NHDOT SPR2 PROGRAM
RESEARCH PROGRESS REPORT

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Project # 42372P		**Report Period** Year *2024* **X** Q1 (Jan-Mar) ☐Q2 (Apr-Jun) ☐Q3 (Jul-Sep) ☐ Q4 (Oct-Dec)
Project Title: Wildlife Vehicle Collisions Data Gathering and Best Management Practices Part 2		
Project Investigator: Remington Moll, University of New Hampshire **Phone:** 603-862-3054 **E-mail:** remington.moll@unh.edu		
Project Start Date: 6/14/2023	**Project End Date:** 6/30/2025	**Project schedule status:** X On schedule ☐ Ahead of schedule ☐ Behind schedule

Brief Project Description:

Wildlife vehicular collisions (WVCs) pose inherent threats to wildlife populations and human safety throughout the State. Roads create barriers that reduce free movements of wildlife species. Plymouth State University Wildlife Vehicle Collisions Data Gathering and Best Management Practices Study (Part 1) has synthesized the available data about WVCs in NH and developed a statistical model to analyze road, temporal, and wildlife specific factors that contribute to areas with more collisions. The study found positive relationships between WVCs and local road density, which corresponds to population centers within the state. However, it also revealed that there is more variability and less predictability in the data than was expected.

This research will refine the model and complete on-the-ground research to identify some hot spots where mitigation should be considered in New Hampshire. The proposed research includes:

- Continuing data analysis from Part 1 of the project,
- Using cameras, wildlife tracking, or roadkill surveys to evaluate the presence of wildlife and analyze the data to identify locations for WVC mitigation projects,
- Investigate the 23 USC 171: Wildlife crossings pilot program and make recommendations to the Technical Advisory Group,
- Develop a guidance document for Wildlife Crossing Best Management Practices (BMPs)
- Facilitate a meeting to include NHDOT personnel from Operations, Project Development and NH F&G to workshop a crossing project proposal.

The project could result in design features to mitigate WVCs in the vicinity of WVC hot spots and future stand-alone projects to reduce WVCs. The BMP manual could lead to reduced WVCs throughout New Hampshire, providing a safer travelling environment for drivers and for wildlife.

Progress this Quarter (include meetings, installations, equipment purchases, significant progress, etc.):

- The UNH graduate student leading field aspects of the project, Clara Dawson, is completing her second semester in the M.S. degree program in Wildlife and Conservation Biology at the University of New Hampshire (UNH) under the supervision of project PI Remington Moll. Clara formed her thesis committee and held her first committee meeting. Committee members are Dr. Amy Villamagna of Plymouth State University and Dr. Fikirte Erda of UNH. Clara's thesis proposal defense will be in early summer 2024.
- Clara Dawson submitted a poster abstract to present at the 2024 Northeastern Transportation and Wildlife Conference to be held in September 2024. This poster presentation will focus on initial results from the camera monitoring of collision hotspots. The presentation details are included in the Appendix.
- Clara Dawson will provide an oral presentation at UNH in the Department of Natural Resources and Environment Seminar Series. The presentation details are included in the Appendix.
- Clara Dawson will provide an oral presentation at UNH in the Graduate Research Conference. The presentation details are included in the Appendix.
- Clara Dawson will provide an oral presentation at UNH for the 3-minute thesis competition. The presentation

details are included in the Appendix.

- We are analyzing image data collected from camera traps at 12 hotspot wildlife-vehicle collision sites identified previously. Each hotspot received 5-12 cameras, with an experimental design consistent with project goals to quantify wildlife use of roads and culverts/crossings. 74 total cameras were deployed. We have processed images from 9 of the 12 sites. A summary of initial wildlife detections during fall 2023 for each hotspot is provided in the Appendix.
- We began analyzing ancillary data (wildlife habitat maps) to inform mitigation planning. Clara and Rem performed an initial analysis of the relationship between wildlife connectivity maps produced by the New Hampshire Fish and Game Department with wildlife-vehicle collision hotspots. We created paired collision hotspot roads with adjacent roads of a similar type. We then extracted connectivity values in spatial buffers of 150 m around these pairs. We will use these data in a regression-type analysis to determine the degree to which habitat connectivity predicts collisions.
- Remington Moll and Clara Dawson, along with other UNH graduate students and collaborators at the University of British Columbia, completed an invited chapter in an upcoming book on large carnivores to be published by Oxford University Press. The book chapter is a global review of road effects on large carnivores, and the results of this literature review will help inform the Best Practices document and related products from this project. The citation is included in the Appendix.

Items needed from NHDOT (i.e., Concurrence, Sub-contract, Assignments, Samples, Testing, etc…):

None at this time.

Anticipated research next three (3) months:

- Complete camera trap image analysis (3 of 12 sites remaining) to identify all wildlife species at each camera location.
- Continue analysis of land connectivity maps to evaluate their relevancy for predicting wildlife-vehicle collisions or wildlife distributions. These efforts will inform the Best Practices document as well as help guide applications to the Wildlife Pilot Program.
- Evaluate plans to use the Survey123 application ROaDS Roadkill Survey to collect data on statewide road wildlife mortalities.
- Plan for future NHDOT and NHFG meetings with project liaison Rebecca Martin.
- Continue literature review for Best Management Practices document.

Circumstances affecting project:

No challenges encountered since project start are expected to substantially affect project completion timelines.

Tasks (from Work Plan)	Planned % Complete	Actual % Complete
Continue data analysis from Part 1 of the project (hotspot mapping) (2023 Q3)	*100*	*100*
Field monitoring of hotspot locations (2023 Q3 - 2025 Q1)	*100*	*100*
Investigate the 23 USC 171: Wildlife crossings pilot program and make recommendations (2024 Q1 – 2024 Q4)	*10*	*10*
Analyze ancillary data (wildlife habitat maps) to inform mitigation analysis (2023 Q4 – 2025 Q1)	*40*	*50*
Analyze field data to inform mitigation analysis (2023 Q2 – 2025 Q1)	*15*	*20*
Develop Best Management Practices document (2024 Q1 – 2024 Q3)	*0*	*0*
Facilitate a meeting to include NHDOT personnel from Operations, Project Development and NH F&G to inform crossing project proposal (2023 Q4, 2024 Q4)	*35*	*0*

Update StoryMap from Phase 1 (2023 Q4 – 2025 Q2)	*0*	*0*
Write technical report (2025 Q2)	*0*	*0*
Present results and prepare manuscript for publication (2024 Q3 – 2025 Q2)	*0*	*0*

Barriers or constraints to implementing research results

A meeting between the TAG and UNH team did not occur in the previous quarter due to scheduling difficulties. Because of this, we record here in the same fashion as the last update that we are slightly behind schedule with respect to facilitating meetings between NHDOT and NHFG. A meeting between the TAG and UNH is a first step to clarify the objectives and timeline for that meeting. We anticipate meeting in the next quarter.

Appendix: Tables and Product Lists.

Site	Bob	Bear	Beav	Coy	Deer	Fishe	Gyfx	Moos	Opp	Porc	Rac	Rdfx
12924	0	0	0	26	9	0	0	0	11	0	96	0
226	26	5	0	0	0	0	11	0	0	0	1804	17
624	33	3	108	21	90	0	0	0	52	0	369	15
93607	0	0	0	0	27	0	0	3	0	3	12	0
515	0	0	9	12	136	6	9	0	32	0	66	9
98140	0	0	6	15	87	3	0	0	6	0	198	6
93749	3	7	0	0	3	0	0	7	0	0	0	0
4180	24	0	9	0	18	0	0	0	0	0	39	34
3689	0	0	0	0	16	0	0	0	0	0	0	3
Total	**86**	**15**	**132**	**74**	**386**	**9**	**20**	**10**	**101**	**3**	**2584**	**84**

Table 1. Number of camera trap detections of target species at 9 out of 12 hotspot sites during fall 2023. Data from remaining 3 sites will be processed next quarter. Abbreviations**:** Bob = bobcat (*Lynx rufus*); Bear = black bear (*Ursus americanus*); Beav = beaver (*Castor canadensis*); Coy = coyote (*Canis latrans*); Deer = white-tailed deer (*Odocoileus virginianus*); Fishe = fisher (*Pekania pennanti*); Gyfx = gray fox (*Urocyon cinereoargenteus*); Moos = moose (*Alces alces*); Opp = Virginia opposum (*Didelphus virginiana*); Porc = porcupine (*Erethizon dorsatum*); Rac = raccoon (*Procyon lotor*); Rdfx = red fox (*Vulpes vulpes*)

Related Scheduled Presentations

C.R. Dawson, A.M. Villamagna, R.A. Martin, R.J. Moll. 2024. Did the mammal cross the road? Identifying and monitoring of collision hotspots across New Hampshire. Northeastern Transportation and Wildlife Conference, Mystic, CT, USA. Poster.

C.R. Dawson and R.J. Moll. 2024. Can the mammal cross the road? Three-Minute Thesis Competition, Durham, NH, USA. Oral.

C.R. Dawson and R.J. Moll. 2024. Can the mammal cross the road? An assessment of wildlife connectivity and vehicle collisions across New Hampshire. Natural Resources and the Environment Spring Seminar Series, Durham, NH, USA. Oral.

C.R. Dawson and R.J. Moll. 2024. Can the mammal cross the road? An assessment of wildlife connectivity and vehicle collisions across New Hampshire. University of New Hampshire Graduate Research Conference, Durham, NH, USA. Oral.

Related Publications

M. K. P. Poisson, A. R. Butler, C. R. Dawson, A. T. Ford, T. S. Readyhough, J. K. Scherger, and R. J. Moll. In press. Lethal effects of roads on large carnivores. In: Apex predators in the Anthropocene: How humans shape large carnivore populations, R. A. Montgomery and R. J. Moll, editors. Oxford University Pres