

# Conservation Values of the Proposed Selkirk Mountain Caribou Park



*Jim Lawrence*

**Submission to the Governments  
of British Columbia and Canada**

**On the urgent need to fully protect the last remnants  
of rare Inland Temperate Rainforest in the Central Selkirk Mountains,  
including habitat for a herd of 90 endangered Mountain Caribou**

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**THIS PARK PROPOSAL  
IS SUPPORTED BY:**

**Applied Ecological Stewardship Council of BC**

**Conservation Biology Center**

**Golden Chapter, Council of Canadians**

**Pacific Wild**

**Purcell Alliance for  
Wilderness**

**Raincoast Conservation**

**Save-the-Cedar League**

**Valhalla Wilderness Society**

**West Kootenay Ecosociety**

**Wilderness Committee**

## EXECUTIVE SUMMARY

This report proposes a 156,461-hectare, fully protected park that would provide connectivity between three existing parks in the central and north Selkirk Mountains of southeastern BC. Establishing a linkage park between the three parks would greatly enhance the protection values of each. The proposal includes a dramatic increase in the intactness and ecological completeness of each park. It contains core areas of intact old-growth forest, connected by corridors that contain a mix of large clearcuts and roads and well-forested areas.

The proposal has remnant stands of primeval Inland Temperate Rainforest with trees up to 2,000 years old, and a biodiversity legacy many thousands of years old. These forests abound with rare lichens, mushrooms, plants and many other forms of biodiversity, some of them red-listed (endangered) or blue-listed. Species of lichens never before known to science have been found here, and scientists say it is likely that more will be found. These remnant forests are the focus of international scientific research on old-growth biodiversity.

Other features of the park proposal include:

- Habitat for the largest and most stable Mountain Caribou herd in the southern Interior Wetbelt.
- Spawning grounds for the blue-listed Bull Trout and other trout and kokanee salmon of the important Kootenay Lake and Arrow Lakes Reservoir fisheries.
- Core habitat for blue-listed Grizzly Bears and Wolverines.
- 27,364 hectares of untracked wilderness contiguous to Glacier National Park River (upper Incomappleux).

Old-growth areas in this park proposal remain intact after 50 years of clearcutting, mostly because they have been too remote, or steep, or had other issues making it unprofitable to log. A number of logging companies have pulled out or gone bankrupt, leaving these forests behind.

The Central Selkirk Mountain Caribou herd has been relatively stable at of 85-92 animals since 2002, but this is approximately half the numbers since 1996 and 1999.\* Every other subpopulation around it has been in steep decline, and some have too few numbers to survive. This im-



Mari Omori

**Upper Incomappleux Valley - primeval, very wet Inland Temperate Rainforest.**

portant Central Selkirk herd could be our only real chance to keep mountain caribou in the southern Interior Wetbelt.

About half of the park proposal is already designated as “no-logging” Ungulate Winter Range (UWR) by the Mountain Caribou Recovery Plan. However, the UWR is not protected from mining, power projects, roads for same, tourist resorts, glading for ski development. The government has said the protection may be removed if the caribou fail to thrive — which would leave many other old-growth dependent species unprotected.

This park proposal would upgrade 1/4 to 1/3 of the Ungulate Winter Range created by the Mountain Caribou Recovery Plan to park status. However, the purpose of the park is to protect the overall biodiversity of the area, including our oldest and highest biodiversity forests that were not protected or even considered for protection by the recovery planning process.

The overall result of the caribou zones and the proposed park would be a conservation complex of fully and partially protected lands representing conservation biology principles urged by scientists for the protection of biodiversity.

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\*2010 Mountain Caribou Census found at:  
<http://a100.gov.bc.ca/pub/siwe/details.do?id=723>



James Bergdahl

*Glada McIntyre in the headwaters of the Duncan River.*

## About the Park Proposal

There has been a park proposal in the Central Selkirks since 1993. The first was proposed by the Applied Ecological Stewardship Council of BC (AESC) whose founder, Glada McIntyre, tried to save the Singing Forest in Howser Creek. In 1998 the Western Canada Wilderness Committee, in collaboration with the Purcell Alliance for Wilderness, proposed a large park called the Bugaboo Extension.

The Valhalla Wilderness Society (VWS) began mapping and researching this area in 1998, in collaboration with the groups above. The VWS proposal changed over the years due to a flow of information streaming from the scientific studies and GIS mapping we sponsored, as well as the Mountain Caribou recovery planning process.

This present proposal was designed by VWS director and forest technician Craig Pettitt and director and bear biologist Wayne McCrory, with the help of Gary Diers of the Purcell Alliance for Wilderness.

Funding was generously provided by the late Glen Davis, the McLean Foundation, and a number of public-spirited individuals who do not wish to be named.

The following scientists and technical experts, were in part commissioned by VWS, but donated hundreds of hours of work on state-of-the-art science and GIS mapping: mathematician Baden Cross of Applied Conservation GIS; lichen researcher Toby Spribille from Graz University in Austria. Dr. Lance Craighead

of the Craighead Environmental Research Institute.

BC lichenologists Curtis Björk and Trevor Goward contributed unimaginable amounts of time. Mushroom specialist Dr. Oluna Ceska and Dr. Adolf Ceska, the former head of BC's Conservation Data Centre volunteered their services in the Incomappleux.

In 1998 Dr. James Bergdahl produced a report on bull trout in the Upper Columbia Basin for VWS. In 2009 Dr. Lee Harding, a former Environment Canada biologist, provided VWS with updated information on fish specific to the park proposal.

Eminent wildlife photographer Jim Lawrence donated the mountain caribou photographs in this report. Professional photographers Mari Omori and Allan Watson of Findhorn also contributed photographs. Gary Diers and his partner Inanna penetrated the untracked wilderness of the park proposal and brought back field information and photographs. Mushroom researcher Jason Hollinger donated his stunning photographs.

No one could have had access to the Incomappleux for the last several years without the heavy labour of a small crew of volunteers who collectively brushed out the road and repaired it.

The Valhalla Wilderness Society deeply thanks all these people. We now turn this work over to the governments of BC and Canada, to be used to create a lasting legacy for the benefit of present and future generations.



### SINIXT OCCUPANCY

Historian Eileen Delehanty Pearkes has provided a summary of historical references to the Sinixt people in the area of this park proposal:

“The use of the north end of upper Arrow Lake and its surrounding watershed (Trout Lake, Incomappleux River, Lardeau River and north end of Kootenay Lake by Arrow Lakes Indians (Sinixt) is well-documented in the ethnographic literature. Several relevant place names confirm the importance of this area to the cultural traditions of this Interior Salish tribe.

“nk'mapeleks was a large village somewhere around the head of Beaton Arm (near the mouth of the Incomappleux River or Beaton Creek). Today, the village site is flooded by the water of the Arrow Lakes Reservoir. nk'mapeleks is an ancient term widely anglicized today as Comaplix. The Incomappleux River is a French derivative dating from the Fur Trade. James Teit was told that this village had a large population and was important for fishing, berrying and root-digging. The term also appears in the ethnographic studies of William Elmendorf and Verne Ray.”

The sources cited by Ms. Pearkes can be found in the References at the end of this report. They also refer to village sites at the head of the Arrow Lake, around Trout Lake and on the west shore of upper Kootenay Lake.



## WHY DOES BC NEED MORE PARKS?

*“We expected the system plan to be considering and ensuring viable representation of British Columbia’s biogeoclimatic zones, adequate land sizes and adequate connectivity between protected areas .... Instead we found otherwise .... it was apparent that the conservation of biodiversity will become more at risk in the future due to the inadequate connectivity of parks and protected areas.”*

*Office of the BC Auditor General  
August, 2010 report on the  
state of BC parks*

- The current level of protection in BC — 14% — has put many species on the road to extinction.
- The BC Conservation Data Centre lists 810 species as “red-listed” (most endangered) and 718 species as “blue-listed”. (BC CDC, pers.com.2011-4-13)
- Worldwide species extinction is now hundreds or thousands of times the natural rate because of human activities. Many scientists are warning that this threatens human health and survival. (Harvard Medical School, 2008.)
- A survey of 3,808 species by Biodiversity BC showed that over 43% were of provincial conservation concern. (Biodiversity BC)
- For 86% of the BC’s species at risk, the greatest threat is habitat loss. (BC Min. of Environment, 2007)
- In 2001, a 17-member science panel funded by government, industry and environmental organizations said that at least 44% of the Great Bear Rainforest must be fully protected to maintain sensitive species such as grizzly bears.
- A Conservation Area Design for the Inland Rainforest Region (roughly equivalent to the Interior Wetbelt) by the Craighead Environmental Research Institute showed that 55% should be fully protected, and another 30% in conservation zones for biodiversity, to maintain the large carnivores, mountain caribou and salmon.

### **Why Does the Interior Wetbelt Need More Parks?**

- The Inland Temperate Rainforest in this region exists nowhere else in the world but the Interior Wetbelt. The very old forests have been heavily logged. Now they are extremely rare and endangered.



Craig Pettitt

**Primeval “very wet” Inland Temperate Rainforest in the upper Incomappleux Valley of the park proposal. This may be the only stand of its kind, for its age and size (hectares), remaining anywhere south of the Robson Valley.**

- Most Mountain Caribou herds received insignificant protection through the Mountain Caribou Recovery Plan. Their populations are continuing to plummet.
- A 2001 study determined that there are 138 vascular plant and 43 vertebrate species listed as rare, threatened or endangered, plus 27 habitat types listed as rare, in BC’s Inland Temperate Rainforest Region. (Not all of these are forest-dependent species or forest habitats.)” (Dr. James Bergdahl 2001)

### **Why Do the Selkirk Mountains Need Another Park?**

- Upwards of 80% of the existing parks in the central and northern Selkirk and Purcell Mountains is high elevation habitat. But by far many more species inhabit the lower elevations. Keeping the lower elevation forests out of parks is slowly wiping out species dependent on the low- and mid-elevation cedar-hemlock forests.



## CARIBOU CRISIS

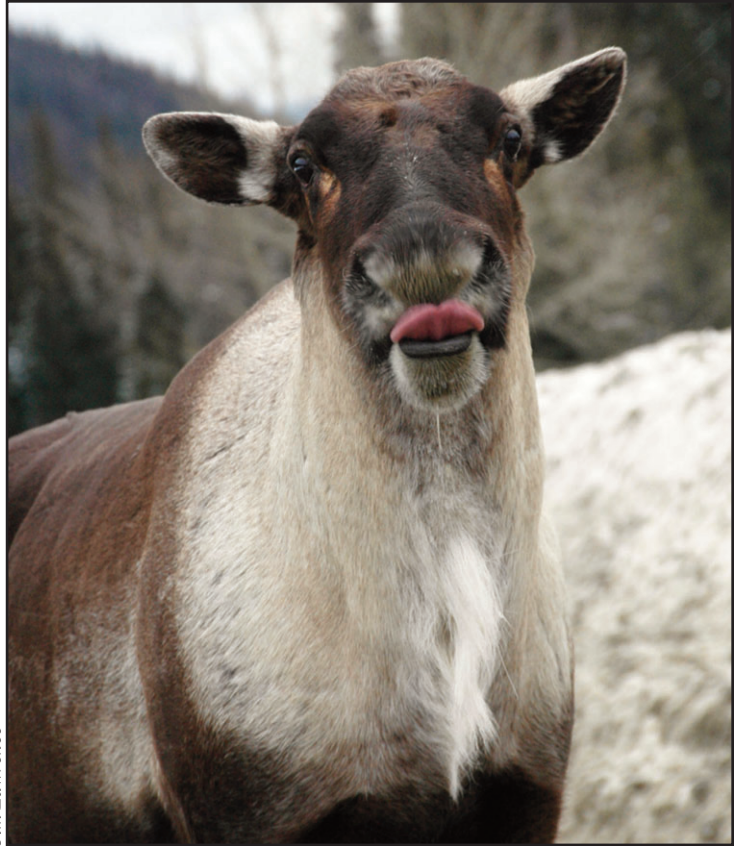
*The Central Selkirk Mountain Caribou herd was estimated at 211 in 1996. By 2002 it was down to 97. The estimate is now 89-92 animals. It is more endangered than herds to the north in the Cariboo Mountains and Robson Valley, but less endangered than its immediate neighbours. And it has more habitat left to protect than its neighbours.*

Other caribou herds have dwindled to the point where recovery is virtually impossible, or else they are experiencing a steep decline. The North Columbia herd has perhaps 70 animals. The South Columbia herd near Revelstoke had a population of 121 animals in 1994; it now has only eight, and their final disappearance is certain. There are only 46 in the South Selkirks and 15 in the South Purcells, where there is little unfragmented habitat left to protect. To the east, the Monashee herd is almost gone. Some of these herds had more habitat to protect, but the caribou Recovery Plan did not protect it.

When we wipe out wildlife populations locally or regionally, we reduce the geographic range of the species as well as its genetic diversity. To let one Mountain Caribou herd disappear will influence the survival prospects for every other subpopulation in the whole Interior Wetbelt.

*Scientific studies show that Mountain Caribou in the Central Columbia Mountains favour habitat with intact old-growth forest that ranges from low- to mid-Inland Temperate Rainforest connected to high elevation spruce-alpine fir forest and alpine ridges (Apps, 2006).*

The idea that we can log part of the forest and leave enough for the caribou was no doubt once true. But logging has already been pushed to the limit where mountain caribou can survive. Scientists say that what is killing caribou is the loss and fragmentation of old-growth forest. The caribou need large, intact tracts of old-growth forest 140 years or older. Smaller and more widely spaced tracts of intact forest expose them to predators. The goal of any planning to protect the caribou should be to preserve the remaining intactness.



Jim Lawrence

***Mountain Caribou in existence: about 1,850 animals. Giant pandas in China: 1,900.***

### ENDANGERED ECOSYSTEMS: ANTIQUE INLAND TEMPERATE RAINFOREST

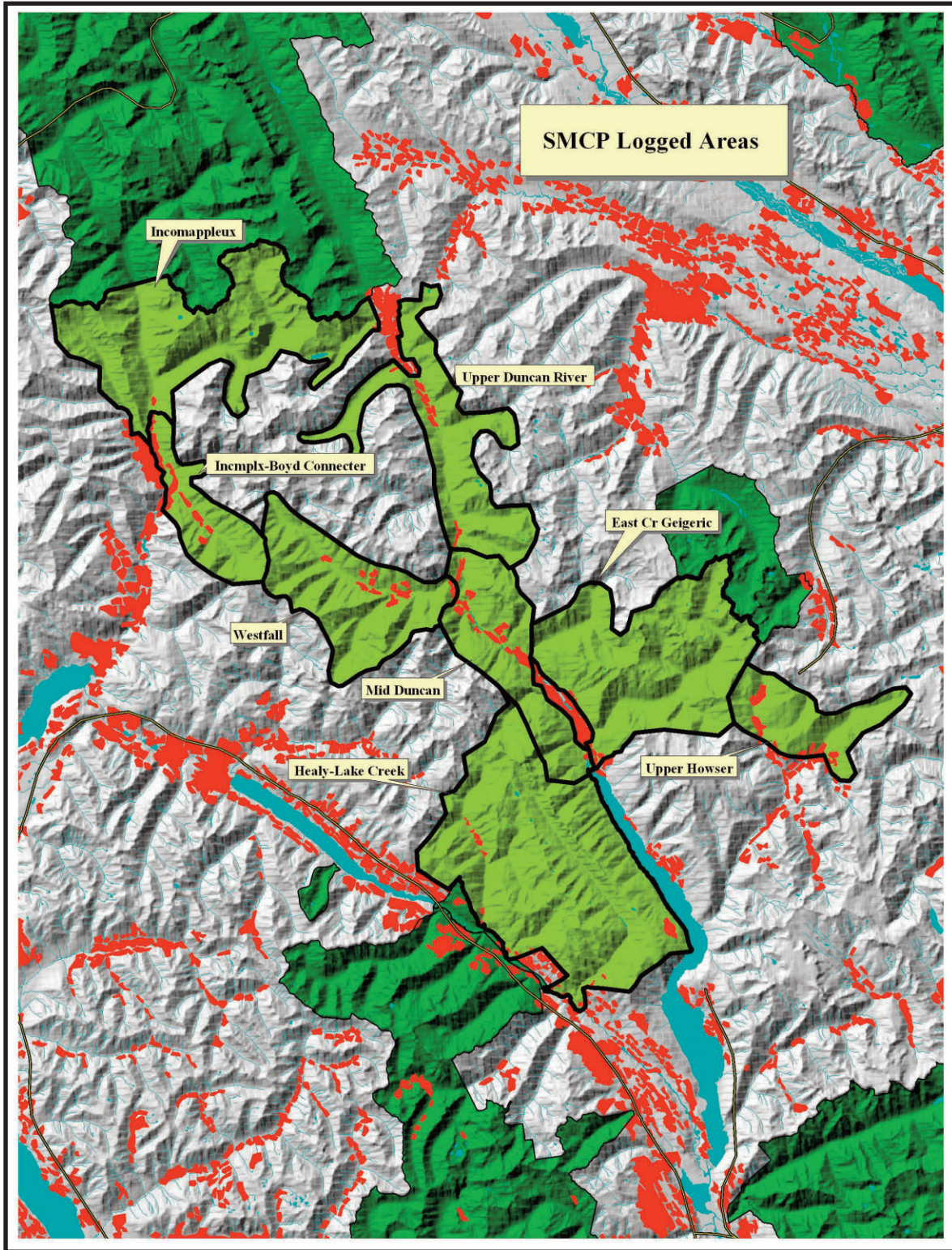
**“We suggest that the oldest old-growth rainforests of inland British Columbia ... represent one of the province’s rarest and most endangered forest ecosystems.”**





Dr. Andre Arsenault and Curator Trevor Goward on the ecological characteristics of BC’s Inland Rainforests

**“These stands are among the rarest, most threatened, and endangered ecosystems on the planet, and require highest global priority for protection.”**

Dr. Adolf Ceska  
Retired head of BC’s Conservation Data Centre  
on the oldest stands of BC’s Inland Rainforest

# SELKIRK MOUNTAIN CARIBOU PARK PROPOSAL

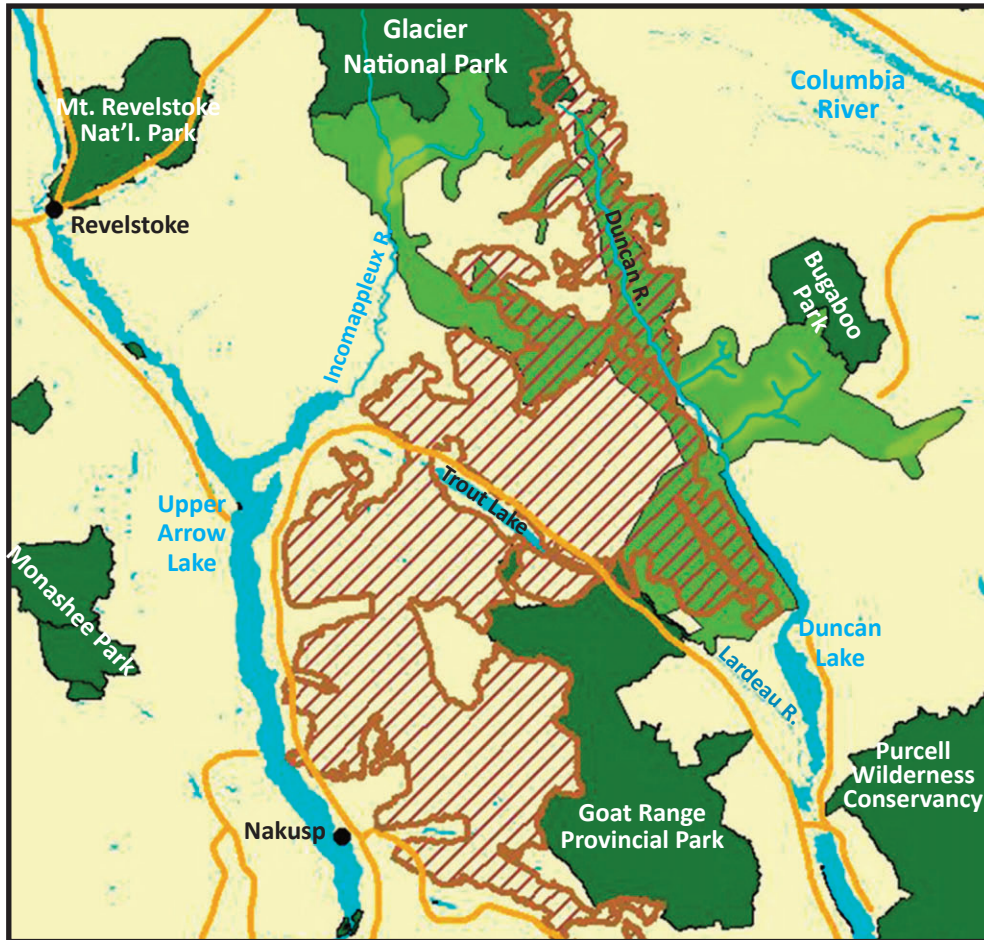


- |   |   |
|---|---|
|  Existing Parks    |  Clearcuts |
|  Proposed new park |  Lakes     |

Prepared by Baden Cross of  
Applied Conservation GIS  
for the Valhalla Wilderness Society

## A Conservation Complex for the Central Selkirks

### Ungulate Winter Range and the Selkirk Caribou Park Proposal



The brown slashing is Ungulate Winter Range (UWR) for Mountain Caribou created in 2009. Where the brown slashing and the proposed park overlap, the Ungulate Winter Range would be upgraded to park status. About half of the park proposal is already UWR, which bans logging. About one-third of the UWR is proposed for upgrade to park status.

If the park is created, it will be important to maintain the remaining UWR permanently. It has important old-growth areas, is currently the most important caribou habitat and has numerous trout streams that include blue-listed bull trout.

- Existing Protected Areas
- Proposed New Park
- Ungulate Winter Range
- UWR - Upgrade to Park

*Preserving the Selkirk Mountain Caribou Park and maintaining the additional Ungulate Winter Range would bring together a conservation complex of fully and partially protected lands similar to the Great Bear Rainforest (but much smaller).*

*The combined size of the parks would be 384,004 ha (944,650 acres). That is almost half the size of the most significant park in the continental United States, Yellowstone. However, this proposal has areas that have been clearcut. Thus it includes its own built-in, partially-logged connectivity corridors linking four major intact areas with old-growth Inland Rainforest. Preserving the logged areas holds out the prospect of restoration of lost caribou habitat.*

### Selkirk Mountain Caribou Park Proposal

	Hectares	%
Total Park Proposal	156,461	
Alpine:	11,965	7.6% of park prop.
ESSF Parkland	27,951	18.0% of park prop.
Forestland (ESSF and ICH biogeoclimatic zones)	116,494	74.4% of park prop.
		100.0%
ICH biogeoclimatic zone	39,639	34.0% of forestland
ESSF (w/o parkland)	76,855	66.0% of forestland
Burned Areas (1920-):	13,681	8.7% of park prop.
Logged Areas:	3,160	2.0% of park prop.
Old-Growth*:	37,792	24.0% of park prop.
Timber Harvesting Land Base	17,827	11.4% of park prop.

ESSF = Englemann Spruce-Subalpine Fir  
 ICH = Interior Cedar-Hemlock (Inland Temp. Rf.)  
 \*Burned areas since 1920 removed.

## WHAT IS INLAND TEMPERATE RAINFOREST?



Craig Pettitt

All photos on this and the next page were taken in the upper Incomappleux Valley in this park proposal.



Alan Watson

The Upper Incomappleux is “very wet” Inland Temperate Rainforest (ICHvk).



Craig Pettitt

This park proposal is in the most southern location where ICHvk occurs



Alan Watson

- Inland Temperate Rainforest occurs nowhere else in the world but in the Interior Wetbelt of BC, a small portion of which extends into the U.S.
- Inland Temperate Rainforest is a type of Interior Cedar-Hemlock (ICH) forest. ICH is the climax forest at low and/or middle elevations over much of the Interior Wetbelt.
- ICH is classified as dry, moist, wet or very wet. Many scientists consider only the “wet” (ICHwk) and “very wet” (ICHvk) to be rainforest. Only these types maintain enough moisture throughout the summer to host many rainforest species otherwise found only in coastal rainforest.
- Due to wetness these forests rarely burn. Therefore Inland Temperate Rainforest has huge trees that may be 500-2,000 years old. The forest itself may be thousands of years older than its oldest trees.
- The ICH extends across the BC-US border as far south as central Idaho. Some scientists refer to all ICH as Inland Temperate Rainforest. But today the huge Western Redcedars found in the northwest US occur only in small, isolated groves. These groves have lost most of their coastal lichens.
- All ICH is dense, humid, high-biomass forest of critical importance to carbon sequestration and storage, and all ICH has a growing constellation of species at risk. But the wet and very wet are the rarest and have by far the highest biodiversity.
- Inland Temperate Rainforest hosts many coastal species that do not otherwise occur inland, but its ecology is unique. A large part of the precipitation falls as snow, and there are both coastal and boreal species.
- These wet ICH forests support hundreds of species of lichens — 283 lichen species have been identified in the Incomappleux Valley alone. Over the last 10 years lichen experts have found species of lichens new to science in these rainforests, and expect to find many more.

## PROVINCEWIDE PROTECTION OF INLAND RAINFOREST



Craig Pettitt



Craig Pettitt

The “very wet” rainforest, ICHvk, is noted for large quantities of moss and lichen on the trees.

Many of the conservation figures for this area come from a 10-year GIS mapping project sponsored by the Valhalla Wilderness Society and carried out by Baden Cross of Applied Conservation GIS. The mapping project area is called the Inland Rainforest Region (IRR). It approximates the Interior Wet-belt and the historical range of the mountain caribou. In the analysis, “protected” means permanently, legally and fully protected in designations such as parks, conservancies and ecological reserves. “Old-growth” is defined by the BC Forest Service standard of 140 years or older. “Inland Rainforest” is used exclusively for ICH vk and wk.

- **IRR land base: 14.31 million hectares.**
- **Forest in the IRR: 9.6 million hectares.**
- **Parks in the IRR: 2.44 million ha., or 17% of the land base.**
- **Only 15% of forest in the IRR is Inland Rainforest.**
- **Only 18% of the Inland Rainforest is fully protected; includes 263,376 ha. of ICHwk and 51,075 ha. of ICH vk.**
- **Government data show that one-third of all fully protected Inland Rainforest is in *one* park: Wells Gray Provincial Park. The majority of this forest burned in the 1940s.**
- **Not surprisingly, only 20% of the protected Inland Rainforest is old-growth. That’s counting all the forest 140 years and older. Trees 1,000+ years old would be exceedingly more rare in protected areas.**
- **Only 51,457 hectares of ICHwk old-growth exist in fully protected areas.**
- **Only 10,014 hectares of ICHvk old-growth exist in fully protected areas.**
- **About two-thirds of the combined ICHvk and wk in parks are over 1,000 m. in elevation, soon to transist to spruce-subalpine fir. This elevation level has far fewer species than the low-elevation rainforest.**
- **47% of Inland Rainforest in parks and ecological reserves is on steep slopes 40% or over — too steep for caribou.**



Craig Pettitt

Ferns, devil’s club and skunk cabbage are predominant in the lush undergrowth of these forests.



Craig Pettitt

The trees are literally encrusted with lichens, which contribute many ecosystem services to the forest.

## CONSERVATION PROFILE OF THE PARK PROPOSAL AREA

***The low and middle elevations of the park proposal are mostly Inland Temperate Rainforest biogeoclimatic zones.***

Together, the Goat Range Provincial Park, Glacier National Park, and this park proposal occupy a range of latitudes where the moist cedar-hemlock transists to “wet,” and then to “very wet,” the further north one travels. Extensive tracts of the “wet” ICHwk occur no further south than the Goat Range Provincial Park, at about the latitude of Nakusp. Extensive tracts of “very wet” ICHvk occur no further south than the Incomappleux River, part of which is in this proposal. At these latitudes there were also large valleys of Inland Rainforest to the west: the Akolkolex and Halfway rivers and Kuskanax Creek.

***A vast area of Inland Rainforest has been destroyed.***

The ancient ICHvk of the Akolkolex has been almost completely decimated by huge clearcuts. The Halfway River and Kuskanax Creek valleys have been heavily logged. Most of the Lardeau and Duncan valleys, and much of the Westfall have been heavily clearcut. These clearcuts are now mostly stumps, impenetrable alder thickets and cottonwoods. to stumps and alder thickets.

In the mountains to the west, the Monashee Range, prime ICHvk has been reduced to a few strips along creeks and the mountain caribou herd has only a few animals left alive. To the north, logging in the Adams River Valley left mostly only a narrow strip of trees along the river. The Revelstoke area may have some remaining tracts, but they have been heavily fragmented into small pieces by logging roads and clearcuts.

***Logging in this region is overwhelmingly concentrated at lower elevations in the Interior Cedar-Hemlock (ICH) forest. Protection is concentrated at higher elevations.***

The highest biodiversity is at the lower elevations. The forest type changes with elevation, transisting from Interior Cedar-Hemlock (ICH) to Engelmann Spruce-Subalpine fir (ESSF) at around 1,400 metres elevation. These subalpine forests are covered by snow much of the year. Comparatively few species live there. At higher elevations the ESSF transists to ESSF Parkland, which is often not forest at all, but subalpine meadows with scattered clumps of trees. Beyond that there is Interior Mountain-heather Alpine (IMA), which is largely treeless.

***Three large species that use valley-bottom cedar-hemlock — Mountain Caribou, Grizzly Bears and Wolverines — are now red- or blue-listed.***

In winter the mountain caribou escape predators by living at high elevation in the deepest snow of winter. They live on hair lichens in the spruce-subalpine fir forest. But to survive on this diet, some go down the mountains in spring, to where the snow melts earlier and the first greens are available. Scientists believe this may be crucial to the ability of cows to give birth to live, healthy calves. The caribou must visit the lower elevations again in early winter, to wait for sufficient snow-pack in the high country to support them so they can



Craig Pettitt



Mark Gronvall

**Incomappleux Logging:** Two-thirds of the length of the Incomappleux River Valley have been clearcut. Loggers say that some of the trees were so big that only one could be loaded on a truck. The snow reveals roads and clearcuts. The forested slope on the right is too steep to economically log. The upper portion beginning with the mountain in the background is splendidly intact. About 17 kilometres of river valley were left unlogged. Due to rugged terrain only about 1,500 hectares of the upper Incomappleux is loggable, but a great deal more is walkable, and because it is contiguous with Glacier National Park, it is part of a large intact wilderness.

reach lichens in the trees.

Grizzly Bears are also high alpine residents that come down to the valley bottoms for early greens in spring, the summer's first berries, and kokanee salmon in fall. Some wolverines come down to the valley-bottom cedar-hemlock forest in winter. Scientists believe they may be scavenging for dead ungulates.

#### MISSING LINKS IN EXISTING PARKS

#### ***There are four rivers in the area. They have very little protection in existing parks.***

Glacier N.P. protects 18 kilometres of the uppermost Incomapleux River. But these reaches are swept by continuous massive avalanches, so there is almost no forest on them. Goat Range P.P. protects about 15 kilometres of the Lardeau River, but protection on one side of this stretch is slight, and the forest along the other side is young. There is currently no protection for the Duncan and Westfall rivers except the caribou Ungulate Winter Range.

#### ***Protection by biogeoclimatic zone: 85.5% of Goat Range and Glacier parks is ESSF or higher, i.e., 1,400 meters or higher.***

Goat Range P.P. —

- 69% ICH and ESSF (subalpine parkland excluded)
- 37,797 ha. ESSF
- 10,675 ha. Inland Rainforest (ICH wk)
- 16,735 total ICH with "moist" type included

Glacier N.P.

- 64% ICH and ESSF, Parkland excluded)
- 61,015 ha. ESSF
- 25,263 Inland Rainforest (ICHwk,vk)
- 26,494 ha. total ICH, with "moist" included

Bugaboo Provincial Park - This is a small mountain climbing park that is mostly subalpine, alpine and rock and ice.

These figures are derived from the government data file "BECvar\_by\_PA\_2010" available on the Internet. More details are provided in the Appendix of this report.

Goat Range and Glacier parks have no habitat lower than 800 metres elevation. Lichen studies show that their Inland Rainforest does not have the species diversity of the 600-metre Incomapleux rainforest in this park proposal.

According to the Glacier N.P. Management Plan: "Riparian areas in the valley bottoms occupy less than 0.6% of (Glacier National Park). Containing some of the oldest forest stands and rare sensitive species, these low elevation wetlands are critical to long-term ecological integrity. Forest harvesting outside the parks threatens this ecosystem." (GNP Management Plan)

#### ***What the park proposal would add to the park system by biogeoclimatic zone.***

74% of the proposal is ICH and ESSF (subalpine parkland excluded)

- 76,855 ha. ESSF
- 27,956 ha. Inland Rainforest (ICHwk,vk)
- 39,639 ha. total ICH, "moist" included

OLD-GROWTH: 24% of park proposal

- 37,792 ha. (ESSF and ICH)
- 13,349 ha. total ICH old-growth
- 4,298 ha. old-growth ICHvk
- 6,853 ha. old-growth ICHwk
- 2,198 ha. old-growth ICHmw

The park proposal cannot appreciably alter the percentage of lower elevation forest in parks because there is too little left; but it would rescue all that remains between the parks. What would be added would be the oldest, most primeval forest, and the highest biodiversity forest, known to have survived in this area.

It would include 17 kilometres of the Incomapleux River in pristine condition, down to 600 metres, with a totally intact tributary, Battlebrook; all of the Westfall River (partially intact) and much of the Duncan River (heavily logged, with short intact stretches) with some intact tributaries.

#### ***Incomapleux recommended as a sanctuary to protect Grizzly Bears from high numbers of Glacier NP visitors.***

A 1984 study on the ecology of Glacier and Mt. Revelstoke National Parks cited the Incomapleux Valley as one of two areas within Glacier Park where wildlife inventory staff saw the most grizzly bears. The report recommended special protective status for the Incomapleux to provide sanctuary for grizzly bears from the pressure of recreationists.



Craig Pettit

**Heart of the rainforest: a totally intact tributary of the Incomapleux, Battlebrook, rushes to its confluence with the river at 650 metres within the Selkirk Mountain Caribou Park Proposal.**

***The BC government's Mountain Caribou Recovery Plan designated 197,126 hectares of the Central Selkirks as Ungulate Winter Range (UWR). Although this program was grossly deficient for most caribou herds, for the Central Selkirk herd it was a significant step forward. But further steps are urgently needed.***

The Ungulate Winter Range (UWR) in the Central Selkirks has a total ban on logging, but it is not protected from mining, hydro, or tourism development. It would not protect the caribou from a mega-tourism development such as the Jumbo Resort, nor from a new or reopened mining exploration road, nor from the devastating impacts of a mine. It would not protect them from huge clearcuts to run hydro lines from independent power projects (IPPs).

In the central Selkirks, only 16,676 hectares (8.4%) of the 197,126 hectare-UWR is Timber Harvesting Land Base. The rest is high elevation, steep slopes, burns, some heavily clearcut areas, and 3,000 hectares where modified harvesting can still take place. Even in the 16,676 hectares there are extensive clearcuts and burns that are unusable for mountain caribou, while some areas of crucial valley-bottom, old-growth cedar-hemlock forest in Lake Creek, Duncan Lake and the Lardeau River valleys were excluded.

The Ungulate Winter Range (UWR) can be removed to allow logging and put somewhere else at any time; in some planning units outside the Central Selkirks, this already has happened. The Government Action Regulations in the Central Selkirks contain at least 10 exceptions under which some logging and road building can occur in the UWR. And if that isn't enough, companies can apply for an exemption from the rules and get a decision within 14 days!

***The Ungulate Winter Range is not permanent protection and offers no permanent protection to other species at risk.***

The government promised the logging companies that if the caribou fail to increase, the caribou zones would be reconsidered. This would leave other species at risk with no protection. And many other species already have no protection, such as the hundreds of species of lichens in the upper Incomappleux forest. Ancient rainforest in East and Giegerich creeks and in Lake Creek received no protection. The Mountain Caribou Recovery Plan is a single species plan. Mountain Caribou do not use some of our oldest forest, and other conservation values besides caribou were not even considered in the planning process. There was no stock taken of what other species might be at risk. At a time when independent power projects pose a severe threat to fish, there was no protection from these projects for fish streams.



Gary Diers



Jim Lawrence

**LEFT: NOT PROTECTED BY THE MOUNTAIN CARIBOU RECOVERY PLAN — The Ungulate Winter Range does include much of Lake Creek, but an exclusion was made for the old-growth valley-bottom cedar, despite the fact it is classic mountain caribou spring and early winter habitat. Old-growth cedar-hemlock forest in the Lake Creek valley was excluded from the Ungulate Winter Range, even though there have been caribou seen in that drainage for many years.**



***Rivers and streams in the park proposal are critical spawning and rearing habitat for the fisheries of the huge Kootenay Lake and Arrow Lakes Reservoir, including blue-listed Bull Trout, giant Gerrard Rainbow Trout and Kokanee salmon.***

Fishing in these lakes is a major tourist attraction and source of income in the Kootenays. The lakes are not in the park proposal, but the resident Rainbow Trout, Bull Trout and Kokanee salmon need moving, well-aerated water to lay their eggs. This need is provided by creeks and rivers within the park proposal.

***In the U.S. Bull Trout are endangered (“red-listed”). In BC they are blue-listed. The Incomappleux, Duncan and Westfall rivers are especially important for them.***

They need very cold spawning waters within a narrow temperature range, often near springs that feed very cold water into the creeks and rivers. The glacier-fed Incomappleux and Duncan Rivers are opaque and such waters are favoured by Bull Trout. They may have colder and more stable temperature. (Decker and Hagen 2007)

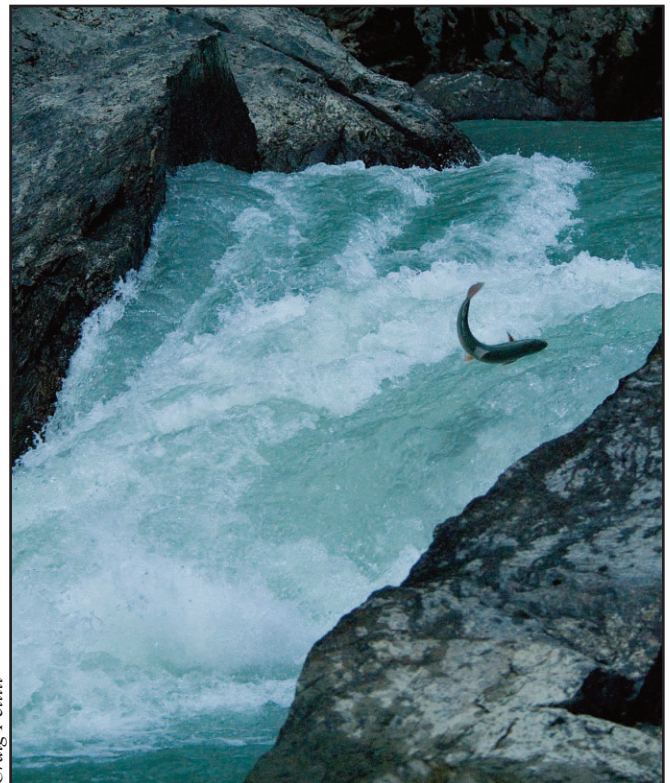
A study conducted in 1996 showed that the primary spawning sites of Bull Trout in Kootenay Lake were the Westfall River, Houston Creek, and upper mainstem Duncan River (O’Brien 2001) — all within this park proposal.

Another study found that there are only five tributaries of the Arrow Lakes that have relatively abundant juvenile Bull Trout (Decker and Hagen 2007). The Incomappleux is the second most important of these streams for Bull Trout spawning and rearing areas. It had 26% of the juvenile Bull Trout counted in tributaries to the ALR.

Most Bull Trout spawning is in the river bed, in the last 11.6 kilometres of accessible length — within the park proposal. Researchers have caught or sighted Bull Trout in or at the mouth of Pool, Lexington, Boyd, Kellie, and Bullard tributaries of the Incomappleux. But logging has wrecked the outlets of some of these creeks, which may be why the fish spawn in the river.

***The Lardeau River has the largest kokanee spawning migration in the Columbia Basin.***

The Incomappleux, Duncan and Lardeau rivers host runs of Kokanee, a small, landlocked Sockeye Salmon. They are the chief food for large trout. After spawning they die and fertilize the entire river and lake systems, as well as the



Craig Pettitt

**Above: Bull Trout hurl themselves up the Incomappleux River. Their competitors, Rainbow Trout, cannot make it. This makes the Incomappleux especially important to Bull Trout.**

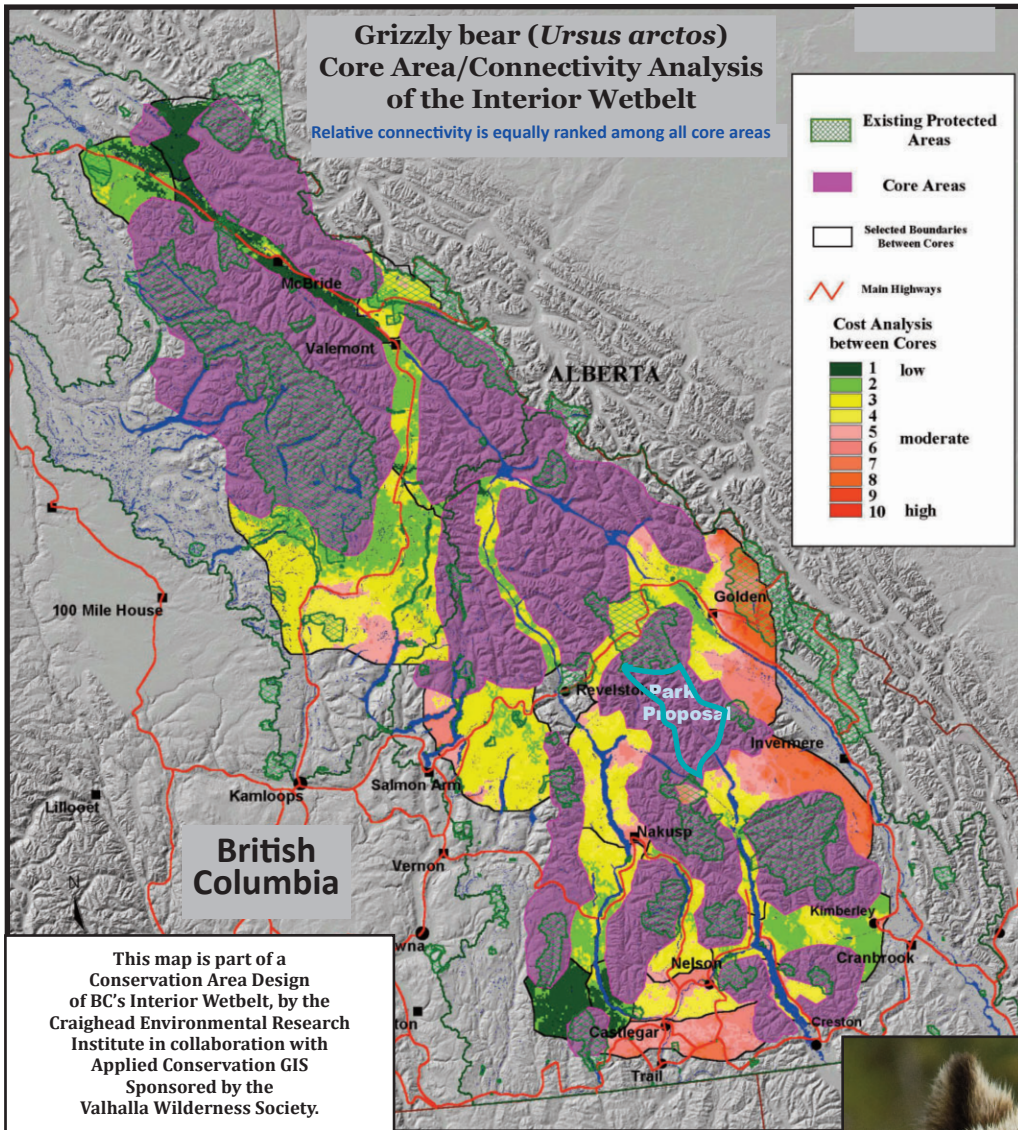
**Below: Gerrard Rainbow Trout — the largest trout in the world. They are seen here in their only native spawning ground in the world: the Lardeau River in the Goat Range Provincial Park. To get there they pass the mouths of Lake and Healy Creeks in this park proposal.**



Craig Pettitt

forests through the droppings of animals such as bears. The taxpayers have paid many millions of dollars to restore the kokanee from collapse caused by dams, yet very little has been done to protect their spawning and rearing habitat in the rivers and streams.

## Park Proposal Is in Shrinking Grizzly Bear and Wolverine Core Habitat



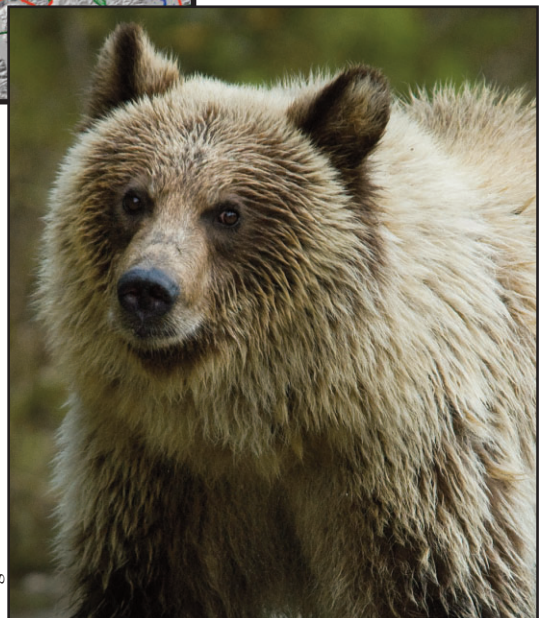
The purple areas are core Grizzly Bear habitat in BC's Interior Wetbelt. The map shows that the land between four parks — Glacier, Goat Range, Valhalla and Bugaboo — is part of a large area of core habitat. The Selkirk Caribou Park Proposal is roughly outlined in light blue.

Core habitat areas become smaller in the south, fragmenting as they approach the U.S. border. Across the border, the bears are almost wiped out, existing mainly in Montana, with very few in Idaho and Washington. This represents encroaching disappearance of the bears from the intensely developed southern areas.

The maintenance of habitat connectivity down the spine of the Selkirks into the US is believed to be critical to the continued existence of Grizzly Bears across the border.

Claims that BC has the largest and healthiest Grizzly Bear population in Canada omit that the bears' range has shrunk by 54% and is seriously fragmenting in southern BC. Shrinking range means less resilience to environmental change, less genetic diversity, more susceptibility to pressures. Nine species of bear worldwide are threatened.

Some scientists believe that the Central Selkirk and Purcell Mountains, in the area of this park proposal, have healthy populations of Grizzly Bears. However, bear-human conflicts in Glacier National Park and along the Trans Canada Highway and CPR mainline are thought to have taken a heavy toll on the Grizzly Bear population north of the park proposal. Bears of the central Selkirks and Purcells are besieged by threats from all directions, including logging roads, private power projects, swarms of off-road vehicles, hunting from ATVs, backcountry lodges, and mega tourism development such as the Jumbo Glacier Resort.



Craig Pettitt

This blonde grizzly cub of the Goat Range Provincial Park uses the park proposal as well. The bears need expanded protection.

## THE PARK PROPOSAL IS DESIGNED FOR CONNECTIVITY

### ***Improved connectivity for our park system requires more fully protected parks.***

The whole concern around connectivity is the massive loss of biodiversity that is ongoing despite the parks we have. Connecting parks with linear corridors is not enough. Linear corridors may be suitable for animals to travel from one core protected area to another, but they are not suitable as security habitat for the residency and breeding of many species.

Connectivity requires a sufficient density of natural, unaltered core habitat to support the survival of species. Protected areas must be large enough to protect species from the influences of surrounding development. With 43% of BC species losing ground, and the vast majority of that caused by habitat loss, we obviously do not have a high enough percentage of protected land. Technical analyses by various scientific teams suggest that 45-55% of our wildlands should be fully protected. Only 17% of the Interior Wetbelt is protected.

### ***Improved connectivity requires expanding existing parks to contain complete ecosystems.***

Care must be taken to keep ecosystem linkages connected. Parks should include the full diversity of habitat that their species need. Protecting a huge expanse of alpine meadows, rock and ice, while leaving prime valley-bottom forests unprotected is not connectivity. It is possible to have geographic linking corridors and still not have connectivity because there are missing links in the ecological protection.

### ***Linkage corridors are needed.***

Existing parks in the province are isolated from each other and becoming “islands of extinction” because of massive logging, roads, hydro and other developments in the lands in-between. Even some of our larger parks such as Glacier National Park and the Goat Range Provincial Park, if left to themselves, would not be large enough to protect wide-ranging species like Grizzly Bears, Wolverines and Mountain Caribou. There is increasing scientific evidence for the benefits of connecting corridors, and there is a trend to believe that the corridors can be partially developed. But the whole reason for connecting corridors is the advancing fragmen-

**“Parks and protected areas are not adequately connected to other protected areas ... From recent scientific research we reviewed, it was apparent that the conservation of biodiversity will become more at risk in the future due to the inadequate connectivity of parks and protected areas.”**

**BC Auditor General  
2010 report on BC parks**

tation of habitat. When the linkage corridors are open for development, they become hosts for enlarging the problem.

### ***One of the top priorities in the design of this park proposal was to provide a critical missing link in protection of the Inland Rainforest ecosystem, by connecting three important existing parks.***

The missing link is low- and mid-elevation forest and rivers. So we used GIS mapping to eliminate from the park proposal much of the alpine, rock and ice high country that composes the majority of existing parks and has proven to be of limited value to species survival. This is why there is a large hole in the middle of the north end of the park proposal.

However, the park proposal crosses the Battle and Badshot ranges to provide connectivity between the Selkirk and Purcell Mountains, taking in obvious alpine mountain passes that serve as important travel corridors between adjoining valleys for mountain caribou, wolverine, grizzly bears and other wide-ranging species. Such areas also provide caribou summer range or glacier lily corm digging sites and denning habitat for grizzly bears.

The park proposal follows rivers to connect Goat Range and Glacier parks. Our research showed that the biodiversity of rivers is extraordinarily high. We endeavored to exclude stretches that were too heavily logged, but in some cases these stretches still had substantial numbers of Grizzly Bears fishing for Kokanee salmon, blue-listed Bull Trout, heavily used salt licks, and places where adjacent mountain slopes were too steep for wildlife travel. We developed a separate map category called “recovery linkage zones” for these heavily logged valley-bottom linkage zones.

Several examples are to be found in the Incomapleaux as well as the head of the Duncan River. The head of the Duncan is a major lower elevation pass into the head of the Beaver Valley in Glacier National Park.

The park proposal comes near the large Purcell Conservancy on the south, but the lands in-between were already too fragmented to propose a large protected corridor between. The main connectivity is riparian along the Lardeau River and much of this is private land. However, some initiative is being undertaken by local people, Ministry of Environment and several land trusts to secure some private land for conservation that will help retain/restore

connectivity between our park proposal and the Purcell Conservancy.

**Conservation Area Design is a tremendous aid for improving connectivity throughout the Inland Rainforest Region**

Dr. Lance Craighead, a wildlife biologist specializing in large carnivores, carried out a massive scientific analysis of wildlife habitat in the Inland Rainforest Region. The resulting data was used to create a Conservation Area Design (CAD) — a blueprint for future conservation efforts that shows the highest value core habitats and travel corridors.

The design identifies core areas and travel corridors for six species: Grizzly Bear, Wolverine, Lynx, Cougar, Gray Wolf, and Mountain Caribou. Aquatic species were addressed using salmon and other aquatic species at risk.

The maps show that this park proposal is in core habitat for Grizzly Bears and Wolverines.

The CAD analysis shows that to adequately protect and maintain biodiversity and ecosystem function, it is necessary to fully protect 55% of the Inland Rainforest Region for biodiversity. Another 30% should be managed for biodiversity through partial protection mechanisms.

**By establishing a major linkage park between three existing parks, the protection values of each is greatly enhanced. The proposal includes a dramatic increase in the intactness and ecological completeness of each park. It uses core areas of intact old-growth forest, connected by corridors that contain a mix of large clearcuts and roads and well-forested areas.**



Anne Sherrod



Anne Sherrod

## INCOMAPPLEUX-BOYD CREEK CONNECTOR: KELLIE CREEK WETLAND

The photo above shows a small part of the extensive wetland at the mouth of Kellie Creek in the heavily logged portion of the Incomappleux River. No survey of species has ever been done to our knowledge. However, at a glance, botanists Toby Spribille and Dr. Adolf Ceska quickly spotted Loesel's Twayblade (*Liparis loeselii*), as well as the Ochroleucous Bladderwort (*Utricularia ochroleuca*) — a plant that traps insects. Both plants are red-listed (endangered). The wetland also contains the blue-listed beaked spikerush, *Eleocharis rostellata*. Loesel's Twayblade is known to occur in only three other locations in BC. The Incomappleux population is the largest so far ever found in BC, but there are reports of another location within the park proposal that has a significant number.

Kellie Creek is threatened by a proposed private power development. Any such development on Kellie Creek could destroy the wetland by reducing its water supply. There are other applications for private power projects on the river.

The strips of forest left around the wetland are in the ICHvk biogeoclimatic zone, and thus are likely to be the rare “very wet” Inland Rainforest. Despite the clearcutting on the surrounding slopes, a visit to the marsh with hip waders is a rare experience of grand nature. The wetland is included in the park proposal, in the Incomappleux-Boyd Creek connector. After taking in the marsh, the park proposal departs the Incomappleux River and ascends Boyd Creek where a pass connects to the Westfall River.



Wayne McCrory-Toby Spribille

View of the Lardeau Valley from the high ridges of the Badshot Range.

## Connectivity Across the Badshot Range

***The Badshot Range divides the Lardeau and Duncan Rivers. This is the most important Mountain Caribou habitat in the park proposal. The 2010 government caribou census found up to 27 caribou or caribou tracks within or near the boundary of this part of the park proposal — about one-third of the Central Selkirk herd.***

Thirteen of the caribou counted in late winter 2010 were in the Healy Creek drainage. The alpine of Healy Creek connects to a system of ridges and passes that give access to Lake Creek, Hall Creek and the Duncan River. Cedar-hemlock at lower elevations in these valleys likely contain crit-

ical spring and early winter habitat for these animals.

In designing the park proposal, VWS recognized that Ungulate Winter Range (UWR) west of the Goat Range park has the highest levels of use during late winter. It's clearly the more gentle slopes and hemlock-leading forest that attract them. But Mountain Caribou need to travel widely through the year, and also change their range over years.

Historically the caribou travelled from these areas, east through the Goat Range Park. They swam the Lardeau River and entered the park proposal, ascending the Badshots through the Healy Creek and perhaps through Lake Creek valleys. Descending to the Duncan and crossing the river, they had good habitat in the Hume Creek valley.

Every year caribou and their tracks are still seen in this area between the Lardeau and the Duncan. Their use of the Duncan River side has drastically dwindled, but continuing access from the Lardeau to Hume and other creeks such as Giegerich and the Westfall is important. Letting their habitat and connectivity continue to shrink would doom this herd to extinction.

This part of the proposal would also protect superb riparian habitat in Lake Creek, with stands of magnificent old-growth cedar-hemlock. The Mountain Caribou Recovery Plan excluded this forest, presumably for logging. No one knows the significance of this old-growth to Mountain Caribou today, because the valley is untracked wilderness and the forest conceals the animals from the air. But caribou tracks were seen there in summer a couple of years ago. There is no excuse for logging Lake Creek, and at any rate, it has not yet been economical to do so.

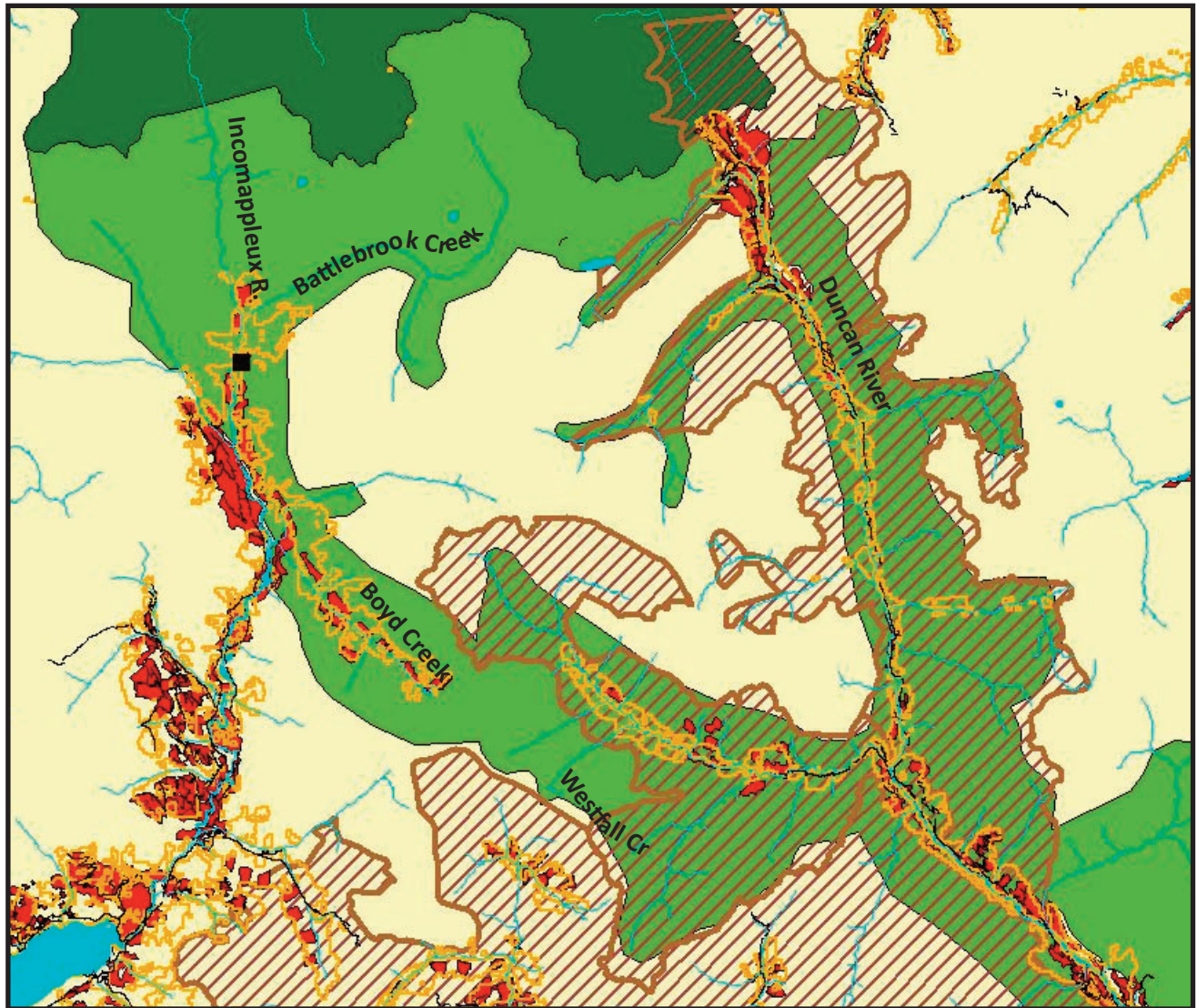
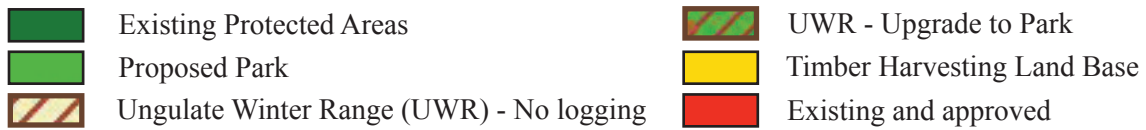


Jim Lawrence

At risk of disappearing forever: mountain caribou

<b>Park Proposal Planning Units</b>	<b>Forest Cover (hectares)</b>	<b>Conservation Values</b>	<b>Status</b>
Incomappleux 27,364 hectares	6,576 ICHvk 8,964 ESSF 5,403 ESSF Parkland 6,421 tundra (IMAun) 54 clearcut	Mostly intact wilderness contiguous to Glacier National Park. 2,997 ha very rare rainforest, 1,800 yr. old trees. Important spawning and rearing for Arrow Lakes bull trout International biodiversity research	5 approved cutblocks in 1,800 year old trees never logged after P&T sold to Interfor and rockfalls damaged the bridge. Current bridge unsuitable for logging trucks.
Incomappleux-Boyd Connector 8,090 hectares	3,315 ICH vk, w (Inland Temp. Rainforest) 2,689 ESSF 1,583 ESSF Parkland 504 tundra (IMAun) 620 clearcut	1413 very fragmented old-growth rainforest. Connectivity: narrow corridor along massively logged river climbs Boyd Cr over pass into Duncan watershed. Extensive wetland along river with red- and blue-listed species.	Logging at high elevation began some years ago but was abandoned when rockfalls damaged the bridge. Current bridge unsuitable for logging trucks. Boyd Creek substantially intact.
Westfall River 16,415 hectares	2,556 ICHwk1 8,758 ESSF 3,455 ESSF Parkland 646 tundra (IMA un) 450 clearcut	948 ha rare old-growth rainforest 3,752 ha old-growth ESSF Critical mountain caribou habitat Primary bull trout spawning for Kootenay Lake.	Logging ceased, reportedly operator not making money. Designated no-logging caribou Ungulate Winter Range
Mid Duncan River 1,3074 hectares	4,773 ICHwk1 1,569 ICHmw2 5,151 ESSF 1,362 ESSF Parkland 219 tundra (IMAun)	1,782 remnant stands old-growth rainforest. Spawning Bull Trout, Kokanee Mountain Caribou habitat Connectivity for Mountain Caribou Grizzlies feeding on Kokanee	Heavily fragmented by logging.  Designated no-logging caribou Ungulate Winter Range
Upper Duncan 16,719 hectares	2,597 ICHwk1 12,044 ESSF 2,035 ESSF Parkland 43 tundra (IMAun) 279 clearcut	1,043 old-growth ICHwk1 4,188 old-growth ESSF Mountain Caribou habitat Intact tributary - Houston Cr. Primary spawning for Kootenay Lake Bull Trout - Grizzly Bears	Heavily fragmented by logging.  Designated no-logging caribou Ungulate Winter Range
East Creek/ Giegerich 26,385 hectares	4,295 ICHwk1 1,737 ICHmw2 11,564 ESSF 5,359 ESSF Parkland 3,430 tundra (IMAun) 156 clearcut	2 almost totally intact tributaries of the Duncan River Connects to Bugaboo Prov Park. 1,283 ha old-growth ICHwk,mw 2,277 ha old-growth ESSF	Classified non-timber-harvesting land base during the mtn caribou process. Partially burned In cutting licences for many years - never logged.
Healy-Lake Cr 39,452 hectares	3,203 ICHwk1 8,376 ICHmw2 19,372 ESSF 7,814 ESSF Parkland 687 tundra (IMAun) 376 clearcut	Connects to Goat Range Prov Park 3,491 old-growth ICH Mountain Caribou, Grizzly Bear and Wolverine core habitat Tributaries to Lardeau R. - only undammed river feeding Kootenay Lake. Largest Kokanee salmon run in Kootenays. Bald Eagles-herons	Mostly designated caribou Ungulate Winter Range Lake Creek nearly intact except for large burn Caribou sightings or tracks every year
Upper Howser 8,964 hectares	642 ICHwk1 7,313 ESSF 994 ESSF Parkland 15 tundra (IMAun) 521 clearcut	1,907 old-growth ESSF Critical Grizzly Bear corridor from Selkirk Range to Purcell Range Headwaters to Bull Trout stream Reported mountain caribou	Site of proposed Glacier-Howser IPP which appears to have failed due to massive opposition and withdrawal of power contract.

## Caribou UWR, Timber Harvesting Land Base, Clearcuts, Approved Clearcuts: Incomappleux, Duncan and Westfall Rivers



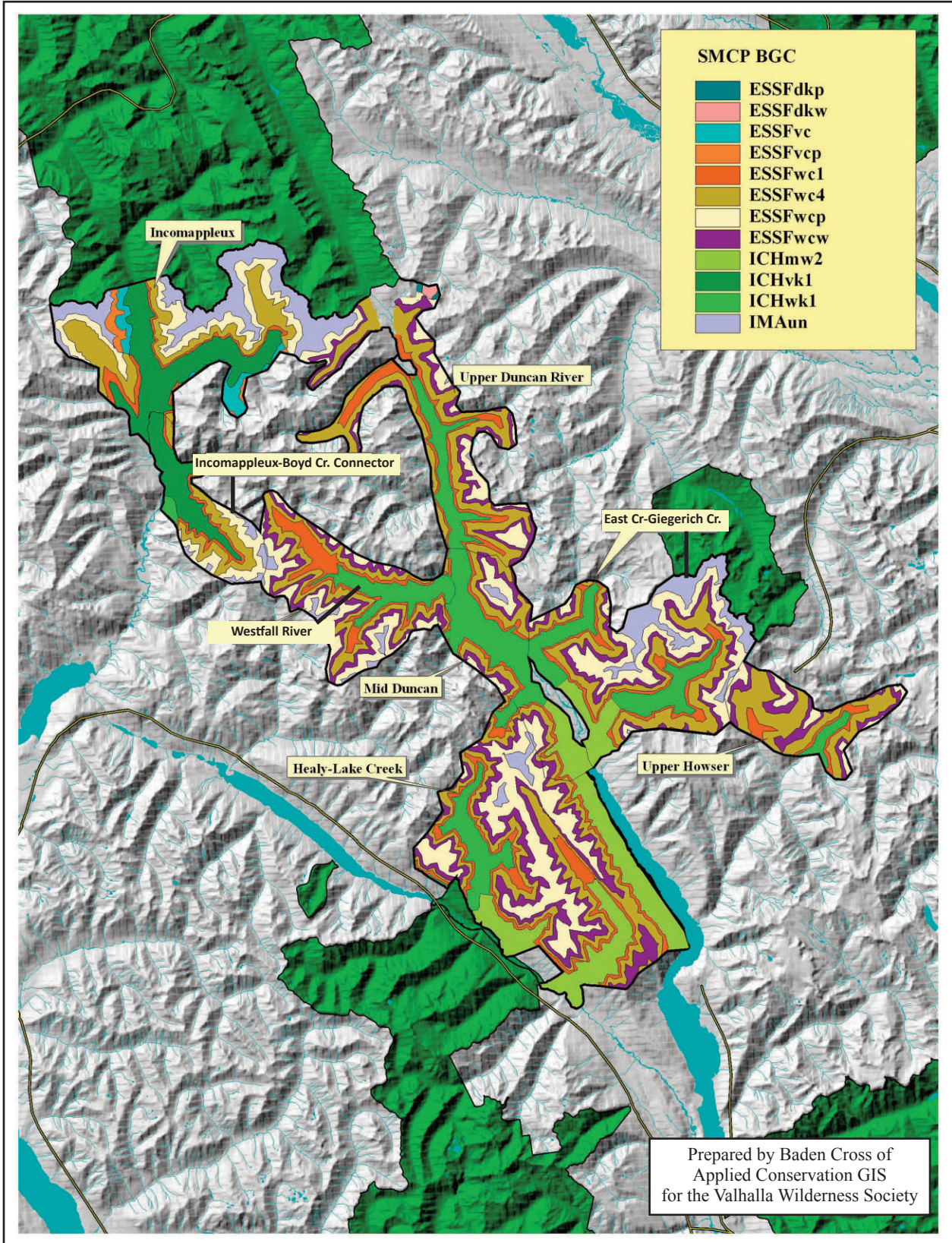
Timber Harvesting Land Base in the park proposal: 17,827 hectares, 11.4% of the park proposal.

Mtn. Caribou Ungulate Winter Range in the park proposal: 72,304, 46% of the park proposal.

The Ungulate Winter Range is more or less closed to logging.

The best and the most economically accessible forest has been logged. Remoteness of the northern part of the proposal requires long trips hauling logs, and the mountainous terrain and wet weather sometimes required expensive road building, things that logging companies cannot afford now that the best and most accessible has been logged. There are extensive clearcuts that do not show up well on the map at this scale, especially along the Duncan River and the Westfall River.

# BIOGEOCLIMATIC ZONES OF THE SELKIRK MOUNTAIN CARIBOU PARK PROPOSAL





## THE PARK PROPOSAL: UPPER INCOMAPPLEUX/BATTLEBROOK

### ***A 27,364-hectare wilderness contiguous to Glacier National Park.***

The Incomappleux River originates in a glacier in the park and travels 18 kilometres within park, un-forested due to continuous massive avalanches. This park proposal would protect another 17 kilometres of the river, as well as an intact tributary, Battlebrook, arising from the Battle Range.

The lowland forest along the river and Battlebrook is extremely rare primeval rainforest. Scientists say the forest may have been growing uninterrupted since the last Ice Age. There are many two- to three-metre diameter trees in the 800-1,500 year range. The oldest range up to four metres and an estimated 1,800 years old.

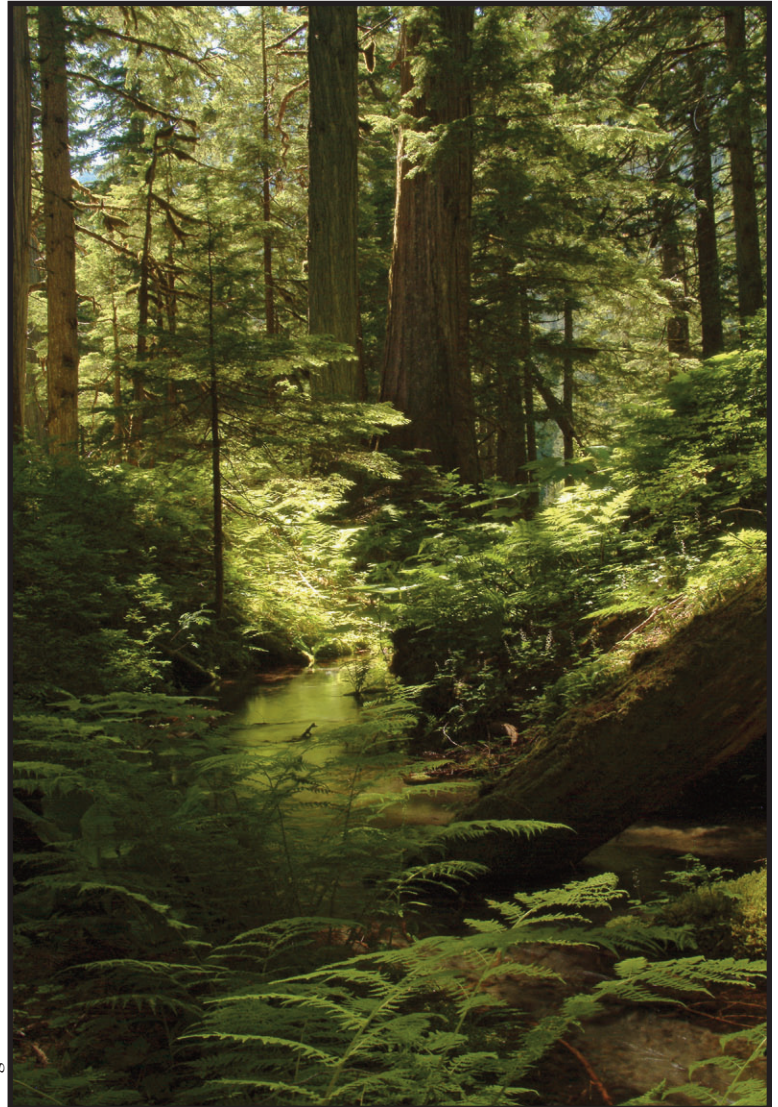
Only about 1,500 hectares of the big trees are within the timber industry “operability line.” This is contained along the lower five kilometres of river, between the clearcuts downriver and a steep-walled canyon with massive avalanche tracks upriver. Yet the visitor can walk amongst these awe-inspiring trees all day long and not come to the end of them.

Upstream of the ancient forest, the Incomappleux River and Battlebrook adjoin Glacier NP to form a remote, wild, intact ecosystem of riparian habitat and avalanche tracts — a haven for Grizzly Bears, offering such amenities as endless cow parsnip and strips of Inland Rainforest for rest in the shade. The bears also use the intact ancient forest downriver, though we’ve seen only their hair on rubbing trees and paw prints.

The logging company that had the licence, Pope & Talbot, went bankrupt, leaving five approved cutblocks within the big trees. The licence has been transferred to Interfor. Some years ago a huge rock-fall on the Incomappleux Canyon road damaged a bridge. The expense of repairing it has protected the trees ever since, but the trees could legally be logged at any time.

There is also an application for a private power development 10 kilometres above the confluence of the Incomappleux River and Battlebrook. This would require pushing a road nearly to the boundary of Glacier National Park, totally destroying the intactness. Additional power development applications exist on McDougal, Kellie, Pool and Boyd creeks — enough to devastate the river ecosystem.

If it is subject to logging and power production, no one will ever see the likes of this forest again.



Craig Pettit

**“Forests of the calibre of the upper Incomappleux are in a class of their own, owing both to their great age, which has allowed thousands of years of colonization for rainforest-dependent species, and their structural complexity – the interactions of the hundreds of plants and fungal species with thousands of poorly known invertebrate organisms.**

**“The fragmentation of this forest would represent a direct and immediate threat to many species whose distribution is limited to short distances, and for whom a clearcut represents an immense migration barrier. Fragmentation would create canopy gaps allowing valley winds to penetrate into the heart of forest canopies that have been sheltered and humid for over a thousand years, drying out the habitats of species, such as the COSEWIC-listed Species of Concern *Nephroma occultum*, whose existence depends on very stable humidity and constant, undisturbed conditions.**

## Scientific Research in the Incomappleux



Lichenologists Toby Spribille and Curtis Björk.



*Lobaria retigera* (Smoker's Lung Lichen)

### Inland temperate rainforest puts BC amongst areas around the world yielding species new to science.

Forests as far north as British Columbia do not have anything like the biodiversity of tropical forests. Many kinds of species become more numerous the further south one travels. But lichen species become more numerous moving north, well into Alaska. Lichens are one of the great pools of diversity in northern forests, but in the past they have been poorly studied. Only recently have scientists discovered totally unexpected explosions of lichen diversity, and this began in the Inland Temperate Rainforest.

### 283 species of lichens in the Incomappleux Valley, mostly in this park proposal.

That's more lichen species than all the other plant species found in the Incomappleux put together. The pioneering lichen surveys in the Incomappleux were carried out by Toby Spribille, a researcher from the University of Graz, Austria, and BC lichenologist Curtis Björk, in consultation with Trevor Goward, former curator of the UBC lichen collection. These findings revolutionized the knowledge of biodiversity in northern coniferous forests.

Of the 283 species found in the Incomappleux Valley, about 74% were found in the old-growth rainforest. A large number of them were "oceanic lichens" — usually found only near the coast. The oceanic lichens can live in the interior only where there are very wet conditions. The lichens of the Incomappleux include:

- 3 species not previously known in BC or Canada;
- 3 species not previously known in North America.
- 7 species new to science.

These lichens were found with only a cursory examination of a few areas. According to Spribille, "We are definitely looking at a major center of lichen diversity at a global level that we haven't even begun to fathom or explain."

### Six-nation team identified species new to science

To determine whether the unidentifiable species were, in fact, new species, a team of eight experts from six countries worked together, using DNA analysis. Four of the new species have been named and published (Spribille et al., *The Bryologist*, bryo-112-01-08.3d). A fifth is due for publication soon. One species — *Myochroidea minutula* — has never been found *anywhere* else in the world but in the ancient forest of the Incomappleux.

In 2010 Spribille led a research group to Mt. McKinley National Park in Alaska. A thorough search yielded 766 species of lichens in a small area. Statistical analysis indicates there may be as many as 1,000. It is believed to be likely that a thorough search of the Incomappleux would yield many more species of lichens, some new to science.

### Research expanding to other species

Research in the Incomappleux is expanding to other species. Mushroom expert Dr. Oluna Ceska has found rare coastal mushrooms, and Dr. Adolf Ceska, formerly of the BC Conservation Data Centre, has found rare plants. More researchers focused on other species will be arriving soon. The Columbia Basin Fish and Wildlife Compensation Fund has sponsored several fisheries studies in the park proposal.



Toby Spribille

New to science: *Gyalecaria diluta*

## Lichens: Major Ecosystem Functions in Temperate Rainforest

*The Peltigera on the right at top is one of many nitrogen-fixing lichen species. Researchers have reported up to 50% of the nitrogen input to Pacific Northwest forests coming from lichens. They draw nitrogen from the air and convert it to a form that plants and trees can use. Rain leaches the nitrogen into the ground; in addition, lichens fall from trees and decompose into the ground, fertilizing it with nitrogen. This is only one of many functions of lichens in the ecosystem. There are numerous known links with other species, for instance, as part of their food or nesting materials, but there is also much that remains unknown.*

The *Alectoria* and *Bryoria* hair lichens (bottom, far right) are almost the sole food of mountain caribou in the winter, and a major food in the summer. Every single species is important to save because we do not know what they do. Amongst hundreds of species of lichens, only these two hair lichen species form the majority of the mountain caribou diet. These lichens were also a favourite food of the interior Salish people. Lichens have associations with a large number of animals as food and nesting material. They also help to break down rock and create soil.

Many small species around the world are now being recognized as holding the biochemical keys to treating diseases and solving many other serious problems. And in many cases they are the *only* species that hold these keys. So the loss of even one species is considered by scientists to be a very great loss to humanity in medical research alone.

The *Lobaria pulmonaria* shown on page 12 was traditionally believed to be effective against tuberculosis. Studies have verified this belief. Scientists have been experimenting with lichens for decades, seeking valuable chemicals. And many of them are being used in commercial products today. Lichens have been found to have anti-tumour or antibiotic properties, as well as effectiveness against HIV.



Anne Sherrad

Genus *Peltigera*

Craig Pettitt

Coral Lichen



Craig Pettitt

*Alectoria* and *Bryoria* hair lichens.

Toby Spribille

*Spilonemella americana*

Toby Spribille

*Pilophorus acicularis*

## The Incomappleux Reveals Ancient Forest Legacies



Noted mycologist Dr. Oluna Ceska.

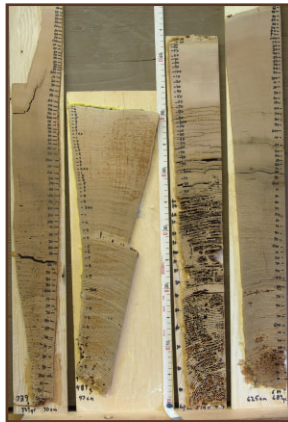
Adolf Ceska



*Phaeocollybia piceae*

Adolf Ceska

Dr. Oluna Ceska, a prominent BC mycologist, and Dr. Adolf Ceska, a retired biologist at BC's Conservation Data Centre, collected 100 species of mushrooms in one day in the upper Incomappleux. Twenty were found in a clearcut and a spectacular 80 species in the ancient rainforest; 41 of the 80 were coastal species. They included the rare old-growth rainforest mushroom, *Phaeocollybia piceae*. Uncommon even in coastal old-growth, at the time of its discovery in the Incomappleux it was (and likely still is) the first inland occurrence



Mark McLean



### HOW OLD IS A 3.25-METRE (10 FEET) THICK TREE?

The oldest cedar documented in the Incomappleux is 3.25 metres diameter. The age of ancient cedars cannot be determined precisely because the natural life cycle of the tree includes rotting in the core, resulting in a hollow centre. Counting tree rings from solid stumps of mature trees, Valhalla Wilderness Society director Craig Pettitt found the following ages from the tree rings in the cross-sections shown in the photo above, centre:

Ages from left to right

- 739 years from a 1.5 m log = 492 years/metre
- 489 years from a 1 m log = 489 years/metre
- 514 years from a 1.3 m stump = 395 years/metre
- 689 years from a 1.3 m stump = 530 years/metre

Assuming similar growth rates throughout the tree's lifetime, a three-metre tree might be 1,300-2,200 years old, average 1,750 years. BC's Ministry of Forests says 800 years old. That means the 3-metre tree would have had to put on approximately two metres more than these trees in about 60-300 years, or a phenomenal 1 centimetre of diameter per year over their entire lifespan. The U.S. Forest Service in Idaho calculated its similarly huge cedar trees at 1,800 years old.

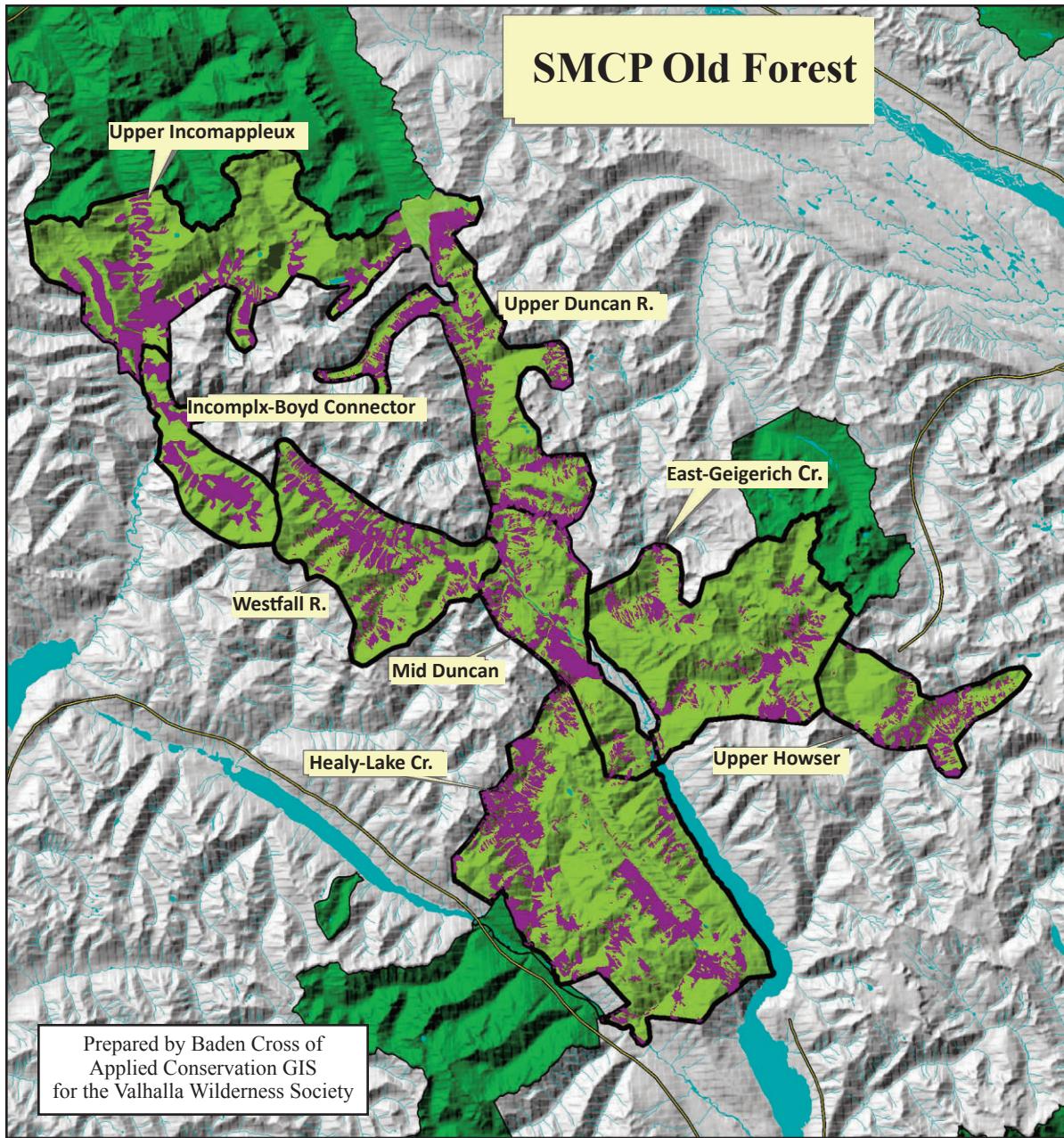
In the Incomappleux, stable growing conditions over thousands of years have allowed time for some of the most fragile small species, including many that need coastal conditions, to establish colonies. Time has enabled the creation

of a precious legacy of ancient soil enriched with millions of microscopic organisms, and undisturbed root systems with invisible filaments from organisms, all interconnecting to hasten the process of decay and the transport of nutrients to support continuous rebirth.

In the ancient forest, lichenologist Toby Spribille found the Mountain Moonwort shown on the left. It is a primitive fern that goes back to the melting of the glaciers and is found only in ancient cedar-hemlock forest.



Craig Pettitt



Big cedars along the middle section of the Duncan



The Westfall River

## THE PARK PROPOSAL: Duncan And Lardeau Watersheds

### Healy-Lake Creek

The Lardeau River (right) is the only river feeding Kootenay Lake that is not blocked by dams, thus it is very important to the ecosystem. It has the only spawning grounds for the giant Gerrard Trout of Kootenay Lake. In the summer of 2010 there were 30 blue-listed Great Blue Herons on the Lardeau River and abundant bald eagles. The Healy-Lake Creek part of this proposal would go down to the river and connect with the Goat Range Park. This is a key, historical mountain caribou travel corridor, and much of Lake Creek is intact except for a large burn.

James Bergdahl



Anne Sherrod

Accessible by 4-wheel drive, the spectacular alpine of Healy Creek offers easy cross-country hiking and sees many visitors every year. Caribou use it in autumn and winter.

### Badshot Range

The Badshot Range divides the Lardeau and Duncan drainages. The alpine is accessible by Healy Creek 4-wheel drive road. With their breathtaking scenery, the Badshots have been visited by recreationists since the days of the silver and gold rush that flooded the valley with settlers in the early 1900s. Besides providing vast views of the Selkirk Mountains, the Badshots themselves are composed of spectacular limestone formations called karst. The high content of dissolvable minerals in the soil around karst formations is known to stimulate high diversity of plants and lichens. This area has significant use by Mountain Caribou.

### East and Giegerich Creeks

The East Creek and Giegerich Creek tributaries of the Duncan were in the licence areas of Slocan Forest Products and Meadow Creek Cedar for many years. But because of a barrier of steep slopes at the start, they were not economically loggable. They were classified as non-Timber Harvesting Land Base in the Mountain Caribou Recovery Plan. Both of these creeks have huge old cedar trees, but it appears that some in Giegerich may have burned recently. Due to difficulty of access, these forests have not yet been scientifically surveyed for lichens and other biodiversity. These valleys are prized by wilderness explorers.



Gary Diers

East Creek in the park proposal, with Howser Spire in Bugaboo Park in the back-

### Duncan River

The Duncan River originally was a vast valley of ancient Inland Temperate Rainforest, used extensively by Mountain Caribou. The easily accessible old-growth has largely been wiped out by clearcuts, but there are patches and slopes of low-elevation old-growth connected to the high-elevation Mountain Caribou habitat, and caribou still come down to these areas. The river has Bull Trout, Rainbow Trout, Kokanee, Mountain Whitefish, unidentified sculpin and Longnose Dace. It is a major spawning route for Bull Trout and Kokanee Salmon from Kootenay Lake. Intact Houston Creek has ESSF forest and heavily used game trails.

## Hydro Development Threatens Fisheries in Central Selkirks

*In the six years from 2003-04 to 2008-09, the Columbia Basin Fish and Wildlife Compensation Program spent \$11.87 million restoring the fisheries of the Arrow Lakes Reservoir and Kootenay Lake. Most of it was spent on fertilization programs to compensate for nutrients blocked by the dams. (CBFWCP Annual Reports, 2003-04 to 2008-09.) If the proposed private power projects on Howser Creek in the Duncan River drainage and on the Incomappleux go through, this effort may have been a grand waste of money and time.*

At one time the Kootenay, Duncan, and Arrow lakes comprised a fabulous, internationally-renowned sport fishery with giant rainbow trout and Bull Trout. But the fishing crashed with the fish in a series of blows in which logging, overfishing, and misguided stocking practices collaborated with the major impacts: dams on the Columbia and Duncan rivers. Over the long term, the dams blocked nutrients carried by the rivers into the lakes. This is why a keystone species of the lake ecosystems, the kokanee salmon, began crashing in the 1990s, and with that the whole lake ecosystems collapsed.

The restoration effort has been modestly successful. Some scientists warn that the fertilization is an artificial remedy that may not work or may cause more damage in the long term. But today fishing continues to attract tourism to the big lakes and Grizzly Bears can once again be seen fattening up on Kokanee salmon.

Strangely enough, little heed has been paid to protecting the natural ecosystem from additional harm. In particular, little heed has been paid to protecting spawning habitat in the rivers and streams. And logging has destroyed some spawning habitat in the park proposal, especially for bull trout.

### Howser Creek IPP

The IPP proposed for the Duncan River tributary, Howser Creek, would remove water from three creeks and push roads and powerlines into the area of Howser covered by this park proposal. However, public opposition to the power project has been huge. Recently BC Hydro cancelled its contract with applicant company, Axor. It is unknown what this means to the IPP application, which is still in the Environmental Assessment process.



Lee Harding

**A 7.2-pound bull trout — Millions of dollars are spent to increase fish in the lakes while allowing their critical habitat in the rivers and creeks to be degraded or wiped out.**

### The Incomappleux Watershed

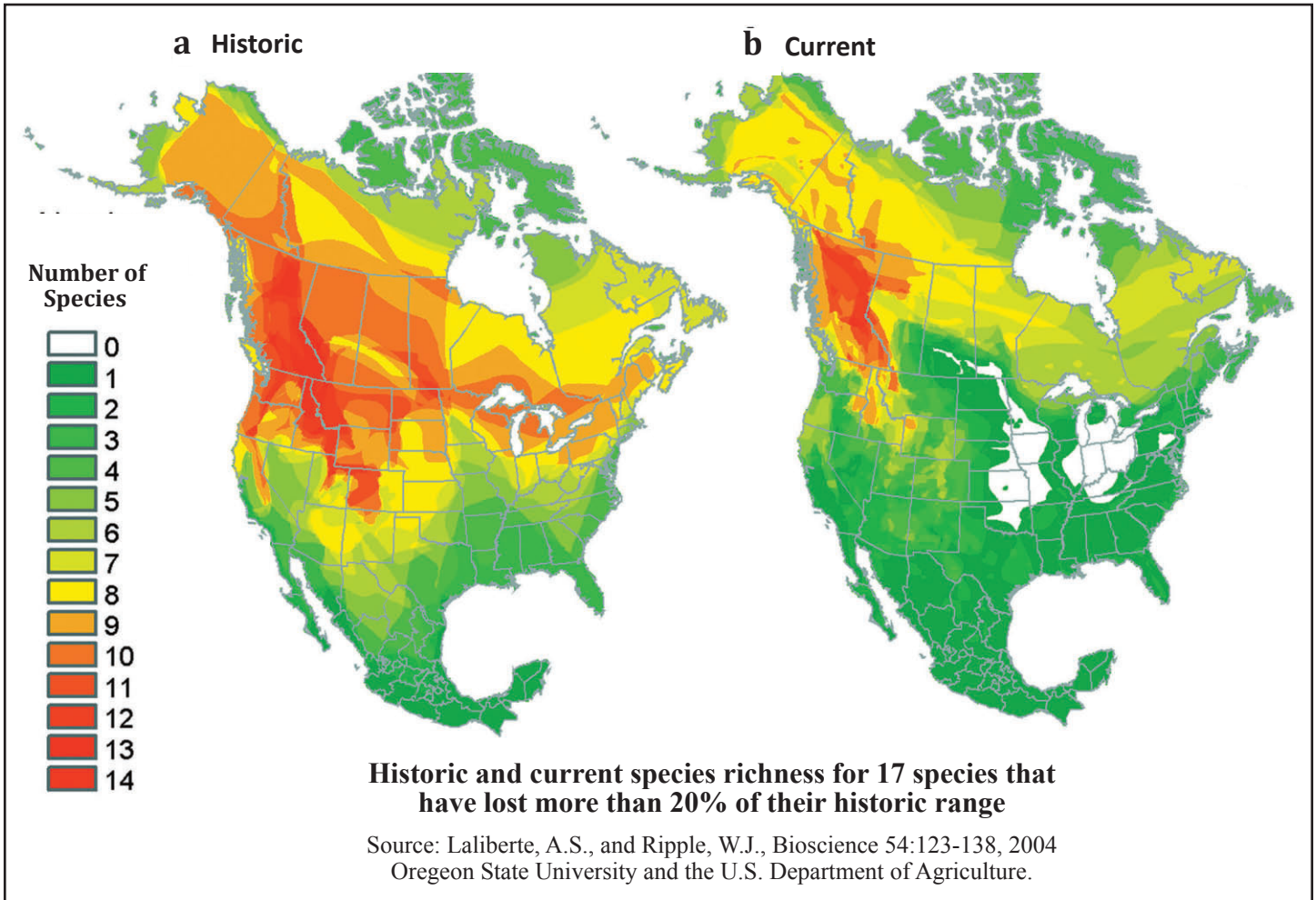
There are at least four IPP applications on the Incomappleux River and its tributaries, at least two of which have bull trout. Imagine the effect of four IPPs on water flow in the river, all the way downstream to the Arrow Lakes. The Incomappleux and Lardeau rivers are not blocked from delivering their nutrients, unlike the Duncan. They are bringing precious natural nutrient flows into the nutrient-starved Arrow Reservoir and Kootenay Lake that don't have to be bought by taxpayers' dollars, while they also provide critical spawning habitat.

**“Proposals for small run-of-the-river hydroelectric projects in Arrow Lakes Reservoir tributaries should also be carefully reviewed by fisheries managers. Sites proposed for such projects are usually located in steep canyons where waterfalls occur. Migration obstructions and barriers for bull trout often occur at these same locations. It is common for a large proportion of a bull trout spawning population to stage for several weeks at the base of an obstruction or barrier....**

**The construction of diversion tunnels, head pools and penstocks in canyon sections used as staging areas by adult bull trout may affect their spawning distribution and eventual reproductive success. ”**

**Decker and Hagen, June 2007  
“Distribution of Adfluvial Bull Trout Production  
in Tributaries of the Arrow Lakes Reservoir...”**

## THE PARK PROPOSAL AND THE GLOBAL CRISES OF CLIMATE CHANGE AND SPECIES LOSS



### BC the Last Refuge for Many Large Wildlife Species

Another word for the shrinking ranges of wildlife is “extirpation.” It means that species gradually disappear across their range until they have been completely annihilated. Researchers have surveyed the current and historic ranges of 17 species of wildlife. The colours show how the ranges overlap. The dark green areas have only one of the 17 species. The colours get warmer as more species are present. The darkest red areas are where as many as 14 species overlap. British Columbia is almost the only place in North America with 12 or more of the species, the only other area as rich being a small strip in the Rocky Mountains of Alberta.

BC is the last refuge of a number of species that used to inhabit the U.S, eastern Canada and even Alaska and the Yukon. Black bear, grizzly bear, wolverine, gray wolf, elk and caribou have the most range contraction.

The maps also show ranges contracting within BC, from

the south, from the Okanagan and from the coast, with the northern half of the Interior Wetbelt and the boreal forest being the remaining strongholds.

#### RANGE CONTRACTIONS OF SPECIES IN THE SELKIRK MOUNTAIN CARIBOU PARK PROPOSAL

Species	% of Historic Range Lost
Grizzly bear	53%
Gray wolf	43%
Wolverine	37%
Elk	74%
Mountain goat	31%
Fisher*	47%
River Otter	25%
Lynx	39%

Laliberte and Ripple, 2004



## HARVARD MEDICAL SCHOOL ISSUES URGENT PLEA TO PROTECT BIODIVERSITY

“In contrast to the issue of climate change, there was inadequate attention being paid to the potential consequences for human health resulting from species loss and the disruption of ecosystems. Not only were the full human dimensions of biodiversity loss failing to inform policy decisions, but the general public, lacking an understanding of the health risks involved, was not grasping the magnitude of the biodiversity crisis, and not developing a sense of urgency to address it.”

Eric Chivian, M.D.  
*Biodiversity: Its Importance to Human Health*  
 Harvard Medical School, 2008



Mari Omori

### **Massive species loss is accelerating and is a threat to human health.**

“The consensus of scientists is that the current rate of species extinctions is on average somewhere between 100 and 1,000 times greater than prehuman levels, and that we are moving toward an extinction rate that is on average 10,000 times greater ...” — *Sustaining Life: How Human Health Depends on Biodiversity*, edited by Eric Chivian, MD and Aaron Bernstein, MD, Center for Health and the Global Environment, Harvard Medical School.

***Biodiversity protection must focus on ecosystems at risk, not species at risk. Ecosystems at risk mean many species at risk. Behind every large, charismatic wildlife species at risk from habitat loss, there are hundreds, thousands, or possibly millions of small species at risk. We do not even know what we are destroying.***

Scientists estimate that only about one in ten organisms have even been identified. In many cases even a single, small, little-known organism turns out to be life-saving. An ocean-dwelling bacterium, *Prochlorococcus*, that was not discovered until 1986 turned out to produce 20% of the oxygen we breathe on Earth.

This tells us that even one single, tiny, nondescript species could be crucially important to future life on Earth. It tells us that there are other discoveries that have not yet been made, and that the consequences of letting species die can be far worse than what we imagine. It also tells us that the tiny, even invisible species, are worth as much concern as the larger ones.

Protecting 140-year-old, mostly high elevation forest, and neglecting the protection of the riverine bottomland and the last remaining 500-2,000-year-old forest teeming with a globally significant assemblage of lichens fails to recognize the biodiversity crisis. It shows that our work on conservation of biodiversity in the Central Selkirks is not finished, although there have been a number of very important steps taken.

### **Steps must be taken to recognize the extraordinary biodiversity and the severe endangerment of species in and around rivers.**

“Current data indicate that as much as one-third of all vertebrate species are confined to freshwater habitats ... Freshwater habitats are among the most endangered habitats in the world, and the decline of freshwater biodiversity outpaces that in both terrestrial and marine systems ... Among North America’s rich fish fauna, some 364 species are considered to be either Endangered or Critically Endangered. This figure represents a 45% increase in endangerment over the previous decade and translates into more than 30 percent of all native fishes being under threat.” — Chivian, *Sustaining Life*, 2008

That’s just the species in the water. The species in riparian habitats on land must be added to that. Clearcuts and roads can eliminate many old-growth species by exposing them to the drying effects of sun and wind. But there is extra moisture in the air, especially near rapids or waterfalls. These high humidity zones, if left forested, may provide refugia for some species that have lost habitat due to climate change, whether from logging or other causes. This park proposal contains many such examples.

## EXTERMINATION DEVELOPMENT OR A PARK?

*There are more reasons to protect the precious remnants of our ancient Inland Temperate Rainforest. Future generations have a right to experience Nature's greatest creations. There is extremely little primeval rainforest in all of Canada where this can happen, and it is all in BC. The moderating influence of these old-growth forests on climate is huge. It is inconceivable that, knowing what we do, we would just keep scalping the planet and leave little or nothing for the survival of our children.*



In this park proposal in the early part of this decade, a logging company drove a road over hydrologically unstable slopes above the Westfall River, into one of the most important areas for Mountain Caribou and Bull Trout. Loggers ran protesters off the road with their trucks. Pleas to the government and police to protect the rights of the protesters were ignored. The company stripped one side of the valley bottom of trees, completely destroying that side for Mountain Caribou, and began carving up the other side. Then it pulled out because it wasn't making money. Landslides have since closed the road. One day this will be viewed as barbarism by a generation that recognizes the enormity of the role these forests and rivers play in the survival of life on Earth.

This can happen again. Interfor, the current licence holder in the upper Incomappleux, may have enough wealth from logging coastal forest to repair the road when market prices rise, and make a quick raid on the giant cedars of the Incomappleux. The Meadow Creek mill holds the licence to log critical intact mountain caribou habitat in Lake Creek. BC Timber Sales is proposing to contract out a strip of forest along Duncan Lake. And miners could get a permit to drive a road pretty much anywhere they like, just speculating to raise money on the stock exchange. These interests have already done immense damage to our environment, and now another tier of environmental exploitation — private power projects for the export of power to the U.S. — loom on the horizon.

Alternatively, the governments of BC, or of Canada, could take this opportunity to implement the BC Auditor General's recommendations on connecting our parks to protect biodiversity. This park proposal represents the work of numerous people who have donated the field studies, mapping and research to present to the government a scientifically sound way to do this. Many generous public-spirited foundations and individuals have contributed to the effort. It is now up to the governments involved.

## APPENDIX AND REFERENCES

### A Sample of the Incomappleux Lichens and Plants

<i>Bacidina contecta</i>	lichen, new to science
<i>Biatora ligni-mollis</i>	lichen, new to science
<i>Pertusaria diluta</i>	lichen, new to science
<i>Nephroma occultum</i> Cryptic Paw Lichen	COSEWIC species of concern; not previously known south of the Adams River
<i>Spilonemella americana</i>	Oceanic lichen, rare inland
<i>Pilophorus acicularis</i>	Oceanic lichen - only three localities in inland North America
<i>P. clavatus</i>	Rare oceanic lichen, only 3 other locations inland
<i>Lobaria retigera</i>	Lichen, Rare inland, new to the Kootenays
<i>Myochroidea minutula</i>	Lichen, found nowhere else in the world but in the upper Incomappleux
<i>Botrychium montanum</i> (Mountain moonwort)	RED-LISTED, primitive fern, found primarily in old-growth cedar-hemlock
<i>Hookeria lucens</i>	Coastal moss found inland in only 2 other locations

### Boyd Creek Canyon and Wetland Section of Park Proposal

<i>Loxosporopsis coralifera</i>	Lichen, very rare inland
<i>Liparis loeselii</i> (Loesel's Twayblade)	RED-LISTED, one of the rarest orchids in Canada
<i>Urticularia ochroleuca</i> (Ochroleucous Bladderwort)	RED-LISTED, insect-eating plant
<i>Eleocharis rostellata</i> (Beaked spikerush)	BLUE-LISTED, in marsh

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### Parks Nearest to the Selkirk Mountain Caribou Park Proposal

Park	Total Area (ha.)	ICHvk1	ICHwk1	ICHm, d	ESSF	ESSFp	IMA (alpine tundra)
Purcell Wilderness Cons.	202,709	0	0	18,565	105,218	45,127	25,593
Goat Range Prov. Park	78,627	0	10,675	6,060	37,797	18,097	6,233
Glacier National Park	135,269	4,323	20,940	1,230	61,015	21,782	26,507
Bugaboo Prov. Park	13,646	0	0	0	6,857	6,867	4,438
Total	430,252	4,323	31,615	25,855	210,887	91,873	62,772
Proposed Selkirk Mtn Caribou Park	156,461	9,633	18,323	11,683	104,857	27,951	11,965

Sources: The BCG figures came from the government data file "BECvar\_by\_PA\_2010". This table did not list the total size of the parks; we used a different government data source for that, so there is a slight variation between park size and total BCG zones, excepting Bugaboo, where the BCG zones are 4,500 hectares larger than the park size. 8,100 hectares of Montane Spruce in the Purcell Conservancy are not shown in the table, but are reflected in total park size. The government file did not list Mount Revelstoke National Park. Information from the park staff shows that it is 26,303 ha. in size with 7,777 ha. of ICH (not broken down by type),

### Old-growth in the Park Proposal by Biogeoclimatic Zone

Unit	Total ha	ICHvk OG	ICHwk OG	ICHvk+wk OG	ICH OG	ESSF OG	IMA/ESSFp	Clearcuts
Howser	8,964	0	266	0	266	3,830	1,009	521
Upper Dun	16,719	0	1,043	1,043	1,043	4,188	2,078	279
East/Geig	26,385	0	983	983	1,283	2,277	8,789	156
Healy/Lake	39,452	0	1,719	1,719	3,491	5,398	8,501	376
Westfall	16,415	0	948	948	948	3,498	4,101	450
Mid Dun	13,074	0	1,782	1,782	1,908	1,749	1,591	704
Incmlpx	27,362	2,997	0	2,997	2,997	2,749	11,824	54
Boyd Conn	8,090	1,301	112	1,413	1,413	971	087	620
Total	156,461	4,298	6,853	10,885	13,349	24,660	39,980	3,160

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