

# Conservation Values of the Proposed Selkirk Mountain Caribou Park



Jim Lawrence

**On the urgent need to fully protect the last remnants  
of a priceless natural heritage in the Central Selkirk Mountains,  
including some of the rarest stands of inland temperate rainforest  
and some of the best habitat for a herd of 85 endangered mountain caribou**

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***“We are so damaging the habitats in which other species live that we are driving them to extinction, the only truly irreversible consequence of our environmental assaults, at a rate that is hundreds or perhaps even thousands of times greater than natural background rates ....***

***Ultimately, our behaviour is the result of a fundamental failure to recognize that human beings are an inseparable part of Nature and that we cannot damage it severely without severely damaging ourselves.”***

***“Biodiversity: Its Importance to Human Health”  
Center for Health and Global Environment  
Harvard Medical School***

***“Despite its declared intentions and clear vision to conserve the ecological integrity in British Columbia’s parks and protected areas, the Ministry of Environment is not successfully meeting this goal. Specifically ... the parks and protected area system has not been designed to ensure ecological integrity ... 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.”***

***“Conservation of Ecological Integrity in  
B.C. Parks and Protected Areas”  
Office of the Auditor General,  
British Columbia, August 2010***



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 and others. In about 2006, VWS presented a refined proposal at meetings with the Species at Risk Coordination Office during the mountain caribou recovery process. After that process was complete, the Society assessed the benefits and the shortcomings of the newly created Ungulate Winter Range (UWR), resulting in this amended proposal.

This proposal was designed by director and forest technician Craig Pettitt and director and bear biologist Wayne McCrory. It is based upon their very extensive field work in this area, as well as the wilderness explorations of Gary Diers of the Purcell Alliance for Wilderness and his partner, Inanna.

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 park proposal is based upon information provided by the following scientists and technical experts who, while being in part commissioned by VWS, donated hundreds of hours of work to contribute state-of-the-art science and GIS mapping: Mathematician Baden Cross of Applied Conservation GIS; Dr. Lance Craighead of the Craighead Envi-

ronmental Research Institute; Lichen researcher Toby Spribille from Graz University in Austria, and BC lichenologists Curtis Björk and Trevor Goward.

Mushroom specialist Dr. Oluna Ceska and Dr. Adolf Ceska, the former head of BC's Conservation Data Centre volunteered their labour, travelling to the Incomappleux and conducting the first mushroom survey there.

In 1998 Dr. James Bergdahl of the Pacific Northwest Biodiversity Centre produced a large report on bull trout in the Upper Columbia Basin for VWS. In 2009 Dr. Lee Harding, a retired Environment Canada biologist and author on biodiversity, provided VWS with updated information on fish in the park proposal.

Eminent wildlife photographer and local naturalist Jim Lawrence donated the mountain caribou photographs for this report. Professional photographers Mari Omori and Allan Watson of Findhorn also contributed photographs.

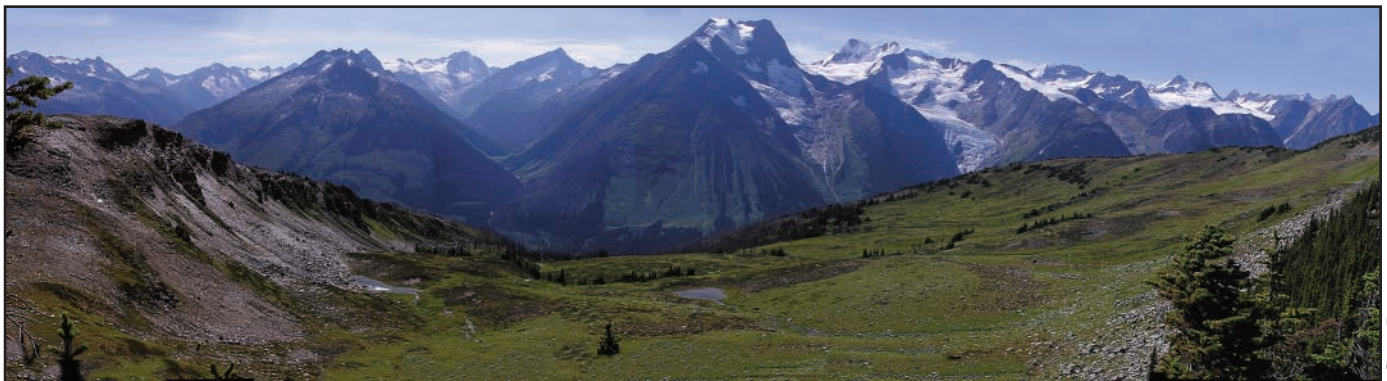
Gary Diers and his partner Inanna penetrated the untracked wilderness of the interior of the park proposal and brought back field information and photographs.

No one could have had access to the Incomappleux for the last several years without volunteer labour of the most arduous kind by director Craig Pettitt, Hank Hastings, Suzie O'Donnell, Tim Sanders, Tom Perry, Rob Farrell, Mari Omori and Brian Leong, who collectively repaired the road after numerous washouts.

This proposal is supported by the Applied Ecological Stewardship Council of BC, Conservation Biology Center, Purcell Alliance for Wilderness, Save-the-Cedar League, and Wilderness Committee.

## THE INTERIOR WETBELT

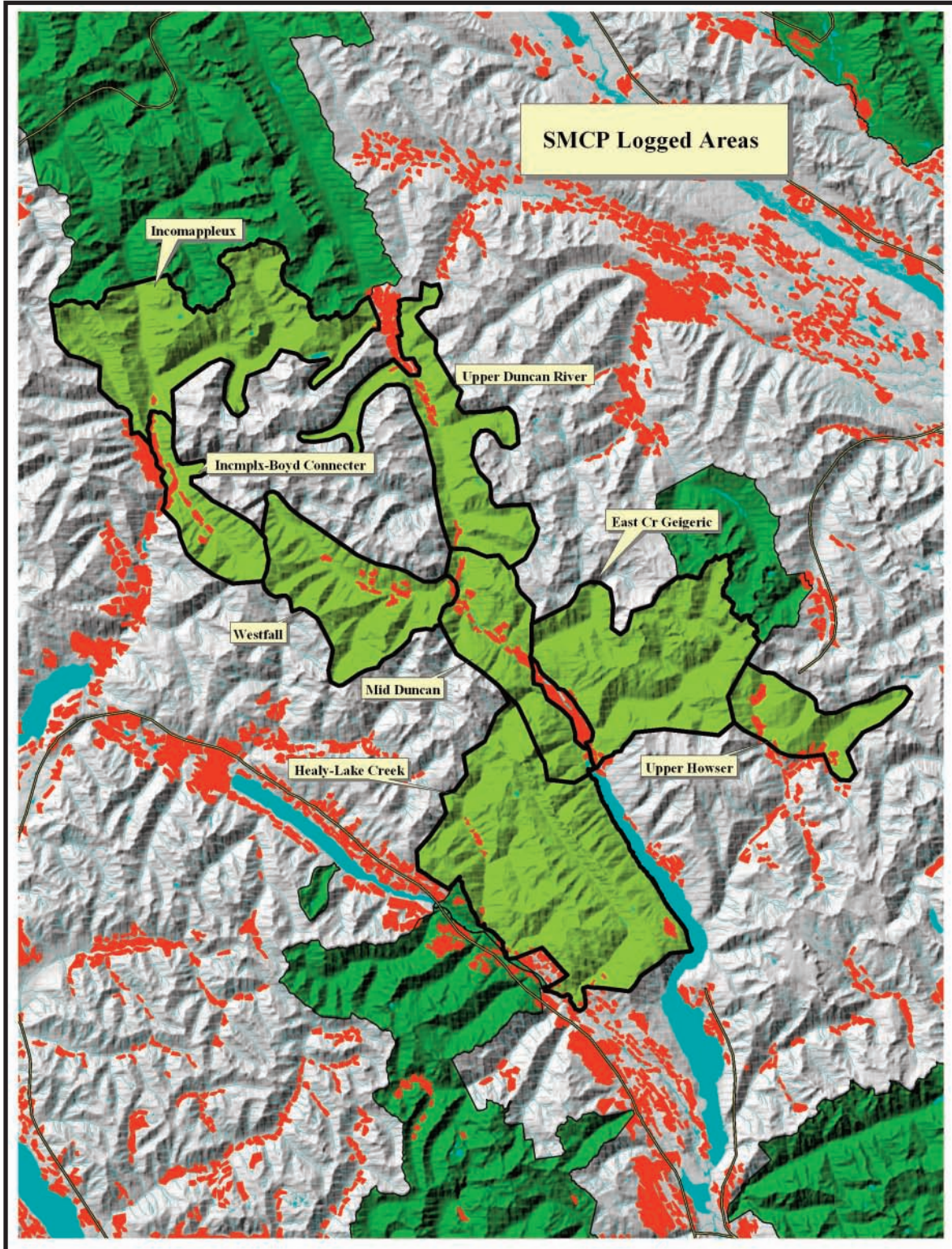
The proposed Selkirk Mountain Caribou Park is located in southeastern BC, in a region called the “Interior Wetbelt.” The Interior Wetbelt has the world’s only Inland Temperate Rainforest and 98% of the world’s only mountain caribou. The wetbelt is formed by the Columbia Mountains, and the park proposal is in the central Selkirk Range of those mountains. The Selkirk Mountains are steep and rugged, with vast areas of glaciated peaks and lush cedar-hemlock rainforest in the valley-bottoms.







Gary Diers

From the flat-topped summit at the centre of the mountains, to the right lies Glacier National Park. To the left of the summit lies the Selkirk Mountain Caribou Park Proposal. It includes some mountain passes for wildlife travel, but large areas of rock and ice have been excluded.

# 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

## EXECUTIVE SUMMARY

In a recent book published by Harvard Medical School, 100 leading scientists warn that the current rate of extinctions of species is a threat to human survival equal to, if not greater than, climate change. In a 2010 report, BC's Auditor General warns that BC's park system is not protecting biodiversity because many parks are not large enough or connected enough. BC has special responsibility because it is one of the last refuges for many large species of wildlife. Several scientific studies in British Columbia state that 40-55% of BC's wildlands must be protected to maintain large wildlife species such as grizzly bears.

In the North and Central Selkirk Mountains of BC, the endangered mountain caribou lives on the edge of extinction, with only about 1,850 animals in existence. These mountains have some large parks, but there are long distances between them. The parks mostly protect the upper slopes of the mountains. This has allowed most of the lower slopes and valley-bottoms to be logged. Although rivers run through these valleys, there is extremely little protection for riverine habitats and their fish.

The Central Selkirk mountain caribou often range outside of parks because they need the unprotected low- and mid-elevation forest to survive. These mountain valleys had the most southerly large tracts of Inland Temperate Rain-



Mari Omori

**The Upper Incomappleux Valley has an extensive stand of trees up to four metres in diameter. They have been conservatively aged at 1,800 years old.**

forest in existence. Some forests had been growing uninterrupted since the last Ice Age before they were logged. They are now almost all gone, but *there are key remnants of this precious natural heritage living today — unprotected.*

These forests have been found to harbour hundreds of species of lichens — some of them never before known to science — as well as rare mushrooms and plants. Scientists believe that the great age of these forests has allowed a vast, living network of smaller organisms to develop, for which there may be very few other examples in BC or in the world.

There is nothing like this proposal's upper Incomappleux Valley in any park in the Interior of BC. It is a rare gem for BC's or Canada's park system. But protecting only rare gems is annihilating BC's wildlife, because it leaves large gaps between parks. Recently the BC government set aside much forest outside of parks for caribou, but it is not completely protected and is subject to ongoing fragmentation that is deadly to caribou and will eventually make our existing parks "islands of extinction." That's why this park proposal shows how to connect three parks to create a protected-area complex similar to the Great Bear Rainforest or the Rocky Mountain parks.

The remnant old-growth in this park proposal remains standing after 50 years of logging because it is in areas that have been too expensive to log, due to its remoteness or steep slopes blocking the entrance to valleys. If conditions for profitability change, these rare ecosystems can be destroyed at any time. The loss of species will be forever.



Jim Lawrence

*At risk of disappearing from the Earth forever: mountain caribou*

## SUMMARY OF CONSERVATION VALUES OF THE PARK PROPOSAL

- Total hectares: 156,461 hectares.
- Approximately half of the park proposal is already partially protected as caribou Ungulate Winter Range.

### FORESTS

- Total old-growth forest: 37,792 hectares, both cedar-hemlock and spruce-balsam, comprising 24% of the park proposal.
- 13,349 hectares of the old-growth is cedar-hemlock forest with trees commonly 300-500 years old. Includes very rare, antique, “very wet” rainforest (ICHvk) and rare, ancient “wet” rainforest (ICHwk). Largest trees up to 4 metres in diameter and 1,800 years old.
- These forests comprise one of the major hotspots for lichen diversity in the Interior Wetbelt. Researchers have also documented rare plants and mushrooms.
- A major wetland with red- and blue-listed plants.

### RIVERS

- Incomappleux River — Two-thirds of the river length is heavily logged, leaving 17 kilometres of the upper valley intact, with a fully intact major tributary, Battlebrook Creek. The most southerly large, intact area of very wet rainforest in the Interior. The river is the second most important spawning and rearing grounds of bull trout in the Arrow Lakes Reservoir.
- Westfall River — Half logged, the Westfall River proved uneconomical to log and has already been designated as “no logging” under the Mountain Caribou Recovery Plan. One of the primary spawning grounds of blue-listed bull trout in the Kootenay Lake fishery.
- Duncan River — Heavily logged, but has important tracts of old-growth Inland Temperate Rainforest with giant cedars. Primary spawning habitat for the Kootenay Lake bull trout fishery. Already been designated as “no-logging” for caribou. Includes two intact tributaries, East and Giegerich Creeks, and the nearly intact Houston Creek.

### WILDLIFE

- Habitat for 85-90 red-listed (endangered) mountain caribou.
- Full range of native large carnivores: grizzly bears, black bears, cougars, wolves, wolverines, lynx, bobcat.
- Core habitat for blue-listed grizzly bears and wolverines.



Craig Pettitt

Antique, “very wet” Inland Temperate Rainforest in the Upper Incomappleux Valley of the park proposal is the rarest kind of Inland Temperate Rainforest.

### RECREATION

- Stunning scenery, untracked wilderness, wildlife viewing, fishing, plus the potential for a few judiciously placed old-growth interpretive trails.

The forests in this park proposal are all dense, humid, high biomass forests of critical importance in removing carbon from the air and storing it. The densities of carbon stored in old-growth forests of the Pacific Northwest are higher than those reported for any other type of vegetation, anywhere in the world (Harmon 2002). Densities in the BC Interior forests are thought to be second only to coastal forest in BC (Hebda 2008). Studies have proven that old-growth forests continue absorbing carbon and that the greatest amount is in their soil, which is released into the air during and after logging. Many scientists are now pleading with governments to protect old-growth forests to help alleviate climate change.

## SPECIES AND ECOSYSTEMS AT RISK IN THE PARK PROPOSAL

### Mountain Caribou: Red-Listed Means Close to Extinction

Mountain caribou herds all around the Central Selkirk herd are being wiped out. There are only 37 in the South Selkirks and 20 in the South Purcells. To the northwest, the Columbia South herd went from an estimated 121 animals in 1994, to 38 in 2004, to 13 in 2009. To the east, the Monashee herd is almost gone. These herds live in landscapes that are extremely fragmented by roads and clearcuts.

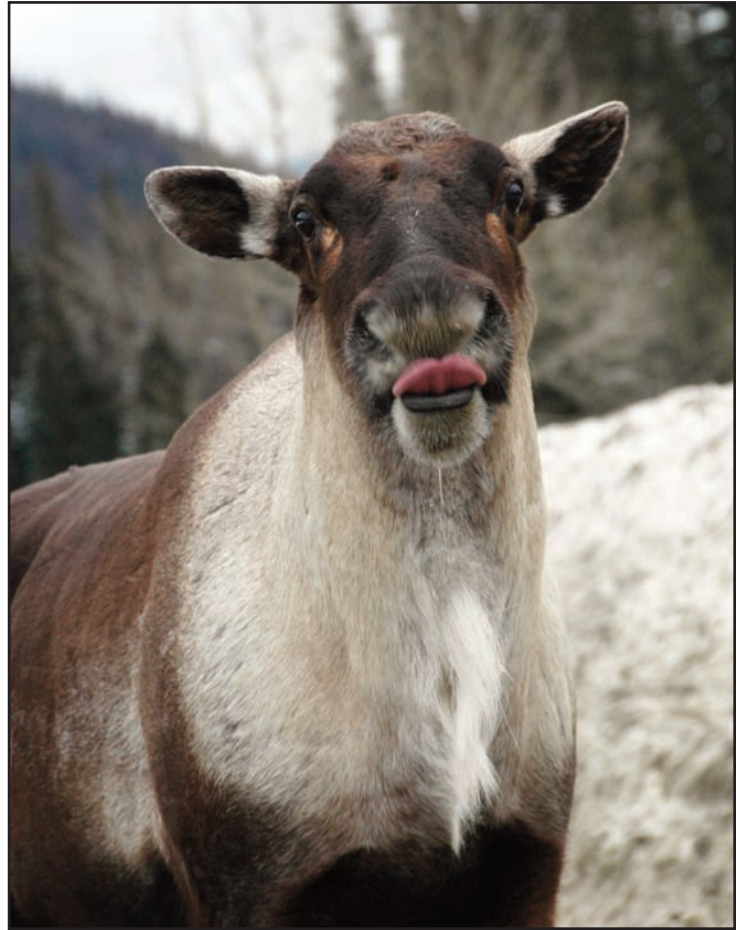
The Central Selkirk mountain caribou herd in this park proposal was estimated at 211 in 1996. By 2002 it was down to 97. The estimate is now about 85-90 animals. It is more endangered than herds to the far north in the Cariboo Mountains and Robson Valley, but less endangered than its immediate neighbours. And it has more habitat left to protect than its neighbors. A large part of its habitat is in the park proposal presented here.

### Other Species-at-Risk

- **RED-LISTED PLANTS:** Loesel's Twayblade, Ochreous Bladderwort, Mountain Moonwort;
- **BLUE-LISTED WILDLIFE:** Grizzly Bear, Wolverine, Bull Trout, Great Blue Heron.
- **SPECIES OF CONCERN:** Cryptic Paw Lichen, *Nephroma occultum*.
- **LICHENS:** Hundreds of species of lichens have been found in the park proposal. Many of them are particular to rainforest ecosystems and are rare in the Interior of BC. They are vulnerable to being wiped out by logging.
- These are only the species that we know about. There has been relatively little scientific assessment.

**One species loss can cause the loss of numerous other species, and when enough species disappear, ecosystems collapse. This is why scientists around the world have declared the present massive species loss a threat to human life. They are urging the public and government to do everything possible to save species from extinction.**

Consider the case of bats, which are rapidly headed for extinction. Scientists are alarmed because the million bats



Jim Lawrence

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

already lost would have eaten nearly 700 tons of insects in one year. That's great for the insects, but very bad for the plants they eat, including our crops and forests. Seven species of bats are in danger, including the Little Brown Bat in this park proposal.

### Endangered Ecosystems

Nature teaches that the greatest range of variation gives life systems the greatest stability and chance to survive stresses and catastrophes. BC has already suffered a catastrophe with the loss of over 9 million hectares of dry pine forests killed by the mountain pine beetle. Fortunately, we have forest types that aren't affected by the beetle, and because of that BC still has some healthy forests left. But some of our other forest types are becoming rare, including the ancient Inland Temperate Rainforest, (ICH vk and wk) in this park proposal.

## HOLES IN THE MOUNTAIN CARIBOU RECOVERY PLAN



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

As part of its Mountain Caribou Recovery Plan, in 2009 the BC Government designated 197,126 hectares of the Central Selkirks as no-logging Ungulate Winter Range (UWR). Only 16,676 hectares of that, or 8.4% of it, was commercial forest (“Timber Harvesting Land Base”).

Maintaining the UWR is extremely important to this proposal. Where UWR and proposed park overlap, the UWR would be upgraded to park status. About half of the park proposal is already UWR. Approximately 1/4 to 1/3 of the UWR is in the park proposal. A conservation complex like this would be similar to the Great Bear Rainforest combination of fully and partially protected land.

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

In the Central Selkirks, the Mountain Caribou Plan was a step forward in conservation of mountain caribou, but it has the following holes:

### **The UWR does not have full protection**

The UWR is a “no-logging” zone, but it does not protect against mining, hydro, or tourism development. These developments would make maintaining the caribou impossible. The UWR would not protect the caribou from a mega-tourism development such as the Jumbo Resort, nor from the new or reopened mining exploration road. It would not protect them from huge clearcuts to run hydro lines from Independent Power Projects (IPPs).

### **There are significant exclusions within the UWR**

Holes that are not visible on the map above have been left around key stands of old-growth cedar-hemlock forest on Lake Creek, Duncan Lake and the Lardeau River. These are valley-bottom locations that could be critical spring and early winter habitat for caribou.

### **The protection is not permanent**

There have already been changes in the UWR in which high quality old-growth forest was given back to the logging companies and replaced with low-quality forest. And the government has said that if the mountain caribou do not increase, it would consider returning all the UWR to the timber industry for logging. This would be taken away from all the other species that need it.

### **The UWR is single-species protection**

For instance, because the UWR does not protect from hydro development, it leaves the fisheries, including vulnerable bull trout, unprotected. Because mountain caribou have not been seen in the Upper Incomappleux in recent years, the UWR did not cover the Incomappleux at all. A large amount of high elevation habitat was protected, while excluding the Central Selkirks’ largest and oldest trees. Hundreds of species of lichens in these forests are totally unprotected at the present time.

## CONNECTING EXISTING PARKS

**“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

GLACIER NATIONAL PARK was created in 1900. It consists mostly of spectacular peaks, massive glaciers, and alpine or subalpine meadows. About 80% of the park is 1,400 metres or higher. Nevertheless, it protects 26,000 hectares of Inland Temperate Rainforest, especially in the wildlife-rich Beaver Valley.

GOAT RANGE PROVINCIAL PARK - In 1994, the BC government created the Goat Range Provincial Park. Some of the best caribou habitat in the Central Selkirks was in the proposal, but was rejected and logged. About 78% of the park is 1,400 m or higher. The park does protect 10,100 hectares of Inland Temperate Rainforest (ICH wk), including the most southerly valleys with large, intact stands of ICHwk in existence.

BUGABOO PROVINCIAL PARK is largely rock, ice and alpine meadows.

Four rivers lie between these two parks. The Incomappleux and the Duncan, have their source in glaciers in the national park. The Battle Range just outside the Glacier Park boundary gives rise to a third river, the Westfall.

A fourth, the Lardeau, flows southward from Trout Lake to Kootenay Lake.

By far the highest biodiversity in these mountains is found along the rivers. They have almost no protection. Glacier National Park includes about 18 kilometres of the Incomappleux River, but for most of this upper reach, massive avalanches have wiped out the forest. About 15 kilometres of the Lardeau River, with mostly second-growth forest, are in the Goat Range Park. But what has been protected is miniscule compared to a massive area of prime ancient rainforest that has been logged in rivers and tributary valleys in the north and central Selkirks: the Akolkolex, Halfway, and Lardeau Rivers, and Kuskanax Creek have had their valley bottoms and low- to mid-elevation slopes stripped bare. Two-thirds of the length of the Incomappleux and much of the Duncan and Westfall River Valleys were reduced to stumps.

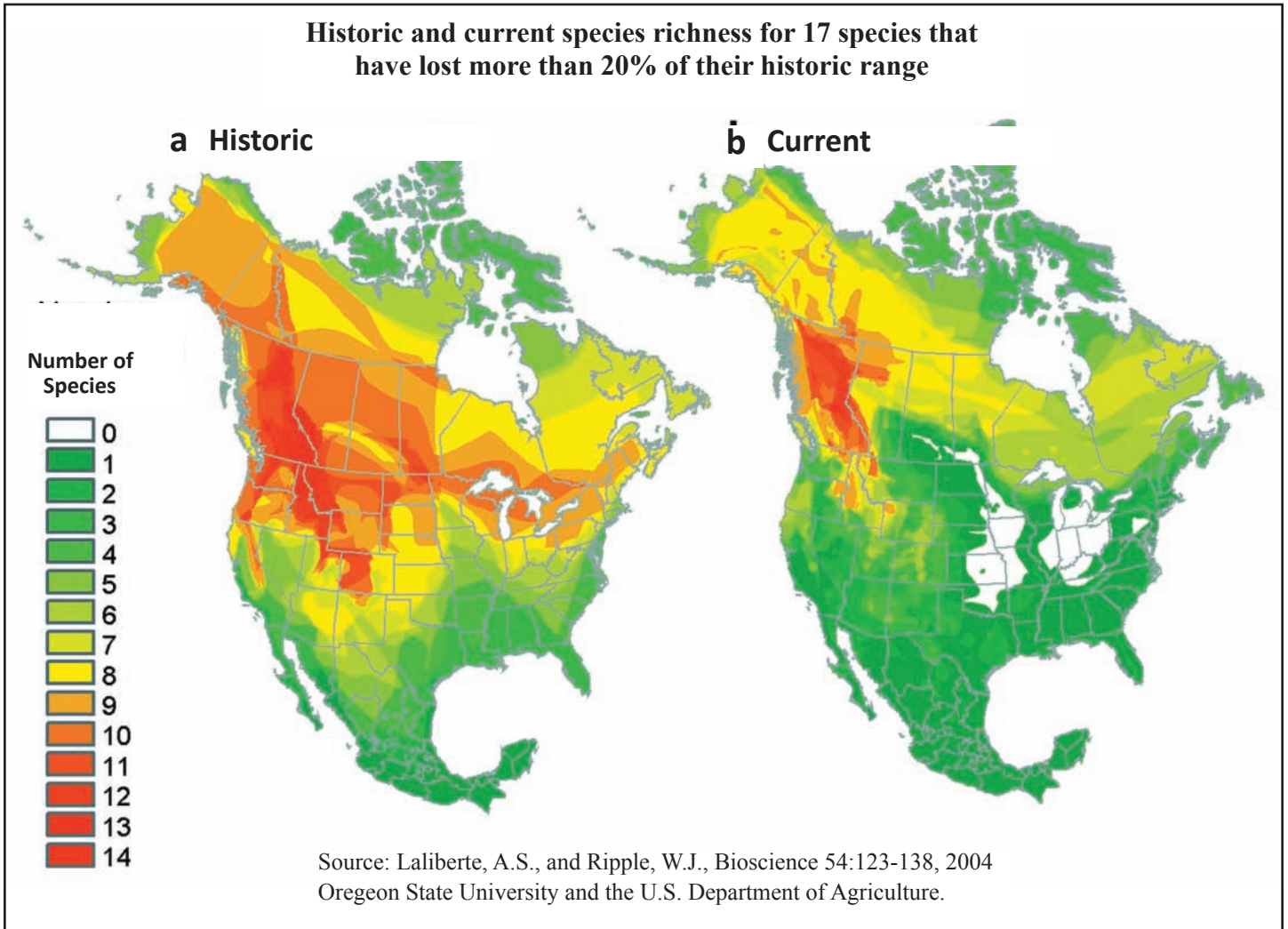
There is increasing scientific recognition of the importance of recovering connectivity between core wildlife habitats. In particular, the massive clearcutting in this park proposal includes the very wet subzone of Interior Cedar-Hemlock in the Incomappleux, and includes about 1,000 hectares of old-growth adjoining a very major wetland with red- and blue-listed species. A critical wildlife travel corridor between the Duncan River and the Beaver Valley in Glacier National Park was also massively clearcut.

As a result, significant segments of the rivers, with over 3,000 hectares of clearcuts, have been included in this park proposal. We have called these areas “recovery linkage zones.”



The lower two-thirds of the Incomappleux River have suffered massive clearcutting. The whole valley-bottom should be dark green, 2,000-year-old cedar-hemlock forest. The snow reveals roads and clearcuts. The forested slope on the right is too steep to economically log. The ancient forest begins on the mountain in the background.

## BC: THE LAST REFUGE FOR MANY LARGE WILDLIFE SPECIES



### Range Contractions of 17 Large Wildlife Species

Another word for range contractions is what scientists term “extirpation.” It means that species gradually disappear across their range until they have been completely annihilated. Researchers 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.

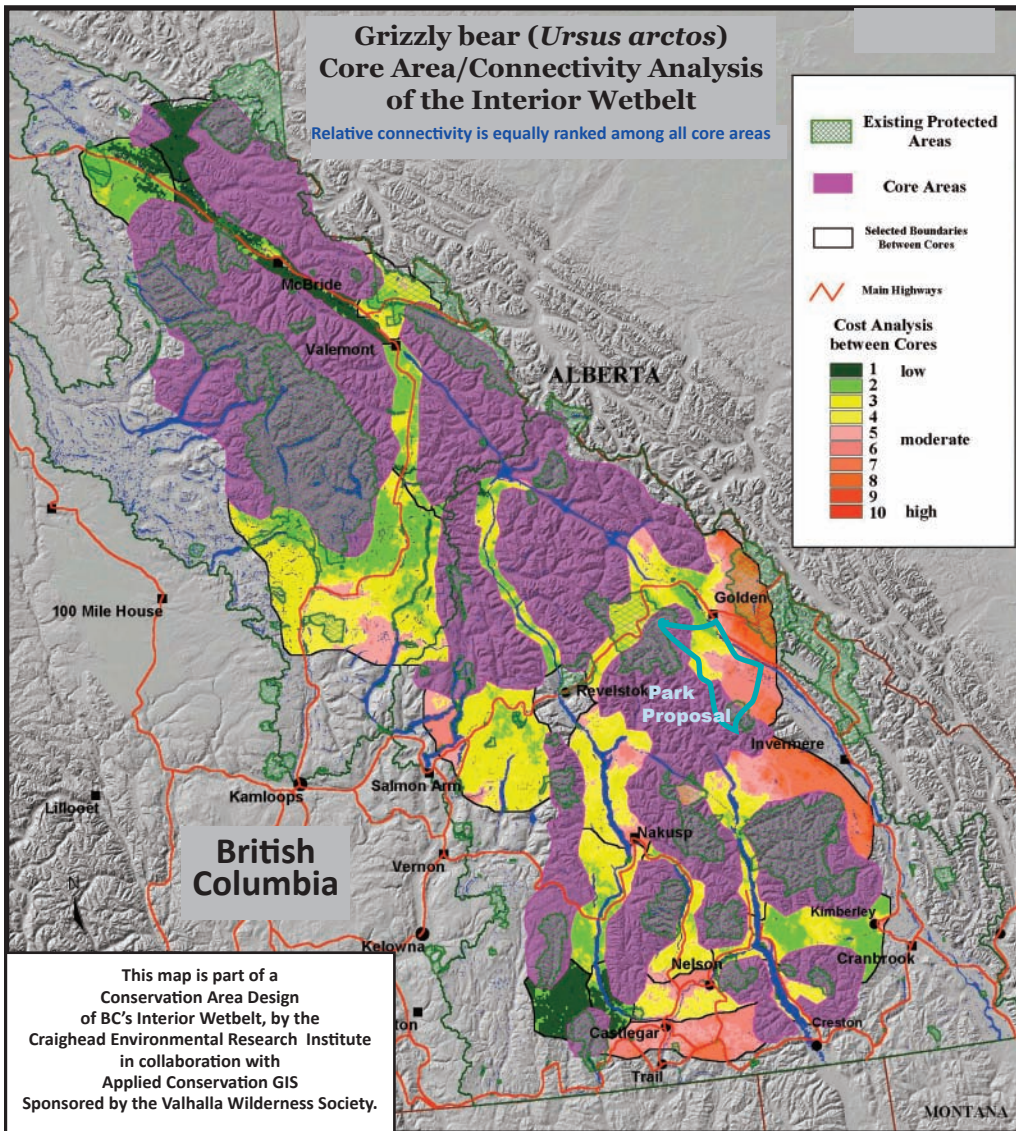
#### RANGE CONTRACTIONS OF SPECIES IN THE SELKIRK MOUNTAIN CARIBOU PARK PROPOSAL

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

\* Occurrence within the park proposal is potential but unknown

## PARK PROPOSAL IS IN SHRINKING CORE GRIZZLY BEAR 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.

The map also shows that the core habitat areas become smaller, 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. The maintenance of habitat connectivity down the spine of the Selkirks into the U.S. is believed to be critical to the continued existence of grizzly bears across the border.

The Central Selkirk area is a place where preservation is urgently needed to help stem the range shrinkage of grizzly bears, which have lost 53% of their historic range.

Only small areas of core grizzly bear habitat remain in the southern Selkirk and Purcell Mountains near the U.S. border. The number of grizzlies there is far below the carrying capacity of the habitat (Proctor et al., 2005). 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 in the alpine from ATVs, backcountry lodges, and mega tourism development such as the Jumbo Glacier Resort.

There is even less core habitat for wolverines in the southern and central mountains. But sightings or tracks in or around the park proposal are recorded in data from caribou censuses, in the records of Glacier National Park, and in sightings by local people. Wolverines are under significant threat from commercial trapping, habitat loss and disturbances to winter birthing and rearing dens in the high country from heli-skiing and snowmobiling. In late winter, female wolverines dig down into the snow in boulder fields or log piles and give birth to their young (natal dens). They then have to leave their young in similar denning areas called maternity dens and travel over broad areas to find carrion or other food. They are very sensitive to any type of disturbance and will try to move their young to a new area that is not disturbed.

## GAPS IN PROTECTION: EXISTING PARKS

### Insufficient Area Protected

Today 14% of BC is in parks and protected areas. This amount has put many species on the road to extinction. Targets are not meant to last on and on even after it's clear they do not work. Recent scientific studies suggest how much protection may be needed to maintain BC's large wildlife populations:

- In 2001 a 17-member science panel funded by government, industry and environmental NGOs said that at least 44% of the Great Bear Rainforest must be fully protected to maintain sensitive species such as grizzly bears.
- In 2003 the BC government and First Nations gave full protection to 28% of the Great Bear Rainforest; partial protection to 5%, and the rest was to have an ecosystem-based management plan.
- A Conservation Area Design for the Inland Rainforest Region (equivalent to the Interior Wetbelt) by the respected Craighead Environmental Research Institute showed a result similar to that found by the coastal science panel. It said that 55% should be fully protected, and another 30% in conservation zones for biodiversity, to maintain the large carnivores, mountain caribou and salmon.
- Recent map analysis by Baden Cross of Applied Conservation GIS shows that only 17% of the land base of the Interior Wetbelt has been protected.

### The Elevation Gap

In the steep, glaciated mountains of the Selkirk Range, it has been convenient to put parks mostly at high elevation and log the low and middle elevations where the forest is most profitable. But higher elevations are cold and covered by snow much of the year. Even the animals that live there in winter cannot stay there all year. This practice is slowly annihilating our wildlife.

In these mountains, low and middle elevation means Interior Cedar-Hemlock (ICH) forest. Upper middle to high elevation means Engelmann Spruce-Subalpine Fir (ESSF) forest. The transition between these forest types is an indicator of a key shift in climate, ecology and biodiversity. This shift occurs at approximately 1,400 metres.

As ESSF forests increase in elevation, they become "ESSF Parkland." Much of the Parkland is not forest at all, but clumps of trees scattered in subalpine meadows. This is of no value to logging companies.

The lush, wet ICH with very high biodiversity known as Inland Temperate Rainforest occurs below 1,000 metres. The Goat Range and Glacier Parks have no habitat lower than 800 metres. But this park proposal goes as low as 600 metres and contains the only intact, ancient forest this low that is known to exist in the Selkirks or adjacent mountains. Scientific surveys show that many more species of lichens are present at this lower elevation than in nearby parks.



Craig Pettit

A totally intact tributary of the Incomappleux River, Battlebrook, rushes to its confluence with the river at 650 metres within the Selkirk Mountain Caribou Park Proposal.

### High Elevation of Existing Parks

Altogether, the four closest parks to this park proposal — Glacier National Park, Goat Range and Bugaboo Provincial Parks and the Purcell Wilderness Conservancy — are:

- 85.5% ESSF forest or higher;
- 21.35% ESSF Parkland;
- 15% tundra (mostly treeless)
- 12.2% ICH;
- 6.15% wet and very wet ICH (Inland Temperate Rainforest.)

## GAPS IN PROTECTION: CEDAR-HEMLOCK FOREST

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, they 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 snowpack in the high country to support them so they can reach lichens high in the trees.

Grizzly bears also come down from the mountains to seek early greens in spring, and again in autumn to feed on the earliest ripening berries and to fish the kokanee runs.

Some wolverines come down to the valley-bottom cedar-hemlock forest in winter. Scientists believe they may be scavenging for dead ungulates. The wolverine shown below was a regular visitor to a forested area near Trout Lake, a short distance from this park proposal, until the forest was logged.

These animals have lost habitat on a massive scale and they are either red-listed or blue-listed. The best description of the habitat they have lost is Timber Harvesting Land Base, which is low- and mid-elevation cedar-hemlock forest on gentle slopes needed by wildlife for low-energy travel.

Even deer and elk need low-elevation old-growth forest in winter, when the heavy canopies of the old-growth intercept snow, making it easier to get around and find food.



Jim Lawrence

*Core wolverine habitat is uncommon in the southern interior; but this park proposal has a large block of it. This photograph was taken near the Lardeau River.*



**Mountain caribou use all elevations of their range. They are dependent upon intact old-growth forest 140 years or older. GIS maps show that the overwhelming majority of logging in the Central Selkirks has been in the cedar-hemlock zone. It is the massive clearcutting in this zone that threatens the existence of this unique animal and flagship species of the Interior Wetbelt. Cedar-hemlock is the spring and early winter habitat of the mountain caribou. The plight of the mountain caribou is representative of that of many other species.**



Craig Pettitt

**Like mountain caribou, the grizzly bears and wolverines are well adapted to cold weather at high elevations. But in some seasons, lower elevations are the only place or the best place to find food. For grizzly bears, this means early greens in spring, the summer's first berries, and kokanee salmon in fall. Many more species live at lower elevations than at higher elevations.**

## Inadequate Protection of Inland Temperate Rainforest



Craig Pettitt

These photos of antique “very wet” Inland Rainforest were taken in the upper Incomappleux Valley within the proposal.



Allan Watson

Heavy loads of moss and lichens hang from the very wet rainforest — upper Incomappleux Valley.



Craig Pettitt

Lung Lichen: *Lobaria pulmonaria*

**“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 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 Inland Temperate Rainforest

- Inland temperate rainforest is Interior Cedar-Hemlock (ICH). ICH is classified as dry, moist, wet or very wet.
- In BC only the “wet” and “very wet” (ICH wk and vk) types are referred to as 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.
- Inland temperate rainforest hosts many coastal species that do not otherwise occur inland, but it has a unique ecology. A large part of its precipitation falls as snow, and its flora consists of both coastal and boreal species.
- “In 2001, using information provided by BC Conservation Data Centre’s website for the Arrow, Clearwater, Columbia, Horsefly, Kootenay and Robson Forest districts, we determined 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)
- These forests support one of richest floras of tree lichens in the world. 283 lichen species have been identified in the Incomappleux Valley alone.
- Old-growth temperate forests sequester high amounts of carbon, and continue doing so as they grow older. After logging, the carbon is released into the atmosphere for years, especially from soil disturbance.
- The dry and moist ICH do not have the same antiquity, due to more frequent fires; but 300-year-old trees are not uncommon in the old growth. They are also dense, humid, high-biomass forests of critical importance to biodiversity and climate stability. Some scientists consider all of the ICH to be Inland Temperate Rainforest.

**The Inland Temperate Rainforest Region is the name of the Valhalla Wilderness Society's project area for GIS mapping. It is approximately equivalent to the Interior Wetbelt and the historical range of the mountain caribou.**

Inland Rainforest Region (IRR) land base	14.31 million hectares (ha)
Parks in the IRR	2.44 million ha, or 17% of the land base
Interior Cedar Hemlock (ICH) in the IRR	3.44 million ha, or 24% of the IRR
ICH of all kinds in parks of the IRR	426,671 ha = 12.4% of the ICH
ICH wk in the parks	263, 376 ha = 20.5% of the wet ICH
ICHvk in parks	51,075 ha = 11.9% of the very wet ICH
% of Inland Rainforest (ICH wet & very wet) in parks	18% of the combined ICH wk and vk

The planning for BC parks aims to capture a certain amount of each biogeoclimatic (BEC) zone, such as ICH, ESSF, etc. But BEC percentages taken alone can be very misleading. They do not tell us whether the forest was once logged or burned, or whether it is on steep slopes unusable by wildlife. Fortunately, government data on these aspects is available. Use of this data shows that:

- **Only about 18% of the cedar-hemlock in the parks is old-growth (140 years or older.)**
- **47% of all Inland Temperate Rainforest (ICHvk, wk) in parks and ecological reserves is on steep slopes 40% or over — unusable by mountain caribou.**

- **Only 36% of the ICH in parks of the Inland Rainforest Region is 1,000 metres or less in elevation.**

*These statistics indicate huge gaps in protection of wildlife habitat and biodiversity that do not show up when we look only at BEC data.*

The data provided here was produced by Baden Cross of Applied Conservation GIS. GIS mapping should be considered an approximation. This analysis used the best data available from the government in 2009. It is based on Parks, Protected Areas and Ecological Reserves over 1,000 hectares within the project area, and includes forest down to 1,000 hectares in size.

### Distribution of Inland Rainforest in Parks

Of all Inland Rainforest protected in parks\*:

- **33% is in one park: Wells Gray Provincial Park. The majority of this forest burned in the 1940s.**
- **62% is in the large Cariboo Mountains park complex: Wells Gray, Cariboo Mountains and Bowron Lakes Provincial Parks.**
- **Most of the rest of the parks with Inland Rainforest are very small fragment parks.**
- **81% of all protected Inland Rainforest is north of Glacier National Park, with 19% in or south of Glacier NP.**
- **Glacier National Park protects 26,000 hectares of Inland Temperate Rainforest. Goat Range Protects 10,100 ha.**
- **Goat Range and Monashee Provincial Parks have 8.8% of all Inland Rainforest in parks. These are the only protected representations of our southernmost Inland Temperate Rainforest of significant size.**

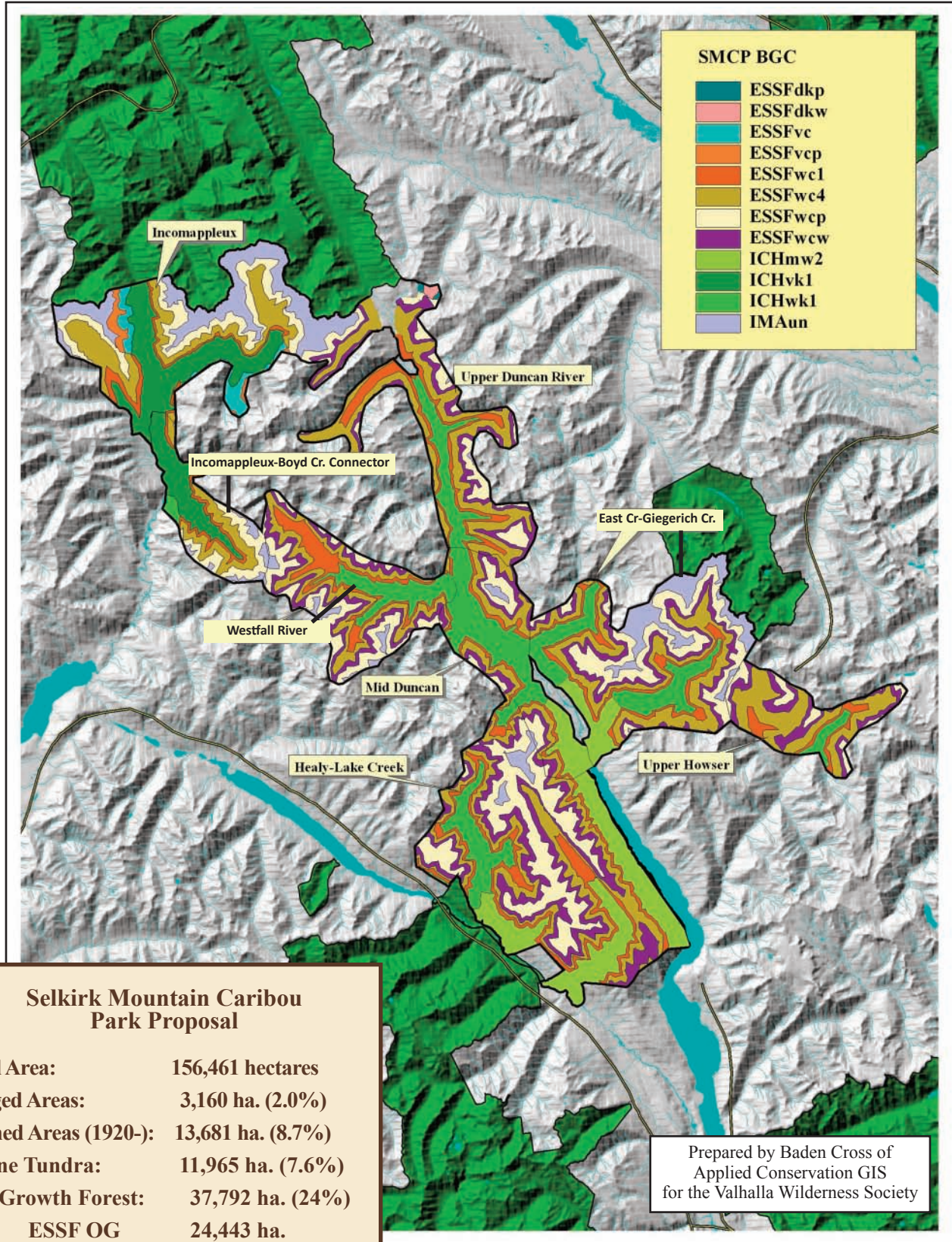
\* "Parks" = full protection, including all parks and protected areas 1,000 hectares or larger in BC.

Inland Rainforest = ICHvk and wk

Based upon BC government 2010 biogeoclimatic data for all parks in BC.

Park	Total Area	ICHvk1	ICHwk1	ICHm, d	ESSF	IMA-ESSFp
Purcell Wilderness Cons.	202,709	0	0	18,565	105,218	25,593
Goat Range Prov. Park	78,627	0	10,675	6,060	37,797	24,330
Glacier National Park	135,269	4,323	20,940	1,230	61,015	48,289
Proposed Selkirk Mtn Caribou Park	156,461	9,633	18,323	11,683	104,857	11,956

Sources: BCG figures for all the parks except the Monashee came from government data file BECvar\_by\_PA\_2010. Park size came from a different source, so there are very minor discrepancies between total BCG hectares and size of park except for Monashee, where there was a radical discrepancy, so consistent data was obtained from a report by Kutenai Nature Investigations. Data for the park proposal is from Baden Cross, Applied Conservation GIS.



**Selkirk Mountain Caribou  
Park Proposal**

<b>Total Area:</b>	<b>156,461 hectares</b>
<b>Logged Areas:</b>	<b>3,160 ha. (2.0%)</b>
<b>Burned Areas (1920-):</b>	<b>13,681 ha. (8.7%)</b>
<b>Alpine Tundra:</b>	<b>11,965 ha. (7.6%)</b>
<b>Old-Growth Forest:</b>	<b>37,792 ha. (24%)</b>
<b>ESSF OG</b>	<b>24,443 ha.</b>
<b>ICH OG</b>	<b>13,349 ha.</b>

ESSF = Englemann Spruce-Subalpine Fir  
 ICH = Interior Cedar-Hemlock (Inland Temp. Rf.)

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

## THE PARK PROPOSAL: UPPER INCOMAPPLEUX/BATTLEBROOK

“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.

“The Incomappleux is unique worldwide in its combination of rainforest and boreal features, over 500 km from the ocean, and harbours a high proportion of species that are globally in decline.”

Toby Spribille, lichen researcher  
University of Graz, Austria

- ◆ Endangered ecosystem: Primeval “very wet” Inland Temperate Rainforest (ICH vk).
- ◆ 27,361 hectares of intact wilderness contiguous to Glacier National Park.
- ◆ Fully intact tributary — Battlebrook.
- ◆ Site of international biodiversity research.
- ◆ One of the highest concentrations of oceanic lichens anywhere in inland BC.
- ◆ Red-listed plants and rare mushrooms.

The trees in this forest are of many sizes and ages, ranging up to four metres in diameter. Tree aging efforts have yielded conservative estimates that the oldest trees may be 1,800 years old.

Because it is contiguous with Glacier National Park, the Incomappleux forest is part of a large, intact, wild ecosystem. But the area of big trees on benches along and above the river is very limited, being contained between the clearcuts downriver and a steep-walled canyon with massive avalanche tracks upriver. Only about 1,500 hectares of the big trees are within the timber industry “operability” line. Yet the visitor can walk amongst these awe-inspiring trees all day long and not come to the end of them.

The logging company that had the Tree Farm Licence,

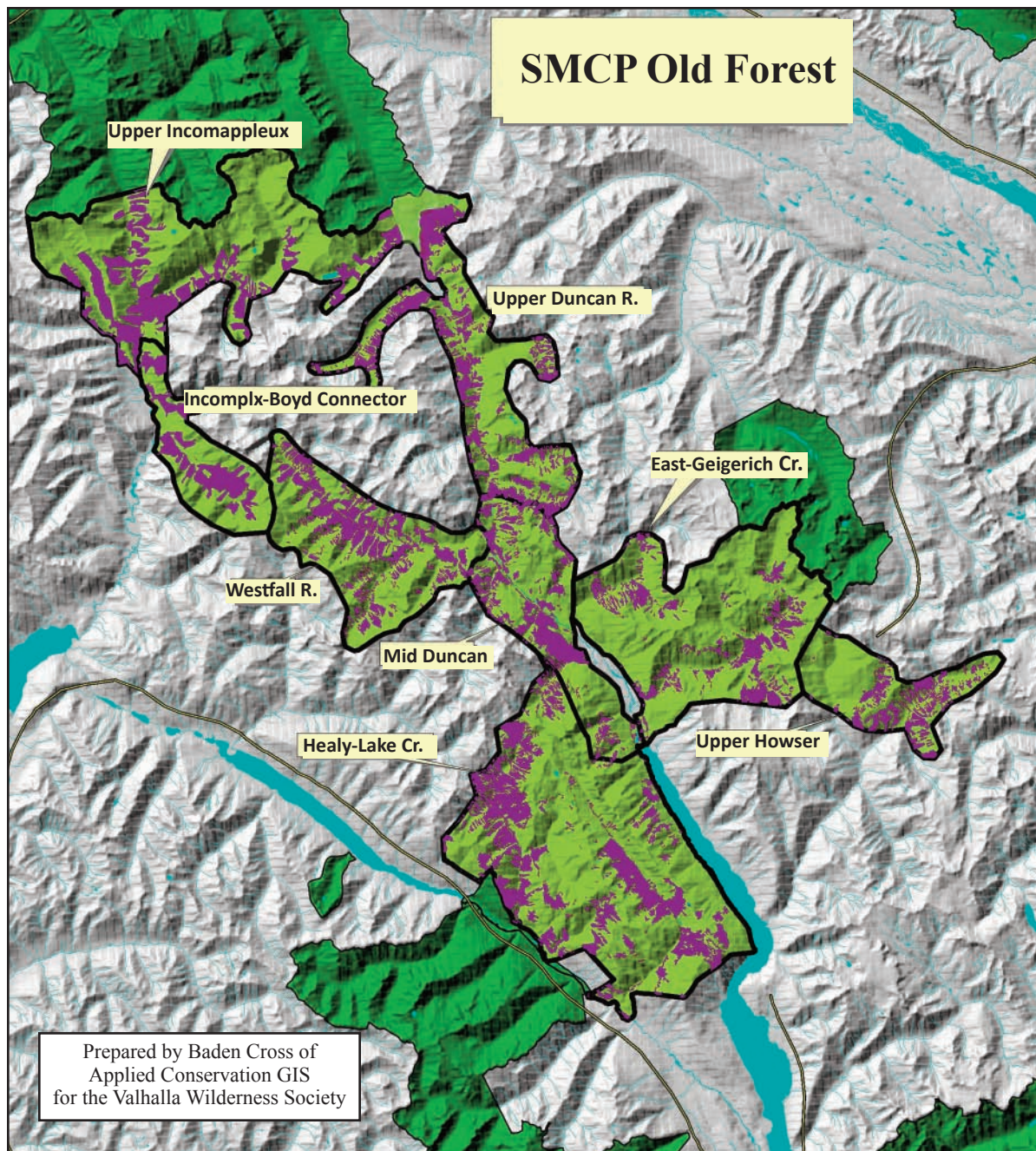


Craig Pettit

Pope & Talbot, went bankrupt, but there are five approved cutblocks within this magnificent forest. The cutting licence has been transferred to Interfor, a company notorious for its coastal logging on steep, unstable slopes.

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 intact quality of the area. Additional power development applications exist on McDougal, Kellie, Pool and Boyd Creeks — enough to devastate the bull trout that spawn in the river and tributaries.

This forest could be preserved for future generations of British Columbians by foregoing a mere 1,500 hectares of logging. If instead it is logged or developed for private power, no one will ever see the likes of this forest again.



### 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	8964	0	266	0	266	3830	1009	521
Upper Dun	16719	0	1043	1043	1043	4188	2078	279
East/Geig	26385	0	983	983	1283	2,277	8789	156
Healy/Lake	39452	0	1719	1719	3491	5398	8501	376
Westfall	16415	0	948	948	948	3498	4101	450
Mid Dun	13074	0	1782	1782	1908	1749	1591	704
Incomplx	27362	2997	0	2997	2997	2749	11824	54
Boyd Conn	8090	1301	112	1413	1413	971	2087	620
<b>Total</b>	<b>156461</b>	<b>4298</b>	<b>6853</b>	<b>10,885</b>	<b>13,349</b>	<b>24660</b>	<b>39980</b>	<b>3160</b>

## THE PARK PROPOSAL: DUNCAN WATERSHED

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 threatened bull trout, rainbow trout, kokanee, mountain whitefish, unidentified sculpin and long-nose dace. It is the major spawning route for bull trout, rainbow trout and kokanee salmon from Kootenay Lake. Houston Creek is almost completely intact, is a primary spawning ground for bull trout in Kootenay Lake and the Duncan River, and has heavily used game trails.



Craig Pettitt

### Westfall River

The Westfall River is a major tributary of the Duncan River with old-growth Inland Temperate Rainforest. Its middle section has been heavily logged on one side and partially logged on the other. But there are still extensive intact slopes of old-growth cedar-hemlock above the logging and sometimes going all the way down to the river. This is a major piece of intact wilder-



Gary Diers

ness that is very important to mountain caribou. It is very remote and has major problems with access for logging. It has been designated Ungulate Winter Range for mountain caribou. The Westfall River is one of the primary spawning grounds of the bull trout that inhabit the Duncan River and Kootenay Lake. There is a mineral lick heavily used by wildlife along the Westfall River.



Gary Diers

East Creek and Howser Spire in Bugaboo Park

### East and Giegerich Creeks

The East Creek and Giegerich Creek tributaries of the Duncan have never been roaded or logged. They were in the licence areas of Slo-can Forest Products and Meadow Creek Cedar for many years, but because of a barrier of steep slopes at the start, they were not economically accessible. They were classified as non-Timber Harvesting Land Base in the recent Mountain Caribou Recovery Plan.

Bull trout spawning has been recorded at the start of both creeks. Mountain caribou census data show mountain caribou in Giegerich Creek. Both of these creeks have spectacular old-growth cedar-hemlock forest. Due to difficulty of access, these forests have not yet been scientifically surveyed for lichens and other biodiversity.

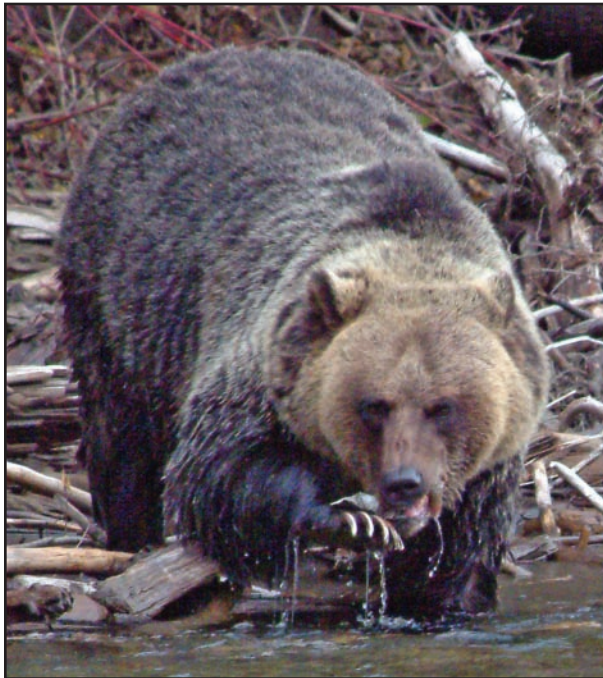
These valleys are prized by wilderness explorers. Both Giegerich and East creeks are visited by cross-country hikers. Both creeks connect to Bugaboo Provincial Park, providing ecosystem completeness to this mountaineers' park. A long hike up East Creek yields spectacular scenery from Bugaboo Park.

## THE PARK PROPOSAL: LARDEAU WATERSHED

The Lardeau River is the most developed of the four rivers in the park proposal. A gravel road that is easily accessible to passenger cars is adjacent to the upper part of the river, bringing increasing homes and farms. But the Lardeau is the only river feeding into Kootenay Lake that is not blocked by dams, thus it is very important to the ecosystem and to conservation. It has the only spawning grounds for the giant Gerard trout of Kootenay Lake, and the largest run of spawning kokanee salmon in the Columbia Basin. In the summer of 2010 there were 30 blue-listed Great Blue Herons on the Lardeau River and abundant bald eagles. Fifteen kilometres of the river are within the Goat Range Provincial Park.



James Bergdahl



Craig Pettit

The Selkirk Caribou Park Proposal would add only a small amount of protection to the shore of the river, but it would protect two major tributaries — Lake Creek and Healy Creek — in the Badshot Range between the Lardeau and Duncan Valleys. Much of this chunk of the Badshot Range is already designated as no-logging Ungulate Winter Range for caribou.

The Conservation Area Design by the Craighead Research Institute shows that the part of the Badshots within the park proposal is core wolverine habitat. Core habitat for wolverines is far more fragmented and uncommon in this region than core grizzly bear habitat. However, wolverines are seen in the valley-bottom every winter.

Grizzly bears come down from the Badshots and the Goat Range Park for berries and kokanee salmon in the Lardeau and Duncan Rivers. These bears are occasionally shot, and they desperately need what remains of their natural habitat.

The alpine is accessible by 4-wheel drive roads. 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. Researchers believe that high lichen diversity in spots on the Duncan River side of the Badshots may be the result of karst.



Anne Sherrad

*Accessible by 4-wheel drive, the spectacular alpine of Healy Creek offers easy cross-country hiking and sees many visitors every year.*

## MOUNTAIN CARIBOU HABITAT IN THE PARK PROPOSAL

Far too little is known about how mountain caribou use the park proposal because they inhabit dense, untracked forest. Census overflights are conducted, but these often occur in late winter when the caribou are in the open in the high elevation part of their habitat. There is question whether radio collar signals can be picked up from the dense forests and deep valleys that compose spring and early winter habitat.

We do know that one of the areas in the Selkirks that is used most intensively by caribou is outside the north-west boundaries of the Goat Range Park. Some of this area was in the original proposal for the park, but it was rejected by the government, designated as a Wildlife Management Area, and fragmented with clearcuts and roads.

It appears that historically the caribou travelled from there through the valleys of the Goat Range Park, to the present park proposal. They swam the Lardeau River and ascended the Badshots through the Healy Creek and Lake Creek drainages in this park proposal. These valleys connected to mountain passes, from which the caribou descended to the Duncan River through drainages such as Hall Creek. Every year mountain caribou or their tracks are still seen in all these areas and there was a recent sighting of one swimming the Lardeau River.



Gary Diers

*Lake Creek: These trees were omitted from caribou habitat protection. Can you find the person in the photo?*



Gary Diers



Jim Lawrence

**Numerous sightings of tracks or animals over many years suggest that mountain caribou use the Lake Creek tributary of the Lardeau River. The photos of old forest on this page were taken in Lake Creek. Despite some clearcutting near the river, Lake Creek is intact. Although part of it has burned, burns do not affect mountain caribou like clearcuts. The Lake Creek old-growth was omitted from the Ungulate Winter Range, apparently to allow logging. But steep slopes have so far made access by road too expensive. Any logging in this valley would be in the heart of the Lardeau-Duncan caribou critical habitat and travel corridor and would likely be disastrous to the prospects for saving the animals.**

## BIODIVERSITY AT RISK: LICHENS IN THE PARK PROPOSAL



Craig Pettitt

Lichenologists Toby Spribille and Curtis Björk.



Craig Pettitt

*Lobaria retigera* (Smoker's Lung Lichen)

Pioneering lichen surveys in the Incomappleux were carried out by Toby Spribille, a researcher from the University of Göttingen, Germany, and BC lichenologist Curtis Björk, in consultation with Trevor Goward, former curator of the UBC lichen collection. At that time most scientists believed that old-growth Interior Cedar Hemlock (ICH) forest was relatively low in biodiversity.

However, the Incomappleux researchers found a veritable explosion of biodiversity. They documented 283 species of lichens alone in the Incomappleux Valley — more than all the species of plants found in the Incomappleux put together. About 74% of the lichen species were found in the old-growth rainforest. A large number of them were “oceanic lichens” — usually found only near the coast. The oceanic lichens tend to be rare in the Interior, where they can live only because of the very wet conditions in the Inland Rainforest. The lichens of the Incomappleux include:

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

“This is by far the longest list of lichen diversity ever published in western North America for an area of comparable size,” says Spribille. “Such levels of lichen diversity and rates of discovery of new species are basically unparalleled in northern conifer forests — even in coastal temperate rainforest,” says 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 worked to identify 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). These species exist as encrustations on the trunks and branches of trees (see photo, right.)



Craig Pettitt

The liver-coloured lichen is *Nephroma occultum* — rare, COSEWIC species of concern, confined to old-growth Coastal and Inland Temperate Rainforest.

Toby Spribille

New to science: *Gyalecaria diluta*  
(originally *Pertusaria diluta*.)

## Why Should We Protect Lichens?

The upper Incomappleux and a few other places like it in BC are the closest thing we will ever have to a complete set of species that made up the primeval rainforests. The *Peltigera* on the right at top is one of many lichen species that fertilize the forest by taking nitrogen from the air and converting it to a form that the plants and trees can use. Researchers have reported up to 50% of the nitrogen input to Pacific Northwest forests coming from lichens.

Recognizing that lichens have a profound influence on ecosystems, do we need so many kinds? Yes, because different species have such profoundly different qualities. 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. Amongst hundreds of species of lichens, only these two form the vast 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. One small snail, the cone snail, living on coral reefs produces tens of thousands of chemicals. One of them provided a medical breakthrough that has brought pain relief to terminal cancer and AIDS patients not helped by other pain relievers. 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.

All the lichen species are part of the legacy of every generation of human beings. They hold profound secrets that are for future generations to discover, and some of them will undoubtedly be of immense value.



Anne Sherrad

Genus *Peltigera*

Craig Pettitt

Coral Lichen



Craig Pettitt

*Alectoria* and *Bryoria* hair lichens.

Toby Spribille

*Spilonemella americana*

Toby Spribille

*Pilophorus acicularis*

SCIENTIFIC RESEARCH DOCUMENTS EXTRAORDINARY BIODIVERSITY



Adolf Ceska

Noted mycologist Dr. Oluna Ceska.



Adolf Ceska

*Phaeocollybia piceae*

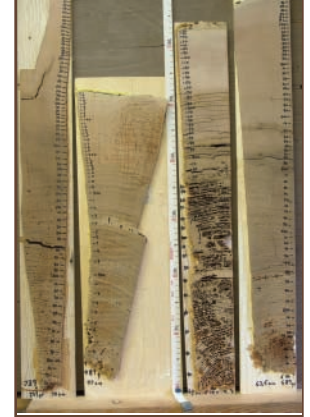


Juscha Grunther

Left to right: Viktoria Wagner, Dr. Adolf Ceska, Curtis Björk, Dr. Oluna Ceska

In 2003 a scientific team visited the upper Incomappleux old-growth. The team included lichenologist Toby Spribille (below) and botanist Viktoria Wagner from the University of Göttingen, Germany; BC lichenologist Curtis Björk; mycology expert Dr. Oluna Ceska; and Dr. Adolf Ceska, retired biologist for the BC Conservation Data Centre.

Oluna Ceska found several specimens of 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 in BC. Its only other location in BC was Carmanah.



Craig Pettitt

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, right :

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.



Mari Omori



Jason Hollinger



Jason Hollinger



Jason Hollinger

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.

This was similar to the results of the lichen surveys, in which roughly 75% of the 238 species were found in the antique rainforest. 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 allowed 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. The scientific team also found the Mountain Moonwort at right, a primitive fern that goes back to the melting of the glaciers and is found only in ancient cedar-hemlock forest.



Craig Pettitt

## BIODIVERSITY AT RISK: KELLIE CREEK WETLAND



Anne Sherrod

**ENDANGERED SPECIES:**  
Loesel's Twayblade orchid



Anne Sherrod

**This extensive wetland along the Incomappleux River contains red- and blue-listed plants. It is fed by Kellie Creek, which is threatened by a proposed private power development. Any such development on Kellie Creek could destroy the wetland by reducing its water supply.**

The park proposal includes a heavily logged section of the Incomappleux River. It has been included because it is in the very rare, very wet cedar-hemlock (ICHvk) zone, and still has over 1,000 hectares of old-growth left. It contains a very extensive wetland complex fed by Kellie Creek. Kellie Creek remains mostly intact except for the effects of wildfire. The park proposal includes part of Kellie Creek and Boyd Creek valleys, which provide vertical connectivity over the mountains and into the Duncan drainage.

The wetland consists of open sedge meadow, marsh, shrub carr, floating mats and open ponds with pond lilies. At a glance by a botanist, it contains one of the rarest orchids in Canada, Loesel's Twayblade (*Liparis loeselii*), as well as the Ochroleucous Bladderwort, *Utricularia ochroleuca* — a plant that traps insects — both red-listed, as well as the blue-listed beaked spikerush, *Eleocharis rostellata*. The orchid 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.

Vegetation on the clearcuts has drawn animals adapted to disturbed forest: black bears, deer, moose, elk, and their predators, the wolves. There are otters in the river and beavers. Visitors to the valley frequently see one or more of these species and are thrilled.



Anne Sherrod

**Pond lilies — an unexpected component of a rare, very wet Inland Temperate Rainforest. Below, a beaver by the road.**



Craig Pettitt

## BIODIVERSITY AT RISK: BULL TROUT POPULATIONS

The bull trout populations in the rivers and creeks of the park proposal are critical to fisheries in Kootenay Lake and Arrow Reservoir. The lakes are outside the park proposal. Fishing on these lakes is one of the major tourist attractions in the Kootenays. But the resident rainbow trout, bull trout and kokanee salmon need moving, well-aerated water to lay their eggs, which occurs in the headwater streams and rivers.

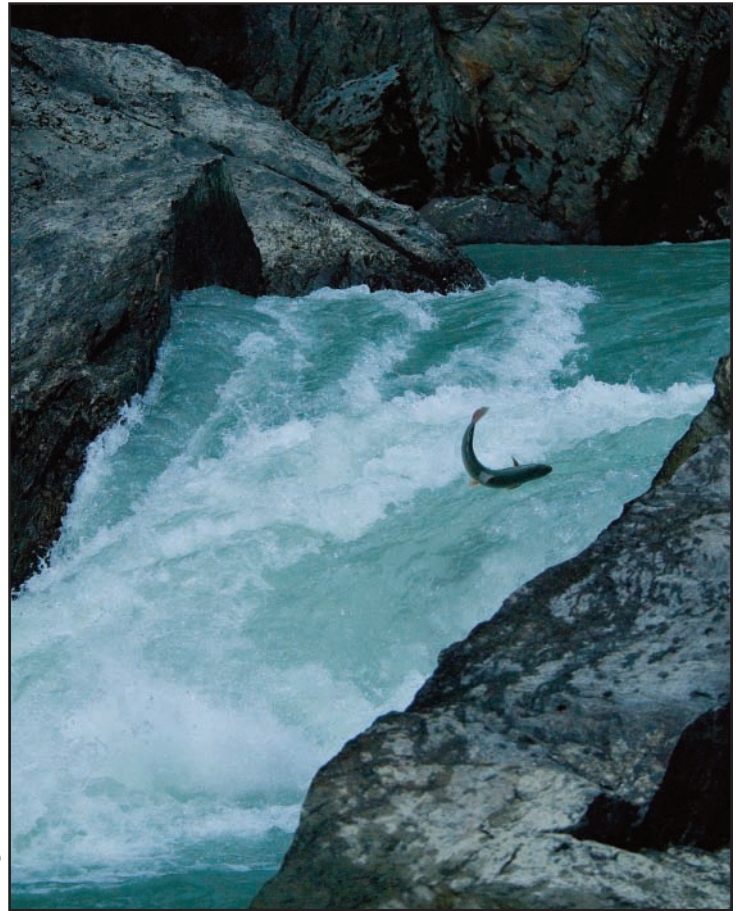
Bull trout are found throughout the park proposal. In the U.S. They are classified as endangered (“red-listed”). In BC they are blue-listed. They need very cold spawning waters within a narrow temperature range, often near springs that feed very cold water into the creeks and rivers.

The waters of the glacier-fed Incomappleux and Duncan Rivers are very cold. Streams that are opaque due to glacial silt are favoured by bull trout. Their opacity may make their water more resistant to temperature change due to climate change.

A study for the Columbia Basin Fish and Wildlife Compensation Program (CBFWCP) estimated that 500 bull trout migrated from Kootenay Lake, through the Duncan Dam and up the Duncan River in 1996 (O’Brien 2001). The major destinations were the mainstem upper Duncan (34.6%), Houston Creek (30.8%), and the Westfall River (23.1%), Giegerich Creek attracted 7.7% of the radio-tagged group of migrants. All these spawning areas are in the park proposal.

Another study by the CBFWCP estimated there were 7,500 catchable-sized bull trout in the Arrow Lakes Reservoir (Sebastian et al. 2000). The annual harvest averages about 1,000 individuals (Arndt 2004).

In 2004-06 the CBFWCP study found only five tributary watersheds of the Arrow Lakes that had relatively abundant juvenile bull trout. The Incomappleux watershed was the second most important bull trout spawning and rearing area. It had 17% of the bull trout spawning sites (“redds”) and 26% of the juvenile bull trout counted in tributaries to the ALR (Decker and Hagen 2007). 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 Creeks.



Craig Pettitt

**Bull trout hurl themselves up this formidable rapids in the Incomappleux River. Its competitors, rainbow trout, cannot make it, nor can mountain whitefish. This makes the Incomappleux very important for bull trout production and the second largest contributor of bull trout to the Arrow Lakes Reservoir fishery.**



Craig Pettitt

**The Incomappleux, Duncan and Lardeau Rivers all have runs of kokanee salmon, 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. They also fertilize the forests through the high-nitrogen droppings of animals such as bears.**

## HYDRO DEVELOPMENT THREATENS FISHERIES

Despite millions spent and decades of vigorous efforts to recover fisheries from the devastating impacts of dams, applications for independent power projects (IPPs) were invited and accepted for review without any regard whatsoever for the fish. For bull trout, continued efforts at conservation may be meaningless if the government approves IPP applications on Howser Creek (a tributary of the Duncan River), and on Incomappleux River and several of its tributaries.

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. Each lake once had its own genetically unique form of giant rainbow trout. The Duncan dam wiped out the giant trout in that system, and the Revelstoke Dam played a large role in wiping out the yellow-fin rainbow trout of the Arrow Lakes.

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.

Since then millions of tax dollars and funds from the dams have been spent to restore the fisheries. In the six years from 2003-04 to 2008-09, the Columbia Basin Fish and Wildlife Compensation Program spent \$11.87 million on fisheries restoration, most of it on fertilization programs to compensate for nutrients blocked by the dams. (CBFWCP Annual Reports, 2003-04 to 2008-09.)

However, little heed has been paid to protecting the natural ecosystem from additional harm. Logging has destroyed considerable spawning habitat on rivers and creeks in the park proposal and elsewhere, 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 park proposal 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 five 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, like the Lardeau River, is not blocked by dams, unlike the Westfall and Duncan. It is bringing precious natural nutrient flows into the nutrient-starved Arrow Reservoir that don't have to be bought by taxpayers' dollars, as well as providing 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...”**

## EXTERMINATION LOGGING OR A PARK?

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, in one of the most important areas for mountain caribou. Loggers ran protesters off the road with their trucks and 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 then pulled out because it wasn't making money. Landslides have since closed the road, no doubt silting up the river. One day this will be viewed as barbarian by a generation that recognizes the enormity of the role these forests and this river play in the survival of all life on Earth.

Anne Sherrod



Critical old-growth in this park proposal not covered by the mountain caribou Ungulate Winter Range is at risk. 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 and only the expense of building road over one steep section keeps it from doing so. BC Timber Sales is proposing to contract out a strip of forest along Duncan Lake.

The Ungulate Winter Range is also at risk. Already the government has been quietly allowing companies to trade poor quality forest in their licence areas for better quality forest that had been declared protected for mountain caribou. And miners could get a permit to drive a road pretty much anywhere they like, just speculating to raise money

on the stock exchange.

Alternatively, the governments of BC, or of Canada, could recognize that it's time to stop the destruction of this profoundly important ecosystem. One or both governments could take this opportunity to implement the BC Auditor General's recommendations on connecting our parks to protect biodiversity.

This report represents the work of many people, including professional biologists and technical specialists who have donated the field studies, mapping and research to present to the government scientific reasons and ways to do this. We don't doubt that the BC or federal government could find within itself the willingness to leave a grove of big trees for tourists to look at. But the urgent necessity is to protect the area as a functioning ecosystem, which means protecting the species that live there. In doing that, we will be protecting future generations of human beings and leaving our children a better world.



Toby Sprittle and Wayne McCrory

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