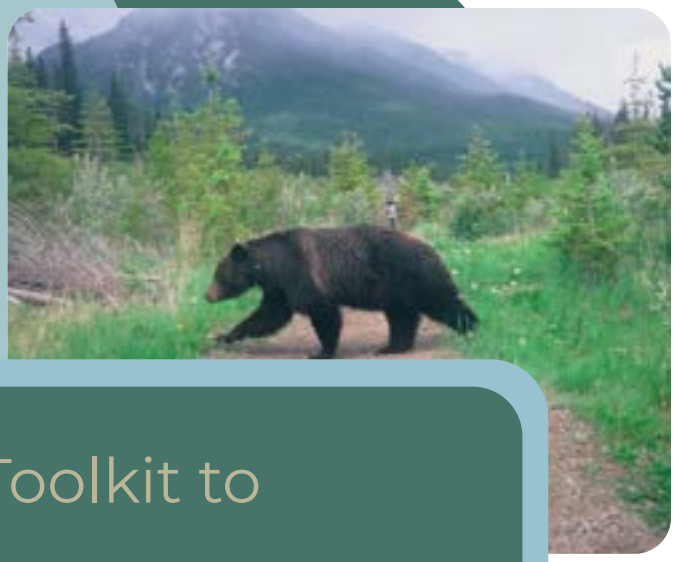
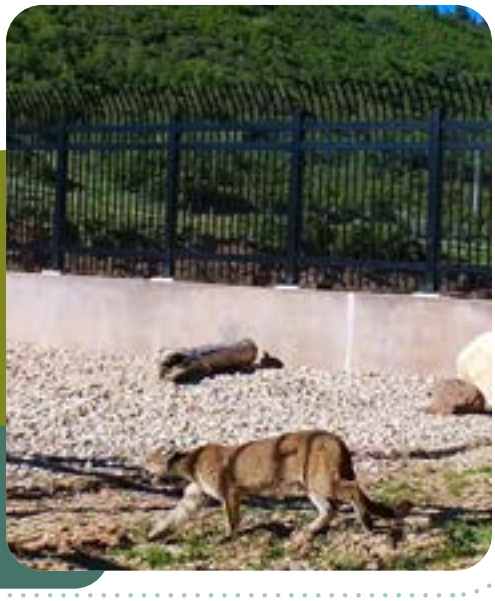


Building a Toolkit to

Communicate the Co-Benefits

of Wildlife Crossings Project Report



Ryerson University
School of Urban & Regional Planning
Faculty of Community Services

Yellowstone to Yukon Conservation Initiative

ARC

The Team

Client

ARC - arc-solutions.org

ARC Solutions works to improve human safety, wildlife mobility and landscape connectivity by ensuring that wildlife crossings are built wherever they are needed. ARC is a fiscally sponsored project of the Centre for Large Landscape Conservation in Bozeman, Montana.

Client Team

Marta Brocki
Renee Callahan

Mentors

Jeremy Guth
Rob Newell

Faculty Supervisor

Professor Nina-Marie Lister

Project Team

Haley Anderson
Kyle Dow
Puneh Jamshidi-Moghadam
Jack Lawson
Ryan Lok
Carly Murphy
Marina Smirnova

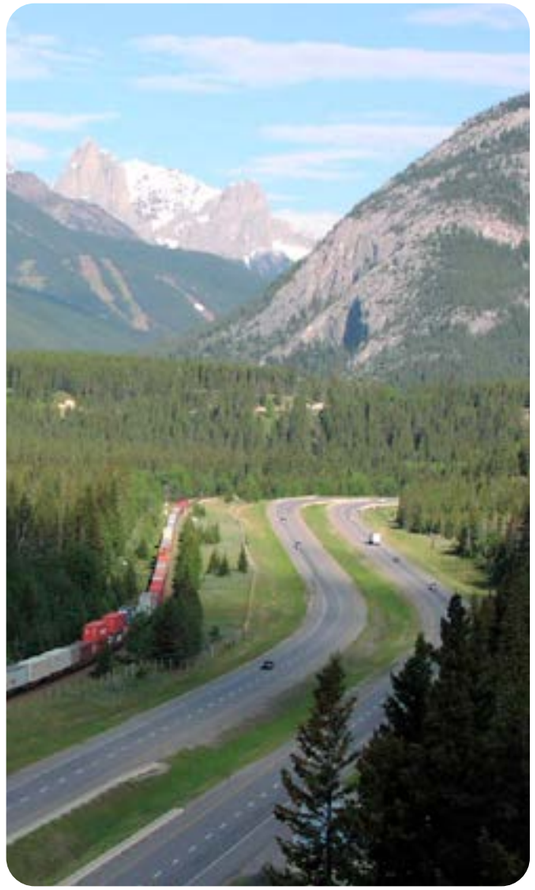
Contributors

Beth Pratt
Candace Batycki
Clayton Lamb
Dale Becker
Jill Robertson
Kelsey Blackwell
Neil Robson
Robert Rock
Sheila Boudreau
Tim Johnson
Tony Clevenger
Tracy Lee
Kim Trotter

Partner

Yellowstone to Yukon Conservation Initiative strives to support people, all wildlife and natural systems in the region between the Greater Yellowstone Ecosystem and Canada's Yukon Territory.
y2y.net

Inside this Report



Images from Tony Clevenger: https://drive.google.com/drive/folders/1KFED93koTJLOci5Nil8otMSSXTpV9sJt

Executive Summary

This report outlines the process that led to the development of A Toolkit for Communicating the Co-Benefits of Wildlife Crossings. The toolkit was produced by Ryerson Graduate Studio Planning Students under the supervisor of Professor Nina-Marie Lister between January and April of 2021. This toolkit was produced for ARC Solutions to aid in communicating the co-benefits of wildlife-crossings to a diverse range of audiences.

There is a communications gap in articulating the co-benefits of wildlife-crossing infrastructure, which hinders the implementation of such projects. The Ryerson Graduate Studio Team intends for this toolkit to accelerate the implementation of wildlife crossing projects by offering tools and strategies that can be used to inform engagement and implementation. For instance, engagement and communication imperatives, which our team outlines, are designed to assist in communication with and engagement of stakeholders involved in a given project.

Primary and secondary research was conducted throughout January to April of 2021. During this period, interviews were conducted with experts and professionals familiar with wildlife crossings and green infrastructure. In early March, the studio team facilitated a virtual workshop to better understand the perspectives of those involved, as well as to complement our research findings. Our work over the past several months culminated in the creation of the toolkit, which includes information on the following: the complexity of wildlife-crossings typologies, the importance of early and ongoing engagement throughout the planning and implementation process, the range of stakeholders and how they benefit and contribute. The toolkit wraps with an ‘idea portfolio’ to inspire future change.

This report is meant to offer an overview of our research process and the work that went into the creation of the toolkit.

Images from Tony Clevenger: https://drive.google.com/drive/folders/1KFED93koTJLOci5Nil8otMSSXTpV9sJt

Project Overview

Setting the Context

Accelerating biodiversity loss is one of the leading environmental crises currently facing our planet. One of the catalysts behind this is landscape fragmentation is the development and expansion of road networks, which ultimately has significant ecological, social, and economic impacts. Landscape fragmentation resulting from the development of road networks increases the rate and likelihood of wildlife-vehicle collisions which result in wildlife mortality, human injuries, and property damage (Green Infrastructure Toolkit Outline, 2021). Beyond more immediate impacts, habitat degradation is a major consequence of fragmentation, impacting both animal and plant species and disrupting essential ecosystem function.

The preservation of natural green infrastructure (through parks and protected areas, corridors and greenways or greenbelts) is one way to maintain existing connectivity within a landscape. Another method is purpose-design green infrastructure such as wildlife corridors and crossings implemented among road networks, which work to re-connect already fragmented landscapes and habitats while reducing the potential for wildlife-vehicle collisions and providing co-benefits to both humans and wildlife. That said, while the economic benefits of wildlife crossing infrastructure have been well-documented, the co-benefits for climate, biodiversity, culture, and human well-being have not yet been effectively studied or publicized (Green Infrastructure Toolkit Outline, 2021).

t is important to recognize that there remains to be socio-ecological challenges associated with the implementation of wildlife crossings, especially given that the responsibility for implementation is not mandated and does not fall on one agency alone. For wildlife crossing infrastructure to be successfully implemented, there must be collaboration among different departments and sectors to establish a successful approach to implementation and stakeholder engagement that involves public-private partnerships to gain recognition and support for the projects. It is important for planning decision-makers to understand and implement new ways of communicating and reaching the public, agencies, departments, and organizations about the co-benefits of implementing green infrastructure, and for this project landscape connectivity in particular, by raising awareness of the power that comes with connecting humans to nature (Green Infrastructure Toolkit Outline, 2021).

“ARC Solutions (ARC) is an international network whose mission is to identify and promote leading-edge solutions to improve human safety, wildlife mobility, and long-term landscape connectivity” (Who is ARC, 2021). ARC is centered around the following core initiatives: Communications; Technology Transfer, and; Implementation.

The Communications initiative is intended to deliver the curated story of ARC to diverse audiences from policy-makers to students and everyone in between. The Technology Transfer initiative works to engage scientific, planning, and engineering professionals by offering opportunities to conduct research and develop effective design approaches essential to implementing crossing structures. Lastly, the third initiative is Implementation, which aims to identify and implement potential wildlife-crossing structures through partnerships with key decision-makers (Who is ARC, 2021).

As such, ARC's dedication to implementing solutions to wildlife and human mobility and landscape connectivity works to both raise awareness about the importance of wildlife movement and protection and provide innovative green infrastructure solutions.

This studio project worked to embed ARC's mandate of communication through the development of a communication toolkit that can be used by a broad audience. Under the supervision of Professor Nina-Marie Lister and in collaboration with ARC Solutions, the studio team conducted research on the co-benefits of green infrastructure more broadly and assessed the applicability of a co-benefits framework to wildlife crossing infrastructure in particular. The studio team engaged in real world case study research provided by ARC, which were Highway 1 and Highway 3 Elk Valley crossings, to understand how the toolkit can be best informed to be applied in real time. The team engaged with a variety of professionals and experts in the field, ranging from communications experts, data visualization experts, to engineers, to understand how a co-benefit framework is understood among various sectors and how the framework could be incorporated into the toolkit.

Objectives

&

Process

Objectives

The objective of the toolkit is to act as an educational tool for not only ARC Solutions, but for a broader audience, that communicates the timeline for implementation and which stakeholders need to be engaged along the way. This roadmap for implementation will include critical talking points that strategically communicate the co-benefits to the appropriate audiences. The toolkit informs effective communication strategies and tools to engage with, and empower stakeholders to be present and invest in the implementation of wildlife crossing infrastructure. The final product is intended to be a stand-alone document that can be easily understood and utilized for various groups that target the specific benefits that pertain to each group.

Primary and secondary research informed the development of the toolkit. This section will outline details and findings of each subsequent section. In order to build a robust background of knowledge on the history, challenges, and co-benefits of animal road crossings a literature review was conducted. Following the literature review, the team conducted two case studies on Highway 1X and Highway 3 to inform our understanding of both the successes and barriers of developing animal road crossings. Following this, 5 interviews were conducted with industry experts to further identify key challenges to implementing animal road crossings. These two steps taught us that one of the prominent problems to building animal road crossings was that there is a communications problem between the intended use of the infrastructure and public/private stakeholders. To seek methods of addressing the communications gap, we conducted a workshop with 16 industry experts to identify who key stakeholders are, methods of addressing and communicating co-benefits of animal road crossings, and to facilitate a discussion about the co-benefits of green infrastructure.

Image Sources (top to bottom): Moose US 89 Culvert Logan Utah, Patty Cramer; Tony Clevenger

Literature Review

Wildlife crossings are an important, though sometimes overlooked typology of green infrastructure. Van Oijstaeijen et al., (2020) describe green infrastructure as a series of semi-natural forms of infrastructure that are characterized by their multifunctionality and services they provide towards improving local ecosystems. This involves the creation of landscape elements or infrastructure that simultaneously provides environmental, economic, and social benefits once created. Generally, this includes the creation of green space in non-traditional spaces in urban areas as a means to adapt to the changing climate conditions (Van Oijstaeijen et al., 2020). Green infrastructure development also results in co-benefits that extend far beyond the local area; these systems are created, resulting in a wider array of benefits (Van Oijstaeijen et al., 2020). Despite wildlife crossings fitting perfectly within this definition of green infrastructure, their limited implementation over the past three decades has left them out of the discussion, leaving ample room for research into why this is the case.

Wildlife crossings are a form of green infrastructure promoting ecological connectivity. The literature on the topic relates primarily to wildlife migration patterns (Ford et al., 2009; Sawaya et al., 2014), the mitigation of wildlife collisions (Huijser et al., 2009), and genetic connectivity (Sawaya et al., 2014). The current literature focuses on collision reduction without discussing the other benefits beyond increased safety for both motorists and animals.

Ecological connectivity and species impact have been a major focus of existing wildlife crossing studies. Ford et al. (2009) evaluated the methods of tracking wildlife movements utilizing wildlife crossings and identified the effectiveness of cameras as opposed to trackpads in the long-term. Although cameras had greater cost-effectiveness in evaluating wildlife-movements, certain species were more likely to be detected by trackpads. The study by Ford et al. (2009) highlighted the importance of monitoring the impacts of wildlife crossings. Similarly, Sawaya et al. (2014) point out that wildlife crossings enable genetic connectivity for grizzly bear populations, which in turn enhances the ecological and biodiversity of the region. This element of conservation is common to all wildlife crossings, although the species differ depending on the location.

Huijser et. al. (2009) highlighted a common mitigation strategy was the use of road-side signage in specific high collision areas. As a response, they proposed a cost-benefit approach that compares the monetary costs of mitigation measures with savings related to collision reduction and animal population preservation. The authors identified that elevated or tunneled roadways provided the highest level of protection for both users and animals. Despite the optimized protection for both wildlife and road users, Huijser et al. (2009) identified that there are challenges justifying the cost of wildlife crossing development.

Literature Review (Con't)

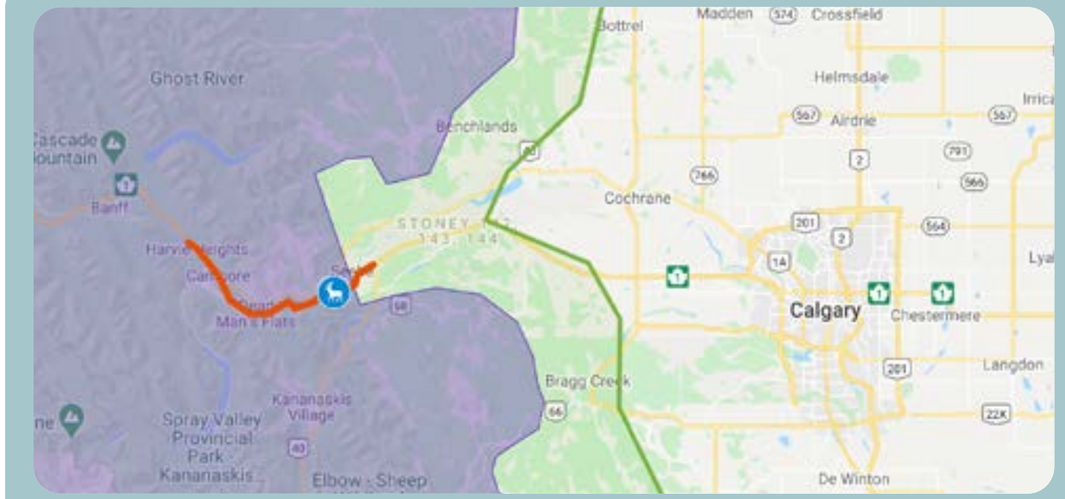
BARRIERS TO IMPLEMENTATION

Despite the ecological benefits recognized in the research, challenges persist. For instance, Keeley et al. (2018) identified a number of factors that compound both challenges and opportunities for wildlife crossings. Firstly, each crossing is context-specific depending on land-ownership patterns, intensity of development and fragmentation, socioeconomic factors, institutional capacity, and regulatory framework. This means that outreach must be tailored in order to be effective. Keeley et al. (2018) also recognized that there are significant challenges based on the belief that the crossings have negative impacts on the rights and economic opportunities of landowners. Historical factors such as land use patterns are also a concern. By the same token, crossing advocates should be ready to identify areas where different stakeholders or participants lack alignment. These are key indicators of where conflicts between participants may develop as the project proceeds.

Scholars have also noted significant barriers in the planning process. Elton & Drescher (2019) examined wildlife-management strategies in Ontario. They identified a range of issues pertaining to project and organizational factors, including public support and buy-in. These findings are consistent with Keeley et al. (2018) who highlighted six broad categories of strategies for successful implementation: building partnerships; developing a common vision; communicating with partners, stakeholders, and the public; basing implementation on sound science; seeking to create multiple benefits; and adopting regulations, incentives and funding mechanisms.

There are opportunities to better understand and recognize the co-benefits of wildlife crossings beyond impacts on the species migration (Ford et al., 2009; Sawaya et al., 2014) and collision mitigation (Huijser et al., 2009). Thus, further research on best practices for communicating co-benefits will enhance prospective investment and support.

Image Sources: Tony Clevenger



Case Study: *Highway 1/1X*

The Highway 1/1X animal road crossing is slated to be built approximately 7 kilometres east of Exshaw Alberta at the highway 1 and highway 1X interchange. The project was proposed under the previous NDP Government in Alberta as a priority for capital investment in wildlife mitigation to enhance public safety (Conboy, 2020; Clevenger et al., 2018). The proposed crossing is projected to cost 7-million dollars and will be built between 2021 and 2022, with both funding and the project construction timeline being supported by the current United Conservative Party Government (Conboy, 2020; Government of Alberta, n.d.). The support for this infrastructure from two administrations indicates that there was a wide variety of bi-partisan support for building animal road crossings, demonstrating at least some success in communications of the benefits of animal crossing infrastructure.

Design and planning for the highway 1X crossing has been undertaken by both Transportation Alberta as well as the Miistakis Institute. The project design draws inspiration from the 6-wildlife crossing overpasses that have been built in Banff, AB (Dialog, 2019; Clevenger et al., 2018). Additionally, the project design is forward-thinking by accounting for any increases in lane-width of the highway below the overpass, ensuring that it is suitable to accommodate highway widening without needing to close or alter the crossing (Dialog, 2019; Clevenger et al., 2018). This, among other design elements, ensures the longevity of the project. In essence, the Highway 1X case study demonstrates the potential for animal road crossings when a governmental institution champions and prioritizes their construction.

Map image source: https://y2y.net/work/hot-projects/safer-bow-valley/

Case Study: *Highway 3*

The Highway 3 Elk Valley animal road crossing is proposed to be built in the east Kootenays of British Columbia. The project currently has buy-in from a variety of stakeholders including Yukon to Yellowstone (Y2Y), ARC, TECK Resources, local indigenous and community members, and some preliminary support from the Ministry of Transportation of British Columbia (Lee et al., 2019). However, the development timeline is still being worked out with sources of funding to support the project being unsecured. From our interviews, it was noted that the Highway 3 Elk Valley crossing proposal has done an excellent job at communicating the benefits of supporting animal road crossings beyond reducing wildlife collisions. This has resulted in the project gaining support from some unlikely allies such as TECK resources as well as local hunting and fishing groups. Gaining support through effective communication of the co-benefits of these structures is necessary to gain support from all parties and relevant stakeholders, making these projects appealing to a broad range of groups (Lee et al., 2019).

Through our interviews, the group learned that the biggest setback for the project is the lack of support from the Government of British Columbia not playing a large enough role in the study and development of this proposal. Interviewees note that this stems from a lack of coherency and responsibility over which ministries and governmental departments are responsible for the construction of animal road crossings within British Columbia. However, interviewed guests noted that project champions have emerged within the Ministry of Transportation to help bring the Elk Valley crossing into the light. Having a champion within government can help make larger strides towards ensuring projects of this kind can come into fruition.

Map image source: Y2Y, Reconnecting the Rockies

Interviews

With direction provided by ARC and Y2Y staff the studio team interviewed a total of seven industry professionals across a variety of fields. Speaking with these experts and practitioners was essential in understanding the multi-disciplinary and often cross-jurisdictional challenges faced in building wildlife crossings.

Interviews were conducted in teams of two divided between the roles of lead and notetaker. The only exception to this rule was in interviewing Dr. Robert Newell. Due to his status as a 'visualization mentor' his interview involved a lead, notetaker, and designer. Regardless, each interview lasted approximately one hour.

Interviewees & Affiliation

Jeremy Guth : Founding Director & Yellowstone to Yukon Board Member, ARC Solutions

Renee Callahan : Executive Director, ARC Solutions

Robert Rock : Principal and COO, Living Habitats

Candace Batycki: BC and Yukon Program Director, Y2Y

Kim Trotter : Former US Program Director, Y2Y

Rob Newell: Data Visualization, University of the Fraser Valley

Dale Becker: Wildlife Program Manager, Confederated Salish and Kootenai Tribes

Based upon these interviews the team was able to establish several themes which were then consolidated and applied to later project stages. Overall, those interviewed during this stage of research found that: a) project ownership; b) motivation; c) personal benefits/impact (e.g. Co-Benefits); d) making connections between participants, and e) identifying champions among key participant groups were the strongest high-level elements that lead to project uptake.

Virtual Workshop

On Wednesday March 4, 2021, the Ryerson Green Infrastructure Team held a virtual workshop for a broad range of professionals working in the spaces in green infrastructure, wildlife crossings, road ecology, and communication. The workshop was designed to foster discussion around co-benefits, planning and implementation of wildlife crossing projects. The workshop involved a total of 16 participants, not including the seven member studio team. A list of participants can be found in the table below.

Participant	**Affiliation**
Kelsey Blackwell	Studio Blackwell
Beth Pratt	National Wildlife Federation
Rob Newell	Data Visualization, UFV
Sheila Boudreau	Spruce Lab, Ryerson University
Robert Rock	Living Habitats
Neil Robson	DIALOG
Tracy Lee	Rockies
Jill Robertson	DIALOG
Tim Johnson	Y2Y Alberta
Candace Batycki	Y2Y
Tony Clevenger	Highway 3
Clayton Lamb	Highway 3
Jeremy Guth	ARC Solutions
Renee Callahan	ARC Solutions
Marta Brocki	ARC Solutions
Nina-Marie Lister	Ryerson University
Ryerson Graduate Planning Studio Team	Ryerson University

The workshop was held using a combination of Zoom for video conferencing and Google Jamboards for participant collaboration. Prior to the workshop the team circulated a 10-page workshop guide, including an itinerary for the day's events.

Following a 10-minute presentation of our studio project, participants were then divided into three Zoom "breakout" rooms. They were further split into two teams of five and one team of six. Each team was directed to their corresponding breakout room.

In advance of March 4th the team created three unique Google Jamboard links. Facilitators from the studio team then copied these links into the chat boxes of their respective breakout rooms. This allowed for participants to collaborate in real time using Google Jamboard features such as coloured sticky notes, pen tools, erasers, etc. In addition, these three links would serve as distinct records for comparison during later stages of analysis.

The Google Jamboard element of the workshop included eight slides. Each slide posed a question or activity designed to build both literacy in interacting with Google Jamboard as a tool as well as fostering better group dynamics. Subsequent slides aimed to use this engagement component to produce more holistic moments of knowledge sharing between participants.

Overall, the workshop sought to engage with experts and professionals by collaboratively exploring the ways to communicate the co-benefits of wildlife crossings

Specific questions and an outline of the Virtual Workshop activity are provided in the Appendix.

Finally, a virtual debrief session was held on March 9 to allow for reflection and further collaboration.

Image Source: Nina-Marie Lister

Workshop Highlights

Through engagement and knowledge-sharing four primary themes emerged during the workshop. These elements are a foundation for the planning and implementation of wildlife-crossings. The development of the toolkit was informed by and grounded in the perspectives of those consulted during Primary Interviews and based on the generous contributions of those who attended the workshop.

Need for Early and Ongoing Engagement

The effective planning and implementation of wildlife crossing projects requires communication and engagement, and it is important to consider both with those who are both directly and indirectly involved.

Importance of Champions

There is a core need to work with eager individuals within ministries, local Indigenous groups, and with conservationists, hunters, and local groups.

Rethinking Wildlife-Crossings from the Lens of Coexistence

Wildlife crossings provide infrastructure for ecological connectivity and also mitigate fatalities with wildlife collisions. The notion of co-existence, and sharing the land with humans and nature, is embedded physically and philosophically through the re-knitting of landscape through infrastructure. However, the broader conversation must be ground through an understanding of how these crossings contain elements of diversity, reconciliation, and connectivity.

Cultivating Place-Based Connection

There are opportunities to cultivate a sense of personal and shared belonging through wildlife-crossing infrastructures. Place-based connection, that is, recognizing the social and cultural connections with human and non-human co-existence, can be cultivated through the shared development of values through the story-telling of place.

Photo credit: Image courtesy Olin Studio

References

This work was built on the shoulders of many who have been working to solve this connectivity problem for decades.

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Appendix 1

Key Interview Takeaways

Key Interview Takeaways

Here we highlight the most important messages we heard during the interview process, organized by broad theme.

Audience

- Insurance Companies (and other unexpected stakeholders) are not part of the conversation but can play an important role.
- We need to seek ways to communicate the trauma of hitting an animal to those who have not experienced that.

Communications Insights

- A failed project holds value as an idea has been planted.
- Important to show efficiency of building in mitigation from the get-go, effectively communicating quantitative and qualitative benefits (make a good “pitch”).
- Need to create a solution which recognizes human connection to nature and communicate that meaningfully to the public.

Engagement / Comms Insights

- Important to communicate personal benefits of projects (answer to the question: “what’s in it for me?”)

Engagement Insights

- Early and Ongoing Engagement is an absolute must.
- Project champions may emerge from surprising places, so do not rule anyone out..

Benefits

- Proximity to national parks can increase the likelihood of road expansions, allowing firms to “double-dip” on a given construction period.

Barriers / Challenges

- Identified as the “wildlife crossing group” rather than the “animal migration group,” the latter of which resonated more with residents.
- Stakeholders working in silos (independently).
- Importance of having a champion to leverage projects.
- Cost is the biggest barrier. Society we live in forces people to prioritize their personal benefits, we need ways to communicate these benefits to people.
- Biggest challenge is motivating people enough to want to do something regarding reducing WVC’s. Need to motivate this to the top of political priority.
- Bureaucratic barriers related to funding: Challenges to articulate to stakeholders’ a rationale to invest and why they would benefit.
- Indigenous groups have significantly longer memories when compared to settler-organizations like a Department of Transportation.

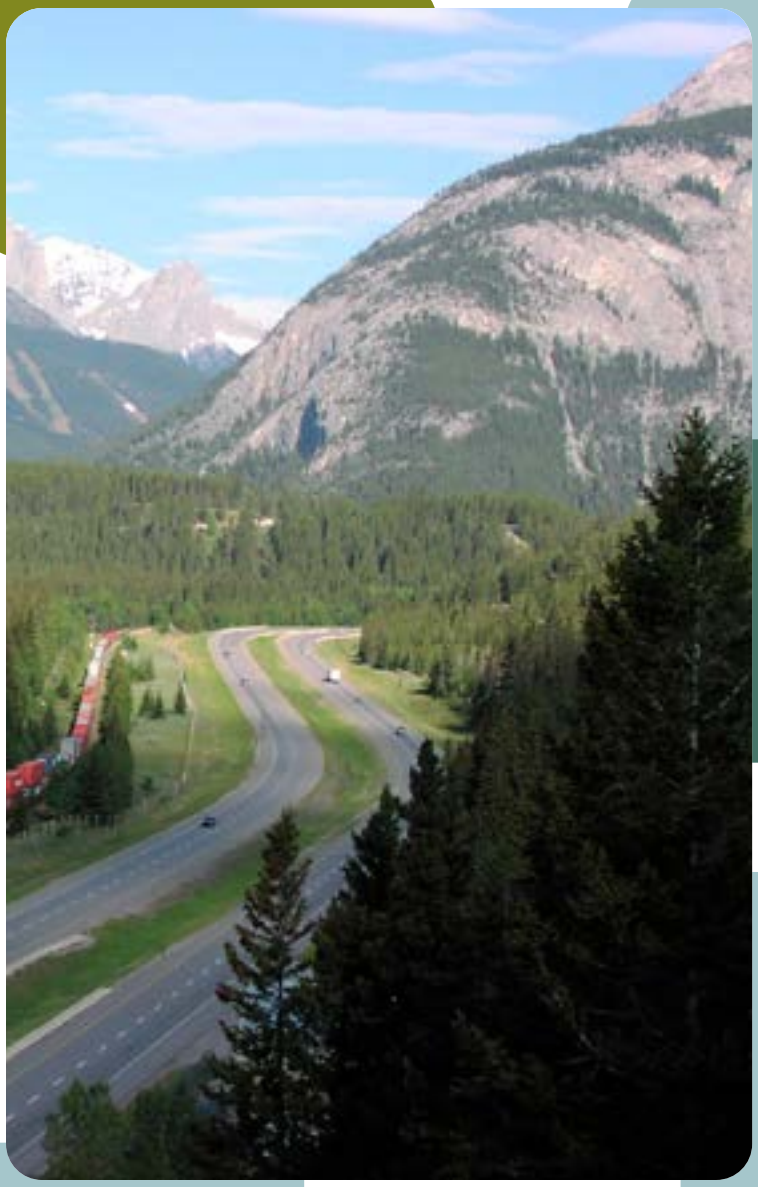
Appendix 2

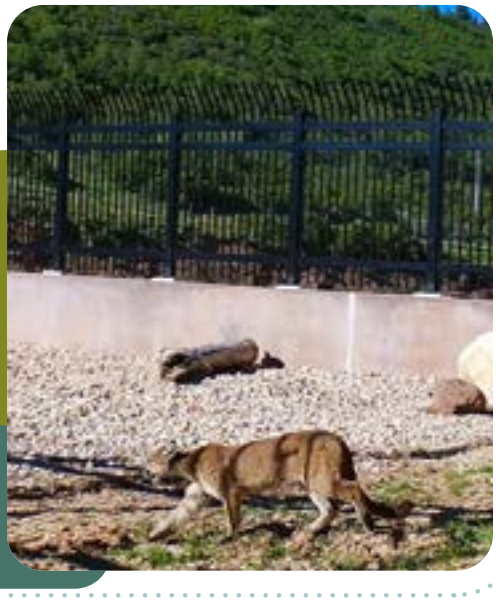
Links to Accompanying Project Documentation

Accompanying Documentation

Here we highlight deliverables produced over the course of the studio project, as well as documentation from the virtual workshop..

- Green Infrastructure Toolkit Project Brief
- Virtual Workshop Guide
- Virtual Workshop Google JamBoard Breakout Room - Group 1
- Virtual Workshop Google JamBoard Breakout Room - Group 2
- Virtual Workshop Google JamBoard Breakout Room - Group 3
- Graduate Planning Studio Interim Presentation
- Graduate Planning Studio Final Presentation





This report was prepared by Marina Smirnova, Carly Murphy, Jack Lawson, Haley Anderson, Puneh Jamshidi-Moghadam, Kyle Dow, and Ryan Lok for Dr. Nina-Marie Lister at Ryerson University