

ᑭᑭᑭᑭ Project

A Ktunaxa Cumulative Effects
Evaluation for a Portion of
ᑭᑭᑭᑭᑭᑭ ᑭᑭᑭᑭ (North Slocan)

Summary Report

Find the detailed assessment and
references in our Final Report:



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Ktunaxa Nation Council

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ʔačpu Project

Background

Throughout ʔamakʔis Ktunaxa, Ktunaxaniñtik (*Ktunaxa people*) have expressed growing concerns for the cumulative effects of various land use activities, including outdoor recreation.

In addition to industrial activities (e.g., forest harvest, mining, road building), the increasing scale and pace of outdoor recreation interests (both commercial and non-commercial) is posing significant threats to the health of the Land. This negatively impacts ʔa·kxañis ǰapi qapsin (*All Living Things*).

Expanding outdoor recreation has known impacts that include:

- soil erosion and compaction
- alteration and loss of native vegetation structure and composition
- introduction and spread of invasive species
- reductions in forage quality and quantity
- reduced water quality and aquatic health
- wildlife disturbance and displacement from key habitats (resulting in poor animal condition, stress-mediated decline and reduced overall population fitness)

These impacts lead to landscape-level such as habitat fragmentation and degradation to permanent loss of habitat.

Managing for *individual* impacts in isolation—without considering the synergistic interactions among *multiple* impacts and how these collectively manifest over time—is counter to the Ktunaxa understanding of ʔa·qatikniyiʔis (*ecosystem services*).

We need to understand the breadth of factors impacting the Land in order to make informed decisions that sustain ʔa·kxañis ǰapi qapsin.

Assessing cumulative effects aligns with **yunaniñ kawaxmuʔxu** (*Ktunaxa natural law*): ‘*What effects one effects all*’ or, ‘*many sources that impact one.*’ The risk is that, without a holistic and cumulative approach to evaluating impacts, the combined effect may further displace us, and ʔa·kxañis ǰapi qapsin, from our shared homeland, and interfere with the exercise of our Ktunaxa rights.

In the spring of 2020, Yaqañ Nuʔkiy (Lower Kootenay Band) and the Ktunaxa Nation Council were notified of two overlapping, year-round commercial recreation developments proposed within the Goat Range of British Columbia’s Selkirk Mountain Range. The proposed developments would add to

existing commercial and non-commercial recreation activities, as well as to other historic and current resource use and extraction activities. This is a key concern to Ktunaxa.

Therefore, Ktunaxa conducted a **cumulative effects assessment** to understand the potential impacts of past, current and proposed future land-use activities within a portion of ʔamakʔis ʔaʔpu (Wolverine’s Land). This area spans the Highway 31A corridor located in south-west British Columbia.

We assessed impacts of regional land-use activities, with an emphasis on two overlapping, year-round commercial recreation developments proposed within this corridor: **(1) Zincton Expression of Interest All-Season Resort**, and **(2) Mount Brennan Backwoods Recreation**.

In our assessment, we asked:

- How much recreational activity, (coupled with existing land uses such as mining, forestry, roads, other linear corridors, urban/rural development, etc.) *exceeds* the carrying capacity of the land and the associated tolerance limits of biodiversity components?
 - Or rather, just how ‘deep’ do we want our ʔa-kʔik (foot tracks) to tread on ʔa-kxaʔnis ʔapi qapsin?
- And, what will be the realized impact on **ʔa-knumuʔitiʔ** (*Ktunaxa law outlining Ktunaxa obligation as responsible stewards of the land*)?

We combined expert knowledge systems with model simulations (using ALCES software) to map the predicted changes to ecosystems and communities caused by *human-mediated landscape change* and *land-use disturbance*, *natural disturbance* (such as fire), and *climate projections*.

For this assessment, we selected **ktawʔa** (grizzly bear) and **aʔpu** (wolverine) as the key benchmark species. They are key species due to their cultural importance, specialized habitat requirements and known sensitivity to recreational activities. We also evaluated impacts to **niznapku** (moose), **kyanukxu** (mountain goat), **ku-ku** (western toad), **ʔawiyax** (huckleberry), **ʔakikqanʔaʔin** (old forest) and **wuʔu / napituk** (water, aquatic) habitat important to local fish species.

Project Area Description and Values

The spatial boundary of the study area is within ʔamakʔis Ktunaxa, between ʔamakʔis ʔaʔpu (Wolverine’s Land) and ʔamakʔis miʔqaqas (Chickadee’s Land). It is home to the Yaqa Nuʔkiy and Kootenay Tribe of Idaho people within the ʔamakʔis Ktunaxa (Ktunaxa Nation, Land of Ktunaxa).

The study area is 5,662 km².
(See Figure 1, next page)

It is bound by Kootenay Lake on the east and Slokan Lake on the west.

To the north, it extends to the northern-most reaches of the Upper Arrow Lakes near Qayitxuʔik (Beaton). To the south, to the confluence of Sʔuqa ʔakinmituk and Kʔantawsanmituk (Slokan and Kootenay rivers) just west of ʔakanukamak (Shoreacres).

The area includes all British Columbia Assessment Watersheds that intersect with the two recreational tenures proposed along Highway 31A.

This area features high relief, encompassing mountain peaks in the Goat Range and Kokanee Glacier massif at 2,700 m above sea level, and valley descents to 461 m at the confluence of the Slokan and Kootenay Rivers.

It is characterized by upland coniferous and mixed forests in the **Interior Cedar Hemlock (ICH)** and **Engelmann Spruce Subalpine Fir (ESSF)** biogeoclimatic zones below 2,300 m (a.s.l.).

Uppermost elevations are within the **Interior Mountain-Heather Alpine** undifferentiated subzone, comprised of alpine meadow, heath, fellfield, talus, avalanche chutes, and, notably, Kokanee Glacier in the headwaters of Keen Creek.

The Highway 31A corridor bisects the heart of the study area. This highway connects Wupnikʔa (New Denver) and Qasʔu (Kaslo), ‘where the snow meets the water.’

Ktunaxa ʔa·qaʔqanuxwatiʔ (oral histories) and archeological records show that, prior to European contact, this was a route used for travel and trade of swaʔmu (salmon) and kamquququʔ ʔiyamu (buffalo, bison) from ʔaʔnu ʔakuqʔnuk (Nakusp) east to Head-Smashed-In Buffalo Jump. Trade and travel routes such as this one are integral to distinctive Ktunaxa culture (*Troy Hunter, interview, 2022*).

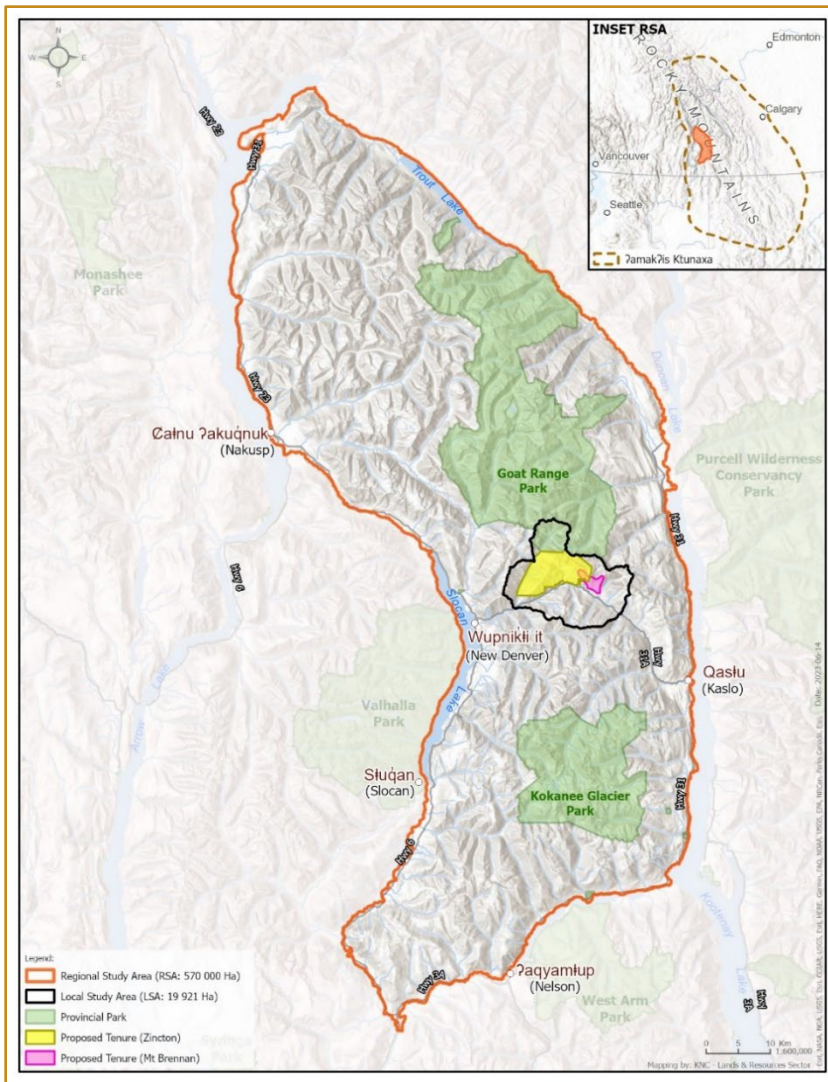


Figure 1 – Study Area Map with Ktunaxa place names

The E-W corridor along Highway 31A also bisects a critical N-S connectivity corridor for both aʔpu and kʔawʔa. The local study area encompassing this corridor (marked by black boundary line, Figure 1) connects **wolverine** populations found within protected areas of Goat Range and Kokanee Glacier Provincial Parks. **This area supports the highest wolverine density still occurring in the southwest portion of the Kootenay region (i.e., 5 – 7 wolverines per 100 km².)**

Similarly, this corridor connects a sub-population of **grizzly bears** occurring in the Kokanee Glacier Provincial Park. Existing natural and anthropogenic barriers to movement have resulted in this

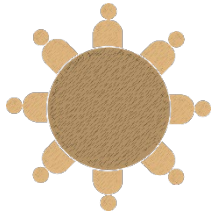
sub-population estimated at only 30 individuals, with less than 25% of the population consisting of breeding females. Female grizzly bears play a pivotal role in reproduction and are susceptible to human disturbance and landscape fragmentation. **Proposed commercial recreation developments overlap with some of the highest quality grizzly bear habitat in the region**, particularly in areas with productive huckleberry patches such as London Ridge (core area of proposed Zincton Resort). Female connectivity therefore requires movement between habitat patches and that bears ‘live’ a portion of their lives within these corridors with limited disturbance.

Both wolverine and grizzly bear are known to be disturbed by recreational activities resulting in habitat displacement, reduced foraging rates, and evidence of den abandonment with implications to their reproductive success and overall population viability.

Further, this area provides for suitable **mountain goat winter range, wetland complexes** utilized by **moose, critical breeding and migratory habitat** for a metapopulation of **western toad** and important habitat for many other animals, including several **species at risk** and those **dependent upon remnant pockets of old forest**.

Situated within the Kaslo River watershed and its many tributaries, the area also supports a variety of fish species, including provincially blue-listed **qustit' (trout)**: bull trout and westslope cutthroat trout.

ʔamakʔis ʔaʔpu offers an abundance of **food** and **medicines** that sustained Ktunaxaniñtik since time immemorial. To the west of the study area boundary, ʔaʔpu were once known to come down to the valley bottoms in Yaqaan Nuʔkiy (Lower Kootenay). Wolverine are fierce; it was a proud hunt to harvest a wolverine (Chris Luke Sr, interview, 2022).



Methods

The ʔaʔpu cumulative effects project assessed the potential risks to environmental values that underpin Ktunaxa way of life. Our assessment followed concerns and values identified through community engagement.

These concerns and values include: habitat loss, alteration and degradation; wildlife disturbance, displacement and mortality risks; landscape fragmentation; aquatic species and systems implications, and inherent uncertainties of accelerating climate change.

Throughout all stages of this assessment, we gathered knowledge from a diverse group of problem solvers, including subject-matter experts (Ktunaxa and non-Ktunaxa), Ktunaxa citizens, and western science biologists.

In turn, outcomes of this work reflect an uncoordinated sample, open to expertise and insights from various educational and cultural backgrounds spanning Ktunaxa communities, sectors, and age groups – exceeding minimum interactions needed to avoid small-sample bias.

We applied **ʔukiniñwiytiyaʔa (One Heart Method)**, or **ʔat kʔa suʔkiñ ʔitkiniñ (making it right again)**: a Ktunaxa framework for sharing information and solving problems with one mind and one heart. Integration of Ktunaxa research methods into cumulative effects research allows us to investigate cumulative impacts to ʔa·kxañis ʔapi qapsin within an inclusive and holistic framework.

From information gathered, we selected a host of **keystone values**, or **valued components (VCs)**, that represent the condition of natural processes and ecological systems supporting ʔa·kxañis ʔapi qapsin and are culturally significant (**Table 1, next page**). VCs serve as indicators of current and prospective environmental condition and trends.

Valued Component	Indicator
Kławta (grizzly bear)*	Female reproductive habitat High quality huckleberry patches Habitat connectivity
ʔaʔpu (wolverine)*	Population density Female reproductive habitat Critical denning habitat High habitat quality (both sexes) Habitat connectivity
kyanukxu (mountain goat)	Suitable winter habitat
niʒnapku (moose)	High suitability winter habitat
ku-ku (western toad)	Traffic volume (road mortality)
ławiyaf (huckleberry)	Probability of occurrence
ʔakikqangʔin (old forest)	Old forest patch size Old forest availability
wuʔu / napituk (water, aquatic health)	Stream flow regime Water temperature
Combined VC*	kławta reproductive habitat + ʔaʔpu habitat quality for females + ʔaʔpu habitat quality for both sexes

*VCs assessed for future condition using computer simulations (ALCES), in addition to current literature and expert knowledge.

Table 1: Valued Components and Corresponding Indicators.

We simulated a **pre-contact scenario** to provide a relevant reference condition for evaluating VCs. The pre-contact simulation examined the condition of the landscape **100-200 years before European settlement**, predicted under the **Range of Natural Variability (RoNV)**. We inferred current winter traffic levels for Highway 31A from estimated autumn traffic levels. We ran scenarios at 100 m spatial resolution and simulated at a decadal time scale for 50 years, with outputs that correspond to current condition (year 2021), and potential future condition (year 2071). We accomplished scenarios at two spatial scales, regional and local, and according to Landscape Units. This summary reports at the scale of the local study area (LSA).

The Zincton All-Season Resort proposes a delineation of a summer *Wildlife Corridor Protection Zone* with opportunities for grizzly bear viewing along the existing Whitewater trail to Whitewater Peak. The mechanism to enforce activity within the proposed protection zone on public lands is unclear.

We selected corresponding indicators for each value to quantify predicted *type* and *extent of impact* on habitat quality from direct and indirect disturbance, (e.g., human-induced wildlife disturbance and displacement) as well as direct land conversion. **The Final Report describes the detailed rationale for selected values and corresponding indicators.**

We used **ALCES Online** to simulate landscape composition and to evaluate the response of each VC to current condition and proposed future land use activities (*see Final Report, MacHydro, 2023, Supplementary Material*).

Future condition scenarios focused primarily on the Mt. Brennan Backwood Adventure Tourism (Mt. Brennan, Hutton 2020) and Zincton All-Season Resort (Zincton, BHA 2021), with forest harvest, natural disturbances (i.e., wildfires and insect infestations), foreseeable urban and rural expansion, increased traffic volume, and recreational activities included as cumulative effects.

Thus, we simulated two scenarios for cumulative effects with the Zincton development: One that assumes use is restricted to designated trails and areas in summer and winter, and the other that assumes unrestricted use. Given no known mechanism to enforce or restrict use, this summary reports on key findings that assume access is unrestricted.

We applied habitat quality discounts (defined as the proportion of habitat quality effectively lost, or degraded) that represent how a certain species is likely to respond to a particular type of disturbance (focus on recreation in this case). For example, the disturbed area (i.e., a trail, lodge, etc.) is considered a **use area**, and then one or more surrounding areas at specific distances from the use area may be delineated and assigned a discount. In the example of wolverines using trails, habitat quality is discounted by 100% on the trail itself, and then by 50% within 300 m of the trail; the discount gradually drops to 0% at 2000 m from the trail. The habitat discount gradient represents how wolverines avoid areas subject to repeated and concentrated human disturbance occurring at closer proximity to trails. Due to existing knowledge limitations related to recreational impacts, explicit indicator thresholds and corresponding habitat discounts for future scenarios were modeled to three of the selected VCs for this assessment (see Table 1 above*).

Our approach exceeds current standards typically used to assess cumulative effects that exclude recreational impacts that extend outside of a project footprint and are therefore not sufficient according to Ktunaxa worldviews. We explicitly incorporated recreation impacts which manifest as indirect habitat loss and/or degradation to habitat quality rather than direct habitat loss (e.g., dam impacts, mining, and forest harvest).

Key Findings

- **Ongoing and increasing human activity proposed by commercial recreation developments within the Highway 31A corridor threaten to further fragment local populations of grizzly bear and wolverine.**
- The ALCES modelling showed decreased habitat quality for vital for female reproductive success in all prospective impact scenarios.
- Within the local study area, we estimate that there has already been approximately a 20% reduction in summer habitat quality and effectiveness for grizzly bears since pre-contact (European settlement) and that another 48.4% reduction in habitat quality can be expected with approval of proposed developments (mainly the Zincton All-Season Resort).
- **Within the proposed Zincton All-Season Resort tenure, our estimates show up to 94% of the high quality huckleberry may be comprised.** When the combined effects of both proposed developments were modeled, a total of 182 ha of huckleberry patches were estimated to be lost across the study area. This has direct implications for grizzly bear and Ktunaxa cultural harvest and ceremonial practices.

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- Disturbance for **grizzly bears** was not restricted to summer activities. Proposed commercial recreation activities, including backcountry skiing, is known to disturb denning grizzly bears, which has been shown to result in den abandonment and subsequent cub mortality.
 - Developments and existing land use activities predict further reductions in **wolverine** habitat quality from 21% up to 60%, depending on the season.
 - Trail development and use play prominent roles in the prospective reductions to female wolverine habitat quality in summer. In winter, backcountry skiing activities are likely to reduce in wolverine use and occupancy and disturb areas selected for female denning.
 - **A marked decrease in future habitat quality was predicted** when combining grizzly bear and wolverine indicators, suggesting cumulative effects of existing and newly proposed recreational land use within the Highway 31A corridor poses '**high hazard**' for regional populations (**Figure 2, next page**).
 - Highway 31A bisects suitable habitat conditions for life cycle requisites of a local **western toad** population. Recent local surveys investigating the extent of toad road mortality found current traffic volumes to result in an average 0.91 adult toads killed per day. Increased traffic volume as a result of proposed developments threaten the long-term survival of this local population.
 - Suitable **moose** winter habitat is currently considered degraded by as much as 50% from human disturbance caused by significant amount of backcountry skiing, cat skiing and heli-skiing are already occurring in the local study area.
 - Suitable winter habitat for **mountain goat** is found within the study area. Knowledge about current goat occurrence and distribution in this region is lacking. Goats use traditional trails and routes to access these lower-elevation licks from their primary alpine habitats. Leaving these trails undisturbed is essential to maintaining local mountain goat populations.
 - At present, small patches of **old forest** (1 – 5 ha) are found in the local study area, supporting a diversity of old forest dependent species. Any changes to forest age and condition by proposed developments should be considered.
 - Under future **climate-change** scenarios, our modeling found local snow conditions to decrease with earlier spring, decreased late summer streamflow and warmer temperatures. **Changes in water temperature**, flow regimes and water quality have potentially negative consequences for local **salmonids** that prefer clear waters and cool ground water for spawning, incubation and rearing (i.e. Westslope Cutthroat trout). Any potential water intake or inputs to local watersheds from past, current and proposed development activities should be considered as additive to impacts from climate change.

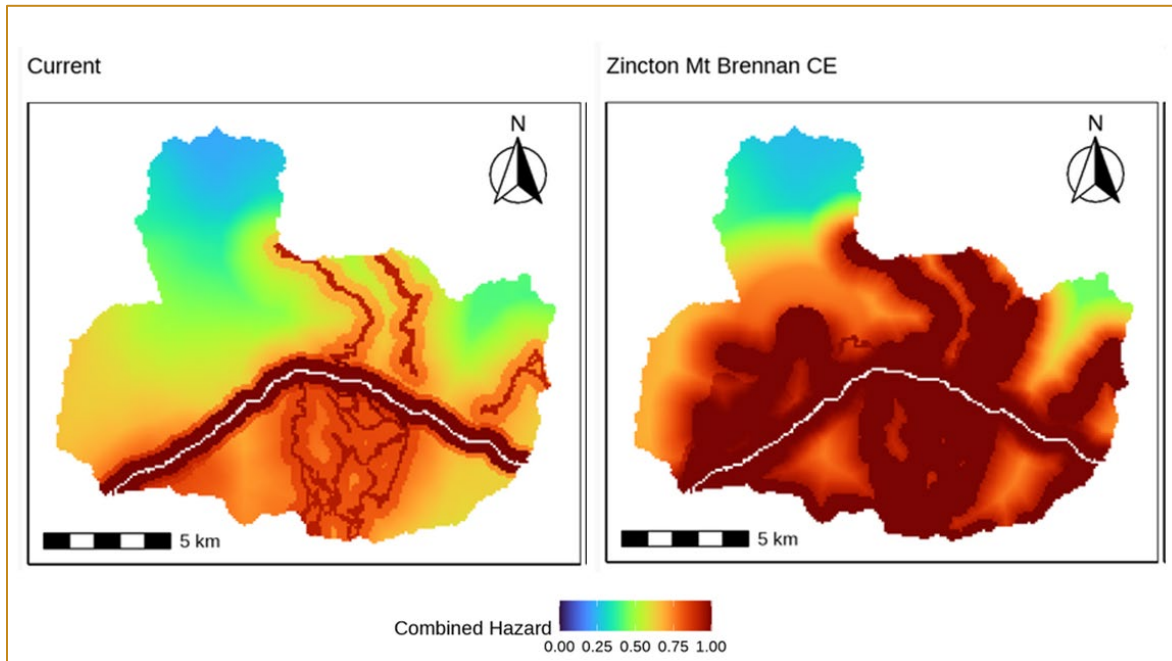


Figure 2 – Combined hazard maps for grizzly bear and wolverine habitat within the LSA (Local Study Area) for current condition and future prospective scenario that include both Zincton and Mt Brennan proposed recreation tenures.

Conclusions

Interviews with Ktunaxaniḥtik confirm that the study area (situated between ʔamakʔis ʔaʔpu and ʔamakʔis miʔqaqas) is a place of historical and current use and cultural importance.

We maintain stewardship responsibility for the area that incorporates our laws and values, including respecting and nurturing ʔa·kxaḥis ʔapi qapsin. We actively use the study area for the exercise of Ktunaxa rights, including knowledge transmission and future harvesting of resources including fish, game, huckleberry and traditional medicines. In addition to existing land use in the area, these rights are expected to be further and significantly compromised by the construction and operation of two new and overlapping recreational tenures in a geographically constrained area.

The present and future ability of Ktunaxaniḥtik to maintain our way of life through the exercise of our rights, activities and cultural traditions is vital to the health of our people and requires continued access to landscapes that maintain natural functions and ecosystem attributes. The results of this study support significant concern that the cumulative effects of the Zincton and Mt. Brennan tenure proposals may compromise this ability within the study area.

We can conclude that increased access into these backcountry areas will result in **significantly diminished habitat quantity and quality** and **unavoidable population-level impacts to selected values of high importance to Ktunaxaniḥtik.**

Results of this assessment find the cumulative effects of existing and proposed land use activities within this narrow and vital corridor to be high hazard.

Following a precautionary approach, and guided by **Yakaḥ hankatitḥki na ḥamak** (*our people care for the land, the land cares for our people*), further cumulative developments in ḥamakḥis Ktunaxa must be informed by regional-scale, long-term and holistic land stewardship planning to prevent further negative impacts and ultimately improve the habitat conditions for ḥa·kxamḥis ḥapi ḥapsin.

Land stewardship planning at regional scales is required to achieve ecosystem resilience and recovery, climate refugia, and maintenance of critical connectivity corridors.

Future land use activities in ḥamakḥis Ktunaxa must be informed by regional-scale, long-term and holistic land stewardship planning to sustain healthy conditions for ḥa·kxamḥis ḥapi ḥapsin and to ensure the rights of Ktunaxanintik are respected and honored into the future.

Only a comprehensive framework to assessing cumulative effects, as has been described here, will ensure the cultural and environmental values and rights of Ktunaxaniḥtik are respected and honored into the future.



ʔa·kxamis q̓api qapsin

Illustration by Marissa Phillips

Artist Statement:

"The center of the image starts from the singularity of spirit at the beginning of time and Spirals out. I was taught that time for us isn't linear, but instead moves in a spiral. Within the larger spiral are smaller spirals showing increasing events (or cumulative effects) and decreasing events throughout time.

Behind the spiral I have represented the four elements: Fire, Water, Earth and Air, which are the building blocks of all life and that which sustains our physical life on Mother Earth.

I chose to represent a small sampling of lifeforms and environmental components from our territory, not in a hierarchical structure, but instead connected to each other via the Life Web, as not one thing is more

important or better than the other (some of the web has been damaged to show humanity's impact on it). Each living being is an important strand and will effect the others.

I have chosen to represent: Moose's tracks; the fungi and mycelium network; a representation of soil minerals (Fe for Iron) and PH Balance in soil; our beloved Huckleberry with its tiny seeds to indicate continuation of the plant; the Pine and it's seeds; Grizzly's track (both Adult and Baby); Mountain Goat; Wolverine; Trout--female and male--with their eggs along the river bed, Toad; the Water cycle of precipitation and evaporation; Humans and their creations (in this piece represented by our Ktunaxa sturgeon nosed canoe); the honey bee for our pollinators; Chickadee for our winged beings; Ladybug for our natural balancing of pests; Lightening to represent the power of Mother Nature's Weather forces and how it can impact our environments.

Each circle-window has four triangles on it to represent the four states of being: Spiritual, Emotional, Mental and Physical. If one of the states of being is affected, then the others will also be affected. I have also shown a personified version of Moon and Sun, as both of their cycles effect our environment and show us movement through time and the seasons."