

## Global Perspectives Trip Report

### **Trip dates:**

19-24 September 2023, Yoho National Park (British Columbia, Canada)

12-16 December 2023, Banff and Yoho National Park (Alberta and British Columbia, Canada)

### **Principle Investigator:**

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### **Project title:**

Mitigating the effects of roads on wildlife through collaborations with Parks Canada

### **Non-technical summary:**

Wildlife-vehicle collisions kill millions of animals and cost society billions of dollars per year, while posing serious threats to human safety. Both Parks Canada and the state of Wyoming have been leaders in adding over- and underpasses to their highways to facilitate safe movement of wildlife. While we know these crossing structure approaches work, two questions remain: Where to construct them, and 2) How to best utilize the landscape (i.e., ridges, waterways, etc.) to facilitate their construction. I have been working on research related to these questions in Canada and Wyoming for a few years now. I traveled to Canada to continue developing relationships and identify new research priorities. I met with and spent time in the field with the lead biologist and the lead Environmental Assessment Scientist within the Highway Engineering Services Department of Parks Canada. We discussed future plans for highway expansion in the national park, locations of over and underpasses, habitat needs of wildlife, and research priorities. My time there was valuable in co-developing upcoming research projects while developing rapport and strong relationships with park personnel. For instance, we developed the plans for a 'what-if' study to see how different road/fence scenarios in the study area would affect wildlife movement – ultimately providing predictions of where wildlife will spend time near the road, and where they will indeed cross the road. My work is helping the College of Agriculture, Life Sciences, and Natural Resources build an international reputation as a leader in science-based wildlife conservation. My collaboration with Parks Canada is helping to solidify the College and UW as a top collaborator with the government of Canada. These contributions directly support UW's goals of more interdisciplinary work that has direct bearing on economic diversification and sustainability in and beyond Wyoming.

## **A brief intro**

In general, part of my research program is studying safe road crossing by wildlife both here in Wyoming and in Canada. In collaboration with Parks Canada, I initiated a project studying how elk cross a major highway in Yoho National Park about 4 years ago. Using GPS collar data on elk and movement ecology methods, my recently finished master's student created research products that provide information on where and when wildlife cross this section of highway as well as the landscape features that facilitate crossing, which was recently published in the *Journal of Animal Ecology* ([Poulin et al. 2023](#)). Our past and current work essentially acts as 'before' data, which is actively being used to inform Parks Canada's management plan to construct new over- and under-passes in a section of highway to be upgraded in Yoho National Park. The second phase of this project is to study wildlife during and after road construction, with the objective of quantifying the effectiveness of the location and type of mitigation activities implemented.

## **Activities during the trip**

My trip was successful. I visited with Seth Cherry who is the head biologist for Yoho National Park, as well as Trevor Kinley who is the Environmental Assessment Scientist within the Highway Engineering Services Department of Parks Canada. We discussed a number of items. First, the road project through the west side of Yoho National Park has been delayed a couple of years due to some changes in politics. So, we are still in the planning stage, which is neat because we still have time to think through all the options for how to widen the road while still allowing safe passage of wildlife. Second, we discussed how our previous work could be used in a type of scenario analysis to help choose among different wildlife crossing options, both type of crossing structure and location. Third, we spent time looking at different locations for crossing structures or options for improving habitat away from the road. We also learned about how crossing structures can alter hydrology dynamics quite a bit. For instance, to keep an underpass dry when located in a wetter area, the water table must be lowered, which can affect wetlands and thus wildlife habitat in nearby areas. Finally, we discussed a number of different possible research projects that would help in making decisions about the road upgrade. Note that my former MS student and I also spent a couple of days in the field with Seth Cherry looking at wildlife habitat that is not influenced by the road. This time was essential to see the 'natural' habitat while also developing rapport with Parks Canada personnel.

## **Future plans**

We have a number of research projects on the table. We are waiting to hear about the next round of road funding for Parks Canada, and I am thinking about how to attract local funding that bridges questions about roads in Wyoming to what is useful in Canada. Those research projects are the following:

- Simulation study to see how different road/fence scenarios in the study area would affect elk space use. The idea is to build some movement models (with response to fence and road in them) and then simulate them out on the landscape across different road/fence scenarios. This work can provide predictions of where elk will spend time near the road, and where elk will indeed cross the road and when.

- Elk augmentation and learning study. The idea here is to bring in a small amount of elk from somewhere else before the current elk herd potentially winks out due to the road expansion. The plan is to translocate young animals that are impressionable and the current herd that is very savvy with the road can potentially teach those young animals how to navigate the road. This study could provide a number of insights into how animals learn to deal with roads.
- Finally, we discussed the possibility of studying how mountain goats use the road too, as the widening of the road will remove a natural mineral lick that they frequent. This project would assess if there are alternative mineral licks the goats could use, would they try to cross the road more, and could they learn to avoid the mineral lick after the road expansion.

### **Potential impacts**

My work with parks Canada could have a number of impacts. First and foremost, this work might bring in external funding to the College and UW. Second, my work can help develop international relationships relative to such an important topic as vehicle wildlife collisions, which costs American's billions of dollars (and injury and life) each year. Third, we have a lot to learn from Parks Canada and they have a lot to learn from us. To explain, in North America, Parks Canada has led the way in implementing a massive over and underpass management strategy. Parks Canada policy mandates crossing structures at least every 14km on major highways going through Banff, Yoho, and Jasper National Parks. Today, there are 44 crossing structures in these parks, representing hundreds of km of major highways. Wyoming is also a leading state in the USA for proactive mitigation, as it has implemented over and underpasses on a handful of sections of its highways. For example, the famed Trappers Point overpass west of Pinedale now allows thousands of mule deer and pronghorn to cross highway 191 without having to step on pavement. This overpass has saved the lives of thousands of individual big game animals, vastly reduced damage to vehicles, and increased human safety on the highway. Despite Wyoming's proactive work, 6,000 big game animals still lose their lives every year while crossing highways in Wyoming. That said, due to many of the research and conservation efforts here in Wyoming and beyond, Wyoming was very recently awarded \$24.4 million from the federal infrastructure bill. Read about it here: <https://highways.dot.gov/newsroom/biden-harris-administration-awards-110-million-grants-improve-safety-americas-roadways>.





Photo 1: From Left to right Jerod Merkle (Assistant Professor, University of Wyoming), Seth Cherry (Biologist, Parks Canada), and Marie-Pier Poulin (Research Scientist, University of Wyoming). Photo taken in front of Takakkaw Falls in Yoho National Park, British Columbia (Canada). Photo credit: Jerod Merkle



Photo 2. Elk near the Trans-Canada Highway in Yoho National Park, British Columbia (Canada). Photo Credit: Marie-Pier Poulin