

Dr. Michael Proctor
Trans-border Grizzly Bear Project
Kaslo, BC
Nov 2021

FLNRORD
Mountain Resorts Branch

Re: Comments on recent formal proposal for Zincton Resort

I, Michael Proctor, am an independent professional biologist that has been researching grizzly bears in the Purcell and Selkirk Mountains since 1995 and running the Trans-border Grizzly Bear Project (TBGBP) since 2004. We research grizzly bear ecology and conservation and translate our research into practical management plans which we try to implement with the cooperation of government, regional and provincial (FLNRORD and MoE). We publish our research in peer-reviewed scientific journals. For a list of those publications see, <https://scholar.google.com/citations?hl=en&user=J7eYfWYAAAAJ>. In the last 2 decades, I have carried out DNA-based population surveys to estimate population size, density, distribution, and fragmentation, and radio collared many grizzly bears to understand and identify their seasonal habitat use, critical habitats, movement patterns, connectivity corridors, ecological needs, critical food patches, human conflict patterns, and relationship with neighbouring populations. I am currently the Co-chair of the International Union for the Conservation of Nature (IUCN), Bear Specialist Group that oversees the conservation activities and science of 7 of the 8 world's bear species and represents over 200 members worldwide.

Locally, I am also part of a science-based initiative that focusses on landscape scale connectivity, particularly cross-valley riparian-wetland complexes to upland habitats across the Kootenay region. As part of that effort I have been gathering all the best-available-science data (government and independent researchers) regionally on species from western toads up through grizzly bears. Our goal is to explore and eventually establish multi-species Ecological Corridors where appropriate. This is part of a global effort to help nature adapt to climate change and mitigate the well-documented biodiversity loss occurring globally (Hilty et al. 2020).

I had previously sent in a submission in response to the pre-proposal focussing on the fragmentation and potential corridor function of the proposed area for grizzly bears. Here I summarize that submission in Figure 1, a map of a probable grizzly bear corridor connecting habitats north of Hwy 31A with the otherwise fragmented peninsular population in the Kokanee Glacier Park area south of the Highway (Figure 2, Appendix Figure 1). I include that May 2020 submission as an Appendix to this letter.

Below I focus on grizzly bears in summer and winter and then beyond grizzly bears, in response to the recently released full proposal for the Zincton resort. My goal is to bring the best available science to the attention of decision makers.

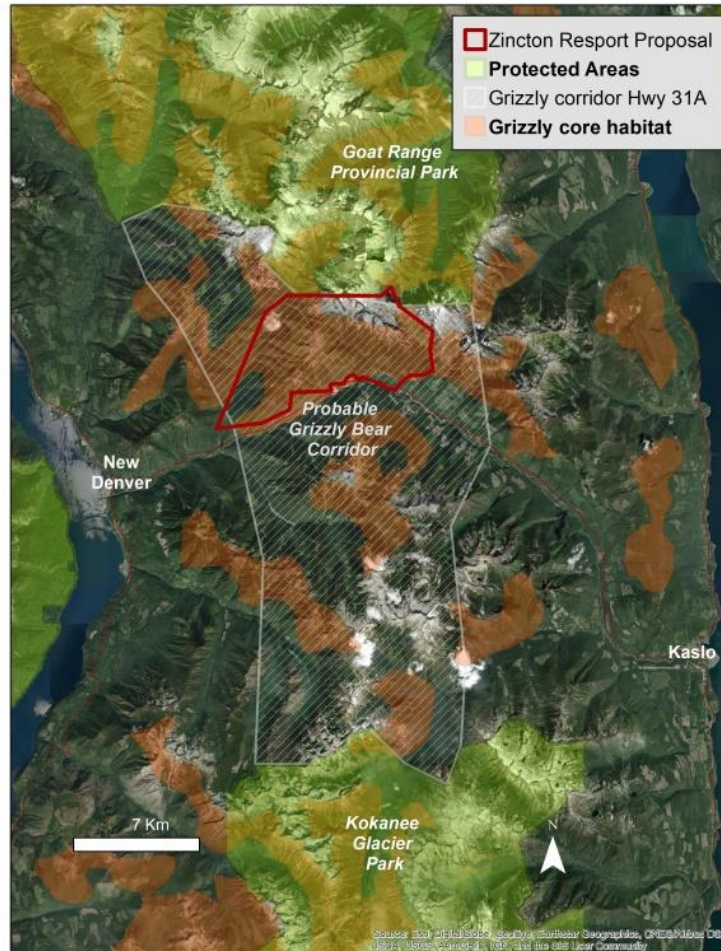


Figure 1. Probable grizzly bear corridor based on extensive published peer-reviewed science (see Appendix).

Grizzly bears in summer

I have one new significant piece of information to add to my previous comments on grizzly bears and summer use of the proposed area. In a recent peer-reviewed scientific paper under review as a Wildlife Monograph (Proctor et al. 2022), we did an extensive analysis of the relationship between human disturbance and grizzly bears' use of important food-bearing habitats, such as the huckleberry patches I have identified in the area (see Appendix). As I submitted previously, and the proponent has reproduced in his proposal maps, the proposed tenure area has significant huckleberry patches important for grizzly bears. Using extensive GPS radio telemetry and DNA-survey data from the the South Selkirk and Purcell Mountains, we clearly demonstrate that these huckleberry patches, when in low disturbance areas, underpin significantly improved female reproduction and higher densities, compared to habitats without these huckleberry patches. Noteworthy, when these huckleberry patches exist in areas with higher levels of human disturbance, these huckleberry patches **do not** translate into higher reproduction or density – in effect the benefit of these important population-driving food sources is lost. Interestingly, the home ranges determined from thousands of telemetry locations for individual female bears actually

take the shape of the larger huckleberry patches in secure habitats regionally, not only in the summer when the huckleberries are available to feed on, but in their year-round home ranges.

I admit to being skeptical that the proposed all-season resort, with or without the proposed 'summer only' wildlife corridor, will actually be able to minimise extensive human use and disturbance of these foraging habitats. The Provincial government has ultimate jurisdiction over much of the proposed tenure lands and they do not have a good record of limiting human access in our region for the benefit of grizzly bear habitat. This is not meant to criticize government, but to be honestly descriptive. Grizzly bears do not need zero activity in these important habitats, but the existence of an all-season resort is not consistent with the sustainability of grizzly bears in this important corridor - more on this below.

Furthermore, the proponent has excluded the significant Whitewater valley from its proposed 'summer only' corridor which seems to suggest that they have plans for commercial use of that valley, although their proposal was not clear on this. I could figure out no other reason to exclude it from their corridor proposal, as the public is already allowed in there, and there already is a trail and access road. So there is no reason to exclude it for these reasons. How much human access can this resource take, before the bears themselves start avoiding it for its generous supply of important spring foods (a significant predictor of den site selection, see below).

Grizzly bears in winter

The proponent has proposed a 'summer only' corridor on land they have no jurisdiction over in the hopes that this would mitigate the proposed ~>100,000 visitors annually to the area. The fact that grizzly bears hibernate in the winter does not necessarily mean a 'summer only' corridor will mitigate impacts to grizzly bears.

When one considers cumulative impacts from multiple recreation tenures in that area (active and proposed), disturbance to female grizzly bears denning in the area has the potential for impacts to these bears. I have been a professional biologist for over 25 years and the proponent's claims of 'minimal impact' of the resort are not backed up by any real evidence.

Here, I briefly summarize the published scientific literature on the impacts of human disturbance of denning grizzly bears. First, note that the literature is not particularly deep on this topic, so don't expect a perfectly clear answer.

Winter hibernation is a particularly vulnerable time for hibernators, including grizzly bears, as they do not have the benefit of other mechanisms to avoid disturbance and their resulting negative responses. Subsequently there is a disproportionate cost to disturbance during denning, especially for female grizzly bears who have their young and nurse them in their winter den. Grizzly bears are also lighter hibernators and can be aroused relatively easily compared to deeper hibernators. Critical to their successful hibernation and reproductive success is their nutritional status upon den entry, spring food sources nearby to their dens (Pigeon et al. 2014), and absence of disturbance while in the den (Linnell et al. 2000).

Disturbance of hibernating bears due to human activities is thought to have 4 levels of impact with increasing severity:

- waking up, slight body warming and increased heart rate
- movements within the den
- elevated body temperature leading to 60-80% increase in metabolism

- den abandonment

Each level of response can have potential impacts to pregnant and nursing females with den abandonment being the most severe with serious fitness consequences (loss of young) being possible and well documented (Swenson et al. 1997, Linnell et al. 2000). Cub loss may not happen immediately, but may reveal itself in lower cub survival in the following year. The literature is sparse concerning the 1st three responses listed above. Impacts from those 1st three responses can reduce fat stores necessary for successful reproduction and frequent or numerous disturbances may take a toll on hibernating females and their offspring. The literature concerning den abandonment has received more attention: In one study, 60% of females that abandoned their den lost a cub within the following year, while 6% of females who did not abandon a den lost a cub within the following year (Swenson et al. 1997).

Disturbance that impacts bears in dens usually occurs within 1 km of a den, but more so within 200m and can be caused by industrial activity, machines, hunters, hikers, skiers and more (Linnell et al. 2000). It was noted that predictable point-source disturbance (e.g. a permanent building) was better tolerated by denning bears, and that irregular unpredictable disturbance (e.g. hikers, skiers) was more likely to elicit a negative response (Linnell et al. 2000).

Grizzly bears tend to select den sites away from roads and human disturbance and in general selected den sites in remote, steeper, higher elevation areas that don't collect water, and in open conifer habitats with abundant spring foods nearby (Pigeon et al. 2014). This generally describes the upper elevation portions of the proposed tenure area. I know the area very well. Females with offspring are routinely spotted in the upper reaches of the tenure area. While there have been no denning (or radio telemetry) studies done on grizzly bears in the proposal area, we know that the immediate and surrounding area is excellent grizzly bear habitat and it is likely that the area contains plenty of good denning habitat. Research has indicated that denning habitat in general is not usually limiting, but disturbance of bears in dens can be one more cumulative impact on top of summer disturbance leading to displacement around important food patches and loss of connectivity with neighbouring populations. All these conditions apply to this proposed resort.

The thought I would like to leave you with is this:

Given that this project is proposing to bring ~100,000 skiers to this area each winter, many of which will be seeking out steep remote ski terrain;

And that there is evidence of people on snowshoes or skis disturbing hibernating bears;

And the fact that unpredictable disturbance from hikers or skiers can be more impactful than predictable disturbance;

And the potential for cumulative impacts from multiple recreation tenures in this backcountry area:

There is potential for a real cost of disturbance to grizzly bears despite the statement by the proponent that impacts on bears will be minimal.

There has been abundant research on grizzly bears in North America and regionally, such that we do not necessarily need an intense research project in every area where land use decisions are being made to predict that this proposal may very well be detrimental to bears.

The 'summer only' wildlife corridor

As a professional biologist, I like to look at issues at several scales. Focusing in on the direct impacts just within the proposed tenure area may miss important parts of the overall story. To illustrate

my point, I am presenting several maps that take a broader geographic look at potential impacts on several species. To be clear, we do not have perfect data on these species, nor data near the level of detail as we have for grizzly bears. However, we do have some data which is useful to consider.

Wolverines

Wolverines have experienced range contraction and habitat fragmentation issues similar to grizzly bears in western North America, particularly at the southern extent of their distribution (Southern BC & Northern US 48-states) over the past century (summarized in Mowat et al. 2020). Also, ***wolverine natal dispersal (offspring moving away from their mother to set up a home range), usually occurs in winter*** (reviewed in Mowat et al. 2020). These facts suggest that connectivity is a serious concern for this species regionally. It is with these ideas in mind that I offer the following discussion of wolverine connectivity through the proposed tenure area as being an issue for consideration when exploring the effectiveness of a 'summer only' wildlife corridor.

The data that underpins that map in Figure 2 is the same data as the proponent has presented in their full proposal, that comes from the BC government files (Mowat et al. 2020). Figure 2 takes a broader geographic view than was presented in the proponent's proposal and reveals a similar situation as described above for grizzly bears. The area south of Highway 31A is essentially a habitat peninsula as 3 sides are fragmented to some degree by large lakes and human-settled valleys (Slocan Valley and North Shore of Kootenay Lake, Figure 2). The north connection across Highway 31A remains the best option for a wolverine corridor connecting habitats north and south of the highway. There has been no formal connectivity analysis of wolverine corridors in the region, but the map illustrates that the most likely corridor is similar to the grizzly corridor generally centered on the mountain pass between Kaslo and New Denver. The blue and purple shading represent a data-based model of wolverine density with the purple being the areas of higher density (Mowat et al. 2020). Figure 2 does not represent a data-derived wolverine corridor, but based on the pattern of wolverine density, it is likely the best option for wolverine connectivity. I offer this illustration to suggest that the proponent's statements of minimal impacts to wolverine is likely also inaccurate. Again, the answer is likely unknown. In fact, the proponent suggests that possibly wolverine have already been 'displaced' by current levels of human disturbance.

(top of page 3-17) "It is likely that the presence of existing public recreation and proximity to Highway 31A have caused Wolverine to avoid much of the tenure area"

This is also an unfounded statement. Note that the wolverine density model has road density as one of its top predictors, so, like grizzly bears, wolverine avoid human disturbance. ***It is important to understand that corridors are often not the prime habitat or areas of high density of a species, they are typically areas that provide essential connections TO those areas of higher density.*** And now for a moment, consider that the proponent's statement is actually correct: paraphrased as 'current levels of disturbance have displaced wolverines from the tenure area'. If the low level of local recreation has displaced wolverine, what does that say about attracting and concentrating 100,000 visitors a year to this area. It will most certainly completely displace wolverine from using this corridor and seal its future of never being a corridor.

Decision makers might ask the question, is it fair to consider the hypothesized wolverine corridor when no formal connectivity analysis has been completed to date? The answer must consider that we do have partial good data to inform this question – the density model and its landscape pattern. To not consider it and decide there is no validity to the tenure area being a wolverine corridor, is itself a decision, but based on no data. Which scenario is more appropriate – use partial data and the best available science

we have to date to inform a decision, or throw the whole question out because we don't have perfect data, I suggest the former scenario is more appropriate in this case.

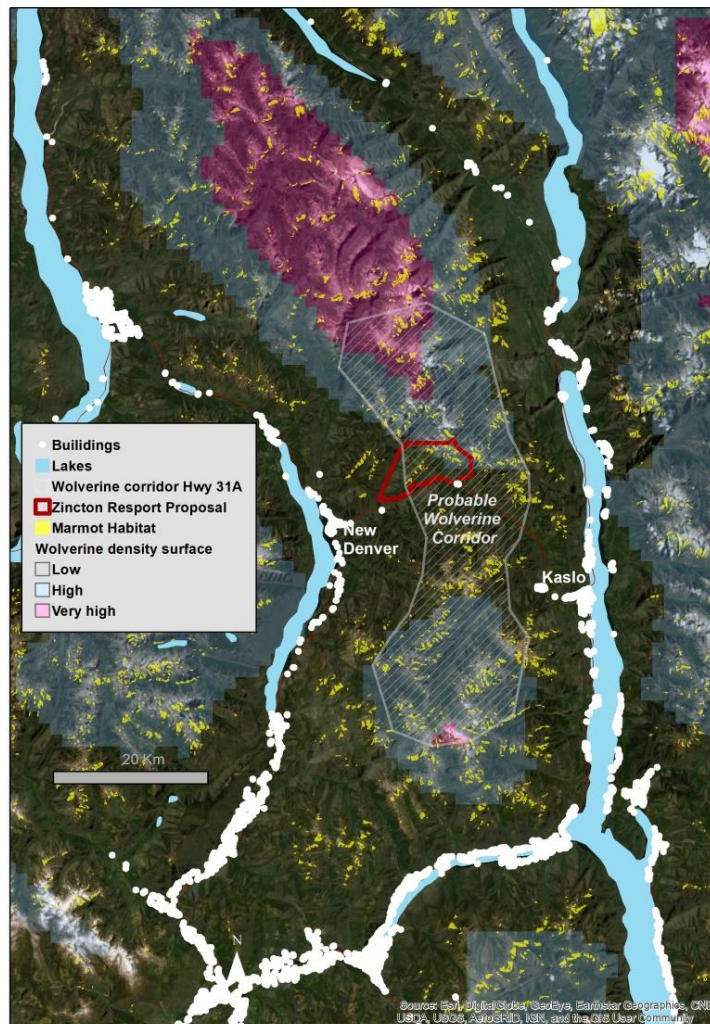


Figure 2. A map highlighting a probable wolverine corridor connecting areas with higher wolverine densities across BC Highway 31A. The wolverine density model was developed by Mowat et al. (2020). This hypothesized corridor is not the result of a formal connectivity analysis, but is presented to highlight what is likely an obvious corridor given the pattern of wolverine density. Also note the peninsular wildlife habitat patch south of Highway 31A where the other 3 sides of this area have either a large lake, concentrated human settlement, or both.

Western Toads

The last species I mention is western toads, primarily as they represent the other end of the ecological continuum between small and large species. They have turned out to be an important amphibian (and species at risk) ambassador in the realm of multi-species Ecological Corridors for our region. These toads demonstrate the link between important valley bottom wetland-riparian complexes and the adjacent upland habitats. Figure 3 is a map of the known important western toad breeding ponds in the area

surrounding the proposed resort area. As is well known, several breeding ponds exist along the Hwy 31A corridor with the dominant ponds being at the top of the pass. It is also known that these toads move out into upland habitats up to 5-7 km from the ponds (Wind and Dupuis 2002). Figure 3 highlights these ponds (yellow) and the grey shaded areas are a 5km buffer surrounding these ponds to provide some geographic context to the habitats that western toads use when not breeding. Indeed, western sub-adult toads have been sighted near the top of London Ridge and likely began their journey the previous year. They have also been using the highway itself between 3-forks (the Sandon turnoff to the west of the pass) and its adjacent habitat as a movement corridor to reach the main breeding pond at the pass, further putting them at risk of highway related mortality. Increased traffic on Highway 31A certainly has the potential to exacerbate an already elevated mortality risk for this population evidenced from a 7-year toad research and management project at the pass.

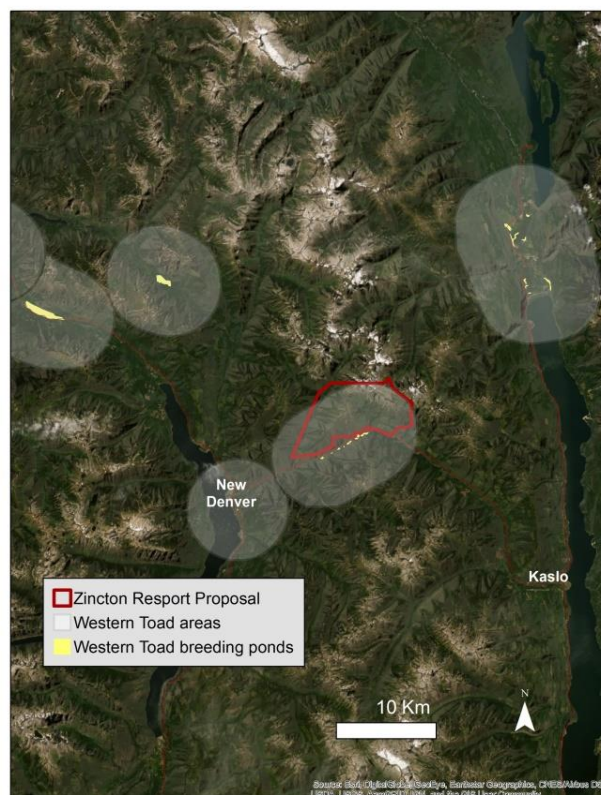


Figure 3. Map depicting known western toad breeding ponds and the adjacent upland habitat that these toads likely use.

To summarize: the peninsular nature of the area south of Highway 31A necessitates that the mountain pass and its wetlands form an important all-season Ecological Corridor connecting areas north and south of the highway. The entire southeast BC region has experienced extensive wildlife population-level fragmentation created by human settlement and highways (Proctor et al. 2012, Mowat et al. 2020 – wolverine summary in Introduction). Therefore, corridors such as what exists across the Highway 31A pass area remain important for the health of our regional wildlife populations. Attracting over 100,000 visitors a year concentrated into what is a relatively small area challenges the area’s ability to function

as an ecological corridor, for grizzly bears, wolverine, western toads, and likely other species for which we do not have even basic data, even with a 'summer only' wildlife corridor.

From a professional biologist's standpoint, the proponent has made too many assumptions of no, negligible, or minimal impacts on this natural system from their proposed resort and use of a large tenured area. If conserving healthy wildlife systems is an important priority for British Columbians, you would be better advised to listen to the voices urging for a deeper more thorough comprehensive look into development and recreation impacts and planning in this area. I echo these voices.

Thanks for your consideration of this material. Don't hesitate to contact me for more information if required.



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Literature Cited

- Hilty, J., G. Worboys, A. Keeley, S. Woodley, B. Lausche, H. Locke, M. Carr, I. Pulsford, J. Pittock, W. White, D. Theobald, J. Levine, M. Reuling, J. E. M. Watson, R. Ament, and G. Tabor. 2020. *Guidelines for Conserving Connectivity through Ecological Networks and Corridors*. Gland, Switzerland: IUCN.
- Linnell, J. D. C., J. E. Swenson, R. Andersen, and B. Barnes. 2000. How vulnerable are denning bears to disturbance? *Wildlife Society Bulletin* 28: 400-413.
- Pigeon, K. E., S. E. Nielsen, G. B. Stenhouse, and S. D. Cote. 2014. Den selection by grizzly bears on a managed landscape. *Journal of Mammalogy* 95:559-571.
- Proctor, M.F., D. Paetkau, B.N. McLellan, G.B. Stenhouse, K.C. Kendall, R.D. Mace, W.F. Kasworm, C. Servheen, C.L. Lausen, M.L. Gibeau, W.L. Wakkinen, M.A. Haroldson, G. Mowat, C.D. Apps, L.M. Ciarniello, R.M.R. Barclay, M.S. Boyce, C.C. Schwartz, and C. Strobeck. 2012. Population Fragmentation and Inter-Ecosystem Movements of Grizzly Bears in Western Canada and the Northern United States. *Wildlife Monographs* 180:1-46.
- Proctor MF, Lamb CT, Boulanger J, MacHutchon AG, Kasworm WF, Paetkau D, Boyce M, Servheen C. 2022. The dance of berries and bullets: the influence of food resources and mortality risk on grizzly bear population in southeastern British Columbia. *Wildlife Monographs*. In review.
- Swenson, J. E., F. Sandegren, S. Brunberg, and P. Wabakkan. 1997. Winter den abandonment by brown bears *Ursus arctos*: causes and consequences. *Wildlife Biology* 3:35-38.
- Mowat, G., A. P. Clevenger, A. D. Kortello, D. Hausleitner, M. Barretto L. Smit, C. Lamb, B. Dorsey, and P. K. Ott. 2020. The sustainability of wolverine trapping mortality in southern Canada. *Journal of Wildlife Management* 84:213-226.
- Wind, El and L.A. Dupuis. 2002. COSEWIC status report on the western toad *Bufo boreas* in Canada, in COSEWIC assessment and status report on the western toad *Bufo boreas* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. 1-31 pp.

APPENDIX I – Michael Proctor submission for the Zincton pre-proposal

Dr. Michael Proctor
Trans-border Grizzly Bear Project
Kaslo, BC
May 2020

Kelly Northcott
FLNRORD
Mountain Resorts Branch

Re; Comments on proposed Zincton Resort

Summary of comments:

Given these cumulative facts surrounding the proposed resort area:

- ***Regionally important inter-population connectivity would be compromised, negatively affecting a small population of ‘conservation concern’ just south of the proposed resort***
- ***The entire resort area overlays, and would compromise, what is one of the very best all-season grizzly bear habitat areas that includes highly important huckleberry patches***
- ***The very real potential for human safety/injury/fatal incidents with mountain bikers and grizzly bears***
- ***This proposal will upend and overwhelm one of the local and regional hiking treasures in the Whitewater valley known for grizzly bear viewing***

it will likely inhibit the provinces ability to meet pre-existing conservation goals by injecting an extensive all-season recreation project right in some of the best grizzly bear habitats of the local area, and the all-season resort activities will likely challenge the already small fragmented population south of Hwy 31A in its ability to recover to a healthy conservation status.

I, Michael Proctor, am an independent biologist that have been researching grizzly bears in the Purcell Mountains since 1995 and running the Trans-border Grizzly Bear Project (TBGBP) in the Purcells and Selkirks since 2004. We research grizzly bear ecology and conservation and translate our research into practical management plans which we try to implement with the cooperation of government, regional and provincial (FLNRO and MoE). We publish our research in peer-reviewed scientific journals. In the last 2 decades, I have carried out DNA-based population surveys to estimate population size, density, distribution, and fragmentation, and radio collaring bears to understand and identify their seasonal habitat use, critical habitats, movement patterns, connectivity corridors, ecological needs, critical food patches, and relationship with neighbouring populations.

GRIZZLY BEAR CONNECTIVITY

I have serious concerns about the proposed all-season Zincton Resort interfering with the province of BC meeting its obligations to grizzly bear conservation. The area where the resort is proposed separates a small fragmented grizzly bear population in the Kokanee Glacier Provincial Park area (~30 bears, Fig. 1) as its location along the Kaslo – New Denver Highway (Hwy 31A) at the top of the pass overlaps the very best option for a grizzly bear corridor across that highway (Figs. 2 Proctor et al. 2015). The corridor is

essential for the long term persistence of the bears to the south of the highway which is too small to persist without connectivity to bears to the north (Fig. 1, Proctor et al. 2012).

It is very likely that the human disturbance of an extensive all-season resort as proposed, over time will disrupt the connectivity function of this location. The fragmentation of this small population was caused by several factors. The first layer is the partial natural fragmentation from Kootenay and Slocan Lakes. The second layer is the human settlement and its accompanied historic and current bear mortality on 3 sides of this population – the Slocan Valley to the east, the North Shore to the south, and Hwy 31 along Kootenay Lake) leaving the corridor to its north, **the only viable connectivity option**. And, the connectivity potential of that north border is concentrated near and around the pass, right where this proposed resort would sit (Fig. 2).

The fragmentation along Hwy 31A was likely caused by the combination of excellent habitat that supported many bears with easy hunter access. Data show a long-term cluster of bear mortalities from the recently closed grizzly bear hunt in that area, sufficient to fracture what was once an inter-connected population. The recent ending of the BC grizzly bear hunt would have allowed this fracture to heal, but this year-round recreation resort will likely replace this as a fracturing force, due to the greatly increased human footprint and backcountry presence.

VERY HIGH QUALITY GRIZZLY BEAR HABITAT

The proposed resort area overlaps some of the very best grizzly bear habitat in the area (Figs. 3 & 4) and that really contributes to its ideal status as a corridor. Our work, and that of others, has shown that habitat of this high quality is best left minimally disturbed (Proctor et al. 2017, Lamb et al. 2018, see review papers Proctor et al. 2018, 2019), particularly in areas with excellent huckleberry patches important for grizzly bears (Fig 3 & 4) and within this extensively fragmented area within southern BC.

PROVINCIAL PRIORITY

If grizzly bear population viability in southern BC is an important provincial priority, and I think it is, then not approving this proposal would be consistent with those provincial goals and values, and good for the local grizzly bear population's long-term persistence. It is not that grizzly bears should inhibit all backcountry recreation, as there are plenty of recreational projects across the Kootenays. It is just that an all-season resort in this location with the very best habitat **and** need for long-term corridor function for the small (~30 grizzlies), fragmented, and therefore "of conservation concern" population, will likely significantly inhibit this area's ability to function as the necessary grizzly bear corridor. This population really does need to be reconnected to the bears north of Hwy 31A for its long-term persistence, and the resort overlays and compromises the very best, and really only option for that.

This situation (a small fragmented population with a higher conservation risk) and the limited corridor potential for healing that fragmentation, is a product of the cumulative effects of long-term patterns of human settlement in our region's valley bottoms, very few of which are open for wildlife connectivity. If this proposal were in northern BC, there would likely be no issue, but in the midst of southeastern BC, where grizzly bears are extensively fragmented into several unsustainably small subpopulations (Fig. 1), it is a serious issue. More consistent with provincial policy to protect identified and important natural values **and** human economics, would be proposals with less of a natural-system detriment than this one.

GRIZZLY BEAR CONFLICTS WITH MOUNTAIN BIKERS

Another concern is that mountain biking in excellent grizzly bear habitat is particularly hazardous in its potential for injurious and/or fatal human-bear conflict. Fast quiet mountain bikers can approach unsuspecting bears with the risk of surprise-induced defensive attacks, sometimes as a result of a collision. Incidents are becoming increasingly common across western North America. As Steve Michel,

the National Human Wildlife Conflict Management Officer for Parks Canada, and past Wildlife Conflict Specialist for Banff National Park put it:

“grizzly bear-human encounter risk is greatly increased when we introduce people on mountain bikes into grizzly bear habitat. The probability of encounter is much higher for those travelling quickly and quietly, and the serious consequences of surprise encounters with grizzly bears is well-documented. We have several examples of incidents and close calls within the Central Rockies, and one only needs to look to the Montana fatality in 2016 as the perfect example of what happens when it all goes wrong...”

The US IGBC (Interagency Grizzly Bear Committee) Board of Review on that incident mentions that **mixing mountain bikers and late summer berry patches may be a bad mix** (Figs. 3 & 4)

(http://igbconline.org/wpcontent/uploads/2016/03/160629_BOR_Recomm_Treat_NCDE.pdf).

This proposal is possibly doing just that, and the grizzly bear habitat here is much better and holds more grizzly bears than found in Banff NP, elevating the risk of these incidents.

It is certainly not good planning to set up an intensive mountain biking operation in an area with this extensive high quality grizzly bear habitat from a human safety context and is likely best avoided if possible. From a management perspective, it is useful to manage people and bears in a way that avoids or minimizes conflict and associated property damage and possible injury as they often translate into intolerance, lower appreciation, and ultimately negative conservation outcomes in the long run.

DISRUPTION OF A REGIONAL BEAR VIEWING AND HIKING ASSET

This is all compounded by the fact that the trail up the Whitewater Creek valley is practically a local, regional, and possibly national (and maybe even international) treasure in that it takes hikers to one of the best and reasonably consistent grizzly bear viewing areas in a natural setting in the southern interior of BC. An old mining trail was rerouted years ago for bear viewing to stay on the safer side of the valley. This resort will certainly denigrate the ability of this valley and trail to provide this rare type of experience for many BC residents and visitors alike. The trail contributes to people safely viewing grizzly bears and enhances appreciation, tolerance, and a willingness to share habitat with these sensitive large carnivores.

Thanks for your consideration of this material. Don't hesitate to contact me for more information if required.



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Figure 1. Map of the regional fragmented grizzly bear populations. Dotted lines indicate subpopulation boundaries created by human disturbance. Note the Zinton Resort proposal sits between a larger healthy population that is required to be reconnected to the small fragmented population of ~30 bears south of Hwy31A in the Kokanee Glacier Park area. The smaller grizzly populations indicated on this map all need to be reconnected to the larger healthy population in the central Purcell/northern Selkirk area. The area of the proposed Zinton Resort has the best corridor potential for grizzly bears (See Fig. 2). Adapted from Proctor et al. (2012). The outline of the resort in the following Figures was redrawn from the proposal and may be slightly inaccurate, but generally captures the proposed area.

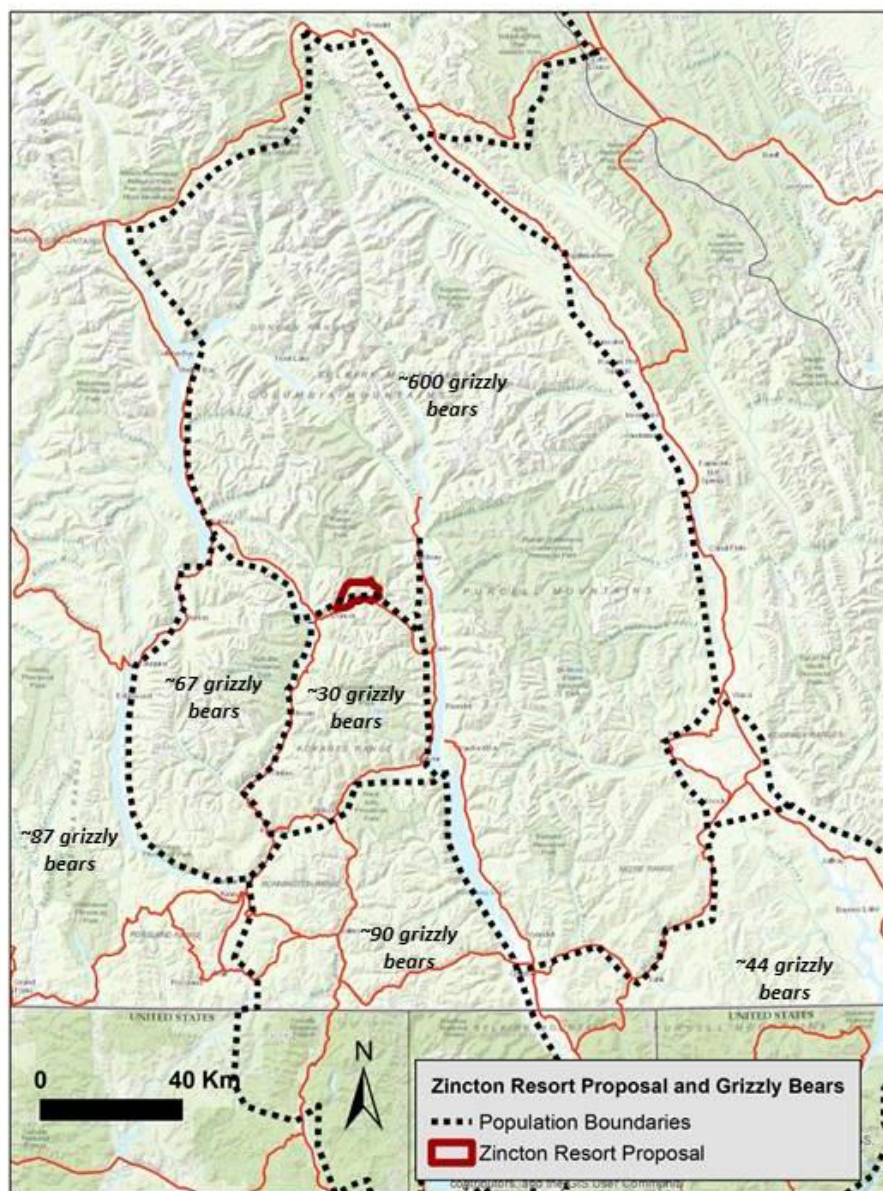


Figure 2. The proposed Zincton Resort area overlaps the best grizzly bear corridor potential for connecting the smaller fragmented ~30 bear population with the bears to the north across Highway 31A – the Kaslo-New Denver Highway. Adapted from Proctor et al. (2015). The proposed resort area overlaps the best grizzly bear habitat along the Kaslo-New Denver Highway (See Fig. 3) and the all-season nature of the proposed resort will very likely inhibit this important connectivity function over time.

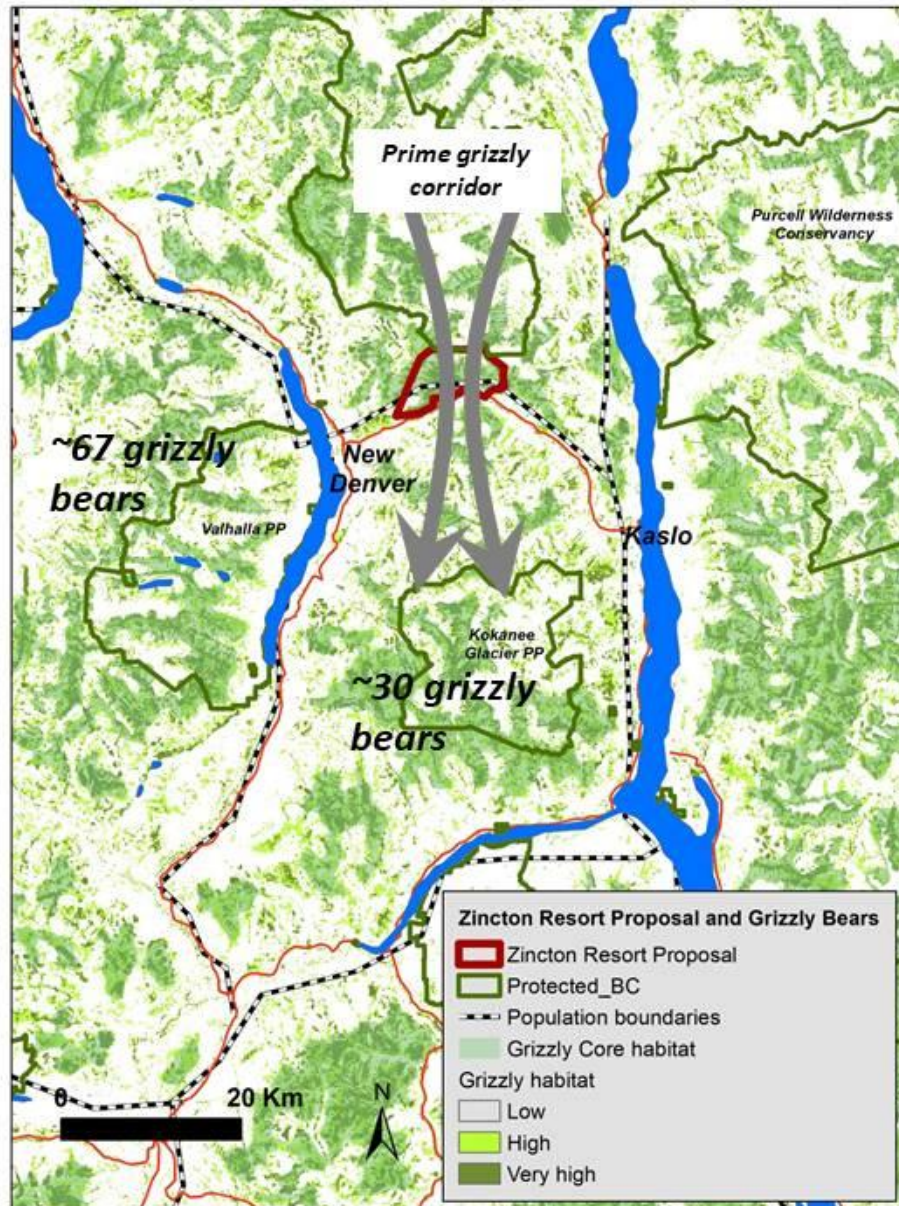


Figure 3. A closer view of the proposed Zincton Resort area relative to grizzly bear habitat and huckleberry patches important to grizzly bears. Huckleberry patches (purple on map) underpin grizzly bear population vitality and viability in this region. Adapted from Proctor et al. (2017). The proposed resort area is the best grizzly bear habitat along the Kaslo-New Denver Highway and represents the best corridor potential for rescue of bears in the larger Kokanee Glacier Park area (Proctor et al. 2015). The dotted population line is drawn just north of Hwy 31A so it does not hide the highway line.

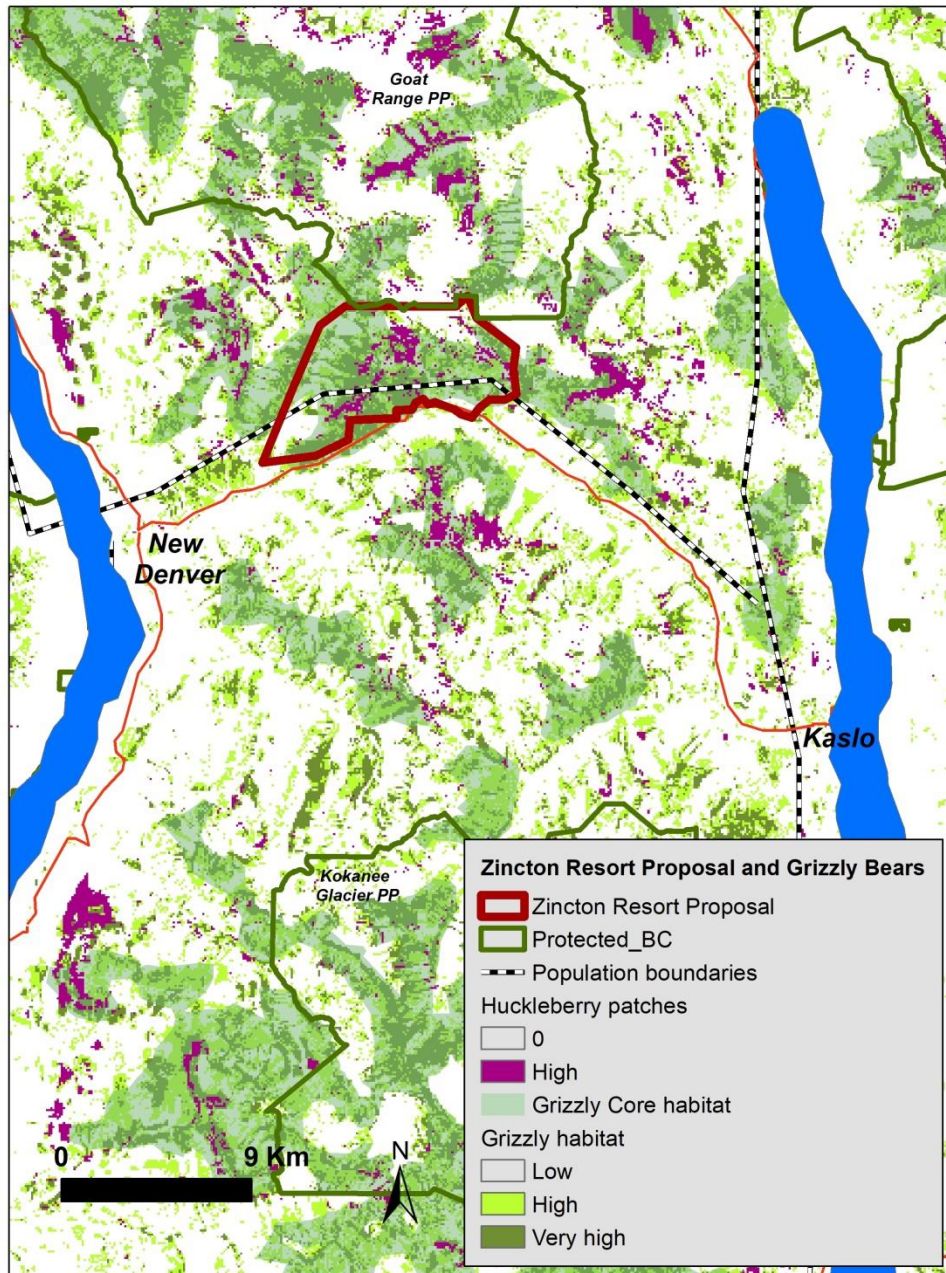
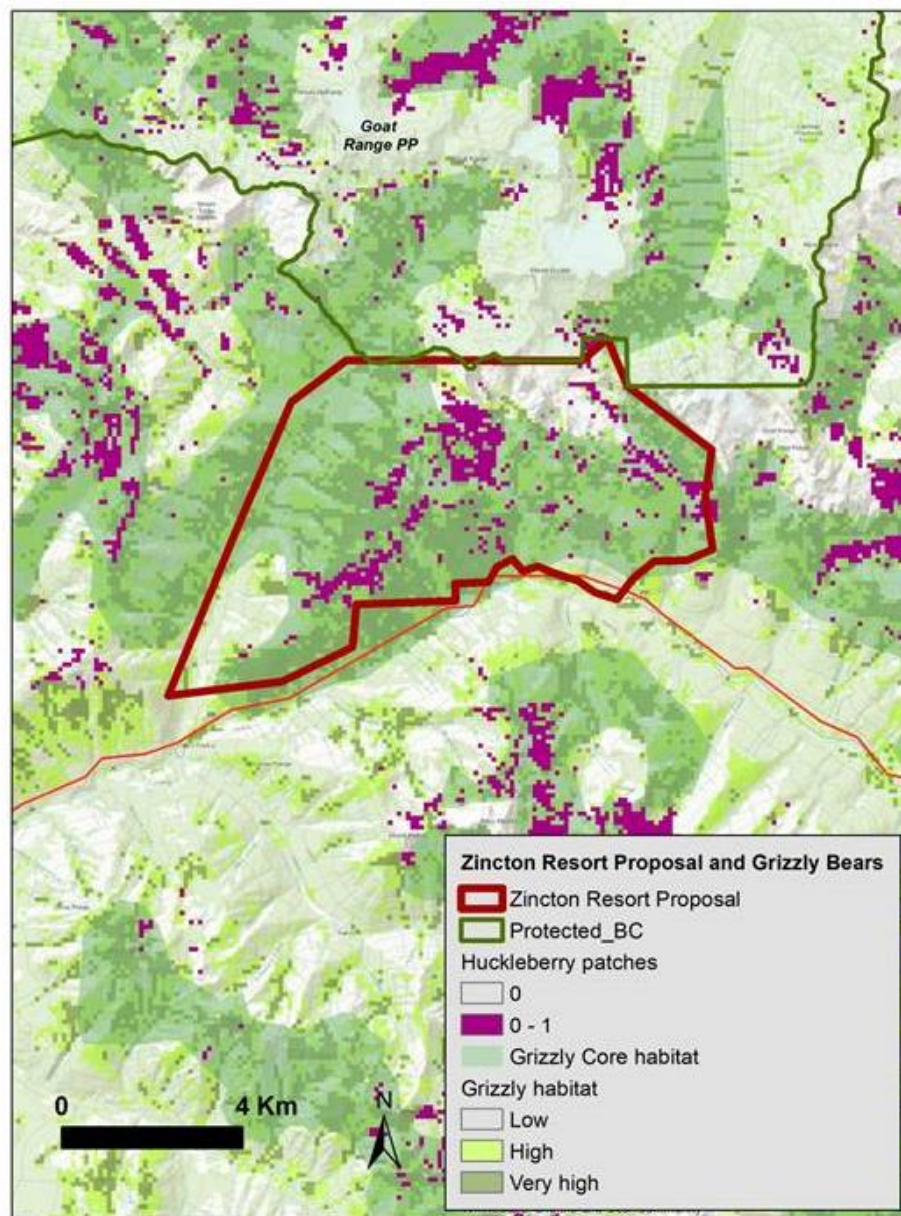


Figure 4. The closest view of the extent of high and very high grizzly bear habitat and huckleberry patches important for grizzlies in the proposed Zincton Resort area (Proctor et al. 2017). The darker green polygon, represents areas where the high and very high habitats cluster, creating especially important areas for these bears. Coupled with the presence of good huckleberry patches (purple), this area represents some of the best grizzly habitat in the area. It's existence just north of the Kaslo - New Denver Highway makes this area the very best corridor connecting bear populations north & south of the Highway. The long term persistence of the bear population to the south of this highway depends on establishing connectivity across this highway. A larger scale all-season resort will very likely compromise that function. Adapted from Proctor et al. (2017).



Literature Cited

- Lamb, C. T., G. Mowat, A. Reid, L. Smit, M. Proctor, B. N. McLellan, S. E. Nielsen, and S. Boutin. 2018. Effects of habitat quality and access management on the density of a recovering grizzly bear population. *Journal of Applied Ecology* 55:1406-1417.
- Proctor, M.F., D. Paetkau, B.N. McLellan, G.B. Stenhouse, K.C. Kendall, R.D. Mace, W.F. Kasworm, C. Servheen, C.L. Lausen, M.L. Gibeau, W.L. Wakkinen, M.A. Haroldson, G. Mowat, C.D. Apps, L.M. Ciarniello, R.M.R. Barclay, M.S. Boyce, C.C. Schwartz, and C. Strobeck. 2012. Population Fragmentation and Inter-Ecosystem Movements of Grizzly Bears in Western Canada and the Northern United States. *Wildlife Monographs* 180:1-46.
- Proctor, M.F., S.E. Nielsen, W.F. Kasworm, C. Servheen, T.G. Radandt, A.G. MacHutchon, and M.S. Boyce. 2015. Grizzly bear connectivity mapping in the Canada-US trans-border region. *Journal of Wildlife Management* 79:544-555.
- Proctor, M. F., C. T. Lamb, and A. G MacHutchon. 2017. The grizzly dance of berries and bullets: The relationship between bottom up food resources, huckleberries, and top down mortality risk on grizzly bear population processes in southeast British Columbia. Trans-border Grizzly Bear Project. Kaslo, BC, Canada.
- Proctor, M. F., B. N. McLellan, G. B. Stenhouse, G. Mowat, C. T. Lamb, and M. Boyce. 2018. Resource Roads and Grizzly Bears in British Columbia, and Alberta. Canadian Grizzly Bear Management Series, Resource Road Management. Trans-border Grizzly Bear Project. Kaslo, BC. Canada.
- Proctor, M. F., B. N. McLellan, G. B. Stenhouse, G. Mowat, C. T. Lamb, and M. Boyce. 2019. The effects of roads and motorized human access on grizzly bear populations in British Columbia and Alberta, Canada. *Ursus* 30e2:6-19.

Most references can be downloaded at:

<http://transbordergrizzlybearproject.ca/research/publications.html>.