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Safe Passages for Wildlife in the Southern Canadian Rockies

2021-22 Final Report

Prepared for: Fish & Wildlife Compensation Program

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Executive Summary

Highway 3 has been identified as a barrier for wildlife connectivity, and a source of direct mortality, with ongoing research for over a decade. For many of the area's large mammals, this highway is a fracture zone that is critical at local (Elk Valley) and continental scales (Canada/USA). This highway contributes to many conservation issues including disconnecting important habitats, fragmenting populations, and direct mortality from collisions. Many of the species that are impacted by the highway are species of local conservation concern and hold high cultural values, such as grizzly bear, wolverine, bighorn sheep, American badger, elk and mule deer. There has been over a decade of research contributing to knowledge and proposing solutions to mitigate impacts of Highway 3 to animals and human safety. This project aligns with the Fish and Wildlife Compensation Program's Upland and Dryland Action Plan, focusing on habitat-based actions with the priority action of improvement of connectivity habitats as the work we are doing directly increases safe connectivity across a major highway and reduces mortality caused by vehicle collisions.

For the first two years of this project, we focused on four sites in the Alexander Michel Linkage, a 6 km stretch of Highway 3 near the Alberta border. In year one of this project, we retrofitted two existing bridges (Carbon and Loop) to create suitable wildlife underpasses and in year two (2021-22), a substantial amount of work was completed on Alexander bridge, fence design was completed contract went out for bid. The effectiveness monitoring program has had continued success with a total of 45 cameras deployed, and nearly half a million photos classified. With the support of FWCP, three more grizzly bears were collared in the project area to support wider use and monitoring of these sites. Engagement has been successful this year as well, with the project highlighted in a cover page article in Canadian Geographic magazine which was released in the Fall of 2021, meeting with BC ministers, Indigenous Governments, and collaborating and learning from researchers and agencies across borders.

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Introduction

Highway 3 has been identified as a barrier for wildlife connectivity, and a source of direct mortality, with ongoing research for over a decade. Since research on this issue began, little has been acted upon while traffic numbers and wildlife deaths have mounted. For many of the area's large mammals, this highway is a fracture zone that is critical at local (Elk Valley) and continental scales (Canada/USA). This highway contributes to many conservation issues including disconnecting important habitats, fragmenting populations, and direct mortality from collisions. Many of the species that are impacted by the highway are species of local conservation concern and hold high cultural values, such as grizzly bear, wolverine, bighorn sheep, American badger, elk and mule deer.

The current rate of wildlife-vehicle collisions has raised concerns among local agencies, with approximately 1,200 to 1,600 road killed animals being collected per year by highways contractors in the East Kootenay service area (Mainroads Group, 2019). Along Highway 3 from the border to Jaffray area, the Wildlife Accident Reporting System reported 1443 animal carcasses from 2012-2017, the majority being deer (~175/year) and elk (~55/year). However, the true number of animals killed is likely much greater. For example, none of the 3 collared grizzly bears that were killed by collisions on Highway 3 were reported in any government databases because the animals died off the highway edge.

There has been over a decade of research contributing to knowledge and proposing solutions to mitigate impacts of Highway 3 to animals and human safety. In 2009, local and regional experts, stakeholders and the public convened on this issue focusing on Highway 3 (Ament et al. 2008). Subsequently, a report was released in 2010 which summarized existing knowledge about landscape suitability and species' vulnerability to Highway 3, and evaluated key linkage corridors and conflict zones (Clevenger et al. 2010). As part of the 2010 report, 22 sites along Highway 3 were identified as mitigation emphasis sites (MES) based on a number of criteria, such as local conservation significance, mitigation options, and land use security. In 2019, these sites were re-evaluated and 4 additional sites were identified. Based on site visits, local landscape attributes, and target species, mitigation strategies to best facilitate movement of large carnivores and ungulates and reduce wildlife-vehicle collisions were identified at key mitigation sites.

This project is exceptional as there is currently no law or policy that requires the Ministry of Transportation and Infrastructure (MOTI) to undertake projects specifically for wildlife, nor does the mandate of the Ministry of Forests, Lands and Natural Resource Operations and Rural Development (FLNRORD) include road mitigation. An innovative partnership has formed to help resolve this issue: two government ministries (FLNRORD, MOTI), two non-government organizations (Wildsight, Y2Y), consultants (Miistakis Institute), subject matter experts (Anthony Clevenger, Clayton Lamb), industry (Teck), elected officials, the highway contractor, and broad community support (including a transportation solutions working group formed in response to the Roadwatch project). These strong partnerships are already in place and are expanding as the project moves forward. The goal of this project is to implement the highway mitigation actions that have been supported by decades of research. Further, we intend to use a rigorous before-after-control-impact design to assess the efficacy of the highway mitigation. Generating evidence on the project efficacy will provide critical information for future mitigation investments in other parts of British Columbia and the development of policy to support such actions.

Study Area

There are four mitigation sites prioritized in the Alexander Michel Linkage (Loop, Carbon, Alexander, and Alexander-Michel), and three others in the surrounding area (Figure 1). This is a critical corridor for ensuring regional and continental scale connectivity for wide-ranging fragmentation-sensitive species, such as grizzly bears, wolverines, lynx, and wolves and local movement of ungulates such as deer and elk. More information is available for each of the sites identified in Lee et al. (2019).

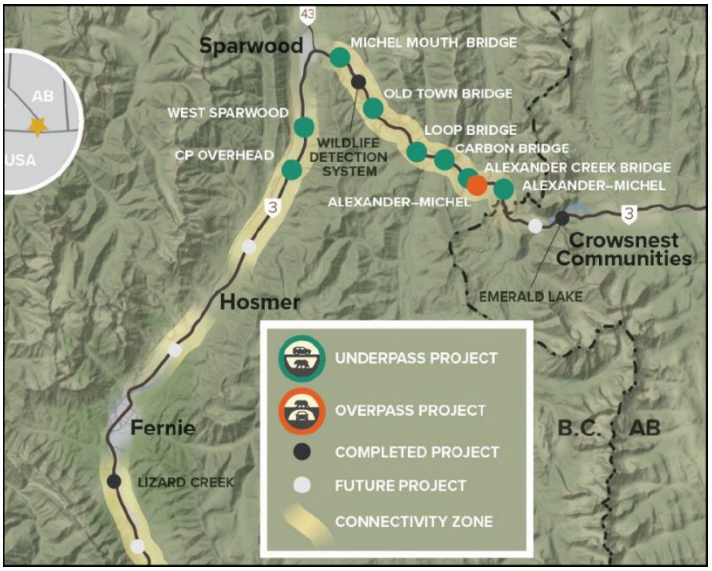

Figure 1. Mitigation emphasis sites from the Alberta border to Hosmer (image from one-pager complete in 2020, Fuse Consulting). The priority area for 2021-22 is between Sparwood and Crowsnest Communities.

Methods – Year 2

Bridge Works and Fencing

In year one, we targeted two sites for mitigation, Loop Bridge and Carbon Creek Bridge. These sites were selected in Year 1 as they offered an opportunity to greatly improve wildlife movement at minimal cost and have completed geotechnical surveys. In year two, we targeted the structure east of Loop and Carbon, Alexander Creek Bridge, for wildlife trail creation. Trails will be manually created under these structures to facilitate movement underneath, therefore acting as an underpass to safely cross the highway. We also aimed to fence between Loop and Carbon Bridges in 2021-22 to connect the two structures that we completed last year. Working on Alexander this year prepares for the next phase of fencing between Carbon and Alexander – which will connect three complete structures.

These actions directly support the Fish and Wildlife Compensation Program's Upland and Dryland Action Plan, primarily supporting the priority action: improvement of connectivity habitats as we are directly creating safer passage across highways in important movement corridors.

Monitoring

Monitoring will be completed using remote cameras and MOTI's wildlife collision reports to account for safe animal crossings and changes in collision frequency after crossing structures have been installed. In year 1, we designed and implemented a remote camera wildlife monitoring program to enable evaluation of investment in road mitigation infrastructure and engage local public in wildlife monitoring. This work will inform future collision reduction efforts both locally and regionally. The data analysis will involve the assessment of successful crossings pre and post road mitigation efforts, with comparison to adjacent control sites in nearby forested areas (a before-after-control-impact design). At existing structures, two cameras are deployed under the structure on each side to capture the animals that cross before landscaping is complete (i.e. "treatment") and monitoring continues after landscaping. Paired control cameras (1-2 per site) are placed up to 1 km from the road crossing in a representative habitat on a wildlife trail to capture what animals are present in the area

surrounding the crossing (i.e. what animals are there that might use the crossing structure?). On sites that do not have an existing structure, control cameras are deployed on either side of the highway up to 1 km away from the proposed site. Where there is an existing trail near the highway, a camera will be deployed as a pre-treatment measure. When the crossing structure is installed, a camera will be mounted to capture what uses the crossing structure.

Once images are collected, they will be uploaded to Alberta Biodiversity Monitoring Institute's WildTrax portal, where a program coordinator will assign volunteers from the community (citizen scientists) to classify images recording species, sex, age, and direction of travel. We planned to employ an Indigenous person from the Ktunaxa Nation to help us with the expert review of camera images. We view the classification of the images as an opportunity to engage with a variety of people in the community (citizen scientists) and find ways to meaningfully employ and work with the Ktunaxa Nation. We will continue to look for Ktunaxa employment opportunities. Future employment possibilities beyond image classification include restoration work (tree planting) for the overpass site.

In addition to the remote camera monitoring data, MOTI will provide roadkill data from the Wildlife Accident Reporting System on how many road-killed animals are picked up to monitor reductions in collisions if mitigation is successful.

Engagement

Throughout this project, First Nations, stakeholder, and public engagement will be at the forefront. We will continue to write articles and press releases through our partner's websites and social media updating on project plans and progress. We expect to reach a broad audience given the scope of the project and profile of our partner organizations and will look for opportunities to engage at a higher level to gain support and funding for these next phases of the project and for the future overpass.

FWCP Funding Summary – Year 2 Funding Ask

Within the larger scope of the project, FWCP funds received for 2021-22 were planned to go towards:

1. **Alexander Bridge wildlife trail construction ($35,000) –** This includes contracting equipment and operators, materials
2. **Grizzly Bear collaring ($7,500)** – This includes buying two grizzly bear collars which will be deployed and monitored by Dr. Clayton Lamb as part of a larger set of 16 collared grizzly bears in the Elk Valley to help understand effectiveness of the crossing structures for grizzly bears.
3. **Camera Monitoring Program ($3,900) –** This includes buying cameras to contribute to the monitoring program, replacement lithium batteries, data hosting costs on WildTrax.
4. **Ktunaxa Nation Council Technician ($3,600) –** This would go towards hiring a technician from KNC to complete expert review on the classified photos from WildTrax.

Results and Outcomes – Year 2

Bridge Works and Fencing

Alexander Bridge was the focus for work in 2021-22. Complications began early when the surveys came back and indicated the bridge works would cost around $200,000 due to structural needs of the bridge and additional materials and design needed. This was substantially more than we initially had forecasted. We also faced some complications around permitting. We put in the application based on the approval of the engineered

drawings which were approved. However, the engineered drawings changed after the approval with some extra material needed along the creek, which required us to resubmit for a new permit. There were concerns with the new drawings in relation to restriction of fish passage, which required extra time and engagement with the biologists to be approved. This pushed our timeline back to complete the trail creation directly under the bridge. MOTI found additional funds to be able to complete this work, and ground-work began in early September 2021 and continued through to mid-October. Though we encountered many complications, all materials were delivered to site, the work at Alexander was substantially completed, and the groundwork was laid to complete the work under the bridge in spring 2022. The only remaining work is to lay the materials (located at site) that are directly under the bridge to finish the trail creation (all other major landscaping and material purchase and movement to site are complete).

In addition to work on Alexander this year, last year, we determined additional work was needed at Carbon Bridge as the ramp down was quite steep. Previously it was a steep rip rap slope adjacent to an old concrete abutment which was not very conducive for movement in the area. This extra work was completed in September 2021.

Figure 2. Work at Alexander progressing through the fall.

Fencing

We planned to fence a 2.5km stretch between Loop and Carbon bridges in 2021-22 funded by MOTI and Conservation Economic Stimulus Funding (no FWCP funding was used for this part of the project, but details are included here to paint the larger picture of this project). One of the biggest complications was the BC Hydro high voltage power line that the fence crosses at Loop Bridge. We did not know the risks of having a metal fence under the high voltage line. In turn, this required us to hire a specialist to design a non-metallic section of fence for the portion that runs under the power line. This substantially delayed our timeline to finish the design and install the fence, which has now been postponed to Spring 2022. We got a timeline extension for the funding source for the fence installation, so the fencing can proceed fully funded in the 22-23 fiscal year. The fencing contract is currently out for bid, and will be completed by July. We will hire Nupqu, a Ktunaxa owned company, to complete the fenceline clearing once the fencing contract is successfully awarded. MOTI also completed the purchase of land parcel from Teck, a small 5m strip beside the highway just east of Corbin to make installing the fenceline less complicated around agreements and permitting between Teck and MOTI (Figure 3).

In addition to the fencing, we purchased two ungulate guards to install at Alexander FSR (near Alexander Bridge), and for Fir-Roberts FSR (near Loop Bridge), in addition to the Corbin guard we installed in 2020.

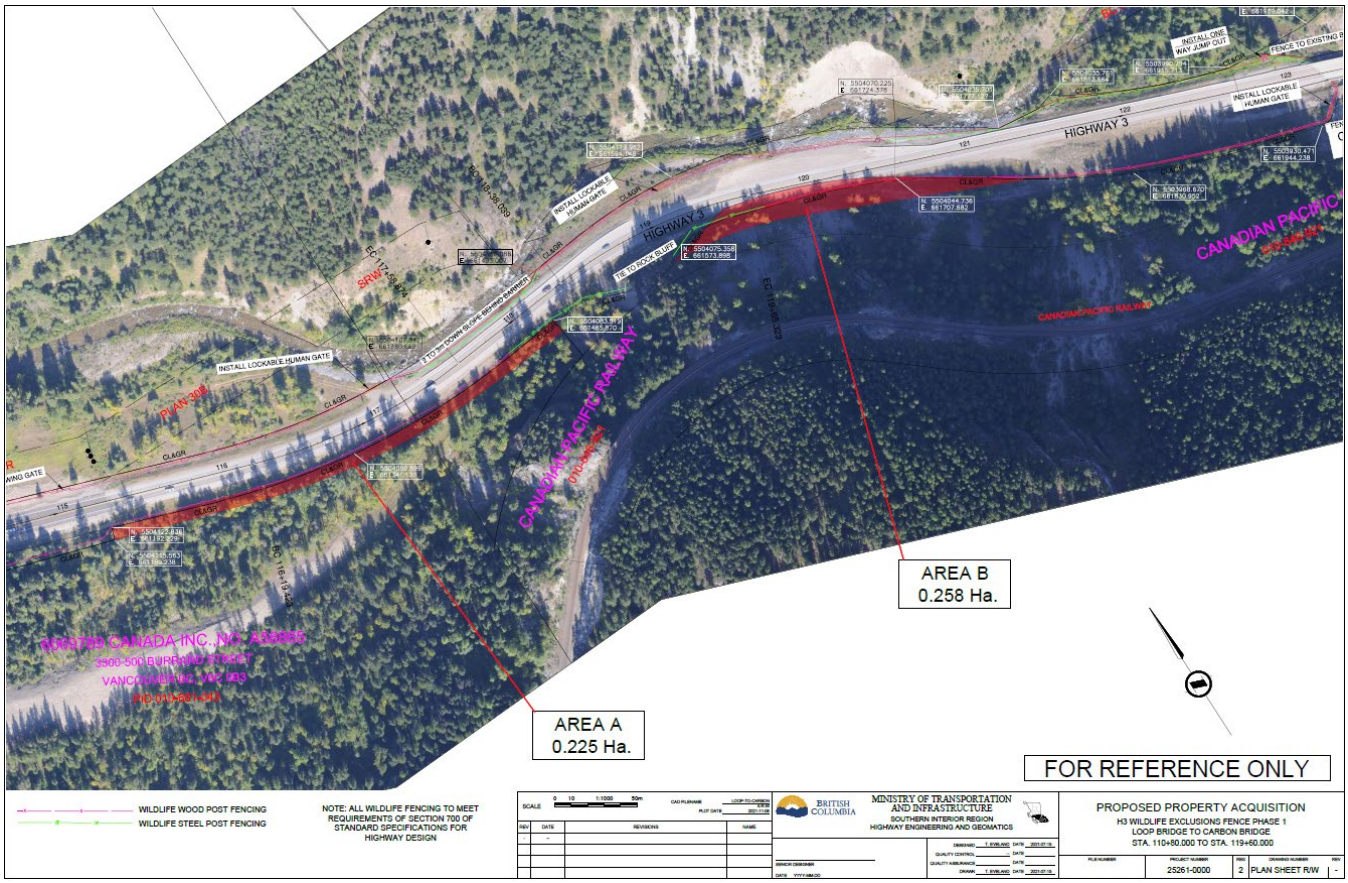

Figure 3. Land purchase from Teck Coal (red) to help facilitate fencing, with approximate fenceline around Loop Bridge.

Monitoring

We made substantial strides in moving our effectiveness monitoring program forward. To date, we have deployed 45 cameras at 12 potential mitigation sites: the 9 we are focused on for this project, and Lizard Creek (completed underpass by Fernie BC), Elko tunnel near Elko BC (a potential future project) and Jaffray underpass, (a completed project near Jaffray BC); (Figure 4).

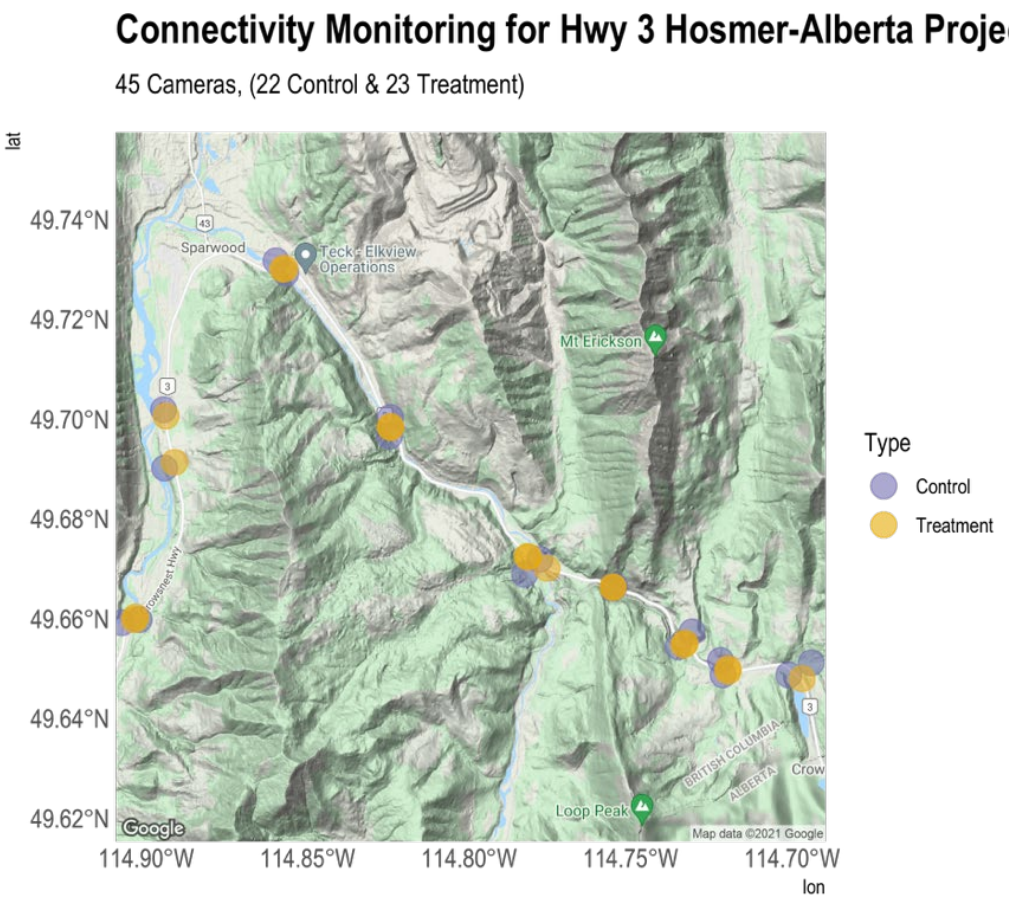

Figure 4. Camera locations for the effectiveness monitoring program.

We successfully uploaded all photos from 2020 and 2021 to Alberta Biodiversity Monitoring Institute's program WildTrax, an online platform to begin our photo classification efforts. We also recruited 25 volunteers to start reviewing and identifying animals in the photos on WildTrax to see what uses the structures before and after mitigation efforts. These volunteers attended training sessions in January and February 2021 and started classifying images. As we worked with them throughout the year, we faced some challenges around efficiencies of volunteer coordination and classification. We found varying levels of accuracy with the volunteers and in October 2021 we hired ABMI technicians who regularly classify photos on WildTrax to complete the classification on the remainder of the unclassified photos. This was an inexpensive option (around one cent per photo), and with professionals classifying photos, greatly reduced our time to quality control the data since the KNC photo quality control contract didn't work out. To date, we have classified 423,249 photos and have presented preliminary analyses on detections at each site (Figure 5,6,7).

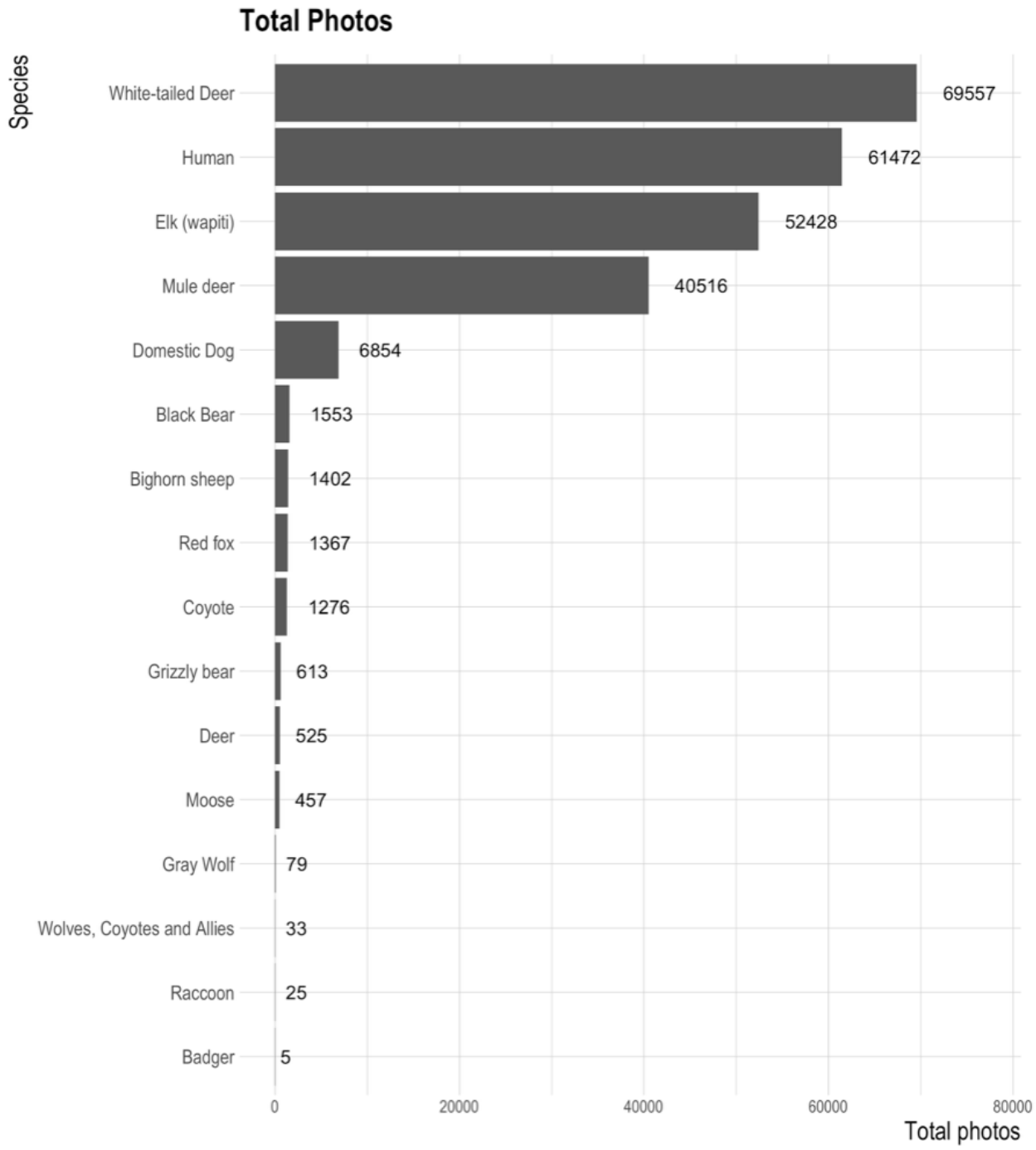

Figure 5. Total detections of different species across all cameras.

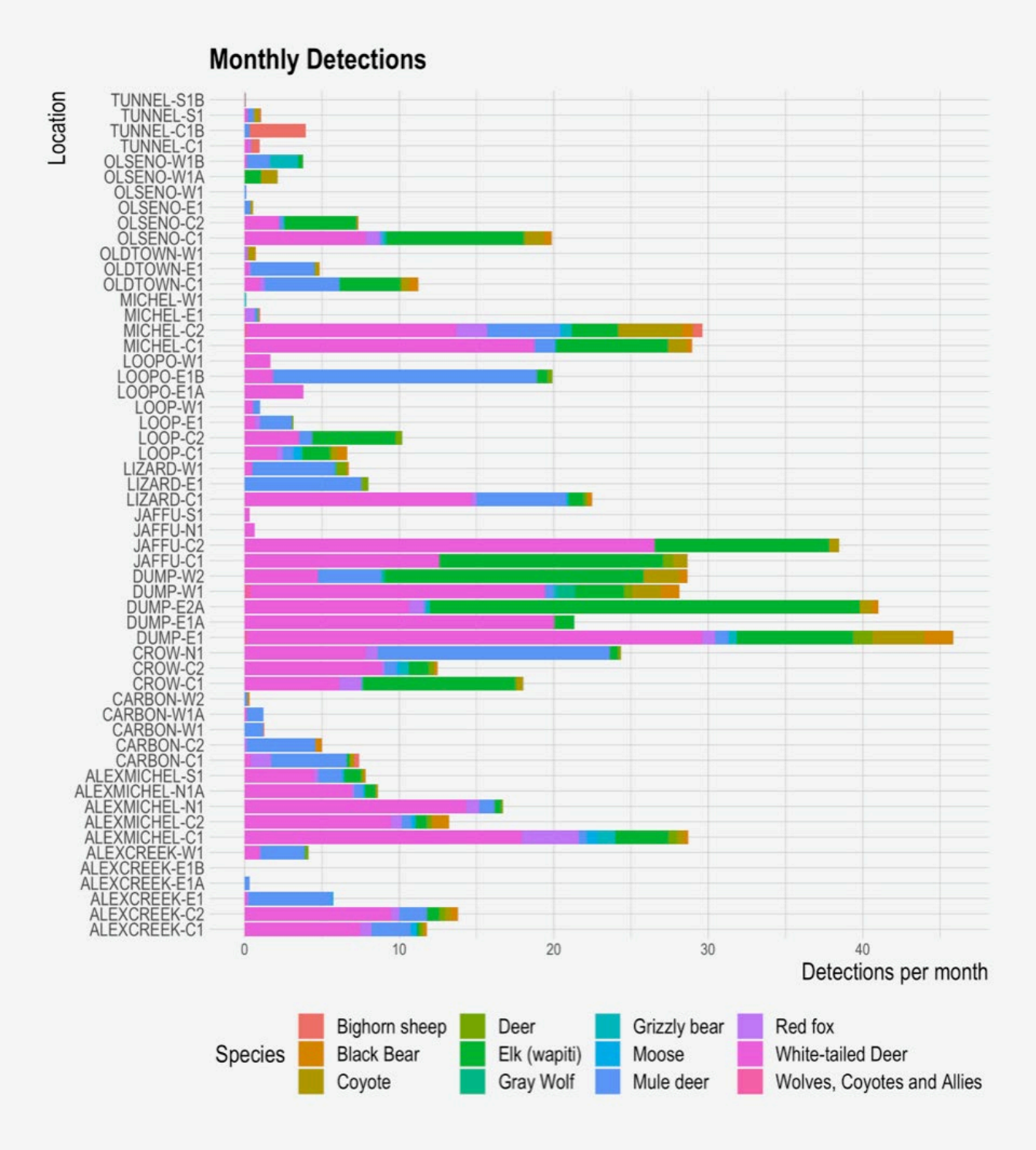

Figure 6. Total detections per month for different species at all cameras (cameras with -C are controls, W=west side of the structure, E=east side of the structure).

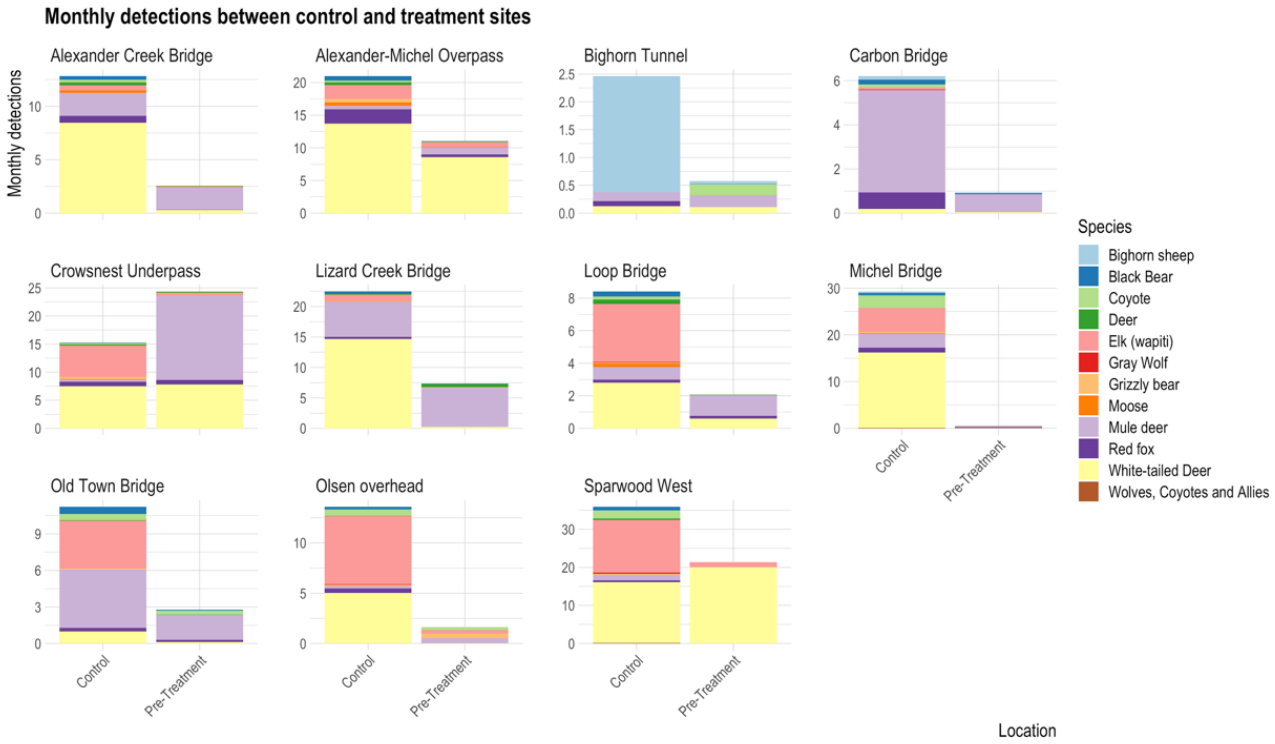

Figure 7. Monthly detections between control and treatment sites at various future and current mitigation locations. This data we will be used to compare after the treatment (mitigation efforts and fencing) is completed.

This camera data has also been useful to refine locations for future work. For example, cameras were deployed at the West Sparwood location, where we planned a future box culvert underpass. There were two potential locations for this work, and we deployed cameras at each to quantity detections at each potential site to help determine the best location for an underpass. As a result of this work, we determined that the more northern location is more suitable for this future underpass.

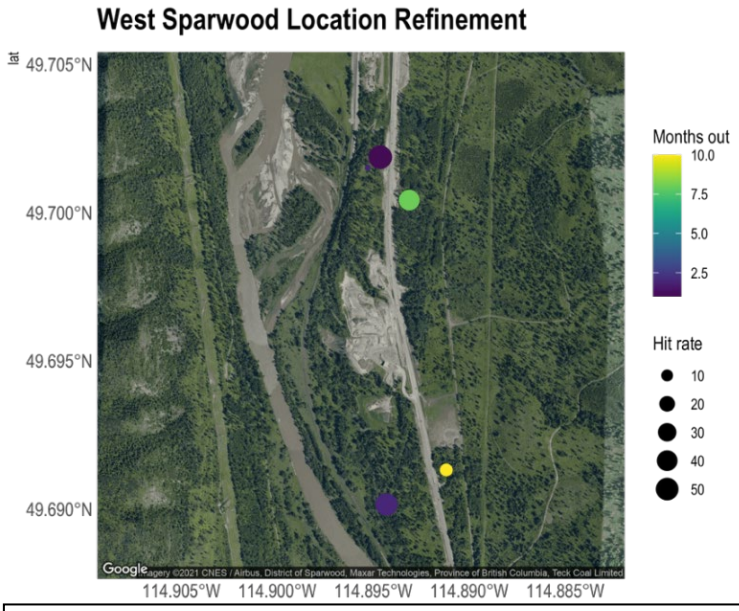

Figure 8. Two locations that were options for the West Sparwood Box Culvert Underpass where we deployed at each to quantify detections of animals at each location to determine the more suitable underpass location.

We also initiated the engagement to hire an Indigenous person from the Ktunaxa Nation who will help us with expert species identification. We engaged with KNC staff several times, but with low capacity, and high demand on KNC staff time, they informed us they would not have time to participate in the photo classification for this project. We asked if they had a preference of where to spend the money, and we agreed that using the money to put towards photo classification/monitoring was an acceptable alternative, and that we will continue to engage and put money towards building Ktunaxa capacity to engage and participate in this project.

This camera monitoring work is in addition to the grizzly bear and elk collars deployed in the area that give us more information about animal movement surrounding the highway and in the larger landscape. With support from FWCP, 3 new grizzly bear collars were deployed in the study area to learn about grizzly bear movement and potential use of these structures through time.

Engagement

Along the way, we worked to gain support and spread awareness about this project and highlight our funders whenever we get the chance. Some highlights include:

- May 2021: Field trip with Parks Canada to our project area and to Kootenay and Yoho parks to share learning and information related to components of highway mitigation projects (overpasses, jump outs, fencing, etc.
- October 2021: an article about this project was published in Canadian Geographic magazine and highlighted on the front cover of the magazine (online article here: https://www.canadiangeographic.ca/article/animal-crossing-reconnecting-north-americas-most-important-wildlife-corridor).
- November 2021: Yellowstone to Yukon hosted a Transborder Road and Wildlife Webinar (https://y2y.net/events/webinar-transborder-transportation/) which was widely attended and Duane Wells (MOTI) presented on this project
- January 2022: Clayton Lamb presented information about this project to the Ktunaxa Wildlife Advisory Committee about this work to share information and gain support
- February 2022: Y2Y met will Minister Fleming (MOTI) to discuss this project and future overpass creation. As a result, he is keen and is talking to federal contacts about funding and ordered the completion of the design for the overpass.
- February 2022: signage was created to put around the crossing structures to limit human disturbance in these areas (Figure 9)

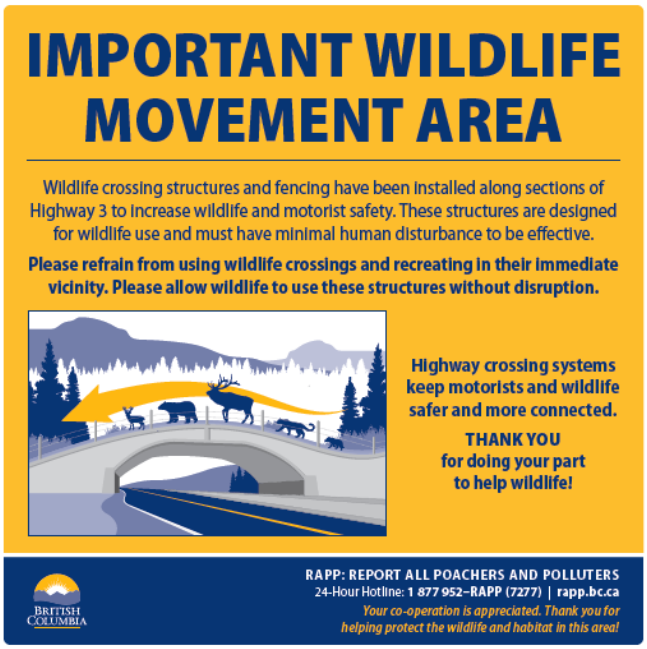

Figure 9. Sign that will be placed at crossing structures to minimize human disturbance.

Some ongoing engagement includes:

- Teck: Our team has had several meetings with Teck Coal about the next phase of the project (Old town/Michel Mouth bridge and associated fencing), as it borders Teck land and some major roads (e.g. Elkview entrance).
- Nature Conservancy of Canada: We expanded our great partnership with the Nature Conservancy of Canada to the Alberta side of the provincial border where similar monitoring efforts are being used to determine appropriate mitigation sites. We have met several times over the year to discuss joint media and collaboration. One of the main accomplishments from this year was the alignment of our photo classification protocol
- Website Creation: We are in the process of creating a website about this project to house all materials and information related to the work we're doing
- Regulation Change Proposal: we submitted a regulation change proposal to implement a 400m no hunting buffer from the highway centreline between Loop and Carbon (matching the fencing that will be installed this spring) as we expect animal will be concentrated along the fence line as adjust to the new system in place

Discussion

Some plans changed along the way this year as we adapted to challenges in design and funding. Alexander cost significantly more than we had planned, and with the complications and delays around permitting, we were put behind schedule. However, we substantially completed Alexander, ordered two ungulate guards, made great strides forward and have preliminary results from our effectiveness monitoring, and had great engagement throughout the year.

We also made progress towards future years' work. We have preliminary funding approval from several sources (FWCP, HCTF, MOTI, ICBC, etc.), and have plans set out for fenceline clearing and fence installation, as well as surveys being completed for Old Town and Michel Mouth bridges.

Recommendations

One of the strengths of this project is the multidisciplinary group that is working on it. Having the biologists work alongside the engineers and planners helps create results that are feasible and long-lasting from an engineering perspective, but that use the best available science and local knowledge to make the project as effective as it can be for wildlife.

We are also learning that implementing the fencing on a working landscape is going to be a continuous challenge. There are so many different landowners, major roads, powerlines, general topography and other complications to fencing that we are learning to adapt and plan ahead for.

For future highway mitigation projects, we recommend planning and executing effectiveness monitoring early. There is a lot of literature available to support highway mitigation projects including specs on crossing structures, fencing, and jump outs. There is no need to reinvent the wheel, and the latest science should guide mitigation efforts. Since our effectiveness monitoring was based on a before-after-control-impact design, we

needed to start as early as possible to collect as much pre-mitigation information as possible. Another recommendation moving forward will be to look for opportunities for ecosystem restoration or additional protection in areas adjacent to the crossing structures. It will be important to look for these opportunities where needed to ensure animals continue to use these structures effectively.

Acknowledgements

We would like to acknowledge the huge contributions from our team members and their organizations: Duane Wells (MOTI), Candace Batycki (Y2Y), Clayton Lamb (UBC), Tracy Lee (Miistakis Institute), and Randal Macnair (Wildsight). We have countless others to thank that have contributed to this work in the past year and before. This work could not have been completed without their work, advice, and guidance. To all those who have helped pave the way, thank you.

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