

Environment and Climate Change Canada  
Canada Nature Fund: Community-Nominated Places for Species-At-Risk



Kootenay Connect: Bonanza Biodiversity Corridor Focal Area  
**Bonanza Biodiversity Corridor  
Conservation Plan**

March 2023



Kootenay Connect is an initiative facilitated by the Kootenay Conservation Program

**PRESENTED TO:**  
Kootenay Connect  
c/o Kootenay Centre for Forestry  
Alternatives

**PRESENTED BY:**  
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## Acknowledgments

The Slocan Lake Stewardship Society respectfully acknowledges that these assessments, projects and planning initiatives are in the traditional, ancestral, and unceded territories of the Sinixt, Syilx Okanagan, Ktunaxa and Secwépemc. We recognize the relationship between land and people and continue to work towards Indigenous people's continued presence on the lands being acknowledged.

This Bonanza Biodiversity Corridor (BBC) Conservation Plan is sponsored and administered by the Slocan Lake Stewardship Society in New Denver, BC. In 2017, the Bonanza Biodiversity Corridor was formally recognized as a key wildlife connectivity corridor in the BC Kootenays. With the ongoing support of the Kootenay Conservation Program through its Kootenay Connect initiative, the BBC is now recognized as a '*Community-Nominated Priority Place*' under the Canada Nature Fund, as administered by Environment and Climate Change Canada.

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## 1 SUMMARY

The Bonanza Biodiversity Corridor (BBC) Conservation Plan is intended to be a strategic-level document, providing a roadmap for local and Indigenous communities, provincial authorities, and vested stakeholders to move forward with a progressive and adaptive approach for protecting the BBC. The overall strategy presents a knowledge-centric view for holding ecological and cultural values in face of rapid climate change, natural disturbances and other human impacts. The objective of this report is solely to provide context and focus for moving forward to move to the next level of strategic collaboration for the BBC. We recognize that this BBC Conservation Plan will lead to the development of detailed Implementation Plans to further articulate specific activities, responsibilities and timelines. The Slocan Lake Stewardship Society will continue maturing our knowledge and network of working partners in the execution of this plan through ongoing collaboration with First Nations, regulatory agencies (federal and provincial), commercial, recreational, local communities and environmental entities.

The Plan is further described in Section 7, summarized as follows:

- **Conservancy Lands:** Continue championing for BBC conservation by building on existing mosaic of conservation lands.
- **Watershed Knowledge:** Develop in-depth understanding of water sources to establish a hydrologic baseline for future planning, assessment and climate monitoring.
- **Traditional Ecosystem Knowledge:** Expand ancestral and cultural knowledge of the BBC through engagement and knowledge exchange with First Nations communities.
- **Forest Management:** Ongoing collaboration with the province, tenure holders and Indigenous communities to develop specific policies and acceptable standards with respect to harvesting and wildfire resiliency in the corridor.
- **Climate Resiliency:** Develop climate resiliency plans based upon identified refugia niches, forestry management zones and wetland assessments.
- **Fish Habitat:** Support Indigenous-led wild salmon recovery and expand life cycle knowledge for kokanee and rainbow trout.
- **Wetland Monitoring:** Continued wetland monitoring and maintenance of restoration sites.
- **Biodiversity Assessments:** Continue the delivery of biodiversity and cumulative impact assessments for recreational, industrial or commercial development on Crown land.

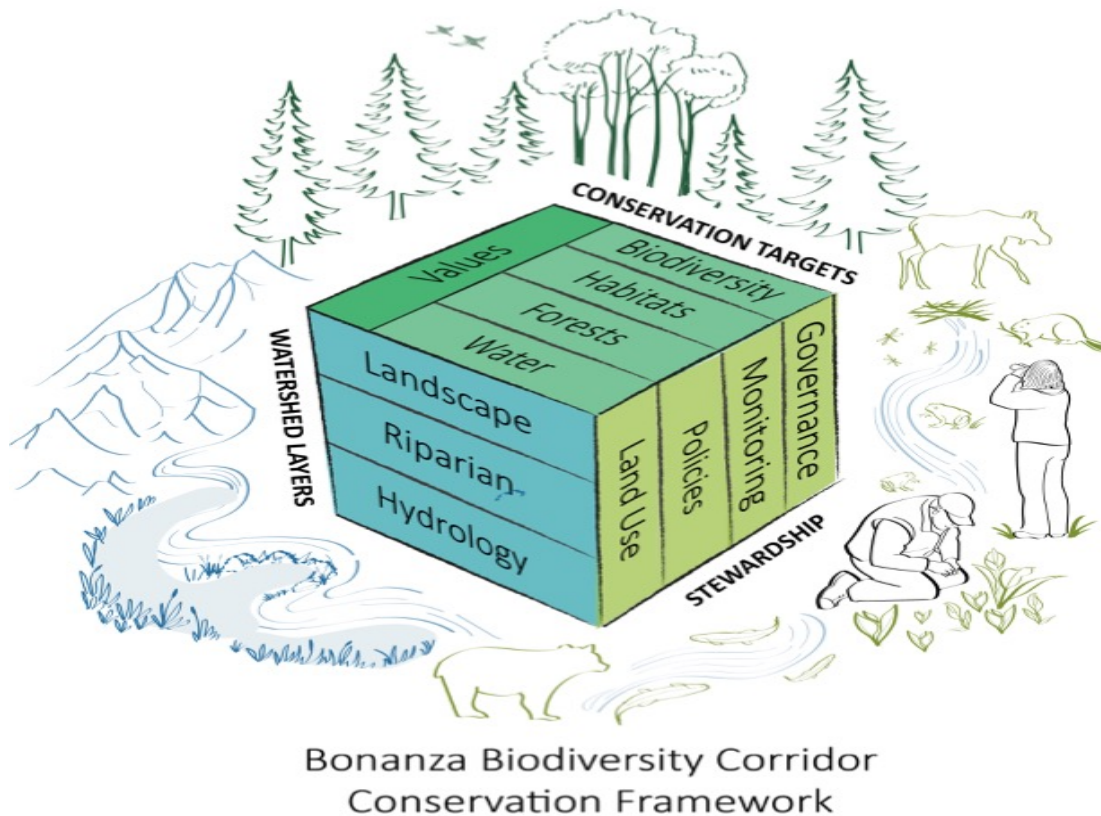
## 2 INTRODUCTION

### 2.1 BACKGROUND

Through the Kootenay Connect project, the Bonanza Biodiversity Corridor (BBC) was officially recognized as a focal area for conservation, biodiversity hotspot and a key wildlife connectivity corridor in the Central Kootenays. Situated at the north end of the Slocan Watershed, the BBC watershed is a healthy, natural resource area that is largely defined by undeveloped lands, mature forests, a multitude of streams, wetlands, species and habitats. Bonanza Creek meanders through the valley bottom, supporting rainbow trout and kokanee spawning grounds before flowing into Slocan Lake. The series of wetlands in the valley bottom are a major contributor of nutrients and a vital source of cold water into the Upper Columbia Basin.

Over the past three years, extensive species and habitat assessments have been conducted and on-the-ground wetland restoration works have been completed for three wetlands within the corridor. The collective results of this Scientific Ecological Knowledge (SEK), has been described in detail and presented in the *BBC Conservation Values Assessment* (CVA, Durand and Ehlers, March 2022). This Conservation Plan is an extension of that work and applies the principles of stewardship to define next steps in the ongoing protection of the BBC's intrinsic values.

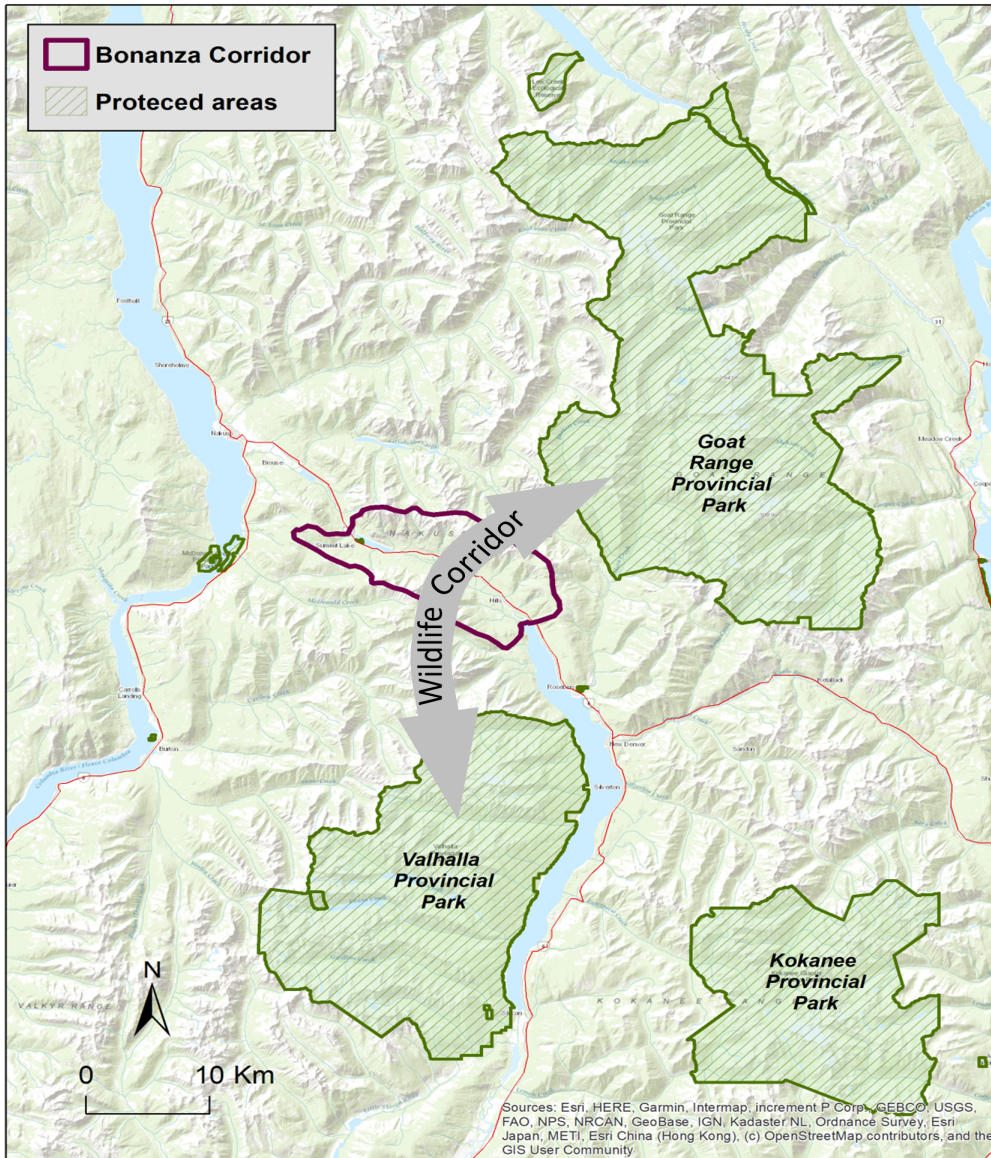
## 2.2 THE BBC CONSERVATION FRAMEWORK



In 2022, a tailored BBC Conservation Framework (the Framework) was developed to provide a multi-world view of nature and its components needed to manage this ecologically rich corridor into the multi-perspective view. The Framework provides a point of reference for sharing and building a new kind of knowledge base for current and future decision making from multiple levels and perspectives. The Framework emphasizes the flow of knowledge critical to making well informed decisions in the protection of the unique ecosystem values of this corridor. The Framework provides a simplified view of the various interdependent watershed components to facilitate to landscape-level decision making for the BBC. Further descriptions are provided in *Appendix A – Conservation Framework Components*.

### 3 CONSERVATION VALUES

#### 3.1 CONNECTIVITY

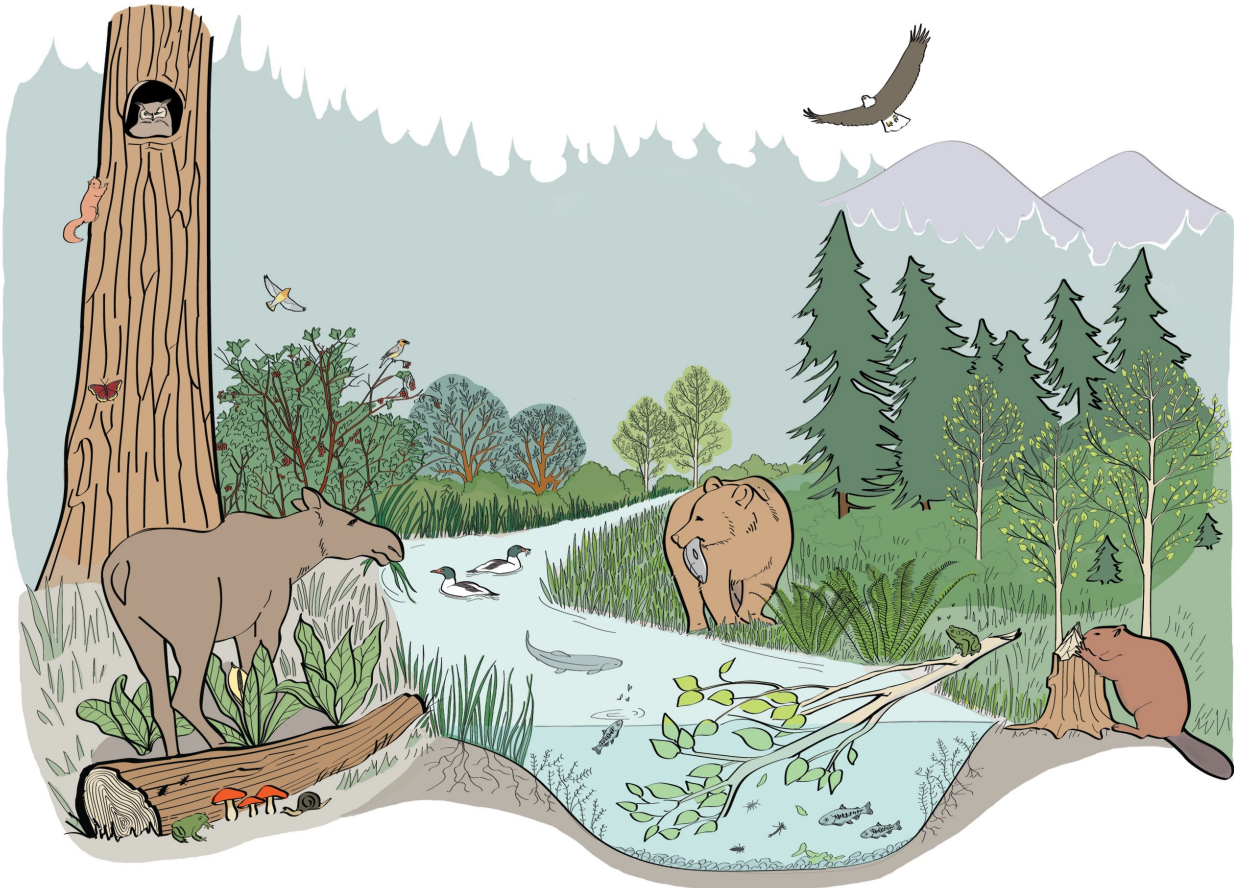


BBC Regional Landscape Connectivity

**Landscape-Level Connectivity:** Geographically the BBC is situated within the northern boundary of the Slokan Watershed between a series of mountain ranges, valleys and water networks in the Upper Columbia Basin. The Upper Columbia Basin is a focal point for the tri-nation 'Return of the Salmon' initiative, collectively providing a flow of water into the Columbia River system. The BBC corridor is very active with large mammal movements (e.g grizzly, wolverine, moose, elk, mule deer, white tailed deer etc.) occurring throughout the year. The entire BBC is considered to be a wildlife corridor, with species movement from outside the boundaries of the corridor and within its varied terrain.

Landscape connectivity for the BBC can be further described in terms of the Inland Temperate Rainforest. Specifically, the BBC is situated within the Interior Wetbelt (IWB) of southcentral British Columbia and contains some of the southernmost wettest portions of the Inland Temperate Rainforest (ITR) bioregion, which is defined by the very wet, moist interior cedar-hemlock (ICH) and Engelmann spruce-subalpine fir (ESSF) biogeoclimatic subzones. This bioregion is globally unique and is considered one of the world's most imperiled temperate rainforests, having recently been assessed as Critically Endangered following International Union for Conservation of Nature (IUCN) Red List of Ecosystems Criteria (DellaSala *et al.* 2021). The ICH forests are considered the prime jewel of the Inland Temperate Rainforest, with the BBC hosting a high percentage of ICH coverage compared to similar regions in the southern interior of BC.

**Micro-View of Connectivity:** When looking at the natural world, its species and habitats we tend to think of an individual species in relation to its specific features, habits and inherent value to humans. The BBC opens our eyes to see so much more, that is, the finer scale interconnectivity of lands and species with the reciprocal roles they play in sustaining life and the food web for nature to thrive. The science of studying biodiversity is a prime example of how the complex and wide range of interdependent relationships in nature work together to exist and adapt to changing conditions. Our focus at the 'on-the-ground' level for addressing the needs of biodiversity and ecological connectivity between species and habitats within the larger ecosystem. The illustration below provides the reader a visual example of this in the valley bottom with a selection of species in their habitats foraging for food.



### 3.2 INDIGENOUS VALUES

It is often said that successful environmental stewardship is based on a sound understanding of land, water and its relationship to existing natural resources, habitats and species. First Nations traditions, cultural and ecological values are inseparable from that intrinsic knowledge and the responsibility to nurture and care for the land, water and wildlife communities. In this respect, the philosophy of conservation holds common values and with the guiding principles of respect and reciprocity to the natural world. Within BC, we are strongly encouraged by the adoption of the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) to set the stage for engagement with ancestral peoples of this land.

During the course of recent BBC wetland enhancement projects, site-specific Archeological Overview Assessments (AOA) and Preliminary Field Reconnaissance were conducted prior to construction works commencing. The AOA work concluded that there was low potential for the presence of archeological sites at the specific restoration sites. Several archeological reviews have occurred elsewhere in the corridor. These reviews cited the potential for traditional use sites do exist along the shores of Summit Lake and at the delta where Bonanza Creek flows into the north end of Slocan Lake. These locations are more conducive to be temporary, seasonal camps and more likely to be above the Bonanza Creek floodplain, along the valley sides, benches and terrace features. Currently, an AOA is being planned to be conducted by Rec Sites and Trails BC on a rail trail property that is being considered for a day use park at the south end of the BBC.

Although our stewardship knowledge base of the BBC has dramatically evolved over the past three years, we have not included, nor formally recognized that strategic layer of Indigenous, traditional and cultural knowledge for the BBC. For example, our recent enhancement work included re-connecting isolated fish habitats to the Bonanza Creek main stem for improved fish spawning flow into the mainstem. There are many benefits to deepening our understanding of the fish value of the BBC as climate change continues to force greater need for adaptation. We see Traditional Ecosystem Knowledge (TEK) coupled with Scientific Ecosystem Knowledge (SEK) as the main foundation of knowledge to move forward with the BBC Conservation Plan.

### 3.3 WATER and FORESTS

**Water:** The Bonanza watershed is a highly functioning watershed and hosts the highest concentration of wetlands in the Slocan. Bonanza Creek is the heart and flow of the Bonanza watershed, commencing at the Summit Lake subbasin and flowing over 13 kilometres into the north end of Slocan Lake. There are over 40 tributary streams of varying classes and lengths throughout the corridor. The cache of water flows from tributaries into the main stem of Bonanza Creek, coupled with the filtering of that water in the series of valley bottom wetlands, are a primary source of nutrients and cold water into Slocan Lake.



The BBC is located in a transitional area between a moist climate associated with the South/Central Selkirk Mountains to the east, and the wet climate of the Northern Monashee / Selkirk Mountains to the west. The area receives high rainfall and historically persistent, deep snowpacks. Old forests and wetlands act like sponges on the landscape, retaining and filtering water that eventually flows into Bonanza Creek and Slocan Lake. Calcareous streams in the southwest corner are a unique feature of the BBC and rare in the West Kootenay.

Water is the foundation for all life and ecosystem processes. The water quality in the BBC is exceptional, gathering nutrients and minerals to support the richness of vegetation and diversity of life in the corridor. It is now important to deepen our understanding of the hydrologic composition and structure of the Bonanza watershed. This means not only expanding monitoring programs to include water quality on Bonanza Creek and tributaries, it means. As we move to fully recognize all the sources of water into the corridor, whether it be derived from precipitation, ground water, aquifers, underground springs, snowpack or glacial melts. With this knowledge in-hand we can better understand how, where and what protection and/or resilience mechanisms can be applied to hold and retain water in the BBC.

**Forests:** The BBC encompasses seven bio-geoclimatic subzones/variants and a diverse topography that supports a wide range of ecosystems, from alpine to valley bottom old growth cedar-hemlock forests. Mature and old forests are relatively abundant, particularly on the south side of the valley where historic fires have had less of an impact. Nine provincially listed at-risk ecological communities have been confirmed to occur in the BBC, and another five have potential to occur. These ecological communities occur in sensitive ecosystems that have high ecological values including biodiversity, species-at-risk habitats, limited regional distribution, and heightened sensitivity to human disturbance. Sensitive ecosystems mapped within the BBC include wetlands and floodplains, old forests, sparsely vegetated ecosystems, brushlands, alpine and subalpine ecosystems, and avalanche paths.

The BBC CVA identified timber harvesting as the single largest threat to conservation values in the BBC (Durand and Ehlers 2022). The old and mature forests support a suite of rare and at-risk species, particularly in the wetter valley-bottom sites that may be the focus of future timber harvests. Many of these forests were historically selectively logged and retained elements of the original primary forest, which most modern clearcutting practices do not. Climate resiliency and protecting biodiversity from habitat loss, dictates the need for existing and future timber harvesting plans to take into consideration the need to proactively managing for species-at-risk, tributary buffer and wetland management zones. There are several logging tenures in the BBC that warrant deploying sound harvesting practices to be established before any logging or further road building occurs.

The composition of the forests canopy in the BBC changes with elevation with the majority of intact mature forest at lower elevations and throughout the valley bottom. With respect to old growth, there is a scattering of potential stands identified for deferral within the BBC. We recognize that core forests are the best indicator of ecosystem integrity and concern exists that if there is further fragmentation through climate impacts, wildfires and future harvesting that a functional collapse of primary areas could occur. Further discussion of forest and wildfire resiliency is provided in Section 4 - BBC Climate Vulnerabilities.

### 3.4 BIODIVERSITY and HABITATS

A baseline biodiversity inventory compiled for the BBC has documented over 1400 species to date. This is one of the most comprehensive regional biodiversity inventories undertaken in BC, with contributions from various experts and an extensive review of provincial databases and other sources of information to identify all known species occurrences in the corridor. The list includes 567 plants, 329 fungi and lichens, over 200 arthropods, 160 birds, 64 slime moulds, 45 mammals, 22 molluscs, 16 fish, 5 amphibians, and 4 reptiles. Twenty-eight provincially and/or federally listed species-at-risk were confirmed to occur in the BBC, with another 21 having potential to occur.

Given the depth of our current understanding of biodiversity and the range of habitats within the BBC, we continue to recognize the growing importance of the varied vegetation with the BBC as a fundamental success factor in maintaining biodiversity in the corridor. The range of lower elevation shrubs, grasses, swamp forests and aquatic habitats are a primary food sources for many species. The ICH forests have an abundance of lichen, a primary food source for many ungulates during the winter seasons. Beavers thrive in the corridor, engineering many of the water channels and holding ponds for the benefit of the series of wetlands adjacent to Bonanza Creek. The isolation of some areas in the corridor permits species, such as owls, to remain relatively undisturbed in their habitats. With respect to recreational impacts, measures are established for seasonal closures for sections of the motorized and non-motorized trails during periods of spring grizzly movements and fall western toad migrations. In sum, the conservation of the BBC relies on land-based practices that incorporate all the complexity of nature's interdependent relationships and not solely focussed on protecting one species.

## 4 BBC CLIMATE VULNERABILITIES

### 4.1 CLIMATE OUTLOOK

The effects of climate change within the BBC include the projected shift and reduction of ecosystem and biogeoclimatic (BCG) zones that will change considerably over the next 60 years (Utzig 2020). The shift in BCG zones will result in different disturbance regimes, soils and growing conditions for vegetation, the food web and forest canopies. While these changes are expected to be gradual, the degree and extent of impact with respect to habitats and life cycles for an individual species is unknown. What we do know is that climate change is re-shaping the natural landscape, biodiversity envelopes, food sources and species range movement. There is no question, climate changes have occurred and will continue to impact the BBC, recapped as follows:

- Increase in Temperature Year-Round (e.g. increased winter rain precipitation, changing snowpack, shorter freshets, increased tree stress, diseases, terrestrial and aquatic invasives, etc.)
- Increase in Extreme Events (e.g. rainstorms, heatwaves, windstorms, temperature whiplash, etc.)
- Warmer and Drier Summers (e.g. shift to mixed fire regimes, stand replacing fires the past, drier wetlands, etc.)

## 4.2 EXPECTED IMPACTS

### 4.2.1 WATER and FORESTS

**Water:** One of the projected impacts of climate disruption for the BBC is increased occurrence of winter precipitation as rain, rather than snow, particularly at lower elevations. This has implications ranging from level of permanent snow pack at higher elevations to increased level water flows through the corridor in the winter seasons. Understanding how this change may affect riparian, wetland and aquatic ecosystems is critical to moving forward. For example, some wetlands are more sensitive to changes in tributary flows than others. Those wetlands supplied with lower elevation watersheds or bench wetlands would be expected to have greater adverse impacts. Expanded hydrologic understanding along with applied geophysical knowledge would help determine potential climate refugia hotspots and aid in prioritizing adaptation measures to retain water.

**Forests:** Intact ecosystems within the Inland Temperate Rainforest are important biodiversity reservoirs and carbon sinks that play an important role in regulating the impacts of adverse climate change effects to BC's fish and wildlife species. Vulnerable ecosystems that are projected to be most impacted by climate change include alpine ecosystems, subalpine ecosystems, wetlands, and freshwater aquatic ecosystems (Price and Daust 2016). BGC zones are predicted to move 300 m higher in elevation and 170 km farther north by 2050 (Pojar 2010). Alpine and subalpine ecosystems are projected to shrink over 80% of their current range by 2080 (Price and Daust 2016). In the BBC, this means the ESSF will see reduced area, replaced by a climate analogous to the current moist ICH forests below. The ability of ecological communities to adapt to climate change within the current range of the ESSF will be higher where they are in proximity to intact moist ICH forests predicted to replace them.

Forests are masters of the reciprocal relationship, they take water, protect water from evaporation and shade aquatic habitats. Most of the BBC is covered in closed forest, with some forest harvested clearing focussed at Summit Lake, at the western end of the corridor and across the highway from the valley bottoms on easter slopes. White bark pine stands currently exist at the alpine/sub alpine elevation but will continue to be under threat with longer periods of drought and disease. Forest coverage at upper elevations, are likely to shift from rare stand-replacing disturbances to more frequent stand-replacing regimes brought on by drought and wildfires.

Taking into account climate change, there is a pressing need to re-define acceptable parameters for harvesting on existing logging tenures in the BBC. Approaches such as climate resilient/refugia management zones within the existing cut blocks must be taken into account. Additional impacts of shifting BGC zones and changes in water sources need to be factored in when determining harvesting plans. Discussions to date, along with BC forestry reforms, will continue to be support further collaboration with existing tenure holders and First Nations.

#### 4.2.2 BIODIVERSITY and HABITATS

Given its location, the nature and type of species in the BBC, it is widely recognized that the BBC is and will continue to become a climate refugia for many habitats. We are expecting that ecosystem response will likely result in an ecosystem re-organization whereby functioning habitat ranges/areas existing today will be reconfigured according to the type and nature of the climate impact. This ecosystem re-organization means a greater emphasis needs to be placed on wetlands health and identifying those persistent zones within the BBC that are less likely to be impacted by long periods of drought. Areas that have higher climate diversity and topographical complexity, such as the BBC, are projected to have more resilience to change in the BBC. There currently are an abundance of ecological niches that will continue to provide habitat potential.

#### 4.3 WILDFIRE RESILIENCY

The climate early in the 20<sup>th</sup> century was overall warmer and drier than the latter half of the century. Those climate factors are reflected in the fire history of the BBC, with a 1925 wildfire burning 75% of the BBC, sparing only the lower valley bottom and forested pockets in the south end, including some high elevation parklands. Fire severity and extent is expected to dramatically increase, with more frequent high intensity fires occurring. The identification of climate refugia, such as cool moist locations that will have an increased likelihood of surviving fires, critically important to contribute to ecological resiliency in the BBC. In addition, recognition of sub-watersheds in the BBC that are less dependent on summer precipitation and low elevation snowpacks is another important consideration. To date, wildfire resiliency in the BBC has not been fully assessed at a landscape level, a vital element to be addressed in the Conservation Plan going forward.

## 5 CONSERVANCY IN THE BBC

### 5.1 CONSERVATION OPPORTUNITIES

The BBC has been studied, assessed and monitored providing a wealth of biological and ecosystem knowledge and extensively modelled for climate change. Overall, there is enough foundational work that has been accomplished in recent years to elevate and build on that knowledge base by seeking provincially designated conservancy status. The BBC is 93% crown land with the concentration of residents at the north shore of Slocan Lake in the community at Hills and along the shores of Summit Lake. The BBC is hydrologically rich and well forested with mature stands, with the following biodiversity and habitat characteristics:

- High diversity of at-risk species
- Wide range of sensitive habitats
- Hosts critical life-cycle phases (e.g. spawning, rearing, nesting, foraging, winter feeding)
- Species movement and/or migration corridors
- Internationally significant migratory bird and waterfowl habitat

In British Columbia, legislated conservancies are provincial Crown lands that are set aside for the protection and maintenance of biological diversity; the preservation and maintenance for First Nations social, ceremonial and cultural use; and the protection and maintenance of recreation values. Conservancy status designation for lands within the BBC would help protect sensitive ecosystems and contribute to strengthening BC's commitment to its goal of 30% by 2030. Conservancy status for the BBC would also greatly benefit the globally imperiled ITR.

**Existing Conservation Lands:** Within the boundaries of the Bonanza watershed, several conservation lands or protected areas already exist. At the south end of the corridor and along the northern shores of Slocan Lake, there are two conservation marshlands at the mouth of Bonanza Creek: Snk'Mip Marsh Sanctuary (Valhalla Foundation for Ecology, est. 2018) and the Bonanza Marsh Conservation Area (Nature Conservancy of Canada, est. 2022). Over 150 species of birds have been identified in these delta marshes, with a high percentage of them migratory birds. The recent establishment of these conservation lands demonstrates the current momentum within the corridor to set aside lands for protection. In the short term, we expect that new lands will be continued to be identified for land securement.

**Provincial Parks:** At the northern boundary of the Bonanza Watershed, the Summit Lake Provincial Park provides protection for the annual migration of western toads at Summit Lake. The BC Ministry of Forests, Lands, Natural Resources and Rural Development (MOFLNRD) led coordinated efforts to protect the significantly important Summit Lake western toads. Management strategies were developed in collaboration with logging tenure holders, Fish and Wildlife Compensation Board, BC Parks, First Nations and local residents (FLNRD 2017). Recommendations included limiting forestry activities to a 2-km buffer around the lake, use of herbicides/pesticides, restricting motorized traffic, seasonal closures on the recreational trails and restriction of riparian disturbances. The plan was never implemented but remains valid to this day. We see this as an opportunity to work with BC Parks to re-visit these recommendations for conservation management at Summit Lake.

**Hamlin Wildlife Management Area:** During the course of our project, existing protection mechanisms were examined and evaluated for the BBC. There is a designated BC Wildlife Management Area (WMA) at Hamlin Lakes located east of Summit Lake, in alpine and subalpine terrain. The Hamlin Lake WMA was established as a protected winter foraging habitat for the Selkirk caribou and is a popular recreational area in the winter season. At present, the status and effectiveness of the management plan for this WMA is unknown, indicative of the issues with WMAs throughout the province. We see this as a conservation opportunity to evaluate further the potential for this WMA to be expanded/refined to address connectivity protection of known species movement from the Goat Range Provincial Park to the BBC and vice versa.

**Regional Conservation Lands:** Recently the Incomappleux Valley, a significant area of intact forests within the ITR, was designated for conservancy under the *Protected Areas of British Columbia Act*, along with a special provision in the BC Forest Act. We are encouraged that the government is moving and evolving their approach to designating areas for protection that do not typically fit existing/established BC protection measures, adopting a more progressive approach to setting aside lands for conservation.

## 5.2 REGULATORY LANDSCAPE

In recent years, the regulatory landscape at both the provincial and federal level has been rapidly evolving in all areas of the environment. These major legislative reforms are being refined to accommodate the impacts of climate change and to fully recognize the rights, knowledge and cultural values of Indigenous peoples. The impacts and uncertainty surrounding climate change has rapidly advanced the need for First Nations and regulatory authorities to re-vamp and reform strategies, legislature, laws and practices of the past. As these reforms take hold and become embedded in various land, water, fish and wildlife legislation will directly benefit stewardship obligations by providing additional clarity and authority. Water, biodiversity and food security will continue to be the main driver in these reforms whether driven from a natural resource or a people perspective. In the interim, we continue to navigate and work with existing legislature, guidelines and permitting processes for conservation in the BBC.

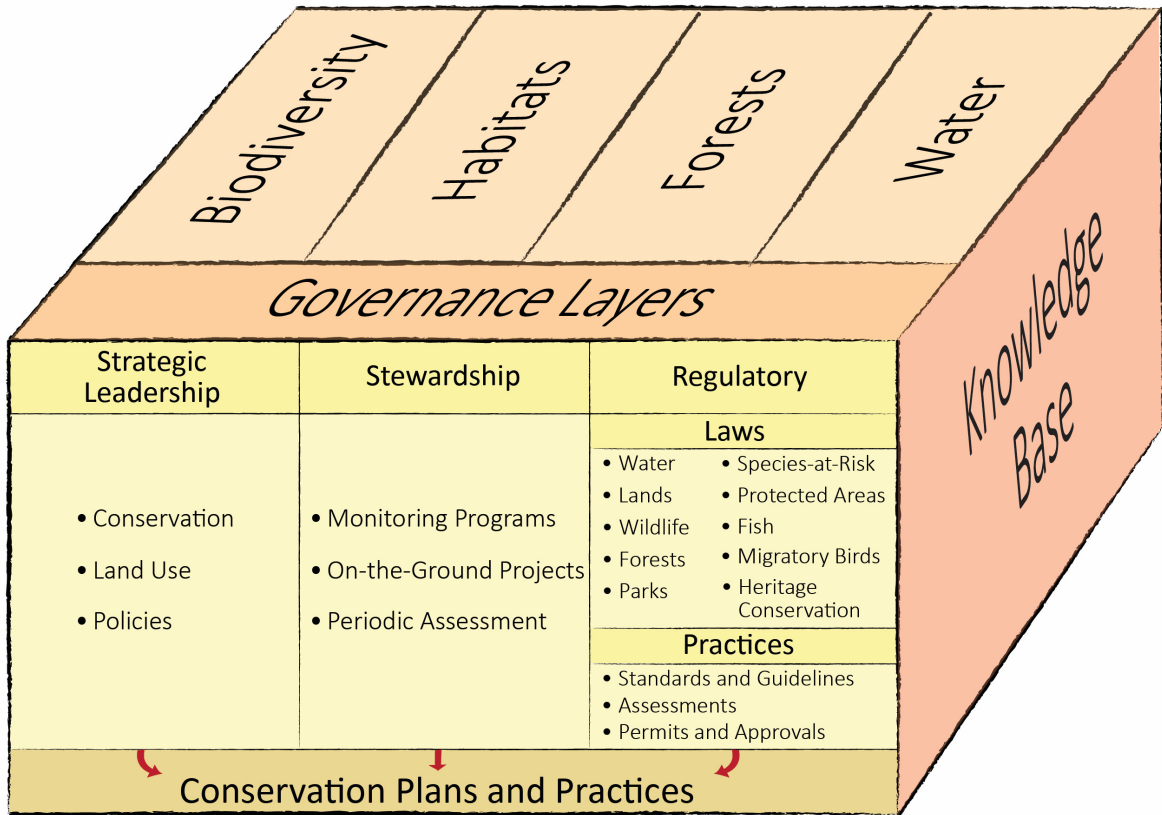
We are encouraged by the BC government's commitment to the following initiatives that will continue to have a positive influence on the ongoing stewardship of the BBC:

- Biodiversity goals of conserving 30% of lands in BC by 2030
- Watershed Security Strategy Intentions Paper (BC Ministry of Water, Lands and Resources, Mar 2023)
- *Nature Agreements* with the Indigenous communities, the federal government and industry organizations
- Forestry Reform from mature forests management to wildfire recovery programs
- Amending the BC Wildlife Act to support Indigenous stewardship of ecosystems
- Revised permitting and approval processes to consider including current and future cumulative impacts on the land base

## 6 STEWARDSHIP

### 6.1 GOVERNANCE ROADMAP

One of the more difficult aspects to envision the future of conservation stewardship for the BBC is how the various governance roles and responsibilities will be allocated. From a classic management perspective, governance is seen as defined, rigid structure with many organizational layers and levels of authority. In our rapidly changing world, we choose to see governance based upon a flexible bottom-up approach. In other words, as we initiate this Conservation Plan, we need to leverage what has already been established and build on what we know. Then as the province ramps up regulatory reform in the protection and conservation of forests, water and biodiversity, we see Indigenous-led and climate driven conservation roles emerging with sufficient legal authority to put into effect those policies and practices needed for landscape-level conservation. To date, stewardship organizations like the Slocan Lake Stewardship have primarily relied on the provisions of the Water Sustainability, Wildlife and Forestry Acts for their on-the-ground conservation work and advocacy activities.



## Bonanza Biodiversity Corridor Governance Model

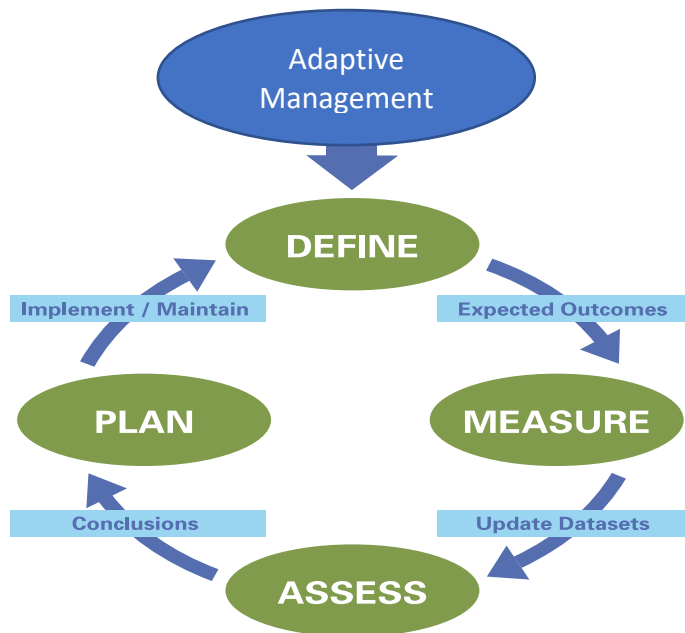
The diagram above provides the reader with a depiction of how we see these inter-related governance layers working together to effectively and pragmatically handle current and future ecosystem threats. It is not intended to identify all the regulatory or legal triggers for land use proposals, rather to capture all governance roles, including the need for defined strategic leadership going forward. Flexible in design and structure, it provides for a balanced approach on how responsibilities can be defined allocated amongst available resource base. As a not-for-profit society registered in BC, Slokan Lake Stewardship Society’s role fills a vital niche in knowledge sharing and collaboration in its capacity to deliver on-the-ground work and monitoring programs.

## 6.2 MONITORING

### 6.2.1 ADAPTIVE CONSERVATION MANAGEMENT

Over the long term, effective monitoring is based on the principles of adaptive conservation management (ACM) to not only assess and measure current state and rates of change, but to provide a reliable flow of knowledge for ongoing decision making and development of optimal conservation strategies. The overarching principle of ACM is to establish the cause-and-effect relationship between plans, actions, and results in order to improve the outcome of any conservation management efforts.

This adaptive management philosophy is first and foremost a knowledge-centric model, relying on reliable information flows to determine if desired conservation values are being protected. Adopting a flexible and integrated ecosystem approach to on-the-ground monitoring programs and partnering with a wide-range of knowledge sources improves the management value of ACM. The diagram below is a simplified view of how adaptive management works and remains relevant through time with a constant flow of knowledge from monitoring programs.



### 6.2.2 MONITORING PROGRAMS

With a biodiverse and ecologically rich corridor like the BBC, relevant monitoring programs and assessments for the BBC are based on multiple parameters and species. A robust set of parameters are needed to monitor not only results of on-the-ground restoration or enhancement work but to extend that monitoring to understand changes to water (quality and quantity), biodiversity and/or habitats. Monitoring is meant to inform stewards of what is happening on the land and meaningful to a course of action to mitigate / enrich or enhance existing ecosystems.



**Wetland Monitoring:** To date, monitoring programs are established for each of the wetland restorations completed in the corridor. Each monitoring site is representative of wetland types in the corridor, providing a baseline for future analysis. These site-specific monitoring programs will continue to measure not only the effectiveness of the restoration works implemented in 2020-21 but further keep us informed of additional species-at-risk, habitat and vegetation transformation through time in the riparian and wetland zones.

**Biodiversity Assessments:** Biodiversity assessment and studies in the BBC has been ongoing for many years and are a form of monitoring in itself. The recent expansion of that work in the past three years, we now have an established baseline of flora and fauna knowledge that needs to be periodically assessed for cumulative impacts from harvesting, recreational use or climate shifts. For example, in 2018, an Environmental Impact Assessment was performed for a recreational trail network system throughout the corridor, with both motorized and non-motorized segments. As a result of this work, the valley bottom trails were formally designated as non-motorized, with recommendations to assess cumulative impacts for both trail segments on a periodic basis.

**Water Monitoring:** We currently are monitoring water temperatures along Bonanza Creek at 4 different locations. On an annual basis, data is uploaded into the Columbia Basin Watershed Network for access and use by government, climate change specialists, Indigenous and conservation communities. As noted throughout this report, there is a recognized need to improve our understanding of water sources and flows not only on Bonanza Creek mainstem, but on major tributaries throughout the BBC. Plans are in place for installation of a hydrometric station on Bonanza Creek in 2023. This additional monitoring will provide a starting point to expanding watershed knowledge and defining strategies for the BBC.

### 6.3 POLICIES

Policies state the guiding principles for a topical area that provide the basis for the development of specific procedures and practices in support of those policy requirements. In context of conservation management, non-governmental organizations like the Slocan Lake Stewardship Society have had to rely on existing regulatory legislation and standards to set policy direction. As the regulatory landscape moves with its intended laws, including Indigenous leadership in conservation, we anticipate improved clarity of policy direction with respect to Watershed Security, Forestry and Biodiversity. As those reforms are delivered, we see the opportunity to tailor specific ecosystems policies to prioritize stewardship decision making. BBC specific policies will evolve conservation policies as reforms and legislative changes are enacted.

### 6.4 LAND USE

Modernized Land Use Planning (MLUP) is a cross-jurisdictional BC government initiative that is ongoing since the adoption of UNDRIP. The MLUP goal is to provide equal weight in decision making for Indigenous laws and territories to engage in land use planning. With respect to the BBC, there are two aspects of MLUP that warrant attention. First, the recognition that current jurisdictional accountabilities need to move towards watershed boundary planning and secondly, to quantify the cumulative effects associated with expanding backcountry recreational use. At the regional level, we are seeing land use reforms trickle down through RDCK Official Community Plans. We continue to monitor these developments and their implications for the BBC.

## 7 THE BBC CONSERVATION PLAN

Based upon the BBC's current state of management knowledge, a strategic plan has been developed to outline the next steps in the protection and stewardship of the BBC. Each strategic arm of the plan is to be seen as the long-term view for execution of the Plan. Actual timeline and priority activities will vary over time, with near term actions described in the sub-bullets to those strategic arms. The Plan is intended to be a pragmatic and workable plan, based on current relationships and resource capacities.

- **Conservancy Lands:** Continue championing the protection of the BBC by building on existing mosaic of conservation lands.
  - Revisit Summit Lake Parks expansion for Western Toad Management
  - Identify opportunities for conservation land securitization within the BBC
  - Explore protection opportunities with First Nations securement and regulatory authorities
- **Watershed Knowledge:** Develop in-depth understanding of water sources to establish a hydrologic baseline for future planning, assessment and climate monitoring.
  - Conduct hydrologic geophysical analysis of the BBC watershed
  - Expand creeks and tributary monitoring to include periodic water quality testing
  - Install hydrometric station on Bonanza Creek
- **Traditional Ecological Knowledge:** Expand ecological and cultural knowledge of the BBC through engagement and knowledge exchange with First Nations communities
  - Conduct additional archaeological reviews at the south end of the corridor
  - Explore outreach opportunities to engage Indigenous youth in on-site tours and workshops
- **Forest Management:** Ongoing collaboration with the province, tenure holders and Indigenous communities to develop specific policies and acceptable standards with respect to timber harvesting and wildfire resiliency in the corridor.
  - Identify climate resilient forestry management zones throughout the corridor
  - Develop assessment policies and harvesting standards specific to the BBC
  - Evaluate opportunities for enhancing isolated old growth and whitebark pine stands
- **Climate Resiliency:** Develop climate resiliency plans based upon identified refugia niches, forestry management zones and riparian assessments.
- **Fish Habitat:** Support Indigenous wild salmon recovery and expand life cycle knowledge for kokanee and rainbow trout.
  - Provide volunteers for annual Kokanee run counts on Bonanza Creek
  - Conduct fish assessment of rainbow trout bearing tributaries throughout the corridor.
- **Wetland Monitoring:** Continued wetland monitoring and maintenance of restoration sites.
  - Expand site monitoring programs to include soil sampling and analysis
- **Biodiversity Assessments:** Coordinate the delivery of biodiversity and cumulative impact assessments for any major residential, commercial or recreational development.
  - Conduct post implementation / cumulative impact reviews of recreational trails
  - Continued collaboration with Central Kootenay Invasive Species Society to mitigate the impacts of invasive plants and aquatic species in the corridor

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## APPENDIX A - BBC CONSERVATION FRAMEWORK COMPONENTS

### WATERSHED LAYERS

**Landscape:** Represents the hydrogeological view and boundaries of the watershed, from valley bottom to the alpine. For alpine watersheds such as the BBC, the system of creeks, ponds, avalanche slopes and nutrient feeds into the drainage, riparian zones and water channels directly influences the type and robustness of biodiversity and habitats that the watershed supports.

**Riparian:** This critical layer is comprised of the wetlands and floodplains adjacent to streams and creeks, providing a link to upslope ecosystems. Riparian zones are a key habitat and travel corridor for vegetative communities. The quantity and quality of wetlands has a direct influence on ecosystem health.

**Hydrology:** These are the natural watercourses, bodies of water and water channels within the watershed, whether or not the watercourse has been altered. Water channels included streams and streambanks, whether or not it contains water throughout varying hydro periods.

### CONSERVATION TARGETS

**Water:** At the heart of all aquatic and terrestrial ecosystem life is water flow, quality and permanence. Any long-term conservation plan must take into account all such parameters when determining water management policies. The BBC is rich with streams, drainages and a defined, precipitous landscape that hosts the highest concentration of wetlands in the Slocan Watershed. Hydrology knowledge directly assists in validating specific conservation actions, policies and practices.

**Forests:** A critical series of ecosystems and related biological processes that provide the environmental foundation for supporting water and life in the corridor. The range of mature forests, diversity of flora and fauna is typically viewed from the perspective of the various watershed layers (i.e., landscape, riparian and hydrology), including native and indigenous plant values.

**Habitats:** This conservation layer focuses on the protection of both aquatic and terrestrial habitats. Sensitive habitat locations and applied species knowledge, contributes to identifying those habitats requiring conservation measures or interventions to be put in place.

**Biodiversity:** An identification of key species with high conservation values, as defined by generally accepted conservation standards, including the ecological processes and conditions needed to retain those values. Biodiversity inventory focuses on all macroscopic life forms, including animals, fungi, lichens, plants, and slime moulds.

### STEWARDSHIP

**Land Use:** The use of the land and how forests are managed is a vital component to maintain the integrity of the landscape, its wildlife and ecosystem processes. This slice of the framework represents the top level of leadership, guidance and strategic direction needed from indigenous, regulatory and stakeholder communities.

**Policies:** This portion of the stewardship plane provides the confirmed direction and manages the expectations of a given set of conservation initiatives or regulatory reforms. It provides the guidance for all levels of stakeholders in planning their contributions and resources retaining conservation values.