Kootenay Connect: Riparian Wildlife Corridors for Climate Change

A Preliminary Report

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2/26/2019

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ABSTRACT

Riparian and wetland systems are biodiversity hotspots and climate refugia that also act as wildlife linkages across human-settled valleys. In the Kootenay region of BC, protecting riparian-wetland complexes is also the best opportunity for re-establishing fragmented grizzly bear populations. A new initiative called Kootenay Connect integrates large carnivore (grizzly bears), ungulate, and other wildlife species occurrence data with large riparian-wetland complexes mapped in GIS to identify critical habitats and landscape features at a regional scale. The resulting composite comprises ecological networks which connect different landscape elements (riparian-wetland to upland habitats) and potential movement corridors for wildlife. This information will then be combined with climate modeling to identify the most important areas for retaining landscape connectivity as habitats shift over time. We will work with the Kootenay Conservation Program, its partners and key stakeholders within 12 corridors of the Kootenays to develop a mosaic of conservation activities, strategies and solutions that include private and public lands in order to improve management across wildlife corridors and landscape connectivity areas throughout the Kootenay region. As regional funders such as the Fish & Wildlife Compensation Program-Columbia Basin and Columbia Basin Trust direct more support to landscape conservation and restoration, and federal and global initiatives encourage increasing protected areas and connectivity areas, the time is ripe for Kootenay Connect to help identify where conservation values are highest, capacity is strongest, and collaborative efforts are valued.

ACKNOWLEDGEMENTS

We are very appreciative of the Fish & Wildlife Compensation Program-Columbia Basin and the Wilburforce Foundation for financial support. Early contributors to the concept of Kootenay Connect include, key individuals such as, Greg Utzig of Kutenai Nature Investigations; Marlene Machmer of Pandion Ecological Research; Chris Bosman of The Nature Trust of BC; Richard Klafki, Nancy Newhouse and Adrian Leslie of Nature Conservancy of Canada; Juliet Craig and Adrienne Shaw of Kootenay Conservation Program; Dave White of Canal Flats Wilderness Club; Rick Hoar and Dr. Suzanne Bayley of Columbia Wetlands Stewardship Partners, among others. A preliminary list of organizational partners includes:

- BC Ministry FLNRORD, Ecosystem Section
- Canal Flats Wilderness Club
- Columbia Wetlands Stewardship Partners
- Creston Valley Wildlife Management Authority
- East Kootenay Wildlife Association
- Kootenay Conservation Program
- Lake Windermere Rod & Gun Club
- Nature Conservancy Canada
- Slocan Lake Stewardship Society
- The Nature Trust of BC
- Trans-border Grizzly Bear Project

Cover photo: Columbia Wetlands at Luxor Linkage (Credit: Richard Klafki).

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OVERVIEW

This preliminary report was prepared for the Kootenay Conservation Program (KCP) to provide background on the justification and anticipated large-scale conservation benefits of a new initiative called "Kootenay Connect". The premise behind Kootenay Connect is that landscape linkages focusing on large riparian-wetland complexes are essential for conserving biodiversity, movement corridors, and ecological functions over time in BC's Kootenay region. Given this, the objective of Kootenay Connect is to blend a science- and community-based approach to large landscape conservation by identifying connectivity areas throughout the East and West Kootenays focused on habitat connectivity, biodiversity hotspots, and climate change refugia.

This primer is organized into several parts. Part I explores the intellectual and conservation rationale for the concept of Kootenay Connect. Part II discusses the successful components of the Creston Valley's Frog Bear Natural Area and considers how the Creston Valley 'proof of concept' can be applied to other potential landscapes in the region that have high biodiversity within wildlife movement corridors. Part III highlights global and regional initiatives that illustrate how Kootenay Connect aligns with strategies and goals operating in a larger context, and how this initiative can help the Kootenay region contribute to these broader conservation initiatives. Part IV identifies potential conservation tools, such as, protections, laws, policies, regulations and management plans that could be applied to conservation and management of wildlife corridors and areas of high biodiversity within a variety of jurisdictions, both public and private. Part V provides a list of potential case studies of key connectivity areas in the Kootenays for inclusion across the region to ultimately develop a framework for identifying, prioritizing and implementing conservation actions. Part VI identifies next steps beyond this primer to effectively deliver Kootenay Connect.

PART I. INTRODUCTION – WHY KOOTENAY CONNECT?

The impetus for developing the new initiative of "Kootenay Connect" is based on ecological principles, with downstream social, political and economic implications. The Trans-border Grizzly Bear Project (TBGBP) has identified corridors for grizzly bears across most human-settled valleys with major highways across the Kootenay region (Proctor et al. 2015) in response to evidence of extensive population-level fragmentation (Proctor et al. 2012). Based on this research, TBGBP focused connectivity management on the Creston Valley; and over a decade or more, successfully re-established connectivity between the South Selkirk and South Purcell mountains in that area (Proctor et al. 2018). The main linkage area was the northern end of the Creston Valley that is dominated by the Creston Valley Wildlife Management Area (CVWMA), a large world class riparian-wetland complex that is also a regional biodiversity hotspot[1] (Fig. 1). That special area was given the moniker, the "Frog Bear Natural Area", to highlight the fact that the endangered northern leopard frog is also staging a comeback in shallow open water wetlands exactly where grizzly bears are traversing the valley bottom.

[1] https://www.crestonwildlife.ca/wetlands/biodiversity

Soon after, and with this frog-bear species overlap in mind, it became clear that many of the predicted grizzly bear connectivity areas in Proctor et al. (2015) also clearly overlapped with valley bottom riparian-wetland areas throughout the Kootenay region. These findings have led us to want to consider other important regional linkage areas and develop a large landscape approach through Kootenay Connect. This initiative is designed to build on conservation success in the Creston Valley to establish and enhance connectivity areas that provide benefits at a regional scale for multiple species at risk, sensitive habitats, movement corridors and ecological functions, and apply them across several landscapes within the Kootenays.

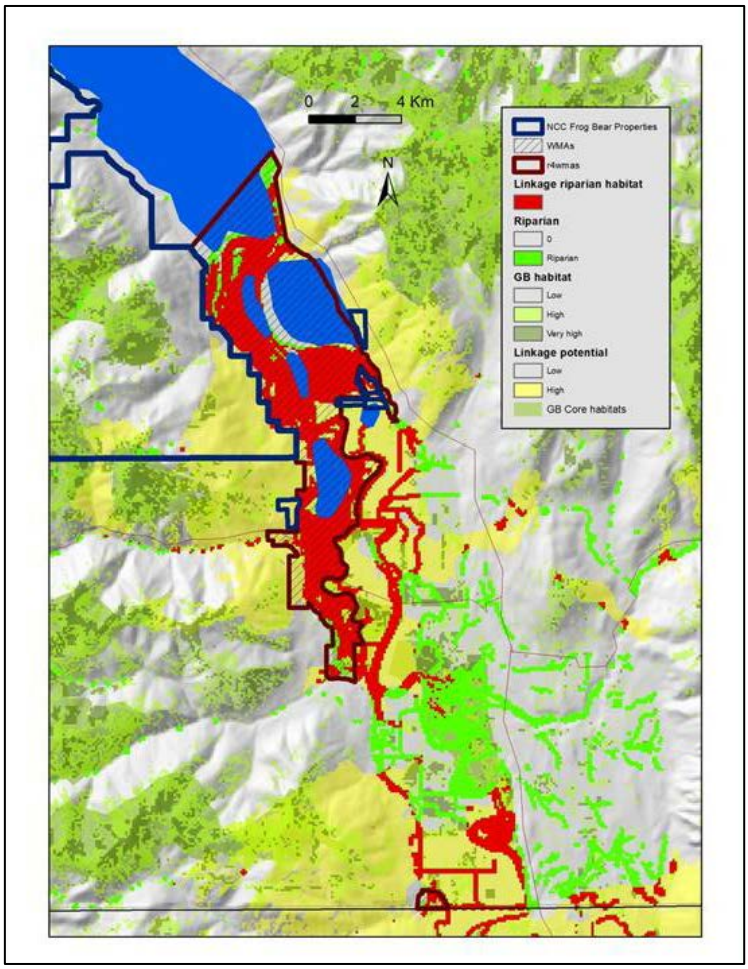


Figure 1. Close up of the overlap of riparian-wetland habitats and grizzly bears linkages (red) in the Creston Valley that reveals the mosaic of land ownership (Provincial, Creston Valley Wildlife Management Area , and private land conservation properties owned by Nature Conservancy Canada).

Figure 1 illustrates the diversity of land ownership that may necessitate a mosaic of conservation strategies respective of private and public landownership. The Trans-border Grizzly Bear Project has been working with a network of organizations to apply a mosaic of conservation strategies within the Creston Valley for over a decade which has resulted in the

re-establishment of inter mountain connectivity of grizzly bears (Proctor et al. 2018) and expanded the conservation utility of the Creston Wildlife Management Area in an east-west dimension to foster wildlife connectivity.

SCIENCE RATIONALE

We know that riparian areas often have higher species richness and abundance than adjacent habitats (Klein et a. 2009, Kinley & Newhouse 1997, Hauer et al. 2017) as well as different suites of species (Sabo et al. 2005). They also provide many ecosystem services and facilitate ecological processes including species migration along their lengths and across their widths as connections to important upland habitats (Naiman et al. 1993, Klein et al. 2009, Hauer et al. 2017). Several ecological processes spill over from riparian-wetland areas into adjacent lands to capture seasonal habitat requirements of species that rely on riparian habitats for some portion of their annual needs (Semlitsch and Bodie 2003, Hauer et al. 2017), particularly for amphibians (Todd et al. 2009. Cushman 2005, Bull 2006) as is the case for the Creston Valley northern leopard frog population mentioned above[2] and the region's grizzly bears (Proctor et al. 2012, 2015). It has also been suggested that to effectively manage for biological diversity (including ecological processes or ecological diversity) a landscape perspective is required (Naimans et al. 1993) that integrates adjacent upland habitats and often adjacent agricultural lands (Harvey et al. 2008).

Thus the paradigm that underpins Kootenay Connect is that landscape linkages focusing on low elevation large riparian-wetland complexes are essential for conserving biodiversity, movement corridors, and ecological functions in BC's Kootenay region.

Considering the entire landscape, grizzly bears are an imperfect but useful umbrella species in our region as they have large home ranges and use almost all habitat types throughout a year. Thus to maintain ~~regional~~ healthy grizzly populations, it is necessary to maintain a wide variety of habitats in reasonably natural condition and with connectivity areas linking mountain ranges. Both suitable habitats and connectivity need to occur across a large-scale grizzly bear metapopulation, as they are fragmented in the Kootenay region (Proctor et al. 2012, Hauer et al. 2017). Couple that with the fact that grizzly bears are iconic and can be used to generate conservation action (and funds) in some specific areas. This combination of scientific rationale and political interest is exactly what occurred in the Frog Bear Natural Area of the Creston Valley (Proctor et al. 2018) in which a diversity of partners leveraged grizzly bear conservation to establish an east-west wildlife corridor across the north end of the Creston Valley.

[2] Nature Conservancy Canada http://www.natureconservancy.ca/en/where-we-work/british-columbia/featured-projects/frog-bear/

One example of connectivity management is the partial protection of key private lands that dominate in the valley bottom. Key forest and agricultural lands were purchased by the Nature Conservancy of Canada to enhance and expand the conservation benefits of the CVWMA in an east-west direction (Fig. 2). When you add together the benefits to wildlife provided by protected crown land (CVWMA), land trust conservation properties, and conservation practices adopted by adjacent private farm and ranch lands by willing landowners, collaborative actions have measurably improved grizzly bear connectivity between the South Selkirk and South Purcell mountains (Proctor et al. 2018) which also has helped secure a critical breeding area for endangered northern leopard frogs.

Figure 2. Graphic developed by the Nature Conservancy of Canada for public communications illustrating the landscape view of The Frog Bear Conservation Corridor.

Thinking beyond grizzly bears how best to advance Kootenay Connect, we would like to expand this concept of landscape connectivity management by identifying other important places where diverse partners might work together to protect areas of high biological diversity and establish recognized wildlife corridors across the Kootenays (Hilty and Merenlender 2004, Todd et al. 2009). Since nature does not recognize private and public land ownership, we envision these biodiversity and wildlife corridors to be some combination of land ownership types, and with a mosaic of potential management and conservation actions that are relevant to the jurisdictional landscape across the Kootenays (Gallo et al. 2009, Miller and Hobbs 2002, Miller et al. 2003). That means we must consider existing provincial and local laws, regulations, and management strategies in both the private and government sectors to accomplish our conservation goals, such as, permanent acquisitions secured by land trusts, additions to BC's Protected Areas system, Wildlife Management Areas, Wildlife Habitat Areas, Regional District Zoning regulations, and/or targeted education and landowner assistance and stewardship to

improve private land management. (See Part IV and Appendix B for more information on conservation tools).

CLIMATE CHANGE REFUGIA

Climate change is having a major impact on global and local biodiversity (Bellard et al. 2012 Stein et al. 2013), resulting in increased stress, shifts in species ranges (Chen et al. 2011), and possibly a dramatic increase in the extinction rate (Pimm 2007). Stressors from climate change likely exacerbate impacts on our natural systems from habitat loss and degradation (Brook et al. 2008, Segan et al. 2016). The necessity for habitat refugia in a changing climate is strong and well documented (Seavy et al. 2008, Keppel and Wardell-Johnson 2012, Morelli et al. 2016). Identifying, recognizing and managing components of landscapes to function as "climate refugia" can allow nature to slowly adapt to the expected but unpredictable shifting conditions that will allow existing flora to hold on longer and provide wildlife with a safe haven while adjusting to a changing environment. Refugia have been defined by many and we favor definitions that include properties that promote species and ecological community persistence, sustain long-term population viability, ecological services (Sweeney et al. 2004), and ecological and evolutionary processes (Klein et al. 2009, Keppel et al. 2012, Reside et al. 2014).

Refugia are often associated with habitats of higher biodiversity, in species number, richness (different types) and ecological processes (Keppel and Wardell-Johnson 2012, Keppel et al. 2012). Riparian-wetland complexes have the ability to act as climate refugia in many places around the world (Sabo et al. 2005, Lees and Peres 2008, Reside et al. 2014, Selwood et al. 2015, Morelli et al. 2016, Nimmo et al. 2016) and for a decent portion of our regional natural resources (Kinley & Newhouse 1997, Hauer et al. 2017). We are not suggesting that riparian-wetland habitats represent the entire suite of climate change refugia for the Kootenay region, however we reason they are likely one component of a refugia system in a region that is expected to get hotter and drier (Holt et al. 2012). There is good evidence from other parts of the world that riparian habitats have the potential to be climate refugia (Croonquist and Brooks 1991, Maeve et al. 1991, Sweeney et al. 2004, Lees and Peres 2008, Klein et al. 2009, Reside et al. 2014, Selwood et al. 2015) and are therefore a relevant management objective for climate adaptation in the Kootenays.

Given that climate change is upon us, is projected to intensify in the coming decades, and will have profound impacts on our region's ecosystems, one of our best strategies to ensure nature's resilience is to manage landscapes for connectivity of the full spectrum of species and processes to facilitate adaptation to changing and shifting habitats. Protecting riparian-wetland areas is considered a good bet for refugia of current biodiversity. In addition, our preliminary

research suggests they are also important areas for landscape-level wildlife connectivity, along and across riparian corridors which link mountain ranges in our region. Our human settlement footprint is the dominant disturbance in the Kootenays and we need to provide unfragmented natural connectivity within and across human-settled valleys. As human development of our mountain valleys continues, there is no better time than the present to develop comprehensive conservation strategies to protect and improve management in some of the most important valley bottom habitats.

THE TIME IS RIPE FOR KOOTENAY CONNECT

Kootenay Connect is a project whose time has come. It is a culmination of science and stewardship efforts throughout the Kootenay region over the past decade and will tie together many priority actions that have been identified for this region. There is growing interest in participating in connectivity conservation from a broad range of organizations, as demonstrated at KCP's Fall Gatherings in 2017 and 2018, and KCP-sponsored Conservation Action Forums held in both the East and West Kootenays.

In conjunction with the scientific rationale described above, the timing of Kootenay Connect allows this initiative to build upon the growing capacity of conservation collaboratives that are emerging across the Kootenays. For example, new conservation collaboratives are being created with leadership from the Kootenay Conservation Program[3] (KCP) to form a network of "conservation neighbourhoods" (Fig. 3). These new collaborations are forming around a specific landscape or geography, such as a watershed, a valley, or a wildlife corridor; they require cross-boundary collaboration from multiple partners and stakeholders; and they are essential to addressing the mosaic of land ownership and management objectives inherent in landscape-scale conservation.

An objective of Kootenay Connect is to develop new, or strengthen existing, landscape-scale partnerships comprised of diverse stakeholders with a common interest in developing place-based solutions for local landscapes.

What unites these diverse stakeholders within KCP's conservation neighbourhoods is their shared commitment to a place and desire to address overarching, large-scale problems such as, habitat fragmentation, declining biodiversity, invasive species, recreational pressure, fire fuel management, and climate change. Participants acknowledge that resolution of these long-term, systems-level problems, will require leveraging a diversity of resources, developing collective

[3] www.kootenayconservation.ca

goals, and providing planning and actions that transcend organizational, land ownership, political, and jurisdictional boundaries.

This type of collaborative approach to identifying and addressing landscape-scale issues is exactly what's needed for Kootenay Connect to succeed. Working with KCP and its diverse partnership, we will engage key stakeholders with interests in private and public lands within each landscape corridor in order to develop a mosaic of conservation activities, strategies, and solutions that will inform how Kootenay Connects' science results in conservation on the ground.

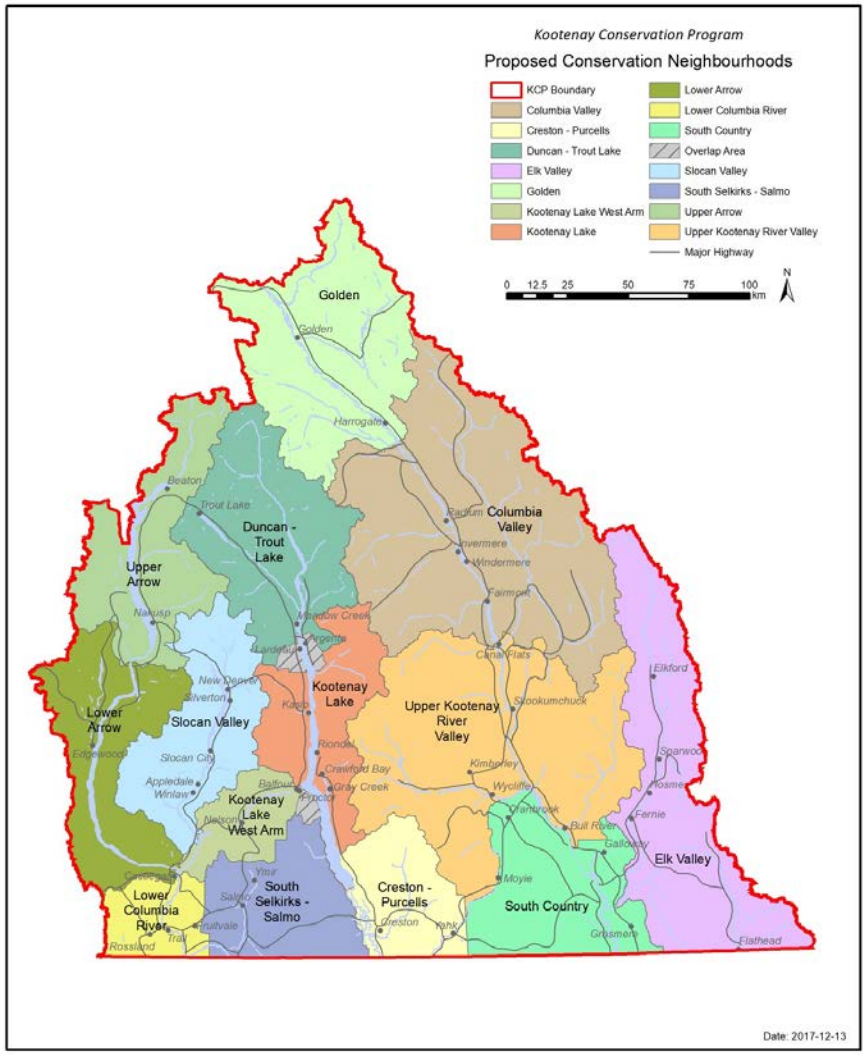


Figure 3. Map of the Kootenay Conservation Program's proposed 14 Conservation Planning Neighbourhoods in the East and West Kootenays.

In Figure 3, the Slocan Lake Watershed, Columbia Valley, and Lower Columbia River are neighbourhoods where landscape-scale conservation action forums have occurred and collaboratives are underway.

PROJECT DESCRIPTION

The goal of Kootenay Connect is to identify, assess and initiate establishment of regionally recognized wildlife connectivity areas across the human-settled valleys within the East and West Kootenays. Preliminary analyses suggest that there is significant overlap between grizzly bear connectivity areas and riparian-wetland complexes in most of our major valleys. These riparian-wetland complexes are also excellent biodiversity hotspots and potential refugia from the impacts of climate change.

Kootenay Connect will be developed over the next three years. In Year 1 (2019/20) of our project we will integrate grizzly bear connectivity mapping with riparian-wetland complexes, climate change adaptation modeling, and expert opinion as a basis for identifying 12 of the most important connectivity areas across the Kootenays (Fig. 4). Also in Year 1, we will scale-down to focus on four connectivity areas to identify conservation targets, threats and opportunities where local champions are already working to develop initial conservation management frameworks. These four areas will become case studies to explore local, regional and provincial resource agencies and stewardship groups (e.g., partners of the Kootenay Conservation Program) to develop a mosaic of strategies that will encompass both private and public lands. (See Part V for more information about developing and applying case studies). At the end of Year 1, we will prepare a report, *Kootenay Connect: Riparian Wildlife Corridors for Climate Change* that will update this preliminary report to KCP and highlight the results of scientific analysis, mapping, and local engagement to advance connectivity conservation in the four focal connectivity areas. In Years 2 and 3, we will expand on our approach from Year 1 plus take our lessons learned and collaborate with KCP to form local corridor initiatives in the other eight corridors where they do not yet exist. (See Part VI for more information on next steps).

There is considerable expertise within the East and West Kootenays for us to tap into. We are confident in this approach based on the success of two conservation action forums co-hosted by KCP in February 2017 for the Slocan Lake Watershed (Mahr 2017a,b) and December 2017 for the Columbia Valley (Mahr 2018a) with many potential partners ready to cooperate on Kootenay Connect. We know from the enthusiastic response to the workshop, “Kootenay Connect: A Collaborative Approach to Corridors” (October 2018), diverse stakeholders throughout the Kootenays are primed to see project-level information rolled-up into a larger landscape context. All agree the time has come for addressing the landscape holistically by incorporating habitat complexes, multiple species, movement corridors, and ecological functioning to inform on-the-ground conservation action.

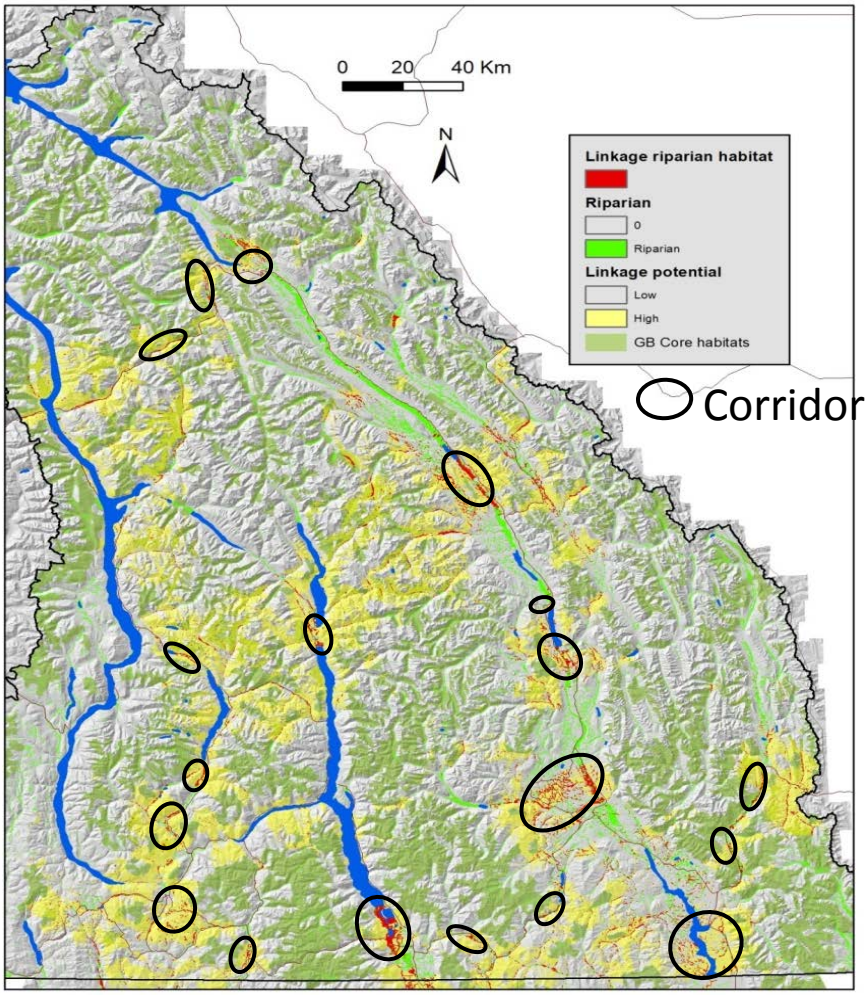


Figure 4. A map of the Kootenay region that illustrates the overlap between predicted grizzly bear linkages and riparian habitat that are potential focal corridors for Kootenay Connect.

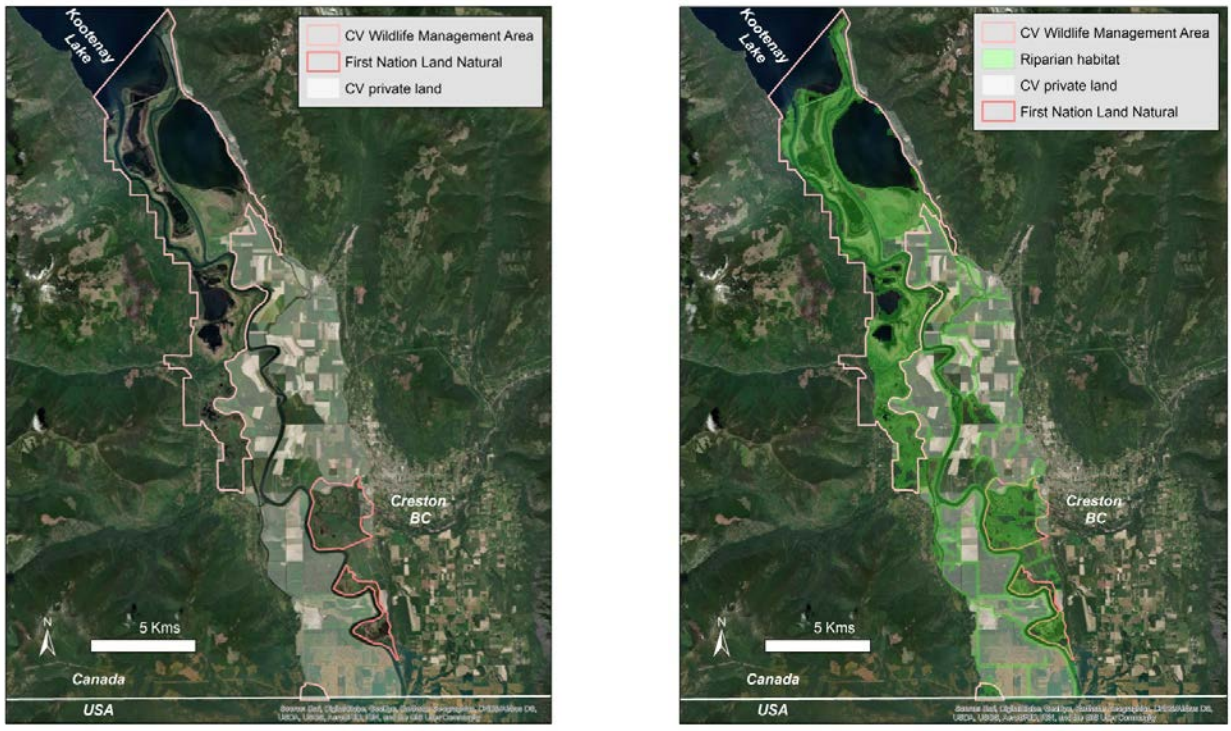
In Figure 4, overlap areas (red) between predicted grizzly bear linkages (yellow) and riparian (lime green) habitat. Red areas with ovals are preliminary riparian-wetland biodiversity hotspot corridors that are candidates for conservation within Kootenay Connect.

PART II. CRESTON VALLEY CASE STUDY

In 2005, researchers for the TBGBP radio collared an adult male grizzly bear in the South Purcell Mountains, high in the mountains of Kidd Creek. The next April, this bear frequented the Creston Valley off a ridge at the north end of the valley, just south of Duck Lake. He crossed Highway 3A, the Kootenay River, and much of the Creston Valley to reach good spring habitat in the Creston Valley Wildlife Management Area (CVWMA) each evening, but went back to the mountains during daylight. He was using a very well used wildlife “game” trail and with a

remote camera TBGBP documented the trail was also being used by several other large mammal species to share their time between the rich productive valley bottom habitat and the adjacent upland habitats. This bear stimulated inclusion of the Creston Valley in TBGBP's grizzly bear research and biologists began to regard the 7000 hectare (17,000 acres) CVWMA – originally established in 1968 for wildlife and waterfowl conservation and flood control – as integral to the transboundary grizzly bear solution.

Fast-forward and a decade later we had ample evidence that the riparian-wetland habitats of the CVWMA (which covers 41% of the valley bottom flats between Kootenay Lake and the US border, Fig. 5) were both important seasonal and connectivity habitats for grizzly bears from the South Selkirk and Purcell mountains (Proctor et al. 2015) and were part of a regional solution to re-connecting regional populations of grizzly bears that had been extensively fragmented (Proctor et al 2012). Not only did TBGBP's connectivity habitat modeling suggest the Creston Valley with its extensive riparian-wetland habitat should be important for re-establishing movements between mountain ranges, the bears were validating our predictions. We therefore chose the Creston Valley to focus our connectivity management efforts in what amounted to an experimental question: *Could we reconnect the decades-long isolated South Selkirk grizzly bear population to the larger healthier population in the South Purcell Mountains?*



a) **b)**

Figure 5. a) The Creston Valley matrix of private lands and farms and the Creston Valley Wildlife Management Area and b) same landscape with the extensive riparian-wetland habitats indicated in lighter green.

The management activities within the Creston Valley by the TBGBP have been centered on grizzly bear connectivity with the idea that they might be a useful umbrella species. Therefore, one of our primary activities has been to focus on expanding the conservation utility of the CVWMA as the centre piece for east-west inter-mountain connectivity. Although the north-south ecosystem and species connectivity is equally important in this trans-border region, particularly in terms of climate change, we had to act immediately on conserving this cross-valley linkage area at the south end of Kootenay Lake as the best opportunity for maintain resilient grizzly bear populations in the area into the future.

With our data and maps of actual and predicted grizzly bear movement in-hand, TBGBP started working with the Nature Conservancy Canada and Yellowstone to Yukon Conservation Initiative to purchase strategic land in fee simple and establish conservation covenants with willing land owners that would enhance ecological connectivity in the east-west dimension across the human-settled valley bottom. Because some of these properties that were purchased were being used for agriculture and included in BC's Agricultural Land Reserve (ALR), we had to acquire a variance from the overseeing BC Agricultural Land Commission to allow restrictions on agricultural activities to be "wildlife friendly". Currently, these purchased lands are managed for wildlife connectivity and northern leopard frog conservation.

We also worked with local farmers and ranchers to integrate wildlife-friendly activities and use electric fencing to secure wildlife attractants. The primary goal of on-the-ground management efforts was to reduce human-wildlife conflict that ultimately results in improved human safety, decreased property damage (of crops, livestock, fences, etc.), and improved tolerance. After a decade of management we have documented an increase in inter-mountain movement and breeding of grizzly bears across the valley (Proctor et al. 2018) (Fig. 2).

This overall effort is a work in progress, as there is still more to be done in regards to private land conservation and documenting the benefit to other important wetland and riparian species. For example, TBGBP is initiating a student project to assess the dispersal and connectivity of threatened western toads in relation to the CVWMA and upland habitats. Another project we are working on is establishing a safe and ecologically sound dead livestock composting facility that will improve valley bottom water quality and reduce a wildlife attractant. This effort is integrating local farmers and ranchers with regional, provincial and federal governments.

The lesson learned from the Creston Valley Frog Bear example: Science research can help confirm the most important locations for conservation measures across landscapes. Using this knowledge, it is possible to develop conservation objectives that are compelling and lead to successful integration of multiple jurisdictions as different interests and mandates do their part to achieve a common vision for conservation.

In the case of the Creston Valley connectivity area, we integrated provincial, regional and municipal governments, private land owners, conservation organizations, and research scientists to facilitate improved landscape level connectivity and enhanced conservation utility of the CVWMA. This result, has not only re-connected an isolated grizzly population and increased protection for an endangered amphibian's breeding area, it has led to an increasing local culture of conservation as residents fence fruit orchards and manage bear attractants in an effort to coexist with grizzly bears and avoid using vehicles on dike roads adjacent to the northern leopard frog's breeding ponds.

PART III. COMPLEMENTARY INITIATIVES

There are many on-going conservation opportunities and initiatives globally, nationally, provincially and regionally that are complementary to the purposes of Kootenay Connect and within which Kootenay Connect can contribute conservation outcomes that will result in more protected land strategically located across the Kootenays (Appendix A). Over the next few years, we anticipate Kootenay Connect will contribute to reaching some of the various goals and targets of these complementary initiatives. For example, global initiatives include the United Nations Convention on Biodiversity Aichi Biodiversity Target 11[4] and designation of Key Biodiversity Areas[5]. Nationally, the 2020 Biodiversity Goals and Targets for Canada[6] has led to the recent Target 1 Challenge Fund of the Canada Nature Fund. The Provincial Wildlife Management Plan 2020 and proposed provincial BC Species at Risk legislation are two opportunities that will guide provincial priorities in the coming years. Regionally, the Fish & Wildlife Compensation Program (FWCP)-Columbia Basin Action Plans, the Columbia Basin Trust's new Ecosystem Enhancement Program, and the Conservation Neighbourhoods approach developed by the Kootenay Conservation Program all work towards some portion of Kootenay Connect's overall goal of conserving connectivity areas with high biodiversity.

PART IV. POTENTIAL CONSERVATION TOOLS

Once high priority regions on the landscape are identified to increase conservation protection and actions, it is important to know what measures or tools are available in the conservation toolbox that can apply to multiple jurisdictions and a mosaic of land ownerships. To increase our collective knowledge of appropriate tools (e.g., land designations, legislation, regulations

[4] https://www.cbd.int/sp/targets/rationale/target-11/
[5] http://www.keybiodiversityareas.org/what-are-kbas
[6] https://biodivcanada.chm-cbd.net/2020-biodiversity-goals-and-targets-canada

and policies), we have put together the *Land Use Designations, Laws and Policies to Protect Biodiversity Toolbox* (Tables 2 and 3 in Appendix B) that applies to federal, provincial and local levels of government and private land. This matrix is a work in progress, and will be expanded and improved as Kootenay Connect and local stakeholders begin assessing how best to designate new lands for conservation, and influence government management plans and practices that protect species at risk and habitat connectivity into the future. We envision working with KCP to develop a *Multi-jurisdictional Conservation Connectivity Toolbox* to guide the application of tools based on location-appropriate conditions.

PART V. APPLICATION ACROSS THE KOOTENAY REGION

The Kootenay region's Columbia Basin has seen substantial conservation effort around our regional wetland complexes, but with minimal emphasis on connectivity with adjacent upland habitats. There also are considerable protected areas across the Columbia Basin, but again with minimal emphasis on connecting Wildlife Management Areas and Provincial and National Parks that were created before 'connectivity' became a focus of landscape-level conservation. With a decade or more of connectivity research under our belts, locally and across the globe, we now know that linking our habitats is essential to realizing ecological integrity and nature's ability to adapt to climate change.

This project is designed to focus on – and add the connectivity dimension to – the regional base of conservation lands and efforts across the Kootenays. Importantly, Kootenay Connect will sew together upland habitats with riparian-wetland habitats for the benefit other species of interest (Olson et al. 2007). We are endeavoring to integrate each realm into a composite effort that bridges protection and management priorities and results in connecting suites of species and ecological processes that require multiple habitat types.

It is our intention to work with and expand upon existing riparian- and wetland-based conservation initiatives that are underway across the Kootenays (e.g. Columbia Wetland Stewardship Partners, Slocan Lake Stewardship Society, Creston Valley Wildlife Management Area). This will work to connect habitats in several dimensions, north-south within mountain ranges and along valley bottoms, east-west between mountain ranges, and elevationally between valley bottom and upland habitats.

Our vision is to add the landscape-scale connectivity dimension, integrate conservation efforts across ecosystems, and help to kick start conservation collaborative where they are not yet occurring.

We envision using a selection of tools from a multi-jurisdictional toolbox, integrating all levels of government, and private land conservation and stewardship activities to reach common conservation goals. Where relevant, we would integrate and expand on existing complementary initiatives (discussed above and in Appendix A); and utilize various tools that we have begun to outline in the *Land Use Designations, Laws and Policies to Protect Biodiversity Toolbox* (Appendix B).

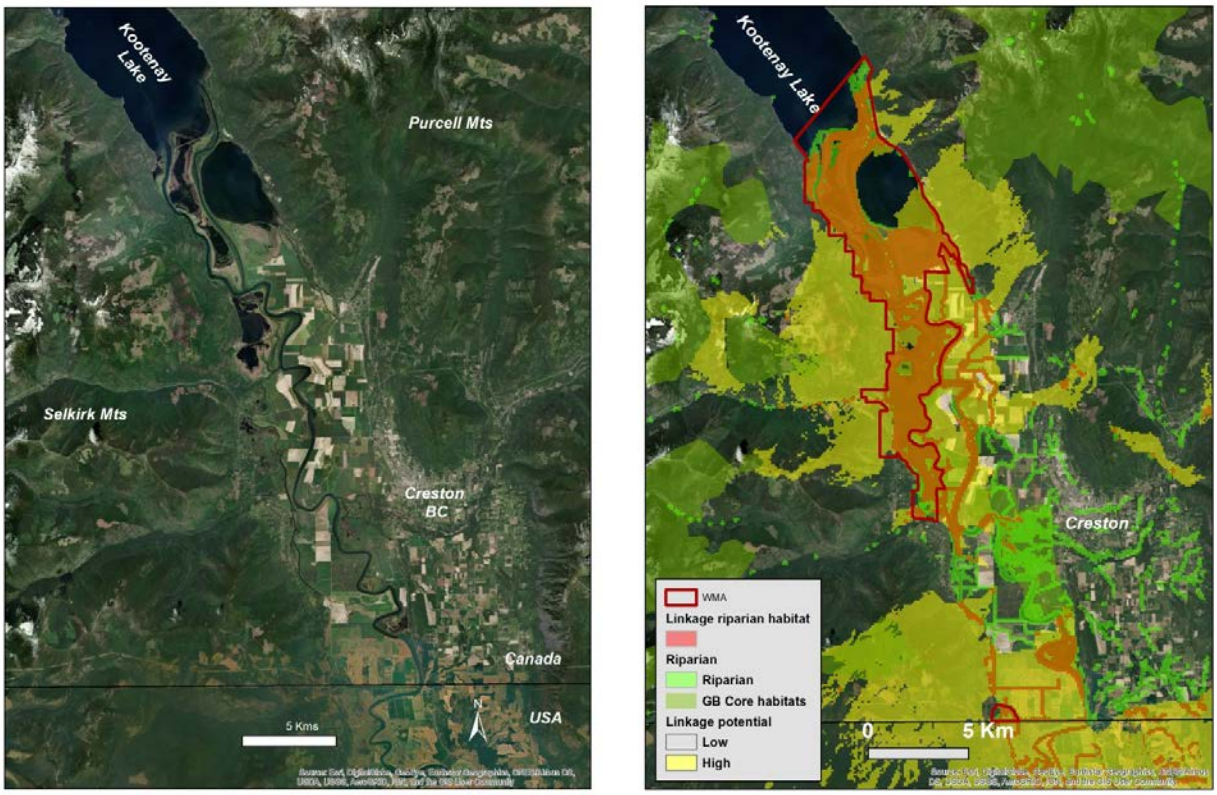
For example, it may be appropriate to apply for an expansion or creation of a Wildlife Management Area on public lands that are important riparian-wetland habitats; or directly purchase in fee simple (or place under conservation covenant) through a land trust private lands that are adjacent to an important riparian area as connectivity habitat to adjacent upland habitats; or embark on wetland restoration on private lands to reclaim degraded habitat. We envision that such specific activities will be undertaken in cooperation with local stewardship groups that in many areas already exist. We have already made contact with several such stewardship groups who are interested in such a working relationship and KCP provides an existing collaborative platform to strengthen these partnerships.

The most promising landscapes for conservation action, and where we plan to initially focus our Kootenay Connect, are the following four connectivity areas where local champions are already working collaboratively to advance conservation at a landscape scale. These four areas are the Creston Valley, Bonanza Biodiversity Corridor in the north Slocan Valley, Columbia Wetlands-north of Radium, and Columbia Lake Wetlands (near Canal Flats).

FOCAL CONNECTIVITY AREAS FOR YEAR 1 (2019/20)

1. Creston Valley-Phase 2

***Lead stewardship groups*:** Trans-border Grizzly Bear Project and Creston Valley Management Authority, Nature Conservancy of Canada. The center point of the Creston Valley corridor is the Wildlife Management Area, and considerable connectivity effort linking the riparian-wetland valley bottom to adjacent upland habitats has been accomplished (as discussed above in Part II, Creston Valley Case Study). The Nature Conservancy of Canada (with fundraising help from the Yellowstone to Yukon Conservation Initiative) has already purchased several strategic lands for grizzly bears and northern leopard frogs. There is more work to be done to ensure inter-mountain connectivity across this valley (Figs. 1, 2, 5, 6 and 10). In Phase 2, all partners are motivated to continue collaborating on conservation land purchases and projects contributing to Kootenay Connect.



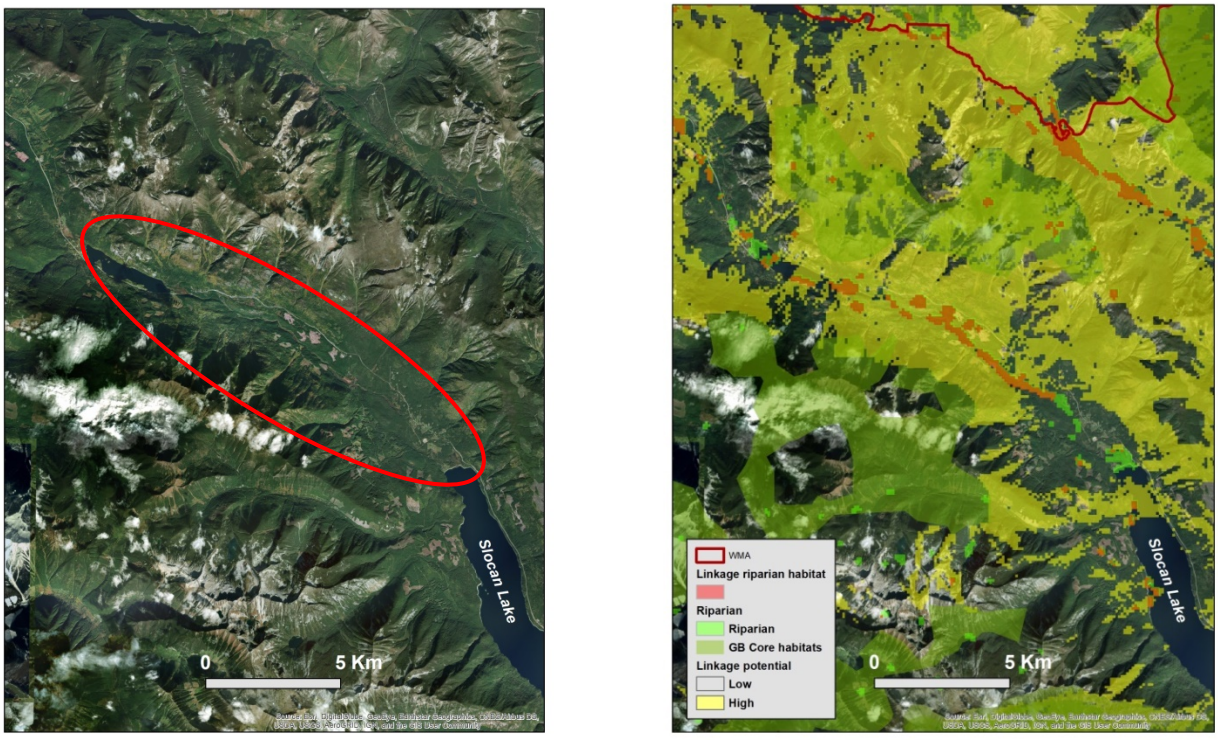
a) b)

Figure 6. Creston Valley corridor connecting the Purcell and Selkirk mountains along BC Highway 3A north of Creston, BC.

In Figure 6, a) Google Earth image of the Creston Valley corridor in red oval; and b) the same area with grizzly bear core (green) and linkage (yellow) habitats overlaid with riparian habitats (orange) in the valley bottom.

2. Bonanza Biodiversity Corridor (BBC): This 140 km^2 corridor located between Slocan and Summit lakes extends ~14 km along Highway 6. The BBC has great potential to be a significant wildlife and ecological corridor linking Valhalla and Goat Range Provincial Parks in the Valhalla and Selkirk mountains, respectively (Figs. 7 and 10).

***Lead stewardship groups*:** Slocan Lake Stewardship Society (SLSS) and Slocan Wetlands Assessment & Monitoring Project (SWAMP). The SLSS is a NGO dedicated to retaining the ecological integrity of the Slocan Lake Watershed through applied scientific research and education. At the Conservation Action Forum co-hosted by SLSS and KCP, the Bonanza Biodiversity Corridor was recognized as a unique ecosystem in need of protection (Mahr 2017a). The BBC was also identified as a grizzly bear corridor (Proctor et al. 2015), and recently a radio collared bear used this area to move across the valley between the two mountain ranges. A high-level assessment of the BBC's conservation values and habitat connectivity areas was conducted by KCP (Mahr 2018b). In addition, SWAMP has surveyed, classified and mapped wetlands throughout the BBC, and their report on species at risk identified many unique native flora and fauna not found elsewhere in the Columbia Basin. Summit Lake is a well-studied breeding hotspot for western toads, possibly the largest in BC. The SLSS and SWAMP are enthusiastic supporters of Kootenay Connect.



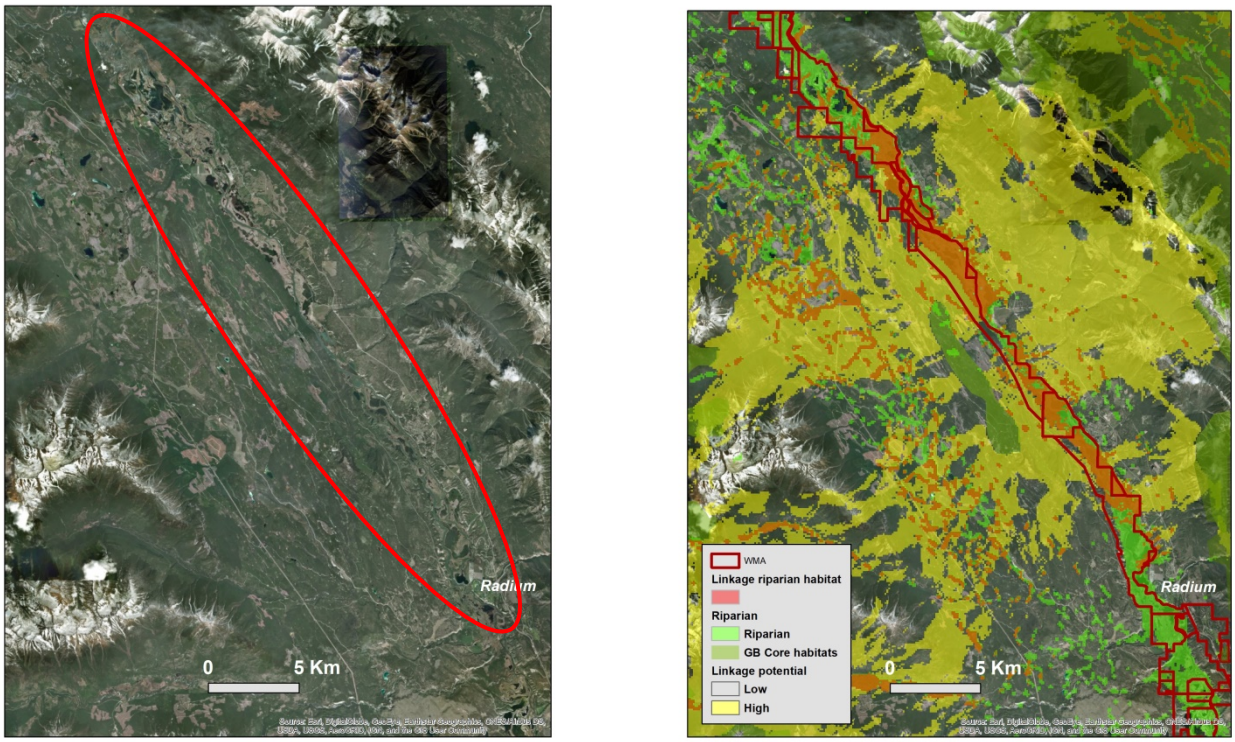
a) **b)**

Figure 7. Bonanza Biodiversity Corridor extending along BC Highway 6 between Slocan and Summit Lakes connecting the Valhalla and Selkirk mountain ranges.

In figure 7, a) Google Earth image of the Bonanza Biodiversity Corridor in red oval; and b) the same area with grizzly bear core (green) and linkage (yellow) habitats overlaid with riparian-wetland habitats (orange) in the valley bottom.

3. Columbia Wetlands north of Radium, BC in the Columbia Valley. The 180-km long Columbia Wetlands within the Rocky Mountain Trench extends between Donald and Canal Flats, BC (Figs. 8 and 10). It is one of the largest intact wetland complexes in Canada, and an international Ramsar Site recognized by the United Nations. Much of the Columbia Wetlands is encompassed within the Columbia Wetlands Wildlife Management Area with a mix of private and federal lands managed as National Wildlife Areas.

***Stewardship group*:** The Columbia Wetlands Stewardship Partners (CWSP), a NGO partnership of over 30 organizations that is dedicated to engaging the general public and working with all levels of government to implement a shared stewardship model for the management of the upper Columbia River and adjacent Columbia Wetlands. The partnership includes a variety of environmental, agricultural, hunting and fishing organizations, various levels of federal and provincial government, local communities and First Nations, and business representatives from tourism and forestry sectors. In 2017, KCP and CWSP co-hosted a conservation action forum of science experts, local and provincial government and important stakeholders to identify conservation targets, threats and priority conservation actions for the Columbia Valley (Mahr 2018a). Two workshop outcomes were to identify and enhance connectivity and corridors, and to conserve and restore montane valley bottom processes and habitats that benefit a suite of species of interest and conservation concern. The CWSP is an enthusiastic supporter of Kootenay Connect and interested in adding landscape connectivity to their mission.



a) **b)**

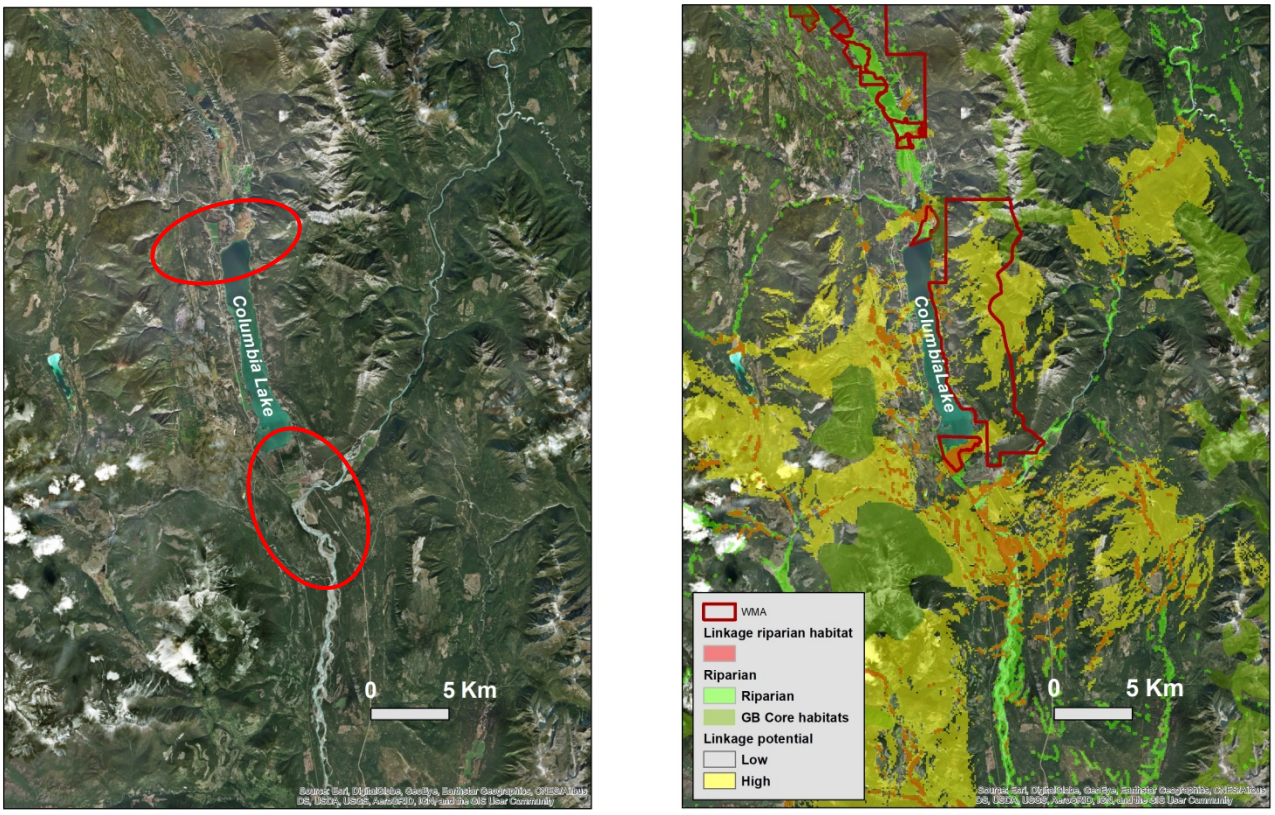
Figure 8. Columbia Wetlands north-south along the Rocky Mountain Trench and with east-west corridors connecting the Purcell and Rocky Mountains along BC Highway 95 north of Radium, BC.

In Figure 8, a) Google Earth image with Columbia Wetlands corridor in red oval; and b) the same area with grizzly bear core (green) and linkage (yellow) habitats overlaid with riparian-wetland habitats (orange) in the valley bottom.

4. Columbia Lake Wetlands. The East Side Columbia Lake Wetlands (ESCLW) is an extensive ~69 km^2 Wildlife Management Area near Canal Flats that encompasses habitat on the east side of the lake and wraps around the south end to include an important wetland area (Figs. 9 and 10).

***Lead stewardship group*:** East Kootenay Wildlife Association (EKWA) and Canal Flats Wilderness Club are primarily hunting and fishing organizations with a strong conservation ethic that recognizes the economic, recreational and ecological importance of healthy wildlife populations. EKWA is concerned because this area has been experiencing increased development pressure which is threatening to eliminate options for habitat connectivity at the north and south ends of Columbia Lake. The East Side Columbia Lake Wetlands WMA abuts Columbia Lake Provincial Park that connects to the northern portion of the WMA which

contains an important small wetland on the north end of Columbia Lake. Both the east and north wetland complexes were identified as grizzly bear corridors (Proctor et al. 2015). At the south-end, the important river crossroads (Kootenay River passes within 1 km of the headwaters to the Columbia River system) is an important opportunity to establish landscape connectivity between the Rocky and Purcell mountains. Also, there is considerable east-west corridor potential in the lands up to 5 km south of Columbia Lake (Figure 9b). EKWA has expressed interest in working with Kootenay Connect on expanding conservation management to facilitate cross-valley connectivity.



a) **b)**

Figure 9. Columbia Lake Wetlands corridors connecting the Purcell and Rocky mountains along BC Highway 95 near Canal Flats, BC.

In Figure 9, a) Google Earth image with the Columbia Lake Wetlands corridors in red ovals; and b) the same area with grizzly bear core (green) and linkage (yellow) habitats overlaid with riparian-wetland habitats (orange) in the valley bottom.

POTENTIAL FOCAL CONNECTIVITY AREAS FOR YEARS 2 AND 3 (2020-2022)

As Kootenay Connect gains momentum and begins achieving results, we plan to expand our riparian-wetland corridor focus to potential new areas. In Year 2, we will consider including these four areas: Wycliffe Grasslands Corridor, Lardeau-Duncan Flats, Elk Valley Corridor, and the Slocan River Valley.

1. Wycliffe Wildlife Corridor between Cranbrook and Kimberley (Fig. 10). This grassland-open forest corridor includes Luke Creek Wildlife Corridor to the north, Pine Butte Ranch Conservation Area in addition to Teck Cominco lands and working ranches. This corridor supports a mosaic of vegetation communities with biological richness and rarity, and significant populations of rare and endangered species.

***Lead stewardship groups*:** Rocky Mountain Trench Natural Resources Society, Nature Conservancy Canada, The Nature Trust of BC. The Wycliffe Wildlife Corridor has received substantial conservation attention, from groups such as the Rocky Mountain Trench Natural Resources Society, Nature Conservancy Canada, The Nature Trust of BC, Columbia Basin Trust, Fish & Wildlife Compensation Program, Habitat Conservation Trust Foundation and others. Kootenay Connect would support and build on this effort.

2. Lardeau-Duncan Flats, between Kootenay and Duncan Lakes. The Lardeau Flats are a riparian-wetland complex at the north end of Kootenay Lake that is a pinch point between Kootenay and Duncan Lakes (Fig. 10). This area has seen considerable conservation attention in the form of private land conservation, including some wetland restoration work.

***Lead stewardship groups*:** The Nature Trust of BC, Fish & Wildlife Compensation Program, Wildlife Habitats for Tomorrow, Friends of the Lardeau.

3. Elk Valley Corridor. There are several riparian areas paralleling the Elk River and Highway 3 between Elko and the Alberta border (Fig. 10). These areas have been identified as good wildlife corridors, and there has been initial effort to manage them as suchThe Kootenay Conservation Program will be hosting a conservation neighbourhood workshop in the area in May 2019 and more specific actions and collaborators will be identified at that time

***Potential Lead stewardship group(s)*:** Sparwood Fish and Wildlife Association, Elkford Rod and Gub Club, Wildsight Elk Valley.

4. Slocan River Valley south of Slocan Lake to Highway 3A (Fig. 10)**.** In the Slocan Valley south of Slocan Lake along the mainstem of the Slocan and Little Slocan rivers there are extensive

riparian areas with associated wetland complexes that are potential areas for exploring Kootenay Connect.

***Stewardship groups*:** Slocan River Stewardship Society (SRSS) and Slocan Wetlands Assessment & Monitoring Project (SWAMP).

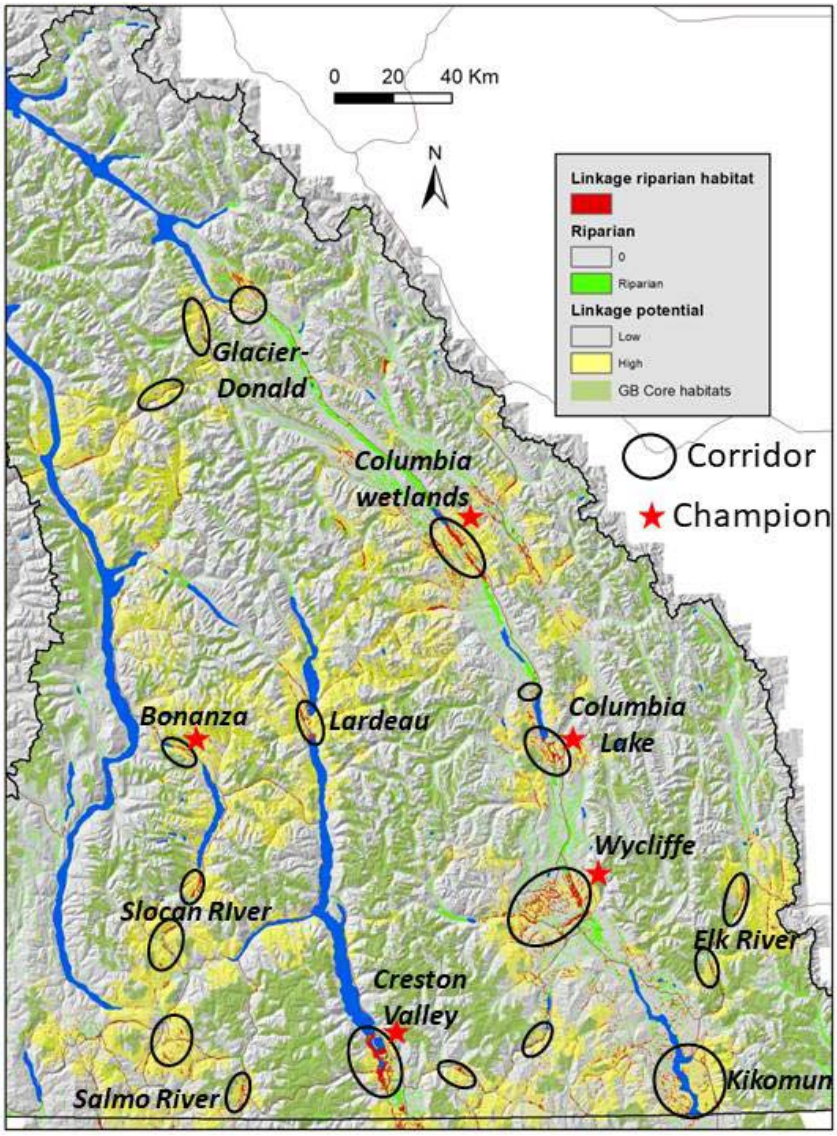


Figure 10. Kootenay Connect's target corridors with local champions identified (star). In corridors currently without clear champions, Kootenay Connect will work with KCP's partners, land trusts, and local and provincial and federal (e.g. Canadian Wildlife Service, Parks Canada) government, and First Nations to identify potential collaborators.

PART VI. WHAT'S NEXT FOR KOOTENAY CONNECT?

NEXT STEPS

The following steps will assist with moving this initiative forward:

- **Finalize Mapping**. Our first task will be to finalize our ecological mapping of carnivore/wildlife/riparian/climate change corridors to be considered for enhanced protection and connectivity management. We will integrate the grizzly bear connectivity model (Proctor et al. 2015), the regional ecological climate-response modeling by Greg Utzig (2015, 2016), Provincial Ministry of Environment and Climate Change Strategy's conservation planning modelling by Don Morgan, and information gathered from several regional wildlife and riparian experts (such as, Irene Manley, Marlene Machmer, Jakob Dulisse, Ian Adams, Randy Moody and others).
- **Integrate GIS layers.** TDGBP's grizzly bear-riparian corridor layer with regional climate change modeling results (Utzig) to yield a value-added product for conservation planning by putting each corridor into a regional landscape perspective.
- **Produce detailed GIS maps for each of 4 Focal Corridors**: Creston Valley, Bonanza Biodiversity Corridor, Columbia Wetlands, and Columbia Lake Wetlands
- **Work with Champions in Focal Corridors.** In consultation with our project partners (see below), we will visit the four identified focal corridors and consult with local stewardship groups, First Nations, local and provincial land managers, and other regional experts to ground truth mapping and identify corridor-specific threats and realistic conservation opportunities in the public and privates sectors. These four focal corridors will serve as test cases to develop a framework and methodologies for approaching our overall workup of each of the 12 anticipated corridors. The proof of concept we develop will then be applied to subsequent corridors in Years 2 and 3.
- **Analyse Case Studies:** 4 Focal Corridors to develop a framework for identifying, prioritizing and implementing conservation actions.
- **Compile existing resources for each corridor**.
- **Report out to partners and funders.** The results of these activities will be presented in a report entitled, *Kootenay Connect: Riparian Wildlife Corridors for Climate Change.* Considerable effort will be invested in this report, as it will showcase the initiative and be our blueprint for future conservation efforts across the region. Matrix of Kootenay Connect corridor-specific needs, effort and conservation tools to identify our approach to new corridors in Years 2 and 3. Kootenay Connect Summit at KCP's Fall Gathering 2019.
- **Apply Kootenay Connect concept in other areas of the Kootenays.** In Years 2 and 3, we will work with stewardship groups, First Nations, and local and provincial land managers to implement the corridor specific conservation strategies decided upon in Year 1. Kootenay Connect report providing rationale, proofs of concept and tools for scaling up local conservation efforts to provide solutions for landscape conservation.

ROLE OF KOOTENAY CONSERVATION PROGRAM

KCP will help facilitate Kootenay Connect to:

- Provide a venue for consultation/input through conservation neighbourhood activities
- Provide communication between the project, their partners and public (i.e., eNews, website)
- Support and facilitate meetings
- Liaise with the KCP Securement Committee (especially for implementation phase)
- Provide access to conservation planning and stewardship information

POTENTIAL PARTNERS

This project engages many partners within a large network of stewardship groups, First Nations, and local and provincial land managers. KCP and TBGBP sponsored a workshop dedicated to the topic of Kootenay Connect in October 2018 with representatives of many of these groups attending (*).

A preliminary list of potential partners of Kootenay Connect:

- BC Ministry FLNRORD, Ecosystem Section*
- Canal Flats Wilderness Club*
- Columbia Wetlands Stewardship Partners*
- Creston Valley Wildlife Management Authority*
- East Kootenay Wildlife Association*
- Elkford Rod and Gun Club
- Kootenay Conservation Program*
- Kutenai Nature Investigations*
- Lake Windermere Rod & Gun Club*
- Nature Conservancy Canada*
- Pandion Ecological Research*
- Slocan Lake Stewardship Society
- Slocan River Streamkeepers
- Sparwood Fish and Wildlife Association
- The Nature Trust of BC*
- Trans-border Grizzly Bear Project*
- Valhalla Foundation for Ecology and Social Justice
- Wildsight

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APPENDIX A: COMPLEMENTARY INITIATIVES

Table 1. Global, national, provincial and regional initiatives which are complementary to the purposes of Kootenay Connect.

Initiatives	Purpose	Goal / Objective	Implications
GLOBAL			
United Nations Strategic Plan for Biodiversity for 2011–2020 and Aichi Biodiversity Targets	Set global targets for conservation under the Convention on Biological Diversity.	Strategic Goal C: *To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity.*	This goal includes a specific target for spatial conservation, **Aichi Target 11** which states: *By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.* https://www.cbd.int/sp/targets/rationale/target-11/
Key Biodiversity Areas Prepared by the Joint Task Force on Biodiversity and Protected Areas led by the IUCN Species Survival Commission and IUCN World Commission on Protected Areas in association with the IUCN Global Species Programme	Provide a global standard for the identification of sites that contribute significantly to the global persistence of biodiversity in terrestrial, inland water and marine environments.	*Support the strategic expansion of protected area networks by governments and civil society.*	KBAs can help achieve the Aichi Biodiversity Targets (in particular Target 11, above), as established by the Convention on Biological Diversity; serve to inform the description or identification of sites under international conventions (such as Ecologically and Biologically Significant Areas described under the Convention on Biological Diversity, wetlands of international importance designated under the Ramsar Convention, and natural World Heritage Sites); inform private sector policies, environmental standards, and certification programs; support conservation planning and priority-setting at national and regional levels; and provide local and indigenous communities with new opportunities and benefits. http://www.keybiodiversityareas.org/home

National Initiatives	Purpose	Goal / Objective	Implications
2020 Biodiversity Goals and Targets for Canada	Set new medium-term goals and targets developed by federal, provincial and territorial governments to achieve long-term biodiversity outcomes.	**Strategic Goal A:** *By 2020, Canada's lands and waters are planned and managed using an ecosystem approach to support biodiversity conservation outcomes at local, regional and national scales.* **Target 1 Conservation Networks:** *By 2020, at least 17 percent of terrestrial areas and inland water, and 10 percent of coastal and marine areas, are conserved through networks of protected areas and other effective area-based conservation measures.*	These goals and targets describe results to be achieved through the collective efforts of a diversity of players both public and private whose actions and decisions have an impact on biodiversity. Target 1 for Canada is especially relevant to Kootenay Connect and is linked with the global Aichi Target 11 (discussed above). Canada is expected to prepare National Reports featuring successful case studies to the Convention on Biological Diversity. https://biodivcanada.chm-cbd.net/2020-biodiversity-goals-and-targets-canada#target_1
Target 1 Challenge Fund of the Canada Nature Fund Administered by Environment and Climate Change Canada	Federal government funding available to acquire critical habitats and landscapes in order to increase Canada's protected areas network.		The Challenge component of the Canada Nature Fund will provide up to $175 million over 4 years to establish new protected and conserved areas. In December 2018, the Target 1 Challenge Fund launched an Expression of Interest phase with the first cohort of successful projects to be notified in May 2019. The duration of the Canada Nature Fund is until March 31, 2023. https://www.canada.ca/en/environment-climate-change/news/2018/06/canada-nature-fund-special-ministerial-representative-and-national-advisory-committee.html
		Protected areas, IPCAs, and OECMs For activities supported by the Target 1 Challenge, examples of new protected areas could include: • Provincial and territorial government protected areas focused on nature conservation that may be established under designations, such as Provincial and Territorial Parks, Wilderness Parks, Wildlife Refuges, Ecological Reserves, Nature Reserves, Biological Reserves, Biodiversity Reserves, Natural Areas, Wilderness Areas, Habitat Protection Areas, Wildlife Management Areas, Conservancies, and Special Management Areas.	

		• In addition to government owned and managed areas, the Target 1 Challenge may also support collaboratively managed and non-government protected areas including Indigenous Protected and Conserved Areas (IPCA), privately owned conservation lands, areas protected and conserved through Indigenous land claim agreements and traditional use planning areas among others. • The Indigenous Circle of Experts (ICE) recommended the concept of IPCAs, which is a spectrum of protected and conserved area approaches led by Indigenous peoples in Canada (including Protected Area, OECMs, and other types of conservation). For more information on IPCA's please refer to the ICE report "We Rise Together". • IPCAs: from the Indigenous Circle of Experts, Indigenous Protected and Conserved Areas (IPCAs) are lands and waters where Indigenous people have a leadership role in protecting and conserving cultures and ecosystems through Indigenous laws, governance, and knowledge systems. • Other effective area-based conservation measures (OECMs): areas that are not recognized as a protected area, and may not have the conservation of biodiversity as the primary goal, yet are geographically defined and managed over the long term in ways that result in the effective and enduring protection of biodiversity.	
Federal Species at Risk Act (SARA)	Designed to meet one of Canada's key commitments under the International Convention on Biological Diversity.	The goal of SARA is to protect endangered or threatened organisms and their habitats. It also manages species which are not yet threatened, but whose existence or habitat is in jeopardy.	The Species at Risk Act designates the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), an independent committee of wildlife experts and scientists, to identify threatened species and assess their conservation status, i.e., federally recognized as special concern, threatened, endangered, extirpated, and extinct in Canada under Schedule I of SARA. COSEWIC reports are influential toward the addition of species to the List of Wildlife Species at Risk (Schedule 1) by the Minister of the Environment. SARA describes Critical Habitat as the habitat that is necessary for the survival or recovery of a listed wildlife species, and that is identified as the species' critical habitat in a recovery strategy or in an action plan for the species. Many projects now require screening for critical habitat as part of the impact assessment process.

Provincial Initiatives	Purpose	Goal / Objective	Implications
Provincial Wildlife Management Plan 2020 (draft) BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development	A broad vision and new strategy for wildlife management and habitat conservation for BC in 2020.	Address some of some of the challenges currently facing wildlife management and habitat conservation in BC.	Address challenges includes enhancing existing collaboration on wildlife management and habitat conservation with Indigenous peoples; increasing involvement of NGO conservation organizations and a broad range of wildlife and habitat stakeholders; identifying measures that need to be taken to proactively manage wildlife and habitat and prevent wildlife from becoming species at risk; addressing habitat loss, alteration and fragmentation due to human activity; determining the most effective ways to proactively adapt to the impacts of climate change on wildlife and habitats; acquiring better information on wildlife and habitats to inform management and conservation outcomes and decision-making to achieve robust compliance and enforcement; encouraging prevention and mitigation of human-wildlife conflicts and addressing the underlying causes; providing stable and increasing funding dedicated to wildlife management, habitat conservation and compliance and enforcement. https://engage.gov.bc.ca/app/uploads/sites/377/2018/05/WL_DiscussionPapers_FINAL_May-22.pdf
Provincial BC Species at Risk legislation (proposed) BC Ministry of Environment and Climate Change Strategy	Stand-alone species at risk legislation to focus government effort and resources on taking actions to protect and recover species at risk, and prevent new species from becoming at risk.	BC's Species at Risk Act is to prevent species from becoming extirpated or extinct and promote the recovery of species at risk by: (a) identifying species at risk; (b) protecting species at risk and their habitats; (c) promoting the recovery of species at risk; and (d) promoting stewardship activities to assist in the protection, survival and recovery of species at risk.	Bill M226 Species at Risk Protection Act 2017. These rules could apply across private and public land, across different resource sectors, and across all of British Columbia. http://www.bclaws.ca/civix/document/id/lc/billsprevious/6th40th:m226-1

Regional Initiatives	Purpose	Goal / Objective	Implications
Fish & Wildlife Compensation Program Action Plans – Columbia Basin	Compensate for impacts to fish, wildlife, and their supporting habitat resulting from the construction of BC Hydro generation facilities.	FWCP's three strategic objectives: 1. Maintain or improve the status of species or ecosystems of concern, and the integrity and productivity of ecosystems and habitats. 2. Maintain or improve opportunities for sustainable use, including harvesting and other uses. Harvesting includes First Nations, recreational, sport and commercial harvests. Other uses may include cultural, medicinal, or non-consumptive uses. 3. Build and maintain relationships with stakeholders and aboriginal communities to support BC Hydro's social responsibility policy and the Province's shared stewardship objective.	FWCP's Columbia Region Action Plans identify priority actions needed to accomplish FWCP objectives for the restoration, conservation and enhancement of fish and wildlife and their habitats at the basin or watershed-level. The Action Plans guide FWCP investments in projects, track progress toward implementation, set annual priorities and guide decision-making in setting out and approving the Annual Operating Plan. • Large Lakes Action Plan • Small Lakes Action Plan • Species of Interest Action Plan • Streams Action Plan • Upland and Dryland Action Plan • Riparian and Wetlands Action Plan Kootenay Connect is a synthesis of the focal ecosystems, habitats, and species indentified in priority actions within Upland/Dryland, Riparian/Wetlands, and Species of Interest Action Plans.
Columbia Basin Trust Ecosystems Enhancement Program	Over the course of five years, the program aims to identify and support one to three projects in each sub-region, focusing on two sub-regions during each year of the program.	The goal is to help maintain and improve ecological health and native biodiversity in a variety of ecosystems, such as wetlands, fish habitat, forests and grasslands. To maintain and improve ecological health and native biodiversity by supporting large-scale ecosystem enhancement, restoration and conservation projects in the Basin.	Supported projects will focus on enhancement, restoration and conservation by seeking input from community groups, First Nations representatives and government experts, and reviewing existing regional plans and research. With a budget of $10 million spread over five years, the Trust will focus on two sub-regions during each year of the program and identify project opportunities to implement on-the-ground actions to support ecological health at a landscape-level. Years 1-4, targeted landscapes include: Year 1 the Southern Rocky Mountain Trench and Kootenay Lake sub-regions; Year 2 targets the Columbia Valley and Arrow/Slocan sub-regions; Year 3 will target Lower Columbia and Elk Valley sub-regions; Year 4 will target North Columbia and Upper Columbia sub-regions; and Year 5 will review additional project opportunities across the Basin. https://ourtrust.org/grants-and-programs-directory/ecosystem-enhancement-program/

Regional Initiatives (cont.)	Purpose	Goal / Objective	Implications
Kootenay Conservation Program Conservation Neighbourhoods	Identify focal areas for both private land securement and stewardship activities within sub-regions to demonstrate how private land securement and stewardship at the local scale fits into the larger picture of conservation in the Kootenay region.	Create 14 Conservation Neighbourhoods in which groups of partners and stakeholders could work together in local landscapes such as, watersheds, valleys, and wildlife corridors to develop shared conservation priorities through collaborative action planning and joint stewardship projects to benefit at-risk species, important habitats, hydrologic functions, and wildlife corridors and connectivity areas.	To date, three Conservation Neighbourhoods have active partnerships working on common conservation priorities, the Slocan Lake Watershed, the Columbia Valley, and the Lower Columbia. http://kootenayconservation.ca/conservation-neighbourhoods/

APPENDIX B: LAND USE DESIGNATIONS, LAWS AND POLICIES TO PROTECT BIODIVERSITY TOOLBOX

The following Tables 2 and 3 constitute a conservation toolbox of protections, laws, policies, regulations and management plans that can be applied to conservation and management of biodiversity areas and wildlife corridors by a variety of jurisdictions.

Table 2. Land Use Designation Tools to Protect Biodiversity[7]

Designation	Legislation (Lead Agency)	Applies to:	Federal Land	Provincial Land	Reg. Distr. / Municipal	Private Land	Implemented by:	Effectiveness	Limitations	Who May Be Impacted?
Federal										
Migratory Bird Sanctuaries	Migratory Birds Convention Act (Canadian Wildlife Service, Environment Canada)	Any land in Canada	√	√	√	√	Federal Cabinet	Established in 1917 (updated in 1994). Contains regulations to protect migratory birds, their eggs, and their nests from hunting, trafficking, and possession. Applied extensively in northern Canada. In southern Canada applied more on private lands. Potentially useful designation to protect wetlands where there are nationally significant migratory bird populations.	Primary focus is hunting regulations; poor to no protection for habitat other than nests while active; would not protect wetlands outside of nationally significant migratory bird habitat.	Depends on whether regulations apply only in sanctuaries, or in any areas frequented by migratory birds.

[7] Sources: *A Wetland Action Plan for British Columbia (2010); Legislation for Species at Risk https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/species-ecosystems-at-risk/legislation*

Designation	Legislation (Lead Agency)	Applies to:	Federal Land	Provincial Land	Reg. Distr. / Municipal	Private Land	Implemented by:	Effectiveness	Limitations	Who May Be Impacted?
Federal cont.										
National Wildlife Areas (NWAs)	Canada Wildlife Act (Canadian Wildlife Service, Environment and Climate Change Canada)	Land under the administration of the Minister of Environment and Climate Change	√				Federal Minister of Environment and Climate Change	Flexible, open-ended designations for areas required for wildlife conservation; good enforcement provisions for NWAs; less difficult to establish and more flexible than National Park designations.	Regulations do not have habitat focus, but prohibit many activities that harm habitat; there is not strong protection for NWAs from outside activity; requirement for federal administration of land requires provincial cooperation (purchase, donation or transfer).	Depends on areas designated NWA.
National Parks	Canada National Parks Act (Parks Canada)	Lands owned by Canada, or agreed to by Province	√				Federal Cabinet	Generally strong protection for species and habitat in national parks, but broad exceptions available; good ecological integrity requirements.	Primary purpose is not protection of biodiversity and habitat – would be of ancillary benefit; low penalty for environmental damage; long process to designate National Parks in legislation.	Potentially the Province if commercially productive land is removed from the land base.

Designation	Legislation (Lead Agency)	Applies to:	Federal Land	Provincial Land	Reg. Distr. / Municipal	Private Land	Implemented by:	Effectiveness	Limitations	Who May Be Impacted?
Provincial										
Wildlife Management Areas (WMA) **Critical Wildlife Areas (CWA)** **Wildlife Sanctuaries**	Wildlife Act (Ministry of Environment & Climate Change Strategy)	Land under the administration of the Minister responsible for the Wildlife Act (e.g., Provincial Crown land, or private land leased to Minister)		√		√	Minister with Cabinet's approval	WMAs provide reasonably strong protection, enforceability, and flexibility due to regional manager's authority over all activities in a WMA; strong degree of decision-making by agency responsible for wildlife habitat; example is Columbia Wetlands WMA.	Requires formal act of designation in order for wetlands and other habitat to be protected; requires high level (Cabinet) consent for Minister's designation decision; may be difficult for agency to acquire administration of land as prerequisite for WMA designation; cannot regulate all activity impacting habitat.	Expanding WMA designations could affect licensed users of the Crown land gaining WMA status; however, some uses could be accommodated depending on the impact.
Provincial Parks	Park Act (Ministry of Environment & Climate Change Strategy)	Provincial Crown land		√			Legislature or Cabinet	Park Act is the strongest protected area designation because many require Act of Legislature to change boundaries. Park, Conservancy and Recreation Area Regulation addresses management and protection of park resources which includes species at risk.	Park Act has strong recreation focus; requires high level approval to designate; may not be suitable for habitats that require active interventions; not well-suited to designations of small, specific habitat, such as wetlands.	None.

Designation	Legislation (Lead Agency)	Applies to:	Federal Land	Provincial Land	Reg. Distr. / Municipal	Private Land	Implemented by:	Effectiveness	Limitations	Who May Be Impacted?
Provincial cont.										
Ecological Reserves	Ecological Reserves Act (Ministry of Environment & Climate Change Strategy)	Provincial Crown land		√			Cabinet (some require the Legislature to modify boundaries)	Strong legislation for protection of ecosystems; takes priority over all other legislation. Ecological reserves are created for many reasons, including protection of at risk species or their habitat. They are established by inclusion to the schedules of the Protected Areas of British Columbia Act or by order in council under the Ecological Reserves Act. The Park, Conservancy and Recreation Area Regulation under the Park Act, applies to ecological reserves as if they were parks. The Ecological Reserve Regulations address additional restrictions in ecological reserves to ensure protection of the resources in an ecological reserve.	Science-based research and education focus; good for many lands, but not for those that require active management. No provisions in associated regulations target species at risk or their habitat.	None.

Designation	Legislation (Lead Agency)	Applies to:	Federal Land	Provincial Land	Reg. Distr. / Municipal	Private Land	Implemented by:	Effectiveness	Limitations	Who May Be Impacted?
Provincial cont.										
Ad Hoc designations	Environment and Land Use Act	All land in BC		√	√	√	Cabinet	Good, flexible legislation that can be tailor-made to special circumstances, where other tools are a poor fit; prevails over other legislation.	Protection and enforcement depends on the Order in Council (OIC) that is passed by Cabinet in a given situation. Past enforcement problems were addressed under **s.6** of the Park Act (might not fit every situation).	Depends on the Cabinet OIC – potentially anyone
Wildlife Habitat Areas (WHAs)	Forest and Range Practices Act (Government Actions, Forest Planning and Practices, Range and Woodlots Regulations)	Crown forest land, range land, and private land in a Tree Farm Licence area, Community Forest Area, or Wildlife Management Area		√		√	Minister of Environment (delegated to Deputy Minister of Environment)	The purpose of WHAs is to conserve those habitats considered most limiting to a given Identified Wildlife element. WHAs are mapped areas that are necessary to meet the habitat requirements of an Identified Wildlife element; designate critical habitats in which activities are managed to limit their impact on the Identified Wildlife element for which the area was established. WHAs can be put into WMAs.	WHAs only apply to identified wildlife; depends on strength of general wildlife measure for the identified wildlife; not very flexible; implementation is highly constrained by occurrences of species and land use impacts.	Would mostly affect forest or range licensees carrying out forest or range practices.

Designation	Legislation (Lead Agency)	Applies to:	Federal Land	Provincial Land	Reg. Distr. / Municipal	Private Land	Implemented by:	Effectiveness	Limitations	Who May Be Impacted?
Provincial cont.										
Wildlife Habitat Features (WHFs)	Forest and Range Practices Act (Government Actions, Forest Planning and Practices, Range and Woodlots Regulations)	Crown forest land, range land, and private land in a Tree Farm Licence area, Community Forest Area, or Wildlife Management Area		√		√	Minister of Environment (delegated to Deputy Minister of Environment)	WHFs may provide additional protection to WMAs or WHAs, e.g., for ecosystem elements used by wildlife to meet one or more of their important habitat requirements. WHFs are a possibility where the Minister of Environment (Deputy Minister) could identify specific localized features to protect a species at risk. Practices requirement for a WHF, once established, is "must not damage or render ineffective".	WHFs are generally small areas, spatially defined, and probably of limited use in conserving large areas of habitat. Examples include a significant mineral lick or wallow, a nest used by a bird, bat hibernaculum, or a burrow or den used by a mammal.	Would mostly affect forest or range licensees carrying out forest or range practices.
Reserves, notations, and transfers	Land Act ss.15, 16, 17	Crown land (Reserves can be referred to as wildlife habitat management areas, natural environment areas, recreation conservation management areas).		√			Ministry of Forests and Range - Integrated Land Management Bureau (ILMB)	Effective in withdrawing Crown land from disposition; could be important tool in implementing a provincial policy in which important Crown lands for wildlife are not sold.	Not necessarily effective in protecting habitat from land use practices, because there are no enforceable measures to protect habitat per se; seen more as an interim designation to preserve conservation opportunity until more appropriate designation is made.	Potentially interested purchasers of Crown land.

Designation	Legislation (Lead Agency)	Applies to:	Federal Land	Provincial Land	Reg. Distr. / Municipal	Private Land	Implemented by:	Effectiveness	Limitations	Who May Be Impacted?
Local Government										
Environmentally Sensitive Areas (ESAs)	Local Government Act	Potentially any land in a municipality or regional district jurisdiction			√	√	Municipal councils and regional district boards	Local governments have the capacity to declare important habitat as ESAs in official community plans and regional growth strategies, and to restrict use of these areas, such as wetlands, through zoning bylaws, development permit areas, etc.	Enabling only with no provincial direction, policy or model to guide local governments; potential for wide discrepancy in results.	Owners of properties with important habitat, such as wetlands, deciduous riparian forest, and old growth conifer forest.
Development Permit Areas (DPAs) **Environmental DPAs**	Local Government Act	Private and public land within a municipality			√	√	Municipal councils and regional district boards	Attempts to control the form and character of development so as to preserve, protect, restore or enhance natural values. DPAs provide an implementation option, for example, for the Riparian Areas Regulation (RAR).	Depends on local government willingness to designate DPAs, and quality of requirements in each development permit.	Local governments; property owners.

Table 3. Legislation and Regulation of Land & Water Uses and Activities That Affect Biodiversity.[8]

Legislation (Lead Agency)	Mechanism / Activity	Federal Land	Provincial Land	Reg. Distr. / Municipal	Private Land	Tools	Effectiveness	Limitations	Who Is Impacted?
Federal									
Species at Risk Act (SARA) (Ministry of Environment)	Prevent wildlife species in Canada from disappearing; provide for the recovery of wildlife species that are extirpated (no longer exist in the wild in Canada), endangered, or threatened as a result of human activity; and manage species of special concern to prevent them from becoming endangered or threatened. .	√	√			SARA includes species at risk listing and reporting processes through COSEWIC. SARA helps protect Critical Habitat – the habitat necessary for the survival or recovery of a listed wildlife species (Schedule 1), and that is identified as the species' critical habitat in a recovery strategy or in an action plan for the species. Many projects now require screening for critical habitat as part of the impact assessment process.	Depends on government's willingness to implement. Many species listed under SARA have continued to decline after SARA's was enacted in 2002. COSEWIC process provides scientific evidence but listing decisions for many vulnerable species are delayed. In some cases, protections are withheld for certain species because of economic interests. SARA does have a "safety net" clause that would force the provinces to protect SARA-listed species, but it has never been used.	The legislation itself may not be the problem but how it's being implemented by the federal government is not stopping populations from declining or helping species recovery; focuses on individual species rather than ecosystems; developing recovery strategies can be challenging and time-consuming which delays protection.	Commercial and industrial interests on the land and in fresh water and marine environments where vulnerable species live or where harvesting occurs.

[8] Sources: *A Wetland Action Plan for British Columbia (2010); Legislation for Species at Risk https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/species-ecosystems-at-risk/legislation*

Legislation (Lead Agency)	Mechanism / Activity	Federal Land	Provincial Land	Reg. Distr. / Municipal	Private Land	Tools	Effectiveness	Limitations	Who Is Impacted?
Federal cont.									
Canadian Environmental Assessment Act – Bill 38 (Canadian Environmental Assessment Agency)	Coordinated impact assessment of proposed major development in BC where federal government has authority	√	√	√?	√?	Certain types of proposed projects must undergo environmental impact assessment and obtain an EA certificate in order to proceed.	The Reviewable Projects Regulation defines the types and sizes of projects that are automatically subject to EAA process. The Minister has power to designate a project as reviewable even though it is not included in Reviewable Projects Regulation. Casts a broad net over many of the potential ways that the federal government can affect species and habitat; the primary means of implementing the Federal Policy on Wetland Conservation.	Act's application is discretionary; increased threshold for review; no guaranteed participation for communities, First Nations, local governments, or the public; government may decide that economic interests prevail over environmental protection.	Major project proponents.
Fisheries Act (Fisheries & Oceans Canada)	Prohibitions on activities that cause harmful alteration, disruption or destruction to fish habitat and/or cause deposit of deleterious (polluting) substances in any Canadian freshwater and marine fisheries waters.	√	√	√	√	Habitat Protection and Pollution Prevention Provisions of the Act outline obligations (of owners, operators, developers and project proponents) and enforcement.	Strong federal laws that may help protect fish habitat and can apply to conserving wetlands and riparian areas associated with fish habitat; enforcement provides deterrent, and creative sentencing may require remediation.	Reactive and rarely applied.	Industrial and commercial interests.

Legislation (Lead Agency)	Mechanism / Activity	Federal Land	Provincial Land	Reg. Distr. / Municipal	Private Land	Tools	Effectiveness	Limitations	Who Is Impacted?
Federal cont.									
International Boundary Waters Treaty Act (International Joint Commission - Canada Ministry of Foreign Affairs)	Protection of international boundary waters	√					Act created in 1909 with a focus on the Great Lakes. Boundary waters are bodies of fresh water that the U.S.-Canada border flows through. Addresses conflicts and rights arising between the two countries over the use of waters that crossed the borders of the two countries, in particular pollution and dams or other structures.	Doesn't include trans-boundary rivers, although the treaty has provisions related to such rivers, e.g., dams.	
Canadian Environmental Protection Act (Environment Canada)	Regulation of toxic wastes & substances	√	√	√	√		Provides indirect benefits to land and water by regulating release of toxic substances, pollutants, and wastes into the environment.		

Legislation (Lead Agency)	Mechanism / Activity	Federal Land	Provincial Land	Reg. Distr. / Municipal	Private Land	Tools	Effectiveness	Limitations	Who Is Impacted?
Provincial									
Provincial BC Species at Risk legislation (proposed) (Ministry of Environment and Climate Change Strategy)	Provincial species at risk legislation to take actions to protect and recover species at risk, and prevent new species from becoming at risk.		√	√	√		In 2017, provincial government mandated the enactment of an endangered species law that is under development. In the absence of a single piece of legislation, current provincial and federal laws collectively govern how at risk populations and habitats in BC are managed and who is responsible for them.	Yet to be determined.	Agriculture, mining forestry, hydroelectric dams, and other industrial and commercial activities under provincial jurisdiction.
Forest and Range Practices Act (FRPA)	Forest practices (including forestry, range, some oil & gas activities) on Crown forest and range land, and some private land within tenures.		√			Allows designation of Wildlife Habitat Areas and Wildlife Habitat Features. Riparian classification includes management area, management reserve zone and management zones with varying restrictions and buffers with well developed discretionary management guidelines.	Effective because protects habitat features important to wildlife for breeding, spawning, nesting, hibernating, etc. It also requires classification of all wetlands with associated restrictions and buffers on wetlands as small as 0.25 ha in specific biogeoclimatic zones. Also provides restrictions and buffers for smaller wetlands within 60 m of each other with a combined size of 5 ha or larger.	Restrictions and buffers do not apply to all small wetlands some of which may have high habitat values. Restrictions and buffers are discretionary and only apply in the absence of an approved forest stewardship plan that does not include a result or strategy to meet the objective for water, fish, wildlife, and biodiversity set out in the Forest Planning and Practices Regulation.	Forest and range tenure holders

Legislation (Lead Agency)	Mechanism / Activity	Federal Land	Provincial Land	Reg. Distr. / Municipal	Private Land	Tools	Effectiveness	Limitations	Who Is Impacted?
Provincial cont.									
Private Managed Forest Land Act and Regulations	Managed Forest Land Class is a BC Assessment property classification established to encourage private landowners in BC to manage their lands for long-term forest production in accordance with the Private Managed Forest Land Act and associated regulations.				√	A regulatory approach that requires forest owners to protect key public environmental values such as, water quality and fish habitat, soils conservation , critical wildlife habitat and reforestation.	Regulations specify management requirements for timber harvesting, silviculture and road-related activities. The Managed Forest Council ensures compliance and makes determinations which may be followed by other steps including: Reconsideration of Council Decision, and Appeal to the Forest Appeals Commission.	A voluntary tax exemption program that has limited protection. Anyone who intends to cut trees on lands covered by FRPA are required to have a cutting licence and must comply with FRPA and associated regulations, or in the case of the oil and gas industry require a master licence to cut and the provision of the Forest Practices Code applies.	Owners of private forest reserve land
Wildlife Act (Ministry of Environment and Climate Change Strategy)	Regulation of hunting		√	√	√	Protects all vertebrate species from direct harm, except as allowed by regulation (e.g., hunting or trapping). Protections can be enabled for endangered or threatened species and their habitats can be protected as Critical Wildlife Habitats in Wildlife Management Areas.	Limited ability to help species through hunting regulations, **s.9** (beaver dams) and **s.34** protection for birds, eggs, and some nests; ability to designate threatened and endangered species, and provide for critical wildlife areas within Wildlife Management Areas.	Focus on "take" regulation is a limiting means of managing wildlife; habitat provisions are limited, usually requiring formal designation, but available; threatened & endangered provisions under-utilized.	Depends on approach taken. Presently, affects mainly hunters, some farmers.

Legislation (Lead Agency)	Mechanism / Activity	Federal Land	Provincial Land	Reg. Distr. / Municipal	Private Land	Tools	Effectiveness	Limitations	Who Is Impacted?
Provincial cont.									
Fish Protection Act (Ministry of Environment & Climate Change Strategy)	Protection of fish & fish habitat		√	√	√	Currently in force are sections dealing with designation of sensitive streams, recovery plans, and no new dams on specified rivers.	Sections not yet in force provide for: issuance of stream flow protection licences; orders for temporary reduction in water use in case of drought; identify fish & habitat considerations in water management plans; authorize reduction of water rights in accordance with water management plans. **Sec. 9** in force for orders for temporary reduction in water use in case of drought to protect threatened fish populations.	Not yet in force: **s. 5** - fish and fish habitat considerations in licensing decisions; **s.8** - streamflow protection licences; **s. 10** - fish and fish habitat considerations in water management plans; **s.11** - reduction of water rights in accordance with plan; Transitional pending Water Act applications **s. 36**	Local governments, landowners, water licence applicants & holders, developers, industry.

Legislation (Lead Agency)	Mechanism / Activity	Federal Land	Provincial Land	Reg. Distr. / Municipal	Private Land	Tools	Effectiveness	Limitations	Who Is Impacted?
Provincial cont.									
Fish Protection Act - Section 12 (Ministry of Environment & Climate Change Strategy) (Local Government)	Riparian Areas Regulation and Sensitive Stream Designation. Focuses on four major objectives: ensuring sufficient water for fish; protecting and restoring fish habitat; improved riparian protection and enhancement; and stronger local government powers in environmental planning.		√	√	√	Provides legislative authority for water managers to consider impacts on fish and fish habitat before approving new licences, amendments to licences or issuing approvals for work in or near streams.	Directives will help fish-associated habitat, especially if they are critical to maintaining mean annual discharge (MAD) and base-flow requirements under a recovery plan; wetlands expressly addressed in regulations; provides provincial guidance for local governments; regulations incorporate no net loss approach; restricts licensing under Water Act; Sensitive Stream designation allows for recovery plans that may help protect associated habitat. Some local governments have failed to implement as required by the Regulation.	Fish-stream focused; limited ability to address agricultural impacts to riparian areas and wetlands; local governments must establish streamside protection and enhancement areas within 5 years of the Regulation being proclaimed. Only applies to urbanized areas of the province.	Local governments, landowners, some water licence applicants, developers, industry.

Legislation (Lead Agency)	Mechanism / Activity	Federal Land	Provincial Land	Reg. Distr. / Municipal	Private Land	Tools	Effectiveness	Limitations	Who Is Impacted?
Provincial cont.									
Land Act	Integrated Land Management Bureau (ILMB) Ministry of Environment for habitat acquired under **s.106**		√			Governs the sale and granting of rights to use Crown land.	Has provisions that could help conserve habitat by: • withdrawing wetlands from disposition, • requiring reservations and conservation covenants on Crown land sold; requiring environmental assessment on Crown land before sale, • regulating activity in designated areas, • enforcing against trespass on Crown lands, • allowing for land exchanges (e.g. Crown land for important private land), • allowing any ministry to acquire and manage land.	When it comes to the extraction of natural resources, the Province normally retains ownership of the land, and grants resource extraction rights through other legislation.	

Legislation (Lead Agency)	Mechanism / Activity	Federal Land	Provincial Land	Reg. Distr. / Municipal	Private Land	Tools	Effectiveness	Limitations	Who Is Impacted?
Provincial cont.									
Land Title Act (LTA)	Land Title Office (LTO); Agricultural Land Commission; Approving Officers under LTA (e.g. local government, Islands Trust, Ministry of Transportation officials)			√	√	Allows registration of **s.219** conservation covenants on land title; specifies terms for subdivision approval	Good tool for protecting habitat values through encumbrances (rather than outright ownership) on titles that survive ownership changes; allows approving officers discretion to refuse or impose conditions on subdivision of land.	LTO policy requires approval of Agricultural Land Commission for ALR land (but not for FLR). This raises issues about weakness of ALC Act regarding wetlands values. Enforcement is problematic; cost issues (e.g. survey for LTO, affordability for NGOs); discretion re subdivision approvals is adequate, but policy guidance on wetlands would improve consistency.	Property owners, and conservation agencies seeking to negotiate and register conservation covenants
Protection of Crown lands (BC Ministry of Environment and Climate Change Strategy)	Orders-in-Council		√	√	√	Orders-in-Council can be made respecting the environment or land use.	Government has used this provision to establish 81 protected areas. Environment and Land Use Committee of Cabinet has broad powers to ensure that all aspects of the preservation and maintenance of the natural environment are fully considered in the administration of land use and resource development.	Management direction for protected areas is provided by any special conditions included in the establishing order in council and specified provisions of the Park Act and Park and Recreation Area Regulation as identified in the order in council.	N/A

Legislation (Lead Agency)	Mechanism / Activity	Federal Land	Provincial Land	Reg. Distr. / Municipal	Private Land	Tools	Effectiveness	Limitations	Who Is Impacted?
Provincial cont.									
Water Protection Act (Ministry of Environment and Climate Change Strategy)	Prohibitions on bulk water removal		√	√	√		Confirms provincial ownership of Crown surface water and groundwater. Province has right to ensure its protection and sustainable use. Prohibits bulk water removal from BC, and diversion of water between major watersheds within BC.		Water licence applicants, developers.
Water Act (Ministry of Environment & Climate Change Strategy)	Ministry of Environment - Water Stewardship Division		√	√	√	Water Use Planning; Water Use Plans (WUPs)	WUPs define daily operating parameters applied at all BC Hydro hydroelectric facilities; recognize multiple water use objectives; and balance competing uses, such as domestic water supply, fish and wildlife, recreation, heritage, and electrical power needs. Once a WUP is accepted by the Comptroller of Water Rights, operational changes, monitoring studies and physical works outlined in the plan are implemented through orders under the Water Act.		BC Hydro, other water stakeholders

Legislation (Lead Agency)	Mechanism / Activity	Federal Land	Provincial Land	Reg. Distr. / Municipal	Private Land	Tools	Effectiveness	Limitations	Who Is Impacted?
Provincial cont.									
Water Act **Groundwater Protection Regulation** (Ministry of Environment & Climate Change Strategy)	Land and Water BC Inc. (for dispositions) Ministry of Environment - groundwater technical standards and water management planning		√	√	√	Issuance of water licences Groundwater protection	Water Act requires provincial approval for diverting or storing water, or changes in and about a stream (definition includes wetlands to some extent). Groundwater regulations (Part 5 of Water Act) protect wells/aquifers from contamination and thus afford some protection for wetlands that are groundwater-fed. Part 4 of Water Act provides for legally binding water management plans tailored to address local issues.	Wetland conservation issues are not effectively addressed in Water Act; important wetlands may be harmed by licence approvals. Groundwater consumption is not regulated which could result in wetlands connected to groundwater going dry. Definition of stream is limited in that it may not be interpreted to include all wetlands	Water Licence applicants/holders. With respect to groundwater, well owners, drillers and pump installers are impacted. Consultants may also be impacted in that they may be required to make alternate specifications for well installations.
Drainage, Ditch and Dike Act (Part 1 of Act repealed by Bill 8, 2002) **Dike Maintenance Act**	Dike construction and maintenance		√	√	√	None – but **s.63** requires compliance with Water Act	Establishes authority for activities that can impact wetlands, but does not impose accountability for wetlands impacts;	May have considerable impact on wetlands, yet does not address wetlands at all. Most diking is historic; new diking is undertaken by local government or Ministry of Transportation.	Local governments, Ministry of Transportation.

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Provincial cont.									
Agriculture Land Commission Act **Agricultural Land Reserve Use, Subdivision and Procedure Regulation**	Agricultural land practices			√	√	Regulates use of agricultural land, soil removal and fill in ALR. BC Brownfield Removal Strategy	Variable. Allows for ecological reserves and wildlife habitat uses of agricultural land if surface is not subject to substantial works; very limited allowance for considering environmental values (**ss. 43.1, 44**), but always subordinate to farm use.	Strong priority given to agriculture; no consideration of environmental impacts such as loss of wetlands for most decisions; assumes agricultural land is more scarce than wetlands; could impede ability to implement mitigation measures.	Private landowners in Agricultural Land Reserve (ALR).
Weed Control Act	Invasive species		√	√	√	The BC Weed Control Act imposes a duty on all land occupiers to control designated noxious plants.	Works for designated species that have an impact on agriculture.	Designated species list may not reflect invasive species that are impacting non-agricultural lands	Crown land and private landowners.

Legislation	Lead Agency	Federal Land	Provincial Land	Reg. Distr. / Municipal	Private Land	Relevance	Effectiveness	Limitations	Who Is Impacted?
Provincial cont.									
Local Government Act (LGA) **Community Charter (CC)**	Local governments Ministry of Community and Rural Development			√	√	Zoning and bylaw actions affect land use	In addition to Environmentally Sensitive Areas (ESAs) and Development Permit Areas (DPAs) designations, local governments have delegated authority to identify land use zones and pass bylaws affecting land use that could impact wetlands, for both public and private land. This can have both a positive or negative effect on wetlands. Wetland areas prone to flooding can be protected by bylaw (**s.910 LGA**) Forested wetlands could be protected from tree cutting by bylaw (**s.50 CC**)	Recognizes that a purpose of local government is to foster the "current and future economic, social, and environmental well-being of a community." Does not provide a definition of "environment", and protection of wetland environments, wetland habitats, and wetland species including species at risk is discretionary rather than mandated ("may" instead of "must"). Local governments are constrained by some provincial legislation, e.g., Farm Practices Protection (Right to Farm) Act, in their desire to protect wetlands as the highest use for a property.	Local governments, landowners, and constituents

Legislation	Lead Agency	Federal Land	Provincial Land	Reg. Distr. / Municipal	Private Land	Relevance	Effectiveness	Limitations	Who Is Impacted?
Provincial cont.									
Official Community Plans (OCPs) - Bylaw						Official Community Plans support a sustainable community, and serve to preserve and enhance the local economy, and the health and wellbeing of its residents and property owners as well as the natural environment. OCPs must encourage environmental stewardship for land, water and air.	OCPs are enacted as bylaws with an overarching goal to support healthy, clean and sustainable communities by ensuring that environmental integrity and diversity are maintained in land use decisions. Broad environmental goals can include: protecting the natural environment; ensuring development does not adversely harm or detract from identified wildlife corridors and areas with high wildlife and fisheries habitat value; protecting the quantity and quality of water resources and waterways; ensuring development is managed along with the physical nature and natural limitations of the land base.	Refers to resource and land use based on forestry, mining, and commercial, residential and recreation development and activities in relative to sustainability. Strong OCPs can have resource objectives such as, protecting the local forest land base and large areas of un-fragmented forest habitat for its aesthetic and recreational value and importance to natural ecological functioning; and protecting riparian zones, sensitive ecosystems, watersheds and biodiversity.	Private landowners, developers, industrial and commercial interests.