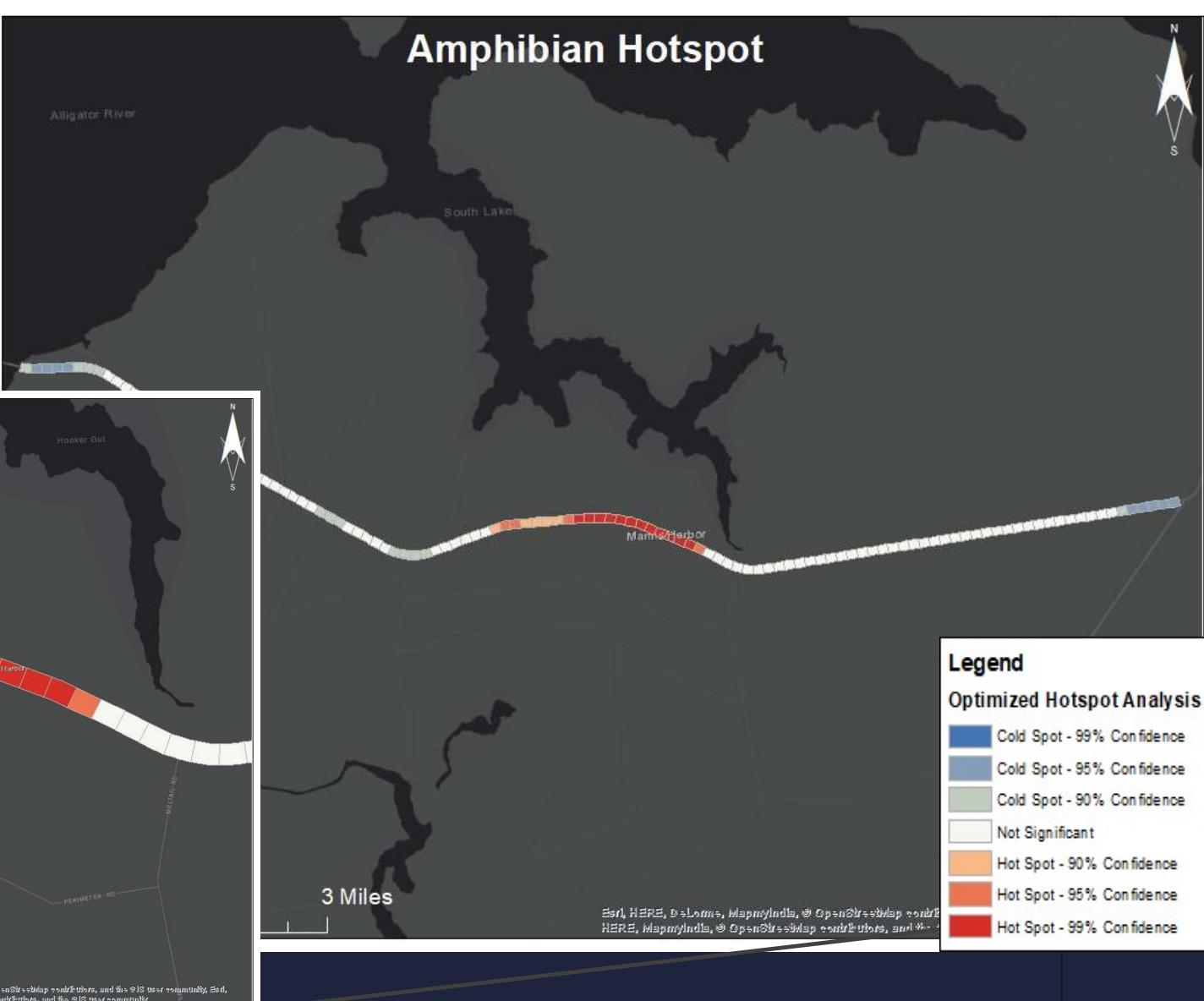
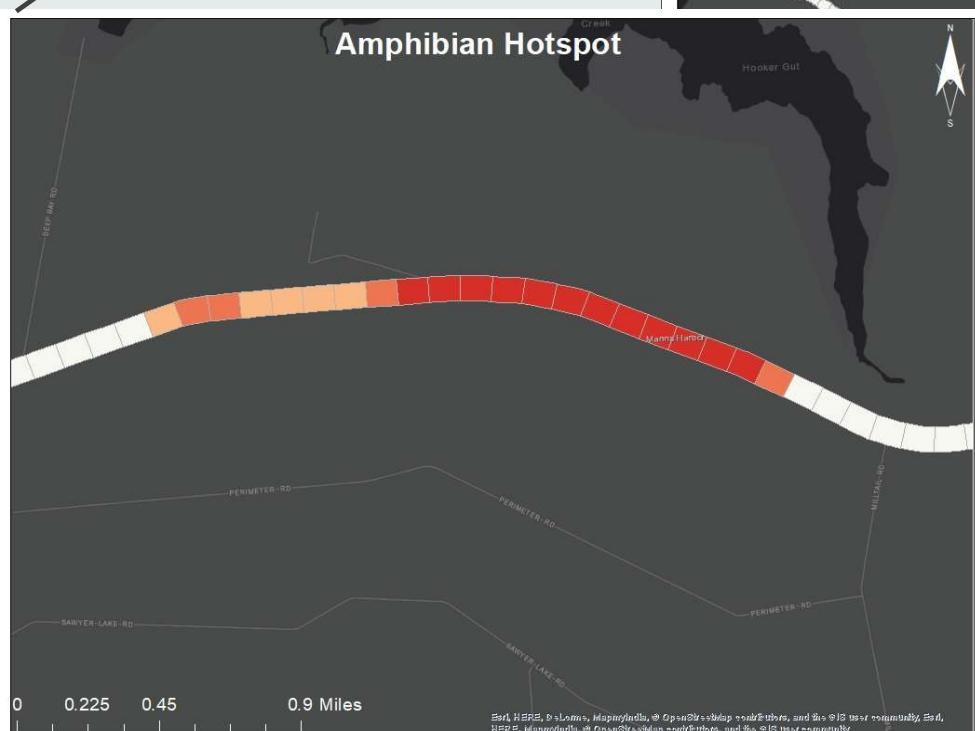
Mammal Results



Reptile Results

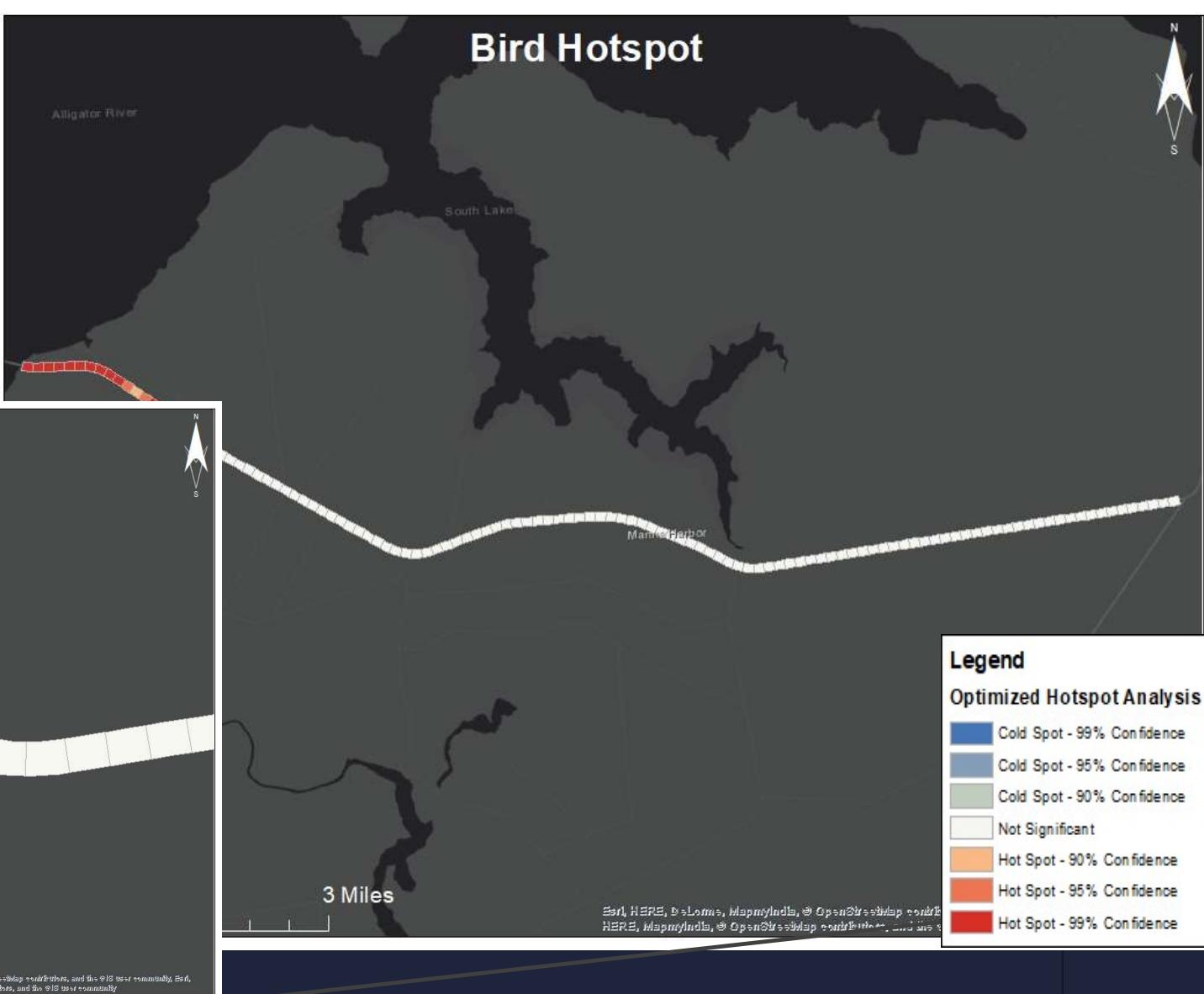
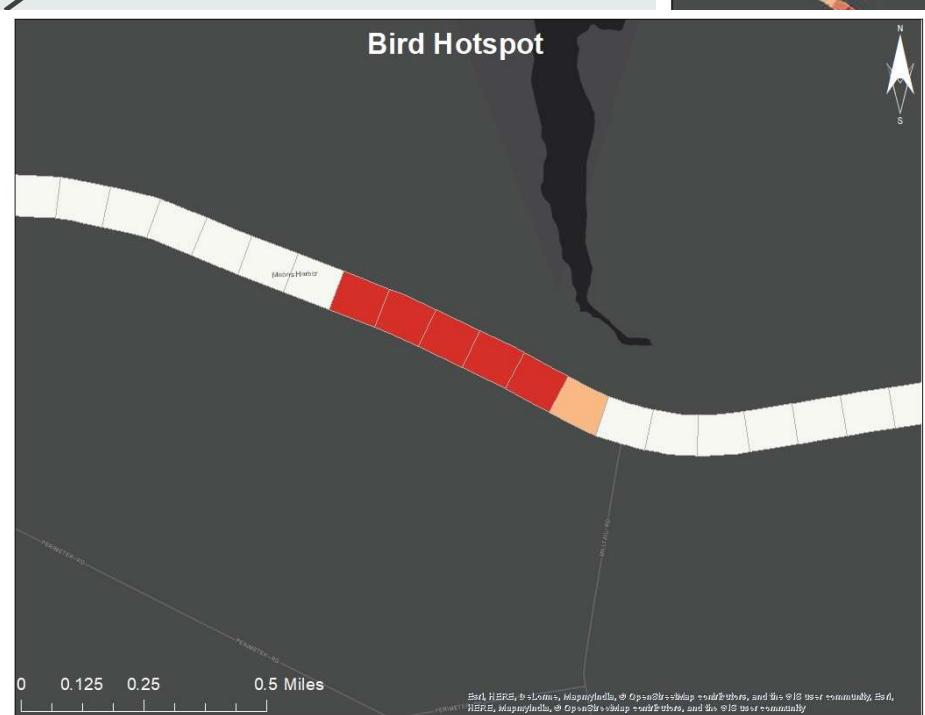


Amphibian Results

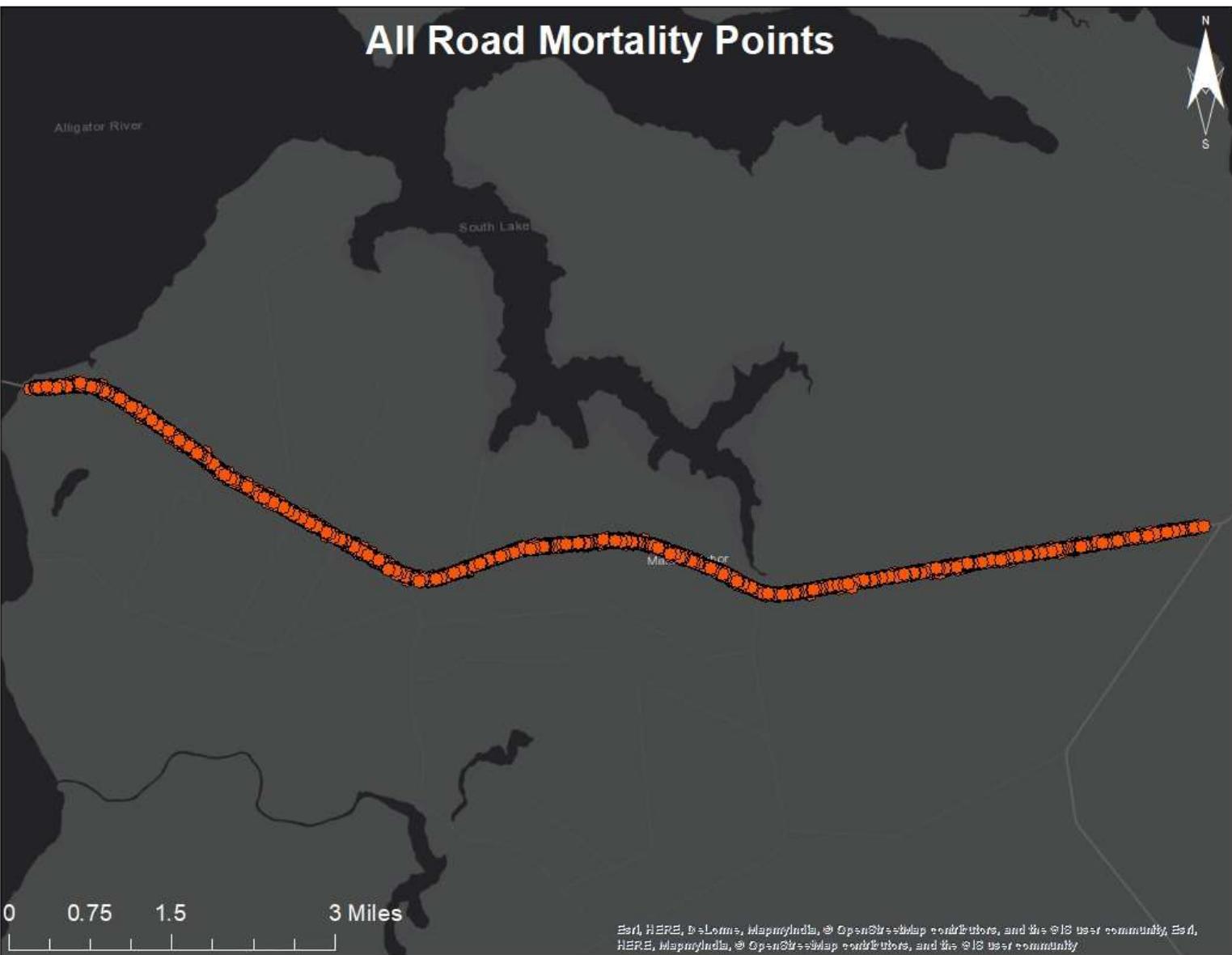


Bird Results

Non-warblers



All Road Mortality Points



Legend

Reptile

- Cold Spot - 99% Confidence
- Cold Spot - 95% Confidence
- Cold Spot - 90% Confidence
- Not Significant
- Hot Spot - 90% Confidence
- Hot Spot - 95% Confidence
- Hot Spot - 99% Confidence

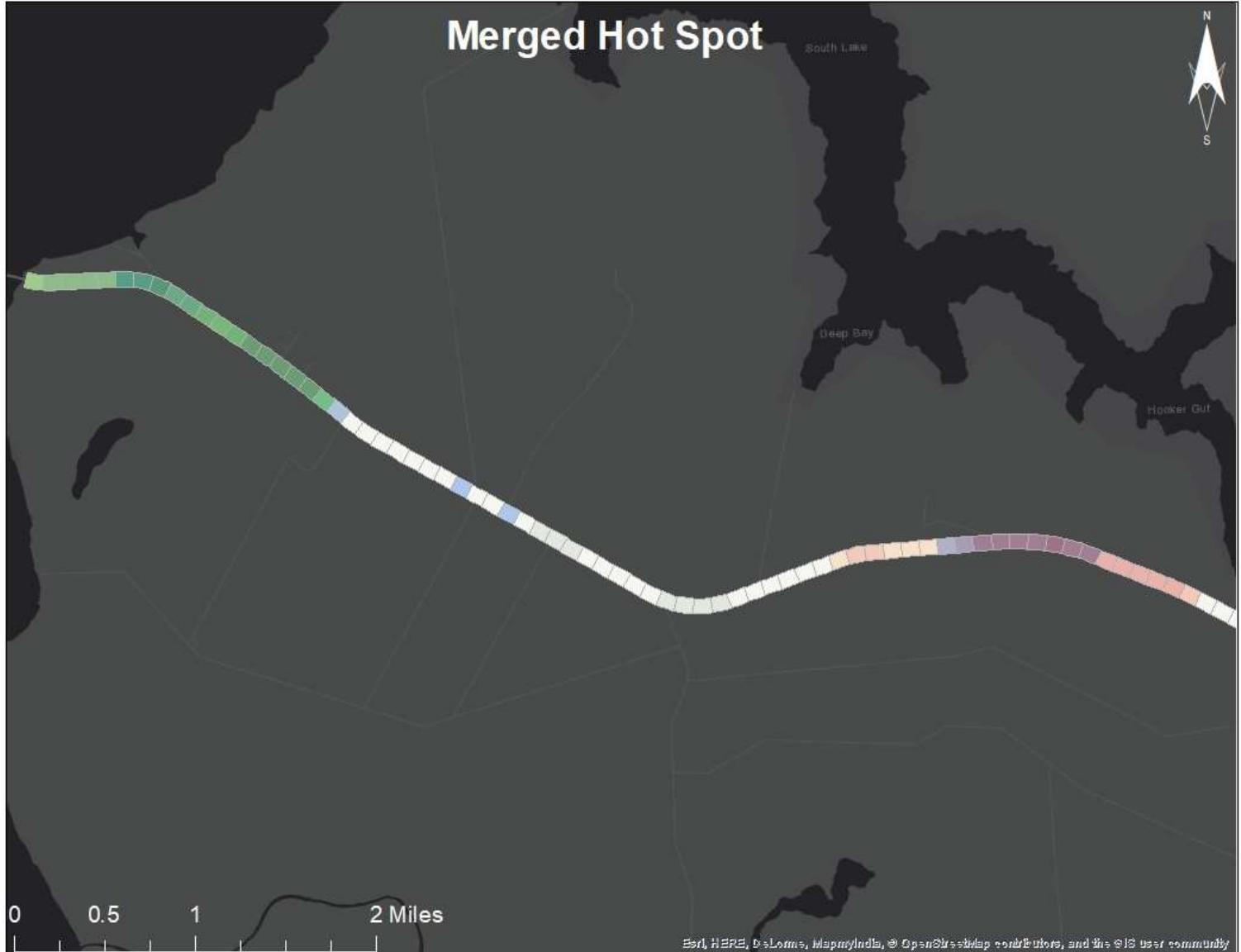
Bird

- Cold Spot - 99% Confidence
- Cold Spot - 95% Confidence
- Cold Spot - 90% Confidence
- Not Significant
- Hot Spot - 90% Confidence
- Hot Spot - 95% Confidence
- Hot Spot - 99% Confidence

Amphibian

- Cold Spot - 99% Confidence
- Cold Spot - 95% Confidence
- Cold Spot - 90% Confidence
- Not Significant
- Hot Spot - 90% Confidence
- Hot Spot - 95% Confidence
- Hot Spot - 99% Confidence

Merged Hot Spot



Base: HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the OSM user community

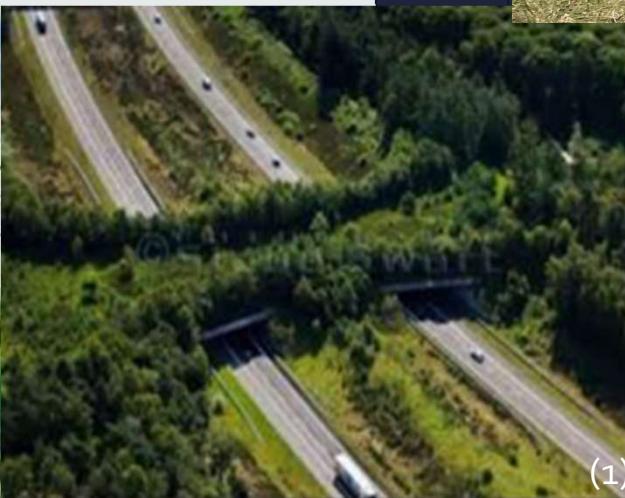


Discussion

- Throughout the entire section of US 64, there are hotspots of different species.
- Due to those results multiple mitigation structures are needed.
- Areas with at least one mitigation method experienced 40% less road kill mortality (1).



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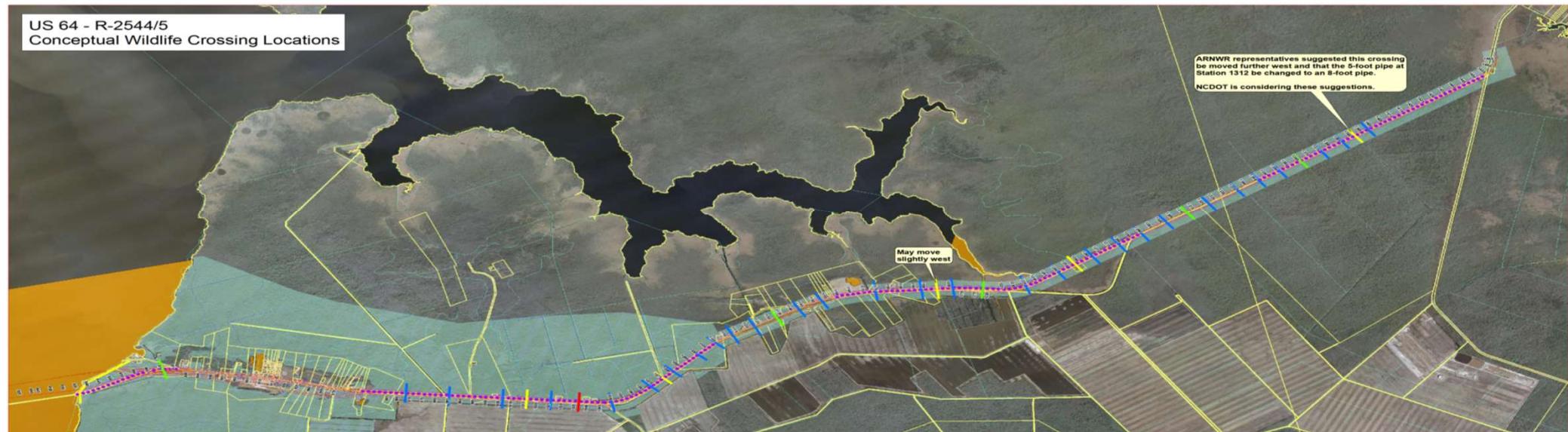
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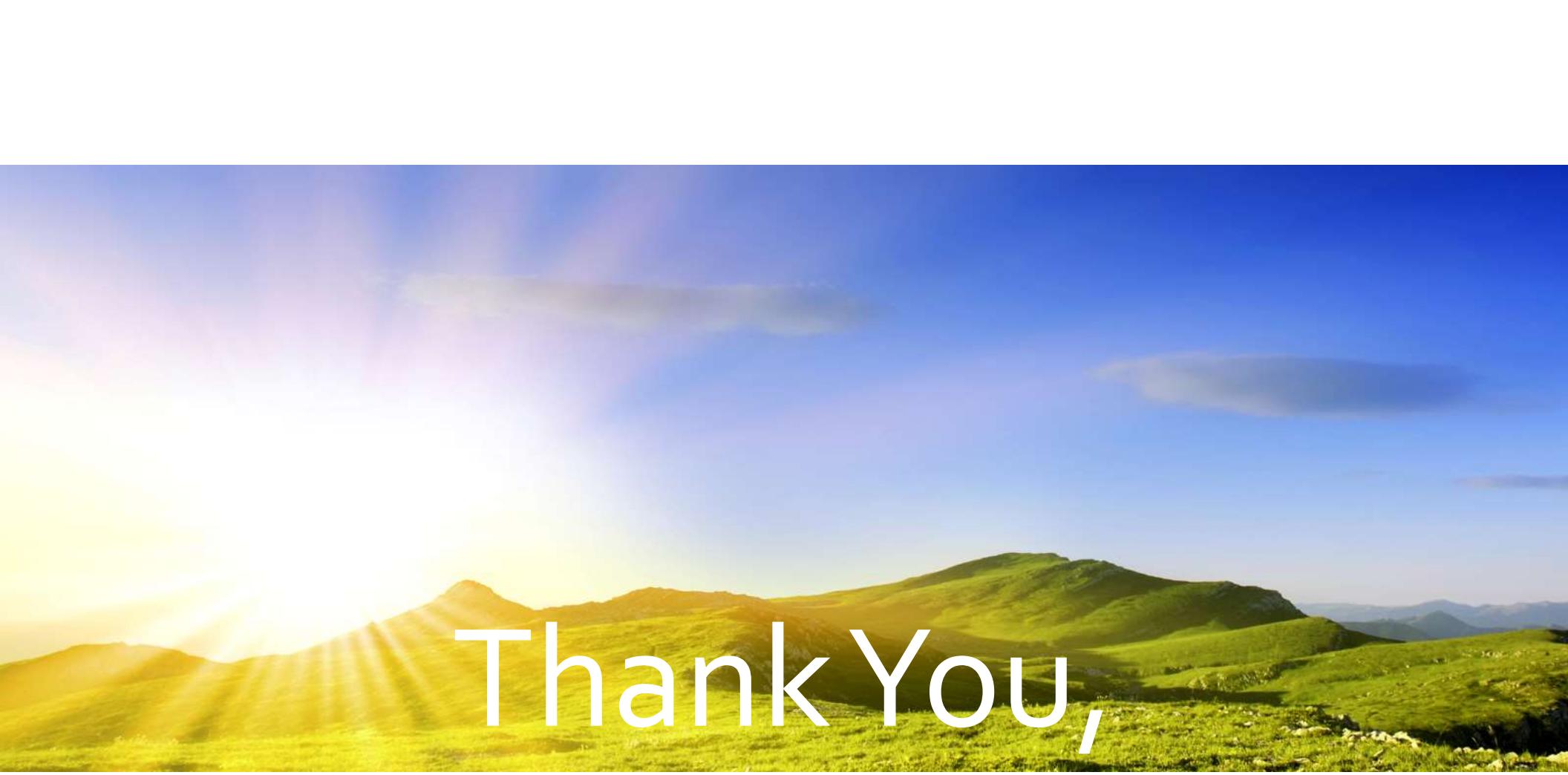
Conclusion

- Analyzing road mortality with optimized hot spot, areas in need of mitigation can be located.
- The preferred mitigation would be to bridge the whole 19km of US 64.
 - Not being considered due to cost.
- 35 small to medium (blue and green) crossing culverts
- 5 large underpasses planned for black bears, red wolves, and white-tailed deer



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Thank You,
Any Questions